FLOOD HAZARD AREA DELINEATION

CITY PARK CHANNEL UPSTREAM OF MAIN STREET AND CITY PARK CHANNEL SOUTH TRIBUTARY

MILE HIGH FLOOD DISTRICT

Mile High Flood District (MHFD)

City and County of Broomfield

Prepared by:

LOEWEN Engineering Inc.

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JANUARY 2023

January 2023

Ms. Brooke Seymour
Planning and Floodplain Management Director
Mile High Flood District
2480 W. 26th Avenue Suite 156-B
Denver, Colorado 80211

Subject: City Park Channel Upstream of Main Street and City Park Channel South Tributary
Flood Hazard Area Delineation
MHFD Agreement No. 19-02.10

Dear Ms. Seymour:

Loewen Engineering, Inc. is pleased to submit this *Flood Hazard Area Delineation – City Park Channel Upstream of Main Street and City Park Channel South Tributary,* dated August 2022. We would like to acknowledge the help and support of the City and County of Broomfield (CCOB) in preparation of this study. Enclosed is the Flood Hazard Area Delineation (FHAD) Report for the City Park Channel Upstream of Main Street and City Park Channel South Tributary. This report documents the FHAD study process from initiation through completion of the final floodplain and floodway delineations. A summary of the project history, description of the study area, field inventory of hydraulic structures, summary of hydraulic analysis, and HEC-RAS water surface profile computer modeling results for the 10-, 50-, 100-, and 500-year storm events, and determination of the 0.5-foot floodway are provided in the following report.

The floodplain and floodway information provided herein should assist the Mile High Flood District (MHFD) and CCOB in administration of new and existing development in the areas prone to flooding.

Thank you for the opportunity to complete this project.

Regards,

Loewen Engineering, Inc.

COLORADO LICENSED DANIEL PAUL LOEWEN 0051819 1/18/23 PROFESSIONAL ENGINEER

Daniel P. Loewen, P.E. Principal

Elysa M. Loewen, P.E. Principal

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MEETING MINUTES

FHAD Kickoff Meeting	March 04, 2019
Model Comment Review Meeting #1	October 02, 2019
Model Comment Review Meeting #2	April 09, 2020
South Tributary Modeling Approach Meeting	August 31, 2020
Model Comment Review Meeting #3	June 09, 2021

SUBMITTALS

Model submittal Memo	*May 6, 2019*
South tributary Cross Sections	*June 21, 2019*
Model submittal Memo/Comment Response	*Updated August 5, 2019*
Model submittal Memo/Comment Response 2020	*Updated January 15,*
Model submittal	*March 20, 2020*
South Tributary Layout Submittal	*July 9, 2020*
Model submittal City Park Channel for 800 Hoyt	*July 27, 2020*
Model submittal	*August 9, 2020*
Model submittal	*September 1, 2020*
Delineation Exhibit Submittal	*December 18, 2020*
Delineation Exhibit 2nd Submittal	*January 20, 2021*
Model Submittal Memo/Comment Response	*May 24, 2021*

Appendix B Hydrologic Analysis Supporting Documents

City Park and 3207 Drainageways Outfall Systems Planning Study, Kiowa Engineering Corporation, June 2006
City Park Channel and Nissen Creek LOMR (15-08-0180P-085073)
City Park Channel Floodplain Modification Study & LOMR Request Report – JVA Consulting Engineers 2018

Appendix C Hydraulic Analysis Supporting Documents

Existing Hydraulic Structures Sections and Photographs
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1. INTRODUCTION

1.1 Authorization

On March 21, 2019, the Mile High Flood District (MHFD) contracted with Loewen Engineering, Inc. for the engineering services for a Flood Hazard Delineation (FHAD) Study for the City Park Channel Drainageway. Specific study tasks were performed in accordance with Agreement Number 19-02.10, Project Number 107576.

1.2 Purpose and Scope

The purpose of this FHAD study is to provide updated hydraulic information for the City Park Channel and the South Tributary. The study includes the upper reach of the City Park Channel, the reach downstream of Main Street was recently updated as part of a Letter of Map Revision (LOMR Case No. 15-08-0180P). The effective Flood Insurance Study (FIS) for the study reach was based on the 1979 FHAD, therefore with this update, the entire 1979 FHAD will be considered historic information. The area of the City Park Channel Basin tributary to this study area (Upstream of Main Street) is approximately 2.05 square miles. The project upstream study limits remained at the existing effective floodplain boundary northwest of Compton Street. The City Park Channel downstream project limits included the culvert at Main Street and 850 feet downstream of Main Street to tie into the effective information.

The scope of this FHAD study is as follows:

1. Assemble information on the existing drainage system including hydraulic structures (bridges and culverts), channel characteristics, and topographic information. The information was gathered by others under a separate agreement.
2. Define the water surface profiles for the 10-, 50-, 100-, and 500-year flood events based on Future conditions hydrology and land use and existing conditions infrastructure; since the watershed is near fully built out, the future conditions equal existing conditions. The 25-year event was not included in the FHAD.
3. Define the flood boundaries for the 100-year and 500-year floodplains including 0.5-foot floodway.
4. Document the study results in the FHAD Report.

The project scope was amended on June 20, 2019, by Agreement No. 19-02.10A. The amendment increased the study area to include the South Tributary from Nickel Street to the confluence with City Park Channel near Emerald Park. The project scope was amended on November 23rd, 2019, by Agreement No. 19-02.10B; the additional scope as part of this amendment included the following scope items:

- Loewen Engineering, Inc. to perform a site visit of the Concrete Plant at the upstream limits, and
- Loewen Engineering to perform an investigation of the storm sewer at 3rd Avenue and Nickel Street.

The project scope was amended on April 17, 2020, by Amendment 19.02-10C to include additional survey for the US-287 overtopping flow path.

The project scope was amended on November 18, 2020, by Amendment 19-02-10D to include 2D modeling for the left overbank of the South Tributary to identify shallow flooding impacts.

The project scope was amended on June 23, 2021, 19.02.10E to include an extension of the model downstream of Main Street and additional modeling effort for spill and split flows at Agate Way and Highway 287 overtopping.

The project scope was amended on November 30, 2021, to obtain additional survey related to the finished floor elevation and lowest adjacent grade for structures preliminarily identified in the flood hazard area.

1.3 Planning Process

The City Park Channel Watershed was previously studied by Kiowa Engineering Corporation in the 2006 study, “City Park and 3207 Watersheds Outfall Systems Planning (OSP) Study” for the City and County of Broomfield, City of Westminster and MHFD (formerly Urban Drainage and Flood Control District). Additionally, a Letter of Map Revision LOMR Case No. 15-08-0180P prepared by RESPEC effective November 27, 2015, which updated the hydrology of the basin and hydraulics for City Park Channel downstream of Main Street.

The specific goals and objectives for the FHAD include redefining the effective flood maps for the drainage channel to adhere to current floodplain criteria and updated topography to identify current flood risks for the community.

A total of six progress meetings were held throughout the course of this study. The meetings included all project sponsors and were held on March 4, 2019, March 7, 2019, October 2, 2019, March 9, 2020, and August 31, 2020, and June 09, 2021. Refer to Appendix A for Minutes for each of the listed meetings.

1.4 Mapping and Surveys

The drainageway mapping consists of one-foot contours base on LiDAR flown in 2017 (NAVD88) provided by the City and County of Broomfield. Ground survey was performed at the crossing (bridge/culvert) locations by Wilson & Company in March 22,2019. Additional ground survey was obtained by Daley Land Surveying Inc. to include curb and gutter flow line elevations along Agate Way (Dated April 28, 2020) and additional topo survey for the Highway 287 flood overflow path (Dated April 30, 2019). Further ground survey of additional structures throughout the project reach was completed by Daley Land Surveying, Inc. in September of 2021. All geospatial data is based on the North American Datum of 1983 (NAD83) and the North American Vertical Datum of 1988 (NAVD 88). See Section 1.5: References for a complete list of digital data obtained.

1.5 Data Collection

Besides the mapping discussed in Section 1.4, several sources of data from other concurrent projects have been collected to provide additional information. A complete list of each item is provided in Section 5. Table 1 includes a summary of the types of information collected and Figure 1 shows the location of the additional survey collected.

Table 1: Data Collected Table

Survey Location Map No. (See Figure 1)	Data File Type	Title	Date	Author
1	.csv POINT FILE/CAD	Broomfield Floodplain SPC 502_09-23-2021	September 2021	Daley Land Surveying, Inc.
2	CAD File	As-Built CAD Survey File for the Emerald Park Improvements	October 2020	Daley Land Surveying, Inc.
3	.csv POINT FILE/CAD	Agate Way Survey	April 2020	Daley Land Surveying, Inc.
4	PDF	Nickel Street Floodplain Development Permit Hydraulic Report	June 2019	Otak, Inc.
NA	PDF	Bridge and Culvert Structure Mapping	March 2019	Wilson& Company
5	.csv POINT FILE/CAD	Additional topo survey for the US-287 flood overflow path	April 2019	Daley Land Surveying, Inc.
6	CAD	Muller Culvert Project Downstream of HWY 287	March 2019	Muller Engineering Company
7	PDF	LOMR 18-08-0246 As-Built PDF files for Emerald Elementary Reconstruction Project	October 2017	JVA Consulting Engineers
NA	PDF	City Park and 3207 Drainageways Outfall Systems Planning Study	June 2006	Kiowa Engineering Corporation
NA	PDF	City Park Drainageway – Emerald Street to Midway Boulevard	October 2005	McLaughlin Rincón
NA	PDF	Broomfield and Vicinity Outfall Systems Planning Study – Alternatives Development and Evaluation Report	September 1999	Kiowa Engineering Corporation
NA	PDF	Broomfield City Park Drainageway Improvements (As-Builts)	October 1986	EHMG Engineers-Consultants
NA	PDF	Flood Hazard Area Delineation – Broomfield Area	June 1979	Wright-McLaughlin Engineers

1.6 Acknowledgements

The following individuals from the Mile High Flood District and City and County of Broomfield have attended the progress meetings, and given input to the study:

Brooke Seymour	Mile High Flood District
Brik Zivkovich	Mile High Flood District
Hung-Teng Ho	Mile High Flood District
Dan Hill	Mile High Flood District
Rebecca Baker	City and County of Broomfield

The following individuals from **Loewen Engineering, Inc.** contributed to this study:

Daniel Loewen, P.E.	Principal/Project Manager
Elysa Loewen, P.E.	Principal/Project Engineer
Kyli Doke, E.I.T.	Engineer II

Refer to Appendix A for more detailed information on meetings, attendance, and comment letters.

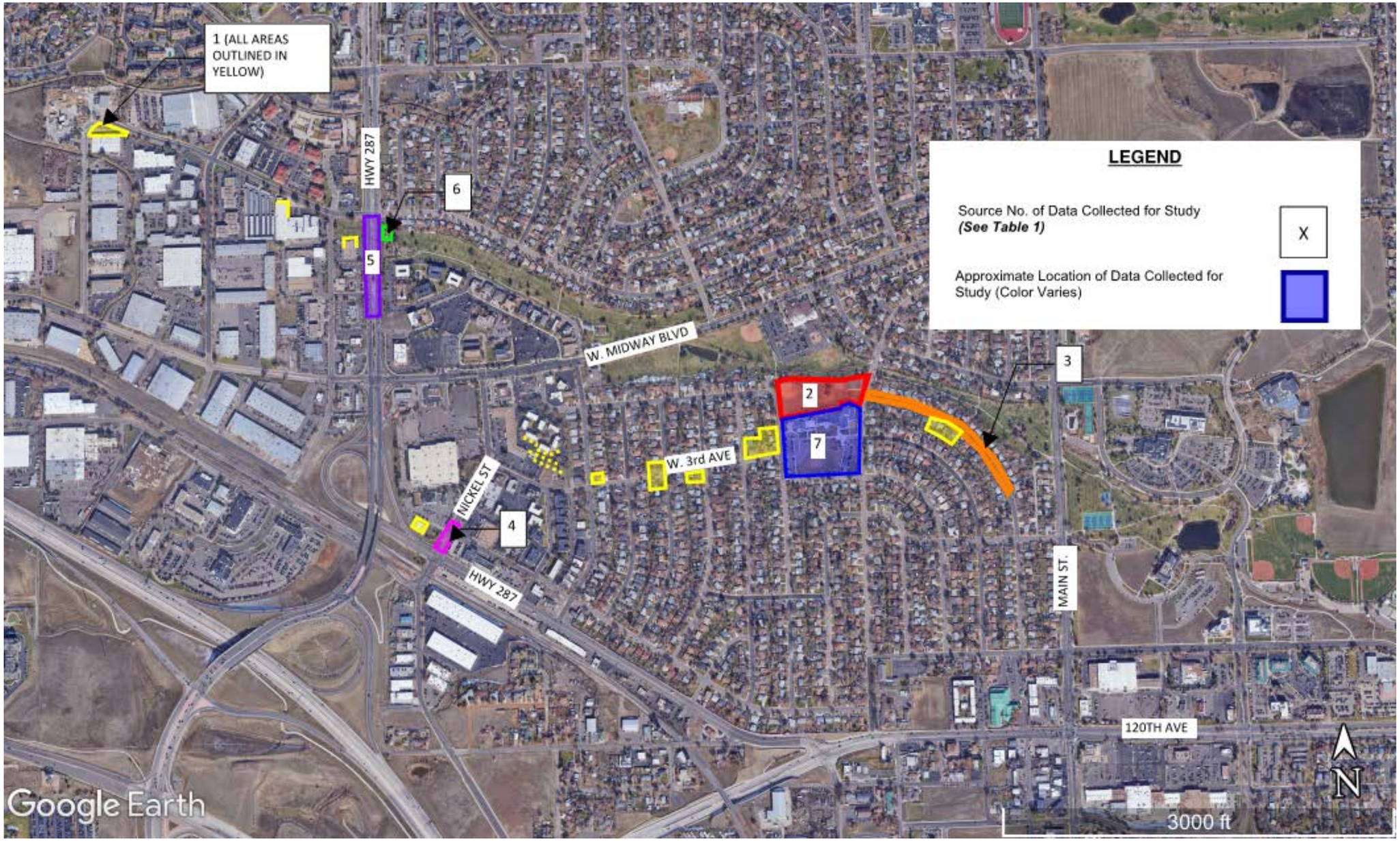


Figure 1: Data Collection Exhibit (Additional Survey Locations)

2. STUDY AREA DESCRIPTION

2.1 Project Area

The study area includes the upper reach of the City Park Channel which extends from Main Street to the upstream limits of the City Park Channel, which is northwest of Compton Street at the limits of the existing effective floodplain boundary (see Figure 7). The South Tributary study limits include the full extents of the flooding source from the confluence with the City Park Channel to the upstream limit at 120th Avenue and Nickel Street. The project study area is completely within the City and County of Broomfield and fully within the Mile High Flood District (MHFD) boundary. The City Park Channel Watershed is 4.8 square miles in size. Per the 2006 OSP, slopes along the drainageway range from 0.5% to 3%. The low point of the project area is 5324' and the high point is 5420'.

The downstream limits of the study area begin approximately 850 feet downstream of Main Street, the study area was extended downstream of Main Street to achieve tie-in to effective data. From the downstream limits moving upstream, City Park Channel travels through open channel greenbelt within the City and County of Broomfield. The City Park Channel crosses Emerald Street where its confluence with the South Tributary is located adjacent to Emerald Park. Upstream of the confluence the channel continues upstream through South Midway Park and crosses Midway Boulevard and travels upstream through North Midway Park and crosses Highway 287 (Wadsworth Boulevard) and crosses West 6th Avenue and runs adjacent to the West 6th Avenue past Compton Street until it reaches the upstream project limit.

A Hydrologic assessment is not included in this FHAD as the land use within the watershed has experienced little change since the 2006 OSP. The City Park Channel is mostly developed, approximately 83% of the City Park Channel Watershed developed into Residential (Large Lot or Single Family), Multi-unit Residential, Schools, Transit, Industrial or Commercial in the existing conditions and approximately 87% in the estimated future conditions per the 2006 OSP.

The predominant soil type in the watershed is Nunn Clay loam, 1 to 3 percent slopes NuB and Nunn Clay loam, 3 to 5 percent slopes; both soil types are of Hydrologic Soil group C as defined by the NRCS soil survey Boulder County Area (CO643). Group C soils are defined[1] "Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission". Group C soil type was used in the 2006 OSP hydrologic analysis. The Soils Map and associated information is in Appendix B.

[1] United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)

2.2 Land Use

Land use information was obtained from the 2006 OSP Study. When existing and future impervious values were compared, little change with land use and percent developed imperviousness was identified as the basin is mostly developed. The study area can be categorized as outlined in Table 2 which categorized the land use and the associated ranges in uniform impervious area. The City Park Channel is estimated to have approximately 79% to 83% of the total watershed having a uniform imperviousness of 40% or greater. The land use is summarized in Table 2 and shown on the Existing Imperviousness and Future Imperviousness Maps prepared for the 2006 OSP are included in Appendix B. The approximate percent of total watershed area was measured and summarized by Loewen Engineering, Inc in Table 2.

Table 2: Land Cover Summary of City Park Basin

Land Use Category	Uniform Percent Imperviousness (2006 OSP)	Approximate Percent of Total Watershed Existing Conditions (2006 OSP)	Approximate Percent of Total Watershed Future Conditions (2006 OSP)
Open Space Park and Land	2%	7%	5%
	7%	10%	8%
Large Lot residential	10%	4%	4%
Single Family Residential	40%	30%	29%
	42%	4%	4%
	45%	0%	0%
Multi-unit Residential and School	50%	3%	3%
	70%	12%	12%
Transit/Industrial	80%	19%	22%
Commercial	90%	10%	12%

2.3 Reach Description

The study reaches of the City Park Channel are outlined below and shown on the Project Area Map (Figure 7). The reach designations listed below are based on changes in channel type or surrounding land use. These reach designations differ from the reaches in the hydraulic model as the hydraulic model only contains three reaches, City Park Channel downstream of the South Tributary confluence, City Park Channel upstream of the South Tributary confluence, and City Park Channel South Tributary.

2.3.1 City Park Channel Reach 1

Reach 1 begins 850-feet downstream of Main Street and ends at Midway Boulevard, approximately 4,000-feet in total length. This reach includes the crossings at Main Street and Emerald Street as well as two pedestrian bridges, one between Main Street and Emerald Street and the other between Emerald Street and Midway Boulevard. Reach 1 is characterized by a confined floodplain through a developed residential area with a constructed channel consisting of various armoring such as grouted boulder drop structures and grouted boulder channel edging (Figure 2). An undersized culvert at Emerald Street creates inundation of the adjacent Agate Way residential street which poses flood risk to existing residential structures.

Figure 2: CPC Reach 1 Channel Cross Section Photo

2.3.2 City Park Channel Reach 2

Reach 2 begins at Midway Boulevard and ends at Highway 287, approximately 2,600-feet in total length. This reach includes numerous low flow pedestrian crossings and a park driveway culvert directly downstream of Highway 287. Reach 2 is characterized by a linear bluegrass park with constructed concrete low flow channel with several low flow grade control structures (Figure 3). The culvert at Highway 287 is sufficiently undersized and poses flood risk to adjacent properties due to the nature of overtopping flows.

Figure 3: CPC Reach 2 Channel Cross Section Photo

2.3.3 City Park Channel Reach 3

Reach 3 begins at Highway 287 and ends at the upstream extent of the floodplain, approximately 3,000-feet in total length. The reach includes several culvert crossings at existing roads and driveways. Reach 3 is characterized as a fully developed area with a mix of residential, commercial, and industrial. The channel is well defined with a concrete lined channel before reaching a concrete batch plant and undefined channel on private property at the most upstream limit (Figure 4).

Figure 4: CPC Reach 3 Cross Section Photo

2.3.4 City Park Channel South Tributary

City Park Channel South Tributary begins at the confluence with the City Park Channel and ends at the upstream extent of the floodplain at the intersection of 120th Avenue and Nickel Street, approximately 4,000-feet in total length. The downstream section of the reach is an undefined flow through Emerald Park. Upstream of the park the flow path is defined by West 3rd Avenue through a residential area (Figure 5). Upstream of the residential area the flow path transitions to Nickel Street. There is no defined drainage channel within this reach. The lack of a defined channel and overall stormwater infrastructure poses flood risk to adjacent properties.

Figure 5: City Park South Tributary Cross Section Photo

2.3.4.1 Flow Splits

The South Tributary has a flow split located just downstream of Nickel Street and 3rd Avenue via storm sewer discharging 100 cfs to the City Park Channel at the pond near South Midway Park. The flow split is defined by an area inlet (Figure 6) in the commercial shopping center parking lot connected with 48-inch RCP capable of passing 100 cfs based on the ground slope above the pipe. See hydrology and hydraulic sections in this report for location of flow subtraction from the South Tributary reach.

Figure 6: Grate Inlet in South Tributary Shopping Center

A Summary of all the major crossing's location, reach and type/size in the project area are in Table 3.

Table 3: Major Crossing Structure Inventory Table

Major Crossing Structure Inventory Table		
Flooding Source	Street/Location	Type/Size
City Park Channel	Main Street (Crossing #19)	Culvert - (2) 21'x4' RCBCs
City Park Channel	Pedestrian Bridge 600-ft upstream of Main Street (Crossing #18)	Bridge
City Park Channel	Emerald Street (Crossing #17)	Culvert - 13'x4.3' RCBC
City Park Channel	Pedestrian Bridge 650-ft upstream of Emerald Street (Crossing #16)	Bridge
City Park Channel	Midway Boulevard (Crossing #14)	Culvert - (2) 4.96'x3.71' HERCP, (1) 36" CMP
City Park Channel	Park Access Drive (Crossing #20)	Culvert - 4.5' RCP
City Park Channel	Highway 287 (Crossing #7)	Culvert - 4'x3' RCBC
City Park Channel	W. 6th Ave (Crossing #6)	Culvert - (2) 10'x2.5' RCBC
City Park Channel	Burbank Street (Crossing #5)	Culvert - (2) 10'x2.5' RCBC
City Park Channel	Business Access Drive (Crossing #4)	Culvert - (2) 8'x2.75' RCBC
City Park Channel	Business Access Drive (Crossing #3)	Culvert - (2) 8'x2.75' RCBC

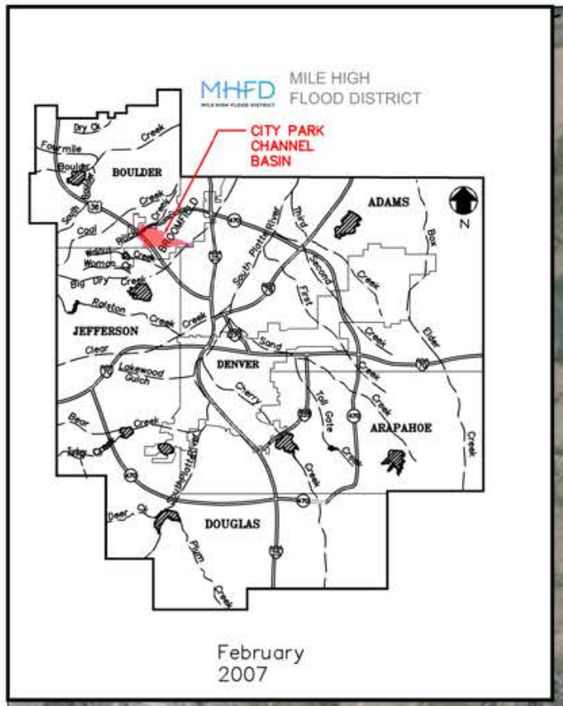
2.4 Flood History

Historic information regarding major flooding events along the City Park Channel was not identified through research and discussion with City and County of Broomfield staff. It was noted that Spader Way overtops frequently in minor 2-5-year storm events, which is located near the downstream limits of this study. Some minor improvements done by City and County of Broomfield to the inlets in this area have improved these conditions.

Other improvements have been made downstream and outside of the study limits at Lowell Boulevard crossing to improve drainage during flooding events.

2.5 Environmental Assessment

The wetland areas were identified and mapped as part of the 2006 OSP prepared by Kiowa Engineering Corporation. The inventory of wetlands within this study area identified wetlands just upstream and downstream of US-287, and along the channel downstream of Midway Boulevard and upstream of Emerald Park. The Wetland Inventory Maps for the City Park Basin are included in the 2006 OSP.



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PREPARED FOR:
MHFD
MILE HIGH FLOOD DISTRICT

CITY AND COUNTY OF BROOMFIELD COLORADO

VERIFY SCALE:
BAR IS ONE INCH
ON ORIGINAL
DRAWINGS

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

CITY PARK CHANNEL
FLOOD HAZARD AREA DELINEATION

#	DATE	DESCRIPTION	INITIALS

DATE
DEC 2022

SHEET

FIGURE 7–PROJECT AREA MAP

3. HYDROLOGIC ANALYSIS

3.1 Overview

An update to the hydrology was not included as part of this Flood Hazard Area Delineation (FHAD). This section summarizes the hydrologic analysis from previous studies implemented into this FHAD. Excerpts from previous studies have been included in Appendix B to provide further detail. In summary, a hydrologic analysis was performed in 2006 as part of the 2006 Outfall Systems Planning (2006 OSP) study performed by Kiowa Engineering. The hydrology was updated as part of Letter of Map Revision (LOMR 15-08-0180P) prepared by RESPEC Engineering Consultants which resulted in an updated hydrologic model for the entire basin using the 2006 OSP as a basis for the update. For the 2015 LOMR update to the hydrology EPA SWMM was used to develop runoff hydrographs. Per the 2006 OSP/2015 LOMR, SWMM channel routing was done utilizing the individual sub-watersheds and the drainage system was modeled using a series of channels and direct flow elements. The updated hydrology performed by RESPEC was done using a converted version of the 1999 Urban Drainage Stormwater Management Model (UDSWMM).

3.3 Design Rainfall

The design rainfall for this study area is from the 2015 LOMR which was specified by Chapter 2 of the USDCM. The rainfall distributions for the 500-, 100-, 50-, 10-, 5-, and 2-year storm events as show in Table 4. The Storm Hyetograph is included in Appendix B. No area adjustment factors were applied because the watershed was less than 5 square miles in size.

Table 4: Design Rainfall Summary (From 2006 OSP)

Event	2-Hour Point Rainfall (in)
2-year	1.12
5-year	1.62
10-year	1.94
50-year	2.77
100-year	3.13
500-year	3.39

3.2 Previous Studies

A Flood Hazard Area Delineation (FHAD) study for the City Park Channel and Nissen Reservoir Channel Watershed was prepared by Wright-Mclaughlin Engineers on behalf of the Mile High Flood District, MHFD (formerly Urban Drainage and Flood Control District, UDFCD) in June 1979 (1979 FHAD). An Outfall Systems Planning (OSP) Study was completed in 1985 prepared by Greenhorne & O'Mara on behalf of MHFD which references the 1979 FHAD study. A second OSP was completed in 1999 which updated an error in the 1979 hydrology resulting in flows to increase in the City Park Channel and 3207 Watershed (also known as the Nissen Reservoir Drainageway) based on a portion of the watershed not being linked to the downstream receiving waters. An Outfall Systems Planning (OSP) Study performed for the City Park and 3207 (Nissen Reservoir) Drainageways for the City and County of Broomfield, and City of Westminster on behalf of MHFD in 2006 by Kiowa Engineering Corporation (2006 OSP) which analyzed and updated the existing hydrology from the 1979 FHAD. Two Letter of Map Revisions (LOMR) were prepared since the OSP was issued. LOMR 15-08-0180P was performed by RESPEC Engineering Consultants in 2015 (2015 LOMR) which updated the hydrology from the 2006 OSP. The most recent LOMR was prepared by JVA Consultants for the Emerald Elementary Project (LOMR 18-08-0246P) effective March 2019 which resulted in no changes to the watershed hydrology.

3.4 Sub-watershed Characteristics

3.4.1 Sub-watershed Delineation

A total of 36 sub-watersheds were delineated in the entire City Park Channel watershed as part of the 2006 OSP of which 15 sub-watersheds drain to the study area included in this FHAD. Per the 2006 OSP watersheds were compiled from the UDSWMM model for the 1985 outfall systems plan. Watershed boundaries were verified by project mapping and field confirmation. Minor changes were made to the sub-watersheds from the previous studies to show existing drainage and peak flows more accurately at key design points. Sub watersheds ranged from 5.6 acres to 125.3 acres in size with an average size of 48.9 acres.

3.4.2 Watershed Imperviousness

Watershed imperviousness was determined by the 2006 City Park Drainage Planning Study, which conducted a land cover study for current and future developments. The future development map was used in the creation of the impervious conditions. The basin's impervious characteristics are summarized in Table 2.

3.5 Hydrograph Routing

Hydrograph routing was performed using EPA SWMM software for the 2015 LOMR. The drainage system comprised of channel elements and direct flow elements were modeled in the software. Channel input parameters includes length, slope, cross-sectional geometry, and roughness coefficient. Channel elements were modeled using data from topographic project mapping of the study area and storm sewer pipes size and location were compiled from utility maps at the time of the 2006 OSP along with some field inspections. The channel geometry elements were modified by the 2015 LOMR to correct errors that occurred from conversion from the previous UDSWMM model. Routing was also modified in the 2015 LOMR to remove flow splits in the routing to be modeled in hydraulic analysis outside the study limits of this FHAD. As discussed previously, hydrograph routing was not modified for our study but based on the results of the hydrology contained in the 2015 LOMR.

Detention Facilities

Three detention facilities are in the study area of the City Park Drainageway; these detention facilities were modeled in the 2015 LOMR and are summarized from the previous study in Table 5.

Table 5: Summary of Detention Facilities in Project Area (2006 OSP)

Detention Facility No.	Location	100-year Volume (Ac-ft)	100-year Flow - IN (cfs)	100-year Flow - Out (cfs)
No. 301 (Public)	City Park Channel and Hwy-287	3.7	1196	1112
No. 304 (Public)	120th Avenue and Hwy 287	5.3	361	315
No. 308 (Private)	US-36 and Hwy-287	7.6	252	42

3.7 Results of Analysis

Hydrologic analysis was performed in previous studies to estimate the 10-, 50-, 100- and 500-year peak flows for this watershed. The resulting peak flows from the hydrology study (2015 LOMR) was used in our hydraulic analysis. As discussed previously, this FHAD did not re-evaluate or update the hydrology. Since the basin is mostly developed, existing conditions and future conditions are considered the same. More detailed hydrologic analysis from the previous study (2015 LOMR) is in Appendix B.

Table 6: Peak Flow Summary

Reach	HEC-RAS River Station	Location	SWMM Design Point	10-year (cfs)	50-year (cfs)	100-year (cfs)	500-year (cfs)
City Park Channel	97+54	Upstream Limit	250	101	184	213	292
City Park Channel	91+18	Concrete Plant Access	103	169	296	353	480
City Park Channel	84+74	Approximately 137 feet upstream of Business Access (Survey Crossing #4)	202	228	396	470	632
City Park Channel	80+77	Approximately 71 feet downstream of Burbank Street	102	302	525	623	839
City Park Channel	76+65	Approximately 483 feet downstream of Burbank Street	201	389	677	804	1081
City Park Channel	68+09	Upstream of Highway 287	101	587	1019	1219	1640
City Park Channel	55+34	Approximately 1202 feet downstream of Highway-287	208	607	1068	1253	1872
City Park Channel	37+42	Midway Pond	210	620	1047	1263	1594
City Park Channel	34+31	Approximately 657 feet Downstream of Midway	216	791	1357	1637	2131
City Park Channel	27+80	South Tributary Confluence	117	897	1692	2170	3022
City Park Channel Downstream	27+80	South Tributary Confluence	117	897	1692	2170	3022
City Park Channel Downstream	25+70	Upstream of Emerald Street Crossing	217	951	1788	2292	3197
City Park Channel Downstream	16+50	Crossing No. 18	218	995	1891	2426	3391
City Park Channel Downstream	00+09	Downstream Limit of Project Area	266	990	1888	2413	3364
South Tributary	40+77	Upstream Limit of Reach	108	119	305	416	661
South Tributary	37+80	Approx. 160 feet N. of 1st Ave.	207	187	372	508	805
South Tributary	28+51	4th Ave.	261	84*	270*	400*	688*
South Tributary	20+99	Kohl St.	264	179	414	547	914

* Reduction of flow from upstream area is a result of an area inlet and 48-inch storm sewer in the left-over bank of cross section 37+80 reducing the flows in the South Tributary flooding source. These flows are conveyed to the City Park Channel and discharged near cross section 37+42.The flow split is represented by SWMM node 262 with a total flow of 100 cfs leaving the South Tributary Channel and entering City Park Channel at SWMM node 210 via SWMM node 110.

4. HYDRAULIC ANALYSIS

4.1 Overview

The existing drainage facilities within the project study area consist of primarily improved urban drainage channels consisting of rock armoring, concrete lined sections, drop structures, culverts, and pedestrian crossings. In addition, there is a short reach from Midway Boulevard to Emerald Street that consists of more natural channel features, albeit with maintained park grounds in the floodplain areas. Hydrology for the hydraulic analysis was based on the 2015 LOMR as defined in the previous section of this report.

4.2 Evaluating Existing Conditions

The hydraulic analysis of the City Park Channel consisted of a HEC-RAS model using supplied 2017 Broomfield aerial topography data including shapefile contours used to delineate the 100-year floodplain. The aerial topography was supplemented with ground survey as discussed previously. Flood Frequencies of 10-, 50-, 100- and 500-year were modeled, and all existing obstructions were included. The model includes the main City Park Channel from approximately 850-feet downstream of Main Street to the upstream extent upstream of Compton Street as well as the extents of the South Tributary floodplain that extends from the confluence with City Park Channel to West 120th Avenue.

4.2.1 Evaluating Existing Capacities

The capacity of existing crossings with a minimum opening of at least 30-inches were evaluated and tabulated as shown in Table 3. All crossings in the study area have less than 100-year capacity.

4.2.2 Development of HEC-RAS Model

The development of the HEC-RAS model (Version 5.0.7) followed MHFD's FHAD Guidelines. Cross section locations throughout the project reach were determined based on existing hydraulic control features and oriented to result in near level water surface configurations to the extent practical.

In general, the project area is made up of well-defined channels ideal for one dimensional modeling. However, near the upstream extent of the South Tributary, between West 1st Avenue and Marble Street, one-dimensional modeling indicated flood spills through an existing commercial/residential development. Therefore, a two-dimensional model was created to determine the depth of flow through this development. The Two-dimensional modeling resulted in a maximum flooding depth of less than 1 foot and therefore this area has been defined as shallow flooding in the resulting delineation based on the two-dimensional model results. HEC-RAS software was used for the two-dimensional modeling (Using the software Version 5.0.7).

4.2.3 Manning's n-values

The previous FHAD was used as a basis for the Manning's n-value determination for the project reach. Manning's n-values were updated as necessary based on field visits to the study area. Manning's n-values are defined and summarized in Table 7. *Section 2.3 Reach Description* includes typical photographs of the channel from each reach as an example of terrain and associated Manning's n-values used.

Table 7: Summary of Manning's n-values used in Hydraulic Analysis

Manning's n-value	Terrain Description
0.02	Concrete Trail within Open Space
0.03	Roadway and Parking areas
0.035	Short vegetation and maintained floodplain overbank areas. Maintained street ROW fringes. Boulder lined channels with minimal vegetation influence
0.04	Medium vegetation and minor trees Obstructions in floodplain overbank areas
0.045	Natural channel bottom with minimal vegetation influence
0.05	Mixed use areas Unmaintained floodplain area
0.06	Residential/Commercial areas Natural channel with dense vegetation influence
0.07	Playground areas

4.2.4 Floodway Analysis

The Floodway analysis was completed using 0.5-ft allowable rises on the base flood water surface elevation and energy grade line elevation as a result of the encroachments. The previously effective information from the 1979 FHAD was based on the 1.0-ft allowable rise. The floodway limits attempted to match the general configuration of the current effective floodway, but generally increased in width as a result of the reduced allowable rise tolerance. The floodway model is included in the digital model.

4.2.5 Results of Analysis

The hydraulic model resulted in the base flood elevations shown in the FHAD Flood Map in Appendix E. The elevations were mapped against the source terrain used as the basis for this study. The mapping results in a total of 1 commercial, 15 garage/shed, 8 Industrial, 4 miscellaneous, 1 public, 3 residential, and 5 tank (concrete plant tanks adjacent to Compton Street) insurable structures located within the delineated 100-year floodplain along City Park Channel. The mapping results in a total of 2 commercial, 6 garage/shed, and 9 residential insurable structures located within the delineated 100-year floodplain along City Park Channel South Tributary.

There are two areas along the City Park Channel where high ground downstream of undersized culvert crossings results in split flows of the flood path. The locations are downstream of Highway 287 and downstream of Emerald Street along Agate Way.

Two areas of Shallow Flooding (less than 1-ft average flood depth) have been identified in the study area along the South Tributary. One area is located Southeast of Nickel Street and West 3rd Avenue through a mixed used commercial/residential development and the other along Garnet Street as street flows continue north along the street.

The existing crossings are summarized in Table 8 demonstrating the current capacity and overtopping at each structure during the 10-,50-100-,500-year storm events.

The results can be viewed in the FHAD Floodplain and Floodway Data Tables, Flood Maps, and FHAD Flood Profiles located in Appendices D, E, and F, respectively.

4.3 Previous Analyses

Most of the study area has existing FEMA Zone AE floodplains and floodways and 500-year Zone X Shaded floodplain, a small Zone A designation exists in the effective model at the downstream limits of this study near the community park tennis courts. The floodplains delineated in the study are generally consistent with the effective floodplains. In addition, LOMR Case No. 21-08-0472P prepared by RESPEC Company (April 3, 2022) resulted in the Zone AE floodplain at Cross Sections 9348 through 9754 to be converted to Zone X Shaded (shallow flooding). This update to the mapping in this area has been incorporated into the mapping as part of this study.

4.4 Flood Hazards

The results of the hydraulic analysis show the existing structures in this floodplain do not have the capacity to convey the major storm events, and a majority of the structures examined overtop in the 10-year event (Table 8). This presents a flood hazard throughout the entire study area.

Table 8: Existing Facilities Summary

Flooding Source	Street/Location	Type/Size	Survey Crossing Number	Overtopping Elevation	Return Interval Conveyance	Max Over Topping Depth (ft)			
						10-YR	50-YR	100-YR	500-YR
City Park Channel	Main Street	Culvert - (2) 21'x4' RCBCs	19	5339.01	< 50-YR	-	0.45	1.12	1.63
City Park Channel	Pedestrian Bridge 600-ft upstream of Main Street	Bridge	18	5340.72	< 10-YR	1.92	2.99	3.51	4.30
City Park Channel	Emerald Street	Culvert - 13'x4.3' RCBC	17	5349.23	< 10-YR	0.91	1.90	2.23	3.57
City Park Channel	Pedestrian Bridge 650-ft upstream of Emerald Street	Bridge	16	5353.59	< 50-YR	-	2.17	2.44	2.88
City Park Channel	Midway Boulevard	Culvert - (2) 4.96'x3.71' HERCP, (1) 36" CMP	14	5361.20	< 10-YR	0.54	0.92	1.04	1.37
City Park Channel	Park Access Drive	Culvert - 4.5' RCP	20	5389.95	< 10-YR	1.38	1.72	1.82	2.01
City Park Channel	Highway 287	Culvert - 4'x3' RCBC	7	5393.01	< 10-YR	1.55	1.92	2.06	2.32
City Park Channel	W. 6th Ave	Culvert - (2) 10'x2.5' RCBC	6	5395.12	< 10-YR	0.63	1.41	1.69	2.24
City Park Channel	Burbank Street	Culvert - (2) 10'x2.5' RCBC	5	5405.00	< 50-YR	-	0.71	0.99	1.45
City Park Channel	Business Access Drive	Culvert - (2) 8'x2.75' RCBC	4	5405.37	< 50-YR	-	1.55	1.83	2.31
City Park Channel	Business Access Drive	Culvert - (2) 8'x2.75' RCBC	3	5410.16	< 100-YR	-	-	0.59	1.04

5. REFERENCES

Flood Hazard Delineation – Broomfield Area, Wright-McLaughlin Engineers, June 1979

Broomfield City Park Drainageway Improvements (As-Built), EHMG Engineers-Consultants, October 1986

Broomfield and Vicinity Outfall Systems Planning Study – Alternatives Development and Evaluation Report, Kiowa Engineering Corporation, September 1999.

City Park Drainageway – Emerald Street to Midway, McLaughlin Rincón, October 2005

City Park and 3207 Drainageways Outfall Systems Planning Study, Kiowa Engineering Corporation, June 2006

City Park Channel and Nissen Reservoir Channel Letter of Map Revision (LOMR) Report, RESPEC, October 2014

Hydraulic Structure survey obtained from City and County of Broomfield: City Park Channel Bridge/Culvert information Sheets, Survey Points and CAD Drawing, March 2019

City Park Channel Floodplain Modification Study and LOMR Request (18-08-0246P), Emerald Elementary School 275 Emerald Street, JVA Consultants Inc. Broomfield, CO, 2018

2017 Aerial imagery obtained from City and County of Broomfield, 2017

Culvert Project Downstream of Hwy 287, As-Built Plans, Muller Engineering Company, March 2019

Additional Topographic Survey for Bridge and Structure Mapping, Wilson & Company, March 2019

Additional Topographic Survey for the US-287 flood overflow path, Daley Land Surveying, Inc., April 2019

Nickel Street Floodplain Development Permit Hydraulic Report, Otak, Inc., June 2019

Additional Topographic Survey of Emerald Elementary Park and Ballfield As-Built Improvements, Daley Land Surveying, Inc., October 28, 2020

Additional Topographic Survey of Agate Way (Roadway and Structures Daley Land Surveying Inc. Field Survey Completed September 23. 2021

Appendix A Project Correspondence

2019 City Park Drainageway Upstream of Main Street FHAD

Scoping Meeting

March 4, 2019 3:30 PM
UDFCD – Cherry Creek Conference Room

MINUTES

Attendees:

Brooke Seymour – Urban Drainage and Flood Control District
Rebecca Baker – City and County of Broomfield
Daniel Loewen – Loewen Engineering, Inc.

1) Study Extents
   a) Downstream Limits – The FHAD model should include the culvert at Main Street. The model should tie into Effective information downstream of Main Street
   b) Upstream Limits – The upstream study limits will be similar to the upstream extents of the current effective floodplain. The FHAD will look at defining the upstream area as shallow flooding (Zone X). There's a recently constructed building east of Hoyt Street and another being proposed in this area that is currently obtaining floodplain permits.
   c) South Tributary – The South Tributary is not included in the scope of this FHAD. A recent model for the elementary school near the confluence of the South Tributary and City Park Drainageway will become effective on March 15, 2019. The LOMR had significant revisions to the floodplain in this area.
   d) Flows – No hydrology is included in the scope of this FHAD. The LOMR Case #15-08-0180P should be referenced for flow information. The LOMR hydrology did not include 25-year event flows. The 25-year event will not be included in the FHAD. The case file will be provided by UDFCD.

2) Survey
   a) Cost - $5,400 The survey will be completed by Wilson.
   b) Broomfield will provide 2017 Aerial LiDar (.las file). The aerial topography will be compared to the limited ground survey to determine if interpolation is needed to determine low flow and/or thalweg elevation for heavily vegetated areas.
   c) Schedule – 2-3 weeks pending weather
   d) Survey for Highway 287 and Midway Boulevard will be provided by other projects. These surveys will be included in the technical appendix of the FHAD. Brooke will request for Wilson survey the pipe inverts at Midway as there is a small discrepancy in invert elevations from the recent survey when compared to a recent LOMR.

3) General
   a) Floodway Model
      i) The FHAD schedule indicates that floodway modeling should not be done until after the floodplain mapping is approved. However, since the floodway run can sometimes result in mapping changes to the floodplain, a basic floodway run will be included in the final floodplain model submittal to help the process.

ii) A floodway with flood fringe will be defined in any location where encroachments can be allowed. It appears that the current effective information uses 1.0-feet encroachment depths whereas the FHAD will update the floodways to 0.5-feet encroachment depths.

b) Apartments Upstream of Highway 287

i) The apartment complex on the left bank has recently obtained two LOMA's for the structures directly adjacent to the City Park Drainageway. The complex is currently working to update the plat to show the floodplain area in a separate tract from the structures to assist with lending. The FHAD should remain aware of the situation with the property and note any apparent impacts of the new modeling.

c) Public Meeting

i) No public meeting is planned at this time. If the FHAD results in private property impacts, a public meeting will be reconsidered.

4) Project Schedule

a) LEI will verify that the lump sum fee of $34,600 is sufficient. – 1 Week

b) Initial floodplain model submittal 4 weeks after survey information is received – Approximately April 22, 2019.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein.

Minutes prepared by: _____ Date: 3/5/19

Daniel Loewen, P.E.

City Park Channel and South Tributary FHAD

Model Comment Review Meeting

October 2, 2019

9:30 am – Mile High Flood District

MINUTES

Attendees:

Brooke Seymour – MHFD

Brik Zivkovich – MHFD

Rebecca Baker – CCOB

Daniel Loewen – Loewen Engineering, Inc.

1. General Topics
    a. City Park
        i. Upstream at concrete batch plant
            1. The existing access drives for the concrete plant are acting as inline berms, therefore, the centerline should be moved into the adjacent roadway until the eastern edge of the concrete plant. The existing concrete channel for the driveway culverts will be modeled as an IEFA. In addition, the correct flowline is through the westernmost concrete plant building due to the existing opening in the building, however, Loewen will need to contact the property owner to gain access to perform physical measurements of the building opening for the model. A note will be included in the model regarding the building opening for FEMA's reference.
            2. The upstream most cross section extends beyond the current effective floodplain; therefore, the cross section will be removed to match the previous effective floodplain extents.
        ii. Downstream at Main Street uncontained ROB
            1. Cross section 529 should be extended to the south to Community Park Road to contain the floodplain. No lateral weir is necessary to estimate the flooding extents. The cross section downstream of 529

will have the ROB's re-oriented through the existing tennis courts and an additional cross section will be added downstream to improve the tie in location. Rebecca mentioned that Broomfield has a large City Center Development project ongoing in that location and the project is aware of the floodplain impacts.

b. South Tributary
    i. Downstream at Emerald Elementary – Broomfield and Boulder Valley School District recently completed a school expansion (with LOMR) and are currently working on improving the baseball field to the north of the school (no-rise). Loewen completed the no-rise and JVA completed the LOMR. The FHAD topography is utilizing the existing ground survey completed north of the school and incorporating the as-built information from the school expansion to the west of the school. The as-built information must be sealed to be included in the FHAD (Loewen will confirm). Notes will be added in the modeled cross sections where topography information differs from the aerial topography.
    ii. Upstream at Nickel Street
        1. Broomfield currently has a roadway improvement project from Hwy 287 and Nickel St. to Nickel St. and 3rd Ave. The project involves median removal, resurfacing, and added sidewalks with a no-rise certification completed by Otak. In general, it was agreed that the improvements will have little impact on the floodplain model results in the area and can be ignored for the purposes of the FHAD.
        2. Flow Split at Nickel Street – Based on the effective hydrology information, there's a substantial flow split (~100 cfs) at 3rd Ave and Nickel St. The flow split appears to account for a pipe that conveys flows from the intersection to the pond downstream of Midway Blvd on the City Park Channel. Loewen will complete a site investigation to determine the feasibility of accounting for the pipe's conveyance in the modeled hydrology. In addition, additional cross sections need to be added to the intersection of 3rd Ave and Nickel St. to determine if a flow spill to the north along Nickel St. needs to be approximated with the model. Loewen will calculate the flow spilt using normal depth approximations. Once the spill, if any, is determined, Loewen will share information with MHFD and

Broomfield to determine the most appropriate way to address the spill. The quantity of flow spill will impact the approach as there may be the need to address the spill using a 2D flow area in the left overbank.

iii. Additional Survey – No additional survey will be obtained at this time, see below discussions for each of the areas in question.

1. Adjacent to Emerald Elementary – As-built information from the LOMR will be used in the area if it's sealed.
2. At 3rd Ave and Nickel Street – Additional survey is likely not necessary, however further field investigation and modeling will be completed to determine if additional survey is necessary.
3. Review Comment – Missing Survey Data XS 8769-8653 – The profile between these cross sections is not representative of the actual field condition. No additional survey is necessary, and the flow line profile will be estimated based on bounding survey that has already been completed.
4. Agate Way – Preliminary model results are indicating that numerous homes may be added to the floodplain along Agate Way. If flooding is still represented in this area after the model is updated, Broomfield may opt to obtain finished floor elevations of the homes to determine if the homes are actually higher in elevation than the aerial topography suggests. Rebecca also noted that one home in the area has a LOMA (05-08-0255A dated 3/2/05).

2. Review Comments
   a. Flows – Attachment B
      i. 500-year flows obtain from RESPEC LOMR 15-08-018P SWMM File
      ii. City Park - RS 3889, 3610 – The flow reduction in the SWMM model in this area will be omitted from the model, so that there are no negative slopes in the flow profile. Furthermore, the cross sections will be re-oriented in the LOB to prevent overestimation of storage in the model.
   b. South Tributary
      i. Hemlock Street Spills and Shallow Flooding – 100-yr flows overtop high point in road by approx. 0.13-ft – Final spills in the model will be quantified (not

optimized) and the area beyond the spill will likely be mapped as Zone X shaded depending the final model results.

ii. Alignment and floodplain mapping on 3rd Avenue downstream of Nickel St. – The alignment in the current model appears correct, but it should be noted that the floodplain mapping should encompass all of 3rd Ave.

3. Other
    a. Expansion and contraction coefficients should be reviewed in detail. In general, 1:1 contraction and 1:2 expansion ratios should be used.
    b. If IEFA's are being adjusted to prevent crossing profiles, notes should be added in the cross section.
    c. The field investigation required by Loewen for the concrete plant and South Tributary flow split are out of scope items. Loewen will continue working off the existing budget and an amendment to the contract will be added in 2020.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein.

Minutes prepared by: _____ Date: 10/8/19

Daniel Loewen, P.E.

City Park Channel and South Tributary FHAD

Model Comment Review Meeting

April 9, 2020

11:00 am – Remote

MINUTES

Attendees:

Brooke Seymour – MHFD

Hung-Teng Ho – MHFD

Rebecca Baker – CCOB

Daniel Loewen – Loewen Engineering, Inc.

Elysa Loewen – Loewen Engineering, Inc.

1. **Review Comments**
   a. **City Park Channel**

      i. Upstream at concrete batch plant

         1. Loewen will include documentation, such as a photo of the drive access into the concrete plant to justify the alignment of the model, building obstructions, and IEFAs. Photos were taken during field investigation to show that the plant has implemented the water quality structure and storage materials near the channel entrance supporting the alignment of the channel around the culverts and into the adjacent road near the drive entrance. We will need to incorporate these water quality areas and culverts during the mapping phase.
         2. Cross Section 9333 will be adjusted to better define the control location within the concrete plant.
         3. Adjustment to the centerline will be implemented to the model between stations 8758 and 9060 to capture low point.

ii. Hwy 287 to Midway Blvd.

1. Cross sections and culvert high chord information will be adjusted to ensure the overtopping of Hwy 287 is being calculated correctly. We will use the test run model provided by Hung-Teng and coordinate preliminary results with Hung-Teng. The submitted model cannot balance the flow distribution at the park driveway culvert that numerically calculated more flows through the structure (culvert flow plus weir flow) than the inflow. It appears that making the downstream IEFAs permanent, eliminates the incorrect condition.
2. We will include the cross sections at the drop structure locations.
3. We discussed the modeling of the new culvert at the park driveway, as-built information is not available for the culvert at this time. However, it doesn't appear to have been any deviation from the design during construction. The model needs to be updated to reflect the newly constructed culvert.
4. (Additional Survey) High chord data for the bridge will be taken as the median elevation as it is the highpoint. Additional survey for the median elevation and extent will be obtained; Loewen will reach out to surveyor to provide quote.
5. (Additional Survey) The current floodplain delineation in the model suggests some buildings in the apartment complex at the southeast corner of the intersection are within the new floodplain. Additional minimum adjacent grade elevations will be obtained at the apartment complex. Loewen will provide quote to CCOB to perform the work.

iii. Downstream Midway to Emerald Street

1. Adjustments to the cross sections at Midway Street suggested in the review will be incorporated into the next submittal.
2. Loewen will provide documentation at the Midway culverts based on the recent work performed by CCOB to spray line the culverts.

Loewen performed the no-rise analysis at this location in 2019 and will include assumptions and details that have been incorporated into the design.

3. Loewen acknowledges the major overland flow path on the LOB at the midway culvert and this area will be mapped similar to the current effective model.

b. South Tributary

i. Downstream at Emerald Elementary Park

1. We discussed the realignment of the channel through the park per review comments which will allow us to include additional cross sections in the park and shorten cross sections at the City Park Channel.
2. As-built information for the recent school expansion was incorporated into the model. There is not a current as-built surface for the new school, however as-built contours are available in a PDF by JVA. In addition, topographic survey was recently obtained for the Emerald Elementary Park project, in which Loewen is doing the no-rise analysis. This recent topography includes the entire park area to the north of the school. Therefore, the FHAD topography will only use JVA's pdf as-built contours to define the geometry near the dumpster storage location directly west of Emerald Elementary. All modifications to the aerial topography based on as-built grades will be noted in the model.
3. Cross sections will be adjusted to terminate earlier along the left bank upstream of Emerald Elementary School, Zone X will be mapped in areas of shallow flooding such as Hemlock street.

ii. Upstream Nickel Street

1. We discussed the Nickel Street project, Loewen will reach out to Ed Thompson, the Broomfield CIP manager for the project to discuss

the status of the no-rise certification. Ideally, we would like the project to confirm a no-rise to reduce further complication of the topography in this area since changes to the roadway width and depth are minimal. If the project is unable to confirm the no-rise, additional information may need to be obtained and included in the model to reflect the changes.

2. We discussed the cross sections in the area of the intersection of 3rd Avenue and Nickel Street, and the team is hopeful that with the adjustments of the cross sections terminated sooner at higher grades along the right overbank, that a shallow flooding/500-yr Zone X floodplain will be mapped during delineation. Multiple iterations and adjustments may be necessary in this area to achieve the desired model results. Loewen will coordinate with Hung-Teng during the revised modeling at this location.
3. We discussed the alignment of the south tributary not being ideal in between cross section 3185 and 2786 due to the low grade through the parking lot north of the channel and location of the inlet in 3rd Avenue. The alignment will remain as is in the model, however the floodplain will need to be mapped to include 3rd Avenue.

c. <u>Steady Flow Data</u>

1. Loewen will provide documentation for the flow change at cross section 3060 in the model. The flow change location differs from the hydrology model as field investigation determined that 48-inch diameter RCP is just upstream of hydraulic cross section 3060.
2. Loewen will review the 50- and 500-year decrease in flow on the City Park Channel between cross sections 3749 and 5541.

d. <u>Structure Comments (Model Profile)</u>

1. Loewen will incorporate the comments discussed previously for the culvert elevations and high cord data.

2. Channel invert elevations between Midway and Wadsworth will be adjusted per the survey and culvert data.

2. Other Discussions

1. Loewen will reach out to Hung-Teng to discuss iterations as we revise the model.
2. Loewen will submit another model review prior to beginning delineations. Turnaround for next revision is to be in the next 3-4 weeks.
3. A public meeting will be held to discuss the floodplain results. The meeting will occur after the mapping phase is complete.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein.

Minutes prepared by: _____ Date: 04/13/20

Daniel Loewen, P.E. 04/29/20 rev

City Park Channel and South Tributary FHAD

South Tributary Modeling Approach

August 31, 2020

10:00 am – Remote

MINUTES

Attendees:

Brooke Seymour – MHFD

Hung-Teng Ho – MHFD

Rebecca Baker – CCOB

Daniel Loewen – Loewen Engineering, Inc.

1. **City Park Channel South Tributary**
   a. **Upstream Split Flow**
      i. There appears to be a split flow path through commercial and multi-family residential properties on the right bank downstream of W 1st Avenue. The existing structures and development make this a complicated area to understand the flow paths and flow quantities, therefore it was determined that a 2D model should be created and used to inform the 1D modeling from the intersection of Nickle Street and W 1st Avenue to the intersection of W 3rd Avenue and Marble Street. Once the split flow quantity is defined from the 2D analysis, a determination will be made whether the area can be mapped as shallow flooding or if a split flow analysis will be required. In either case, the flow will be optimized (split flow quantity removed from the South Tributary flow quantity). Although this split flow is not the intended or desired flow path for the flooding, future improvements to alleviate the flooding would likely involve a large scale box culvert that would require a CLOMR/LOMR, so it was determined to be acceptable to remove the split flow from the main flow in this situation.

b. Confluence with City Park Channel

i. The improvements to the Emerald Elementary field are nearly complete. Loewen will be obtaining as-built information near the end of September. Loewen has been providing grade checks as the project progresses and the as-built grades should be close to the design grades based on the checks to date.

ii. Loewen will incorporate the proposed grading design for the Emerald Elementary field into the City Park Channel geometry.

iii. Loewen will update the stream centerline to better follow the proposed contours.

iv. Cross sections through the field will be updated per the recommended layout.

v. As the cross sections on the South Tributary approach the City Park Channel, it may be difficult to fully contain the flow without dramatically bending the cross sections back to higher ground. Uncontained 500-year cross section may be okay in this area.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein.

Minutes prepared by: _____ Date: 08/31/20

Daniel Loewen, P.E.

City Park Channel FHAD

Floodway Meeting

June 9, 2021

10:00 am – Virtual Meeting

MINUTES

Attendees:

Brooke Seymour – MHFD

Hung-Teng Ho – MHFD

Daniel Loewen – Loewen Engineering, Inc.

Agate Way Flow Split

The group discussed the flow split at Agate Way being modeled as effective versus ineffective. The previous 100-year model submittals had included this area as effective flow, however when applying floodway encroachments, the results would include the floodway in Agate Way. Therefore, Loewen modeled the 100-year floodplain with Agate Way represented as ineffective flow area as in the 1979 FHAD. The change resulted in minimal increases to the BFE's in this area and allows the floodway to be contained in the main channel section. Therefore, the study will move forward with Agate Way being modeled as IEFA and the floodway and floodplains being delineated accordingly. In addition, the encroachments will be adjusted to be as close to the existing residence fence line as possible to eliminate mapped floodway on private property. It was also determined that the residences along Agate Way have basements. Therefore, observation will be made to the nature of the houses to determine if the FFE represents the lowest adjacent grade elevation or if the foundation of the structure is exposed. Daniel noted that it appears that one structure has exposed foundation walls along the north side of the residence and may need to be mapped in the floodplain. Loewen will make this determination and update the floodplain accordingly.

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p 720.667.2063
www.loeweneng.com

Draft Report

Daniel asked about the detail necessary for the hydrology portion of the report since a hydrology update was not included in the FHAD scope. It was determined that the report section should include a detailed summary of the previous hydrologic studies including a summary of the 2006 OSP hydrology and the updates made in the 2015 LOMR hydrology. In addition to the summary, the report appendices will include figures and exhibits necessary to ensure the final FHAD contains all relevant information. A copy of the hydrologic model will also be included as part of the submittal package.

Flood profiles should still be included as part of the report submittal.

Downstream Tie In

Hung-Teng asked about the information used for the downstream tie in and noted that it did not appear to be in the location of a lettered cross section. Daniel noted that the downstream tie in was based on a cross section in the 2015 LOMR effective information. Daniel will confirm this in the next submittal and verify that the downstream water surface elevation is correct. In addition, the downstream tie in cross section will be updated to include the duplicate effective geometry from the 2015 LOMR model and provide a graphical tie in accordingly. If a cross section does not exist at the current downstream model extent, the downstream FHAD model extent will be revised to tie into lettered cross section “I” from the effective/2015 LOMR model.

Other

Daniel will send a copy of the 100-year auto-delineated floodplain to Hyung-Teng to assist in the review.

Memorandum

To: Brooke Seymour
From: Daniel Loewen
CC: Rebecca Baker
Date: May 6, 2019
RE: City Park Drainageway FHAD

This memo is intended to summarize the modeling process and key decisions of the DRAFT Flood Hazard Analysis Delineation (FHAD).

Project Topography

Project mapping was based on a 2017 Aerial Topography provided by Broomfield. Included within the submittal files are the direct shapefile contours that were provided by Broomfield. These contours and associated surface information were used to cut the cross sections and delineate the 100-year floodplain. In addition, a dem surface is provided that is based on the raw aerial point cloud data with minimal filtering of the points. This information was used to help determine invert elevations to maintain a consistent invert profile. Lastly, survey information provided by UDFCD and completed by Wilson was used for the structures and to inform some invert elevation assumptions through interpolation of cross sections. In addition, UDFCD provided ground survey from another project directly downstream of Highway 287. The topographic information is included in this submittal.

HEC-RAS Modeling Notes

A. Flood Frequencies
   The following flood design frequencies were modeled in detail for the FHAD: 10-, 50-, 100-, and 500-year.
B. Boundary Conditions
   A Known WSEL downstream boundary was used based on the January 2015 LOMR completed by RESPEC. (attached)

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C. Blocked Obstructions

A few buildings in the model were represented by blocked obstructions. In areas where flooding approaches residences, the model currently has these structures represented by a Manning's "n" value of 0.15.

D. Bridge and Drop Structures

Survey information was obtained for most of the bridges and drop structures.

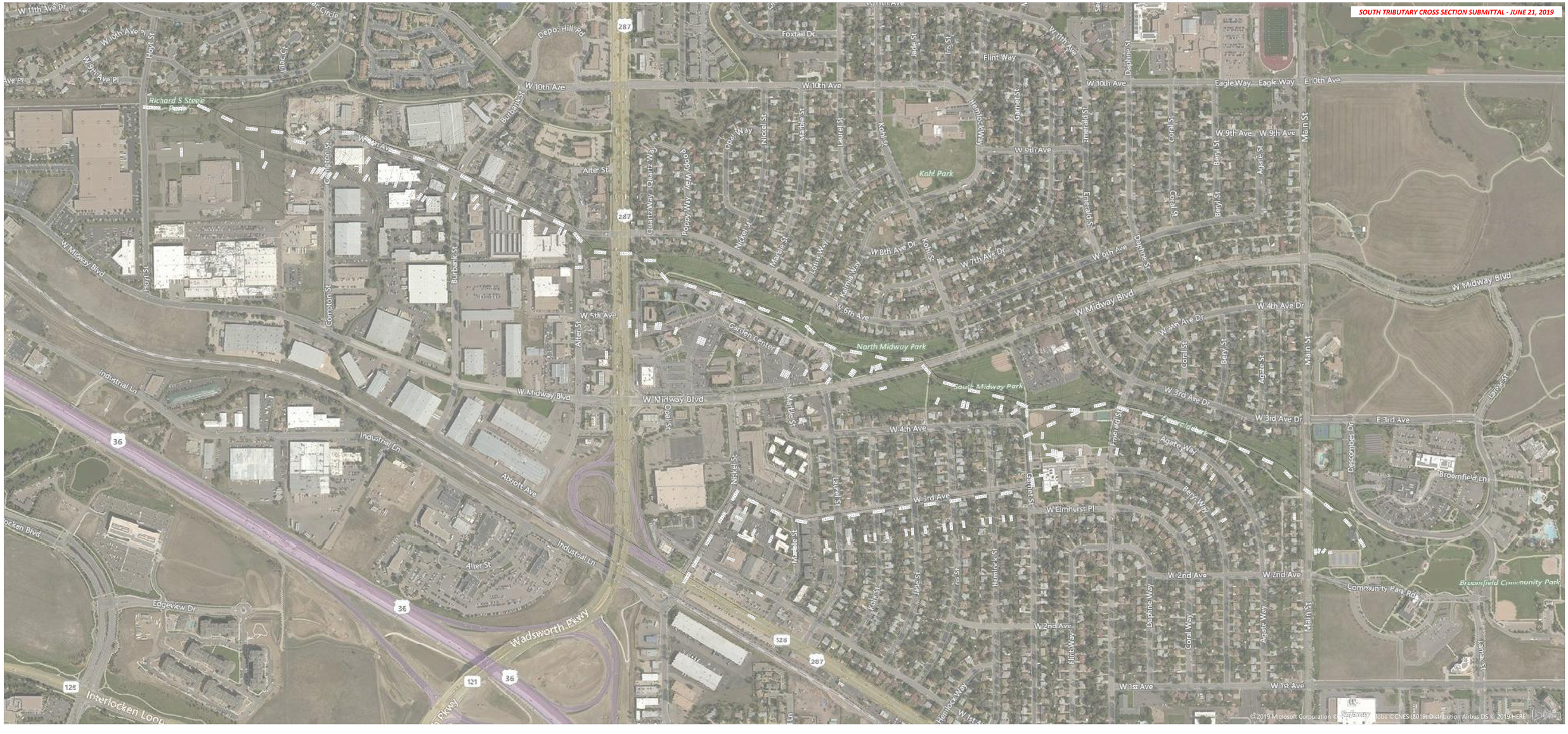
E. Manning's Roughness

Horizontal variation of Manning's Roughness was used at each cross section with as much detail as allowed based on aerial imagery. In general, the following values were considered:

0.013 – Paved Surface
0.02 – Gravel Surface
0.035 – Clean straight low flow channel with minimal or well-maintained veg.
0.04 – Maintained grass overbank area
0.045-0.05 – Overbank or channel areas with more dense vegetation
0.07 – Dense trees and/or vegetation.

Areas of Concern Moving Forward

- Main Street Crossing – Flow profiles are uncontained along the right overbank. The surface was trimmed short of containing the flows and future models will extend the cross section to the south to contain the flows. Downstream of Main Street there appears to be a small trail crossing that was not included in the structure survey. Survey will be needed at this structure to represent it in the model.
- Main Street – Emerald Street – It appears that some homes along the right bank of the creek may be shown in the floodplain. The homes do not appear to be in the current effective floodplain.
- Concrete Plant on Compton Street – There are numerous structures and/or pieces of equipment within the flow path according to aerial imagery. A site visit will be necessary to determine what areas if any will be defined as blocked obstructions.


SOUTH TRIBUTARY CROSS SECTION SUBMITTAL - JUNE 21, 2019
W 11th Ave Dr
W 10th Ave Pl
W 9th Ave Pl
Hoyt St
Utica Ct
Utica Circle
Depot Hill Rd
287
Foxtail Dr
Jade St
Iris St
W 11th Ave
Flint Way
Daphne St
W 10th Ave
Eagle Way
E 10th Ave
Richard S Steele Park
Bunbank St
Alter St
Quartz Way
Opal Way
Nickel St
Marble St
Laurel St
Kohl St
Hemlock Way
Garnet St
Emerald St
Coral St
W 9th Ave
Beryl St
Agate St
Main St
Koh! Park
Compton St
Burbank St
W Midway Blvd
W 8th Ave Dr
W 7th Ave Dr
W 6th Ave
Kohls Way
Lotus Way
W 5th Ave
Garden Center
North Midway Park
W 4th Ave Dr
South Midway Park
W 3rd Ave Dr
E 3rd Ave
Industrial Ln
Abbott Ave
36
W 4th Ave
W 3rd Ave
Elmhurst Pl
Agate Way
Beryl Way
Broomfield Ln
Descombes Dr
Lamar St
Interlocken Blvd
Edgeview Dr
Wadsworth Pkwy
125
121
128
W 2nd Ave
W 1st Ave
Community Park Rd
Broomfield Community Park
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Memorandum

To: Brooke Seymour P.E., CFM
From: Daniel Loewen P.E.
CC: Rebecca Baker P.E., CFM
Date: May 6, 2019; Updated August 5, 2019
RE: City Park Drainageway FHAD

Project Topography

City Park Channel

Project mapping was based on a 2017 Aerial Topography provided by the City and County of Broomfield. Included with the previous submittal files, were the direct shapefile contours that were provided by Broomfield. These contours and associated surface information were used to cut the cross sections and delineate the 100-year floodplain. In addition, a .dem surface file was included, based on the raw aerial point cloud data with minimal filtering of points. This information was used to help determine invert elevations to maintain a consistent invert profile. Crossing survey information provided by UDFCD, completed by Wilson was used for the structures and to inform some invert elevation assumptions through interpolation of cross sections. In addition, UDFCD provided ground survey from another project located directly downstream of Highway 287. The topographic information was included in the initial submittal on May 6, 2019.

South Tributary

Topography for the South Tributary model was compiled from a recent topographic survey of Emerald Park, completed in June 2019 and "as-built" information from the Emerald Elementary School expansion, completed in October 2017. Outside the school and park areas, 2017 aerial topography was utilized. As-built survey from the Nickel Street Project, currently under construction, will be incorporated into the terrain when the information becomes available.

Included in this submittal is a revised terrain file that includes the following surface information (listed in order of overlapping):

1. 2017 LiDar from Shapefile Contours
2. Project survey from UDFCD project downstream of Highway 287
3. As-Built contours from Emerald Elementary School Expansion
4. Field survey of Emerald Elementary School park for upcoming field improvements

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Hydrology Documentation

Hydrology input for the model was taken from the City Park and 3207 Watersheds Outfall Systems Plan prepared by Kiowa Engineering Corporation in 2006. An annotated exhibit from the plan is shown in **Exhibit A** of this memorandum.

HEC-RAS Modeling Notes

A. Flood Frequencies

The following flood design frequencies were modeled in detail for the FHAD: 10-, 50-, 100-, and 500-year.

B. Boundary Conditions

A Known WSEL downstream boundary was used based on the January 2015 LOMR completed by RESPEC.

C. Blocked Obstructions

Blocked obstructions are included for structures that appeared to be impacted by the floodplain, other structures outside of flooding limits have not been included at this time.

D. Bridge and Drop Structures

Survey information was obtained for most of the bridges and drop structures.

E. Manning's Roughness

Horizontal variation of Manning's Roughness was used at each cross section with as much detail as allowed based on aerial imagery. In general, the following values were considered:

Table 1: City Park and South Tributary Manning's n-Value Documentation

Manning's n-value	Terrain Description
0.02	Concrete Trail within Open Space
0.03	Roadway and Parking areas
0.035	Short vegetation and maintained floodplain overbank areas Maintained street ROW fringes Boulder lined channels with minimal vegetation influence
0.04	Medium vegetation and minor trees Obstructions in floodplain overbank areas
0.045	Natural channel bottom with minimal vegetation influence
0.05	Mixed use areas Unmaintained floodplain area
0.06	Residential/Commercial areas Natural channel with dense vegetation influence
0.07	Playground areas

Cross Section Notes

City Park Channel

- XS 351-732 – A lateral weir was added to the right overbank ROB of each cross section in this area to address and quantify uncontained flows. If this is the preferred way to address this area, additional aerial topo will be used to approximate extents of shallow floodplain resulting from the lateral weir. Please advise.

South Tributary

- XS 581 – Surface was modified based on an "as-built" drawing pdf in the recent LOMR case file (18-08-0246P). Broomfield is requesting actual as-built topo from the engineer. If actual survey information is not available, additional field survey may be necessary in this location.

- XS 3335 and XS 3671 – Adjacent localized detention features in left overbank LOB were cropped out to match adjacent grades; therefore, the low area is not represented in hydraulic model.

Areas of Concern Moving Forward

- South Tributary – A discussion regarding the potential need for a more detailed survey in South Tributary reach and surrounding areas is merited in our opinion, based on the vicinity of structures and nature of the flood flows.

Comment Response (see attached)

Comment	Response
DS Length: Check DS length at XS 6734 and going upstream. Revise XS stationing if necessary.	Downstream reach length revised.
Profiles: Crossing profiles at XS 1389 / upstream of low flow crossing.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: Crossing profiles at XS 6546 / upstream of Wads Pkwy.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: Crossing profiles at XS 6734.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: crossing profiles at XS 8371.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: crossing profiles at XS 8467.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: crossing profiles at XS 8819.	IEFA's were adjusted at crossing profile locations to address crossing profiles
Profiles: crossing profiles from XS 8877 upstream to XS 9395.	IEFA's were adjusted at crossing profile locations to address crossing profiles
DS Length: XS 3610. LOB seems small.	LOB adjusted.
Bank stations. XS 4303. Revise ROB bank station to be consistent with up/downstream XSs.	Bank stations revised
Bank stations. XS 4525. Revise bank stations to be more consistent in plan with up/downstream sections.	Bank stations revised
Bank stations. XS 5555. CL outside of bank stations.	Bank stations revised
Bank stations. XS 5999. CL outside of bank stations.	Bank stations revised
Bank stations. XS 5904. Revise ROB station, seems too wide out.	XS not in model.
Bank stations. XS 5584. CL outside of bank stations.	XS not in model.
Bank stations. XS 8877. CL outside of bank stations.	Bank Stations and Centerline Revised
Bank stations. XS 8945. CL outside of bank stations.	Bank Stations and Centerline Revised
CL. Review/revise jagged C btw XSs 3142 and 3410.	Centerline revised
CL. Discuss CL upstream of XS 8945	Discussion still needed, maybe on-site?
XS, XS 351. Uncontained in ROB.	Lateral weir added to ROB
XS, XS 529. Uncontained in ROB.	Lateral weir added to ROB

XS, XS 6656. Realign ROB.	ROB adjusted
XS, XS 6734. Uncontained in ROB.	ROB extended
Mannings. General. Please provide general documentation of Mannings values used.	Mannings value table provided in memo
Mannings. General. Suggest higher value for streets and trails, e.g. 0.02-0.03.	Trails revised to 0.02. Streets revised to 0.03.
Mannings. XS 29–529. Values for trail in LOB/ROB seem offset too far left/right vs aerial and in XS.	Mannings value horizontal locations revised.
Mannings. General. Suggest lower values for housing areas, e.g. 0.05-0.06.	Housing areas revised to 0.06.
Mannings. XS 732. LOB/ROB areas look similar to u/s areas with values of 0.04.	Mannings revised
Mannings. XS 1754. Value in extreme LOB appears it should be 0.05 and not 0.005.	Mannings revised
Mannings. XS 732–2150. Single Family Housing in ROB has values of 0.15 while LOB has 0.05.	Mannings revised
Mannings. XS 2280–2954. Suggest lower value for channel.	This area is a natural bottom channel heavily overgrown with vegetation. Mannings of 0.06 within main channel seems appropriate.
Mannings. XS 4515–4535. Use values of 0.05 in this LOB region following adjacent XSs.	Mannings revised
XS. XS 4810–5770. ROB extents could probably be trimmed to edge of parking lot.	ROB extents will be trimmed at final model
Mannings. XS 6546–6656. Values of 0.06 seem inconsistent with values used elsewhere.	Mannings revised
Mannings. XS 6734. Value of 0.02 in LOB onconsistent with other commercial areas in ROB using 0.15.	Mannings revised
Mannings. XS 8371–8467. Value of 0.07 used in LOB inconsistent with other parts of the model with similar cover.	Mannings revised
Mannings. XS 7941–8945. Areas in ROB vary between values of 0.15 and 0.05 but appear to have similar building types throughout this reach from Compton to Burbank.	Mannings revised
Mainnings. XS 9395–10176. Value of 0.05 seems high when compared with other areas of similar vegetation (e.g. immediate overbanks in XSs 5250–5576).	0.05 is used in this area as there does not appear to be a defined channel. 0.05 is consistent with the maximum n value for a floodplain area with high grass and no brush.
Mannings. XS 9174. Value of 0.06 used in ROB inconsistent with other parts of the model showing similar cover.	Mannings revised
Bridge/XS, Crossing 15 / XS 3447. Revise invert to reflect survey. Bridge/XS, Crossing 15 / XS 3440. Revise invert to reflect survey.	Inverts revised to reflect survey. XS 3447 is modeling the top of the foot bridge. There is no cross section immeidately upstream of the foot bridge as there is an existing pond located immediately upstream of the bridge. Should an additional cross section be included upstream of the bridge within the pond area?
Bank stations, XS 3610. Both L/R bank stations look like they could be pushed out to the edges of the pond.	Bank stations revised
IEFA, XS 732. Set IEFAs to permanent on upstream side of bridge.	IEFA's changed to permanenet

Memorandum

To: Brooke Seymour P.E., CFM
From: Daniel Loewen P.E.
CC: Rebecca Baker P.E., CFM
Date: May 6, 2019; Updated August 5, 2019 ; Updated January 15, 2020
RE: City Park Drainageway FHAD

Project Topography

City Park Channel

Project mapping was based on a 2017 Aerial Topography provided by the City and County of Broomfield. Included with the previous submittal files, were the direct shapefile contours that were provided by Broomfield. These contours and associated surface information were used to cut the cross sections and delineate the 100-year floodplain. In addition, a .dem surface file was included, based on the raw aerial point cloud data with minimal filtering of points. This information was used to help determine invert elevations to maintain a consistent invert profile. Crossing survey information provided by UDFCD, completed by Wilson was used for the structures and to inform some invert elevation assumptions through interpolation of cross sections. In addition, UDFCD provided ground survey from another project located directly downstream of Highway 287. The topographic information was included in the initial submittal on May 6, 2019. For the January 2020 submittal, additional topography was obtained from the City and County of Broomfield to extend the model's downstream tie in location further downstream. An updated geotiff terrain file is included with the submittal that encompasses all of the surface information discussed above as well as this additional downstream area.

South Tributary

Topography for the South Tributary model was compiled from a recent topographic survey of Emerald Park, completed in June 2019 and "as-built" information from the Emerald Elementary School expansion, completed in October 2017. Outside the school and park areas, 2017 aerial topography was utilized. As-built survey from the Nickel Street Project, currently under construction, will be incorporated into the terrain when the information becomes available. No modifications were made to the topography information related to the South Tributary for this submittal.

Included in this submittal is a revised terrain file that includes the following surface information (listed in order of overlapping, the previous order still holds true for this submittal):

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1. 2017 LiDar from Shapefile Contours
2. Project survey from UDFCD project downstream of Highway 287
3. As-Built contours from Emerald Elementary School Expansion
4. Field survey of Emerald Elementary School park for upcoming field improvements

Hydrology Documentation

Hydrology input for the model was taken from the City Park and 3207 Watersheds Outfall Systems Plan prepared by Kiowa Engineering Corporation in 2006. An annotated exhibit from the plan is shown in **Exhibit A** of this memorandum. The flow file used in the model was updated to reflect the most recent comments received. In addition, the flow split for the existing storm sewer along the South Tributary was confirmed and the flow decrease is represented in the model. The discrepancy in the effective hydrology that was discussed during the preparation of the model was determined to have little impact to the overall flow, therefore the SWMM model from RESPEC's 2014 LOMR (based on the 2006 Kiowa Engineering Study) City Park Channel was used to determine the flow quantities and flow change locations.

HEC-RAS Modeling Notes

A. Flood Frequencies

   The following flood design frequencies were modeled in detail for the FHAD: 10-, 50-, 100-, and 500-year.

B. Boundary Conditions

   A Known WSEL downstream boundary was used based on the January 2015 LOMR completed by RESPEC. The boundary condition was extended one additional cross section to help define the flow convergence after the overtopping of Main Street.

C. Blocked Obstructions

   Blocked obstructions are included for structures that appeared to be impacted by the floodplain, other structures outside of flooding limits have not been included at this time.

D. Bridge and Drop Structures

   Survey information was obtained for most of the bridges and drop structures.

E. Manning's Roughness

Horizontal variation of Manning's Roughness was used at each cross section with as much detail as allowed based on aerial imagery. In general, the following values were considered:

Table 1: City Park and South Tributary Manning's n-Value Documentation

Manning's n-value	Terrain Description
0.02	Concrete Trail within Open Space
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0.05	Mixed use areas Unmaintained floodplain area
0.06	Residential/Commercial areas Natural channel with dense vegetation influence
0.07	Playground areas

Cross Section Notes

City Park Channel

- XS 351-732 – A lateral weir was added to the right overbank ROB of each cross section in this area to address and quantify uncontained flows. If this is the preferred way to address this area, additional aerial topo will be used to approximate extents of shallow floodplain resulting from the lateral weir. Please advise. The model extents were extended downstream and the cross sections were reoriented to eliminate the need for a lateral weir at this location.
- Culvert Modeling – HY-8 v. HEC-RAS – The table on the following page shows the comparison between the hydraulic modeling results for the listed culverts using both HY-8 and HEC RAS. It does not appear that there is a significant enough difference in the 100 yr and 500 yr events to use HY-8 to inform the HEC-RAS model. The HY-8 modeling used for these results is included with the submittal.

HEC-RAS v. HY-8 Crossing Results Table												
	HEC-RAS Headwater Elevation				HY-8 Headwater Elevation				Headwater Elevation Difference			
Culvert #	10-yr	50-yr	100-yr	500-yr	10-yr	50-yr	100-yr	500-yr	10-yr	50-yr	100-yr	500-yr
7150	5396.29	5396.75	5396.92	5397.32	5396.35	5396.85	5397.06	5397.50	0.06	0.10	0.14	0.18
8175	5404.38	5405.55	5405.85	5406.31	5404.57	5405.59	5405.88	5406.33	0.19	0.04	0.03	0.02
8355	5404.76	5405.95	5406.43	5406.97	5405.33	5406.42	5406.68	5407.13	0.57	0.47	0.25	0.16
8800	5410.21	5410.44	5410.55	5410.75	5409.85	5410.3	5410.46	5410.81	-0.36	-0.14	-0.09	0.06

South Tributary

- XS 581 – Surface was modified based on an "as-built" drawing pdf in the recent LOMR case file (18-08-0246P). Broomfield is requesting actual as-built topo from the engineer. If actual survey information is not available, additional field survey may be necessary in this location.

- XS 3335 and XS 3671 – Adjacent localized detention features in left overbank LOB were cropped out to match adjacent grades; therefore, the low area is not represented in hydraulic model. Per the review comments these detention areas were added back to the geometry as IEFA's to help with the mapping process.
- Hemlock Street Shallow Flooding – Normal depth calculations were used to quantify the anticipated quantity of flow spilling to the north during the 100 yr and 500 yr flood events. The calculation are included herein and the results spills are 8.5 cfs and 91.9 cfs for the 100 yr and 500 yr events, respectively.

Areas of Concern Moving Forward

- South Tributary – A discussion regarding the potential need for a more detailed survey in South Tributary reach and surrounding areas is merited in our opinion, based on the vicinity of structures and nature of the flood flows. Additional survey along the South Tributary no longer appears necessary.

Comment Response (see attached, also included in Excel file in submittal folder)

OBJECTID	comment	River	type	Comment Response
1	Add reach length 43.5 feet to cross-sections. Related to name of XS. XS-404 actually located at XS-444.	South Trib	Misc.	Cross section lengths were adjusted.
2	XS South 3019-3335 – Need more cross sections for better definition in this area. Need to quantify flow split. Does Broomfield want to maintain full flow in mainstem? Let's discuss.	South Trib	Flow Split	Additional cross sections added in this location. Flow file accounts for approximately 100 cfs split flow via existing storm drains and capacity appeared available in pipes based on brief field investigation.
4	XS South 3671 is not perpendicular to the river channel. See upstream and downstream XS for visual check.	South Trib	Misc.	XS orientation modified to be perpendicular to river channel
5	Follows major flow path on property. During mapping phase, please note 100-yr floodplain should include the street.	South Trib	Misc.	Flow path maintained and mapping will reflect flooding in 3rd Ave
7	XS South 2668 Please review alignment and revise as necessary. IEFA likely needed in LOB due to downstream floodplain contraction.	South Trib	Misc.	IEFA added to LOB. Alignment appears correct based on anticipated flow path.
8	XS South 983-2256 – Please add blocked obstructions for individual buildings within or very near 500-yr floodplain.	South Trib	IEFA/Obstruction	Structures added as necessary.
9	XS South 719 - Residential buildings represented as single blocked obstruction. Please revise.	South Trib	IEFA/Obstruction	Structures separated into individual buildings including building shadows where applicable.
10	XS South 3671-3446 - Please add XS for constricted area.	South Trib	Misc.	XS added
11	XS South 3446 - Please model buildings as individual blocked obstructions.	South Trib	IEFA/Obstruction	Individual structures added.
13	XS South 2668-2746 Bank Stations: XS 2746 Revise bank station to be within 100-yr floodplain. XS 2668 Revise bank station placement as needed to provide smooth transition.	South Trib	Misc.	Bank Stations Modified
14	HEC-RAS Junction 1. Length for South Trib should be 529 ft.	South Trib	Misc.	Stream length for South Tributary updated to 529 feet.
15	XS South 404 actually located at XS-444. Please adjust cross sections names to match stationing once model is finalized.	South Trib	Misc.	Cross section lengths were adjusted.
16	XS South 581 – Check placement of blocked obstruction and IEFA is unnecessary.	South Trib	IEFA/Obstruction	IEFA removed. Blocked obstruction remains as school building was recently expanded since date of latest aerial photo.
17	XS South 719-983 – Please add cross section(s) for better floodplain definition adjacent to the home in LOB.	South Trib	Misc.	Cross section added.
19	XS South 3695 – Please add IEFA in LOB.	South Trib	IEFA/Obstruction	IEFA added to LOB.
20	XS 3831 – Cutline doubles back over itself in ROB.	South Trib	Misc.	Cross section modified.
22	XS South 3671 – Please use IEFA rather than modifying topo to simplify mapping process.	South Trib	IEFA/Obstruction	Blocked IEFA added and topo modified to reflect the adjacent pond topography
23	XS South 3335 – Please use IEFA rather than modifying topo to simplify mapping process.	South Trib	IEFA/Obstruction	Blocked IEFA added and topo modified to reflect the adjacent pond topography
24	XS South 3019 – Section is uncontained at building. Suggest tying back to high ground.	South Trib	Misc.	Cross section modified to contain flows.
25	XS South 2668-2746 – Please review if IEFA needed in LOB due to contraction/expansion and building shadows. Please add blocked obstrcutions for buildings.	South Trib	IEFA/Obstruction	IEFA added to LOB to account for flow contraction
26	XS South 1127 – How much flow is spilling to the north? Is it contained to street? LOMR 18-08-0246P identified shallow flooding north along Hemlock St., and spill flow was not subtracted from main channel.	South Trib	Flow Split	Normal depth calculation is included to define spill flow quantity for both 100 yr and 500 yr events.
27	XS South 1127, 1435, 1736, 2031, 2339 – N-value representing street is too low for average area between cross sections. Please review and revise.	South Trib	n-value	Manning's n-values revised to better represent average roughness between cross sections.
28	XS South 1435, 1736, 2031, and 2339 – IEFA may be overly conservative. Please review and revise if necessary.	South Trib	IEFA/Obstruction	Left Bank IEFA's for XSs 1435, 1736, and 2031 were adjusted to be less conservative. The IEFA for XS 2339 was not adjusted due to the extents of the adjacent upstream berm on the left bank.
29	XS 3025 – Please modify n-value for parking area to be consistent with Table 1 in the summary memo (n=0.03)	Main	n-value	Manning's n-value revised to be consistent for parking areas.
30	XS 4826 – n=0.02 used for trail likely doesn't represent average roughness between cross sections.	Main	n-value	Value updated.
31	XS 5999 - n=0.02 used for trail likely doesn't represent average roughness between cross sections.	Main	n-value	Value updated.
32	XS 6288-6363 – Please review if n-value representing commercial area would be more appropriate in ROB area.	Main	n-value	Manning's value updated to reflect commerical area for XS 6288. XS 6363 was not changed.
34	XS 8854 – N-value is not consistent with adjacent cross sections.	Main	n-value	Manning's n-value adjusted to match surrounding XSs
35	XS 1085-2150 – Based on results, IEFA in ROB is inconsistent. Please review – it appears that it is likely effective due to flow from upstream cross sections.	Main	IEFA/Obstruction	IEFA on ROB at Agate Way was removed from the model upstream of trail spur. IEFA's remain downstream of the trail spur as no effective hydraulic connection appears to exist for these flows.
36	XS 1389 – How was the elevation of the ROB IEFA determined? Please verify.	Main	IEFA/Obstruction	IEFA elevation determined by elevation of downstream bridge deck.
37	Culvert 2215 – Please add IEFA for culvert at bounding sections.	Main	IEFA/Obstruction	IEFAs added to bounding cross sections at Emerald Street.
38	Bridge 2985 – Please add IEFA for bridge at bounding sections.	Main	IEFA/Obstruction	IEFAs added to downstream XS. IEFAs added to upstream cross section are outside of flow area. Does an additional corss section need to be added closer to the upstream face of the bridge?
39	XS 3610-XS 3714 – Please add IEFA below elevation of pond berm.	Main	IEFA/Obstruction	Permanent IEFA added to reflect downstream pond berm elevation.
40	XS 3714 – Please consider realigning section to avoid overestimating conveyance area.	Main	IEFA/Obstruction	Comment omitted per review meeting discussion.
41	XS-3889-4062 – Please consider realigning sections to avoid overestimating conveyance area. Please also review IEFA for consistency across adjacent sections.	Main	IEFA/Obstruction	Cross sections were realigned based on discussion at review meeting.
42	Culvert 3800 – Please set IEFA elevations to high point in road and make permanent.	Main	IEFA/Obstruction	IEFA adjusted to high point in Midway Blvd and set to permanent.
44	XS 6288 – Please review if IEFA necessary for building shadows.	Main	IEFA/Obstruction	IEFA does not appear necessary due to antipcated nature of flows.
46	Culvert 6320 – Please review if IEFA should be added at bounding sections.	Main	IEFA/Obstruction	IEFA on ROB removed as results indicate flow is already outside of channel. LOB IEFA still appears appropriate.

47	XS 6363 – IEFA in ROB is probably more appropriate outside of the parking entrance.	Main	IEFA/Obstruction	IEFA in ROB adjusted to keep parking lot driveway open
48	Culvert 6540 - Please add IEFA for culvert at bounding sections.	Main	IEFA/Obstruction	IEFAs adjusted to account for culvert. Downstream ROB IEFA left open at existing driveway access.
50	XS 6656 – XS 6734 – Please verify elevation of IEFA in LOB. Appears that it should be at the road elevation to block onsite channel/pond.	Main	IEFA/Obstruction	LOB IEFA updated to reflect road/pond berm elevation.
51	XS 6734 – Add IEFA for upstream culvert.	Main	IEFA/Obstruction	Culvert IEFAs added
52	XS 6917 – IEFA in ROB does not appear necessary. Please revise or justify.	Main	IEFA/Obstruction	IEFA previously defined in ROB was removed. IEFA added in new location for downstream culvert.
53	XS 6954-XS 7057 – Please add blocked obstruction for building in LOB.	Main	IEFA/Obstruction	Obstruction added for building in LOB
54	XS 7173 – Please add blocked obstruction for building in ROB.	Main	IEFA/Obstruction	Obstruction added for building in ROB
55	XS 7941 – Please make LOB IEFA permanent.	Main	IEFA/Obstruction	IEFA in LOB changed to permanent.
56	XS 8371-XS 8467 – ROB IEFA appears too high. Please revise or justify.	Main	IEFA/Obstruction	IEFAs were initially raised to prevent crossing profiles, current model has lower elevation for IEFA.
57	XS 8653-XS 8877 – Please add blocked obstruction for building in ROB.	Main	IEFA/Obstruction	Obstruction added to cross sections. XS 8904 was also included after review of the area.
58	XS 9174 – Please add blocked obstruction for building.	Main	IEFA/Obstruction	Field measurements of building openings were taken and added to model.
59	Ped Bridge 1345 – Check inverts (u/s is higher than d/s) and revise if necessary.	Main	Profile	Upstream XS updated to reflect surface invert.
60	XS 3447 – Please add section at upstream toe of pond berm to better define channel profile.	Main	Profile	XS added near downstream extent of pond.
61	XS 6233 – Lower channel invert based on survey	Main	Profile	Channel invert updated to reflect average channel slope between bounding ground surveys.
63	XS 6954 – Lower invert based on survey.	Main	Profile	Invert lowered based on average slope from bounding survey.
64	XS 7057 – Lower invert based on survey.	Main	Profile	Invert lowered based on average slope from bounding survey.
65	XS 7875 - Invert doesn't appear to reflect survey. Culvert is longer than XS downstream reach.	Main	Profile	Culvert length appears to match survey. Deck width, bounding cross section inverts, and distance to upstream cross section were updated.
66	XS 8544 - Invert doesn't appear to reflect survey.	Main	Profile	Invert updated to reflect survey
67	XS 8769-8653 – Missing survey data, but appears that invert could be reasonably estimated based on nearby upstream and downstream survey.	Main	Profile	Inverts estimated based on average slope for adjacent survey points
68	XS - Please review if additional section is necessary between sections 6021 and 6233 at playground.	Main	Misc.	Cross section added. Playground equipment does not appear to warrant change in roughness value through area.
69	XS 29-351 – Please consider realigning sections in ROB.	Main	Misc.	Sections were realigned and tie in was extended downstream
71	XS 8095 – Please review if increased C/E warranted due to downstream culvert and revise if necessary.	Main	Misc.	Increased C/E removed from cross section. Increased C/E was also removed from the upstream cross section of the next downstream culvert based on the same idea.
72	XS 6734 – Section length in HEC-RAS geometry appears to be 484-ft, but HEC-RAS results show 561-ft. Did we receive an outdated geometry?	Main	Misc.	Unsure of what happened in the last submittal. The correct cross section geometry has been provided.
74	Discuss during next meeting: Channel centerline, bank stations, and IEFA due to inline berms from XS-9174 through XS-8653.	Main	Misc.	Channel Alignment was moved to adjacent roadway and private infrastructure on concrete plant property was modeled as blocked.
75	Please revise model to avoid crossing profiles at XS 6546, 6656, and 6734.	Main	Misc.	All crossing profiles have been corrected. Where signficant adjustment to the IEFA's was required a note has been added to the cross section.
76	The following sections are uncontained: 529, 1389, South 3335, South 3446, and 6734. For XS 529, it doesn't appear that a lateral structure is necessary to estimate the floodplain extents. Downstream tie-in location may	Main	Misc.	Sections were realigned and tie in was extended downstream
77	Add XS upstream of first crossing (approx. XS-9150)	Main	Misc.	Cross Section added (XS 9333).
78	XS 6263-6363 – Please review IEFA placement in ROB based on results. It appears that this area may be effective due to flow in ROB from upstream section.	Main	IEFA/Obstruction	IEFA removed from ROB
79	For complex culverts, please calculate hydraulics outside of HEC-RAS to verify results. If substantially different, then use a rating curve in HEC-RAS.	Main	Misc.	Culverts 6850, 8175, 8355, 8800 were analzed in HY-8. Significant differences were only found in 10-year event for 8175, 8355, and 8800 and then again in the 50-year event for 8355.
80	XS 3025 - Why is cutline bent in ROB? Please review and revise as necessary.	Main	Misc.	XS revised.

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Jan 14 2020

South Tributary Spill at Hemlock St - 100-year

User-defined

Invert Elev (ft)	= 5363.28
Slope (%)	= 0.30
N-Value	= 0.030

Calculations

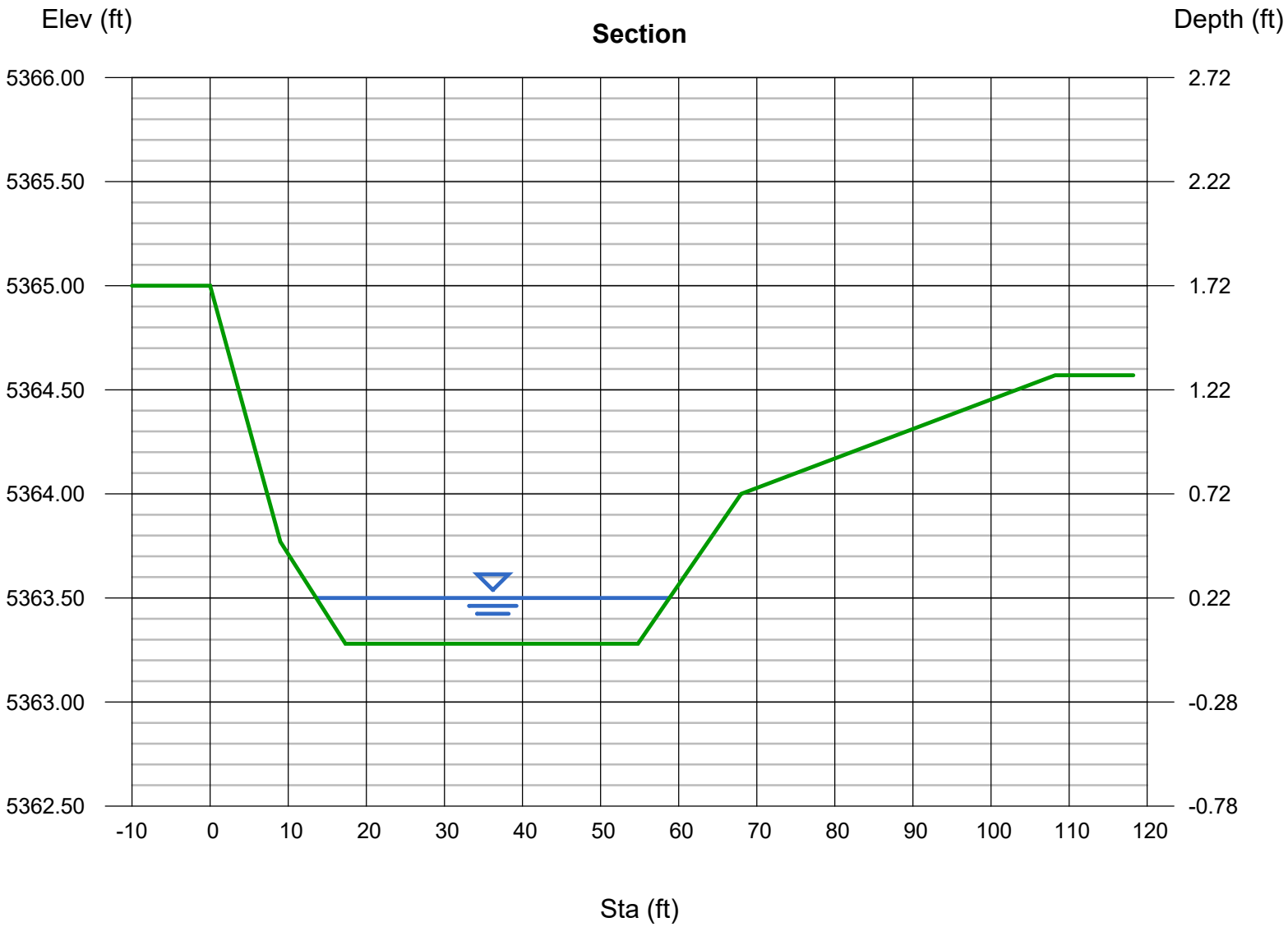
Compute by:	Known Depth
Known Depth (ft)	= 0.22

Highlighted

Depth (ft)	= 0.22
Q (cfs)	= 8.494
Area (sqft)	= 9.11
Velocity (ft/s)	= 0.93
Wetted Perim (ft)	= 45.26
Crit Depth, Yc (ft)	= 0.12
Top Width (ft)	= 45.24
EGL (ft)	= 0.23

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

(0.00, 5365.00)-(8.99, 5363.77, 0.030)-(17.32, 5363.28, 0.030)-(54.78, 5363.28, 0.030)-(68.00, 5364.00, 0.030)-(108.22, 5364.57, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Jan 14 2020

South Tributary Spill at Hemlock St - 500-year

User-defined

Invert Elev (ft)	= 5363.28
Slope (%)	= 0.30
N-Value	= 0.030

Calculations

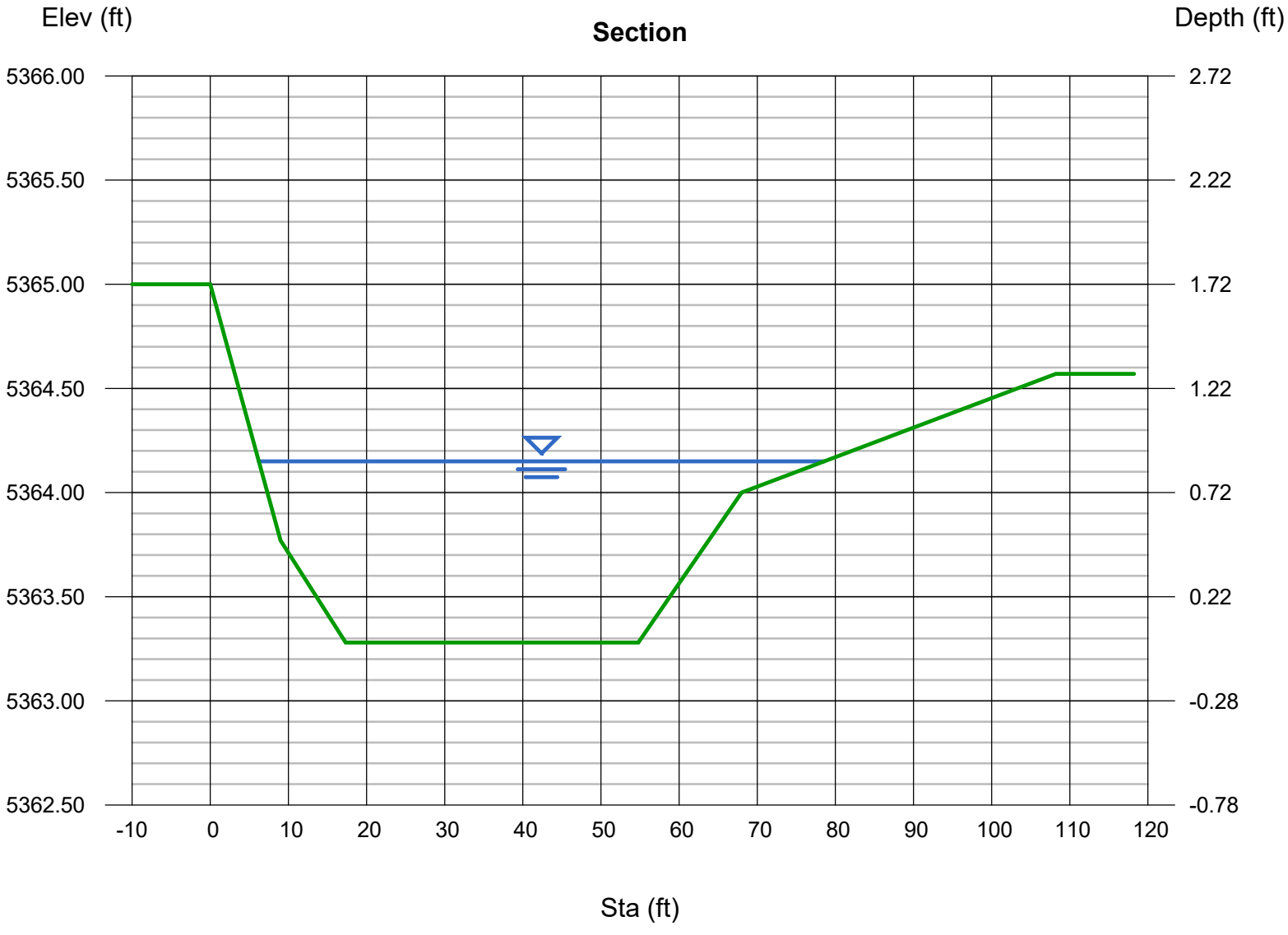
Compute by:	Known Depth
Known Depth (ft)	= 0.87

Highlighted

Depth (ft)	= 0.87
Q (cfs)	= 91.90
Area (sqft)	= 45.86
Velocity (ft/s)	= 2.00
Wetted Perim (ft)	= 72.43
Crit Depth, Yc (ft)	= 0.53
Top Width (ft)	= 72.37
EGL (ft)	= 0.93

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

(0.00, 5365.00)-(8.99, 5363.77, 0.030)-(17.32, 5363.28, 0.030)-(54.78, 5363.28, 0.030)-(68.00, 5364.00, 0.030)-(108.22, 5364.57, 0.030)



Obstructions, XS 1389. Suggest obstruction for house/structures in this reach on ROB.	Obstructions were included for structures that appear to experience inundation
Centerline recommended revision	In area where suggested centerline was provided the centerline was revised. The revision accounted for the recommended alignment but was also alightly adjusted for topo and existing features in the area.
Other revision	Upstream most cross section was removed per conversation with Rebecca Baker at Broomfield. The previous model showed extending the floodplain upstream towards Hoyt, but has now been reduced to the previously studied limits.

Memorandum

To: Brooke Seymour P.E., CFM; Hung-Teng Ho P.E., CFM
From: Daniel Loewen P.E.
CC: Rebecca Baker P.E., CFM
Date: May 24, 2021
RE: City Park Drainageway FHAD

Comment Response

Comments were received on 4/8/21. The comments received were reviewed and addressed. Comments related to the delineation associated with additional obtained survey may need further discussion as follows:

1. Agate Way spill/split – It appears a meeting should be held to determine the best approach for the final flood hazard determination in this area. The previously submitted and approved multi-profile model, included effective flow along Agate Way in the right over bank downstream of Emerald Street. Based on the aerial topography, there appears to be a hydraulic connection to this area along a trail spur that connects the City Park Channel trail to the neighborhood on Agate Way. However, when developing the floodway model, it appears that this modeling approach will cause numerous homes to be included in the floodway based on both HGL and EGL surcharge constraints. The 1979 FHAD identified this area as not hydraulically connected and therefore, it appears that a discussion is necessary to determine if more detailed analysis should be completed or if conclusions can be made from the information/analysis already completed. The model included in this submittal includes two geometries, one with the Agate Way flow connected as previously submitted and one with the Agate Way flow adjusted to be represented as on IEFA as in the 1979 FHAD. The two geometries in the model submitted depict the impact of the change to the flood maps in the area, particularly the floodway. It appears that modifying the area to IEFA may be most appropriate based on the 1979 FHAD and therefore the delineations provided assume that this change will be incorporated into the final FHAD. Furthermore, based on effective flooding information, it was previously assumed that the homes in this area were slab on grade, without basement structures. However, upon further research (real estate web sites), it appears that these homes have basement living areas indicating that the current flood extents may not have been accurately represented and further discussion is warranted to determine how to represent the flood hazard related to these insurable structures.
2. Another comment requested further discussion regarding the delineation related to the right over bank directly downstream of Highway 287 (another area where additional survey information was obtained for the survey). Per a discussion with Hung-Teng, Loewen modified the terrain

information to include the building FFE and lowest adjacent grade survey. It appears that this modification to the terrain has adequately addressed the comment.

Additional Notes regarding Submittal

1. A 0.5-foot floodway model and delineation has been included in this submittal.
2. A 500-year floodplain delineation has been included in this submittal.
3. A draft report is currently being prepared and is not provided in this submittal due to the pending issue for discussion noted above and will be provided following the determination/resolution of the above topic. A draft of the FHAD Map has been provided with the understanding that additional labels and modifications to readability will need to be made once the delineations are approved. Further, flood profiles have not been included pending approval of outstanding items discussed above.

Appendix B Hydrologic Analysis Supporting Documents

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City and County of Broomfield Colorado	NO PROJECT	FLOODWAY HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA WEIR-DAM CHANGES
	COMMUNITY NO.: 085073		
IDENTIFIER	City Park Channel and Nissen Creek LOMR	APPROXIMATE LATITUDE AND LONGITUDE: 39.914, -105.048 SOURCE: Other DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 0850730087G DATE: October 2, 2013 TYPE: FIRM* NO.: 0850730091G DATE: October 2, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: October 2, 2013 PROFILE(S): 07P-09P, 22P-24P and 44P-45P FLOODWAY DATA TABLE: 3 SUMMARY OF DISCHARGES TABLE: 2

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCES AND REVISED REACHES See Page 2 for Additional Flooding Sources

City Park Channel - from the confluence with Nissen Reservoir Channel to approximately 260 feet upstream of Main Street

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
City Park Channel	Zone AE	Zone AE	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
	BFEs	BFEs	YES	YES
	Floodway	Floodway	YES	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER FLOODING SOURCES AFFECTED BY THIS REVISION

FLOODING SOURCES AND REVISED REACHES

City Park Channel - from the confluence with Nissen Reservoir Channel to approximately 260 feet upstream of Main Street
Nissen Reservoir Channel - from the confluence with Big Dry Creek to just upstream of Sheridan Boulevard
City Park Overflow - from the confluence with Nissen Reservoir Channel to the divergence from City Park Channel

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
City Park Channel	Zone AH	Zone AE	YES	NONE
Nissen Reservoir Channel	Zone AH	Zone A	YES	NONE
	Zone AE	Zone AE	YES	YES
	Floodway	Floodway	YES	YES
	BFEs*	BFEs	YES	YES
	Zone X (shaded)	Zone X (shaded)	YES	YES
City Park Overflow	Zone AH	Zone A	YES	NONE
	Zone AH	Zone AE	YES	NONE
	BFEs	BFEs	YES	YES
	Zone AH	Zone X (shaded)	YES	NONE

* BFEs - Base Flood Elevations

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

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Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 080008 **Name:** City of Westminster, Colorado

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 08059C0091F DATE: February 5, 2014 TYPE: FIRM* NO.: 08059C0092F DATE: February 5, 2014	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: February 5, 2014 PROFILE(S): 95P-96P AND 371P FLOODWAY DATA TABLE: 7 SUMMARY OF DISCHARGES TABLE: 3

CID Number: 080087 **Name:** Jefferson County, Colorado

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM* NO.: 08059C0091F DATE: February 5, 2014	NO REVISION TO THE FLOOD INSURANCE STUDY REPORT

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that any permits required by Federal or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Jeanine D. Petterson
Director, Mitigation Division
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267
(303) 235-4830

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

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Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping Web site at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Broomfield Enterprise*
Dates: July 23, 2015 and July 30, 2015

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304. Additional Information about the NFIP is available on our Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

TABLE 2. SUMMARY OF DISCHARGES

REVISED TO
REFLECT LOMR
DATED: November 27, 2015

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
City Park Channel					
Downstream of Main Street	1.70	990	1,888	2,413	3,364
Upstream of Divergence of City Park Overflow	1.95	1,004	1,993	2,536	3,473
At Confluence With Nissen Reservoir Channel	2.50	676	1,074	1,260	1,904
City Park Overflow					
Downstream of Divergence from City Park Channel	--[1]	0	452	893	1,696
Downstream of Vrain Street	--[1]	0	264	339	852
Nissen Reservoir Channel					
Downstream of West 123rd Place	2.12	370	727	977	1,812
Upstream of Perry Street	2.64	624	1,433	1,791	2,750
At Lowell Boulevard	5.19	1,149	2,367	3,068	4,440

[1]Data not available

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CITY PARK CHANNEL								
A	5,025	143	514	3.9	5,288.3	5,288.3	5,288.3	0.0
B	5,753	153	321	6.3	5,294.8	5,294.8	5,294.8	0.0
C	6,286	171	554	3.7	5,298.8	5,298.8	5,298.9	0.1
D	7,018	99	674	3.8	5,304.9	5,304.9	5,305.2	0.3
E	7,550	104	599	4.2	5,305.9	5,305.9	5,306.3	0.3
F	8,140	300	572	4.4	5,311.5	5,311.5	5,311.5	0.0
G	8,747	180	354	6.8	5,314.9	5,314.9	5,315.0	0.1
H	9,546	255	361	6.7	5,325.2	5,325.2	5,325.4	0.2
I	10,544	156	314	7.7	5,330.6	5,330.6	5,330.7	0.1
J	11,065	102	260	9.3	5,336.4	5,336.4	5,336.4	0.0
K	11,567	172	172	8.7	5,338.4	5,338.4	5,338.4	0.0
L	12,040	76	307	4.9	5,341.1	5,341.1	5,341.5	0.4
M	12,540	61	159	9.4	5,344.7	5,344.7	5,344.7	0.0
N	12,970	89	232	6.5	5,349.2	5,349.2	5,349.4	0.2
O	13,080	82	323	4.6	5,350.3	5,350.3	5,350.3	0.0
P	13,280	111	426	3.2	5,350.5	5,350.5	5,350.6	0.1
Q	13,800	61	151	9.1	5,353.1	5,353.1	5,353.1	0.0
R	14,220	85	196	7.0	5,358.5	5,358.5	5,358.5	0.0
S	15,180	68	131	6.8	5,365.2	5,365.2	5,365.4	0.2
T	15,670	58	149	6.0	5,369.5	5,369.5	5,370.2	0.7
U	16,170	47	113	7.9	5,374.2	5,374.2	5,374.8	0.6
V	16,660	44	104	8.6	5,382.6	5,382.6	5,383.0	0.4
W	16,995	212	206	4.3	5,390.7	5,390.7	5,391.2	0.5
X	17,225	104	403	2.2	5,393.4	5,393.4	5,393.5	0.1
Y	17,440	50	239	3.7	5,393.3	5,393.3	5,393.7	0.4
Z	18,265	23	164	5.7	5,401.7	5,401.7	5,402.2	0.5

REVISED DATA

[1] Stream distance in feet above confluence with Nissen Reservoir Channel

REVISED TO REFLECT LOMR DATED: November 27, 2015

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

FLOODWAY DATA

CITY PARK CHANNEL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NISSEN RESERVOIR CHANNEL	**REVISED DATA** ↓							
A	2,577	180	658	4.7	5,242.2	5,242.2	5,242.3	0.2
B	3,266	49	201	9.9	5,243.7	5,243.7	5,243.8	0.1
C	3,705	271	467	3.8	5,247.7	5,247.7	5,248.0	0.3
D	4,118	160	461	3.9	5,251.7	5,251.7	5,251.9	0.2
E	4,515	65	264	3.7	5,254.4	5,254.4	5,254.5	0.0
F	4,832	65	198	5.0	5,258.3	5,258.3	5,258.3	0.0
G	5,124	32	98	10.0	5,261.3	5,261.3	5,261.4	0.1
H	5,441	46	166	5.9	5,264.1	5,264.1	5,264.3	0.3
I	5,746	51	171	5.8	5,266.1	5,266.1	5,266.1	0.0
J	5,955	40	124	7.9	5,268.0	5,268.0	5,268.4	0.4
K	6,604	181	220	4.4	5,273.5	5,273.5	5,273.6	0.0
L	7,654	223	222	4.4	5,283.3	5,283.3	5,283.5	0.2
M	8,816	70	230	4.5	5,293.2	5,293.2	5,293.3	0.1
N	9,850	15	53	10.6	5,304.2	5,304.2	5,304.2	0.0
O	9,940	38	153	7.2	5,306.9	5,306.9	5,306.9	0.0
P	10,420	36	93	11.7	5,306.9	5,306.9	5,306.9	0.0
Q	10,950	43	120	9.2	5,308.5	5,308.5	5,308.7	0.2
R	11,070	43	71	7.4	5,311.0	5,311.0	5,311.0	0.0
S	11,500	78	84	6.6	5,314.3	5,314.3	5,314.3	0.0
T	12,250	131	95	4.9	5,322.7	5,322.7	5,322.7	0.0
U	12,450	60	72	7.2	5,326.4	5,326.4	5,326.4	0.0
V	13,150	150	138	3.5	5,331.9	5,331.9	5,331.9	0.0
W	13,270	72	77	5.9	5,341.3	5,341.3	5,341.3	0.0

[1] Stream Distance in Feet above Confluence with Big Dry Creek

TABLE 3

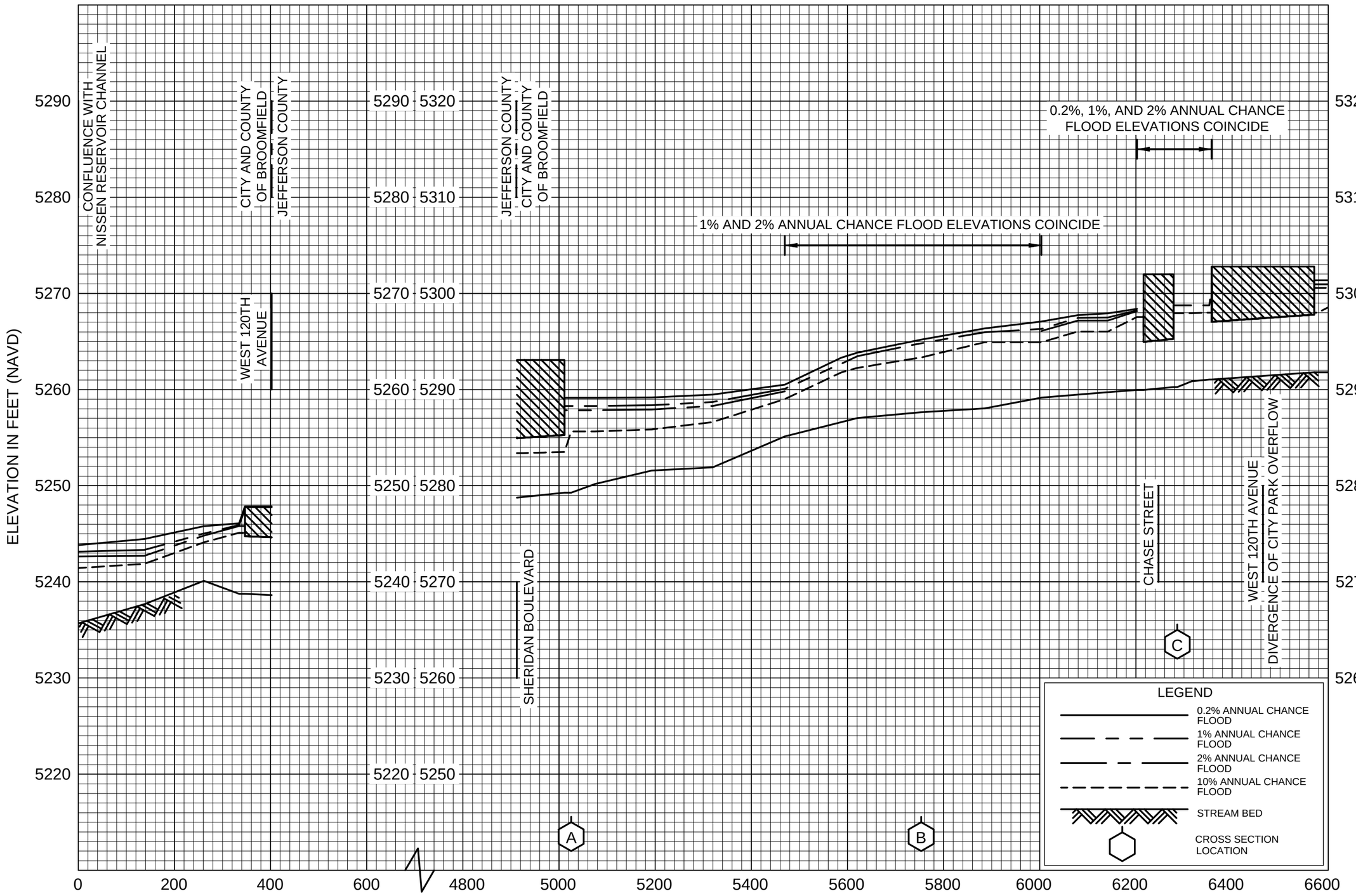
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

REVISED TO REFLECT LOMR DATED: November 27, 2015

FLOODWAY DATA

NISSEN RESERVOIR CHANNEL



FLOOD PROFILES

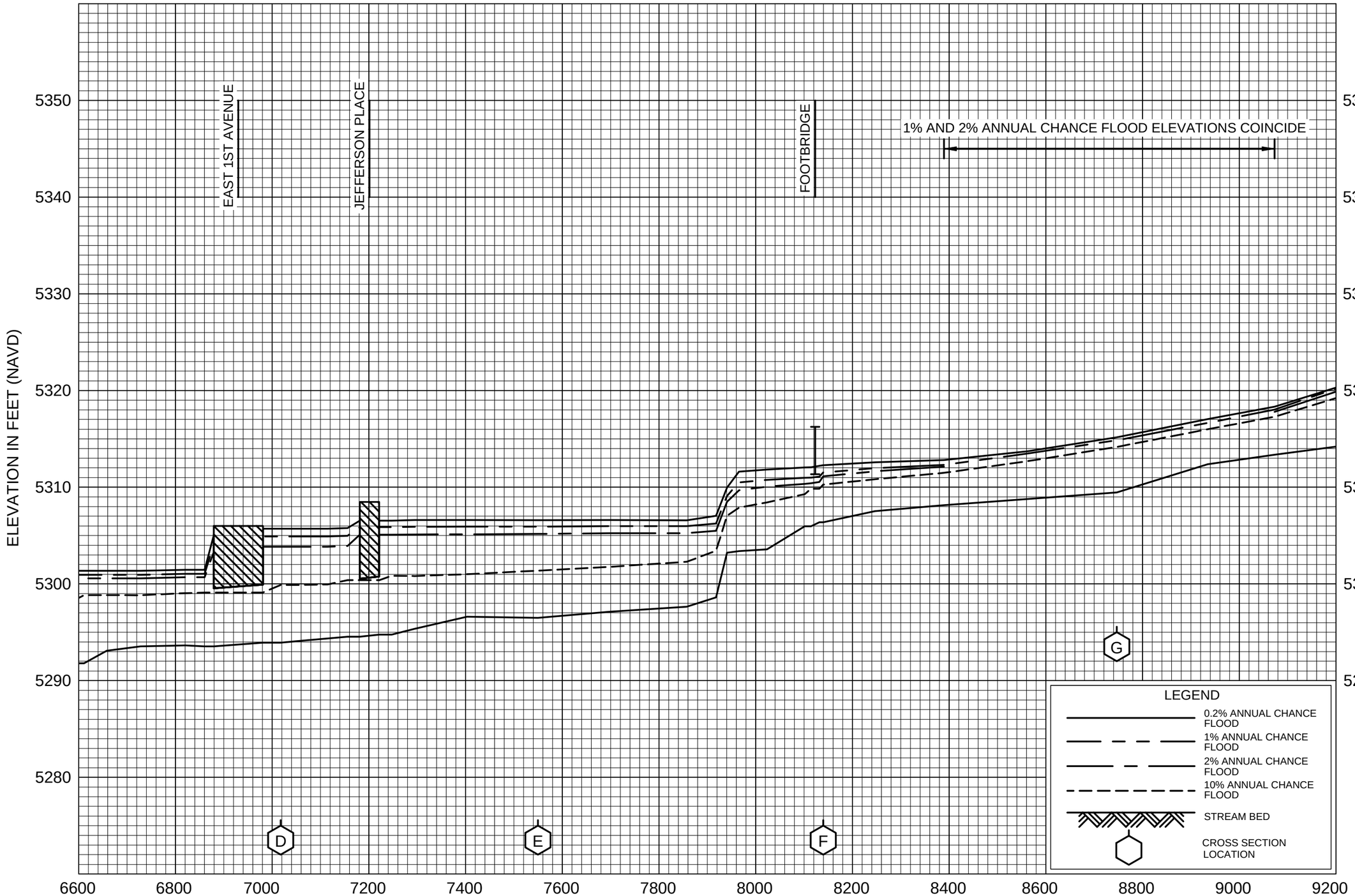
REVISED TO REFLECT LOMR
DATED: November 27, 2015

CITY PARK CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

07P



FLOOD PROFILES

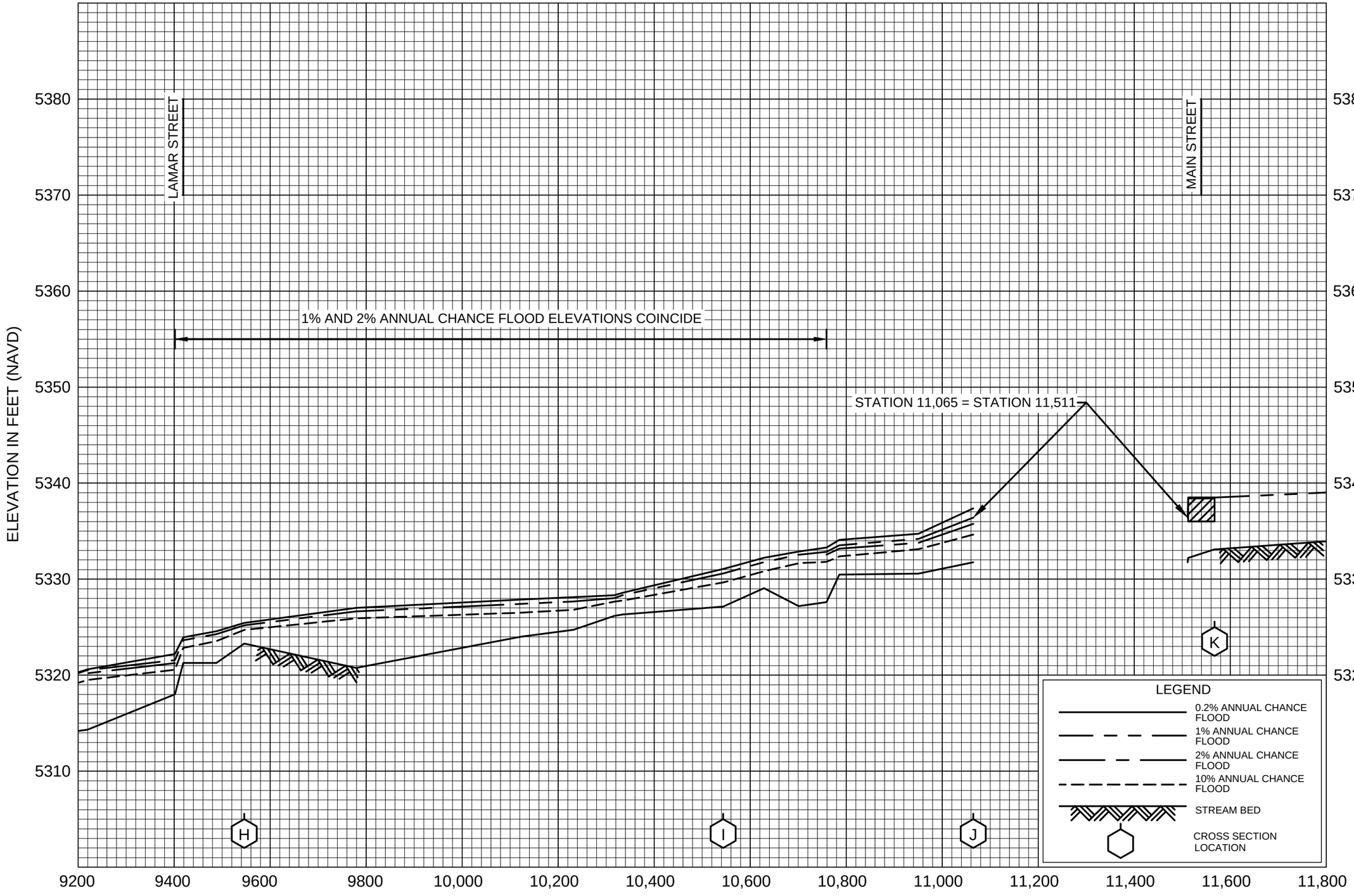
REVISED TO REFLECT LOMR DATED: November 27, 2015

CITY PARK CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

08P



FLOOD PROFILES

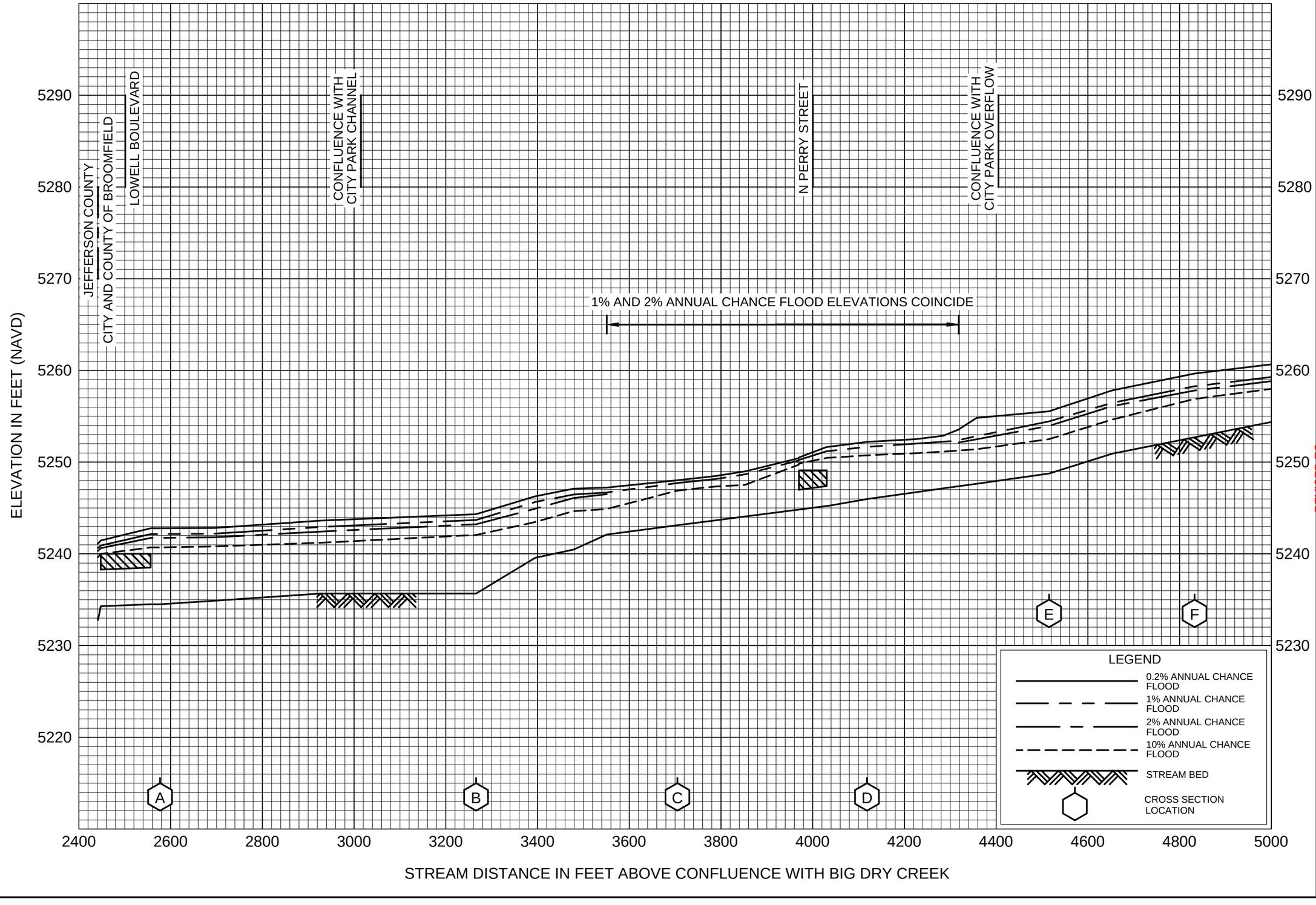
CITY PARK CHANNEL

REVISED TO REFLECT LOMR DATED: November 27, 2015

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

09P



FLOOD PROFILES

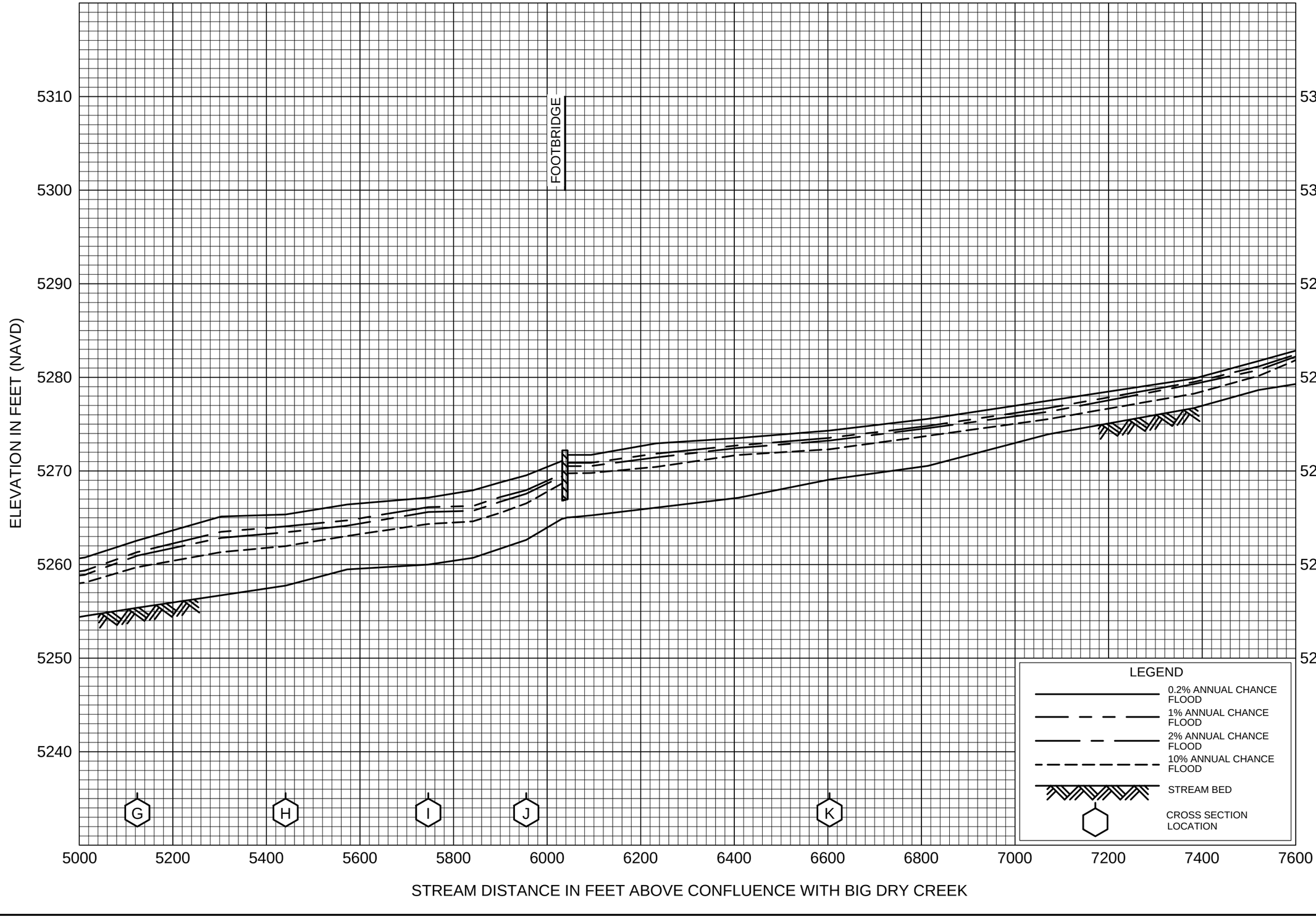
REVISED TO REFLECT LOMR DATED: November 27, 2015

NISSEN RESERVOIR CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

22P



REVISED TO REFLECT LOMR DATED: November 27, 2015

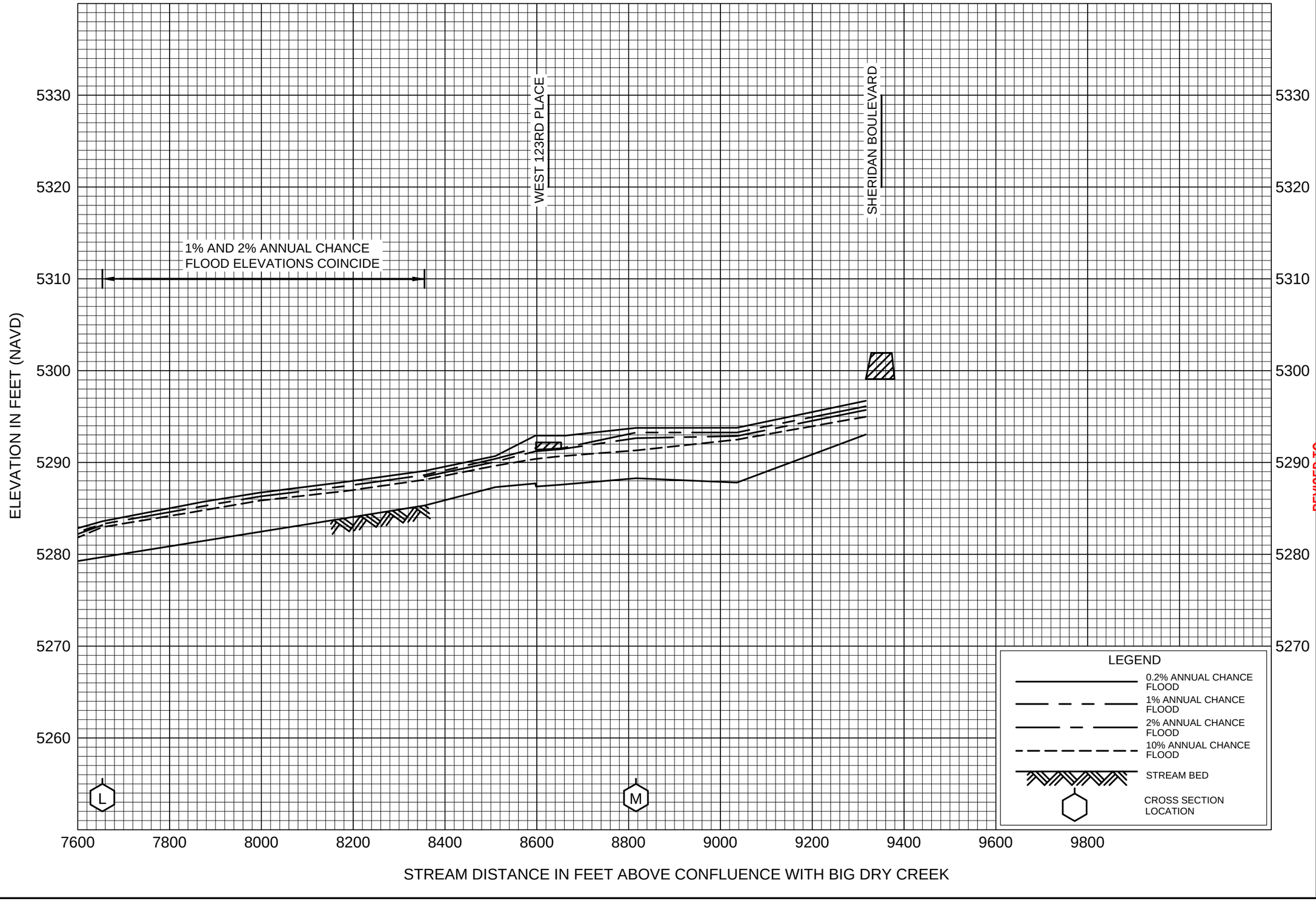
FLOOD PROFILES

NISSEN RESERVOIR CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

23P



FLOOD PROFILES

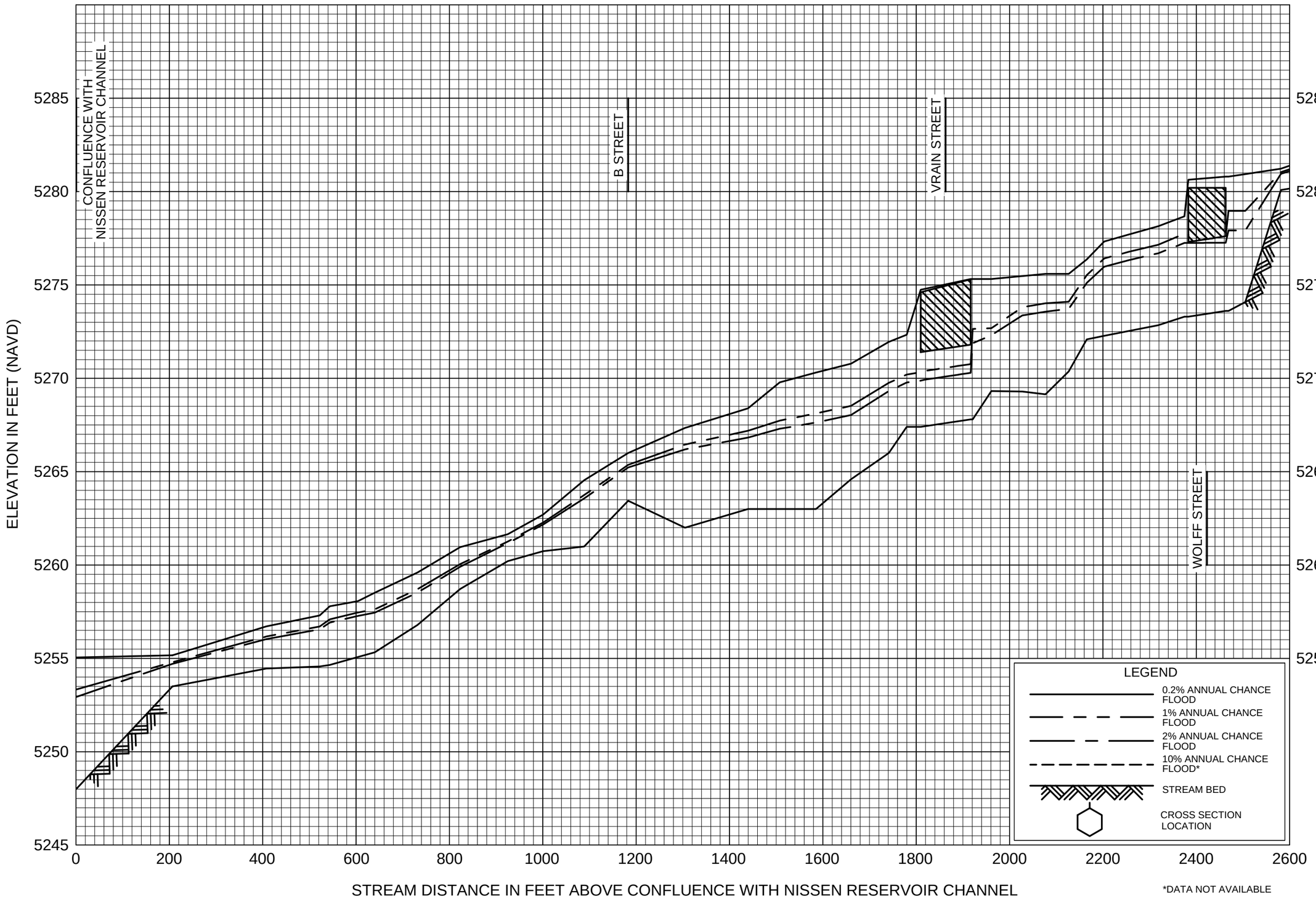
~~REVISED TO~~ REFLECT LOMR DATED: November 27, 2015

NISSEN RESERVOIR CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

24P



FLOOD PROFILES

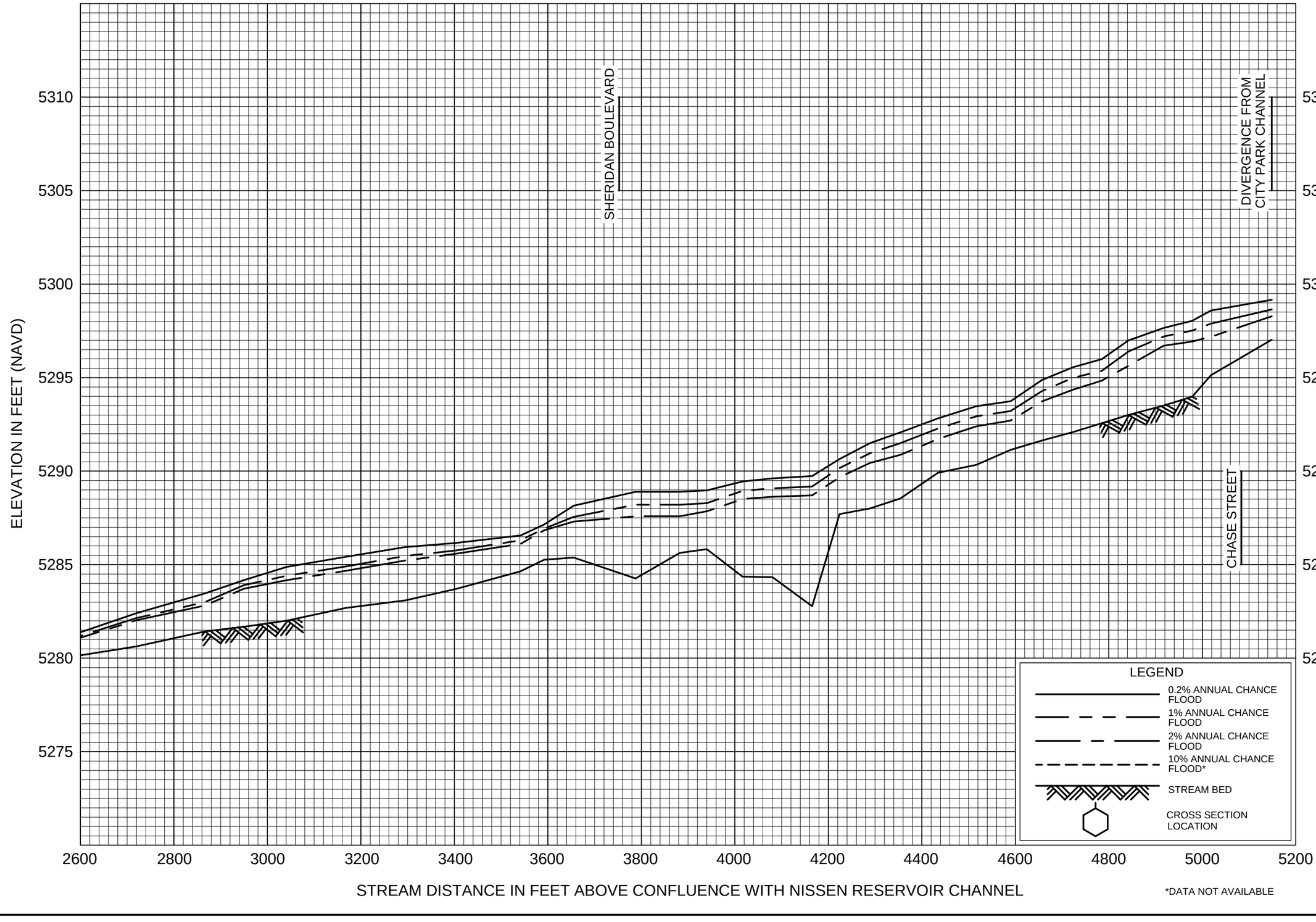
REVISED TO REFLECT LOMR
DATED: November 27, 2015

CITY PARK OVERFLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY
OF BROOMFIELD, CO

44P



FLOOD PROFILES

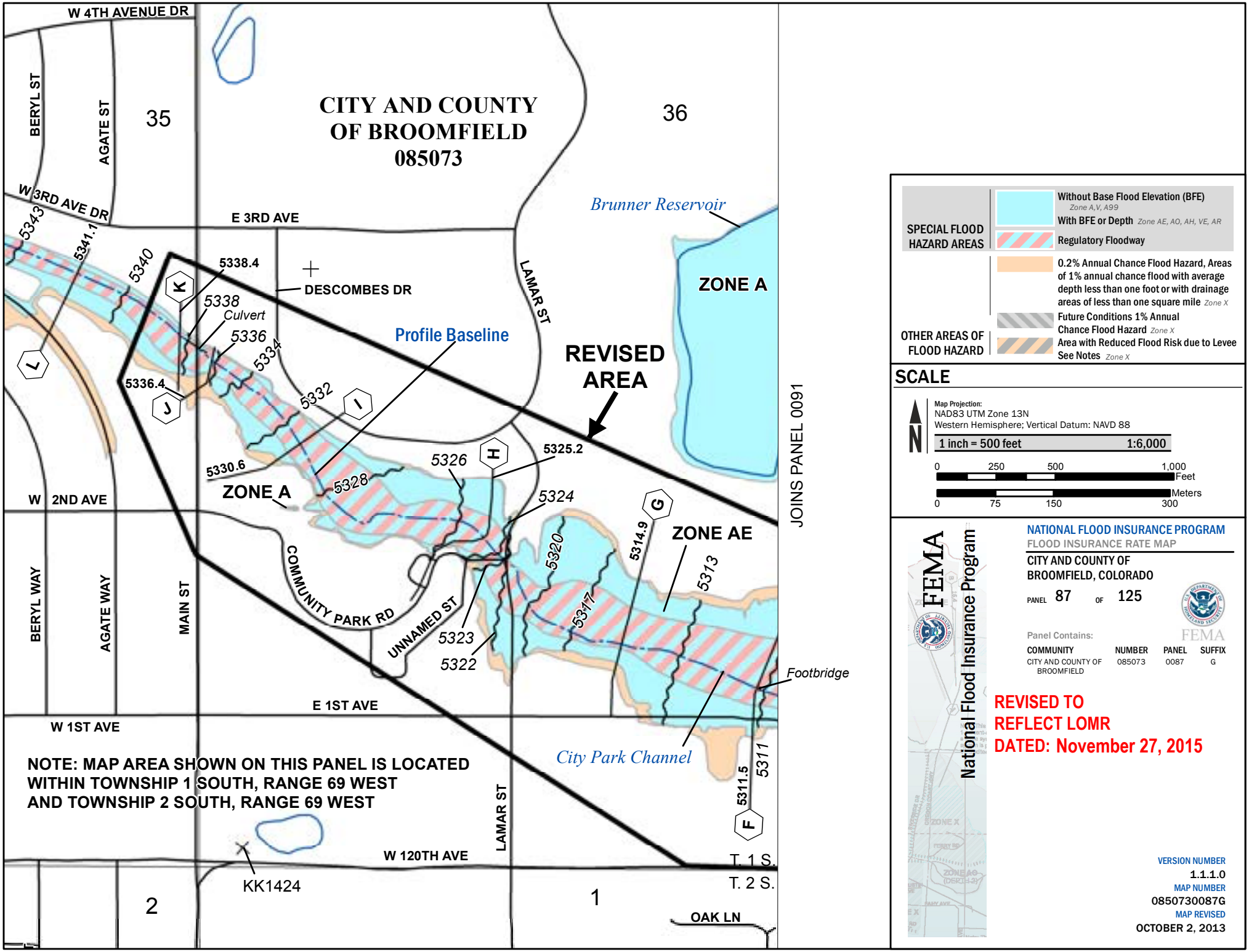
REVISED TO REFLECT LOMR DATED: November 27, 2015

CITY PARK OVERFLOW

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY AND COUNTY OF BROOMFIELD, CO

45P



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 1 SOUTH, RANGE 69 WEST AND TOWNSHIP 2 SOUTH, RANGE 69 WEST

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*

SCALE

Map Projection:
NAD83 UTM Zone 13N
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 75 150 300 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CITY AND COUNTY OF BROOMFIELD, COLORADO

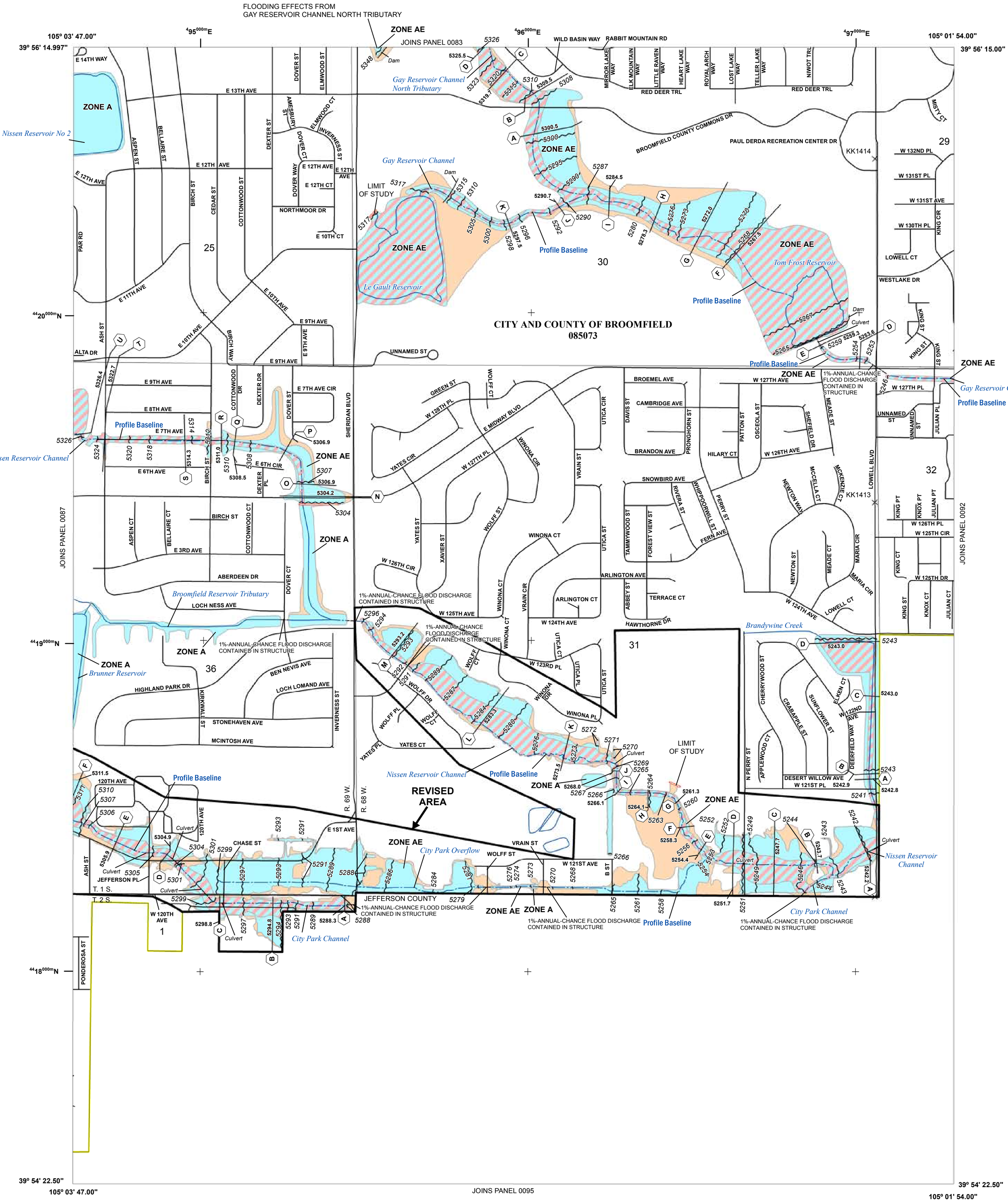
PANEL 87 OF 125

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CITY AND COUNTY OF BROOMFIELD	085073	0087	G

REVISED TO REFLECT LOMR DATED: November 27, 2015

VERSION NUMBER
1.1.1.0
MAP NUMBER
08507300876
MAP REVISED
OCTOBER 2, 2013



FLOOD HAZARD INFORMATION

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

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTP://MSC.FEMA.GOV

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*

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

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall

OTHER FEATURES
- 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in 2009 by the City and County of Broomfield GIS Department.

Local vertical monuments were used to create this map. To obtain current monument information, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit the website at **http://www.ngs.noaa.gov**.

SCALE

Map Projection:
Universal Transverse Mercator Zone 13N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 500 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CITY AND COUNTY OF BROOMFIELD, COLORADO

PANEL 91 OF 125

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CITY AND COUNTY OF BROOMFIELD	085073	0091	G

REVISED TO REFLECT LOMR DATED: November 27, 2015

VERSION NUMBER
1.1.1.0

MAP NUMBER
0850730091G

MAP REVISED
OCTOBER 2, 2013

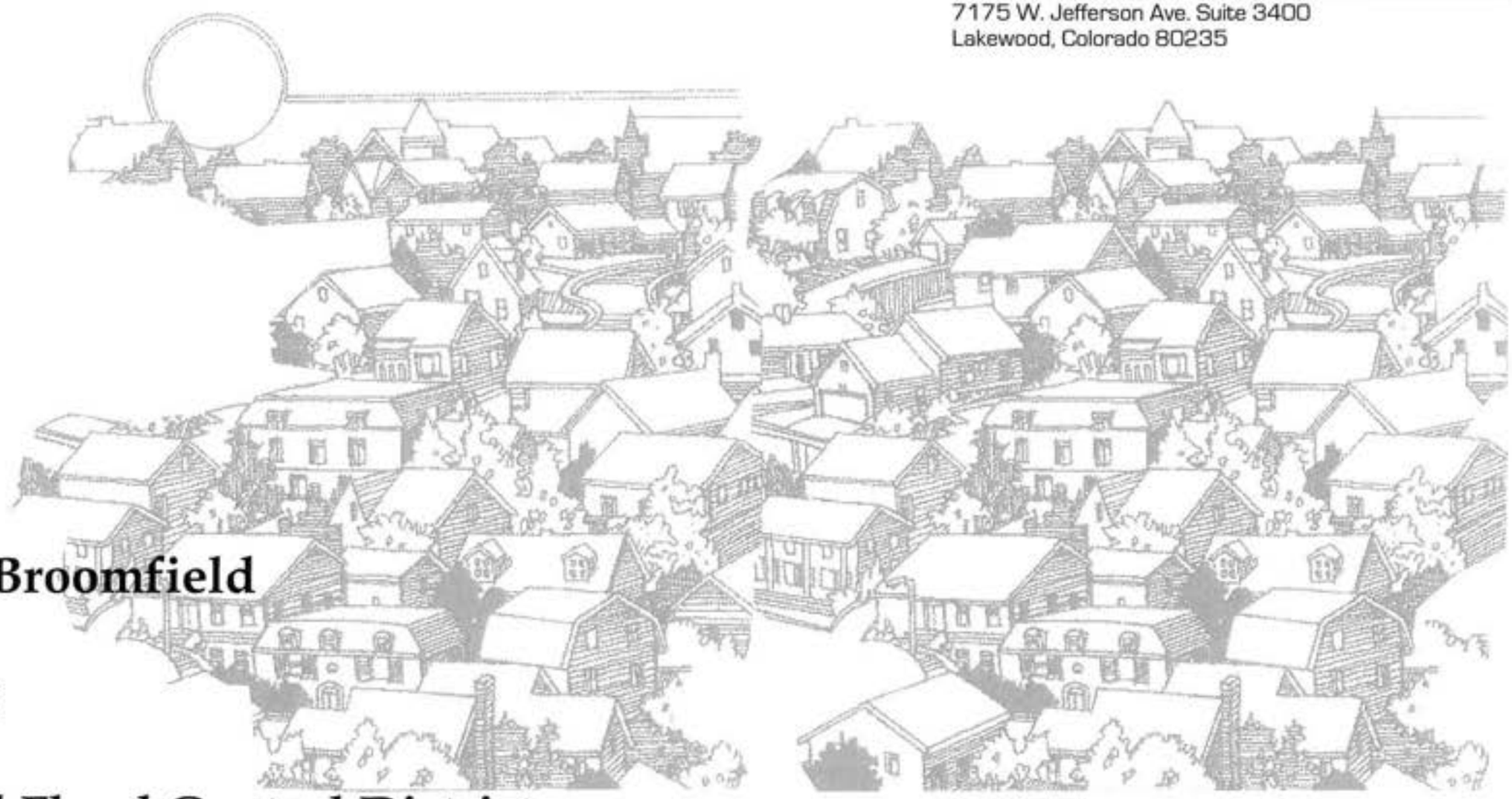
City Park and 3207 Drainageways Outfall Systems Planning Study

Preliminary Design Report

Prepared by:

Kiowa Engineering Corporation
7175 W. Jefferson Ave. Suite 3400
Lakewood, Colorado 80235

June 2006

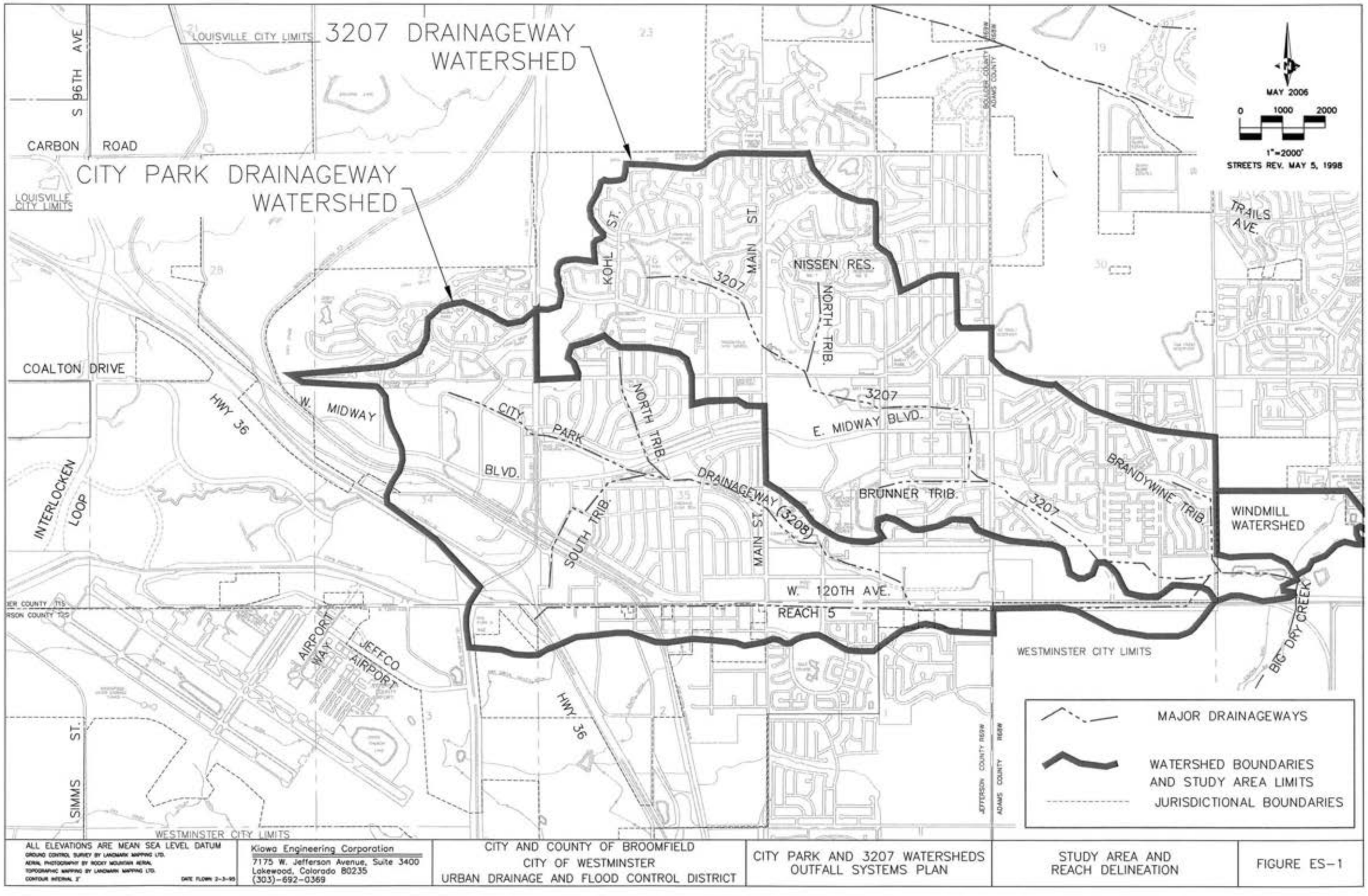


Sponsored by:

City and County of Broomfield

City of Westminster

Urban Drainage and Flood Control District



ALL ELEVATIONS ARE MEAN SEA LEVEL DATUM
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AERIAL PHOTOGRAPHY BY ROCKY MOUNTAIN AERIAL
TOPOGRAPHIC MAPPING BY LANDMARK MAPPING LTD.
CONTOUR INTERVAL 2'
DATE FLOWN 2-3-95

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Lakewood, Colorado 80235
(303)-692-0369

CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS OUTFALL SYSTEMS PLAN

STUDY AREA AND REACH DELINEATION

FIGURE ES-1

LEGEND

JURIDICTIONAL BOUNDARIES
WATERSHED BOUNDARIES
DRAINAGEWAY
STREET CROSSING
OPEN CHANNEL
STORM SEWER

REACH 1
REACH 2
REACH 3
REACH 4
REACH 5
REACH 6

W. 136TH AVE.
W. 10TH AVE.
W. 120TH AVE.
HWY. 287
MAIN ST.
SHERIDAN BLVD.
LOWELL BLVD.
HWY 36
MIDWAY BLVD.
AIRPORT WAY
COMMUNITY DITCH
CITY PARK
NORTH TRIB.
SOUTH TRIB.
W. 4TH AVE.
W. 3RD AVE.
NICKEL ST.
HEMLOCK ST.
GARNET ST.
EMERALD ST.
AGATE WAY
DOES COMBES DR.
LAMAR ST.
E. 1ST AVE.
TENNYSON STREET
PERRY ST.
REED ST.
COUNTY R69W
BOULDER COUNTY T1S
JEFFERSON COUNTY T2S
JEFFERSON COUNTY AIRPORT
BIG DRY CREEK

3207
3207
3207

MAY 2006
0 500 1000 2000
STREETS REV. MAY 5, 1998
1" = 1500'

100-YEAR CROSSING
100-YR CROSSING
100-YR CROSSING
100-YR CROSSING
100-YR CROSSING
100-YR CROSSING
100-YR STORM SEWER
100-YR CROSSING
IMPROVED CROSSING
100-YR CROSSING
OUTLET PROTECTION
100-YR CHANNEL
100-YR CROSSING
5 YR-STORM SEWER/OVERFLOW SWALE
5-YR RIP-RAP CHANNEL
5-YR STORM SEWER AND FLOODPROOFING
100-YR CHANNEL
100-YR CROSSING
100-YR CHANNEL
100-YR DIV. CHANNEL
DETENTION FORMALIZATION

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CONTOUR INTERVAL 2'

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CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

SELECTED PLAN

ES-2

Table 2 Storm hyetographs

Time	2-year 1-hr depth(in) 0.98			5-year 1-hr depth(in) 1.40			10-year 1-hr depth(in) 1.68			50-year 1-hr depth(in) 2.40			100-year 1-hr depth(in) 2.68		
(min)	(%)	Depth(in)	Inches/hr	(%)	Depth(in)	Inches/hr	(%)	Depth(in)	Inches/hr	(%)	Depth(in)	Inches/hr	(%)	Depth(in)	Inches/hr
5	0.02	0.02	0.24	0.02	0.03	0.34	0.02	0.03	0.40	0.01	0.03	0.37	0.01	0.03	0.32
10	0.04	0.04	0.47	0.04	0.05	0.62	0.04	0.06	0.75	0.04	0.08	1.01	0.03	0.08	0.96
15	0.08	0.08	0.99	0.09	0.12	1.46	0.08	0.14	1.65	0.05	0.12	1.44	0.05	0.12	1.48
20	0.16	0.16	1.88	0.15	0.21	2.57	0.15	0.25	3.02	0.08	0.19	2.30	0.08	0.22	2.64
25	0.24	0.24	2.82	0.25	0.35	4.20	0.25	0.42	5.04	0.15	0.36	4.32	0.14	0.38	4.50
30	0.14	0.14	1.65	0.13	0.18	2.18	0.12	0.20	2.42	0.25	0.60	7.20	0.25	0.68	8.16
35	0.06	0.06	0.74	0.06	0.08	0.97	0.06	0.09	1.13	0.12	0.29	3.46	0.14	0.38	4.50
40	0.05	0.05	0.59	0.04	0.06	0.74	0.04	0.07	0.87	0.08	0.19	2.30	0.08	0.22	2.64
45	0.03	0.03	0.35	0.04	0.05	0.60	0.04	0.06	0.77	0.05	0.12	1.44	0.06	0.17	1.99
50	0.03	0.03	0.35	0.04	0.05	0.60	0.03	0.05	0.65	0.05	0.12	1.44	0.05	0.14	1.68
55	0.03	0.03	0.35	0.03	0.04	0.50	0.03	0.05	0.65	0.03	0.08	0.92	0.04	0.11	1.29
60	0.03	0.03	0.35	0.03	0.04	0.50	0.03	0.05	0.65	0.03	0.08	0.92	0.04	0.11	1.29
65	0.03	0.03	0.35	0.03	0.04	0.50	0.03	0.05	0.65	0.03	0.08	0.92	0.04	0.11	1.29
70	0.02	0.02	0.24	0.03	0.04	0.50	0.03	0.05	0.65	0.02	0.06	0.69	0.02	0.05	0.64
75	0.02	0.02	0.24	0.03	0.04	0.42	0.03	0.05	0.65	0.02	0.06	0.69	0.02	0.05	0.64
80	0.02	0.02	0.24	0.02	0.03	0.37	0.03	0.04	0.50	0.02	0.04	0.52	0.01	0.03	0.39
85	0.02	0.02	0.24	0.02	0.03	0.37	0.02	0.03	0.38	0.02	0.04	0.52	0.01	0.03	0.39
90	0.02	0.02	0.24	0.02	0.03	0.37	0.02	0.03	0.38	0.01	0.03	0.40	0.01	0.03	0.39
95	0.02	0.02	0.24	0.02	0.03	0.37	0.02	0.03	0.38	0.01	0.03	0.40	0.01	0.03	0.39
100	0.02	0.02	0.24	0.02	0.02	0.25	0.02	0.03	0.38	0.01	0.03	0.40	0.01	0.03	0.39
105	0.02	0.02	0.24	0.02	0.02	0.25	0.02	0.03	0.38	0.01	0.03	0.40	0.01	0.03	0.39
110	0.02	0.02	0.24	0.02	0.02	0.25	0.02	0.03	0.38	0.01	0.03	0.40	0.01	0.03	0.39
115	0.01	0.01	0.12	0.02	0.02	0.25	0.02	0.03	0.34	0.01	0.03	0.40	0.01	0.03	0.39
120	0.01	0.01	0.12	0.01	0.02	0.22	0.01	0.02	0.26	0.01	0.03	0.40	0.01	0.03	0.39
		1.12			1.62			1.94			2.77			3.13	

MAJOR DRAINAGEWAYS

WATERSHED BOUNDARIES

JURISDICTIONAL BOUNDARIES

UNIFORM PERCENTAGE IMPERVIOUSNESS

2%	45%
7%	50%
10%	70%
40%	80%
42%	90%

N

MAY 2006

0 1000 2000

1"=1500'

STREETS REV. MAY 5, 1998

W. 136TH AVE.

US 287

BNRR

MIRAMONTE BLVD.

KOHL ST.

MAIN ST

3207

SHERIDAN BLVD.

LOWELL BLVD.

128TH AVENUE

W. MIDWAY

CITY PARK

BLVD.

INDUSTRIAL LANE

HIGHWAY 36

E. MIDWAY BLVD.

3207

DRAINAGEWAY

MAIN ST

3207

120TH AVENUE

W. 120TH AVE

80%

AIRPORT WAY

JEFFCO AIRPORT

MAIN STREET

SHERIDAN BLVD.

WESTMINSTER CITY LIMITS

BIG DRY CREEK

\\Prairie\company\Active Projects\1998\98410\City Park and 3207 Drawings\F\Sheet.dwg, 04/24/03 03:25:30 PM, MST

ALL ELEVATIONS ARE MEAN SEA LEVEL DATUM
GROUND CONTROL SURVEY BY LANDMARK MAPPING LTD.
AERIAL PHOTOGRAPHY BY ROCKY MOUNTAIN AERIAL
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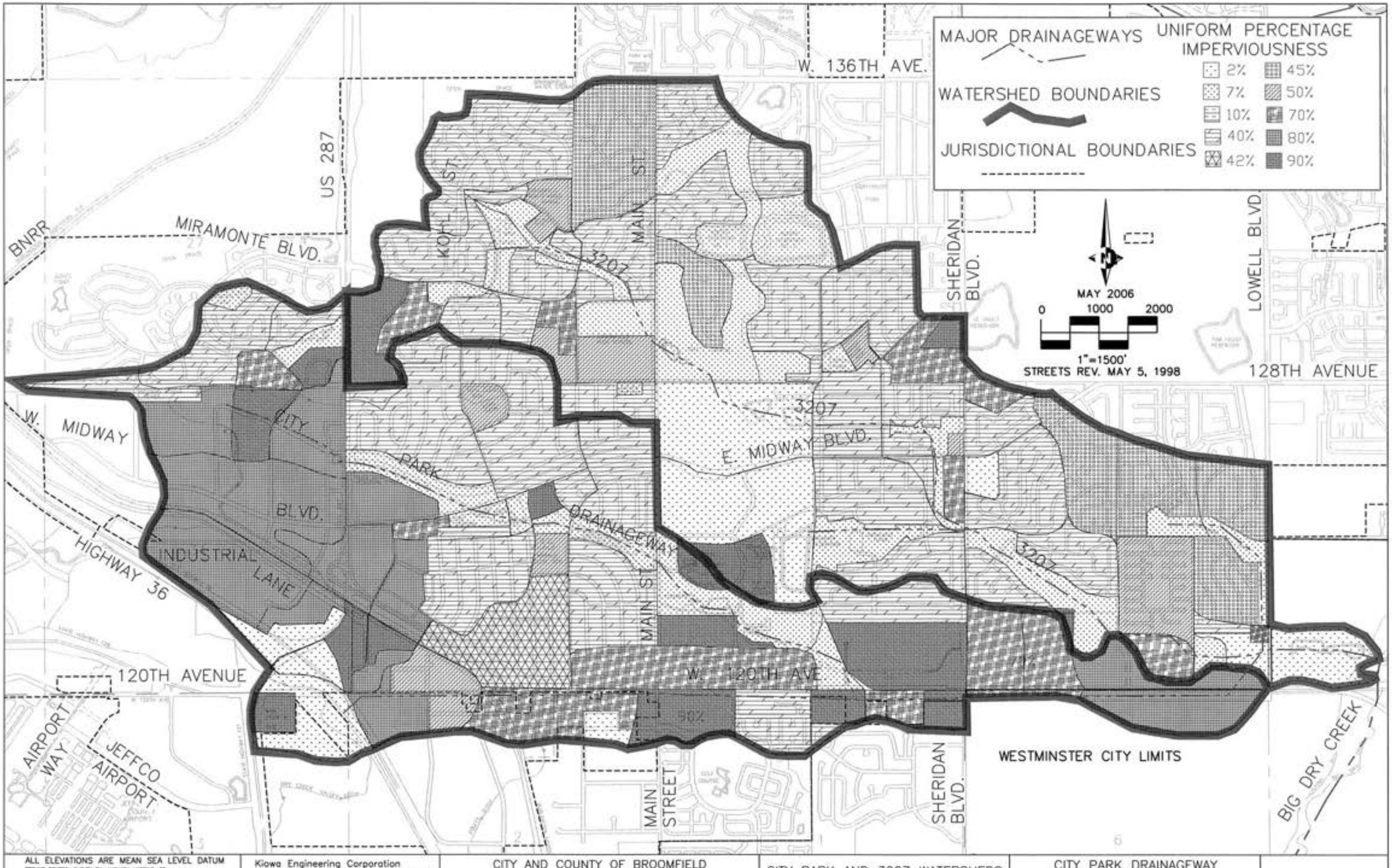
Lakewood, Colorado 80235
(303)-692-0369

CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

CITY PARK DRAINAGEWAY
3207 DRAINAGEWAY
EXISTING IMPERVIOUSNESS

FIGURE 2



ALL ELEVATIONS ARE MEAN SEA LEVEL DATUM
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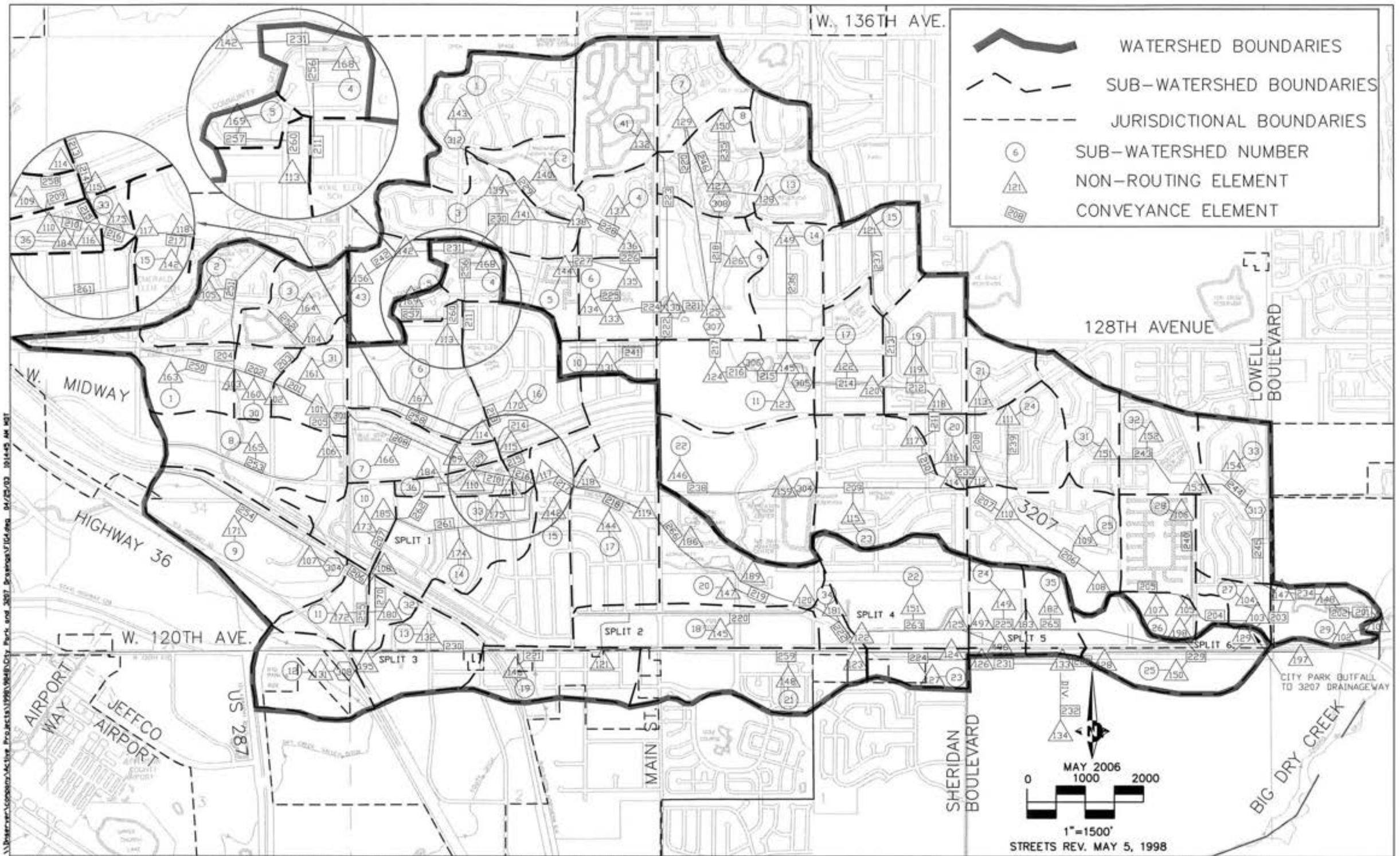
Lakewood, Colorado 80235
(303)-692-0369

CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

CITY PARK DRAINAGEWAY
3207 DRAINAGEWAY
FUTURE IMPERVIOUSNESS

FIGURE 3



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AERIAL PHOTOGRAPHY BY ROCKY MOUNTAIN AERIAL
TOPOGRAPHIC MAPPING BY LANDMARK MAPPING LTD.
CONTOUR INTERVAL 2'
DATE FLOWN 2-3-95

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Lakewood, Colorado 80235
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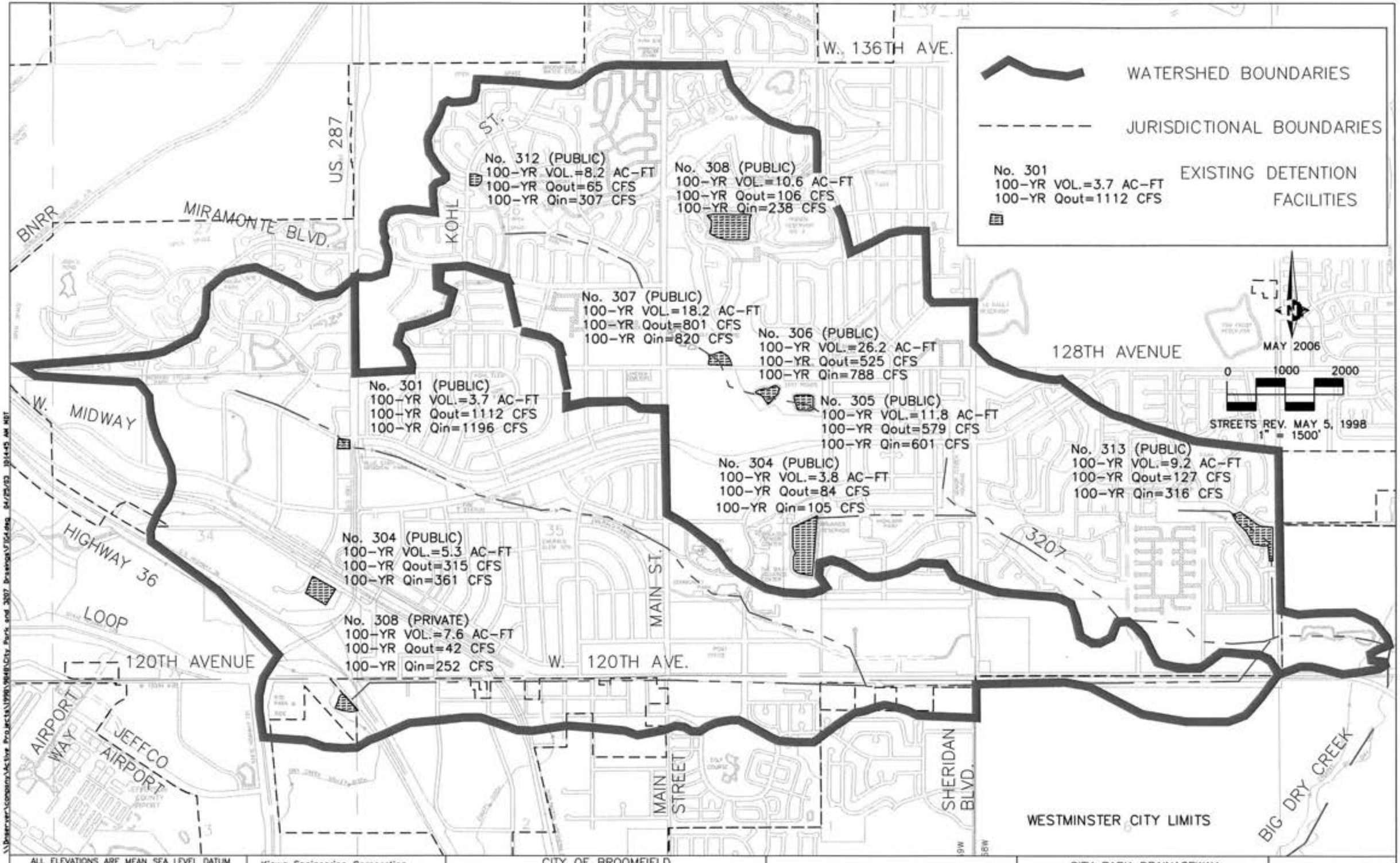
CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

CITY PARK AND 3207 DRAINAGEWAYS
EXISTING AND FUTURE CONDITIONS
SUB-WATERSHEDS & SWMM ELEMENTS

FIGURE 4



ALL ELEVATIONS ARE MEAN SEA LEVEL DATUM
GROUND CONTROL SURVEY BY LANDMARK MAPPING LTD.
AERIAL PHOTOGRAPHY BY ROCKY MOUNTAIN AERIAL
TOPOGRAPHIC MAPPING BY LANDMARK MAPPING LTD.
CONTOUR INTERVAL 2'
DATE PLOTTED: 2-3-05

Kiowa Engineering Corporation
7175 W. Jefferson Avenue, Suite 3400
Lakewood, Colorado 80235
(303)-692-0369

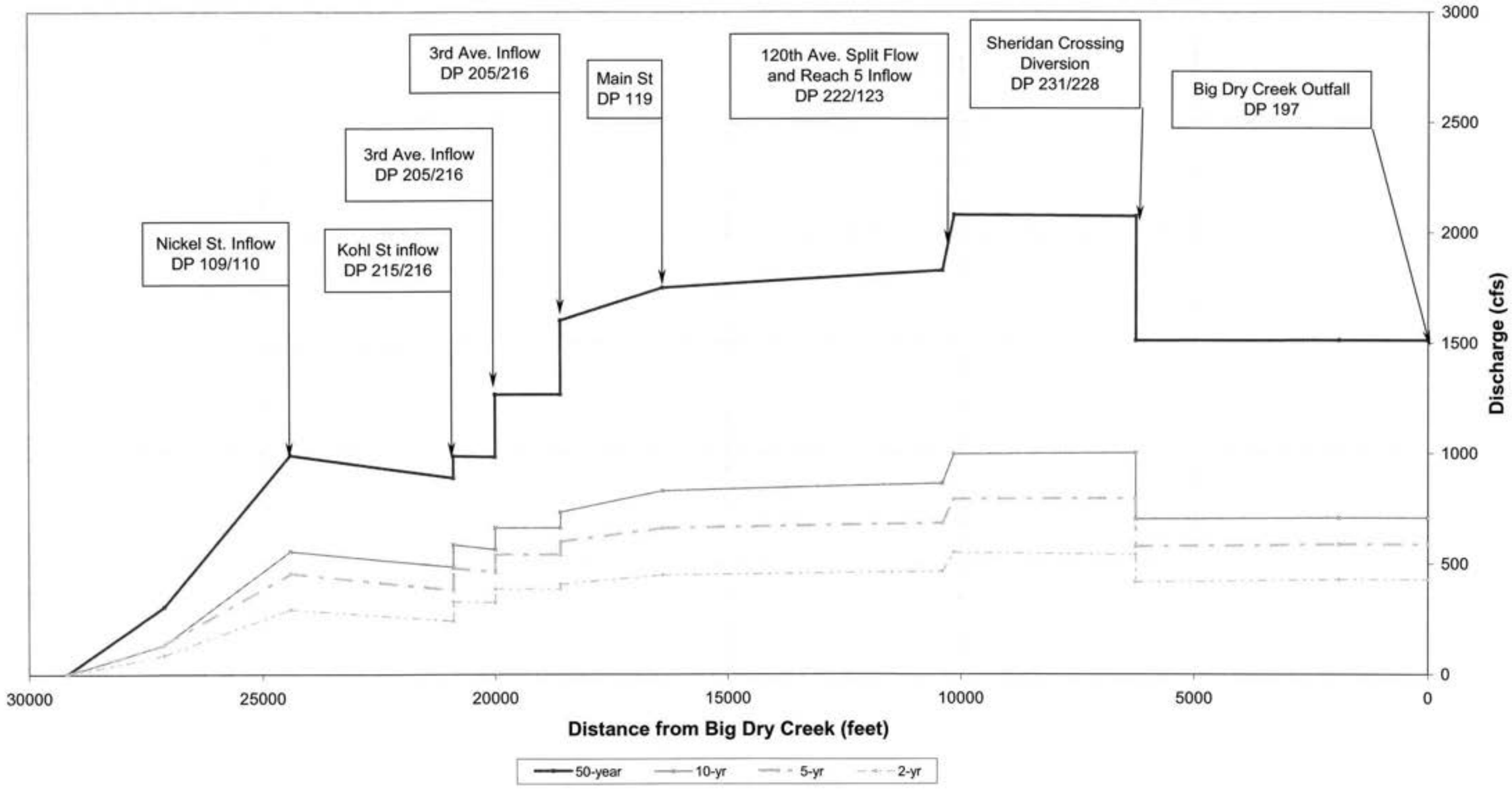
CITY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

CITY PARK DRAINAGEWAY
3207 DRAINAGEWAY
BASELINE DETENTION FACILITIES

FIGURE 5

Figire 6: City Park Drainageway Master Plan Discharge Profiles



LEGEND

JURIDICTIONAL BOUNDARIES

WATERSHED BOUNDARIES

DRAINAGEWAY

STREET CROSSING

OPEN CHANNEL

STORM SEWER

REACH 1

REACH 2

REACH 3

REACH 4

REACH 5

REACH 6

HWY. 287

MAIN ST.

W. 136TH AVE.

SHERIDAN BLVD.

LOWELL BLVD.

MAY 2006

0 500 1000 2000

STREETS REV. MAY 5, 1998

1" = 1500'

3207

W. 10TH AVE.

COMMUNITY DITCH

CITY PARK

NORTH TRIB.

100-YR CROSSING

100-YEAR CROSSING

MIDWAY BLVD.

HWY 36

SOUTH TRIB.

W. 4TH AVE.

W. 3RD AVE.

NICKEL ST.

HEMLOCK ST.

GARNET ST.

EMERALD ST.

AGATE WAY

DES COMBES DR.

100-YR STORM SEWER

DRAINAGEWAY

IMPROVED CROSSING

W. 120TH AVE.

E. 1ST AVE.

LAMAR ST.

BOULDER COUNTY T1S

JEFFERSON COUNTY T2S

5 YR-STORM SEWER/OVERFLOW SWALE

5-YR RIP-RAP CHANNEL

5-YR STORM SEWER AND FLOODPROOFING

AIRPORT WAY

DETENTION FORMALIZATION

REED ST.

B.N.R.R.

100-YR CHANNEL

100-YR DIV. CHANNEL

COUNTY R68W

JEFFERSON COUNTY

ADAMS COUNTY

TENNYSON STREET

PERRY ST.

OUTLET PROTECTION

BIG DRY CREEK

ALL ELEVATIONS ARE MEAN SEA LEVEL DATUM
GROUND CONTROL SURVEY BY LANDMARK MAPPING LTD.
AERIAL PHOTOGRAPHY BY ROCKY MOUNTAIN AERIAL
TOPOGRAPHIC MAPPING BY LANDMARK MAPPING LTD.
CONTOUR INTERVAL 2'

Kiowa Engineering Corporation
7175 W. Jefferson Avenue, Suite 3400
Lakewood, Colorado 80235

CITY AND COUNTY OF BROOMFIELD
CITY OF WESTMINSTER
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

CITY PARK AND 3207 WATERSHEDS
OUTFALL SYSTEMS PLAN

SELECTED PLAN

FIGURE 8

NOTE: ADD 1000 TO 3207 DRAINAGEWAY ELEMENT NUMBERS
205 → 1205

MAJOR DRAINAGEWAYS
WATERSHED BOUNDARIES
JURISDICTIONAL BOUNDARIES
(6) SUB-WATERSHED NUMBER
(121) NON-ROUTING ELEMENT
(208) CONVEYANCE ELEMENT
(OVER 261 DIV) DIVERSION AND OVERFLOW

NOTE: ADD 1000 TO 3207 DRAINAGEWAY ELEMENT NUMBERS

MARCH 1998
0 1000 2000
STREETS REV. MAY 5, 1998
1" = 1500'

W. 136TH AVE.
US. 287
BNRR
MIRAMONTE BLVD.
W. MIDWAY BLVD.
HIGHWAY 36
120TH AVENUE
128TH AVENUE
MAIN ST.
POTENTIAL BRUNNER DIVERSION
SHERIDAN BLVD.
BIG DRY CREEK
JEFFCO AIRPORT
AIRPORT WAY
JEFFERSON COUNTY T2S
BOULDER COUNTY T1S

Kiowa Engineering Corporation 1776 South Jackson Street, Suite 1120 Denver, Colorado 80210 (303)-692-0369	CITY AND COUNTY OF BROOMFIELD CITY OF WESTMINSTER URBAN DRAINAGE AND FLOOD CONTROL DISTRICT	OUTFALL SYSTEMS PLANNING STUDY BROOMFIELD AND VICINITY	CITY PARK DRAINAGEWAY 3207 DRAINAGEWAY ALTERNATIVES SWMM SCHEMATIC	FIGURE 9

Note: Add 1000 to 3207 Drainageway Element Numbers (205 – 1205)
Master Plan EPA SWMM 5.0 Results
City Park and 3207 Drainageways
(Drainageway 3207 codes in 1000's)

dp	100YR	50YR	10YR	5YR	2YR
101	1184	992	557	457	294
102	633	528	301	235	150
103	367	306	173	134	86
104	161	134	79	62	37
105	164	141	86	70	45
106	434	371	212	174	113
107	389	328	185	149	92
108	399	319	125	101	63
109	1104	889	486	381	242
110	1202	988	587	481	327
1101	1352	1110	514	430	302
1102	34	23	3	3	2
1103	1216	985	424	342	240
1104	37	31	17	14	9
1105	1202	979	436	355	241
1106	184	158	93	73	44
1107	81	69	42	34	21
1108	960	769	340	280	199
1109	296	250	150	123	81
1110	835	675	316	270	195
1111	165	142	84	66	39
1112	732	589	271	226	173
1113	120	103	62	50	31
1114	669	555	255	214	161
1115	329	282	172	139	89
1116	81	69	42	34	22
1117	539	478	203	169	121
1118	539	478	204	169	121
1119	192	163	90	72	46
1120	511	459	143	119	87
1121	203	173	105	85	56
1122	147	127	75	59	36
1123	71	47	10	8	5
1124	835	628	248	159	45
1125	835	673	328	274	196
1126	168	142	85	69	46
1127	241	205	128	103	70
1128	101	85	51	42	28
1129	60	60	60	49	32
1129-DIV	58	40	0	0	0
113	82	68	40	33	23
1131	78	67	41	33	21
1132	224	193	113	88	54
1133	510	430	231	202	144
1134	107	90	54	44	29
1135	458	394	230	203	144
1136	389	340	207	185	129
1137	86	74	40	33	21
1138	336	301	194	176	119
1139	202	174	105	84	52
114	497	417	241	196	126
1140	115	97	59	48	32
1141	79	79	76	72	52
1142	82	83	81	83	61
1143	294	253	152	121	74
1144	132	114	67	53	32
1145	497	446	108	59	35
1146	152	129	77	63	42
1147	1333	1093	513	428	304
1148	1327	1091	511	429	301
1149	160	137	84	68	43
115	498	407	253	198	127
1150	140	118	70	58	38
1151	126	109	61	47	31
1152	123	106	61	47	30
1153	225	187	103	82	50
1154	155	130	72	58	36
1155	1352	1110	514	430	302
1156	79	79	79	79	59
1156-DIV	163	130	41	15	0
1157	163	130	41	15	0
1158	163	130	41	15	0
1159	103	77	41	33	21
116	1523	1256	673	542	393
117	2041	1628	741	608	418
118	2136	1681	793	640	441
119	2236	1769	843	678	461
119-DIV	0	0	0	0	0
120	2347	1842	868	693	474
1201	18	18	18	18	18
1201-OVERFLOW	1310	1072	493	411	284
1202	18	18	18	18	18
1202-OVERFLOW	1310	1072	493	411	283
1203	129	129	130	128	128
1203-OVERFLOW	1087	858	295	214	112
1204	241	241	241	241	239

SWMM Subcatchment Variables
City Park and 3207 Drainageways
May 2006

Subcatchment	Draining Element	Trib Width (ft)	Area (Acres)	% Impervious	Slope (ft/ft)	Impervious Mannings n	Pervious Mannings n	Impervious Area Surface Retention Storage (in)	Pervious Area Surface Retention Storage (in)	Maximum Infiltration Rate (in/hr)	Minimum Infiltration Rate (in/hr)	Decay Rate
1015	1121	3498	55.8	40.0	0.03	0.02	0.2	0.1	0.4	3	0.5	0.0018
1017	1122	1886	52.5	38.6	0.013	0.02	0.2	0.1	0.4	3	0.5	0.0018
1019	1119	1834	71.0	52.3	0.008	0.02	0.2	0.1	0.4	3	0.5	0.0018
1020	1116	1960	20.2	46.4	0.01	0.02	0.2	0.1	0.4	3	0.5	0.0018
1021	1113	1500	31.8	48.3	0.02	0.02	0.2	0.1	0.4	3	0.5	0.0018
1022	1146	3637	126.1	12.7	0.02	0.02	0.2	0.1	0.4	3	0.5	0.0018
1023	1115	4720	120.4	32.3	0.025	0.02	0.2	0.1	0.4	3	0.5	0.0018
1024	1111	1600	58.2	40.0	0.02	0.02	0.2	0.1	0.4	3	0.5	0.0018
1025	1109	6035	101.4	30.6	0.03	0.02	0.2	0.1	0.4	3	0.5	0.0018
1026	1107	1500	14.6	70.0	0.01	0.02	0.2	0.1	0.4	3	0.5	0.0018
1027	1104	2000	27.8	12.1	0.01	0.02	0.2	0.1	0.4	3	0.5	0.0018
1028	1106	2000	57.3	46.0	0.015	0.02	0.2	0.1	0.4	3	0.5	0.0018
1029	1102	2854	30.9	2.0	0.01	0.02	0.2	0.1	0.4	3	0.5	0.0018
1041	1132	2000	73.6	45.0	0.02	0.02	0.2	0.1	0.4	3	0.5	0.0018
1043	1156	2000	45.4	82.8	0.02	0.02	0.2	0.1	0.4	3	0.5	0.0018
1031	1151	1800	47.8	45.0	0.005	0.02	0.2	0.1	0.4	3	0.5	0.0018
1032	1152	2000	50.0	38.5	0.005	0.02	0.2	0.1	0.4	3	0.5	0.0018
1033	1154	1800	79.0	38.7	0.005	0.02	0.2	0.1	0.4	3	0.5	0.0018

Master Plan EPA SWMM 5.0 Results
City Park and 3207 Drainageways
(Drainageway 3207 codes in 1000's)

dp	100YR	50YR	10YR	5YR	2YR
101	1184	992	557	457	294
102	633	528	301	235	150
103	367	306	173	134	86
104	161	134	79	62	37
105	164	141	86	70	45
106	434	371	212	174	113
107	389	328	185	149	92
108	399	319	125	101	63
109	1104	889	486	381	242
110	1202	988	587	481	327
1101	1352	1110	514	430	302
1102	34	23	3	3	2
1103	1216	985	424	342	240
1104	37	31	17	14	9
1105	1202	979	436	355	241
1106	184	158	93	73	44
1107	81	69	42	34	21
1108	960	769	340	280	199
1109	296	250	150	123	81
1110	835	675	316	270	195
1111	165	142	84	66	39
1112	732	589	271	226	173
1113	120	103	62	50	31
1114	669	555	255	214	161
1115	329	282	172	139	89
1116	81	69	42	34	22
1117	539	478	203	169	121
1118	539	478	204	169	121
1119	192	163	90	72	46
1120	511	459	143	119	87
1121	203	173	105	85	56
1122	147	127	75	59	36
1123	71	47	10	8	5
1124	835	628	248	159	45
1125	835	673	328	274	196
1126	168	142	85	69	46
1127	241	205	128	103	70
1128	101	85	51	42	28
1129	60	60	60	49	32
1129-DIV	58	40	0	0	0
113	82	68	40	33	23

dp	100YR	50YR	10YR	5YR	2YR
1131	78	67	41	33	21
1132	224	193	113	88	54
1133	510	430	231	202	144
1134	107	90	54	44	29
1135	458	394	230	203	144
1136	389	340	207	185	129
1137	86	74	40	33	21
1138	336	301	194	176	119
1139	202	174	105	84	52
114	497	417	241	196	126
1140	115	97	59	48	32
1141	79	79	76	72	52
1142	82	83	81	83	61
1143	294	253	152	121	74
1144	132	114	67	53	32
1145	497	446	108	59	35
1146	152	129	77	63	42
1147	1333	1093	513	428	304
1148	1327	1091	511	429	301
1149	160	137	84	68	43
115	498	407	253	198	127
1150	140	118	70	58	38
1151	126	109	61	47	31
1152	123	106	61	47	30
1153	225	187	103	82	50
1154	155	130	72	58	36
1155	1352	1110	514	430	302
1156	79	79	79	79	59
1156-DIV	163	130	41	15	0
1157	163	130	41	15	0
1158	163	130	41	15	0
1159	103	77	41	33	21
116	1523	1256	673	542	393
117	2041	1628	741	608	418
118	2136	1681	793	640	441
119	2236	1769	843	678	461
119-DIV	0	0	0	0	0
120	2347	1842	868	693	474
1201	18	18	18	18	18
1201-OVERFLOW	1310	1072	493	411	284
1202	18	18	18	18	18
1202-OVERFLOW	1310	1072	493	411	283
1203	129	129	130	128	128
1203-OVERFLOW	1087	858	295	214	112
1204	241	241	241	241	239

dp	100YR	50YR	10YR	5YR	2YR
1205	856	772	347	285	199
1205-OVERFLOW	91	0	0	0	0
1206	838	769	340	280	199
1206-OVERFLOW	122	0	0	0	0
1207	734	596	271	226	168
1207-OVERFLOW	0	0	0	0	0
1208	57	55	54	46	31
1208-OVERFLOW	55	37	0	0	0
1209	133	132	109	95	64
1209-OVERFLOW	109	76	0	0	0
121	471	397	236	193	124
1210	141	141	140	139	117
1210-OVERFLOW	401	337	61	31	0
1211	539	478	203	169	121
1211-OVERFLOW	0	0	0	0	0
1212	143	143	143	142	121
1212-OVERFLOW	396	335	61	27	0
1213	44	45	44	44	43
1213-OVERFLOW	127	95	33	18	0
1214	35	34	35	36	35
1214-OVERFLOW	456	411	59	26	10
1215	147	147	106	43	25
1215-OVERFLOW	276	260	0	0	0
1216	156	156	156	155	45
1216-OVERFLOW	683	472	90	0	0
1217	37	36	37	37	37
1217-OVERFLOW	798	591	212	123	8
1218	163	129	63	50	33
1218-OVERFLOW	13	0	0	0	0
122	2360	1841	870	693	472
1220	31	23	0	0	0
1220-OVERFLOW	0	0	0	0	0
1221	153	153	153	153	153
1221-OVERFLOW	510	394	127	84	18
1222	49	49	32	25	18
1222-OVERFLOW	20	8	0	0	0
1223	61	62	61	62	51
1223-OVERFLOW	128	98	34	19	0
1224	76	76	76	76	75
1224-OVERFLOW	434	354	155	126	69
1225	147	147	147	147	144
1225-OVERFLOW	362	283	83	54	0
1226	306	306	207	184	130
1226-OVERFLOW	88	35	0	0	0
1227	48	47	48	48	34

dp	100YR	50YR	10YR	5YR	2YR
1228	147	147	147	147	129
1228-OVERFLOW	242	193	60	38	0
1229	147	147	121	106	67
1229-OVERFLOW	116	81	0	0	0
123	2684	2094	1004	804	551
1230	79	79	76	72	52
1230-OVERFLOW	0	0	0	0	0
1231	81	81	79	77	56
1233	670	555	255	214	161
1233-OVERFLOW	0	0	0	0	0
1234	18	18	18	18	18
1234-OVERFLOW	1309	1073	493	411	283
1235	109	84	46	38	26
1236	142	119	69	55	34
1237	178	149	86	69	42
1238	103	77	41	33	21
1239	133	108	62	49	30
124	2739	2150	1076	859	586
1240	150	122	70	55	34
1241	71	59	35	28	18
1242	82	83	81	83	61
1243	176	171	103	82	50
1243-OVERFLOW	50	17	0	0	0
1244	180	180	154	125	78
1244-OVERFLOW	150	95	0	0	0
1245	127	113	90	86	69
1246	60	60	51	42	29
125	127	104	0	0	0
125-DIV	65	41	0	0	0
126	2737	2151	1076	859	586
127	137	119	70	55	33
128	2153	1592	748	615	444
129	0	0	0	0	0
131	242	209	115	92	59
132	277	239	145	116	72
133	2155	1599	750	614	444
133-DIV	604	560	323	241	138
134	601	559	328	241	138
142	168	136	74	58	34
144	302	260	151	117	73
145	394	340	203	160	96
146	285	246	145	114	69
147	257	218	132	107	71
148	418	361	216	171	104
149	126	108	60	48	30

dp	100YR	50YR	10YR	5YR	2YR
151	342	289	161	129	81
160	140	122	73	57	34
161	209	180	108	85	51
163	213	184	101	80	52
164	162	139	80	62	39
165	552	478	291	231	143
166	203	173	105	86	56
167	241	208	123	97	59
168	63	54	33	26	17
169	32	28	17	13	8
170	266	229	134	105	64
171	448	386	222	173	108
172	112	96	59	47	30
173	143	123	67	54	35
174	341	294	177	141	86
175	10	7	2	2	1
180	115	100	62	50	31
181	16	11	4	4	2
182	102	88	48	39	25
183	196	145	63	49	29
184	61	53	32	26	16
185	100	100	100	100	95
185-DIV	374	256	79	45	0
186	2195	1734	819	658	451
189	2195	1734	819	658	451
192	0	0	0	0	0
193	0	0	0	0	0
194	0	0	0	0	0
196	2162	1610	756	619	457
197	2162	1610	756	619	457
198	184	149	89	69	43
198-DIV	44	25	11	9	5
201	808	671	385	303	188
201-OVERFLOW	0	0	0	0	0
202	479	398	230	181	113
202-OVERFLOW	0	0	0	0	0
203	155	130	71	58	38
204	151	125	73	58	38
204-OVERFLOW	0	0	0	0	0
205	42	42	42	42	40
205-OVERFLOW	408	332	186	141	68
206	35	35	35	35	35
206-OVERFLOW	280	220	26	16	3
207	83	82	82	82	81
207-OVERFLOW	394	276	97	65	14

dp	100YR	50YR	10YR	5YR	2YR
208-OVERFLOW	1055	839	437	332	193
209	224	224	222	218	218
209-OVERFLOW	884	670	269	162	35
210	369	369	369	369	326
210-OVERFLOW	826	615	196	94	0
211	12	12	12	12	12
211-OVERFLOW	42	33	14	10	3
213	138	136	137	127	81
213-OVERFLOW	162	113	17	0	0
214	133	132	133	132	127
214-OVERFLOW	366	275	121	66	0
215	163	162	163	162	128
215-OVERFLOW	346	255	68	28	0
216	369	369	369	369	369
216-OVERFLOW	1176	904	295	174	18
217	353	353	353	353	353
217-OVERFLOW	1783	1328	440	287	88
218	286	286	286	286	286
218-OVERFLOW	1950	1483	557	392	175
219	68	68	68	68	68
219-OVERFLOW	2177	1696	755	589	382
220	313	257	154	124	77
221	471	397	236	193	124
222	2360	1841	870	693	472
223	2360	1840	871	692	472
224	2689	2092	1015	810	553
225	167	145	63	49	29
225-OVERFLOW	30	0	0	0	0
226	2737	2151	1076	859	586
228	2153	1592	748	615	444
229	501	501	501	501	457
229-OVERFLOW	1661	1109	255	118	0
230	189	185	136	107	66
230-OVERFLOW	67	38	0	0	0
231	2758	2159	1073	854	582
232	325	323	328	241	138
232-OVERFLOW	281	239	0	0	0
250	216	181	100	76	49
250-OVERFLOW	0	0	0	0	0
251	23	23	23	22	23
251-OVERFLOW	130	104	52	37	15
252	21	21	21	22	21
252-OVERFLOW	141	113	58	42	16
253	15	15	15	15	15
253-OVERFLOW	420	356	198	160	99

dp	100YR	50YR	10YR	5YR	2YR
254-OVERFLOW	0	0	0	0	0
255	26	26	26	27	27
255-OVERFLOW	183	147	83	63	32
256	31	31	30	24	16
256-OVERFLOW	23	15	0	0	0
257	31	25	15	13	8
257-OVERFLOW	0	0	0	0	0
258	16	17	17	17	17
258-OVERFLOW	187	155	79	62	34
259	40	40	40	40	38
259-OVERFLOW	702	577	302	237	136
260	9	8	9	8	7
260-OVERFLOW	20	15	6	3	0
261	13	13	13	13	13
261-OVERFLOW	514	398	181	124	61
262	101	101	102	101	93
263	167	167	158	121	78
263-OVERFLOW	159	100	0	0	0
265	167	164	100	78	48
265-OVERFLOW	62	11	0	0	0
266	68	68	68	68	68
266-OVERFLOW	2126	1666	751	590	383
269	0	0	0	0	0
494	62	63	62	51	34
496	65	41	0	0	0
497	127	104	0	0	0
498	192	152	0	0	0
499	62	63	62	51	34
499-DIV	192	152	0	0	0

100-YEAR EPA SWMM5.0 Master Plan Output

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.006a)

BROOMFIELD AND VICINITY (no park div.)(city/3207 w/Upstream 120th split)
KIOWA ENGINEERING MP100.sin (308 pond/120th sewer alt.) May/06

****
Analysis Options
****
Flow Units ..... CFS
Infiltration Method ..... HORTON
Flow Routing Method ..... KINWAVE
Starting Date JAN-01-2005 00:00:00
Ending Date JAN-01-2005 06:00:00
Antecedent Dry Days 0.0
Report Time Step 00:15:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 300.00 sec

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	928.902	3.120
Evaporation Loss	0.000	0.000
Infiltration Loss	336.360	1.130
Surface Runoff	581.849	1.954
Final Surface Storage	14.487	0.049
Continuity Error (%)	-0.408	

Flow Routing Continuity	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	581.986	189.649
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	550.123	179.266
Surface Flooding	2.288	0.746
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	41.155	13.411
Continuity Error (%)	-1.990	

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Subcatchment Runoff Summary
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Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Runoff Coeff
SWMM_SUBC_1	3.120	0.000	0.000	0.704	2.357	0.755
SWMM_SUBC_2	3.120	0.000	0.000	1.256	1.840	0.590
SWMM_SUBC_3	3.120	0.000	0.000	1.005	2.072	0.664
SWMM_SUBC_8	3.120	0.000	0.000	0.345	2.716	0.870
SWMM_SUBC_30	3.120	0.000	0.000	0.169	2.880	0.923
SWMM_SUBC_31	3.120	0.000	0.000	0.544	2.522	0.808
SWMM_SUBC_4	3.120	0.000	0.000	1.450	1.648	0.528
SWMM_SUBC_5	3.120	0.000	0.000	1.259	1.831	0.587
SWMM_SUBC_6	3.120	0.000	0.000	1.273	1.817	0.582
SWMM_SUBC_7	3.120	0.000	0.000	1.024	2.068	0.663
SWMM_SUBC_9	3.120	0.000	0.000	0.641	2.424	0.777
SWMM_SUBC_10	3.120	0.000	0.000	0.617	2.439	0.782
SWMM_SUBC_11	3.120	0.000	0.000	0.939	2.147	0.688
SWMM_SUBC_12	3.120	0.000	0.000	0.371	2.675	0.857
SWMM_SUBC_14	3.120	0.000	0.000	0.905	2.176	0.697
SWMM_SUBC_15	3.120	0.000	0.000	1.440	1.627	0.521
SWMM_SUBC_16	3.120	0.000	0.000	1.260	1.828	0.586
SWMM_SUBC_32	3.120	0.000	0.000	0.252	2.806	0.899
SWMM_SUBC_33	3.120	0.000	0.000	1.715	1.409	0.452
SWMM_SUBC_36	3.120	0.000	0.000	1.279	1.816	0.582
SWMM_SUBC_17	3.120	0.000	0.000	1.445	1.646	0.528
SWMM_SUBC_18	3.120	0.000	0.000	0.350	2.708	0.868
SWMM_SUBC_20	3.120	0.000	0.000	1.184	1.913	0.613
SWMM_SUBC_34	3.120	0.000	0.000	1.822	1.298	0.416
SWMM_SUBC_13	3.120	0.000	0.000	0.666	2.407	0.772
SWMM_SUBC_19	3.120	0.000	0.000	0.552	2.513	0.805
SWMM_SUBC_21	3.120	0.000	0.000	0.567	2.501	0.802
SWMM_SUBC_22	3.120	0.000	0.000	0.615	2.437	0.781
SWMM_SUBC_23	3.120	0.000	0.000	0.364	2.693	0.863
SWMM_SUBC_24	3.120	0.000	0.000	0.602	2.451	0.786
SWMM_SUBC_25	3.120	0.000	0.000	0.350	2.707	0.868
SWMM_SUBC_35	3.120	0.000	0.000	0.601	2.453	0.786
SWMM_SUBC_1001	3.120	0.000	0.000	1.244	1.847	0.592
SWMM_SUBC_1002	3.120	0.000	0.000	1.230	1.869	0.599
SWMM_SUBC_1003	3.120	0.000	0.000	1.437	1.660	0.532
SWMM_SUBC_1004	3.120	0.000	0.000	1.568	1.518	0.487
SWMM_SUBC_1005	3.120	0.000	0.000	0.942	2.138	0.685
SWMM_SUBC_1006	3.120	0.000	0.000	1.459	1.646	0.528
SWMM_SUBC_1007	3.120	0.000	0.000	1.484	1.619	0.519
SWMM_SUBC_1008	3.120	0.000	0.000	1.444	1.660	0.532
SWMM_SUBC_1009	3.120	0.000	0.000	1.656	1.452	0.465
SWMM_SUBC_1010	3.120	0.000	0.000	1.231	1.864	0.598
SWMM_SUBC_1011	3.120	0.000	0.000	2.151	0.971	0.311
SWMM_SUBC_1013	3.120	0.000	0.000	1.704	1.405	0.450
SWMM_SUBC_1014	3.120	0.000	0.000	1.320	1.777	0.569
SWMM_SUBC_1015	3.120	0.000	0.000	1.126	1.969	0.631
SWMM_SUBC_1017	3.120	0.000	0.000	1.315	1.776	0.569
SWMM_SUBC_1019	3.120	0.000	0.000	1.072	1.998	0.640
SWMM_SUBC_1020	3.120	0.000	0.000	1.005	2.084	0.668
SWMM_SUBC_1021	3.120	0.000	0.000	1.009	2.076	0.665
SWMM_SUBC_1022	3.120	0.000	0.000	1.972	1.141	0.366
SWMM_SUBC_1023	3.120	0.000	0.000	1.384	1.714	0.549
SWMM_SUBC_1024	3.120	0.000	0.000	1.290	1.799	0.577
SWMM_SUBC_1025	3.120	0.000	0.000	1.332	1.770	0.567
SWMM_SUBC_1026	3.120	0.000	0.000	0.531	2.538	0.813
SWMM_SUBC_1027	3.120	0.000	0.000	1.827	1.288	0.413
SWMM_SUBC_1028	3.120	0.000	0.000	1.127	1.956	0.627
SWMM_SUBC_1029	3.120	0.000	0.000	1.996	1.128	0.362
SWMM_SUBC_1041	3.120	0.000	0.000	1.170	1.914	0.614
SWMM_SUBC_1043	3.120	0.000	0.000	0.303	2.748	0.881
SWMM_SUBC_1031	3.120	0.000	0.000	1.236	1.845	0.591
SWMM_SUBC_1032	3.120	0.000	0.000	1.392	1.696	0.543
SWMM_SUBC_1033	3.120	0.000	0.000	1.506	1.576	0.505
Totals	3.120	0.000	0.000	1.130	1.954	0.626

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Node Depth Summary
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Node	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Total Flooding acre-in	Total Minutes Flooded
JUNCT_1157	0.00	0.00	1000.00	0 00:00	0	0
JUNCT_192	0.00	0.00	1000.00	0 00:00	0	0
JUNCT_269	0.00	0.00	1000.00	0 00:00	0	0
JUNCT_150	0.00	0.00	1025.00	0 00:00	0	0
JUNCT_127	0.00	0.00	1058.42	0 00:00	0	0
JUNCT_148	0.00	0.00	1132.42	0 00:00	0	0
JUNCT_131	0.00	0.00	1226.43	0 00:00	0	0
JUNCT_132	0.00	0.00	1226.42	0 00:00	0	0
JUNCT_146	0.00	0.00	1172.42	0 00:00	0	0
JUNCT_221	1.46	3.00	1175.42	0 00:40	0	0
JUNCT_121	0.64	1.59	1134.01	0 00:40	0	0
JUNCT_223	2.09	5.89	1065.56	0 01:00	0	0
JUNCT_123	2.41	5.90	1064.32	0 01:05	0	0

JUNCT_224	2.77	7.75	1066.17	0	01:00	0	0
JUNCT_124	2.77	7.74	1051.20	0	01:05	0	0
JUNCT_226	3.57	20.00	1063.46	0	01:15	0.00	10
JUNCT_126	3.33	11.82	1054.38	0	01:05	0	0
JUNCT_231	3.63	9.28	1051.84	0	01:05	0	0
JUNCT_228	3.14	7.92	1039.92	0	01:10	0	0
JUNCT_128	3.14	7.92	1032.92	0	01:10	0	0
JUNCT_196	3.19	5.00	1005.00	0	01:10	0	0
JUNCT_1102	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1152	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1151	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1153	0.93	2.97	1034.48	0	00:45	0	0
JUNCT_1154	0.00	0.00	1031.51	0	00:00	0	0
JUNCT_1245	1.54	2.99	1016.49	0	01:25	0	0
JUNCT_1107	0.00	0.00	1037.00	0	00:00	0	0
JUNCT_1109	0.00	0.00	1058.60	0	00:00	0	0
JUNCT_1111	0.00	0.00	1068.60	0	00:00	0	0
JUNCT_1239	0.26	1.05	1069.65	0	00:30	0	0
JUNCT_1116	0.00	0.00	1073.60	0	00:00	0	0
JUNCT_1121	0.00	0.00	1106.79	0	00:00	0	0
JUNCT_1237	0.21	0.98	1107.77	0	00:30	0	0
JUNCT_1122	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1123	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1149	0.00	0.00	1161.13	0	00:00	0	0
JUNCT_1236	0.19	0.70	1161.83	0	00:30	0	0
JUNCT_1134	0.00	0.00	1135.19	0	00:00	0	0
JUNCT_1137	0.00	0.00	1146.69	0	00:00	0	0
JUNCT_1242	0.87	3.26	1168.46	0	00:25	0	0
JUNCT_1142	0.87	3.36	1166.05	0	00:30	0	0
JUNCT_1231	0.87	3.36	1166.05	0	00:30	0	0
JUNCT_1141	0.79	2.36	1149.05	0	00:50	0	0
JUNCT_1140	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1139	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1143	0.00	0.00	1169.70	0	00:00	0	0
JUNCT_1138	1.69	3.00	1149.69	0	01:15	0	0
JUNCT_1136	1.81	3.00	1138.69	0	00:55	0	0
JUNCT_1144	0.00	0.00	1145.45	0	00:00	0	0
JUNCT_1133	1.89	3.00	1127.19	0	00:50	0	0
JUNCT_1131	0.00	0.00	1166.90	0	00:00	0	0
JUNCT_1241	0.16	0.59	1167.48	0	00:30	0	0
JUNCT_1132	0.00	0.00	1177.69	0	00:00	0	0
JUNCT_1130	2.53	4.20	1127.89	0	00:40	0	0
JUNCT_1126	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1246	0.65	2.64	1171.78	0	00:30	0	0
JUNCT_1150	0.00	0.00	1190.92	0	00:00	0	0
JUNCT_1235	0.16	0.86	1191.77	0	00:30	0	0
JUNCT_1128	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1127	0.65	2.65	1159.79	0	00:35	0	0
JUNCT_1125	1.93	3.00	1111.73	0	00:50	0	0
JUNCT_1124	2.93	3.20	1111.43	0	00:50	0	0
JUNCT_1145	2.18	3.00	1097.20	0	01:20	0	0
JUNCT_1120	2.69	3.00	1086.40	0	00:40	0	0
JUNCT_1119	0.00	0.00	1083.40	0	00:00	0	0
JUNCT_1118	2.56	3.00	1077.60	0	00:50	0	0
JUNCT_1117	3.01	5.20	1078.80	0	01:50	0	0
JUNCT_1115	0.00	0.00	1083.90	0	00:00	0	0
JUNCT_1146	0.00	0.00	1130.10	0	00:00	0	0
JUNCT_1238	0.24	0.94	1131.04	0	00:30	0	0
JUNCT_1159	0.27	0.79	1084.69	0	00:55	0	0
JUNCT_1114	2.56	3.00	1066.10	0	01:05	0	0
JUNCT_1113	0.00	0.00	1082.90	0	00:00	0	0
JUNCT_1112	2.90	4.77	1066.87	0	00:50	0	0
JUNCT_1110	2.12	3.85	1062.45	0	00:50	0	0
JUNCT_1108	2.18	4.00	1041.00	0	01:00	0	0
JUNCT_181	0.00	0.00	1087.10	0	00:00	0	0
JUNCT_147	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_142	0.00	0.00	1131.06	0	00:00	0	0
JUNCT_175	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_174	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_176	0.13	0.83	1146.30	0	00:55	0	0
JUNCT_167	0.00	0.00	1183.27	0	00:00	0	0
JUNCT_170	0.00	0.00	1191.27	0	00:00	0	0
JUNCT_169	0.00	0.00	1211.27	0	00:00	0	0

JUNCT_168	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_113	0.48	1.50	1192.77	0	00:35	0	0
JUNCT_114	1.09	4.00	1157.27	0	00:35	0	0
JUNCT_115	1.22	4.00	1151.27	0	00:35	0	0
JUNCT_173	0.00	0.00	1184.27	0	00:00	0	0
JUNCT_171	0.00	0.00	1213.27	0	00:00	0	0
JUNCT_107	0.61	3.20	1192.47	0	00:35	0	0
JUNCT_172	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_180	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_108	1.54	3.21	1187.47	0	00:50	0	0
JUNCT_262	1.36	2.86	1172.13	0	00:30	0	0
JUNCT_166	0.00	0.00	1175.67	0	00:00	0	0
JUNCT_165	0.00	0.00	1213.67	0	00:00	0	0
JUNCT_106	0.81	2.00	1181.67	0	01:05	0	0
JUNCT_161	0.00	0.00	1263.67	0	00:00	0	0
JUNCT_164	0.00	0.00	1305.67	0	00:00	0	0
JUNCT_104	0.71	2.00	1287.67	0	00:30	0	0
JUNCT_203	0.25	0.99	1286.66	0	00:35	0	0
JUNCT_160	0.00	0.00	1319.67	0	00:00	0	0
JUNCT_105	0.00	0.00	1367.27	0	00:00	0	0
JUNCT_163	0.00	0.00	1331.67	0	00:00	0	0
JUNCT_103	0.62	2.75	1322.42	0	00:35	0	0
JUNCT_102	0.45	2.13	1265.80	0	00:35	0	0
JUNCT_101	1.08	3.00	1178.67	0	00:35	0	0
JUNCT_109	1.12	3.10	1146.36	0	00:50	0	0
JUNCT_110	2.31	6.40	1148.67	0	00:45	0	0
JUNCT_184	0.00	0.00	1142.27	0	00:00	0	0
JUNCT_116	1.85	4.00	1139.27	0	00:40	0	0
JUNCT_117	2.01	4.50	1135.56	0	00:40	0	0
JUNCT_118	2.06	4.00	1128.06	0	00:35	0	0
JUNCT_144	0.00	0.00	1124.06	0	00:00	0	0
JUNCT_186	2.14	4.16	1103.74	0	01:05	0	0
JUNCT_189	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_145	0.00	0.00	1152.31	0	00:00	0	0
JUNCT_220	0.34	1.54	1153.84	0	00:30	0	0
JUNCT_120	2.27	4.20	1091.30	0	01:10	0	0
JUNCT_222	2.44	7.82	1094.92	0	01:10	0	0
JUNCT_152	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_151	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_125	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_149	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_225	0.55	2.00	1072.00	0	00:35	27.46	30
JUNCT_183	0.55	2.00	1063.00	0	00:40	0	10
JUNCT_182	0.00	0.00	1061.00	0	00:00	0	0
JUNCT_198	1.33	4.50	1026.50	0	00:50	0	40
JUNCT_1106	0.00	0.00	1032.00	0	00:00	0	0
JUNCT_1240	0.27	1.09	1033.09	0	00:30	0	0
JUNCT_1105	2.18	4.00	1026.00	0	00:55	0	0
JUNCT_1104	0.00	0.00	1007.00	0	00:00	0	0
JUNCT_1103	4.12	5.00	1012.00	0	00:55	0	0
JUNCT_1147	3.76	4.50	1010.50	0	00:45	0	0
JUNCT_1148	3.22	4.57	1005.57	0	01:00	0	0
JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1155	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_197	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_134	2.28	7.13	1007.13	0	00:55	0	0
JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1101	3.21	4.57	1004.57	0	01:00	0	0
ROOT_JUNCT_1155	0.00	0.00	1000.00	0	00:10	0	0
ROOT_JUNCT_197	0.00	0.00	1000.00	0	00:20	0	0
ROOT_JUNCT_134	0.00	0.00	1000.00	0	00:40	0	0
ROOT_JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1158	0.00	0.00	1000.00	0	00:25	0	0
JUNCT_259	1.82	2.50	1134.92	0	00:20	0	0
JUNCT_133	3.63	9.26	1041.26	0	01:10	0	0
JUNCT_210	1.84	4.00	1146.27	0	00:35	0	0
JUNCT_217	2.05	4.00	1135.06	0	00:30	0	0
JUNCT_1223	0.84	3.00	1180.69	0	00:25	0	0
JUNCT_1229	1.66	3.00	1172.69	0	00:25	0	0
JUNCT_229	3.21	5.00	1030.00	0	00:40	0	0
JUNCT_1227	0.70	3.00	1148.45	0	00:25	0	0
JUNCT_1213	0.78	3.00	1098.40	0	00:30	0	0
JUNCT_1218	1.75	3.00	1160.14	0	00:30	0	0
JUNCT_1215	2.16	3.00	1101.20	0	01:15	0	0

JUNCT_1210	2.61	3.00	1076.60	0	00:30	0	0
JUNCT_256	0.66	3.00	1229.27	0	00:30	0	0
JUNCT_1228	1.81	3.00	1149.69	0	00:30	0	0
JUNCT_1214	2.70	2.80	1097.00	0	00:20	0	0
JUNCT_1230	0.90	3.31	1160.01	0	00:35	0	0
JUNCT_232	2.27	7.13	1011.60	0	00:45	0	0
JUNCT_254	0.59	3.45	1216.72	0	00:30	0	0
JUNCT_1243	0.90	3.00	1060.01	0	00:30	0	0
JUNCT_1222	0.48	3.00	1135.66	0	00:35	0	0
JUNCT_1206	2.20	4.00	1062.60	0	00:40	0	0
JUNCT_1202	3.22	4.57	1005.57	0	01:00	0	0
JUNCT_119	2.72	7.00	1119.07	0	01:00	0	0
JUNCT_1208	0.60	3.00	1085.90	0	00:25	0	0
JUNCT_258	0.81	2.00	1185.27	0	00:20	0	0
JUNCT_1221	1.92	3.00	1126.69	0	00:30	0	0
JUNCT_263	0.24	1.24	1083.24	0	01:10	0	0
JUNCT_257	0.36	1.94	1213.20	0	00:30	0	0
JUNCT_215	1.16	4.00	1151.27	0	00:30	0	0
JUNCT_265	1.38	4.50	1065.50	0	00:30	0	60
JUNCT_1233	2.87	4.77	1067.87	0	00:50	0	0
JUNCT_252	0.71	2.00	1307.67	0	00:20	0	0
JUNCT_1204	4.18	5.00	1027.00	0	00:35	0	0
JUNCT_207	1.63	3.50	1187.77	0	00:25	0	0
JUNCT_251	0.63	2.00	1369.27	0	00:20	0	0
JUNCT_1212	2.60	3.00	1086.40	0	00:30	0	0
JUNCT_216	1.94	4.00	1139.27	0	00:35	0	0
JUNCT_264	1.07	4.50	1149.96	0	00:30	0	0
JUNCT_211	0.66	3.00	1224.27	0	00:40	0	0
JUNCT_1201	3.22	4.57	1005.07	0	01:00	0	0
JUNCT_206	1.49	3.13	1192.40	0	00:45	0	0
JUNCT_1207	2.13	3.85	1065.95	0	00:50	0	0
JUNCT_260	0.43	1.88	1205.14	0	00:35	0	0
JUNCT_1209	1.24	3.00	1086.90	0	00:25	0	0
JUNCT_208	1.10	3.25	1178.91	0	00:40	0	0
JUNCT_1224	2.53	4.20	1128.39	0	00:30	0	0
JUNCT_261	0.12	0.85	1169.44	0	00:50	0	0
JUNCT_219	2.27	4.23	1103.81	0	01:05	0	0
JUNCT_253	0.85	2.00	1215.67	0	00:15	0	0
JUNCT_202	0.44	2.13	1321.80	0	00:35	0	0
JUNCT_122	2.44	7.82	1089.82	0	01:10	0	0
JUNCT_1216	2.23	3.00	1111.23	0	00:55	0	0
JUNCT_1244	1.15	3.00	1034.51	0	00:30	0	0
JUNCT_1129	7.09	7.09	1176.23	0	00:05	0	0
JUNCT_1217	2.94	3.20	1111.93	0	00:45	0	0
JUNCT_230	1.46	3.00	1229.42	0	00:30	0	0
JUNCT_218	2.72	7.04	1131.11	0	00:55	0	0
JUNCT_209	2.27	6.40	1149.67	0	00:35	0	0
JUNCT_1211	3.01	5.20	1079.80	0	01:50	0	0
JUNCT_214	1.23	4.00	1157.27	0	00:30	0	0
JUNCT_1205	2.20	4.00	1041.00	0	00:50	0	0
JUNCT_213	1.03	4.00	1195.27	0	00:25	0	0
JUNCT_205	1.08	3.00	1182.67	0	00:25	0	0
JUNCT_250	0.61	2.73	1334.40	0	00:30	0	0
JUNCT_201	0.57	2.68	1266.35	0	00:35	0	0
JUNCT_266	2.14	4.19	1116.25	0	01:00	0	0
JUNCT_1226	2.38	7.10	1142.79	0	00:45	0	0
JUNCT_1156	0.00	0.00	1165.19	0	00:00	0	0
JUNCT_204	0.63	2.00	1329.67	0	00:30	0	0
JUNCT_255	0.59	2.00	1228.27	0	00:20	0	0
JUNCT_1203	3.77	4.50	1011.50	0	00:35	0	0
JUNCT_1234	3.24	4.57	1010.57	0	01:00	0	0
JUNCT_1225	1.90	3.00	1138.19	0	00:30	0	0
JUNCT_185	1.62	3.50	1172.77	0	00:35	0	0
JUNCT_1220	0.10	2.50	1177.73	0	00:30	0	0
JUNCT_1304	1.70	3.66	1087.57	0	01:25	0	0
JUNCT_1313	2.58	9.43	1022.94	0	01:25	0	0
JUNCT_301	0.46	3.91	1179.58	0	00:40	0	0
JUNCT_1312	2.95	7.96	1177.66	0	01:20	0	0
JUNCT_1308	3.94	10.06	1167.20	0	01:25	0	0
JUNCT_304	1.60	5.39	1194.66	0	00:45	0	0
JUNCT_1305	6.74	10.71	1104.92	0	01:45	0	0
JUNCT_1306	16.22	30.17	1128.38	0	01:55	0	0
JUNCT_308	3.80	7.87	1234.30	0	01:25	0	0
JUNCT_302	0.73	2.24	1072.24	0	01:15	0	0
JUNCT_1307	12.89	18.32	1127.06	0	01:00	0	0

****
Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
JUNCT_1304	74.154	0	159.551	0	0 01:25	80.93
JUNCT_1313	112.482	0	410.883	0	0 01:25	127.39
JUNCT_301	20.035	0	170.457	1	0 00:40	1120.41
JUNCT_1312	128.528	1	346.914	1	0 01:20	57.40
JUNCT_1308	171.612	0	438.273	0	0 01:25	100.58
JUNCT_304	69.554	0	234.941	1	0 00:45	300.00
JUNCT_1305	293.657	1	466.658	1	0 01:45	472.01
JUNCT_1306	706.548	1	1314.090	1	0 01:55	420.00
JUNCT_308	165.331	0	342.839	1	0 01:25	38.14
JUNCT_302	31.651	0	97.472	1	0 01:15	400.00
JUNCT_1307	561.373	1	798.153	1	0 01:00	828.15

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Conduit Flow Summary
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Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
1105	1357.59	0 00:50				
186	2184.62	0 01:05				
1114	669.01	0 00:50				
259	40.17	0 03:00	9.12	1.00	1.07	130
259-OVERFLOW	702.45	0 00:40	9.25	1.00	0.01	0
1147	1467.73	0 01:00				
1121	202.72	0 00:30				
1109	295.61	0 00:30				
231	2416.06	0 01:10	7.34	1.00	0.15	0
1128	100.54	0 00:30				
133	1837.15	0 01:10				
133-DIV	578.91	0 01:10				
1108	960.28	0 01:00				
1111	164.71	0 00:30				
1239	133.03	0 00:40	3.57	1.00	0.00	0
1102	33.77	0 00:50				
198	415.65	0 00:50				
210	368.67	0 00:40	4.39	1.00	1.00	60
210-OVERFLOW	825.88	0 00:55	2.37	1.00	0.08	0
1148	1471.16	0 01:00				
217	353.12	0 00:35	4.23	1.00	1.00	95
217-OVERFLOW	1761.55	0 00:55	3.90	1.00	0.11	0
147	256.81	0 00:30				
1223	61.31	0 00:45	10.80	1.00	1.00	35
1223-OVERFLOW	128.35	0 00:40	13.98	1.00	0.00	0
1144	131.80	0 00:30				
125	400.00	0 01:10				
1229	147.29	0 01:15	3.23	1.00	1.00	5
1229-OVERFLOW	116.10	0 00:45	3.50	1.00	0.01	0
229	500.52	0 01:10	5.14	1.00	1.00	75
229-OVERFLOW	1316.06	0 01:20	5.29	1.00	0.06	0
1237	178.09	0 00:35	4.97	1.00	0.00	0
164	161.51	0 00:30				
1227	48.08	0 00:30	7.62	1.00	1.04	35
1227-OVERFLOW	81.13	0 00:35	7.82	1.00	0.00	0
144	301.75	0 00:30				
1213	43.66	0 01:25	7.62	1.00	1.01	55
1213-OVERFLOW	127.38	0 00:40	7.57	1.00	0.00	0
1218	162.58	0 01:15	3.45	1.00	1.00	5
1218-OVERFLOW	12.94	0 01:15	2.30	1.00	0.00	0

1215	147.29	0	01:20	3.07	1.00	1.00	130
1215-OVERFLOW	275.52	0	01:30	2.69	1.00	0.02	0
1115	329.22	0	00:30				
1210	140.84	0	01:05	3.00	1.00	1.00	175
1210-OVERFLOW	401.09	0	01:55	3.15	1.00	0.03	0
256	30.79	0	00:55	5.11	1.00	1.00	25
256-OVERFLOW	22.99	0	00:35	4.94	1.00	0.00	0
123	2402.40	0	01:00				
1157	162.73	0	00:30				
1122	147.35	0	00:30				
192	0.00	0	00:00				
132	277.47	0	00:30				
1103	1358.87	0	01:00				
146	285.09	0	00:30				
103	366.80	0	00:35				
120	2337.99	0	01:10				
1228	147.29	0	00:55	3.11	1.00	1.00	55
1228-OVERFLOW	241.98	0	00:50	3.02	1.00	0.01	0
1117	538.68	0	01:50				
166	202.77	0	00:30				
1134	107.14	0	00:30				
1214	35.32	0	00:25	5.94	1.00	1.03	340
1214-OVERFLOW	456.31	0	01:45	6.69	1.00	0.00	0
1230	79.09	0	00:50	2.68	1.00	0.54	0
1230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
232	329.10	0	02:00	9.38	1.00	1.03	75
232-OVERFLOW	256.62	0	01:15	6.48	1.00	0.00	0
1151	126.20	0	00:30				
180	114.94	0	00:30				
1138	336.28	0	00:45				
254	388.68	0	00:35	8.00	1.00	0.41	0
254-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1243	175.99	0	00:45	3.95	1.00	0.98	0
1243-OVERFLOW	50.46	0	00:40	3.03	1.00	0.00	0
1104	36.95	0	00:30				
121	471.21	0	00:40				
127	137.46	0	00:30				
1158	162.73	0	00:30				
1222	49.33	0	00:40	8.03	1.00	1.01	5
1222-OVERFLOW	19.81	0	00:40	9.67	1.00	0.00	0
174	340.95	0	00:30				
1206	838.13	0	01:00	5.63	1.00	1.00	0
1206-OVERFLOW	122.15	0	01:00	4.85	1.00	0.01	0
1202	18.24	0	00:40	2.43	1.00	1.00	330
1202-OVERFLOW	1452.81	0	01:00	4.37	1.00	0.13	0
126	2431.11	0	01:05				
1155	1502.22	0	01:00				
119	2223.32	0	01:00				
119-DIV	0.00	0	00:00				
1127	241.29	0	00:35				
197	1816.58	0	01:20				
184	61.43	0	00:30				
160	140.17	0	00:30				
1208	57.16	0	00:30	9.23	1.00	1.04	25
1208-OVERFLOW	55.13	0	00:35	10.47	1.00	0.00	0
269	0.00	0	00:00				
113	81.85	0	00:40				
1124	834.66	0	01:00				
1242	81.82	0	00:30	6.53	1.00	0.91	0
1142	81.82	0	00:30				
262	100.51	0	00:35	12.02	1.00	1.00	5
258	16.11	0	00:55	6.74	1.00	1.00	80
258-OVERFLOW	187.05	0	00:35	9.63	1.00	0.00	0
1221	152.68	0	00:50	3.27	1.00	1.00	90
1221-OVERFLOW	510.29	0	00:55	3.30	1.00	0.03	0
171	447.91	0	00:30				
263	468.19	0	01:10	11.61	1.00	0.39	0
263-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1132	224.38	0	00:30				
257	31.06	0	00:35	7.00	1.00	0.72	0
257-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
215	163.46	0	00:35	14.84	1.00	1.01	50
215-OVERFLOW	346.43	0	00:40	3.52	1.00	0.01	0
148	418.25	0	00:30				
265	198.02	0	01:30	17.08	1.00	1.01	45
265-OVERFLOW	219.00	0	00:50	14.94	1.00	0.44	0
1101	1502.22	0	01:00				
1233	669.63	0	00:50	14.27	1.00	0.24	0
1233-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1120	510.68	0	01:45				
221	471.21	0	00:40	9.41	1.00	0.06	0
223	2006.50	0	01:05	20.45	1.00	0.08	0
1140	114.85	0	00:30				
151	342.45	0	00:35				
1143	293.61	0	00:30				
228	1834.03	0	01:10	7.29	1.00	0.58	0
168	63.14	0	00:30				
1145	496.91	0	01:30				
252	21.44	0	00:25	7.77	1.00	1.03	80
252-OVERFLOW	140.62	0	00:35	7.02	1.00	0.00	0
1133	509.71	0	00:55				
1150	139.58	0	00:30				
1204	241.07	0	00:55	4.43	1.00	1.00	175
1204-OVERFLOW	1090.11	0	01:00	4.22	1.00	0.05	0
176	494.78	0	00:40				
1112	732.13	0	00:50				
207	82.86	0	00:30	9.87	1.00	1.03	100
207-OVERFLOW	393.62	0	00:50	7.88	1.00	0.01	0
1110	834.64	0	00:50				
251	23.20	0	01:35	8.27	1.00	1.06	75
251-OVERFLOW	130.30	0	00:35	9.91	1.00	0.00	0
1212	142.90	0	00:50	3.01	1.00	1.00	180
1212-OVERFLOW	395.77	0	01:50	3.15	1.00	0.03	0
165	552.47	0	00:30				
216	368.67	0	00:35	4.39	1.00	1.00	80
216-OVERFLOW	1167.71	0	00:55	3.34	1.00	0.05	0
110	1202.29	0	00:50				
264	190.80	0	01:20	14.01	1.00	1.02	50
264-OVERFLOW	307.89	0	00:40	6.81	1.00	0.02	0
114	496.92	0	00:35				
1137	85.60	0	00:35				
211	12.25	0	00:30	7.87	1.00	1.04	70
211-OVERFLOW	42.33	0	00:40	7.34	1.00	0.00	0
1201	18.24	0	00:40	2.43	1.00	1.00	330
1201-OVERFLOW	1452.56	0	01:00	4.37	1.00	0.13	0
169	32.43	0	00:30				
206	34.74	0	00:40	6.71	1.00	1.01	135
206-OVERFLOW	279.69	0	00:50	3.89	1.00	0.08	0
1207	734.28	0	00:50	5.06	1.00	0.94	0
1207-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
128	1834.03	0	01:10				
102	633.44	0	00:35				
131	242.31	0	00:30				
1245	127.12	0	01:35	4.53	1.00	0.47	0
226	2431.11	0	01:05	15.21	1.00	0.53	0
1238	102.89	0	00:55	2.73	1.00	0.00	0
260	8.72	0	00:30	5.71	1.00	1.04	55
260-OVERFLOW	20.04	0	00:35	5.30	1.00	0.00	0
167	241.23	0	00:30				
1209	132.78	0	01:05	3.92	1.00	1.00	35
1209-OVERFLOW	108.62	0	00:40	4.11	1.00	0.01	0
1123	70.96	0	01:05				
1125	835.18	0	00:55				
1159	102.89	0	00:55				
208	50.47	0	01:15	3.16	1.00	1.00	70
208-OVERFLOW	1054.74	0	00:50	4.46	1.00	0.05	0
1224	75.91	0	00:35	6.23	1.00	1.01	135
1224-OVERFLOW	434.33	0	00:55	5.29	1.00	0.00	0
106	433.75	0	00:35				
1152	123.48	0	00:30				
224	2433.11	0	01:05	7.30	1.00	0.58	0
105	164.48	0	00:30				
261	18.17	0	00:35	7.18	1.00	1.00	60
261-OVERFLOW	341.15	0	00:55	7.43	1.00	0.00	0
219	68.38	0	00:55	3.42	1.00	1.00	155
219-OVERFLOW	2167.48	0	01:10	4.23	1.00	0.10	0
253	14.70	0	01:05	6.44	1.00	1.00	70
253-OVERFLOW	419.59	0	00:35	10.24	1.00	0.01	0

202	478.68	0	00:35	23.91	1.00	0.23	0
202-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
203	154.76	0	00:35	7.87	1.00	0.32	0
122	348.85	0	01:10				
122-DIV	2000.00	0	01:00				
1136	389.24	0	00:50				
124	2433.11	0	01:05				
115	498.03	0	00:40				
189	2184.62	0	01:05				
1106	183.72	0	00:30				
1135	458.17	0	00:50				
220	312.56	0	00:40	8.54	1.00	0.01	0
134	577.10	0	01:15				
1216	156.18	0	01:05	3.26	1.00	1.00	110
1216-OVERFLOW	682.71	0	01:05	3.66	1.00	0.04	0
1244	180.39	0	00:50	3.82	1.00	1.00	20
1244-OVERFLOW	149.73	0	00:45	3.04	1.00	0.01	0
1240	149.63	0	00:40	3.69	1.00	0.00	0
222	2348.85	0	01:10	6.91	1.00	0.59	0
142	168.26	0	00:35				
1129	60.00	0	00:30				
1129-DIV	57.58	0	00:30				
1217	36.52	0	00:45	5.12	1.00	1.00	320
1217-OVERFLOW	798.25	0	01:00	6.18	1.00	0.01	0
230	188.56	0	00:40	9.33	1.00	1.00	0
230-OVERFLOW	67.49	0	00:35	13.80	1.00	0.00	0
218	285.62	0	00:45	5.30	1.00	1.00	95
218-OVERFLOW	1937.70	0	01:00	8.33	1.00	0.10	0
209	223.96	0	00:40	7.74	1.00	1.03	70
209-OVERFLOW	884.30	0	00:50	8.80	1.00	0.00	0
1139	201.82	0	00:30				
1141	79.09	0	00:50				
150	428.92	0	00:30				
1119	191.70	0	00:35				
1149	160.10	0	00:30				
1231	80.55	0	00:35	6.51	1.00	0.89	0
1211	538.68	0	01:50	13.67	1.00	0.59	0
1211-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1241	71.19	0	00:35	5.15	1.00	0.00	0
173	143.03	0	00:30				
1118	538.68	0	01:50				
117	2025.55	0	00:55				
1246	60.18	0	00:35	7.77	1.00	0.92	0
1130	666.86	0	00:50				
1236	141.59	0	00:35	7.60	1.00	0.00	0
214	133.07	0	00:30	12.10	1.00	1.01	60
214-OVERFLOW	365.99	0	00:40	8.64	1.00	0.01	0
1205	855.85	0	00:55	5.65	1.00	1.00	15
1205-OVERFLOW	91.45	0	01:10	4.96	1.00	0.01	0
1116	80.55	0	00:30				
213	137.67	0	00:30	12.71	1.00	1.04	45
213-OVERFLOW	161.89	0	00:35	13.23	1.00	0.00	0
205	41.78	0	00:30	6.49	1.00	1.08	75
205-OVERFLOW	407.87	0	00:40	6.37	1.00	0.01	0
172	112.18	0	00:30				
250	216.27	0	00:35	7.13	1.00	0.81	0
250-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1235	109.07	0	00:40	2.97	1.00	0.00	0
225	356.90	0	00:40	8.92	1.00	1.00	10
163	213.29	0	00:30				
152	348.85	0	01:10				
201	808.17	0	00:35	27.36	1.00	0.39	0
201-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
266	68.38	0	01:00	3.36	1.00	1.00	135
266-OVERFLOW	2116.23	0	01:05	3.91	1.00	0.10	0
1146	152.02	0	00:30				
116	1522.72	0	00:50				
183	356.90	0	00:40				
1226	305.78	0	00:45	8.82	1.00	1.00	35
1226-OVERFLOW	88.27	0	00:50	5.20	1.00	0.00	0
175	10.37	0	00:35				
161	208.97	0	00:30				
104	161.42	0	00:35				
109	1104.47	0	00:50				
181	16.11	0	00:40				
1156	79.00	0	00:25				
1156-DIV	162.73	0	00:30				
204	150.53	0	00:35	12.36	1.00	0.03	0
204-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
255	26.16	0	00:25	9.72	1.00	1.03	60
255-OVERFLOW	182.91	0	00:35	13.33	1.00	0.00	0
1126	167.87	0	00:30				
182	102.24	0	00:35				
1131	77.84	0	00:30				
1153	224.97	0	00:40				
1203	128.16	0	00:40	9.19	1.00	1.00	245
1203-OVERFLOW	1232.17	0	01:00	8.91	1.00	0.01	0
1234	18.24	0	00:40	2.43	1.00	1.00	330
1234-OVERFLOW	1452.92	0	01:00	4.38	1.00	0.13	0
170	265.87	0	00:30				
1225	147.29	0	00:50	3.12	1.00	1.00	75
1225-OVERFLOW	362.42	0	00:55	2.75	1.00	0.02	0
1113	120.00	0	00:30				
108	398.77	0	00:50				
1154	155.32	0	00:35				
107	388.68	0	00:35				
145	393.69	0	00:30				
196	1816.58	0	01:20				
118	2114.67	0	00:55				
185	100.00	0	00:30				
185-DIV	373.71	0	00:50				
101	1184.21	0	00:35				
193	0.00	0	00:00				
1220	31.22	0	00:40	15.45	1.00	0.89	0
1220-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1107	80.53	0	00:30				
149	126.42	0	00:35				

****
Routing Time Step Summary
****
Minimum Time Step : 300.00 sec
Average Time Step : 300.00 sec
Maximum Time Step : 300.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.06

Analysis begun on: Tue May 23 16:21:50 2006
Total elapsed time: < 1 sec

50-YEAR EPA SWMM5.0 Master Plan Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.006a)
  ----------------------------------------------------------------

  BROOMFIELD AND VICINITY  (no park div.)(city/3207 connect w/Upstream 120th split
  KIOWA ENGINEERING  MP10.sin (308 pond/120th sewer alt.) May/06

  ****************
  Analysis Options
  ****************
  Flow Units ..... CFS
  Infiltration Method ..... HORTON
  Flow Routing Method ..... KINWAVE
  Starting Date ..... JAN-01-2005 00:00:00
  Ending Date ..... JAN-01-2005 06:00:00
  Antecedent Dry Days ..... 0.0
  Report Time Step ..... 00:15:00
  Wet Time Step ..... 00:05:00
  Dry Time Step ..... 00:05:00
  Routing Time Step ..... 300.00 sec

  **************************        Volume         Depth
  Runoff Quantity Continuity      acre-feet        inches
  **************************      ---------       -------
  Total Precipitation .....         818.744         2.750
  Evaporation Loss .....              0.000         0.000
  Infiltration Loss .....           328.554         1.104
  Surface Runoff .....              478.784         1.608
  Final Surface Storage ....         14.487         0.049
  Continuity Error (%) .....         -0.376

  **************************        Volume        Volume
  Flow Routing Continuity         acre-feet      Mgallons
  **************************      ---------     ---------
  Dry Weather Inflow .....            0.000         0.000
  Wet Weather Inflow .....          479.111       156.125
  Groundwater Inflow .....            0.000         0.000
  RDII Inflow .....                   0.000         0.000
  External Inflow .....              0.000         0.000
  External Outflow .....           449.632       146.519
  Surface Flooding .....             0.076         0.025
  Evaporation Loss .....             0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume .....         39.150        12.758
  Continuity Error (%) .....        -2.034

  ****************************
  Subcatchment Runoff Summary
  ****************************

  ------------------------------------------------------------------------------
                    Total      Total      Total      Total      Total     Runoff
                   Precip      Runon       Evap      Infil     Runoff      Coeff
  Subcatchment         in         in         in         in         in
  ------------------------------------------------------------------------------
  SWMM_SUBC_1       2.750      0.000      0.000      0.691      1.997      0.726
  SWMM_SUBC_2       2.750      0.000      0.000      1.238      1.485      0.540
  SWMM_SUBC_3       2.750      0.000      0.000      0.984      1.722      0.626
  SWMM_SUBC_8       2.750      0.000      0.000      0.345      2.342      0.852
  SWMM_SUBC_30      2.750      0.000      0.000      0.169      2.506      0.911
  SWMM_SUBC_31      2.750      0.000      0.000      0.542      2.151      0.782
  SWMM_SUBC_4       2.750      0.000      0.000      1.415      1.311      0.477
  SWMM_SUBC_5       2.750      0.000      0.000      1.230      1.488      0.541
  SWMM_SUBC_6       2.750      0.000      0.000      1.241      1.476      0.537
  SWMM_SUBC_7       2.750      0.000      0.000      1.019      1.700      0.618
  SWMM_SUBC_9       2.750      0.000      0.000      0.634      2.058      0.748
  SWMM_SUBC_10      2.750      0.000      0.000      0.607      2.076      0.755
  SWMM_SUBC_11      2.750      0.000      0.000      0.931      1.781      0.648
  SWMM_SUBC_12      2.750      0.000      0.000      0.369      2.304      0.838
  SWMM_SUBC_14      2.750      0.000      0.000      0.896      1.813      0.659
  SWMM_SUBC_15      2.750      0.000      0.000      1.350      1.346      0.489
  SWMM_SUBC_16      2.750      0.000      0.000      1.226      1.490      0.542
  SWMM_SUBC_32      2.750      0.000      0.000      0.253      2.431      0.884
  SWMM_SUBC_33      2.750      0.000      0.000      1.706      1.045      0.380
  SWMM_SUBC_36      2.750      0.000      0.000      1.257      1.465      0.533
  SWMM_SUBC_17      2.750      0.000      0.000      1.393      1.326      0.482
  SWMM_SUBC_18      2.750      0.000      0.000      0.350      2.334      0.849
  SWMM_SUBC_20      2.750      0.000      0.000      1.175      1.549      0.563
  SWMM_SUBC_34      2.750      0.000      0.000      1.799      0.949      0.345
  SWMM_SUBC_13      2.750      0.000      0.000      0.664      2.037      0.741
  SWMM_SUBC_19      2.750      0.000      0.000      0.549      2.142      0.779
  SWMM_SUBC_21      2.750      0.000      0.000      0.565      2.130      0.774
  SWMM_SUBC_22      2.750      0.000      0.000      0.604      2.076      0.755
  SWMM_SUBC_23      2.750      0.000      0.000      0.364      2.320      0.844
  SWMM_SUBC_24      2.750      0.000      0.000      0.592      2.089      0.760
  SWMM_SUBC_25      2.750      0.000      0.000      0.350      2.334      0.849
  SWMM_SUBC_35      2.750      0.000      0.000      0.591      2.090      0.760
  SWMM_SUBC_1001    2.750      0.000      0.000      1.218      1.501      0.546
  SWMM_SUBC_1002    2.750      0.000      0.000      1.220      1.506      0.548
  SWMM_SUBC_1003    2.750      0.000      0.000      1.400      1.324      0.482
  SWMM_SUBC_1004    2.750      0.000      0.000      1.486      1.228      0.447
  SWMM_SUBC_1005    2.750      0.000      0.000      0.928      1.779      0.647
  SWMM_SUBC_1006    2.750      0.000      0.000      1.440      1.292      0.470
  SWMM_SUBC_1007    2.750      0.000      0.000      1.460      1.272      0.462
  SWMM_SUBC_1008    2.750      0.000      0.000      1.425      1.307      0.475
  SWMM_SUBC_1009    2.750      0.000      0.000      1.622      1.114      0.405
  SWMM_SUBC_1010    2.750      0.000      0.000      1.216      1.507      0.548
  SWMM_SUBC_1011    2.750      0.000      0.000      2.086      0.665      0.242
  SWMM_SUBC_1013    2.750      0.000      0.000      1.663      1.074      0.391
  SWMM_SUBC_1014    2.750      0.000      0.000      1.298      1.427      0.519
  SWMM_SUBC_1015    2.750      0.000      0.000      1.117      1.605      0.584
  SWMM_SUBC_1017    2.750      0.000      0.000      1.280      1.438      0.523
  SWMM_SUBC_1019    2.750      0.000      0.000      1.035      1.663      0.605
  SWMM_SUBC_1020    2.750      0.000      0.000      0.998      1.718      0.625
  SWMM_SUBC_1021    2.750      0.000      0.000      0.997      1.716      0.624
  SWMM_SUBC_1022    2.750      0.000      0.000      1.902      0.839      0.305
  SWMM_SUBC_1023    2.750      0.000      0.000      1.358      1.368      0.497
  SWMM_SUBC_1024    2.750      0.000      0.000      1.256      1.461      0.531
  SWMM_SUBC_1025    2.750      0.000      0.000      1.318      1.411      0.513
  SWMM_SUBC_1026    2.750      0.000      0.000      0.530      2.165      0.787
  SWMM_SUBC_1027    2.750      0.000      0.000      1.788      0.955      0.347
  SWMM_SUBC_1028    2.750      0.000      0.000      1.103      1.609      0.585
  SWMM_SUBC_1029    2.750      0.000      0.000      1.959      0.792      0.288
  SWMM_SUBC_1041    2.750      0.000      0.000      1.140      1.571      0.571
  SWMM_SUBC_1043    2.750      0.000      0.000      0.303      2.375      0.864
  SWMM_SUBC_1031    2.750      0.000      0.000      1.193      1.515      0.551
  SWMM_SUBC_1032    2.750      0.000      0.000      1.343      1.374      0.500
  SWMM_SUBC_1033    2.750      0.000      0.000      1.427      1.284      0.467
  ------------------------------------------------------------------------------
  Totals            2.750      0.000      0.000      1.104      1.608      0.585

  ******************
  Node Depth Summary
  ******************

  ------------------------------------------------------------------------------
                    Average    Maximum    Maximum  Time of Max      Total      Total
                      Depth      Depth        HGL   Occurrence    Flooding    Minutes
  Node                 Feet       Feet       Feet  days hr:min    acre-in    Flooded
  ------------------------------------------------------------------------------
  JUNCT_150            0.00       0.00    1025.00    0 00:00          0          0
  JUNCT_223            1.97       5.63    1065.30    0 01:10          0          0
  JUNCT_131            0.00       0.00    1226.43    0 00:00          0          0
  JUNCT_132            0.00       0.00    1226.42    0 00:00          0          0
  JUNCT_146            0.00       0.00    1172.42    0 00:00          0          0
  JUNCT_221            1.36       2.97    1175.40    0 00:35          0          0
  JUNCT_121            0.60       1.49    1133.91    0 00:35          0          0
  JUNCT_148            0.00       0.00    1132.42    0 00:00          0          0
  JUNCT_123            2.20       5.62    1064.04    0 01:10          0          0
  JUNCT_127            0.00       0.00    1058.42    0 00:00          0          0
  JUNCT_224            2.59       7.22    1065.64    0 01:10          0          0
```

JUNCT_124	2.58	7.19	1050.65	0	01:15	0	0
JUNCT_226	2.99	10.45	1053.91	0	01:15	0	0
JUNCT_126	2.99	10.45	1053.01	0	01:15	0	0
JUNCT_231	3.42	8.70	1051.26	0	01:15	0	0
JUNCT_228	2.94	7.30	1039.30	0	01:15	0	0
JUNCT_128	2.94	7.29	1032.29	0	01:15	0	0
JUNCT_196	3.12	5.00	1005.00	0	01:10	0	0
JUNCT_1104	0.00	0.00	1007.00	0	00:00	0	0
JUNCT_1109	0.00	0.00	1058.60	0	00:00	0	0
JUNCT_1111	0.00	0.00	1068.60	0	00:00	0	0
JUNCT_1239	0.24	0.99	1069.59	0	00:30	0	0
JUNCT_1246	0.58	2.64	1171.78	0	00:30	0	0
JUNCT_1150	0.00	0.00	1190.92	0	00:00	0	0
JUNCT_1235	0.15	0.80	1191.71	0	00:30	0	0
JUNCT_1128	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1127	0.59	2.66	1159.80	0	00:35	0	0
JUNCT_1126	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1132	0.00	0.00	1177.69	0	00:00	0	0
JUNCT_1134	0.00	0.00	1135.19	0	00:00	0	0
JUNCT_1144	0.00	0.00	1145.45	0	00:00	0	0
JUNCT_1242	0.85	3.26	1168.46	0	00:25	0	0
JUNCT_1142	0.85	3.39	1166.08	0	00:30	0	0
JUNCT_1231	0.85	3.39	1166.08	0	00:30	0	0
JUNCT_1141	0.78	2.36	1149.05	0	00:50	0	0
JUNCT_1140	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1139	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1143	0.00	0.00	1169.70	0	00:00	0	0
JUNCT_1138	1.52	3.00	1149.69	0	01:00	0	0
JUNCT_1137	0.00	0.00	1146.69	0	00:00	0	0
JUNCT_1136	1.66	3.00	1138.69	0	00:55	0	0
JUNCT_1135	2.09	7.10	1142.29	0	00:55	0	0
JUNCT_1133	1.75	3.00	1127.19	0	00:50	0	0
JUNCT_1131	0.00	0.00	1166.90	0	00:00	0	0
JUNCT_1241	0.16	0.55	1167.45	0	00:30	0	0
JUNCT_1130	2.30	4.20	1127.89	0	00:40	0	0
JUNCT_1125	1.82	3.00	1111.73	0	00:50	0	0
JUNCT_1124	2.93	3.20	1111.43	0	00:50	0	0
JUNCT_1149	0.00	0.00	1161.13	0	00:00	0	0
JUNCT_1236	0.18	0.66	1161.78	0	00:30	0	0
JUNCT_1123	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1145	2.07	3.00	1097.20	0	01:25	0	0
JUNCT_1122	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1121	0.00	0.00	1106.79	0	00:00	0	0
JUNCT_1237	0.20	0.93	1107.72	0	00:30	0	0
JUNCT_1120	2.68	3.00	1086.40	0	00:40	0	0
JUNCT_1119	0.00	0.00	1083.40	0	00:00	0	0
JUNCT_1118	2.50	3.00	1077.60	0	00:50	0	0
JUNCT_1117	2.61	4.84	1078.44	0	02:05	0	0
JUNCT_1116	0.00	0.00	1073.60	0	00:00	0	0
JUNCT_1146	0.00	0.00	1130.10	0	00:00	0	0
JUNCT_1238	0.21	0.87	1130.98	0	00:30	0	0
JUNCT_1159	0.23	0.69	1084.59	0	00:45	0	0
JUNCT_1115	0.00	0.00	1083.90	0	00:00	0	0
JUNCT_1114	2.50	3.00	1066.10	0	01:05	0	0
JUNCT_1113	0.00	0.00	1082.90	0	00:00	0	0
JUNCT_1112	2.55	4.33	1066.43	0	02:05	0	0
JUNCT_1110	1.83	3.42	1062.02	0	00:50	0	0
JUNCT_1108	1.89	3.81	1040.81	0	00:55	0	0
JUNCT_1107	0.00	0.00	1037.00	0	00:00	0	0
JUNCT_147	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_142	0.00	0.00	1131.06	0	00:00	0	0
JUNCT_166	0.00	0.00	1175.67	0	00:00	0	0
JUNCT_105	0.00	0.00	1367.27	0	00:00	0	0
JUNCT_163	0.00	0.00	1331.67	0	00:00	0	0
JUNCT_103	0.58	2.54	1322.21	0	00:35	0	0
JUNCT_160	0.00	0.00	1319.67	0	00:00	0	0
JUNCT_164	0.00	0.00	1305.67	0	00:00	0	0
JUNCT_104	0.69	2.00	1287.67	0	00:30	0	0
JUNCT_203	0.24	0.92	1286.59	0	00:35	0	0
JUNCT_102	0.42	1.96	1265.63	0	00:35	0	0
JUNCT_161	0.00	0.00	1263.67	0	00:00	0	0
JUNCT_165	0.00	0.00	1213.67	0	00:00	0	0
JUNCT_106	0.81	2.00	1181.67	0	01:05	0	0
JUNCT_101	1.08	3.00	1178.67	0	00:35	0	0

JUNCT_109	1.09	2.83	1146.09	0	00:50	0	0
JUNCT_173	0.00	0.00	1184.27	0	00:00	0	0
JUNCT_180	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_172	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_171	0.00	0.00	1213.27	0	00:00	0	0
JUNCT_107	0.57	2.93	1192.20	0	00:35	0	0
JUNCT_108	1.52	2.86	1187.12	0	00:50	0	0
JUNCT_262	1.36	2.86	1172.13	0	00:30	0	0
JUNCT_110	2.27	6.40	1148.67	0	00:45	0	0
JUNCT_184	0.00	0.00	1142.27	0	00:00	0	0
JUNCT_167	0.00	0.00	1183.27	0	00:00	0	0
JUNCT_169	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_168	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_113	0.46	1.50	1192.77	0	00:35	0	0
JUNCT_170	0.00	0.00	1191.27	0	00:00	0	0
JUNCT_114	0.98	4.00	1157.27	0	00:40	0	0
JUNCT_115	1.17	4.00	1151.27	0	00:35	0	0
JUNCT_116	1.85	4.00	1139.27	0	00:40	0	0
JUNCT_175	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_174	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_176	0.11	0.69	1146.15	0	00:55	0	0
JUNCT_117	1.98	4.50	1135.56	0	00:40	0	0
JUNCT_118	2.04	4.00	1128.06	0	00:35	0	0
JUNCT_144	0.00	0.00	1124.06	0	00:00	0	0
JUNCT_186	2.08	3.78	1103.36	0	01:05	0	0
JUNCT_189	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_145	0.00	0.00	1152.31	0	00:00	0	0
JUNCT_220	0.33	1.46	1153.76	0	00:30	0	0
JUNCT_120	2.21	3.80	1090.91	0	01:10	0	0
JUNCT_181	0.00	0.00	1087.10	0	00:00	0	0
JUNCT_222	2.26	6.95	1094.05	0	01:10	0	0
JUNCT_152	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_151	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_125	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_149	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_225	0.49	2.00	1072.00	0	00:35	0.91	15
JUNCT_183	0.49	2.00	1063.00	0	00:40	0	5
JUNCT_182	0.00	0.00	1061.00	0	00:00	0	0
JUNCT_198	1.23	4.50	1026.50	0	00:50	0	20
JUNCT_1106	0.00	0.00	1032.00	0	00:00	0	0
JUNCT_1240	0.25	1.03	1033.03	0	00:30	0	0
JUNCT_1105	1.89	3.77	1025.77	0	00:55	0	0
JUNCT_1103	4.01	5.00	1012.00	0	00:55	0	0
JUNCT_1152	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1151	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1153	0.87	2.94	1034.44	0	00:40	0	0
JUNCT_1154	0.00	0.00	1031.51	0	00:00	0	0
JUNCT_1245	1.39	2.86	1016.36	0	01:20	0	0
JUNCT_1147	3.63	4.50	1010.50	0	00:45	0	0
JUNCT_1148	3.06	4.33	1005.33	0	01:00	0	0
JUNCT_1102	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1101	3.06	4.33	1004.33	0	01:00	0	0
JUNCT_192	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1157	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_134	2.15	7.13	1007.13	0	01:00	0	0
JUNCT_197	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1155	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_269	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1158	0.00	0.00	1000.00	0	00:25	0	0
ROOT_JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1155	0.00	0.00	1000.00	0	00:10	0	0
ROOT_JUNCT_134	0.00	0.00	1000.00	0	00:40	0	0
ROOT_JUNCT_197	0.00	0.00	1000.00	0	00:20	0	0
JUNCT_215	1.09	4.00	1151.27	0	00:30	0	0
JUNCT_230	1.36	3.00	1229.42	0	00:30	0	0
JUNCT_259	1.71	2.50	1134.92	0	00:20	0	0
JUNCT_1233	2.53	4.33	1067.43	0	02:05	0	0
JUNCT_261	0.10	0.69	1169.27	0	00:50	0	0
JUNCT_1213	0.75	3.00	1098.40	0	00:30	0	0
JUNCT_122	2.26	6.93	1088.94	0	01:10	0	0
JUNCT_1234	3.09	4.33	1010.33	0	01:00	0	0
JUNCT_1225	1.75	3.00	1138.19	0	00:30	0	0

JUNCT_119	2.62	6.11	1118.18	0	01:00	0	0
JUNCT_207	1.63	3.50	1187.77	0	00:25	0	0
JUNCT_1207	1.84	3.40	1065.50	0	00:45	0	0
JUNCT_1211	2.62	4.84	1079.44	0	02:05	0	0
JUNCT_210	1.82	4.00	1146.27	0	00:40	0	0
JUNCT_1218	1.60	2.95	1160.09	0	00:30	0	0
JUNCT_1129	7.09	7.09	1176.23	0	00:05	0	0
JUNCT_217	2.12	10.00	1141.06	0	01:05	0.00	5
JUNCT_218	2.61	6.13	1130.19	0	00:55	0	0
JUNCT_263	0.20	0.97	1082.98	0	00:30	0	0
JUNCT_1228	1.65	3.00	1149.69	0	00:30	0	0
JUNCT_260	0.40	1.65	1204.92	0	00:35	0	0
JUNCT_232	2.15	7.13	1011.60	0	00:50	0	0
JUNCT_1204	4.06	5.00	1027.00	0	00:35	0	0
JUNCT_1215	2.06	3.00	1101.20	0	01:25	0	0
JUNCT_1214	2.69	2.80	1097.00	0	00:25	0	0
JUNCT_1226	2.08	7.10	1142.79	0	00:45	0	0
JUNCT_204	0.62	2.00	1329.67	0	00:30	0	0
JUNCT_253	0.85	2.00	1215.67	0	00:15	0	0
JUNCT_211	0.57	3.00	1224.27	0	00:40	0	0
JUNCT_254	0.55	3.19	1216.46	0	00:30	0	0
JUNCT_185	1.62	3.50	1172.77	0	00:35	0	0
JUNCT_1244	1.10	3.00	1034.51	0	00:30	0	0
JUNCT_257	0.33	1.75	1213.02	0	00:30	0	0
JUNCT_202	0.42	1.96	1321.63	0	00:35	0	0
JUNCT_1156	0.00	0.00	1165.19	0	00:00	0	0
JUNCT_214	1.18	4.00	1157.27	0	00:30	0	0
JUNCT_258	0.79	2.00	1185.27	0	00:20	0	0
JUNCT_206	1.47	2.78	1192.04	0	00:45	0	0
JUNCT_1223	0.79	3.00	1180.69	0	00:25	0	0
JUNCT_1216	2.16	3.00	1111.23	0	00:55	0	0
JUNCT_1230	0.88	3.33	1160.03	0	00:35	0	0
JUNCT_1227	0.65	3.00	1148.45	0	00:25	0	0
JUNCT_250	0.58	2.56	1334.23	0	00:30	0	0
JUNCT_255	0.59	2.00	1228.27	0	00:20	0	0
JUNCT_133	3.41	8.68	1040.68	0	01:15	0	0
JUNCT_1208	0.55	3.00	1085.90	0	00:30	0	0
JUNCT_1243	0.85	3.00	1060.01	0	00:30	0	0
JUNCT_229	3.14	5.00	1030.00	0	00:45	0	0
JUNCT_219	2.22	3.83	1103.42	0	01:05	0	0
JUNCT_252	0.69	2.00	1307.67	0	00:20	0	0
JUNCT_209	2.24	6.40	1149.67	0	00:35	0	0
JUNCT_1217	2.94	3.20	1111.93	0	00:45	0	0
JUNCT_1220	0.05	2.50	1177.73	0	00:30	0	0
JUNCT_1222	0.43	3.00	1135.66	0	00:35	0	0
JUNCT_1205	1.90	3.81	1040.81	0	00:55	0	0
JUNCT_201	0.53	2.46	1266.13	0	00:35	0	0
JUNCT_251	0.62	2.00	1369.27	0	00:20	0	0
JUNCT_213	0.92	4.00	1195.27	0	00:30	0	0
JUNCT_1202	3.06	4.33	1005.33	0	01:00	0	0
JUNCT_1201	3.06	4.33	1004.83	0	01:00	0	0
JUNCT_1203	3.64	4.50	1011.50	0	00:35	0	0
JUNCT_256	0.58	3.00	1229.27	0	00:30	0	0
JUNCT_265	1.27	4.50	1065.50	0	00:30	0	35
JUNCT_216	1.92	4.00	1139.27	0	00:35	0	0
JUNCT_208	1.07	3.04	1178.70	0	00:40	0	0
JUNCT_1224	2.31	4.20	1128.39	0	00:30	0	0
JUNCT_1229	1.48	3.00	1172.69	0	00:25	0	0
JUNCT_1209	1.13	3.00	1086.90	0	00:25	0	0
JUNCT_1212	2.54	3.00	1086.40	0	00:30	0	0
JUNCT_264	1.02	4.50	1149.96	0	00:30	0	0
JUNCT_1221	1.79	3.00	1126.69	0	00:30	0	0
JUNCT_266	2.09	3.80	1115.87	0	01:00	0	0
JUNCT_1206	1.92	3.86	1062.46	0	00:50	0	0
JUNCT_1210	2.55	3.00	1076.60	0	00:30	0	0
JUNCT_205	1.09	3.00	1182.67	0	00:25	0	0
JUNCT_302	0.66	1.69	1071.69	0	00:40	0	0
JUNCT_1305	6.13	10.28	1104.49	0	02:00	0	0
JUNCT_1312	1.93	5.68	1175.38	0	01:20	0	0
JUNCT_1306	14.27	23.72	1121.93	0	01:45	0	0
JUNCT_304	1.55	4.95	1194.22	0	00:45	0	0
JUNCT_1313	1.59	6.47	1019.98	0	01:20	0	0
JUNCT_308	2.97	6.36	1232.78	0	01:25	0	0
JUNCT_1304	1.50	2.88	1086.78	0	01:30	0	0
JUNCT_1308	3.14	7.77	1164.91	0	01:25	0	0
JUNCT_301	0.40	3.11	1178.78	0	00:40	0	0
JUNCT_1307	12.34	17.69	1126.42	0	01:10	0	0

****
Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
JUNCT_302	28.916	0	73.523	1	0 00:40	273.08
JUNCT_1305	267.052	1	447.997	1	0 02:00	430.48
JUNCT_1312	84.182	0	247.582	1	0 01:20	57.03
JUNCT_1306	621.638	1	1033.136	1	0 01:45	406.50
JUNCT_304	67.509	0	215.586	1	0 00:45	240.78
JUNCT_1313	69.366	0	281.994	0	0 01:20	113.31
JUNCT_308	129.569	0	276.860	1	0 01:25	35.02
JUNCT_1304	65.209	0	125.408	0	0 01:30	56.14
JUNCT_1308	136.587	0	338.633	0	0 01:25	77.72
JUNCT_301	17.277	0	135.503	1	0 00:40	963.08
JUNCT_1307	537.443	1	770.574	1	0 01:10	628.47

****
Conduit Flow Summary
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Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
215	162.20	0 00:35	14.85	1.00	1.00	40
215-OVERFLOW	255.00	0 00:40	2.99	1.00	0.01	0
230	185.16	0 00:35	9.35	1.00	0.98	0
230-OVERFLOW	38.00	0 00:35	9.34	1.00	0.00	0
167	207.87	0 00:30				
169	27.94	0 00:30				
1145	445.71	0 01:45				
1240	121.51	0 00:40	3.57	1.00	0.00	0
106	370.62	0 00:35				
182	87.99	0 00:30				
259	40.01	0 02:50	9.16	1.00	1.06	120
259-OVERFLOW	577.01	0 00:40	10.04	1.00	0.00	0
101	991.85	0 00:35				
1233	555.22	0 02:05	13.54	1.00	0.20	0
1233-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
261	18.17	0 00:35	8.62	1.00	1.00	60
261-OVERFLOW	239.07	0 00:55	6.58	1.00	0.00	0
1120	458.91	0 02:00				
1115	282.01	0 00:30				
189	1720.83	0 01:05				
203	129.95	0 00:35	7.51	1.00	0.27	0
1213	45.42	0 01:15	7.25	1.00	1.05	45
1213-OVERFLOW	95.31	0 00:40	8.54	1.00	0.00	0
122	0.00	0 00:00				
122-DIV	1828.42	0 01:10				
1234	18.24	0 00:40	2.43	1.00	1.00	330
1234-OVERFLOW	1260.19	0 01:00	4.22	1.00	0.11	0
1134	90.37	0 00:30				
1132	193.46	0 00:30				
186	1720.83	0 01:05				
174	293.74	0 00:30				
1225	147.29	0 00:50	3.11	1.00	1.00	70
1225-OVERFLOW	282.84	0 00:55	2.47	1.00	0.02	0
1116	69.00	0 00:30				
1117	477.93	0 02:05				
1152	106.43	0 00:30				
1157	129.92	0 00:30				
1139	173.54	0 00:30				

119	1751.14	0	01:00				
119-DIV	0.00	0	00:00				
1153	187.23	0	00:40				
207	81.63	0	02:05	9.89	1.00	1.02	100
207-OVERFLOW	276.25	0	00:50	7.49	1.00	0.01	0
1108	769.42	0	00:55				
118	1660.42	0	00:55				
164	139.26	0	00:30				
1207	595.85	0	00:50	4.76	1.00	0.76	0
1207-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
198	386.60	0	00:45				
1211	477.93	0	02:05	13.29	1.00	0.52	0
1211-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
210	368.67	0	00:40	4.39	1.00	1.00	60
210-OVERFLOW	614.90	0	00:55	1.81	1.00	0.06	0
115	407.46	0	00:40				
1218	128.91	0	01:10	3.25	1.00	0.79	0
1218-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1129	60.00	0	00:30				
1129-DIV	39.83	0	00:30				
228	1511.30	0	01:15	6.96	1.00	0.47	0
173	123.15	0	00:30				
125	273.08	0	00:40				
1111	141.97	0	00:30				
217	353.12	0	00:35	4.22	1.00	1.00	90
217-OVERFLOW	1307.29	0	00:55	3.63	1.00	0.08	0
221	397.28	0	00:35	9.06	1.00	0.05	0
196	1512.54	0	01:25				
218	285.62	0	00:45	5.29	1.00	1.00	95
218-OVERFLOW	1465.52	0	01:00	7.71	1.00	0.07	0
1107	69.47	0	00:30				
1112	589.45	0	00:45				
168	54.22	0	00:30				
263	298.43	0	00:35	10.40	1.00	0.25	0
263-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1228	147.29	0	00:55	3.11	1.00	1.00	45
1228-OVERFLOW	192.80	0	00:50	2.99	1.00	0.01	0
1133	430.13	0	00:55				
1122	126.97	0	00:30				
260	8.42	0	01:10	5.59	1.00	1.01	45
260-OVERFLOW	15.45	0	00:35	4.34	1.00	0.00	0
232	324.20	0	00:55	9.37	1.00	1.01	65
232-OVERFLOW	231.71	0	01:20	6.07	1.00	0.00	0
1204	241.07	0	00:55	4.42	1.00	1.00	160
1204-OVERFLOW	918.88	0	01:00	3.80	1.00	0.04	0
1215	147.29	0	01:25	3.07	1.00	1.00	110
1215-OVERFLOW	259.89	0	01:50	2.64	1.00	0.01	0
110	988.46	0	00:50				
1246	60.43	0	00:35	7.89	1.00	0.92	0
193	0.00	0	00:00				
1236	118.92	0	00:35	7.34	1.00	0.00	0
1130	549.49	0	00:50				
113	67.64	0	00:40				
1238	76.92	0	00:45	2.56	1.00	0.00	0
1150	117.89	0	00:30				
1214	34.31	0	00:30	5.83	1.00	1.00	335
1214-OVERFLOW	410.85	0	02:00	6.52	1.00	0.00	0
1226	305.87	0	00:50	8.82	1.00	1.00	15
1226-OVERFLOW	34.99	0	00:50	5.58	1.00	0.00	0
204	125.08	0	00:35	11.81	1.00	0.03	0
204-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
253	14.70	0	01:05	6.44	1.00	1.00	70
253-OVERFLOW	356.45	0	00:35	10.32	1.00	0.01	0
211	12.19	0	01:30	8.01	1.00	1.03	65
211-OVERFLOW	33.26	0	00:40	6.56	1.00	0.00	0
1144	113.64	0	00:30				
117	1602.92	0	00:55				
1135	394.32	0	00:50				
254	328.23	0	00:35	7.52	1.00	0.35	0
254-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
126	2083.56	0	01:15				
1104	30.52	0	00:30				
1125	673.23	0	00:55				
183	356.90	0	00:40				
1109	250.17	0	00:30				
176	382.87	0	00:40				
185	100.00	0	00:30				
185-DIV	256.34	0	00:50				
1244	180.39	0	00:50	3.87	1.00	1.00	5
1244-OVERFLOW	95.02	0	00:45	3.92	1.00	0.01	0
1137	73.58	0	00:30				
1155	1298.06	0	01:00				
163	183.69	0	00:30				
231	2073.84	0	01:15	7.07	1.00	0.13	0
160	121.63	0	00:30				
257	25.43	0	00:35	6.79	1.00	0.59	0
257-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
202	397.99	0	00:35	22.85	1.00	0.19	0
202-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1140	97.34	0	00:30				
223	1826.41	0	01:10	19.90	1.00	0.08	0
1156	79.00	0	00:25				
1156-DIV	129.92	0	00:30				
224	2082.91	0	01:15	7.02	1.00	0.50	0
114	416.74	0	00:35				
214	132.04	0	00:35	12.09	1.00	1.00	50
214-OVERFLOW	275.42	0	00:40	8.09	1.00	0.00	0
258	16.76	0	02:10	6.70	1.00	1.04	80
258-OVERFLOW	155.40	0	00:35	10.08	1.00	0.00	0
1242	82.71	0	00:30	6.57	1.00	0.92	0
1124	627.91	0	01:10				
152	0.00	0	00:00				
1154	129.98	0	00:30				
206	35.17	0	02:50	6.78	1.00	1.02	135
206-OVERFLOW	219.52	0	00:50	3.74	1.00	0.06	0
172	96.33	0	00:30				
1223	61.63	0	01:10	10.59	1.00	1.01	30
1223-OVERFLOW	98.29	0	00:35	12.05	1.00	0.00	0
127	118.84	0	00:30				
145	340.45	0	00:30				
120	1830.59	0	01:10				
144	260.11	0	00:30				
1216	156.18	0	01:05	3.28	1.00	1.00	105
1216-OVERFLOW	472.32	0	01:10	3.27	1.00	0.02	0
121	397.28	0	00:35				
149	108.46	0	00:30				
170	229.20	0	00:30				
132	239.16	0	00:30				
1105	1175.31	0	00:55				
105	140.81	0	00:30				
1141	79.12	0	00:50				
1230	79.12	0	00:50	2.74	1.00	0.54	0
1230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
124	2082.91	0	01:15				
181	11.34	0	00:40				
222	1828.42	0	01:10	6.48	1.00	0.46	0
147	218.07	0	00:30				
1227	47.35	0	00:50	7.77	1.00	1.02	25
1227-OVERFLOW	59.56	0	00:35	8.76	1.00	0.00	0
250	180.69	0	00:35	6.89	1.00	0.68	0
250-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
255	26.39	0	01:20	9.61	1.00	1.04	60
255-OVERFLOW	147.17	0	00:35	12.36	1.00	0.00	0
107	328.23	0	00:35				
1237	148.65	0	00:35	4.86	1.00	0.00	0
133	1520.37	0	01:15				
133-DIV	553.48	0	01:15				
220	256.72	0	00:35	8.08	1.00	0.00	0
165	477.88	0	00:30				
1118	477.86	0	02:05				
1208	55.03	0	00:35	9.58	1.00	1.00	10
1208-OVERFLOW	36.88	0	00:35	10.26	1.00	0.00	0
1243	170.55	0	00:40	3.96	1.00	0.95	0
1243-OVERFLOW	16.68	0	00:40	2.34	1.00	0.00	0
229	500.52	0	01:10	5.11	1.00	1.00	75
229-OVERFLOW	1012.02	0	01:25	4.62	1.00	0.04	0
219	68.38	0	00:55	3.40	1.00	1.00	150
219-OVERFLOW	1684.04	0	01:10	4.26	1.00	0.08	0

252	21.44	0	00:25	7.78	1.00	1.03	75
252-OVERFLOW	113.09	0	00:35	7.76	1.00	0.00	0
171	386.44	0	00:30				
128	1511.30	0	01:15				
225	356.90	0	00:40	8.92	1.00	1.00	5
209	224.22	0	00:40	7.76	1.00	1.03	65
209-OVERFLOW	670.48	0	00:50	8.22	1.00	0.00	0
1217	36.41	0	00:50	5.11	1.00	1.00	315
1217-OVERFLOW	591.49	0	01:10	5.72	1.00	0.01	0
1136	340.06	0	00:50				
269	0.00	0	00:00				
1220	23.10	0	00:35	18.00	1.00	0.65	0
1220-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1222	49.36	0	00:40	8.13	1.00	1.01	5
1222-OVERFLOW	7.88	0	00:40	9.83	1.00	0.00	0
1205	772.07	0	00:55	5.52	1.00	0.90	0
1205-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1121	172.71	0	00:30				
1158	129.92	0	00:30				
201	670.57	0	00:35	26.15	1.00	0.32	0
201-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1119	162.91	0	00:30				
108	319.15	0	00:50				
251	23.45	0	01:30	8.30	1.00	1.08	70
251-OVERFLOW	104.21	0	00:35	10.76	1.00	0.00	0
1147	1280.46	0	01:00				
1151	108.72	0	00:30				
109	888.81	0	00:50				
102	527.95	0	00:35				
1239	107.87	0	00:40	3.47	1.00	0.00	0
213	136.33	0	00:55	12.73	1.00	1.03	25
213-OVERFLOW	113.03	0	00:35	14.25	1.00	0.00	0
1202	18.24	0	00:40	2.43	1.00	1.00	330
1202-OVERFLOW	1259.78	0	01:00	4.22	1.00	0.11	0
1159	76.92	0	00:45				
1201	18.24	0	00:40	2.43	1.00	1.00	330
1201-OVERFLOW	1259.23	0	01:00	4.22	1.00	0.11	0
131	208.79	0	00:30				
1110	674.80	0	00:50				
161	180.42	0	00:30				
1203	128.88	0	00:40	9.20	1.00	1.01	225
1203-OVERFLOW	1050.44	0	01:00	8.56	1.00	0.01	0
192	0.00	0	00:00				
256	31.34	0	00:45	5.44	1.00	1.02	15
256-OVERFLOW	15.05	0	00:35	5.61	1.00	0.00	0
1131	66.56	0	00:30				
1106	158.40	0	00:30				
116	1256.31	0	00:50				
265	197.60	0	01:10	15.12	1.00	1.00	25
265-OVERFLOW	190.07	0	00:45	11.94	1.00	0.38	0
175	7.23	0	00:40				
216	368.67	0	00:40	4.39	1.00	1.00	75
216-OVERFLOW	898.35	0	00:55	3.13	1.00	0.04	0
1123	46.76	0	00:50				
150	370.90	0	00:30				
208	50.47	0	01:15	3.15	1.00	1.00	70
208-OVERFLOW	839.08	0	00:50	4.37	1.00	0.04	0
123	2080.49	0	01:10				
226	2083.56	0	01:15	14.76	1.00	0.45	0
1113	103.30	0	00:30				
1245	113.15	0	01:30	3.33	1.00	0.42	0
1224	76.23	0	00:35	6.22	1.00	1.01	125
1224-OVERFLOW	354.46	0	00:55	5.03	1.00	0.00	0
197	1512.54	0	01:25				
1231	81.09	0	00:35	6.59	1.00	0.90	0
262	101.06	0	00:35	12.03	1.00	1.01	5
103	305.77	0	00:35				
1103	1178.28	0	01:00				
142	135.85	0	00:35				
1128	85.19	0	00:30				
1102	22.77	0	00:50				
1229	147.07	0	01:00	3.16	1.00	1.00	0
1229-OVERFLOW	81.02	0	00:45	3.32	1.00	0.01	0
1126	141.84	0	00:30				
1209	131.84	0	01:10	3.91	1.00	0.99	0
1209-OVERFLOW	75.78	0	00:40	5.47	1.00	0.01	0
1127	204.70	0	00:35				
1212	142.90	0	00:50	3.03	1.00	1.00	165
1212-OVERFLOW	334.96	0	02:05	3.03	1.00	0.02	0
180	99.65	0	00:30				
1149	137.19	0	00:30				
1143	252.81	0	00:30				
146	246.14	0	00:30				
1142	82.71	0	00:30				
264	189.60	0	00:35	14.17	1.00	1.02	40
264-OVERFLOW	185.88	0	00:40	6.03	1.00	0.01	0
1146	128.50	0	00:30				
151	289.11	0	00:30				
1138	300.76	0	00:45				
1101	1298.06	0	01:00				
184	52.73	0	00:30				
1235	84.26	0	00:40	2.81	1.00	0.00	0
1221	152.68	0	00:50	3.26	1.00	1.00	85
1221-OVERFLOW	393.55	0	00:55	3.10	1.00	0.02	0
134	552.19	0	01:20				
148	361.04	0	00:30				
266	68.38	0	01:00	3.39	1.00	1.00	135
266-OVERFLOW	1652.45	0	01:05	3.67	1.00	0.08	0
1114	555.40	0	02:05				
1206	769.42	0	00:55	5.49	1.00	0.92	0
1206-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1241	59.30	0	00:35	5.08	1.00	0.00	0
1210	140.84	0	01:05	3.01	1.00	1.00	155
1210-OVERFLOW	337.24	0	02:10	3.30	1.00	0.02	0
166	172.82	0	00:30				
205	41.78	0	00:30	6.44	1.00	1.08	80
205-OVERFLOW	332.25	0	00:40	6.08	1.00	0.01	0
104	133.89	0	00:35				
1148	1278.43	0	01:00				

```
**************************
Routing Time Step Summary
**************************
Minimum Time Step           :   300.00 sec
Average Time Step           :   300.00 sec
Maximum Time Step           :   300.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.06

Analysis begun on:  Tue May 23 16:22:05 2006
Total elapsed time: < 1 sec
```

10-YEAR EPA SWMM5.0 Master Plan Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.006a)
  --------------------------------------------------------------

  BROOMFIELD AND VICINITY  (no park div.)(city/3207  w/Upstream 120th split)
  KIOWA ENGINEERING  MP10.sin (308 pond/120th sewer alt.) MAY 2006

  ***************
  Analysis Options
  ***************
  Flow Units ..... CFS
  Infiltration Method ..... HORTON
  Flow Routing Method ..... KINWAVE
  Starting Date ..... JAN-01-2005 00:00:00
  Ending Date ..... JAN-01-2005 06:00:00
  Antecedent Dry Days ..... 0.0
  Report Time Step ..... 00:15:00
  Wet Time Step ..... 00:05:00
  Dry Time Step ..... 00:05:00
  Routing Time Step ..... 300.00 sec


  **************************       Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  **************************     ---------       -------
  Total Precipitation ......       562.700         1.890
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........       289.355         0.972
  Surface Runoff ...........       260.980         0.877
  Final Surface Storage ....        14.477         0.049
  Continuity Error (%) .....        -0.375


  **************************       Volume         Volume
  Flow Routing Continuity        acre-feet       Mgallons
  **************************     ---------       ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......       261.190        85.113
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........       231.707        75.505
  Surface Flooding .........         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......        35.242        11.484
  Continuity Error (%) .....        -2.205


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------
                        Total      Total      Total      Total      Total     Runoff
                       Precip      Runon       Evap      Infil     Runoff      Coeff
  Subcatchment            in         in         in         in         in
  ---------------------------------------------------------------------------
  SWMM_SUBC_1          1.890      0.000      0.000      0.619      1.205      0.638
  SWMM_SUBC_2          1.890      0.000      0.000      1.125      0.735      0.389
  SWMM_SUBC_3          1.890      0.000      0.000      0.867      0.975      0.516
  SWMM_SUBC_8          1.890      0.000      0.000      0.335      1.486      0.786
  SWMM_SUBC_30         1.890      0.000      0.000      0.166      1.644      0.870
  SWMM_SUBC_31         1.890      0.000      0.000      0.516      1.312      0.694
  SWMM_SUBC_4          1.890      0.000      0.000      1.236      0.628      0.332
  SWMM_SUBC_5          1.890      0.000      0.000      1.079      0.776      0.411
  SWMM_SUBC_6          1.890      0.000      0.000      1.082      0.773      0.409
  SWMM_SUBC_7          1.890      0.000      0.000      0.963      0.892      0.472
  SWMM_SUBC_9          1.890      0.000      0.000      0.586      1.242      0.657
  SWMM_SUBC_10         1.890      0.000      0.000      0.549      1.271      0.672
  SWMM_SUBC_11         1.890      0.000      0.000      0.871      0.978      0.517
  SWMM_SUBC_12         1.890      0.000      0.000      0.347      1.462      0.773
  SWMM_SUBC_14         1.890      0.000      0.000      0.826      1.019      0.539
  SWMM_SUBC_15         1.890      0.000      0.000      1.042      0.793      0.419
  SWMM_SUBC_16         1.890      0.000      0.000      1.059      0.793      0.420
  SWMM_SUBC_32         1.890      0.000      0.000      0.248      1.571      0.831
  SWMM_SUBC_33         1.890      0.000      0.000      1.610      0.275      0.145
  SWMM_SUBC_36         1.890      0.000      0.000      1.127      0.733      0.388
  SWMM_SUBC_17         1.890      0.000      0.000      1.165      0.691      0.366
  SWMM_SUBC_18         1.890      0.000      0.000      0.338      1.481      0.783
  SWMM_SUBC_20         1.890      0.000      0.000      1.099      0.761      0.403
  SWMM_SUBC_34         1.890      0.000      0.000      1.643      0.242      0.128
  SWMM_SUBC_13         1.890      0.000      0.000      0.630      1.206      0.638
  SWMM_SUBC_19         1.890      0.000      0.000      0.519      1.308      0.692
  SWMM_SUBC_21         1.890      0.000      0.000      0.537      1.293      0.684
  SWMM_SUBC_22         1.890      0.000      0.000      0.540      1.276      0.675
  SWMM_SUBC_23         1.890      0.000      0.000      0.351      1.468      0.777
  SWMM_SUBC_24         1.890      0.000      0.000      0.534      1.284      0.679
  SWMM_SUBC_25         1.890      0.000      0.000      0.338      1.480      0.783
  SWMM_SUBC_35         1.890      0.000      0.000      0.533      1.284      0.679
  SWMM_SUBC_1001       1.890      0.000      0.000      1.076      0.780      0.412
  SWMM_SUBC_1002       1.890      0.000      0.000      1.139      0.723      0.383
  SWMM_SUBC_1003       1.890      0.000      0.000      1.216      0.646      0.342
  SWMM_SUBC_1004       1.890      0.000      0.000      1.182      0.671      0.355
  SWMM_SUBC_1005       1.890      0.000      0.000      0.842      1.002      0.530
  SWMM_SUBC_1006       1.890      0.000      0.000      1.316      0.554      0.293
  SWMM_SUBC_1007       1.890      0.000      0.000      1.313      0.556      0.294
  SWMM_SUBC_1008       1.890      0.000      0.000      1.302      0.567      0.300
  SWMM_SUBC_1009       1.890      0.000      0.000      1.434      0.440      0.233
  SWMM_SUBC_1010       1.890      0.000      0.000      1.112      0.748      0.396
  SWMM_SUBC_1011       1.890      0.000      0.000      1.779      0.109      0.058
  SWMM_SUBC_1013       1.890      0.000      0.000      1.452      0.423      0.224
  SWMM_SUBC_1014       1.890      0.000      0.000      1.165      0.697      0.369
  SWMM_SUBC_1015       1.890      0.000      0.000      1.045      0.813      0.430
  SWMM_SUBC_1017       1.890      0.000      0.000      1.109      0.747      0.395
  SWMM_SUBC_1019       1.890      0.000      0.000      0.870      0.965      0.511
  SWMM_SUBC_1020       1.890      0.000      0.000      0.934      0.919      0.486
  SWMM_SUBC_1021       1.890      0.000      0.000      0.912      0.937      0.496
  SWMM_SUBC_1022       1.890      0.000      0.000      1.594      0.286      0.151
  SWMM_SUBC_1023       1.890      0.000      0.000      1.210      0.654      0.346
  SWMM_SUBC_1024       1.890      0.000      0.000      1.085      0.769      0.407
  SWMM_SUBC_1025       1.890      0.000      0.000      1.218      0.648      0.343
  SWMM_SUBC_1026       1.890      0.000      0.000      0.510      1.320      0.699
  SWMM_SUBC_1027       1.890      0.000      0.000      1.577      0.303      0.161
  SWMM_SUBC_1028       1.890      0.000      0.000      0.970      0.879      0.465
  SWMM_SUBC_1029       1.890      0.000      0.000      1.750      0.139      0.074
  SWMM_SUBC_1041       1.890      0.000      0.000      0.992      0.857      0.453
  SWMM_SUBC_1043       1.890      0.000      0.000      0.292      1.521      0.805
  SWMM_SUBC_1031       1.890      0.000      0.000      1.003      0.843      0.446
  SWMM_SUBC_1032       1.890      0.000      0.000      1.123      0.731      0.387
  SWMM_SUBC_1033       1.890      0.000      0.000      1.134      0.715      0.378
  ---------------------------------------------------------------------------
  Totals               1.890      0.000      0.000      0.972      0.877      0.464


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                        Average    Maximum    Maximum  Time of Max      Total      Total
                          Depth      Depth        HGL   Occurrence    Flooding    Minutes
  Node                     Feet       Feet       Feet  days hr:min    acre-in    Flooded
  ---------------------------------------------------------------------------
  JUNCT_1157               0.00       0.00    1000.00    0 00:00          0          0
  JUNCT_192                0.00       0.00    1000.00    0 00:00          0          0
  JUNCT_269                0.00       0.00    1000.00    0 00:00          0          0
  JUNCT_150                0.00       0.00    1025.00    0 00:00          0          0
  JUNCT_223                1.59       3.90    1063.57    0 01:10          0          0
  JUNCT_148                0.00       0.00    1132.42    0 00:00          0          0
  JUNCT_146                0.00       0.00    1172.42    0 00:00          0          0
  JUNCT_132                0.00       0.00    1226.42    0 00:00          0          0
  JUNCT_131                0.00       0.00    1226.43    0 00:00          0          0
  JUNCT_221                1.07       2.63    1175.05    0 00:30          0          0
  JUNCT_121                0.49       1.22    1133.64    0 00:35          0          0
  JUNCT_123                1.64       3.90    1062.32    0 01:10          0          0
```

JUNCT_127	0.00	0.00	1058.42	0	00:00	0	0
JUNCT_224	2.02	5.02	1063.44	0	01:10	0	0
JUNCT_124	2.02	5.01	1048.47	0	01:10	0	0
JUNCT_226	2.08	5.99	1049.45	0	01:10	0	0
JUNCT_126	2.08	5.98	1048.54	0	01:10	0	0
JUNCT_231	2.77	6.35	1048.91	0	01:10	0	0
JUNCT_228	2.42	5.21	1037.21	0	01:15	0	0
JUNCT_128	2.42	5.21	1030.21	0	01:15	0	0
JUNCT_196	2.89	5.00	1005.00	0	01:15	0	0
JUNCT_1154	0.00	0.00	1031.51	0	00:00	0	0
JUNCT_1152	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1151	0.00	0.00	1057.01	0	00:00	0	0
JUNCT_1153	0.72	2.42	1033.92	0	00:35	0	0
JUNCT_1245	1.08	2.62	1016.12	0	00:55	0	0
JUNCT_1104	0.00	0.00	1007.00	0	00:00	0	0
JUNCT_1106	0.00	0.00	1032.00	0	00:00	0	0
JUNCT_1240	0.20	0.84	1032.84	0	00:25	0	0
JUNCT_1113	0.00	0.00	1082.90	0	00:00	0	0
JUNCT_1122	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1150	0.00	0.00	1190.92	0	00:00	0	0
JUNCT_1235	0.10	0.63	1191.54	0	00:25	0	0
JUNCT_1246	0.38	2.64	1171.78	0	00:25	0	0
JUNCT_1128	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1127	0.39	2.33	1159.47	0	00:30	0	0
JUNCT_1126	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1137	0.00	0.00	1146.69	0	00:00	0	0
JUNCT_1242	0.74	3.26	1168.46	0	00:25	0	0
JUNCT_1142	0.75	3.32	1166.02	0	00:30	0	0
JUNCT_1231	0.75	3.32	1166.02	0	00:30	0	0
JUNCT_1141	0.72	2.32	1149.01	0	00:40	0	0
JUNCT_1139	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1143	0.00	0.00	1169.70	0	00:00	0	0
JUNCT_1140	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1138	1.13	2.78	1149.47	0	00:35	0	0
JUNCT_1136	1.35	3.00	1138.69	0	00:50	0	0
JUNCT_1144	0.00	0.00	1145.45	0	00:00	0	0
JUNCT_1135	1.43	4.29	1139.48	0	00:45	0	0
JUNCT_1134	0.00	0.00	1135.19	0	00:00	0	0
JUNCT_1133	1.47	3.00	1127.19	0	00:50	0	0
JUNCT_1132	0.00	0.00	1177.69	0	00:00	0	0
JUNCT_1131	0.00	0.00	1166.90	0	00:00	0	0
JUNCT_1241	0.13	0.45	1167.35	0	00:25	0	0
JUNCT_1130	1.94	4.20	1127.89	0	00:40	0	0
JUNCT_1125	1.55	3.00	1111.73	0	00:50	0	0
JUNCT_1124	2.92	3.20	1111.43	0	00:55	0	0
JUNCT_1123	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1149	0.00	0.00	1161.13	0	00:00	0	0
JUNCT_1236	0.15	0.54	1161.67	0	00:25	0	0
JUNCT_1145	1.64	2.65	1096.85	0	02:30	0	0
JUNCT_1121	0.00	0.00	1106.79	0	00:00	0	0
JUNCT_1237	0.15	0.76	1107.55	0	00:25	0	0
JUNCT_1120	2.40	3.00	1086.40	0	00:35	0	0
JUNCT_1119	0.00	0.00	1083.40	0	00:00	0	0
JUNCT_1118	2.06	3.00	1077.60	0	00:40	0	0
JUNCT_1117	1.61	3.02	1076.62	0	00:40	0	0
JUNCT_1116	0.00	0.00	1073.60	0	00:00	0	0
JUNCT_1115	0.00	0.00	1083.90	0	00:00	0	0
JUNCT_1146	0.00	0.00	1130.10	0	00:00	0	0
JUNCT_1238	0.11	0.69	1130.79	0	00:25	0	0
JUNCT_1159	0.14	0.51	1084.41	0	00:35	0	0
JUNCT_1114	2.09	3.00	1066.10	0	00:50	0	0
JUNCT_1112	1.62	2.92	1065.02	0	00:50	0	0
JUNCT_1111	0.00	0.00	1068.60	0	00:00	0	0
JUNCT_1239	0.19	0.81	1069.41	0	00:25	0	0
JUNCT_1110	1.05	2.17	1060.77	0	00:50	0	0
JUNCT_1109	0.00	0.00	1058.60	0	00:00	0	0
JUNCT_1108	1.10	2.38	1039.38	0	00:50	0	0
JUNCT_1107	0.00	0.00	1037.00	0	00:00	0	0
JUNCT_182	0.00	0.00	1061.00	0	00:00	0	0
JUNCT_151	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_147	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_144	0.00	0.00	1124.06	0	00:00	0	0
JUNCT_142	0.00	0.00	1131.06	0	00:00	0	0
JUNCT_170	0.00	0.00	1191.27	0	00:00	0	0

JUNCT_168	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_169	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_113	0.32	1.50	1192.77	0	00:35	0	0
JUNCT_167	0.00	0.00	1183.27	0	00:00	0	0
JUNCT_114	0.78	3.43	1156.70	0	00:30	0	0
JUNCT_115	0.87	4.00	1151.27	0	00:35	0	0
JUNCT_173	0.00	0.00	1184.27	0	00:00	0	0
JUNCT_171	0.00	0.00	1213.27	0	00:00	0	0
JUNCT_107	0.45	2.15	1191.42	0	00:35	0	0
JUNCT_180	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_172	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_108	1.44	2.75	1187.02	0	00:45	0	0
JUNCT_262	1.27	2.86	1172.13	0	00:30	0	0
JUNCT_166	0.00	0.00	1175.67	0	00:00	0	0
JUNCT_161	0.00	0.00	1263.67	0	00:00	0	0
JUNCT_160	0.00	0.00	1319.67	0	00:00	0	0
JUNCT_163	0.00	0.00	1331.67	0	00:00	0	0
JUNCT_105	0.00	0.00	1367.27	0	00:00	0	0
JUNCT_103	0.49	1.95	1321.62	0	00:30	0	0
JUNCT_164	0.00	0.00	1305.67	0	00:00	0	0
JUNCT_104	0.59	2.00	1287.67	0	00:30	0	0
JUNCT_203	0.20	0.75	1286.42	0	00:30	0	0
JUNCT_102	0.34	1.53	1265.20	0	00:30	0	0
JUNCT_165	0.00	0.00	1213.67	0	00:00	0	0
JUNCT_106	0.81	2.00	1181.67	0	01:05	0	0
JUNCT_101	1.05	3.00	1178.67	0	00:35	0	0
JUNCT_109	1.03	2.17	1145.44	0	00:45	0	0
JUNCT_110	2.00	6.40	1148.67	0	00:45	0	0
JUNCT_184	0.00	0.00	1142.27	0	00:00	0	0
JUNCT_116	1.72	4.00	1139.27	0	00:40	0	0
JUNCT_174	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_175	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_176	0.05	0.50	1145.96	0	00:35	0	0
JUNCT_117	1.83	4.00	1135.06	0	00:35	0	0
JUNCT_118	1.95	4.00	1128.06	0	00:30	0	0
JUNCT_186	1.98	3.00	1102.58	0	01:00	0	0
JUNCT_189	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_145	0.00	0.00	1152.31	0	00:00	0	0
JUNCT_220	0.29	1.19	1153.50	0	00:25	0	0
JUNCT_120	2.11	3.00	1090.10	0	00:55	0	0
JUNCT_181	0.00	0.00	1087.10	0	00:00	0	0
JUNCT_222	1.78	4.76	1091.87	0	01:05	0	0
JUNCT_152	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_125	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_149	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_225	0.40	1.50	1071.50	0	00:35	0	0
JUNCT_183	0.40	1.50	1062.50	0	00:35	0	0
JUNCT_198	1.02	3.72	1025.72	0	00:45	0	0
JUNCT_1105	1.10	2.38	1024.38	0	00:55	0	0
JUNCT_1103	3.44	5.00	1012.00	0	00:55	0	0
JUNCT_1147	2.99	4.50	1010.50	0	00:45	0	0
JUNCT_1148	2.87	3.27	1004.27	0	00:55	0	0
JUNCT_1102	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_134	1.42	5.39	1005.39	0	01:20	0	0
JUNCT_1155	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_197	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1101	2.86	3.27	1003.27	0	01:00	0	0
ROOT_JUNCT_1155	0.00	0.00	1000.00	0	00:15	0	0
ROOT_JUNCT_197	0.00	0.00	1000.00	0	00:20	0	0
ROOT_JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1158	0.00	0.00	1000.00	0	00:25	0	0
ROOT_JUNCT_134	0.00	0.00	1000.00	0	00:40	0	0
JUNCT_260	0.29	1.50	1204.77	0	00:25	0	0
JUNCT_1211	1.61	3.02	1077.62	0	00:40	0	0
JUNCT_257	0.24	1.29	1212.56	0	00:25	0	0
JUNCT_1213	0.56	3.00	1098.40	0	00:25	0	0
JUNCT_1210	2.12	3.00	1076.60	0	00:30	0	0
JUNCT_215	0.80	4.00	1151.27	0	00:30	0	0
JUNCT_250	0.48	1.97	1333.64	0	00:25	0	0
JUNCT_1203	3.00	4.50	1011.50	0	00:35	0	0
JUNCT_1233	1.61	2.92	1066.02	0	00:50	0	0
JUNCT_119	2.45	5.00	1117.06	0	00:45	0	0

JUNCT_133	2.77	6.35	1038.35	0	01:15	0	0
JUNCT_1204	3.48	5.00	1027.00	0	00:35	0	0
JUNCT_1224	1.95	4.20	1128.39	0	00:30	0	0
JUNCT_1212	2.09	3.00	1086.40	0	00:25	0	0
JUNCT_256	0.39	3.00	1229.27	0	00:25	0	0
JUNCT_1209	0.65	3.00	1086.90	0	00:25	0	0
JUNCT_1223	0.60	3.00	1180.69	0	00:25	0	0
JUNCT_210	1.70	4.00	1146.27	0	00:40	0	0
JUNCT_218	2.44	5.00	1129.06	0	00:25	0	0
JUNCT_1243	0.69	2.58	1059.58	0	00:25	0	0
JUNCT_263	0.16	0.71	1082.71	0	00:30	0	0
JUNCT_1220	0.00	0.17	1175.41	0	00:25	0	0
JUNCT_213	0.67	4.00	1195.27	0	00:25	0	0
JUNCT_266	1.98	3.00	1115.06	0	00:25	0	0
JUNCT_202	0.33	1.53	1321.20	0	00:30	0	0
JUNCT_1205	1.11	2.39	1039.39	0	00:50	0	0
JUNCT_255	0.51	2.00	1228.27	0	00:20	0	0
JUNCT_209	1.98	6.40	1149.67	0	00:35	0	0
JUNCT_259	1.44	2.50	1134.92	0	00:20	0	0
JUNCT_253	0.84	2.00	1215.67	0	00:15	0	0
JUNCT_216	1.81	4.00	1139.27	0	00:35	0	0
JUNCT_252	0.59	2.00	1307.67	0	00:20	0	0
JUNCT_207	1.51	3.50	1187.77	0	00:25	0	0
JUNCT_1244	0.92	2.87	1034.38	0	00:35	0	0
JUNCT_1156	0.00	0.00	1165.19	0	00:00	0	0
JUNCT_1228	1.34	3.00	1149.69	0	00:30	0	0
JUNCT_1227	0.50	3.00	1148.45	0	00:25	0	0
JUNCT_1234	2.89	3.28	1009.28	0	00:55	0	0
JUNCT_217	1.94	4.00	1135.06	0	00:30	0	0
JUNCT_1215	1.64	2.65	1100.85	0	02:30	0	0
JUNCT_219	2.11	3.00	1102.58	0	00:20	0	0
JUNCT_204	0.47	2.00	1329.67	0	00:30	0	0
JUNCT_214	0.87	4.00	1157.27	0	00:30	0	0
JUNCT_1218	1.13	2.41	1159.54	0	00:25	0	0
JUNCT_265	1.05	4.50	1065.50	0	00:35	0	10
JUNCT_1216	1.97	3.00	1111.23	0	01:15	0	0
JUNCT_205	1.05	3.00	1182.67	0	00:25	0	0
JUNCT_1229	1.08	3.00	1172.69	0	00:25	0	0
JUNCT_1222	0.28	1.88	1134.53	0	00:30	0	0
JUNCT_1226	1.39	4.29	1139.98	0	00:45	0	0
JUNCT_1201	2.86	3.27	1003.77	0	01:00	0	0
JUNCT_251	0.47	2.00	1369.27	0	00:20	0	0
JUNCT_211	0.39	2.38	1223.65	0	00:30	0	0
JUNCT_264	0.61	3.54	1149.00	0	00:25	0	0
JUNCT_1129	7.09	7.09	1176.23	0	00:05	0	0
JUNCT_122	1.78	4.77	1086.77	0	01:10	0	0
JUNCT_185	1.50	3.50	1172.77	0	00:35	0	0
JUNCT_254	0.44	2.38	1215.65	0	00:25	0	0
JUNCT_1217	2.94	3.20	1111.93	0	00:45	0	0
JUNCT_1221	1.53	3.00	1126.69	0	00:30	0	0
JUNCT_229	2.90	5.00	1030.00	0	00:50	0	0
JUNCT_1202	2.87	3.27	1004.27	0	00:55	0	0
JUNCT_1230	0.78	3.25	1159.95	0	00:30	0	0
JUNCT_258	0.71	2.00	1185.27	0	00:20	0	0
JUNCT_230	1.06	2.75	1229.17	0	00:25	0	0
JUNCT_1225	1.46	3.00	1138.19	0	00:30	0	0
JUNCT_261	0.04	0.50	1169.08	0	00:30	0	0
JUNCT_1214	2.43	2.80	1097.00	0	00:20	0	0
JUNCT_1207	1.06	2.17	1064.27	0	00:45	0	0
JUNCT_1208	0.41	3.00	1085.90	0	00:25	0	0
JUNCT_208	1.01	2.36	1178.03	0	00:35	0	0
JUNCT_232	1.40	5.41	1009.88	0	01:15	0	0
JUNCT_206	1.39	2.75	1192.02	0	00:35	0	0
JUNCT_1206	1.12	2.45	1061.05	0	00:40	0	0
JUNCT_201	0.43	1.94	1265.61	0	00:30	0	0
JUNCT_1305	4.17	6.25	1100.46	0	02:50	0	0
JUNCT_1304	1.13	1.59	1085.50	0	01:35	0	0
JUNCT_1313	0.22	1.67	1015.18	0	00:55	0	0
JUNCT_304	1.24	3.91	1193.18	0	01:05	0	0
JUNCT_1308	1.36	3.16	1160.30	0	01:20	0	0
JUNCT_1307	10.72	15.18	1123.92	0	01:20	0	0
JUNCT_1306	11.22	16.30	1114.51	0	02:30	0	0
JUNCT_1312	0.73	2.45	1172.15	0	00:50	0	0
JUNCT_302	0.62	1.30	1071.30	0	00:35	0	0
JUNCT_301	0.27	1.72	1177.39	0	00:35	0	0
JUNCT_308	1.43	3.22	1229.64	0	01:25	0	0

****
Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
JUNCT_1305	181.581	0	272.261	1	0 02:50	93.27
JUNCT_1304	49.185	0	69.420	0	0 01:35	15.58
JUNCT_1313	9.710	0	72.753	0	0 00:55	90.44
JUNCT_304	53.867	0	170.120	1	0 01:05	60.10
JUNCT_1308	59.388	0	137.699	0	0 01:20	31.61
JUNCT_1307	467.161	1	661.359	1	0 01:20	247.36
JUNCT_1306	488.841	0	710.076	1	0 02:30	106.64
JUNCT_1312	31.820	0	106.616	0	0 00:50	36.35
JUNCT_302	26.838	0	56.456	1	0 00:35	153.59
JUNCT_301	11.905	0	75.063	0	0 00:35	549.48
JUNCT_308	62.506	0	140.149	0	0 01:25	26.45

****
Conduit Flow Summary
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Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
260	8.68	0 00:30	5.82	1.00	1.04	10
260-OVERFLOW	5.72	0 00:30	6.95	1.00	0.00	0
1211	203.34	0 00:40	10.57	1.00	0.22	0
1211-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
170	134.35	0 00:25				
132	145.10	0 00:25				
257	15.49	0 00:30	5.98	1.00	0.36	0
257-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
1109	149.93	0 00:25				
127	70.31	0 00:25				
1213	43.67	0 00:30	7.71	1.00	1.01	15
1213-OVERFLOW	32.78	0 00:35	8.70	1.00	0.00	0
1149	83.75	0 00:25				
1136	206.61	0 00:45				
184	32.13	0 00:25				
1130	282.86	0 00:50				
1210	140.25	0 00:50	3.09	1.00	1.00	0
1210-OVERFLOW	61.15	0 00:50	3.96	1.00	0.00	0
1241	35.08	0 00:30	4.63	1.00	0.00	0
1120	142.88	0 00:35				
215	162.78	0 00:35	14.83	1.00	1.01	10
215-OVERFLOW	68.11	0 00:40	4.47	1.00	0.00	0
269	0.00	0 00:00				
115	252.93	0 00:35				
250	99.62	0 00:30	6.03	1.00	0.37	0
250-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
131	114.72	0 00:25				
168	32.95	0 00:25				
1203	129.12	0 00:40	9.18	1.00	1.01	115
1203-OVERFLOW	419.03	0 00:55	6.81	1.00	0.00	0
105	86.02	0 00:25				
1233	255.38	0 00:50	10.84	1.00	0.09	0
1233-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
101	556.53	0 00:35				
192	0.00	0 00:00				
166	105.13	0 00:25				
119	831.32	0 00:50				
119-DIV	0.00	0 00:00				
133	705.78	0 01:15				

133-DIV	296.20	0	01:15				
1140	629.52	0	00:55				
1204	241.07	0	00:55	4.44	1.00	1.00	50
1204-OVERFLOW	301.04	0	00:55	4.26	1.00	0.01	0
228	703.41	0	01:15	5.73	1.00	0.22	0
1224	75.52	0	00:35	6.23	1.00	1.00	100
1224-OVERFLOW	155.49	0	00:50	4.09	1.00	0.00	0
151	160.61	0	00:30				
150	220.26	0	00:25				
1142	80.90	0	00:30				
104	78.99	0	00:30				
1139	104.98	0	00:25				
1123	9.51	0	00:25				
223	862.55	0	01:10	15.92	1.00	0.04	0
1138	193.63	0	00:35				
1112	270.55	0	00:45				
1212	142.56	0	00:40	3.16	1.00	1.00	0
1212-OVERFLOW	61.10	0	00:40	3.95	1.00	0.00	0
256	29.71	0	00:30	5.42	1.00	0.97	0
256-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1150	70.34	0	00:25				
1106	92.95	0	00:25				
1209	108.97	0	00:35	4.19	1.00	0.82	0
1209-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
118	780.71	0	00:50				
1223	61.17	0	00:35	10.82	1.00	1.00	0
1223-OVERFLOW	34.18	0	00:35	14.31	1.00	0.00	0
167	123.44	0	00:25				
210	368.67	0	00:40	4.39	1.00	1.00	30
210-OVERFLOW	195.91	0	00:50	2.08	1.00	0.02	0
1151	60.81	0	00:25				
1125	327.54	0	00:55				
218	285.62	0	00:45	5.26	1.00	1.00	75
218-OVERFLOW	545.69	0	00:50	5.87	1.00	0.03	0
148	215.98	0	00:25				
1131	40.66	0	00:25				
1145	108.18	0	02:30				
109	486.11	0	00:45				
1243	103.39	0	00:35	3.58	1.00	0.57	0
1243-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
146	144.76	0	00:25				
126	1004.44	0	01:10				
263	168.93	0	00:30	8.68	1.00	0.14	0
263-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1135	229.60	0	00:45				
161	107.59	0	00:25				
1128	51.30	0	00:25				
165	290.59	0	00:25				
1220	0.00	0	00:00	0.00	1.00	0.00	0
1220-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1157	41.47	0	00:25				
213	136.96	0	00:30	12.54	1.00	1.04	5
213-OVERFLOW	16.03	0	00:35	14.32	1.00	0.00	0
266	68.38	0	01:00	3.37	1.00	1.00	125
266-OVERFLOW	742.34	0	01:00	4.04	1.00	0.04	0
202	230.02	0	00:30	19.77	1.00	0.11	0
202-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1205	347.15	0	00:55	4.21	1.00	0.41	0
1205-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
117	734.46	0	00:50				
255	26.44	0	00:50	9.75	1.00	1.04	30
255-OVERFLOW	82.63	0	00:30	11.13	1.00	0.00	0
1132	112.59	0	00:25				
209	221.68	0	00:40	7.76	1.00	1.02	40
209-OVERFLOW	269.29	0	00:45	8.42	1.00	0.00	0
259	40.06	0	02:30	9.32	1.00	1.06	100
259-OVERFLOW	301.53	0	00:40	12.38	1.00	0.00	0
1107	42.32	0	00:25				
1238	41.00	0	00:35	2.40	1.00	0.00	0
253	14.70	0	01:05	6.51	1.00	1.00	70
253-OVERFLOW	198.16	0	00:35	9.59	1.00	0.00	0
216	368.67	0	00:35	4.39	1.00	1.00	50
216-OVERFLOW	293.94	0	00:50	2.36	1.00	0.01	0
125	153.59	0	00:35				
1143	151.86	0	00:25				
252	21.41	0	00:25	7.73	1.00	1.03	40
252-OVERFLOW	58.20	0	00:30	7.07	1.00	0.00	0
207	82.11	0	00:30	9.64	1.00	1.03	75
207-OVERFLOW	97.12	0	00:30	6.92	1.00	0.00	0
221	236.17	0	00:35	8.18	1.00	0.03	0
1242	80.90	0	00:30	6.49	1.00	0.90	0
1244	154.04	0	00:40	3.81	1.00	0.85	0
1244-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1156	79.00	0	00:25				
1156-DIV	41.47	0	00:25				
203	71.04	0	00:30	6.71	1.00	0.15	0
1153	103.39	0	00:35				
1228	147.27	0	00:50	3.12	1.00	1.00	0
1228-OVERFLOW	59.51	0	00:45	3.27	1.00	0.00	0
1114	255.08	0	00:50				
1104	16.96	0	00:25				
220	153.52	0	00:35	7.27	1.00	0.00	0
128	703.41	0	01:15				
1137	40.23	0	00:30				
1141	75.82	0	00:40				
222	862.53	0	01:10	5.28	1.00	0.22	0
1124	248.05	0	01:20				
144	150.54	0	00:25				
1227	47.65	0	00:30	7.86	1.00	1.03	5
1227-OVERFLOW	17.86	0	00:30	9.39	1.00	0.00	0
1133	230.76	0	00:50				
1115	172.14	0	00:25				
1146	76.98	0	00:25				
1234	18.24	0	00:40	2.43	1.00	1.00	330
1234-OVERFLOW	611.28	0	00:55	3.54	1.00	0.05	0
173	67.44	0	00:25				
217	353.12	0	00:30	4.22	1.00	1.00	70
217-OVERFLOW	427.59	0	00:50	2.69	1.00	0.03	0
1215	106.49	0	02:30	2.83	1.00	0.72	0
1215-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1235	46.15	0	00:35	2.77	1.00	0.00	0
219	68.38	0	00:55	3.37	1.00	1.00	145
219-OVERFLOW	747.80	0	01:10	3.93	1.00	0.04	0
198	219.66	0	00:45				
107	184.53	0	00:35				
204	73.06	0	00:30	10.29	1.00	0.02	0
204-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
164	80.07	0	00:25				
214	133.09	0	00:30	12.09	1.00	1.01	20
214-OVERFLOW	120.89	0	00:35	11.95	1.00	0.00	0
1154	72.27	0	00:30				
152	0.00	0	00:00				
1218	62.71	0	00:35	2.88	1.00	0.39	0
1218-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1108	339.78	0	00:50				
114	240.76	0	00:30				
224	1005.05	0	01:10	5.76	1.00	0.24	0
265	198.29	0	00:45	15.13	1.00	1.01	5
265-OVERFLOW	21.38	0	00:45	8.29	1.00	0.04	0
196	707.90	0	01:35				
1216	156.18	0	01:25	3.27	1.00	1.00	45
1216-OVERFLOW	89.60	0	01:25	2.08	1.00	0.00	0
205	41.78	0	00:30	6.37	1.00	1.08	70
205-OVERFLOW	186.06	0	00:35	6.19	1.00	0.00	0
1134	53.70	0	00:25				
1246	51.01	0	00:30	8.39	1.00	0.78	0
134	294.64	0	01:20				
124	1005.05	0	01:10				
1229	120.84	0	00:35	3.17	1.00	0.82	0
1229-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1121	105.02	0	00:25				
181	4.38	0	00:25				
1155	633.17	0	01:00				
1222	32.26	0	00:30	7.67	1.00	0.66	0
1222-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1245	90.07	0	01:05	2.81	1.00	0.33	0
1127	127.95	0	00:30				
1226	206.71	0	00:45	8.27	1.00	0.68	0

1226-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1140	58.52	0	00:25				
262	101.62	0	00:30	11.95	1.00	1.02	5
1201	18.24	0	00:40	2.43	1.00	1.00	330
1201-OVERFLOW	611.90	0	01:00	3.52	1.00	0.05	0
1144	67.38	0	00:25				
1102	3.40	0	00:30				
251	22.93	0	00:45	8.39	1.00	1.05	25
251-OVERFLOW	52.40	0	00:30	11.59	1.00	0.00	0
211	12.16	0	00:30	8.20	1.00	1.03	15
211-OVERFLOW	14.34	0	00:35	8.02	1.00	0.00	0
197	707.90	0	01:35				
264	166.88	0	00:30	14.10	1.00	0.89	0
264-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
103	172.68	0	00:30				
1231	78.83	0	00:30	6.54	1.00	0.87	0
1119	89.87	0	00:30				
1129	60.00	0	00:25				
1129-DIV	0.33	0	00:25				
122	0.00	0	00:00				
122-DIV	862.53	0	01:10				
185	100.00	0	00:30				
185-DIV	79.24	0	00:30				
171	222.10	0	00:25				
1118	203.65	0	00:40				
1110	316.35	0	00:40				
1237	86.14	0	00:30	4.55	1.00	0.00	0
254	184.53	0	00:35	6.61	1.00	0.20	0
254-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
113	40.12	0	00:35				
193	0.00	0	00:00				
1113	62.48	0	00:25				
1217	36.57	0	00:50	5.09	1.00	1.00	315
1217-OVERFLOW	211.63	0	01:20	4.43	1.00	0.00	0
163	101.22	0	00:25				
1221	152.68	0	00:50	3.23	1.00	1.00	40
1221-OVERFLOW	126.76	0	00:55	3.07	1.00	0.01	0
116	673.25	0	00:50				
121	236.17	0	00:35				
1239	61.86	0	00:35	3.13	1.00	0.00	0
1122	75.36	0	00:25				
229	500.52	0	01:15	5.09	1.00	1.00	45
229-OVERFLOW	207.38	0	01:35	4.10	1.00	0.01	0
1159	41.00	0	00:35				
102	301.05	0	00:30				
160	72.54	0	00:25				
1147	635.26	0	00:55				
1236	69.07	0	00:30	6.96	1.00	0.00	0
145	202.54	0	00:25				
1202	18.24	0	00:40	2.43	1.00	1.00	330
1202-OVERFLOW	611.14	0	01:00	3.52	1.00	0.05	0
1101	633.17	0	01:00				
142	73.92	0	00:30				
1116	42.22	0	00:25				
1230	75.82	0	00:40	2.74	1.00	0.51	0
1230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
258	17.20	0	01:40	6.46	1.00	1.07	50
258-OVERFLOW	79.22	0	00:35	8.28	1.00	0.00	0
231	1001.98	0	01:15	5.87	1.00	0.06	0
226	1004.44	0	01:10	12.43	1.00	0.22	0
149	59.70	0	00:30				
183	198.97	0	00:35				
230	136.32	0	00:30	8.85	1.00	0.72	0
230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1240	69.54	0	00:35	3.21	1.00	0.00	0
182	48.34	0	00:30				
1225	147.29	0	00:50	3.10	1.00	1.00	20
1225-OVERFLOW	83.47	0	00:50	2.96	1.00	0.01	0
1103	546.10	0	00:55				
261	18.17	0	00:35	5.68	1.00	1.00	15
261-OVERFLOW	50.03	0	00:35	5.19	1.00	0.00	0
1158	41.47	0	00:25				
1214	35.37	0	00:25	6.53	1.00	1.03	245
1214-OVERFLOW	59.46	0	02:55	7.29	1.00	0.00	0
1207	271.43	0	00:50	3.64	1.00	0.35	0
1207-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1208	54.44	0	00:30	9.46	1.00	0.99	0
1208-OVERFLOW	0.02	0	00:25	0.02	1.00	0.00	0
208	50.47	0	01:15	3.15	1.00	1.00	65
208-OVERFLOW	437.22	0	00:45	4.16	1.00	0.02	0
169	16.68	0	00:25				
180	61.73	0	00:25				
1152	60.98	0	00:25				
176	179.00	0	00:25				
174	176.92	0	00:25				
232	294.64	0	01:20	9.12	1.00	0.92	0
232-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
189	810.72	0	01:00				
1126	84.81	0	00:25				
1117	203.34	0	00:40				
225	198.97	0	00:35	7.60	1.00	0.56	0
110	587.27	0	00:45				
120	858.66	0	01:05				
1111	83.64	0	00:25				
108	125.15	0	00:30				
172	58.88	0	00:25				
186	810.72	0	01:00				
147	131.68	0	00:25				
123	995.67	0	01:10				
206	35.09	0	02:35	6.71	1.00	1.02	120
206-OVERFLOW	25.64	0	01:05	1.99	1.00	0.01	0
106	212.33	0	00:35				
1206	339.78	0	00:50	4.23	1.00	0.40	0
1206-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
175	2.09	0	00:25				
201	384.97	0	00:30	22.60	1.00	0.18	0
201-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1105	569.08	0	00:45				

```
**************************
Routing Time Step Summary
**************************
Minimum Time Step           :   300.00 sec
Average Time Step           :   300.00 sec
Maximum Time Step           :   300.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.04

Analysis begun on:  Tue May 23 16:22:25 2006
```

5-YEAR EPA SWMM5.0 Master Plan Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.006a)
  ---------------------------------------------------------------

  BROOMFIELD AND VICINITY  (no park div.)(city/3207 connect w/n120th splits)
  KIOWA ENGINEERING  MP5.sin (308 pond/120th sewer alt.) MAY 2006

  ***************
  Analysis Options
  ***************
  Flow Units ..............  CFS
  Infiltration Method .....  HORTON
  Flow Routing Method .....  KINWAVE
  Starting Date ...........  JAN-01-2005 00:00:00
  Ending Date .............  JAN-01-2005 06:00:00
  Antecedent Dry Days .....  0.0
  Report Time Step ........  00:15:00
  Wet Time Step ...........  00:05:00
  Dry Time Step ...........  00:05:00
  Routing Time Step .......  300.00 sec


  **************************       Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  **************************     ---------       -------
  Total Precipitation .....        476.360         1.600
  Evaporation Loss ........          0.000         0.000
  Infiltration Loss .......        257.756         0.866
  Surface Runoff ..........        205.740         0.691
  Final Surface Storage ....        14.459         0.049
  Continuity Error (%) .....        -0.335


  **************************       Volume         Volume
  Flow Routing Continuity        acre-feet       Mgallons
  **************************     ---------       ---------
  Dry Weather Inflow .......          0.000         0.000
  Wet Weather Inflow .......        206.011        67.132
  Groundwater Inflow .......          0.000         0.000
  RDII Inflow ..............          0.000         0.000
  External Inflow ..........          0.000         0.000
  External Outflow .........        178.259        58.088
  Surface Flooding .........          0.000         0.000
  Evaporation Loss .........          0.000         0.000
  Initial Stored Volume ....          0.000         0.000
  Final Stored Volume ......         33.833        11.025
  Continuity Error (%) .....         -2.952


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------
                        Total      Total      Total      Total      Total     Runoff
                       Precip      Runon       Evap      Infil     Runoff      Coeff
  Subcatchment             in         in         in         in         in
  ---------------------------------------------------------------------------
  SWMM_SUBC_1           1.600      0.000      0.000      0.553      0.980      0.613
  SWMM_SUBC_2           1.600      0.000      0.000      1.010      0.558      0.349
  SWMM_SUBC_3           1.600      0.000      0.000      0.770      0.780      0.488
  SWMM_SUBC_8           1.600      0.000      0.000      0.315      1.214      0.759
  SWMM_SUBC_30          1.600      0.000      0.000      0.157      1.360      0.850
  SWMM_SUBC_31          1.600      0.000      0.000      0.475      1.061      0.663
  SWMM_SUBC_4           1.600      0.000      0.000      1.094      0.479      0.299
  SWMM_SUBC_5           1.600      0.000      0.000      0.956      0.607      0.380
  SWMM_SUBC_6           1.600      0.000      0.000      0.957      0.607      0.379
  SWMM_SUBC_7           1.600      0.000      0.000      0.883      0.679      0.425
  SWMM_SUBC_9           1.600      0.000      0.000      0.531      1.005      0.628
  SWMM_SUBC_10          1.600      0.000      0.000      0.492      1.036      0.648
  SWMM_SUBC_11          1.600      0.000      0.000      0.794      0.763      0.477
  SWMM_SUBC_12          1.600      0.000      0.000      0.317      1.200      0.750
  SWMM_SUBC_14          1.600      0.000      0.000      0.747      0.805      0.503
  SWMM_SUBC_15          1.600      0.000      0.000      0.895      0.649      0.405
  SWMM_SUBC_16          1.600      0.000      0.000      0.934      0.627      0.392
  SWMM_SUBC_32          1.600      0.000      0.000      0.235      1.291      0.807
  SWMM_SUBC_33          1.600      0.000      0.000      1.475      0.120      0.075
  SWMM_SUBC_36          1.600      0.000      0.000      1.006      0.561      0.351
  SWMM_SUBC_17          1.600      0.000      0.000      1.018      0.547      0.342
  SWMM_SUBC_18          1.600      0.000      0.000      0.315      1.211      0.757
  SWMM_SUBC_20          1.600      0.000      0.000      1.002      0.567      0.354
  SWMM_SUBC_34          1.600      0.000      0.000      1.479      0.115      0.072
  SWMM_SUBC_13          1.600      0.000      0.000      0.580      0.964      0.602
  SWMM_SUBC_19          1.600      0.000      0.000      0.476      1.059      0.662
  SWMM_SUBC_21          1.600      0.000      0.000      0.494      1.043      0.652
  SWMM_SUBC_22          1.600      0.000      0.000      0.483      1.042      0.651
  SWMM_SUBC_23          1.600      0.000      0.000      0.327      1.199      0.750
  SWMM_SUBC_24          1.600      0.000      0.000      0.478      1.048      0.655
  SWMM_SUBC_25          1.600      0.000      0.000      0.315      1.210      0.756
  SWMM_SUBC_35          1.600      0.000      0.000      0.478      1.048      0.655
  SWMM_SUBC_1001        1.600      0.000      0.000      0.956      0.608      0.380
  SWMM_SUBC_1002        1.600      0.000      0.000      1.037      0.534      0.334
  SWMM_SUBC_1003        1.600      0.000      0.000      1.075      0.496      0.310
  SWMM_SUBC_1004        1.600      0.000      0.000      1.021      0.541      0.338
  SWMM_SUBC_1005        1.600      0.000      0.000      0.756      0.796      0.497
  SWMM_SUBC_1006        1.600      0.000      0.000      1.185      0.394      0.246
  SWMM_SUBC_1007        1.600      0.000      0.000      1.175      0.403      0.252
  SWMM_SUBC_1008        1.600      0.000      0.000      1.172      0.406      0.253
  SWMM_SUBC_1009        1.600      0.000      0.000      1.275      0.308      0.193
  SWMM_SUBC_1010        1.600      0.000      0.000      1.002      0.566      0.354
  SWMM_SUBC_1011        1.600      0.000      0.000      1.563      0.035      0.022
  SWMM_SUBC_1013        1.600      0.000      0.000      1.285      0.299      0.187
  SWMM_SUBC_1014        1.600      0.000      0.000      1.041      0.529      0.330
  SWMM_SUBC_1015        1.600      0.000      0.000      0.952      0.614      0.384
  SWMM_SUBC_1017        1.600      0.000      0.000      0.979      0.585      0.366
  SWMM_SUBC_1019        1.600      0.000      0.000      0.761      0.783      0.489
  SWMM_SUBC_1020        1.600      0.000      0.000      0.851      0.709      0.443
  SWMM_SUBC_1021        1.600      0.000      0.000      0.822      0.735      0.459
  SWMM_SUBC_1022        1.600      0.000      0.000      1.393      0.196      0.122
  SWMM_SUBC_1023        1.600      0.000      0.000      1.078      0.494      0.309
  SWMM_SUBC_1024        1.600      0.000      0.000      0.957      0.606      0.379
  SWMM_SUBC_1025        1.600      0.000      0.000      1.103      0.471      0.295
  SWMM_SUBC_1026        1.600      0.000      0.000      0.474      1.064      0.665
  SWMM_SUBC_1027        1.600      0.000      0.000      1.401      0.189      0.118
  SWMM_SUBC_1028        1.600      0.000      0.000      0.861      0.696      0.435
  SWMM_SUBC_1029        1.600      0.000      0.000      1.561      0.038      0.023
  SWMM_SUBC_1041        1.600      0.000      0.000      0.877      0.680      0.425
  SWMM_SUBC_1043        1.600      0.000      0.000      0.272      1.249      0.780
  SWMM_SUBC_1031        1.600      0.000      0.000      0.878      0.677      0.423
  SWMM_SUBC_1032        1.600      0.000      0.000      0.982      0.581      0.363
  SWMM_SUBC_1033        1.600      0.000      0.000      0.979      0.579      0.362
  ---------------------------------------------------------------------------
  Totals                1.600      0.000      0.000      0.866      0.691      0.432


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                        Average    Maximum    Maximum  Time of Max      Total      Total
                          Depth      Depth        HGL   Occurrence   Flooding    Minutes
  Node                     Feet       Feet       Feet  days hr:min   acre-in    Flooded
  ---------------------------------------------------------------------------
  JUNCT_1106               0.00       0.00    1032.00    0  00:00          0          0
  JUNCT_1240               0.19       0.76    1032.76    0  00:25          0          0
  JUNCT_1105               0.82       2.13    1024.13    0  00:55          0          0
  JUNCT_1103               2.67       5.00    1012.00    0  01:05          0          0
  JUNCT_1152               0.00       0.00    1057.01    0  00:00          0          0
  JUNCT_1151               0.00       0.00    1057.01    0  00:00          0          0
  JUNCT_1153               0.66       2.21    1033.72    0  00:35          0          0
  JUNCT_1154               0.00       0.00    1031.51    0  00:00          0          0
  JUNCT_1245               1.00       2.58    1016.08    0  00:50          0          0
  JUNCT_1147               2.53       4.50    1010.50    0  00:45          0          0
  JUNCT_1148               2.85       3.00    1004.00    0  00:30          0          0
```

JUNCT_1101	2.84	3.00	1003.00	0	00:35	0	0
JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_197	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_134	1.13	4.33	1004.33	0	01:20	0	0
JUNCT_1155	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_150	0.00	0.00	1025.00	0	00:00	0	0
JUNCT_127	0.00	0.00	1058.42	0	00:00	0	0
JUNCT_146	0.00	0.00	1172.42	0	00:00	0	0
JUNCT_132	0.00	0.00	1226.42	0	00:00	0	0
JUNCT_131	0.00	0.00	1226.43	0	00:00	0	0
JUNCT_221	0.96	2.38	1174.80	0	00:30	0	0
JUNCT_121	0.44	1.13	1133.55	0	00:35	0	0
JUNCT_148	0.00	0.00	1132.42	0	00:00	0	0
JUNCT_223	1.44	3.49	1063.16	0	01:10	0	0
JUNCT_123	1.49	3.48	1061.90	0	01:10	0	0
JUNCT_224	1.80	4.47	1062.89	0	01:10	0	0
JUNCT_124	1.80	4.46	1047.92	0	01:15	0	0
JUNCT_226	1.79	5.07	1048.53	0	01:15	0	0
JUNCT_126	1.79	5.07	1047.63	0	01:15	0	0
JUNCT_231	2.50	5.75	1048.31	0	01:15	0	0
JUNCT_228	2.21	4.77	1036.77	0	01:20	0	0
JUNCT_128	2.21	4.77	1029.77	0	01:20	0	0
JUNCT_196	2.71	5.00	1005.00	0	01:30	0	0
JUNCT_1157	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_192	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_269	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1102	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1104	0.00	0.00	1007.00	0	00:00	0	0
JUNCT_149	0.00	0.00	1055.00	0	00:00	0	0
JUNCT_151	0.00	0.00	1067.01	0	00:00	0	0
JUNCT_142	0.00	0.00	1116.06	0	00:00	0	0
JUNCT_174	0.00	0.00	1130.46	0	00:00	0	0
JUNCT_175	0.00	0.00	1130.46	0	00:00	0	0
JUNCT_176	0.03	0.50	1130.96	0	00:35	0	0
JUNCT_167	0.00	0.00	1168.27	0	00:00	0	0
JUNCT_170	0.00	0.00	1176.27	0	00:00	0	0
JUNCT_168	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_169	0.00	0.00	1196.27	0	00:00	0	0
JUNCT_113	0.28	1.50	1177.77	0	00:35	0	0
JUNCT_114	0.70	3.15	1141.42	0	00:30	0	0
JUNCT_115	0.78	4.00	1136.27	0	00:35	0	0
JUNCT_184	0.00	0.00	1127.27	0	00:00	0	0
JUNCT_171	0.00	0.00	1198.27	0	00:00	0	0
JUNCT_107	0.41	1.92	1176.19	0	00:35	0	0
JUNCT_172	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_180	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_108	1.32	2.75	1172.02	0	00:50	0	0
JUNCT_173	0.00	0.00	1169.27	0	00:00	0	0
JUNCT_262	1.13	2.86	1157.13	0	00:30	0	0
JUNCT_165	0.00	0.00	1198.67	0	00:00	0	0
JUNCT_106	0.79	2.00	1166.67	0	01:05	0	0
JUNCT_161	0.00	0.00	1248.67	0	00:00	0	0
JUNCT_164	0.00	0.00	1290.67	0	00:00	0	0
JUNCT_104	0.53	2.00	1272.67	0	00:30	0	0
JUNCT_203	0.18	0.69	1271.36	0	00:30	0	0
JUNCT_163	0.00	0.00	1316.67	0	00:00	0	0
JUNCT_105	0.00	0.00	1352.27	0	00:00	0	0
JUNCT_103	0.44	1.73	1306.40	0	00:30	0	0
JUNCT_160	0.00	0.00	1304.67	0	00:00	0	0
JUNCT_102	0.30	1.37	1250.04	0	00:30	0	0
JUNCT_101	0.98	3.00	1163.67	0	00:35	0	0
JUNCT_166	0.00	0.00	1160.67	0	00:00	0	0
JUNCT_109	1.00	2.00	1130.27	0	01:15	0	0
JUNCT_110	1.79	6.40	1133.67	0	00:50	0	0
JUNCT_116	1.61	4.00	1124.27	0	00:45	0	0
JUNCT_117	1.70	4.00	1120.06	0	00:40	0	0
JUNCT_118	1.83	4.00	1113.06	0	00:35	0	0
JUNCT_144	0.00	0.00	1109.06	0	00:00	0	0
JUNCT_186	1.92	3.00	1087.58	0	01:00	0	0
JUNCT_189	0.00	0.00	1084.58	0	00:00	0	0
JUNCT_147	0.00	0.00	1084.58	0	00:00	0	0
JUNCT_145	0.00	0.00	1137.31	0	00:00	0	0
JUNCT_220	0.27	1.09	1138.40	0	00:25	0	0

JUNCT_120	2.04	3.00	1075.10	0	00:55	0	0
JUNCT_181	0.00	0.00	1072.10	0	00:00	0	0
JUNCT_222	1.58	4.23	1076.34	0	01:10	0	0
JUNCT_152	0.00	0.00	1067.01	0	00:00	0	0
JUNCT_125	0.00	0.00	1055.00	0	00:00	0	0
JUNCT_183	0.74	1.43	1047.43	0	00:45	0	0
JUNCT_182	0.00	0.00	1046.00	0	00:00	0	0
JUNCT_198	0.68	1.90	1008.90	0	00:40	0	0
JUNCT_1107	0.00	0.00	1037.00	0	00:00	0	0
JUNCT_1109	0.00	0.00	1058.60	0	00:00	0	0
JUNCT_1111	0.00	0.00	1068.60	0	00:00	0	0
JUNCT_1239	0.18	0.73	1069.33	0	00:25	0	0
JUNCT_1113	0.00	0.00	1082.90	0	00:00	0	0
JUNCT_1116	0.00	0.00	1073.60	0	00:00	0	0
JUNCT_1119	0.00	0.00	1083.40	0	00:00	0	0
JUNCT_1121	0.00	0.00	1106.79	0	00:00	0	0
JUNCT_1237	0.14	0.70	1107.49	0	00:25	0	0
JUNCT_1123	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1149	0.00	0.00	1161.13	0	00:00	0	0
JUNCT_1236	0.13	0.50	1161.62	0	00:25	0	0
JUNCT_1134	0.00	0.00	1135.19	0	00:00	0	0
JUNCT_1242	0.69	3.26	1168.46	0	00:25	0	0
JUNCT_1142	0.69	3.38	1166.08	0	00:30	0	0
JUNCT_1231	0.69	3.38	1166.08	0	00:30	0	0
JUNCT_1141	0.68	2.27	1148.97	0	00:40	0	0
JUNCT_1139	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1140	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1143	0.00	0.00	1169.70	0	00:00	0	0
JUNCT_1138	1.02	2.64	1149.34	0	00:35	0	0
JUNCT_1137	0.00	0.00	1146.69	0	00:00	0	0
JUNCT_1136	1.23	3.00	1138.69	0	00:45	0	0
JUNCT_1144	0.00	0.00	1145.45	0	00:00	0	0
JUNCT_1135	1.28	3.99	1139.18	0	00:45	0	0
JUNCT_1133	1.36	3.00	1127.19	0	00:55	0	0
JUNCT_1131	0.00	0.00	1166.90	0	00:00	0	0
JUNCT_1241	0.12	0.42	1167.31	0	00:25	0	0
JUNCT_1132	0.00	0.00	1177.69	0	00:00	0	0
JUNCT_1130	1.77	4.20	1127.89	0	00:40	0	0
JUNCT_1126	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1150	0.00	0.00	1190.92	0	00:00	0	0
JUNCT_1235	0.08	0.57	1191.48	0	00:25	0	0
JUNCT_1246	0.32	2.27	1171.41	0	00:25	0	0
JUNCT_1128	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1127	0.33	2.05	1159.19	0	00:30	0	0
JUNCT_1125	1.44	3.00	1111.73	0	00:50	0	0
JUNCT_1124	2.90	3.20	1111.43	0	01:00	0	0
JUNCT_1145	1.36	1.85	1096.05	0	04:45	0	0
JUNCT_1122	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1120	1.78	2.80	1086.20	0	00:35	0	0
JUNCT_1118	1.65	2.99	1077.59	0	00:40	0	0
JUNCT_1117	1.22	2.74	1076.34	0	00:40	0	0
JUNCT_1115	0.00	0.00	1083.90	0	00:00	0	0
JUNCT_1146	0.00	0.00	1130.10	0	00:00	0	0
JUNCT_1238	0.09	0.63	1130.73	0	00:25	0	0
JUNCT_1159	0.12	0.46	1084.36	0	00:35	0	0
JUNCT_1114	1.67	2.99	1066.09	0	00:50	0	0
JUNCT_1112	1.26	2.67	1064.77	0	00:50	0	0
JUNCT_1110	0.77	1.95	1060.55	0	00:40	0	0
JUNCT_1108	0.82	2.13	1039.13	0	00:50	0	0
ROOT_JUNCT_1155	0.00	0.00	1000.00	0	00:15	0	0
ROOT_JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1158	0.00	0.00	1000.00	0	00:25	0	0
ROOT_JUNCT_197	0.00	0.00	1000.00	0	00:25	0	0
ROOT_JUNCT_134	0.00	0.00	1000.00	0	00:40	0	0
JUNCT_208	0.98	2.15	1162.81	0	00:35	0	0
JUNCT_133	2.50	5.74	1037.74	0	01:20	0	0
JUNCT_1210	1.71	3.00	1076.60	0	00:35	0	0
JUNCT_1225	1.35	3.00	1138.19	0	00:35	0	0
JUNCT_1205	0.83	2.13	1039.13	0	00:50	0	0
JUNCT_213	0.58	3.06	1179.33	0	00:30	0	0
JUNCT_122	1.58	4.23	1071.24	0	01:10	0	0
JUNCT_260	0.26	1.50	1189.77	0	00:25	0	0
JUNCT_211	0.34	2.02	1208.29	0	00:30	0	0
JUNCT_1204	2.71	5.00	1027.00	0	00:45	0	0

JUNCT_119	2.32	5.00	1102.06	0	00:45	0	0
JUNCT_261	0.02	0.50	1154.08	0	00:30	0	0
JUNCT_264	0.52	2.94	1133.41	0	00:25	0	0
JUNCT_217	1.83	4.00	1120.06	0	00:30	0	0
JUNCT_206	1.28	2.75	1177.02	0	00:40	0	0
JUNCT_259	1.35	2.50	1134.92	0	00:20	0	0
JUNCT_215	0.71	4.00	1136.27	0	00:30	0	0
JUNCT_1156	0.00	0.00	1165.19	0	00:00	0	0
JUNCT_1207	0.79	1.95	1064.05	0	00:50	0	0
JUNCT_1209	0.52	3.00	1086.90	0	00:25	0	0
JUNCT_1212	1.69	3.00	1086.40	0	00:30	0	0
JUNCT_229	2.72	5.00	1030.00	0	01:05	0	0
JUNCT_230	0.95	2.50	1228.92	0	00:25	0	0
JUNCT_251	0.41	2.00	1354.27	0	00:20	0	0
JUNCT_266	1.92	3.00	1100.06	0	00:25	0	0
JUNCT_1213	0.47	3.00	1098.40	0	00:30	0	0
JUNCT_209	1.79	6.40	1134.67	0	00:40	0	0
JUNCT_250	0.44	1.77	1318.44	0	00:30	0	0
JUNCT_1230	0.72	3.21	1159.90	0	00:30	0	0
JUNCT_216	1.69	4.00	1124.27	0	00:35	0	0
JUNCT_1222	0.24	1.63	1134.28	0	00:30	0	0
JUNCT_210	1.58	4.00	1131.27	0	00:40	0	0
JUNCT_1244	0.85	2.64	1034.15	0	00:35	0	0
JUNCT_257	0.21	1.14	1197.40	0	00:25	0	0
JUNCT_1129	7.09	7.09	1176.23	0	00:05	0	0
JUNCT_1208	0.36	2.24	1085.14	0	00:25	0	0
JUNCT_1214	1.83	2.80	1097.00	0	00:25	0	0
JUNCT_253	0.82	2.00	1200.67	0	00:15	0	0
JUNCT_1218	0.98	2.22	1159.36	0	00:25	0	0
JUNCT_1228	1.23	3.00	1149.69	0	00:30	0	0
JUNCT_204	0.41	2.00	1314.67	0	00:30	0	0
JUNCT_214	0.79	4.00	1142.27	0	00:30	0	0
JUNCT_202	0.30	1.38	1306.05	0	00:30	0	0
JUNCT_1229	0.97	3.00	1172.69	0	00:25	0	0
JUNCT_201	0.39	1.74	1250.41	0	00:30	0	0
JUNCT_225	0.74	1.43	1056.43	0	00:45	0	0
JUNCT_1234	2.88	3.00	1009.00	0	00:25	0	0
JUNCT_1227	0.44	3.00	1148.45	0	00:25	0	0
JUNCT_1217	2.92	3.20	1111.93	0	00:50	0	0
JUNCT_254	0.39	2.08	1200.35	0	00:25	0	0
JUNCT_1226	1.23	4.00	1139.69	0	00:45	0	0
JUNCT_185	1.34	3.50	1157.77	0	00:35	0	0
JUNCT_1216	1.86	3.00	1111.23	0	01:30	0	0
JUNCT_1243	0.64	2.33	1059.34	0	00:25	0	0
JUNCT_1224	1.78	4.20	1128.39	0	00:30	0	0
JUNCT_263	0.14	0.63	1067.63	0	00:30	0	0
JUNCT_1206	0.84	2.21	1060.81	0	00:40	0	0
JUNCT_232	1.12	4.33	1008.80	0	01:20	0	0
JUNCT_265	0.68	1.93	1047.93	0	00:30	0	0
JUNCT_218	2.31	5.00	1114.06	0	00:30	0	0
JUNCT_1203	2.54	4.50	1011.50	0	00:35	0	0
JUNCT_1211	1.23	2.74	1077.34	0	00:40	0	0
JUNCT_252	0.54	2.00	1292.67	0	00:20	0	0
JUNCT_258	0.65	2.00	1170.27	0	00:20	0	0
JUNCT_219	2.04	3.00	1087.58	0	00:25	0	0
JUNCT_1220	0.00	0.00	1175.23	0	00:00	0	0
JUNCT_1202	2.85	3.00	1004.00	0	00:30	0	0
JUNCT_256	0.33	2.15	1213.41	0	00:25	0	0
JUNCT_1201	2.85	3.00	1003.50	0	00:30	0	0
JUNCT_255	0.46	2.00	1213.27	0	00:20	0	0
JUNCT_205	0.99	3.00	1167.67	0	00:25	0	0
JUNCT_207	1.35	3.50	1172.77	0	00:25	0	0
JUNCT_1215	1.36	1.85	1100.05	0	04:45	0	0
JUNCT_1233	1.24	2.67	1065.77	0	00:50	0	0
JUNCT_1223	0.53	3.00	1180.69	0	00:25	0	0
JUNCT_1221	1.42	3.00	1126.69	0	00:30	0	0
JUNCT_1304	1.06	1.38	1085.29	0	01:35	0	0
JUNCT_1313	0.11	0.89	1014.40	0	00:50	0	0
JUNCT_1308	0.98	2.35	1159.49	0	01:00	0	0
JUNCT_308	1.08	2.48	1228.90	0	01:20	0	0
JUNCT_301	0.24	1.41	1162.08	0	00:35	0	0
JUNCT_1307	10.09	14.56	1123.30	0	01:30	0	0
JUNCT_304	0.93	3.09	1177.36	0	01:05	0	0
JUNCT_302	0.91	2.75	1057.76	0	01:00	0	0
JUNCT_1312	0.51	1.90	1171.60	0	00:45	0	0
JUNCT_1306	9.82	14.36	1112.59	0	04:40	0	0
JUNCT_1305	2.98	5.29	1099.49	0	05:20	0	0

****
Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
JUNCT_1304	46.036	0	60.169	0	0 01:35	8.87
JUNCT_1313	4.576	0	38.934	0	0 00:50	86.74
JUNCT_1308	42.642	0	102.301	0	0 01:00	23.48
JUNCT_308	46.993	0	107.853	0	0 01:20	23.79
JUNCT_301	10.318	0	61.210	0	0 00:35	446.51
JUNCT_1307	439.512	0	634.389	1	0 01:30	157.14
JUNCT_304	40.329	0	134.571	1	0 01:05	50.16
JUNCT_302	39.718	0	119.828	1	0 01:00	50.93
JUNCT_1312	22.325	0	82.823	0	0 00:45	32.00
JUNCT_1306	427.842	0	626.376	1	0 04:40	42.64
JUNCT_1305	130.015	0	230.274	0	0 05:20	41.94

****
Conduit Flow Summary
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Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
134	219.34	0 01:20				
1107	33.81	0 00:25				
208	50.47	0 01:15	3.14	1.00	1.00	60
208-OVERFLOW	331.90	0 00:45	3.78	1.00	0.02	0
148	170.78	0 00:25				
147	107.46	0 00:25				
116	541.77	0 00:50				
174	140.59	0 00:25				
133	578.01	0 01:20				
133-DIV	218.88	0 01:20				
1245	86.14	0 01:05	2.75	1.00	0.32	0
1210	139.28	0 00:50	3.16	1.00	0.99	0
1210-OVERFLOW	31.04	0 00:50	3.30	1.00	0.00	0
1117	168.64	0 00:40				
131	91.86	0 00:30				
220	123.53	0 00:35	6.86	1.00	0.00	0
1116	34.14	0 00:25				
231	796.88	0 01:20	5.54	1.00	0.05	0
164	62.25	0 00:25				
224	800.68	0 01:15	5.40	1.00	0.19	0
173	54.24	0 00:30				
1130	240.83	0 00:50				
1225	147.29	0 00:55	3.14	1.00	1.00	5
1225-OVERFLOW	54.49	0 00:55	3.30	1.00	0.00	0
1128	41.85	0 00:25				
1205	285.30	0 00:55	3.95	1.00	0.33	0
1205-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
213	127.08	0 00:30	12.37	1.00	0.96	0
213-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
122	0.00	0 00:00				
122-DIV	683.67	0 01:10				
107	148.77	0 00:35				
102	234.83	0 00:30				
168	26.41	0 00:25				
1150	57.52	0 00:25				
165	231.34	0 00:25				
184	25.80	0 00:25				
1103	386.47	0 01:05				

260	8.49	0	00:30	5.99	1.00	1.02	10
260-OVERFLOW	3.36	0	00:35	5.35	1.00	0.00	0
1145	58.61	0	00:30				
211	12.00	0	00:30	8.08	1.00	1.01	15
211-OVERFLOW	9.92	0	00:35	10.92	1.00	0.00	0
1204	241.07	0	01:05	4.47	1.00	1.00	10
1204-OVERFLOW	61.18	0	01:05	4.18	1.00	0.00	0
1139	83.77	0	00:25				
196	587.93	0	01:40				
1141	72.06	0	00:40				
126	800.96	0	01:15				
119	661.85	0	00:50				
119-DIV	0.00	0	00:00				
261	18.17	0	00:35	7.00	1.00	1.00	5
261-OVERFLOW	23.32	0	00:40	6.14	1.00	0.00	0
120	684.00	0	01:10				
124	800.68	0	01:15				
163	80.45	0	00:30				
1136	185.16	0	00:45				
264	134.72	0	00:30	13.48	1.00	0.72	0
264-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
217	353.12	0	00:35	4.22	1.00	1.00	45
217-OVERFLOW	277.91	0	00:50	3.43	1.00	0.02	0
206	34.93	0	02:20	6.79	1.00	1.02	100
206-OVERFLOW	15.71	0	01:10	1.68	1.00	0.00	0
1134	43.94	0	00:25				
259	39.54	0	02:25	9.42	1.00	1.05	95
259-OVERFLOW	237.33	0	00:40	11.96	1.00	0.00	0
1118	169.14	0	00:40				
1242	82.50	0	00:30	6.56	1.00	0.91	0
215	162.17	0	00:35	14.84	1.00	1.00	5
215-OVERFLOW	27.66	0	00:40	4.92	1.00	0.00	0
197	587.93	0	01:40				
1110	270.31	0	00:40				
1140	47.80	0	00:25				
1156	79.00	0	00:25				
1156-DIV	14.65	0	00:25				
1207	225.73	0	00:40	3.42	1.00	0.29	0
1207-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
115	197.70	0	00:35				
127	55.24	0	00:25				
1209	94.82	0	00:35	4.06	1.00	0.71	0
1209-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
198	99.76	0	00:40				
1106	72.90	0	00:25				
170	105.32	0	00:25				
151	129.11	0	00:30				
145	159.50	0	00:25				
1212	142.09	0	00:40	3.14	1.00	0.99	0
1212-OVERFLOW	27.05	0	00:40	2.81	1.00	0.00	0
152	0.00	0	00:00				
150	173.31	0	00:25				
1236	54.50	0	00:30	6.67	1.00	0.00	0
1112	225.74	0	00:50				
149	48.15	0	00:30				
108	100.81	0	00:30				
1115	138.82	0	00:25				
1124	159.19	0	01:30				
1143	120.56	0	00:25				
1114	213.53	0	00:50				
229	500.52	0	01:30	5.10	1.00	1.00	15
229-OVERFLOW	87.40	0	01:40	4.02	1.00	0.00	0
230	106.85	0	00:30	8.39	1.00	0.57	0
230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1132	87.99	0	00:25				
251	22.19	0	00:40	8.57	1.00	1.02	20
251-OVERFLOW	37.48	0	00:30	13.10	1.00	0.00	0
266	68.38	0	01:00	3.38	1.00	1.00	120
266-OVERFLOW	579.57	0	01:00	3.69	1.00	0.03	0
1213	43.83	0	00:35	7.36	1.00	1.01	5
1213-OVERFLOW	17.58	0	00:35	10.59	1.00	0.00	0
203	58.06	0	00:35	6.35	1.00	0.12	0
262	101.09	0	00:35	11.99	1.00	1.01	5
209	218.17	0	00:45	7.76	1.00	1.00	25
209-OVERFLOW	162.42	0	00:45	7.83	1.00	0.00	0
123	793.44	0	01:10				
1153	82.37	0	00:35				
250	76.41	0	00:30	5.70	1.00	0.29	0
250-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1230	72.06	0	00:40	2.77	1.00	0.49	0
1230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
142	57.93	0	00:30				
1159	32.99	0	00:35				
216	368.67	0	00:40	4.39	1.00	1.00	35
216-OVERFLOW	173.48	0	00:55	2.18	1.00	0.01	0
114	196.38	0	00:30				
1222	25.43	0	00:35	7.30	1.00	0.52	0
1222-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
210	368.67	0	00:45	4.39	1.00	1.00	20
210-OVERFLOW	94.26	0	00:55	1.78	1.00	0.01	0
186	647.96	0	01:00				
125	50.93	0	01:00				
161	84.93	0	00:25				
228	578.72	0	01:20	5.44	1.00	0.18	0
189	647.96	0	01:00				
106	173.90	0	00:35				
1121	85.49	0	00:25				
1244	124.50	0	00:40	3.57	1.00	0.69	0
1244-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
257	12.66	0	00:30	5.61	1.00	0.29	0
257-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1129	49.18	0	00:25				
1129-DIV	0.00	0	00:00				
109	380.54	0	00:45				
1208	46.47	0	00:30	9.32	1.00	0.85	0
1208-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1137	32.51	0	00:30				
223	682.02	0	01:10	14.87	1.00	0.03	0
1214	35.84	0	00:45	6.76	1.00	1.05	100
1214-OVERFLOW	26.40	0	00:30	7.43	1.00	0.00	0
1122	59.43	0	00:25				
1142	82.50	0	00:30				
221	192.91	0	00:35	7.70	1.00	0.03	0
1154	58.06	0	00:30				
146	113.54	0	00:25				
253	15.16	0	02:10	6.37	1.00	1.03	70
253-OVERFLOW	159.74	0	00:35	9.19	1.00	0.00	0
1104	13.92	0	00:25				
1218	50.24	0	00:35	2.75	1.00	0.31	0
1218-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1228	147.02	0	00:45	3.13	1.00	1.00	0
1228-OVERFLOW	38.14	0	00:45	3.15	1.00	0.00	0
181	3.55	0	00:25				
1144	53.09	0	00:25				
204	58.08	0	00:30	9.70	1.00	0.01	0
204-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
214	132.13	0	00:30	12.03	1.00	1.00	15
214-OVERFLOW	65.66	0	00:35	7.80	1.00	0.00	0
202	181.32	0	00:30	18.54	1.00	0.09	0
202-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1111	65.72	0	00:25				
1240	55.22	0	00:35	3.05	1.00	0.00	0
1229	106.01	0	00:35	3.11	1.00	0.72	0
1229-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
110	480.61	0	00:45				
201	302.93	0	00:30	21.19	1.00	0.15	0
201-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
121	192.91	0	00:35				
225	71.82	0	00:45	6.14	1.00	0.43	0
225-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
182	39.01	0	00:30				
1138	175.51	0	00:35				
192	0.00	0	00:00				
1231	77.47	0	00:30	6.72	1.00	0.86	0
1239	48.98	0	00:35	2.98	1.00	0.00	0
1125	273.54	0	00:55				
1158	14.65	0	00:25				
1109	122.54	0	00:25				

1234	18.24	0	00:35	2.43	1.00	1.00	335
1234-OVERFLOW	453.51	0	01:05	3.27	1.00	0.04	0
1131	32.91	0	00:25				
1241	28.14	0	00:30	4.47	1.00	0.00	0
180	49.57	0	00:25				
166	85.61	0	00:25				
1235	37.60	0	00:35	2.66	1.00	0.00	0
1227	47.84	0	00:30	7.91	1.00	1.03	5
1227-OVERFLOW	5.66	0	00:30	8.56	1.00	0.00	0
160	57.03	0	00:25				
1151	46.88	0	00:30				
1217	36.58	0	00:55	5.15	1.00	1.00	310
1217-OVERFLOW	122.77	0	01:30	3.88	1.00	0.00	0
1148	471.75	0	01:05				
1120	119.01	0	00:35				
172	47.38	0	00:25				
1133	201.78	0	00:55				
254	148.77	0	00:35	6.10	1.00	0.16	0
254-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1155	471.81	0	01:05				
193	0.00	0	00:00				
1226	184.49	0	00:45	8.05	1.00	0.61	0
1226-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
185	100.00	0	00:30				
185-DIV	45.47	0	00:35				
1101	471.81	0	01:05				
1152	47.35	0	00:25				
176	142.25	0	00:25				
1238	32.99	0	00:35	2.39	1.00	0.00	0
183	71.82	0	00:45				
1216	155.24	0	01:35	3.27	1.00	0.99	0
1216-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1243	82.37	0	00:35	3.37	1.00	0.46	0
1243-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1224	76.20	0	00:35	6.23	1.00	1.01	80
1224-OVERFLOW	126.33	0	00:55	3.88	1.00	0.00	0
263	132.23	0	00:30	7.97	1.00	0.11	0
263-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1206	279.65	0	00:50	4.02	1.00	0.33	0
1206-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
232	219.34	0	01:20	8.64	1.00	0.68	0
232-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
167	97.38	0	00:25				
265	99.76	0	00:40	11.79	1.00	0.33	0
265-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
269	0.00	0	00:00				
1149	67.52	0	00:25				
144	117.38	0	00:25				
1105	312.91	0	00:55				
218	285.62	0	00:45	5.25	1.00	1.00	60
218-OVERFLOW	376.23	0	00:50	5.34	1.00	0.02	0
1127	103.39	0	00:30				
1126	69.31	0	00:25				
1113	49.80	0	00:25				
118	631.03	0	00:50				
222	683.67	0	01:10	4.95	1.00	0.17	0
175	1.66	0	00:25				
101	456.60	0	00:35				
1203	128.35	0	00:40	9.20	1.00	1.00	105
1203-OVERFLOW	258.84	0	01:05	6.03	1.00	0.00	0
1123	7.58	0	00:25				
1211	168.64	0	00:40	10.01	1.00	0.19	0
1211-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
128	578.72	0	01:20				
252	21.93	0	00:25	8.05	1.00	1.05	30
252-OVERFLOW	41.52	0	00:30	6.47	1.00	0.00	0
169	13.20	0	00:25				
1102	2.62	0	00:25				
1119	72.40	0	00:30				
103	134.49	0	00:30				
226	800.96	0	01:15	11.70	1.00	0.17	0
1147	472.80	0	01:05				
113	33.47	0	00:35				
258	16.68	0	01:25	6.28	1.00	1.04	35
258-OVERFLOW	62.03	0	00:35	7.33	1.00	0.00	0
1108	279.65	0	00:50				
1237	68.69	0	00:30	4.41	1.00	0.00	0
1146	62.87	0	00:25				
1246	42.15	0	00:30	8.01	1.00	0.64	0
104	62.32	0	00:30				
219	68.38	0	00:55	3.40	1.00	1.00	135
219-OVERFLOW	580.59	0	01:10	4.26	1.00	0.03	0
117	599.91	0	00:45				
171	172.59	0	00:25				
1220	0.00	0	00:00	0.00	1.00	0.00	0
1220-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1202	18.24	0	00:40	2.43	1.00	1.00	330
1202-OVERFLOW	453.28	0	01:05	3.27	1.00	0.04	0
256	24.36	0	00:30	5.20	1.00	0.79	0
256-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1201	18.24	0	00:40	2.43	1.00	1.00	330
1201-OVERFLOW	453.03	0	01:05	3.27	1.00	0.04	0
255	26.58	0	00:25	9.83	1.00	1.04	25
255-OVERFLOW	63.17	0	00:30	12.11	1.00	0.00	0
205	41.78	0	00:30	6.45	1.00	1.08	60
205-OVERFLOW	141.42	0	00:35	4.85	1.00	0.00	0
105	69.50	0	00:25				
1157	14.65	0	00:25				
1135	203.23	0	00:45				
207	81.97	0	01:15	9.65	1.00	1.02	50
207-OVERFLOW	65.38	0	00:35	5.59	1.00	0.00	0
1215	42.64	0	04:45	2.25	1.00	0.29	0
1215-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1233	213.54	0	00:50	10.29	1.00	0.08	0
1233-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
132	115.72	0	00:25				
1223	62.43	0	00:35	10.67	1.00	1.02	5
1223-OVERFLOW	19.38	0	00:35	14.90	1.00	0.00	0
1221	152.68	0	00:50	3.22	1.00	1.00	25
1221-OVERFLOW	84.42	0	00:55	3.22	1.00	0.00	0

```
**************************
Routing Time Step Summary
**************************
Minimum Time Step           :   300.00 sec
Average Time Step           :   300.00 sec
Maximum Time Step           :   300.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.03

Analysis begun on:  Tue May 23 16:22:43 2006
```

2-YEAR EPA SWMM5.0 Master Plan Output

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.006a)
  ------------------------------------------------------------

  BROOMFIELD AND VICINITY  (no park div.)(city/3207 w/Upstream 120th split)
  KIOWA ENGINEERING  MP2.sin (308 pond/120th sewer alt.) MAY 2006

  ***************
  Analysis Options
  ***************
  Flow Units ..... CFS
  Infiltration Method ..... HORTON
  Flow Routing Method ..... KINWAVE
  Starting Date ..... JAN-01-2005 00:00:00
  Ending Date ..... JAN-01-2005 06:00:00
  Antecedent Dry Days ..... 0.0
  Report Time Step ..... 00:15:00
  Wet Time Step ..... 00:05:00
  Dry Time Step ..... 00:05:00
  Routing Time Step ..... 300.00 sec


  **************************       Volume         Depth
  Runoff Quantity Continuity     acre-feet        inches
  **************************     ---------       -------
  Total Precipitation ......       339.407         1.140
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........       184.565         0.620
  Surface Runoff ...........       141.452         0.475
  Final Surface Storage ....        14.431         0.048
  Continuity Error (%) .....        -0.307


  **************************       Volume         Volume
  Flow Routing Continuity        acre-feet       Mgallons
  **************************     ---------       ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......       141.637        46.155
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.000         0.000
  External Outflow .........       122.180        39.814
  Surface Flooding .........         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......        24.251         7.903
  Continuity Error (%) .....        -3.384


  ****************************
  Subcatchment Runoff Summary
  ****************************

  ---------------------------------------------------------------------------
                        Total      Total      Total      Total      Total     Runoff
                       Precip      Runon       Evap      Infil     Runoff      Coeff
  Subcatchment             in         in         in         in         in
  ---------------------------------------------------------------------------
  SWMM_SUBC_1           1.140      0.000      0.000      0.396      0.675      0.592
  SWMM_SUBC_2           1.140      0.000      0.000      0.724      0.383      0.336
  SWMM_SUBC_3           1.140      0.000      0.000      0.551      0.538      0.472
  SWMM_SUBC_8           1.140      0.000      0.000      0.228      0.837      0.734
  SWMM_SUBC_30          1.140      0.000      0.000      0.114      0.939      0.823
  SWMM_SUBC_31          1.140      0.000      0.000      0.342      0.731      0.641
  SWMM_SUBC_4           1.140      0.000      0.000      0.782      0.329      0.288
  SWMM_SUBC_5           1.140      0.000      0.000      0.684      0.418      0.367
  SWMM_SUBC_6           1.140      0.000      0.000      0.684      0.418      0.366
  SWMM_SUBC_7           1.140      0.000      0.000      0.635      0.465      0.408
  SWMM_SUBC_9           1.140      0.000      0.000      0.381      0.693      0.607
  SWMM_SUBC_10          1.140      0.000      0.000      0.352      0.714      0.626
  SWMM_SUBC_11          1.140      0.000      0.000      0.570      0.524      0.460
  SWMM_SUBC_12          1.140      0.000      0.000      0.228      0.827      0.725
  SWMM_SUBC_14          1.140      0.000      0.000      0.536      0.554      0.486
  SWMM_SUBC_15          1.140      0.000      0.000      0.638      0.445      0.390
  SWMM_SUBC_16          1.140      0.000      0.000      0.668      0.432      0.379
  SWMM_SUBC_32          1.140      0.000      0.000      0.171      0.890      0.781
  SWMM_SUBC_33          1.140      0.000      0.000      1.060      0.074      0.065
  SWMM_SUBC_36          1.140      0.000      0.000      0.720      0.385      0.338
  SWMM_SUBC_17          1.140      0.000      0.000      0.727      0.377      0.331
  SWMM_SUBC_18          1.140      0.000      0.000      0.228      0.835      0.732
  SWMM_SUBC_20          1.140      0.000      0.000      0.719      0.387      0.340
  SWMM_SUBC_34          1.140      0.000      0.000      1.060      0.073      0.064
  SWMM_SUBC_13          1.140      0.000      0.000      0.417      0.663      0.582
  SWMM_SUBC_19          1.140      0.000      0.000      0.342      0.730      0.640
  SWMM_SUBC_21          1.140      0.000      0.000      0.356      0.719      0.630
  SWMM_SUBC_22          1.140      0.000      0.000      0.345      0.718      0.630
  SWMM_SUBC_23          1.140      0.000      0.000      0.236      0.827      0.725
  SWMM_SUBC_24          1.140      0.000      0.000      0.342      0.722      0.633
  SWMM_SUBC_25          1.140      0.000      0.000      0.228      0.835      0.732
  SWMM_SUBC_35          1.140      0.000      0.000      0.342      0.722      0.633
  SWMM_SUBC_1001        1.140      0.000      0.000      0.684      0.418      0.367
  SWMM_SUBC_1002        1.140      0.000      0.000      0.744      0.364      0.320
  SWMM_SUBC_1003        1.140      0.000      0.000      0.768      0.341      0.299
  SWMM_SUBC_1004        1.140      0.000      0.000      0.728      0.373      0.327
  SWMM_SUBC_1005        1.140      0.000      0.000      0.542      0.548      0.481
  SWMM_SUBC_1006        1.140      0.000      0.000      0.849      0.268      0.235
  SWMM_SUBC_1007        1.140      0.000      0.000      0.841      0.275      0.241
  SWMM_SUBC_1008        1.140      0.000      0.000      0.840      0.276      0.242
  SWMM_SUBC_1009        1.140      0.000      0.000      0.912      0.210      0.184
  SWMM_SUBC_1010        1.140      0.000      0.000      0.718      0.388      0.340
  SWMM_SUBC_1011        1.140      0.000      0.000      1.117      0.021      0.018
  SWMM_SUBC_1013        1.140      0.000      0.000      0.919      0.204      0.179
  SWMM_SUBC_1014        1.140      0.000      0.000      0.746      0.363      0.318
  SWMM_SUBC_1015        1.140      0.000      0.000      0.684      0.420      0.368
  SWMM_SUBC_1017        1.140      0.000      0.000      0.700      0.403      0.353
  SWMM_SUBC_1019        1.140      0.000      0.000      0.544      0.539      0.473
  SWMM_SUBC_1020        1.140      0.000      0.000      0.611      0.487      0.427
  SWMM_SUBC_1021        1.140      0.000      0.000      0.589      0.505      0.443
  SWMM_SUBC_1022        1.140      0.000      0.000      0.995      0.133      0.117
  SWMM_SUBC_1023        1.140      0.000      0.000      0.772      0.339      0.297
  SWMM_SUBC_1024        1.140      0.000      0.000      0.684      0.417      0.366
  SWMM_SUBC_1025        1.140      0.000      0.000      0.791      0.321      0.282
  SWMM_SUBC_1026        1.140      0.000      0.000      0.342      0.733      0.643
  SWMM_SUBC_1027        1.140      0.000      0.000      1.002      0.127      0.111
  SWMM_SUBC_1028        1.140      0.000      0.000      0.616      0.480      0.421
  SWMM_SUBC_1029        1.140      0.000      0.000      1.117      0.021      0.019
  SWMM_SUBC_1041        1.140      0.000      0.000      0.627      0.469      0.411
  SWMM_SUBC_1043        1.140      0.000      0.000      0.196      0.861      0.755
  SWMM_SUBC_1031        1.140      0.000      0.000      0.627      0.466      0.409
  SWMM_SUBC_1032        1.140      0.000      0.000      0.701      0.400      0.351
  SWMM_SUBC_1033        1.140      0.000      0.000      0.699      0.398      0.350
  ---------------------------------------------------------------------------
  Totals                1.140      0.000      0.000      0.620      0.475      0.417


  ******************
  Node Depth Summary
  ******************

  ---------------------------------------------------------------------------
                        Average    Maximum    Maximum  Time of Max      Total     Total
                          Depth      Depth        HGL   Occurrence   Flooding   Minutes
  Node                     Feet       Feet       Feet  days hr:min   acre-in   Flooded
  ---------------------------------------------------------------------------
  JUNCT_1154               0.00       0.00    1031.51    0  00:00          0         0
  JUNCT_1151               0.00       0.00    1057.01    0  00:00          0         0
  JUNCT_1152               0.00       0.00    1057.01    0  00:00          0         0
  JUNCT_1153               0.58       1.82    1033.32    0  00:35          0         0
  JUNCT_1245               0.88       2.45    1015.95    0  00:45          0         0
  JUNCT_1104               0.00       0.00    1007.00    0  00:00          0         0
  JUNCT_182                0.00       0.00    1061.00    0  00:00          0         0
  JUNCT_149                0.00       0.00    1070.00    0  00:00          0         0
  JUNCT_151                0.00       0.00    1082.01    0  00:00          0         0
  JUNCT_181                0.00       0.00    1087.10    0  00:00          0         0
  JUNCT_144                0.00       0.00    1124.06    0  00:00          0         0
  JUNCT_142                0.00       0.00    1131.06    0  00:00          0         0
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JUNCT_174	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_175	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_176	0.00	0.00	1145.46	0	00:00	0	0
JUNCT_184	0.00	0.00	1142.27	0	00:00	0	0
JUNCT_164	0.00	0.00	1305.67	0	00:00	0	0
JUNCT_104	0.45	2.00	1287.67	0	00:35	0	0
JUNCT_203	0.16	0.56	1286.23	0	00:30	0	0
JUNCT_160	0.00	0.00	1319.67	0	00:00	0	0
JUNCT_163	0.00	0.00	1331.67	0	00:00	0	0
JUNCT_105	0.00	0.00	1367.27	0	00:00	0	0
JUNCT_103	0.38	1.41	1321.08	0	00:35	0	0
JUNCT_102	0.25	1.09	1264.76	0	00:35	0	0
JUNCT_161	0.00	0.00	1263.67	0	00:00	0	0
JUNCT_165	0.00	0.00	1213.67	0	00:00	0	0
JUNCT_106	0.74	2.00	1181.67	0	01:10	0	0
JUNCT_101	0.83	3.00	1178.67	0	00:40	0	0
JUNCT_166	0.00	0.00	1175.67	0	00:00	0	0
JUNCT_109	0.96	2.00	1145.27	0	01:20	0	0
JUNCT_173	0.00	0.00	1184.27	0	00:00	0	0
JUNCT_171	0.00	0.00	1213.27	0	00:00	0	0
JUNCT_107	0.34	1.47	1190.74	0	00:35	0	0
JUNCT_180	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_172	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_108	1.09	2.75	1187.02	0	01:00	0	0
JUNCT_262	0.92	2.73	1171.99	0	00:35	0	0
JUNCT_110	1.52	6.40	1148.67	0	00:55	0	0
JUNCT_167	0.00	0.00	1183.27	0	00:00	0	0
JUNCT_170	0.00	0.00	1191.27	0	00:00	0	0
JUNCT_168	0.00	0.00	1226.27	0	00:00	0	0
JUNCT_169	0.00	0.00	1211.27	0	00:00	0	0
JUNCT_113	0.24	1.24	1192.50	0	00:35	0	0
JUNCT_114	0.56	2.26	1155.53	0	00:30	0	0
JUNCT_115	0.64	3.16	1150.42	0	00:35	0	0
JUNCT_116	1.38	3.80	1139.06	0	00:50	0	0
JUNCT_117	1.50	4.00	1135.06	0	00:50	0	0
JUNCT_118	1.64	4.00	1128.06	0	00:40	0	0
JUNCT_186	1.82	3.00	1102.58	0	01:05	0	0
JUNCT_189	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_147	0.00	0.00	1099.58	0	00:00	0	0
JUNCT_145	0.00	0.00	1152.31	0	00:00	0	0
JUNCT_220	0.24	0.90	1153.20	0	00:25	0	0
JUNCT_120	1.94	3.00	1090.10	0	01:00	0	0
JUNCT_222	1.31	3.46	1090.57	0	01:15	0	0
JUNCT_152	0.00	0.00	1082.01	0	00:00	0	0
JUNCT_125	0.00	0.00	1070.00	0	00:00	0	0
JUNCT_225	0.31	1.01	1071.01	0	00:40	0	0
JUNCT_183	0.31	0.97	1061.97	0	00:45	0	0
JUNCT_198	0.78	2.31	1024.31	0	00:45	0	0
JUNCT_1115	0.00	0.00	1083.90	0	00:00	0	0
JUNCT_1146	0.00	0.00	1130.10	0	00:00	0	0
JUNCT_1238	0.07	0.51	1130.62	0	00:25	0	0
JUNCT_1159	0.10	0.37	1084.27	0	00:40	0	0
JUNCT_1116	0.00	0.00	1073.60	0	00:00	0	0
JUNCT_1121	0.00	0.00	1106.79	0	00:00	0	0
JUNCT_1237	0.12	0.59	1107.38	0	00:25	0	0
JUNCT_1122	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1149	0.00	0.00	1161.13	0	00:00	0	0
JUNCT_1236	0.12	0.41	1161.54	0	00:25	0	0
JUNCT_1132	0.00	0.00	1177.69	0	00:00	0	0
JUNCT_1242	0.58	2.65	1167.84	0	00:30	0	0
JUNCT_1142	0.58	2.71	1165.40	0	00:30	0	0
JUNCT_1231	0.58	2.71	1165.40	0	00:30	0	0
JUNCT_1141	0.60	2.00	1148.69	0	00:40	0	0
JUNCT_1139	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1140	0.00	0.00	1169.69	0	00:00	0	0
JUNCT_1143	0.00	0.00	1169.70	0	00:00	0	0
JUNCT_1138	0.89	2.21	1148.91	0	00:40	0	0
JUNCT_1137	0.00	0.00	1146.69	0	00:00	0	0
JUNCT_1136	1.09	2.85	1138.55	0	00:45	0	0
JUNCT_1144	0.00	0.00	1145.45	0	00:00	0	0
JUNCT_1135	1.07	3.23	1138.43	0	00:45	0	0
JUNCT_1134	0.00	0.00	1135.19	0	00:00	0	0
JUNCT_1133	1.20	2.97	1127.16	0	00:50	0	0
JUNCT_1131	0.00	0.00	1166.90	0	00:00	0	0

JUNCT_1241	0.11	0.35	1167.24	0	00:25	0	0
JUNCT_1130	1.49	4.20	1127.89	0	00:50	0	0
JUNCT_1246	0.27	1.74	1170.88	0	00:25	0	0
JUNCT_1150	0.00	0.00	1190.92	0	00:00	0	0
JUNCT_1235	0.07	0.47	1191.38	0	00:25	0	0
JUNCT_1128	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1127	0.27	1.65	1158.79	0	00:30	0	0
JUNCT_1126	0.00	0.00	1157.14	0	00:00	0	0
JUNCT_1125	1.29	3.00	1111.73	0	00:55	0	0
JUNCT_1124	2.83	3.20	1111.43	0	01:10	0	0
JUNCT_1123	0.00	0.00	1094.20	0	00:00	0	0
JUNCT_1145	1.09	1.49	1095.70	0	06:00	0	0
JUNCT_1120	1.28	2.80	1086.20	0	00:35	0	0
JUNCT_1119	0.00	0.00	1083.40	0	00:00	0	0
JUNCT_1118	1.39	2.81	1077.41	0	00:40	0	0
JUNCT_1117	0.98	2.31	1075.91	0	00:40	0	0
JUNCT_1114	1.41	2.79	1065.89	0	00:45	0	0
JUNCT_1113	0.00	0.00	1082.90	0	00:00	0	0
JUNCT_1112	1.02	2.33	1064.43	0	00:45	0	0
JUNCT_1111	0.00	0.00	1068.60	0	00:00	0	0
JUNCT_1239	0.16	0.60	1069.20	0	00:30	0	0
JUNCT_1110	0.60	1.64	1060.24	0	00:45	0	0
JUNCT_1109	0.00	0.00	1058.60	0	00:00	0	0
JUNCT_1108	0.65	1.74	1038.74	0	00:55	0	0
JUNCT_1107	0.00	0.00	1037.00	0	00:00	0	0
JUNCT_1106	0.00	0.00	1032.00	0	00:00	0	0
JUNCT_1240	0.16	0.63	1032.63	0	00:30	0	0
JUNCT_1105	0.65	1.72	1023.72	0	01:00	0	0
JUNCT_1103	2.58	5.00	1012.00	0	01:05	0	0
JUNCT_1147	2.11	4.50	1010.50	0	00:55	0	0
JUNCT_1148	2.81	3.00	1004.00	0	00:40	0	0
JUNCT_1102	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1101	2.81	3.00	1003.00	0	00:40	0	0
JUNCT_192	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_269	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_150	0.00	0.00	1025.00	0	00:00	0	0
JUNCT_223	1.22	2.97	1062.64	0	01:15	0	0
JUNCT_131	0.00	0.00	1226.43	0	00:00	0	0
JUNCT_132	0.00	0.00	1226.42	0	00:00	0	0
JUNCT_146	0.00	0.00	1172.42	0	00:00	0	0
JUNCT_221	0.80	1.95	1174.37	0	00:35	0	0
JUNCT_121	0.38	0.95	1133.37	0	00:35	0	0
JUNCT_148	0.00	0.00	1132.42	0	00:00	0	0
JUNCT_123	1.30	2.88	1061.30	0	01:15	0	0
JUNCT_127	0.00	0.00	1058.42	0	00:00	0	0
JUNCT_224	1.48	3.66	1062.08	0	01:15	0	0
JUNCT_124	1.48	3.65	1047.11	0	01:20	0	0
JUNCT_226	1.40	3.85	1047.31	0	01:20	0	0
JUNCT_126	1.40	3.85	1046.41	0	01:20	0	0
JUNCT_231	2.11	4.84	1047.40	0	01:20	0	0
JUNCT_228	1.91	4.11	1036.11	0	01:25	0	0
JUNCT_128	1.91	4.10	1029.10	0	01:25	0	0
JUNCT_196	2.39	4.68	1004.68	0	01:30	0	0
JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_197	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_134	0.76	3.08	1003.08	0	01:25	0	0
JUNCT_1155	0.00	0.00	1000.00	0	00:00	0	0
JUNCT_1157	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_1158	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_197	0.00	0.00	1000.00	0	00:25	0	0
ROOT_JUNCT_193	0.00	0.00	1000.00	0	00:00	0	0
ROOT_JUNCT_134	0.00	0.00	1000.00	0	00:45	0	0
ROOT_JUNCT_1155	0.00	0.00	1000.00	0	00:15	0	0
JUNCT_1218	0.85	1.88	1159.02	0	00:25	0	0
JUNCT_201	0.33	1.40	1265.07	0	00:30	0	0
JUNCT_250	0.37	1.45	1333.12	0	00:30	0	0
JUNCT_1216	1.64	1.84	1110.07	0	02:35	0	0
JUNCT_1204	2.61	5.00	1027.00	0	00:45	0	0
JUNCT_214	0.64	3.14	1156.40	0	00:35	0	0
JUNCT_257	0.18	0.87	1212.14	0	00:25	0	0
JUNCT_210	1.37	3.82	1146.09	0	00:50	0	0
JUNCT_1201	2.81	3.00	1003.50	0	00:40	0	0
JUNCT_1230	0.62	2.57	1159.26	0	00:35	0	0

JUNCT_1221	1.28	3.00	1126.69	0	00:45	0	0
JUNCT_255	0.40	2.00	1228.27	0	00:20	0	0
JUNCT_206	1.03	2.75	1192.02	0	00:50	0	0
JUNCT_258	0.56	2.00	1185.27	0	00:20	0	0
JUNCT_1208	0.30	1.61	1084.51	0	00:25	0	0
JUNCT_1224	1.50	4.20	1128.39	0	00:40	0	0
JUNCT_1243	0.56	1.96	1058.96	0	00:30	0	0
JUNCT_207	1.07	3.50	1187.77	0	00:30	0	0
JUNCT_218	2.08	5.00	1129.06	0	00:35	0	0
JUNCT_1205	0.66	1.74	1038.74	0	00:55	0	0
JUNCT_1202	2.81	3.00	1004.00	0	00:40	0	0
JUNCT_217	1.64	4.00	1135.06	0	00:35	0	0
JUNCT_232	0.75	3.08	1007.55	0	01:25	0	0
JUNCT_1226	1.03	3.23	1138.92	0	00:45	0	0
JUNCT_205	0.84	3.00	1182.67	0	00:30	0	0
JUNCT_266	1.81	3.00	1115.06	0	00:30	0	0
JUNCT_204	0.34	1.71	1329.38	0	00:35	0	0
JUNCT_1206	0.66	1.80	1060.40	0	00:45	0	0
JUNCT_1203	2.13	4.50	1011.50	0	00:45	0	0
JUNCT_264	0.42	2.17	1147.63	0	00:25	0	0
JUNCT_251	0.35	2.00	1369.27	0	00:25	0	0
JUNCT_1207	0.60	1.67	1063.77	0	00:45	0	0
JUNCT_1211	0.99	2.31	1076.91	0	00:40	0	0
JUNCT_1214	1.31	2.80	1097.00	0	00:25	0	0
JUNCT_261	0.00	0.00	1168.58	0	00:00	0	0
JUNCT_1212	1.41	2.87	1086.27	0	00:35	0	0
JUNCT_202	0.25	1.09	1320.76	0	00:30	0	0
JUNCT_265	0.79	2.34	1063.34	0	00:40	0	0
JUNCT_256	0.28	1.57	1227.84	0	00:25	0	0
JUNCT_1227	0.37	1.83	1147.29	0	00:25	0	0
JUNCT_209	1.52	6.40	1149.67	0	00:45	0	0
JUNCT_260	0.21	1.21	1204.48	0	00:30	0	0
JUNCT_252	0.46	2.00	1307.67	0	00:25	0	0
JUNCT_253	0.78	2.00	1215.67	0	00:20	0	0
JUNCT_1220	0.00	0.00	1175.23	0	00:00	0	0
JUNCT_1223	0.44	2.19	1179.88	0	00:30	0	0
JUNCT_263	0.12	0.48	1082.49	0	00:30	0	0
JUNCT_213	0.49	2.30	1193.56	0	00:30	0	0
JUNCT_1217	2.84	3.20	1111.93	0	01:00	0	0
JUNCT_122	1.31	3.45	1085.46	0	01:15	0	0
JUNCT_219	1.95	3.00	1102.58	0	00:25	0	0
JUNCT_1234	2.84	3.00	1009.00	0	00:35	0	0
JUNCT_259	1.22	2.50	1134.92	0	00:20	0	0
JUNCT_1229	0.83	2.51	1172.20	0	00:25	0	0
JUNCT_1209	0.40	2.33	1086.23	0	00:25	0	0
JUNCT_1233	1.01	2.34	1065.44	0	00:45	0	0
JUNCT_133	2.11	4.83	1036.83	0	01:25	0	0
JUNCT_1228	1.09	2.90	1149.59	0	00:40	0	0
JUNCT_1156	0.00	0.00	1165.19	0	00:00	0	0
JUNCT_1222	0.20	1.25	1133.90	0	00:30	0	0
JUNCT_211	0.29	1.54	1222.80	0	00:30	0	0
JUNCT_254	0.32	1.61	1214.88	0	00:30	0	0
JUNCT_1210	1.44	2.89	1076.49	0	00:40	0	0
JUNCT_216	1.49	4.00	1139.27	0	00:45	0	0
JUNCT_1129	7.09	7.09	1176.23	0	00:05	0	0
JUNCT_208	0.93	2.00	1177.67	0	00:25	0	0
JUNCT_230	0.79	2.03	1228.45	0	00:25	0	0
JUNCT_229	2.40	4.70	1029.70	0	01:25	0	0
JUNCT_215	0.58	2.67	1149.94	0	00:35	0	0
JUNCT_185	1.05	3.50	1172.77	0	00:40	0	0
JUNCT_1225	1.20	3.00	1138.19	0	00:45	0	0
JUNCT_1215	1.09	1.49	1099.70	0	06:00	0	0
JUNCT_119	2.08	5.00	1117.06	0	00:50	0	0
JUNCT_1213	0.39	2.39	1097.79	0	00:30	0	0
JUNCT_1244	0.76	2.21	1033.71	0	00:35	0	0
JUNCT_1304	0.98	1.23	1085.14	0	02:10	0	0
JUNCT_304	0.55	1.93	1191.20	0	01:05	0	0
JUNCT_1308	0.67	1.62	1158.76	0	01:05	0	0
JUNCT_301	0.18	0.99	1176.66	0	00:35	0	0
JUNCT_1305	1.30	2.94	1097.15	0	06:00	0	0
JUNCT_1313	0.05	0.29	1013.79	0	00:45	0	0
JUNCT_308	0.71	1.57	1228.00	0	01:10	0	0
JUNCT_302	0.56	1.00	1071.00	0	00:40	0	0
JUNCT_1306	5.86	11.15	1109.36	0	06:00	0	0
JUNCT_1312	0.32	1.24	1170.94	0	00:45	0	0
JUNCT_1307	8.14	12.60	1121.34	0	02:35	0	0

****
Storage Volume Summary
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Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
JUNCT_1304	42.754	0	53.793	0	0 02:10	4.26
JUNCT_304	23.868	0	84.268	0	0 01:05	37.12
JUNCT_1308	29.331	0	70.468	0	0 01:05	16.17
JUNCT_301	8.033	0	42.999	0	0 00:35	277.86
JUNCT_1305	56.491	0	128.134	0	0 06:00	15.19
JUNCT_1313	2.043	0	12.435	0	0 00:45	76.08
JUNCT_308	30.965	0	68.497	0	0 01:10	19.18
JUNCT_302	24.232	0	43.556	1	0 00:40	70.51
JUNCT_1306	255.400	0	485.524	0	0 06:00	24.92
JUNCT_1312	14.142	0	54.148	0	0 00:45	24.98
JUNCT_1307	354.636	0	548.982	1	0 02:35	44.86

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Conduit Flow Summary
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Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
1218	33.24	0 00:35	2.41	1.00	0.20	0
1218-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
201	188.49	0 00:35	18.94	1.00	0.09	0
201-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
220	77.21	0 00:35	6.08	1.00	0.00	0
125	70.51	0 00:40				
250	48.77	0 00:35	5.00	1.00	0.18	0
250-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
1216	44.85	0 02:40	2.38	1.00	0.29	0
1216-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
151	81.05	0 00:30				
1110	195.21	0 00:45				
1204	241.07	0 01:05	4.50	1.00	1.00	5
1204-OVERFLOW	44.54	0 01:10	4.34	1.00	0.00	0
118	429.71	0 00:55				
214	127.26	0 00:35	12.00	1.00	0.96	0
214-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
257	8.27	0 00:30	4.85	1.00	0.19	0
257-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
203	37.94	0 00:35	5.56	1.00	0.08	0
210	326.41	0 00:50	4.28	1.00	0.89	0
210-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
1118	120.51	0 00:40				
1105	295.11	0 00:55				
1107	21.05	0 00:25				
1201	18.24	0 00:45	2.43	1.00	1.00	305
1201-OVERFLOW	323.19	0 01:10	3.00	1.00	0.03	0
173	34.61	0 00:30				
196	428.85	0 01:30				
1230	52.03	0 00:40	2.54	1.00	0.35	0
1230-OVERFLOW	0.00	0 00:00	0.00	1.00	0.00	0
231	541.20	0 01:25	5.04	1.00	0.03	0
102	150.46	0 00:35				
1221	152.65	0 00:55	3.26	1.00	1.00	0
1221-OVERFLOW	18.26	0 00:55	2.48	1.00	0.00	0
255	26.99	0 00:25	9.73	1.00	1.06	20
255-OVERFLOW	32.19	0 00:30	13.23	1.00	0.00	0
1239	29.88	0 00:40	2.66	1.00	0.00	0
206	34.87	0 01:30	6.68	1.00	1.01	40

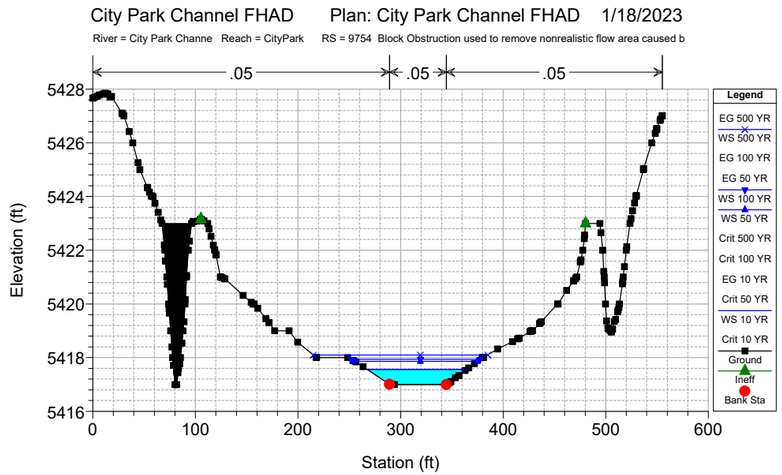
206-OVERFLOW	2.60	0	01:15	1.50	1.00	0.00	0
1127	69.83	0	00:30				
1237	42.18	0	00:30	3.98	1.00	0.00	0
258	16.92	0	00:55	6.14	1.00	1.05	10
258-OVERFLOW	34.22	0	00:35	10.00	1.00	0.00	0
1208	30.86	0	00:30	8.29	1.00	0.56	0
1208-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1224	75.35	0	00:45	6.23	1.00	1.00	40
1224-OVERFLOW	68.76	0	00:50	3.35	1.00	0.00	0
103	86.31	0	00:35				
106	112.79	0	00:35				
1157	0.00	0	00:00				
1150	38.25	0	00:25				
181	2.43	0	00:25				
1116	21.93	0	00:25				
1149	43.02	0	00:25				
1123	5.20	0	00:25				
222	463.74	0	01:15	4.44	1.00	0.12	0
269	0.00	0	00:00				
1243	50.10	0	00:35	2.98	1.00	0.28	0
1243-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
184	16.28	0	00:25				
1144	31.97	0	00:25				
1133	143.50	0	00:50				
207	80.98	0	00:35	9.95	1.00	1.01	15
207-OVERFLOW	14.17	0	00:35	8.12	1.00	0.00	0
1231	56.13	0	00:35	6.33	1.00	0.62	0
1120	87.46	0	00:35				
169	8.03	0	00:25				
218	285.62	0	00:50	5.25	1.00	1.00	30
218-OVERFLOW	164.52	0	01:00	5.39	1.00	0.01	0
176	87.51	0	00:25				
1155	341.59	0	01:10				
1113	30.82	0	00:25				
1134	29.28	0	00:25				
1152	29.84	0	00:30				
1205	199.12	0	01:00	3.51	1.00	0.23	0
1205-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1102	1.79	0	00:25				
170	63.76	0	00:30				
113	22.69	0	00:35				
1202	18.24	0	00:45	2.43	1.00	1.00	305
1202-OVERFLOW	323.40	0	01:05	3.00	1.00	0.03	0
217	353.12	0	00:40	4.21	1.00	1.00	25
217-OVERFLOW	76.59	0	00:55	3.06	1.00	0.00	0
232	123.96	0	01:25	7.51	1.00	0.39	0
232-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1226	129.62	0	00:45	7.39	1.00	0.43	0
1226-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
163	51.64	0	00:30				
146	68.59	0	00:30				
152	0.00	0	00:00				
168	16.56	0	00:25				
205	39.72	0	01:05	6.43	1.00	1.02	35
205-OVERFLOW	68.46	0	00:40	6.39	1.00	0.00	0
1146	41.60	0	00:25				
104	37.12	0	00:30				
134	123.96	0	01:25				
266	68.38	0	01:05	3.39	1.00	1.00	100
266-OVERFLOW	371.88	0	01:05	4.14	1.00	0.02	0
1240	33.63	0	00:40	2.72	1.00	0.00	0
204	37.54	0	00:35	8.80	1.00	0.01	0
204-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1246	29.44	0	00:30	7.14	1.00	0.45	0
1135	143.81	0	00:45				
132	71.74	0	00:25				
1206	198.74	0	00:55	3.58	1.00	0.24	0
1206-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1241	17.72	0	00:30	4.04	1.00	0.00	0
1104	9.43	0	00:25				
131	58.74	0	00:30				
193	0.00	0	00:00				
1203	128.18	0	01:50	9.20	1.00	1.00	65
1203-OVERFLOW	158.44	0	01:10	5.81	1.00	0.00	0
264	88.56	0	00:30	11.98	1.00	0.47	0
264-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
251	22.58	0	00:35	8.58	1.00	1.04	5
251-OVERFLOW	14.59	0	00:30	14.18	1.00	0.00	0
145	95.93	0	00:25				
226	544.67	0	01:20	10.47	1.00	0.12	0
1121	55.99	0	00:25				
182	24.70	0	00:30				
124	544.73	0	01:20				
1106	44.05	0	00:30				
225	87.03	0	00:45	6.19	1.00	0.24	0
1207	168.40	0	00:45	3.12	1.00	0.21	0
1207-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1211	120.64	0	00:40	9.12	1.00	0.13	0
1211-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1214	35.20	0	00:40	6.87	1.00	1.03	15
1214-OVERFLOW	9.80	0	00:35	6.86	1.00	0.00	0
123	541.57	0	01:15				
171	108.44	0	00:30				
261	0.00	0	00:00	0.00	1.00	0.00	0
261-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1212	120.51	0	00:40	3.05	1.00	0.84	0
1212-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
116	392.90	0	00:50				
1126	45.98	0	00:25				
1151	30.56	0	00:30				
1112	172.99	0	00:45				
172	30.05	0	00:25				
180	31.26	0	00:25				
105	44.54	0	00:25				
202	112.52	0	00:35	16.53	1.00	0.05	0
202-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
183	87.03	0	00:45				
107	92.34	0	00:35				
1130	177.88	0	00:45				
1147	343.69	0	01:05				
265	102.55	0	00:45	13.00	1.00	0.52	0
265-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1108	198.74	0	00:55				
256	16.01	0	00:30	4.56	1.00	0.52	0
256-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1227	33.55	0	00:30	7.32	1.00	0.72	0
1227-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
149	30.44	0	00:30				
1153	50.10	0	00:35				
209	218.25	0	00:50	7.76	1.00	1.00	10
209-OVERFLOW	34.50	0	00:50	7.32	1.00	0.00	0
1145	35.29	0	00:35				
189	440.27	0	01:05				
144	72.72	0	00:30				
1103	286.28	0	01:10				
1132	54.00	0	00:30				
221	124.26	0	00:35	6.75	1.00	0.02	0
260	7.48	0	00:35	5.70	1.00	0.89	0
260-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
252	21.35	0	00:30	8.01	1.00	1.03	20
252-OVERFLOW	15.77	0	00:30	9.02	1.00	0.00	0
253	15.32	0	02:05	6.35	1.00	1.04	60
253-OVERFLOW	99.20	0	00:35	7.27	1.00	0.00	0
167	58.80	0	00:25				
1140	31.67	0	00:25				
161	51.35	0	00:25				
197	428.85	0	01:30				
1139	51.99	0	00:25				
160	34.17	0	00:25				
150	104.04	0	00:25				
1128	27.60	0	00:25				
262	93.15	0	00:40	12.05	1.00	0.93	0
175	1.14	0	00:25				
110	327.43	0	00:50				
1220	0.00	0	00:00	0.00	1.00	0.00	0
1220-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1137	20.65	0	00:30				
1111	39.38	0	00:30				

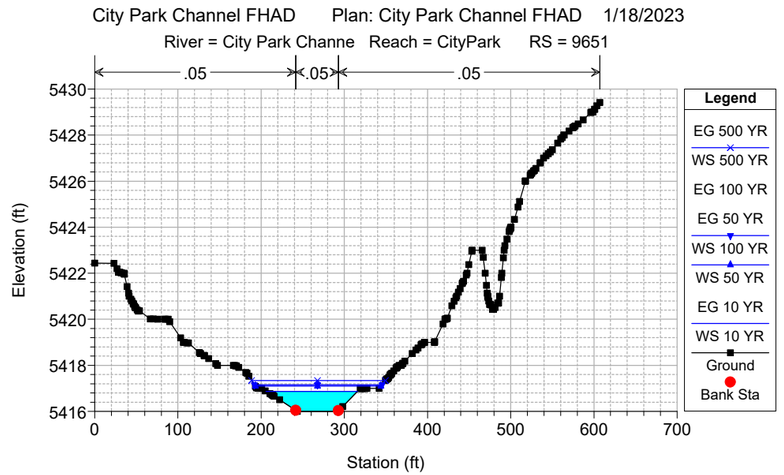
1223	50.90	0	00:30	10.50	1.00	0.83	0
1223-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
121	124.26	0	00:35				
127	33.12	0	00:30				
1148	342.15	0	01:05				
1158	0.00	0	00:00				
1142	60.89	0	00:30				
223	463.20	0	01:15	13.04	1.00	0.02	0
115	127.26	0	00:35				
1154	36.41	0	00:30				
263	77.61	0	00:30	6.80	1.00	0.06	0
263-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
224	544.73	0	01:20	4.86	1.00	0.13	0
213	80.86	0	00:30	11.30	1.00	0.61	0
213-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1217	36.55	0	01:05	5.17	1.00	1.00	285
1217-OVERFLOW	8.45	0	02:35	1.98	1.00	0.00	0
126	544.67	0	01:20				
122	0.00	0	00:00				
122-DIV	463.74	0	01:15				
219	68.38	0	01:00	3.39	1.00	1.00	120
219-OVERFLOW	373.85	0	01:15	4.05	1.00	0.02	0
1124	44.86	0	02:35				
164	39.03	0	00:30				
1235	25.88	0	00:35	2.32	1.00	0.00	0
1234	18.24	0	00:45	2.43	1.00	1.00	295
1234-OVERFLOW	323.91	0	01:05	3.01	1.00	0.03	0
1117	120.64	0	00:40				
259	37.79	0	02:15	9.66	1.00	1.00	85
259-OVERFLOW	136.06	0	00:40	10.63	1.00	0.00	0
1229	67.19	0	00:40	2.76	1.00	0.46	0
1229-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1209	63.60	0	00:35	3.43	1.00	0.48	0
1209-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1233	161.35	0	00:45	9.45	1.00	0.06	0
1233-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
133	417.00	0	01:25				
133-DIV	124.20	0	01:25				
1228	129.40	0	00:45	3.06	1.00	0.88	0
1228-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
192	0.00	0	00:00				
1131	21.21	0	00:25				
1156	58.77	0	00:30				
1156-DIV	0.00	0	00:00				
128	416.62	0	01:25				
109	242.31	0	00:50				
1159	21.21	0	00:40				
1222	17.72	0	00:35	6.56	1.00	0.36	0
1222-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1136	129.40	0	00:45				
120	466.09	0	01:15				
228	416.62	0	01:25	5.00	1.00	0.13	0
142	34.49	0	00:30				
148	103.67	0	00:25				
108	63.37	0	00:30				
147	70.95	0	00:25				
211	11.89	0	00:35	8.19	1.00	1.01	5
211-OVERFLOW	3.32	0	00:35	7.17	1.00	0.00	0
1119	45.69	0	00:30				
1114	161.22	0	00:45				
254	92.34	0	00:35	5.17	1.00	0.10	0
254-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1245	69.09	0	00:55	2.43	1.00	0.26	0
174	86.37	0	00:25				
198	102.55	0	00:45				
1210	116.92	0	00:45	3.03	1.00	0.83	0
1210-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1138	119.22	0	00:40				
186	440.27	0	01:05				
1141	52.03	0	00:40				
1101	341.59	0	01:10				
165	142.74	0	00:25				
166	56.14	0	00:25				
114	126.40	0	00:35				
216	368.67	0	00:50	4.39	1.00	1.00	5
216-OVERFLOW	18.16	0	00:55	2.32	1.00	0.00	0
1129	32.35	0	00:25				
1129-DIV	0.00	0	00:00				
1236	33.97	0	00:35	5.88	1.00	0.00	0
1109	81.30	0	00:25				
1143	73.89	0	00:25				
208	50.47	0	01:20	3.07	1.00	1.00	45
208-OVERFLOW	193.01	0	00:50	3.24	1.00	0.01	0
1242	60.89	0	00:30	6.18	1.00	0.67	0
101	293.76	0	00:35				
230	66.26	0	00:35	7.54	1.00	0.35	0
230-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
229	428.85	0	01:30	4.88	1.00	0.86	0
229-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
117	407.03	0	00:50				
1115	88.53	0	00:25				
1125	195.91	0	00:55				
215	127.97	0	00:35	14.30	1.00	0.79	0
215-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
185	95.14	0	00:35				
185-DIV	0.00	0	00:00				
1225	143.50	0	00:50	3.13	1.00	0.97	0
1225-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1215	24.85	0	06:00	1.96	1.00	0.17	0
1215-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
119	450.14	0	01:00				
119-DIV	0.00	0	00:00				
1213	43.44	0	00:35	7.40	1.00	1.00	5
1213-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0
1122	35.86	0	00:25				
1238	21.21	0	00:40	2.19	1.00	0.00	0
1244	77.71	0	00:40	3.17	1.00	0.43	0
1244-OVERFLOW	0.00	0	00:00	0.00	1.00	0.00	0

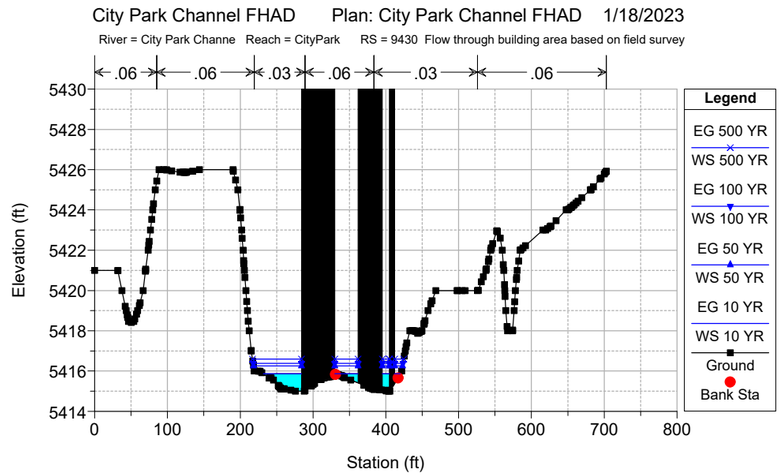
```
**************************
Routing Time Step Summary
**************************
Minimum Time Step           :   300.00 sec
Average Time Step           :   300.00 sec
Maximum Time Step           :   300.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.03

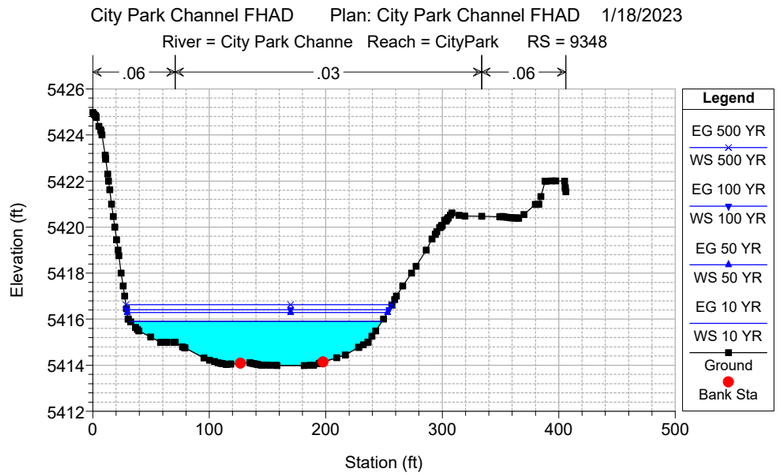
Analysis begun on:  Tue May 23 16:23:09 2006
Total elapsed time: 00:00:01
```

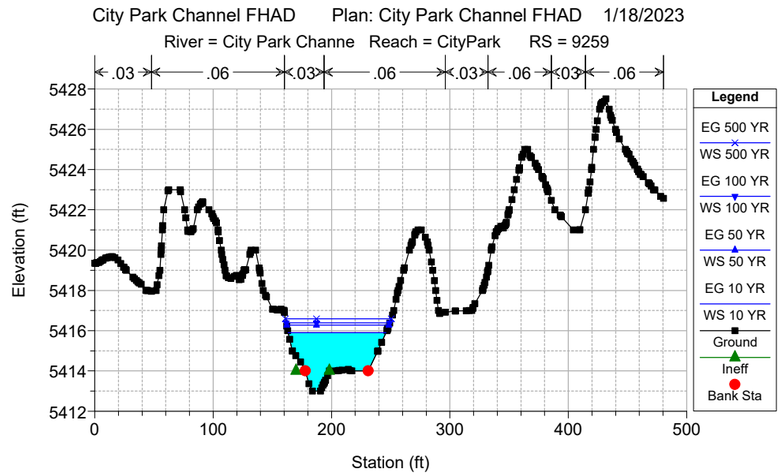
Appendix C Hydraulic Analysis Supporting Documents


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9754 Block Obstruction used to remove nonrealistic flow area caused b
.05
.05
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9651
.05
.05
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9430 Flow through building area based on field survey
.06
.06
.03
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9348
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta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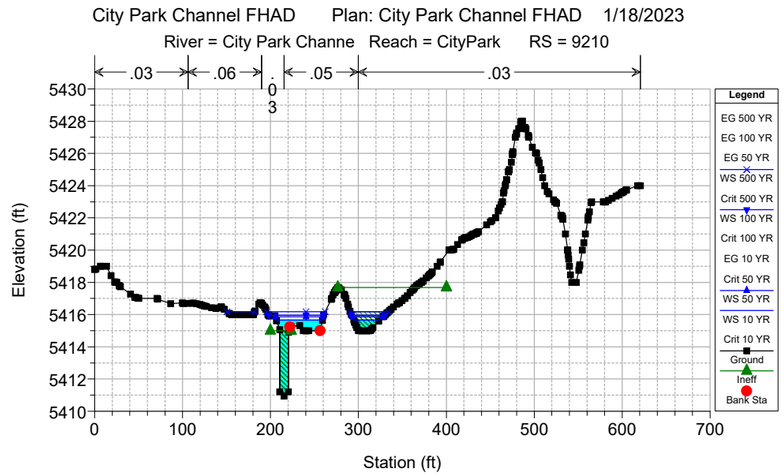
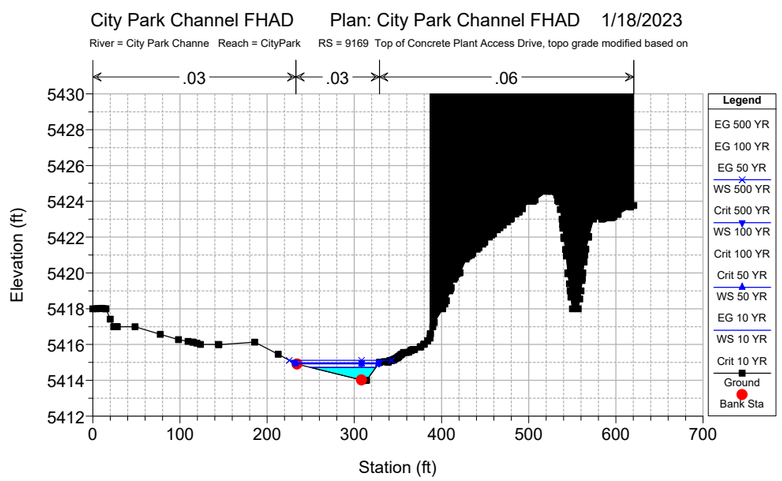
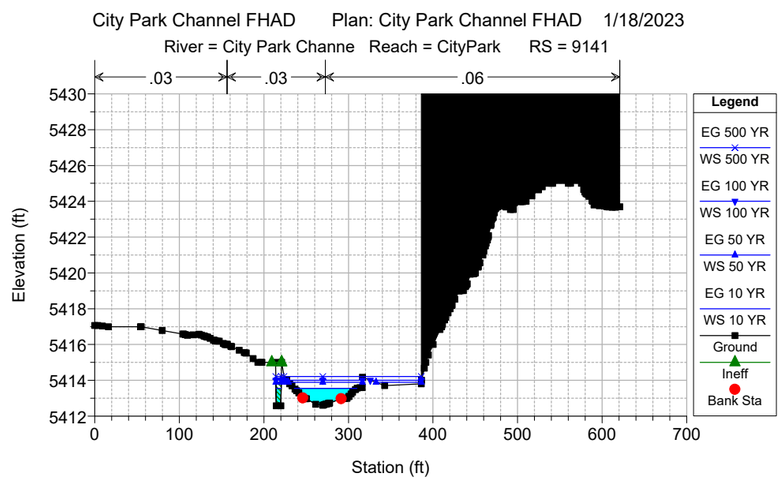
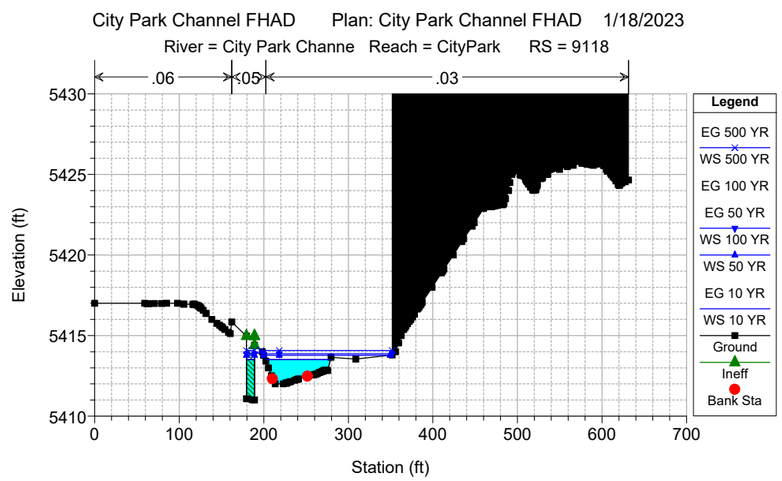
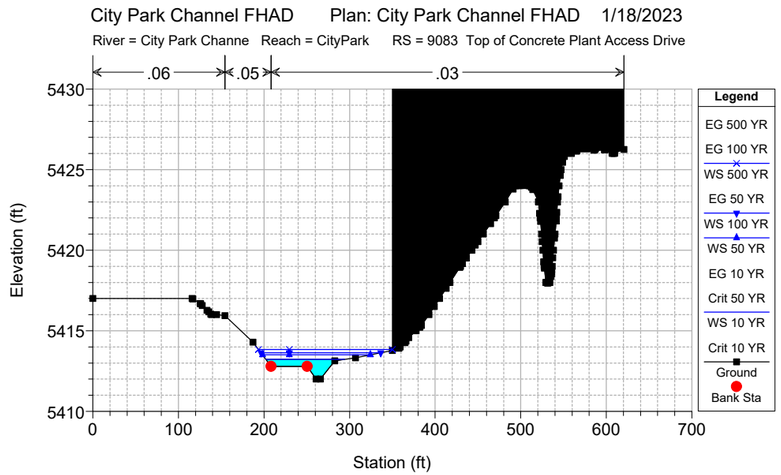
River = City Park Channe Reach = CityPark RS = 9259
.03
.06
.03
.06
.03
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

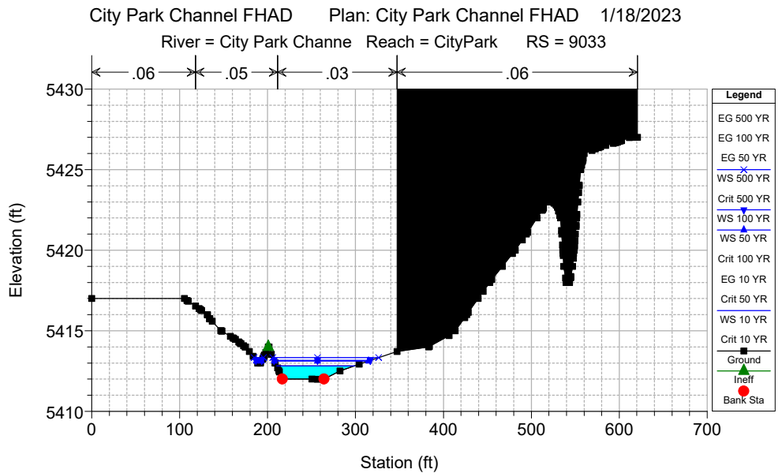

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9210
.03
.06
.05
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

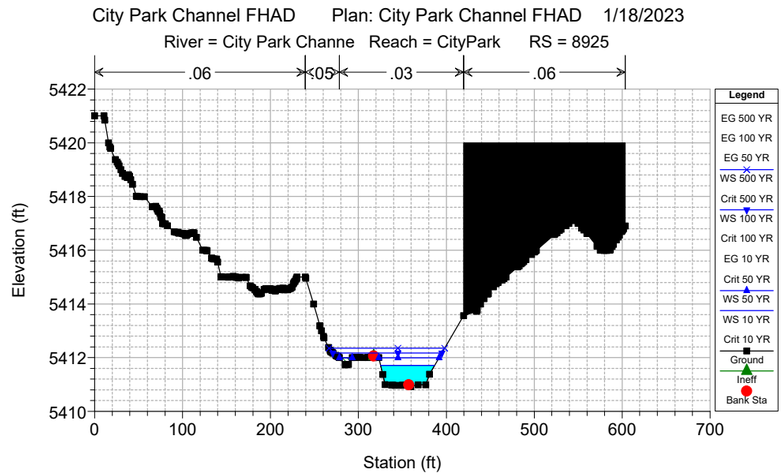

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9169 Top of Concrete Plant Access Drive, topo grade modified based on
.03
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

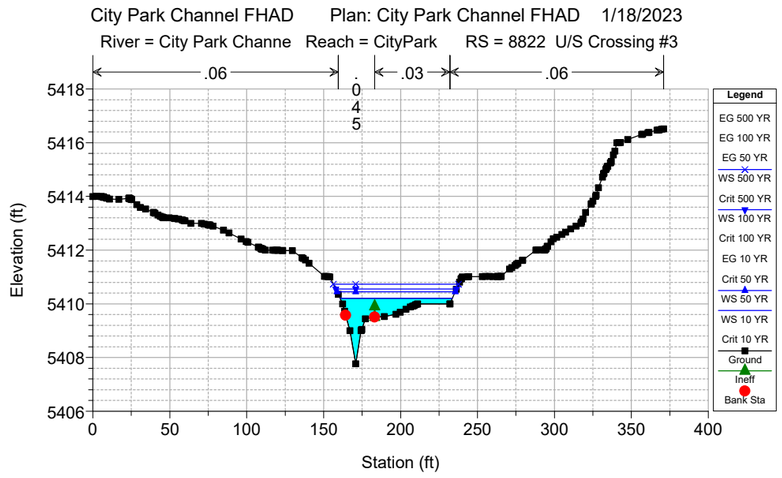

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9141
.03
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

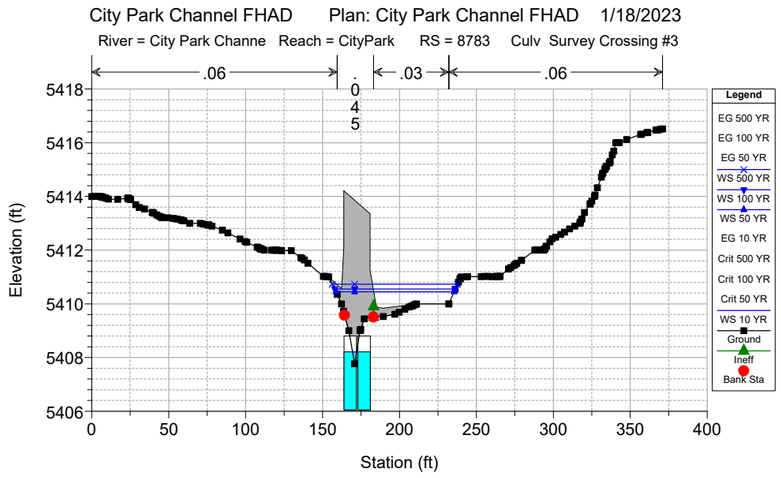

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9118
.06
.05
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

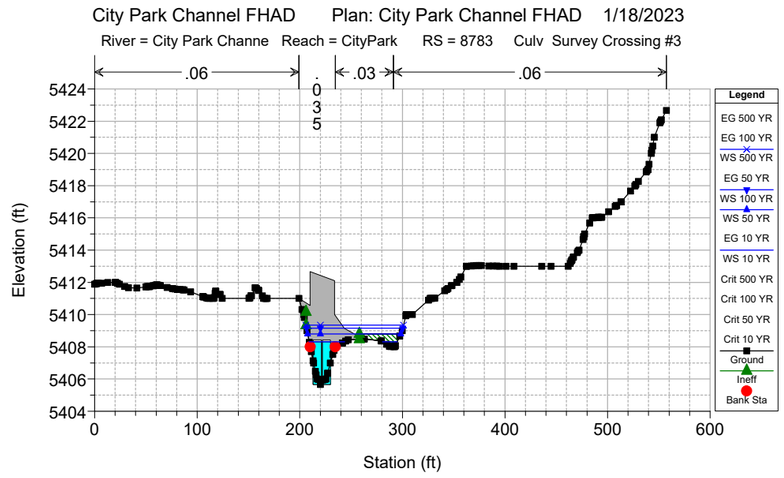

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9083 Top of Concrete Plant Access Drive
.06
.05
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

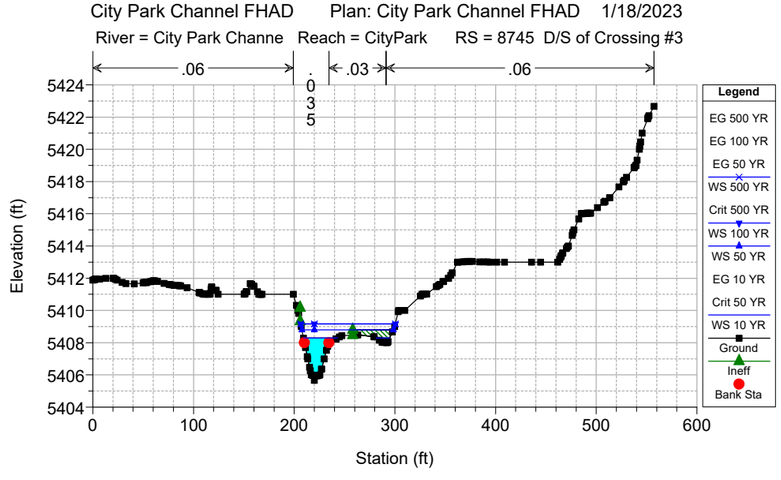

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 9033
.06
.05
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

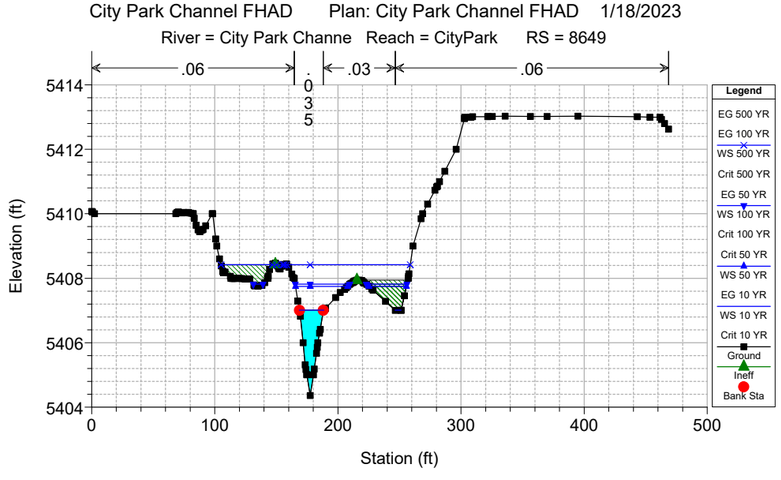

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8925
.06
.05
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

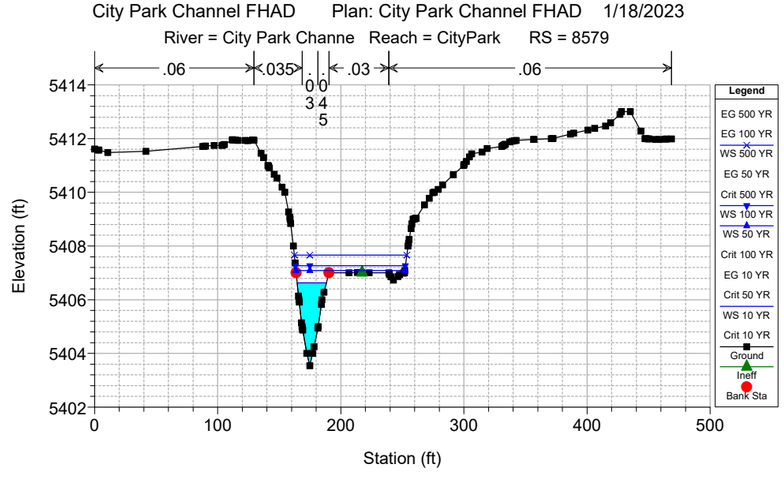

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8822 U/S Crossing #3
.06
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

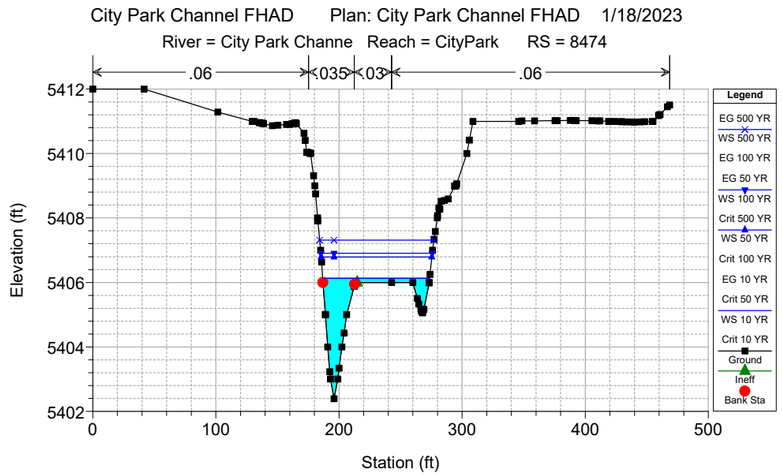

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8783 Culv Survey Crossing #3
.06
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
WS 10 YR
Ground
Ineff
Bank Sta

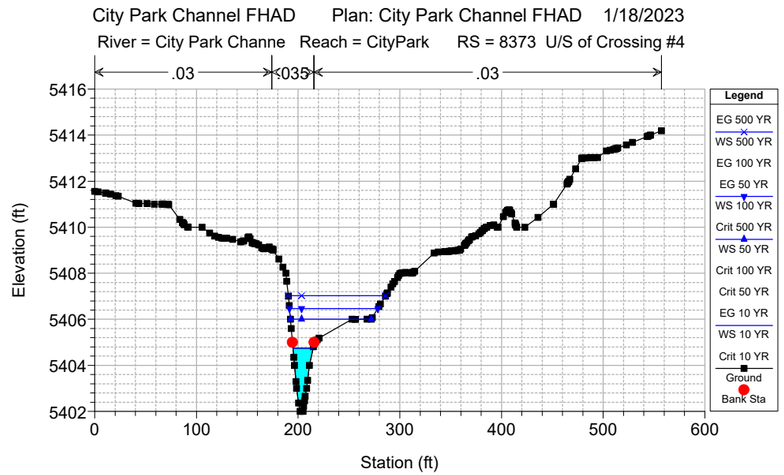

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8783 Culv Survey Crossing #3
.06
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

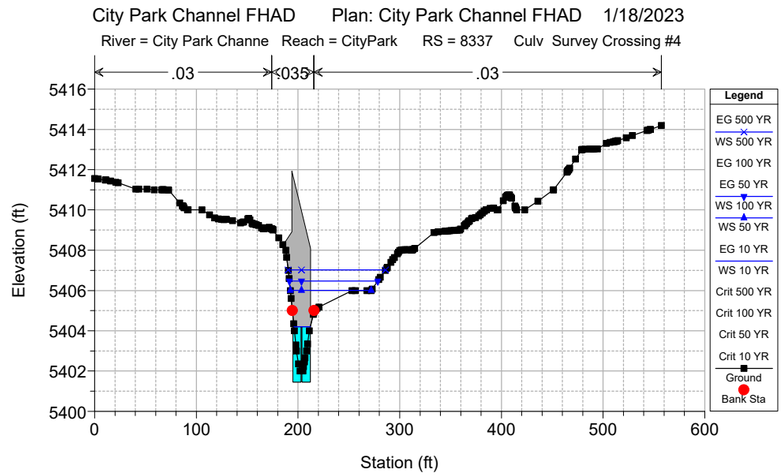

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8745 D/S of Crossing #3
.06
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Ground
Ineff
Bank Sta

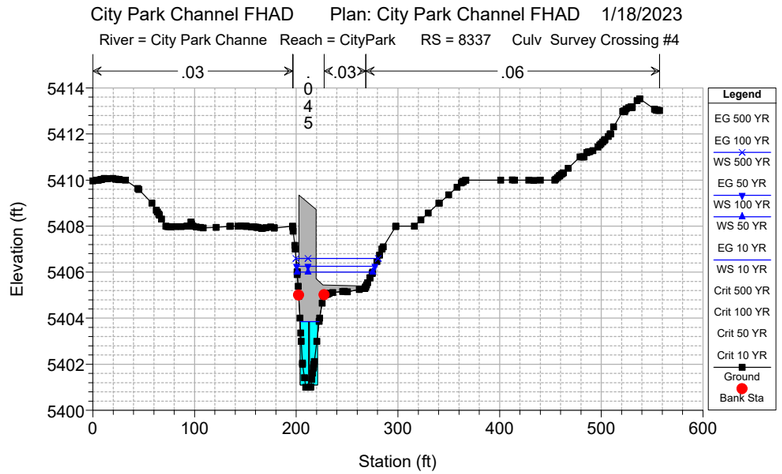

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8649
.06
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

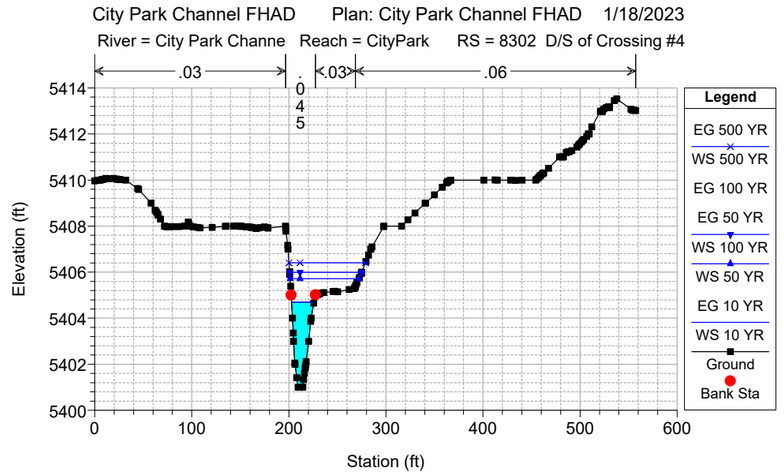

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8579
.06
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

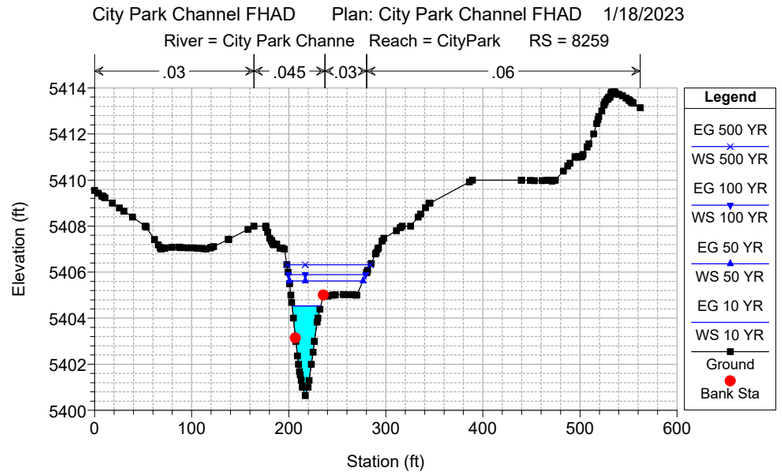

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8474
.06
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

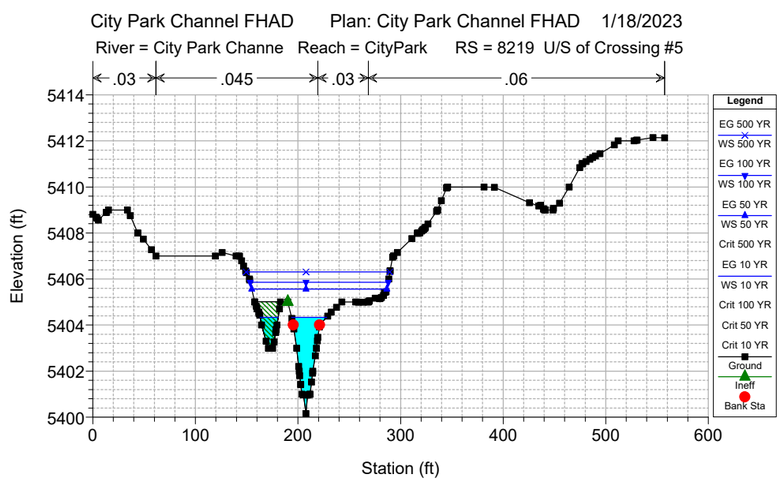

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8373 U/S of Crossing #4
.03
.035
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

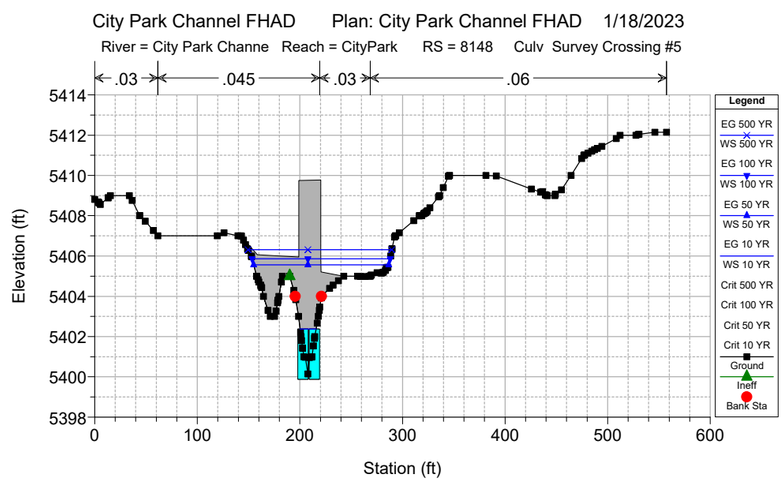

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8337 Culv Survey Crossing #4
.03
.035
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Bank Sta

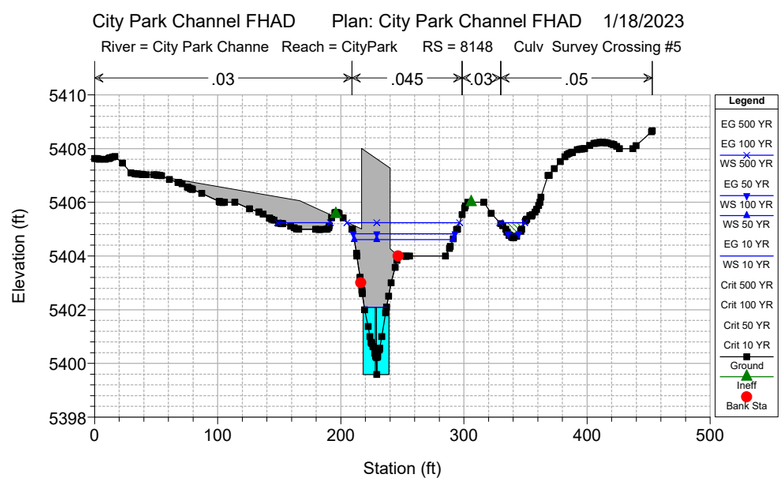

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8337 Culv Survey Crossing #4
.03
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Bank Sta

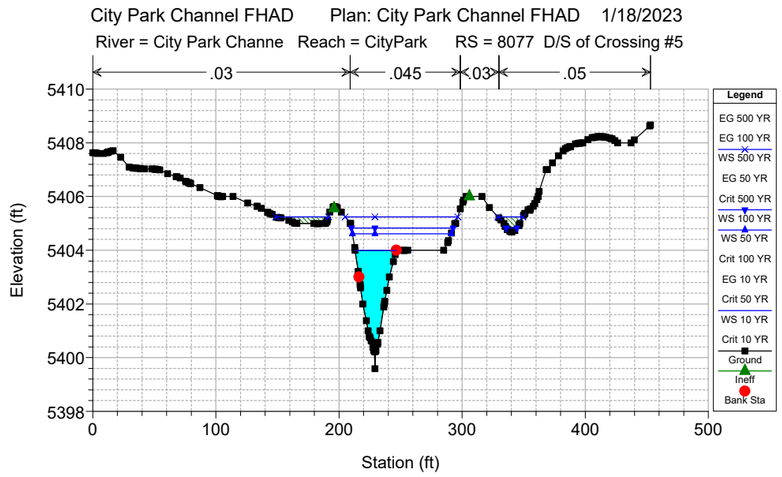

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8302 D/S of Crossing #4
.03
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

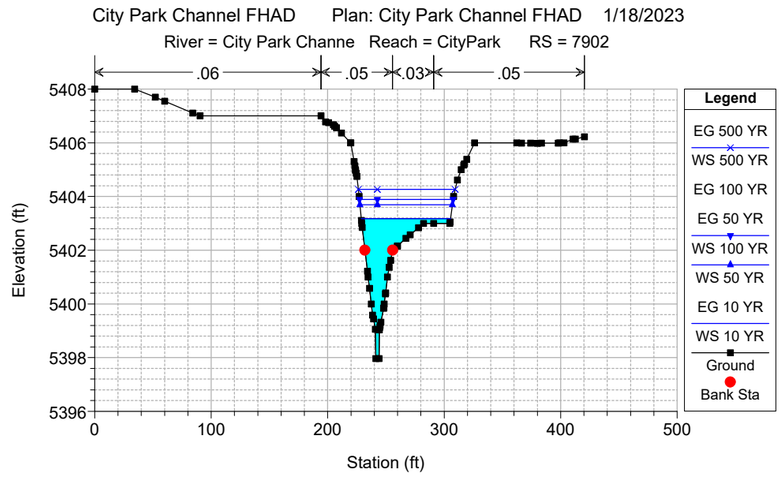

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8259
.03
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

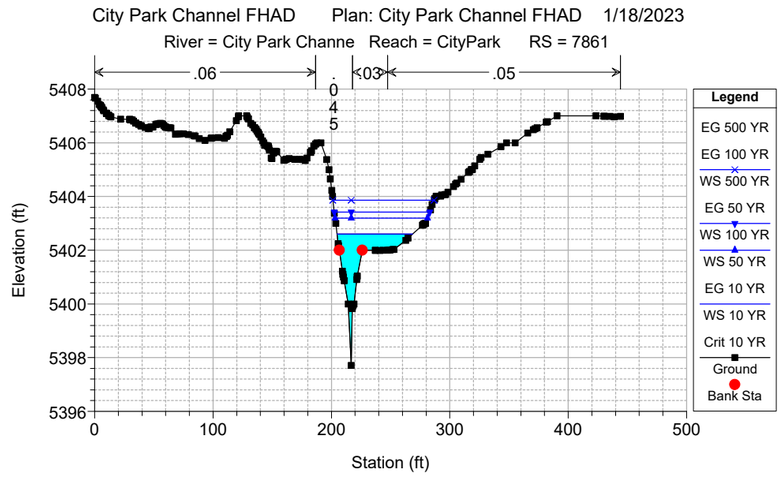

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8219 U/S of Crossing #5
.03
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
EG 10 YR
WS 10 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

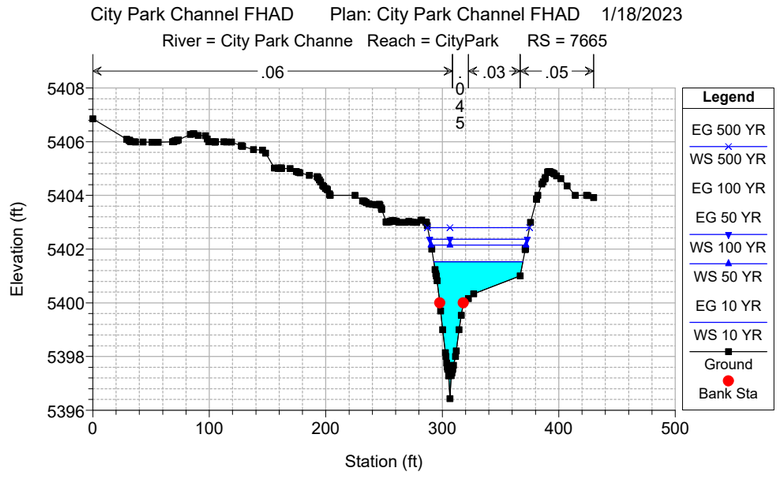

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8148 Culv Survey Crossing #5
.03
.045
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

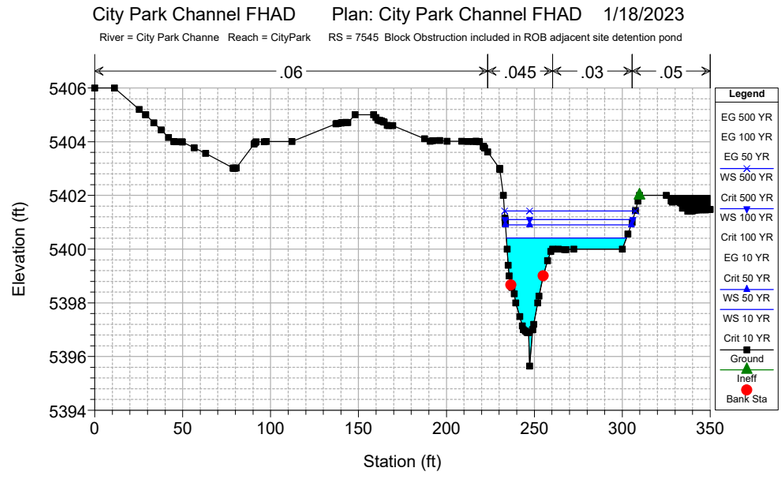

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8148 Culv Survey Crossing #5
.03
.045
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

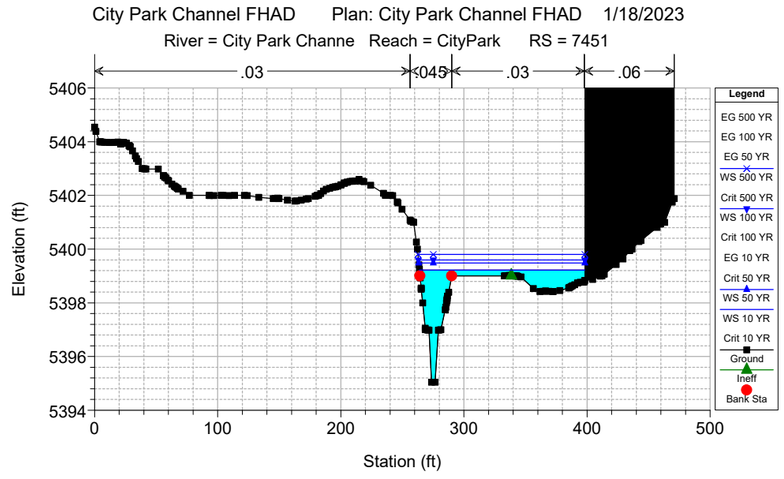

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 8077 D/S of Crossing #5
.03 .045 .03 .05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

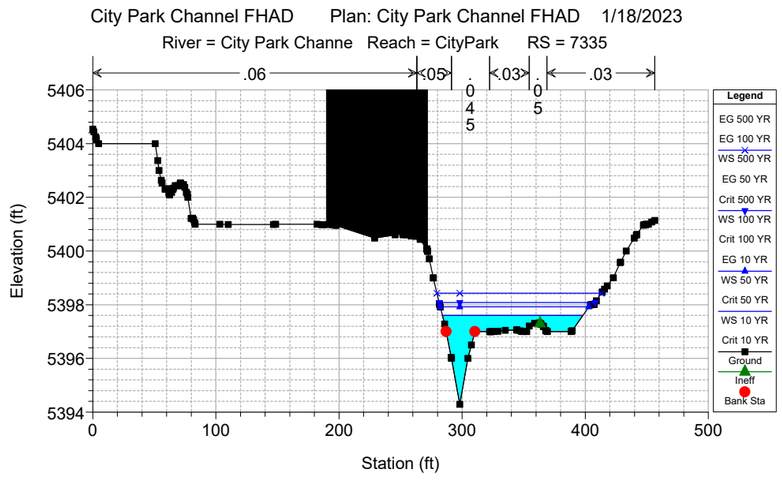

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7902
.06 .05 .03 .05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

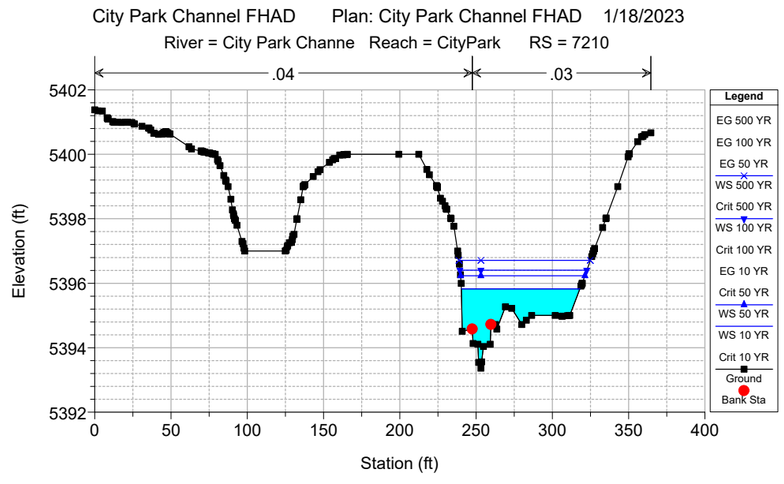

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7861
.06 .045 .03 .05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

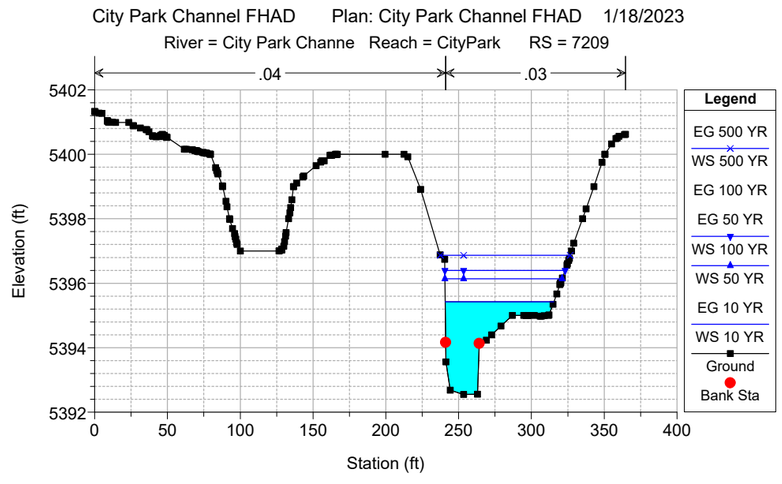

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7665
.06 .045 .03 .05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

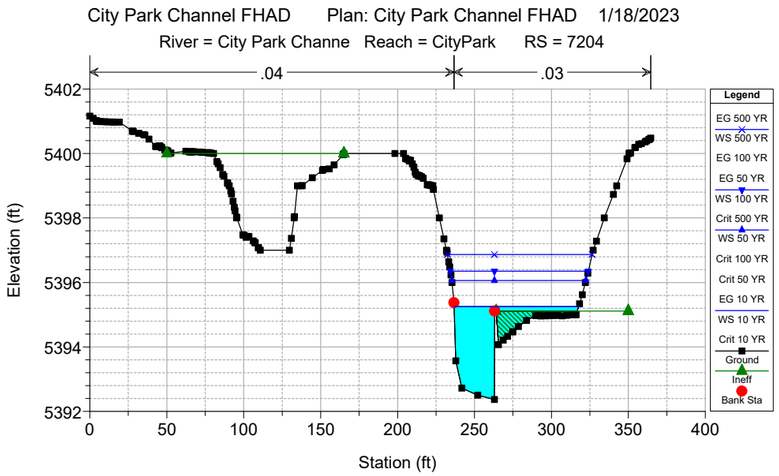

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7545 Block Obstruction included in ROB adjacent site detention pond
.06 .045 .03 .05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

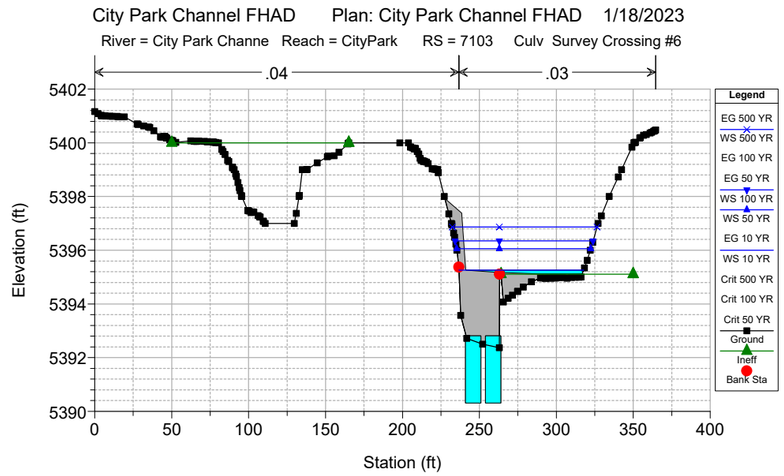

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7451
.03 .045 .03 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

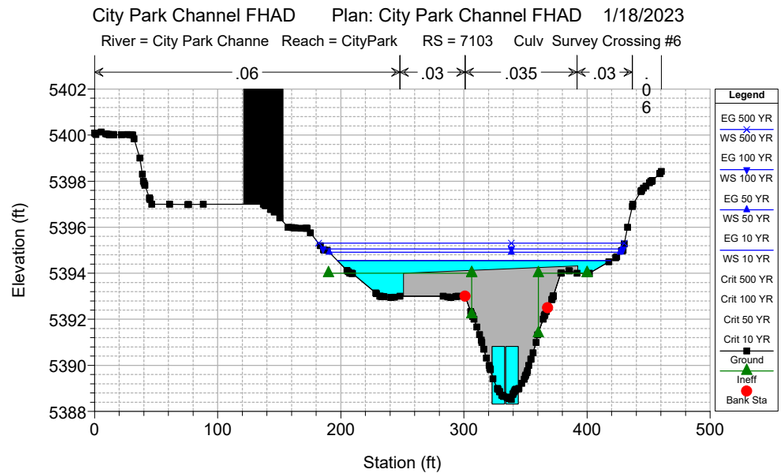

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7335
.06 .05 .045 .03 .05 .03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
WS 50 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

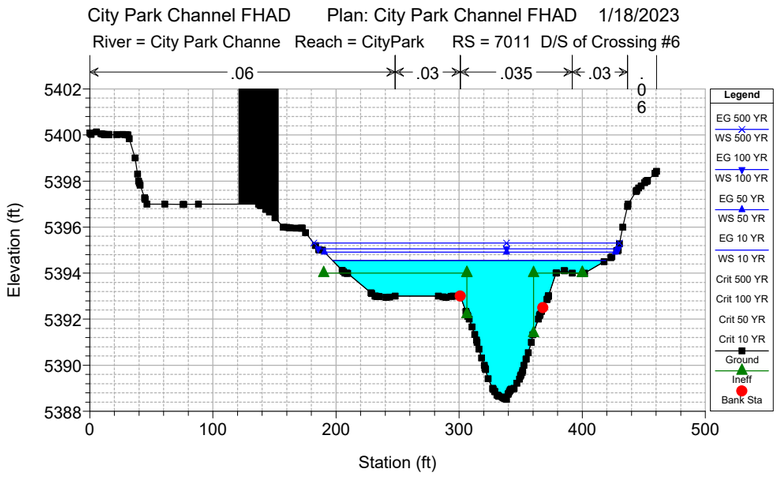

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7210
.04 .03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

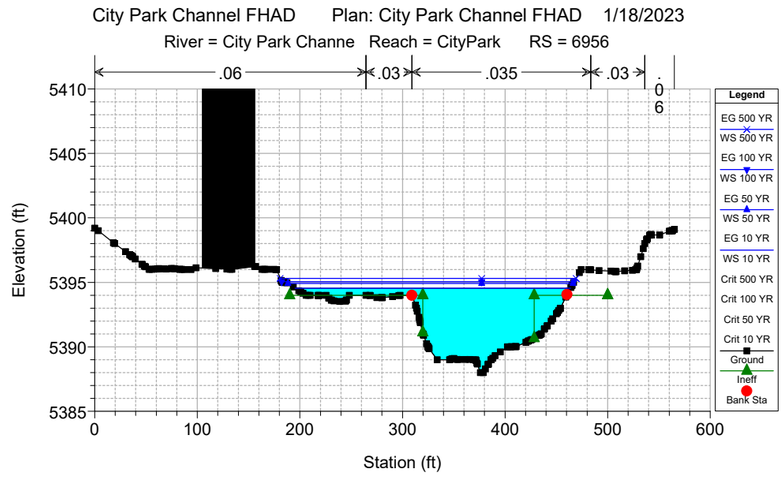

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7209
.04 .03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

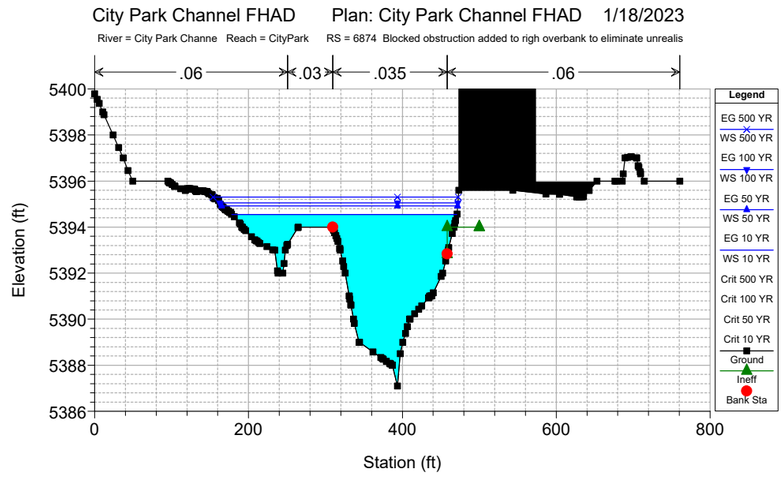

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7204
.04
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

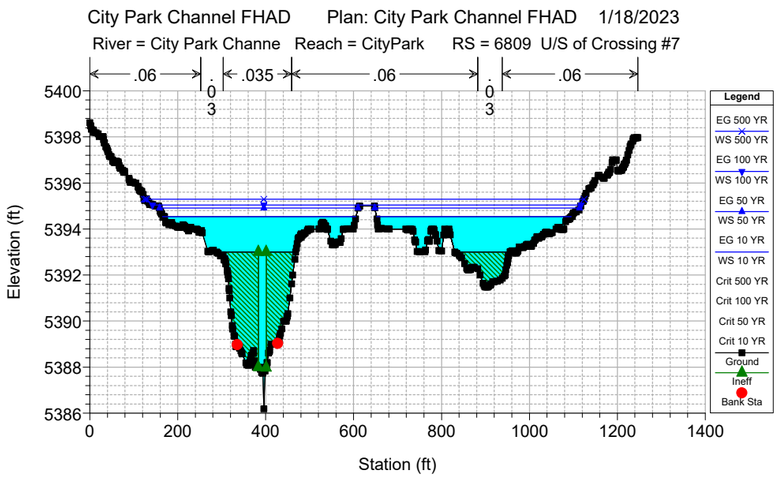

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7103 Culv Survey Crossing #6
.04
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Ground
Ineff
Bank Sta

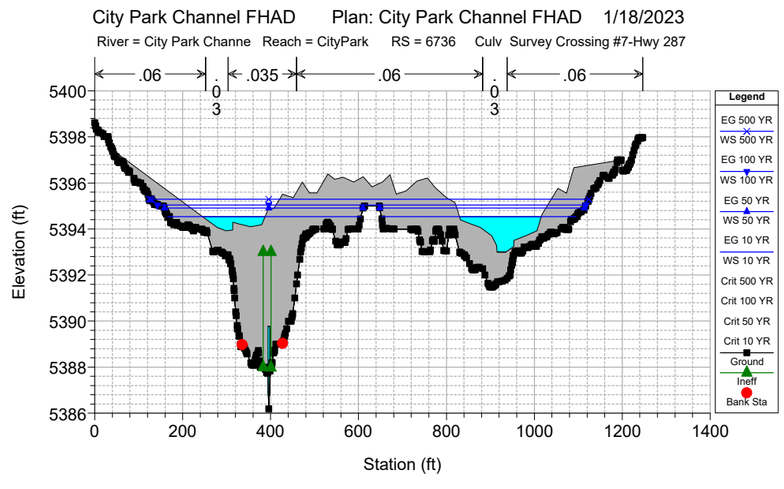

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7103 Culv Survey Crossing #6
.06
.03
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

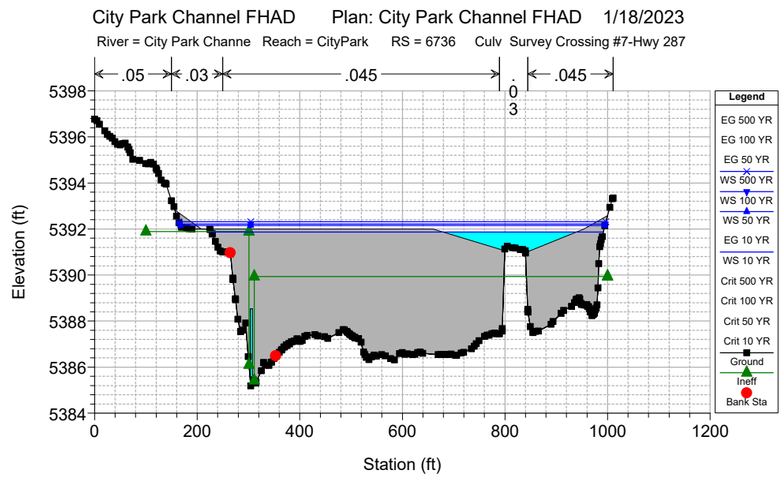

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 7011 D/S of Crossing #6
.06
.03
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

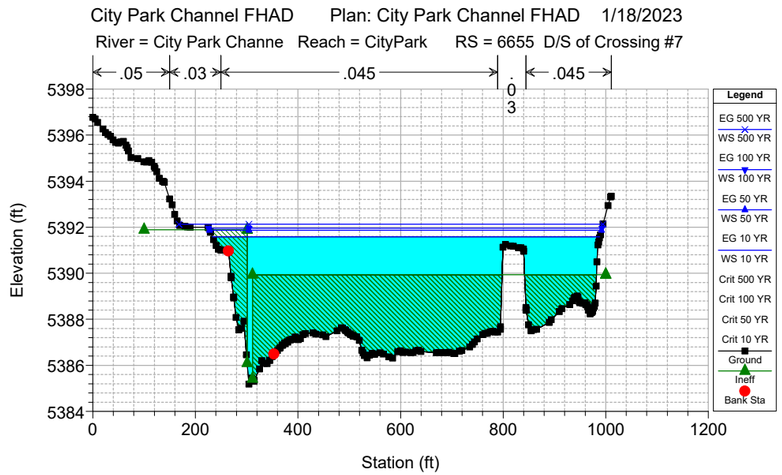

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6956
.06
.03
.035
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

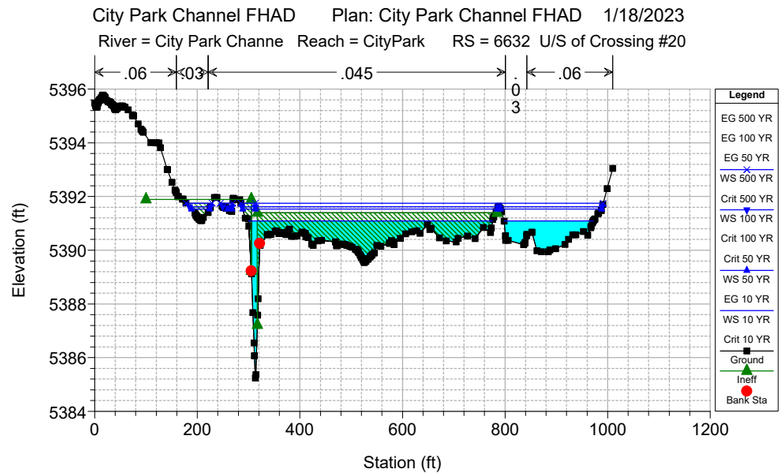

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6874 Blocked obstruction added to righ overbank to eliminate unrealis
.06
.03
.035
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

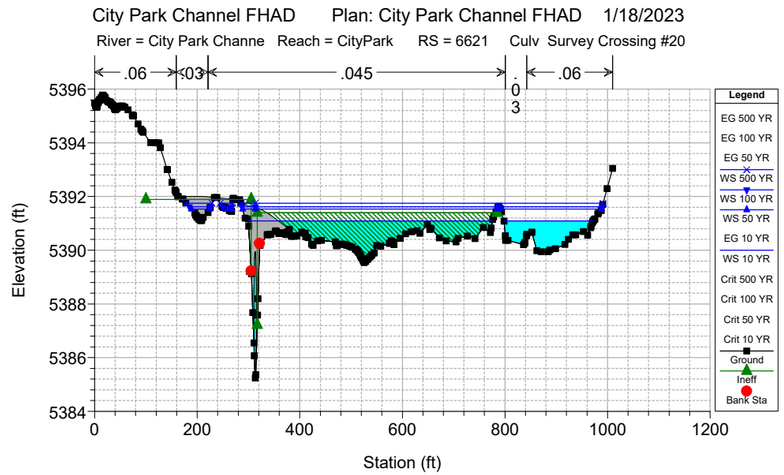

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6809 U/S of Crossing #7
.06
.035
.06
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

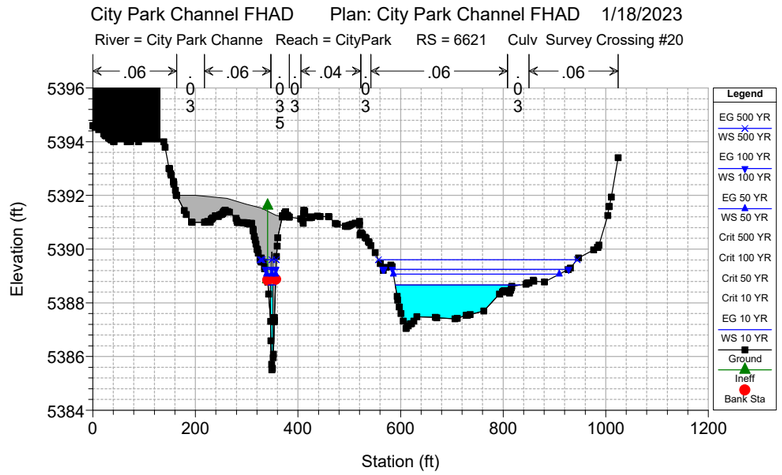

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6736 Culv Survey Crossing #7-Hwy 287
.06
.035
.06
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

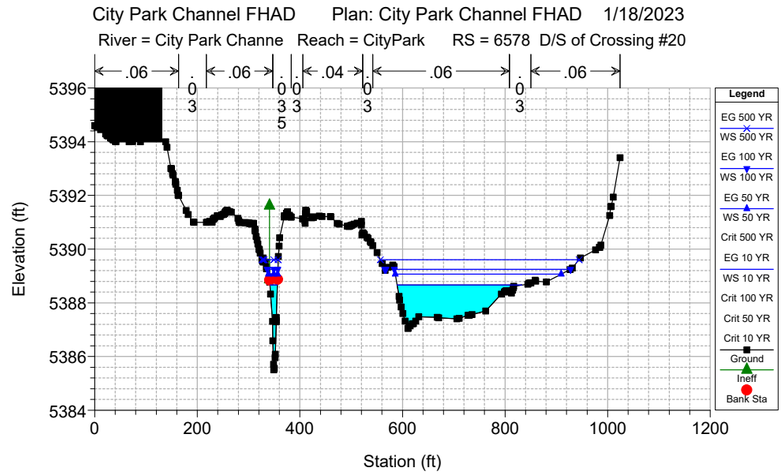

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6736 Culv Survey Crossing #7-Hwy 287
.05
.03
.045
.045
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

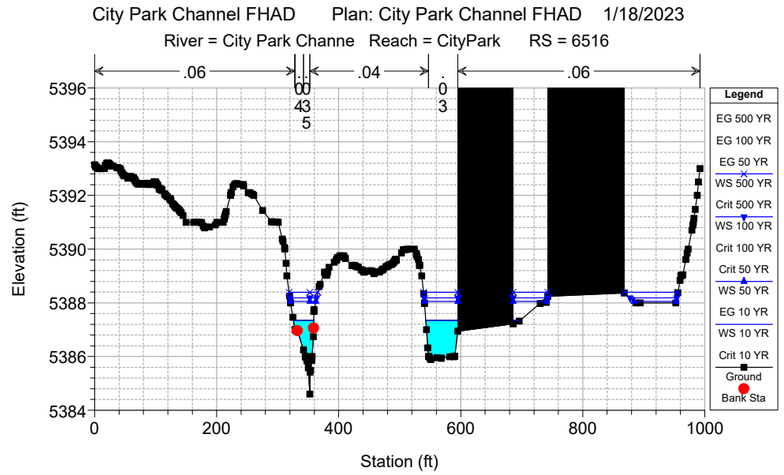

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6655 D/S of Crossing #7
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

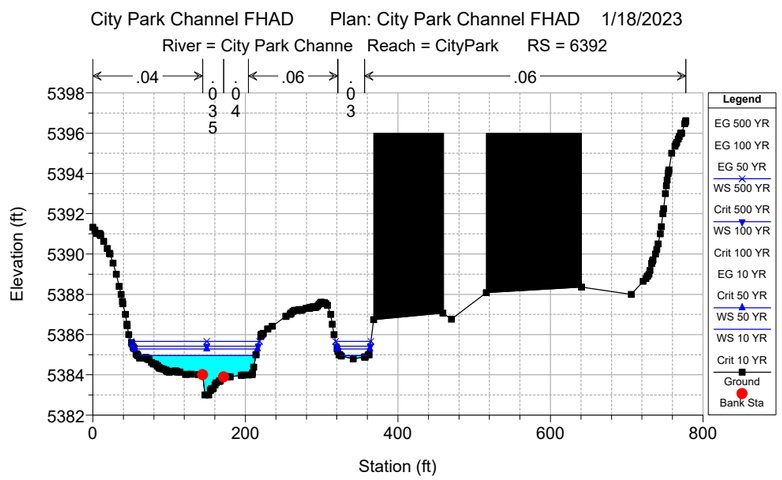

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6632 U/S of Crossing #20
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

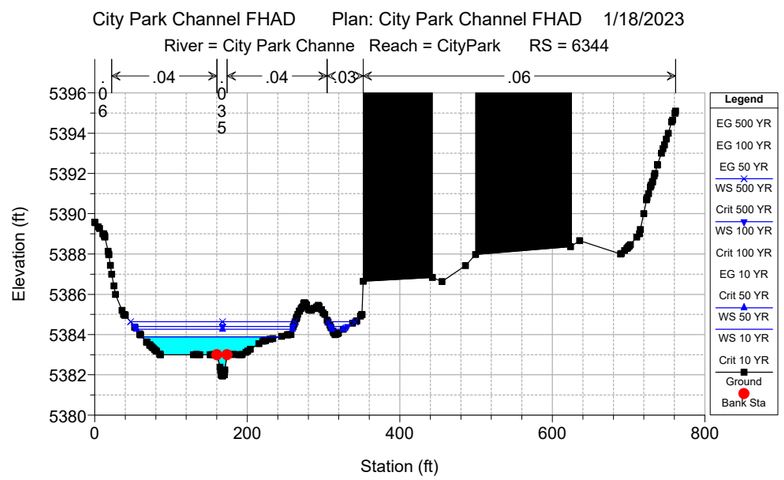

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6621 Culv Survey Crossing #20
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
WS 100 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

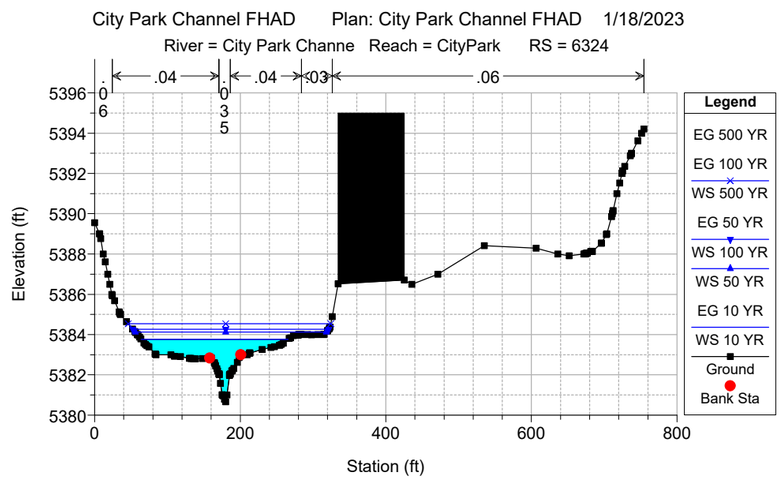

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6621 Culv Survey Crossing #20
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

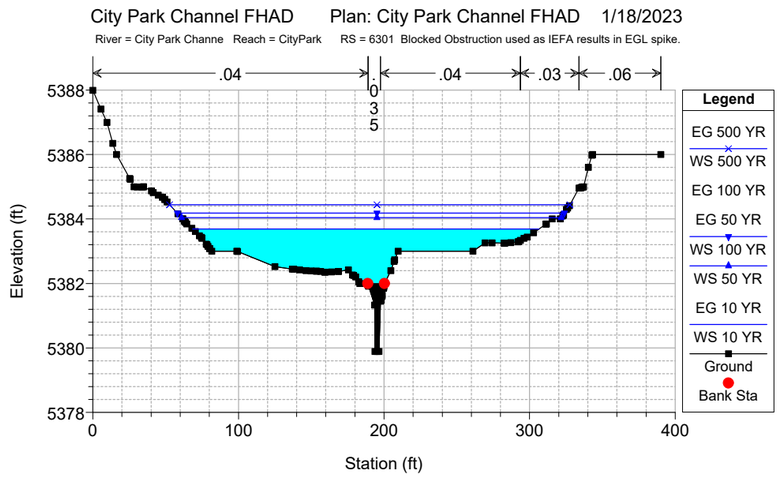

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6578 D/S of Crossing #20
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
EG 10 YR
WS 10 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

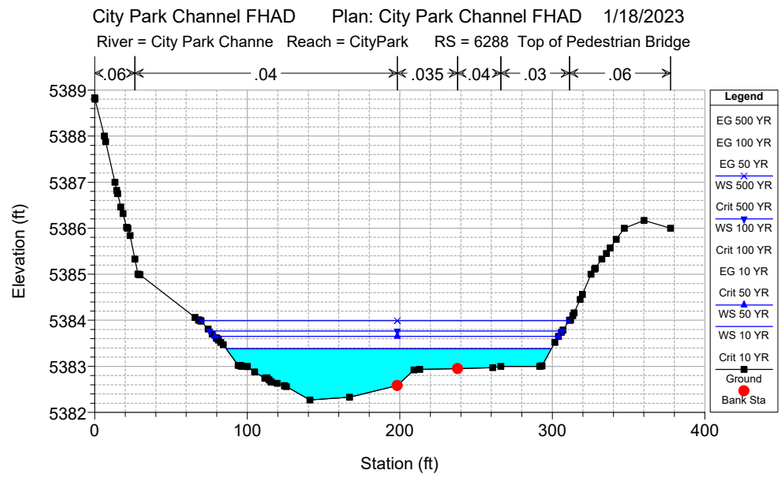

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6516
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

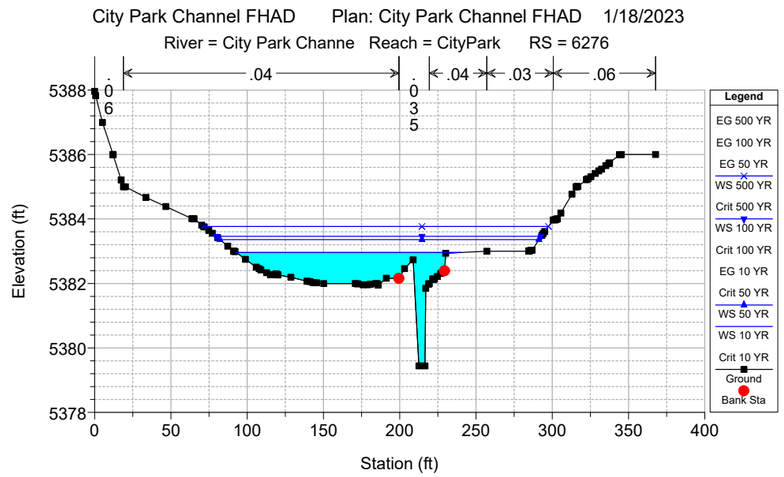

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6392
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

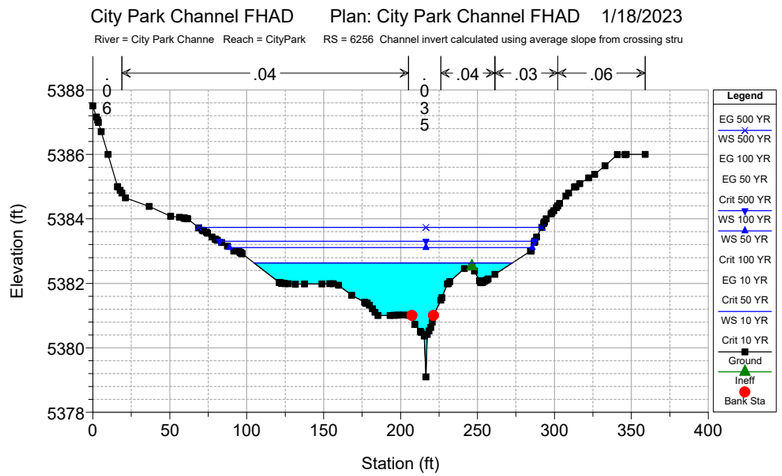

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6344
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

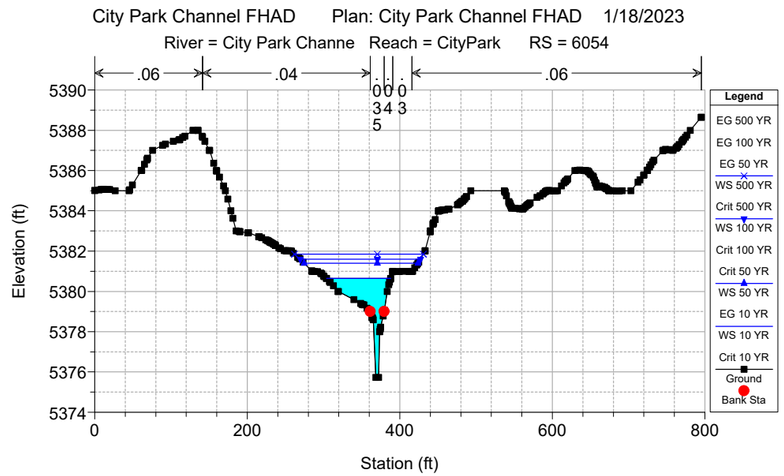

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6324
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

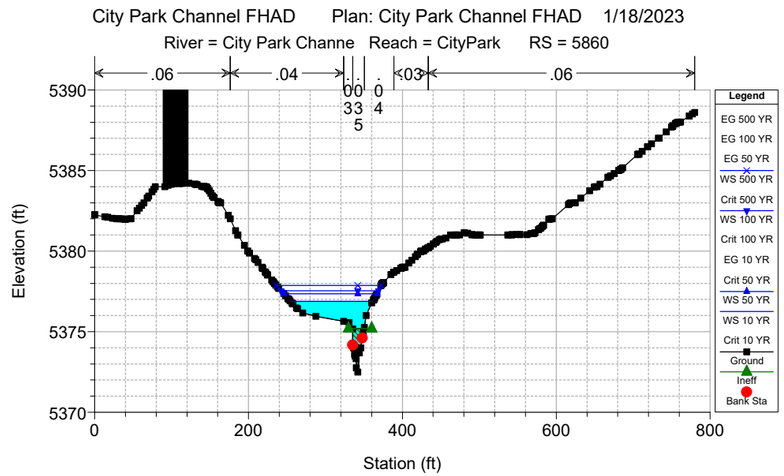

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6301 Blocked Obstruction used as IEFA results in EGL spike.
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

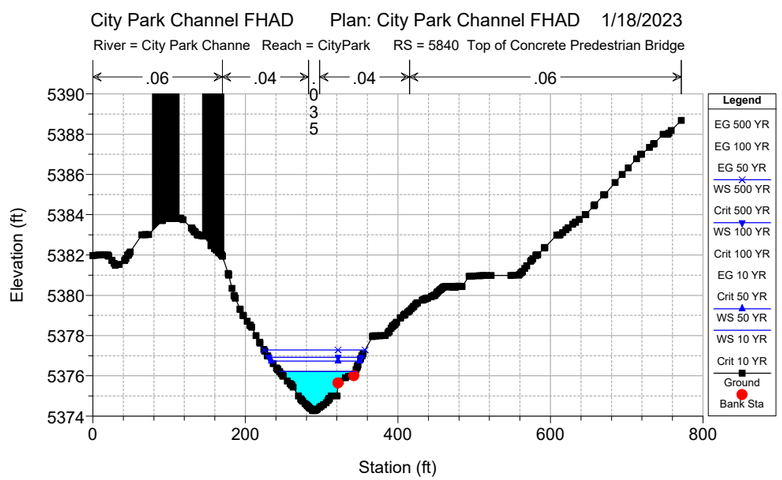

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6288 Top of Pedestrian Bridge
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

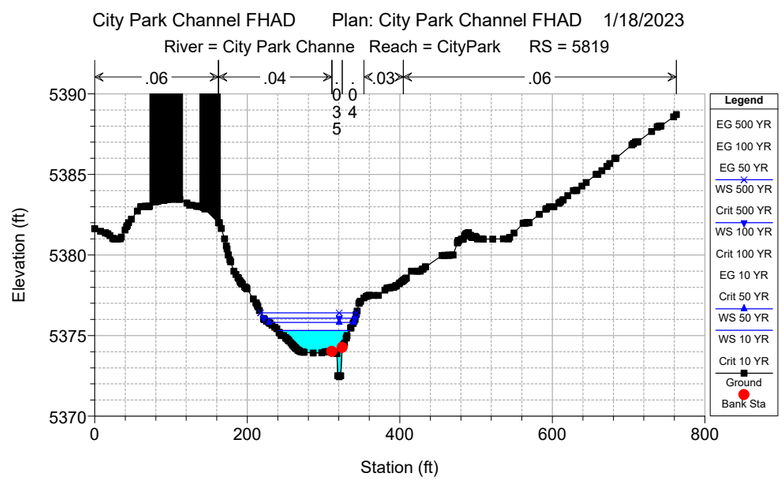

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6276
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

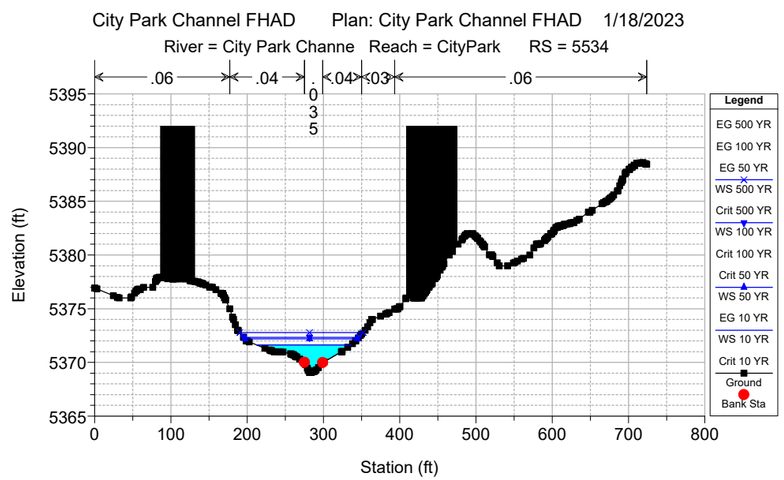

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6256 Channel invert calculated using average slope from crossing stru
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
Crit 500 YR
WS 100 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

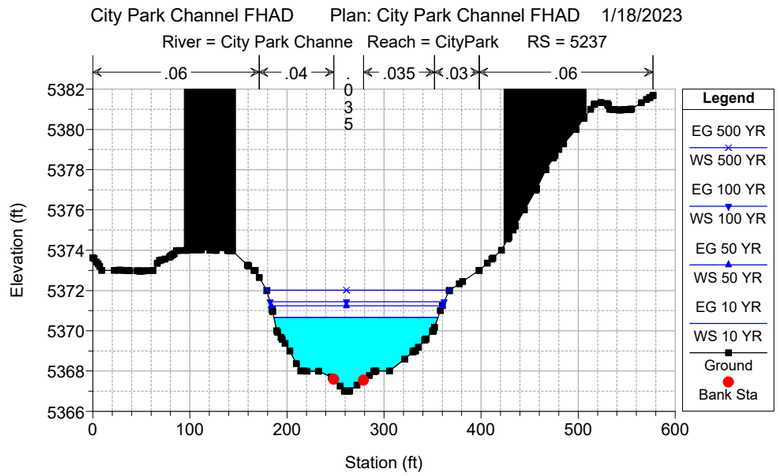

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 6054
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

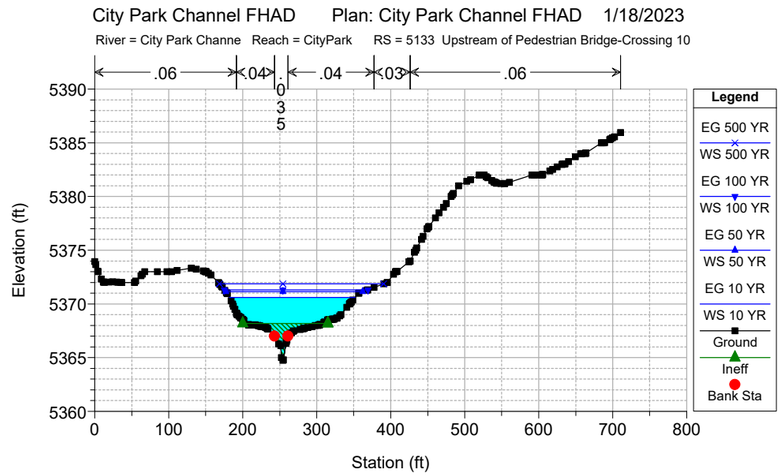

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5860
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

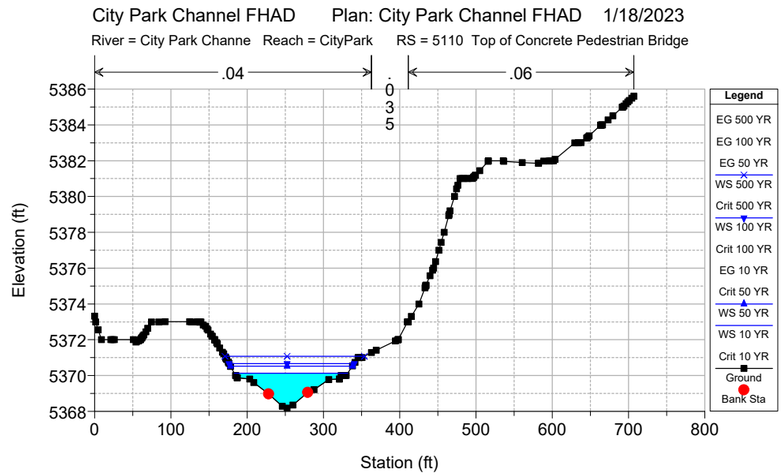

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5840 Top of Concrete Predestrian Bridge
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

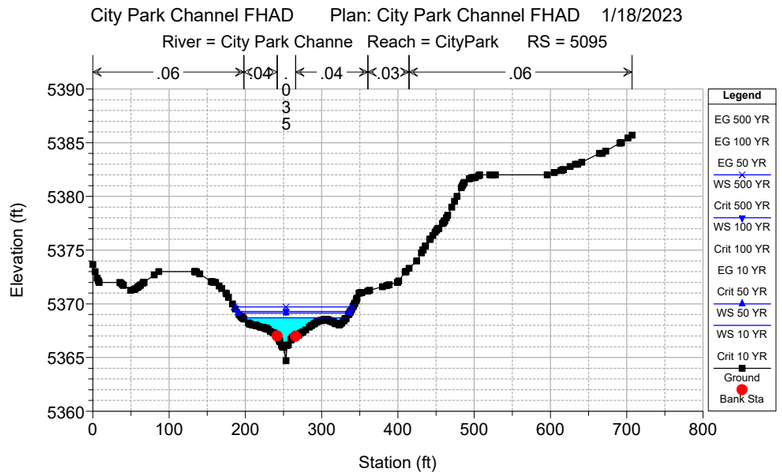

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5819
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

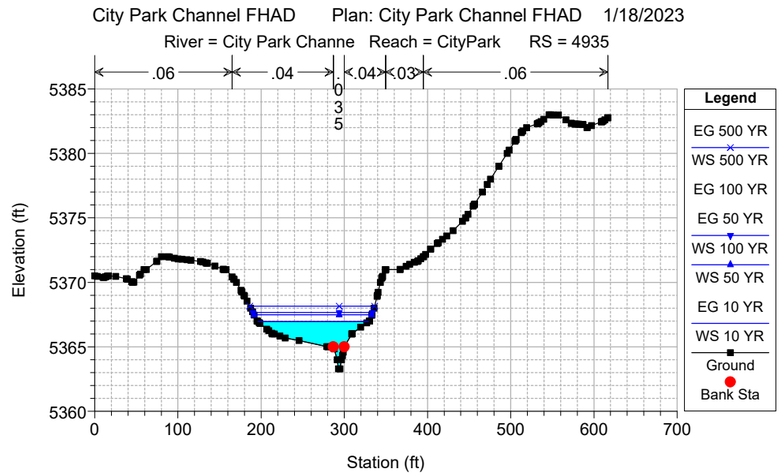

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5534
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

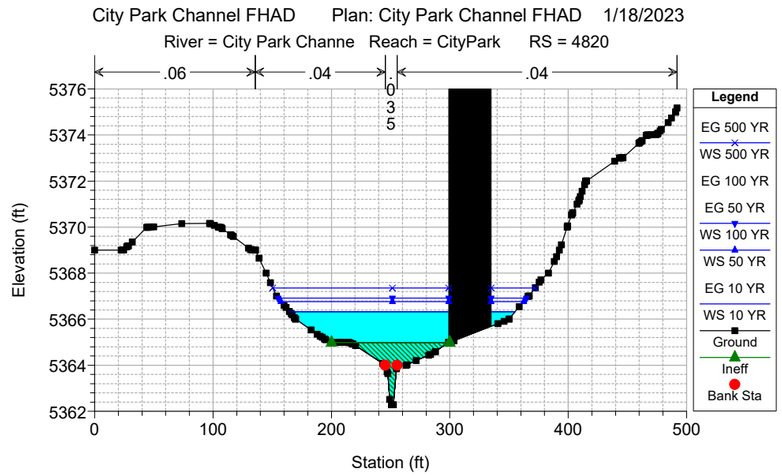

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5237
.06 .04 .035 .03 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

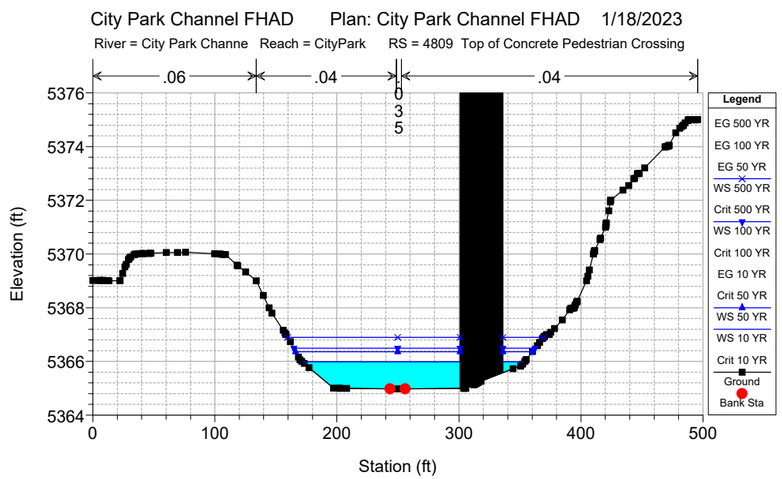

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5133 Upstream of Pedestrian Bridge-Crossing 10
.06 .04 .04 .03 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

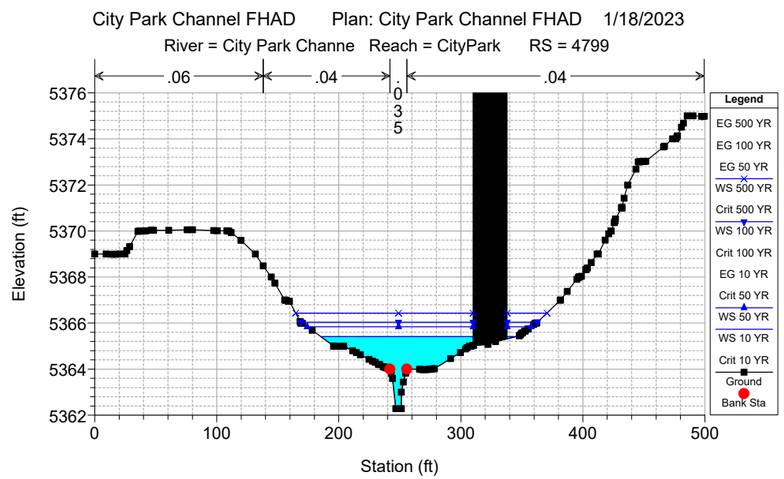

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5110 Top of Concrete Pedestrian Bridge
.04 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

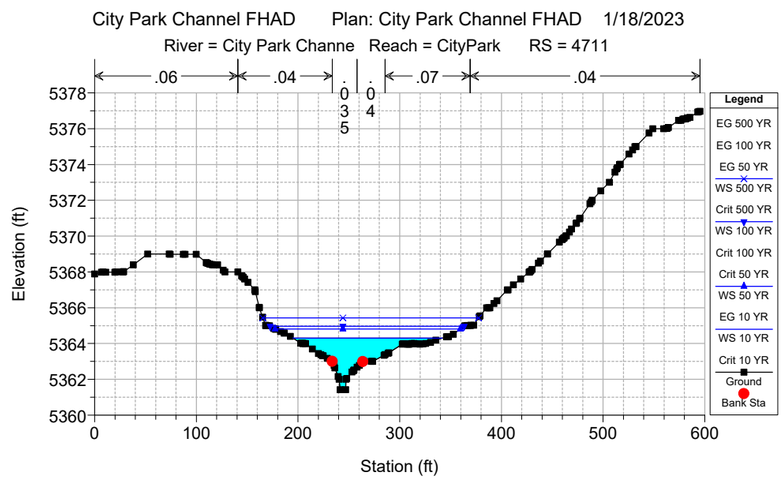

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 5095
.06 .04 .04 .03 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

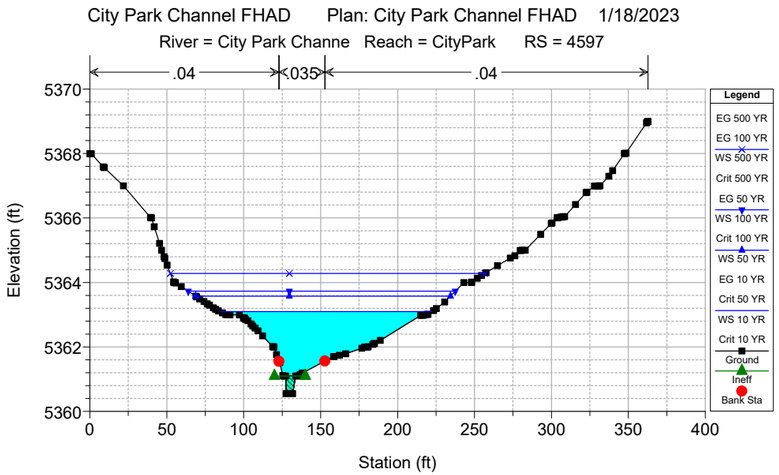

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4935
.06 .04 .04 .03 .06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

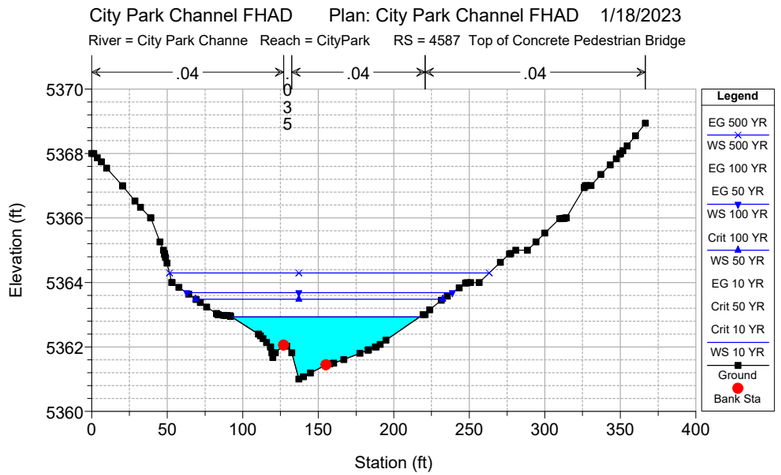

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4820
.06 .04 .04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

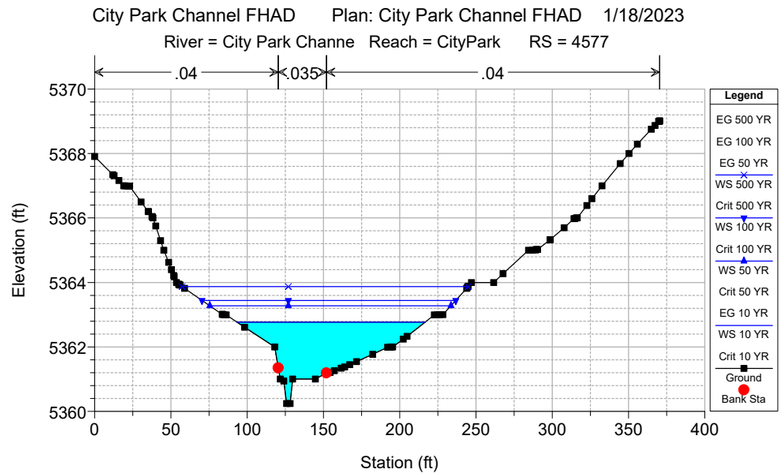

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4809 Top of Concrete Pedestrian Crossing
.06 .04 .04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

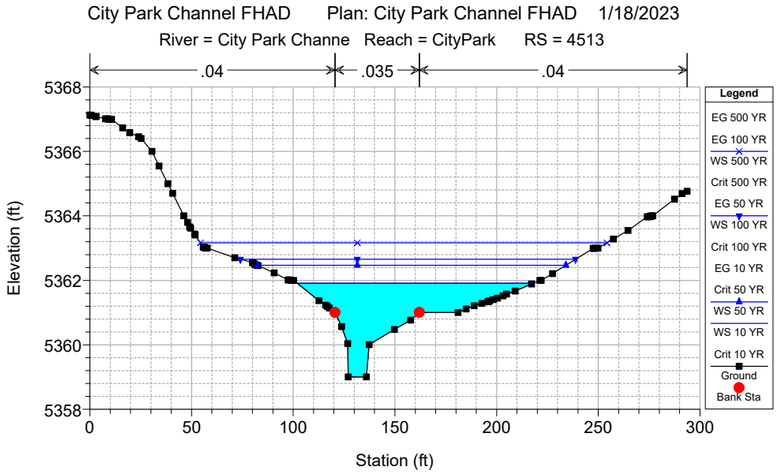

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4799
.06 .04 .04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

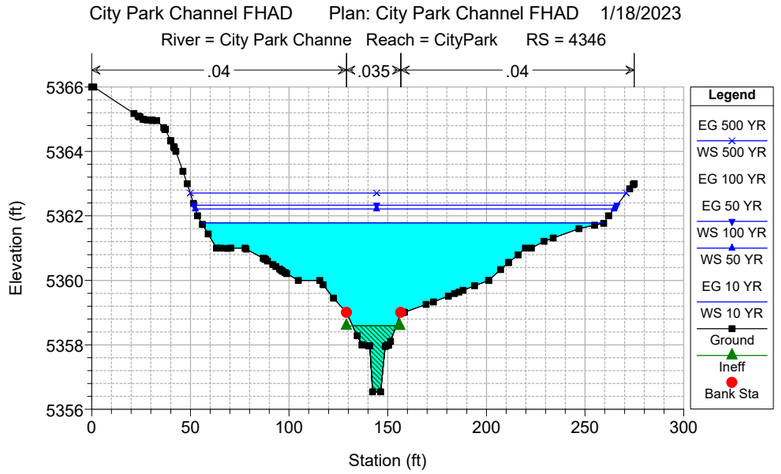

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4711
.06 .04 .07 .04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

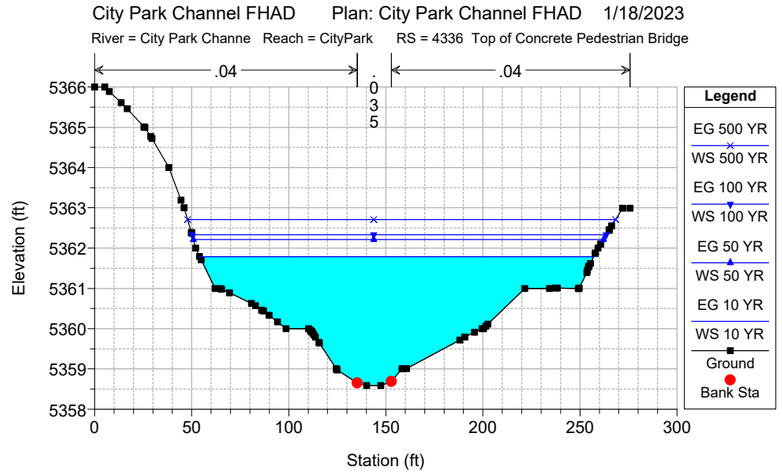

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4597
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

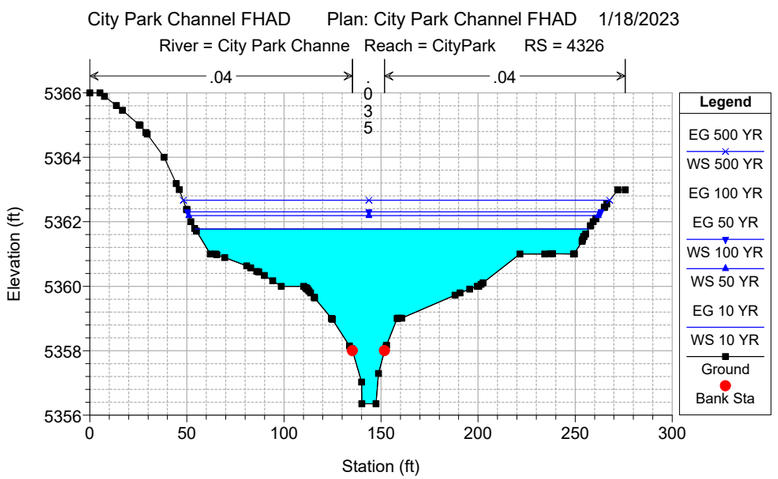

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4587 Top of Concrete Pedestrian Bridge
.04
.035
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
Crit 10 YR
WS 10 YR
Ground
Bank Sta

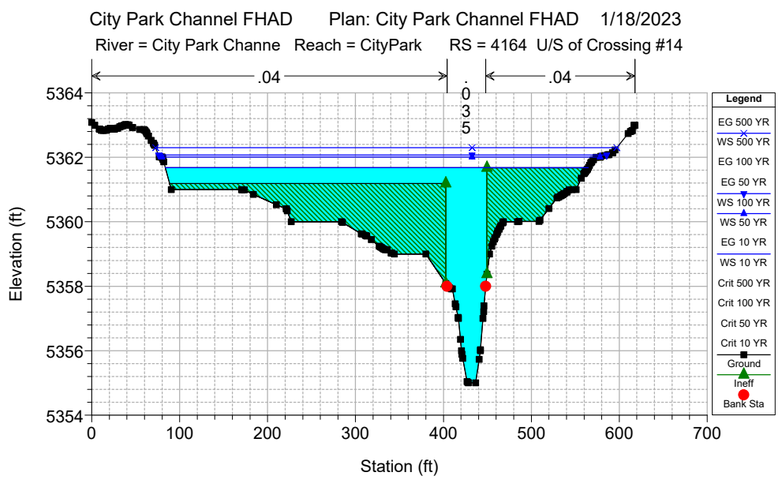

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4577
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

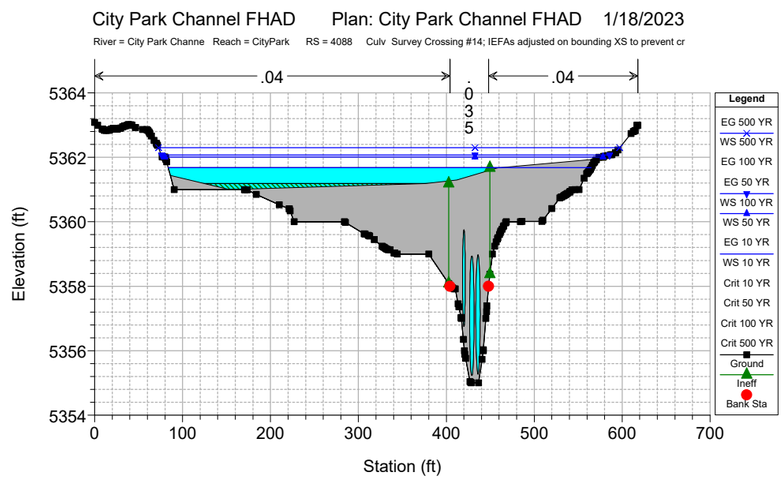

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4513
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

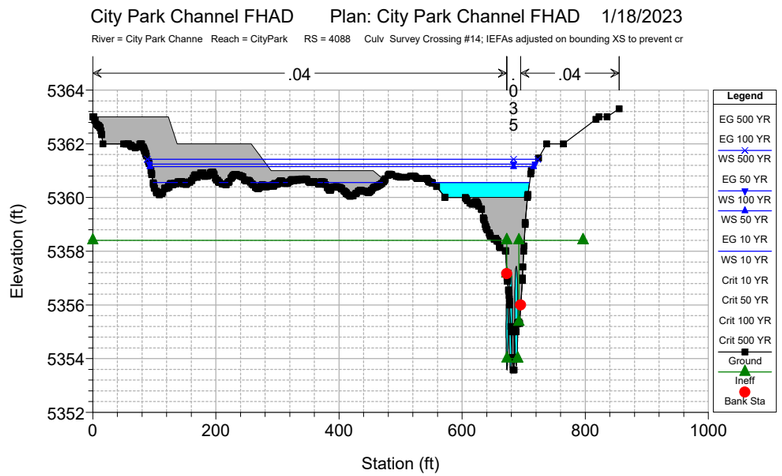

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4346
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

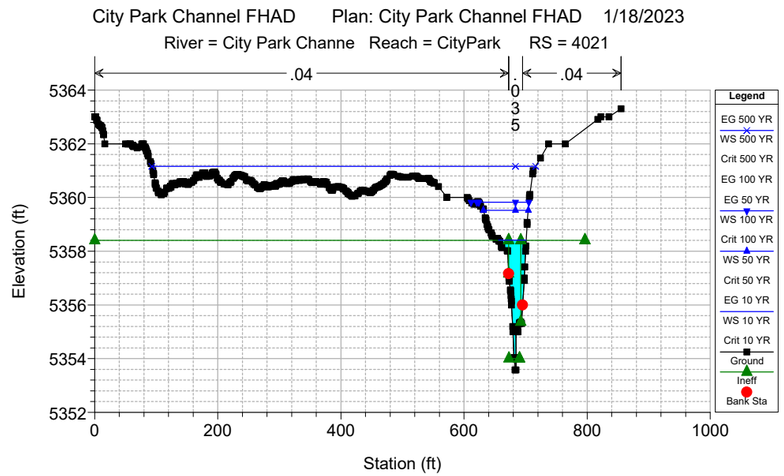

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4336 Top of Concrete Pedestrian Bridge
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

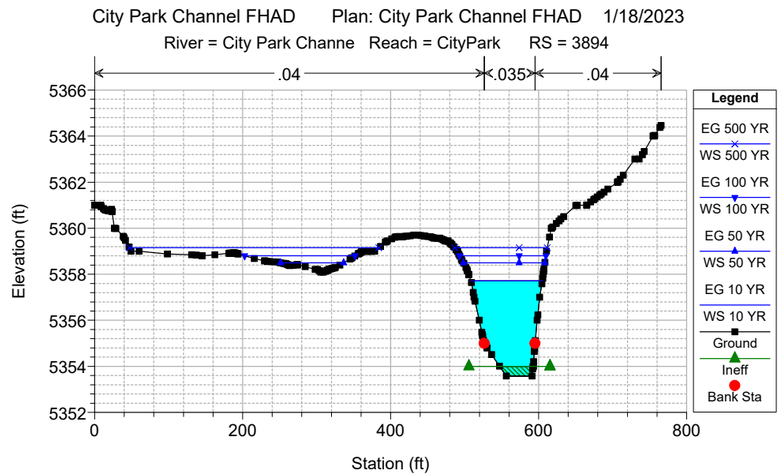

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4326
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

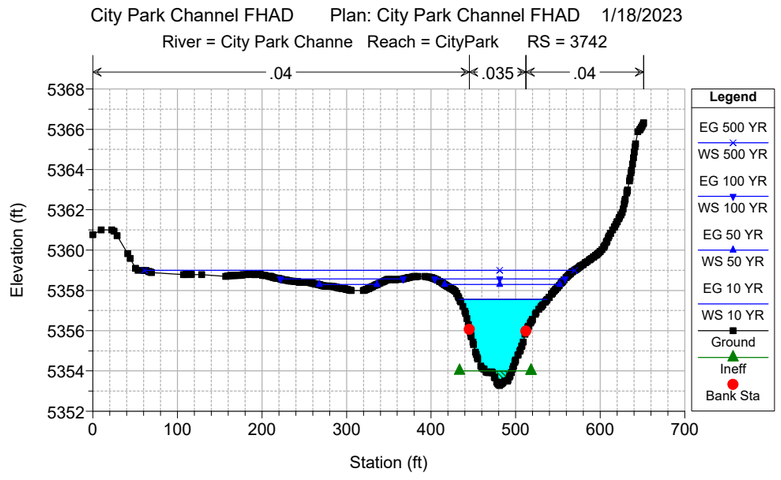

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4164 U/S of Crossing #14
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

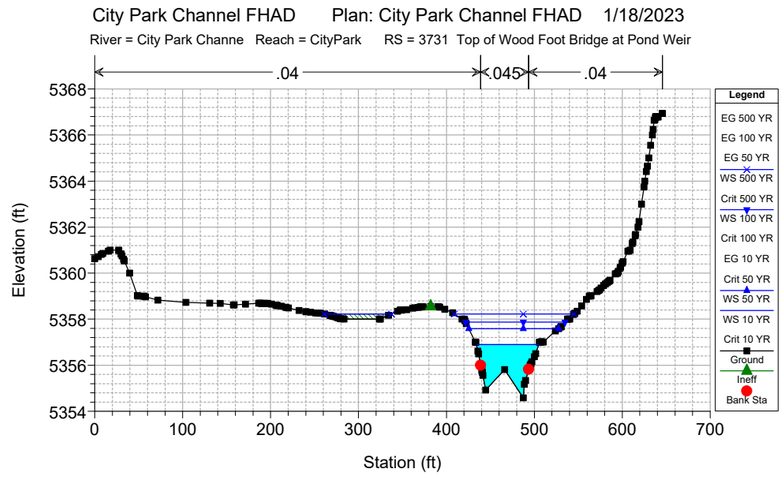

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4088 Culv Survey Crossing #14; IEFAs adjusted on bounding XS to prevent cr
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Crit 50 YR
Crit 100 YR
Crit 500 YR
Ground
Ineff
Bank Sta

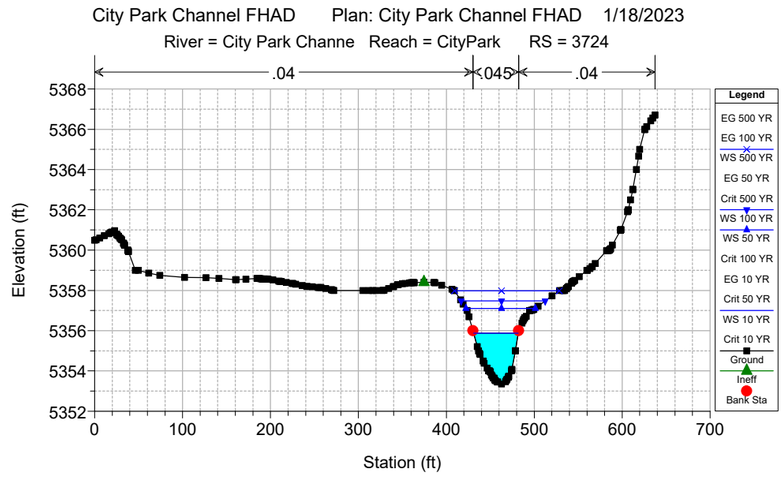

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4088 Culv Survey Crossing #14; IEFAs adjusted on bounding XS to prevent cr
.04
.035
.04
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Crit 50 YR
Crit 100 YR
Crit 500 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

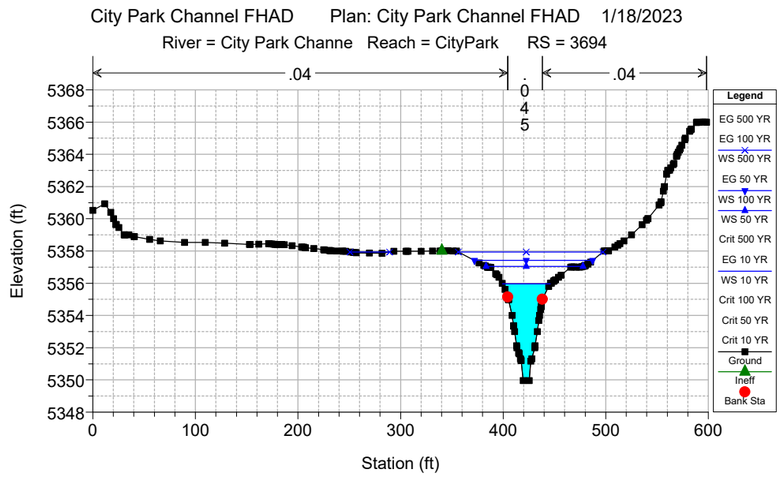

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 4021
.04
.035
.04
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

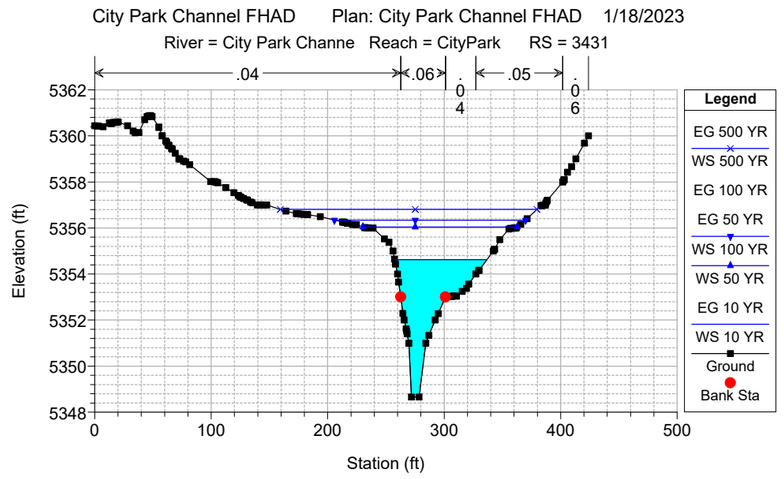

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3894
.04
.035
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

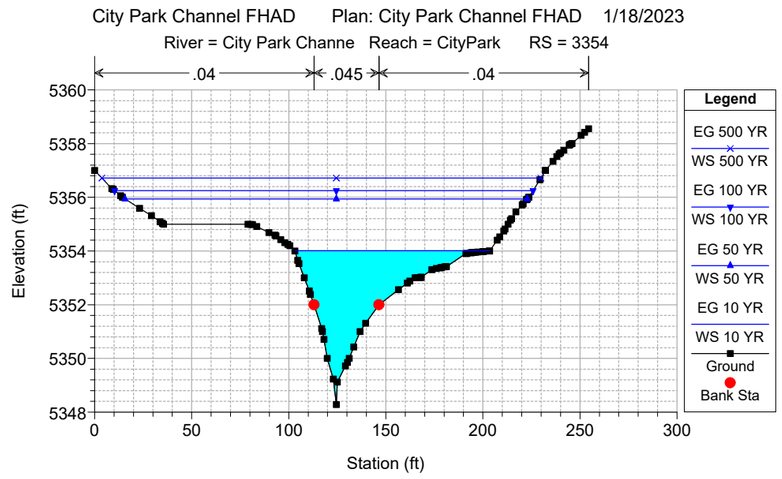

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3742
.04
.035
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

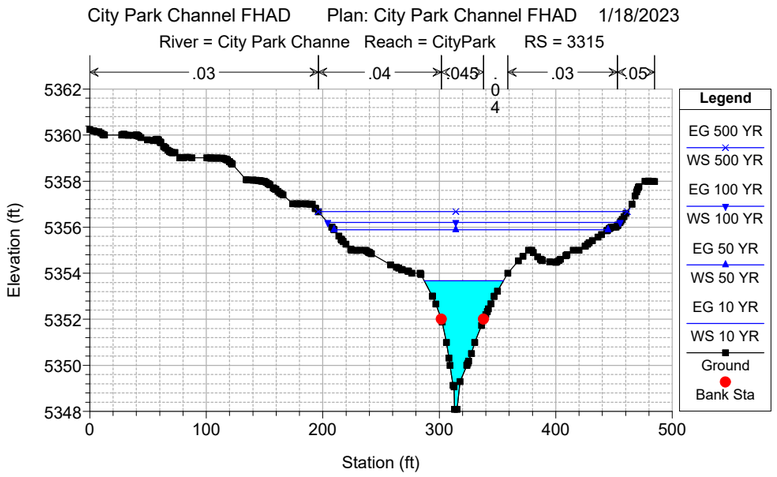

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3731 Top of Wood Foot Bridge at Pond Weir
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

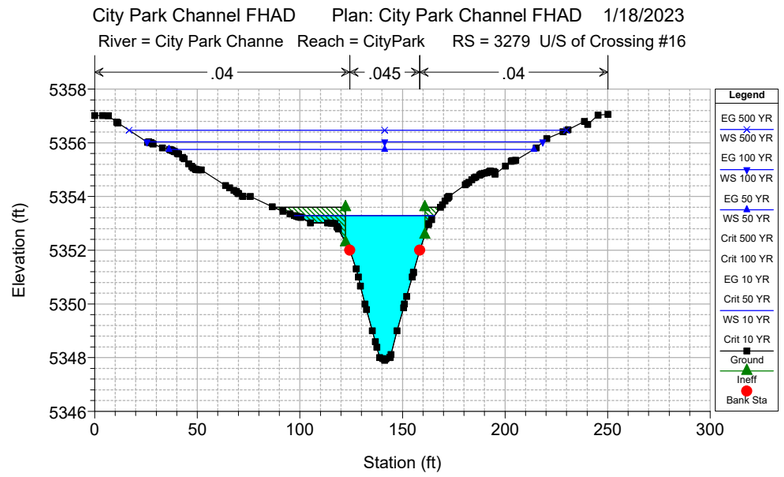

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3724
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

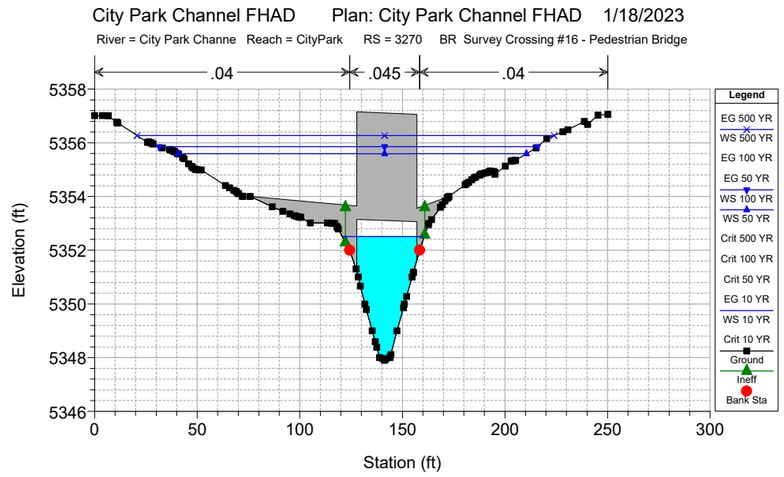

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3694
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 500 YR
EG 10 YR
WS 10 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

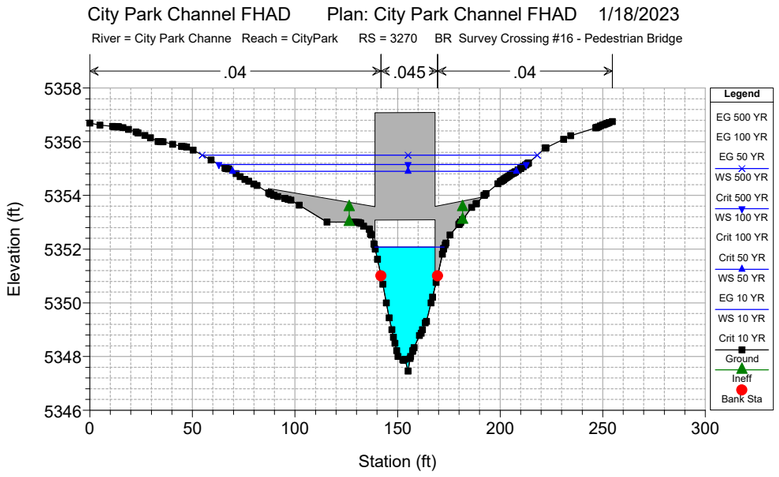

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3431
.04
.06
.04
.05
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

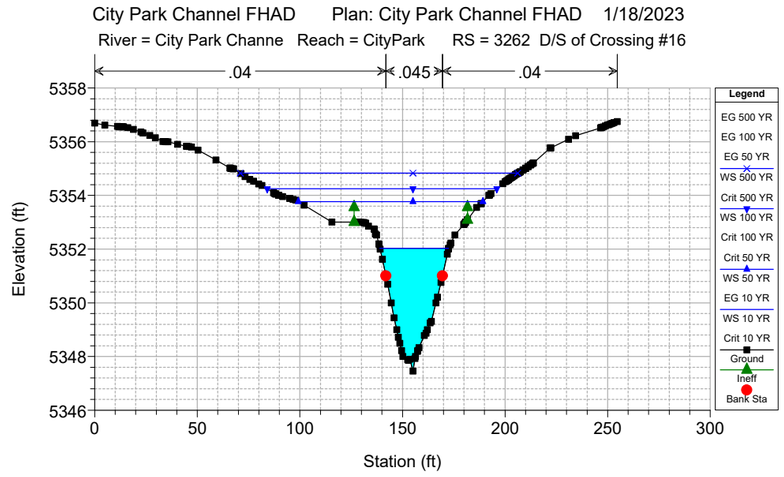

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3354
.04
.045
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

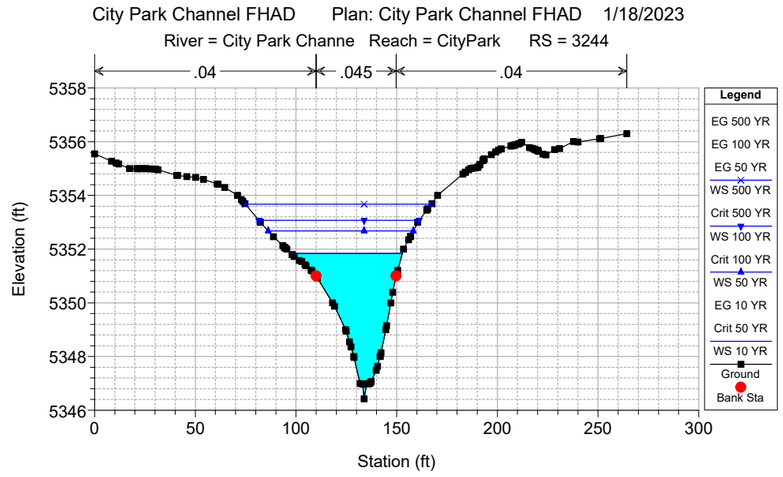

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3315
.03
.04
.045
.04
.03
.05
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

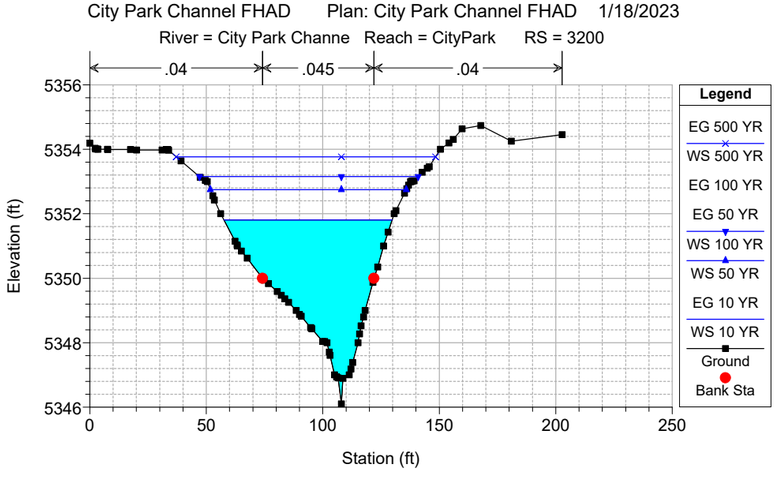

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3279 U/S of Crossing #16
.04
.045
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

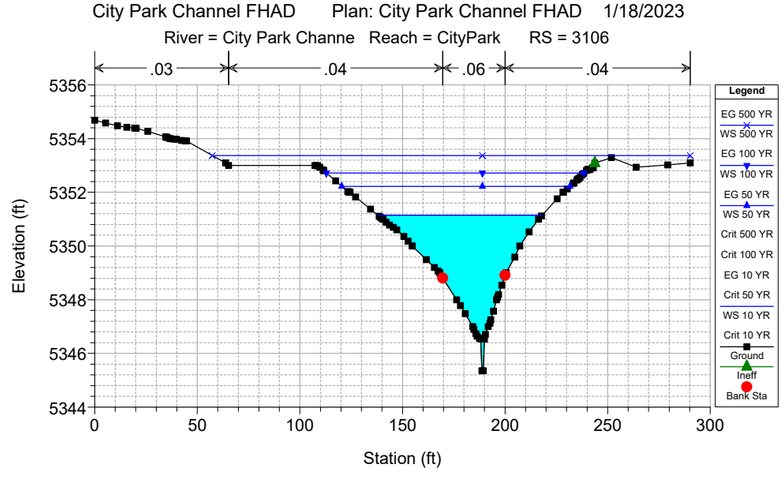

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3270 BR Survey Crossing #16 - Pedestrian Bridge
.04
.045
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

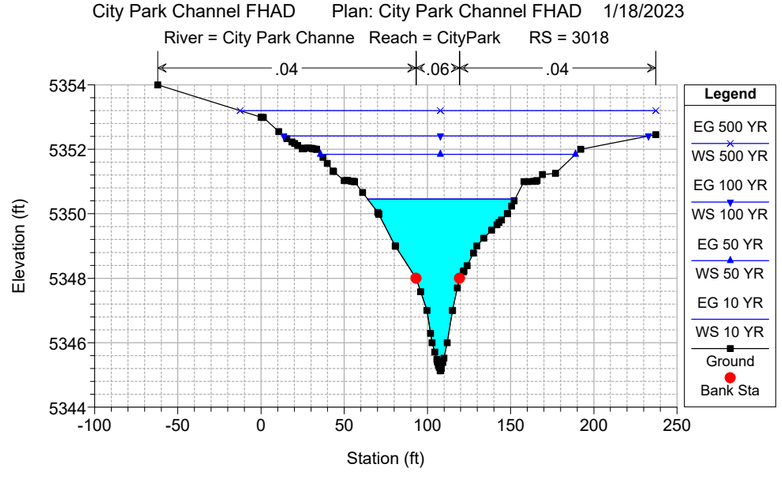

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3270 BR Survey Crossing #16 - Pedestrian Bridge
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

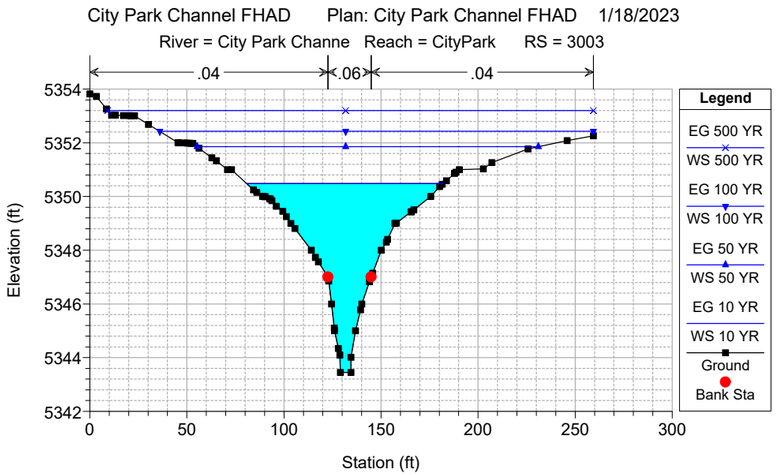

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3262 D/S of Crossing #16
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

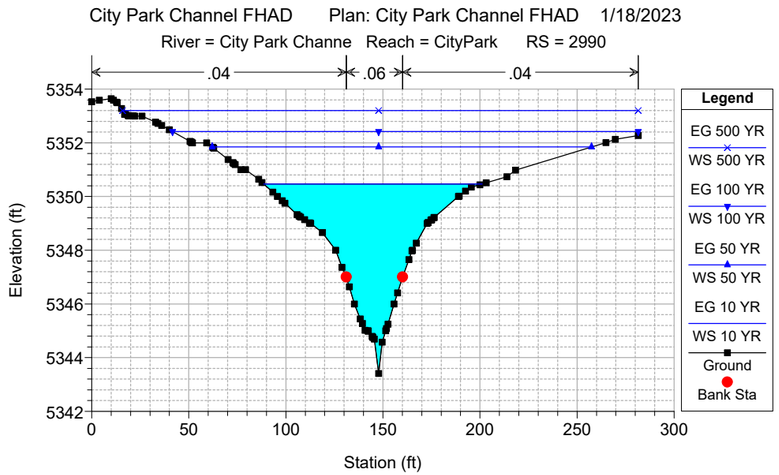

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3244
.04
.045
.04
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

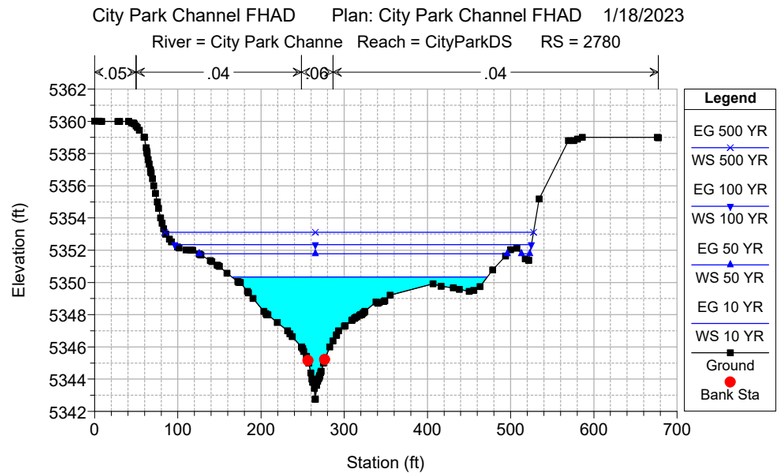

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3200
.04
.045
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

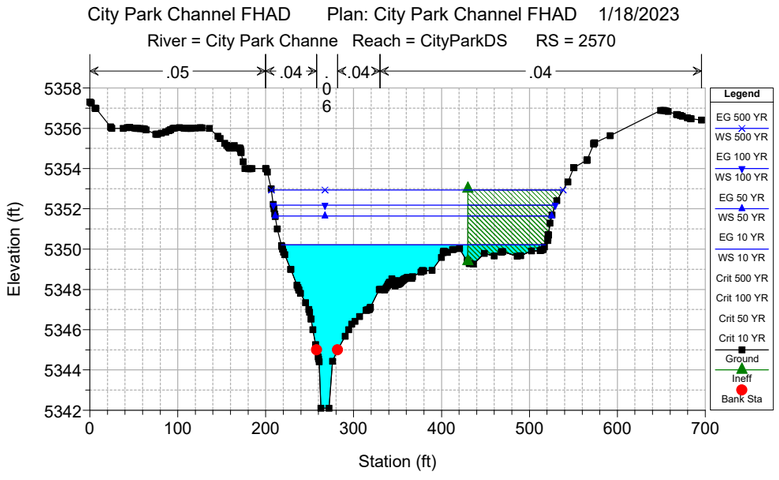

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3106
.03
.04
.06
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

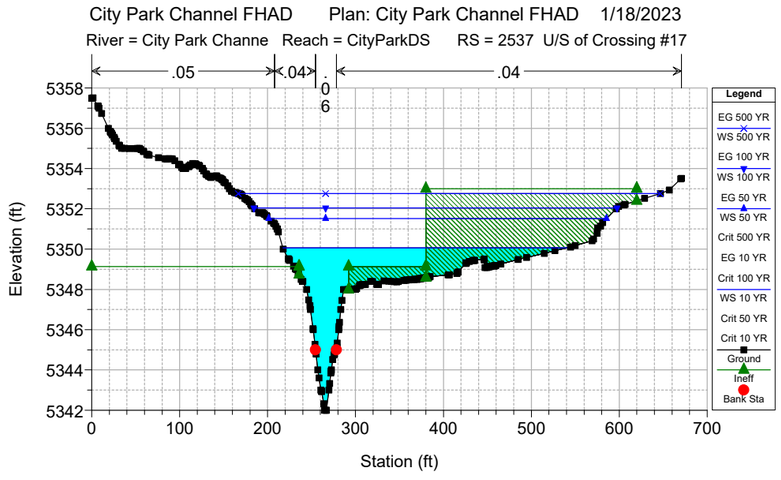

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3018
.04
.06
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

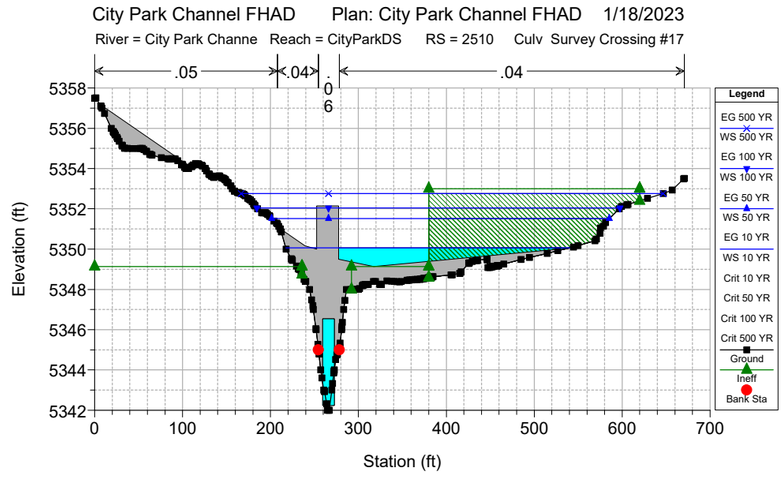

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 3003
.04
.06
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

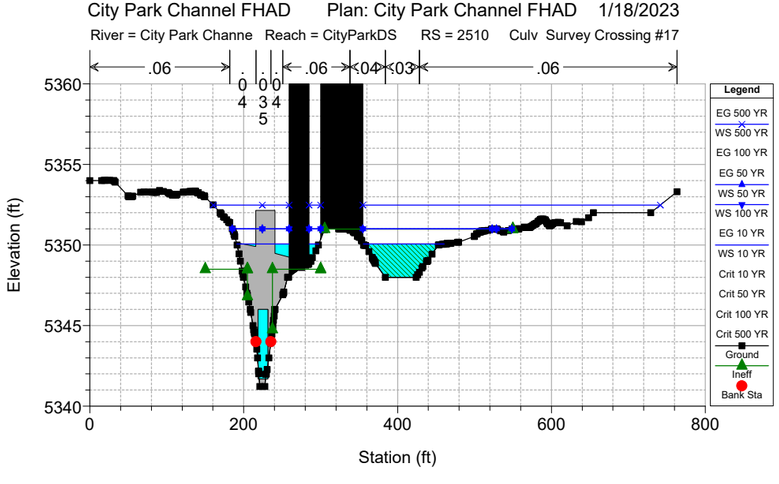

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityPark RS = 2990
.04
.06
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

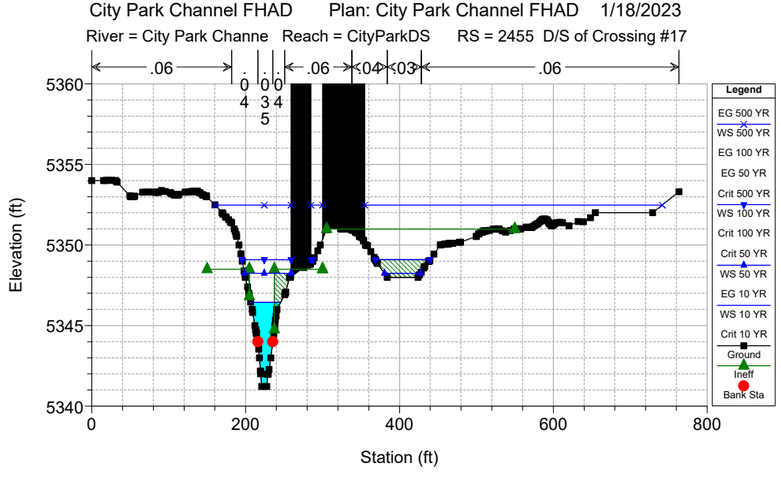

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2780
.05
.04
.06
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

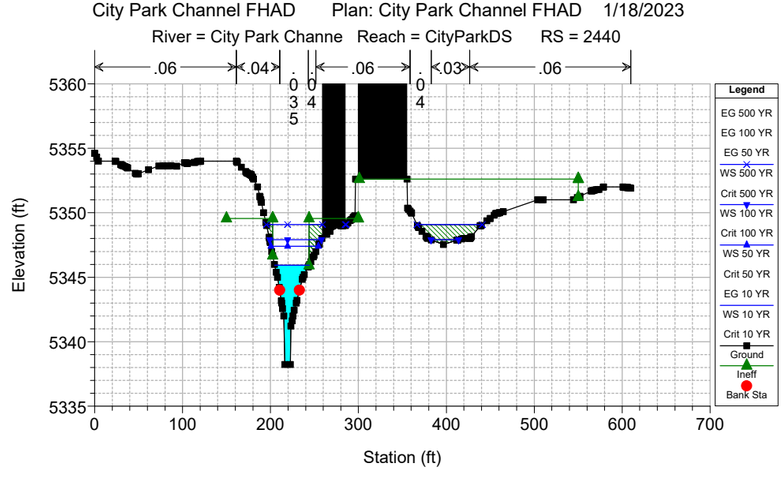

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2570
.05
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

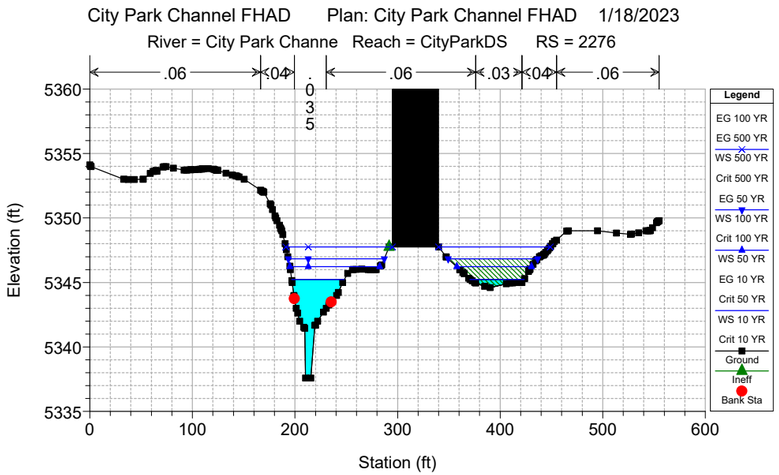

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2537 U/S of Crossing #17
.05
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
EG 10 YR
Crit 100 YR
WS 10 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

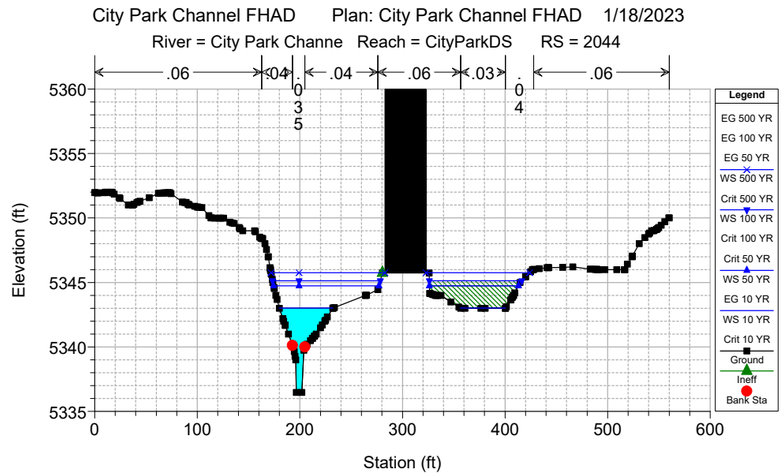

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2510 Culv Survey Crossing #17
.05
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Crit 50 YR
Crit 100 YR
Crit 500 YR
Ground
Ineff
Bank Sta

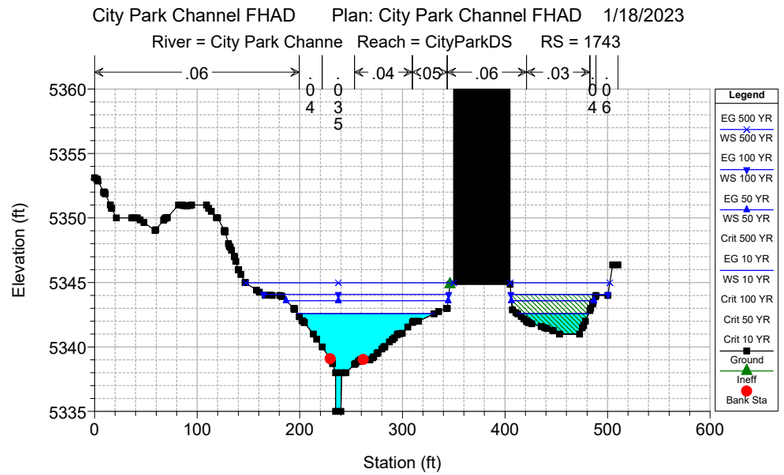

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2510 Culv Survey Crossing #17
.06
.06
.04
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 50 YR
WS 100 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Crit 50 YR
Crit 100 YR
Crit 500 YR
Ground
Ineff
Bank Sta

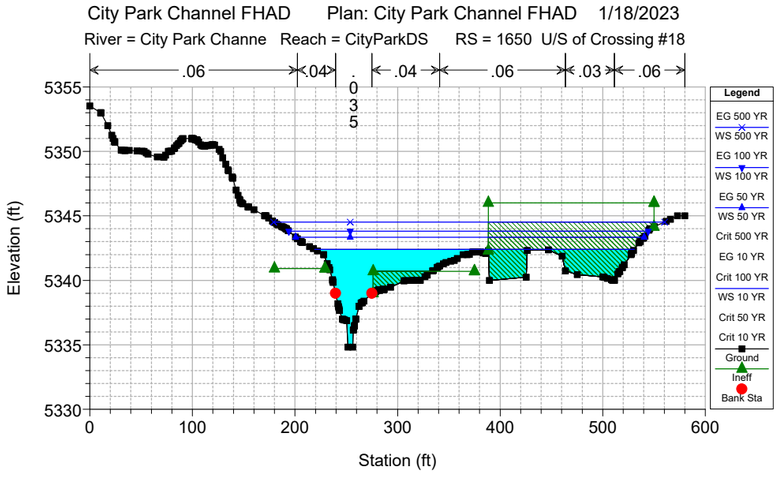

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2455 D/S of Crossing #17
.06
.06
.04
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

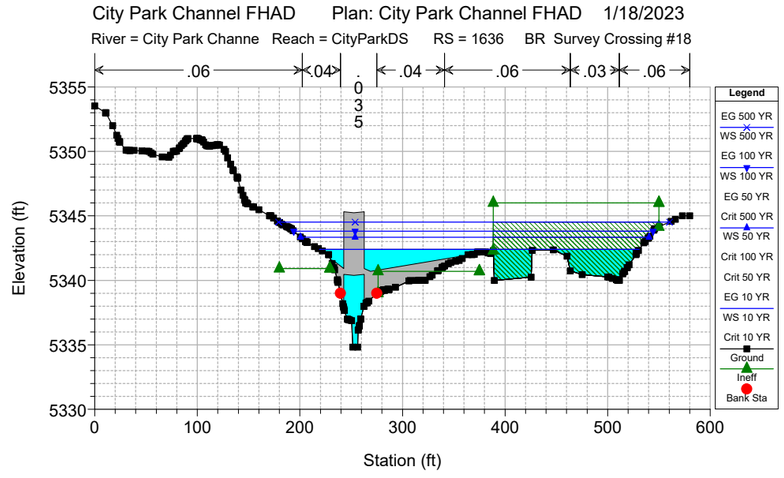

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2440
.06
.04
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

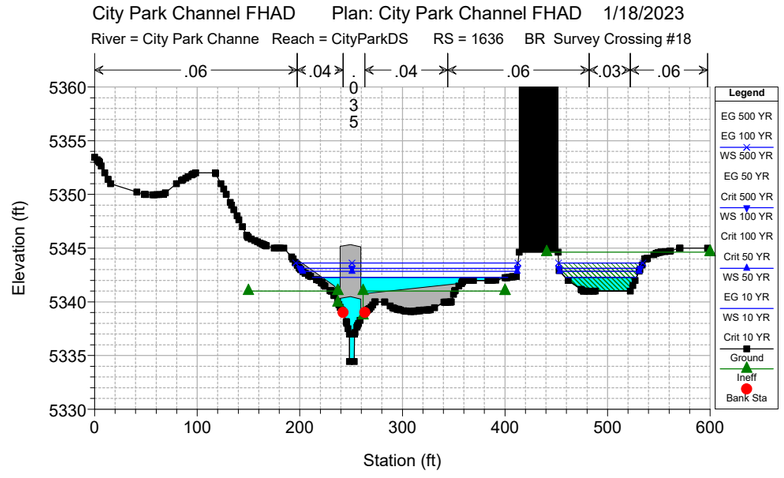

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2276
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

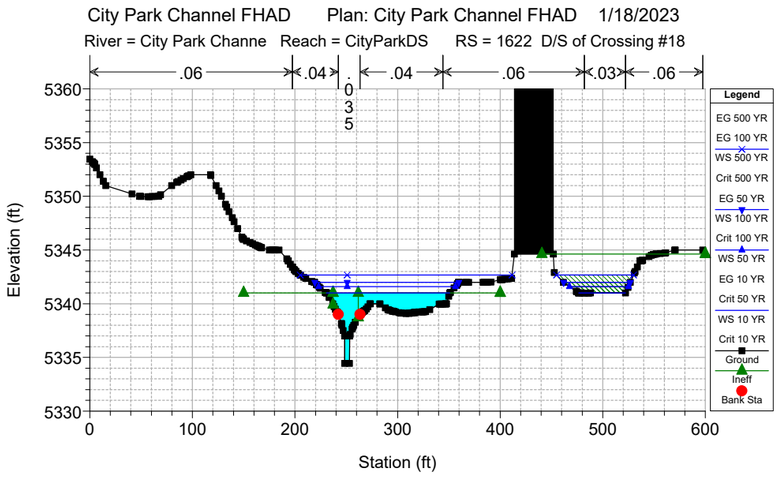

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 2044
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

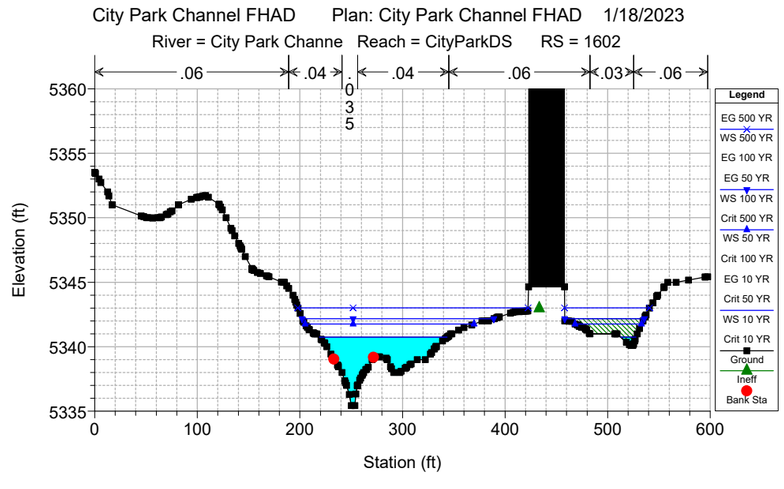

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1743
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
EG 10 YR
WS 10 YR
Crit 100 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

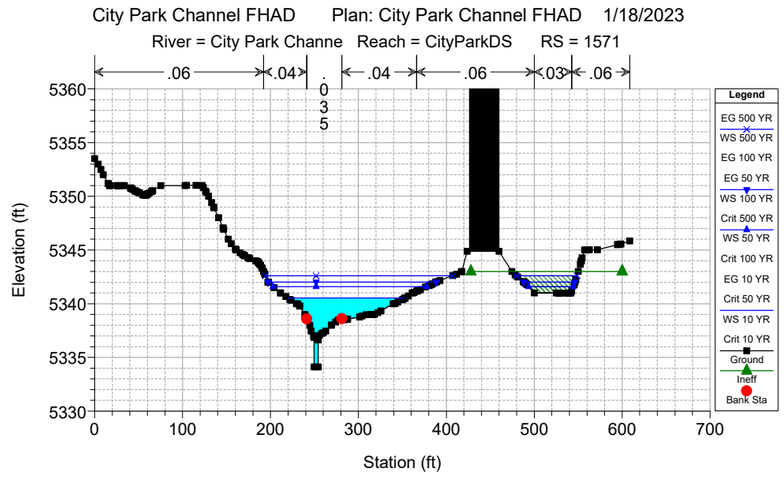

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1650 U/S of Crossing #18
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
EG 10 YR
Crit 100 YR
WS 10 YR
Crit 50 YR
Crit 10 YR
Ground
Ineff
Bank Sta

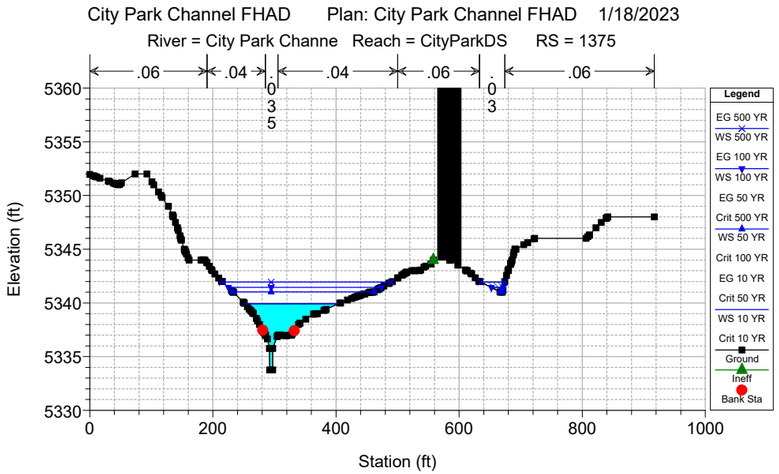

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1636 BR Survey Crossing #18
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

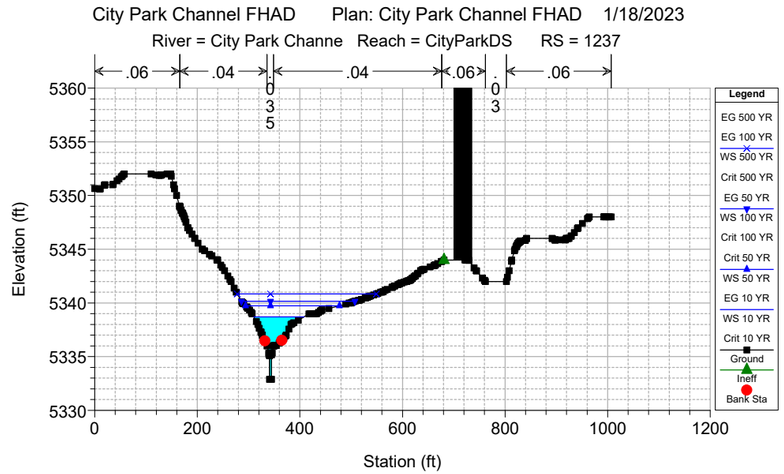

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1636 BR Survey Crossing #18
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

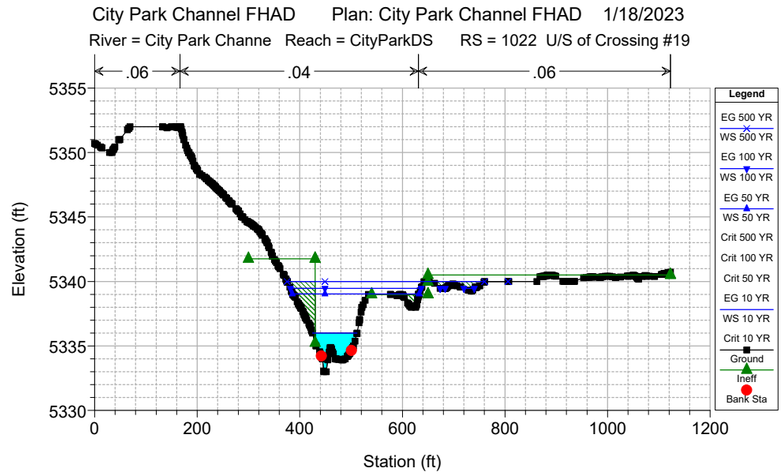

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1622 D/S of Crossing #18
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

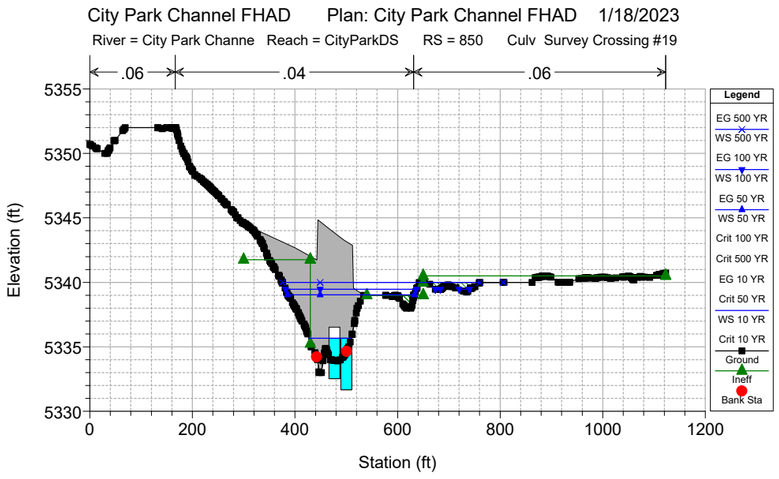

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1602
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

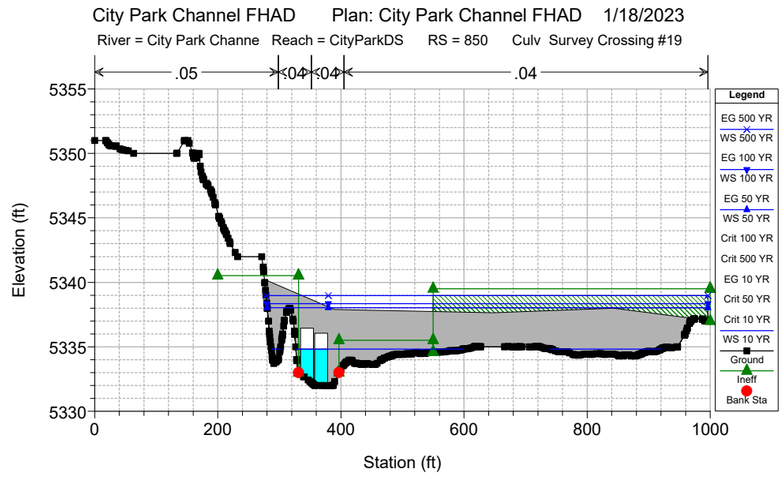

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1571
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

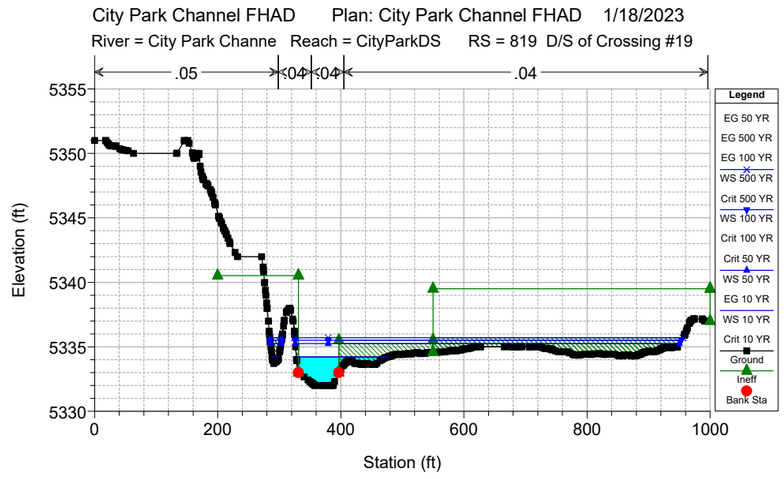

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1375
.06
.04
.035
.04
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

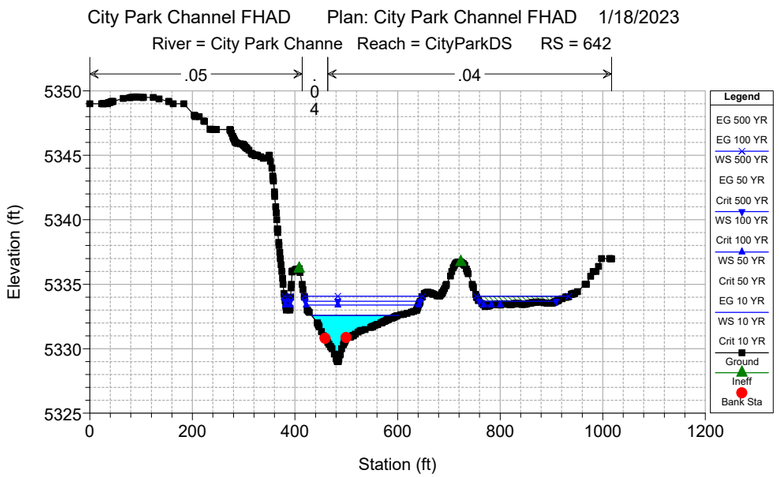

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1237
.06
.04
.035
.04
.06
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

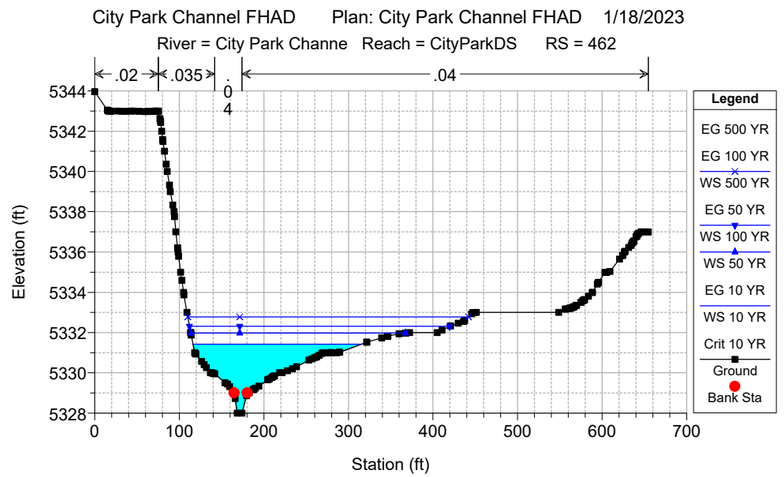

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 1022 U/S of Crossing #19
.06
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

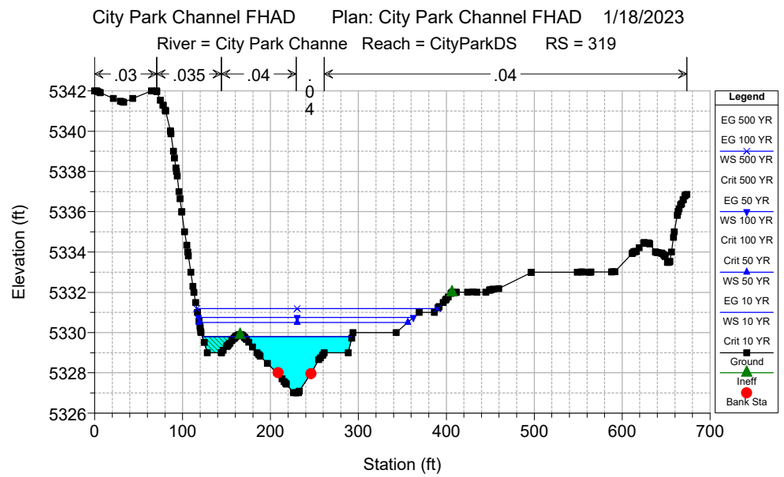

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 850 Culv Survey Crossing #19
.06
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 100 YR
Crit 500 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

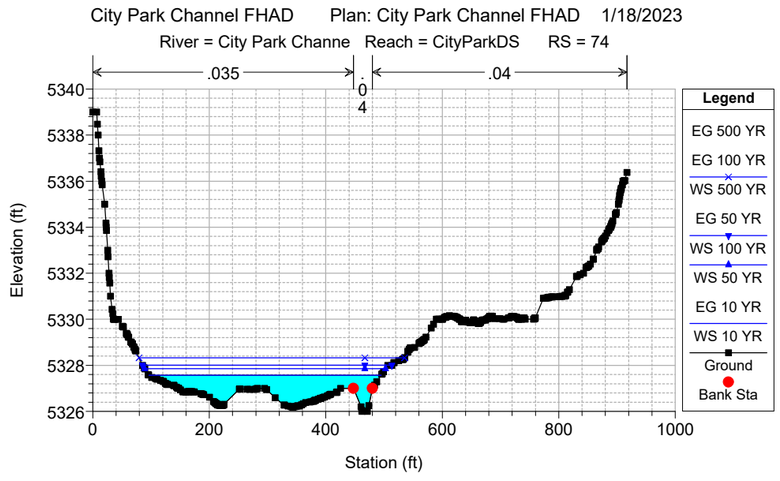

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 850 Culv Survey Crossing #19
.05
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 100 YR
Crit 500 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

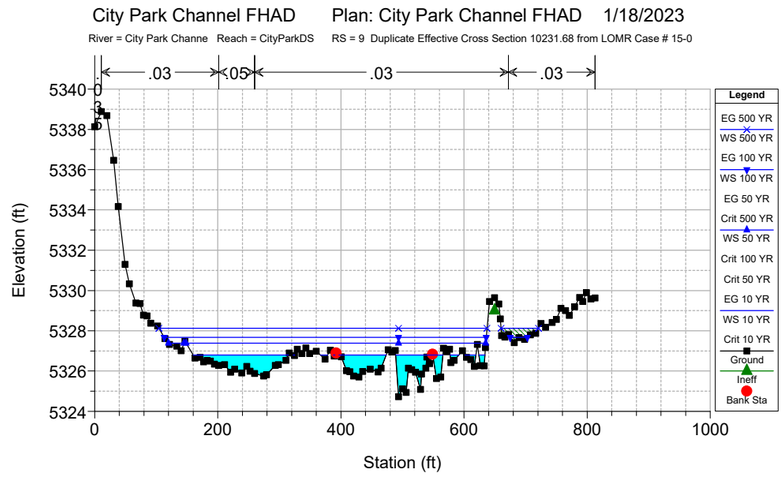

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 819 D/S of Crossing #19
.05
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 50 YR
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

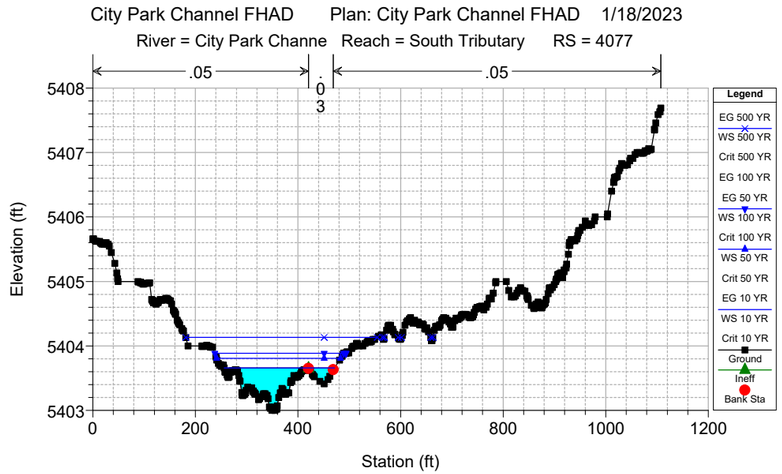

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 642
.05
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
Crit 500 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

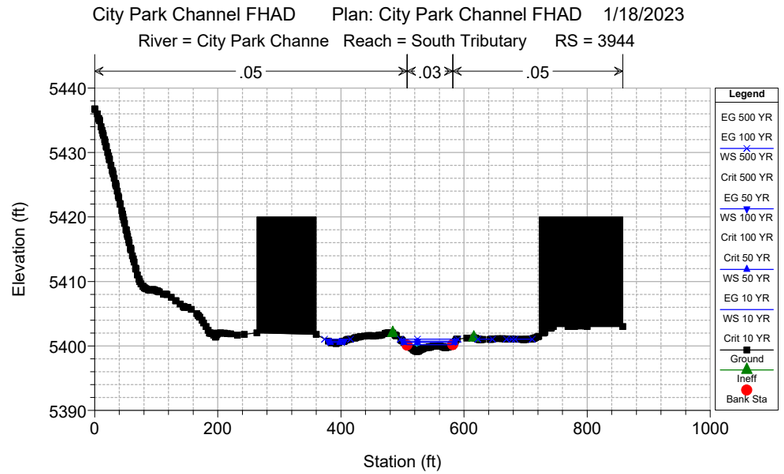

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 462
.02
.035
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

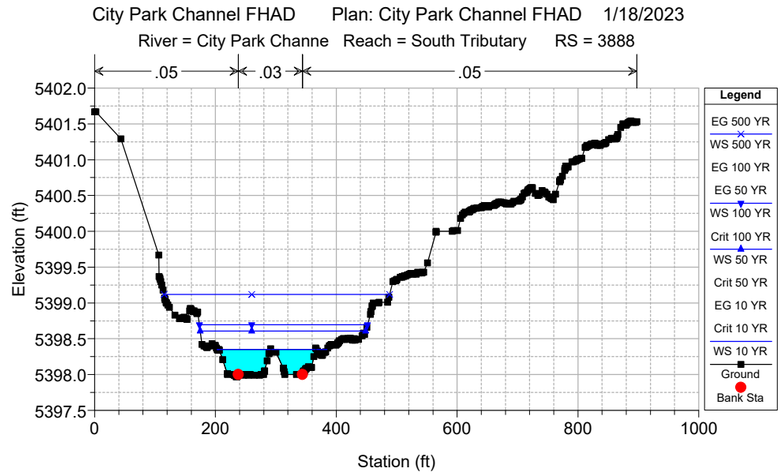

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 319
.03
.035
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

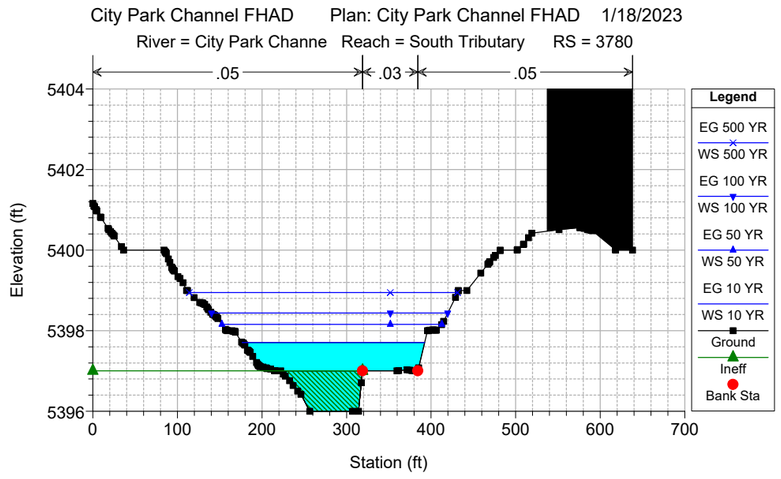

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 74
.035
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

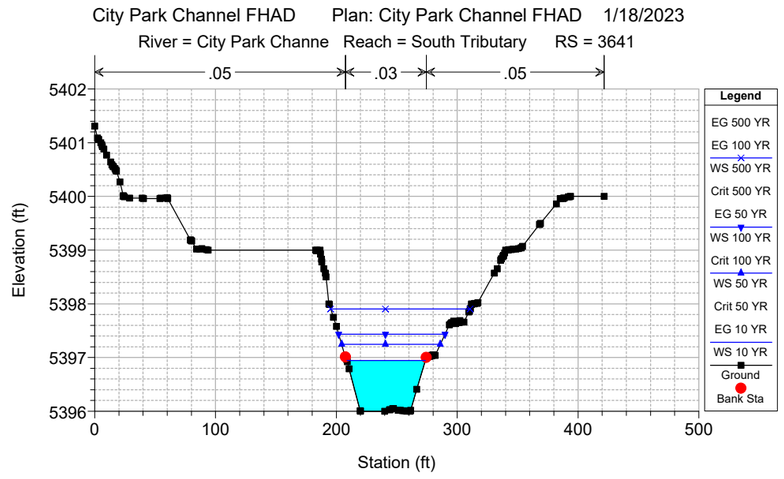

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = CityParkDS RS = 9 Duplicate Effective Cross Section 10231.68 from LOMR Case # 15-0
.03
.05
.03
.03
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

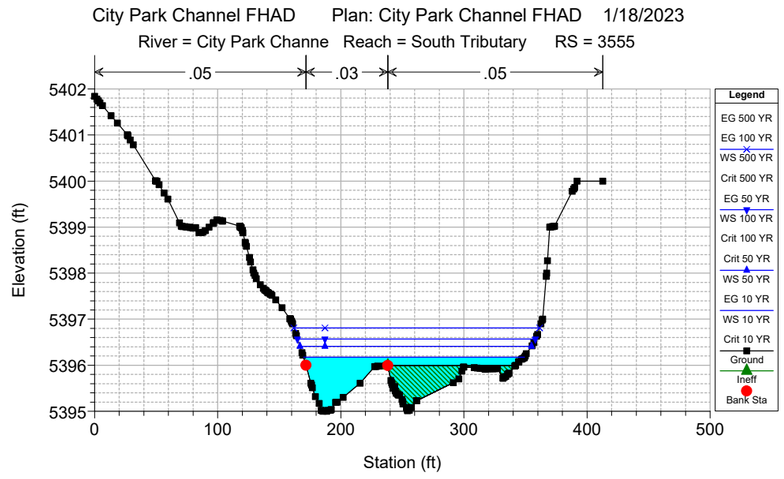

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 4077
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

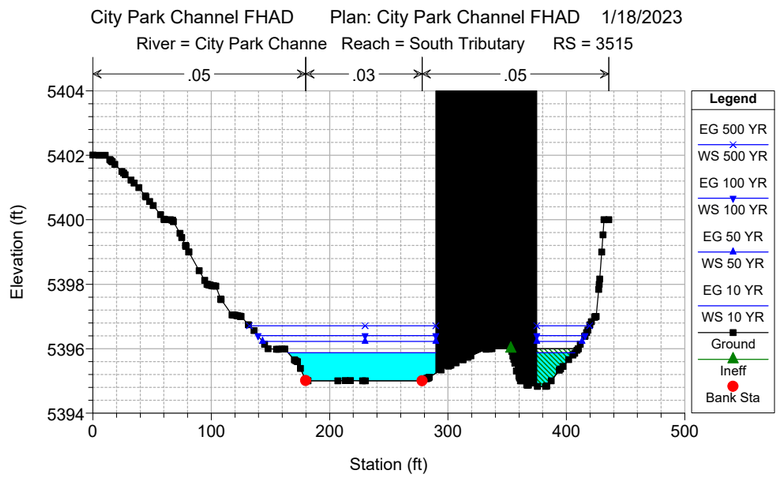

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3944
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

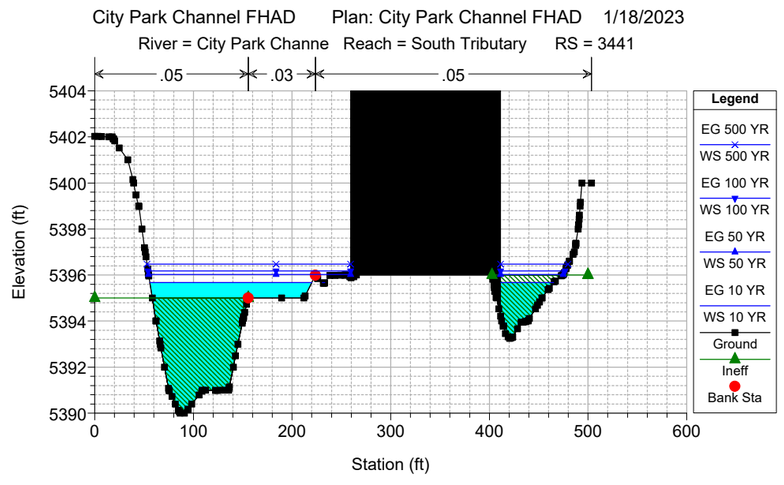

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3888
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
Crit 10 YR
WS 10 YR
Ground
Bank Sta

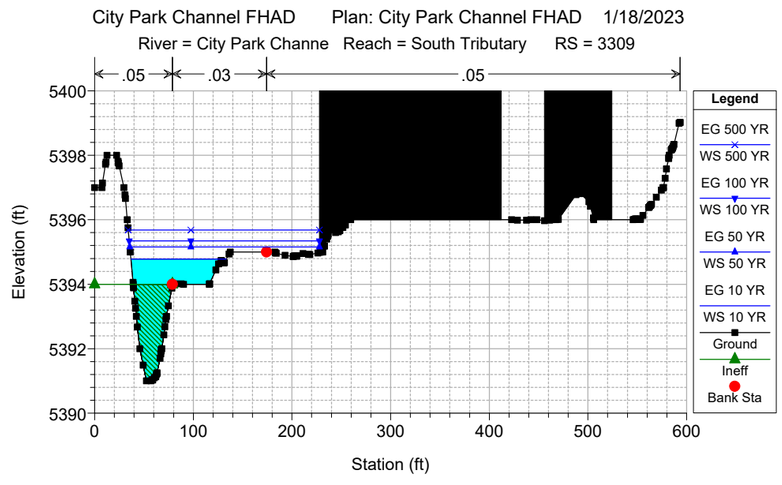

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3780
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

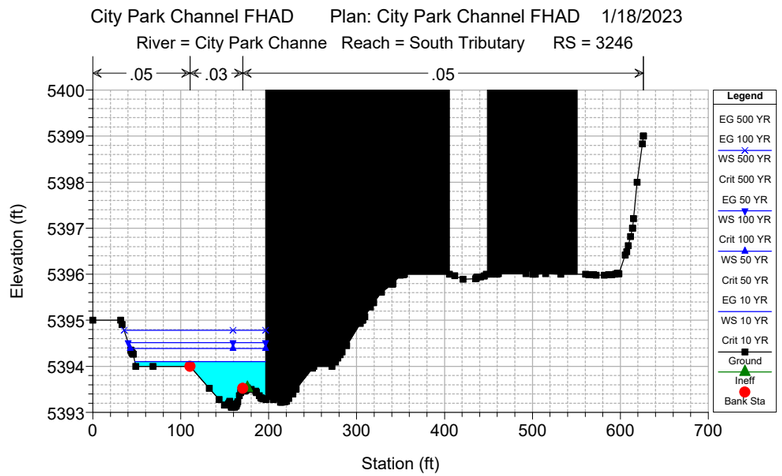

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3641
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

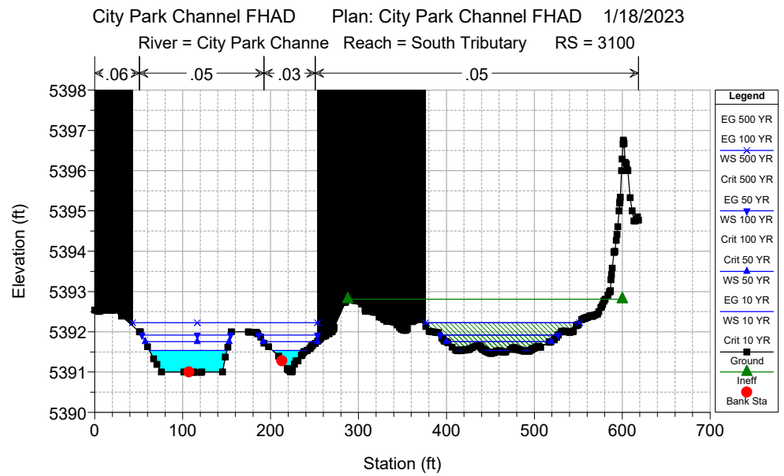

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3555
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

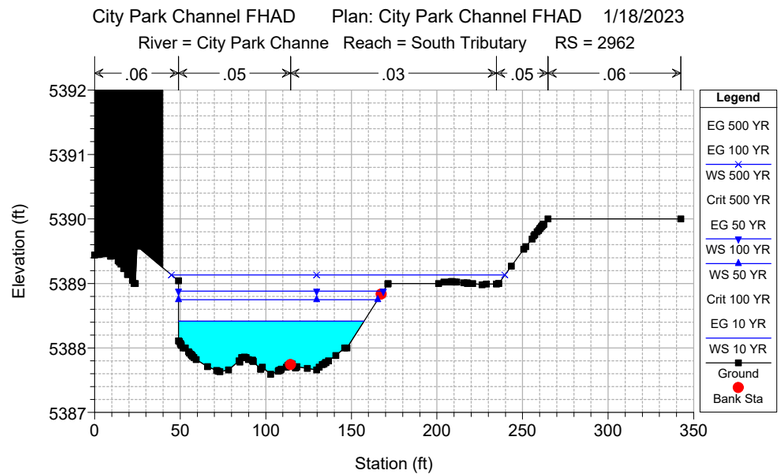

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3515
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

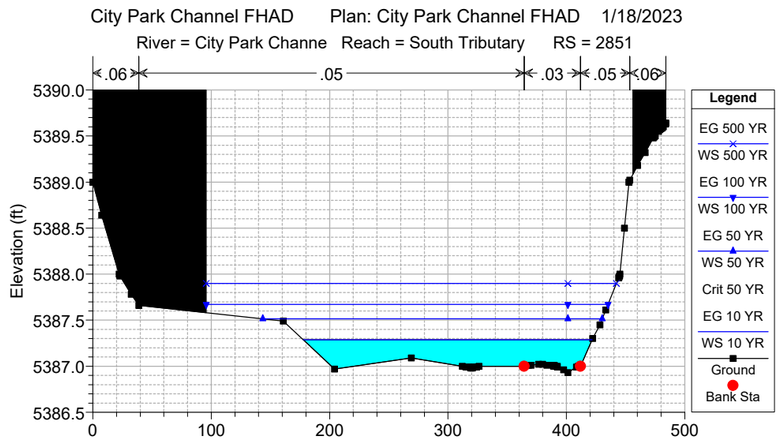

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3441
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

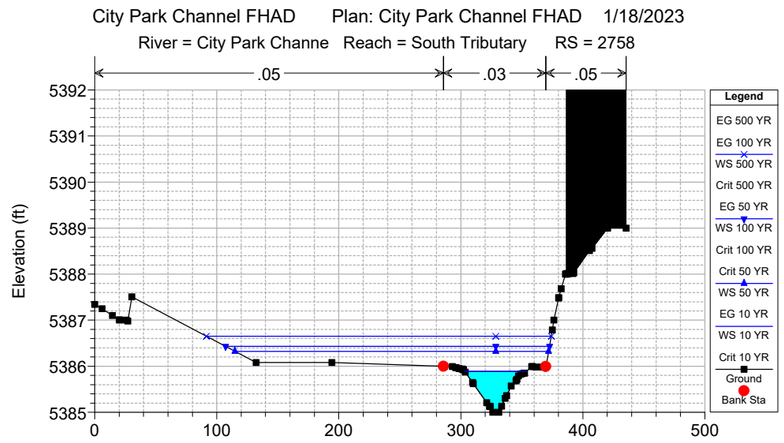

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3309
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Ineff
Bank Sta

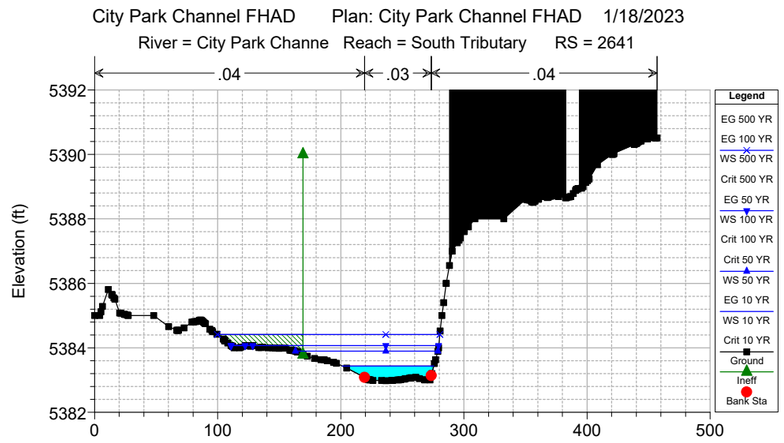

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3246
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

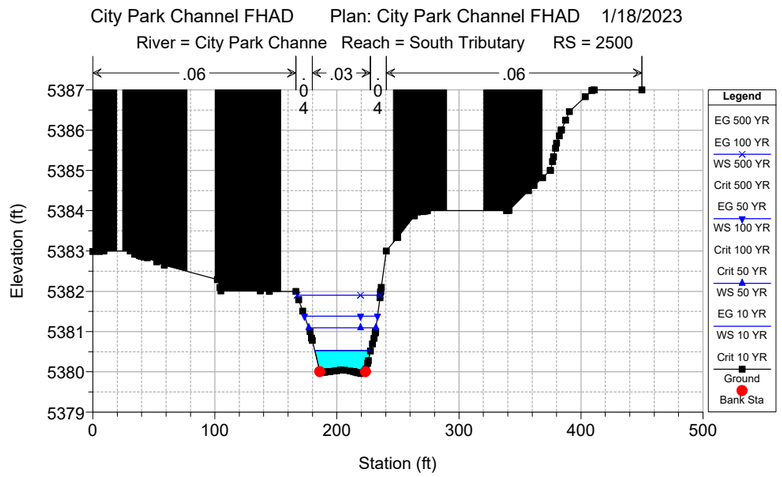

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 3100
.06
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

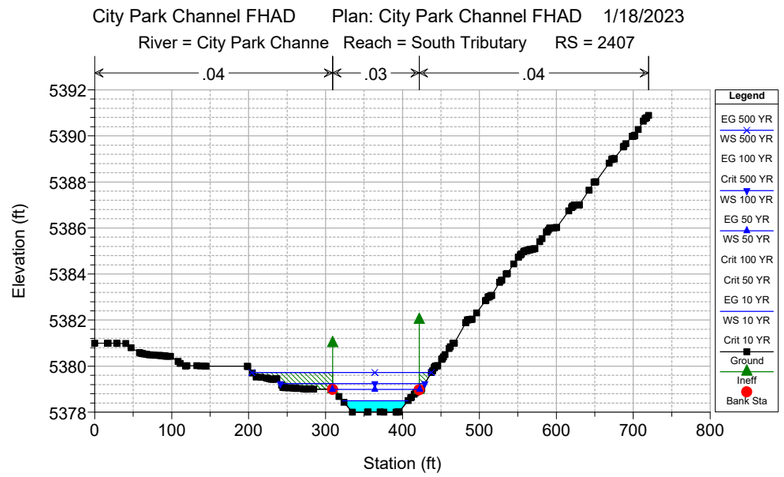

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2962
.06
.05
.03
.05
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 100 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

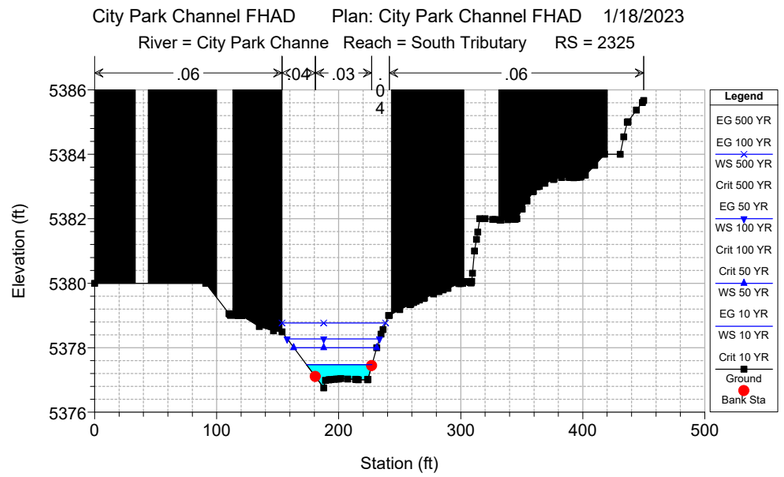

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2851
.06
.05
.03
.05
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

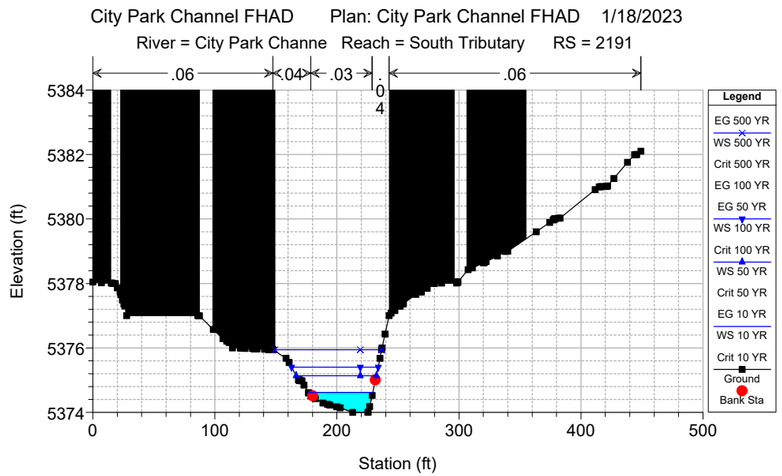

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2758
.05
.03
.05
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

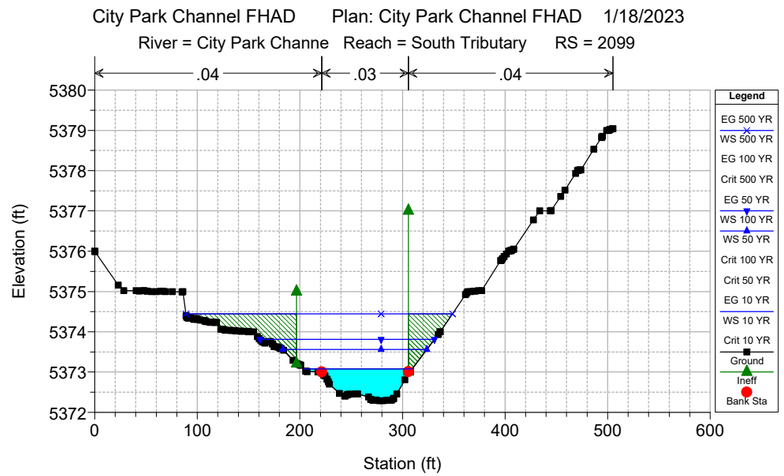

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2641
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

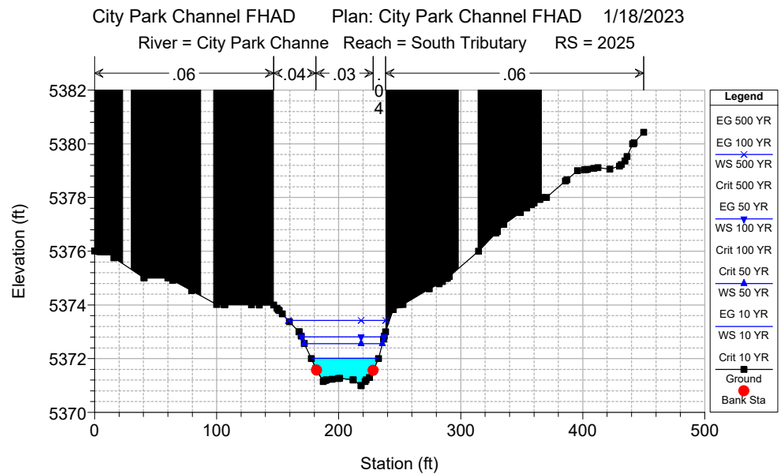

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2500
.06
.04
.03
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

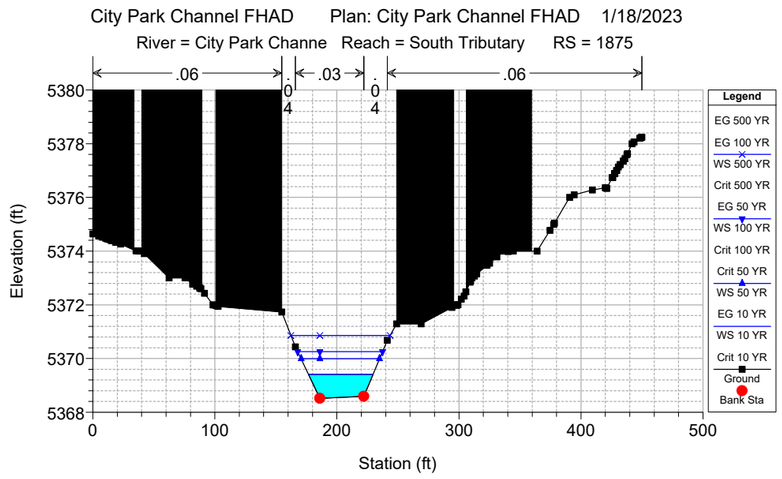

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2407
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

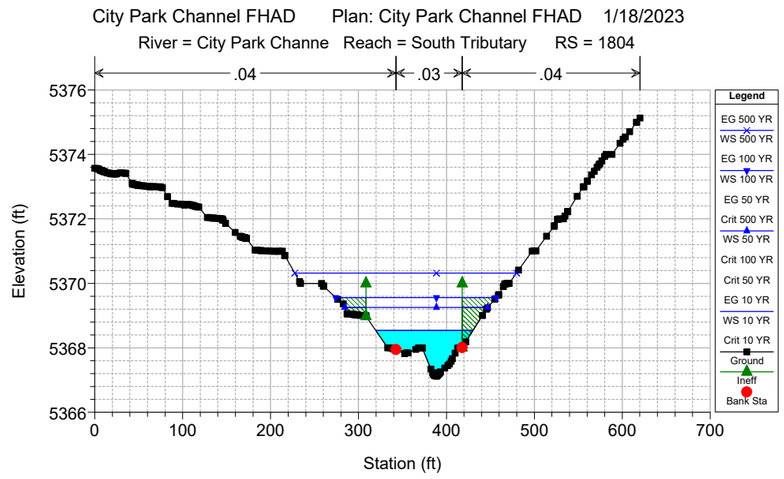

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2325
.06
.04
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

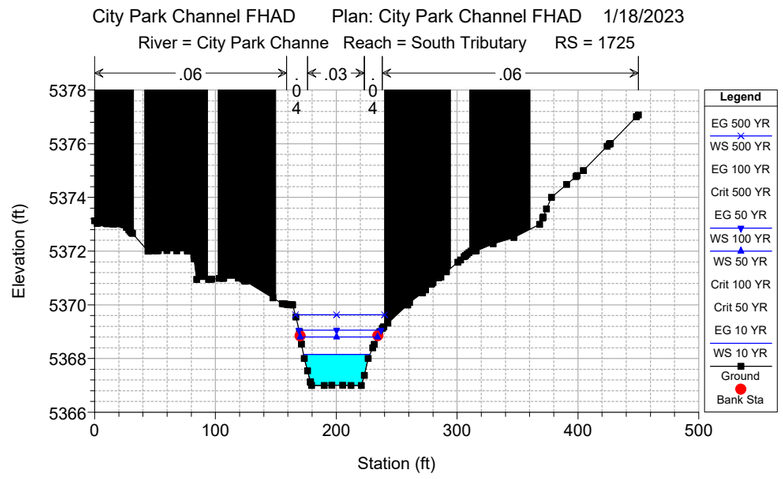

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2191
.06
.04
.03
.04
.06
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

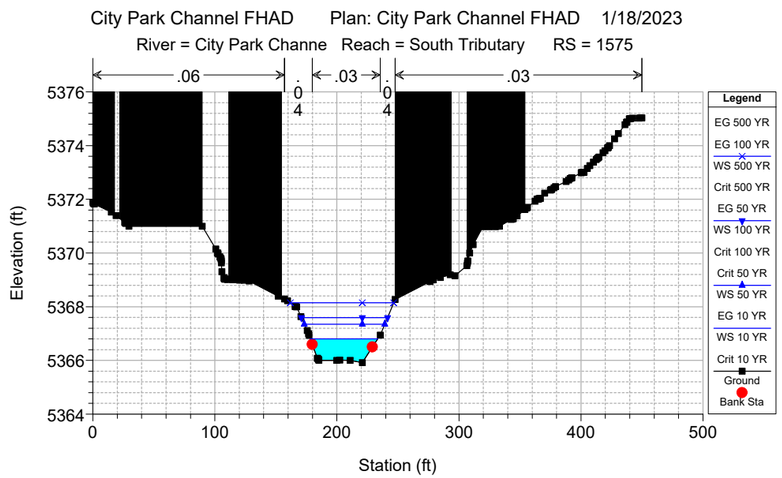

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2099
.04
.03
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

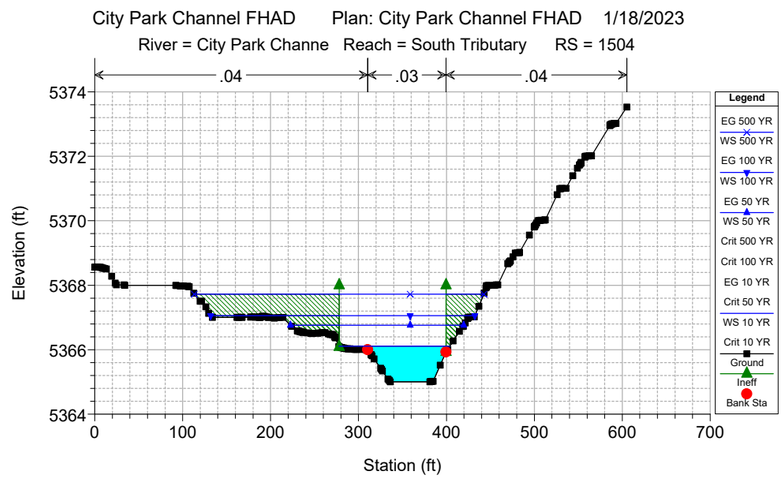

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 2025
.06
.04
.03
.06
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

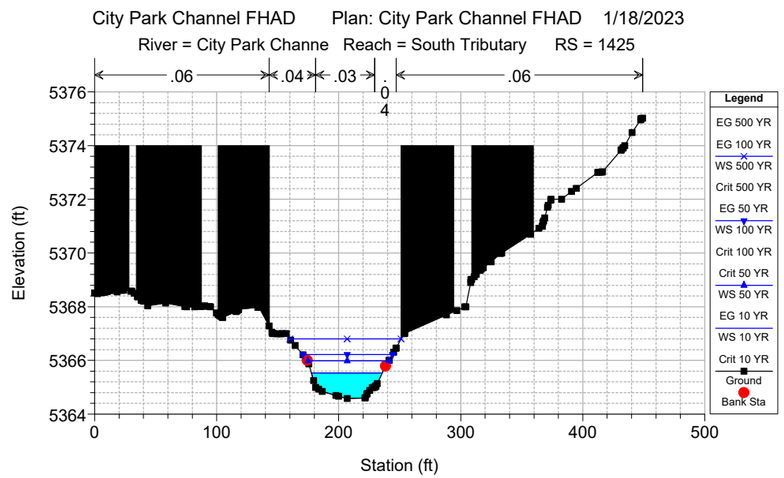

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1875
.06
.03
.06
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

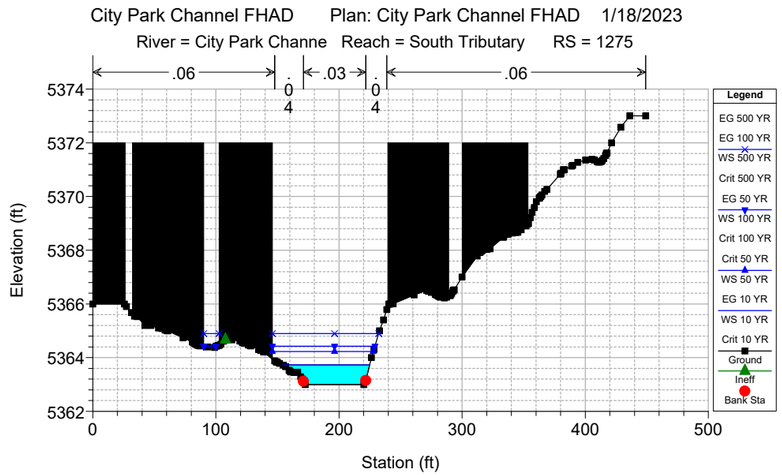

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1804
.04
.03
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
Crit 500 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

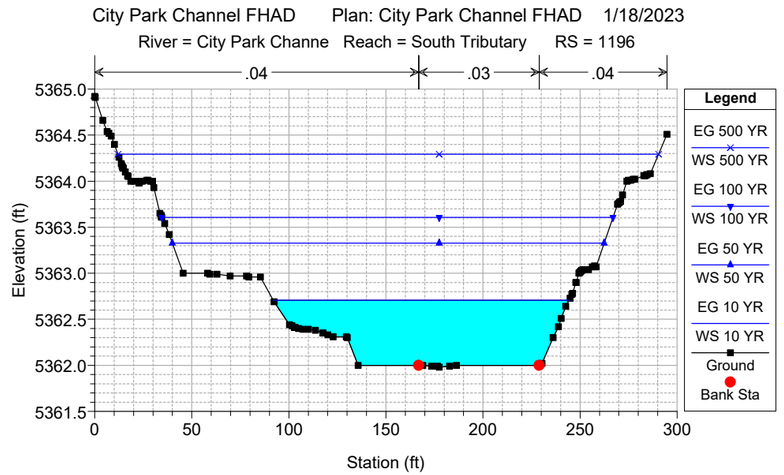

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1725
.06
.03
.06
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

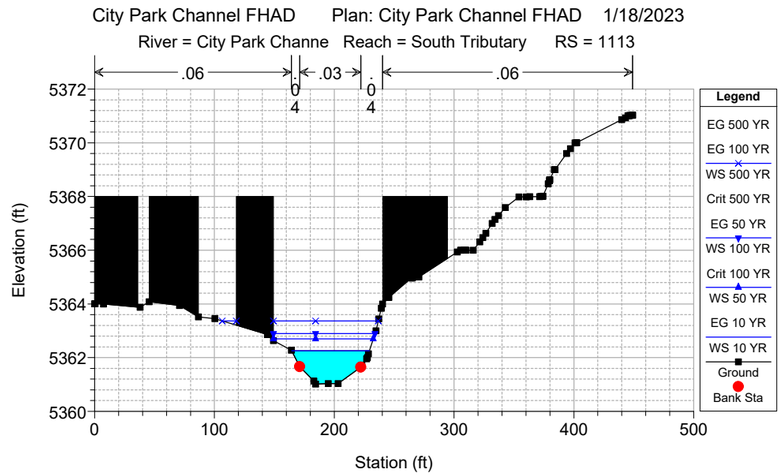

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1575
.06
.03
.03
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

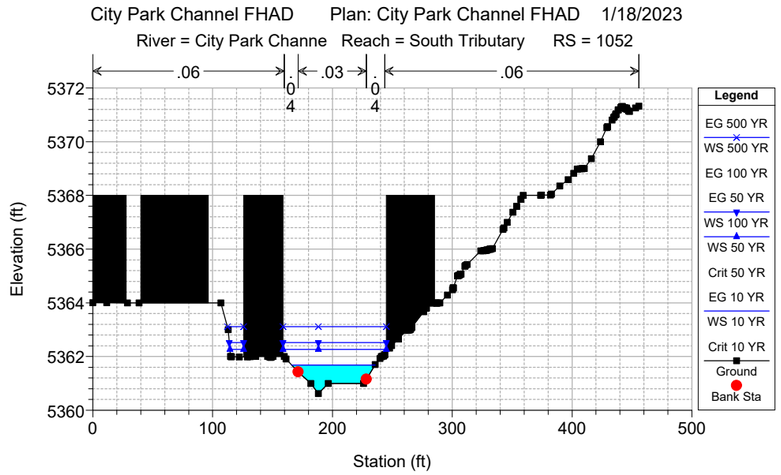

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1504
.04
.03
.04
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 500 YR
Crit 100 YR
EG 10 YR
Crit 50 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

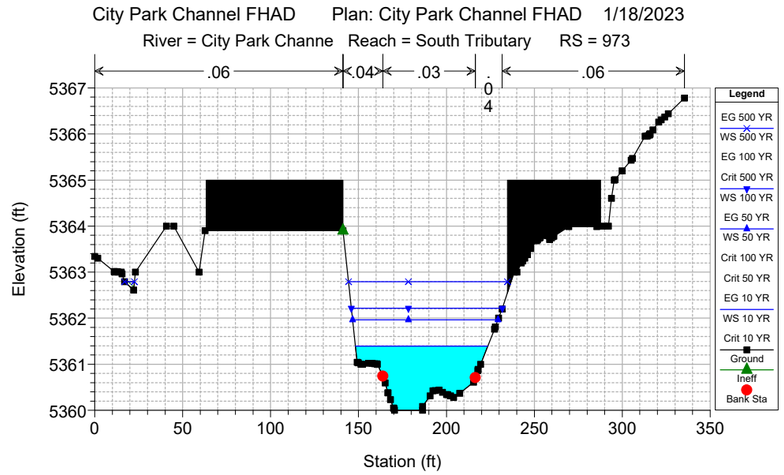

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1425
.06
.04
.03
.06
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta
Elevation (ft)
Station (ft)

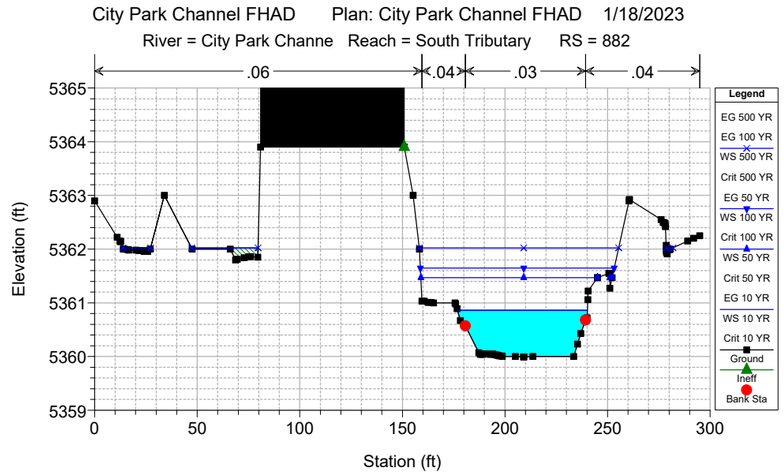

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1275
.06
.04
.03
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

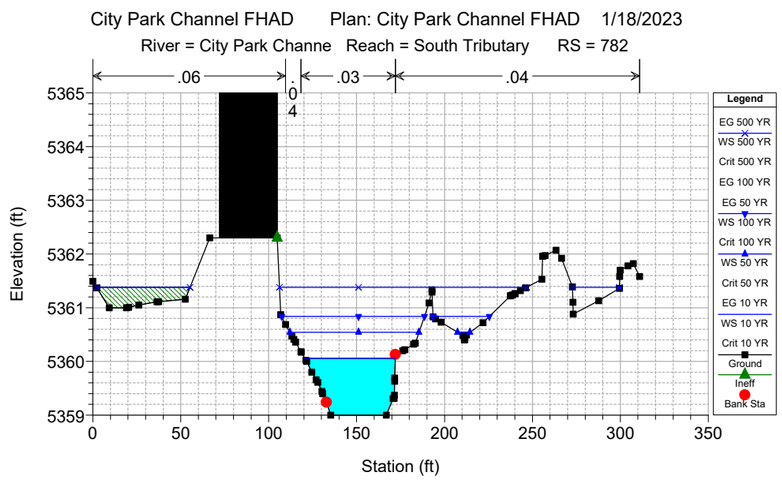

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1196
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
WS 100 YR
EG 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

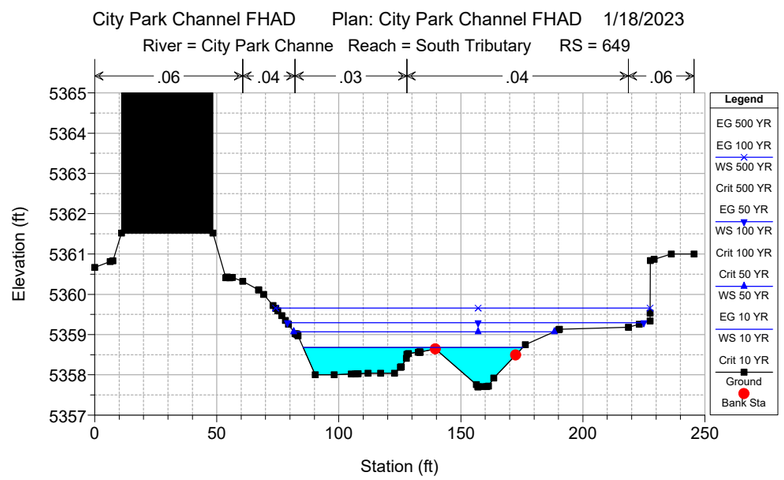

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1113
.06
.04
.03
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
EG 10 YR
WS 10 YR
Ground
Bank Sta

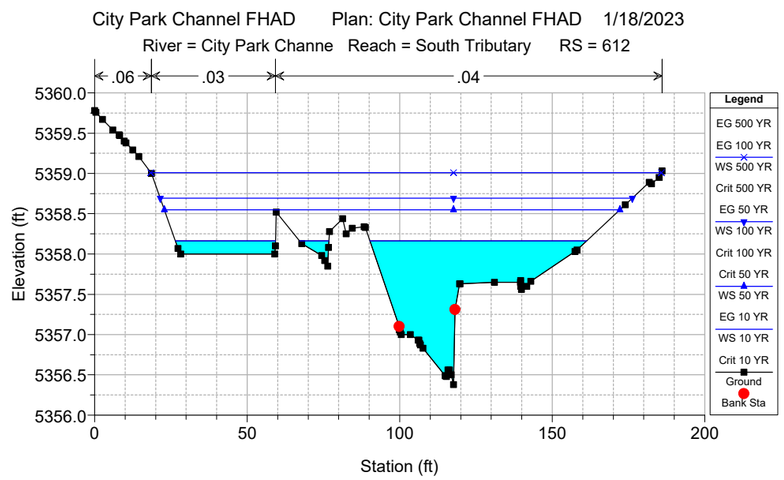

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 1052
.06
.04
.03
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

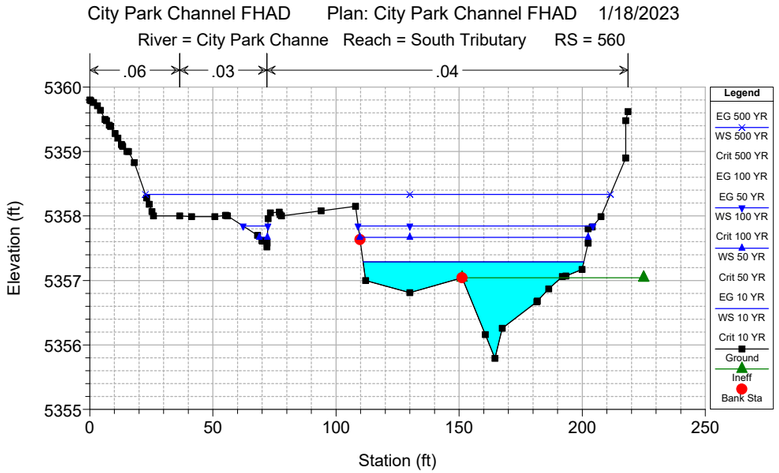

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 973
.06
.04
.03
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
WS 100 YR
EG 50 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

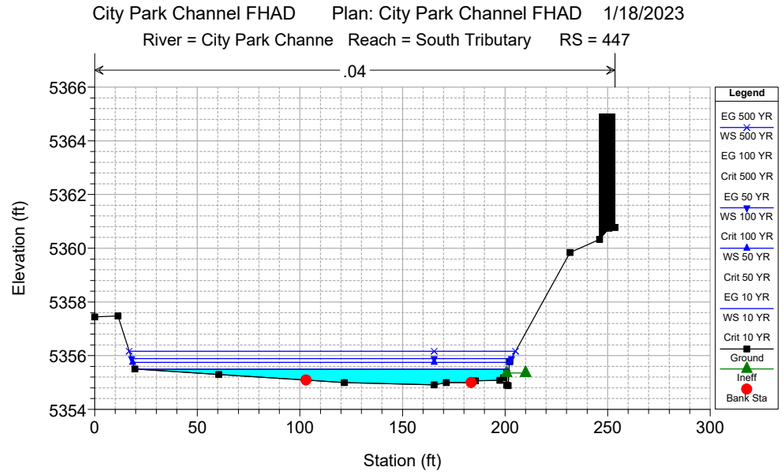

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 882
.06
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

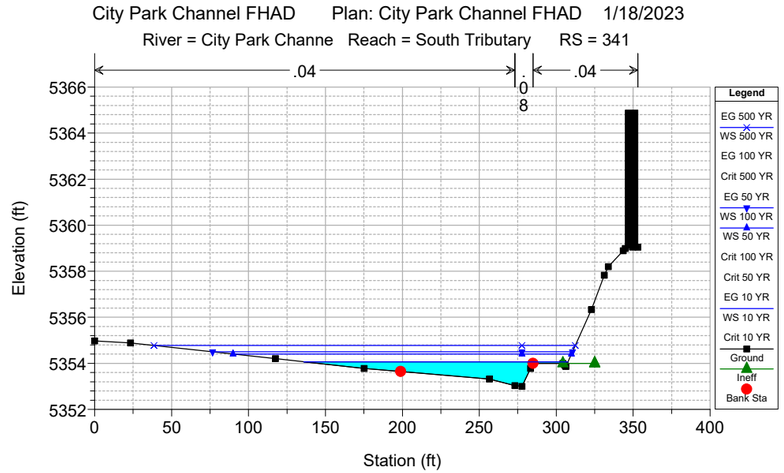

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 782
.06
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

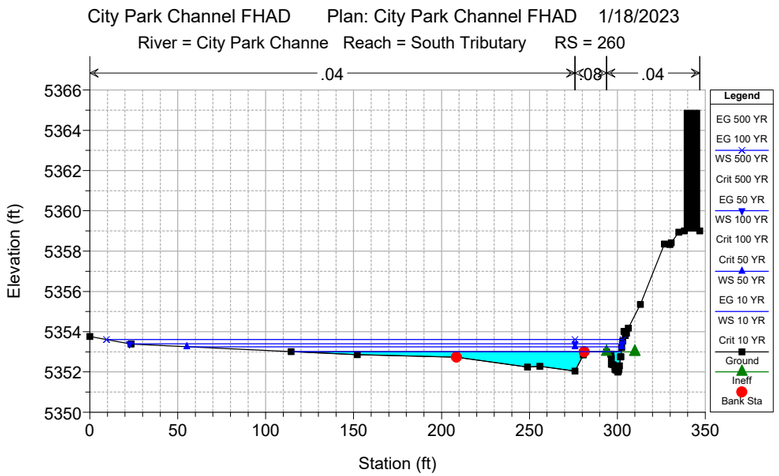

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 649
.06
.04
.03
.04
.06
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta

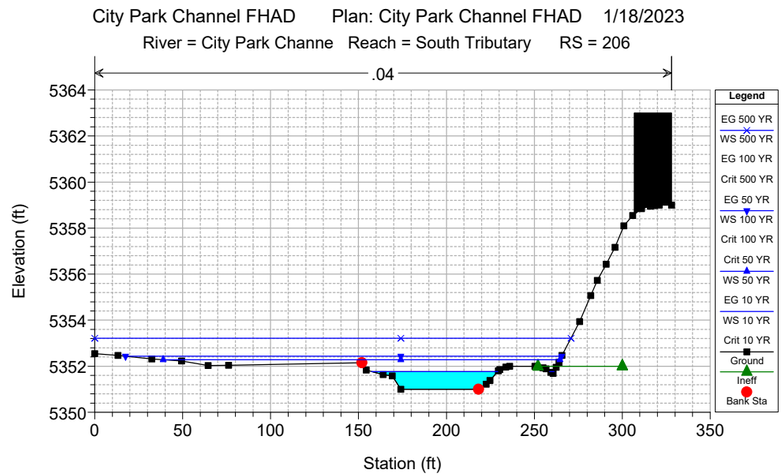

City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 612
.06
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 560
.06
.03
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
Crit 500 YR
EG 100 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 447
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
WS 50 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 341
.04
.08
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
EG 50 YR
WS 100 YR
WS 50 YR
Crit 100 YR
Crit 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 260
.04
.08
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
EG 100 YR
WS 500 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta


City Park Channel FHAD Plan: City Park Channel FHAD 1/18/2023
River = City Park Channe Reach = South Tributary RS = 206
.04
Elevation (ft)
Station (ft)
Legend
EG 500 YR
WS 500 YR
EG 100 YR
Crit 500 YR
EG 50 YR
WS 100 YR
Crit 100 YR
Crit 50 YR
WS 50 YR
EG 10 YR
WS 10 YR
Crit 10 YR
Ground
Ineff
Bank Sta

HEC-RAS Plan: FLDWY Profile: 100 YR

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)	
CityParkDS	9	100 YR	2413.00	5324.73	5327.68	5327.31	5327.91	0.004377	4.47	656.10	551.02	0.62
CityParkDS	74	100 YR	2426.00	5326.00	5328.01		5328.37	0.009787	5.10	509.92	428.57	0.70
CityParkDS	319	100 YR	2426.00	5327.01	5330.75	5330.75	5331.47	0.010682	8.55	399.72	244.68	0.83
CityParkDS	462	100 YR	2426.00	5328.00	5332.31		5332.85	0.008513	8.54	475.04	307.60	0.75
CityParkDS	642	100 YR	2426.00	5329.00	5333.68	5333.45	5334.26	0.007246	7.56	446.25	384.10	0.69
CityParkDS	819	100 YR	2426.00	5331.97	5335.51	5335.51	5336.11	0.007726	7.15	430.22	646.10	0.70
CityParkDS	850		Culvert									
CityParkDS	1022	100 YR	2426.00	5333.00	5339.46	5337.38	5339.94	0.002672	5.90	503.45	285.39	0.45
CityParkDS	1237	100 YR	2426.00	5332.90	5340.16	5340.16	5341.10	0.009071	9.52	388.71	220.80	0.79
CityParkDS	1375	100 YR	2426.00	5333.75	5341.44	5340.36	5341.82	0.002957	5.91	581.18	267.96	0.47
CityParkDS	1571	100 YR	2426.00	5334.12	5342.02	5341.33	5342.54	0.004069	6.93	473.69	249.76	0.57
CityParkDS	1602	100 YR	2426.00	5335.44	5342.17	5341.26	5342.66	0.003698	6.71	472.79	264.53	0.55
CityParkDS	1622	100 YR	2426.00	5334.44	5341.99	5341.82	5342.90	0.008859	9.66	347.63	205.35	0.78
CityParkDS	1636		Bridge									
CityParkDS	1650	100 YR	2426.00	5334.81	5343.82	5342.56	5344.20	0.001886	6.08	599.79	350.42	0.42
CityParkDS	1743	100 YR	2292.00	5335.00	5344.07	5342.38	5344.38	0.001888	5.44	552.39	275.14	0.39
CityParkDS	2044	100 YR	2292.00	5336.47	5345.14	5345.14	5346.33	0.007830	11.45	307.35	195.27	0.75
CityParkDS	2276	100 YR	2292.00	5337.58	5346.83	5346.83	5348.47	0.008523	10.72	268.12	180.49	0.81
CityParkDS	2440	100 YR	2292.00	5338.24	5347.91	5347.91	5350.18	0.010037	12.81	199.51	90.08	0.88
CityParkDS	2455	100 YR	2292.00	5341.23	5349.08	5349.08	5350.94	0.007049	12.38	246.20	137.83	0.83
CityParkDS	2510		Culvert									
CityParkDS	2537	100 YR	2292.00	5342.00	5352.05	5350.13	5352.23	0.001555	3.98	681.97	413.14	0.24
CityParkDS	2570	100 YR	2292.00	5342.10	5352.19	5348.76	5352.27	0.000587	2.44	981.37	320.71	0.14
CityParkDS	2780	100 YR	2170.00	5342.76	5352.34		5352.38	0.000444	2.06	1343.42	428.59	0.13
CityPark	2990	100 YR	1637.00	5343.41	5352.42		5352.56	0.001711	3.64	590.91	239.83	0.24
CityPark	3003	100 YR	1637.00	5343.45	5352.43		5352.60	0.002159	4.11	533.90	223.46	0.27
CityPark	3018	100 YR	1637.00	5345.13	5352.42		5352.66	0.003797	4.86	446.72	219.29	0.35
CityPark	3106	100 YR	1637.00	5345.35	5352.72	5351.64	5353.14	0.006710	5.80	322.02	125.57	0.45
CityPark	3200	100 YR	1637.00	5346.10	5353.16		5353.72	0.004883	6.32	290.67	93.94	0.52
CityPark	3244	100 YR	1637.00	5346.42	5353.08	5352.79	5354.19	0.010957	8.82	208.12	79.72	0.76
CityPark	3262	100 YR	1637.00	5347.46	5354.25	5354.25	5355.34	0.008900	9.16	232.18	111.80	0.71
CityPark	3270		Bridge									
CityPark	3279	100 YR	1637.00	5347.90	5356.03	5354.53	5356.31	0.002009	4.94	467.80	192.96	0.35
CityPark	3315	100 YR	1637.00	5348.09	5356.21		5356.37	0.001425	3.97	564.77	251.04	0.29
CityPark	3354	100 YR	1637.00	5348.28	5356.25		5356.44	0.001729	4.26	528.97	215.53	0.31
CityPark	3431	100 YR	1637.00	5348.66	5356.34		5356.70	0.004850	5.12	362.46	163.99	0.39
CityPark	3694	100 YR	1263.00	5349.96	5357.42	5355.84	5357.99	0.004473	6.39	240.77	115.31	0.49
CityPark	3724	100 YR	1263.00	5353.35	5357.48	5356.94	5358.24	0.009843	7.13	193.00	95.50	0.70
CityPark	3731	100 YR	1263.00	5354.58	5357.87	5357.87	5358.71	0.015927	7.76	185.03	112.91	0.86
CityPark	3742	100 YR	1263.00	5353.28	5358.57		5358.80	0.001402	4.07	399.94	299.10	0.35
CityPark	3894	100 YR	1253.00	5353.58	5358.80		5358.97	0.000881	3.49	447.07	265.32	0.29
CityPark	4021	100 YR	1253.00	5353.58	5359.82	5359.82	5360.97	0.007747	9.55	175.97	90.47	0.79
CityPark	4088		Culvert									
CityPark	4164	100 YR	1253.00	5355.00	5362.07	5359.24	5362.24	0.000775	3.75	595.06	509.57	0.28
CityPark	4326	100 YR	1253.00	5356.35	5362.31		5362.45	0.001259	4.42	492.92	212.92	0.34
CityPark	4336	100 YR	1253.00	5358.59	5362.33		5362.47	0.001671	4.17	466.19	213.43	0.38
CityPark	4346	100 YR	1253.00	5356.54	5362.33		5362.49	0.001871	4.28	442.67	214.36	0.39
CityPark	4513	100 YR	1253.00	5359.00	5362.65	5362.65	5363.36	0.010377	7.84	220.81	164.77	0.87
CityPark	4577	100 YR	1253.00	5360.24	5363.44	5363.41	5364.08	0.010353	7.93	228.70	166.30	0.88
CityPark	4587	100 YR	1253.00	5361.00	5363.68	5363.57	5364.21	0.011636	7.12	232.38	175.98	0.83
CityPark	4597	100 YR	1253.00	5360.55	5363.73	5363.71	5364.36	0.011059	8.06	229.97	173.53	0.90
CityPark	4711	100 YR	1253.00	5361.43	5364.96	5364.96	5365.63	0.010871	8.31	245.03	190.60	0.90
CityPark	4799	100 YR	1253.00	5362.28	5366.03	5366.03	5366.65	0.011312	8.87	225.95	166.14	0.91
CityPark	4809	100 YR	1253.00	5364.98	5366.49	5366.49	5367.12	0.020619	7.36	199.11	162.83	1.05
CityPark	4820	100 YR	1253.00	5362.28	5366.92		5367.27	0.008659	5.82	265.15	174.03	0.74
CityPark	4935	100 YR	1253.00	5363.30	5367.66		5368.04	0.005324	7.01	277.74	143.94	0.66
CityPark	5095	100 YR	1253.00	5364.70	5369.28	5369.28	5369.97	0.009808	8.42	222.67	148.51	0.86
CityPark	5110	100 YR	1253.00	5368.18	5370.67	5370.67	5371.30	0.014242	7.30	215.83	164.07	0.89
CityPark	5133	100 YR	1253.00	5364.76	5371.32		5371.43	0.001406	3.29	476.12	194.11	0.33
CityPark	5237	100 YR	1253.00	5367.00	5371.44		5371.54	0.000741	3.01	529.10	179.43	0.26
CityPark	5534	100 YR	1253.00	5369.07	5372.33	5372.33	5373.00	0.009737	8.49	226.47	150.80	0.88
CityPark	5819	100 YR	1219.00	5372.45	5376.09	5376.09	5376.83	0.014469	9.23	189.71	120.62	0.99
CityPark	5840	100 YR	1219.00	5375.64	5376.92	5376.92	5377.67	0.015201	4.71	180.49	121.19	0.81
CityPark	5860	100 YR	1219.00	5372.49	5377.53	5377.53	5378.27	0.015453	8.86	183.68	126.51	1.02
CityPark	6054	100 YR	1219.00	5375.73	5381.60	5381.60	5382.29	0.007694	8.57	229.55	157.55	0.76
CityPark	6256	100 YR	1219.00	5379.10	5383.31	5383.10	5383.67	0.007754	6.99	275.48	205.08	0.74
CityPark	6276	100 YR	1219.00	5379.44	5383.46	5383.46	5384.00	0.016902	7.28	220.14	213.12	0.98
CityPark	6288	100 YR	1219.00	5382.58	5383.77	5383.77	5384.25	0.020436	5.58	220.68	231.15	1.05
CityPark	6301	100 YR	1219.00	5382.00	5384.18		5384.41	0.006286	5.45	333.75	265.88	0.65
CityPark	6324	100 YR	1219.00	5380.67	5384.26		5384.63	0.007556	6.11	294.09	269.06	0.73
CityPark	6344	100 YR	1219.00	5381.96	5384.40	5384.40	5384.88	0.014809	8.23	239.16	231.11	1.01
CityPark	6392	100 YR	1219.00	5383.00	5385.42	5385.42	5385.94	0.013132	7.66	233.73	208.62	0.96
CityPark	6516	100 YR	1219.00	5384.60	5388.18	5388.18	5388.67	0.008685	5.77	220.57	231.85	0.71
CityPark	6578	100 YR	1219.00	5385.50	5389.25	5388.64	5389.37	0.006796	4.08	438.66	366.88	0.50

HEC-RAS Plan: FLDWY Profile: 100 YR (Continued)

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)	
CityPark	6621		Culvert									
CityPark	6632	100 YR	1219.00	5385.24	5391.61	5391.61	5391.88	0.008642	6.46	388.86	760.24	0.61
CityPark	6655	100 YR	1219.00	5385.18	5391.96	5390.45	5391.97	0.000206	1.03	1534.33	767.00	0.10
CityPark	6736		Culvert									
CityPark	6809	100 YR	1219.00	5386.19	5395.04	5393.57	5395.06	0.000267	1.46	1476.85	974.71	0.15
CityPark	6874	100 YR	804.00	5387.10	5395.05	5390.22	5395.07	0.000065	0.99	955.63	309.67	0.08
CityPark	6956	100 YR	804.00	5388.00	5395.06	5390.60	5395.08	0.000073	1.04	870.79	285.01	0.08
CityPark	7011	100 YR	804.00	5388.52	5395.05	5391.68	5395.10	0.000239	1.84	569.44	243.94	0.15
CityPark	7103		Culvert									
CityPark	7204	100 YR	804.00	5392.37	5396.35	5395.97	5396.81	0.003171	6.06	168.55	89.64	0.56
CityPark	7209	100 YR	804.00	5392.55	5396.39		5396.82	0.002843	6.07	170.94	82.53	0.56
CityPark	7210	100 YR	804.00	5393.36	5396.40	5396.40	5397.12	0.009995	8.57	125.21	83.10	0.97
CityPark	7335	100 YR	804.00	5394.29	5398.08	5398.00	5398.58	0.013330	6.51	147.75	126.87	0.75
CityPark	7451	100 YR	804.00	5395.04	5399.60	5399.60	5400.07	0.011775	6.27	151.33	135.24	0.70
CityPark	7545	100 YR	804.00	5395.65	5401.10	5401.10	5401.82	0.011305	7.64	124.75	72.73	0.72
CityPark	7665	100 YR	804.00	5396.43	5402.36		5402.68	0.004639	4.54	181.21	83.58	0.40
CityPark	7861	100 YR	623.00	5397.71	5403.42		5403.90	0.008567	6.39	121.65	80.75	0.67
CityPark	7902	100 YR	623.00	5397.97	5403.89		5404.17	0.004746	4.63	152.00	80.43	0.42
CityPark	8077	100 YR	623.00	5399.59	5404.83	5404.47	5405.27	0.007305	5.72	132.76	91.29	0.58
CityPark	8148		Culvert									
CityPark	8219	100 YR	470.00	5400.15	5405.86	5404.24	5405.98	0.001548	3.15	199.56	134.60	0.28
CityPark	8259	100 YR	470.00	5400.64	5405.89		5406.08	0.002605	3.78	144.17	79.67	0.36
CityPark	8302	100 YR	470.00	5401.00	5405.99		5406.25	0.003842	4.42	121.81	74.17	0.42
CityPark	8337		Culvert									
CityPark	8373	100 YR	470.00	5402.00	5406.47	5405.99	5406.82	0.003485	5.26	115.66	86.78	0.52
CityPark	8474	100 YR	470.00	5402.39	5406.91	5406.53	5407.18	0.003577	4.82	133.72	90.52	0.52
CityPark	8579	100 YR	353.00	5403.54	5407.27	5406.94	5407.75	0.007880	5.80	73.94	89.30	0.71
CityPark	8649	100 YR	353.00	5404.36	5407.82	5407.82	5408.68	0.012401	7.71	51.91	85.17	0.92
CityPark	8745	100 YR	353.00	5405.66	5409.16		5409.43	0.003572	4.63	98.01	93.86	0.51
CityPark	8783		Culvert									
CityPark	8822	100 YR	353.00	5407.77	5410.55	5410.55	5410.97	0.015823	5.49	69.32	78.46	0.78
CityPark	8925	100 YR	353.00	5410.97	5412.17	5412.17	5412.51	0.010285	4.85	80.58	124.22	0.88
CityPark	9033	100 YR	353.00	5411.99	5413.16	5413.06	5413.45	0.007425	4.72	87.93	116.02	0.77
CityPark	9083	100 YR	353.00	5412.79	5413.64		5413.87	0.009638	4.35	94.22	140.04	0.83
CityPark	9118	100 YR	353.00	5412.00	5413.88		5414.04	0.002664	3.64	127.53	162.25	0.49
CityPark	9141	100 YR	213.00	5412.60	5414.01		5414.12	0.004280	2.95	96.34	158.46	0.47
CityPark	9169	100 YR	213.00	5414.01	5414.97	5414.97	5415.25	0.016453	4.07	50.64	97.28	1.00
CityPark	9210	100 YR	213.00	5414.99	5415.95	5415.95	5416.32	0.037021	5.09	44.25	99.95	0.98
CityPark	9259	100 YR	213.00	5413.00	5416.39		5416.41	0.000341	1.23	186.92	87.42	0.13
CityPark	9348	100 YR	213.00	5413.99	5416.42		5416.42	0.000047	0.60	417.77	225.30	0.07
CityPark	9430	100 YR	213.00	5415.00	5416.38		5416.45	0.002347	1.56	107.37	119.86	0.29
CityPark	9651	100 YR	213.00	5416.00	5417.16		5417.23	0.005760	2.48	107.12	153.55	0.41
CityPark	9754	100 YR	213.00	5417.00	5417.93	5417.68	5418.05	0.010959	2.97	83.92	125.75	0.54

HEC-RAS Plan: FLDWY River: City Park Channe Reach: South Tributary Profile: 100 YR

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)	
South Tributary	206	100 YR	547.00	5351.00	5352.44	5352.44	5352.72	0.012694	4.78	148.91	247.98	0.76
South Tributary	260	100 YR	547.00	5352.05	5353.40	5353.40	5353.64	0.015920	4.61	156.14	280.26	0.80
South Tributary	341	100 YR	547.00	5353.00	5354.50	5354.38	5354.71	0.012484	4.08	160.89	233.81	0.69
South Tributary	447	100 YR	547.00	5354.91	5355.89	5355.79	5356.15	0.016216	4.43	137.98	185.18	0.82
South Tributary	560	100 YR	547.00	5356.81	5357.85	5357.85	5358.32	0.020711	5.00	100.08	105.43	0.93
South Tributary	612	100 YR	547.00	5356.38	5358.69	5358.69	5359.05	0.012551	6.29	128.24	154.75	0.80
South Tributary	649	100 YR	547.00	5357.70	5359.29	5359.29	5359.72	0.012280	4.62	112.76	146.07	0.75
South Tributary	782	100 YR	547.00	5359.00	5360.84	5360.84	5361.38	0.007522	6.30	104.69	113.27	0.83
South Tributary	882	100 YR	547.00	5359.99	5361.65	5361.47	5362.09	0.006795	5.51	110.66	94.42	0.78
South Tributary	973	100 YR	547.00	5360.00	5362.22	5361.74	5362.52	0.003613	4.65	134.47	85.89	0.59
South Tributary	1052	100 YR	547.00	5360.62	5362.52		5362.94	0.006933	5.47	116.82	98.12	0.78
South Tributary	1113	100 YR	547.00	5361.02	5362.90	5362.74	5363.39	0.007071	5.85	106.78	84.69	0.80
South Tributary	1196	100 YR	547.00	5361.98	5363.61		5363.69	0.001767	2.86	267.96	232.46	0.40
South Tributary	1275	100 YR	547.00	5363.00	5364.43	5364.43	5365.00	0.010486	6.42	97.92	93.28	0.95
South Tributary	1425	100 YR	547.00	5364.58	5366.22	5366.22	5366.86	0.011580	6.44	86.18	73.49	0.99
South Tributary	1504	100 YR	547.00	5365.00	5367.06	5366.30	5367.19	0.001670	3.03	196.73	300.33	0.39
South Tributary	1575	100 YR	547.00	5365.92	5367.60	5367.60	5368.26	0.010388	6.71	87.42	70.55	0.96
South Tributary	1725	100 YR	547.00	5367.00	5369.06	5368.62	5369.44	0.005909	4.96	110.67	67.83	0.67
South Tributary	1804	100 YR	547.00	5367.12	5369.56	5368.82	5369.71	0.001964	3.34	182.12	182.52	0.43
South Tributary	1875	100 YR	547.00	5368.52	5370.25	5370.25	5370.93	0.010133	7.10	89.61	69.46	0.96
South Tributary	2025	100 YR	547.00	5371.00	5372.82	5372.82	5373.50	0.010415	6.87	87.66	67.75	0.96
South Tributary	2099	100 YR	547.00	5372.29	5373.81	5373.54	5374.11	0.005766	4.52	129.93	170.13	0.69
South Tributary	2191	100 YR	400.00	5374.00	5375.41	5375.41	5375.94	0.011387	6.02	71.49	71.10	0.96
South Tributary	2325	100 YR	400.00	5376.75	5378.28	5378.28	5378.81	0.011253	6.13	74.41	75.81	0.96
South Tributary	2407	100 YR	400.00	5378.00	5379.25	5378.96	5379.44	0.005022	3.53	113.39	187.87	0.62
South Tributary	2500	100 YR	400.00	5379.96	5381.38	5381.38	5381.97	0.011127	6.46	66.93	59.93	0.97
South Tributary	2641	100 YR	400.00	5382.98	5384.07	5384.07	5384.46	0.011417	5.48	89.07	168.57	0.94
South Tributary	2758	100 YR	400.00	5385.00	5386.43	5386.43	5386.69	0.012145	4.61	127.60	265.41	0.92
South Tributary	2851	100 YR	400.00	5386.93	5387.67		5387.79	0.011192	4.04	171.90	339.40	0.87
South Tributary	2962	100 YR	508.00	5387.66	5388.88	5388.72	5389.18	0.013183	5.15	119.85	119.71	0.98
South Tributary	3100	100 YR	508.00	5390.99	5391.92	5391.92	5392.28	0.030482	4.34	109.81	302.17	0.95
South Tributary	3246	100 YR	508.00	5393.11	5394.51	5394.49	5394.88	0.011523	5.53	125.13	156.12	0.95
South Tributary	3309	100 YR	508.00	5394.00	5395.35		5395.54	0.007602	3.83	158.37	192.84	0.74
South Tributary	3441	100 YR	508.00	5395.00	5396.18		5396.30	0.004077	3.36	213.14	270.39	0.57
South Tributary	3515	100 YR	508.00	5395.00	5396.40		5396.55	0.002732	3.24	190.09	191.03	0.48
South Tributary	3555	100 YR	508.00	5395.00	5396.57	5396.57	5396.90	0.010515	5.28	137.89	193.33	0.90
South Tributary	3641	100 YR	508.00	5396.00	5397.43	5397.43	5398.00	0.011405	6.07	88.16	88.02	0.96
South Tributary	3780	100 YR	508.00	5397.00	5398.44		5398.50	0.001495	2.44	320.85	279.50	0.36
South Tributary	3888	100 YR	416.00	5397.99	5398.69	5398.69	5398.93	0.015359	4.48	128.67	278.28	1.00
South Tributary	3944	100 YR	416.00	5399.16	5400.74	5400.74	5401.22	0.012780	5.57	77.28	111.98	0.99
South Tributary	4077	100 YR	416.00	5403.41	5403.89	5403.89	5404.13	0.038936	5.09	109.25	252.73	1.46

HEC-RAS Plan: FLDWY Profile: FLDWY

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)	
CityParkDS	9	FLDWY	2413.00	5324.73	5327.81	5327.67	5328.36	0.007978	6.36	415.14	280.00	0.85
CityParkDS	74	FLDWY	2426.00	5326.00	5328.48		5328.84	0.005862	4.67	513.96	285.31	0.57
CityParkDS	319	FLDWY	2426.00	5327.01	5330.87	5330.87	5331.95	0.013062	9.69	308.77	130.35	0.92
CityParkDS	462	FLDWY	2426.00	5328.00	5332.63	5332.04	5333.31	0.006878	8.08	375.18	126.86	0.69
CityParkDS	642	FLDWY	2426.00	5329.00	5333.86	5333.45	5334.75	0.008676	8.53	331.46	108.67	0.76
CityParkDS	819	FLDWY	2426.00	5331.97	5335.51	5335.51	5336.38	0.010353	8.12	338.35	135.00	0.80
CityParkDS	850		Culvert									
CityParkDS	1022	FLDWY	2426.00	5333.00	5339.86	5337.61	5340.33	0.002478	5.96	501.98	156.97	0.43
CityParkDS	1237	FLDWY	2426.00	5332.90	5340.38	5340.05	5341.36	0.007859	9.14	330.28	105.00	0.74
CityParkDS	1375	FLDWY	2426.00	5333.75	5341.54	5340.23	5342.10	0.003559	6.58	422.23	104.00	0.52
CityParkDS	1571	FLDWY	2426.00	5334.12	5342.26	5341.16	5342.84	0.003904	7.01	415.52	110.00	0.56
CityParkDS	1602	FLDWY	2426.00	5335.44	5342.51	5341.21	5342.96	0.002962	6.27	470.30	122.81	0.50
CityParkDS	1622	FLDWY	2426.00	5334.44	5342.47	5341.83	5343.09	0.005255	7.93	410.80	133.91	0.61
CityParkDS	1636		Bridge									
CityParkDS	1650	FLDWY	2426.00	5334.81	5344.30	5342.48	5344.64	0.001460	5.61	595.17	138.00	0.38
CityParkDS	1743	FLDWY	2292.00	5335.00	5344.46	5342.31	5344.79	0.001652	5.29	512.83	106.00	0.36
CityParkDS	2044	FLDWY	2292.00	5336.47	5345.14	5345.14	5346.55	0.008800	12.14	275.13	80.00	0.80
CityParkDS	2276	FLDWY	2292.00	5337.58	5346.91	5346.41	5348.71	0.008851	11.01	227.12	48.58	0.83
CityParkDS	2440	FLDWY	2292.00	5338.24	5348.16	5347.93	5350.24	0.008763	12.27	209.99	41.44	0.82
CityParkDS	2455	FLDWY	2292.00	5341.23	5349.08	5349.08	5350.95	0.007026	12.36	243.25	59.93	0.83
CityParkDS	2510		Culvert									
CityParkDS	2537	FLDWY	2292.00	5342.00	5352.51	5350.12	5352.71	0.001510	4.06	646.82	150.00	0.24
CityParkDS	2570	FLDWY	2292.00	5342.10	5352.63	5348.71	5352.75	0.000678	2.71	825.89	146.24	0.16
CityParkDS	2780	FLDWY	2170.00	5342.76	5352.79		5352.87	0.000483	2.23	980.72	180.00	0.13
CityPark	2990	FLDWY	1637.00	5343.41	5352.86		5353.06	0.001597	3.66	453.89	87.00	0.24
CityPark	3003	FLDWY	1637.00	5343.45	5352.86		5353.10	0.001906	4.01	414.00	80.00	0.25
CityPark	3018	FLDWY	1637.00	5345.13	5352.83		5353.17	0.003156	4.64	349.58	75.00	0.33
CityPark	3106	FLDWY	1637.00	5345.35	5353.08	5351.53	5353.57	0.005691	5.59	291.62	69.00	0.42
CityPark	3200	FLDWY	1637.00	5346.10	5353.50		5354.02	0.003942	5.96	291.28	66.00	0.47
CityPark	3244	FLDWY	1637.00	5346.42	5353.49		5354.36	0.007536	7.79	229.52	65.00	0.64
CityPark	3262	FLDWY	1637.00	5347.46	5354.23	5354.23	5355.30	0.008766	9.07	227.81	96.00	0.70
CityPark	3270		Bridge									
CityPark	3279	FLDWY	1637.00	5347.90	5356.41	5354.43	5356.76	0.002052	5.19	370.15	83.00	0.35
CityPark	3315	FLDWY	1637.00	5348.09	5356.47		5356.83	0.002346	5.24	351.15	74.50	0.37
CityPark	3354	FLDWY	1637.00	5348.28	5356.55		5356.93	0.002513	5.32	343.00	73.26	0.38
CityPark	3431	FLDWY	1637.00	5348.66	5356.79		5357.17	0.004129	4.98	331.85	72.45	0.36
CityPark	3694	FLDWY	1263.00	5349.96	5357.73	5355.85	5358.21	0.003518	5.89	240.25	63.84	0.44
CityPark	3724	FLDWY	1263.00	5353.35	5357.80	5356.99	5358.38	0.006775	6.31	218.19	86.83	0.59
CityPark	3731	FLDWY	1263.00	5354.58	5357.87	5357.87	5358.71	0.015781	7.73	185.64	112.91	0.85
CityPark	3742	FLDWY	1263.00	5353.28	5358.56		5358.80	0.001447	4.13	348.67	120.00	0.36
CityPark	3894	FLDWY	1253.00	5353.58	5358.79		5358.97	0.000914	3.55	393.09	109.47	0.29
CityPark	4021	FLDWY	1253.00	5353.58	5359.94	5359.94	5360.96	0.006810	9.10	184.92	81.30	0.75
CityPark	4088		Culvert									
CityPark	4164	FLDWY	1253.00	5355.00	5362.55	5359.24	5362.71	0.000637	3.59	524.75	250.00	0.25
CityPark	4326	FLDWY	1253.00	5356.35	5362.69		5362.90	0.001299	4.71	376.63	101.16	0.35
CityPark	4336	FLDWY	1253.00	5358.59	5362.70		5362.92	0.001868	4.69	342.29	100.40	0.41
CityPark	4346	FLDWY	1253.00	5356.54	5362.71		5362.94	0.001879	4.57	337.16	99.46	0.40
CityPark	4513	FLDWY	1253.00	5359.00	5362.90	5362.73	5363.74	0.009621	8.03	182.27	82.52	0.85
CityPark	4577	FLDWY	1253.00	5360.24	5363.58	5363.44	5364.44	0.010911	8.43	178.95	83.05	0.91
CityPark	4587	FLDWY	1253.00	5361.00	5363.70	5363.70	5364.65	0.017187	8.69	163.39	83.45	1.01
CityPark	4597	FLDWY	1253.00	5360.55	5364.09		5364.79	0.008441	7.72	196.37	83.84	0.81
CityPark	4711	FLDWY	1253.00	5361.43	5365.06	5365.03	5366.02	0.012417	9.10	176.69	83.95	0.96
CityPark	4799	FLDWY	1253.00	5362.28	5366.27	5366.09	5366.99	0.010005	8.77	195.07	90.00	0.86
CityPark	4809	FLDWY	1253.00	5364.98	5366.72	5366.72	5367.61	0.020456	8.05	166.32	96.00	1.07
CityPark	4820	FLDWY	1253.00	5362.28	5367.19		5367.77	0.009825	6.77	205.29	92.92	0.80
CityPark	4935	FLDWY	1253.00	5363.30	5368.07		5368.50	0.004272	6.75	251.26	87.52	0.60
CityPark	5095	FLDWY	1253.00	5364.70	5369.36	5369.36	5370.34	0.011755	9.37	173.07	81.70	0.95
CityPark	5110	FLDWY	1253.00	5368.18	5370.75	5370.75	5371.72	0.017637	8.34	163.25	84.71	0.99
CityPark	5133	FLDWY	1253.00	5364.76	5371.66		5371.90	0.002237	4.45	319.48	91.80	0.42
CityPark	5237	FLDWY	1253.00	5367.00	5371.91		5372.04	0.000757	3.26	447.90	108.00	0.27
CityPark	5534	FLDWY	1253.00	5369.07	5372.38	5372.38	5373.41	0.012284	9.64	167.04	76.75	0.99
CityPark	5819	FLDWY	1219.00	5372.45	5376.23	5376.23	5377.23	0.014439	9.55	159.19	75.29	1.00
CityPark	5840	FLDWY	1219.00	5375.64	5377.20	5377.20	5378.17	0.013390	5.17	161.97	79.51	0.79
CityPark	5860	FLDWY	1219.00	5372.49	5377.75	5377.75	5378.77	0.015237	9.33	152.80	74.91	1.03
CityPark	6054	FLDWY	1219.00	5375.73	5381.60	5381.60	5382.78	0.010773	10.15	154.15	59.00	0.90
CityPark	6256	FLDWY	1219.00	5379.10	5383.76	5383.13	5384.17	0.005513	6.51	244.70	105.00	0.64
CityPark	6276	FLDWY	1219.00	5379.44	5383.77		5384.36	0.012536	6.94	201.47	120.00	0.86
CityPark	6288	FLDWY	1219.00	5382.58	5384.04	5384.04	5384.75	0.018863	6.42	182.19	128.00	1.05
CityPark	6301	FLDWY	1219.00	5382.00	5384.58		5384.91	0.005499	5.71	273.79	135.00	0.63
CityPark	6324	FLDWY	1219.00	5380.67	5384.70		5385.05	0.005127	5.59	279.14	150.00	0.61
CityPark	6344	FLDWY	1219.00	5381.96	5384.71	5384.71	5385.36	0.014309	8.89	205.52	147.88	1.02
CityPark	6392	FLDWY	1219.00	5383.00	5385.64	5385.64	5386.44	0.014706	8.70	181.63	113.06	1.03
CityPark	6516	FLDWY	1219.00	5384.60	5388.18	5388.18	5389.10	0.011437	6.62	163.94	88.45	0.81
CityPark	6578	FLDWY	1219.00	5385.50	5389.75	5388.61	5389.87	0.004465	3.82	457.25	231.68	0.42

HEC-RAS Plan: FLDWY Profile: FLDWY (Continued)

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)	
CityPark	6621		Culvert									
CityPark	6632	FLDWY	1219.00	5385.24	5392.09	5392.09	5392.38	0.007507	6.55	417.98	520.10	0.58
CityPark	6655	FLDWY	1219.00	5385.18	5392.46	5390.53	5392.47	0.000171	1.03	1434.37	530.00	0.09
CityPark	6736		Culvert									
CityPark	6809	FLDWY	1219.00	5386.19	5395.54	5393.62	5395.55	0.000212	1.44	1367.62	633.00	0.13
CityPark	6874	FLDWY	804.00	5387.10	5395.55	5390.22	5395.56	0.000057	0.98	828.55	154.59	0.07
CityPark	6956	FLDWY	804.00	5388.00	5395.55	5390.58	5395.57	0.000061	0.99	809.22	151.08	0.08
CityPark	7011	FLDWY	804.00	5388.52	5395.53	5391.65	5395.60	0.000288	2.16	390.72	84.00	0.17
CityPark	7103		Culvert									
CityPark	7204	FLDWY	804.00	5392.37	5396.84	5395.99	5397.24	0.002240	5.54	171.68	63.35	0.48
CityPark	7209	FLDWY	804.00	5392.55	5396.89		5397.25	0.001944	5.45	175.55	59.42	0.47
CityPark	7210	FLDWY	804.00	5393.36	5396.60	5396.60	5397.47	0.009924	8.99	112.96	60.53	0.98
CityPark	7335	FLDWY	804.00	5394.29	5398.29	5398.24	5398.96	0.014236	7.11	125.31	78.69	0.78
CityPark	7451	FLDWY	804.00	5395.04	5399.93	5399.93	5400.57	0.012515	7.02	129.42	86.98	0.74
CityPark	7545	FLDWY	804.00	5395.65	5401.20	5401.20	5402.18	0.013789	8.60	105.85	47.49	0.80
CityPark	7665	FLDWY	804.00	5396.43	5402.75		5403.18	0.005101	5.06	155.75	48.53	0.43
CityPark	7861	FLDWY	623.00	5397.71	5403.80		5404.37	0.007002	6.27	104.40	43.33	0.61
CityPark	7902	FLDWY	623.00	5397.97	5404.30		5404.61	0.004068	4.35	140.85	45.92	0.37
CityPark	8077	FLDWY	623.00	5399.59	5405.14	5404.32	5405.61	0.006945	5.69	117.69	44.94	0.55
CityPark	8148		Culvert									
CityPark	8219	FLDWY	470.00	5400.15	5406.34	5404.24	5406.48	0.001342	3.17	159.08	52.79	0.27
CityPark	8259	FLDWY	470.00	5400.64	5406.38		5406.56	0.001887	3.51	143.89	49.21	0.31
CityPark	8302	FLDWY	470.00	5401.00	5406.46		5406.66	0.002491	3.74	133.75	52.58	0.34
CityPark	8337		Culvert									
CityPark	8373	FLDWY	470.00	5402.00	5406.97	5406.07	5407.19	0.001830	4.20	131.19	56.71	0.39
CityPark	8474	FLDWY	470.00	5402.39	5407.02	5406.44	5407.60	0.005535	6.17	78.71	31.10	0.65
CityPark	8579	FLDWY	353.00	5403.54	5407.76	5406.94	5408.16	0.004751	5.09	70.05	28.29	0.56
CityPark	8649	FLDWY	353.00	5404.36	5407.89	5407.88	5408.83	0.012294	7.86	46.76	24.64	0.93
CityPark	8745	FLDWY	353.00	5405.66	5409.22		5409.68	0.004904	5.51	65.92	28.47	0.60
CityPark	8783		Culvert									
CityPark	8822	FLDWY	353.00	5407.77	5410.72	5410.72	5411.46	0.019760	6.58	51.74	35.22	0.88
CityPark	8925	FLDWY	353.00	5410.97	5412.45	5412.43	5413.00	0.011424	6.04	60.04	52.17	0.96
CityPark	9033	FLDWY	353.00	5411.99	5413.51	5413.16	5413.82	0.005134	4.57	78.81	54.13	0.66
CityPark	9083	FLDWY	353.00	5412.79	5413.80	5413.80	5414.35	0.013104	5.70	60.07	54.68	1.00
CityPark	9118	FLDWY	353.00	5412.00	5414.33		5414.54	0.002125	3.70	97.75	46.64	0.44
CityPark	9141	FLDWY	213.00	5412.60	5414.51		5414.60	0.001821	2.38	89.93	54.93	0.32
CityPark	9169	FLDWY	213.00	5414.01	5415.09	5415.09	5415.41	0.015955	4.56	46.74	73.92	1.01
CityPark	9210	FLDWY	213.00	5414.99	5416.18	5416.18	5416.70	0.037372	5.78	36.85	34.37	0.98
CityPark	9259	FLDWY	213.00	5413.00	5416.78		5416.80	0.000314	1.28	172.80	57.73	0.13
CityPark	9348	FLDWY	213.00	5413.99	5416.80		5416.82	0.000128	1.08	198.06	71.29	0.11
CityPark	9430	FLDWY	213.00	5415.00	5416.69		5416.92	0.011444	3.84	55.46	46.20	0.62
CityPark	9651	FLDWY	213.00	5416.00	5417.66		5417.70	0.001644	1.69	134.29	88.00	0.23
CityPark	9754	FLDWY	213.00	5417.00	5417.94	5417.71	5418.14	0.016541	3.66	59.38	64.00	0.67

HEC-RAS Plan: FLDWY River: City Park Channe Reach: South Tributary Profile: FLDWY

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)	
South Tributary	206	FLDWY	547.00	5351.00	5352.72	5352.52	5353.14	0.012115	5.28	106.90	78.28	0.76
South Tributary	260	FLDWY	547.00	5352.05	5353.57	5353.57	5354.14	0.023076	6.13	90.24	77.21	0.99
South Tributary	341	FLDWY	547.00	5353.00	5354.95	5354.48	5355.21	0.008032	4.10	134.05	86.88	0.58
South Tributary	447	FLDWY	547.00	5354.91	5356.09	5356.09	5356.64	0.022975	5.98	92.20	83.52	1.00
South Tributary	560	FLDWY	547.00	5356.81	5358.23	5358.23	5358.81	0.016236	5.60	93.81	90.00	0.87
South Tributary	612	FLDWY	547.00	5356.38	5358.95	5358.95	5359.55	0.014231	7.29	95.73	70.10	0.87
South Tributary	649	FLDWY	547.00	5357.70	5359.51	5359.47	5360.13	0.016165	5.80	87.27	65.71	0.86
South Tributary	782	FLDWY	547.00	5359.00	5360.98	5360.93	5361.68	0.008529	6.86	86.42	55.69	0.87
South Tributary	882	FLDWY	547.00	5359.99	5361.94	5361.48	5362.33	0.004733	5.01	109.20	58.57	0.65
South Tributary	973	FLDWY	547.00	5360.00	5362.35	5361.78	5362.73	0.004166	5.00	109.36	52.52	0.61
South Tributary	1052	FLDWY	547.00	5360.62	5362.69		5363.19	0.007006	5.70	96.04	56.82	0.77
South Tributary	1113	FLDWY	547.00	5361.02	5363.08		5363.60	0.006458	5.79	94.54	51.06	0.75
South Tributary	1196	FLDWY	547.00	5361.98	5363.71		5364.12	0.005702	5.16	106.06	62.09	0.70
South Tributary	1275	FLDWY	547.00	5363.00	5364.55	5364.55	5365.31	0.011973	6.98	78.33	50.71	0.99
South Tributary	1425	FLDWY	547.00	5364.58	5366.33	5366.20	5366.88	0.009080	5.96	91.72	64.12	0.88
South Tributary	1504	FLDWY	547.00	5365.00	5367.05	5366.29	5367.23	0.002118	3.35	163.07	89.13	0.44
South Tributary	1575	FLDWY	547.00	5365.92	5367.62	5367.62	5368.40	0.012047	7.11	76.98	49.32	1.00
South Tributary	1725	FLDWY	547.00	5367.00	5369.19	5368.62	5369.52	0.004686	4.60	119.01	64.44	0.60
South Tributary	1804	FLDWY	547.00	5367.12	5369.58	5368.88	5369.81	0.002705	3.84	142.49	75.07	0.49
South Tributary	1875	FLDWY	547.00	5368.52	5370.28	5370.28	5371.15	0.011693	7.71	74.65	44.28	1.03
South Tributary	2025	FLDWY	547.00	5371.00	5372.86	5372.86	5373.68	0.012061	7.25	75.41	46.35	1.00
South Tributary	2099	FLDWY	547.00	5372.29	5373.97	5373.57	5374.27	0.004786	4.38	124.92	84.51	0.63
South Tributary	2191	FLDWY	400.00	5374.00	5375.42	5375.42	5376.05	0.012865	6.36	62.90	51.32	1.01
South Tributary	2325	FLDWY	400.00	5376.75	5378.33	5378.33	5379.00	0.013008	6.58	60.81	46.23	1.01
South Tributary	2407	FLDWY	400.00	5378.00	5379.39	5378.96	5379.53	0.003290	3.10	129.10	112.51	0.51
South Tributary	2500	FLDWY	400.00	5379.96	5381.52	5381.52	5382.29	0.012861	7.03	56.91	37.61	1.01
South Tributary	2641	FLDWY	400.00	5382.98	5384.21	5384.21	5384.80	0.012879	6.17	64.86	54.23	0.99
South Tributary	2758	FLDWY	400.00	5385.00	5386.54	5386.54	5386.99	0.014419	5.42	73.79	83.67	1.02
South Tributary	2851	FLDWY	400.00	5386.93	5387.94	5387.86	5388.29	0.013184	5.49	93.16	100.00	0.99
South Tributary	2962	FLDWY	508.00	5387.66	5389.18		5389.61	0.010779	5.70	101.98	80.43	0.93
South Tributary	3100	FLDWY	508.00	5390.99	5392.32	5392.32	5392.75	0.031767	5.24	96.40	112.57	1.01
South Tributary	3246	FLDWY	508.00	5393.11	5394.76	5394.71	5395.34	0.011004	6.17	85.61	65.40	0.95
South Tributary	3309	FLDWY	508.00	5394.00	5395.61		5395.98	0.008767	4.85	104.66	95.50	0.82
South Tributary	3441	FLDWY	508.00	5395.00	5396.55		5396.80	0.004471	4.27	139.65	101.28	0.62
South Tributary	3515	FLDWY	508.00	5395.00	5396.86		5396.98	0.001438	2.77	183.19	98.39	0.36
South Tributary	3555	FLDWY	508.00	5395.00	5396.73	5396.73	5397.34	0.012771	6.28	80.85	66.46	1.00
South Tributary	3641	FLDWY	508.00	5396.00	5397.71		5398.10	0.006223	5.05	100.56	66.92	0.73
South Tributary	3780	FLDWY	508.00	5397.00	5398.57		5398.86	0.004700	4.50	122.03	78.08	0.63
South Tributary	3888	FLDWY	416.00	5397.99	5399.18		5399.37	0.004583	3.54	117.68	106.34	0.59
South Tributary	3944	FLDWY	416.00	5399.16	5400.75	5400.75	5401.24	0.013041	5.59	74.36	74.29	0.99
South Tributary	4077	FLDWY	416.00	5403.41	5404.21	5404.21	5404.55	0.021741	5.74	97.80	143.00	1.21

1

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. BIBEAU, _____

_____, _____

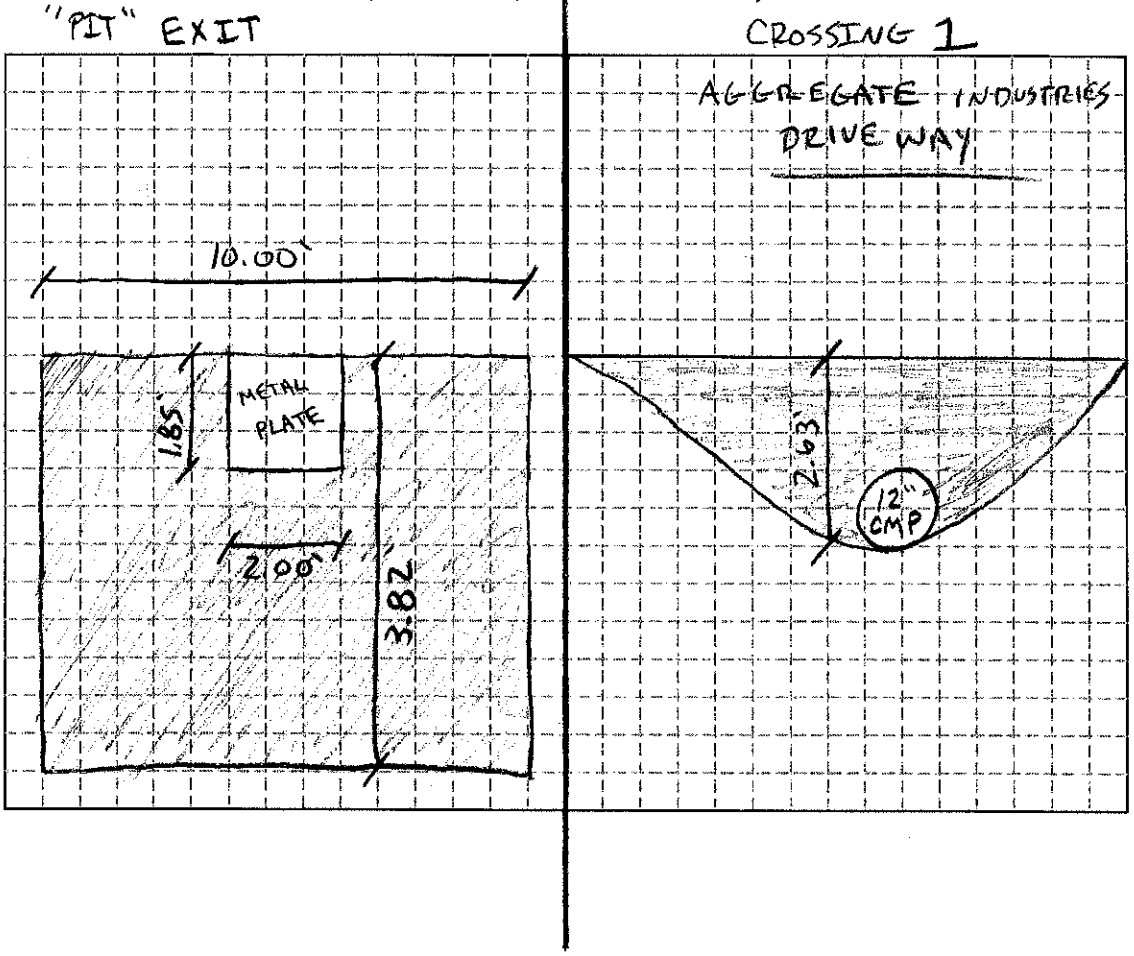
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)

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BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	12"
Bridge Opening Length L		•Span	
Piers (see below for quantity, type)		Shape	ROUND
•Width		Material	CMP
•Pier Cap Width		Length of Culvert	35.53
•Pier Cap Height		Road Elevation	5415.86
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	2:1
•Outlet		•Outlet	2:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	
•Wingwall Length		•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5413.24
•Outlet		•Outlet	5412.58
High Point in Road Centerline		High Point in Road Centerline	5415.46
Deck Elevations		Elevation Top	5414.24

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, (CMP), CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, (Circular), Elliptical, Rectangular

Bridge Pier Types:

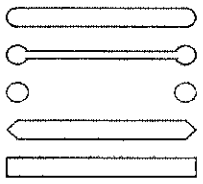
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

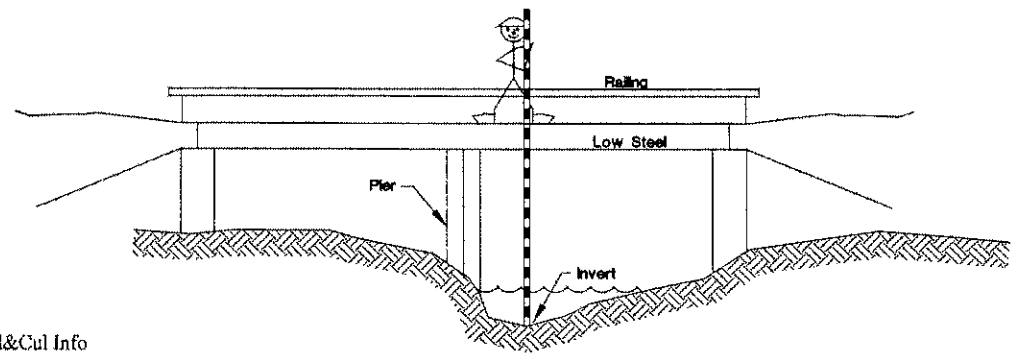
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




YIELD
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2

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER _____, _____

C. WIKA _____, _____

_____, _____

PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

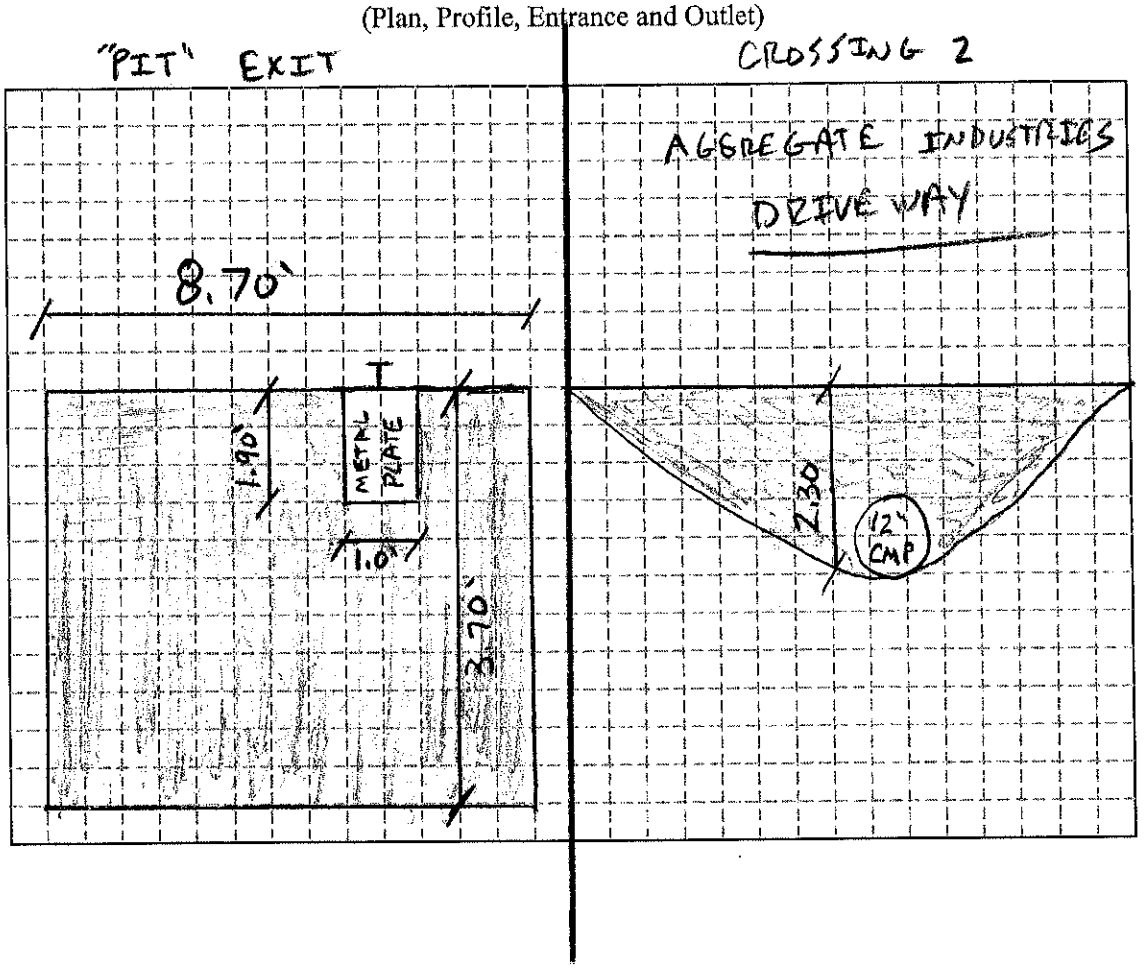
ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK1432

ELEVATION OF BENCHMARK 55557.96 (NAVD 88)

ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	12"
Bridge Opening Length L		•Span	
Piers (see below for quantity, type)		Shape	ROUND
•Width		Material	CMP
•Pier Cap Width		Length of Culvert	49.79
•Pier Cap Height		Road Elevation	5414.81
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	2:1
•Outlet		•Outlet	0:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5412.27
•Outlet		•Outlet	5411.94
High Point in Road Centerline		High Point in Road Centerline	5414.30
Deck Elevations		Elevation Top	5413.27

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

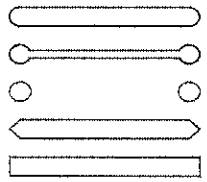
□ Semi-Circular Nose and Tail ----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm ----------

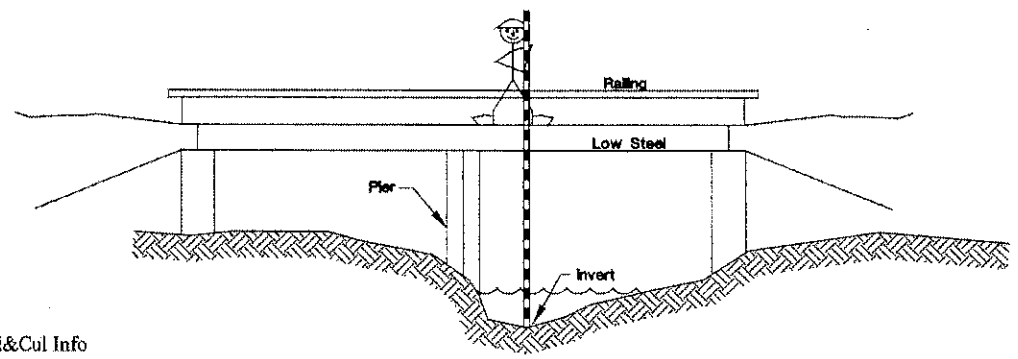
□ 90° Triangular Nose and Tail ----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:

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3

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. RIBEAU, _____

_____, _____

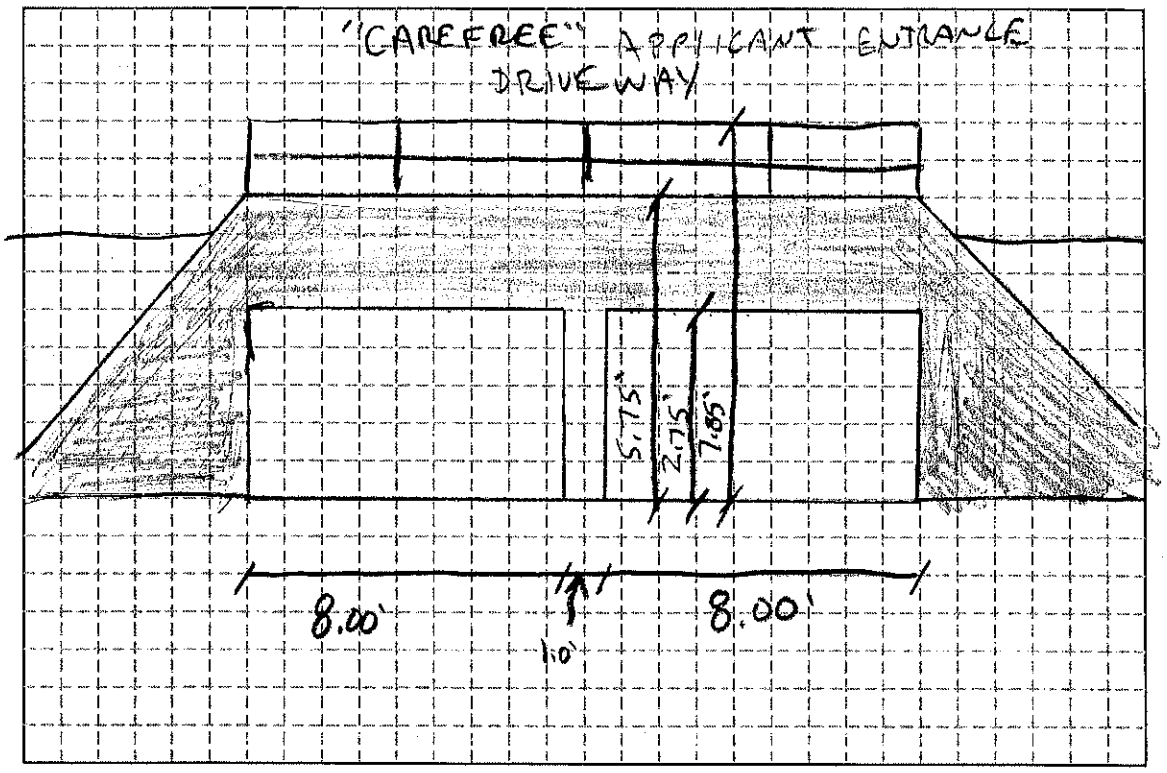
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.75' (X2)
Bridge Opening Length L		•Span	8.00'
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	30.73
•Pier Cap Height		Road Elevation	541.80
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	0:1
•Outlet		•Outlet	2:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 96° R 103°
•Wingwall Length		•Wingwall Length	L 9.27' R 9.09
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	543.90
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	540.05
•Outlet		•Outlet	540.66
High Point in Road Centerline		High Point in Road Centerline	541.16
Deck Elevations		Elevation Top	541.80

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

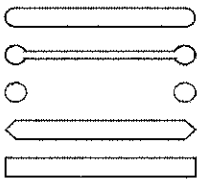
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm----------

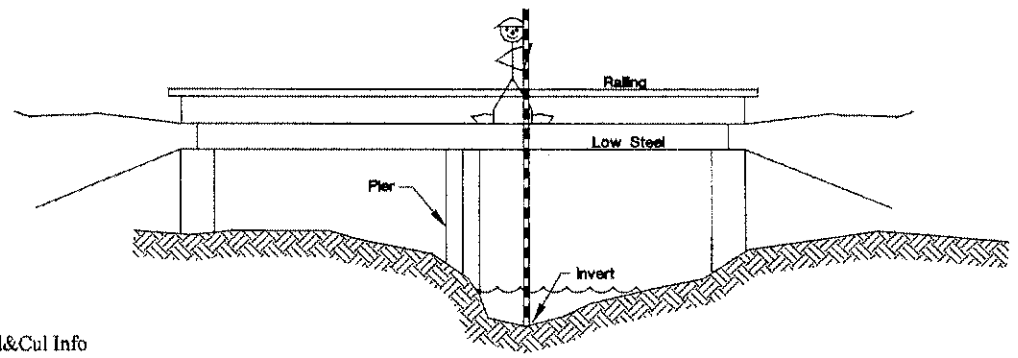
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




3

4

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. WIKA, _____

_____, _____

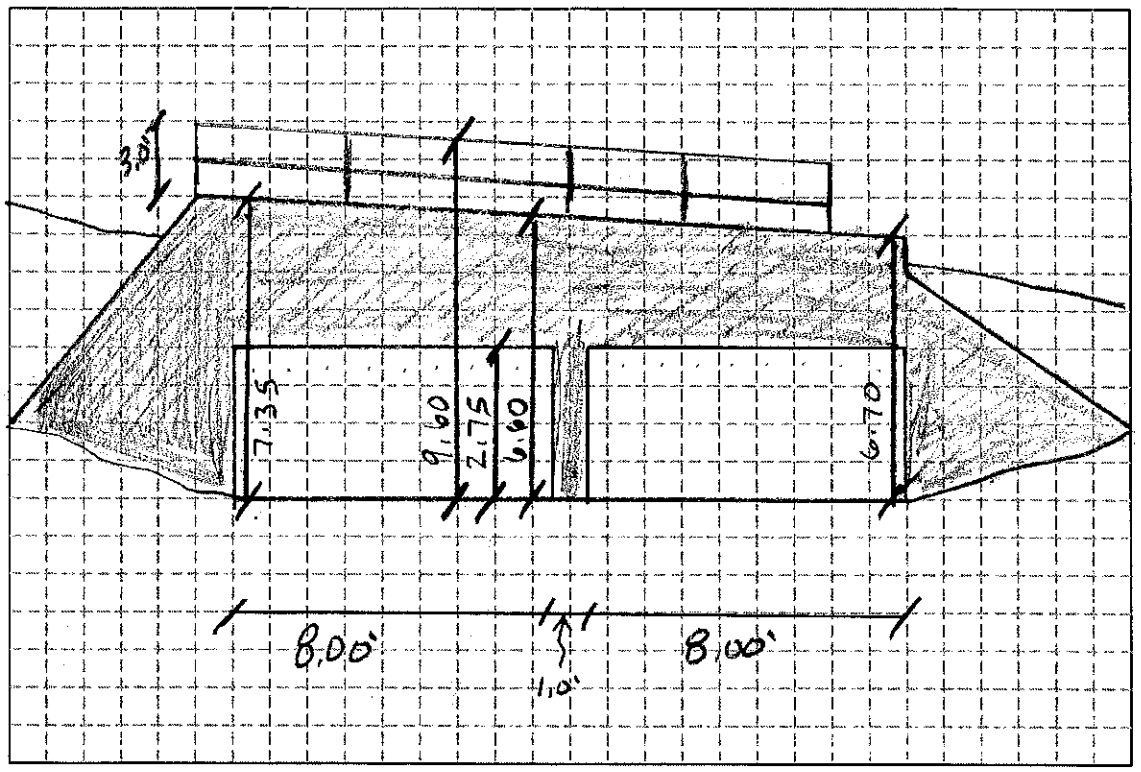
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.75 (X2)
Bridge Opening Length L		•Span	8.00
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	30.57
•Pier Cap Height		Road Elevation	
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 99° R 100°
•Wingwall Length		•Wingwall Length	L 9.23 R 8.96
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	5411.05
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5401.45
•Outlet		•Outlet	5401.10
High Point in Road Centerline		High Point in Road Centerline	5406.35
Deck Elevations		Elevation Top	5408.05

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

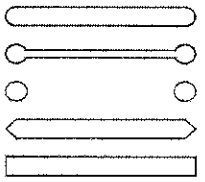
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

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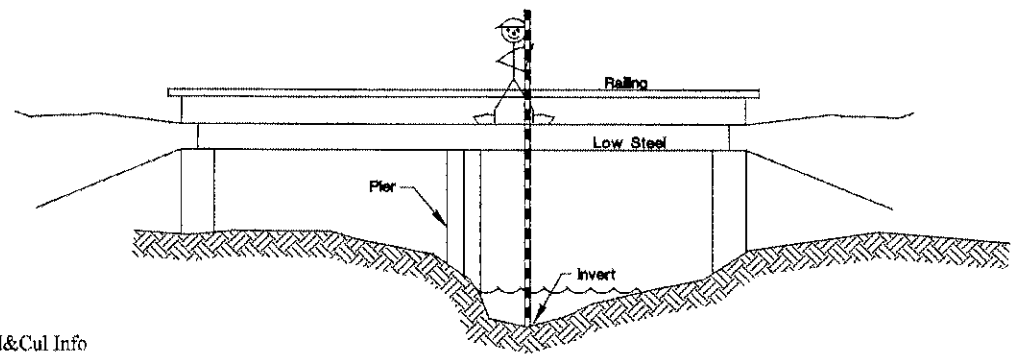



4

5

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___ OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. BIBEAU, _____

_____, _____

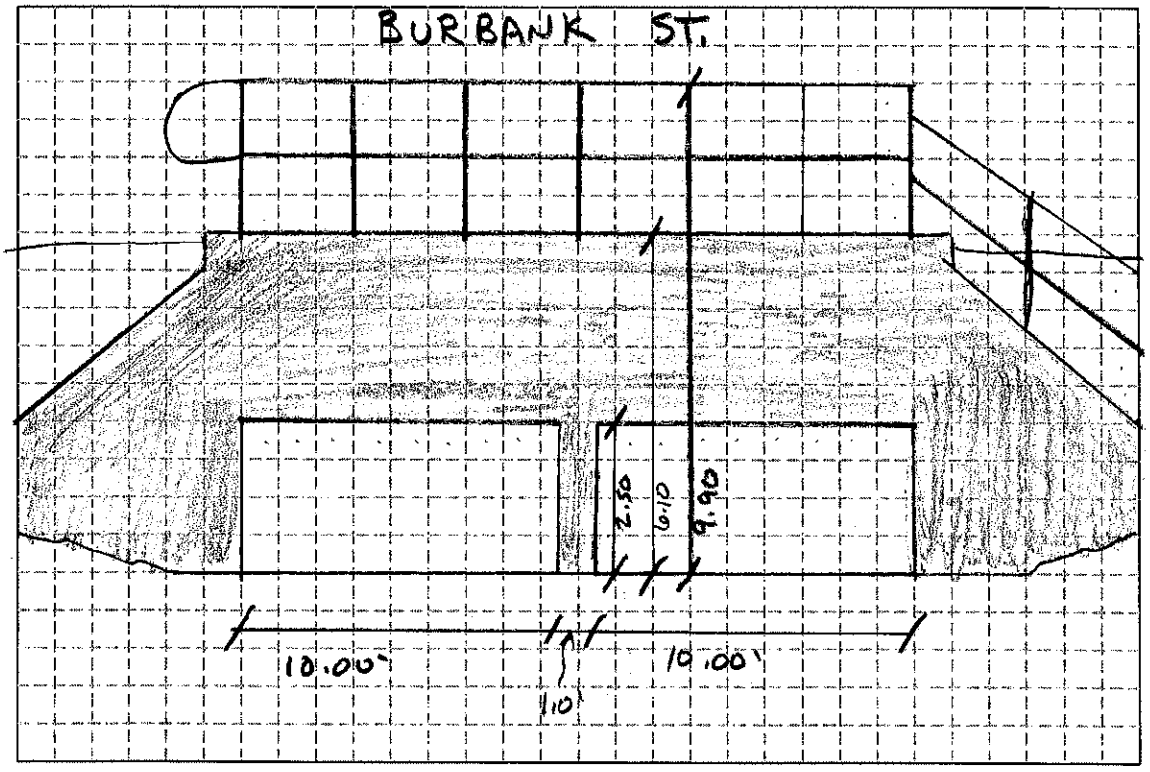
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.50 (X2)
Bridge Opening Length L		•Span	10.00
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	73.69
•Pier Cap Height		Road Elevation	5405.25
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 101° R 103°
•Wingwall Length		•Wingwall Length	L 19.92' R 19.8
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	5409.78
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5399.88
•Outlet		•Outlet	5399.59
High Point in Road Centerline		High Point in Road Centerline	5405.01
Deck Elevations		Elevation Top	5405.98

REMARKS:

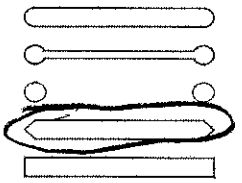
GENERAL INFORMATION

Culvert Materials: RCP, (CMP), CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, (Rectangular)

Bridge Pier Types:

- □ Semi-Circular Nose and Tail
- □ Twin-Cylinder Piers With Connecting Diaphragm
- □ Twin-Cylinder Piers Without Diaphragm
- □ 90° Triangular Nose and Tail
- □ Square Nose and Tail



- □ Other

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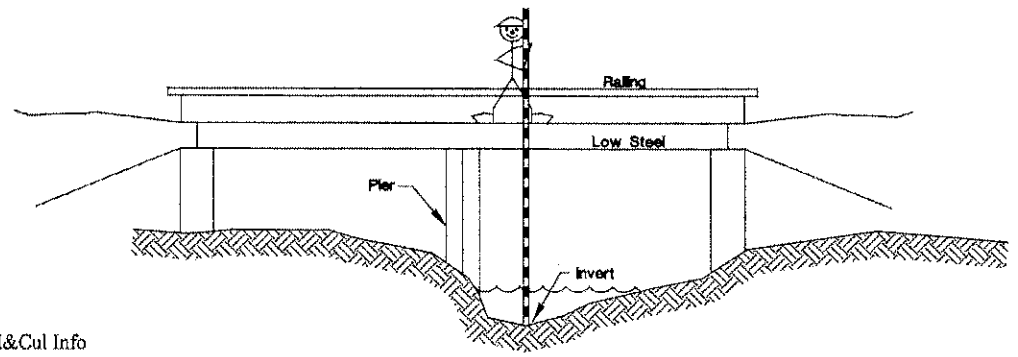



BURBANK ST
5
17-79

6

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. BIBEAU, _____

_____, _____

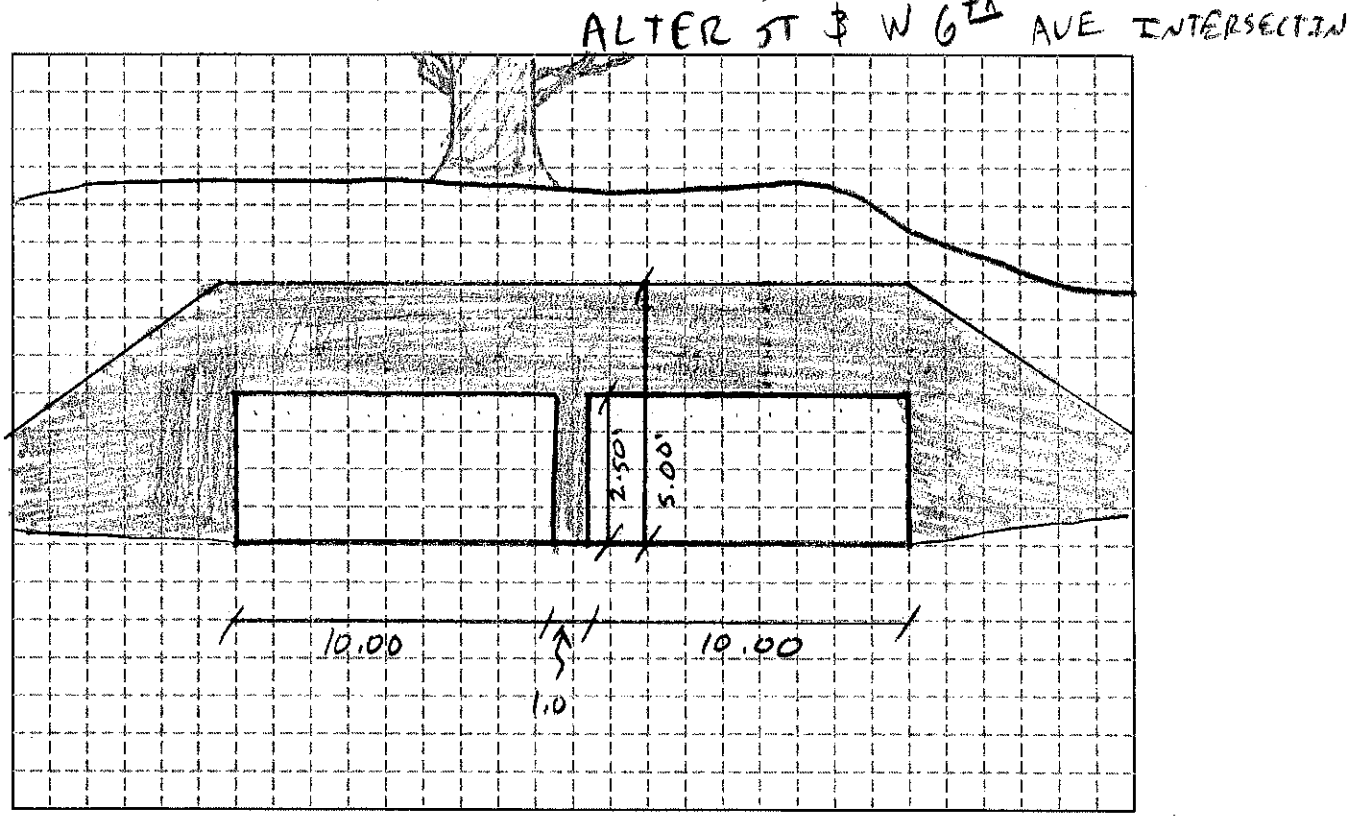
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.50 (X2)
Bridge Opening Length L		•Span	10.00
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	137.94
•Pier Cap Height		Road Elevation	5397.59
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	0:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 105° R 88°
•Wingwall Length		•Wingwall Length	L 21.25' R 21.25
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5390.31
•Outlet		•Outlet	5388.32
High Point in Road Centerline		High Point in Road Centerline	5394.32
Deck Elevations		Elevation Top	5395.31

REMARKS:

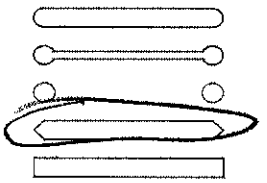
GENERAL INFORMATION

Culvert Materials: (RCP), CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, (Rectangular)

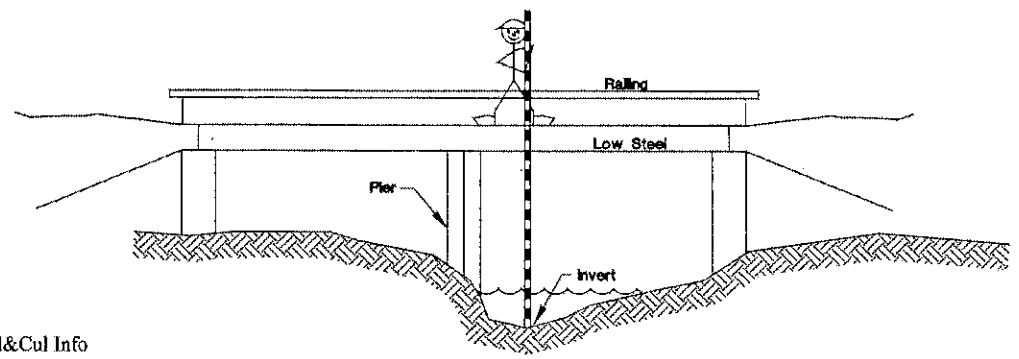
Bridge Pier Types:

- □ Semi-Circular Nose and Tail
- □ Twin-Cylinder Piers With Connecting Diaphragm
- □ Twin-Cylinder Piers Without Diaphragm
- □ 90° Triangular Nose and Tail
- □ Square Nose and Tail



- □ Other

*Photographs should show Rod and Rodman as follows:




6

7

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER _____, _____

C. BIBEAU _____, _____

_____, _____

PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

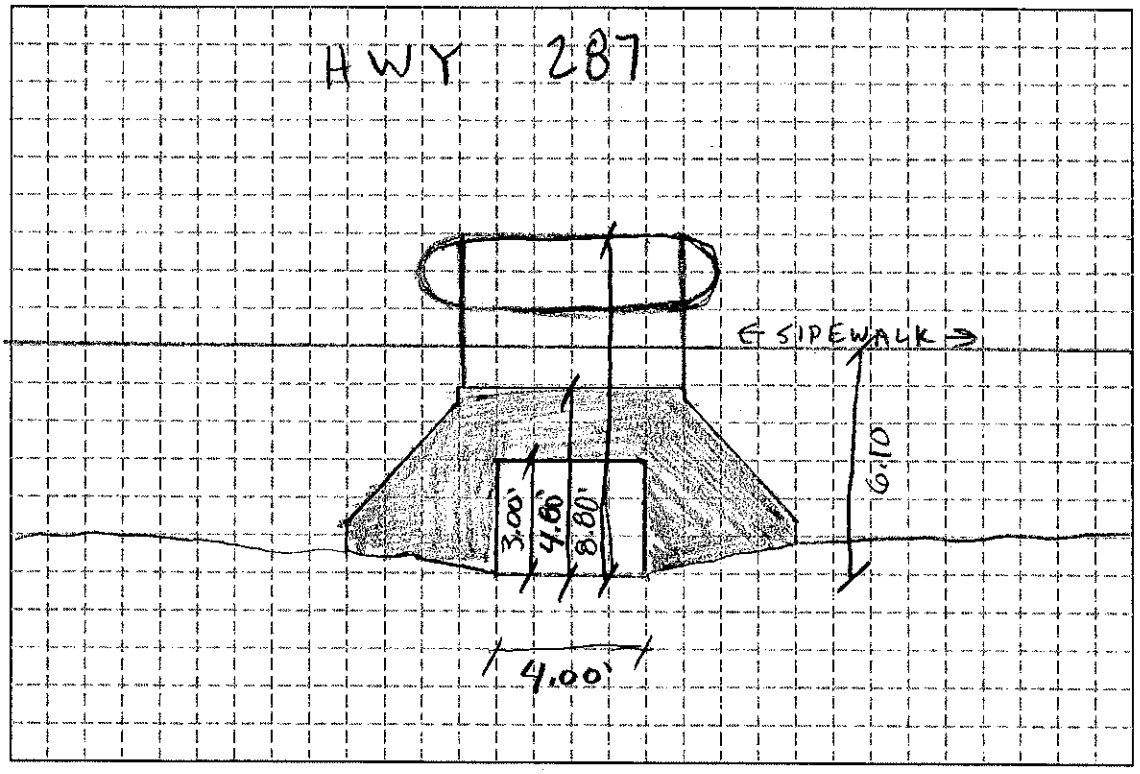
ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143

ELEVATION OF BENCHMARK 55557.96 (NAVD 88)

ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



* VERTICAL DIFFERENCE BETWEEN SIDEWALK & FE IS 6.10' *

BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	3.00'
Bridge Opening Length L		•Span	4.00'
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	
•Pier Cap Height		Road Elevation	5392.99
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:3
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 136° R 134°
•Wingwall Length		•Wingwall Length	L 5.95' R 6.06
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	5395.57
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5386.77
•Outlet		•Outlet	5385.53
High Point in Road Centerline		High Point in Road Centerline	5396.27
Deck Elevations		Elevation Top	5391.57

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

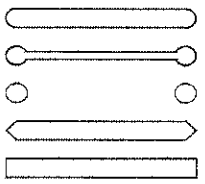
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

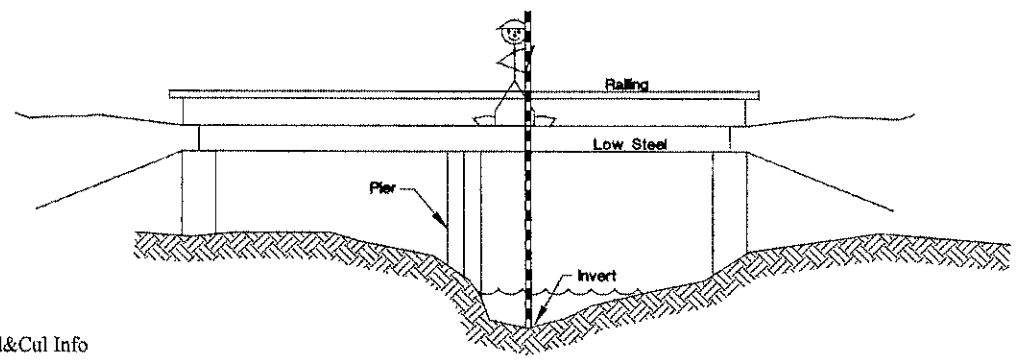
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




7

8

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

C. BIBEAU, _____

_____, _____

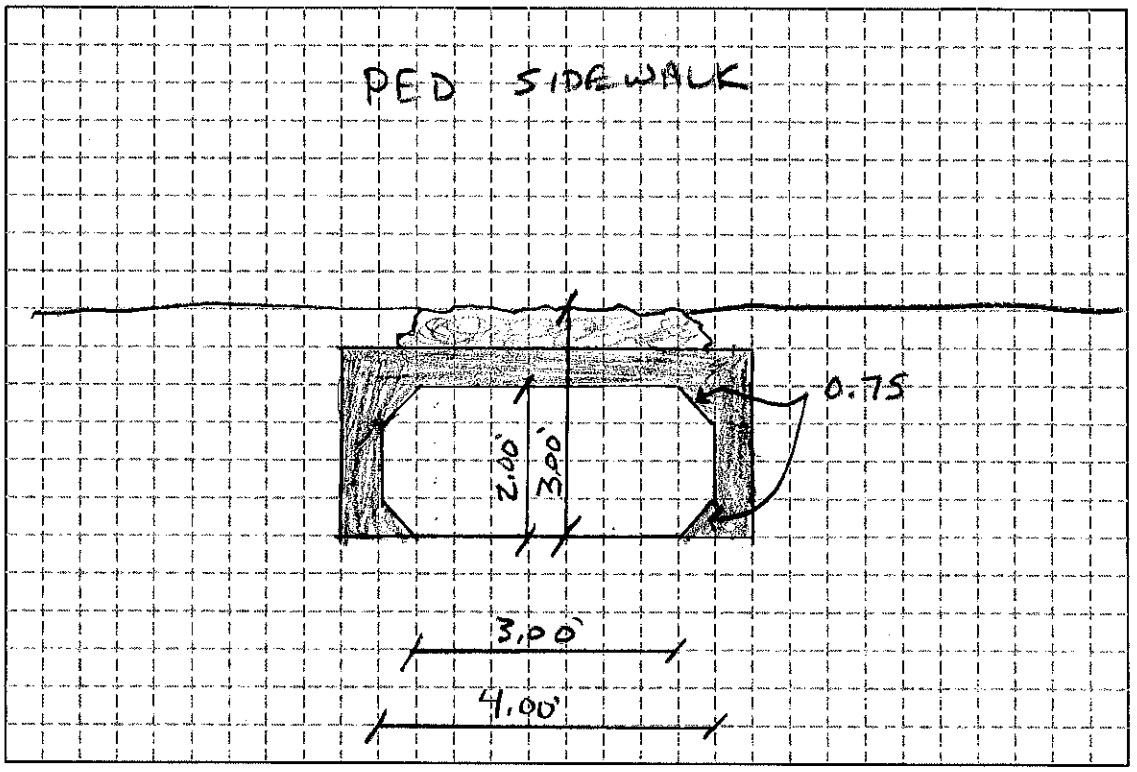
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.00
Bridge Opening Length L		•Span	4.00
Piers (see below for quantity, type)		Shape	OCTO
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	18.15
•Pier Cap Height		Road Elevation	5382.93
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	N/A
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5379.90
•Outlet		•Outlet	5379.44
High Point in Road Centerline		High Point in Road Centerline	5382.93
Deck Elevations		Elevation Top	5382.89

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

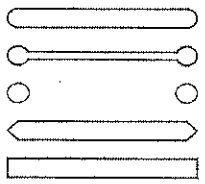
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

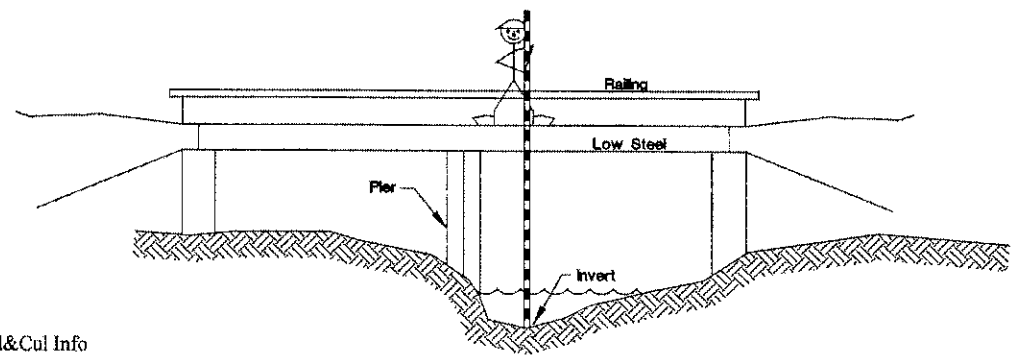
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




8

9

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER, _____

CBIBEAU, _____

_____, _____

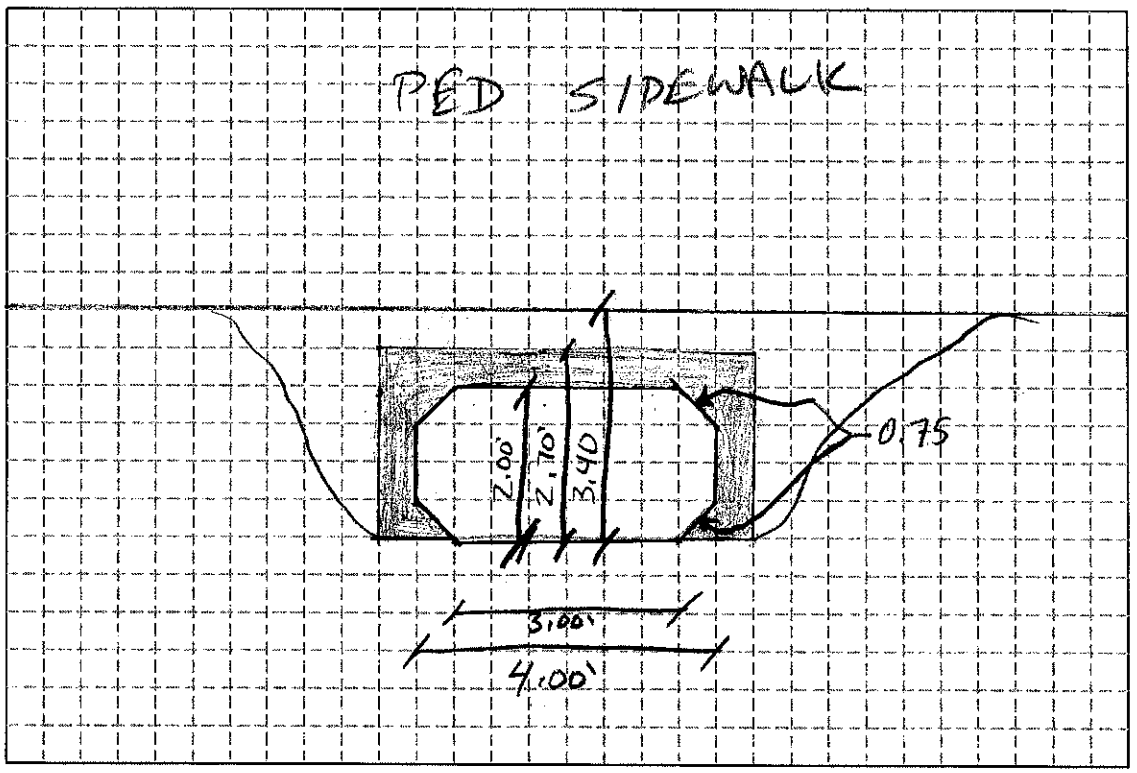
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.00'
Bridge Opening Length L		•Span	4.00'
Piers (see below for quantity, type)		Shape	RECT
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	17.86
•Pier Cap Height		Road Elevation	5375.19
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	N/A
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5372.49
•Outlet		•Outlet	5372.45
High Point in Road Centerline		High Point in Road Centerline	5375.93
Deck Elevations		Elevation Top	5375.19

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

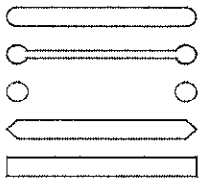
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

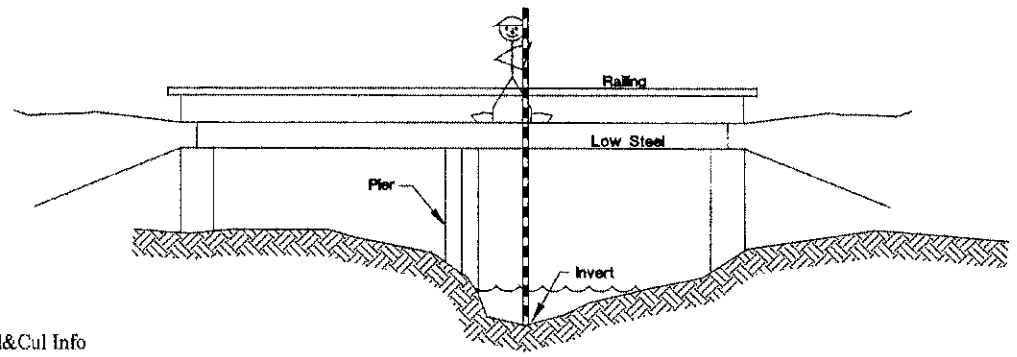
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




9
WILSON

10

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J. WHEELER _____, _____

C. BIBEAU _____, _____

_____, _____

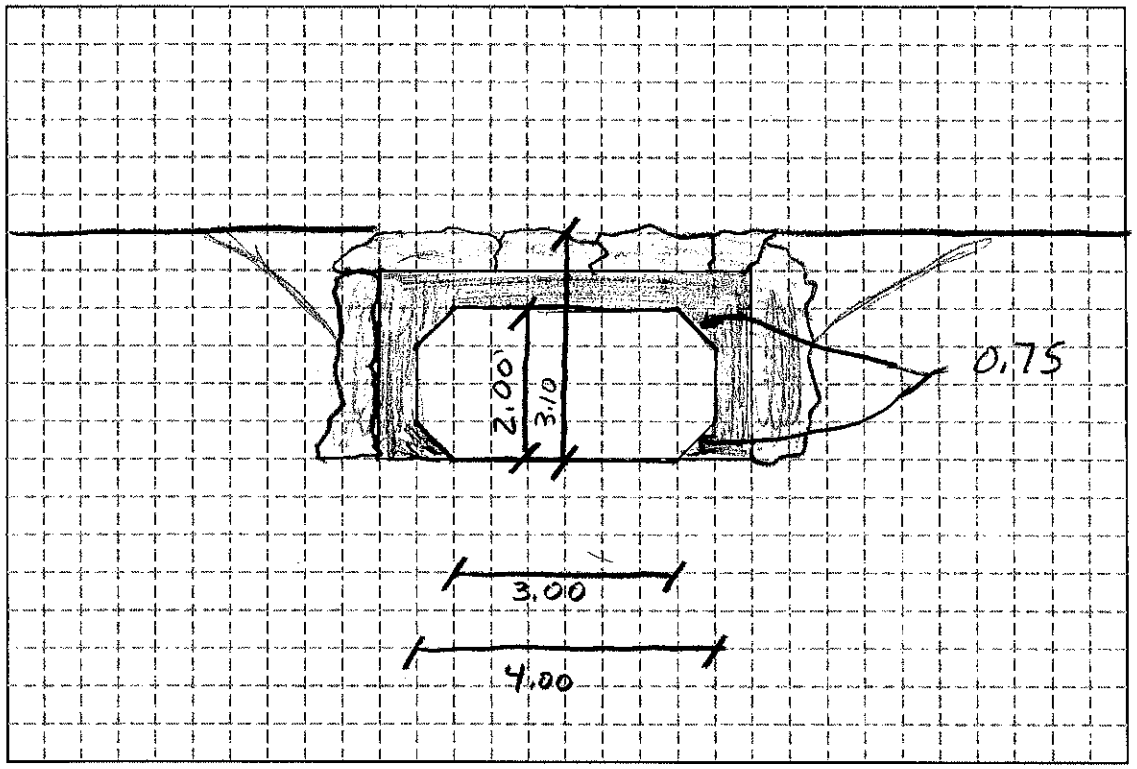
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



2+4

BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.00
Bridge Opening Length L		•Span	4.00
Piers (see below for quantity, type)		Shape	OCTO
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	17.92
•Pier Cap Height		Road Elevation	5368.18
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	0:1
•Outlet		•Outlet	0:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	N/A
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5364.76
•Outlet		•Outlet	5364.70
High Point in Road Centerline		High Point in Road Centerline	5368.18
Deck Elevations		Elevation Top	5367.86

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

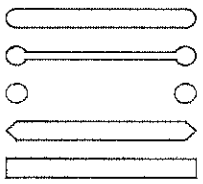
□ Semi-Circular Nose and Tail ----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm ----------

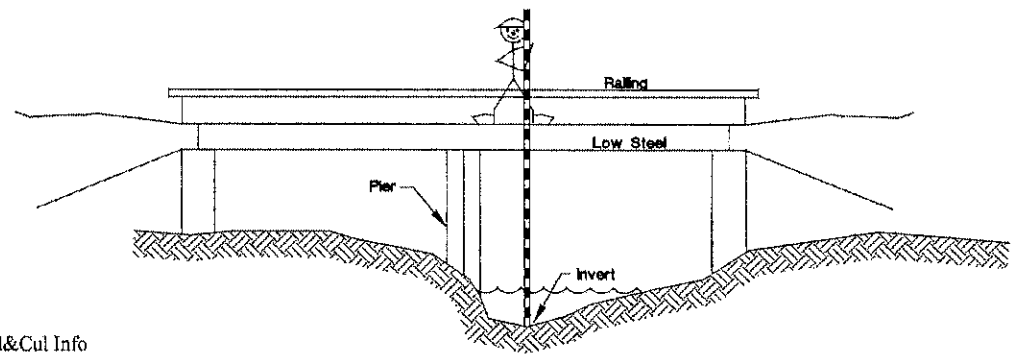
□ 90° Triangular Nose and Tail ----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




10

11

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/8/19

CREW J.WHEELER _____, _____

C.BIBEAU _____, _____

_____, _____

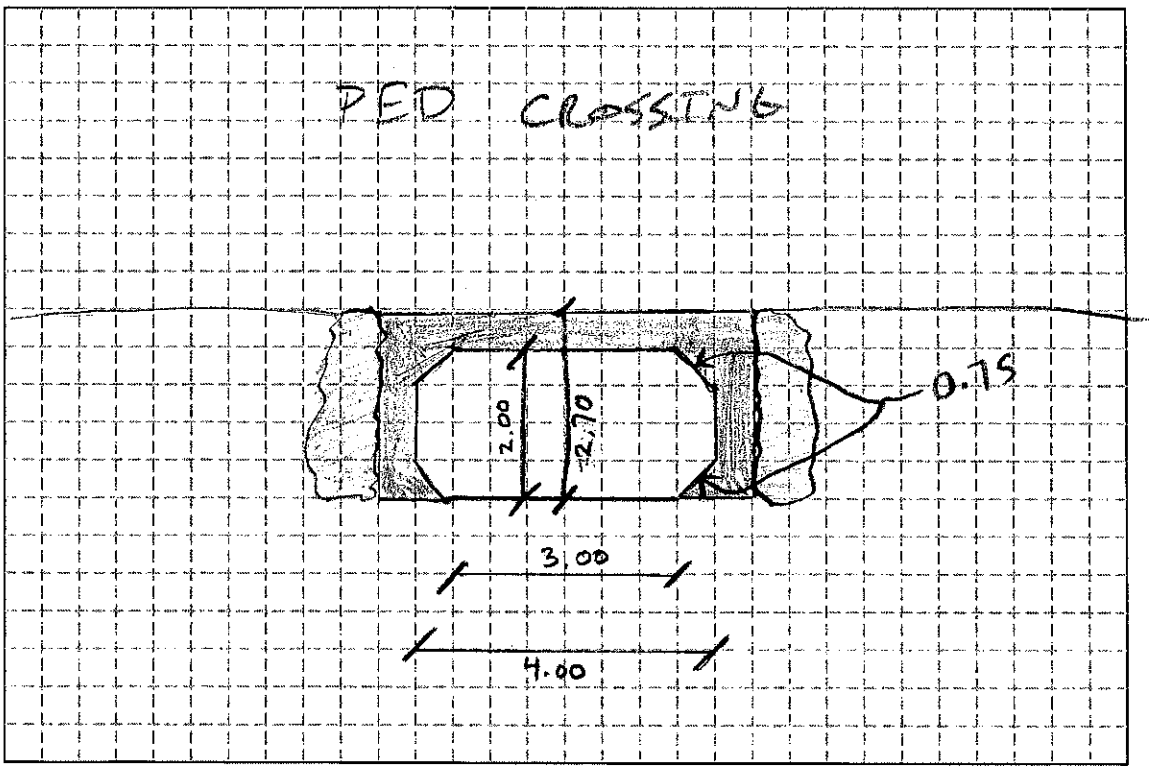
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	2.00
Bridge Opening Length L		•Span	4.00
Piers (see below for quantity, type)		Shape	OCTO
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	11.88
•Pier Cap Height		Road Elevation	
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	
•Outlet		•Outlet	
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	N/A
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5362.28
•Outlet		•Outlet	5362.28
High Point in Road Centerline		High Point in Road Centerline	5364.98
Deck Elevations		Elevation Top	5364.98

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

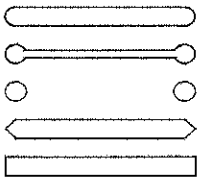
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm----------

□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

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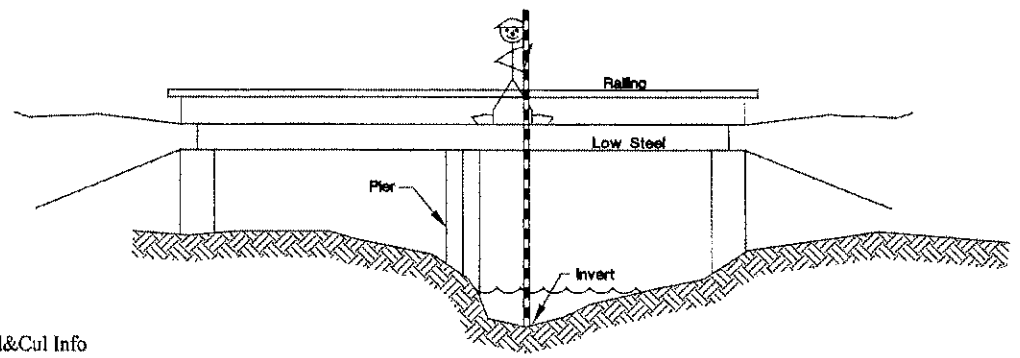



11

12

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

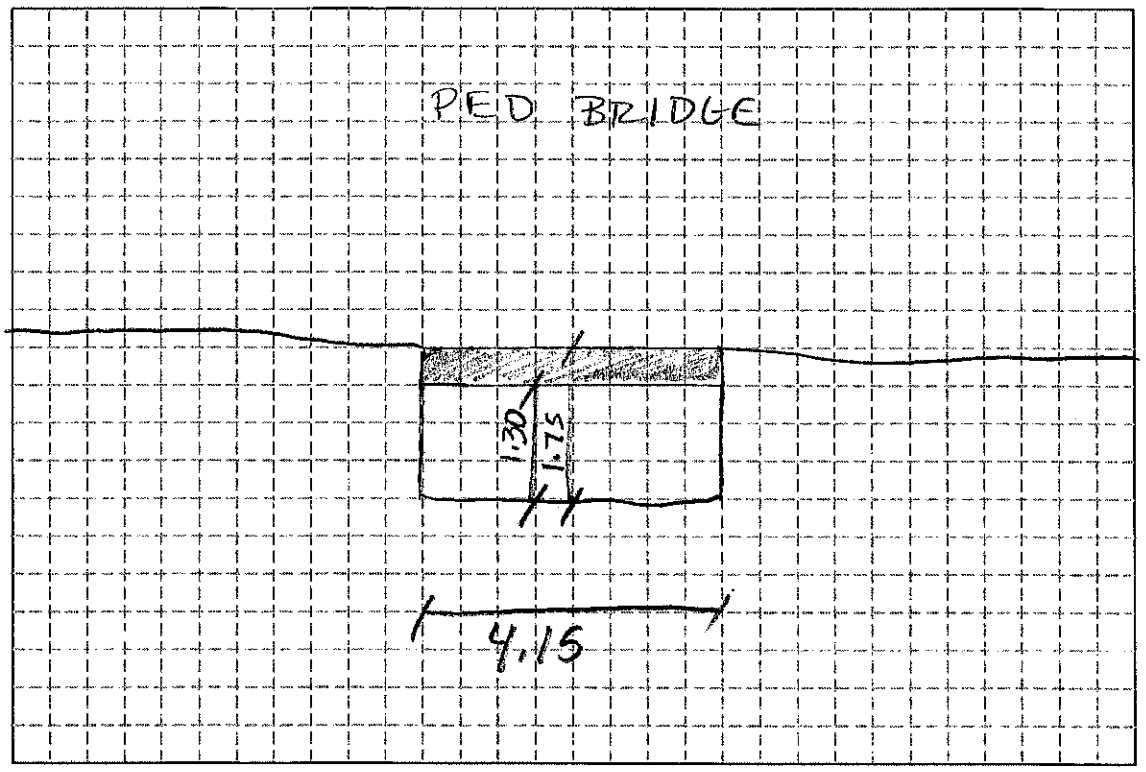
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment	S12°W	Inside Dimensions	
Bridge Opening Width W	4.15	•Rise (Diameter)	
Bridge Opening Length L	7.58	•Span	
Piers (see below for quantity, type)		Shape	
•Width	N/A	Material	
•Pier Cap Width	N/A	Length of Culvert	
•Pier Cap Height	N/A	Road Elevation	
Elevation Top	5362.05	Outlet	
Elev Low Steel	5361.85	•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance	0:1	•Entrance	
•Outlet	0:1	•Outlet	
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	
•Wingwall Length		•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing	N/A	Top of Railing	
Invert Elevations		Invert Elevations	
•Entrance	5360.55	•Entrance	
•Outlet	5360.24	•Outlet	
High Point in Road Centerline	5362.06	High Point in Road Centerline	
Deck Elevations	5362.05	Elevation Top	

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

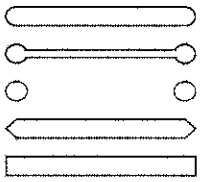
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

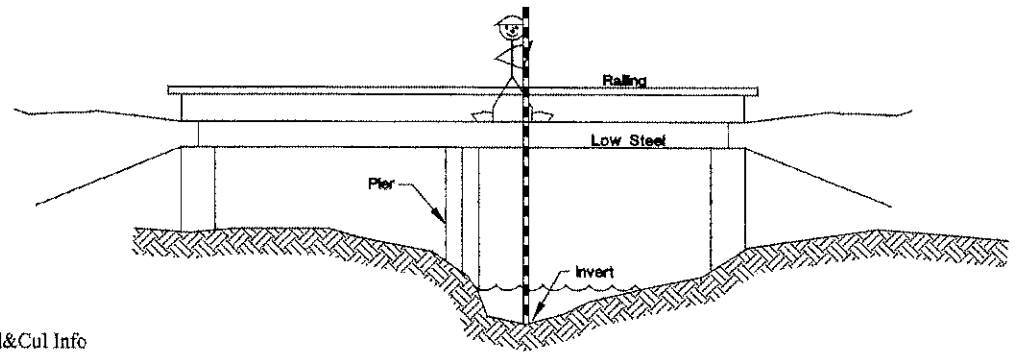
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




12

13

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J.WHEELER _____, _____

_____, _____

_____, _____

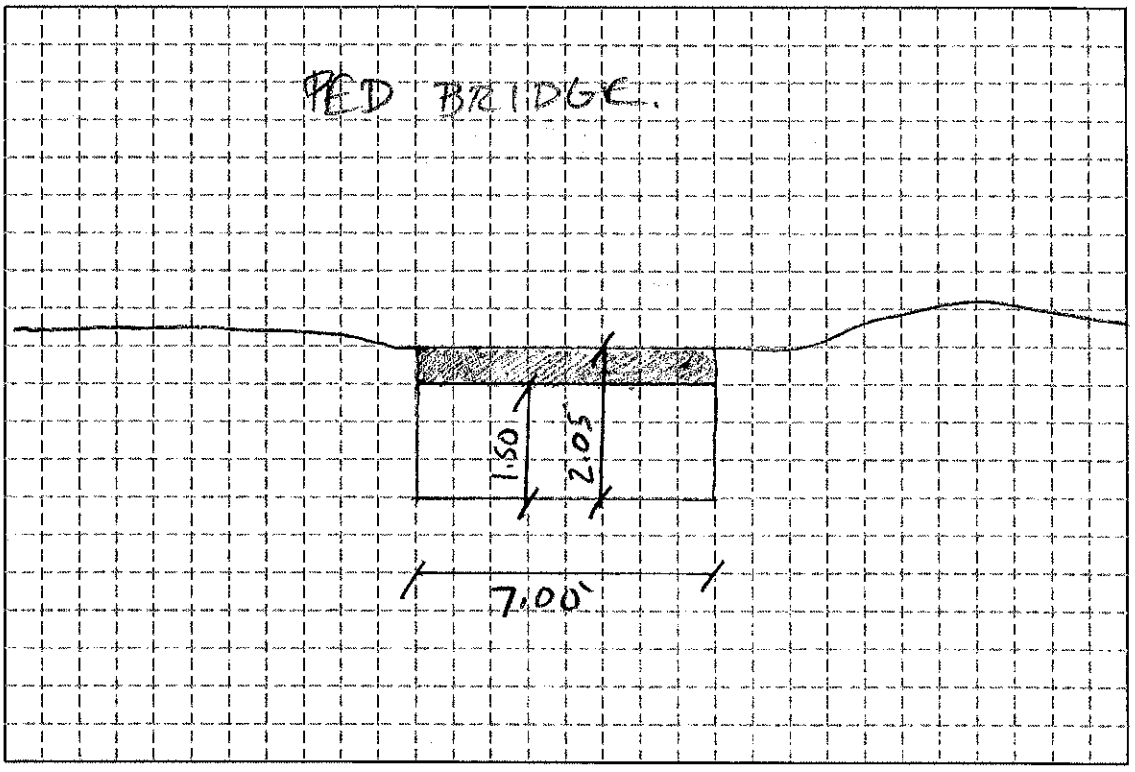
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment	5040 E	Inside Dimensions	
Bridge Opening Width W	7.00	•Rise (Diameter)	
Bridge Opening Length L	7.69	•Span	
Piers (see below for quantity, type)		Shape	
•Width	N/A	Material	
•Pier Cap Width	N/A	Length of Culvert	
•Pier Cap Height	N/A	Road Elevation	
Elevation Top	5358.59	Outlet	
Elev Low Steel	5358.04	•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance	0:1	•Entrance	
•Outlet	0:1	•Outlet	
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	
•Wingwall Length		•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing	N/A	Top of Railing	
Invert Elevations		Invert Elevations	
•Entrance	5356.54	•Entrance	
•Outlet	5356.35	•Outlet	
High Point in Road Centerline	5358.59	High Point in Road Centerline	
Deck Elevations	5358.59	Elevation Top	

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

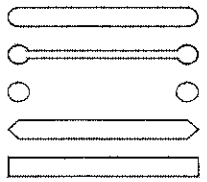
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm----------

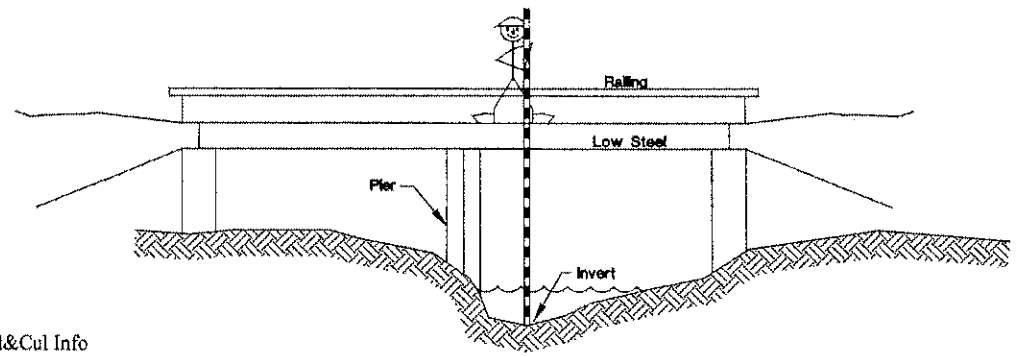
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




13

14

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

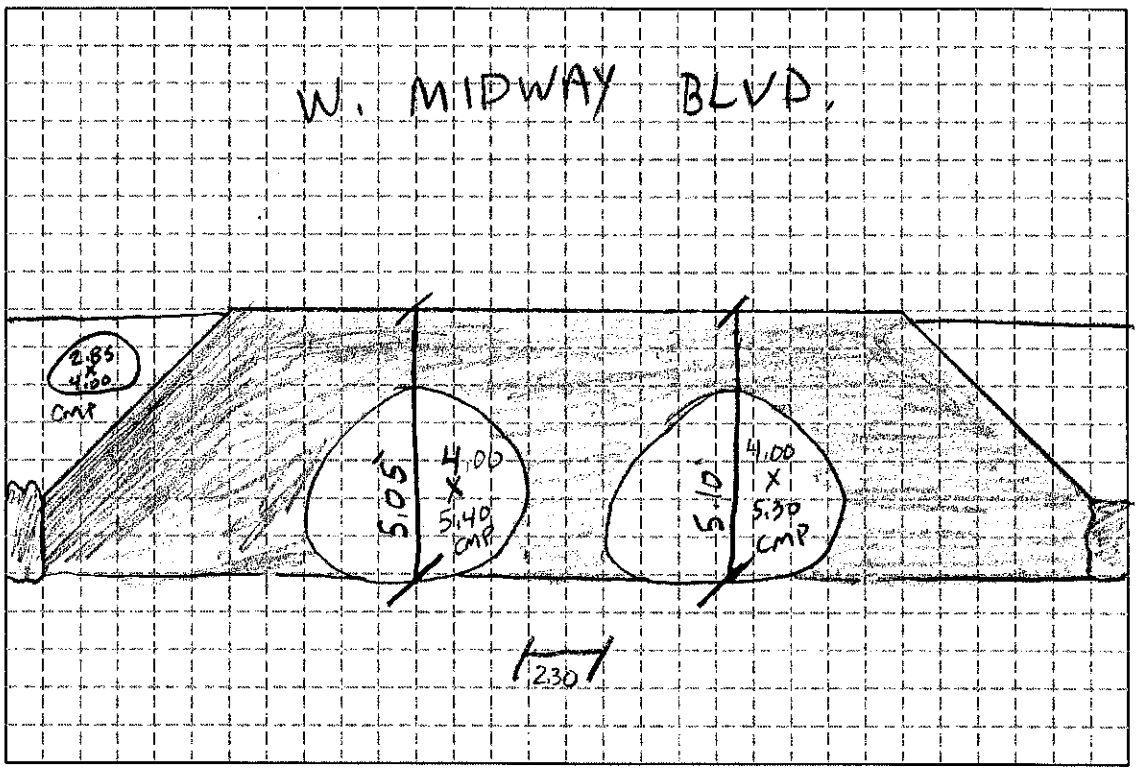
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	4.00 // 4.00 // 2.85 (SQUASHED)
Bridge Opening Length L		•Span	5.40 // 5.30 // 4.00
Piers (see below for quantity, type)		Shape	SQUASHED
•Width		Material	CMP
•Pier Cap Width		Length of Culvert	129'
•Pier Cap Height		Road Elevation	5360.28
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 134° R 134°
•Wingwall Length		•Wingwall Length	L 8.72 R 8.35
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5355.22
•Outlet		•Outlet	5355.70
High Point in Road Centerline		High Point in Road Centerline	5361.30
Deck Elevations		Elevation Top	5360.52

REMARKS:

GENERAL INFORMATION

Culvert Materials: RCP, (CMP), CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, (Elliptical), Rectangular

Bridge Pier Types:

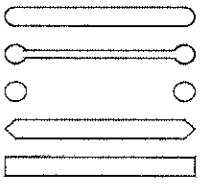
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

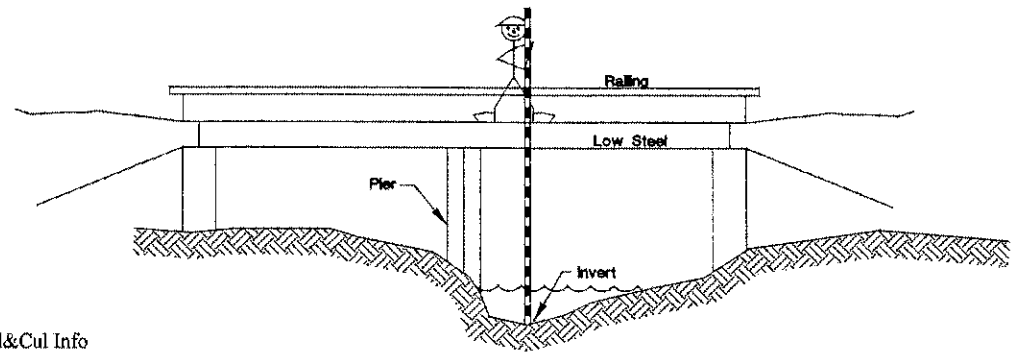
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




CAUTION
SLIPPERY CONDITIONS
MAY EXIST IN DITCH
14
25

15

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___ OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE _____

CREW J.WHEELER _____, _____

_____, _____

_____, _____

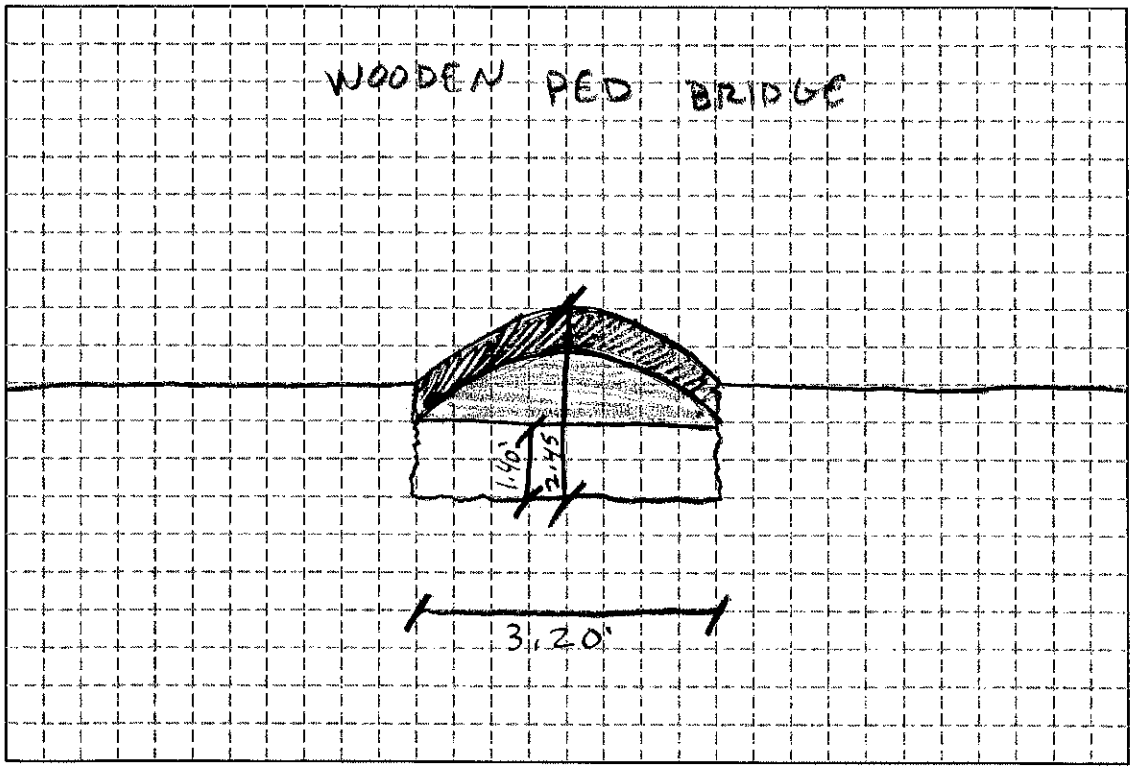
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment	N 15°E	Inside Dimensions	
Bridge Opening Width W	3.20	•Rise (Diameter)	
Bridge Opening Length L	4.85	•Span	
Piers (see below for quantity, type)		Shape	
•Width	N/A	Material	
•Pier Cap Width	N/A	Length of Culvert	
•Pier Cap Height	N/A	Road Elevation	
Elevation Top	5355.81	Outlet	
Elev Low Steel	5354.76	•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance	1:2	•Entrance	
•Outlet	1:2	•Outlet	
Entrance		Entrance	
•Wingwall Angle	N/A	•Wingwall Angle	
•Wingwall Length	N/A	•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing	N/A	Top of Railing	
Invert Elevations		Invert Elevations	
•Entrance	5353.36	•Entrance	
•Outlet	5353.35	•Outlet	
High Point in Road Centerline	5355.81	High Point in Road Centerline	
Deck Elevations	5355.81	Elevation Top	

REMARKS: OUT FROM POND

GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

Bridge Pier Types:

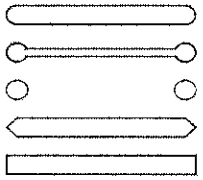
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm----------

□ Twin-Cylinder Piers Without Diaphragm----------

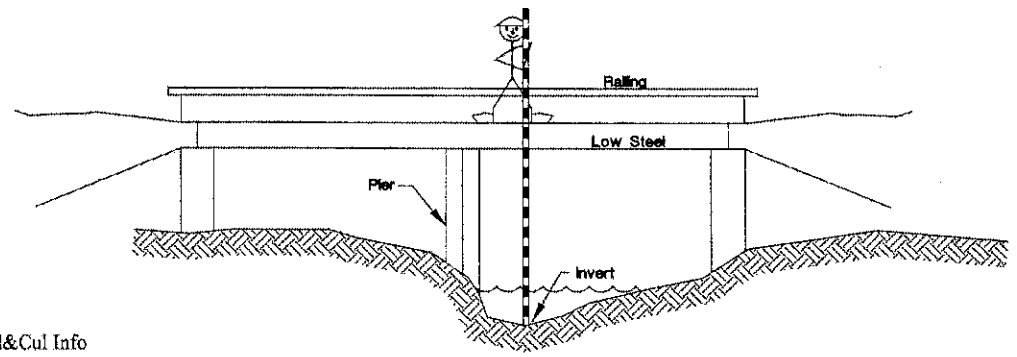
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:

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FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

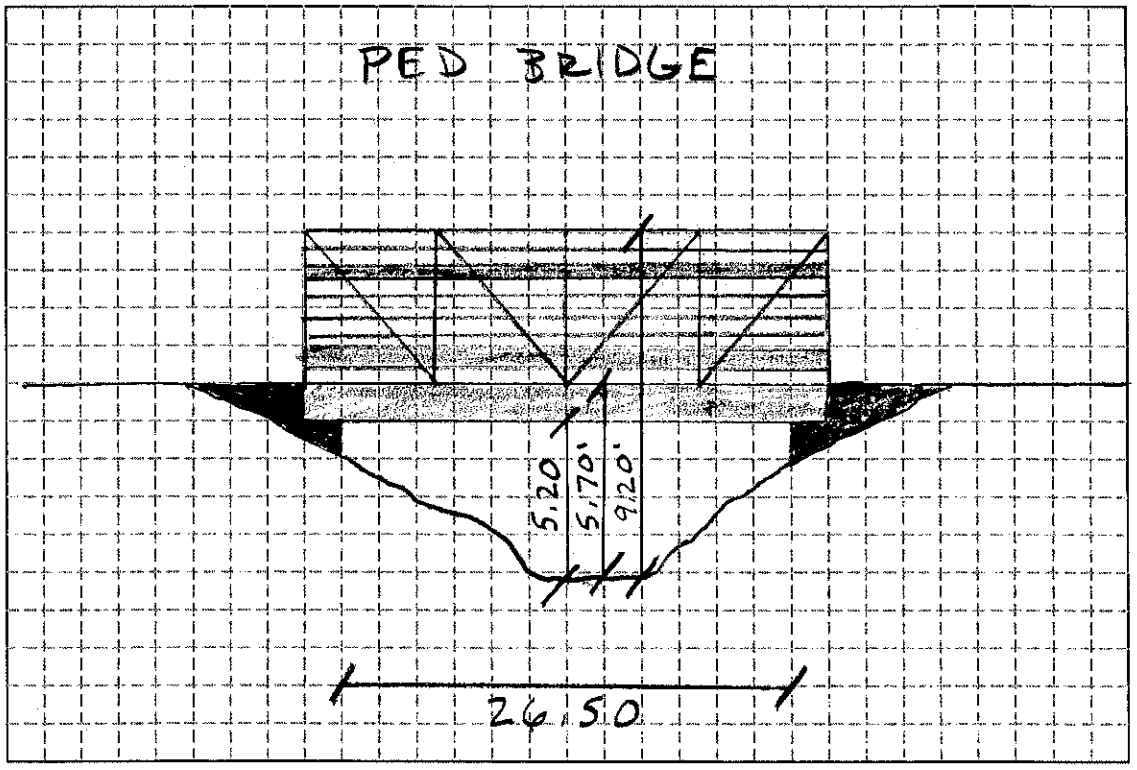
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

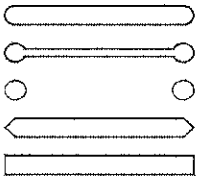
BRIDGE		CULVERT	
Alignment	S00°W	Inside Dimensions	
Bridge Opening Width W	26.50	•Rise (Diameter)	
Bridge Opening Length L	9.10	•Span	
Piers (see below for quantity, type)		Shape	
•Width	N/A	Material	
•Pier Cap Width	N/A	Length of Culvert	
•Pier Cap Height	N/A	Road Elevation	
Elevation Top	5353.60	Outlet	
Elev Low Steel	5353.10	•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance	1:1	•Entrance	
•Outlet	1:1	•Outlet	
Entrance		Entrance	
•Wingwall Angle	L 83° R 71°	•Wingwall Angle	
•Wingwall Length	L 4.47 R 4.78	•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing	5357.10	Top of Railing	
Invert Elevations		Invert Elevations	
•Entrance	5347.90	•Entrance	
•Outlet	5347.46	•Outlet	
High Point in Road Centerline	5353.60	High Point in Road Centerline	
Deck Elevations	5353.60	Elevation Top	

REMARKS:

GENERAL INFORMATION

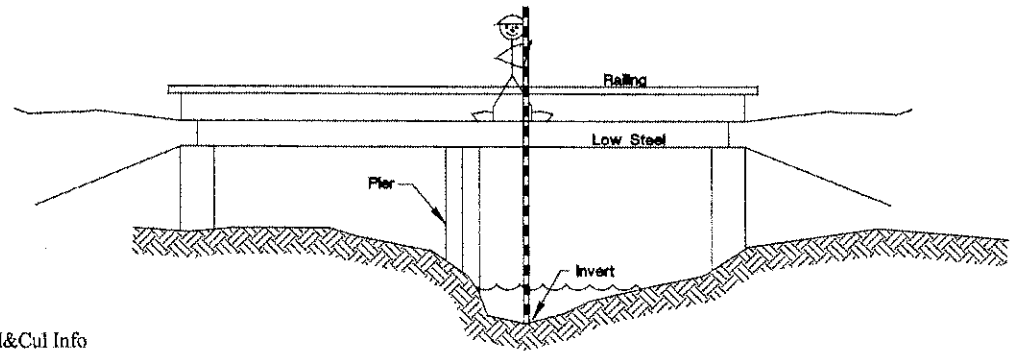
Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.
Culvert Shapes: Arch, Circular, Elliptical, Rectangular
Bridge Pier Types:

- □ Semi-Circular Nose and Tail----------
- □ Twin-Cylinder Piers With Connecting Diaphragm ----------
- □ Twin-Cylinder Piers Without Diaphragm----------
- □ 90° Triangular Nose and Tail----------
- □ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:

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17

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

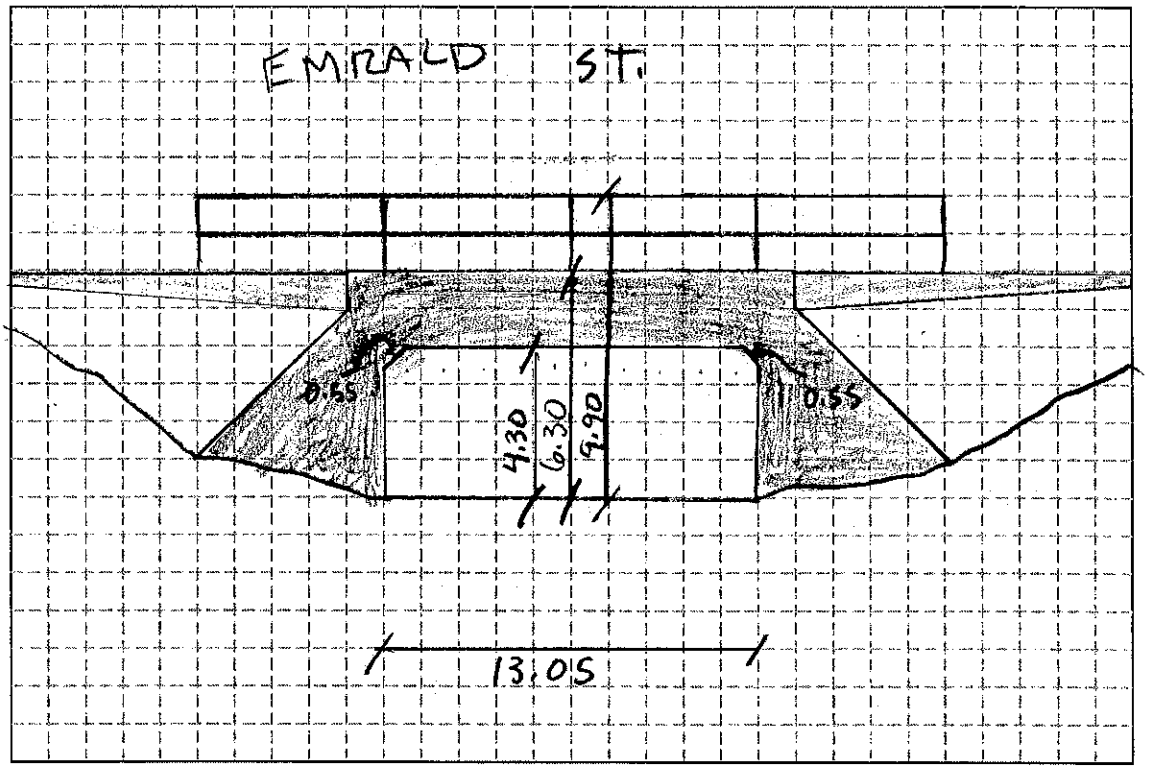
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	4.30
Bridge Opening Length L		•Span	13.05
Piers (see below for quantity, type)		Shape	RECTANGLE
•Width		Material	CONC
•Pier Cap Width		Length of Culvert	54.82
•Pier Cap Height		Road Elevation	5348.94
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 133° R 132°
•Wingwall Length		•Wingwall Length	L 6.25' R 6.18
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	5352.14
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5342.24
•Outlet		•Outlet	5341.70
High Point in Road Centerline		High Point in Road Centerline	5349.55
Deck Elevations		Elevation Top	5348.94

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: (RCP), CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, (Rectangular)

Bridge Pier Types:

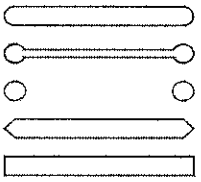
□ Semi-Circular Nose and Tail----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm----------

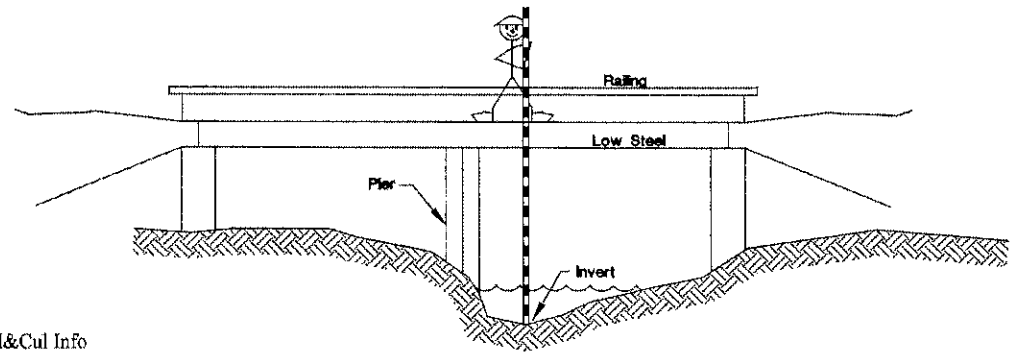
□ 90° Triangular Nose and Tail----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:




17
17-56

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FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

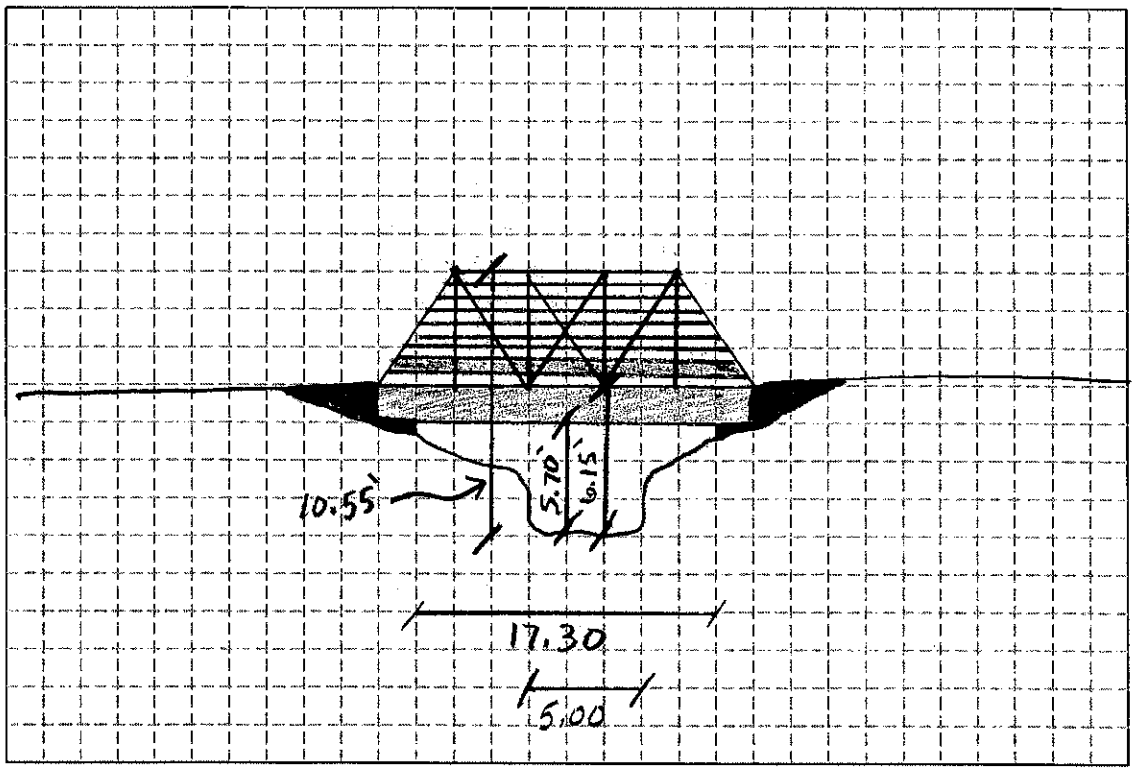
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment	526° W	Inside Dimensions	
Bridge Opening Width W	17.30	•Rise (Diameter)	
Bridge Opening Length L	9.59	•Span	
Piers (see below for quantity, type)		Shape	
•Width	N/A	Material	
•Pier Cap Width	N/A	Length of Culvert	
•Pier Cap Height	N/A	Road Elevation	
Elevation Top	5340.84	Outlet	
Elev Low Steel	5340.39	•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance	1:3 → 0:1 @ CREEK	•Entrance	
•Outlet	1:3 → 0:1 @ CREEK	•Outlet	
Entrance		Entrance	
•Wingwall Angle	0°	•Wingwall Angle	
•Wingwall Length		•Wingwall Length	
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing	5452.40	Top of Railing	
Invert Elevations		Invert Elevations	
•Entrance	5334.69	•Entrance	
•Outlet	5334.63	•Outlet	
High Point in Road Centerline	5340.84	High Point in Road Centerline	
Deck Elevations	5340.84	Elevation Top	

REMARKS:

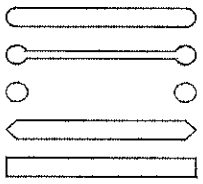
GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

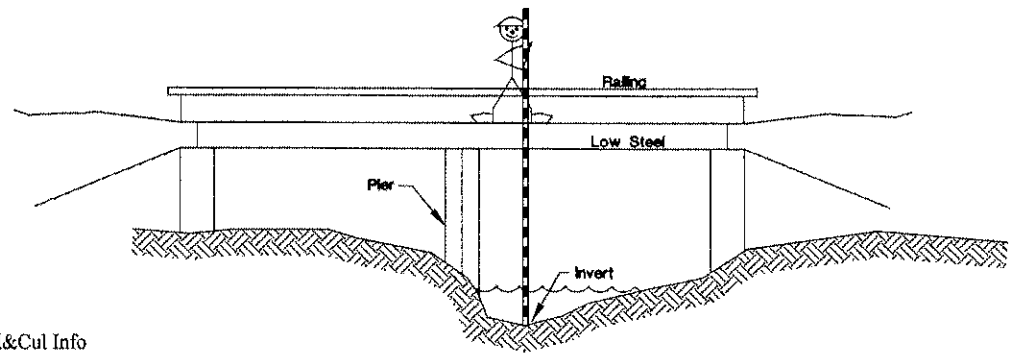
Bridge Pier Types:

- □ Semi-Circular Nose and Tail----------
- □ Twin-Cylinder Piers With Connecting Diaphragm ----------
- □ Twin-Cylinder Piers Without Diaphragm----------
- □ 90° Triangular Nose and Tail----------
- □ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:

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19

FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE _____

CREW J.WHEELER _____, _____

_____, _____

_____, _____

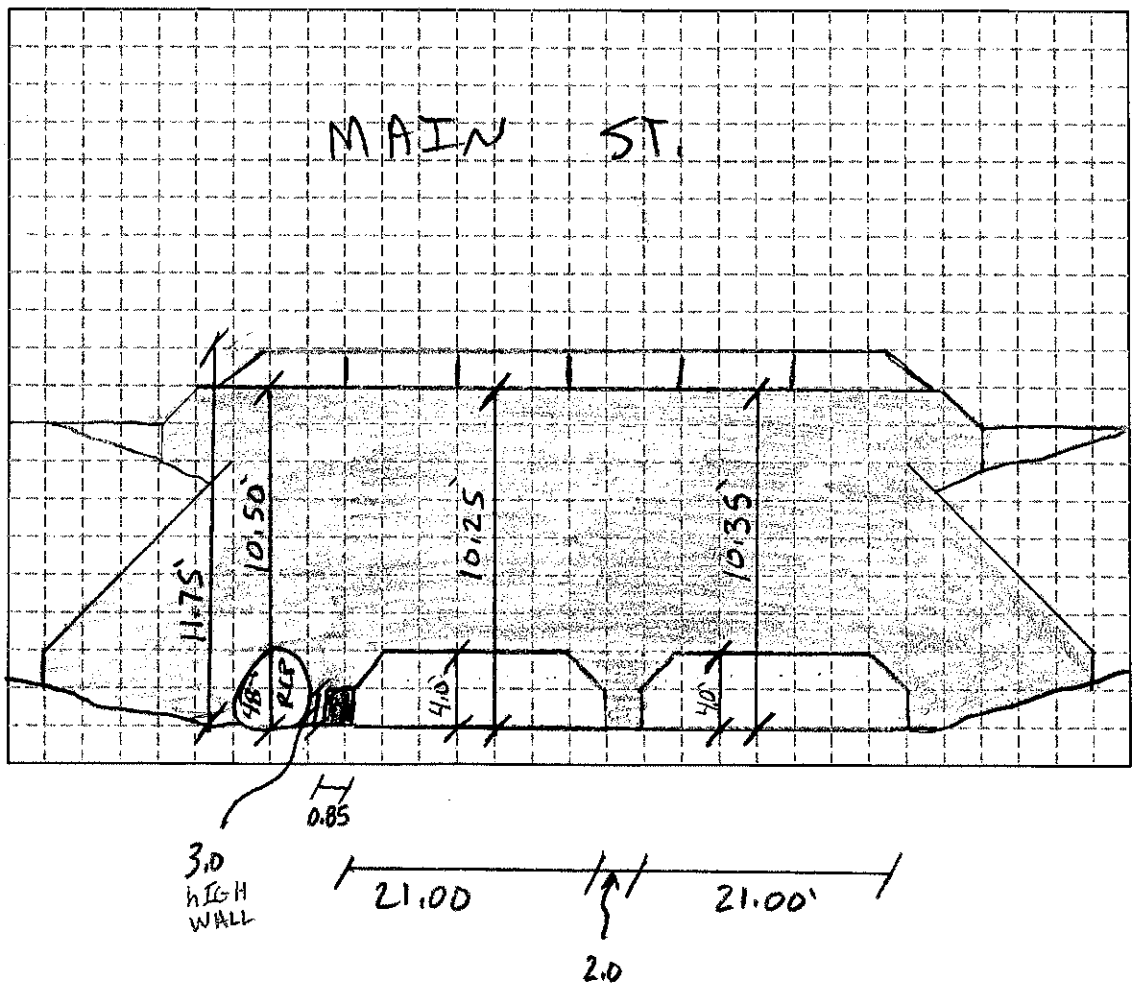
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	48"
Bridge Opening Length L		•Span	48 RCP / 48" x 21
Piers (see below for quantity, type)		Shape	ROUND
•Width		Material	RCP
•Pier Cap Width		Length of Culvert	97.34 / 100.12
•Pier Cap Height		Road Elevation	
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	1:1
•Outlet		•Outlet	1:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	L 137° R 113°
•Wingwall Length		•Wingwall Length	L 16.44 R 18.20
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	5341.27
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5333.40 / 5332.52
•Outlet		•Outlet	5331.96 5332.45
High Point in Road Centerline		High Point in Road Centerline	5340.52
Deck Elevations		Elevation Top	5342.77

REMARKS: TWO (2) 4'X21' BOX CULVERTS EAST OF 48" RCP FOR OVER FLOW.

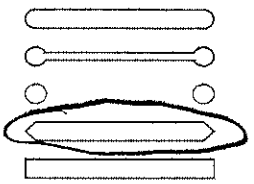
GENERAL INFORMATION

Culvert Materials: RCP, CMP, CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, Circular, Elliptical, Rectangular

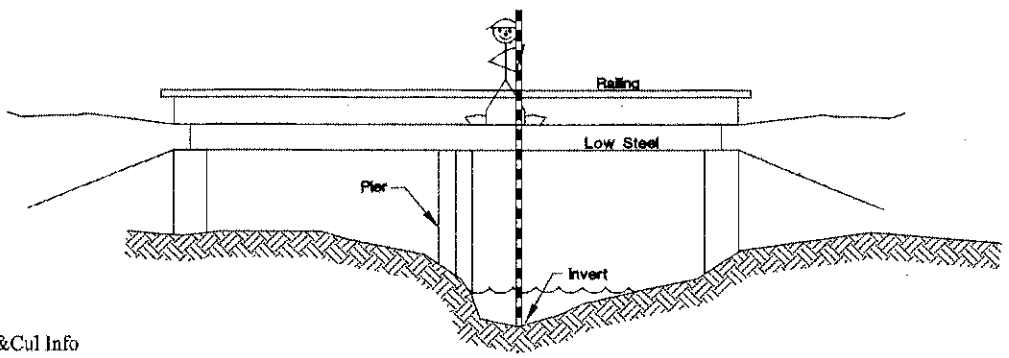
Bridge Pier Types:

- □ Semi-Circular Nose and Tail----------
- □ Twin-Cylinder Piers With Connecting Diaphragm ----------
- □ Twin-Cylinder Piers Without Diaphragm----------
- □ 90° Triangular Nose and Tail----------
- □ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:



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FORM NO._____ BRIDGE/CULVERT GEOMETRY PAGE___OF___

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

PROJECT _____ DATE 3/11/19

CREW J. WHEELER _____, _____

_____, _____

_____, _____

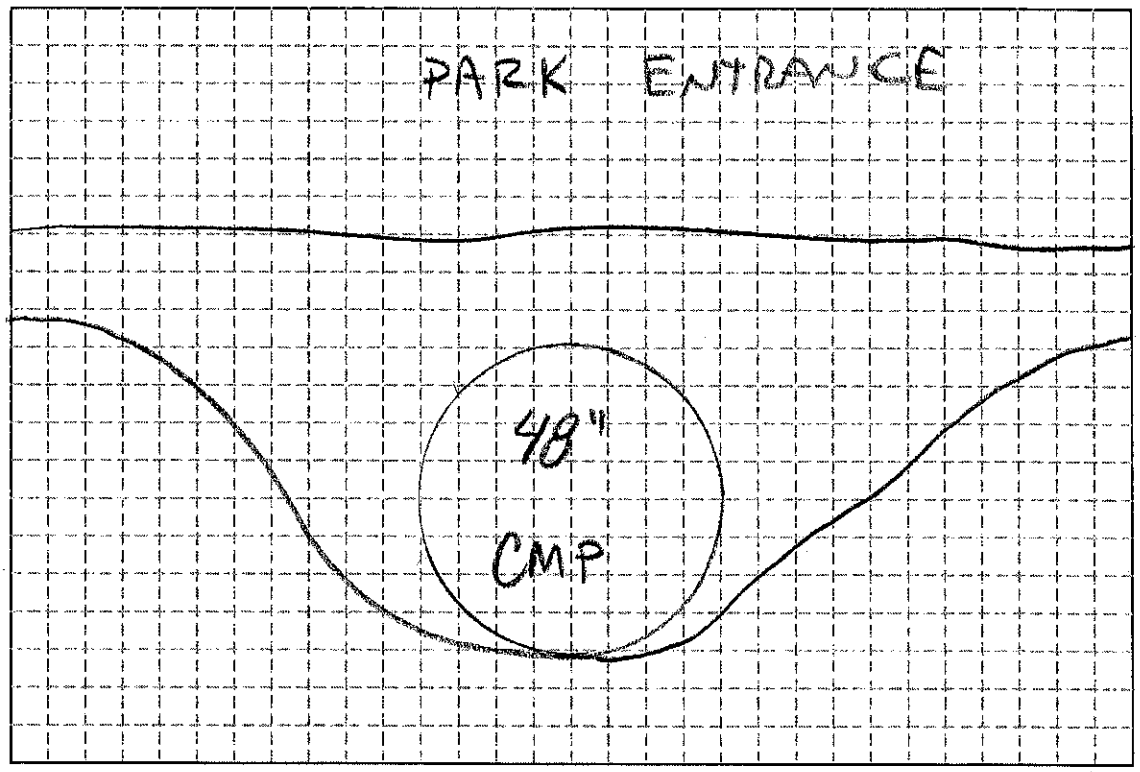
PHOTOS: ENTRANCE X OUTLET_____

(Position Rod and Rodman in the Photograph)

ELEVATIONS TAKEN FROM BENCH MARK NO. USGS DESIGNATION: JEFFCO RESET PID KK143
ELEVATION OF BENCHMARK 55557.96 (NAVD 88)
ELEVATION AND CROSS-SECTION NOTES ON PAGE _____ OF FIELD BOOK NO._____

SKETCH

(Plan, Profile, Entrance and Outlet)



BRIDGE/CULVERT INFORMATION

Crossing Name: CITY PARK MAIN CREEK CROSSING 17-300-035-28

BRIDGE		CULVERT	
Alignment		Inside Dimensions	
Bridge Opening Width W		•Rise (Diameter)	48"
Bridge Opening Length L		•Span	
Piers (see below for quantity, type)		Shape	ROUND
•Width		Material	CMP
•Pier Cap Width		Length of Culvert	42.12
•Pier Cap Height		Road Elevation	5391.53
Elevation Top		Outlet	
Elev Low Steel		•Siltation Depth	
Bridge Opening Sideslopes		•End Projection	
Embankment Sideslopes		Embankment Sideslopes	
•Entrance		•Entrance	2:1
•Outlet		•Outlet	2:1
Entrance		Entrance	
•Wingwall Angle		•Wingwall Angle	N/A
•Wingwall Length		•Wingwall Length	N/A
•Angle of Bridge Skew		•Angle of Bridge Skew	
Top of Railing		Top of Railing	N/A
Invert Elevations		Invert Elevations	
•Entrance		•Entrance	5385.42
•Outlet		•Outlet	5385.36
High Point in Road Centerline		High Point in Road Centerline	5391.53
Deck Elevations		Elevation Top	5389.42

REMARKS: _____

GENERAL INFORMATION

Culvert Materials: RCP, (CMP), CPP, PVC, Aluminum, etc.

Culvert Shapes: Arch, (Circular), Elliptical, Rectangular

Bridge Pier Types:

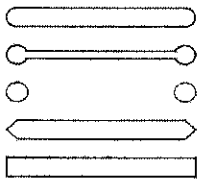
□ Semi-Circular Nose and Tail ----------

□ Twin-Cylinder Piers With Connecting Diaphragm ----------

□ Twin-Cylinder Piers Without Diaphragm ----------

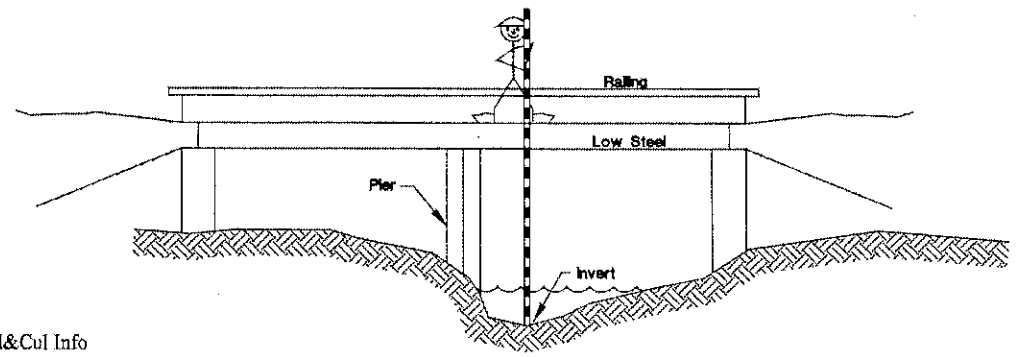
□ 90° Triangular Nose and Tail ----------

□ Square Nose and Tail ----------



□ Other ----------

*Photographs should show Rod and Rodman as follows:

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Appendix D Floodplain and Floodway Data Table

FHAD City Park Channel upstream of Main Street

Floodplain and Floodway Data Table

REFERENCE LOCATION	RIVER STATION	CROSS SECTION	THALWEG ELEVATION (FT)	PEAK DISCHARGE					WATER SURFACE ELEVATION					100-YEAR FLOODPLAIN		100-YEAR FLOODWAY (<0.5' HGL/EGL and No Negative Surcharge)						NOTE	COMMENT
				10-YR	25-YR	50-YR	100-YR	500-YR	10-YR	25-YR	50-YR	100-YR	500-YR										
				FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WIDTH (FT)	EGL (FT)	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	HGL SURCHARGE (FT)	EGL SURCHARGE (FT)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
City Park Channel																							
	103+19	9	5324.7	990	-	1888	2413	3364	5326.80	-	5327.38	5327.68	5328.13	588	5327.91	5327.81	280	415	5.8	0.13	0.45		
	103+84	74	5326.0	995	-	1891	2426	3391	5327.57	-	5327.85	5328.01	5328.32	425	5328.37	5328.48	285	514	4.7	0.47	0.47		
	106+30	319	5327.0	995	-	1891	2426	3391	5329.80	-	5330.51	5330.75	5331.19	245	5331.47	5330.87	130	309	7.9	0.12	0.48		
	107+72	462	5328.0	995	-	1891	2426	3391	5331.42	-	5331.97	5332.31	5332.78	308	5332.85	5332.63	127	375	6.5	0.32	0.46		
	109+52	642	5329.0	995	-	1891	2426	3391	5332.59	-	5333.39	5333.68	5334.08	490	5334.26	5333.86	109	331	7.3	0.17	0.50	2,3	Floodplain top width excludes disconnected ditch at left overbank.
Main St. downstream	111+29	819	5332.0	995	-	1891	2426	3391	5334.21	-	5335.25	5335.51	5335.71	628	5336.11	5335.51	134	338	7.2	0.00	0.27	2,3,6	Floodplain top width excludes disconnected ditch at left overbank.
Main St. upstream	113+32	1022	5333.0	995	-	1891	2426	3391	5336.00	-	5339.04	5339.46	5339.99	356	5339.94	5339.86	157	503	4.8	0.40	0.39	2,3,6	
	115+48	1237	5332.9	995	-	1891	2426	3391	5338.70	-	5339.74	5340.16	5340.84	221	5341.10	5340.38	105	330	7.4	0.22	0.26		
	116+86	1375	5333.8	995	-	1891	2426	3391	5339.91	-	5341.03	5341.44	5341.94	446	5341.82	5341.54	104	422	5.8	0.10	0.28	2,3	
	118+81	1571	5334.1	995	-	1891	2426	3391	5340.52	-	5341.60	5342.02	5342.61	349	5342.54	5342.26	109	416	5.8	0.23	0.31	2,3	
	119+13	1602	5335.4	995	-	1891	2426	3391	5340.73	-	5341.76	5342.17	5343.02	334	5342.66	5342.51	123	470	5.2	0.33	0.30	2,3	
Pedestrian Bridge downstream	119+32	1622	5334.4	995	-	1891	2426	3391	5341.01	-	5341.60	5341.99	5342.68	308	5342.90	5342.47	135	411	5.9	0.48	0.19	2,3	
Pedestrian Bridge upstream	119+60	1650	5334.8	995	-	1891	2426	3391	5342.41	-	5343.35	5343.82	5344.53	347	5344.20	5344.30	139	647	4.1	0.49	0.44	3,6,7	
	120+53	1743	5335.0	951	-	1788	2292	3197	5342.57	-	5343.59	5344.07	5344.97	334	5344.38	5344.46	106	513	4.5	0.39	0.41	2,3	
	123+54	2044	5336.5	951	-	1788	2292	3197	5343.01	-	5344.74	5345.14	5345.75	245	5346.33	5345.14	80	275	8.3	0.00	0.23	2,3	
	125+86	2276	5337.6	951	-	1788	2292	3197	5345.24	-	5346.22	5346.83	5347.76	243	5348.47	5346.91	49	227	10.1	0.07	0.24	2,3	
	127+50	2440	5338.2	951	-	1788	2292	3197	5345.94	-	5347.40	5347.91	5349.08	226	5350.18	5348.16	41	210	10.9	0.25	0.06	2,3	FP Widened on ROB for logical transition from upstream cross section
Emerald Street downstream	127+65	2455	5341.2	951	-	1788	2292	3197	5346.45	-	5348.25	5349.08	5352.48	244	5350.94	5349.08	60	243	9.4	0.00	0.00	2,3	
Emerald Street upstream	128+47	2537	5342.0	951	-	1788	2292	3197	5350.06	-	5351.52	5352.05	5352.76	415	5352.23	5352.51	150	694	3.5	0.46	0.48	6,7	
	128+80	2570	5342.1	951	-	1788	2292	3197	5350.22	-	5351.64	5352.19	5352.93	321	5352.27	5352.63	146	826	2.8	0.44	0.48		
South Tributary Confluence downstream	130+90	2780	5342.8	897	-	1692	2170	3022	5350.34	-	5351.77	5352.34	5353.12	425	5352.38	5352.79	179	981	2.2	0.45	0.49	2,3	
South Tributary Confluence upstream	133+00	2990	5343.4	791	-	1357	1637	2131	5350.46	-	5351.85	5352.42	5353.20	237	5352.56	5352.86	87	454	3.6	0.44	0.50		Top width measurement ends at the right end of the cross-section where located within the confluence area.
	133+14	3003	5343.5	791	-	1357	1637	2131	5350.48	-	5351.85	5352.43	5353.20	227	5352.60	5352.86	80	414	4.0	0.43	0.50		Top width measured along the cross-section projection line at right overbank.
	133+29	3018	5345.1	791	-	1357	1637	2131	5350.46	-	5351.85	5352.42	5353.20	217	5352.66	5352.83	75	350	4.7	0.41	0.50		
	134+17	3106	5345.4	791	-	1357	1637	2131	5351.15	-	5352.22	5352.72	5353.37	128	5353.14	5353.08	69	292	5.6	0.36	0.43		
	135+10	3200	5346.1	791	-	1357	1637	2131	5351.81	-	5352.75	5353.16	5353.77	92	5353.72	5353.50	66	291	5.6	0.35	0.30		
	135+54	3244	5346.4	791	-	1357	1637	2131	5351.84	-	5352.68	5353.08	5353.67	79	5354.19	5353.49	67	230	7.1	0.42	0.17		
Pedestrian Bridge downstream	135+72	3262	5347.5	791	-	1357	1637	2131	5352.03	-	5353.76	5354.25	5354.83	114	5355.34	5354.23	96	228	7.2	-0.01	-0.03		
Pedestrian Bridge upstream	135+89	3279	5347.9	791	-	1357	1637	2131	5353.29	-	5355.76	5356.03	5356.47	191	5356.31	5356.41	83	390	4.4	0.38	0.45	6,7	
	136+25	3315	5348.1	791	-	1357	1637	2131	5353.67	-	5355.89	5356.21	5356.68	268	5356.37	5356.47	75	351	4.7	0.26	0.46		Top width includes shallow flooding at right overbank.
	136+65	3354	5348.3	791	-	1357	1637	2131	5354.01	-	5355.94	5356.25	5356.72	215	5356.44	5356.55	74	343	4.8	0.31	0.49		
	137+42	3431	5348.7	791	-	1357	1637	2131	5354.63	-	5356.04	5356.34	5356.81	165	5356.70	5356.79	72	332	4.9	0.45	0.48		
	140+04	3694	5350.0	620	-	1047	1263	1594	5355.96	-	5357.04	5357.42	5357.94	272	5357.99	5357.73	64	240	5.3	0.31	0.22		
	140+34	3724	5353.4	620	-	1047	1263	1594	5355.88	-	5357.10	5357.48	5357.98	285	5358.24	5357.80	87	218	5.8	0.32	0.15		
	140+41	3731	5354.6	620	-	1047	1263	1594	5356.90	-	5357.59	5357.87	5358.23	305	5358.71	5357.87	113	186	6.8	0.01	0.00		Added width to account for flow path of upstream roadway overtopping
	140+52	3742	5353.3	620	-	1047	1263	1594	5357.55	-	5358.29	5358.57	5358.99	337	5358.80	5358.56	120	360	3.6	-0.01	0.00	2,6,7	
	142+05	3894	5353.6	607	-	1068	1253	1872	5357.71	-	5358.50	5358.80	5359.15	407	5358.97	5358.79	109	410	3.2	0.00	0.01	2,6,7	
Midway Blvd. downstream	143+31	4021	5353.6	607	-	1068	1253	1872	5358.41	-	5359.52	5359.82	5361.16	424	5360.97	5359.94	81	186	6.8	0.11	-0.01	6,7	
Midway Blvd. upstream	144+75	4164	5355.0	607	-	1068	1253	1872	5361.68	-	5362.01	5362.07	5362.30	505	5362.24	5362.55	250	906	2.4	0.48	0.47	6,7	
	146+37	4326	5356.4	607	-	1068	1253	1872	5361.78	-	5362.19	5362.31	5362.67	213	5362.45	5362.69	101	377	3.3	0.39	0.45		
	146+47	4336	5358.6	607	-	1068	1253	1872	5361.79	-	5362.21	5362.33	5362.71	213	5362.47	5362.70	100	342	3.7	0.36	0.45		
	146+57	4346	5356.5	607	-	1068	1253	1872	5361.79	-	5362.21	5362.33	5362.71	214	5362.49	5362.71	99	357	3.7	0.37	0.45	6,7	
	148+23	4513	5359.0	607	-	1068	1253	1872	5361.91	-	5362.47	5362.65	5363.17	165	5363.36	5362.90	83	182	6.9	0.24	0.38		
	148+88	4577	5360.2	607	-	1068	1253	1872	5362.77	-	5363.28	5363.44	5363.88	167	5364.08	5363.58	83	179	7.0	0.14	0.36		
	148+98	4587	5361.0	607	-	1068	1253	1872	5362.93	-	5363.48	5363.68	5364.30	176	5364.21	5363.70	83	163	7.7	0.01	0.45		
	149+08	4597	5360.6	607	-	1068	1253	1872	5363.10	-	5363.57	5363.73	5364.28	174	5364.36	5364.09	84	199	6.4	0.37	0.44	6,7	
	150+21	4711	5361.4	607	-	1068	1253	1872	5364.31	-	5364.81	5364.96	5365.43	191	5365.63	5365.06	84	177	7.1	0.10	0.39		
	151+10	4799	5362.3	607	-	1068	1253	1872	5365.42	-	5365.84	5366.03	5366.43	194	5366.65	5366.27	93	195	6.4	0.23	0.34	2	
	151+20	4809	5365.0	607	-	1068	1253	1872	5365.98	-	5366.36	5366.49	5366.90	197	5367.12	5366.72	96	166	7.5	0.23	0.49	2	
	151+30	4820	5362.3	607	-	1068	1253	1872	5366.33	-	5366.77	5366.92	5367.36	210	5367.27	5367.19	93	264	6.1	0.27	0.50	2,6,7	
	152+45	4935	5363.3	607	-	1068	1253	1872	5366.95	-	5367.48	5367.66	5368.14	144	5368.04	5368.07	88	251	5.0	0.41	0.45		
	154+05	5095	5364.7	607	-	1068	1253	1872	5368.70	-	5369.14	5369.28	5369.71	150	5369.97	5369.36	82	173	7.2	0.08	0.37		
	154+20	5110	5368.2	607	-	1068	1253	1872	5370.14	-	5370.53	5370.67	5371.07	163	5371.30	5370.75	85	163	7.7	0.08	0.42		
	154+44	5133	5364.8	607	-	1068	1253	1872	5370.60	-	5371.14	5371.32	5371.87	194	5371.43	5371.66	92	392	3.9	0.34	0.47	6,7	

FHAD City Park Channel upstream of Main Street

Floodplain and Floodway Data Table

REFERENCE LOCATION	RIVER STATION	CROSS SECTION	THALWEG ELEVATION (FT)	PEAK DISCHARGE					WATER SURFACE ELEVATION					100-YEAR FLOODPLAIN		100-YEAR FLOODWAY (<0.5' HGL/EGL and No Negative Surcharge)						NOTE	COMMENT
				10-YR	25-YR	50-YR	100-YR	500-YR	10-YR	25-YR	50-YR	100-YR	500-YR										
				FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WIDTH (FT)	EGL (FT)	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	HGL SURCHARGE (FT)	EGL SURCHARGE (FT)		
	155+47	5237	5367.0	607	-	1068	1253	1872	5370.67	-	5371.25	5371.44	5372.02	180	5371.54	5371.91	108	448	2.8	0.47	0.50		
	158+44	5534	5369.1	607	-	1068	1253	1872	5371.64	-	5372.18	5372.33	5372.78	151	5373.00	5372.38	77	167	7.5	0.05	0.41		
	161+30	5819	5372.5	587	-	1019	1219	1640	5375.31	-	5375.81	5376.09	5376.41	120	5376.83	5376.23	77	159	7.7	0.15	0.40		
	161+50	5840	5375.6	587	-	1019	1219	1640	5376.23	-	5376.74	5376.92	5377.28	121	5377.67	5377.20	80	162	7.5	0.28	0.49		
	161+70	5860	5372.5	587	-	1019	1219	1640	5376.88	-	5377.35	5377.53	5377.87	126	5378.27	5377.75	75	174	8.0	0.21	0.50	6,7	
	163+64	6054	5375.7	587	-	1019	1219	1640	5380.65	-	5381.40	5381.60	5381.85	157	5382.29	5381.60	61	154	7.9	0.00	0.50		
	165+66	6256	5379.1	587	-	1019	1219	1640	5382.63	-	5383.11	5383.31	5383.73	205	5383.67	5383.76	105	245	5.0	0.45	0.50		
	165+86	6276	5379.4	587	-	1019	1219	1640	5382.96	-	5383.36	5383.46	5383.77	213	5384.00	5383.77	120	201	6.1	0.31	0.36		
	165+98	6288	5382.6	587	-	1019	1219	1640	5383.38	-	5383.65	5383.77	5383.99	232	5384.25	5384.04	128	182	6.7	0.27	0.50		
	166+12	6301	5382.0	587	-	1019	1219	1640	5383.69	-	5384.04	5384.18	5384.44	264	5384.41	5384.58	135	274	4.5	0.40	0.50	6,7	
	166+34	6324	5380.7	587	-	1019	1219	1640	5383.77	-	5384.12	5384.26	5384.53	268	5384.63	5384.70	150	279	4.4	0.44	0.42		
	166+54	6344	5382.0	587	-	1019	1219	1640	5383.89	-	5384.27	5384.40	5384.64	281	5384.88	5384.71	189	206	5.9	0.31	0.47	2,4	
	167+02	6392	5383.0	587	-	1019	1219	1640	5384.96	-	5385.28	5385.42	5385.66	311	5385.94	5385.64	213	182	6.7	0.22	0.50	2,4	
	168+27	6516	5384.6	587	-	1019	1219	1640	5387.35	-	5388.06	5388.18	5388.40	634	5388.67	5388.18	265	164	7.4	0.00	0.43	2,4	
Park Driveway Culvert downstream	168+89	6578	5385.5	587	-	1019	1219	1640	5388.66	-	5389.07	5389.25	5389.60	654	5389.37	5389.75	440	457	2.7	0.50	0.49	2,4	Top width adjusted for logical transition from adjacent cross section
Park Dirveway Culvert upstream	169+45	6632	5385.2	587	-	1019	1219	1640	5391.09	-	5391.53	5391.61	5391.75	804	5391.88	5392.09	520	875	2.9	0.48	0.50	2,3,4,5,6,7	
Hwy 287 downstream	169+66	6655	5385.2	587	-	1019	1219	1640	5391.58	-	5391.86	5391.96	5392.13	807	5391.97	5392.46	532	2927	0.9	0.50	0.50	6,7	Top width adjusted for logical transition from adjacent cross section
Hwy 287 upstream	171+20	6809	5386.2	587	-	1019	1219	1640	5394.54	-	5394.90	5395.04	5395.30	975	5395.06	5395.54	633	1961	0.9	0.49	0.49	6,7	
	171+86	6874	5387.1	389	-	677	804	1081	5394.55	-	5394.92	5395.05	5395.31	311	5395.07	5395.55	155	829	1.0	0.49	0.49		
	172+72	6956	5388.0	389	-	677	804	1081	5394.55	-	5394.92	5395.06	5395.31	285	5395.08	5395.55	151	809	1.0	0.49	0.49		
Alter Street downstream	173+28	7011	5388.5	389	-	677	804	1081	5394.55	-	5394.91	5395.05	5395.31	245	5395.10	5395.53	84	391	2.1	0.48	0.50		
Alter Street upstream	175+20	7204	5392.4	389	-	677	804	1081	5395.25	-	5396.06	5396.35	5396.87	90	5396.81	5396.84	63	187	4.7	0.49	0.44	6,7	
	175+25	7209	5392.6	389	-	677	804	1081	5395.42	-	5396.14	5396.39	5396.87	84	5396.82	5396.89	61	176	4.6	0.49	0.43		
	175+26	7210	5393.4	389	-	677	804	1081	5395.83	-	5396.24	5396.40	5396.71	84	5397.12	5396.60	61	113	7.1	0.20	0.35		
	176+51	7335	5394.3	389	-	677	804	1081	5397.60	-	5397.92	5398.08	5398.43	127	5398.58	5398.29	78	125	6.4	0.20	0.38		
	177+67	7451	5395.0	389	-	677	804	1081	5399.22	-	5399.49	5399.60	5399.80	148	5400.07	5399.93	87	129	6.2	0.33	0.50	2	Floodplain Delineation was based on contours that included the buildings modeled as block obstruction.
	178+62	7545	5395.7	389	-	677	804	1081	5400.41	-	5400.91	5401.10	5401.42	73	5401.82	5401.20	47	106	7.6	0.10	0.36		
	179+82	7665	5396.4	389	-	677	804	1081	5401.53	-	5402.15	5402.36	5402.80	84	5402.68	5402.75	49	156	5.2	0.39	0.50		
	181+77	7861	5397.7	302	-	525	623	839	5402.60	-	5403.20	5403.42	5403.86	80	5403.90	5403.80	43	104	6.0	0.37	0.47		
	182+18	7902	5398.0	302	-	525	623	839	5403.18	-	5403.70	5403.89	5404.27	80	5404.17	5404.30	46	141	4.4	0.42	0.44		
Burbank Street downstream	183+94	8077	5399.6	302	-	525	623	839	5403.99	-	5404.62	5404.83	5405.24	82	5405.27	5405.14	45	118	5.3	0.30	0.34	2	Floodplain top width excludes the nearby on-site detention facility.
Burbank Street upstream	185+35	8219	5400.2	228	-	396	470	632	5404.34	-	5405.56	5405.86	5406.31	134	5405.98	5406.34	53	159	3.0	0.48	0.50		
	185+76	8259	5400.6	228	-	396	470	632	5404.53	-	5405.62	5405.89	5406.32	80	5406.08	5406.38	49	144	3.3	0.49	0.47		
Business Access Drive downstream	186+18	8302	5401.0	228	-	396	470	632	5404.70	-	5405.72	5405.99	5406.41	74	5406.25	5406.46	53	134	3.5	0.47	0.41		
Business Access Drive upstream	186+89	8373	5402.0	228	-	396	470	632	5404.75	-	5406.01	5406.47	5407.02	87	5406.82	5406.97	57	131	3.6	0.50	0.38		
	187+91	8474	5402.4	228	-	396	470	632	5406.13	-	5406.79	5406.91	5407.31	90	5407.18	5407.02	31	79	6.0	0.12	0.42		
	188+95	8579	5403.5	169	-	296	353	480	5406.63	-	5407.09	5407.27	5407.67	89	5407.75	5407.76	28	70	5.0	0.49	0.41		
	189+65	8649	5404.4	169	-	296	353	480	5407.01	-	5407.75	5407.82	5408.42	123	5408.68	5407.89	25	47	7.6	0.08	0.15	2,3	
Business Access Drive downstream	190+62	8745	5405.7	169	-	296	353	480	5408.29	-	5408.81	5409.16	5409.17	94	5409.43	5409.22	29	66	5.4	0.06	0.26	3	
Business Access Drive upstream	191+38	8822	5407.8	169	-	296	353	480	5410.21	-	5410.45	5410.55	5410.73	79	5410.97	5410.72	35	52	6.8	0.17	0.49		
	192+41	8925	5411.0	169	-	296	353	480	5411.71	-	5411.99	5412.17	5412.35	123	5412.51	5412.45	52	60	5.9	0.27	0.49		
	193+50	9033	5412.0	169	-	296	353	480	5412.83	-	5413.13	5413.16	5413.34	130	5413.45	5413.51	54	79	4.5	0.35	0.38	2,3	
	193+99	9083	5412.8	169	-	296	353	480	5413.23	-	5413.51	5413.64	5413.85	141	5413.87	5413.80	55	60	5.9	0.16	0.48		
	194+34	9118	5412.0	169	-	296	353	480	5413.51	-	5413.78	5413.88	5414.07	175	5414.04	5414.33	47	98	3.6	0.45	0.50	2,3,6	
	194+58	9141	5412.6	101	-	184	213	292	5413.55	-	5413.89	5414.01	5414.22	173	5414.12	5414.51	55	90	2.4	0.50	0.48	2,3,6	
	194+85	9169	5414.0	101	-	184	213	292	5414.72	-	5414.93	5414.97	5415.12	115	5415.25	5415.09	74	47	4.6	0.12	0.16		Floodplain top width includes flow continued from upstream at left overbank
	195+27	9210	5415.0	101	-	184	213	292	5415.66	-	5415.86	5415.95	5416.18	133	5416.32	5416.18	36	37	5.8	0.23	0.38	2,3,6	
	195+75	9259	5413.0	101	-	184	213	292	5415.90	-	5416.27	5416.39	5416.59	88	5416.41	5416.78	58	173	1.2	0.39	0.39		
	196+65	9348	5414.0	101	-	184	213	292	5415.91	-	5416.30	5416.42	5416.63	224	5416.42	5416.80	71	198	1.1	0.39	0.40		
	197+47	9430	5415.0	101	-	184	213	292	5415.86	-	5416.26	5416.38	5416.59	205	5416.45	-	-	-	-	-	-	2,4	Area defined as shallowing flooding due to hydraulic radius less than 1.
	199+67	9651	5416.0	101	-	184	213	292	5416.87	-	5417.09	5417.16	5417.34	154	5417.23	-	-	-	-	-	-		
	200+71	9754	5417.0	101	-	184	213	292	5417.57	-	5417.86	5417.93	5418.10	126	5418.05	-	-	-	-	-	-		

1. Floodway equal to floodplain.
2. Floodplain top width includes high ground or obstruction.
3. Floodplain top width includes IEFA.
4. Floodway top width includes high ground or obstruction.
5. Floodway top width includes IEFA.
6. Floodplain includes permanent IEFA from structure modeling.
7. Floodway includes permanent IEFA from structure modeling.

FHAD City Park Channel South Tributary

Floodplain and Floodway Data Table

REFERENCE LOCATION	RIVER STATION	CROSS SECTION	THALWEG ELEVATION (FT)	PEAK DISCHARGE					WATER SURFACE ELEVATION					100-YEAR FLOODPLAIN		100-YEAR FLOODWAY (<0.5' HGL/EGL and No Negative Surcharge)						NOTE	COMMENT
				10-YR	25-YR	50-YR	100-YR	500-YR	10-YR	25-YR	50-YR	100-YR	500-YR										
				FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	FLOW (CFS)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WSEL (FT)	WIDTH (FT)	EGL (FT)	WSEL (FT)	WIDTH (FT)	AREA (SQ FT)	VELOCITY (FT/S)	HGL SURCHARGE (FT)	EGL SURCHARGE (FT)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
City Park Channel South Tributary																							
Confluence with City Park Channel	2+07	206	5351.0	179	-	414	547	914	5351.77	-	5352.29	5352.44	5353.21	249	5352.72	5352.72	78	107	5.1	0.28	0.43		
	2+60	260	5352.1	179	-	414	547	914	5353.01	-	5353.25	5353.40	5353.61	280	5353.64	5353.57	77	90	6.1	0.17	0.50		
	3+41	341	5353.0	179	-	414	547	914	5354.07	-	5354.40	5354.50	5354.78	233	5354.71	5354.95	87	134	4.1	0.45	0.50		
	4+47	447	5354.9	179	-	414	547	914	5355.49	-	5355.75	5355.89	5356.17	185	5356.15	5356.09	84	92	5.9	0.20	0.49		
	5+54	560	5356.8	179	-	414	547	914	5357.29	-	5357.67	5357.85	5358.34	142	5358.32	5358.23	87	94	5.8	0.38	0.49	2	
	6+07	612	5356.4	179	-	414	547	914	5358.16	-	5358.55	5358.69	5359.01	154	5359.05	5358.95	73	96	5.7	0.26	0.50		
	6+43	649	5357.7	179	-	414	547	914	5358.68	-	5359.07	5359.29	5359.66	146	5359.72	5359.51	66	87	6.3	0.21	0.41		
	7+75	782	5359.0	179	-	414	547	914	5360.06	-	5360.54	5360.84	5361.38	117	5361.38	5360.98	56	86	6.3	0.14	0.30	2	
	8+75	882	5360.0	179	-	414	547	914	5360.86	-	5361.47	5361.65	5362.03	95	5362.09	5361.94	59	109	5.0	0.30	0.24		
	9+65	973	5360.0	179	-	414	547	914	5361.39	-	5361.97	5362.22	5362.79	86	5362.52	5362.35	53	109	5.0	0.13	0.21		
	10+45	1052	5360.6	179	-	414	547	914	5361.69	-	5362.26	5362.52	5363.11	136	5362.94	5362.69	57	96	5.7	0.16	0.25	2	
	11+05	1113	5361.0	179	-	414	547	914	5362.26	-	5362.70	5362.90	5363.37	85	5363.39	5363.08	51	95	5.8	0.18	0.21	2	
	11+89	1196	5362.0	179	-	414	547	914	5362.71	-	5363.33	5363.61	5364.29	231	5363.69	5363.71	62	106	5.2	0.10	0.43		
	12+67	1275	5363.0	179	-	414	547	914	5363.73	-	5364.23	5364.43	5364.89	139	5365.00	5364.55	51	78	7.0	0.12	0.31	2	
	14+17	1425	5364.6	179	-	414	547	914	5365.54	-	5365.99	5366.22	5366.81	74	5366.86	5366.33	64	92	6.0	0.11	0.02		
	14+97	1504	5365.0	179	-	414	547	914	5366.11	-	5366.76	5367.06	5367.73	298	5367.19	5367.05	88	163	3.4	0.00	0.04	3	
	15+67	1575	5365.9	179	-	414	547	914	5366.80	-	5367.35	5367.60	5368.15	70	5368.26	5367.62	49	77	7.1	0.02	0.14		
	17+17	1725	5367.0	179	-	414	547	914	5368.16	-	5368.81	5369.06	5369.63	68	5369.44	5369.19	66	119	4.6	0.13	0.08		
	17+97	1804	5367.1	179	-	414	547	914	5368.54	-	5369.25	5369.56	5370.32	183	5369.71	5369.58	75	142	3.8	0.02	0.10	3	
	18+67	1875	5368.5	179	-	414	547	914	5369.41	-	5369.99	5370.25	5370.86	73	5370.93	5370.28	45	75	7.3	0.03	0.22		
	20+17	2025	5371.0	179	-	414	547	914	5372.01	-	5372.56	5372.82	5373.42	68	5373.50	5372.86	46	75	7.3	0.04	0.17		
	20+92	2099	5372.3	179	-	414	547	914	5373.08	-	5373.56	5373.81	5374.45	168	5374.11	5373.97	85	125	4.4	0.16	0.16	3	
	21+84	2191	5374.0	84	-	270	400	688	5374.62	-	5375.14	5375.41	5375.94	71	5375.94	5375.42	51	63	6.4	0.01	0.11		
	23+17	2325	5376.8	84	-	270	400	688	5377.48	-	5378.00	5378.28	5378.77	77	5378.81	5378.33	46	61	6.6	0.05	0.19		
	24+00	2407	5378.0	84	-	270	400	688	5378.50	-	5378.99	5379.25	5379.73	189	5379.44	5379.39	112	129	3.1	0.14	0.10	3	
	24+92	2500	5380.0	84	-	270	400	688	5380.53	-	5381.09	5381.38	5381.91	59	5381.97	5381.52	38	57	7.0	0.14	0.32		
	26+34	2641	5383.0	84	-	270	400	688	5383.44	-	5383.90	5384.07	5384.41	169	5384.46	5384.21	54	65	6.2	0.14	0.34	3	
	27+50	2758	5385.0	84	-	270	400	688	5385.89	-	5386.32	5386.43	5386.65	459	5386.69	5386.54	84	74	5.4	0.11	0.31		
	28+44	2851	5386.9	84	-	270	400	688	5387.29	-	5387.51	5387.67	5387.90	609	5387.79	5387.94	101	93	4.3	0.27	0.50	2	
	29+55	2962	5387.7	187	-	372	508	805	5388.42	-	5388.75	5388.88	5389.13	425	5389.18	5389.18	139	102	5.0	0.30	0.42	2	ROB is shallow flooding based on 2D analysis. 100-year mapped top width includes shallow flooding.
	30+93	3100	5391.0	187	-	372	508	805	5391.53	-	5391.75	5391.92	5392.23	512	5392.28	5392.32	151	96	5.3	0.40	0.48	2,3	
	32+39	3246	5393.1	187	-	372	508	805	5394.10	-	5394.39	5394.51	5394.78	569	5394.88	5394.76	65	86	5.9	0.25	0.46	2	
	33+02	3309	5394.0	187	-	372	508	805	5394.78	-	5395.16	5395.35	5395.68	531	5395.54	5395.61	95	105	4.9	0.26	0.44	2,3	
	34+34	3441	5395.0	187	-	372	508	805	5395.68	-	5396.02	5396.18	5396.48	423	5396.30	5396.55	101	173	3.6	0.37	0.50	2,3,5,6,7	
	35+07	3515	5395.0	187	-	372	508	805	5395.87	-	5396.23	5396.40	5396.71	275	5396.55	5396.86	98	183	2.8	0.46	0.43	2,3	
	35+48	3555	5395.0	187	-	372	508	805	5396.17	-	5396.41	5396.57	5396.81	194	5396.90	5396.73	66	81	6.3	0.16	0.43	3	
	36+34	3641	5396.0	187	-	372	508	805	5396.95	-	5397.25	5397.43	5397.91	88	5398.00	5397.71	67	101	5.1	0.27	0.10	3,5	
	37+73	3780	5397.0	187	-	372	508	805	5397.71	-	5398.16	5398.44	5398.95	279	5398.50	5398.57	79	132	4.2	0.13	0.36		
	38+81	3888	5398.0	119	-	305	416	661	5398.35	-	5398.61	5398.69	5399.12	326	5398.93	5399.18	106	118	3.5	0.48	0.44		FP widened for logical downstream tie in
	39+36	3944	5399.2	119	-	305	416	661	5400.19	-	5400.56	5400.74	5401.07	206	5401.22	5400.75	75	74	5.6	0.01	0.02	2	
Upstream extent	40+70	4077	5403.4	119	-	305	416	661	5403.66	-	5403.81	5403.89	5404.13	262	5404.13	5404.21	143	98	4.3	0.32	0.42		

1. Floodway equal to floodplain.
2. Floodplain top width includes high ground or obstruction.
3. Floodplain top width includes IEFA.
4. Floodway top width includes high ground or obstruction.
5. Floodway top width includes IEFA.
6. Floodplain includes permanent IEFA from structure modeling.
7. Floodway includes permanent IEFA from structure modeling.

CITY PARK CHANNEL
SOUTH TRIBUTARY

50 25 0 50 100 150
Feet
SCALE: 1" = 100'

N

TOP WIDTH MEASUREMENT
LOCATION (TYP)

CITY PARK CHANNEL UPSTREAM OF MAIN STREET AND CITY PARK CHANNEL SOUTH TRIBUTARY FHAD

FIRM FLOODPLAIN TOP WIDTH MEASUREMENTS

Appendix E Flood Maps

FLOOD HAZARD AREA DELINEATION
CITY PARK CHANNEL UPSTREAM OF MAIN STREET
AND CITY PARK CHANNEL SOUTH TRIBUTARY
JANUARY 2023

INSTRUCTIONS TO PRINT AN AREA SMALLER THAN THE FULL PAGE SCALE:

1. USING THE "SNAPSHOT" TOOL, SELECT THE DESIRED AREA TO PRINT.
2. CLICK FILE > PRINT...
3. SELECT YOUR PRINTER FROM THE PRINTER DROPDOWN MENU.
4. SET THE DESIRED PAPER SIZE USING THE PRINTER "PROPERTIES" MENU.
5. CHOOSE THE "SELECTED GRAPHIC" OPTION UNDER "PRINT RANGE."
6. SELECT "NONE" FROM THE "PAGE SCALING" DROPDOWN MENU.
7. UNSELECT "CHOOSE PAPER SOURCE BY PDF PAGE SIZE."
8. CLICK "OK" TO PRINT SELECTION.

Coordinates and Projection Information:

Horizontal Datum - NAD83 Colorado State Plane Central - US Foot
Vertical Datum - NAVD88
Basis for Topographic Information is Broomfield's 2017 Aerial Topography
and supplemented by additional ground survey completed between 2019 and 2021.

Legend

- 5396.4 BFE at Cross Section
- Cross_Section
- Stream_Centerline

Contours

- Major
- Minor
- Insurable_Structure
- Floodway
- Shallow_Flooding
- Floodplain_100yr
- Floodplain_500yr

N

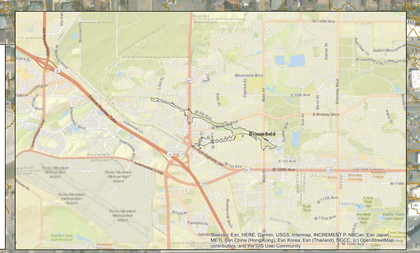
400 200 0 400 800 1,200 1,600 Feet

SCALE: 1" = 200'

LOEWEN Engineering Inc.

CITY AND COUNTY OF BROOMFIELD COLORADO

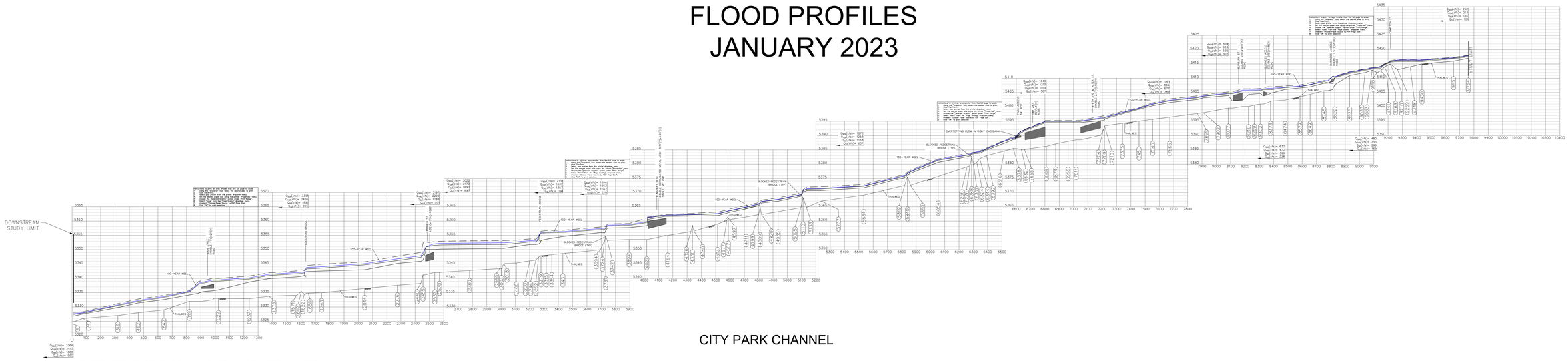
MHFD MILE HIGH FLOOD DISTRICT



Appendix F Flood Profiles

FLOOD HAZARD AREA DELINEATION
CITY PARK CHANNEL UPSTREAM OF MAIN STREET AND CITY PARK CHANNEL SOUTH TRIBUTARY

FLOOD PROFILES
JANUARY 2023



CITY PARK CHANNEL

CITY PARK CHANNEL SOUTH TRIBUTARY

NOTE: STREAM DISTANCES FOR CITY PARK CHANNEL ARE MEASURED IN FEET ALONG RIVER CENTERLINE FROM THE CONFLUENCE WITH NISSEN RESERVOIR CHANNEL LOCATED 10,319-FEET FROM "0" ON THE SHOWN PROFILES. STATION 0+00 EQUAL TO STATION 103+19.

LEGEND

- 500-YEAR WSEL (0.2% ANNUAL EXCEEDANCE PROBABILITY)
- 100-YEAR WSEL (1% ANNUAL EXCEEDANCE PROBABILITY)
- 50-YEAR WSEL (2% ANNUAL EXCEEDANCE PROBABILITY)
- 10-YEAR WSEL (10% ANNUAL EXCEEDANCE PROBABILITY)
- STREAM BED
- XXXX CROSS SECTION LOCATION

VERT. SCALE: 1" = 10'

HORIZ. SCALE: 1" = 200'

DATUM IS NAVD 88

LOEWEN Engineering Inc.
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Suite 601
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(720) 667-2063

MHFD
MILE HIGH FLOOD DISTRICT

CITY AND COUNTY OF BROOMFIELD • COLORADO •