ERIE OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN

TOWN OF ERIE AND WELD COUNTY

TOWN OF ERIE
1874

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DECEMBER 2007

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December 17, 2007

Mr. Gary Behlen, P.E
Ms. Wendi Palmer, P.E.
645 Holbrook Street
Erie, Colorado 80516

RE: 0603B Erie Outfall Systems Planning
Preliminary Design Report
Town of Erie and Weld County

Dear Gary and Wendi:

Enclosed, please find the *Erie Outfall Systems Planning Preliminary Design Report Town of Erie and Weld County*. It is bounded on the east by I-25; on the south by Highway 7 (Baseline Road); on the west by Coal Creek; and on the north by WCR 16.5. This study also picks up a small area west of Coal Creek to Boulder Creek north of Highway 52 which was not included in the original Boulder County Outfall Systems Plan prepared in 2000. The majority of the study area is located in Weld County. This study encompasses portions of four major watersheds: Godding Hollow, Little Dry Creek, and the downstream portion of Coal Creek and Boulder Creek. This report is submitted in completion of the second phase of the "Consulting Agreement between the Town of Erie and Love & Associates dated April 26, 2006."

The report represents a significant contribution to the existing hydrologic and hydraulic data base required for stormwater management in the study area. It reviews the findings of the Phase A report, updates selected Alternate 2 drainage facilities, and provides preliminary design plans, profiles and cost estimates for preliminary design of the proposed outfall system. The alternate analysis indicated existing stormwater conveyance facilities within the study area do not have the capacity to transport the 100-year storm event when proposed future development of the area is complete and, in some cases, under current development conditions. The preliminary design provided in this document will correct these deficiencies.

The conceptual cost for the outfall system includes $22,916,000 for regional detention facilities, $49,687,000 for conveyance facilities, $6,777,000 for road and railroad crossings and spreaders, and $1,300,000 for WCR 3 relocation. The total estimated cost for drainage improvements is $80,700,000.

Love & Associates, Inc. wishes to thank the Town of Erie and its staff for assisting us on this very important preliminary design and for approving the approach represented by this report to improve stormwater conveyance efficiency, reduces flood hazards, and improve water quality within the study area.

Sincerely,

LOVE & ASSOCIATES, INC.

David J. Love, P.E.,
President

Roger J. Peterson, Ph.D., P.E.,
Project Manager

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EXECUTIVE SUMMARY

Purpose and Objective

Rapid development in the Erie Planning Area, including portions of the Town of Erie, Boulder County, and Weld County, has resulted in an immediate need for an outfall system planning study. The Outfall System Plan evaluates the impact of existing and projected future development on flood peaks and presents a preliminary design of the Plan, including stormwater outfall systems which safely convey the projected 100-year flood under future development conditions through the study area. The Outfall Systems Plan, presented in this Preliminary Design Report, was selected by the Erie Board of Trustees at the conclusion of an Alternate Analysis of the study area.

The study area and location map, shown on Figure ES1, encompasses approximately 30 square miles and includes the confluence of Coal Creek and Boulder Creek. It is bounded on the east by I-25; on the south by Highway 7 (Baseline Road); on the west by Coal Creek; and on the north by WCR 16.5. This study also picks up a small area west of Coal Creek to Boulder Creek north of Highway 52 which was not included in the Boulder County Outfall Systems Plan prepared in 2000. The majority of the study area is located in Weld County. This study encompasses portions of four major watersheds: Godding Hollow, Little Dry Creek, and the downstream portions of Coal Creek and Boulder Creek.

Planning Process

The planning process began at the kickoff meeting in April, 2006. During this meeting, objectives and requirements for the study were defined, known and required data, studies, and other information was identified, adjacent community involvement was discussed, and the completion dates and immediate data requirements for the ongoing topographic mapping for the project was discussed. It was decided to use USGS topographic mapping for the Alternate Analysis and the new aerial topographic mapping for this Outfall Systems Plan.

A second meeting was held during August, 2006. During this meeting several in-process work products were presented including the preliminary drainage basin map delineation, soils map, existing and future land use map, UDSWMM flow charts, and sheet layout for the report which were presented to the Town for review and comment. The findings generated from a complete field site review conducted by Love were reviewed in detail with the Town. This review included identification of potential areas of flooding concern, a review of the status of culverts and bridges below roads and railroad embankments, and a review of the conveyance and layout of channels within the study area. The second meeting discussed a variety of issues, including modeling procedures, existing detention facilities, maintenance concerns, annexation issues, minimizing the size and number of regional facilities, involvement of the Urban Drainage and Flood Control District (UDFCD), and landfill issues. A field review of potential major drainage problem areas in the Erie Planning Area discussed during the meeting was scheduled and held with Town personnel during September, 2006.

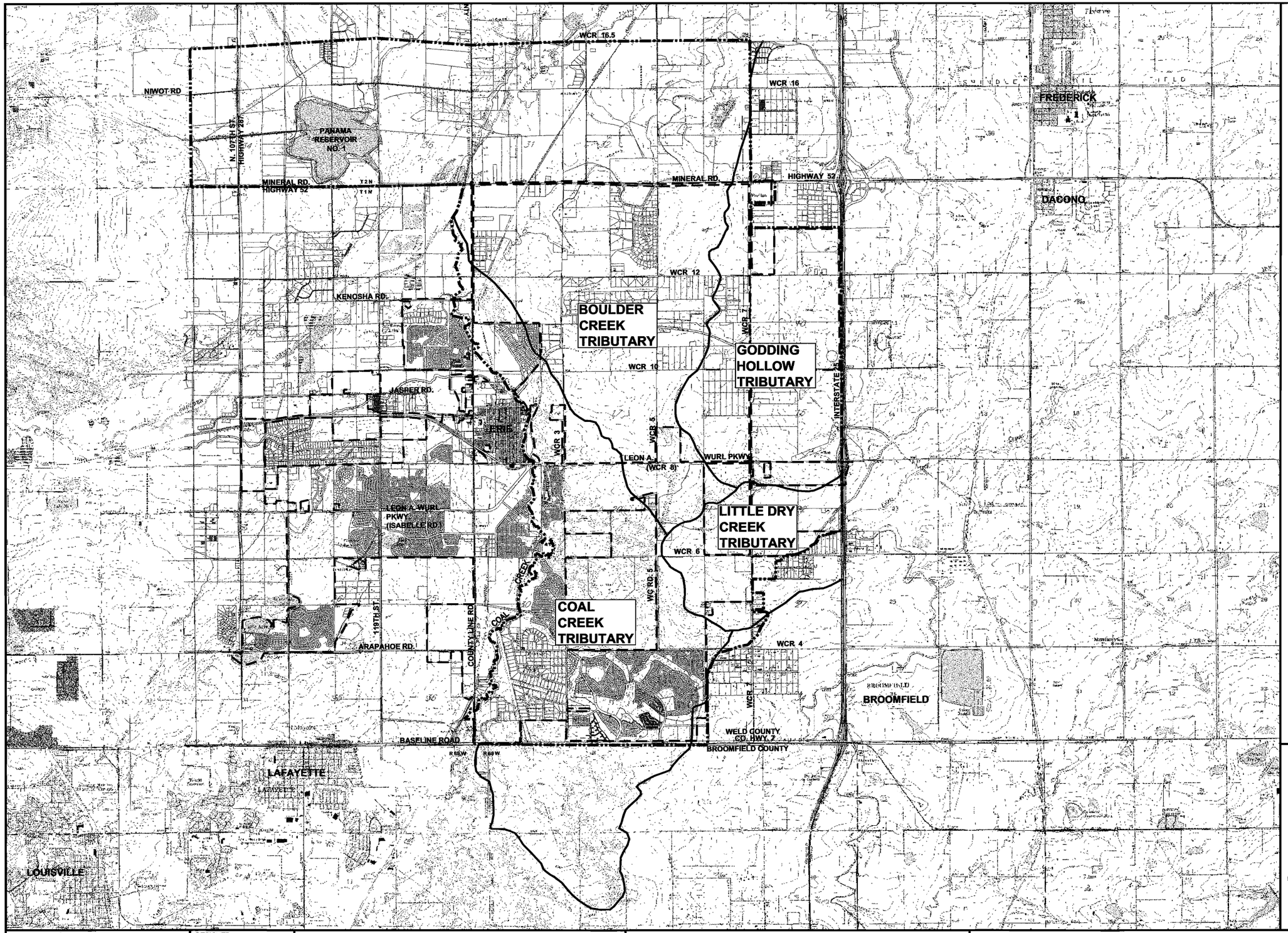
A third meeting was held during November, 2006 including Town Public Works and Planning Officials. During this meeting, the hydrologic analysis for existing, future, and the first alternate analysis was presented and results discussed with the Town. Advantages and disadvantages of drainage facilities, drainage design guidelines were presented and discussed. It was decided water quality methods would be discussed as a part of the Outfall Systems Planning Report. Criteria to be used in the development of the second alternate was discussed. The outcome of the meeting was to meet with UDFCD personnel and present the findings to date and to conduct a public meeting/open house with interested property owners and land developers of property located within the study area to solicit comments for the second alternate.

A meeting was held with UDFCD personnel in December, 2006. During this meeting, hard copies of the draft figures for the report, the UDSWM models, flow charts, and results of the first alternate analysis were presented to UDFCD for review. The modeling efforts and objectives for the alternate analysis were also discussed. UDFCD indicated they had adopted EPASWMM5 model for Master Planning, and suggested the input from the UDSWM model be converted to EPASWMM5 input. UDFCD provided copies of the latest checklist used by UDFCD for Outfall Systems Planning. Following the meeting, the UDSWM models were converted to EPASWMM5 input, run using the EPASWMM5 model and the results discussed with the UDFCD. Following these tasks, the Town decided to retain the use of the original UDSWM models as the base hydrologic models for this Outfall System Planning effort.

A public meeting/open house with the property owners and land developers was held following the meeting with UDFCD during December, 2006. The purpose of the meeting was to solicit comments from the community for development of a second alternate. During the meeting, the results of the first alternate were presented, including potential locations of regional conveyance facilities and the amount of property they could require. A number of interested property owners and/or developers or their representative with property located in the Erie Planning Area attended the meeting, and they requested to be provided with additional information on the Alternate. Interested parties and/or their engineering consultants were furnished with hard copies of maps and UDSWM output. The result of the meeting was the development of the second alternate taking into consideration probable future development plans and requests of the interested property owners/land developers.

The Alternates were formally presented to the Town Board during the March 13, 2007 Town Board Meeting, and Alternate 2 was selected as the preferred alternate for the Outfall Systems Plan. Love & Associates was directed to begin the Preliminary Design Report for Alternate 2. On March 20, 2007, the kick-off meeting for the Preliminary Design Report was held. During this meeting, the Alternates were reviewed, and objectives and requirements for the Preliminary Design Report were defined, and a discussion on model use and water quality methods was held. The Selected Alternate was refined resulting in the publication of this Preliminary Design Report.

Adjacent communities, including Weld County, Boulder County, City of Broomfield, Town of Dacona, and Town of Fredrick, were informed of the drainage planning effort. All communities will be provided a copy of this Preliminary Design Report to aid in their planning efforts.



LEGEND

STUDY AREA BOUNDARY

ERIE TOWN LIMITS

5400 0 2700 5400

(IN FEET)

Original Scale:
1 inch = 5400 ft.

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DRAWN:	PEM
CHECKED:	DJL
DATE:	7-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

LOCATION MAP

Figure ES1

Background

The study area is currently in transition from agricultural activities to subdivision and commercial development and is characterized by the lack of stormwater conveyance facilities. Development is most pronounced in the portion of the Coal Creek Watershed within the Erie Planning Area. Flooding along two FEMA-regulated floodplains within the study area is reported in the historic records. Many channels have been modified by agricultural activities and are undersized. There are no culverts below roads at most channel crossings. Irrigation ditches capture, transport, and re-direct stormwater flow paths from their historic flow paths. Two railroad lines located within the study area, one abandoned and one in significant disrepair can impound water and modify stormwater flow directions. In some cases, homes in Weld County within the Erie Planning Area have been constructed within the probable 100-year floodplain of significant drainage channels.

The hydrologic analysis for the Erie Planning Area identifies hydrologic conditions which currently exist in the study area (using existing percent imperviousness) and the hydrologic conditions which will exist under full build out (using future percent imperviousness developed from the Town of Erie land use plan). The data used for the analysis comes from topographic mapping, aerial photographs, land use projections, and soils maps. Flood peaks are estimated for the average storm and the 2-, 5-, 10-, 50-, and 100-year events. The results for the 10-year and 100-year events are presented in Table ES-1. The analysis indicates more frequent and possibly severe flooding can be expected if development proceeds as projected without improvements to the stormwater conveyance system.

Table ES-1. Flood Peak Discharge Comparison: Existing, Future, and Outfall Systems Plan

Godding Hollow Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
754	Leon A Wurl	141	305	*	340	628	340
755	Leon A Wurl	16	124	*	75	246	75
751	WCR 7	30	195	*	128	384	128
750	Leon A Wurl	23	113	*	91	212	92
970	**South Outfall**	**200**	**888**	*	**728**	**1845**	**732**
971	**Central Outfall**	**139**	**955**	*	**621**	**2052**	**624**
973	**North Outfall**	**86**	**502**	*	**387**	**1055**	**353**
974	**North Outfall**	**12**	**92**	*	**55**	**184**	**55**
763	WCR 10	172	515	*	713	1240	673
767	WCR 10	284	637	*	1008	1622	985
770	WCR 12	30	45	*	111	133	111
772	WCR 12	98	313	*	429	722	378
975	**North Outfall**	**413**	**1046**	*	**1524**	**2594**	**1534**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

Table ES-1. Flood Peak Discharge Comparison: Existing, Future, and Outfall Systems Plan (con)

Little Dry Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
707	WCR 6	56	66	*	254	271	271
714	WCR 6	54	217	*	253	499	249
716/717	WCR 7	152	529	*	731	1305	654
962	**I25 Outfall**	**342**	**1106**	*	**1427**	**2791**	**1394**
960	**Outfall**	**26**	**100**	*	**113**	**225**	**113**
961	**Outfall**	**20**	**114**	*	**82**	**244**	**82**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

Coal Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
310	Hwy 7	297	303	*	515	517	512
905	**Outfall**	**313**	**425**	*	**537**	**920**	**538**
327	WCR 6	72	137	*	272	356	204
329	WCR 6	37	39	*	272	356	152
1002	WCR 4	220	220	*	1110	1110	1110
1003	WCR 3	83	83	*	275	275	275
336	WCR 3	304	366	*	1148	1142	950
915	**Outfall**	**408**	**481**	*	**1358**	**1369**	**1187**
916	**Vista Pt.**	**27**	**28**	*	**105**	**107**	**107**
917	**Vista Pt.**	**129**	**159**	*	**541**	**582**	**541**
918	**Vista Pt.**	**81**	**81**	*	**541**	**582**	**338**
921	**Outfall**	**146**	**271**	*	**613**	**781**	**547**
922	**Outfall**	**32**	**103**	*	**153**	**253**	**153**
923	**Outfall**	**9**	**39**	*	**48**	**88**	**50**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

Table ES-1. Flood Peak Discharge Comparison: Existing, Future, and Outfall Systems Plan (con)

Coal Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
310	Hwy 7	297	303	*	515	517	512
905	**Outfall**	**313**	**425**	*	**537**	**920**	**538**
327	WCR 6	72	137	*	272	356	204
329	WCR 6	37	39	*	272	356	152
1002	WCR 4	220	220	*	1110	1110	1110
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918	**Vista Pt.**	**81**	**81**	*	**541**	**582**	**338**
921	**Outfall**	**146**	**271**	*	**613**	**781**	**547**
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* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

Design Criteria

Design criteria including procedures and parameters follow recommendations in *Town of Erie Standards and Specifications, UDFCD Urban Storm Drainage Criteria Manual*, and *Boulder County Stormwater Management Manual*. Computer models used for the study include CUHPF, UDSWM, (both distributed by UDFCD) and FHWA HDS5. The regulatory floodplains for Boulder and Coal Creeks were also incorporated into this study.

Drainage design guidelines are developed for detention, conveyance, and road crossings within the Erie Planning Area. Their purpose is to help accommodate the various needs and planning efforts of the property owners within the study area. Regional and on-site/local detention are to be used to reduce major and minor developed flood peaks to historic magnitudes and improve surface water quality. Regional ponds are located in larger property ownership blocks and generally detain flows to benefit the property owner. Regional channels identify flow paths below upstream development and, when constructed, will reduce existing and future flooding. The 100-year floodplain along Coal Creek and Boulder Creek will be preserved.

General drainage design guidelines used for hydrologic modeling include:

- existing 100-year flood peaks are preserved at design points,
- existing 100-year flood peaks are preserved at the Erie Planning Area Boundary, and,
- discharge directly into Coal Creek or Boulder Creek without 100-year detention is allowed for properties adjacent to the Creek if no property owner experiences discharges greater than existing conditions from upstream areas.

Along with the modeling guidelines, additional general drainage design guidelines used for developing the location of regional drainage facilities include:

- the regional facility is required for conveyance and/or detention by a property owned by one owner to maintain existing 100-year flood peaks,
- regional channels are located in historic flow paths,
- regional detention facilities are not located in commercial areas unless requested by the property owner, and,
- regional channels and detention facilities are not located within existing developed areas unless these areas have allowed for property to accommodate the regional facility.

General design guidelines encouraged by the Town for drainage facilities include:

- Conveyance channel designs should be soft rather than hard,
- Detention facilities shall not have concrete trickle channels,
- Developments are required to provide at least 10-year or other high frequency discharge detention, and,
- Developments are required to provide water quality improvements.

Alternate Analysis

Two Alternates were developed to safely convey the 100-year storm flows safely through the study area. Both require the construction of new regional detention facilities, channel improvements, and culverts below roads. The alternates were similar; Alternate 1 acted as a target for private landowners to provide suggestions for Alternate 2. Conceptual construction cost estimates were calculated for each alternate for comparative purposes considering regional detention and conveyance facilities as well as culvert improvements. The costs of the two alternates are similar.

The second alternate was the Engineer's recommended outfall system and, with refinement, it was used for the preliminary design of the outfall system

Preliminary Design

The preliminary design of the outfall system incorporates several components, including regional detention facilities, regional channels, low flow channels, spreader systems, on-site and/or local detention in some catchments, and road and railroad crossings. The following components of the system are shown on Figures ES2 a through d:

- Godding Hollow Catchment requires five regional detention facilities, spreader systems, and three flow paths including channels and storm sewers which discharge along the north boundary of the Erie Planning Area,
- Little Dry Creek Catchment requires three regional detention facilities and two regional channels which leave the study area at I-25,
- Coal Creek Catchment requires two regional detention facilities and four regional channels which discharge into Coal Creek, and,
- Boulder Creek Catchment requires six regional detention ponds, four flow paths including channels and storm sewers which discharge into Boulder Creek, and two low flow channels in the Boulder Creek floodplain to transport 2-year flood peaks into Boulder Creek.

Conceptual cost estimates were prepared for the preliminary design of the overall outfall system. Costs were estimated, and include costs for construction and land with contingencies and a percentage for legal, administration, engineering, and mobilization fees. The cost for drainage facilities shown on Figure ES-2a through ES-2d are shown on Table ES-2. The conceptual cost for the outfall system includes $22,916,000 for regional detention facilities, $49,687,000 for conveyance facilities, $6,777,000 for road and railroad crossings and spreaders, and $1,300,000 for WCR 3 relocation. The total estimated cost for drainage improvements is $80,700,000.

Table ES-2. Outfall System Improvement Costs

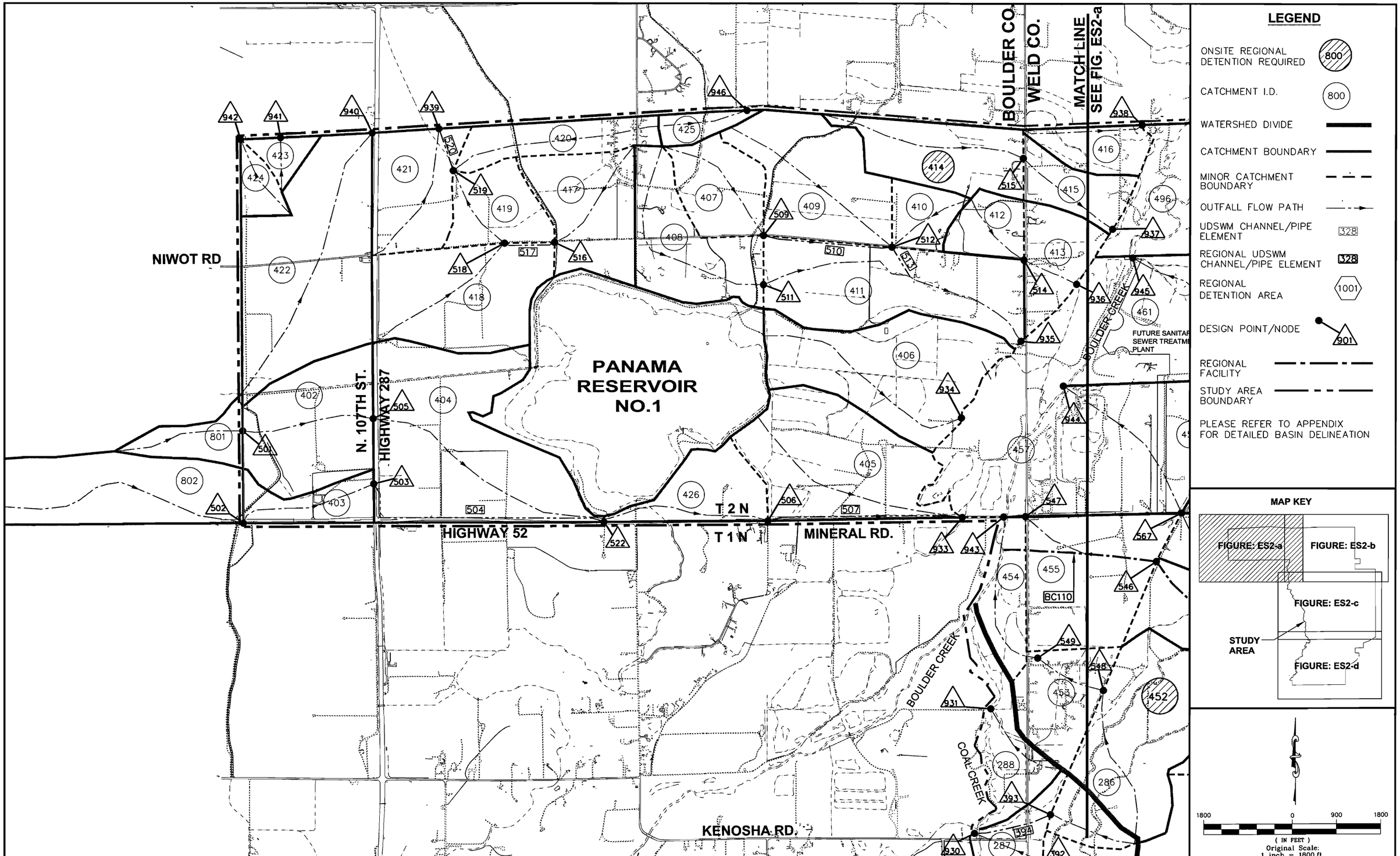
Description			Cost		
Item	**Length**	**Drainage Area (sq.mi.)**	**Total Construction Costs**	**Total Land Costs**	**Total Cost**
Conveyance Facilities by Reach					
Coal Creek Tributaries					
CC100*	0.55	0.56	$1,289,618	$463,750	$1,753,368
CC120*	0.9	0.36	$928,998	$312,500	$1,241,498
Subtotal			**$2,218,616**	**$776,250**	**$2,994,866**
Little Dry Creek Tributaries					
LDC100	1.59	2.08	$2,758,171	$1,035,733	$3,793,874
LDC105	0.32	0.29	$426,375	$169,520	$595,925
Subtotal			**$3,184,546**	**$1,205,253**	**$4,389,799**
Godding Hollow Tributaries					
GH100	0.76	0.47	$1,800,332	$430,379	$2,230,710
GH110	1.02	0.88	$1,444,108	$641,061	$2,085,169
GH120	3.14	1.52	$8,035,471	$2,491,489	$10,526,961
Subtotal			**$11,279,911**	**$3,562,929**	**$14,842,840**
Boulder Creek Tributaries					
BC100	2.93	3.58	$8,218,127	$2,802,424	$11,020,552
BC110	4.23	4.22	$12,171,970	$4,267,096	$16,439,065
Subtotal			**$20,390,097**	**$7,069,520**	**$27,459,617**
Estimated Total Conveyance			**$37,073,170**	**$12,613,952**	**$49,687,122**

* drainage area and stream length Erie Planning Area only

Table ES-2. Outfall System Improvement Costs (con)

Item	Volume w/ 1-ft freeboard (ac-ft)	Drainage Area (sq.mi.)	Total Construction Costs	Total Land Costs	Total Cost
Detention Facilities by Catchment					
Coal Creek Tributaries					
1101	16.2	0.61	$103,704	$389,549	$493,253
1102	7.5	0.14	$383,239	$152,615	$535,854
Subtotal			**$486,942**	**$542,164**	**$1,029,106**
Little Dry Creek Tributaries					
1104	6.0	0.15	$307,777	$119,575	$427,352
1105	29.8	1.05	$1,632,852	$512,889	$2,145,741
1106	25.0	1.38	$1,389,402	$445,653	$1,835,055
Subtotal			**$3,330,032**	**$1,078,117**	**$4,408,149**
Godding Hollow Tributaries					
1107	3.0	0.11	$170,181	$60,963	$231,145
1108	23.0	0.48	$1,241,461	$344,606	$1,586,067
1109	10.3	0.12	$508,725	$175,328	$684,053
1110	16.0	1.31	$957,180	$367,085	$1,324,266
1119	20.2	0.3	$985,545	$367,085	$1,352,630
Subtotal			**$3,863,093**	**$1,315,067**	**$5,178,160**
Boulder Creek Tributaries					
1103	23.0	0.41	$1,400,263	$423,221	$1,823,483
1113	41.0	1.63	$2,529,650	$602,414	$3,132,063
1115	7.6	0.23	$422,472	$141,238	$563,709
1117	23.0	0.51	$1,112,864	$468,075	$1,580,939
1213	23.7	1.23	$1,460,892	$400,776	$1,861,668
1121	35.5	0.75	$2,758,398	$580,044	$3,338,442
Subtotal			**$9,684,538**	**$2,615,767**	**$12,300,305**
Total Estimated – Detention Facilities					
			$17,364,605	**$5,551,115**	**$22,915,720**

Road, Railroad Crossings and Spreaders by Catchment					
Coal Creek Tributaries*					
					$0
Little Dry Creek Tributaries					
			$121,090		**$121,090**
Godding Hollow Tributaries					
			$1,170,405		**$1,170,405**
Boulder Creek Tributaries					
			$5,485,632		**$5,485,632**
Total Estimated Road, Railroad Crossings and Spreaders by Catchment			**$6,777,127**		**$6,777,127**
Other					
1000-ft WCR 3 Relocation					
Sub-Total			**$1,300,000**		**$1,300,000**
Total Preliminary Drainage Costs			**$62,514,903**	**$18,165,067**	**$80,679,970**



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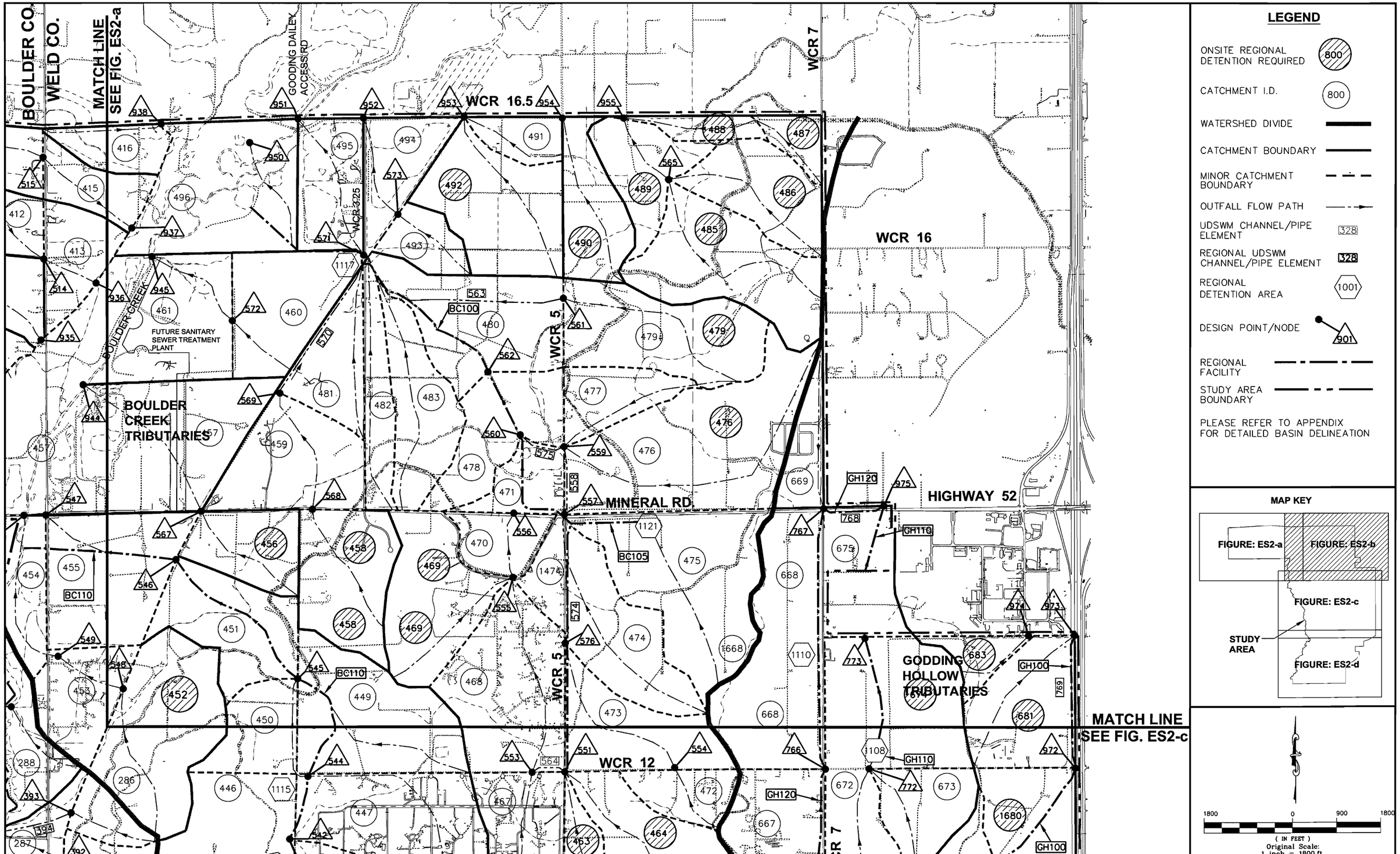
DRAWN:	PEM
CHECKED:	DJL
DATE:	7-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure ES2-a



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TOWN OF ERIE

ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

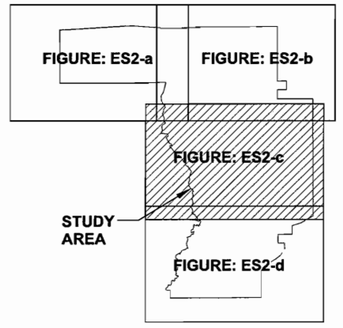
Figure ES2-b

LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY



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(IN FEET)
Original Scale:
1 inch = 1800 ft.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure ES2-c

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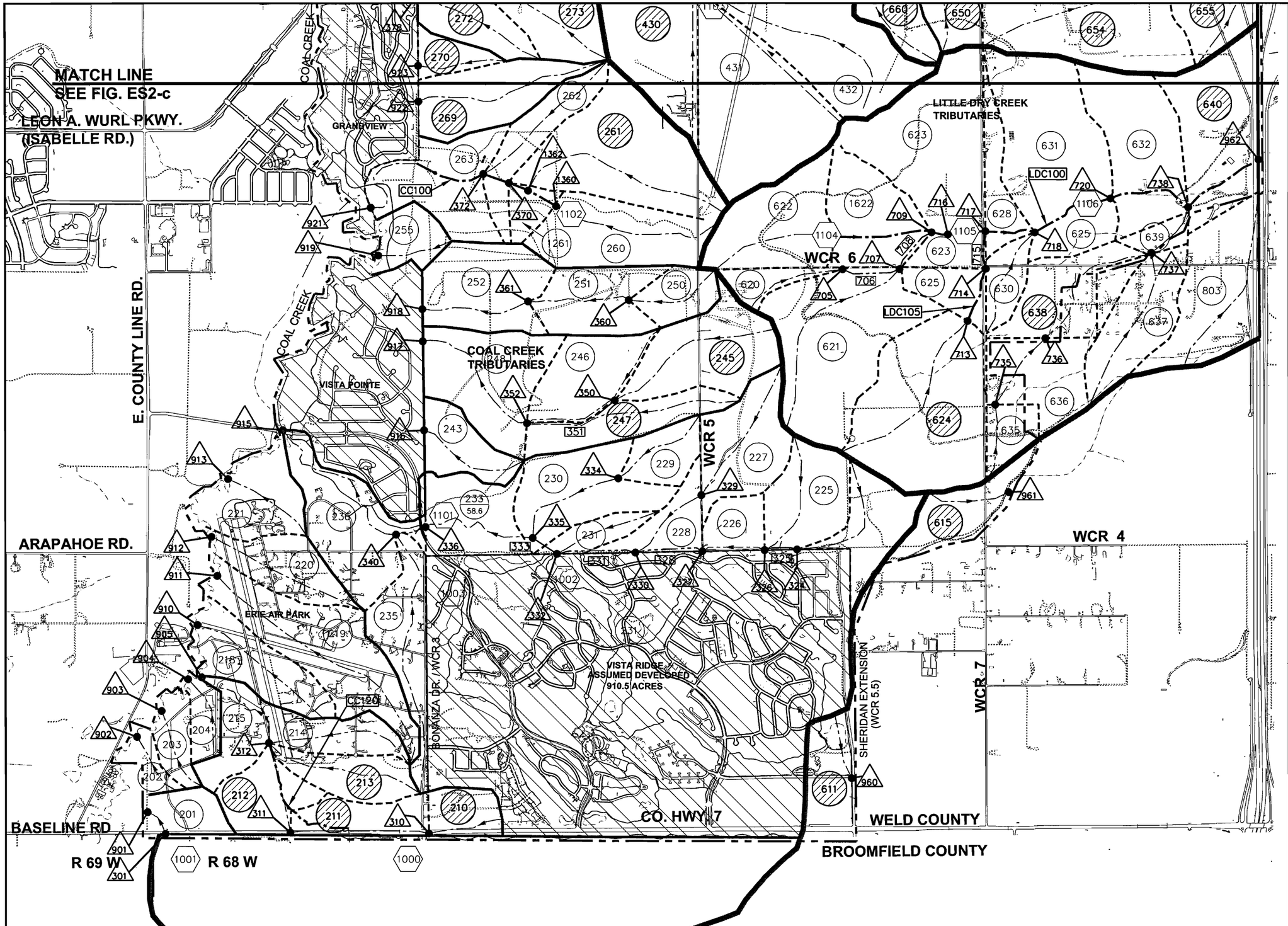
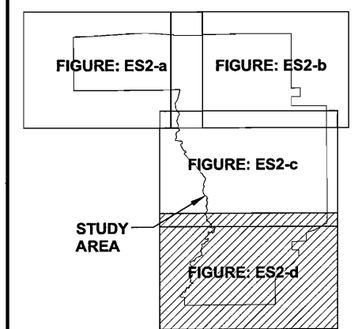


LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure ES2-d

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I. INTRODUCTION

A. Authorization

The Town of Erie, Colorado, in response to rapid development in the Erie Planning Area east of the Boulder/Weld County line near the Town of Erie, has sponsored a Master Planning Alternate Evaluation Study of lands in this area within and adjacent to the Erie Planning Area. See Figure 1, "Location Map" for study limits.

This study was performed under the direction of the Town of Erie. The firm of Love & Associates, Inc. is responsible for the study content. Jurisdictions surrounding the Erie Planning Area were contacted during the study and input was obtained directly from these jurisdictions including Weld County, City & County of Broomfield, Lafayette and the Town of Erie and solicited from property owners during a public meeting, follow up conversations, and correspondence.

B. Purpose and Scope

The purpose of the Master Planning study is to identify alternate methods to convey stormwater within the study area to enhance public health and safety and minimize property damage. The hydrologic study, undertaken as a part of this project, provides public and private entities a comprehensive analysis of existing and proposed percent imperviousness within the study area for catchments. It identifies critical areas of stormwater management and provides an analysis of alternates which may be used as a guideline for addressing water quality degradation and flood peak increases resulting from current and future development anticipated within the study area.

The planning study entailed:

- compiling data on existing stormwater management facilities, soils, existing and proposed land uses, property ownership, wetlands, and utilities,
- identifying probable flow paths and catchments (with an average area of 130 acres) under current land use using 2006 aerial topography,
- developing base hydrologic prediction models for existing and projected future percent imperviousness for the average storm (0.4-inch), 2, 5, 10, 50, and 100-year storm events,
- identifying existing stormwater management facilities and the adequacy of their hydraulic operation under existing and proposed percent imperviousness,
- defining critical areas requiring stormwater management, exclusion areas, and zones of rapid development,
- describing methods of stormwater management and production of general management recommendations for various catchments in the study area,
- recommending stormwater management alternatives for consideration by the Town of Erie, and,
- developing conceptual estimates of construction costs and land valuation for proposed alternate improvements.

The preliminary design of the alternate selected by the Town is addressed in this report.

C. Baseline Information

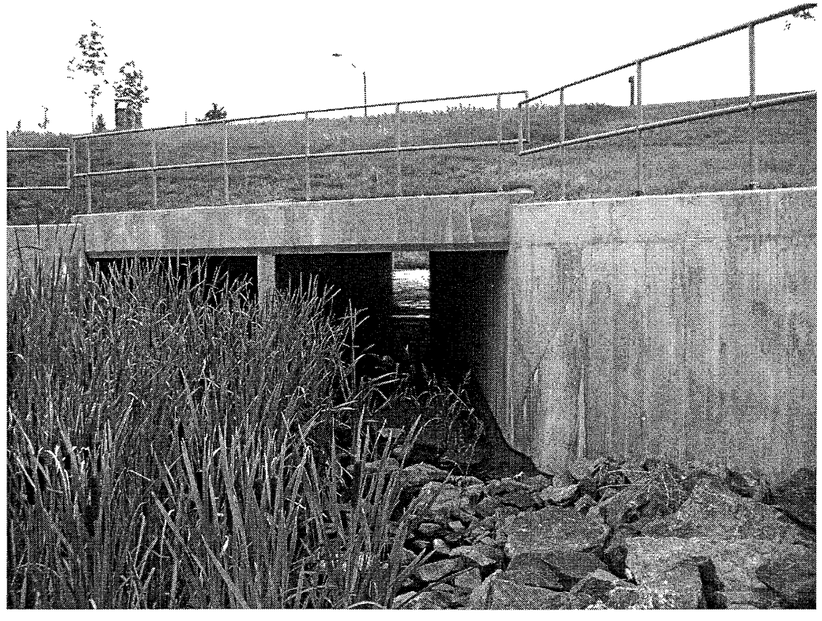
Information used for the study includes:

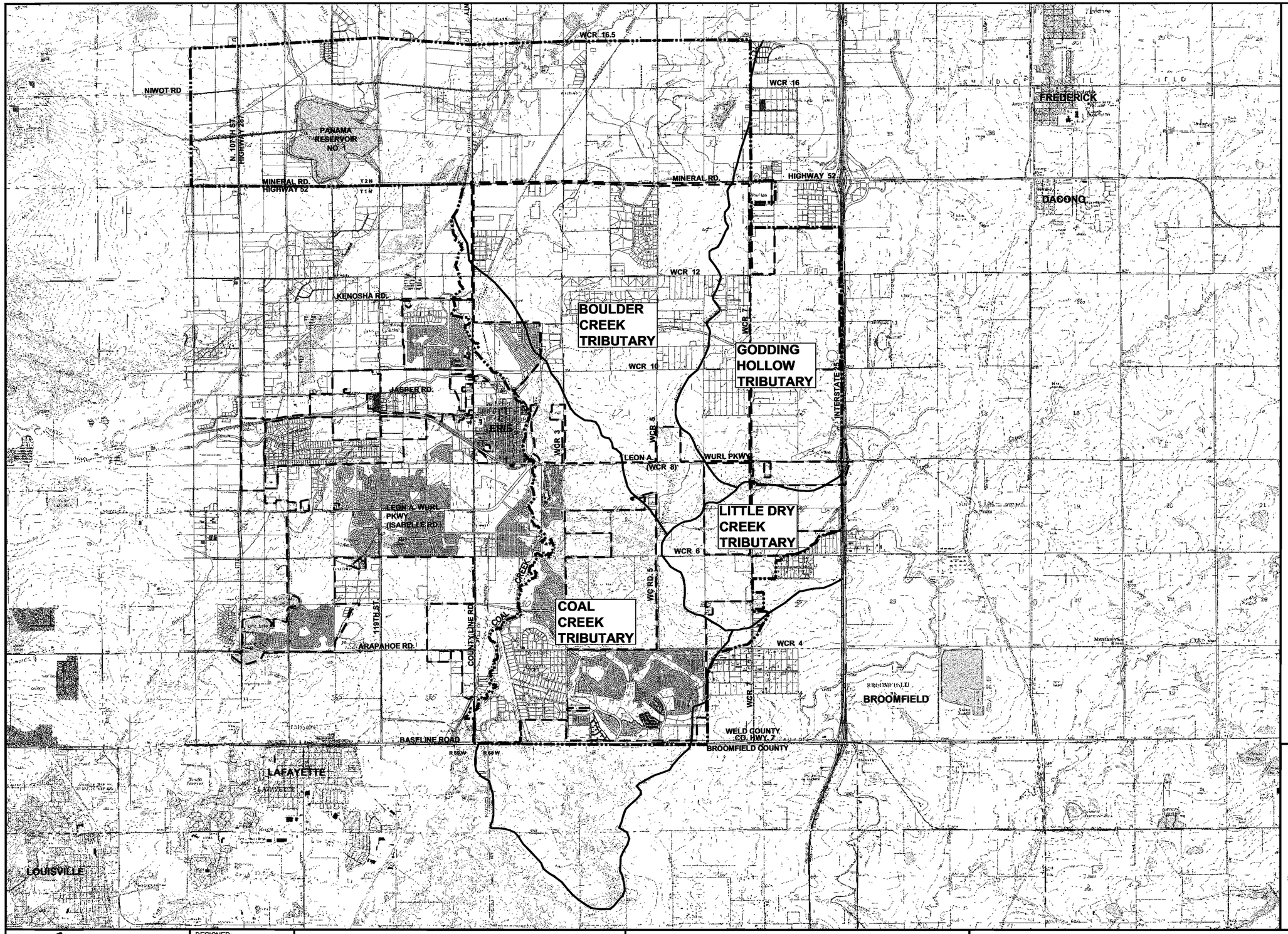
- USGS Quad Maps covering the Town's Planning Area,
- Topographic mapping from aerial photography flown during April, 2006 with a 2-foot contour interval and electronically filed on AutoCAD Version 2004 (Benchmark Mapping, Inc., 2006),
- Land use maps and proposed water and sanitary facilities for the Town of Erie (Town of Erie, 2006),
- NRCS soils maps for Boulder (SCS, 1975) and Weld Counties, Colorado (SCS, 1982),
- Irrigation ditch, and reservoir, and gas and oil well and pipeline information,
- Flood Insurance Studies (FIS) and Flood Insurance Rate Maps (FIRM) for Boulder, Coal and Little Dry Creeks updated in 1995 (FEMA, 1995; USDA SCS, 1976; and WRC Engineering, Inc., 1996), and,
- Various drainage reports (Erie Drainage Reports, 2001-2007) for existing and proposed developments and master plans within the study area provided by the Town of Erie.

D. Design Procedures

Design procedures and parameters used in the study follow recommendations in *UDFCD Urban Storm Drainage Criteria Manual* (UDFCD, 1969 and updates), Town of Erie Standards and Specifications (Town of Erie, 2006), and *Boulder County Stormwater Management Manual* (Boulder County, 1984). Computer models used in the study include CUHP2000 (UDFCD, 2000), UDSWM2000 (UDSWM) (UDFCD, 2000), and HY-8 (Federal Highway Administration, 1966).

The floodplains of Boulder Creek and Coal Creek is regulated by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program. A Flood Insurance Study (FIS) has been prepared for portions of Little Dry Creek and Godding Hollow.





LEGEND

STUDY AREA BOUNDARY

ERIE TOWN LIMITS

5400 0 2700 5400

(IN FEET)

Original Scale:
1 inch = 5400 ft.

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DRAWN:	PEM
CHECKED:	DJL
DATE:	7-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

LOCATION MAP

Figure 1

II. STUDY AREA

A. Location

The study area is approximately 30 sq. mi. and is located within the Town of Erie, Colorado, and Boulder and Weld Counties, Colorado, occupying part or all of Sections 25, 26, 27, 34, 35, 36, T2N, R69W, Sections 27-34, T2N, R68W, Sections 1, 12, and 36, T1N, R69W, and Sections 3-10, 15-22, and 27-33, T1N, R68W. This study is primarily concerned with the properties within the jurisdiction or planning area of the Town of Erie. However, portions of the study area fall within both the jurisdictions of Boulder County and Weld County. The study area is located within the South Platte River Basin. It is bounded by the Erie Planning Area boundary to the north (approximately 1.5 miles north of Highway 52), Coal Creek, Boulder Creek, and 0.5 mile west of Highway 287 to the west, Baseline Road to the south (Highway 7), and Interstate 25 (I-25) to the east. Please refer to Location Map, Figure 1.

B. Catchments

Portions of five important watersheds are located within the study area: Boulder Creek, Coal Creek, Godding Hollow, Little Dry Creek, and Big Dry Creek (See Location Map, Figure 1). Boulder Creek flows northeastwardly through the study area and eventually joins St. Vrain Creek downstream of the study area. Coal Creek flows northerly along the western boundary of the study area and joins Boulder Creek within the study area in Section 1, T1N, R69W. Godding Hollow drains northerly through the study area and joins St. Vrain Creek north of the study area in Section 36, T3N, R67W. The headwaters of Little Dry Creek drains eastwardly through the study area and enters the City and County of Broomfield at the western boundary of Section 23, T1N, R68W, as it crosses I-25. Only a few acres in the southeast portion of the study area drain to Big Dry Creek.

The Boulder County FIS (FEMA, 2002) reports the Boulder Creek drainage basin to be approximately 440 square miles in area at its confluence with Coal Creek and the Coal Creek basin to be approximately 79 square miles in area at its confluence with Boulder Creek. Godding Hollow is approximately 19.4 square miles in area at its confluence with St. Vrain Creek (Anderson, 2000). Within the study area, approximately 15.2 square miles is directly tributary to Boulder Creek, approximately 4.9 square miles is directly tributary to Coal Creek, approximately 4.5 square miles is located within Godding Hollow, and approximately 2.4 square miles are located in Little Dry Creek. In addition to the on-site catchments, off-site catchments in the City and County of Broomfield south of Baseline Road (Highway 7) are tributary to Coal Creek and offsite Catchments in Boulder County tributary to Boulder Creek discharge into the study area and were incorporated into the hydrologic analysis. On-site catchments are delineated on Figures 2a through 2d, and off-site catchments are delineated on Figure 3.

C. Flood History

The FIS for Boulder County (FEMA, 2002) states periodic flooding has occurred along Boulder Creek and Coal Creek within the study area. There is no record of damage occurring in the study area published in the FIS from these flood events, probably due to the low population density in the study area at the time of the flood events. Significant flood events along Boulder Creek have been reported in the City of Boulder occurring in 1894, 1914, 1938 and 1969. The 1894 flood is considered to have approximated the 100-year flood for Boulder Creek. Flood events along Coal Creek reported in the FIS for Erie (FEMA, 2004) have been reported in 1876, 1891, June, 1896, June 3, 1921, May 26, 1935, September 2, 1938, June 9, 1949, May 9, 1957, and May 1969. The 1876 flood peak discharge was estimated to be 13,200 cfs near Erie and is believed to approximate the 100-year flood peak. There are no FEMA floodplains for Little Dry Creek or Godding Hollow within the Erie Planning Area. Flooding has also been reported in the Godding Hollow Watershed (Anderson, 2000).

D. Land Characteristics

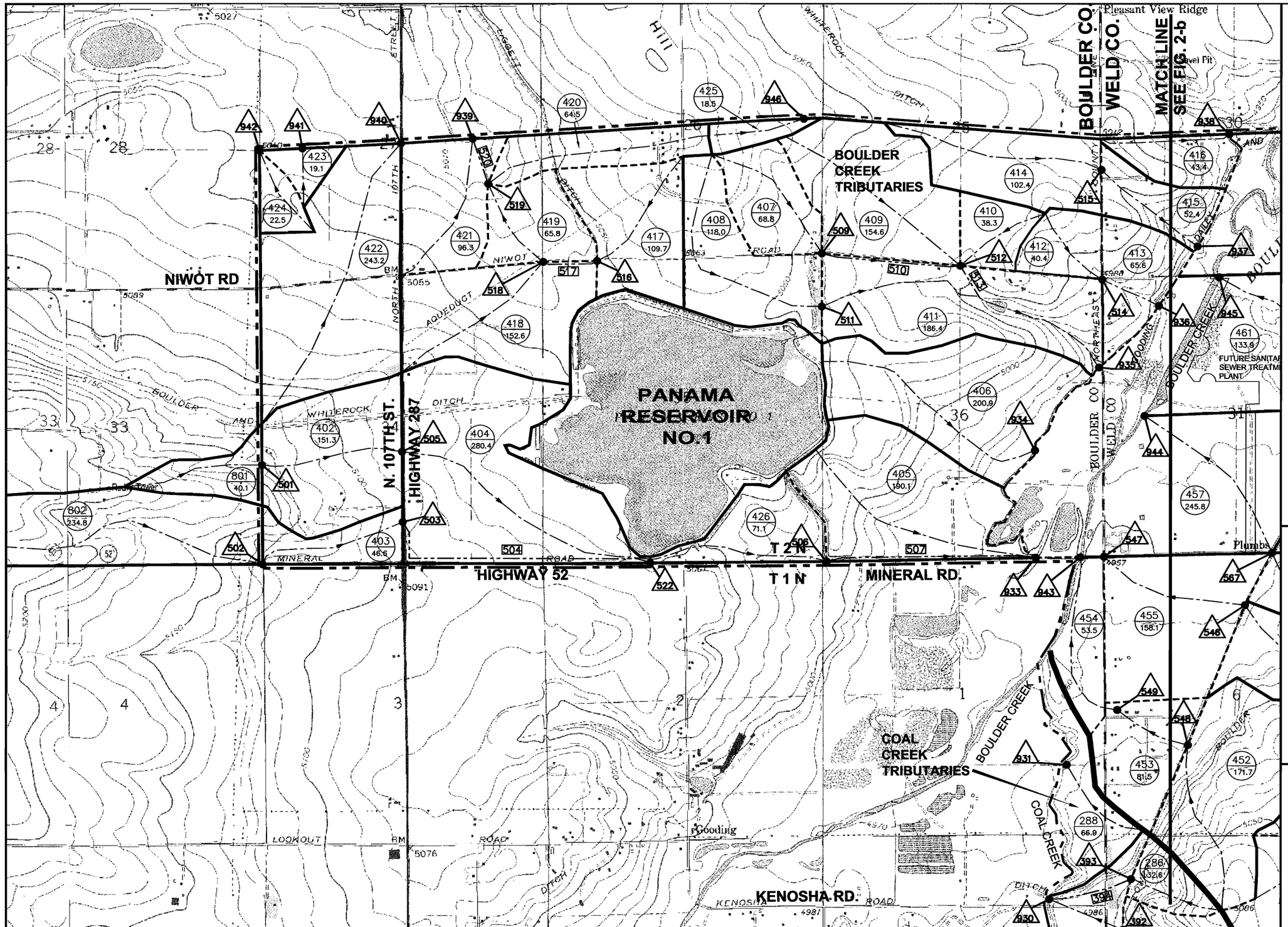
Topography within the study area is characterized by generally flat terrain along floodplains and moderate to steep slopes adjacent to floodplains. The study area currently includes significant amounts of agricultural lands, and many of the historic channels in the study area have been smoothed or altered by agricultural practices.

Highways, railroad embankments, irrigation ditches, small reservoirs, gravel mining, landfills, and commercial, industrial and residential developments have influenced historic surface drainage patterns. Highway I-25 and railroad embankments interrupt basin continuity, concentrating flow patterns and creating, in some cases, inadvertent detention storage.

Gravel mining operations, located primarily within the 100-year floodplain of Boulder Creek, influence drainage patterns along Boulder Creek. The potential for stream capture by these open pit areas along Boulder Creek was not evaluated. Abandoned underground coal mines located throughout the study area have apparently not significantly impacted surface drainage patterns at this time.

1. Soils

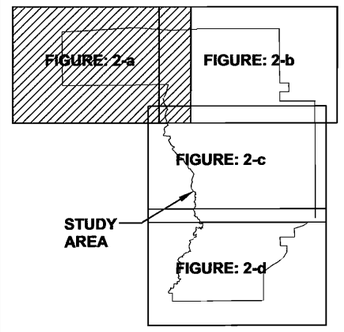
Soils within the study area are primarily Hydrologic Soils Groups C and D interspersed with Hydrologic Soils Groups A and B, as shown on Figures 4a-4d. Soils within and adjacent to the study area were obtained using soil maps developed by the National Resources Conservation Service (SCS, 1975 and 1980).



LEGEND

- CATCHMENT I.D. — 800 / 80.6 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DETENTION AREA — 1001
- UDSWM CHANNEL/PIPE ELEMENT — 328
- DESIGN POINT/NODE — 901
- EXISTING MAJOR SUBDIVISION
- WELD COUNTY ROADS — WCR X

MAP KEY



1800 0 900 1800

(IN FEET)
Original Scale:
1 inch = 1800 ft.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

CATCHMENT DELINEATION AND SWMM ELEMENTS IN THE STUDY AREA

Figure 2-a

LEGEND

CATCHMENT I.D.	800 / 80.6 CATCHMENT ACRES
WATERSHED DIVIDE	
CATCHMENT BOUNDARY	
MINOR CATCHMENT BOUNDARY	
OUTFALL FLOW PATH	
STUDY AREA BOUNDARY	
DETENTION AREA	1001
UDSWM CHANNEL/PIPE ELEMENT	328
DESIGN POINT/NODE	901
EXISTING MAJOR SUBDIVISION	
WELD COUNTY ROADS	WCR X

MAP KEY

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(IN FEET)
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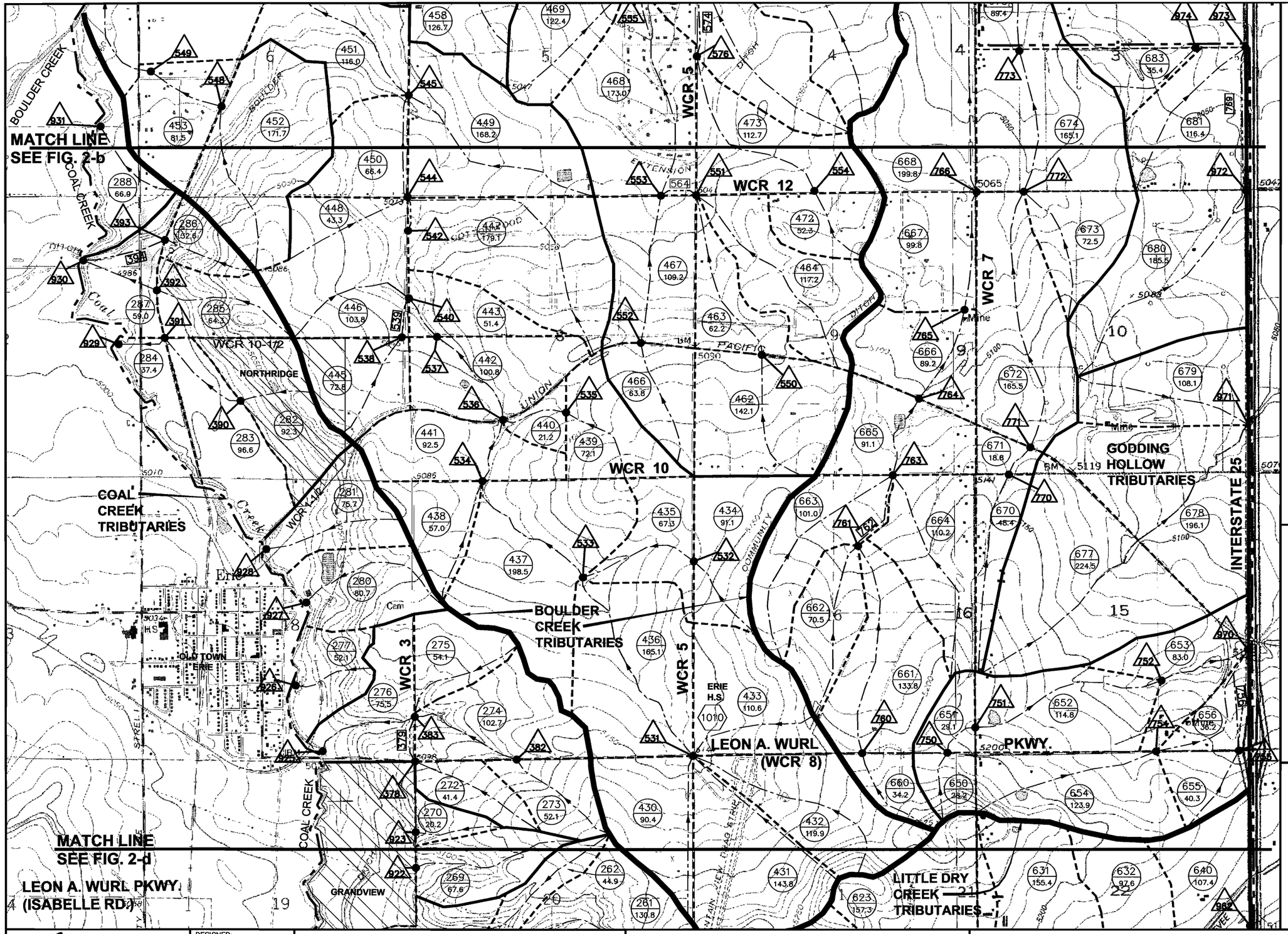
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

CATCHMENT DELINEATION AND SWMM ELEMENTS IN THE STUDY AREA

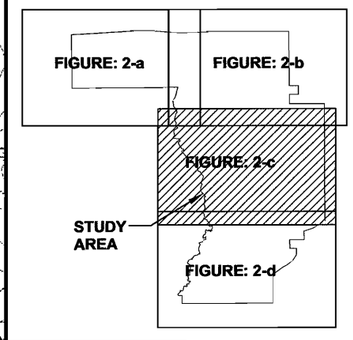
Figure 2-b



LEGEND

- CATCHMENT I.D. — 800 / 80.6 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DETENTION AREA — 1001
- UDSWM CHANNEL/PIPE ELEMENT — 328
- DESIGN POINT/NODE — 901
- EXISTING MAJOR SUBDIVISION
- WELD COUNTY ROADS — WCR X

MAP KEY



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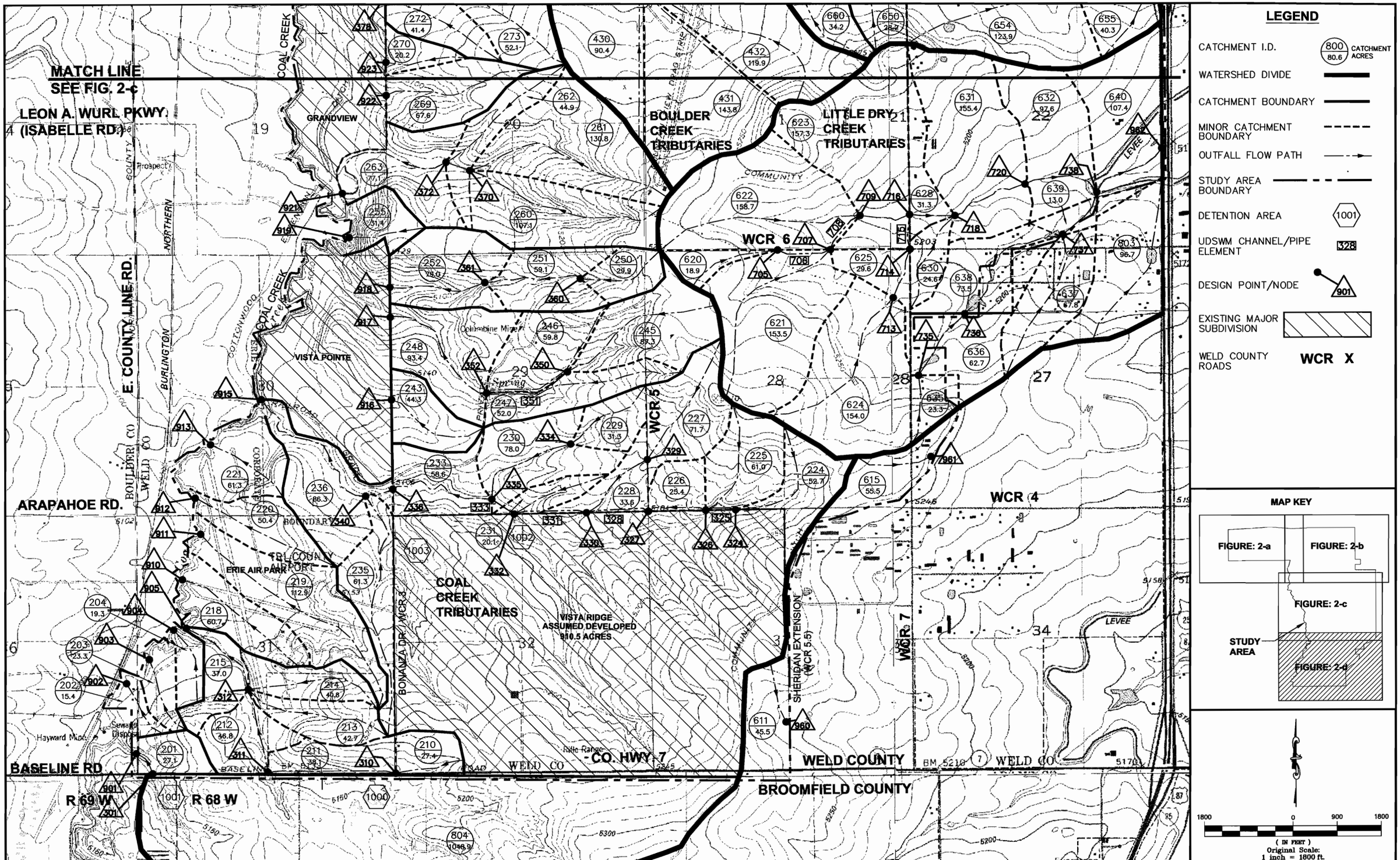
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

CATCHMENT DELINEATION AND SWMM ELEMENTS IN THE STUDY AREA

Figure 2-c



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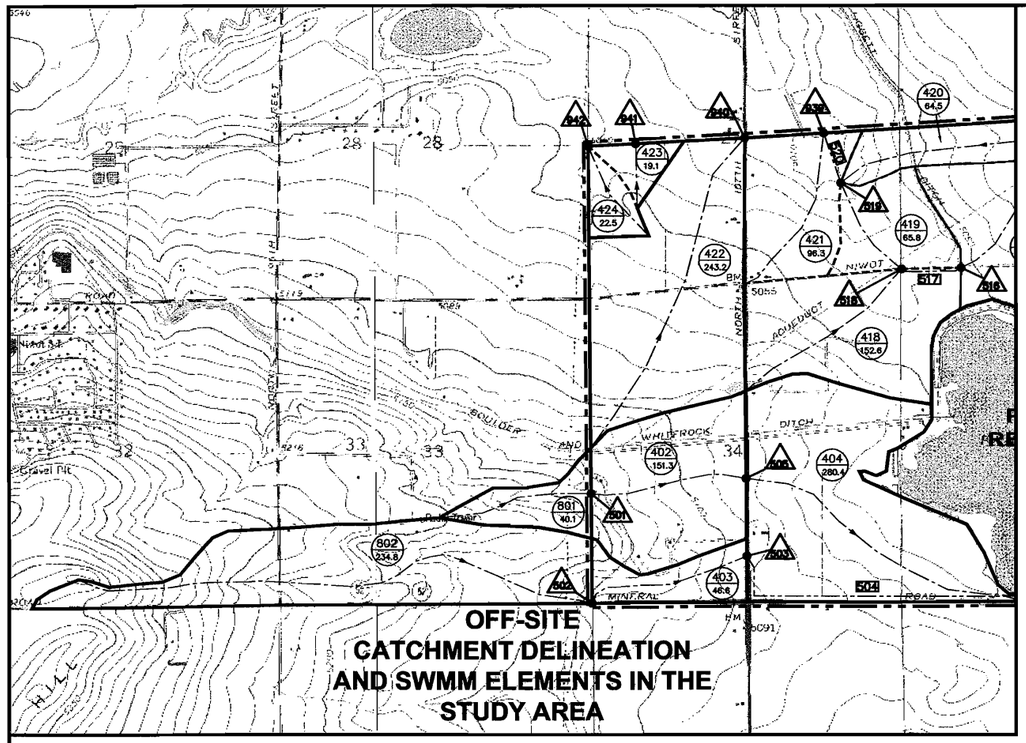
TOWN OF ERIE

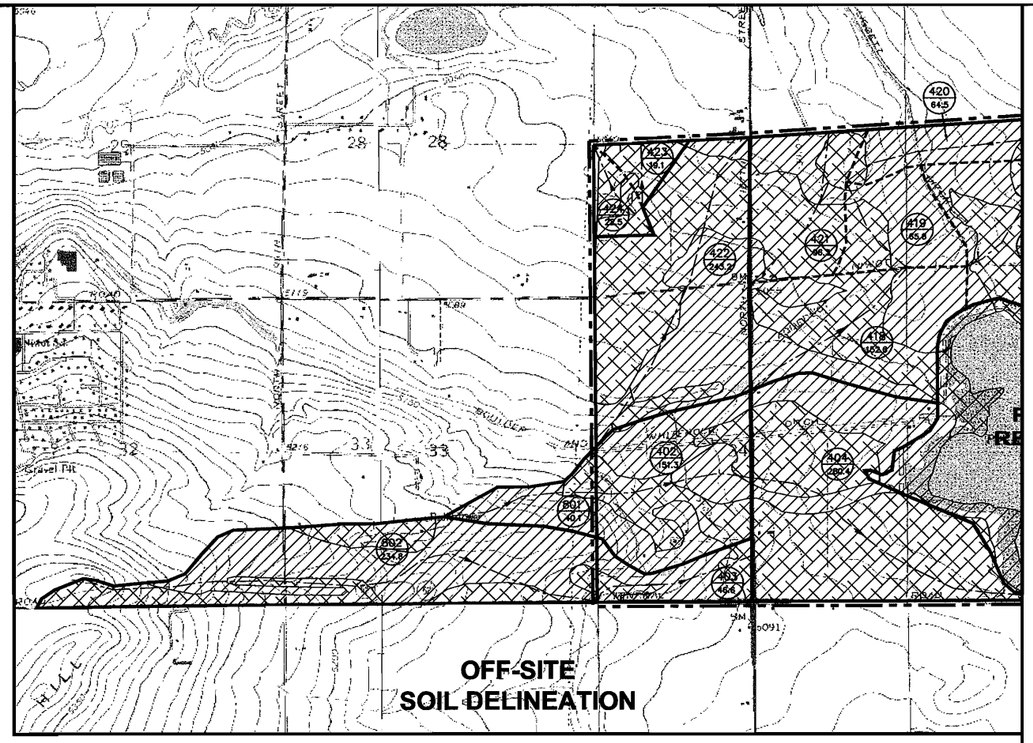
ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

CATCHMENT DELINEATION
AND SWMM ELEMENTS IN THE
STUDY AREA

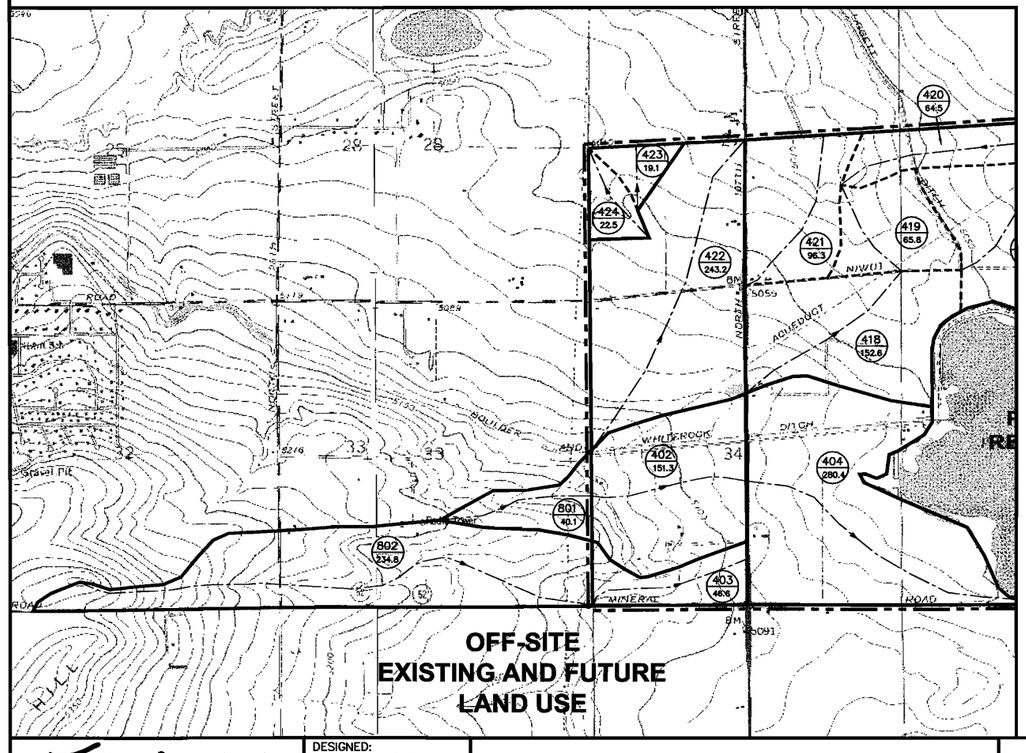
Figure 2-d



OFF-SITE CATCHMENT DELINEATION AND SWMM ELEMENTS IN THE STUDY AREA



OFF-SITE SOIL DELINEATION



OFF-SITE EXISTING AND FUTURE LAND USE

LEGEND

- CATCHMENT I.D. — 800 / 80.6 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DETENTION AREA — 1001
- UDSWM CHANNEL/PIPE ELEMENT — 328
- DESIGN POINT/NODE — 901
- DEVELOPED SUBDIVISION

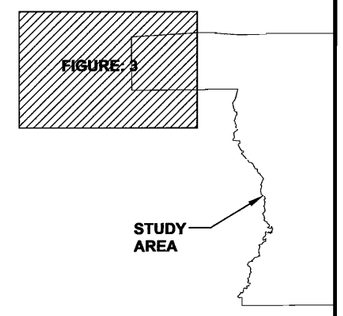
LAND USE LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
LOW DENSITY RESIDENTIAL	43
MEDIUM DENSITY RESIDENTIAL, SCHOOLS, AIRPORTS	50
HIGH DENSITY RESIDENTIAL	70
INDUSTRIAL	90
COMMERCIAL	95
DEVELOPED SUBDIVISION	

SOIL LEGEND

- A - SOIL
- B - SOIL
- C & D SOIL

MAP KEY



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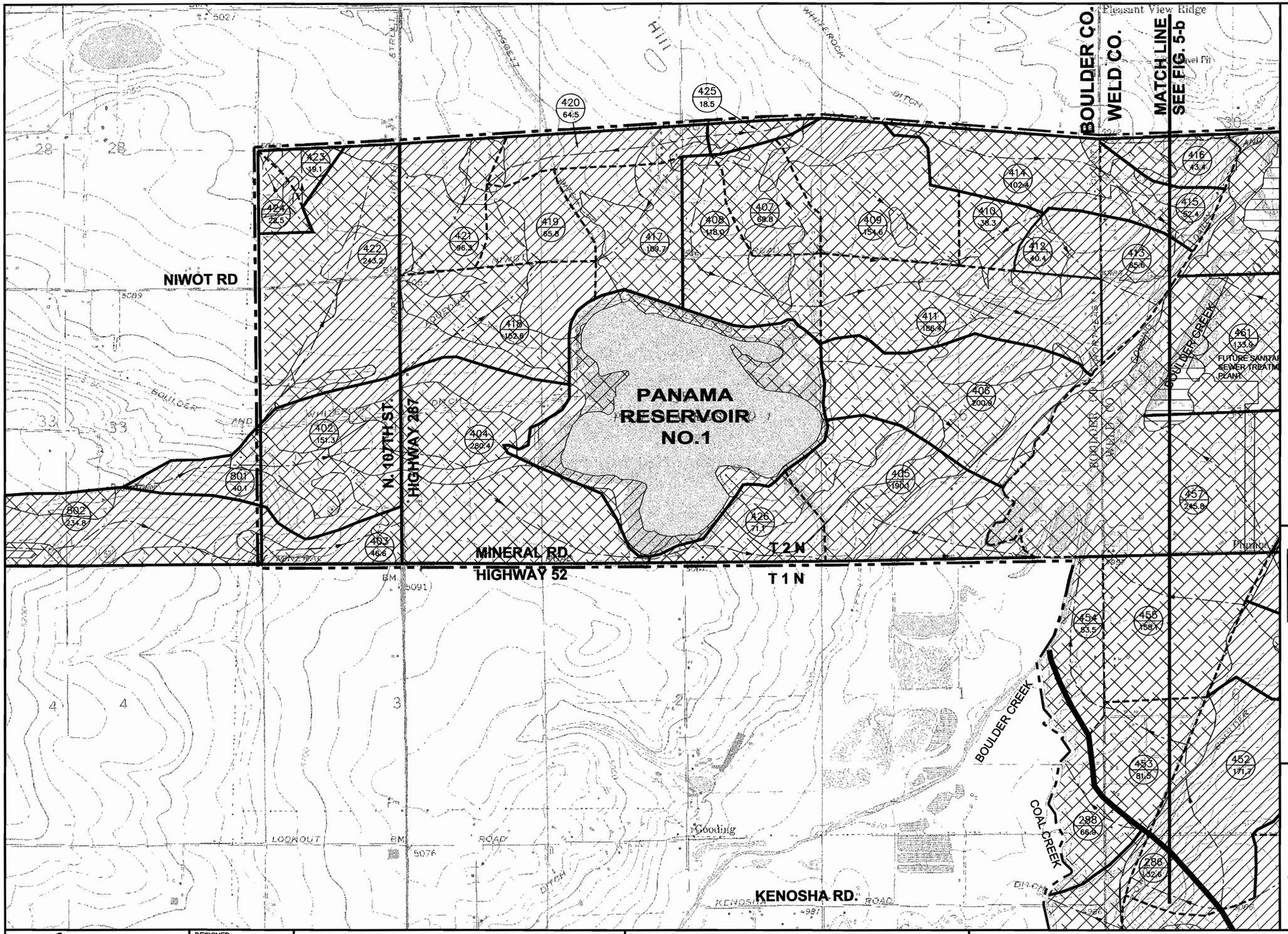
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

CATCHMENT DELINEATION, SOILS AND LAND USE OFFSITE

Figure 3



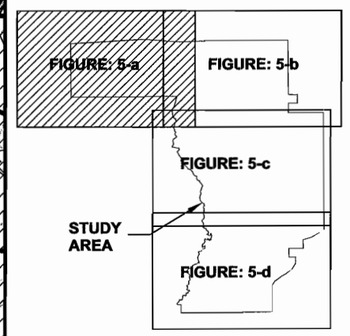
LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DEVELOPED SUBDIVISION

SOIL LEGEND

- A - SOIL
- B - SOIL
- C & D SOIL

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

HYDROLOGIC SOIL GROUPS

Figure 4-a

BOULDER CO.
WELD CO.

MATCH LINE
SEE FIG. 5-a

GOODING DAILEY ACCESS RD

WCR 16.5

WCR 3.25

WCR 16

MINERAL RD.

HIGHWAY 52

WCR 12

MATCH LINE
SEE FIG. 5-c

FUTURE SANITARY SEWER TREATMENT PLANT

BOULDER CREEK

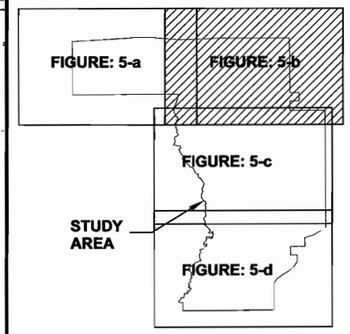
LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DEVELOPED SUBDIVISION

SOIL LEGEND

- A - SOIL
- B - SOIL
- C & D SOIL

MAP KEY



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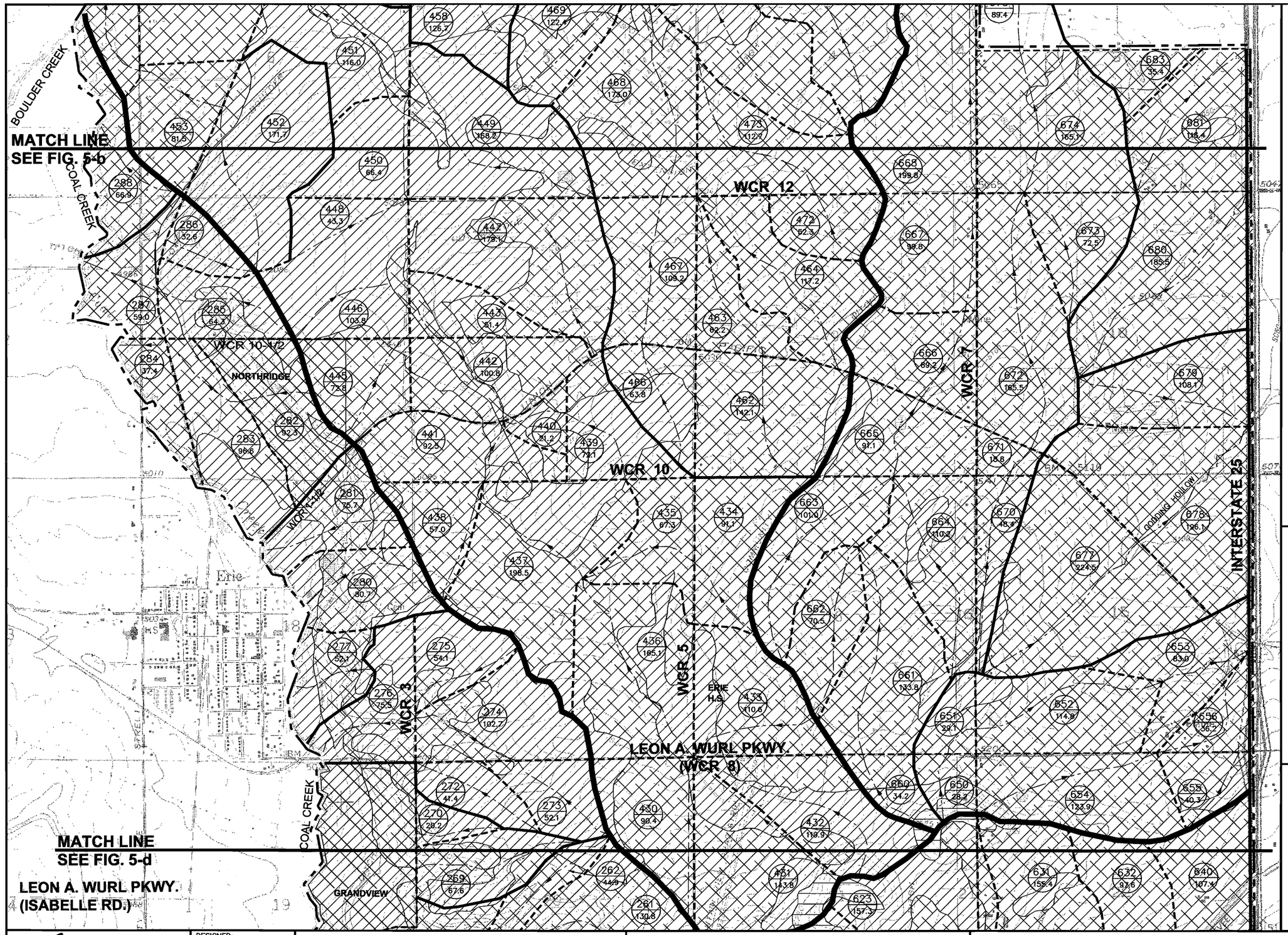
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

HYDROLOGIC SOIL GROUPS

Figure 4-b



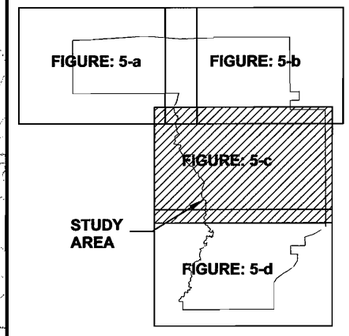
LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DEVELOPED SUBDIVISION

SOIL LEGEND

- A - SOIL
- B - SOIL
- C & D SOIL

MAP KEY



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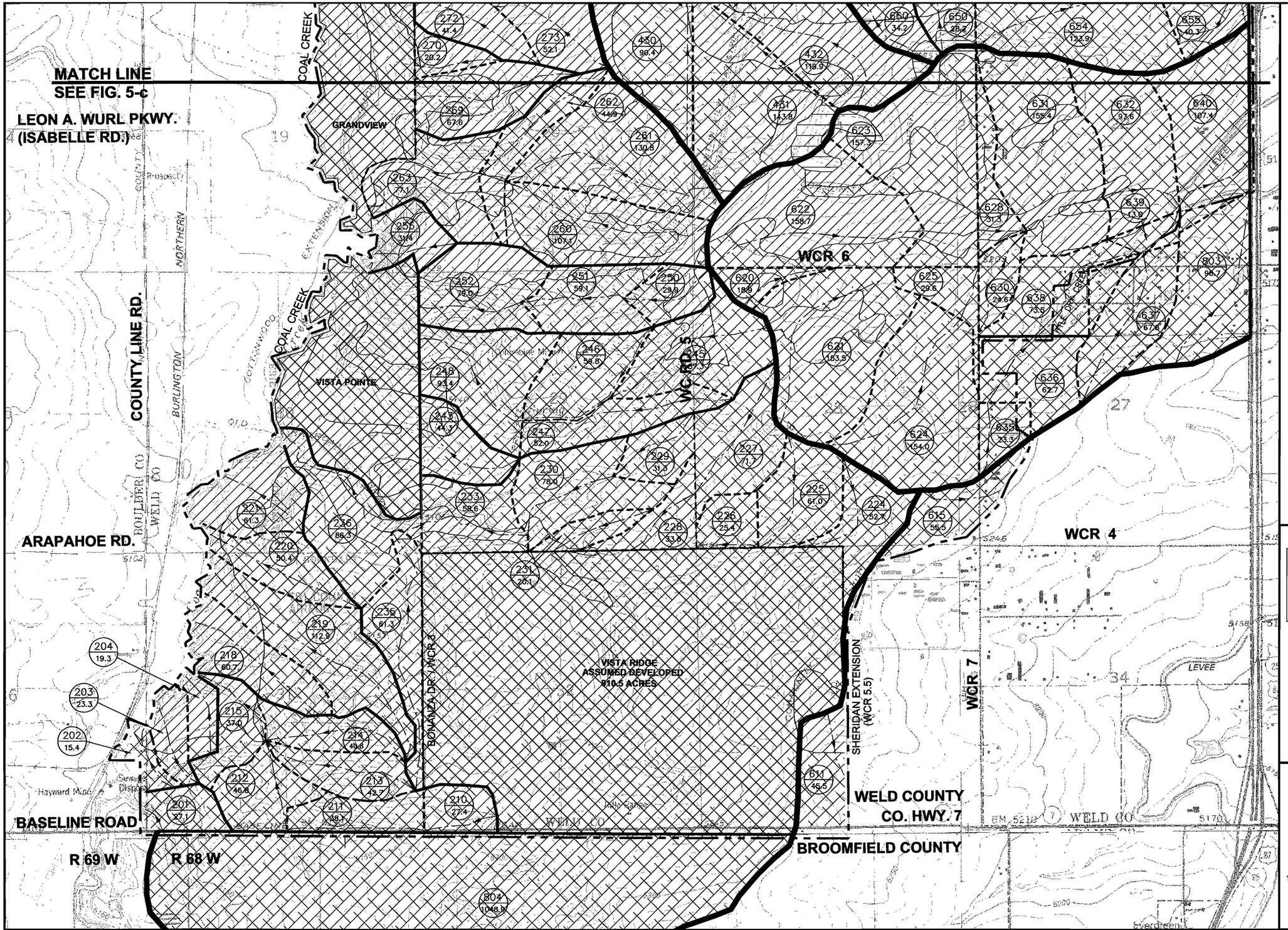
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

HYDROLOGIC SOIL GROUPS



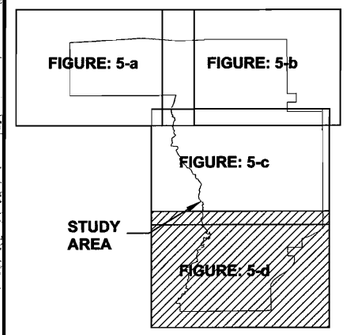
LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- DEVELOPED SUBDIVISION

SOIL LEGEND

- A - SOIL
- B - SOIL
- C & D SOIL

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

HYDROLOGIC SOIL GROUPS

Figure 4-d

2. Vegetation

Vegetation in the study area consists of dry land and irrigated crops in agricultural areas; deciduous trees, evergreens, shrubs, and native grasses along floodplains and undisturbed areas; and landscaping in residential and commercial areas. Numerous oil and gas wells create discontinuous areas absent of vegetation.

3. Wetlands

SEI field checked many of the NWI wetlands to observe accuracy of mapping. NWI (1975) data initially provides a good basis or estimate for locating wetlands. However the accuracy, completeness, reliability, and/or suitability of the NWI maps vary given the particular location, since 31 years have elapsed since these wetlands were mapped. Wetlands, which were defined conceptually by Smith Environmental, Inc. (SEI) using National Wetland Inventory (NWI) maps are shown on Figure 5-a through 5-d, and are found throughout the study area. In SEI's best professional judgment, the NWI maps (alone) are 70-90% accurate, depending on the location. The main significant changes are wetlands in roadside ditches and in gravel pits. One other significant change is the occurrence of a wetland mitigation bank located along State Highway 52 in the planning area. The Middle South Platte River Bank occurs about 2 miles west of I-25 on both sides of State Highway 52. It was the first bank built in the Omaha District of the U.S. Army Corps of Engineers. It was built in 1998 long after the NWI maps were created. Otherwise, SEI observed the extent of wetlands has not changed significantly over the past 30+ years.

Three major types of wetlands occur in the planning area: Palustrine, Riverine, and Lacustrine. Palustrine types include forested, emergent, open water and scrub shrub; Palustrine emergent wetlands are the most common throughout the planning area. Palustrine emergent wetlands are dominated by sedges (*Carex* spp.), rushes (*Juncus* spp.), cattails (*Typha* spp.), and bulrushes (*Scirpus* spp.). Riverine types include lower perennial and intermittent. Lacustrine types include open water and littoral. The wetlands are facilitated by both surface water flow and/or shallow groundwater. Generally, the larger the wetland the greater its value; as the size increases so to does erosion protection, storm surge bank protection, wildlife habitat value, water quality treatment, and aquatic habitat value. Open water types provide habitat for various minnow populations and some recreational fish species.

Wetland width varies with the topography; in general, the flatter the topography, the wider the wetland. Wetlands along the shoreline of Panama Reservoir, for example, are wider ranging up to 250 feet. Wetlands along the edge of creeks and irrigation canals are typically less than 15 feet and as narrow as 1 foot. Wetlands facilitated by leaky irrigation ditches are common in the planning area and are up to 50 feet wide.

4. Threatened and Endangered Species

The three federally-listed threatened and endangered species (TES) that potentially occur in the study area include: Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*), and Ute ladies'-tresses orchid (*Spiranthes diluvialis*). These species are dependent on wetland areas for most to all of their life cycles (i.e. wetlands represent potential habitat). Potential habitat for these three species was observed within the project area.

E. Land Use

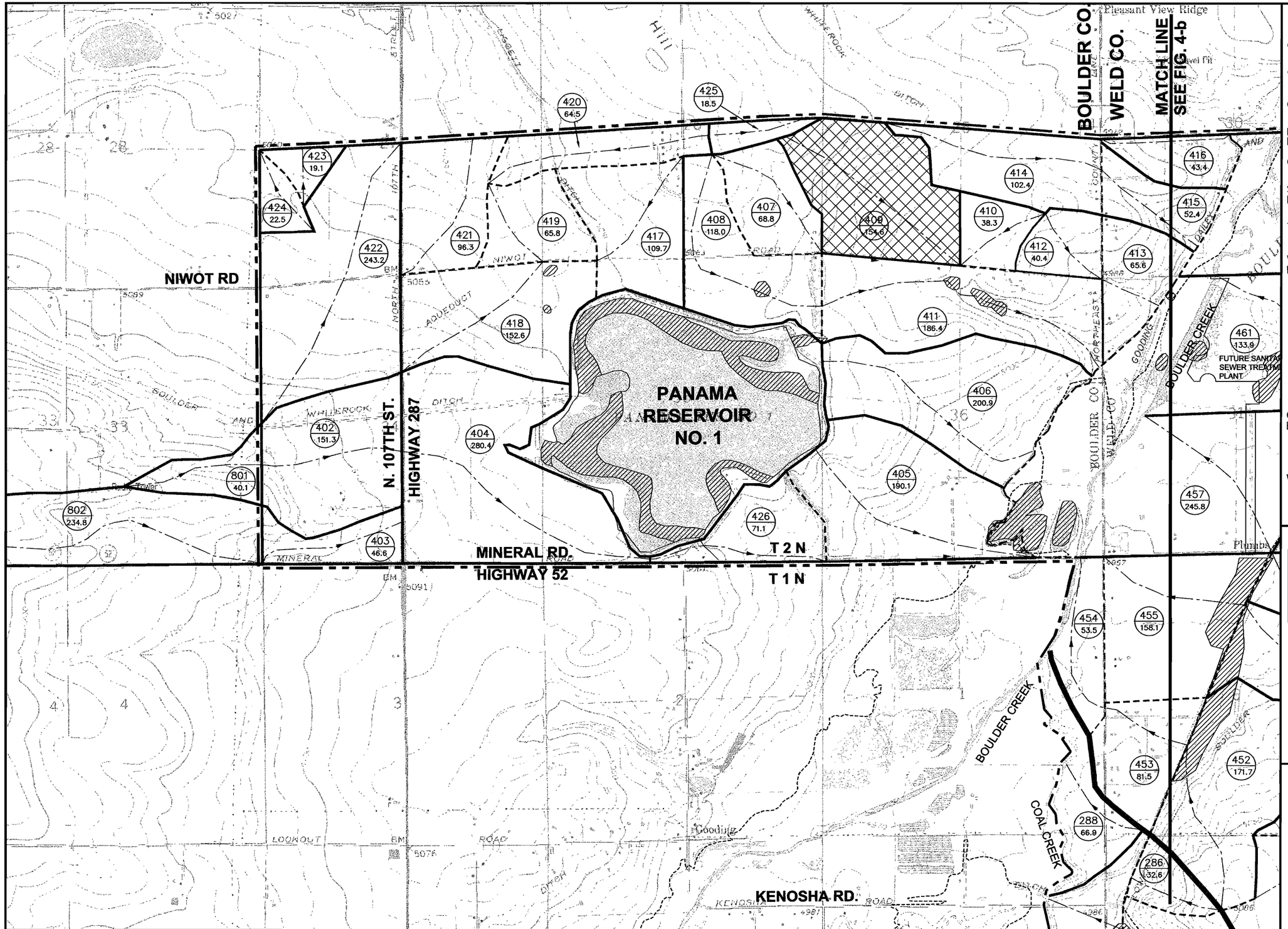
Portions of the study area located in the Coal Creek and Boulder Creek Catchments are expected to develop rapidly. According to the US Census 1950-2000 (as reported in the 2005 Town of Erie Comprehensive Plan) the population of the Town of Erie in 2000 was over 6,000. The 2005 Comprehensive Plan for the Town of Erie (Town of Erie, 2005) estimates the population in 2005 as approximately 13,000 and projects a population of approximately 40,000 by the year 2025 in the Planning Area. Existing (complete or under construction) and proposed (those known by Erie officials as of July, 2006) developments are listed on Table 1.

Table 1. Existing and Proposed Developments, July 2007

Existing/Under Construction	Under Discussion
Residential	Residential
Vista Ridge	Bridgewater
Vista Pointe	Dearmin West
Erie Air Park	Haymeadow Farm
Grandview	Longview Ranch
Northridge	Morgan Hill
Parkland Estates	
Carmacar Ranchettes	
Westview Estates	
Scotts Acres	
Other	
Erie High School	
Asphalt Specialties	
Denver Regional Landfill	
Front Range Landfill	

Note: See Erie Drainage Reports in Reference Section

Current percent imperviousness for off-site and on-site areas is shown on Figure 3 and Figures 6-a through 6-d, respectively. The percent imperviousness was identified using aerial photographs and field investigations. Projected percent imperviousness for off-site and on-site areas is shown on Figure 3 and Figures 7-a through 7-d, respectively. Future percent imperviousness was identified using planning and zoning GIS data for the Town of Erie (2005 Town of Erie Comprehensive Plan).



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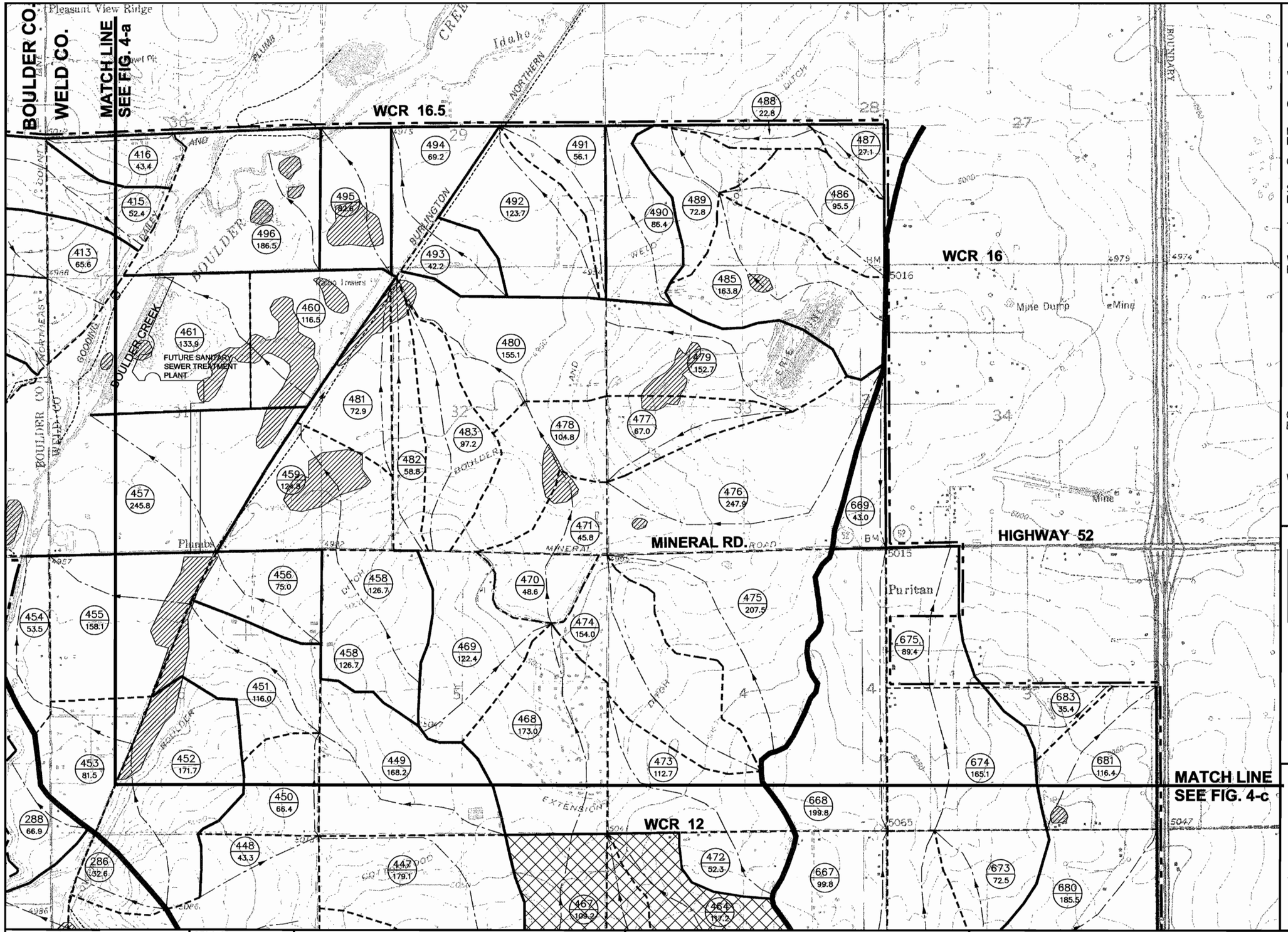
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

WETLANDS, FLOODPLAINS, AND CALIBRATION BASINS

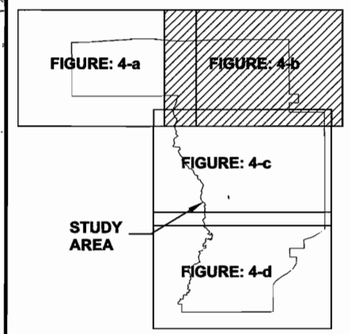
Figure 5-a



LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- 100-YR FLOODPLAIN
- WELD COUNTY ROADS — WCR X
- CALIBRATION BASIN
- WETLANDS

MAP KEY



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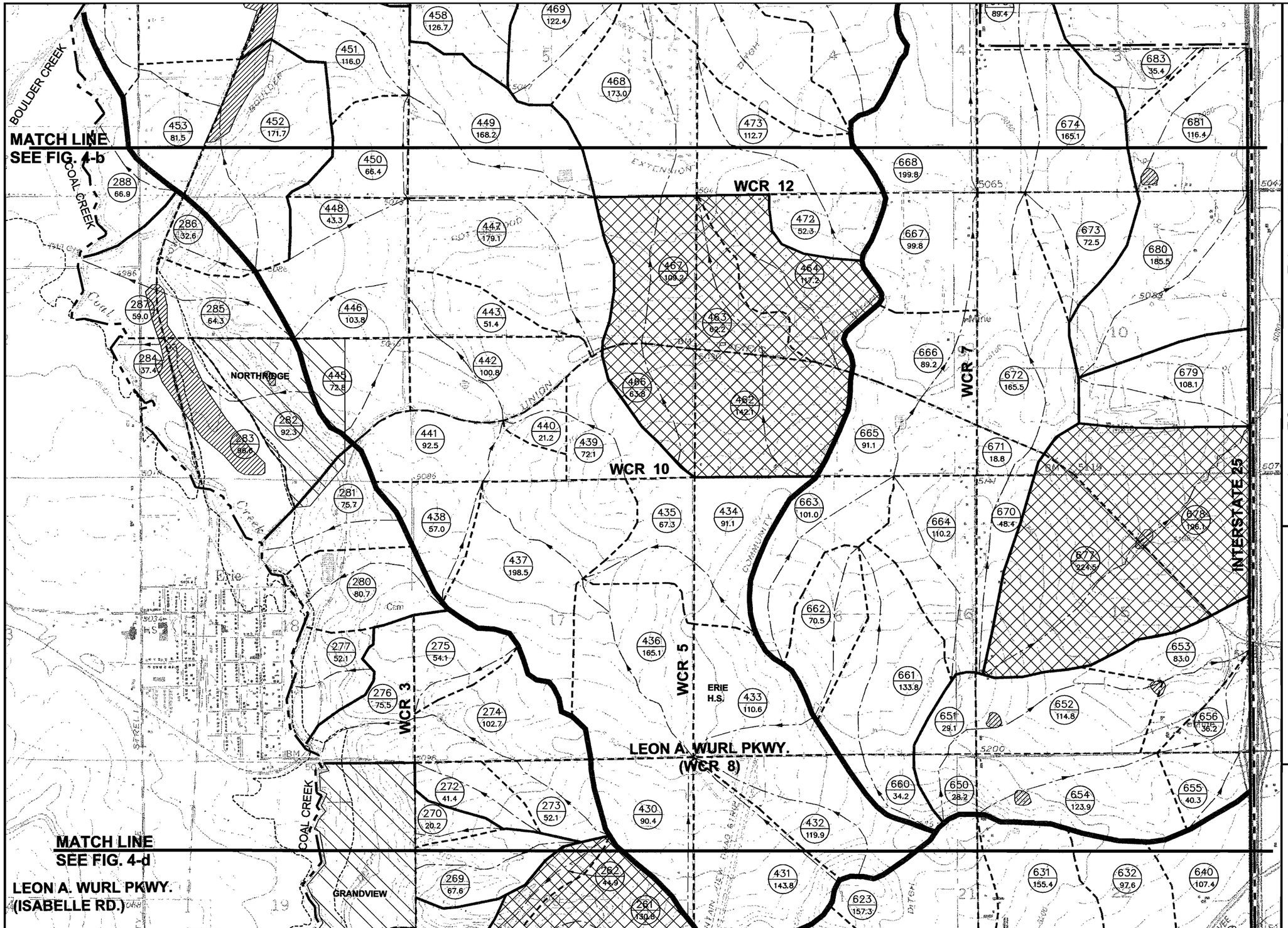
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

WETLANDS, FLOODPLAINS, AND CALIBRATION BASINS

Figure 5-b



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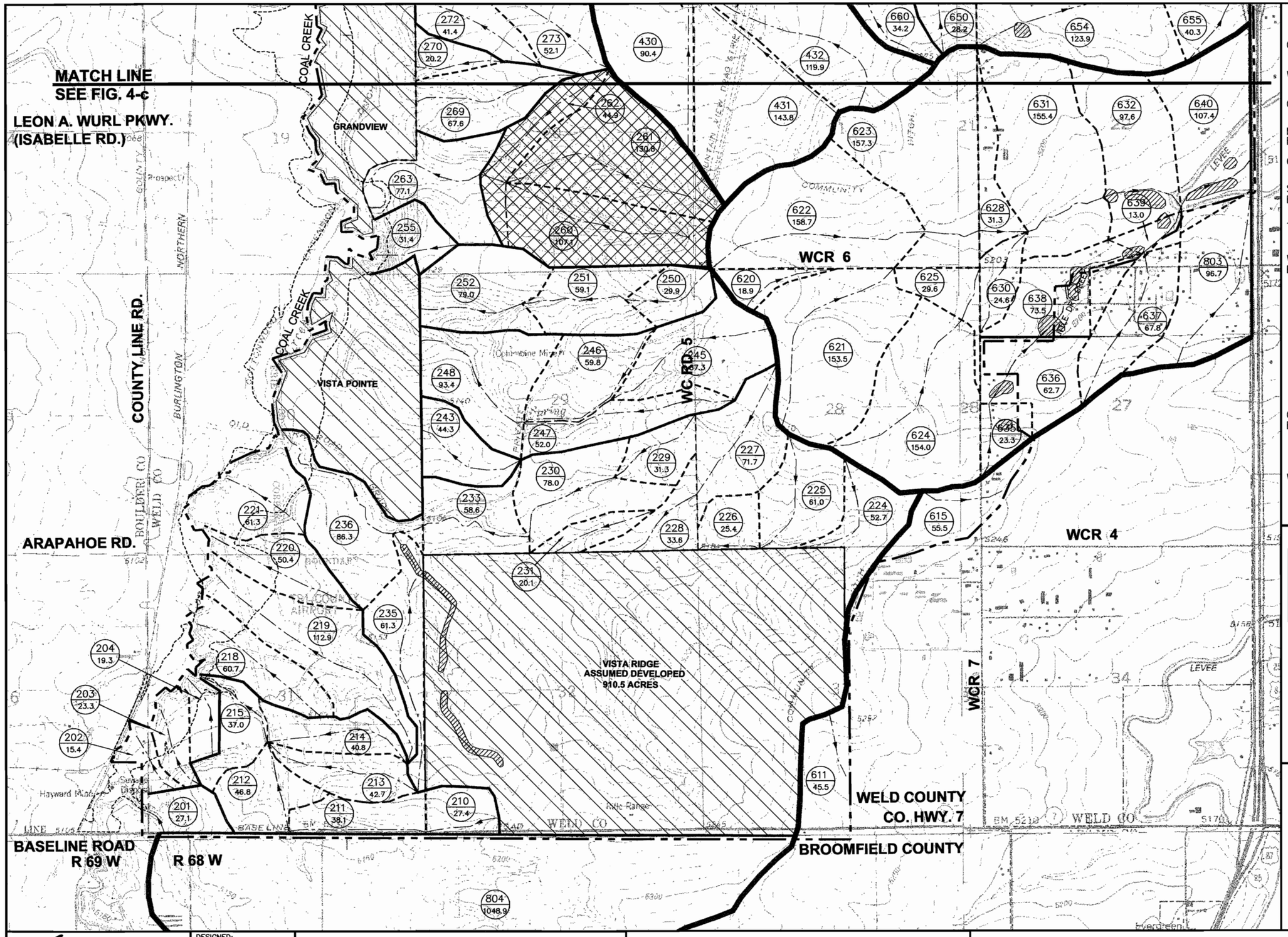
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

WETLANDS, FLOODPLAINS, AND CALIBRATION BASINS

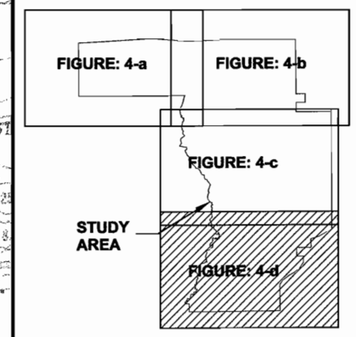
Figure 5-c



LEGEND

- CATCHMENT I.D. — 800 / 80.5 CATCHMENT ACRES
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- STUDY AREA BOUNDARY
- 100-YR FLOODPLAIN
- WELD COUNTY ROADS — WCR X
- CALIBRATION BASIN
- WETLANDS

MAP KEY



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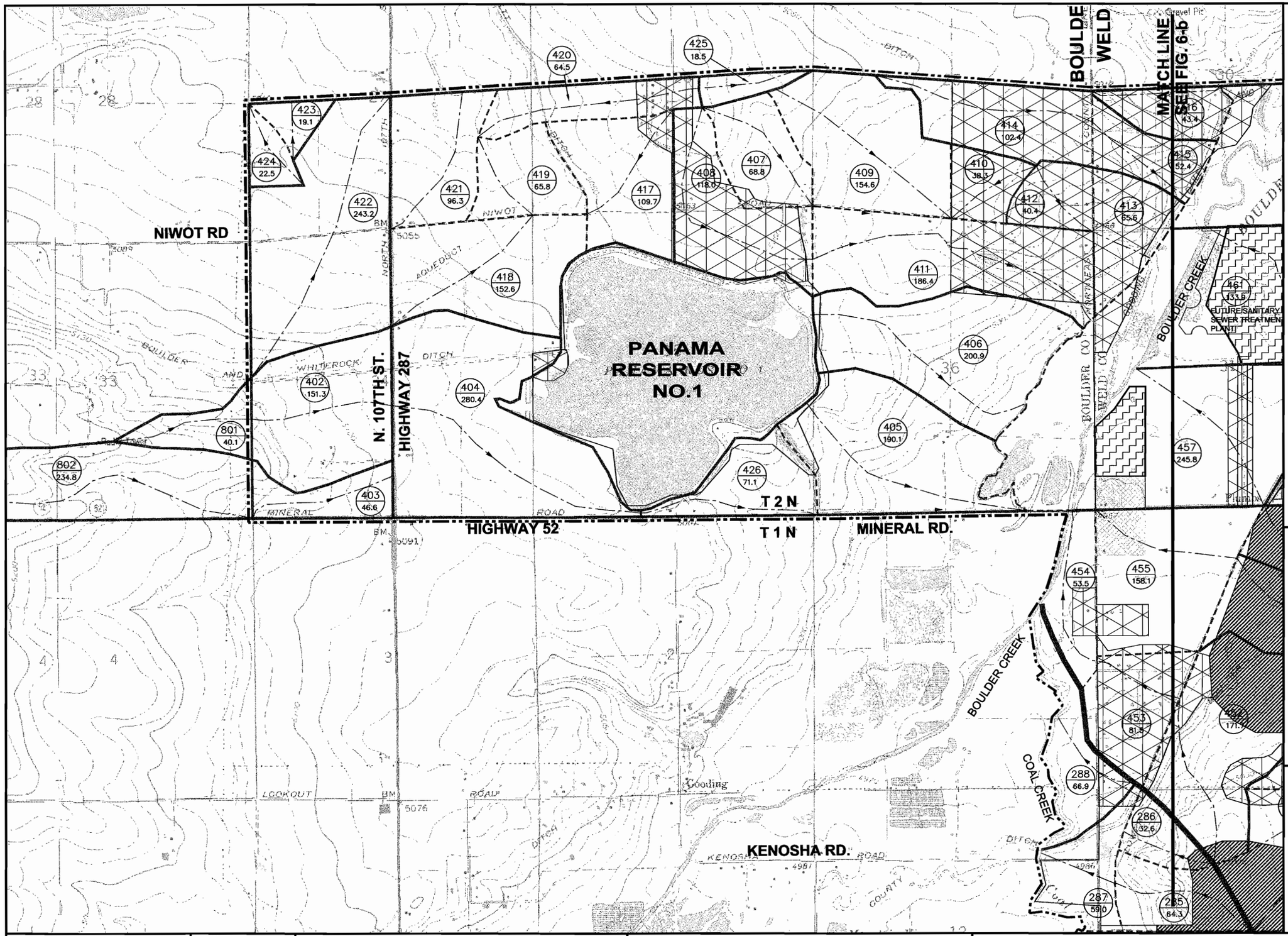
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

WETLANDS, FLOODPLAINS, AND CALIBRATION BASINS



LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
LOW DENSITY RESIDENTIAL	43
MEDIUM DENSITY RESIDENTIAL, SCHOOLS, AIRPORTS	50
HIGH DENSITY RESIDENTIAL	70
INDUSTRIAL	90
COMMERCIAL	95
DEVELOPED SUBDIVISION	

CATCHMENT I.D. 800 / 80.6 (CATCHMENT ACRES)

WATERSHED DIVIDE

CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

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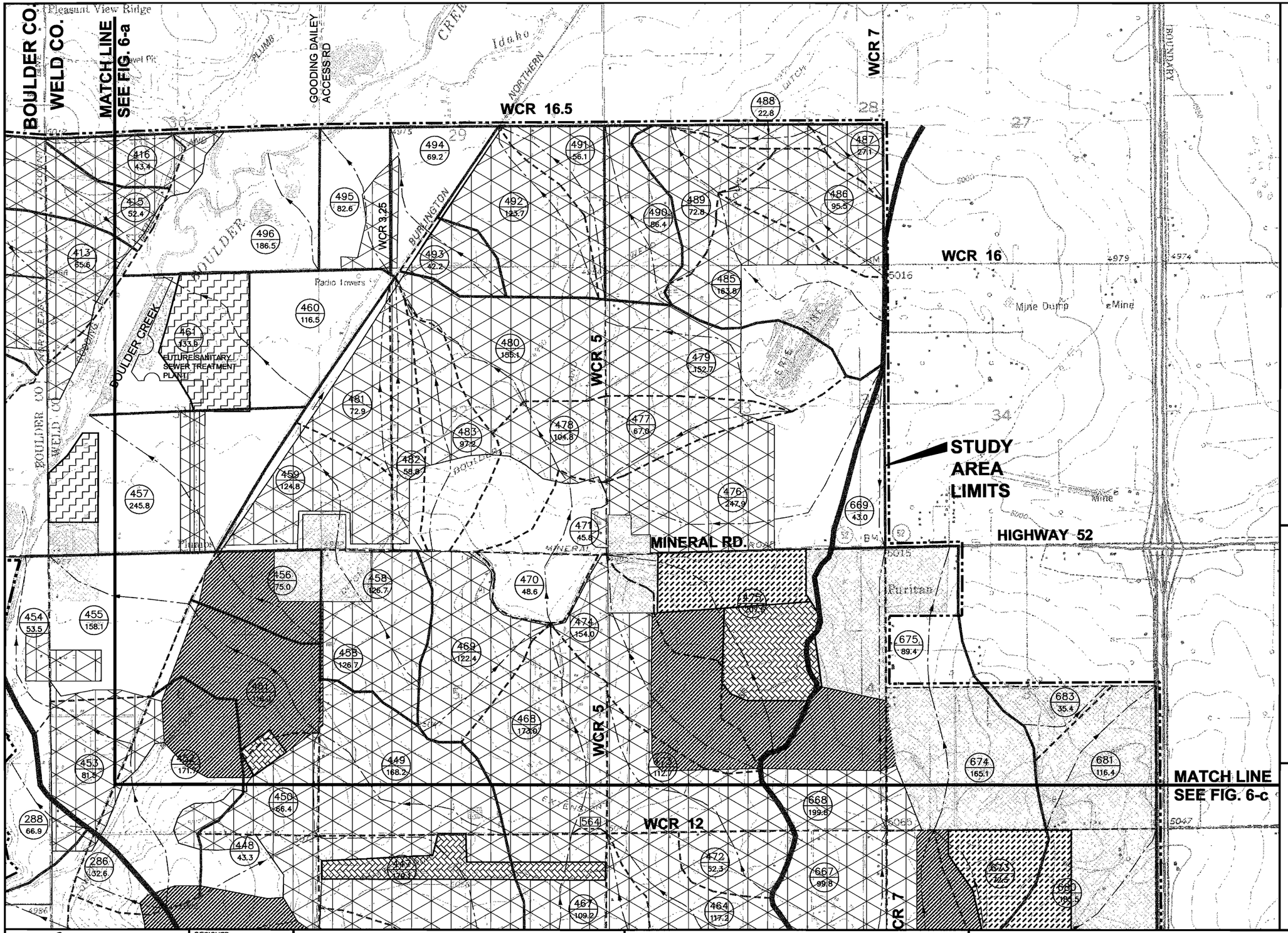
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

EXISTING PERCENT IMPERVIOUS

Figure 6-a



LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
LOW DENSITY RESIDENTIAL	43
MEDIUM DENSITY RESIDENTIAL, SCHOOLS, AIRPORTS	50
HIGH DENSITY RESIDENTIAL	70
INDUSTRIAL	90
COMMERCIAL	95
DEVELOPED SUBDIVISION	

CATCHMENT I.D. — 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

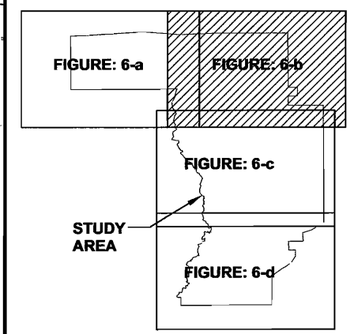
CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

EXISTING PERCENT IMPERVIOUS

Figure 6-b

LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
LOW DENSITY RESIDENTIAL	43
MEDIUM DENSITY RESIDENTIAL, SCHOOLS, AIRPORTS	50
HIGH DENSITY RESIDENTIAL	70
INDUSTRIAL	90
COMMERCIAL	95
DEVELOPED SUBDIVISION	

CATCHMENT I.D. 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

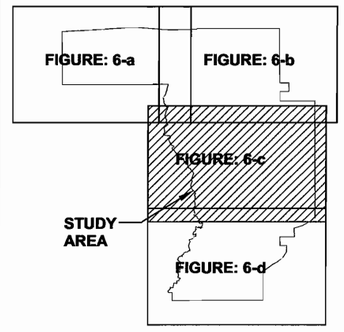
CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY



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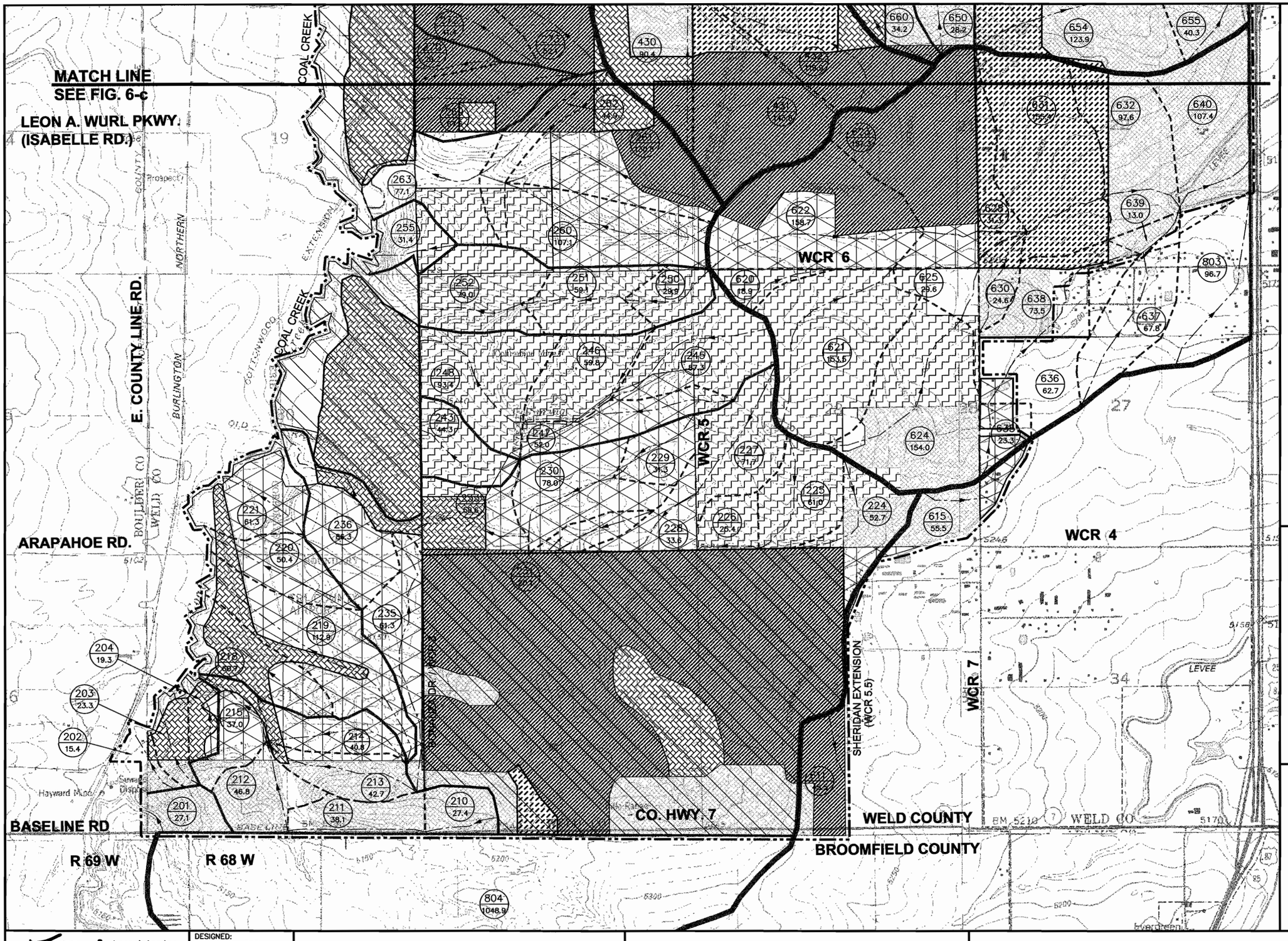
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

EXISTING PERCENT IMPERVIOUS

Figure 6-c



LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
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DEVELOPED SUBDIVISION	

CATCHMENT I.D. 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

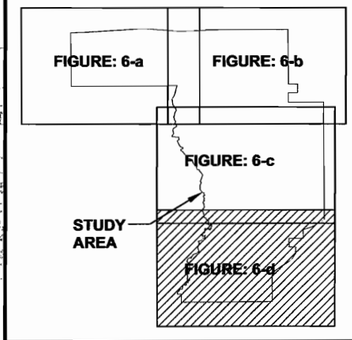
CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY



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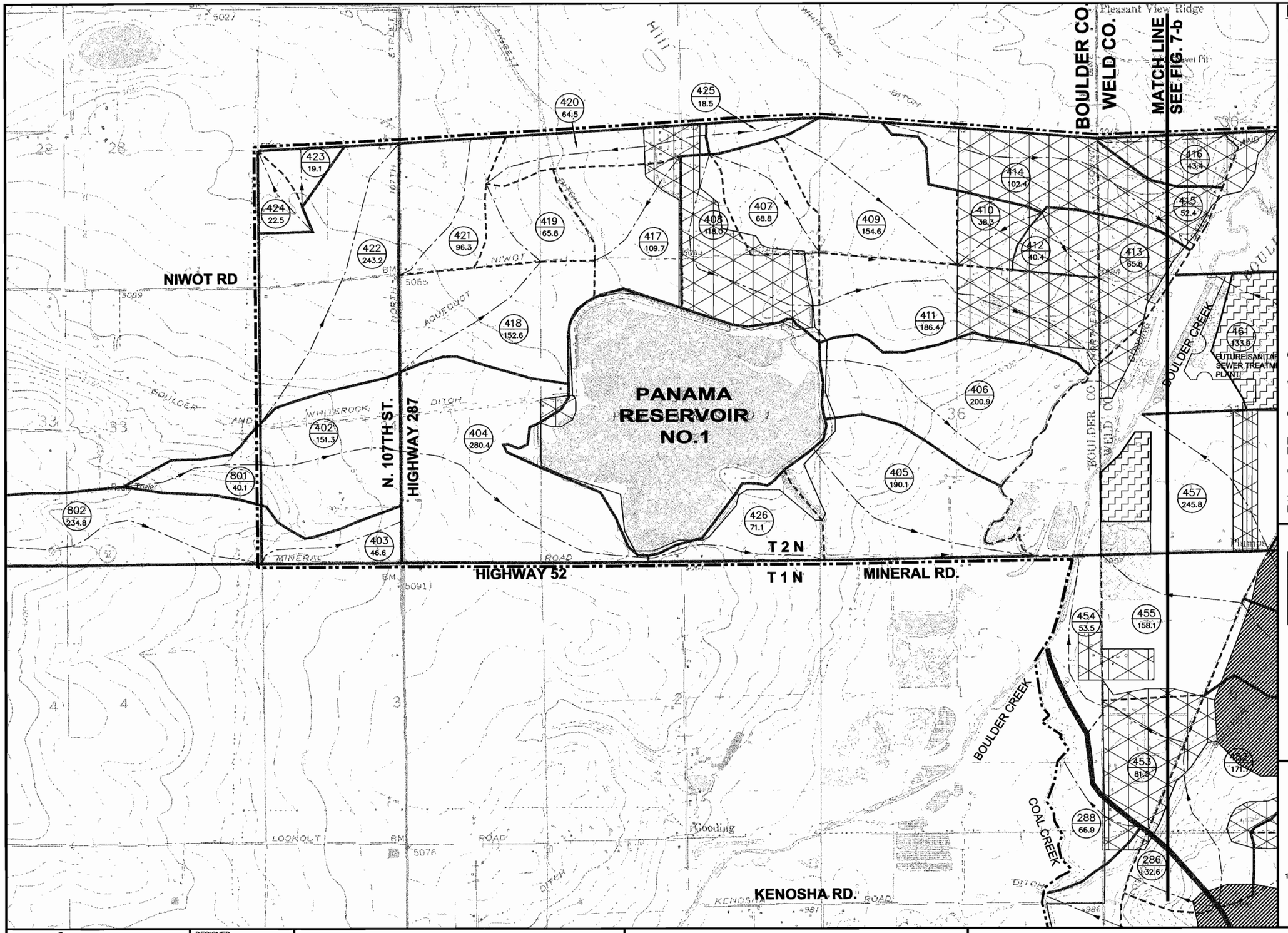
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

EXISTING PERCENT IMPERVIOUS

Figure 6-d



LEGEND

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DEVELOPED SUBDIVISION	

CATCHMENT I.D. — 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

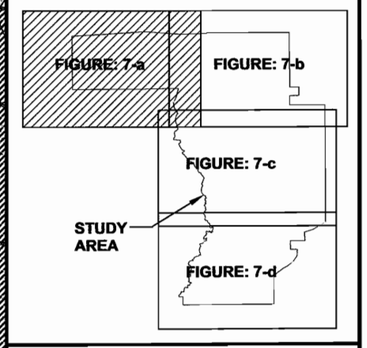
CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

FUTURE PERCENT IMPERVIOUS

Figure 7-a

BOULDER CO.
WELD CO.
MATCH LINE SEE FIG. 7-a
Pleasant View Ridge
GOODING DAILEY ACCESS RD
Idaho NORTHERN DITCH
WCR 7
WCR 16.5
WCR 16
WCR 3.25
WCR 5
WCR 12
CR 7
BURLINGTON DITCH
BOULDER CREEK
FUTURE SANITARY SEWER TREATMENT PLANT
Radio Towers
Mine Dump
STUDY AREA LIMITS
MINERAL RD.
HIGHWAY 52
MATCH LINE SEE FIG. 7-c
Puritan
488 22.8
487 27.1
494 69.2
491 56.1
495 82.6
492 123.7
489 72.8
490 86.4
486 95.5
496 186.5
493 42.2
485 163.87
416 43.4
415 52.4
413 85.8
460 116.5
461 133.5
480 185.1
479 152.7
481 72.9
483 97.8
478 104.8
477 67.6
482 58.8
459 124.8
457 245.8
476 247.9
471 45.8
669 43.0
456 75.0
458 126.7
470 48.6
454 53.5
455 158.1
474 154.0
675 89.4
469 122.4
453 81.8
452 171.7
449 168.2
468 173.0
683 35.4
674 165.1
681 116.4
450 66.4
668 199.6
564
288 66.9
448 43.3
286 32.6
472 52.3
667 99.8
467 109.2
464 117.2

LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
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MEDIUM DENSITY RESIDENTIAL, SCHOOLS, AIRPORTS	50
HIGH DENSITY RESIDENTIAL	70
INDUSTRIAL	90
COMMERCIAL	95
DEVELOPED SUBDIVISION	

CATCHMENT I.D. 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY

FIGURE: 7-a
FIGURE: 7-b
FIGURE: 7-c
FIGURE: 7-d
STUDY AREA

1800 0 900 1800
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

FUTURE PERCENT IMPERVIOUS

Figure 7-b

LEGEND

	% IMPERVIOUS
OPENSPACE, PARKS, AGRICULTURAL	2
CEMETERY, GOLF COURSE RECREATION	7
LANDFILL, MINES AND OIL & GAS FIELDS	10
RURAL RESIDENTIAL	30
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DEVELOPED SUBDIVISION	

CATCHMENT I.D. 800 / 80.6 CATCHMENT ACRES

WATERSHED DIVIDE

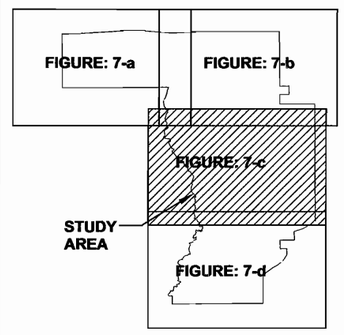
CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

OUTFALL FLOW PATH

STUDY AREA BOUNDARY

MAP KEY



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(IN FEET)

Original Scale:
1 inch = 1800 ft.

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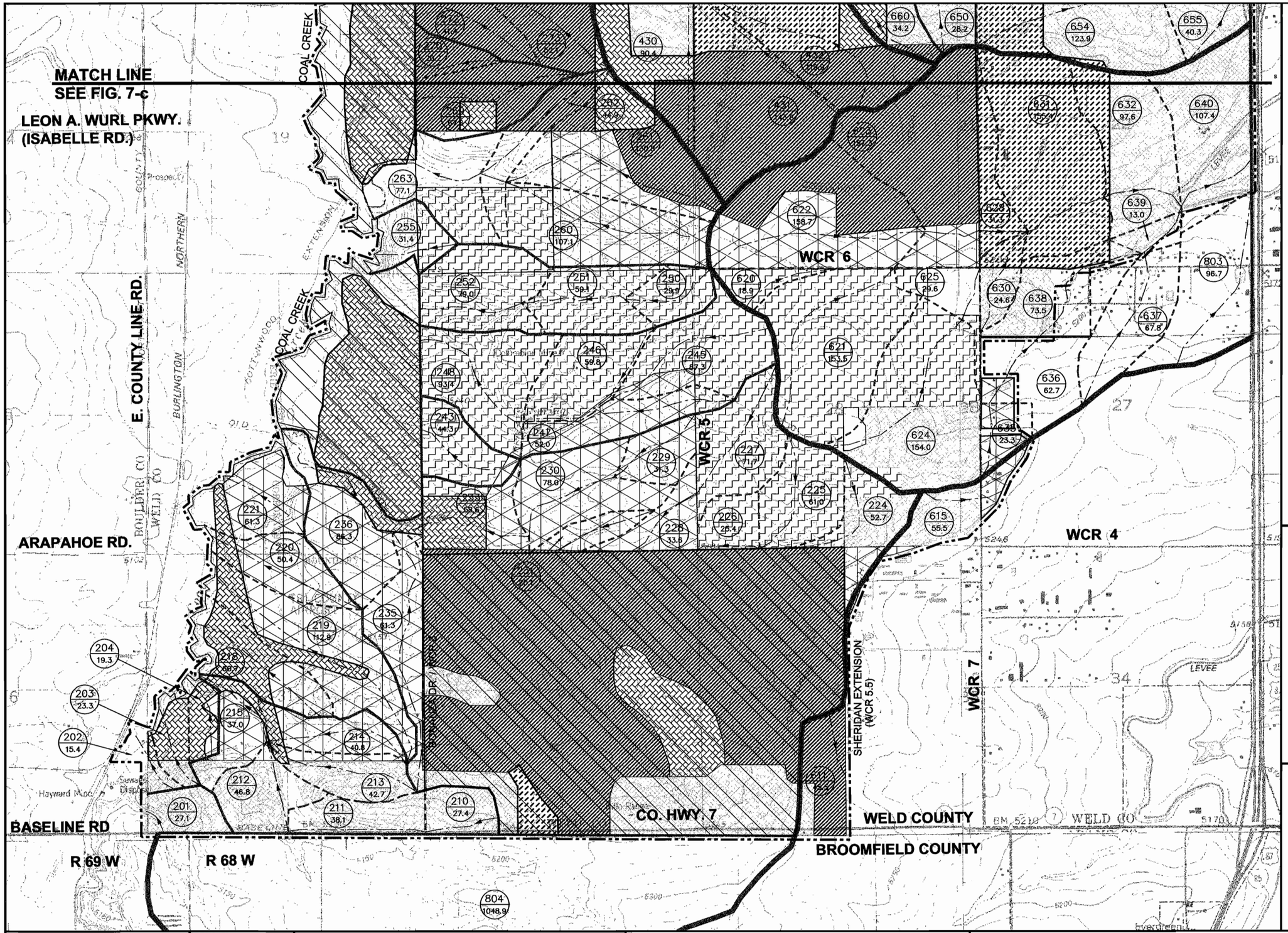
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

FUTURE PERCENT IMPERVIOUS

Figure 7-c



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

FUTURE PERCENT IMPERVIOUS

Figure 7-d

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III. HYDROLOGIC MODEL

A. General

Flood peaks and hydrographs for each of the four major sub-watersheds in the study area are defined using UDSWM2000 (UDSWM), calibrated to CUHP2000 for the 100-year storm event. Standard routines in ACAD-2004 and Land Desktop computer programs were used to identify basin parameters required for UDSWM and CUHP2000. The detention area outlets are modeled using FHWA HDS5 (FHWA, 2004). Irrigation facilities are assumed to be full and thus do not transport stormwater. Catchments, flow paths, design points, and catchment and conveyance element identifiers are presented on Figures 2a, 2b, 2c, 2d and 3 in Chapter II of this report. UDSWM flow charts for the hydrologic model are presented in Appendix A1 of this report.

B. UDSWM and CUHP Parameters

Precipitation depth and distributions were obtained from Town of Erie Standards and Specifications (Town of Erie, 2006) and *Boulder County Storm Drainage Criteria Manual* (Boulder County, 1984) and are reproduced in Table 2.

Catchment parameters, including area, stream and basin length, slopes, and distance to centroid were identified using recent topographic mapping developed from aerial photography flown during April, 2006 (Benchmark, 2006). Area and length measurements were obtained using the ACAD2004 and Land Desktop computer programs. Parameters for individual catchments for UDSWM are listed in the computer output summary in Appendix A1.

Hydrologic soil groups and land use were overlaid on the topographic mapping, areas obtained using ACAD2004, and catchment averages were determined using average area calculations. Weighted soil parameters required for the model include initial and final infiltration (in/hr) and decay coefficient shown on Table 3. Soil parameters for individual catchments are listed in the computer output summary in Appendix A1.

The type and density of land use defines the magnitude of the percent impervious parameter used in the hydrologic model. Percent impervious for various land uses are listed in Table 4. Percent imperviousness for individual catchments for existing and future conditions is listed in the computer output summary in Appendix A1.

Table 2. Precipitation Distribution for UDSWM

Time (min)	100 yr. (in/hr)	50 yr. (in/hr)	10 yr. (in/hr)	5 yr. (in/hr)	2 yr. (in/hr)	0.4"/hr (in/hr)
5	0.36	0.36	0.36	0.36	0.24	0
10	0.96	0.96	0.72	0.60	0.48	0.12
15	1.44	1.44	1.68	1.44	0.96	0.24
20	2.64	2.28	3.12	2.52	1.92	0.36
25	4.56	4.32	5.16	4.32	3.00	0.72
30	8.16	7.20	2.52	2.04	1.68	1.20
35	4.56	3.48	1.20	0.96	0.72	0.72
40	2.64	2.28	0.84	0.72	0.60	0.36
45	2.04	1.44	0.84	0.60	0.36	0.24
50	1.68	1.44	0.72	0.60	0.36	0.24
55	1.32	0.96	0.72	0.60	0.36	0.24
60	1.32	0.96	0.72	0.60	0.36	0.24
65	1.32	0.96	0.72	0.60	0.36	0.24
70	0.60	0.72	0.72	0.60	0.24	0.12
75	0.60	0.72	0.72	0.60	0.24	0.12
80	0.36	0.48	0.48	0.48	0.24	0
85	0.36	0.48	0.36	0.36	0.24	0
90	0.36	0.36	0.36	0.36	0.24	0
95	0.36	0.36	0.36	0.36	0.24	0
100	0.36	0.36	0.36	0.36	0.24	0
105	0.36	0.36	0.36	0.36	0.24	0
110	0.36	0.36	0.36	0.36	0.24	0
115	0.36	0.36	0.36	0.24	0.12	0
120	0.36	0.36	0.24	0.24	0.12	0

From Boulder County, 1984, "Two Hour Design Storm for Basins Less Than Five Square Miles"
Note: 1-hr ppt. depths: 2-yr = 1.01", 5-yr = 1.43", 10-yr = 1.73", 50-yr = 2.4", 100-yr = 2.7" from Town of Erie, 2006.

Table 3. Soil Parameters

NRCS Hydrologic Soil Group	Infiltration (in/hr)		Decay Coefficient
	Initial	Final	
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C and D	3.0	0.5	0.0018

Table 4. Percent Impervious for Land Uses in Study Area

Land Use	% Impervious
Open Space/Parks/Agricultural	2
Cemetery/Golf Course/Recreation	7
Landfill Mines/Oil & Gas Fields	10
Rural Residential	30
Low Density Residential	43
Medium Density Residential/ Schools/Airports	50
High Density Residential	70
Industrial	90
Commercial	95

UDSWM Catchment width (W) parameters were calculated using,

$$W = L_c \{ 2- [(A_2 - A_1)/A_t] \}$$ (Huber et al., 1984),

where L_c = length of the channel, A_i = area on i^{th} side of the channel, and A_t = the total area of the catchment. All conveyance elements were simulated with a main element and an overbank element. Following recommendations in the UDSWM manual (Boyle Engineering Corp., 1985), roughness coefficients for conveyance elements were increased by 25 percent. Two types of conveyance elements within catchment areas were simulated using channel elements; a grassed channel and a street. The grassed channel simulates the channel in catchments dominated by open space and/or agricultural activities. The street channel simulates stormwater transport in catchments dominated by development. Typical parameters used for conveyance elements are shown in Table 5. Catchment widths and conveyance element parameters for individual catchments are listed in the computer output summary in Appendix A1.

Table 5. Typical Conveyance Element Parameters

	Depth (ft)	Side Slopes H:V	Manning *n* *	Bottom Width		
				1st Order	2nd Order	3rd Order
Channel						
Main	3	3:1	0.044	5	7.5	10
Overflow	10	20:1	0.056	23	25.5	28
Street						
Main	0.5	3:1	0.020	8	8	8
Overflow	10	20:1	0.044	11	11	11

* increased by 25%, see text

C. Calibration

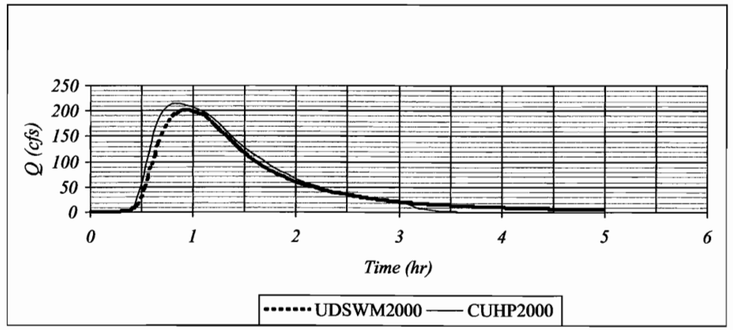
Hydrographs produced by UDSWM are calibrated to CUHP2000 hydrographs for the 100-year event using the four catchments within the study area shown on Figures 2a-d in Chapter II. Flood peak calibration is summarized on Table 6. CUHP2000 and UDSWM flood hydrographs for the 100-year event are compared on Figure 8. All individual or contiguous catchments in the study area meeting the following criteria were used for calibration; (1) area greater than 150 acres, (2) reasonably uniform shape, (3) length-width ratio less than 4, and (4) catchment slope between 0.005 and 0.04 ft/ft. Flood peak and hydrograph calibration for existing and future percent imperviousness was achieved by multiplying the UDSWM catchment width parameters for all catchments by 1.6. This multiplication factor was also applied to the catchment width parameter for all other storm events (0.4-inch average storm, and 2-, 5-, 10-, and 50-year events).

Table 6. Flood Peak Calibration, UDSWM to CUHP

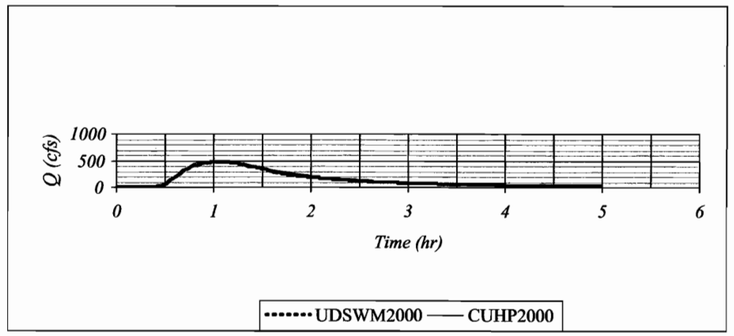
Existing Percent Imperviousness			
UDSWM Design Point	Flood Peak (cfs)		% different from CUHP2000
	CUHP2000	UDSWM	
409 (BC)	216	200	-7%
553 (BC)	667	821	23%
370 (CC)	404	444	11%
678 (GH)	497	463	-7%

Future Percent Imperviousness			
UDSWM Design Point	Flood Peak (cfs)		% different from CUHP2000
	CUHP2000	UDSWM	
409 (BC)	216	200	-7%
553 (BC)	1053	1076	2%
370 (CC)	696	655	-6%
678 (GH)	1843	1575	-15%

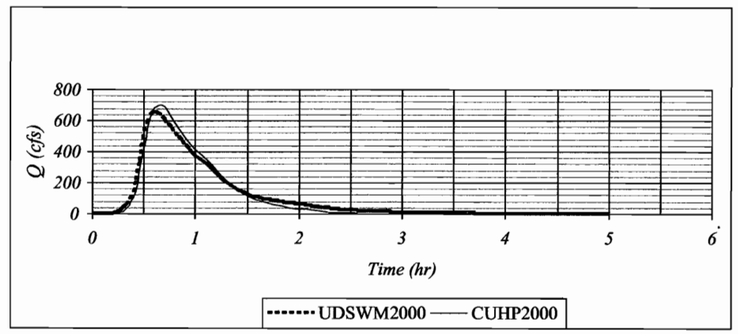
Note: BC = Boulder Creek Tributaries, CC = Coal Creek Tributaries, GH = Godding Hollow Tributaries



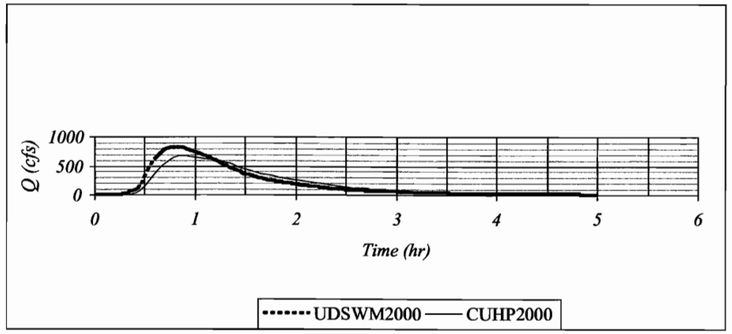
Existing Condition
Basin 409 Calibration



Existing Condition
Basin 678 Calibration



Future Condition
Basin 370 Calibration



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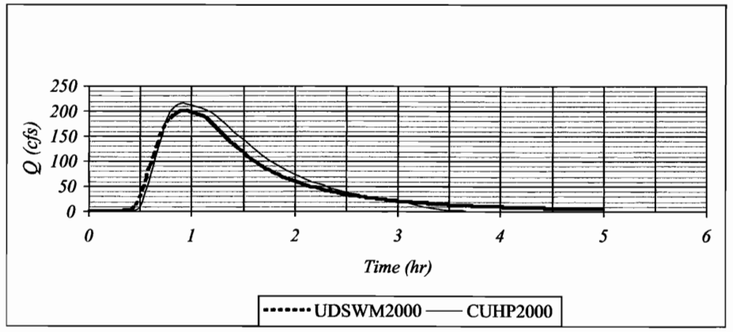

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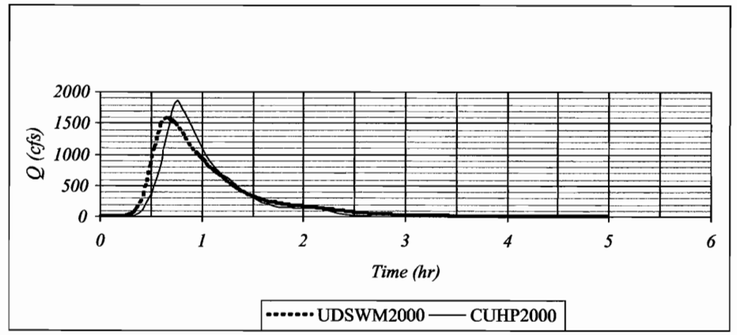

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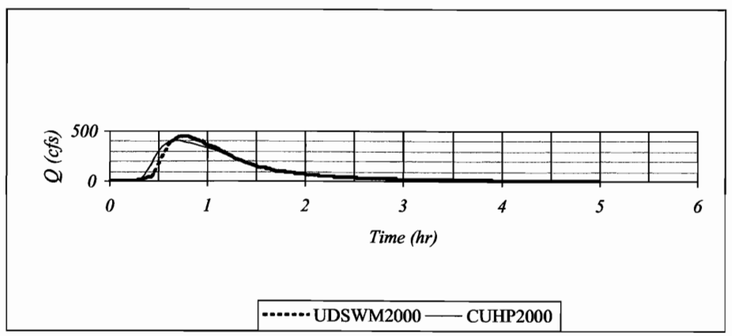

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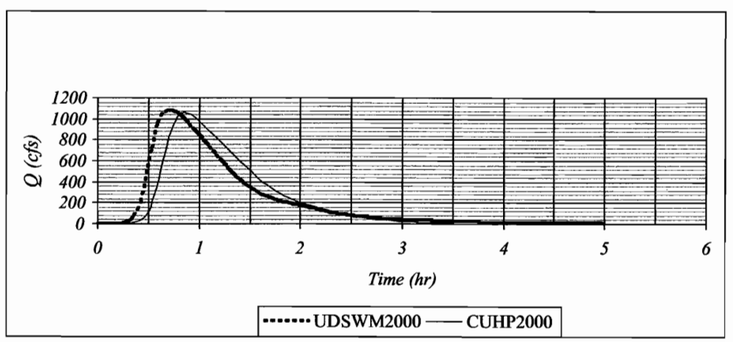

Future Condition
Basin 553 Calibration

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

CALIBRATION HYDROGRAPHS 100-YEAR EVENT

Figure 8

D. Previous Outfall Studies

There are no previous outfall studies of the study area; however, there are two previous studies which addressed stormwater management within parts of the study area, including the area occupied by Erie Airport and Godding Hollow. Drainage within the Erie Airport area in the Coal Creek Basin was analyzed by Centennial Engineering (1997). Flood peak estimates in the 1997 study are superseded by the current study.

A Master Plan was developed in 2000 (Anderson, 2000) for the I-25 Corridor in South Weld County, known as the I-25 Corridor Plan, and it included portions of Godding Hollow within the Erie Planning Area. Proposed drainage improvements in the Master Plan can impact communities downstream of the Erie Planning Area, and therefore study parameters, data, and the magnitude of flood peak reductions were reviewed.

The I-25 Corridor Plan used CUHP (for hydrograph generation) and UDSWMM (for stormwater routing) to compute flood peaks for existing and future percent imperviousness. Detention was assumed at various locations in the Erie Planning Area to help reduce future flood peaks to those representative of the 10- and 100- year event, existing conditions. The I-25 Corridor Plan did not include an existing land use map, so existing percent imperviousness could not be compared to current conditions.

The Godding Hollow portion of the Erie Planning Area discharges through three culverts below I-25. Using the nomenclature of the current study, two of the culverts identified as Design Points 970 and 971 on Figure 2-c are located along the eastern boundary of the Erie Planning Area. The third is located north of Highway 52 and north of the Erie Planning area; Design Points 973, 974, and 975 all eventually discharge through this culvert.

Design Point 970 (southernmost culvert) exits the Erie Planning Area through two 10- x 5-ft RCB's below I-25. The I-25 Corridor Plan incorrectly defined the basin area (Basin 37 in the Anderson Plan) by extending it across the basin boundary defined by I-25. Thus, the 10- and 100-year discharges cannot be compared between the I-25 Corridor Plan and the current Master Plan. The I-25 Corridor Plan required the Erie Planning Area to detain for this entire basin. The current Master Plan corrects the basin delineation and will maintain existing discharges from the Erie Planning Area as required by the I-25 Corridor Plan.

Design Point 971, located north of Design Point 970, exits the Erie Planning Area through two 14- x 6-ft RCB's below I-25. The I-25 Corridor Plan indicated the discharge at this point should be maintained at 938 cfs for the 100-year event and 318 cfs for the 10-year event.

The culvert north of Highway 52, which passes the flows from Design Points 973, 974, and 975 in the Erie Planning Area consists of three 8- x 6-ft RCB's below I-25. The basins in the I-25 Corridor Plan do not reflect the boundaries of the Erie Planning Area, thus, the 10- and 100-year discharges cannot be compared between I-25 Corridor Plan and the current Master Plan. The current Master Plan basin delineation reflects the boundary of the Erie Planning Area and will maintain existing discharges from this area as required by the I-25 Corridor Plan.

E. Existing Catchments' Characteristics

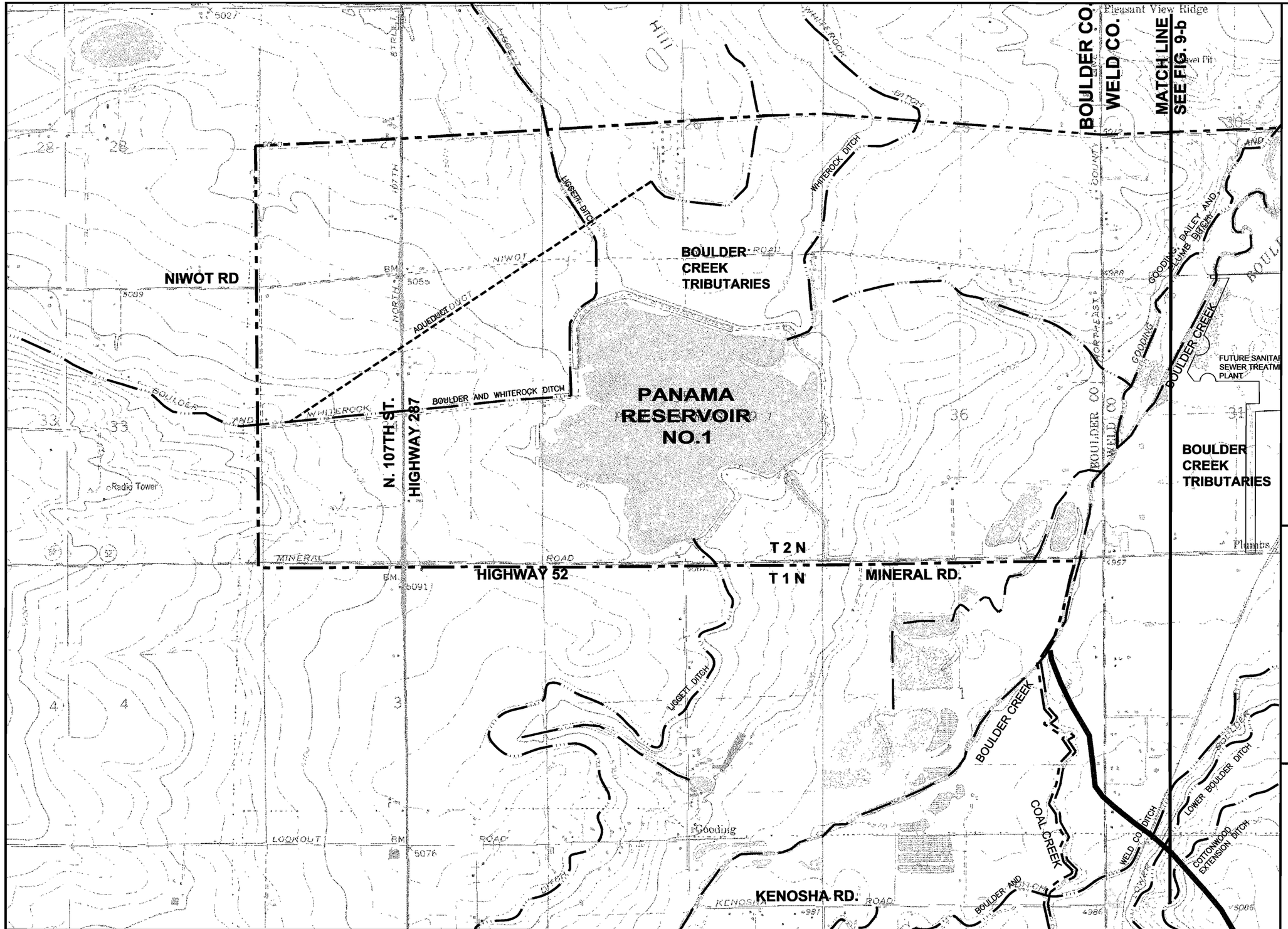
1. General Drainage Pattern Influences

Road and railroad embankments, roadside swales, and irrigation ditches can influence drainage patterns in the study area. Embankments and swales intersect flow lines and re-direct flows to low points along the embankment. Water can pond upstream of the embankment if there is no or an inadequately sized crossing at the low point. Depending on their location in the catchment, irrigation ditches can capture and redirect stormwater.

There are two railroad lines within the study area which could influence drainage patterns; one owned by Burlington Northern Railroad (BNRR) and the other owned by Union Pacific Railroad (UPRR). The BNRR track has been abandoned; the track and rails have been removed. The embankment is no longer continuous and has been breeched in numerous locations. Using the embankment without reconstruction for future detention dams is unlikely. The UPRR is still under "active" status and the embankment along the main line is generally intact at most locations. Parts of the line are in disrepair, and at least one part of the track has been blocked with a barrier. Culverts and bridges accommodate streamflow. There are a few locations where ponding could occur against the embankment.

Irrigation ditches and their associated crossings are in good repair in the study area. Major irrigation ditches include; Erie Coal Creek Ditch, Lower Boulder Ditch, and Community Ditch (Coal Creek); Cottonwood Extension Ditch, Community Ditch, Lower Boulder Ditch, Boulder and Weld County Ditch, Whiterock Ditch, Liggett Ditch (Boulder Creek); Community Ditch (Godding Hollow); and Community Ditch and Stanley Ditch (Little Dry Creek). Please refer to Figures 9-a through 9-d.

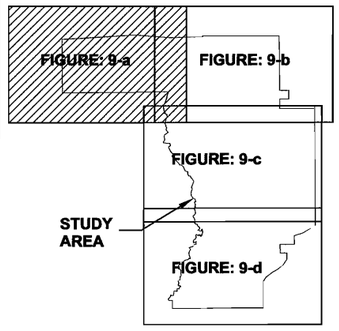
The study assumes raised railroad embankments, which have not been breached and contain no culverts, will act as basin boundaries and direct stormwater to low points, and it assumes embankments do not detain stormwater or attenuate flood peaks during any event. The analysis assumes irrigation ditches flow full during all events and do not influence flow patterns.



LEGEND

- LIMITER ●
- OTHER □
- PIPE OPTION ----------
- IMPROVEMENT NUMBER ①
- WATERSHED DIVIDE ━━━
- STUDY AREA BOUNDARY ━ · ━
- DITCH ━ · · ━
- CREEK ━ · ━

MAP KEY



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(IN FEET)

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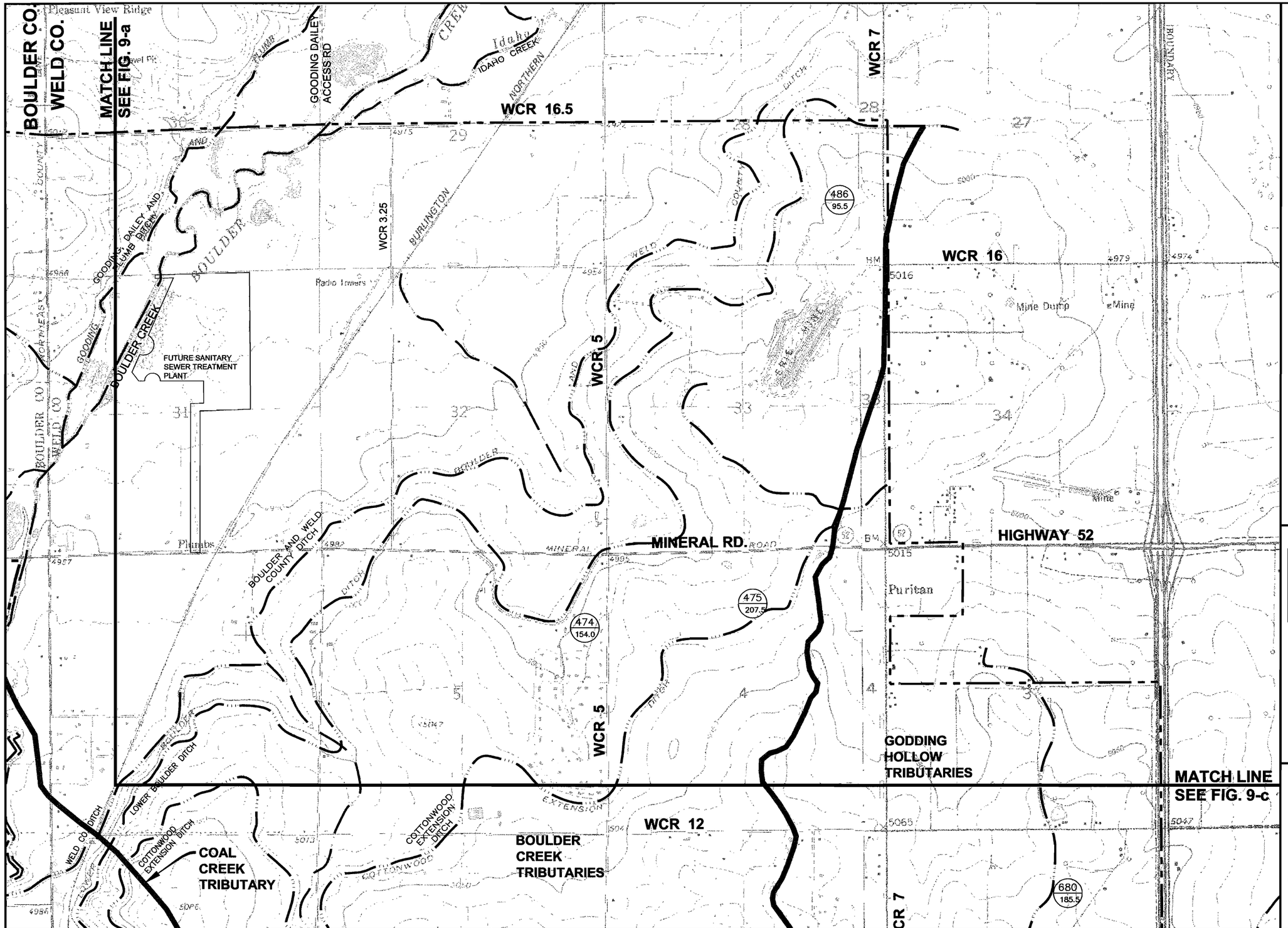
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

IRRIGATION FACILITIES

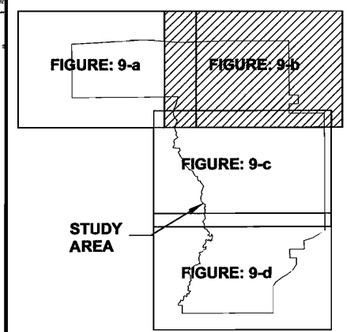
Figure 9-a



LEGEND

- LIMITER
- OTHER
- PIPE OPTION
- IMPROVEMENT NUMBER (1)
- WATERSHED DIVIDE
- STUDY AREA BOUNDARY
- DITCH
- CREEK

MAP KEY



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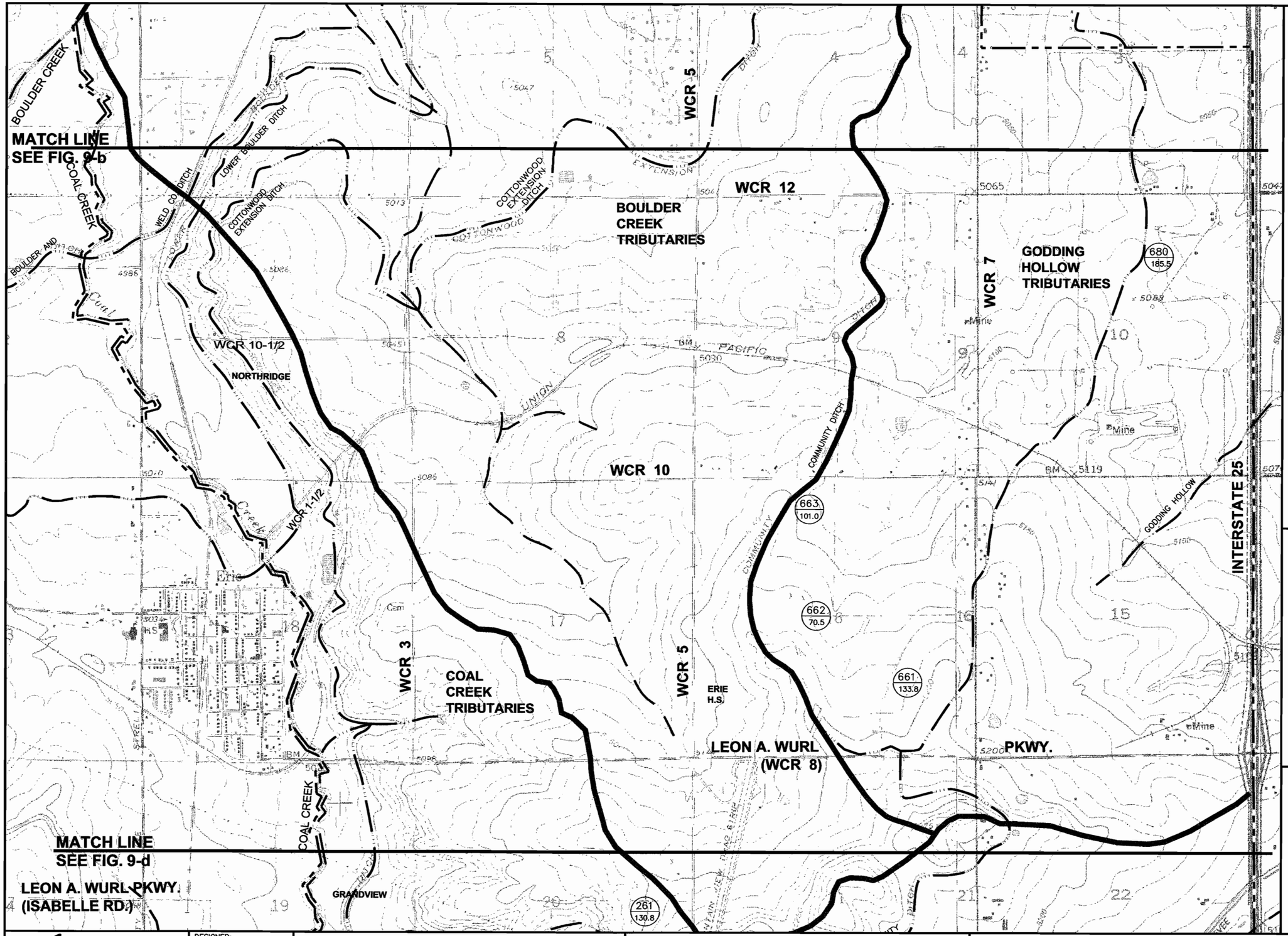
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

IRRIGATION FACILITIES

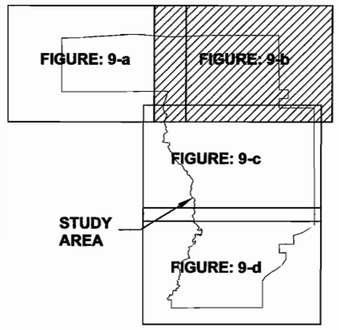
Figure 9-b



LEGEND

- LIMITER
- OTHER
- PIPE OPTION
- IMPROVEMENT NUMBER (1)
- WATERSHED DIVIDE
- STUDY AREA BOUNDARY
- DITCH
- CREEK

MAP KEY



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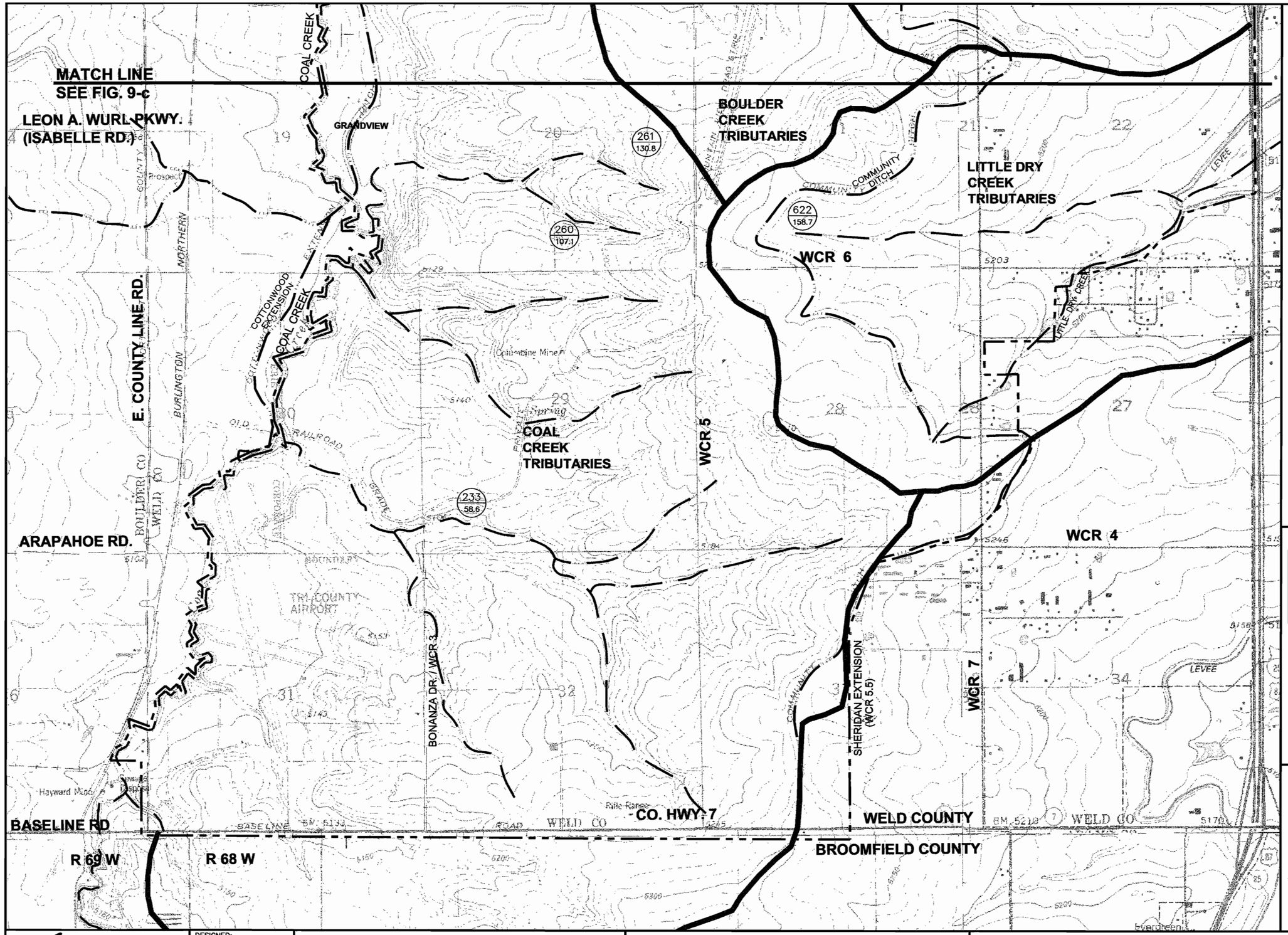
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

IRRIGATION FACILITIES

Figure 9-c



LEGEND

- LIMITER
- OTHER
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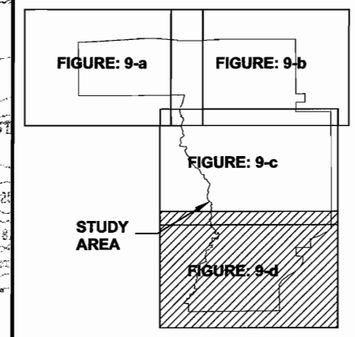
- IMPROVEMENT NUMBER (1)
- WATERSHED DIVIDE
- STUDY AREA BOUNDARY
- DITCH
- CREEK

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

IRRIGATION FACILITIES

Figure 9-d

F. Watersheds

1. Godding Hollow

Godding Hollow Watershed in the study area is largely rural in character. Roadside swales direct minor flows to the low points. With a few exceptions, there are no culverts at stream crossings, and some existing culverts are in need of maintenance and/or replacement. Drainage patterns can be influenced by railroads, roads, and irrigation ditches in the study area. Stormwater flows northeastwardly in Godding Hollow in the study area and leaves the study area at three RCB crossings below I-25. Irrigation ditches of significance include Community Ditch and a lateral of Community Ditch which begins north of Leon A. Wurl Parkway.

Drainage from the northern part of Godding Hollow eventually discharges below I-25 through three 8- x 6-ft RCB's located north of Highway 52 and outside of the study area. The lateral of Community Ditch flows, in part, along a stream channel path and may convey some stream flow. The lateral ends south of Highway 52 just north of the study area boundary. A small pond will form at a low point adjacent to I-25, identified as Design Point 972 on Figure 2-b, and will flow to the north to Design Point 973.

Drainage in the middle part of Godding Hollow discharges through two 14- x 6-ft RCB's below I-25 (Design Point 971, Figure 2-c). Streamflows upstream of I-25 pass through an approximately 40-ft long timber bridge with a height approximately between 2 and 2 ½ feet. A lateral of the Community Ditch could intercept stormwater and have a minor impact on low flow discharges.

Drainage from the southern part of Godding Hollow discharges through two 10- x 5-ft RCB's below I-25 (Design Point 970, Figure 2-c). A raised embankment constructed for a short spur of the UPRR near I-25 has been breached and has little influence on streamflow patterns.

Roadside Ditch along Leon A. Wurl Parkway

2. Little Dry Creek

Little Dry Creek Watershed in the study area is also largely rural in character. Roadside ditches direct minor flows to the low points. With the exception of the new RCP installed below Sheridan Parkway, CMP culverts without erosion protection are located below County Roads at stream crossings. The Watershed drains to the northeast, leaving the study area in a 72-in RCP below I-25 (Design Point 962, Figure 2-d). Stanley Ditch enters and leaves the study area in RCB's below I-25 on either side of the 72-in RCP, crossing the Creek.

The Community Ditch enters the study area to the south and leaves Little Dry Creek to the north. The Ditch traverses the upper reaches of Little Dry Creek in the study area, and it has the potential to intercept and transport stormwater runoff. Just before it leaves the Catchment to the north, the Ditch crosses WCR 7 in a 48-in CMP. The CMP is estimated to convey about 100 cfs before the road is overtopped, which is the maximum amount of transbasin diversion of stormwater from Little Dry Creek to the Catchment to the north, Godding Hollow.

18-in CMP below WCR7

3. Coal Creek

Much of Coal Creek Watershed in the study area is developed, including Erie Air Park, Vista Ridge, Vista Pointe, Grandview, and Northridge developments. Two active landfills, the Front Range Landfill and the Denver Regional Landfill are located in part of the upper portion of this Watershed. With the exception of Vista Ridge, developments are adjacent to the Coal Creek 100-year floodplain. Stormwater enters Erie Air Park, Vista Pointe, and Grandview from upstream Catchments. Stormwater facilities have been constructed within these three developments to pass the upstream discharges, and the conveyance of these facilities within the developments imposes a limit on the magnitude of peak discharges which can be released from upstream areas.

A channel passes through Erie Air Park which transports offsite flows, including a large basin from the Anthem development in City and County of Broomfield south of Highway 7. Discharge from the Anthem development during the 100-year event is limited by two detention ponds (simulated by Pond 1000, Figure 2-d) south of Highway 7 to about 500 cfs, and the 10-year event discharges from the ponds at about 290 cfs (Carter Burgess, 2005). Runoff passes through the Airport through two 6-ft RCP's at two locations and an open channel, all designed to pass 825 cfs (Centennial, 1996). This channel will be called "Air Park Channel" and it discharges into Coal Creek at Design Point 905 as shown on Figure 2-d.

Anthem development also discharges into an existing channel within the southwest corner of the study area, which runs a short distance in the study area within Catchment 201 (Figure 2-d) to Coal Creek, Design Point 901. The discharge from Anthem is controlled by a detention pond which eventually discharges below Highway 7 through a 7.5- x 10-ft RCB. The discharge through the culvert, simulated by Pond 1001 on Figure 2d, is about 225 cfs during the 10-year event and 400 cfs during the 100-year event (Carter Burgess, 2005).

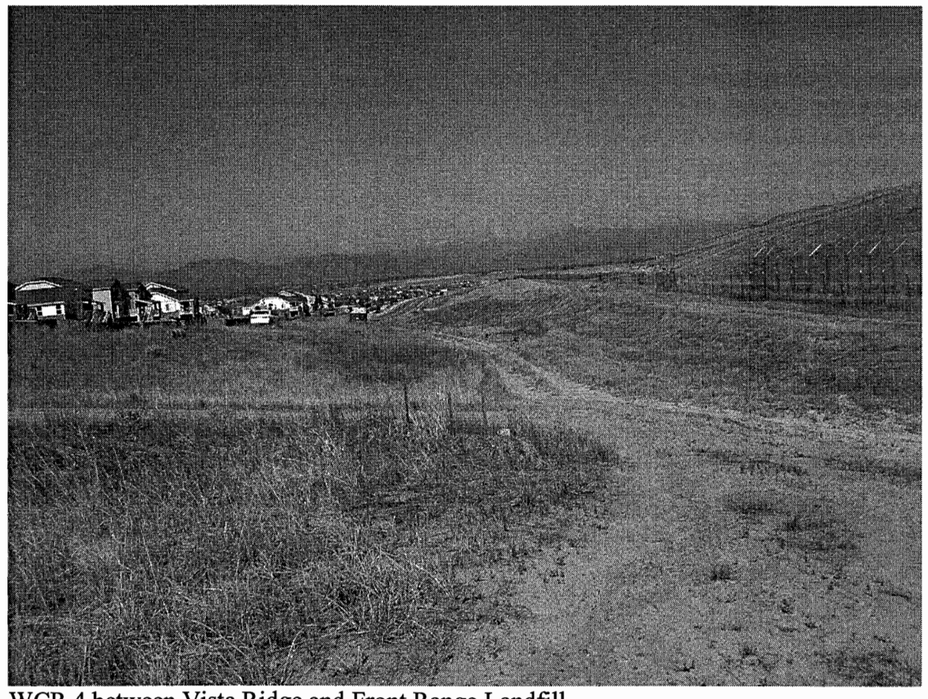
Vista Ridge is located near the upper reaches of the Watershed. Storm flows entering Vista Ridge have been accommodated by the development. Some of the offsite flows pass through ponds which release runoff undetained from Front Range Landfill. Vista Ridge has been Master Planned to accommodate these flows and releases runoff from two regional detention facilities located in the northwestern part of the development. Runoff from properties in the development which do not enter the regional detention facilities are required to release stormwater at historic rates using onsite detention.

Releases from regional detention facilities in Vista Ridge enter a channel which meanders along the southern boundary of Vista Pointe, eventually entering Coal Creek at Design Point 915 (Figure 2-d). This channel, called "Vista Ridge Channel," was designed using the model developed for the Vista Ridge Master Plan and carries a 100-year discharge of about 1210 cfs with freeboard (Carroll & Lange, 2002).

An open channel skirts the south side of Grandview Subdivision and enters Coal Creek at Design Point 921 (Figure 2-d). This channel, called "Grandview Channel," was shown to carry about 540 cfs during the 100-year event (Kirkham Michael Consulting Engineers, 2001). Minor grading of the channel occurred during the construction of Grandview; however, there are no calculations identifying the carrying capacity of the channel in the Subdivision's Drainage Report.

Stormwater also enters Vista Pointe (Design Points 916, 917, and 918, Figure 2-d) and Grandview (Design Points 922 and 923, Figure 2-d) along the eastern boundary of the two subdivisions. These offsite flows are accommodated by the stormwater infrastructure in each subdivision, which was designed assuming the upstream catchments have an imperviousness of two (2) percent (Carroll & Lange, Inc. 2002, and Kirkham Michael Consulting Engineers, 2001).

In the northern part of the Watershed, the UPRR tracks and irrigation ditches including Erie Coal Creek Ditch and Lower Boulder Ditch run adjacent to Coal Creek and can impact flow paths. Erie Coal Creek Ditch is transported in an RCP within Grandview and does not impact surface flows.



WCR 4 between Vista Ridge and Front Range Landfill

4. Boulder Creek

Boulder Creek Watershed in the study area is largely rural in character and includes scattered clusters of low density development. Roadside ditches direct minor flows to the low points. There is only one small detention pond in the Watershed, located at Erie High School (Pond 1010, Figure 2-c). Active and reclaimed gravel mining operations are located within the Boulder Creek floodplain in the study area.

The Boulder Creek Watershed in the study area can be divided into two areas; one west and the other east of Boulder Creek. The portion west of Boulder Creek is dominated by Panama Reservoir No. 1 (Figure 2-a). A small portion of the west part of the Watershed will be dedicated to rural residential development, the majority will remain undeveloped.

There are two major Catchments in the eastern portion of Boulder Creek Watershed with areas greater than 2500 acres. One is referred to as the "Bridgewater Catchment" in the text and discharges into Boulder Creek at Design Point 943, the other will be identified using its design point designation at its outfall at Boulder Creek, Design Point 951.

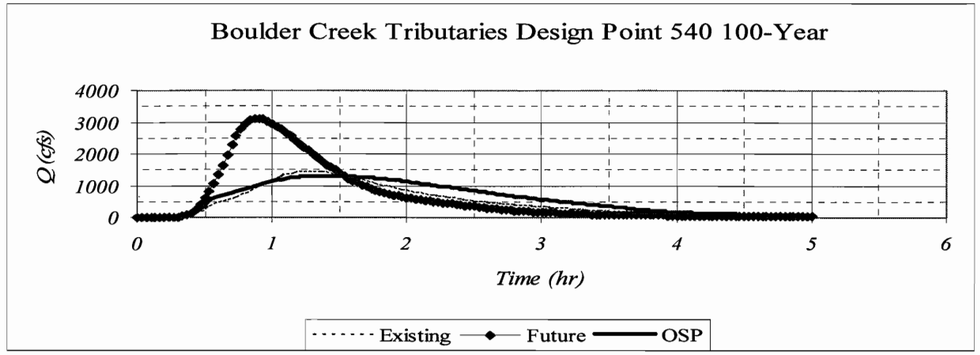
Reviewing Bridgewater Catchment from upstream to downstream; the divide of the Catchment is near Erie High School. Its channel winds to the northwest through agricultural areas and is not well defined. In the upper part of the Catchment, just downstream of Erie High School, between WCR 5 and Leon A. Wurl Parkway and WCR 10, a residential and commercial development currently called Bridgewater is planned. The channel passes through a bridge below the UPRR north of WCR 10. Just before the channel reaches WCR 10½, it passes near structures located on lands owned by Eureka Cattle Company near Design Point 537. These structures can be subject to periodic flooding. Between WCR 10½ and the BNRR tracks, the channel path is interrupted by irrigation ditches including Cottonwood Extension Ditch, Boulder Ditch and Boulder and Weld County Ditch, and it passes adjacent to the potential Morgan Hill development. The channel passes through the potential Haymeadow Farms development, crosses the BNRR embankment, crosses E. County Line Road, and enters Boulder Creek south of Highway 52.

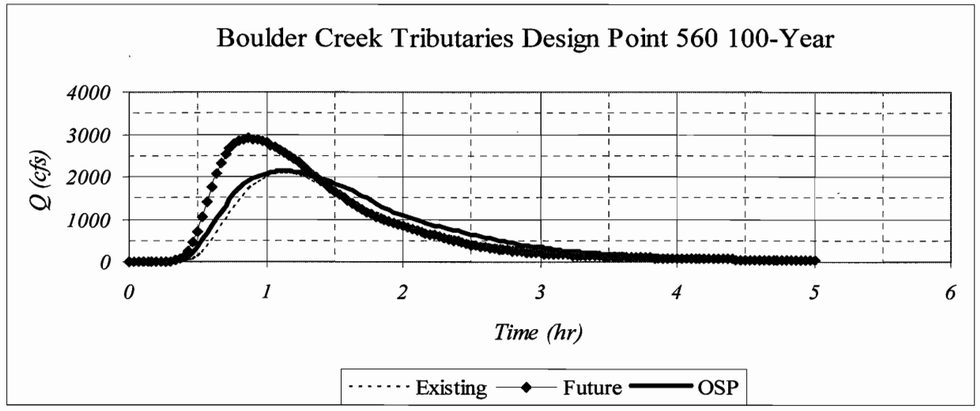
Reviewing Catchment 951 from upstream to downstream, the divide of Catchment 951 is located along WCR 10. The channel is not well defined but follows the topographic low which passes through existing rural homes located west of WCR 5, north of WCR 12 and south of Highway 52, a subdivision called Carmacar Estates. The path of the channel is interrupted by Cottonwood Extension Ditch and Boulder Ditch near the subdivision and by Boulder and Weld County Ditch just north of Highway 52. The channel flows northwestwardly and crosses the BNRR embankment near Boulder Creek. It discharges into gravel mine pits located in the Boulder Creek floodplain.

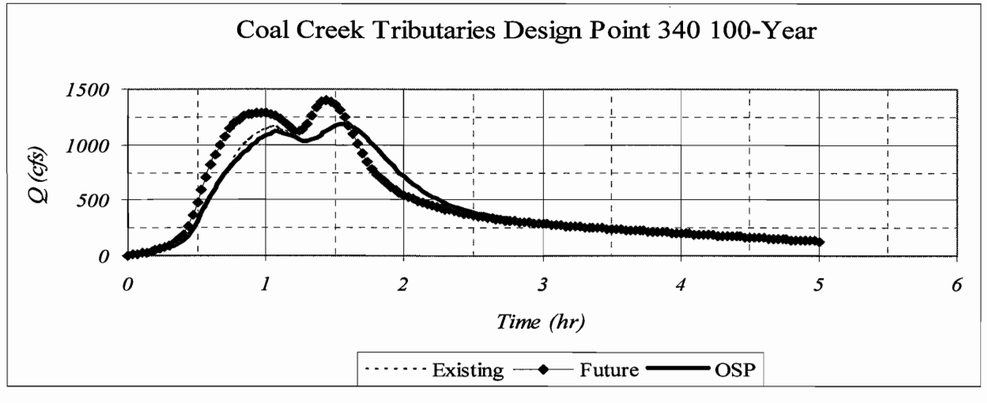
Residence near channel in Bridgewater Catchment

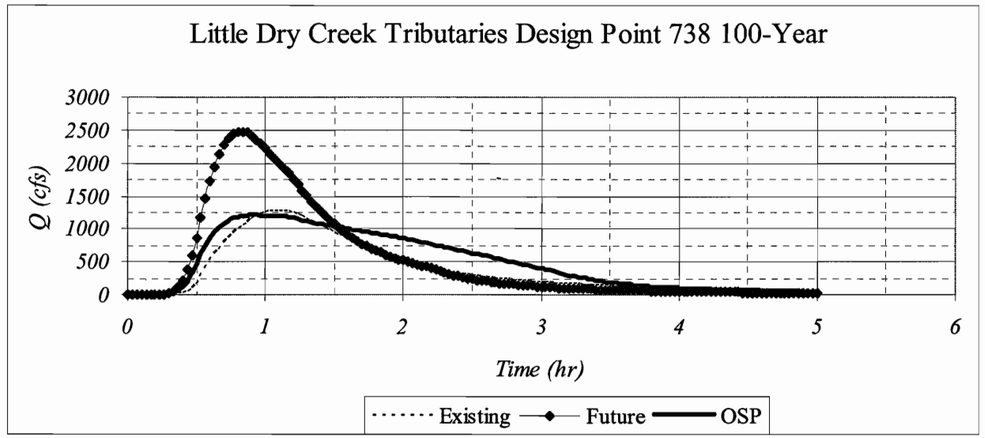
G. Results

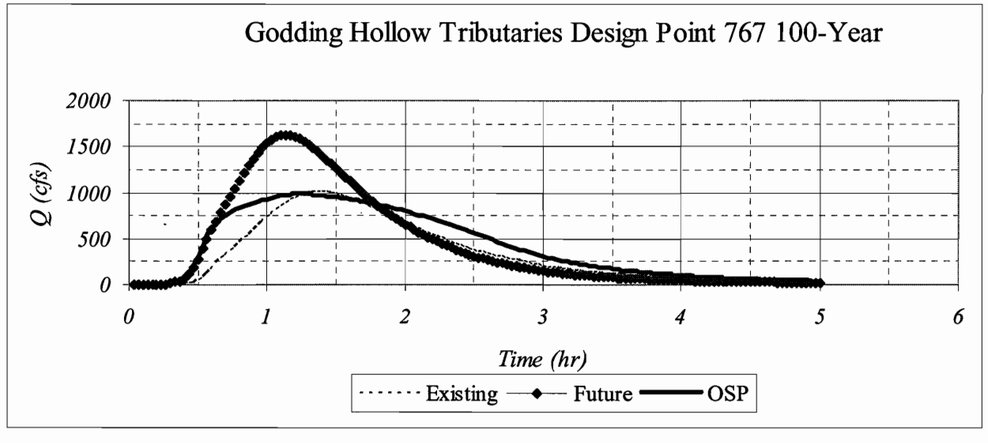
Flood peaks for the 0.4-inch and the 2-, 5-, 10-, 50-, and 100-year flood events are summarized in Tables 7 and 8 for selected design points shown on Figures 2-a, though 2-d and Figure 3 in Chapter II. These tables include cumulative area and percent impervious at each design point and are organized by major watershed and Catchment. A comparison of existing and future hydrographs for the 10- and 100-year storm event at selected design points are shown on Figure 10. The hydrologic analysis indicates development will increase the magnitude of flood peaks for all events.











TOWN OF ERIE	ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

HYDROGRAPH COMPARISON AT SELECTED DESIGN POINTS	Figure 10 Page III-13

Table 7. Design Point Flood Peaks, Existing Percent Imperviousness

Boulder Creek Tributaries Existing Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
501	0	1	10	22	69	93	40	2
502	1	4	32	71	228	317	35	2
503	0	4	35	80	251	349	81	2
522	1	7	60	145	479	652	553	2
505	1	4	22	52	193	268	191	2
506	1	8	65	156	501	681	624	6
933	1	9	76	186	583	783	814	5
934	1	3	21	51	181	255	201	2
509	1	5	12	26	85	116	69	7
511	7	28	47	69	164	214	118	25
512	2	7	35	78	266	368	262	4
935	10	35	100	195	608	815	566	10
514	7	23	35	47	102	128	40	29
936	13	46	71	94	202	258	106	23
515	2	9	19	35	105	143	102	11
937	8	32	51	75	182	239	155	17
938	5	20	31	43	92	117	43	30
516	2	7	16	33	113	155	110	5
518	2	8	27	63	229	322	262	3
519	3	11	43	100	361	493	393	4
939	3	12	53	125	435	602	489	4
940	1	3	21	54	193	274	243	2
941	0	1	4	10	32	43	19	2
942	0	0	4	9	29	40	23	2
946	0	1	5	10	33	45	19	2
531	25	80	129	206	527	754	465	18
532	1	3	11	23	82	113	91	2
533	19	59	145	272	739	1018	788	11
534	17	55	158	301	824	1153	1044	9
535	1	2	9	22	83	115	72	2
536	17	58	176	338	930	1296	1230	8
537	16	57	181	350	968	1347	1330	8
538	12	43	66	89	175	216	73	35
540	18	70	211	390	1045	1442	1455	10
542	18	70	219	410	1111	1534	1558	9
544	32	120	269	489	1285	1770	1781	11
545	31	110	283	522	1404	1940	2015	10
546	27	98	284	524	1412	1947	2131	10
547	22	90	252	480	1285	1766	2289	10
548	1	4	11	31	135	193	172	2
549	7	25	42	64	189	260	253	10
943	24	101	280	530	1422	1975	2596	10

Boulder Creek Tributaries Existing Percent Impervious (cont.)

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
550	8	29	47	66	149	196	142	14
551	12	44	87	143	386	513	322	14
552	0	1	9	22	80	110	64	2
553	21	80	144	229	617	821	495	15
554	6	21	32	44	93	117	52	22
555	33	115	203	317	799	1068	790	17
556	32	113	204	324	828	1113	839	16
557	4	19	70	146	466	651	527	6
559	5	21	88	198	662	934	841	4
560	35	126	281	522	1511	2078	1726	4
561	1	4	12	31	125	179	153	3
562	34	123	281	529	1530	2110	1831	4
568	6	24	41	60	152	202	127	14
569	5	19	42	77	244	334	252	8
571	31	123	333	651	1902	2629	2619	4
576	3	12	28	52	158	215	165	8
951	28	119	337	650	1869	2574	2701	9
565	1	4	22	60	242	343	259	2
566	0	0	3	8	34	47	27	2
955	1	5	31	85	340	479	382	2
567	4	14	25	40	109	144	75	13
944	3	12	35	68	199	271	321	6
572	1	3	6	13	44	64	117	2
945	2	8	15	27	77	104	250	5
573	0	1	5	13	48	67	42	2
952	0	1	11	26	90	127	111	2
950	1	4	12	21	58	80	187	3
953	1	2	13	35	135	193	180	2
954	0	1	9	25	100	140	86	2

Coal Creek Tributaries Existing Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
301	70	70	70	228	320	400	0	N/A
901	70	70	73	231	340	432	27	2
902	0	1	4	9	30	39	15	2
903	0	1	4	10	36	49	23	3
904	1	4	7	14	40	54	19	13
310	167	168	258	297	462	512	27	2
311	167	168	259	299	464	515	66	2
312	167	171	267	310	480	534	196	11
905	167	171	269	313	483	537	233	13

Coal Creek Tributaries Existing Percent Impervious (cont.)

UDSWM Design Point	Peak Discharge (cfs) Flood Event 0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr	Cumulative Area (ac)	Cumulative Percent Impervious
910	12	39	56	76	151	189	61	37
911	16	51	77	107	222	277	113	34
912	6	22	35	49	103	130	50	31
913	7	24	38	51	116	150	61	21
324	2	7	16	29	88	117	53	9
326	4	16	37	69	202	266	114	9
327	4	15	39	72	207	272	139	10
329	2	8	19	37	112	149	72	8
330	5	22	66	125	368	485	244	8
332	25	29	175	294	1032	1370	265	8
334	0	2	11	23	70	93	31	2
335	25	31	184	314	1042	1391	374	6
336	24	29	186	304	888	1148	432	6
340	26	39	238	396	1078	1409	494	9
915	26	42	245	408	1037	1358	580	10
916	2	6	14	27	80	105	44	10
350	1	5	17	37	120	163	87	5
352	3	11	47	95	299	403	199	6
917	5	19	63	129	405	541	293	7
360	1	5	11	22	65	86	30	10
361	3	13	28	52	159	211	89	10
918	6	24	44	81	252	338	168	10
919	1	3	7	15	50	68	31	5
370	6	22	50	102	327	444	238	7
372	6	24	62	127	408	553	283	7
921	6	22	70	146	460	613	360	7
922	0	2	13	32	113	153	68	2
923	0	0	3	9	36	48	20	2
378	0	1	6	17	68	93	41	2
382	0	1	7	20	79	109	52	2
383	1	4	25	69	287	401	250	2
925	1	4	30	83	352	491	326	2
926	0	2	10	25	87	116	52	2
927	6	21	36	56	142	185	81	18
928	1	4	15	34	116	157	76	4
390	1	4	14	31	105	143	92	2
391	1	4	18	41	146	203	189	2
929	1	4	21	48	169	237	226	2
392	0	1	10	26	97	133	64	2
393	0	1	7	18	67	91	33	2
930	1	2	22	55	203	280	156	2
931	1	3	8	17	56	78	67	5

Little Dry Creek Tributaries Existing Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event 0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr	Cumulative Area (ac)	Cumulative Percent Impervious
960	0	1	11	26	85	113	46	2
961	2	7	12	20	60	82	56	8
705	0	2	5	10	32	43	19	9
707	2	9	27	56	185	254	172	6
709	3	11	38	87	306	427	331	4
713	1	4	21	46	156	215	154	2
714	1	4	25	54	183	253	184	2
716	4	16	68	152	523	731	672	3
718	8	30	83	176	580	807	728	5
720	13	53	100	204	645	903	883	6
735	3	10	16	26	62	80	23	22
736	3	13	26	45	126	166	86	10
737	3	14	43	84	266	361	227	6
738	16	61	148	302	922	1282	1221	6
962	15	57	169	342	1028	1427	1425	5

Godding Hollow Tributaries Existing Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event 0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr	Cumulative Area (ac)	Cumulative Percent Impervious
750	0	1	10	23	68	91	28.2	2.0
751	0	2	13	30	96	128	57.3	2.0
752	2	9	31	64	208	282	172.1	5.6
754	23	71	106	141	274	340	123.9	34.7
755	0	1	7	16	54	75	40.3	2.0
970	16	60	118	200	557	728	455.5	12.3
760	0	1	8	17	57	77	34.2	2.0
761	1	6	37	81	272	374	238.5	2.6
763	8	30	86	172	528	713	450	8
764	11	43	101	199	594	806	541	9
765	15	57	118	226	650	887	630	10
766	21	78	142	260	700	953	730	13
767	15	58	153	284	745	1008	973	10
770	2	7	16	30	84	111	48	15
771	2	7	18	34	98	131	67	11
772	1	9	47	98	313	429	305	4
773	1	10	58	125	385	536	470	3
975	15	64	213	413	1119	1524	1532	8
777	2	8	29	62	209	289	225	3
971	3	13	65	139	458	621	529	3
972	1	4	26	56	187	259	186	2
973	1	6	39	86	276	387	116	2
974	0	1	5	12	40	55	35	2

Table 8. Design Point Flood Peaks, Future Percent Imperviousness

Boulder Creek Tributaries Future Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
501	0	1	10	22	69	93	40	10
502	1	4	32	71	228	317	235	4
503	0	4	35	80	251	349	281	3
522	1	7	60	146	479	653	753	3
505	1	4	22	52	193	268	191	6
506	1	7	64	156	501	682	824	2
933	1	8	75	185	583	784	1014	2
934	1	4	21	51	182	256	201	2
509	1	2	10	23	81	111	69	2
511	8	29	49	72	168	217	118	2
512	5	20	38	81	266	368	262	14
935	16	57	116	211	631	835	566	8
514	7	23	36	48	104	130	40	30
936	18	62	94	124	249	303	106	17
515	6	24	40	59	137	178	102	30
937	10	41	68	100	231	296	155	30
938	5	20	31	43	92	117	43	25
516	1	5	14	32	111	153	110	30
518	2	7	26	62	227	320	262	30
519	3	10	42	99	359	490	393	16
939	3	11	52	124	432	599	489	14
940	1	3	21	54	193	274	243	9
941	0	1	4	10	32	43	19	2
942	0	0	4	9	29	40	23	2
946	0	1	5	10	33	45	19	2
531	102	363	543	709	1377	1631	465	32
532	25	94	146	192	351	415	91	56
533	160	603	906	1163	2062	2477	788	41
534	184	658	988	1281	2297	2772	1044	45
535	12	42	64	84	170	206	72	45
536	191	651	989	1304	2422	2961	1230	43
537	188	605	929	1246	2385	2953	1330	43
538	12	44	67	89	175	216	73	30
540	197	621	962	1297	2515	3122	1455	42
542	207	638	993	1345	2644	3286	1558	41
544	223	683	1072	1468	2942	3664	1781	41
545	231	688	1092	1508	3082	3888	2015	40
546	216	638	1027	1428	2948	3755	2131	39
547	157	505	849	1190	2460	3153	2289	39
548	15	55	83	113	232	296	172	33
549	17	65	103	142	278	354	253	36
943	167	532	905	1281	2696	3466	2596	37

Boulder Creek Tributaries Future Percent Impervious (cont.)

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
550	17	64	98	132	257	305	142	2
551	28	104	177	255	553	678	322	13
552	8	30	47	65	137	174	64	30
553	45	168	281	402	874	1076	495	19
554	8	28	44	58	117	144	52	2
555	60	209	340	471	1041	1328	790	22
556	59	206	337	474	1066	1368	839	24
557	77	301	474	643	1212	1464	527	17
559	91	344	535	733	1472	1788	841	31
560	139	493	799	1084	2295	2899	1726	31
561	9	35	54	77	183	241	153	28
562	140	472	775	1070	2313	2937	1831	30
568	26	95	144	189	363	433	127	56
569	41	155	236	314	600	732	252	27
570	23	81	131	173	343	430	252	27
571	164	522	882	1282	2868	3716	2619	28
576	19	75	118	161	315	391	165	4
951	153	485	851	1250	2790	3622	2701	28
574	14	54	89	126	268	328	165	4
575	90	340	522	714	1448	1763	841	31
565	15	59	94	137	340	450	259	21
566	3	11	18	25	56	71	27	15
955	25	95	154	222	508	663	382	29
567	22	79	120	158	299	355	75	7
944	18	67	109	154	298	371	321	13
572	1	3	6	13	44	64	117	41
945	2	7	15	26	75	102	250	36
573	5	17	27	38	81	103	42	30
952	4	13	25	42	115	154	111	29
950	1	5	13	23	60	83	187	5
953	14	53	85	120	259	329	180	30
954	9	33	52	74	164	210	86	30

Coal Creek Tributaries Future Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
301	70	70	70	400	320	400	0	N/A
901	79	89	117	435	351	490	27	95
902	5	16	24	32	59	71	15	43
903	9	32	45	57	102	120	23	61
904	5	18	27	34	66	80	19	41

Coal Creek Tributaries Future Percent Impervious (cont.)

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
310	168	173	264	303	465	514	27	95
311	167	176	269	308	468	517	66	88
312	168	216	324	425	771	919	196	73
905	168	222	331	425	773	920	233	69
910	12	39	56	76	151	189	61	37
911	16	51	77	107	222	278	113	34
912	6	22	35	49	103	131	50	31
913	9	30	46	62	133	168	61	26
324	17	56	82	106	196	235	53	58
326	19	65	102	144	302	379	114	32
327	15	57	94	137	284	356	139	28
329	2	10	21	39	115	152	72	10
330	19	72	130	199	458	584	244	23
332	28	81	194	303	1030	1362	265	24
334	6	19	30	45	101	127	31	30
335	37	113	250	373	1038	1372	374	25
336	38	116	250	366	896	1142	432	27
340	44	135	301	465	1086	1404	494	28
915	44	136	315	481	1062	1369	580	28
916	2	7	16	28	81	107	44	11
350	4	15	27	47	135	180	87	13
352	9	35	74	125	340	446	199	15
917	10	40	90	159	446	582	293	14
360	1	5	11	22	65	86	30	10
361	3	13	28	52	159	211	89	10
918	6	24	44	81	252	338	168	10
919	1	3	7	15	51	68	31	5
370	30	111	174	245	516	655	238	31
372	35	130	206	293	624	793	283	30
921	26	98	176	271	613	781	360	24
922	18	53	77	103	205	253	68	42
923	6	20	30	39	73	88	20	43
378	11	35	49	63	127	157	41	43
382	15	46	66	85	165	201	52	43
383	62	228	337	440	802	958	250	54
925	54	206	316	427	797	973	326	42
926	0	2	10	25	87	116	52	2
927	2	7	18	37	117	159	81	7
928	2	8	18	37	121	162	76	7
390	1	4	14	31	105	143	92	2
391	1	4	18	40	145	203	189	2
929	5	17	26	52	175	244	226	5

Coal Creek Tributaries Future Percent Impervious (cont.)

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
392	6	22	34	49	121	158	64	17
393	1	3	9	21	70	96	33	6
930	6	24	44	77	234	313	156	11
931	1	4	9	18	58	80	67	6

Little Dry Creek Tributaries Future Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
960	18	52	77	100	187	225	46	49
961	17	58	87	114	204	244	56	65
705	1	2	5	11	33	44	19	10
706	0	2	5	10	31	42	19	10
707	5	19	37	66	200	271	172	10
709	22	83	135	193	452	581	331	22
713	33	107	162	214	393	477	154	50
714	32	104	160	217	408	499	184	43
716	68	247	389	529	1052	1305	672	32
718	81	292	451	603	1173	1443	728	36
720	105	372	568	756	1459	1785	883	42
735	3	10	16	26	62	80	23	22
736	3	13	26	45	125	165	86	10
737	14	56	96	148	367	474	227	19
738	139	482	746	1011	2010	2483	1221	42
962	154	511	805	1106	2247	2791	1425	42

Godding Hollow Tributaries Future Percent Impervious

UDSWM Design Point	Peak Discharge (cfs) Flood Event						Cumulative Area (ac)	Cumulative Percent Impervious
	0.4-in	2-yr	5-yr	10-yr	50-yr	100-yr		
750	21	62	91	113	186	212	28	93
751	33	103	152	195	332	384	57	89
752	56	197	293	381	664	786	172	87
754	46	159	236	305	533	628	124	87
755	20	67	97	124	213	246	40	95
970	133	457	682	888	1558	1845	456	90
760	15	48	69	89	161	188	34	71
761	53	177	267	354	649	786	239	56
763	74	252	382	515	1011	1240	450	48
764	80	267	402	543	1085	1343	541	45
765	83	274	412	560	1136	1416	630	43
766	84	273	414	565	1152	1447	730	41
767	87	285	464	637	1279	1622	973	43
770	4	17	29	45	105	133	48	31
771	7	26	42	61	134	170	67	32
772	49	156	236	313	590	722	305	43
773	79	269	410	544	1021	1232	470	59
975	151	489	774	1046	2062	2594	1532	48
777	60	216	329	433	776	930	225	75
971	136	478	728	955	1718	2052	529	82
972	52	179	271	354	626	746	186	83
973	80	260	387	502	890	1055	116	95
974	14	49	72	92	157	184	35	95

H. Drainage Problem Areas

Based on the hydrologic analysis and field observations, general drainage concerns in the study area include: near absence of culverts below all roads in the study area, conveyance of significant runoff from off-site areas which are presently undetained, uncontrolled spills from irrigation structures, and undefined or inadequately sized channels. Specific drainage problems for existing and future conditions are summarized in Table 9 below.

Table 9. Drainage Concerns Within the Study Area

Godding Hollow Tributaries

Existing and Future Land Use

- Absence of road culverts or roadside swales along roads in most locations.
- Ponding near I-25 at design point.
- No consideration for passing historic stormwaters north of the north boundary of Erie Planning Area.
- Community Ditch lateral captures stormwater near WCR 7.

Future Land Use

- Regional detention required per I-25 Corridor Plan.

Dry Creek Tributaries

Existing and Future Land Use

- Absence of road culverts or roadside swales along roads in most locations.
- Stanley Ditch crosses main channel near I-25, existing crossing too small to pass 100-yr event.
- Community Ditch captures stormflows.

Future Land Use

- Detention required to maintain existing flood peak magnitude at I-25.

Coal Creek Tributaries

Existing and Future Land Use

- Absence of road culverts or roadside swales along roads in most locations.
- Inadequately sized culverts below BNRR and UPRR.
- Uncontrolled drainage spills along irrigation ditches.

Future Land Use

- Upstream development discharge points and flood peak magnitude: Grandview.
- Upstream development discharge points and flood peak magnitude: Vista Pointe.

Boulder Creek Tributaries

Existing and Future Land Use

- Absence of road culverts or roadside swales along roads in most locations.
- Inadequately sized culverts below BNRR and UPRR.
- Uncontrolled drainage spills along irrigation ditches.
- Undefined or inadequately sized major channels.
- Carmacar Estates subject to occasional flooding.
- Structures in flow path south of WCR 10½.
- Erie High School detention too small for Sub-Catchment 433.

Future Land Use

- Channel outflow from proposed developments in Catchment 943 are not defined.
- Stream flows in Catchment 951 could cause flooding.

IV. SUMMARY OF ALTERNATE EVALUATION

A. General

The hydrologic analysis indicated development in the study area will increase the magnitude of flood peaks. Improvements to the drainage system are required to safely convey flood peaks produced under fully-developed conditions to minimize public health and safety concerns and property damage from flooding. A variety of methods to improve the drainage system were discussed with the Town, and this discussion resulted in the development of drainage design guidelines for the study area. The drainage design guidelines identify methods which reduce the magnitude of flood peaks under developed conditions. These methods include using detention facilities to reduce flood peaks and channel improvements to contain flood flows within major channels.

Using the drainage design guidelines, an Alternate Evaluation Report (Love & Associates, Inc., 2007) consisting of alternate conceptual plans to improve drainage in the study area was prepared. The Alternates were formally presented to the Town Board during the March 13, 2007 Town Board Meeting, and Alternate 2 was selected to be the Outfall Systems Plan.

B. Drainage Design Guidelines

After review of a variety of drainage control components incorporated into a storage/conveyance strategy, the Town selected a drainage design strategy which included local, on-site, and regional components. The drainage design guidelines followed in the Erie Planning Area is summarized in Table 10. The Town recognized the strategy may not be applicable to all situations and exceptions should be made for special conditions or cases. For example, if regional detention facilities unreasonably burden one landowner, multiple parallel ponds with unit release rates may be substituted.

The study area may be roughly divided into open space areas, rural residential areas, and dense development areas. Stormwater conveyance improvements will differ in each of these areas.

1. Open Space Areas

The design strategy for large open space areas, particularly lands in the 100-year floodplain, which are relatively unaffected by development is to minimize stormwater improvements in these areas. Conveyance will maintain natural channel and floodplains in undeveloped open space areas and, when the open space area is slightly impacted by development, a 2-year stable channel will be constructed while the natural floodplain will be maintained.

2. Rural Residential Areas

The design strategy for rural residential areas is structured by the downstream hydrologic impact of the rural residential development. Detention is always required when there is a significant increase of drainage which negatively impacts downstream properties. The minimum amount of proposed development of rural residential lands west of Boulder Creek in the Boulder Creek Watershed (Figure 7a) will require at the most only local or on-site detention when the drainage impacts downstream properties.

Table 10. Drainage Design Guidelines For Erie Planning Area

Detention Facilities

- Local detention: limit to small developments, incorporate water quality and MDCIA (minimize directly connected impervious areas).
- On-site detention: provide detention and water quality for the 100-year event, flow depths in ponds and trickle channel to be compatible with the site, design downstream conveyance to safely convey 100-year discharge.
- Regional detention facilities: use for flood peak reduction from the minor and major event, locate in residential areas.
- Frequent flow detention: depending on location of the development in the Catchment, provide water quality improvements and detention for frequent events (such as the 10-year event) as determined by the Town.

Conveyance Facilities

- Preserve 100-year floodplain for Coal Creek and Boulder Creek.
- Do not use hard lined channels.
- Open space areas:
  - maintain natural channel and floodplains in undeveloped open space areas.
  - construct 2-year stable channel in partially developed open space areas and maintain natural floodplain.
- Subdivision (moderate and high density developments) and commercial and industrial areas:
  - encourage MDCIA (minimize directly connected impervious areas) on lots but provide no credit for runoff reduction.
  - streets (major storm) and storm sewers (minor storms) convey drainage in catchment areas of approximately 20 acres.
  - curb and gutter for all streets.
  - top of foundations to be a minimum of 1-foot above the top of curb or 6-inches above the major storm street discharge, whichever is greater.
  - grass lined swales for conveyance of discharges from Catchment areas greater than approximately 20 acres in area.
- Subdivision (low density):
  - roadside swales and MDCIA methods or storm sewers and on-site detention facilities; no credit should be given for runoff reduction.
  - for homes within 50-feet of the road, top of foundations to be at least 6-inches above the elevation of the major storm street discharge.

Table 10. Drainage Design Guidelines For Erie Planning Area (cont'd)

Roadway and Railroad Cross Flow
• For major roadways, provide a culvert to pass the 100-year event, use inadvertent upstream detention if present to decrease culvert size.
• Design roads to function as an emergency overflow spillway which can pass the 100-year event at a depth of less than one foot at the crown.
• Design all active railroad crossings to convey the 100-year event following railroad guidelines.
• Establish wetland upstream of culvert when possible.
Trans-Catchment Diversions
• Consider when there is substantial discharge onto developed lands without a defined flow path.
• Use as a last resort.
• Utilize flow limiters so that only design flows will be diverted (higher discharges to follow historic flow path).
• Obtain legal opinion prior to construction.

3. Dense Development Areas

The design strategy within dense development areas recognizes a variety of constraints within the area, including such items as existing developments, existing problem areas, active "moving target development", proximity to Coal Creek and Boulder Creek, planning limitations, maximizing available lands zoned for commercial use, combining catchments within property blocks for regional facilities, and utilizing lands which can be reasonably used for drainage facilities Depending on their location in the Catchment, all developments which do not require 100-year regional detention facilities may still be required to provide water quality and 10-year detention facilities to reduce the impact of more frequent storm flows on downstream properties. Best Management Practices (BMP's) will be required for all development in the Erie Planning Area (please refer to Appendix E).

When developing the guidelines, the Town recognized the strategy may not be applicable to all situations, and exceptions should be made for special conditions or cases. For example, if regional detention facilities unreasonably burden one landowner, multiple parallel ponds with unit release rates may be substituted.

C. Selected Plan

Using the Drainage Design Guidelines, alternate methods were developed to maintain existing flood peak discharges. These alternates were published in the Alternate Evaluation Report for the study area (Love & Associates, Inc., 2007). They were developed considering such variables as regional detention facilities, on-site and local detention facilities, and regional conveyance. Alternates 2 was based on Alternate 1, refined with citizen and developer input during a Town Meeting and subsequent follow up meetings. Alternate 2 incorporated input from property owners and developers, including (1) probable site grading, (2) changes in channel flow paths resulting from the proposed grading, and (3) preferred locations for regional detention facilities. The total costs for each Alternate were similar, on the order of $90,000,000, including land costs. The Town Selected Alternate 2, directing Love & Associates to proceed to Preliminary Design. Please refer to Appendix C "Meeting minutes and Town Board Resolutions".

V. PRELIMINARY DESIGN OF THE OUTFALL SYSTEM

A. General

The Outfall Systems Plan (OSP) utilizes stormwater storage and conveyance facilities to safely transport stormwaters through the Erie Planning Area. Its major components include, (1) on-site/local detention used in conjunction with regional detention ponds, (2) 10-year ponds where necessary for properties served by regional ponds, (3) improvements to existing culverts and channels to convey 100-year flows, (4) new channels to reduce existing flooding in developed areas, and (5) channels capable of conveying 2-year flood peaks in floodplain areas. Catchments which require on-site or local detention are modeled using existing percent imperviousness. UDSWM flow charts and model summaries for the Selected Plan are presented in Appendix A2. UDSWM output for the OSP is presented in Appendix B2.

Once the OSP is adopted, the Town and Boulder and Weld Counties should require final design of regional detention facilities be designed for 10- and 100-year release rates using the OSP hydrologic model. A summary of use of the model is found in Appendix D. Appendix D also identifies design methods for on-site and local detention facilities. Water quality provisions could help reduce developed flows, and water quality measures preferred by the Town are described in Appendix E.

In the event development occurs in a sub-catchment to be served by a regional pond or channel before the regional detention facility has been constructed, the development should include 10- and 100-year detention which could be removed once the regional facility is in place.

B. Description

Flood peaks at various design points for existing and future percent imperviousness are compared to those in the OSP in Tables 11a through 11d for the 10- and 100-year events. Proposed detention facilities, regional conveyance facilities, and conveyance improvements are shown on Figures 11a through 11d. Hydrographs for the 100-year event at selected design points for existing, future, and the Outfall Plan are compared on Figure 10.

1. Godding Hollow Tributaries

Regional detention facilities and conveyance channels are planned to convey peak stormwater flows within Godding Hollow to the boundary of the Erie Planning Area. These flows will ultimately discharge through three existing culverts in different locations below I-25. The objective of the design in the OSP is to maintain existing discharges during the 100-year event at the Erie Planning Area boundary, a requirement of the I-25 Corridor Plan (Anderson, 2000). Review of Table 11a indicates the five design points at the Erie Planning Area Boundary, including 970 (southernmost culvert), 971 (central culvert), and 973, 974, and 975 (northernmost culvert) all discharge at existing conditions for the 100-year event. Please refer to Figures 2b and 2c and 11b and 11c for design points and the location of regional facilities.

The Outfall Plan requires five regional detention facilities and a regional conveyance system. It also requires on-site and/or local detention in some catchments. There are three regional channels in the Erie Planning Area, called west, central and east. All discharge along the north boundary of the Erie Planning Area. The OSP requires a spreader system be placed at the outfall points of the regional channels. The areas downstream of the Erie Planning Area are required by the I-25 Corridor Plan to convey stormwaters safely through their property, and the spreaders are assumed to either not be needed if receiving channels have been constructed, or will be used as a temporary measure until the receiving channels are constructed.

The western channel begins at Pond 1119 located south of WCR 10. A small regional pond, Pond 1117, also discharges into the regional channel south of WCR 10. Upon reaching WCR 10, the channel parallels the south side of WCR 10 for a short distance, then crosses WCR 10 at the low point of the road. The regional channel crosses the UPRR and flows northeastwardly to WCR 7. At WCR 7, the channel parallels the west side of the road flowing to the north. The channel will require a few driveway crossing bridges and, to avoid an existing residence, enters a storm sewer for a short distance. The regional channel crosses WCR 12 and proceeds to Highway 52. A regional detention facility, Pond 1110, is located adjacent to the channel. To attenuate the 100-year flood peak in the regional channel, it is designed with a side channel spill which discharges into Pond 1110 during the 100-year flood peak event, effectively cutting off the flood peak. This strategy allows Pond 1110 to remain an off-line pond which reduces its volume considerably than the volume required for an on-line pond. The regional channel crosses WCR 7 at Highway 52, where it flows eastwardly along the south side of Highway 52 for a short distance to the northern boundary of the Erie Planning Area.

The central channel begins at Pond 1108 located just south of WCR 12. This channel follows the natural flow path through undeveloped land until it reaches Highway 52. For a short distance south of Highway 52, the channel leaves the Erie Planning Area. A flow spreader is placed at this location in the event the channel outside of the Erie Planning Area is not constructed.

The eastern channel begins at Pond 1109, follows the existing flow path to the northeast to I-25, then parallels I-25 on the western side flowing to the north. The channel is conveyed in a storm sewer below a topographic high point. The storm sewer may not be required if the site is graded for positive northerly flow when it is developed. The channel leaves the Erie Planning Area south of Highway 52.

Comments were received from some property owners and developers in Godding Hollow and were used in the development of the Outfall Plan. The major comment received from the property owners was the location of the regional detention facilities may shift depending on future proposed developments, but their conceptual location was adequate at this time. Based on property owner comments, on-site and/or local detention was required within Catchments 670 and 674 to better reflect property ownership boundaries.

Developments will be required at a minimum to provide 10-year detention and water quality facilities. Since the location of these facilities is not known, they have generally not been included in the modeling effort and their impact is not shown on Table 11a. The final design of regional ponds will include 10-year flood peak attenuation, if necessary. In addition, the 10-year ponds in the developments will reduce 10-year flood peaks to existing conditions at the design points.

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NIWOT RD

HIGHWAY 52

N. 107TH ST.

HIGHWAY 287

PANAMA RESERVOIR NO.1

T 2 N

T 1 N

MINERAL RD.

KENOSHA RD.

BOULDER CO.

WELD CO.

MATCH LINE SEE FIG. ES2-a

BOULDER CREEK

COAL CREEK

FUTURE SANITAR SEWER TREATM PLANT

BC110

LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY

FIGURE: ES2-a | FIGURE: ES2-b | FIGURE: ES2-c | FIGURE: ES2-d | STUDY AREA

1800 0 900 1800

(IN FEET)
Original Scale:
1 inch = 1800 ft.

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DRAWN:	PEM
CHECKED:	DJL
DATE:	7-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure 11-a

Page V-2

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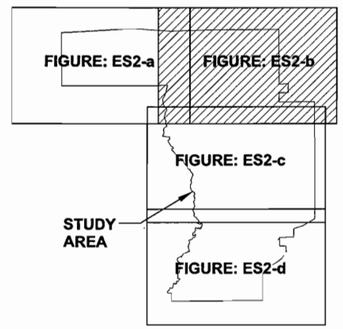
BOULDER CO.
WELD CO.
MATCH LINE SEE FIG. ES2-a
GOODING DAILEY ACCESS RD
WCR 16.5
WCR 7
WCR 16
WCR 325
WCR 5
BOULDER CREEK
FUTURE SANITARY SEWER TREATMENT PLANT
BOULDER CREEK TRIBUTARIES
MINERAL RD
HIGHWAY 52
WCR 12
GODDING HOLLOW TRIBUTARIES
MATCH LINE SEE FIG. ES2-c
BC100
BC105
BC110
GH100
GH110
GH120

LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800 CATCHMENT)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure 11-b
Page V-3

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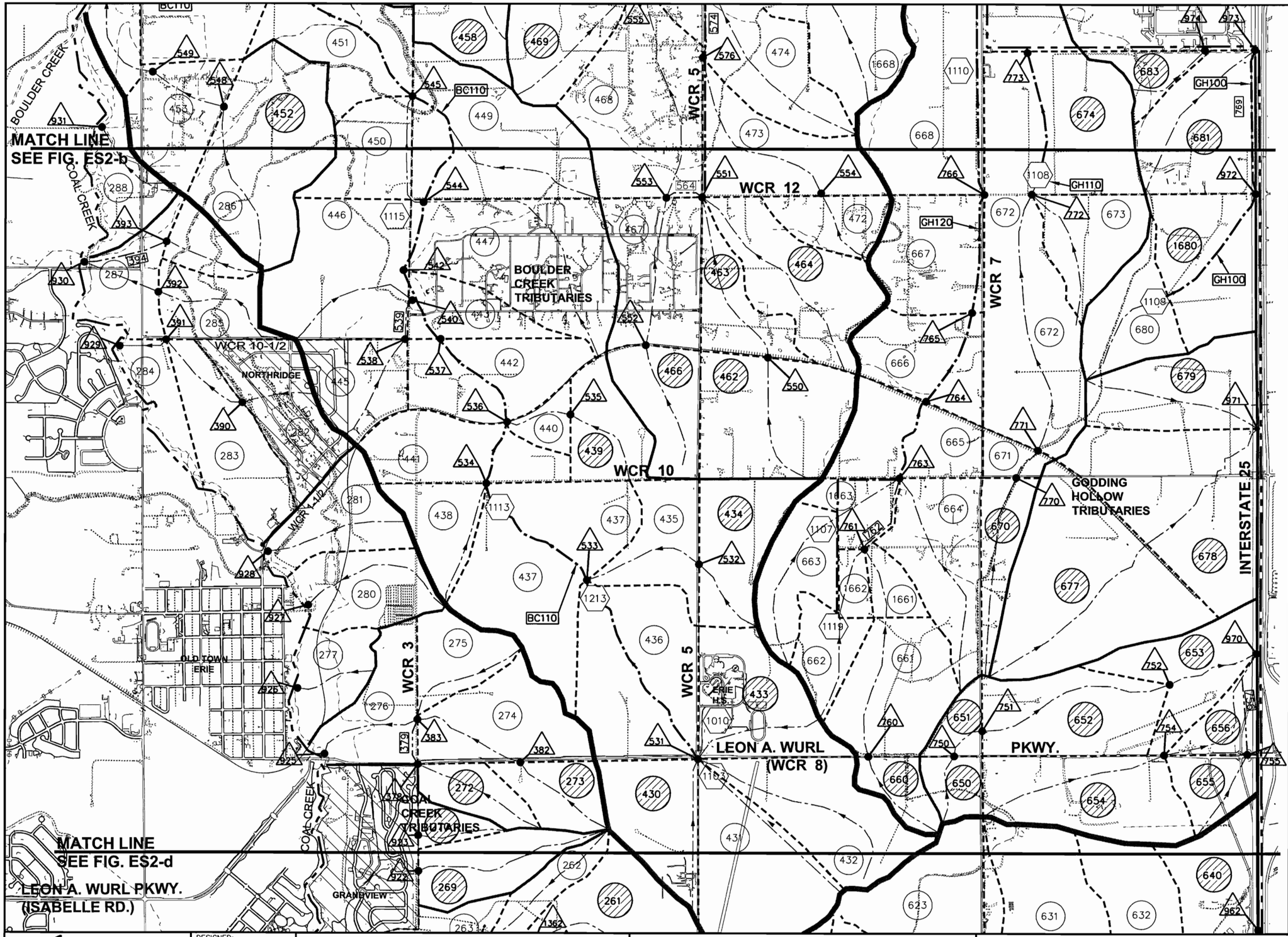
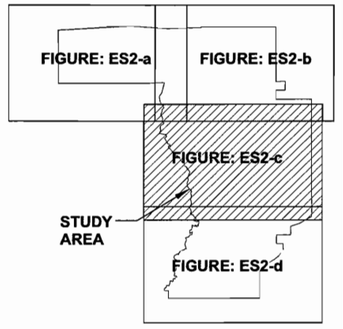


LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY



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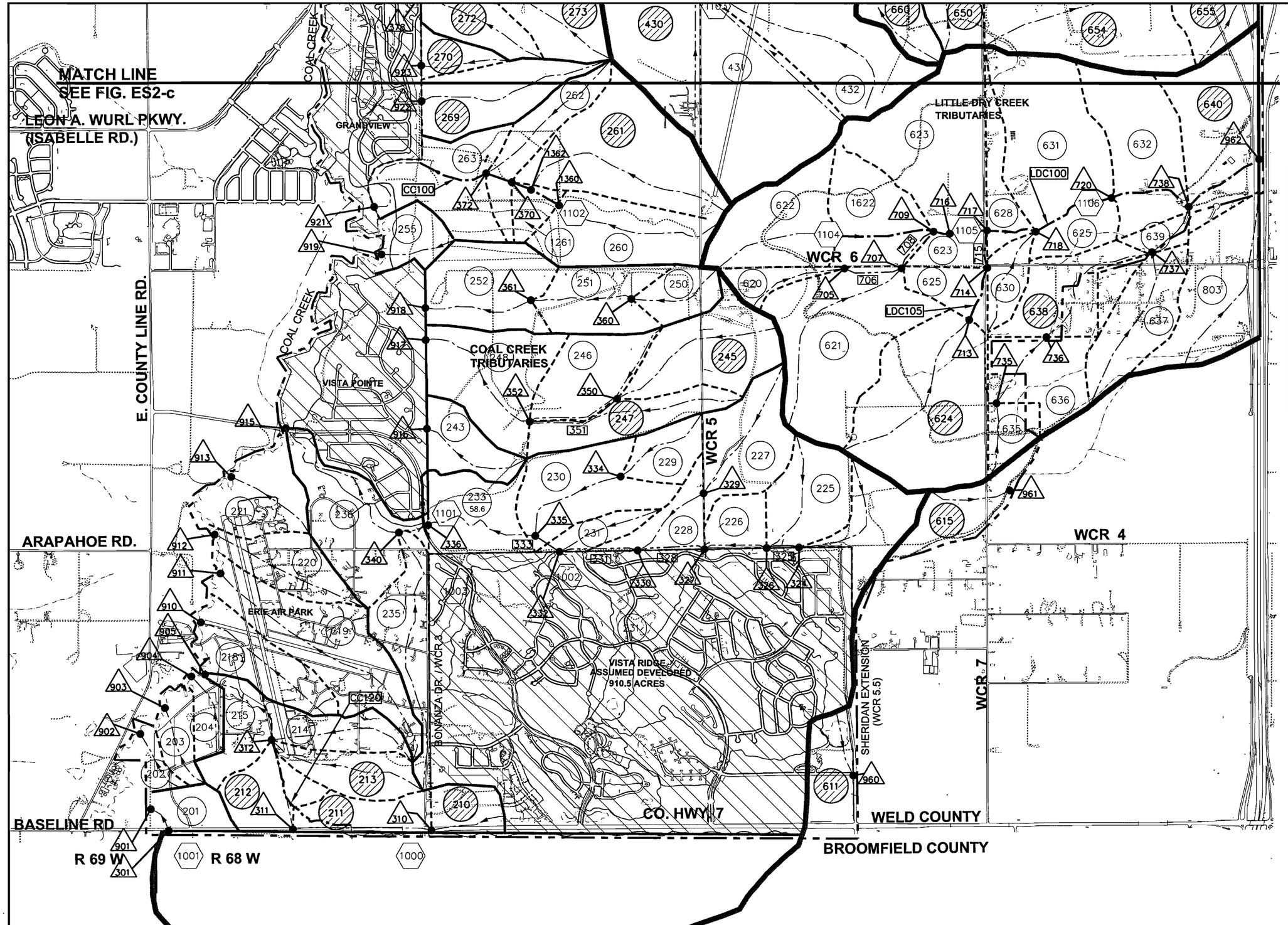
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure 11-c

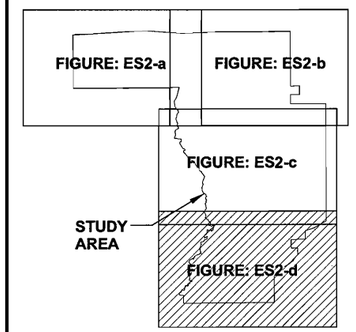


LEGEND

- ONSITE REGIONAL DETENTION REQUIRED (800)
- CATCHMENT I.D. (800)
- WATERSHED DIVIDE
- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- OUTFALL FLOW PATH
- UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL UDSWM CHANNEL/PIPE ELEMENT (328)
- REGIONAL DETENTION AREA (1001)
- DESIGN POINT/NODE (901)
- REGIONAL FACILITY
- STUDY AREA BOUNDARY

PLEASE REFER TO APPENDIX FOR DETAILED BASIN DELINEATION

MAP KEY



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PROPOSED DRAINAGE FACILITIES

Figure 11-d

Table 11a. Flood Peak Discharge Comparison: Existing, Future, and Outfall Plan – Godding Hollow

Godding Hollow Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
754	Leon A Wurl	141	305	*	340	628	340
755	Leon A Wurl	16	124	*	75	246	75
751	WCR 7	30	195	*	128	384	128
750	Leon A Wurl	23	113	*	91	212	92
970	**South Outfall**	**200**	**888**	*	**728**	**1845**	**732**
971	**Central Outfall**	**139**	**955**	*	**621**	**2052**	**624**
973	**North Outfall**	**86**	**502**	*	**387**	**1055**	**353**
974	**North Outfall**	**12**	**92**	*	**55**	**184**	**55**
763	WCR 10	172	515	*	713	1240	673
767	WCR 10	284	637	*	1008	1622	985
770	WCR 12	30	45	*	111	133	111
772	WCR 12	98	313	*	429	722	378
975	**North Outfall**	**413**	**1046**	*	**1524**	**2594**	**1534**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

2. Little Dry Creek Tributaries

Regional detention facilities and conveyance channels are planned to convey peak stormwater flows within Little Dry Creek within the Erie Planning Area through the existing 72-inch RCP culvert below I-25 which then enters the City and County of Broomfield. The objective of the design in the OSP is to maintain existing discharges during the 100-year event at the Erie Planning Area boundary at I-25. Review of Table 11b indicates at Design Point 962, the design point at I-25, discharges at existing conditions for the 100 year event. Please refer to Figures 2d and 11d for design points and the location of regional conveyance facilities.

The Outfall Plan requires three regional detention facilities and one regional conveyance system. It also requires on-site and/or local detention in some catchments. The regional channel follows the path of the existing channel. It begins at Pond 1104 upstream of WCR 7. The regional channel flows to the east, entering Pond 1105, an in-line pond located on the west side of WCR 7. The regional channel continues to the east, enters Pond 1106 which is located at a topographic low point, and continues to the east to Stanley Ditch, crosses Stanley Ditch, and flows eastwardly to I-25.

The regional channel is designed to convey the 100-year event to Stanley Ditch. The 72-inch RCP below I-25 can pass only approximately the 5-year event. As a result, a channel is designed to pass only approximately the 5-year event for the area between Stanley Ditch and I-25. Stanley Ditch enters and leaves the catchment through I-25, and the area bounded by I-25 and the Ditch will be flooded for events exceeding the 5-year event.

No comments were received from property owners in the Little Dry Creek watershed. Developments will be required at a minimum to provide 10-year detention and water quality facilities. Since the location of these facilities is not known, they have generally not been included in the modeling effort and their impact is not shown on Table 11b. The final design of regional ponds will include 10-year flood peak attenuation, if necessary. In addition, the 10-year ponds in the developments will reduce 10-year flood peaks to existing conditions at the design points.

Table 11b. Flood Peak Discharge Comparison: Existing, Future, and Outfall Plan – Little Dry Creek

Little Dry Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
707	WCR 6	56	66	*	254	271	271
714	WCR 6	54	217	*	253	499	249
716/717	WCR 7	152	529	*	731	1305	654
962	**I25 Outfall**	**342**	**1106**	*	**1427**	**2791**	**1394**
960	**Outfall**	**26**	**100**	*	**113**	**225**	**113**
961	**Outfall**	**20**	**114**	*	**82**	**244**	**82**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

3. Coal Creek Tributaries

Regional detention facilities and conveyance channels are planned to convey peak stormwater flows within Coal Creek Tributaries from the Erie Planning Area to Coal Creek. The principal design objective is to maintain existing discharges during the 100-year event using regional facilities and on-site/local detention. The Outfall Plan requires two regional detention facilities and a regional conveyance system. It also requires on-site and/or local detention in some catchments.

Two special circumstances related to drainage occur in Coal Creek Tributaries; one is the result of existing developments and the second is the result of the proximity of small catchments to Coal Creek. There are a number of existing developments which currently convey flows through the development from undeveloped land upstream, and the design objective for these areas is to maintain existing 100-year peak discharges from the upstream lands once they develop. Numerous small catchments which

are located immediately adjacent to Coal Creek will be allowed to discharge without detention into the Creek and will require only water quality improvements. No regional facilities are planned for these catchments. Please refer to Figures 2a through 2d, and 11a through 11d, for design points and the location of regional conveyance facilities. Table 11c compares flood peaks for existing, future, and the outfall plan for the 10- and 100-year event.

a. Regional Facilities

There are four regional channels in Coal Creek Tributaries. One is a short segment of channel in the southwest corner of the Erie Planning Area which discharges from one of the detention ponds in Anthem Development in Broomfield (Pond 1001) within the existing 7.5 x 10-ft RCB below Highway 7, entering the Erie Planning Area in Catchment 201 and discharging into Coal Creek at Design Point 901. This channel should not require improvements, and, therefore, no construction cost estimate has been provided for the channel. A second, the "Air Park Channel", receives discharge from another one of the detention ponds in Anthem Development in Broomfield (Pond 1000), which passes below Highway 7 through two 6-ft RCP culverts. This channel discharges through Erie Air Park and discharges into Coal Creek at Design Point 905.

The third channel, called "Vista Ridge Channel", receives runoff from the Vista Ridge detention facilities 1002 and 1003 and passes it through Vista Ridge, discharging at Coal Creek at Design Point 915. A portion of this channel has been constructed. The Vista Ridge Channel includes a proposed regional detention facility, Pond 1101, near WCR 3. The Outfall Plan located this pond adjacent to WCR 3, based on the comments of the property owners and developers. The fourth channel, called "Grandview Channel", skirts the southern boundary of Grandview Subdivision and enters Coal Creek at Design Point 921. Regional Detention Facility 1102 is located at the upstream end of the regional channel.

Developments will be required at a minimum to provide 10-year detention and water quality facilities. Since the location of these facilities is not known, they have generally not been included in the modeling effort and their impact is not shown on Table 11c. The final design of regional ponds will include 10-year flood peak attenuation, if necessary. In addition, the 10-year ponds in the developments will reduce 10-year flood peaks to existing conditions at the design points.

b. Existing Downstream Developments

Grandview and Vista Pointe are developed subdivisions which pass discharges from upstream catchments through the subdivisions. Discharge enters Grandview at Design Points 922 and 923 and Vista Point at Design Points 916, 917, and 918. The catchments upstream of the design points are required to provide on-site or local detention.

c. Catchments Immediately Adjacent to Coal Creek

Catchments immediately adjacent to Coal Creek which could be developed will be allowed to discharge into the Creek without detention due to large differences in timing of the hydrograph of the small catchments compared to Coal Creek. Detention is required only if an upstream property owner is discharging directly onto a downstream property owner. Catchments considered for no detention include Design Points 901, 902, 903, 904, 925, 928, and 930. Since the 100-year flood peak discharges are equivalent to the future 100-year flood peak discharges shown on Table 8, flood peaks for these design points are not included on Table 11c.

Table 11c. Flood Peak Discharge Comparison: Existing, Future, and Outfall Plan – Coal Creek

Coal Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
310	Hwy 7	297	303	*	515	517	512
905	**Outfall**	**313**	**425**	*	**537**	**920**	**538**
327	WCR 6	72	137	*	272	356	273
329	WCR 6	37	39	*	272	356	152
1002	WCR 4	220	220	*	1110	1110	1110
1003	WCR 3	83	83	*	275	275	275
336	WCR 3	304	366	*	1148	1142	1010
915	**Outfall**	**408**	**481**	*	**1358**	**1369**	**1248**
916	**Vista Pt.**	**27**	**28**	*	**105**	**107**	**107**
917	**Vista Pt.**	**129**	**159**	*	**541**	**582**	**541**
918	**Vista Pt.**	**81**	**81**	*	**541**	**582**	**338**
921	**Outfall**	**146**	**271**	*	**613**	**781**	**547**
922	**Outfall**	**32**	**103**	*	**153**	**253**	**153**
923	**Outfall**	**9**	**39**	*	**48**	**88**	**50**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

4. Boulder Creek Tributaries

Boulder Creek Tributaries have been divided into lands west of Boulder Creek and lands east of Boulder Creek in the Erie Planning Area. Much of the Boulder Creek Tributary area west of Boulder Creek will remain as open space and will not be impacted by future development. Design guidelines for open space areas should be followed in these areas, and there will be no further analysis of alternate regional conveyance systems for this area.

Regional detention facilities and conveyance channels are planned to convey peak stormwater flows within Boulder Creek Tributaries east of Boulder Creek which discharge directly to Boulder Creek. The principal design objective is to maintain existing discharges during the 100-year event using regional facilities and on-site/local detention. The Outfall Plan requires six regional detention ponds and a conveyance system. It also requires on-site and/or local detention in some catchments. Please refer to Figures 2a through 2c, and 11a through 11c for design points and the location of regional conveyance facilities.

When developing the OSP for Boulder Creek Tributaries, property owners provided general to specific information on grading they expected on their property, and this information was a great help in defining potential changes in flow paths and relocation of irrigation facilities. Property owners also requested the regional ponds be designed to detain flows from the property rather than to include offsite flows when possible. On-site/local detention will be used to reduce flood peak discharges to existing conditions for catchments leaving the boundary of the Erie Planning Area prior to reaching the Boulder Creek floodplain: these catchments generally discharge along the northern boundary of the planning area.

Developments will be required at a minimum to provide 10-year detention and water quality facilities. Since the location of these facilities is not known, they have generally not been included in the modeling effort and their impact is not shown on Table 11d. The final design of regional ponds will include 10-year flood peak attenuation if necessary. In addition, the 10-year ponds in the developments will reduce 10-year flood peaks to existing conditions at the design points.

a. Regional Facilities

There are two regional channels in Boulder Creek Tributaries. One, the "Bridgewater Channel" discharges into Boulder Creek at Design Point 943. This channel begins upstream at the intersection of Leon A. Wurl Parkway and WCR 5. It flows to the northwest to WCR 10 through a proposed development currently called Bridgewater. Two regional ponds in series were located in Bridgewater, as requested by the property owner, including Pond 1113 adjacent to WCR 10 and Pond 1213 further upstream of Pond 1113.

The Bridgewater Channel proceeds to the northwest from WCR 10, flowing below a bridge supporting the UPRR and through the Eureka Cattle Company property to WCR 10½. Just south of WCR 10½, the channel passes south of existing homes, some of which could be located in the floodplain of the existing channel. The Outfall Plan requires channelization at and south of WCR 10½ and will remove the existing homes from the floodplain. The channel continues along the east side of WCR 3, and based on input from the property owner, WCR 3 will be moved to the west to allow room for the channel between the existing Cottonwood Irrigation Ditch and WCR 3. The channel continues to the north along the east side of the WCR following its historic flow path, crosses WCR 12, finally jogs to the west and crosses WCR 3 about ½ mile north of WCR 12. The property owner also requested a regional detention facility, Pond 1115, be placed on the northeast corner of the proposed Morgan Hill development to capture all flows from Morgan Hill.

The Bridgewater Channel discharges into Boulder Creek. The channel is designed for the 2-year event in the Boulder Creek floodplain and for the 100-year event once upstream of the floodplain of Boulder Creek.

The second regional channel discharges into Boulder Creek at Design Point 951, just west of WCR 3¼. It begins upstream at the intersection of WCR 5 and WCR 12. Offsite flows from all catchments east and south of the intersection are collected in the regional channel at the intersection. These flows are directed to the north on the east side of WCR 5 to Highway 52, and it crosses the intersection of WCR 5 and Highway 52, continuing to the north/northeast, northwest of the intersection.

The regional channel captures offsite flows from all catchments east and south of the intersection of WCR 5 and WCR 12. These catchments are required to detain flows using on-site/local detention and, as a result, the regional channel transports only existing flood peaks until it reaches Highway 52. The property owner of the lands south of Highway 52, north of WCR 12, and east of WCR 5 indicated the property will be graded so it drains primarily to the north where it will enter a regional detention facility. In the OSP, this regional detention, Pond 1120, is located just south of Highway 52 and east of WCR 5. It discharges into a short segment of regional channel flowing to the west south of Highway 52 and joins the regional channel east of WCR 5 at the intersection of WCR 5 and Highway 52.

The regional channel continues to flow from the intersection of WCR 5 and Highway 52 to the northeast to the abandoned BNRR embankment and finally enters Boulder Creek. A regional detention facility, Pond 1117, is located at the BNRR embankment. The channel is designed to carry the 2-year event once the channel enters the Boulder Creek floodplain.

b. Catchments Discharging at the Erie North Planning Boundary

Catchments upstream of Design Points 953, 954, and 955 will be developed and discharge at the northern boundary of the Erie Planning Area. These catchments are required to incorporate on-site/local detention into their design.

C. Design Criteria

The OSP is presented in plan view on Sheets 1 through 55 and in profile on Sheets 56 through 64. Typical design details are shown on Sheets 65 through 67. The locations of proposed regional detention and conveyance facilities are based on engineering judgment, input from the Town and property owners and developers, practicality, anticipated cost minimization, and legal requirements. Using these criteria and the design strategy recommendations, often only one area is conceptually "best" for regional detention facility locations.

Table 11d. Flood Peak Discharge Comparison: Existing, Future, and Outfall Plan – Boulder Creek

Boulder Creek Tributaries							
Design Point	Location	10-year flood peak (cfs)			100-year flood peak (cfs)		
		Existing	Future	Outfall Plan	Existing	Future	Outfall Plan
531	WCR5/Ln Wrl	206	709	*	754	1631	664
534	WCR 10	301	1281	*	1153	2772	1092
540	WCR 3	390	1297	*	1442	3122	1309
545	WCR 5	522	1508	*	1940	3888	1912
546	BNRR	524	1428	*	1947	3755	1955
547	Bld Ck	480	1190	*	1766	3153	1847
943	**Outfall**	**530**	**1281**	*	**1975**	**3466**	**2017**
944	**Outfall**	**68**	**154**	*	**271**	**371**	**309**
551	WCR12/5	143	255	*	513	678	501
557	WCR5/Hiwy52	146	643	*	651	1464	1065
571	BNRR	651	1282	*	2629	3716	2726
951	**Outfall**	**650**	**1250**	*	**2574**	**3622**	**2709**
953	**Outfall**	**35**	**120**	*	**193**	**329**	**213**
954	**Outfall**	**25**	**74**	*	**140**	**210**	**140**
955	**Outfall**	**85**	**222**	*	**479**	**663**	**469**

* 10-year flood peaks will be maintained at pre-developed rates using 10-year detention facilities in all developments

Limitations and assumptions of the modeling effort include:

- all regional facilities must be constructed to mitigate the impact of development on stormwater flows,
- normal depth and inlet control is assumed,
- catchments requiring on-site or local detention facilities are modeled assuming flood peak release defined by the existing percent imperviousness of the catchment without adjustments in hydrograph timing,
- the specific locations of on-site and local detention facilities are not addressed and will be decided by the individual property owner, and,
- water quality is incorporated into all detention facilities without adding additional volume beyond the 100-year event detention volume to the facilities.

The volume of regional detention ponds shown on the plan views are reported with and without 1-foot of freeboard. The volume without freeboard is the same calculated by the hydrologic model. A 1 percent bottom slope and 4:1 slopes on the embankment are assumed, and surface area of the pond is estimated using this information and site topography. Ponds are designed using FHWA culvert nomographs (FHWA, 2004) assuming inlet control.

Regional channels were sized using the Manning's Equation assuming a trapezoidal cross section, 4:1 side slopes, an average velocity of 5 fps or less, and a Manning's *n* of 0.035. Channel slope is adjusted to meet this criteria using 2-foot drops distributed along the channel. All channels conveying the 100-year event are designed to include 1-foot of freeboard. A 12-foot maintenance trail is added to the top width of the channel when the bottom width of the channel is less than 15-feet.

Road crossings and storm sewers were designed using FHWA culvert nomographs (FHWA, 2004) assuming inlet control. Storm sewers flow under open channel conditions and their capacity was checked using normal depth calculations.

D. Cost Estimates

Cost estimates are presented in Tables 12 through 14 and summarized in Table 16. Unit cost information is presented on Table 17. The proposed drainage facilities in plan and profile and design details are shown on Sheets 1 through 67. The cost estimates are divided into three general categories; channel improvements, road crossings, and detention facilities. Irrigation facility improvements are commonly incorporated into the development design and were not incorporated into the conceptual cost analysis. The three cost categories are discussed in more detail below. The three categories are further subdivided into construction costs and land costs.

Construction cost estimates are increased by 40 percent to account for contingencies, engineering, mobilization, administration and legal fees. The construction unit costs are based on recently completed projects in the Denver metro area, Colorado Department of Transportation (CDOT) Cost Data, UDFCD Bid Tabs and engineering judgment. The unit prices utilized for this study are summarized in Table 17.

Unit land cost estimates are $100,000 per acre of land. Land cost estimates are increased by 10 percent to account for administration and legal fees.

All construction and land costs are in year 2007 dollars. No financing costs or monetary impacts of phased construction or purchase of the proposed improvements are included in these cost estimates.

The cost estimates prepared for this study are conceptual in nature and should be used for comparative purposes only.

1. Regional Detention Facilities

Proposed construction and land costs for the proposed regional detention facilities for each of the alternates are presented in Table 12. Detention volumes presented in the Table are required to detain the 100-year event without freeboard. Detention volumes used for cost estimates include 1-foot of freeboard. It is assumed for the conceptual cost analysis the required storage volume is obtained totally by excavation below grade. Construction costs are based on the estimated costs of pond excavation, outlet structure installation, revegetation, and spillway. Excavation volumes are based on the pond volume shown on Table 12. The outlet structure costs are based on the outlet size and tabulated in Table 13.

Land costs are based on the estimated land required for the proposed regional detention facilities. The total land required was calculated as the sum of the detention pond surface area with 1 foot of freeboard. Maintenance trails were assumed to be incorporated into the pond design, and a maintenance trail above the edge of the pond was not incorporated into the land cost. Water quality costs for the ponds were estimated using cost information from recent projects; the water quality cost was set at 13 percent of the construction cost excluding contingencies. Please note the regional detention facility costs do not include utility relocation, wetland reconstruction, or landscape plantings.

Table 12. Regional Detention Facility Cost Estimates

Pond ID	Sheet No.	Volume w/ 1-ft freebrd (ac-ft)	Outlet Pipe Type	Outlet Lgth (ft)	RCP Diam (ft)	RCP RCP Cost ($)	RCB Span (ft)	RCB Hght (ft)	RCB RCB Cost ($)	Special Spillway Cost ($)	Reveg. Cost ($)	Water Quality Cost ($)	Subtotal Const. Cost ($)	Const. Conting. Cost ($)	Total Const. Cost ($)	Land w/ 1-ft freebrd (ac)	Subtotal Land Cost ($)	Land Conting. Cost ($)	Total Land Cost ($)	Total Pond Cost ($)
Boulder Creek Tributaries																				
1103	39	23.0	RCB	300			6	4	$179,167	$60,714	$14,428	$115,066	$1,000,188	$400,075	$1,400,263	3.85	$384,746	$38,475	$423,221	***$1,823,483***
1113	32	41.0	2x RCB	230			8	6	$383,519	$70,471	$20,537	$207,873	$1,806,893	$722,757	$2,529,650	5.48	$547,649	$54,765	$602,414	***$3,132,063***
1115	24	7.6	RCP	180	4.5	$37,800				$15,992	$4,815	$34,716	$301,766	$120,706	$422,472	1.28	$128,398	$12,840	$141,238	***$563,709***
1117	10	23.0	2x RCP	100	4	$35,000				$21,684	$15,957	$91,449	$794,903	$317,961	$1,112,864	4.26	$425,523	$42,552	$468,075	***$1,580,939***
1213	35	23.7	2x RCB	100			8	6	$190,926	$68,845	$13,663	$120,048	$1,043,494	$417,398	$1,460,891	3.64	$364,342	$36,434	$400,776	***$1,861,668***
1121	21	35.5	2x RCP	1350	6	$715,500				$34,694	$19,774	$226,670	$1,970,284	$788,114	$2,758,398	5.27	$527,313	$52,731	$580,044	***$3,338,442***
TOTAL						$788,300			$753,611	$272,399	$89,174	$795,822	$6,917,527	$2,767,011	$9,684,538		$2,377,970	$237,797	$2,615,767	***$12,300,305***
Coal Creek Tributaries																				
1101*	47	16.2	Existing								$13,280	$8,522	$74,074	$29,630	$103,703	3.54	$354,136	$35,414	$389,549	***$493,253***
1102	41	7.5	RCP	100	3.5	$14,000			$0	$17,347	$5,203	$31,492	$273,742	$109,497	$383,239	1.39	$138,741	$13,874	$152,615	***$535,854***
TOTAL						$14,000			$0	$17,347	$18,483	$40,014	$347,816	$139,126	$486,942		$492,876	$49,288	$542,164	***$1,029,106***
Dry Creek Tributaries																				
1104	42	6.0	RCP	100	3.5	$14,000				$13,010	$4,076	$25,291	$219,841	$87,936	$307,777	1.09	$108,704	$10,870	$119,575	***$427,352***
1105	43	29.8	RCB	150			10	6	$146,389	$50,956	$17,485	$134,179	$1,166,323	$466,529	$1,632,853	4.66	$466,262	$46,626	$512,889	***$2,145,741***
1106	43	25.0	RCB	100			6	6	$169,537	$7,860	$15,193	$114,173	$992,430	$396,972	$1,389,402	4.05	$405,139	$40,514	$445,653	***$1,835,055***
1106			RCB	100			8	8												
TOTAL						$14,000			$315,926	$71,827	$32,678	$273,644	$2,378,594	$951,438	$3,330,032		$980,106	$98,011	$1,078,117	***$4,408,149***
Godding Hollow Tributaries																				
1107	33	3.0	RCP	100	3.5	$14,000				$9,215	$2,078	$13,985	$121,558	$48,623	$170,182	0.55	$55,421	$5,542	$60,963	***$231,145***
1108	26	23.0	RCB	150			6	5	$106,944	$35,236	$11,748	$102,016	$886,758	$354,703	$1,241,461	3.13	$313,278	$31,328	$344,606	***$1,586,067***
1109	30	10.3	RCP	100	3	$12,500				$20,599	$5,977	$41,804	$363,375	$145,350	$508,725	1.59	$159,389	$15,939	$175,328	***$684,053***
1110	26	16.0	RCB	100			6	5	$153,704	$0	$12,514	$78,656	$683,700	$273,480	$957,181	3.34	$333,714	$33,371	$367,085	***$1,324,266***
1119	36	20.2	RCP	100	5.5	$25,000				$31,441	$12,514	$80,987	$703,961	$281,584	$985,545	3.34	$333,714	$33,371	$367,085	***$1,352,630***
TOTAL						$51,500			$260,648	$96,492	$44,832	$317,448	$2,759,353	$1,103,741	$3,863,094		$1,195,515	$119,552	$1,315,067	***$5,178,160***

* enlarge existing, 20% of total volume estimated

2. Conveyance Facilities

Proposed construction and land costs for the proposed conveyance facility improvements, including open channels and storm sewers, were estimated for each of the alternates and are presented in Table 13. Costs for regional channels including a trickle channel is included and assumed to carry 2% of the 100 year flow. The number of drop structures along the channel was calculated by assuming 2 foot vertical drops and the channel length required and slope allowed based on the Manning's Equation. Construction cost estimates included the channel with 1-foot of freeboard, estimated cost of channel excavation, drop structure installation, and revegetation.

Land costs are based on the estimated land required for the proposed channel improvements. The total land required was calculated as the product of the total top width of the channel times the channel length. Channel costs do not include wetland or landscape plantings, channel linings or trails.

Table 13. Conveyance Facility Cost Estimates

Reach	Sheet No.	Design Discharge (cfs)	Length (ft)	Slope (ft/ft)	Bottom Width / Diameter (ft)	Channel Geometry		# of Drops	Sub-total Const. Cost ($)	Const. Contig. Cost ($)	Total Const. Cost ($)	Sub-total Land Cost ($)	Land Contig. Cost ($)	Total Land Cost ($)	Total Const. & Land Cost ($)
						Top Width (ft)	depth (ft)								
Coal Creek															
CC120	53	538	2250	0.0050	25	55	4	7	$ 663,570	$ 265,428	$ 928,998	$ 284,091	$ 28,409	$ 312,500	$ 1,241,498
CC100	41	351	1035	0.0057	10	63	4.1	10	$ 323,046	$ 129,219	$ 452,265	$ 149,690	$ 14,969	$ 164,659	$ 616,924
CC100	41	547	1880	0.0041	10	63	5.1	9	$ 598,109	$ 239,244	$ 837,353	$ 271,901	$ 27,190	$ 299,091	$ 1,136,444
TOTAL									**$ 1,584,726**	**$ 633,890**	**$ 2,218,616**	**$ 705,682**	**$ 70,568**	**$ 776,250**	**$ 2,994,866**
Little Dry Creek															
LDC100	42	227	1745	0.0073	5	48	3.8	5	$ 391,457	$ 156,583	$ 548,040	$ 192,287	$ 19,229	$ 211,515	$ 759,555
LDC100	42&43	710	300	0.0073	5	68	5.8	0	$ 75,894	$ 30,358	$ 106,252	$ 46,832	$ 4,683	$ 51,515	$ 157,767
LDC100	43	898	2405	0.0030	16	64	6	5	$ 781,871	$ 312,748	$ 1,094,619	$ 353,352	$ 35,335	$ 388,687	$ 1,483,306
LDC100	43	878	950	0.0031	15	63	6	5	$ 350,691	$ 140,277	$ 490,968	$ 137,397	$ 13,740	$ 151,136	$ 642,104
LDC100	43	450	1590	0.0045	5	58	5.2	0	$ 370,188	$ 148,075	$ 518,263	$ 211,708	$ 21,171	$ 232,879	$ 751,142
LDC105	46	249	1025	0.0070	5	49	4	0	$ 206,552	$ 82,621	$ 289,173	$ 115,301	$ 11,530	$ 126,831	$ 416,004
LDC105	46	249	345	0.0070	5	49	4	3	$ 98,023	$ 39,209	$ 137,232	$ 38,809	$ 3,881	$ 42,689	$ 179,921
TOTAL									**$ 2,274,676**	**$ 909,870**	**$ 3,184,546**	**$ 1,095,684**	**$ 109,568**	**$ 1,205,253**	**$ 4,389,799**
Godding Hollow															
GH120	33&36	250	1960	0.0066	5	50	4	5	$ 443,218	$ 177,287	$ 620,505	$ 224,977	$ 22,498	$ 247,475	$ 867,980
GH120	33	357	1725	0.0053	5	55	4.7	2	$ 397,270	$ 158,908	$ 556,177	$ 217,803	$ 21,780	$ 239,583	$ 795,761
GH120	33	806	1565	0.0032	15	60	5.8	7	$ 546,554	$ 218,622	$ 765,175	$ 215,565	$ 21,556	$ 237,121	$ 1,002,297
GH120	30,29,33	913	1675	0.0030	17	65	6	1	$ 513,535	$ 205,414	$ 718,949	$ 249,943	$ 24,994	$ 274,937	$ 993,886
GH120	30	998	1685	0.0026	25	61	6	7	$ 648,867	$ 259,547	$ 908,414	$ 235,962	$ 23,596	$ 259,558	$ 1,167,972
GH120	30	998	400	0.0013			2x8'x7'RCB	N/A	$ 619,259	$ 247,704	$ 866,963	N/A	N/A	N/A	$ 866,963
GH120	26&30	998	620	0.0026	25	61	6	0	$ 200,117	$ 80,047	$ 280,164	$ 86,823	$ 8,682	$ 95,505	$ 375,669
GH120	26	1093	2495	0.0028	25	75	6	5	$ 1,064,890	$ 425,956	$ 1,490,846	$ 429,580	$ 42,958	$ 472,538	$ 1,963,384
GH120	22&26	941	2830	0.0030	20	65	6	4	$ 930,601	$ 372,240	$ 1,302,841	$ 422,291	$ 42,229	$ 464,520	$ 1,767,361
GH120	22	978	1220	0.0030	20	65	6	0	$ 375,312	$ 150,125	$ 525,437	$ 182,048	$ 18,205	$ 200,253	$ 725,689
GH110	22&26	494	2950	0.0045	10	60	4.9	2	$ 725,914	$ 290,366	$ 1,016,280	$ 406,336	$ 40,634	$ 446,970	$ 1,463,250
GH110	22	557	1220	0.0040	5	63	5.7	0	$ 305,591	$ 122,237	$ 427,828	$ 176,446	$ 17,645	$ 194,091	$ 621,919
GH100	26&30	222	2690	0.0075	5	47	3.8	3	$ 557,697	$ 223,079	$ 780,776	$ 290,243	$ 29,024	$ 319,268	$ 1,100,044
GH100	26	355	1880	0.0050			6.5' RCP	N/A	$ 545,200	$ 218,080	$ 763,280	N/A	N/A	N/A	$ 763,280
GH100	22&26	353	800	0.0054	5	55	4.6	1	$ 183,054	$ 73,222	$ 256,275	$ 101,010	$ 10,101	$ 111,111	$ 367,386
TOTAL									**$ 8,057,079**	**$ 3,222,832**	**$ 11,279,911**	**$ 3,239,027**	**$ 323,903**	**$ 3,562,929**	**$ 14,842,840**

Table 13. Conveyance Facility Cost Estimates (cont'd.)

Reach	Sheet No.	Design Discharge (cfs)	Length (ft)	Slope (ft/ft)	Bottom Width / Diameter (ft)	Channel Geometry Top Width (ft)	Channel Geometry depth (ft)	# of Drops	Sub-total Const. Cost ($)	Const. Contig. Cost ($)	Total Const. Cost ($)	Sub-total Land Cost ($)	Land Contig. Cost ($)	Total Land Cost ($)	Total Conveyance Cost ($)
Boulder Creek															
BC100	21	462	920	0.0043	5	60	5.3	0	$ 217,303	$ 86,921	$ 304,224	$ 126,722	$ 12,672	$ 139,394	$ 443,618
BC100	21	460	450	0.0350		N/A	2x5.5'RCP	N/A	$ 225,000	$ 90,000	$ 315,000	N/A	N/A	N/A	$ 315,000
BC100	21&25	460	2950	0.0043	5	60	5.3	1	$ 706,286	$ 282,514	$ 988,800	$ 406,336	$ 40,634	$ 446,970	$ 1,435,770
BC100	21&25	460	720				2x6'RCP	N/A	$ 381,600	$ 152,640	$ 534,240	N/A	N/A	N/A	$ 534,240
BC100	17	1763	1245	0.0023	50	100	6	6	$ 712,749	$ 285,099	$ 997,848	$ 285,813	$ 28,581	$ 314,394	$ 1,312,242
BC100	17	1763	700	0.0014	70	120	6	0	$ 389,509	$ 155,804	$ 545,313	$ 192,837	$ 19,284	$ 212,121	$ 757,434
BC100	10,11,&17	2185	4228	0.0022	70	120	6	10	$ 2,798,513	$ 1,119,405	$ 3,917,919	$ 1,164,738	$ 116,474	$ 1,281,212	$ 5,199,131
BC100	4&10	330	2940	0.0026	20	55	3	0	$ 439,132	$ 175,653	$ 614,784	$ 371,212	$ 37,121	$ 408,333	$ 1,023,118
BC110	35,36,39	974	3540	0.003	25	70	6	16	$ 1,394,788	$ 557,915	$ 1,952,703	$ 568,871	$ 56,887	$ 625,758	$ 2,578,461
BC110	32&35	1232	1930	0.0026	30	80	6	5	$ 880,829	$ 352,332	$ 1,233,161	$ 354,454	$ 35,445	$ 389,899	$ 1,623,060
BC110	32	1126	1160	0.0026	30	78	6	2	$ 509,676	$ 203,870	$ 713,546	$ 207,713	$ 20,771	$ 228,485	$ 942,031
BC110	28&32	1264	2690	0.0026	30	78	6	7	$ 1,226,210	$ 490,484	$ 1,716,694	$ 481,680	$ 48,168	$ 529,848	$ 2,246,542
BC110	24&28	1308	2355	0.0026	35	85	5.8	7	$ 1,113,893	$ 445,557	$ 1,559,450	$ 459,539	$ 45,954	$ 505,492	$ 2,064,943
BC110	24	1660	1940	0.0023	50	97	5.9	4	$ 997,582	$ 399,033	$ 1,396,615	$ 432,002	$ 43,200	$ 475,202	$ 1,871,817
BC110	20&24	1955	1655	0.0022	60	108	6	4	$ 730,872	$ 292,349	$ 1,023,221	$ 410,331	$ 41,033	$ 451,364	$ 1,474,585
BC110	20	1955	1805	0.0022	60	110	6	3	$ 993,559	$ 397,423	$ 1,390,982	$ 455,808	$ 45,581	$ 501,389	$ 1,892,371
BC110	19	325	2670	0.0006	50	75	3	0	$ 552,722	$ 221,089	$ 773,811	$ 459,711	$ 45,971	$ 505,682	$ 1,279,493
BC110	19	325	475	0.0025	20	45	3	0	$ 69,132	$ 27,653	$ 96,785	$ 49,070	$ 4,907	$ 53,977	$ 150,762
TOTAL									**$ 14,564,355**	**$ 5,825,742**	**$ 20,390,097**	**$ 6,426,837**	**$ 642,684**	**$ 7,069,520**	**$ 27,459,617**
TOTAL ALL BASINS															

3. Road and Railroad Crossings

Proposed construction costs for the proposed road crossings were estimated for each of the alternates and are presented in Table 14. Road widths were approximated using the lane width from the *Town of Erie Comprehensive Plan, 2030 Roadway System Plan*. The road widths include shoulders and medians; 6-lane facilities are assumed to be 140-ft wide, 4-lane facilities were assumed to be 80-ft wide, and 2-lane facilities are assumed to be 30-ft wide.

Construction costs are based on the estimated conduit cost plus roadway restoration and traffic control. Road conduit costs are based on the conduit size and lengths tabulated in Table 14. The roadway restoration and traffic control costs are calculated as a percentage of the conduit cost.

For purposes of this study it was assumed no additional land or right of way is required for the proposed roadway crossings. The roadway crossing costs do not include roadway widening, wetland or landscape plantings, or pedestrian trail underpasses.

Table 14. Road and Railroad Crossing Cost Estimates

Reach	Sheet No.	Road/Irrigation Ditch ID	Design Discharge Q100 (cfs)	Q2 (cfs)	other (cfs)	Culvert Type	Lgth. (ft)	Diam or Span (ft)	ht (ft)	RCP Cost ($)	RCB Cost ($)	Roadway Restoration Cost ($)	Sub-total Cost ($)	Contingency Cost ($)	Total Cost ($)
Coal Creek															
Little Dry Creek															
LDC100	43	Stanley Ditch			450	two RCB	50	5	5		$ 67,593	N/A	$ 67,593	$ 27,037	$ 94,630
LDC105	46	WCR 6	250			two RCP	30	4.5		$ 12,600		$ 6,300	$ 18,900	$ 7,560	$ 26,460
Godding Hollow															
GH120	33	WCR 10	675			two RCB	80	6	6		$ 117,685	$ 58,843	$ 176,528	$ 70,611	$ 247,139
GH120	33	UPRR	810			three RCB	100	6	6		$ 201,944	$ 100,972	$ 302,917	$ 121,167	$ 424,083
GH120	26	WCR 12	998			RCB	30	12	8		$ 61,667	$ 30,833	$ 92,500	$ 37,000	$ 129,500
GH120	22	WCR 7	940			RCB	140	12	8		$ 168,611	$ 84,306	$ 252,917	$ 101,167	$ 354,083
GH120	22	flow spreader	1500				250								$ 10,000
GH110	22	flow spreader	500				80								$ 3,200
GH100	22	flow spreader	355				60								$ 2,400
Boulder Creek															
BC100	21	Hywy 52 & Lwr Bldr Ditch	1065			RCB	400	10	6		$ 336,204	$ 168,102	$ 504,306	$ 201,722	$ 706,028
BC100	17	Bldr & Weld Co Ditch	1763			two RCB	50	8	6		$ 90,833	$ 45,417	$ 136,250	$ 54,500	$ 190,750
BC100	10	WCR 3.25		338		RCB	50	8	6		$ 56,111	$ 150,000	$ 206,111	$ 82,444	$ 288,556
BC110	28	Rue de Trust	1265			two RCB	40	8	6		$ 76,944	$ 38,472	$ 115,417	$ 46,167	$ 161,583
BC115	28	WCR 10.5 & 3	220			RCP	800	5		$ 184,000		$ 92,000	$ 276,000	$ 110,400	$ 386,400
BC100	25	Cottonwd Ext. Ditch	460			two RCP	720	6		$ 381,600		$ 190,800	$ 572,400	$ 228,960	$ 801,360
BC110	24	WCR 12	1682			two RCB	50	10	8		$ 120,463	$ 60,231	$ 180,694	$ 72,278	$ 252,972
BC110	24	WCR 3 & Lwr Bldr Dtch	1955			two RCB	600	10	8		$ 1,088,056	$ 544,028	$ 1,632,083	$ 652,833	$ 2,284,917
BC110	20	Bldr & Weld Co Ditch	1955				110								$ 40,000
BC110	20	flow spreader	1955				110								$ 4,400
BC110	19	County Line Road		325		two RCB	180	6	3		$ 175,556	$ 87,778	$ 263,333	$ 105,333	$ 368,667
TOTAL										**$ 578,200**	**$ 2,561,667**	**$ 1,658,081**	**$ 4,797,948**	**$ 1,919,179**	**$ 6,777,127**

4. Annualized Maintenance Cost Estimate

All stormwater facilities require periodic maintenance to ensure their proper operation. Maintenance includes such items as routine mowing, sediment cleanout, and debris and trash removal. Periodic repairs to drainage facilities may also be required. For this study, annualized maintenance costs are estimated based on a percentage of construction costs; 5 percent for detention facilities, 3 percent for conveyance facilities and 2 percent for road crossings. Annualized maintenance costs are summarized in Table 15. Estimated annualized maintenance costs are approximately $2,116,000.

Table 15. Summary of Annualized Maintenance Cost Estimates

Improvement	OSP Cost
Regional Detention Facilities	
Boulder Creek Tributaries	$ 484,230
Coal Creek Tributaries	$ 24,350
Little Dry Creek Tributaries	$ 166,500
Godding Hollow Tributaries	$ 193,160
Sub-Total	**$ 868,200**
Channel Improvements	
Boulder Creek Tributaries	$ 611,700
Coal Creek Tributaries	$ 66,560
Little Dry Creek Tributaries	$ 95,540
Godding Hollow Tributaries	$ 338,400
Sub-Total	**$ 1,112,200**
Road and Railroad Crossings	
Sub-Total	**$ 135,540**
TOTAL	**$ 2,116,000**

5. Summary

Table 16 summarizes overall estimated project costs. The total estimated project cost for the OSP is approximately $81,000,000. These costs estimates are conceptual and should be used for comparative purposes only. Multiple purpose land use could decrease land costs and were not included in the land cost estimate. Detention facilities represent approximately 28 percent, conveyance facilities represent approximately 62 percent, and road crossings and road improvements represent approximately 10 percent of the total cost estimate.

Table 16. Cost Estimate Summary

Improvement	Total Construction Cost	Total Land Cost	**Total Cost**
Regional Detention Facilities			
Boulder Creek Tributaries	$ 9,684,538	$ 2,615,767	**$ 12,300,305**
Coal Creek Tributaries	$ 486,942	$ 542,164	**$ 1,029,106**
Little Dry Creek Tributaries	$ 3,330,032	$ 1,078,117	**$ 4,408,149**
Godding Hollow Tributaries	$ 3,863,094	$ 1,315,067	**$ 5,178,161**
Sub-Total	**$ 17,364,606**	**$ 5,551,115**	**$ 22,915,721**
Channel Improvements			
Boulder Creek Tributaries	$ 20,390,097	$ 7,069,520	**$ 27,459,617**
Coal Creek Tributaries	$ 2,218,616	$ 776,250	**$ 2,994,866**
Little Dry Creek Tributaries	$ 3,184,546	$ 1,205,253	**$ 4,389,799**
Godding Hollow Tributaries	$ 11,279,911	$ 3,562,929	**$ 14,842,840**
Sub-Total	**$ 37,073,170**	**$ 12,613,952**	**$ 49,687,122**
Road and Railroad Crossings and Spreaders			
Sub-Total	**$ 6,777,127**	**N/A**	**$ 6,777,127**
Other			
1000-ft WCR 3 Relocation			
Sub-Total	**$ 1,300,000**		**$ 1,300,000**
TOTAL	**$ 62,514,903**	**$ 18,165,067**	**$ 80,679,970**

Table 17. Unit Cost and Percentage Data

Item	Description	Unit	Unit Cost ($)
Drop Structures			
0 - 500 cfs		EA	$ 9,500
500 - 1000 cfs		EA	$ 15,000
greater than 1000 cfs		EA	$ 18,750
Trickle Channel			
Fabric		SY	$ 2
Cobble - 4" diameter		SY	$ 108
	Subtotal	SY	$ 110
Boulder Edge Protection		LF	$ 75
Soil Riprap			
Type M		SY	$ 30
Topsoil Removal & Replacement			
Topsoil Stockpiled		SY	$ 3
Topsoil Replaced –	Onsite topsoil	SY	$ 5
	Subtotal	SY	$ 8
Reinforced Concrete Pipe (earthwork, pipe, restoration, utility relocations)			
18-in Diameter		LF	$ 90
21-in Diameter		LF	$ 95
24-in Diameter		LF	$ 100
27-in Diameter		LF	$ 110
30-in Diameter		LF	$ 115
33-in Diameter		LF	$ 120
36-in Diameter		LF	$ 125
42-in Diameter		LF	$ 140
48-in Diameter		LF	$ 175
54-in Diameter		LF	$ 210
60-in Diameter		LF	$ 230
66-in Diameter		LF	$ 250
72-in Diameter		LF	$ 265
78-in Diameter		LF	$ 290
53- x 34-in Elliptical		LF	$ 275
Concrete Structures			
		CY	$ 625
Concrete Cut-Off Wall (flow spreader)			
		CY	$ 180
Earthwork			
Channel Excavation		CY	$ 15
Pond Excavation		CY	$ 10
Pond Embankment		CY	$ 7
Revegetation			
Seed, Mulch, Fertilizer		Acre	$ 3,750

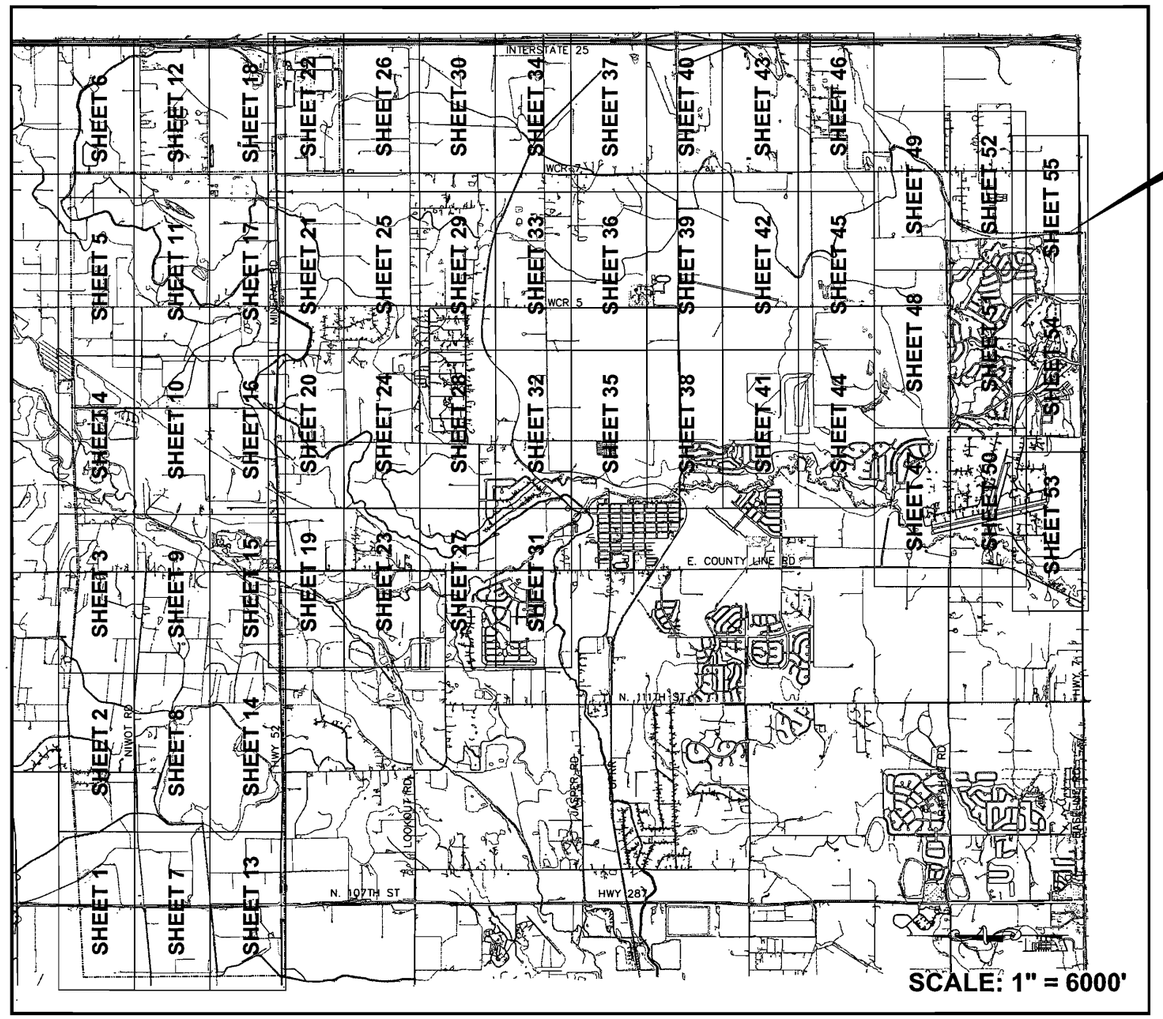
Item	Description	Unit	%
Water Quality for Detention Facilities			
	% of Construction Cost	LS	13%
Roadway Restoration and Traffic Control Costs for Crossings			
	% of Conduit Cost	LS	50%
Construction Contingencies: Engineering, Administration, and Mobilization			
	Contingencies		20%
	Engineering		10%
	Administration & Legal		5%
	Mobilization		5%
	Sub-total		40%

Land Acquisition			
	Land Value	Acre	$ 125,000
	Administration & Legal		10%

PRELIMINARY DESIGN DRAWINGS

PLAN SHEETS
PROFILE SHEETS
DETAIL SHEETS

ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING



STUDY AREA BOUNDARY

SHEET INDEX

SHEET NO.	TITLE
T	TITLE SHEET
1–55	PRELIMINARY DESIGN PLAN SHEETS
56–64	PRELIMINARY DESIGN PROFILE SHEETS
65–67	PRELIMINARY DESIGN DETAIL SHEETS

PRELIMINARY DESIGN REPORT

TOWN OF ERIE
URBAN DRAINAGE AND FLOOD CONTROL DISTRICT

JULY 2007

Lore & Associates, Inc.
water resource consultants
800 Jefferson Avenue – Suite B
Louisville, Colorado 80027–1873
Phone: 303–673–9795
Fax: 303–673–9796

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COMMENTARY ON SHEET 1

No Regional Outfall System improvements are required on this sheet.

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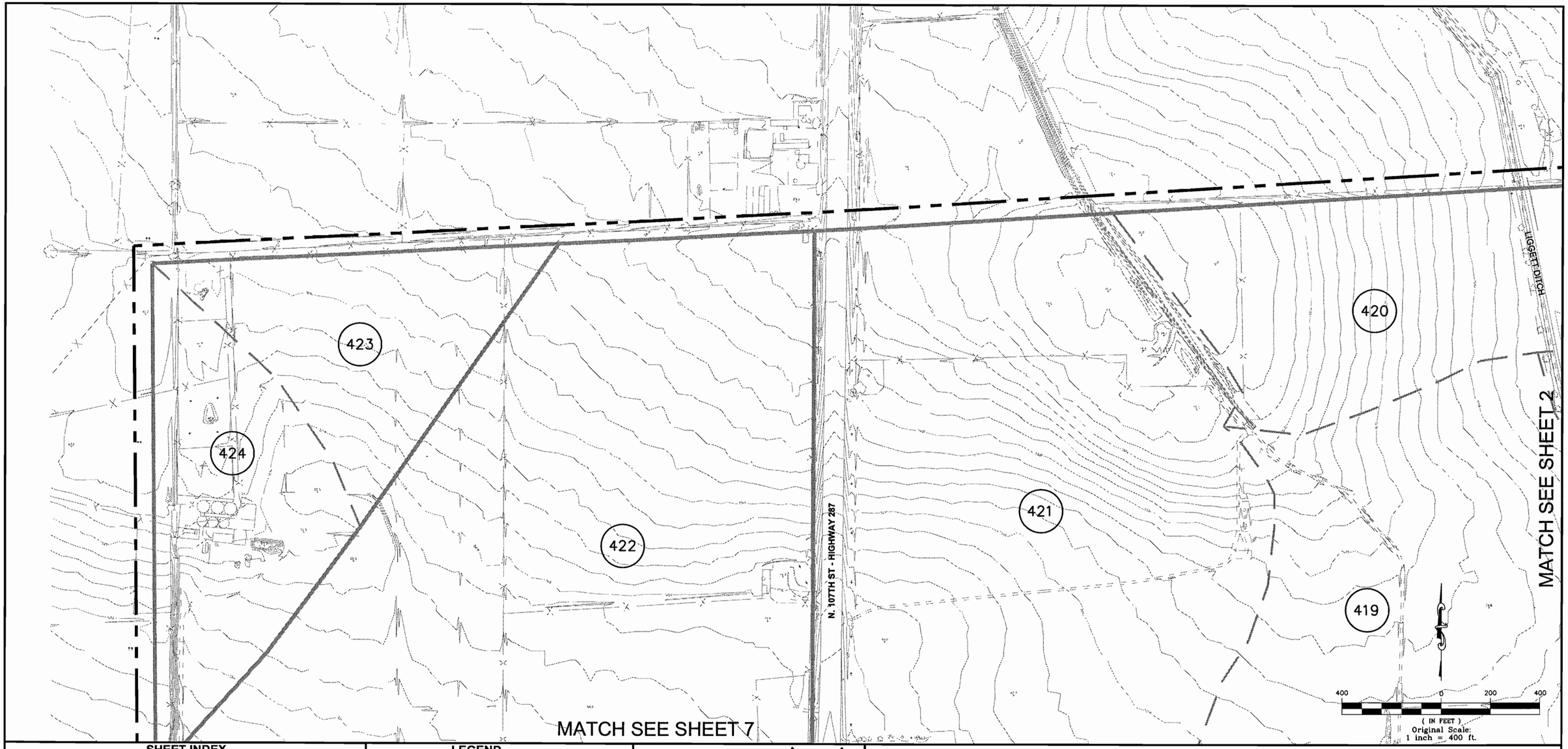
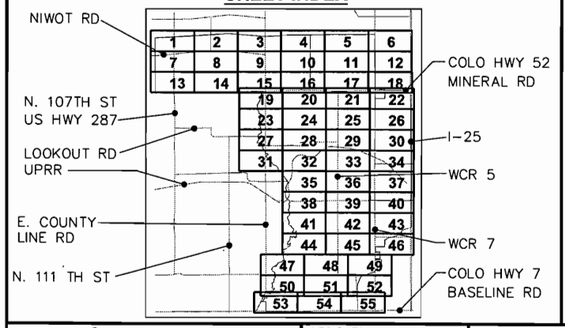


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 1 OF 67

COMMENTARY ON SHEET 2

No Regional Outfall System improvements are required on this sheet.

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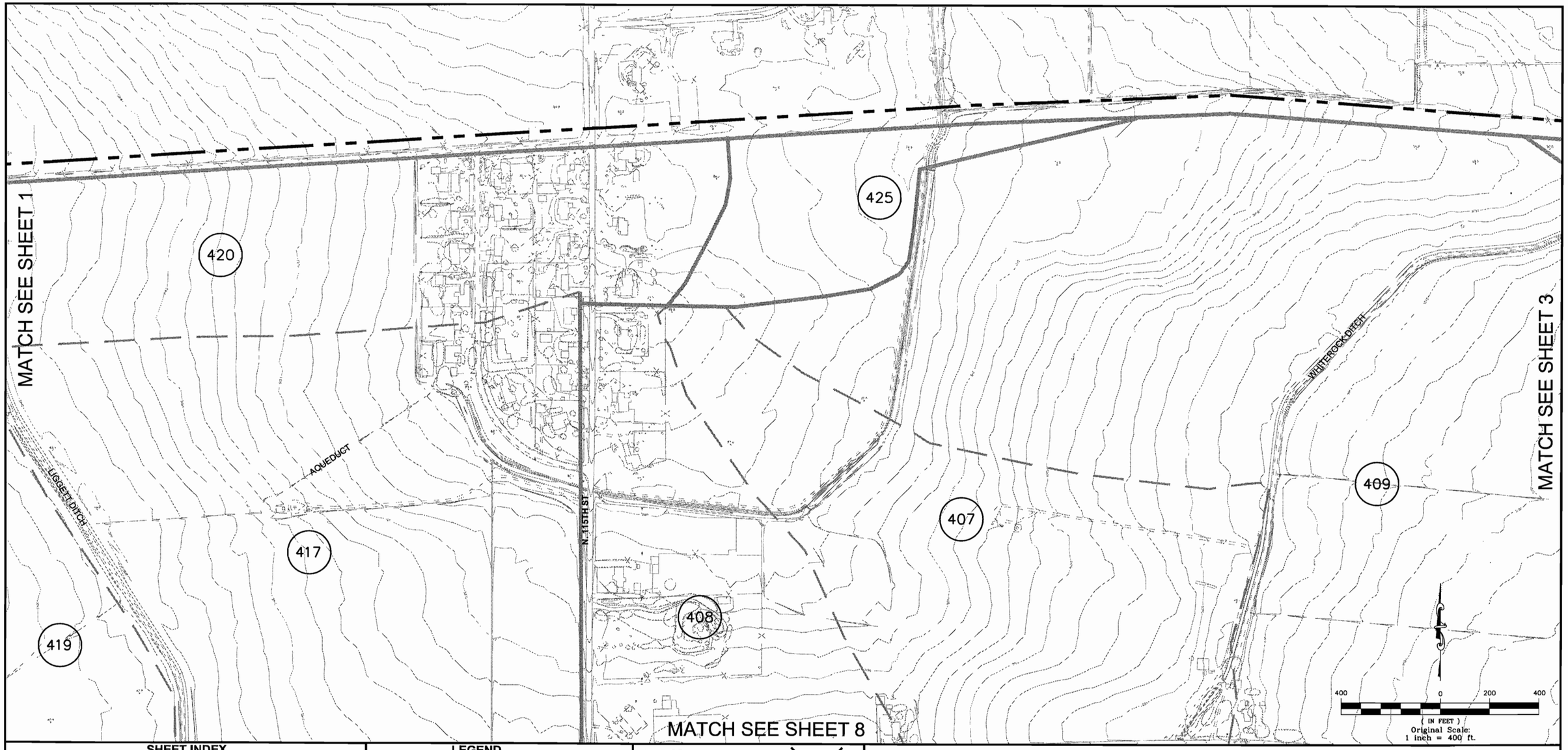
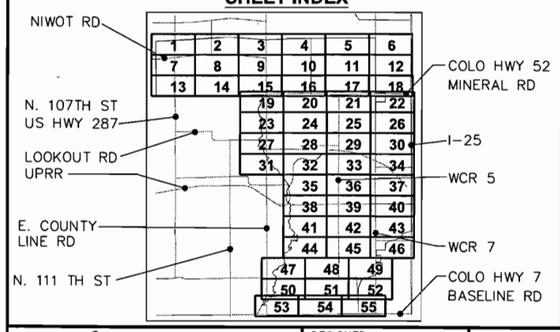


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
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OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
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JR-53-1948

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

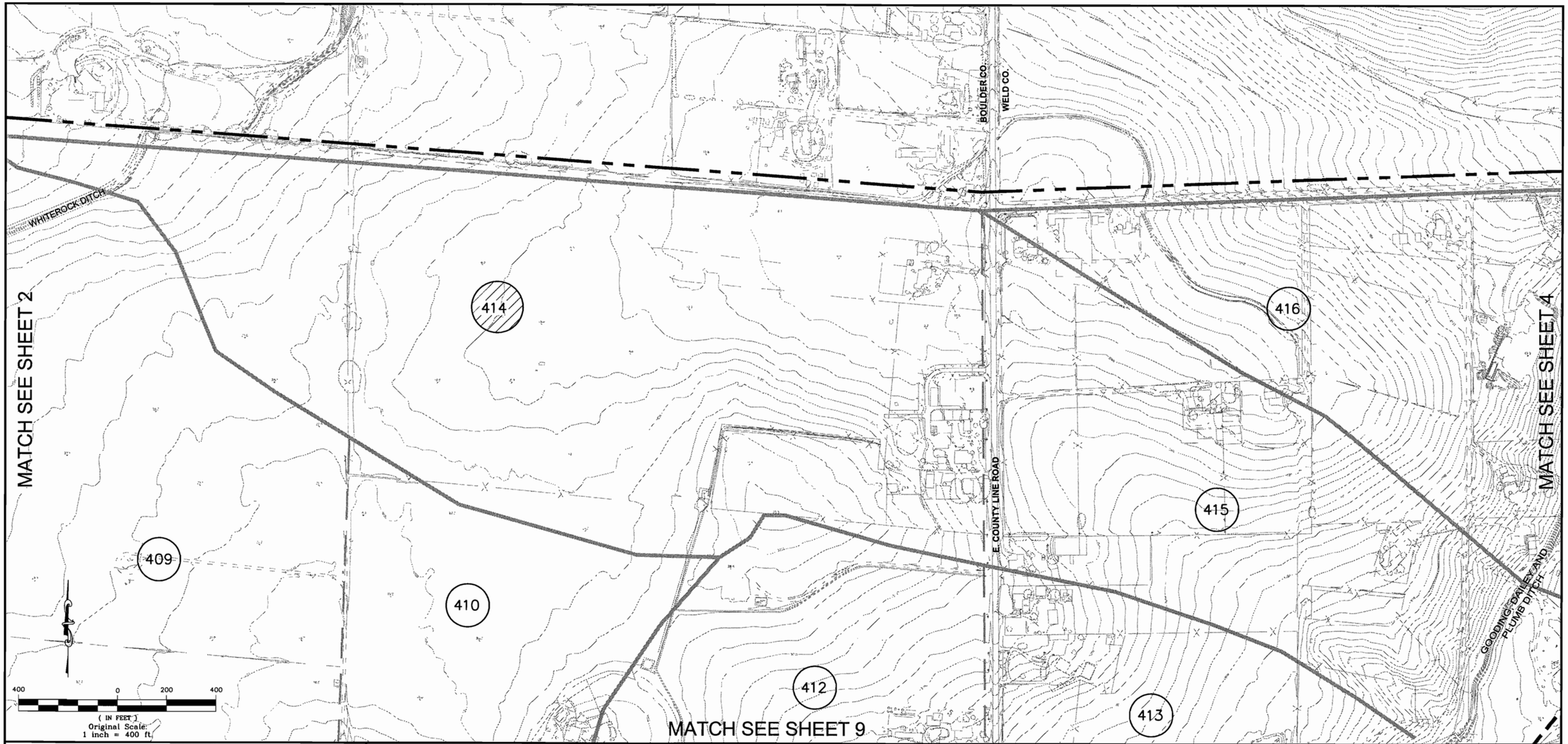
PRELIMINARY DESIGN PLAN

SHEET 2 OF 67

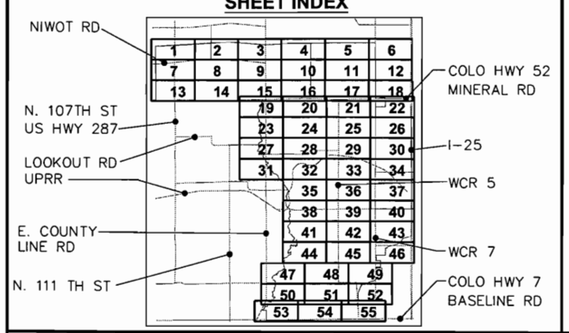
COMMENTARY ON SHEET 3

No Regional Outfall System improvements are required on this sheet.

\\ServerData\PROJECTS - CURRENT\0603D\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-1-6.dwg, 8/8/2007 7:50:40 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 3 OF 67

COMMENTARY ON SHEET 4

The improvements for Outfall System BC100 includes a 825-foot grass lined channel with a trickle channel. This channel is located in the Boulder Creek 100-year floodplain which cannot be developed and designed to pass the 2-year flood peak discharge. The 100-year flood peak for BC100 will spread over the floodplain.

Improvements for Outfall BC100 continue on Sheet 10.

Profiles for BC100 are shown on Sheet 56.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC100	Channel	825	$ 313,000

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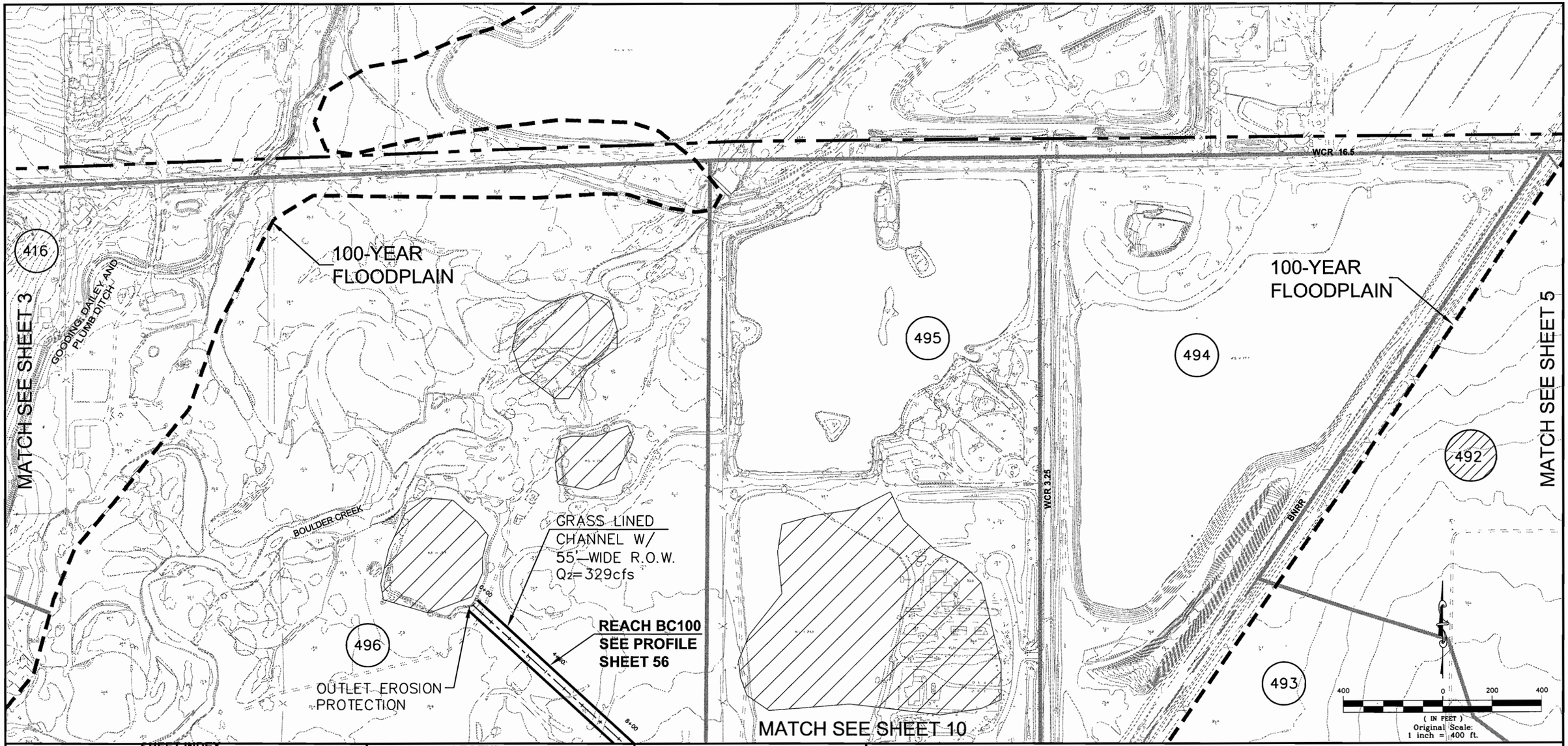
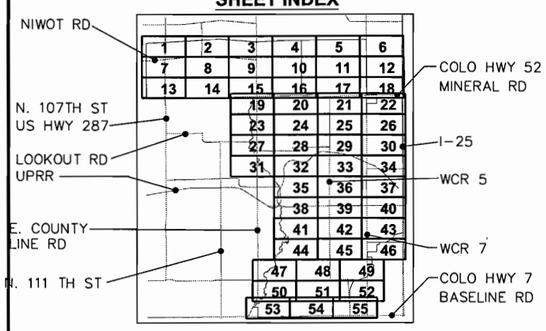


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 4 OF 67

COMMENTARY ON SHEET 5

No Regional Outfall System improvements are required on this sheet.

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WCR 16.5

MATCH SEE SHEET 4

MATCH SEE SHEET 6

MATCH SEE SHEET 11

WCR 5

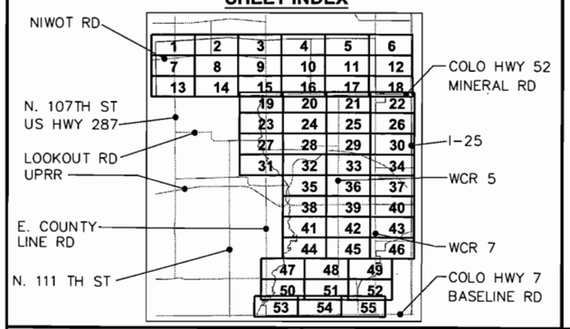
BOULDER & WELD CO. DITCH

LOWER BOULDER DITCH

491 492 490 489 488 487 1486 486 485

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
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- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
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- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 5 OF 67

COMMENTARY ON SHEET 6

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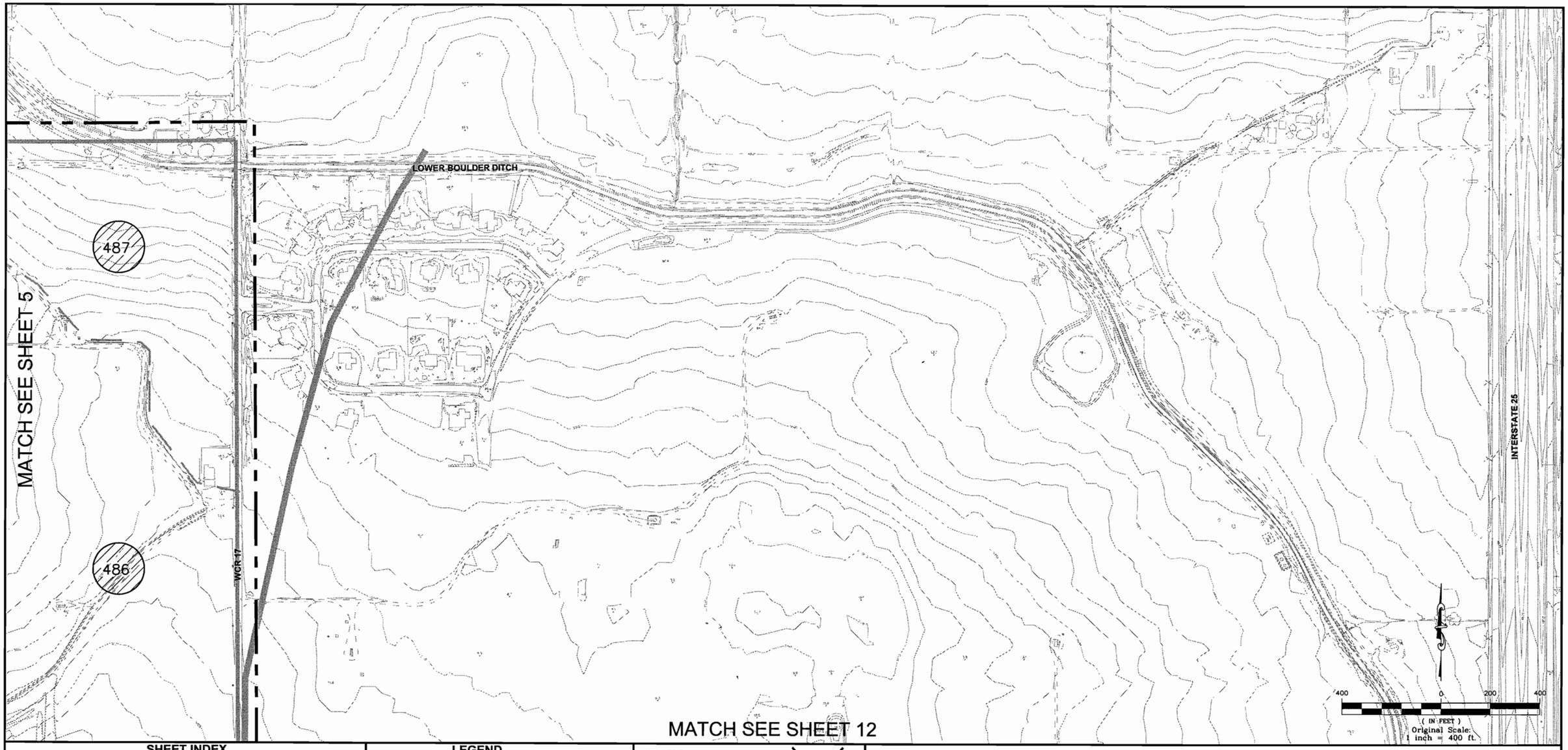
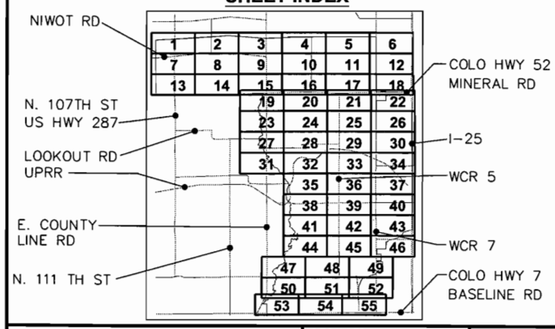


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
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- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
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DESIGNED:	RJP
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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 6 OF 67

COMMENTARY ON SHEET 7

No Regional Outfall System improvements are required on this sheet.

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MATCH SEE SHEET 1

NIWOT ROAD

421

419

422

N. 107TH ST - HIGHWAY 287

418

MATCH SEE SHEET 8

404

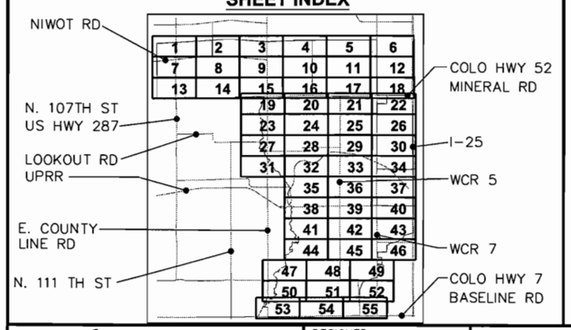
402

BOULDER AND WHITEROCK DITCH

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

MATCH SEE SHEET 13

SHEET INDEX



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OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 7 OF 67

COMMENTARY ON SHEET 8

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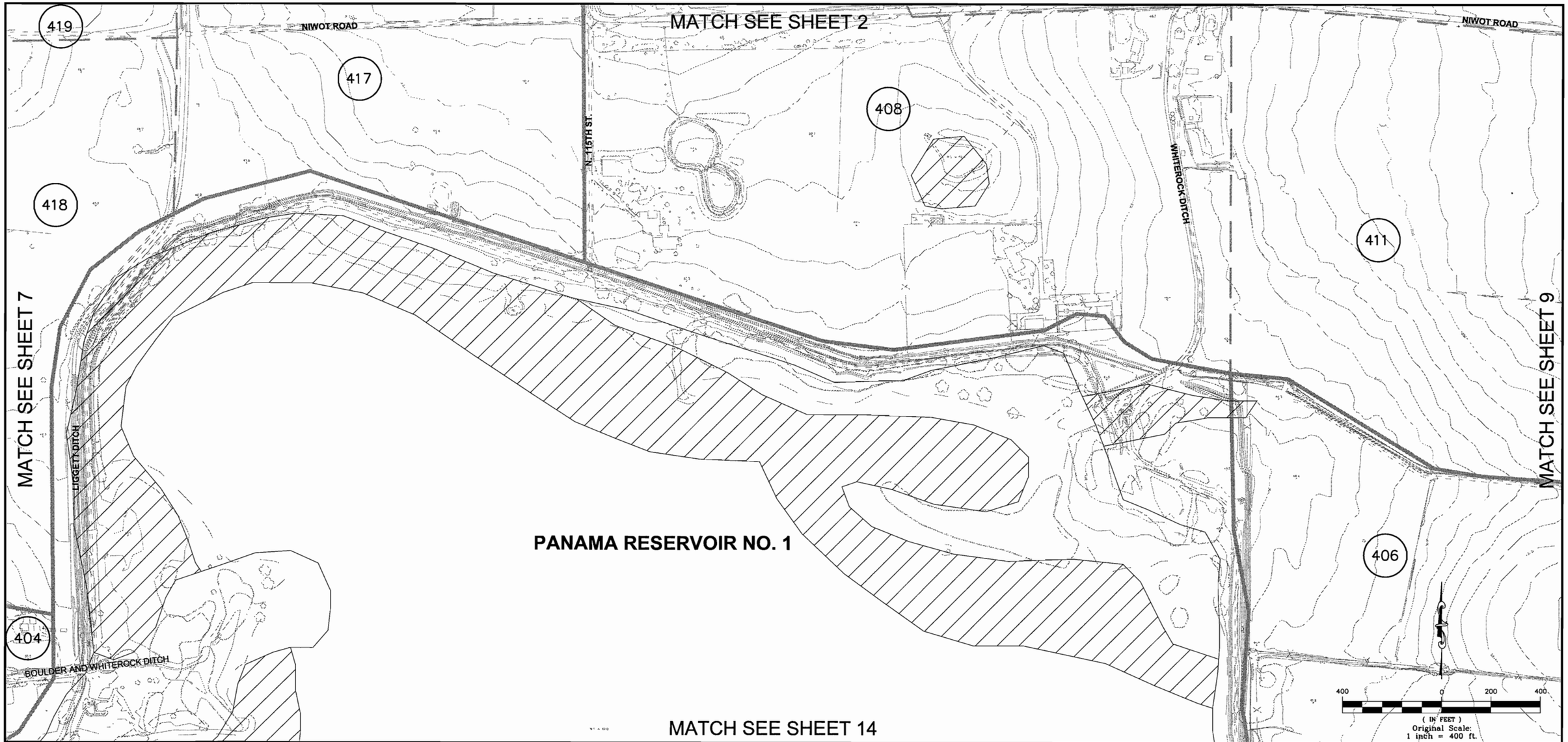

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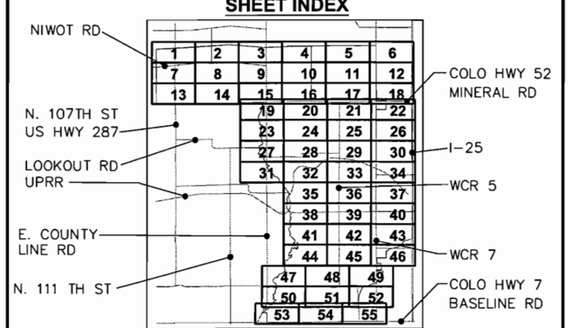

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. — 800
- ON-SITE OR LOCAL DETENTION REQUIRED — 800
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
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- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

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b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 8 OF 67

COMMENTARY ON SHEET 9

No Regional Outfall System improvements are required on this sheet.

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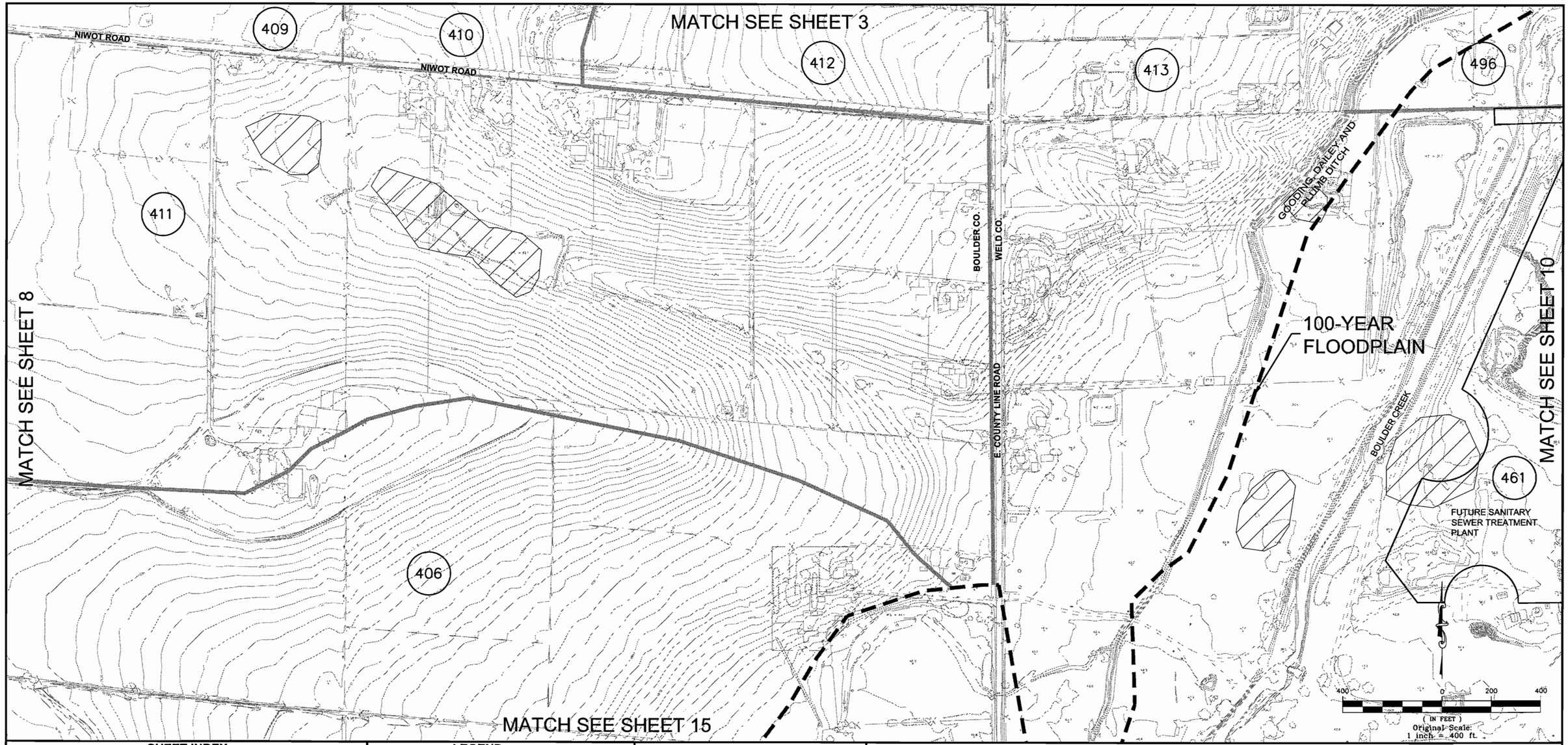

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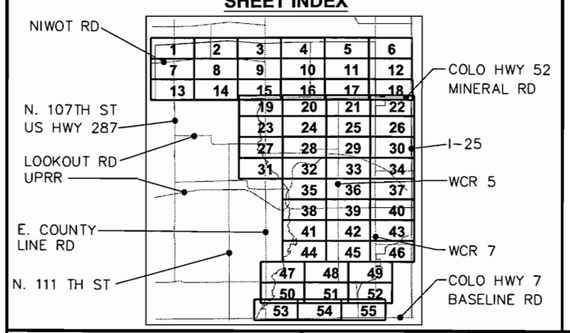

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 9 OF 67

COMMENTARY ON SHEET 10

The improvements for Outfall System BC100 includes a 4885 -foot grass lined channel with a trickle channel, grade control and drop structures, a 50-foot 8- x 6-ft RCB culvert below WCR 3.5, and modifications to approximately 350-feet of WCR 3.5 to create a 300-foot long overflow weir. The channel downstream of WCR 3.5 is located in the Boulder Creek 100-year floodplain which cannot be developed. The channel is designed to pass the 2-year flood peak discharge. The 100-year flood peak will spread over the floodplain by the overflow weir.

Improvements for Outfall BC100 continue on Sheets 4 and 11.

Profiles for BC100 are shown on Sheet 56.

Detention Facility 1117 with an outlet of two 48-inch RCP's is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC100	Channel	4885	$ 4,061,000
BC100	8' x 6' RCB	50	$ 118,000
1117	Detention Facility and Outlet		$ 1,581,000
BC100	Modifications to WCR 3.5	300	$ 150,000

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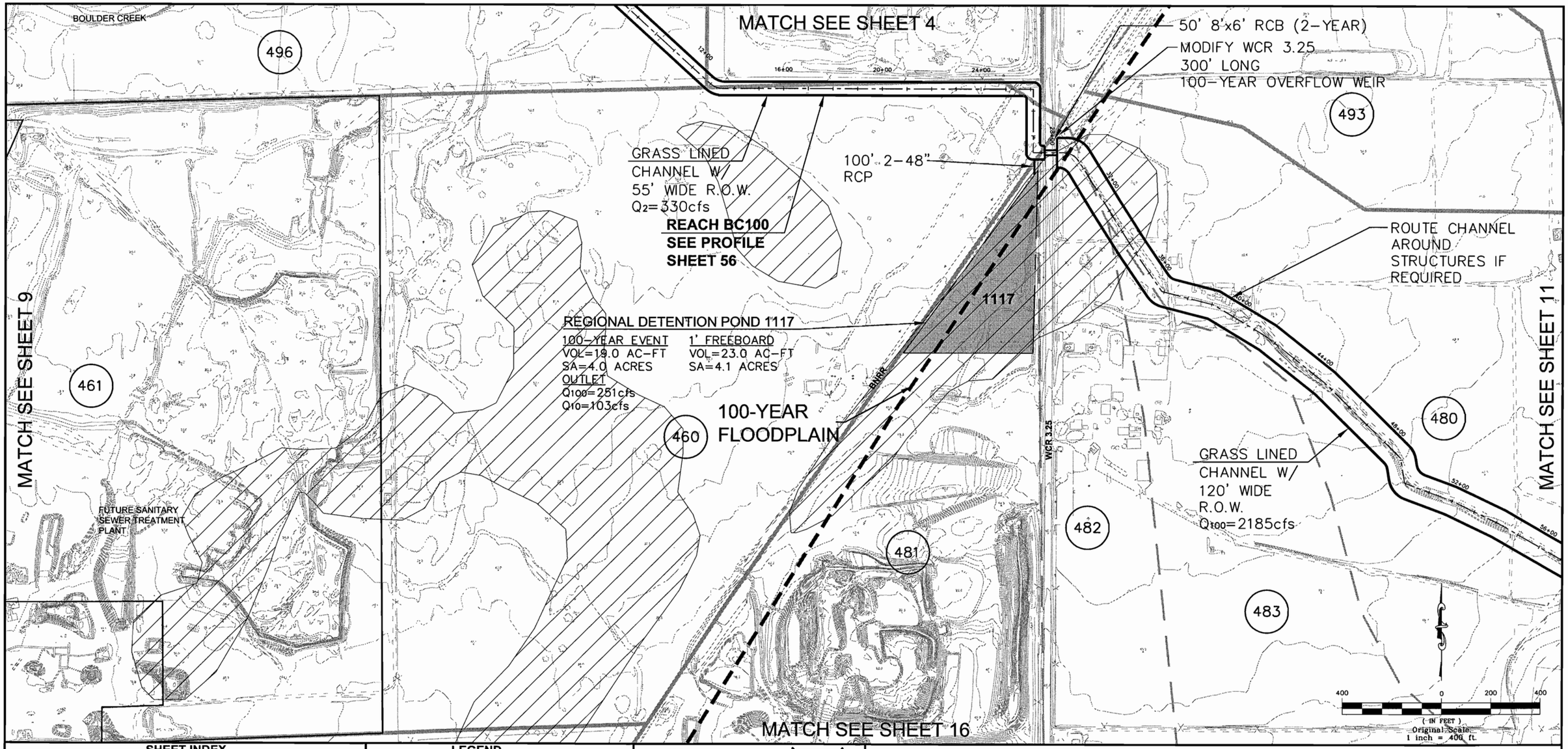
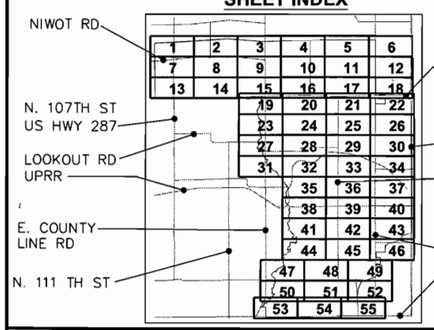


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE
- BURIED ELECTRIC — ELC
- CABLE TV — TV
- TELEPHONE — T
- GAS — GAS
- WATER — W
- SANITARY SEWER — S
- STORM SEWER — ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 10 OF 67

COMMENTARY ON SHEET 11

The improvements for Outfall System BC100 includes a 930-foot grass lined channel with a trickle channel.

Improvements for Outfall BC100 continue on Sheets 10 and 17.

Profiles for BC100 are shown on Sheet 56.

Outfall	Improvement	Linear Feet	Cost
BC100	Channel	930	$ 1,103,000

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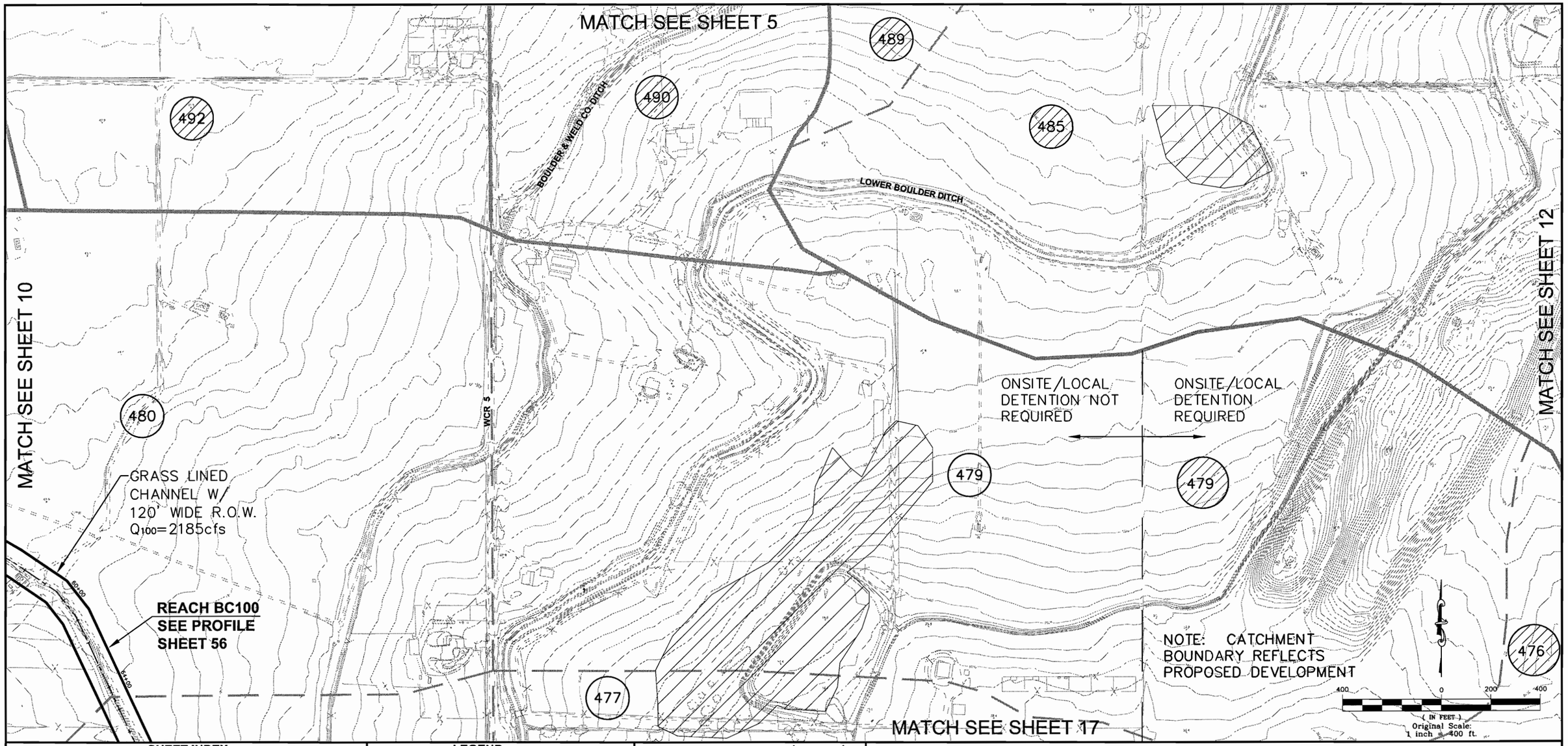
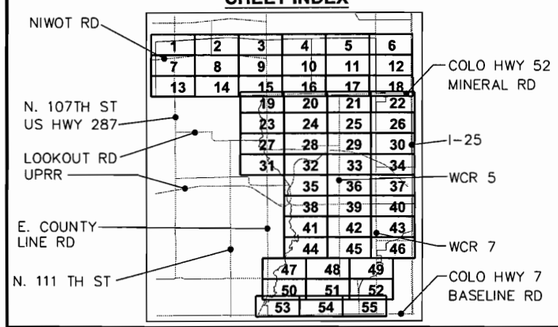


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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Fax: 303-673-9796

DESIGNED:	RJP
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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 11 OF 67

COMMENTARY ON SHEET 12

No Regional Outfall System improvements are required on this sheet.

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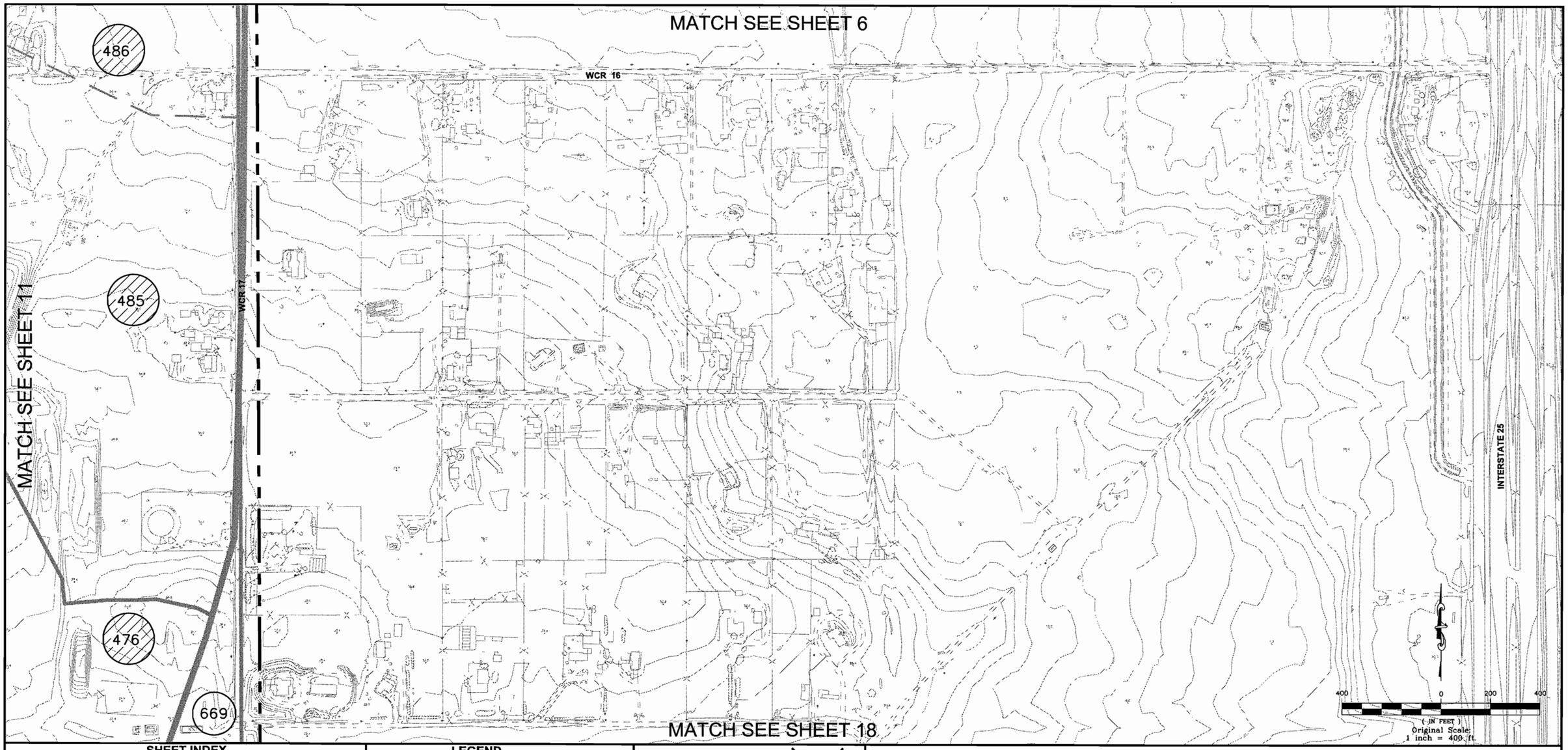

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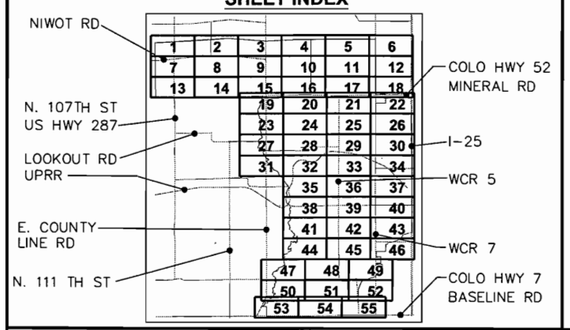

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
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- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

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VERTICAL: NGVD 88

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 12 OF 67

COMMENTARY ON SHEET 13

No Regional Outfall System improvements are required on this sheet.

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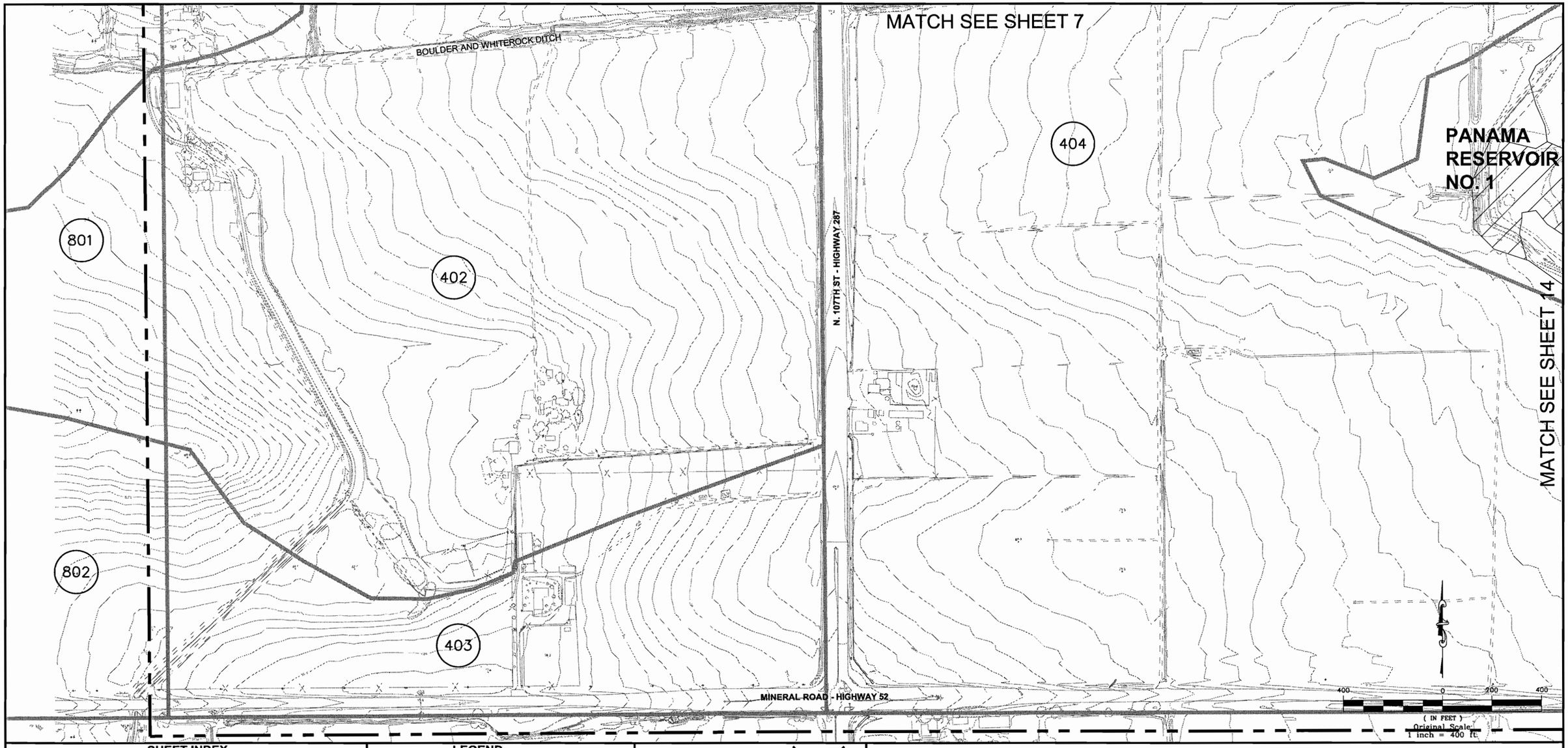
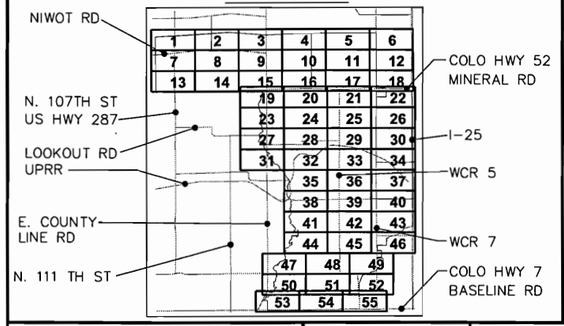


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
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- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
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- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 13 OF 67

COMMENTARY ON SHEET 14

No Regional Outfall System improvements are required on this sheet.

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MATCH SEE SHEET 8

PANAMA RESERVOIR NO. 1

MATCH SEE SHEET 13

MATCH SEE SHEET 15

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

404

405

426

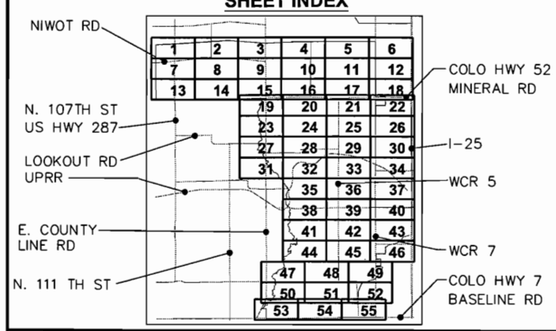
LIGGETT DITCH

T 2 N.

T 1 N.

MINERAL ROAD - HIGHWAY 52

SHEET INDEX



LEGEND

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OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

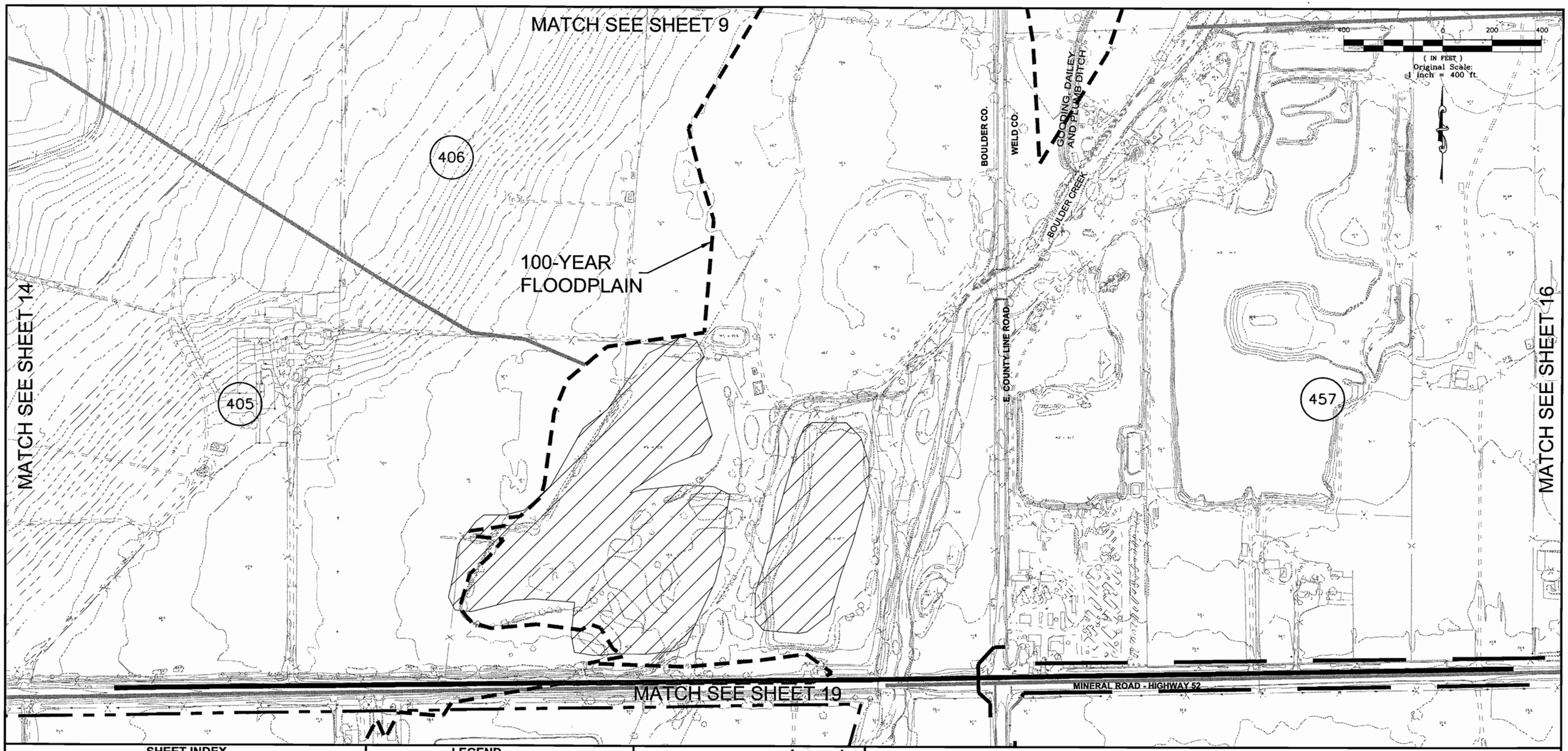
PRELIMINARY DESIGN PLAN

SHEET 14 OF 67

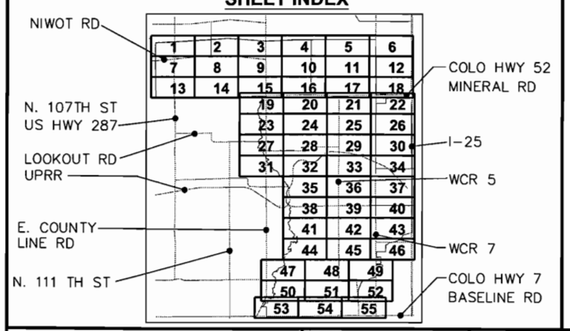
COMMENTARY ON SHEET 15

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-13-18.dwg, 8/8/2007 9:00:12 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

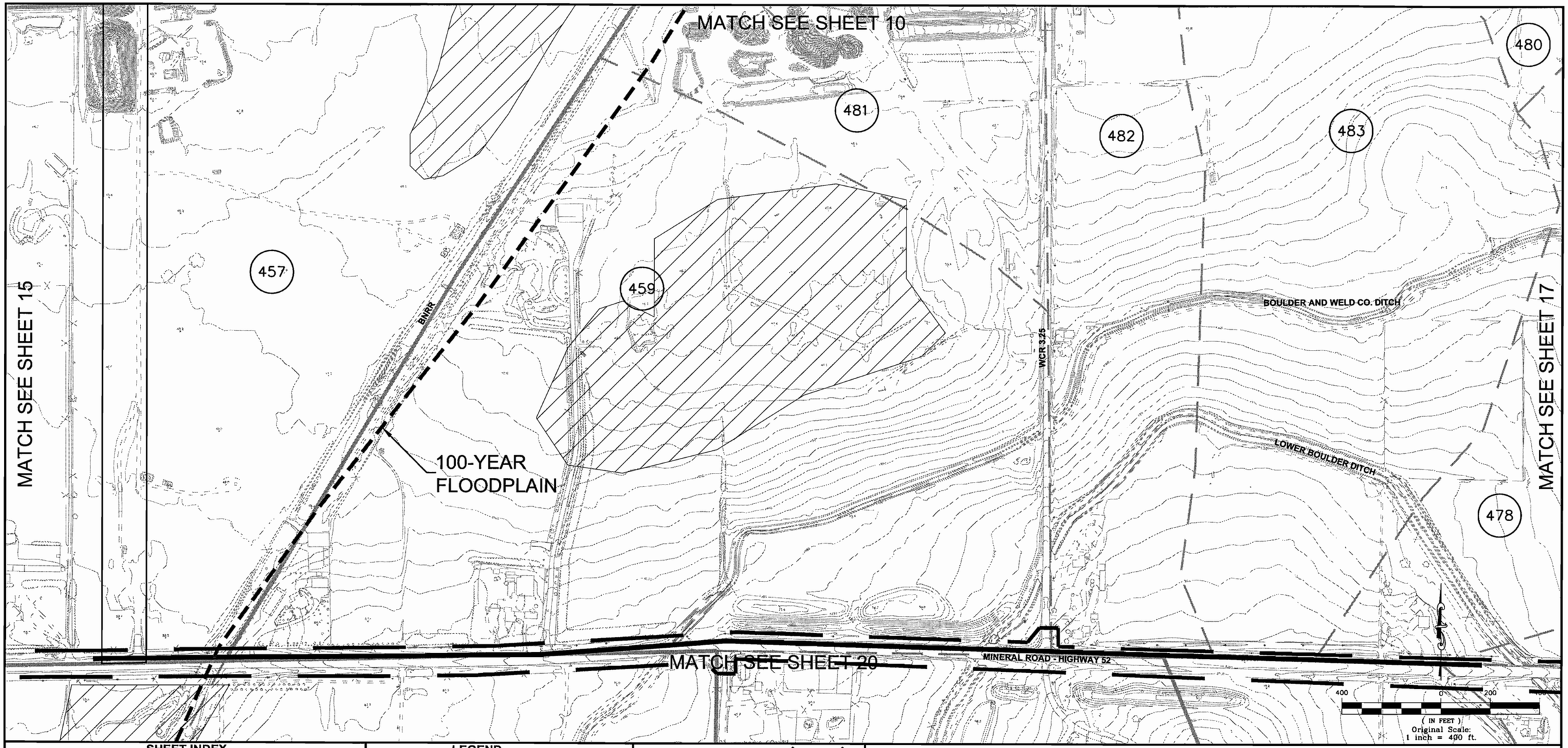
PRELIMINARY DESIGN PLAN

SHEET 15 OF 67

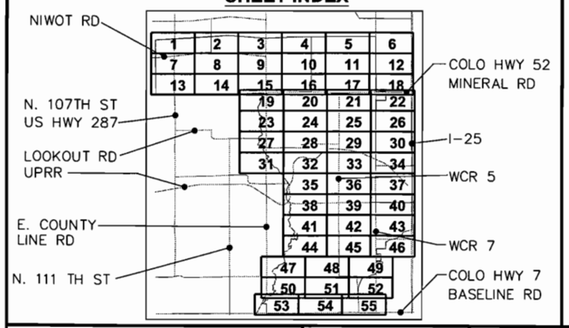
COMMENTARY ON SHEET 16

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\PDF-SHTS-13-18.dwg, 8/8/2007 9:05:12 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 16 OF 67

COMMENTARY ON SHEET 17

The improvements for Outfall System BC100 includes a 3380 -foot grass lined channel with a trickle channel, drop structures, and a 50-ft long 2 x 8- x 6-ft RCB below Boulder and Weld County Ditch.

Improvements for Outfall BC100 continue on Sheets 11 and 21.

Profiles for BC100 are shown on Sheet 56.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC100	Channel	3380	$ 3,772,000
BC100	two 8' x 6' RCB	50	$ 191,000

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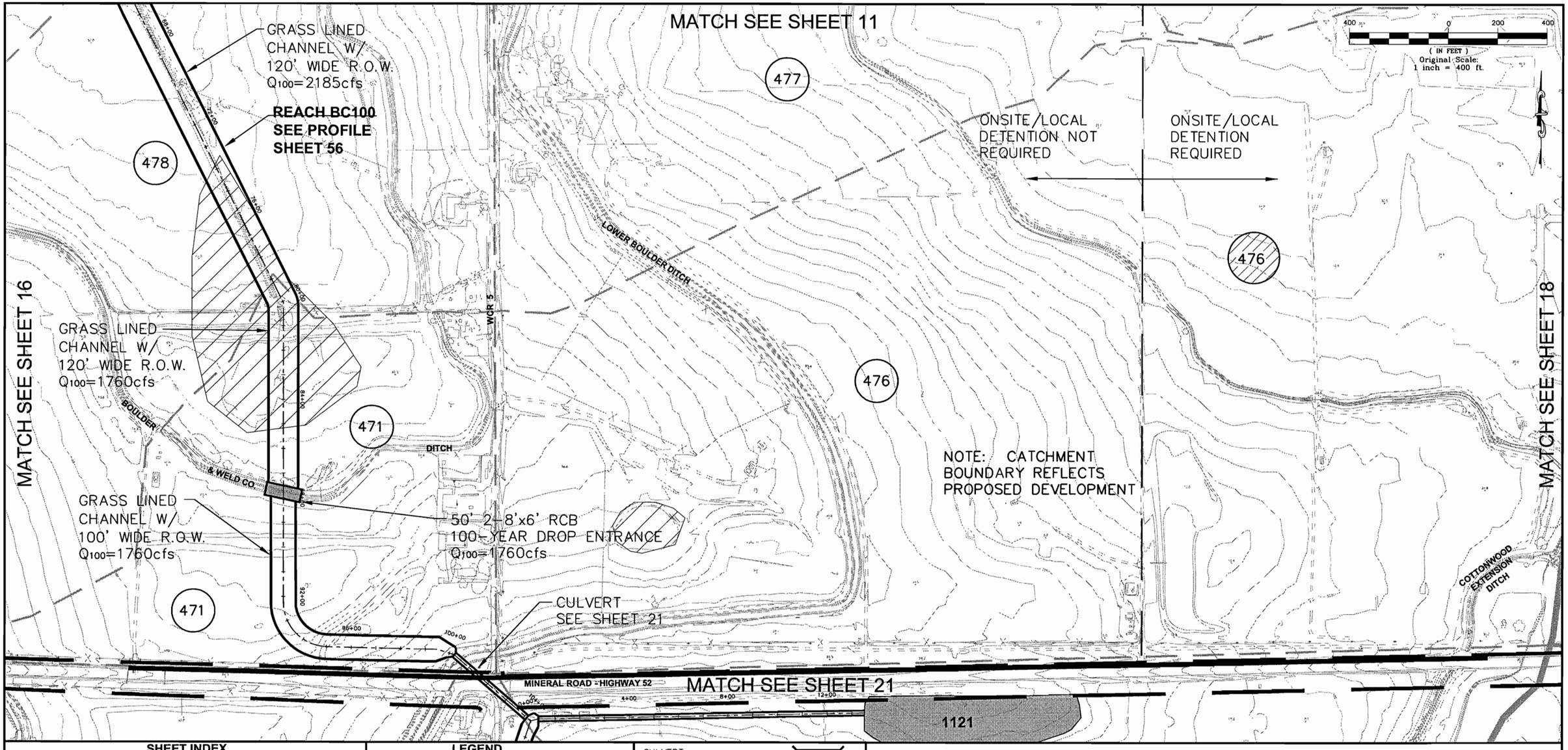
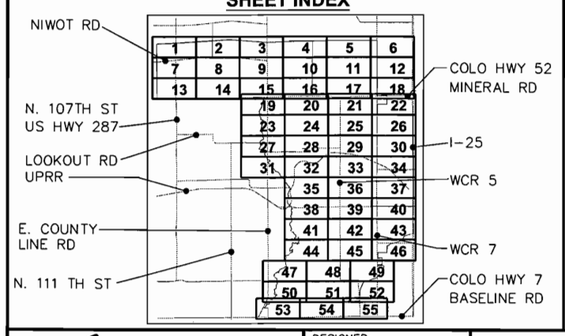


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE
NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 17 OF 67

COMMENTARY ON SHEET 18

No Regional Outfall System improvements are required on this sheet.

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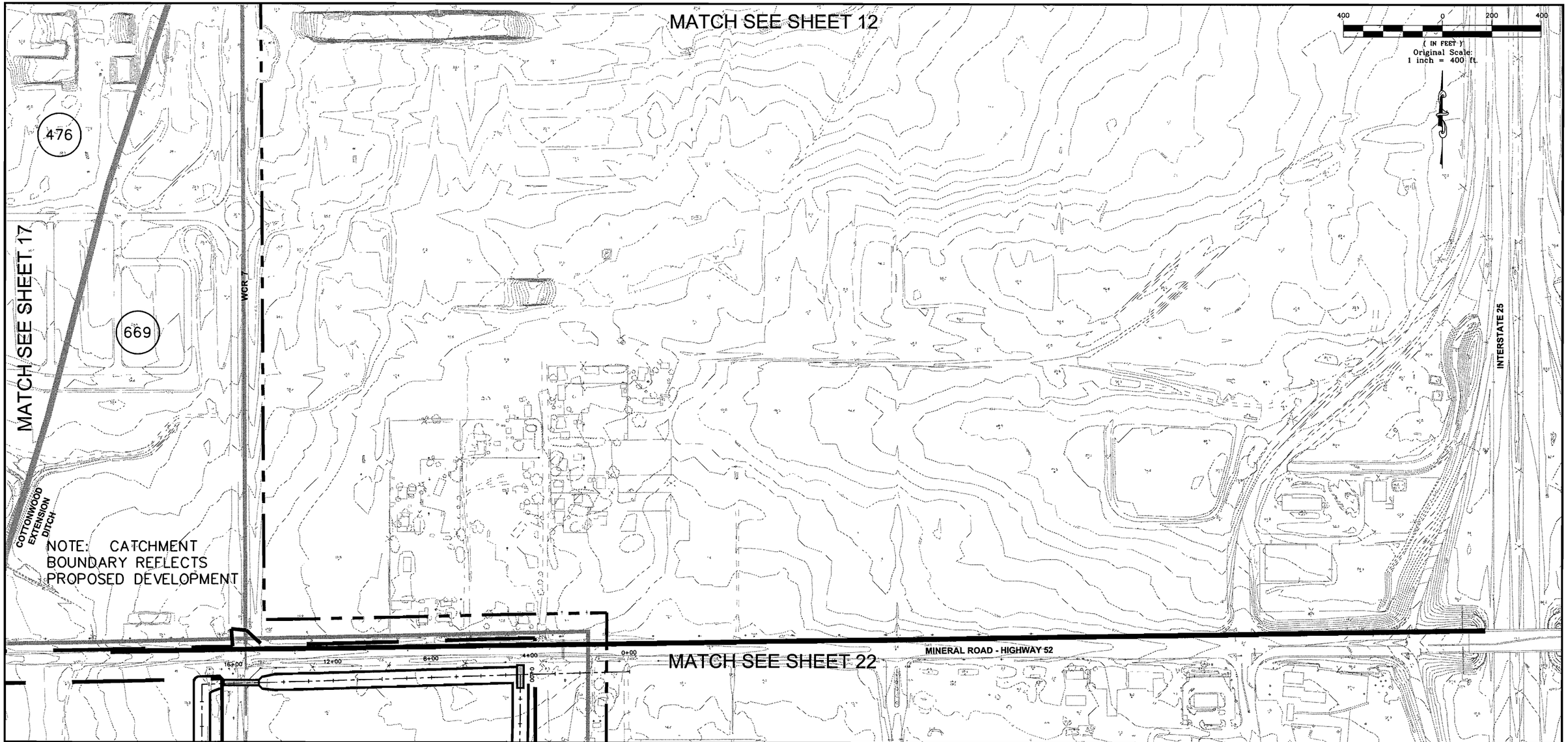
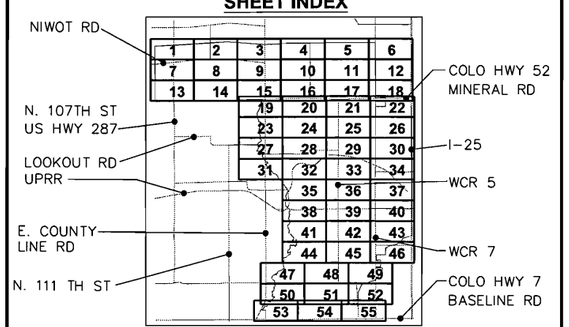


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 18 OF 67

COMMENTARY ON SHEET 19

The improvements for Outfall System BC110 includes a 2990 -foot grass lined channel with a trickle channel, and 180 feet of 2 x 6- x 3- ft RCB culvert. This channel is located in the Boulder Creek 100-year floodplain which cannot be developed. The channel is designed to pass the 2-year flood peak discharge. The 100-year flood peak will spread over the floodplain.

Improvements for Outfall BC110 continue on Sheet 20.

Profiles for BC110 are shown on Sheet 57.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	2990	$ 1,353,000
BC110	two 3' x 6' RCB	180	$ 369,000

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MATCH SEE SHEET 15

MINERAL ROAD-HIGHWAY 52

OUTLET EROSION PROTECTION

180' 2-3'x 6' RCB
Q_2=325cfs

GRASS LINED CHANNEL W/ 45' WIDE R.O.W.
Q_2=325cfs

REACH BC110
SEE PROFILE SHEET 57

GRASS LINED CHANNEL W/ 75' WIDE R.O.W.
Q_2=325cfs

BOULDER CREEK

454

455

E. COUNTY LINE ROAD

100-YEAR FLOODPLAIN

MATCH SEE SHEET 20

BOULDER CREEK

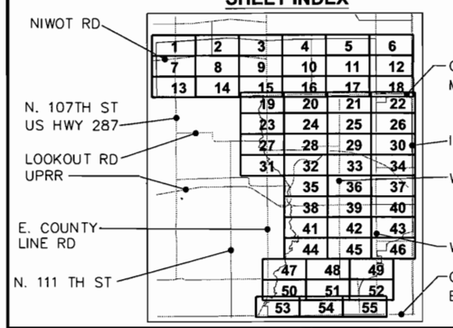
COAL CREEK

BOULDER & WELD CO. DITCH

MATCH SEE SHEET 23

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

COMMENTARY ON SHEET 20

The improvements for Outfall System BC110 includes a 2770 -foot grass lined channel with a trickle channel, drop structures, a 110 feet long spreader system, and a 110 foot long irrigation overflow structure. The flow spreader channel is located on the 100-year floodplain which cannot be developed. The flow spreader will spread the 100-year flood peak over the floodplain.

Improvements for Outfall BC110 continue on Sheet 19 and 24.

Profiles for BC110 are shown on Sheet 57 and 58.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	2770	$ 2,677,000
BC110	Flow Spreader	110	$ 4,400
BC110	Irrigation Ditch Overflow	110	$ 40,000

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19

MATCH SEE SHEET 16

MINERAL ROAD-HIGHWAY 52

MATCH SEE SHEET 21

MATCH SEE SHEET 24

GRASS LINED CHANNEL W/ 75' WIDE R.O.W. Q_2=325cfs

FLOW SPREADER L=110'

REACH BC110 SEE PROFILE SHEETS 57 & 58

110' LONG IRRIGATION DITCH OVERFLOW STRUCTURE

GRASS LINED CHANNEL W/ 110' WIDE R.O.W. Q_{100}=1955cfs

GRASS LINED CHANNEL W/ 110' WIDE R.O.W. Q_{100}=1955cfs

BOULDER & WELD CO. DITCH

LOWER BOULDER DITCH

WCR 3

456

458

469

470

451

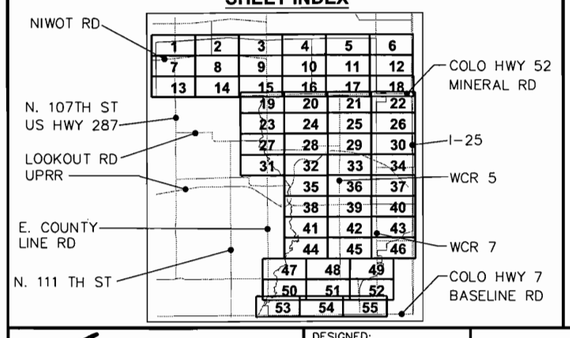
452

449

32+00 36+00 40+00 44+00 48+00 52+00 56+00

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE
- BURIED ELECTRIC — ELC
- CABLE TV — TV
- TELEPHONE — T
- GAS — GAS
- WATER — W
- SANITARY SEWER — S
- STORM SEWER — ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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water resource consultants
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Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 20 OF 67

COMMENTARY ON SHEET 21

The improvements for Outfall System BC100 includes a 1975 -foot grass lined channel with a trickle channel, drop structures, a 400-foot 10- x 6-ft RCB culvert below Highway 52 and Lower Boulder Ditch, and 450 feet of 2 x 6-ft RCP storm sewers.

Improvements for Outfall BC100 continue on Sheets 17 and 25.

Profiles for BC100 are shown on Sheets 56 and 57.

The improvements for Outfall System BC105 include 1350-feet of 2 x 6-ft RCP storm sewer which are outlets for Detention Facility 1121.

Profiles for BC105 are shown on Sheet 57.

Detention Facility 1121 with an outlet of two 6-foot RCP's is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC100	Channel	1975	$ 958,000
BC100	10' x 6' RCB	400	$ 707,000
BC100	two 5.5' RCP Storm Sewers	450	$ 315,000
1121	Detention Facility and Outlet		$ 3,339,000

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MATCH SEE SHEET 17

MINERAL ROAD-HIGHWAY 52

MATCH SEE SHEET 20

MATCH SEE SHEET 22

400' 10'x6' RCB
DROP ENTRANCE
Q_{100}=1100cfs

GRASS LINED
CHANNEL W/
60' WIDE R.O.W.
Q_{100}=460cfs

1350' 2-6' RCP
OUTLET PIPES
Q_{100}=641cfs

REACH BC105
SEE PROFILE
SHEET 57

1121

REGIONAL DETENTION POND 1121

100-YEAR EVENT	1' FREEBOARD
VOL=30.5 AC-FT	VOL=35.5 AC-FT
SA=5.0 ACRES	SA=5.1 ACRES

OUTLET
Q_{100}=641cfs
Q_{10}=302cfs

NOTE: CATCHMENT
BOUNDARY REFLECTS
PROPOSED DEVELOPMENT

450' 2-66" RCP
STORM SEWER
Q_{100}=460cfs

REACH BC100
SEE PROFILE
SHEETS 56 & 57

GRASS LINED
CHANNEL W/
60' WIDE R.O.W.
Q_{100}=460cfs

LOWER BOULDER DITCH

WCR 5

COTTONWOOD EXTENSION DITCH

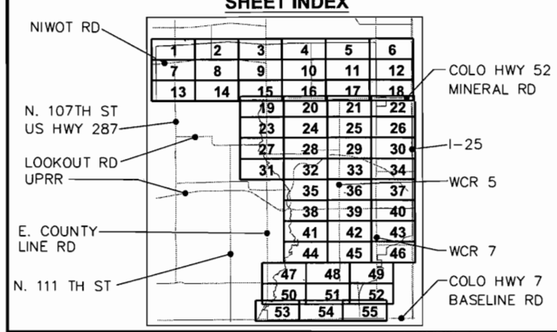
COMMUNITY DITCH

470 475 1474 474 469 468

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

MATCH SEE SHEET 25

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE
NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 21 OF 67

COMMENTARY ON SHEET 22

The improvements for Outfall System GH120 includes a 3950 -foot grass lined channel with a trickle channel, drop structures, a 140-foot 12- x 8-ft RCB culvert below WCR 7, and a flow spreader shared with Outfall System GH110. The channel ends at the Erie Planning Area Boundary, and channel design downstream will be done by others, per the South Weld County I-25 Corridor Master Drainage Plan (Anderson, 2000).

Improvements for Outfall GH120 continue on Sheet 26.

Profiles for GH120 are shown on Sheet 63.

The improvements for Outfall System GH110 includes a 1310 -foot grass lined channel with a trickle channel, drop structures and a flow spreader. The channel ends at the Erie Planning Area Boundary, and channel design downstream will be done by others, per the South Weld County I-25 Corridor Master Drainage Plan (Anderson, 2000). The channel also terminates at the Erie Planning Area boundary at Station 26+00, channel improvements outside of the Erie Planning Area boundary at Stations 12+25 to 26+00 will be done by others, per Anderson (2000).

Improvements for Outfall GH110 continue on Sheet 26.

Profiles for GH110 are shown on Sheet 62.

The improvements for Outfall System GH100 includes a 100 -foot grass lined channel with a trickle channel, drop structures, and a flow spreader. The channel ends at the Erie Planning Area Boundary, and channel design downstream will be done by others, per the South Weld County I-25 Corridor Master Drainage Plan (Anderson, 2000).

Improvements for Outfall GH100 continue on Sheet 26.

Profiles for GH100 are shown on Sheet 62.

Outfall	**Improvement**	**Linear Feet**	**Cost**
GH120	Channel	3850	$ 2,418,000
GH120	12' x 8' RCB	140	$ 355,000
GH120	Flow Spreader	250	$ 10,000
GH110	Channel	1310	$ 862,000
GH110	Flow Spreader	80	$ 3,200
GH100	Channel	100	$ 138,000
GH100	Flow Spreader	60	$ 2,400

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MATCH SEE SHEET 18

MINERAL ROAD-HIGHWAY 52

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

Q_{100}=1500cfs

HISTORIC FLOW PATH DIRECT TO EXISTING 3'x8'x6' RCB BELOW I-25 BY OTHERS.
RE: SOUTH WELD I-25 CORRIDOR MASTER DRAINAGE PLAN.

FLOW SPREADER
L=250'

GRASS LINED CHANNEL W/ 65' WIDE R.O.W.
Q_{100}=980cfs

140' 12'x8' RCB 100-YEAR WITH DROP INLET
Q_{100}=940cfs

REACH GH120 SEE PROFILE SHEET 63

675

GRASS LINED CHANNEL W/ 65' WIDE R.O.W.
Q_{100}=560cfs

REACH GH110 SEE PROFILE SHEET 62

Q_{100}=355cfs

MATCH SEE SHEET 21

668

WCR 7

STA. 12+25 TO 26+00 CHANNEL IMPROVEMENTS BY OTHERS

INTERSTATE 25

HISTORIC FLOW PATH DIRECT TO EXISTING 3'x8'x6' RCB BELOW I-25 BY OTHERS.
RE: SOUTH WELD I-25 CORRIDOR MASTER DRAINAGE PLAN.

FLOW SPREADER
L=60'

REACH GH100 SEE PROFILE SHEET 62

GRASS LINED CHANNEL W/ 55' WIDE R.O.W.
Q_{100}=355cfs

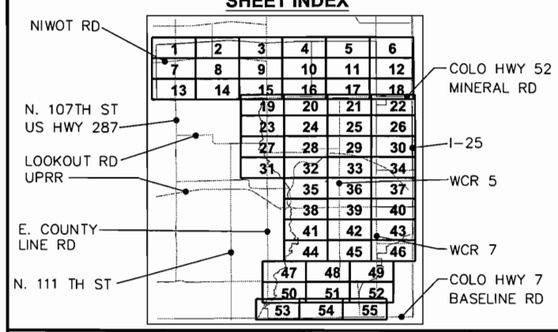
GRASS LINED CHANNEL W/ 65' WIDE R.O.W.
Q_{100}=940cfs

FLOW SPREADER
L=80'

GRASS LINED CHANNEL W/ 60' WIDE R.O.W.
Q_{100}=500cfs

MATCH SEE SHEET 26

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

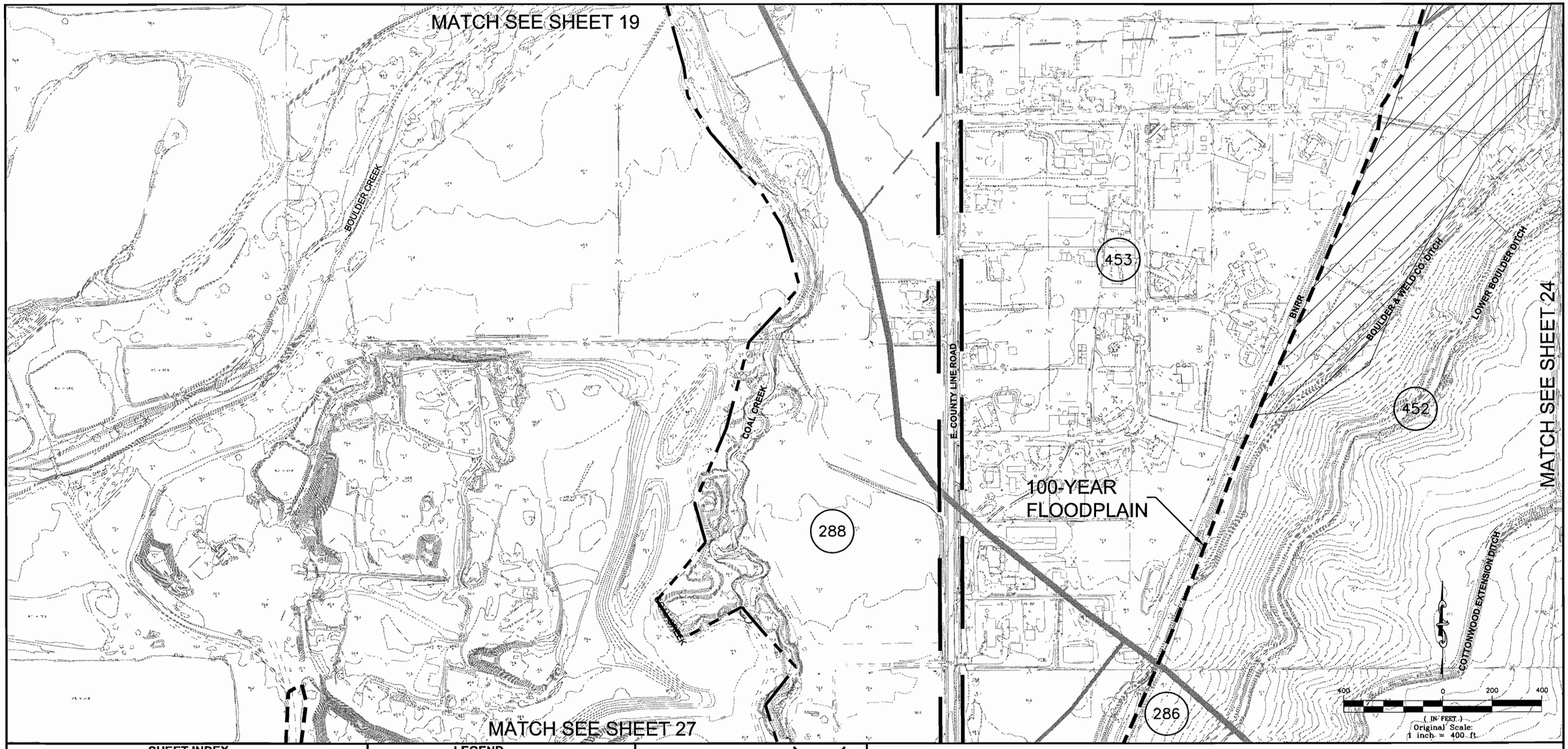
PRELIMINARY DESIGN PLAN

SHEET 22 OF 67

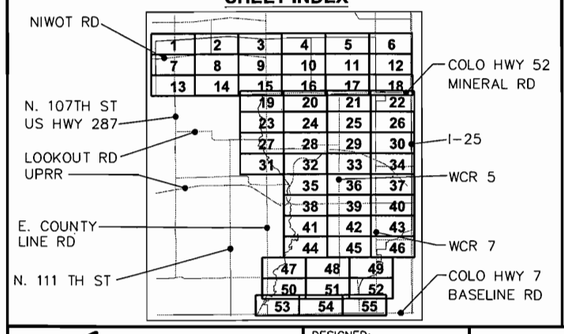
COMMENTARY ON SHEET 23

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-19-24.dwg, 8/7/2007 10:15:20 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

CULVERT	
STORM SEWER	
POTENTIAL WETLANDS	
OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

DATUM:
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VERTICAL: NGVD 88

CONTROL POINTS:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 23 OF 67

COMMENTARY ON SHEET 24

The improvements for Outfall System BC110 includes a 3115 -foot grass lined channel with a trickle channel, drop structures, a 600-foot 2 x 10- x 8-ft RCB culvert below Lower Boulder Ditch and WCR 3, and 50 feet of 2 x 10- x 8-ft RCB culverts below WCR 12.

Improvements for Outfall BC110 continue on Sheets 20 and 28.

Profiles for BC110 are shown on Sheet 58.

Detention Facility 1115 with an outlet of one 54-inch RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	3115	$ 2,907,000
BC110	two 10' x 8' RCB	600	$ 2,285,000
BC110	two 10' x 8' RCB	50	$ 253,000
1115	Detention Facility and Outlet		$ 564,000

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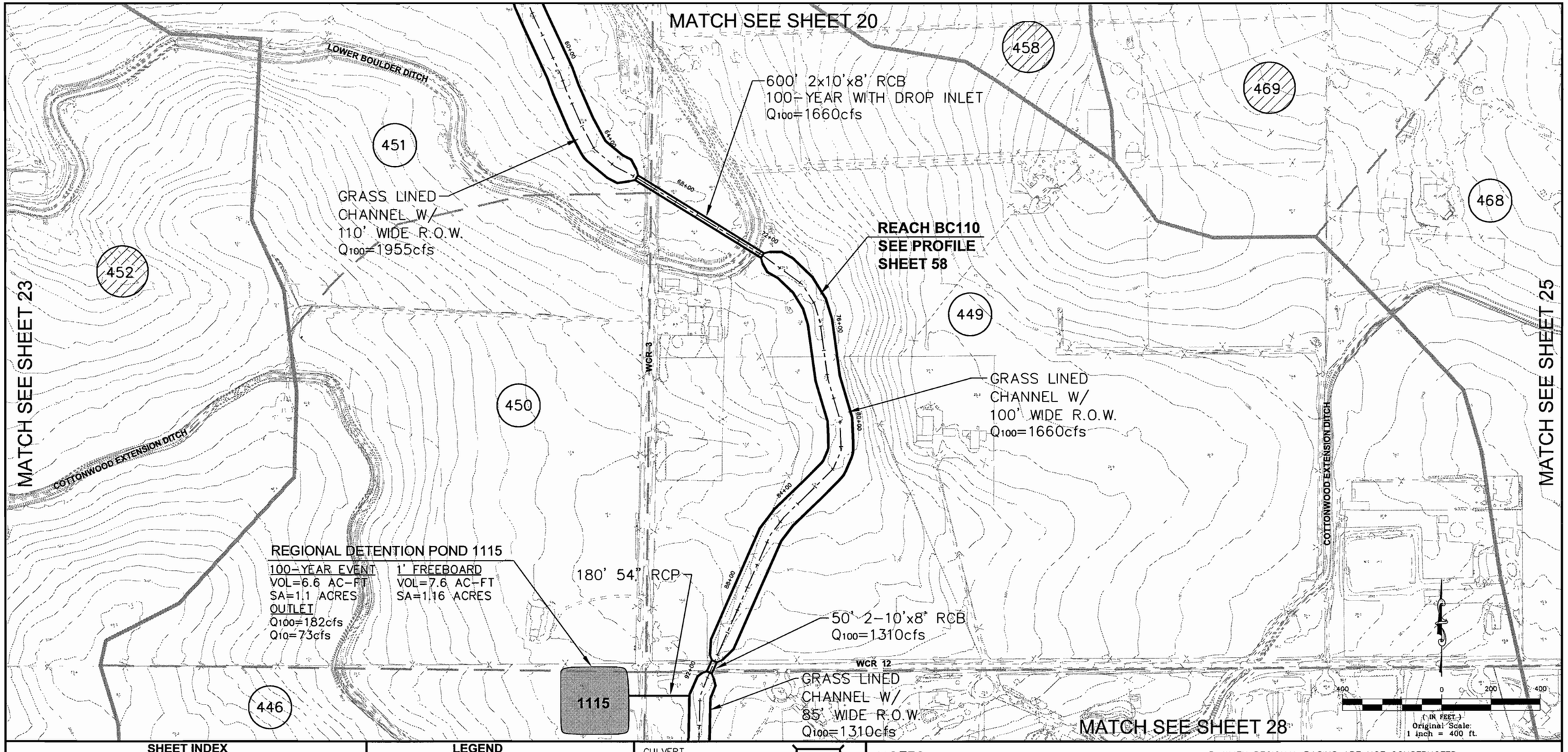
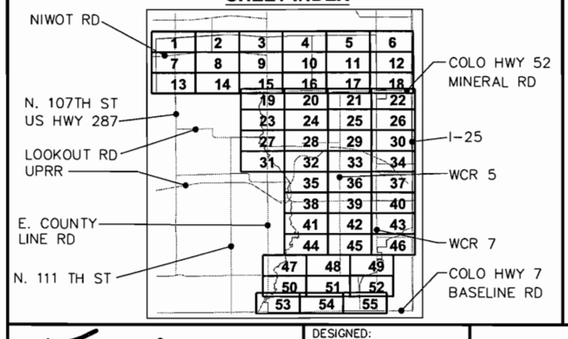


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
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- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

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VERTICAL: NGVD 88

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USGS CONTROL POINT:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 24 OF 67

COMMENTARY ON SHEET 25

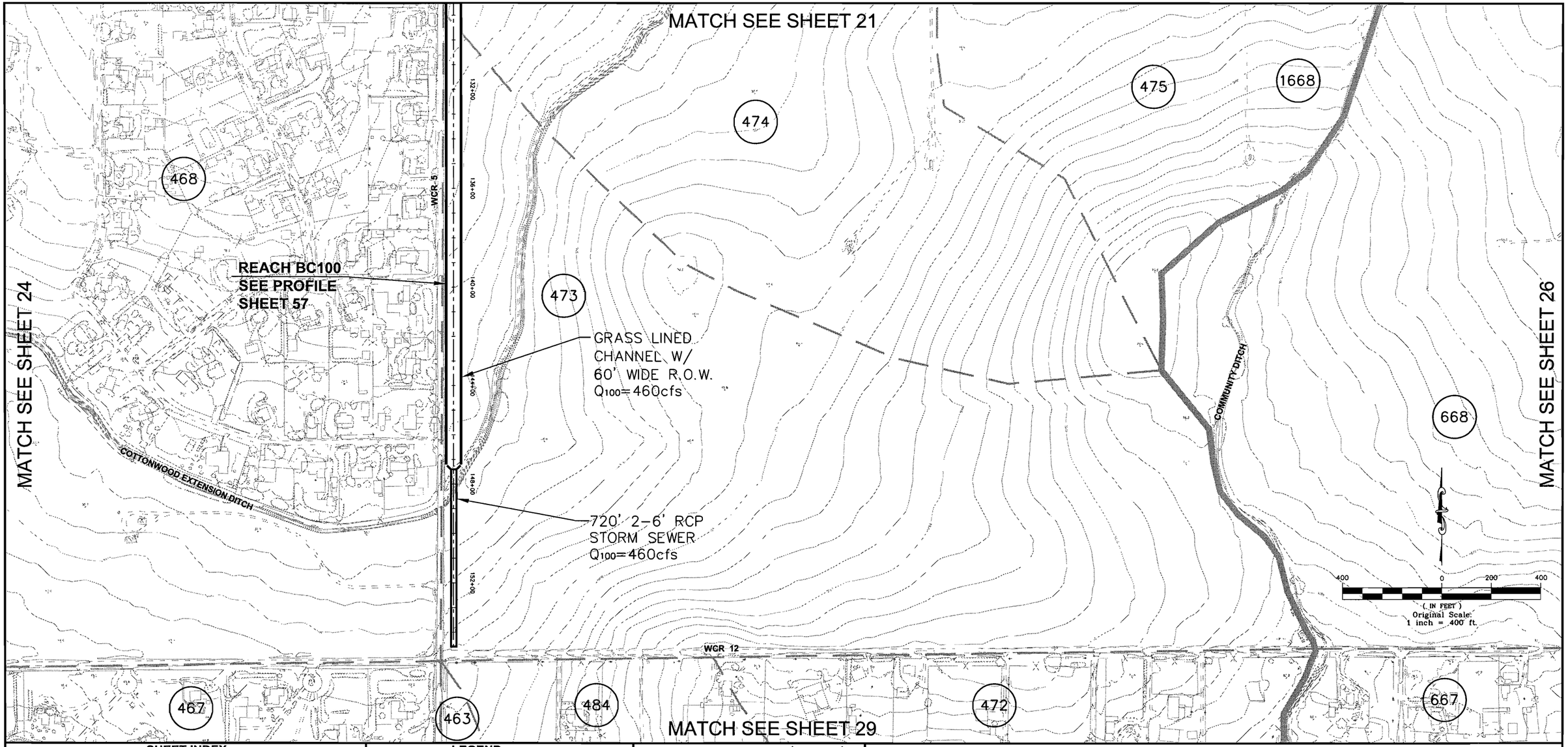
The improvements for Outfall System BC100 includes a 1895 -foot grass lined channel with a trickle channel, and 720 feet of 2 x 6 ft RCP storm sewers below the Cottonwood Extension Ditch.

Improvements for Outfall BC100 continue on Sheet 21.

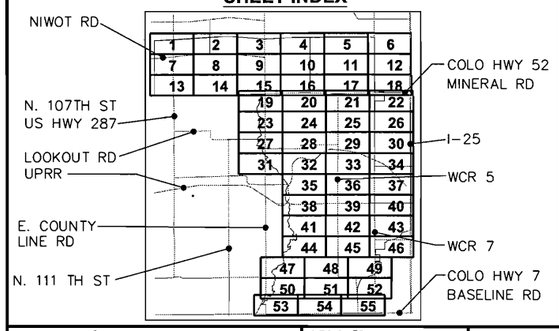
Profiles for BC100 are shown on Sheet 57.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC100	Channel	1895	$ 922,000
BC100	two 6' RCP Storm Sewers	720	$ 534,000

Z:\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-25-30.dwg, 8/7/2007 1:25:18 PM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
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Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 25 OF 67

COMMENTARY ON SHEET 26

The improvements for Outfall System GH120 includes a 2900 -foot grass lined channel with a trickle channel, drop structures, and a 30-foot 12- x 8-ft RCB culvert below WCR 12.

Improvements for Outfall GH120 continue on Sheets 22 and 30.

Profiles for GH120 are shown on Sheet 63.

The improvements for Outfall System GH110 includes a 2860 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall GH110 continue on Sheet 22.

Profiles for GH110 are shown on Sheet 62.

The improvements for Outfall System GH100 includes a 1130 -foot grass lined channel with a trickle channel and drop structures and 1880-feet of a 78-inch diameter RCP storm sewer.

Improvements for Outfall GH100 continue on Sheets 22 and 30.

Profiles for GH100 are shown on Sheet 62.

Detention Facility 1108 with an outlet of one 6- x 5-ft RCB is also presented on this sheet.

Detention Facility 1110 with an outlet of one 6- x 5-ft RCB is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
GH120	Channel	3000	$ 2,281,000
GH120	12' x 8' RCB	30	$ 130,000
GH110	Channel	2860	$ 1,419,000
1108	Detention Facility and Outlet		$ 1,587,000
1110	Detention Facility and Outlet		$ 1,325,000
GH100	Channel	1130	$ 1,016,000
GH100	78" Storm Sewer	1880	$ 763,280

Z:\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-25-30.dwg, 8/7/2007 1:20:24 PM, LOVE & ASSOCIATES, INC.

MATCH SEE SHEET 25

MATCH SEE SHEET 22

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

100' 6'x5' RCB

1110

STA. 44+00 TO 44+43
43 LF SIDE CHANNEL
SPILL. WEIR ELEV. = 5038.3

GRASS LINED
CHANNEL W/
65' WIDE R.O.W.
Q_{100}=1090cfs

REGIONAL DETENTION POND 1110

100-YEAR EVENT	1' FREEBOARD
VOL=12.9 AC-FT	VOL=16.0 AC-FT
SA=3.0 ACRES	SA=3.2 ACRES

OUTLET
Q_{100}=230cfs
Q_{10}=N/A

REACH GH110
SEE PROFILE
SHEET 62

GRASS LINED
CHANNEL W/
60' WIDE R.O.W.
Q_{100}=500cfs

674

683

COMMUNITY DITCH BRANCH

GRASS LINED
CHANNEL W/
55' WIDE R.O.W.
Q_{100}=355cfs

REACH GH100
SEE PROFILE
SHEET 62

NOTE: CATCHMENT BOUNDARY REFLECTS PROPOSED DEVELOPMENT

681

668

REACH GH120
SEE PROFILE
SHEET 63

GRASS LINED
CHANNEL W/
75' WIDE R.O.W.
Q_{100}=1090cfs

1880' 78" RCP
STORM SEWER
Q_{100}=355cfs
ALTERNATE: REGRADE AND CHANNELIZE

INTERSTATE 25

WCR 7

GRASS LINED
CHANNEL,
3:1 SS
W/61' WIDE
R.O.W.
Q_{100}=1000cfs

30' 12'x8' RCB
WITH DROP INLET
Q_{100}=1000cfs

150 LF
6'x5' RCB

REGIONAL DETENTION POND 1108

100-YEAR EVENT	1' FREEBOARD
VOL=20.7 AC-FT	VOL=23.0 AC-FT
SA=2.9 ACRES	SA=3.0 ACRES

OUTLET
Q_{100}=378cfs
Q_{10}=170cfs

WCR 12

667

672

1108

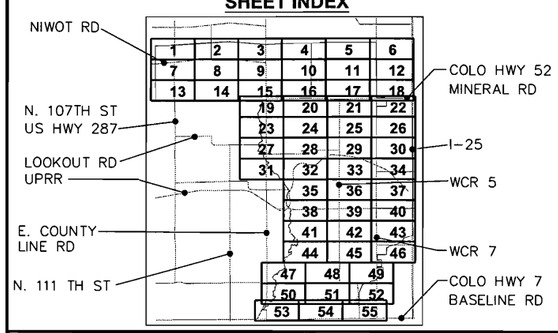
673

1680

GRASS LINED
CHANNEL W/
50' WIDE R.O.W.
Q_{100}=225cfs

MATCH SEE SHEET 30

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE
- BURIED ELECTRIC — ELC
- CABLE TV — TV
- TELEPHONE — T
- GAS — GAS
- WATER — W
- SANITARY SEWER — S
- STORM SEWER — ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 26 OF 67

COMMENTARY ON SHEET 27

No Regional Outfall System improvements are required on this sheet.

Z:\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-25-30.dwg, 8/7/2007 1:19:38 PM, LOVE & ASSOCIATES, INC.

MATCH SEE SHEET 23

288

KENOSHA ROAD

E. COUNTY LINE ROAD

BOULDER & WELD CO. DITCH

BNRR

LOWER BOULDER DITCH

EXTENSION DITCH

COTTONWOOD

452

286

287

100-YEAR FLOODPLAIN

285

MATCH SEE SHEET 28

WCR 10-1/2

NORTHRIDGE

282

0 200 400

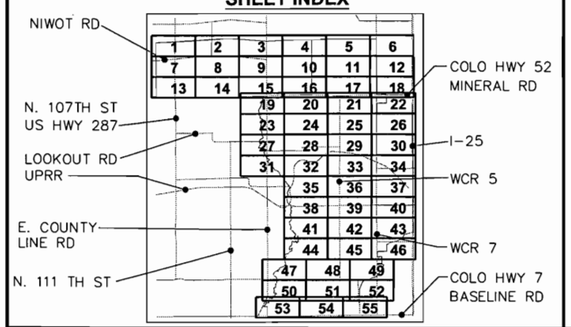
(IN FEET)
Original Scale:
1 inch = 400 ft

284

283

MATCH SEE SHEET 31

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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USGS CONTROL POINT:
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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 27 OF 67

COMMENTARY ON SHEET 28

The improvements for Outfall System BC110 includes a 3545 -foot grass lined channel with a trickle channel, drop structures, a 40-foot 2 x 8- x 6-ft RCB culvert below Rue de Trust, a 500-ft long 36-in CMP suspended bypass of Cottonwood Extension Ditch with erosion protection at the ditch, and re-alignment of 1300 feet of WCR 3.

Improvements for Outfall BC110 continue on Sheets 24 and 32.

Profiles for BC110 are shown on Sheet 58.

The improvements for Outfall System BC115 include 800 feet of 60-inch RCP storm sewer below WCR 10.5 and WCR 3.

Profiles for BC115 are shown on Sheet 59.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	3545	$ 2,920,000
BC110	two 8' x 6' RCB	40	$ 162,000
BC110	1300' WCR 3 Realignment (includes 500'-36" Irrigation Pipe)	1300	$ 1,300,000
BC115	60" RCP Storm Sewer	800	$ 387,000

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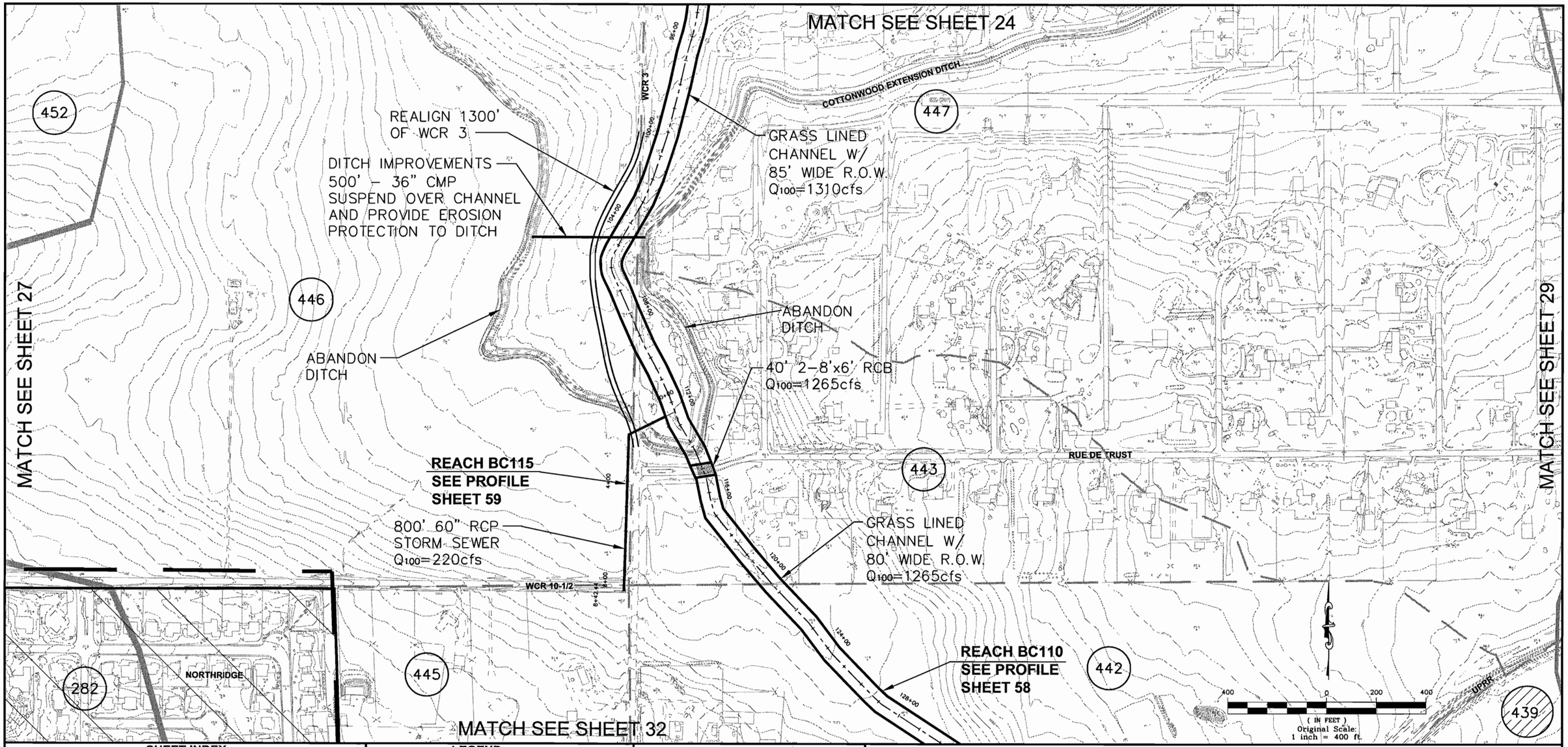
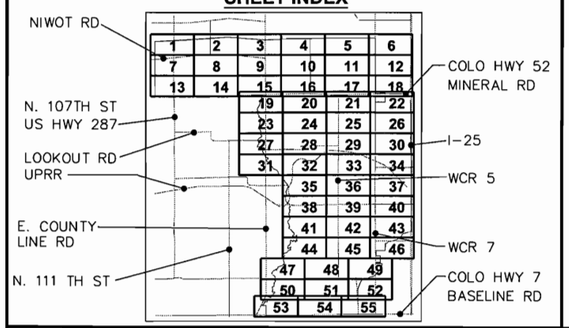


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

COMMENTARY ON SHEET 29

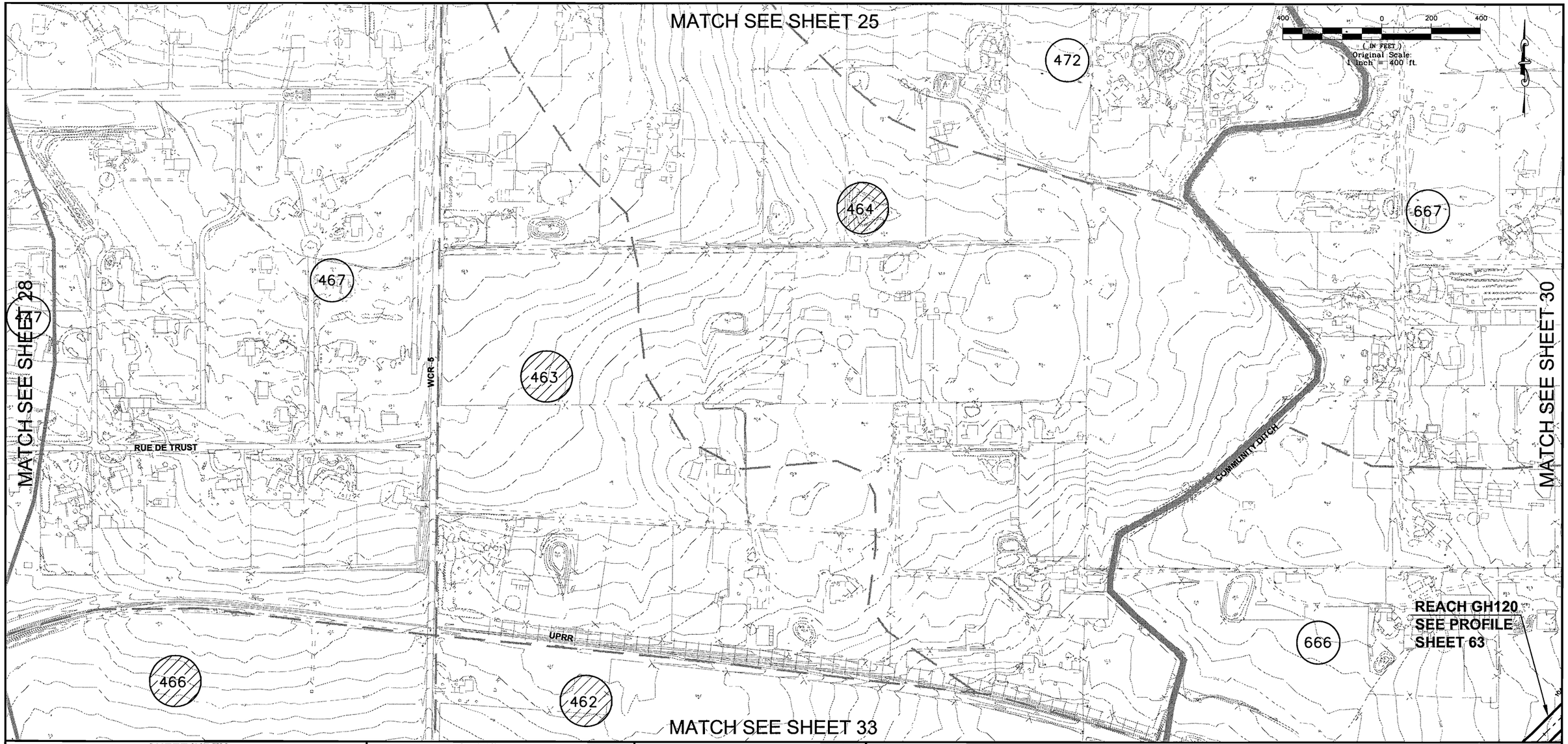
The improvements for Outfall System GH120 includes a 150 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall GH120 continue on Sheets 30 and 33.

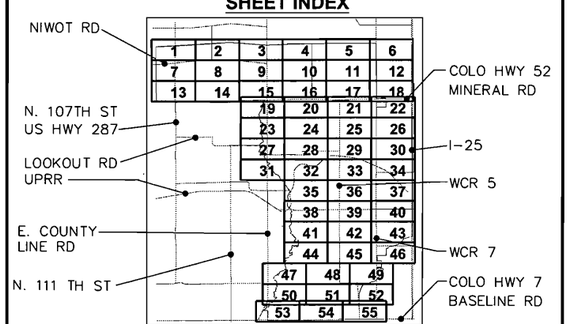
Profiles for GH120 are shown on Sheet 63.

Outfall	**Improvement**	**Linear Feet**		**Cost**
GH120	Channel	150	$	77,000

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-25-30.dwg, 8/7/2007 1:42:16 PM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
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- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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VERTICAL: NGVD 88

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USGS CONTROL POINT:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 29 OF 67

COMMENTARY ON SHEET 30

The improvements for Outfall System GH120 includes a 2800 -foot grass lined channel with a trickle channel, drop structures, two driveway crossings, and a 400-foot 2 x 8- x 7-ft RCB storm sewer adjacent to WCR 7.

Improvements for Outfall GH120 continue on Sheets 26 and 29.

Profiles for GH120 are shown on Sheet 63.

The improvements for Outfall System GH100 includes a 2210 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall GH100 continue on Sheets 22 and 26.

Profiles for GH100 are shown on Sheet 62.

Detention Facility 1109 with an outlet of one 3-ft RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
GH120	Channel	2800	$ 1,868,000
GH120	two x 8' x 7' Storm Sewer	400	$ 867,000
GH100	Channel	2210	$ 314,000
1109	Detention Facility and Outlet		$ 685,000

MATCH SEE SHEET 26

REACH GH120
SEE PROFILE
SHEET 63

GRASS LINED
CHANNEL, 3:1 SS
W/61' WIDE R.O.W.
Q_{100}=1000cfs

400' 2-8'x7' RCB
STORM SEWER
Q_{100}=1000cfs
ALTERNATES:
1. ACQUIRE PROPERTY
2. REALIGN ROAD

GRASS LINED
CHANNEL, 3:1 SS
W/61' WIDE R.O.W.
Q_{100}=1000cfs

STA. 86+20
10' WIDE DRIVEWAY
BRIDGE OVER CHANNEL

STA. 95+90
10' WIDE DRIVEWAY
BRIDGE OVER CHANNEL

GRASS LINED
CHANNEL W/
65' WIDE R.O.W.
Q_{100}=915cfs

667
673
672
680
666
679
1680
1109

MATCH SEE SHEET 29

WCR 7

COMMUNITY DITCH BRANCH

INTERSTATE 25

REACH GH100
SEE PROFILE
SHEET 62

NOTE: CATCHMENT
BOUNDARY REFLECTS
PROPOSED DEVELOPMENT

100' 36" RCP

GRASS LINED
CHANNEL W/
50' WIDE R.O.W.
Q_{100}=225cfs

REGIONAL DETENTION POND 1109

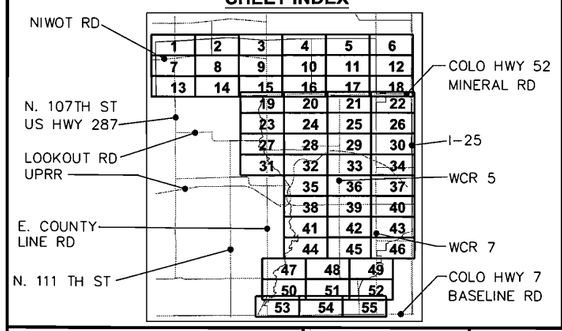
100-YEAR EVENT	1' FREEBOARD
VOL=9.0 AC-FT	VOL=10.3 AC-FT
SA=1.4 ACRES	SA=1.5 ACRES

OUTLET
Q_{100}=97cfs
Q_{10}=55cfs

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

MATCH SEE SHEET 34

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE
NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

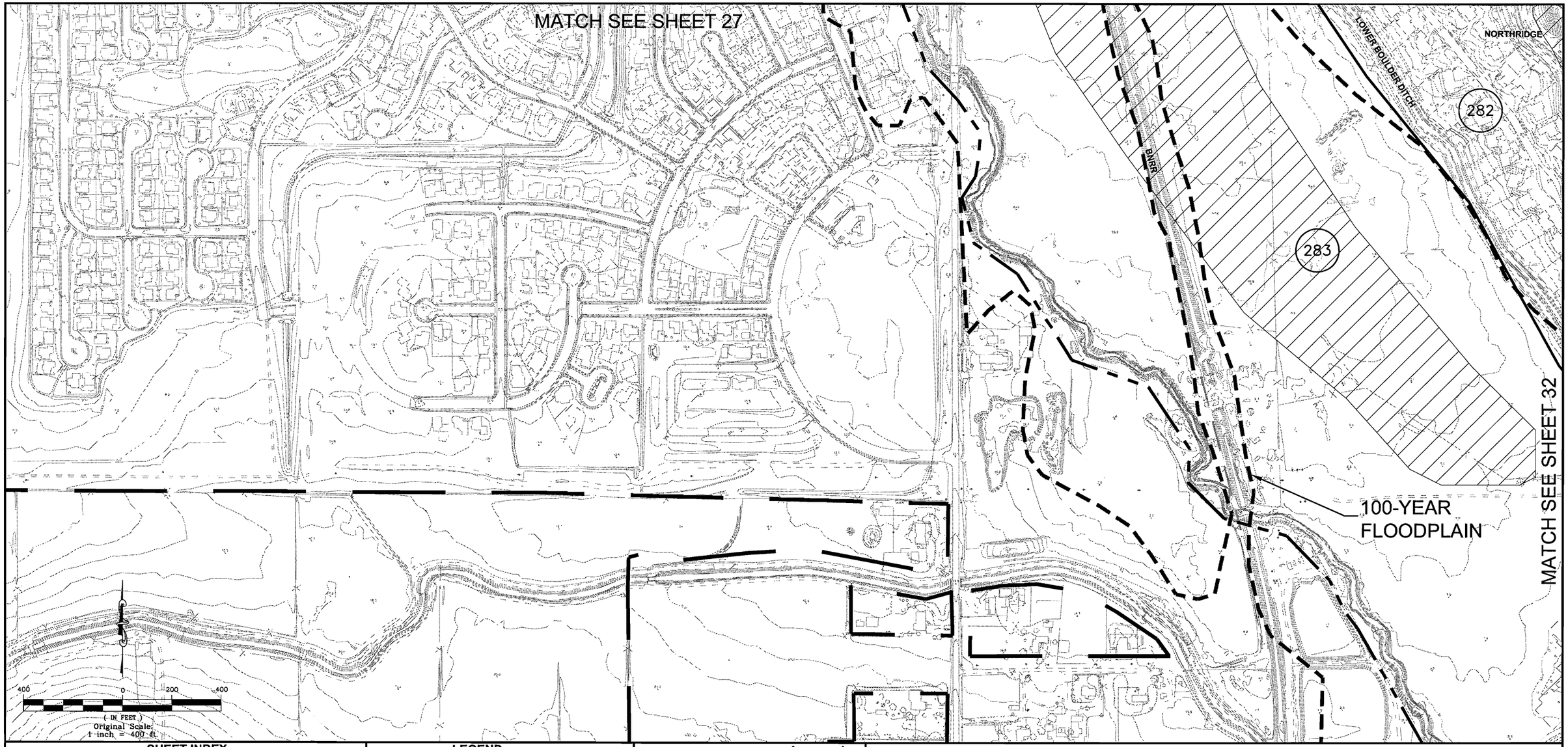
SHEET 30 OF 67

Z:\0603\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-25-30.dwg, 8/7/2007 1:23:20 PM, LOVE & ASSOCIATES, INC.

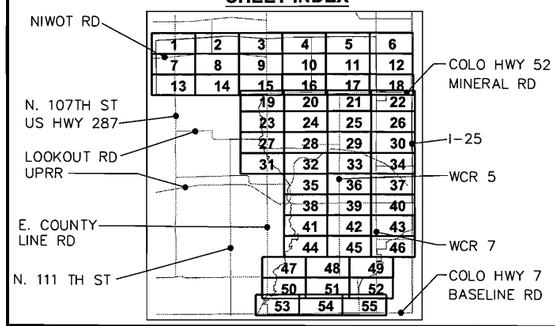
COMMENTARY ON SHEET 31

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-31-36.dwg, 8/8/2007 9:20:05 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 31 OF 67

COMMENTARY ON SHEET 32

The improvements for Outfall System BC110 includes a 2865 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall BC110 continue on Sheets 28 and 35.

Profiles for BC110 are shown on Sheet 58.

Detention Facility 1113 with an outlet of 2 x 8- x 6-ft RCB which cross below WCR 10 is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	2865	$ 2,552,000
1113	Detention Facility and Outlet		$ 3,133,000

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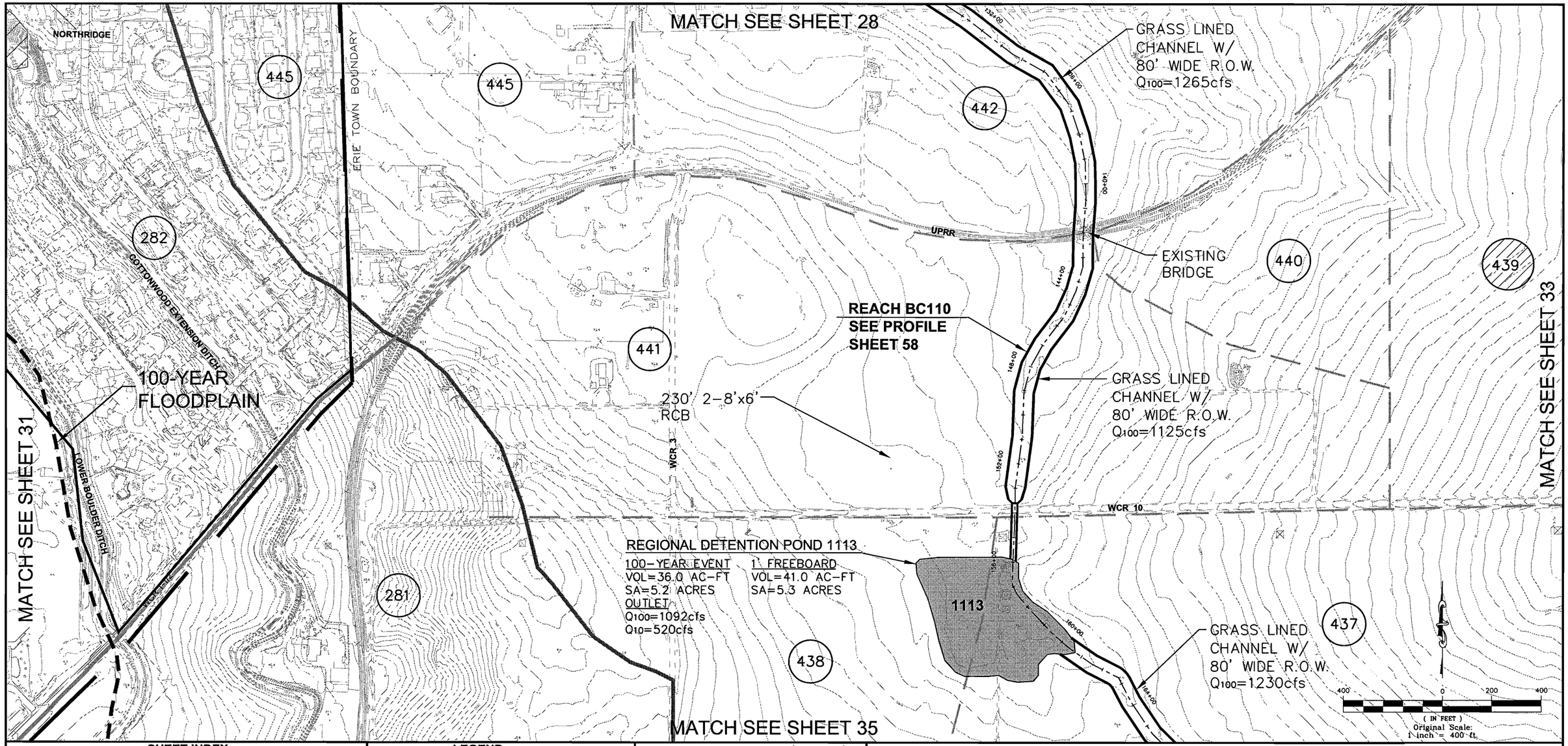
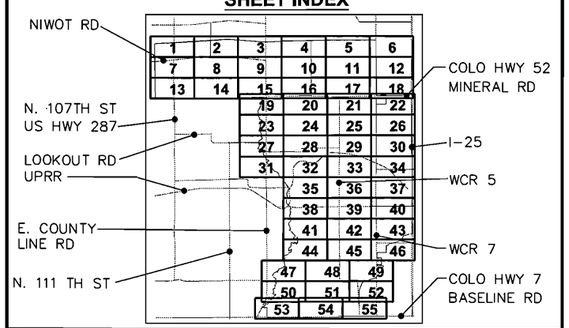


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

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Fax: 303-673-9796

DESIGNED:	RJP
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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 32 OF 67

COMMENTARY ON SHEET 33

The improvements for Outfall System GH120 includes a 4410 -foot grass lined channel with a trickle channel, drop structures, an 100-ft long 3 x 6- x 6-ft RCB below UPRR, and an 80-foot 2 x 6- x 6-ft RCB culvert below WCR 10.

Improvements for Outfall GH120 continue on Sheets 30 and 36.

Profiles for GH120 are shown on Sheet 64.

Detention Facility 1107 with an outlet of one 42-in RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
GH120	Channel	4410	$ 2,352,000
GH120	three x 6' x 6' RCB	100	$ 425,000
GH120	two x 6' x 6' RCB	80	$ 248,000
1107	Detention Facility and Outlet		$ 232,000

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MATCH SEE SHEET 29

MATCH SEE SHEET 32

MATCH SEE SHEET 34

MATCH SEE SHEET 36

GRASS LINED CHANNEL W/ 65' WIDE R.O.W. Q_{100}=915cfs

100' 3-6'x6' RCB 100-YEAR Q_{100}=810cfs

GRASS LINED CHANNEL W/ 60' WIDE R.O.W. Q_{100}=810cfs

REACH GH120 SEE PROFILE SHEET 64

80' 2-6'x6' RCB 100-YEAR Q_{100}=360cfs

GRASS LINED CHANNEL W/ 55' WIDE R.O.W. Q_{100}=360cfs

REGIONAL DETENTION POND 1107

100-YEAR EVENT VOL=2.5 AC-FT SA=4.3 ACRES

1' FREEBOARD VOL=3.0 AC-FT SA=0.47 ACRES

OUTLET Q_{100}=133cfs Q_{10}=58cfs

100' 42" RCP

GRASS LINED CHANNEL W/ 50' WIDE R.O.W. Q_{100}=260cfs

NOTE: CATCHMENT BOUNDARY REFLECTS PROPOSED DEVELOPMENT

WCR 5

WCR 10

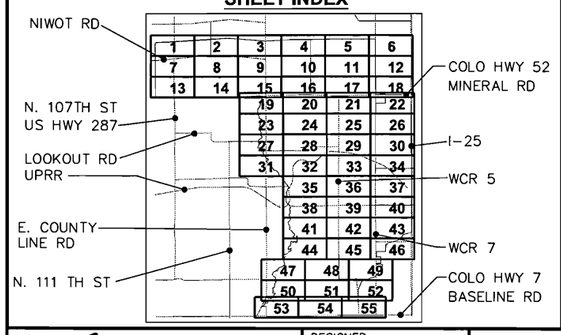
UPRR

COMMUNITY DITCH BRANCH

666 665 663 1663 664 462 466 439 435 437 434 1107

(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

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DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 33 OF 67

COMMENTARY ON SHEET 34

No Regional Outfall System improvements are required on this sheet.

MATCH SEE SHEET 30

MATCH SEE SHEET 33

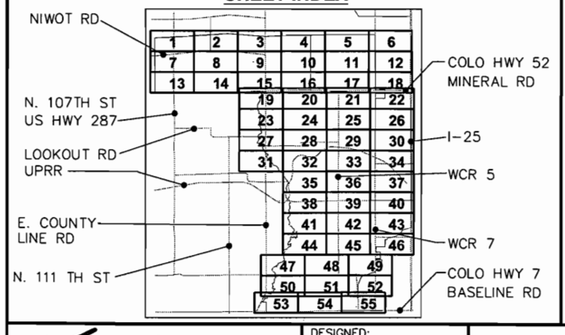
MATCH SEE SHEET 37

666
672
679
665
671
664
670
677
678

COMMUNITY DITCH BRANCH
UPRR
WCR 7
WCR 10
INTERSTATE 25

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

CATCHMENT BOUNDARY

MINOR CATCHMENT BOUNDARY

STUDY AREA

100-YEAR REGULATORY FLOODPLAIN

CATCHMENT I.D. 800

ON-SITE OR LOCAL DETENTION REQUIRED 800

ERIE TOWN BOUNDARY

CHANNEL CENTERLINE

DRAINAGE R.O.W.

DETENTION BASIN

CULVERT

STORM SEWER

POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 34 OF 67

Z:\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-31-36.dwg, 8/7/2007 5:02:34 PM, LOVE & ASSOCIATES, INC.

COMMENTARY ON SHEET 35

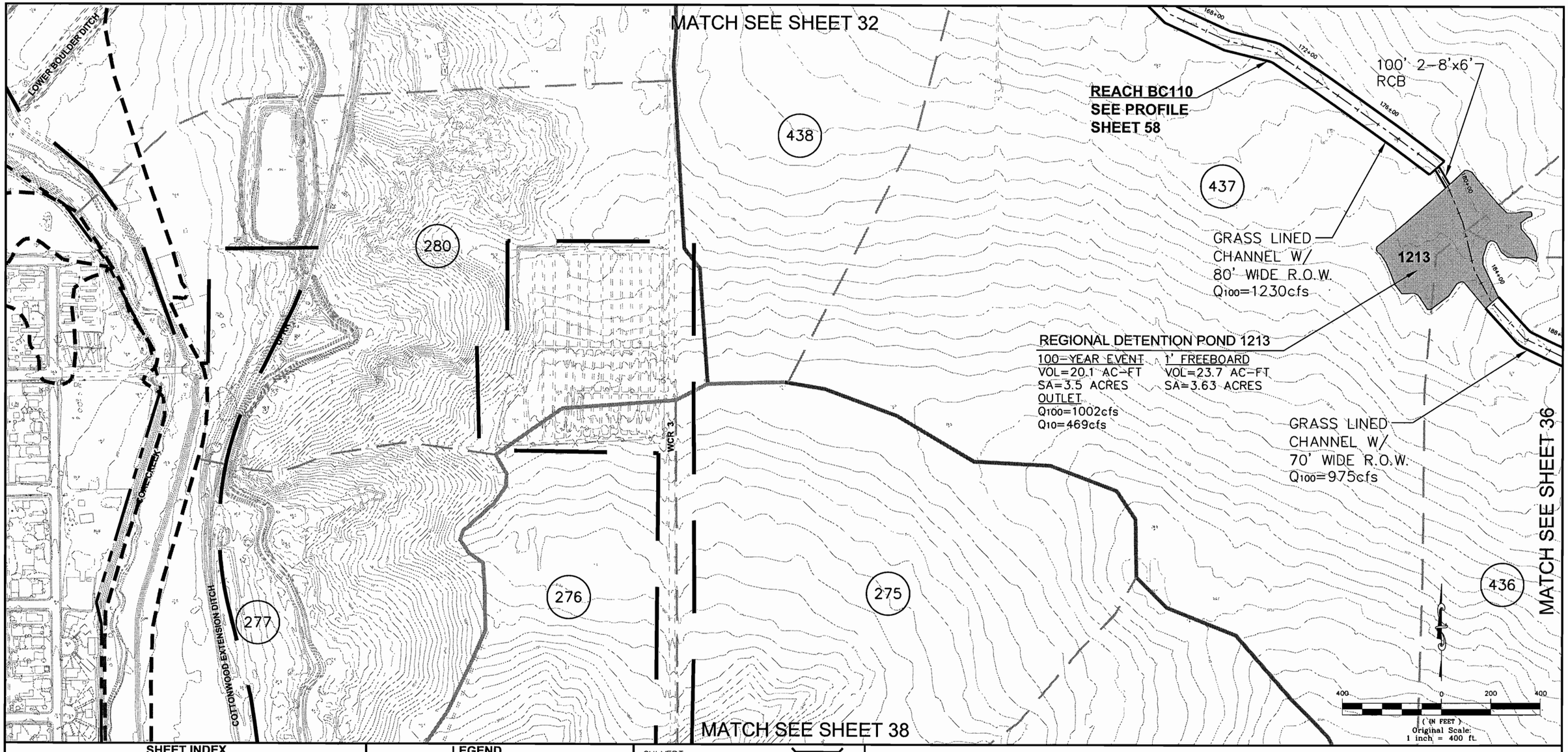
The improvements for Outfall System BC110 includes a 1655 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall BC110 continue on Sheets 32 and 36.

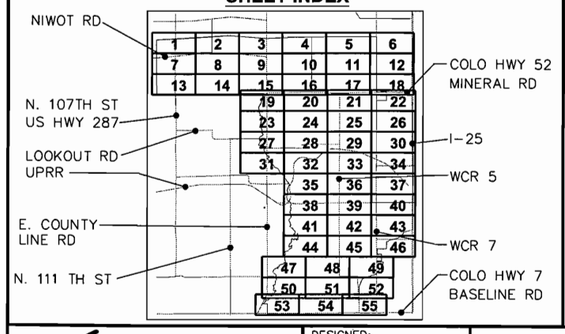
Profiles for BC110 are shown on Sheet 58.

Detention Facility 1213 with an outlet of 2 x 8- x 6-ft RCB is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	1655	$ 1,390,000
1213	Detention Facility and Outlet		$ 1,862,000



SHEET INDEX



LEGEND

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- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
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- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

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USGS CONTROL POINT:
JR-53-1948

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 35 OF 67

Z:\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-31-36.dwg, 8/7/2007 5:16:54 PM, LOVE & ASSOCIATES, INC.

COMMENTARY ON SHEET 36

The improvements for Outfall System BC110 includes a 1780 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall BC110 continue on Sheets 35 and 39.

Profiles for BC110 are shown on Sheet 59.

The improvements for Outfall System GH120 includes a 1475 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall GH120 continue on Sheet 33.

Profiles for GH120 are shown on Sheet 64.

Detention Facility 1119 with an outlet of a 5.5-ft RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	1780	$ 1,297,000
GH120	Channel	1475	$ 664,000
1119	Detention Facility and Outlet		$ 1,353,000

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MATCH SEE SHEET 33

MATCH SEE SHEET 35

MATCH SEE SHEET 37

MATCH SEE SHEET 39

435

434

433

436

663

664

662

1662

1661

661

1119

WCR 5

GRASS LINED
CHANNEL W/
70' WIDE R.O.W.
Q_{100}=975cfs

GRASS LINED
CHANNEL W/
50' WIDE R.O.W.
Q_{100}=260cfs

100' 66" RCP

REACH GH120
SEE PROFILE
SHEET 64

REACH BC110
SEE PROFILE
SHEET 59

NOTE: CATCHMENT BOUNDARY REFLECTS PROPOSED DEVELOPMENT

ERIE HIGH SCHOOL

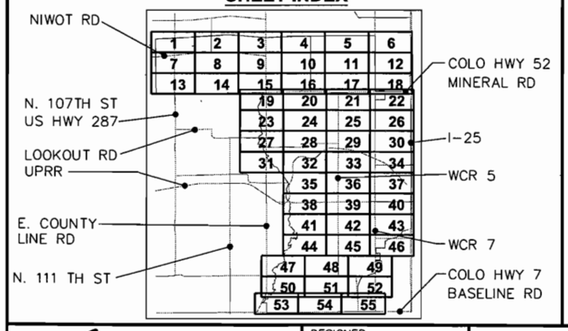
REGIONAL DETENTION POND 1119

100-YEAR EVENT	1' FREEBOARD
VOL=16.9 AC-FT	VOL=20.2 AC-FT
SA=3.1 ACRES	SA=3.2 ACRES

OUTLET
Q_{100}=253cfs
Q_{10}=113cfs

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
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Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 36 OF 67

COMMENTARY ON SHEET 37

No Regional Outfall System improvements are required on this sheet.

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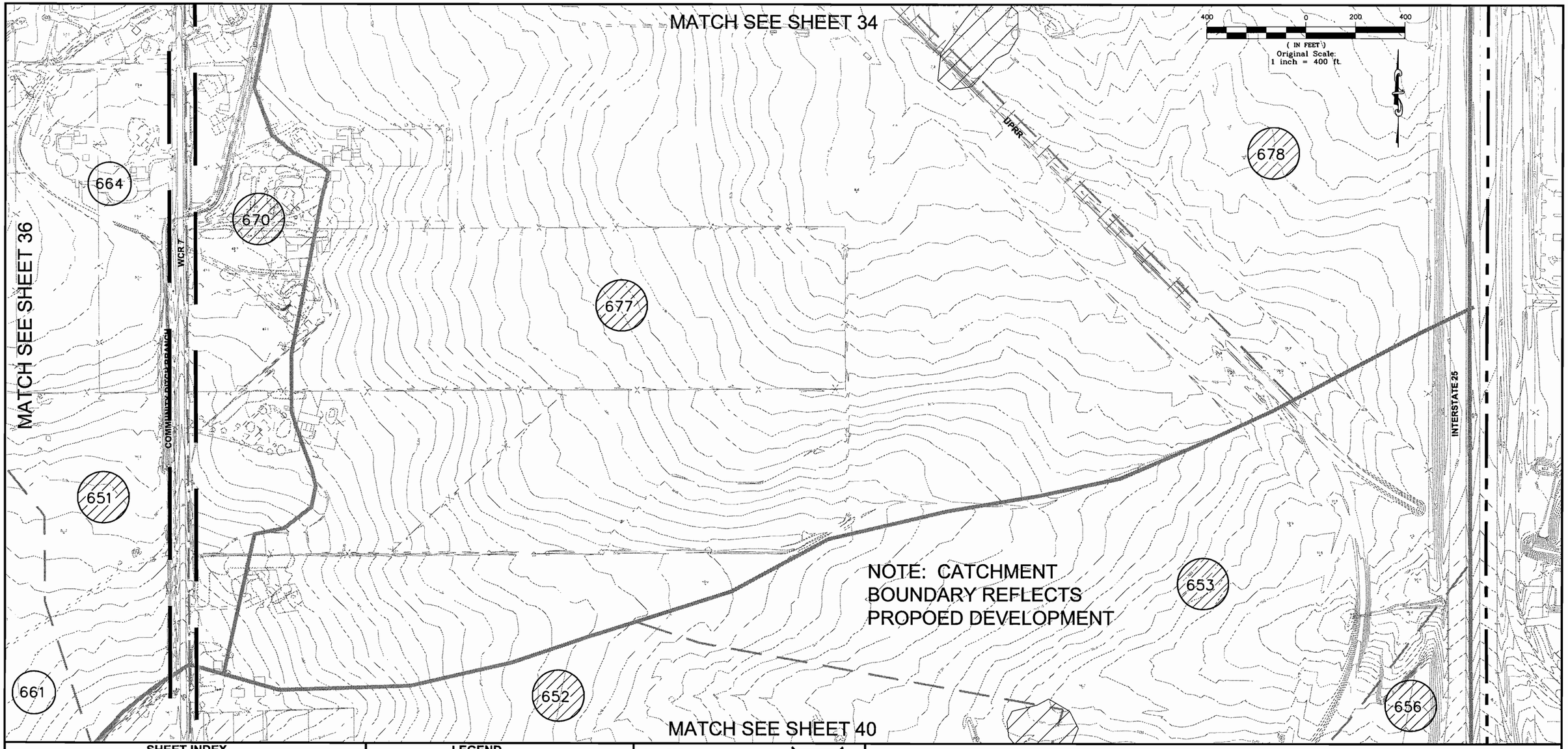
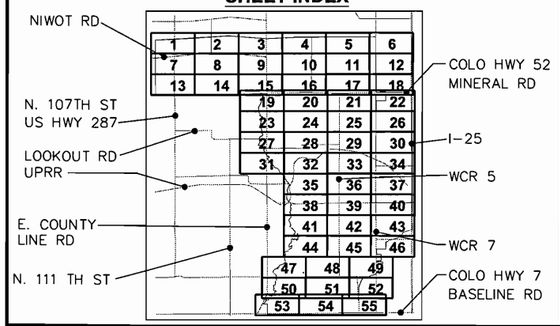


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

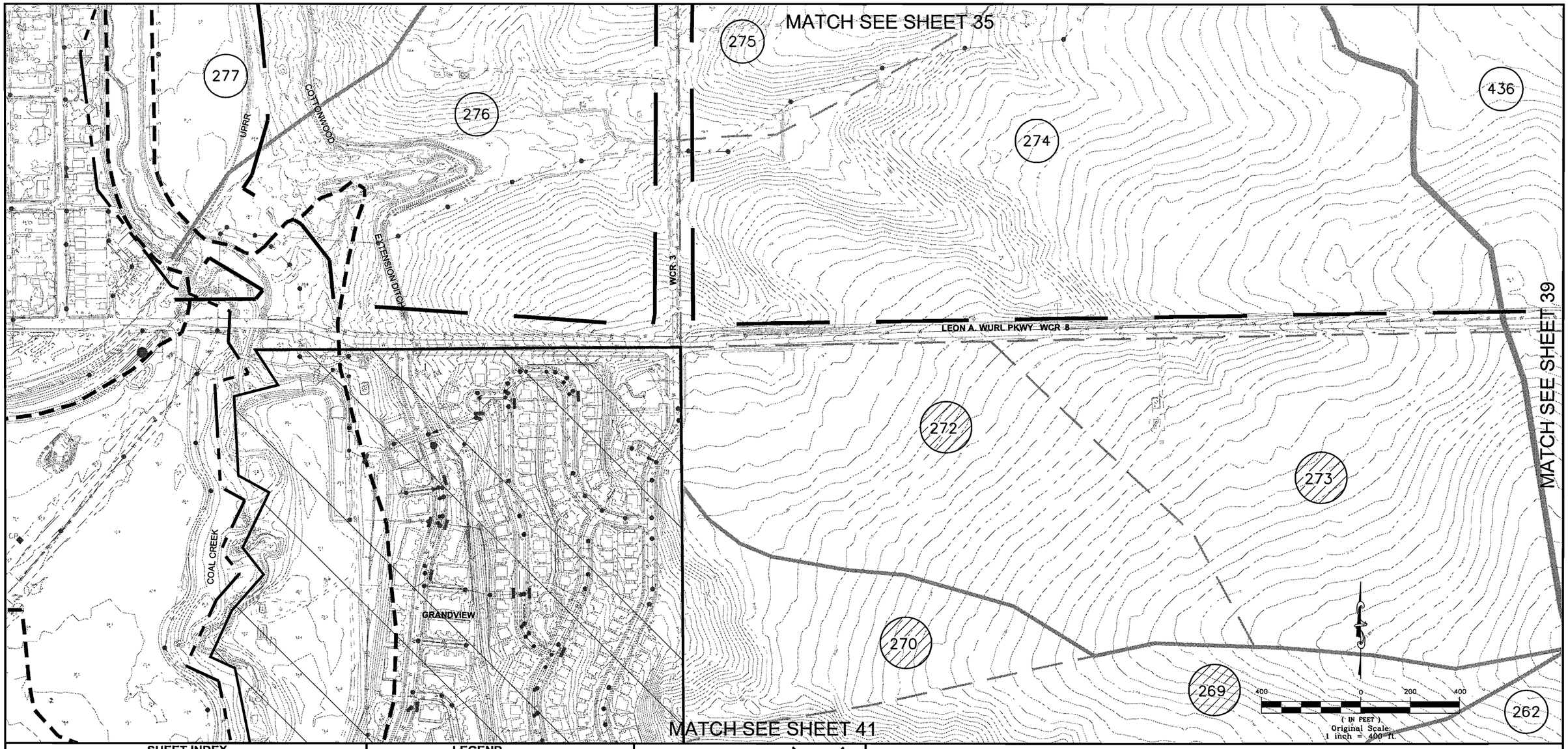
PRELIMINARY DESIGN PLAN

SHEET 37 OF 67

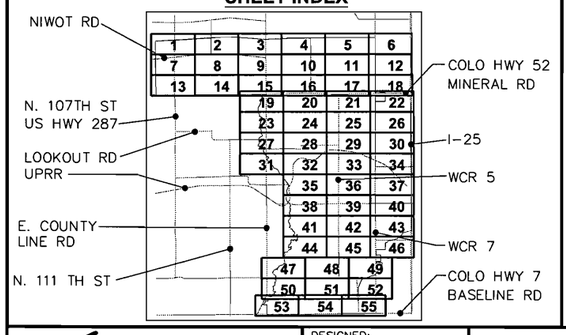
COMMENTARY ON SHEET 38

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-37-42.dwg, 8/8/2007 9:49:13 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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VERTICAL: NGVD 88

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USGS CONTROL POINT:
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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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Fax: 303-673-9796

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 38 OF 67

COMMENTARY ON SHEET 39

The improvements for Outfall System BC110 includes a 1400 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall BC110 continue on Sheet 36.

Profiles for BC110 are shown on Sheet 59.

Detention Facility 1103 with an outlet of one 6- x 4-ft RCB is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
BC110	Channel	1400	$ 1,020,000
1103	Detention Facility and Outlet		$ 1,824,000

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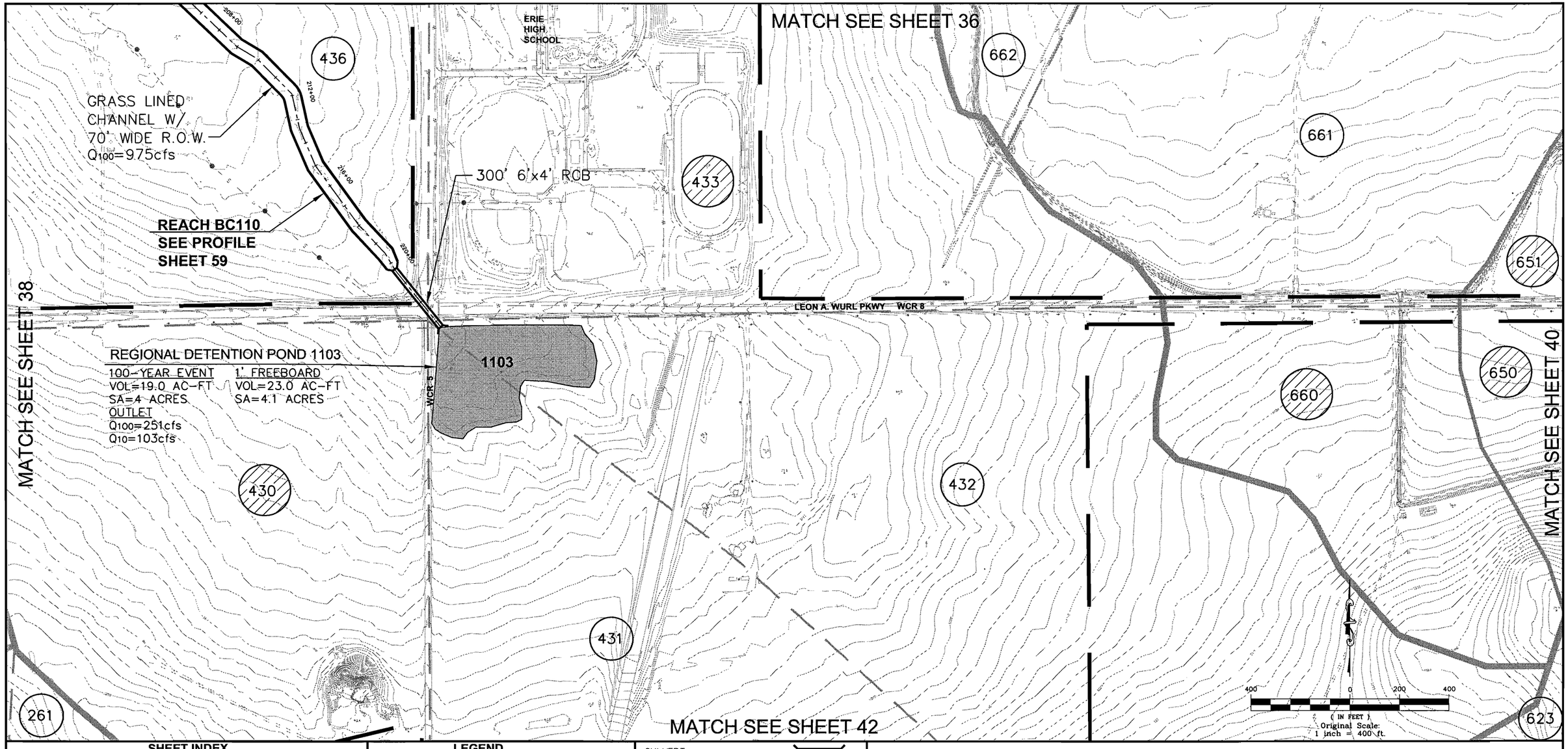

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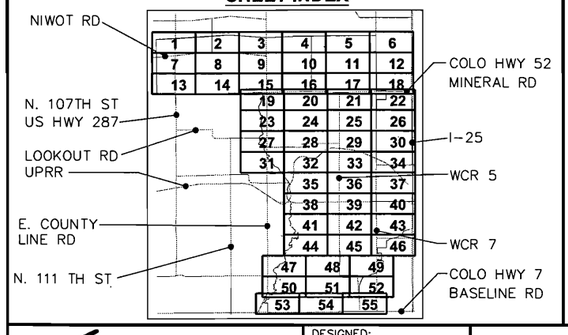

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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DESIGNED:	RJP
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DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 39 OF 67

COMMENTARY ON SHEET 40

No Regional Outfall System improvements are required on this sheet.

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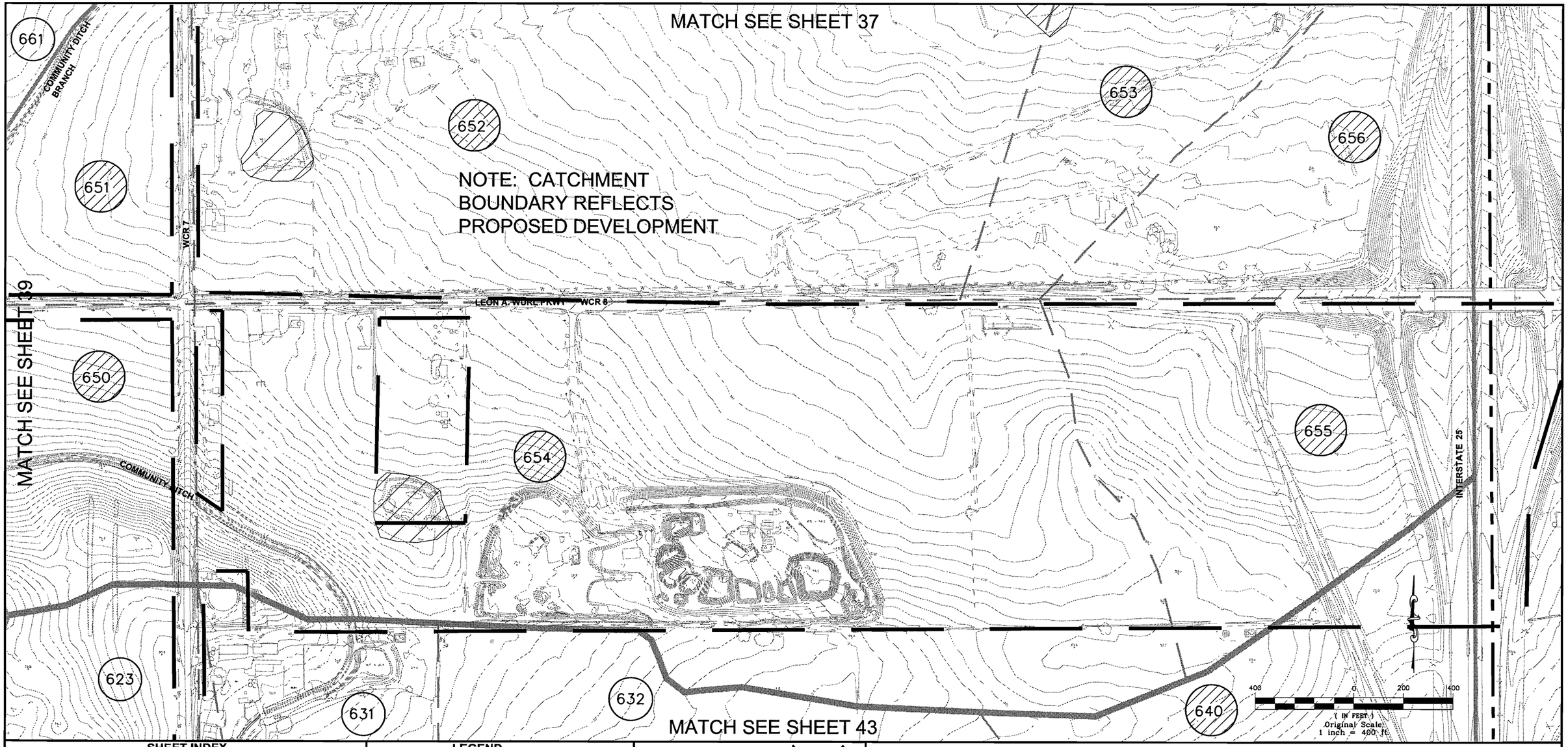
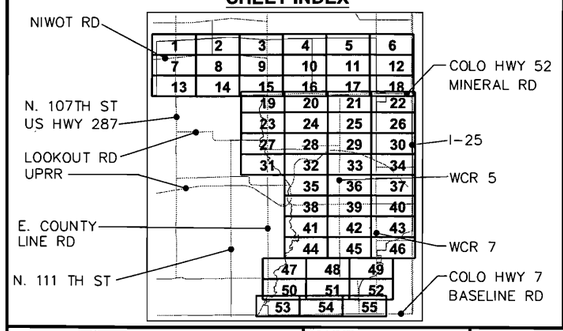


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 40 OF 67

COMMENTARY ON SHEET 41

The improvements for Outfall System CC100 includes a 2915 -foot grass lined channel with a trickle channel and drop structures.

Profiles for CC100 are shown on Sheet 60.

The existing regional channel shown on this sheet downstream of the drop structure was designed and constructed by others are requires no improvements.

Detention Facility 1102 with an outlet of one 42-in RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
CC100	Channel	2915	$ 1,754,000
1102	Detention Facility and Outlet		$ 536,000

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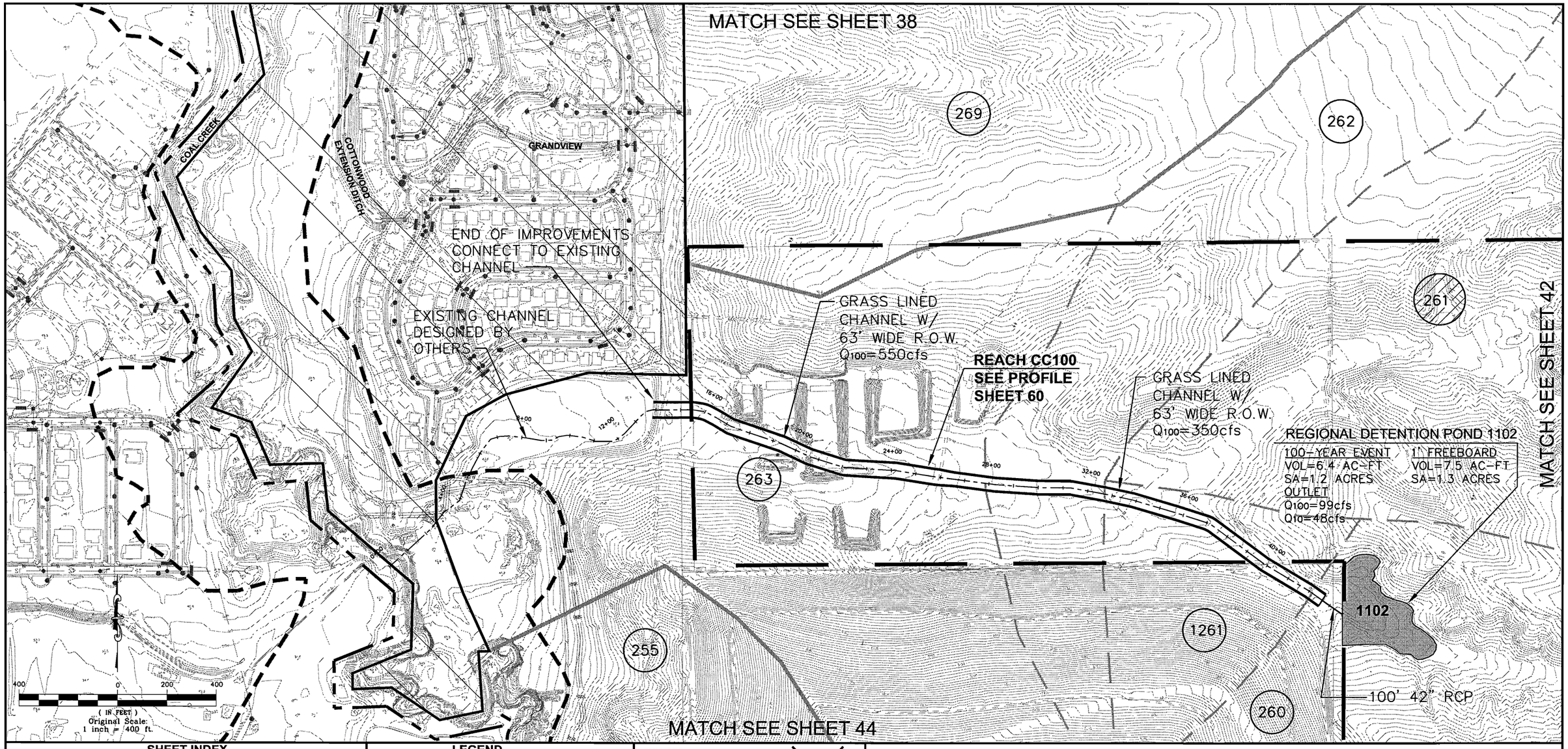
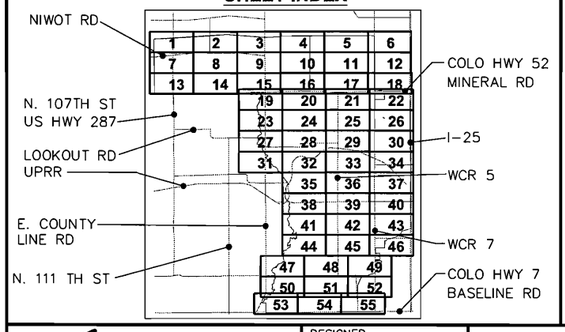


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 41 OF 67

COMMENTARY ON SHEET 42

The improvements for Outfall System LDC100 includes a 2045 -foot grass lined channel with a trickle channel and drop structures.

Improvements for Outfall LDC100 continue on Sheet 43.

Profiles for LDC100 are shown on Sheet 61.

Detention Facility 1104 with an outlet of one 42-in RCP is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
LDC100	Channel	2045	$ 918,000
1104	Detention Facility and Outlet		$ 428,000

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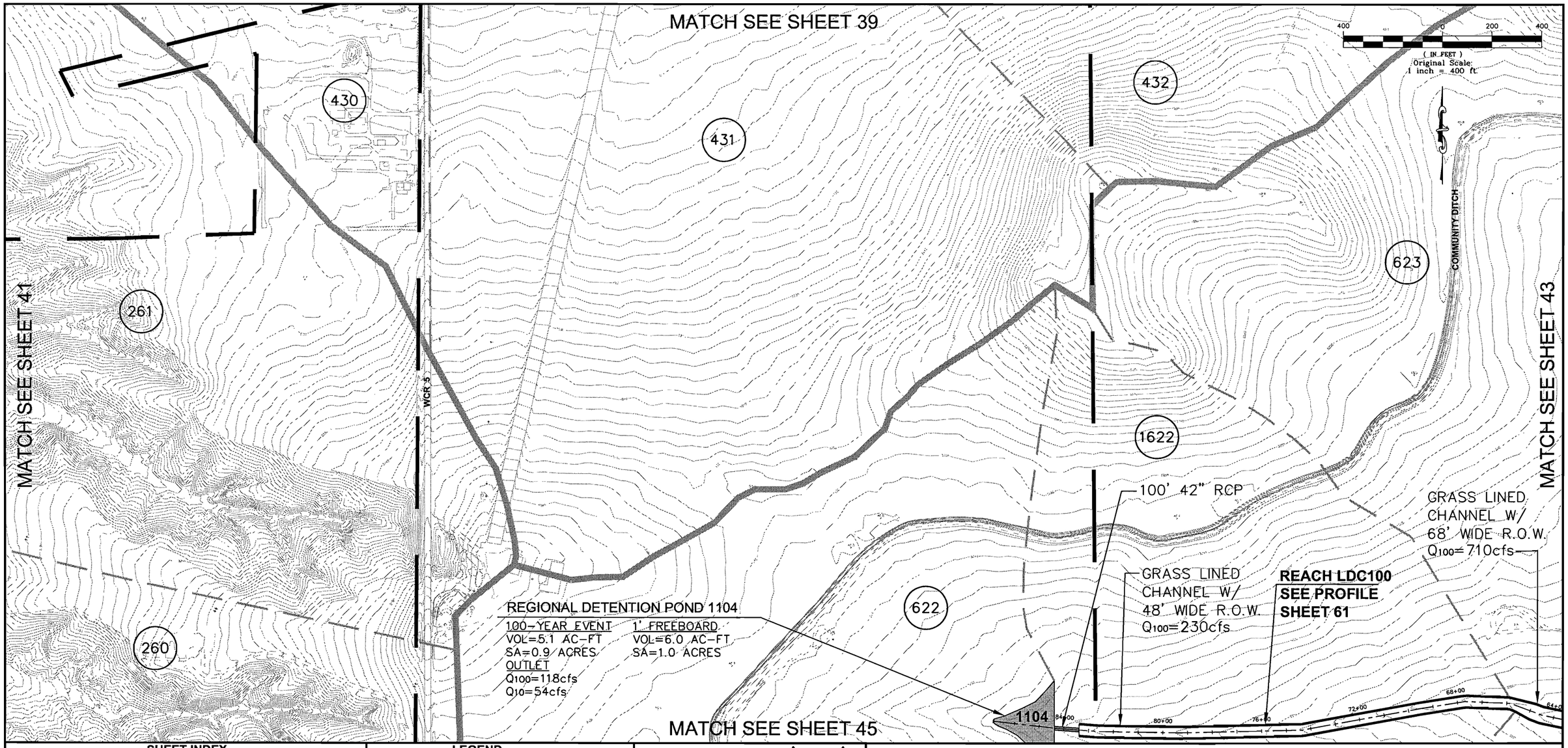
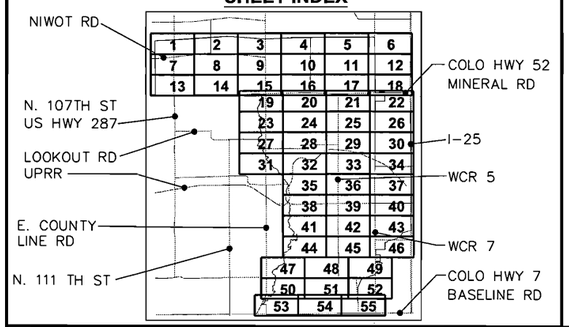


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 42 OF 67

COMMENTARY ON SHEET 43

The improvements for Outfall System LDC100 includes a 4945 -foot grass lined channel with a trickle channel and drop structures and a 2 x 5- x 5-ft RCB below Stanley Ditch. The crossing below Stanley Ditch and the the channel downstream of Stanely Ditch is designed to pass 50 cfs more than the capacity of the 72-in RCP culvert below I-25. The 100-year flood will overtop Stanley Ditch as it has historically and be contained within the confines of the Ditch and I-25.

Improvements for Outfall LDC100 continue on Sheet 42.

Profiles for LDC100 are shown on Sheet 61.

Detention Facility 1105 with an outlet of one 10- x 6-ft RCB, and Detention Facility 1106 with an outlet of one 6- x 6-ft RCB and one 8- x 8-ft RCB is also presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
LDC100	Channel	4945	$ 2,876,000
LDC100	two x 5' x 5' RCB	50	$ 94,700
1105	Detention Facility		$ 2,146,000 and Outlet
1106	Detention Facility and Outlet		$ 1,835,000

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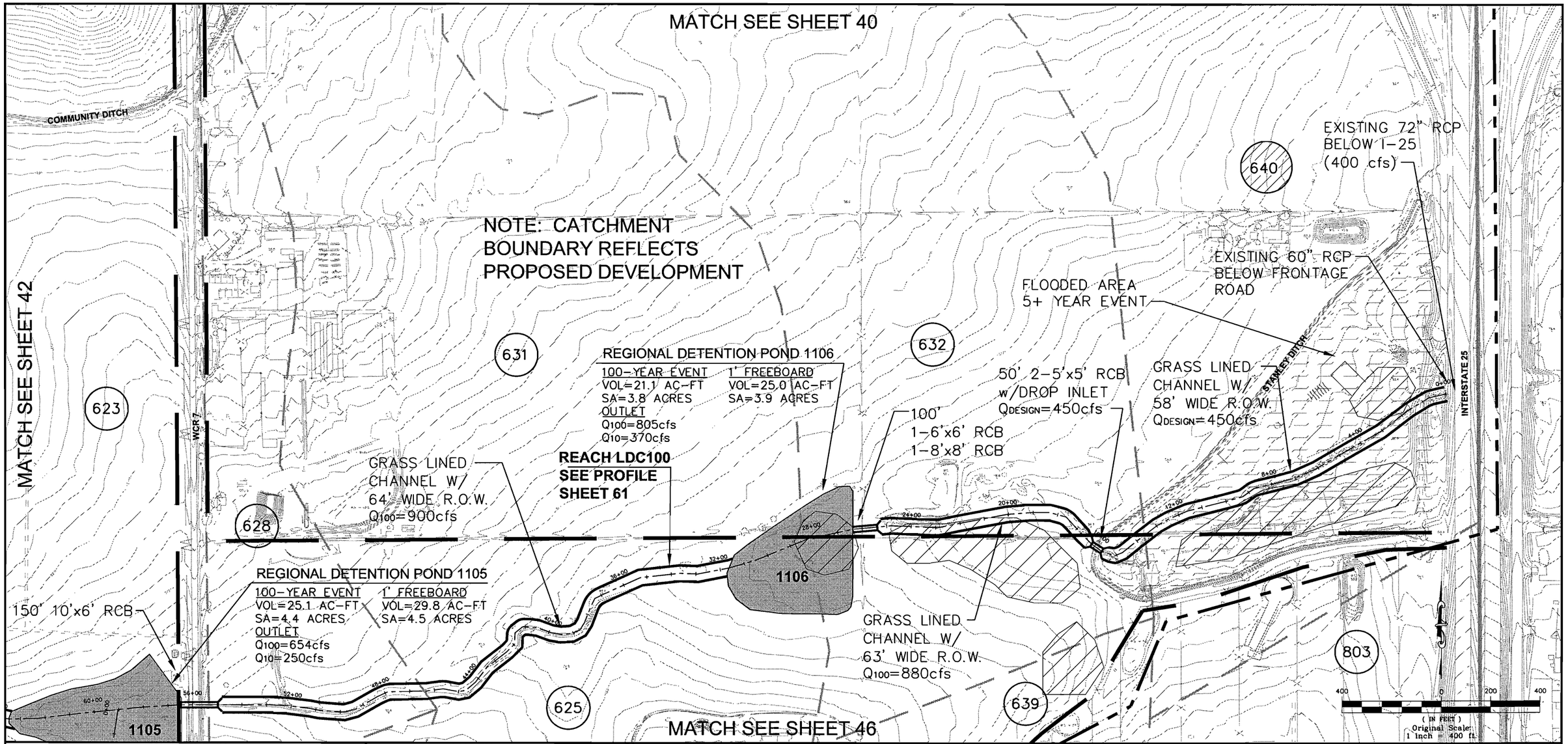

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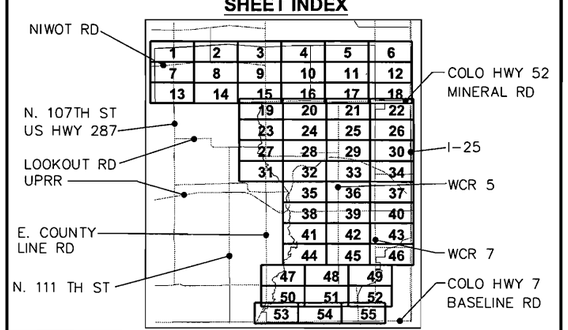

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 43 OF 67

COMMENTARY ON SHEET 44

No Regional Outfall System improvements are required on this sheet.

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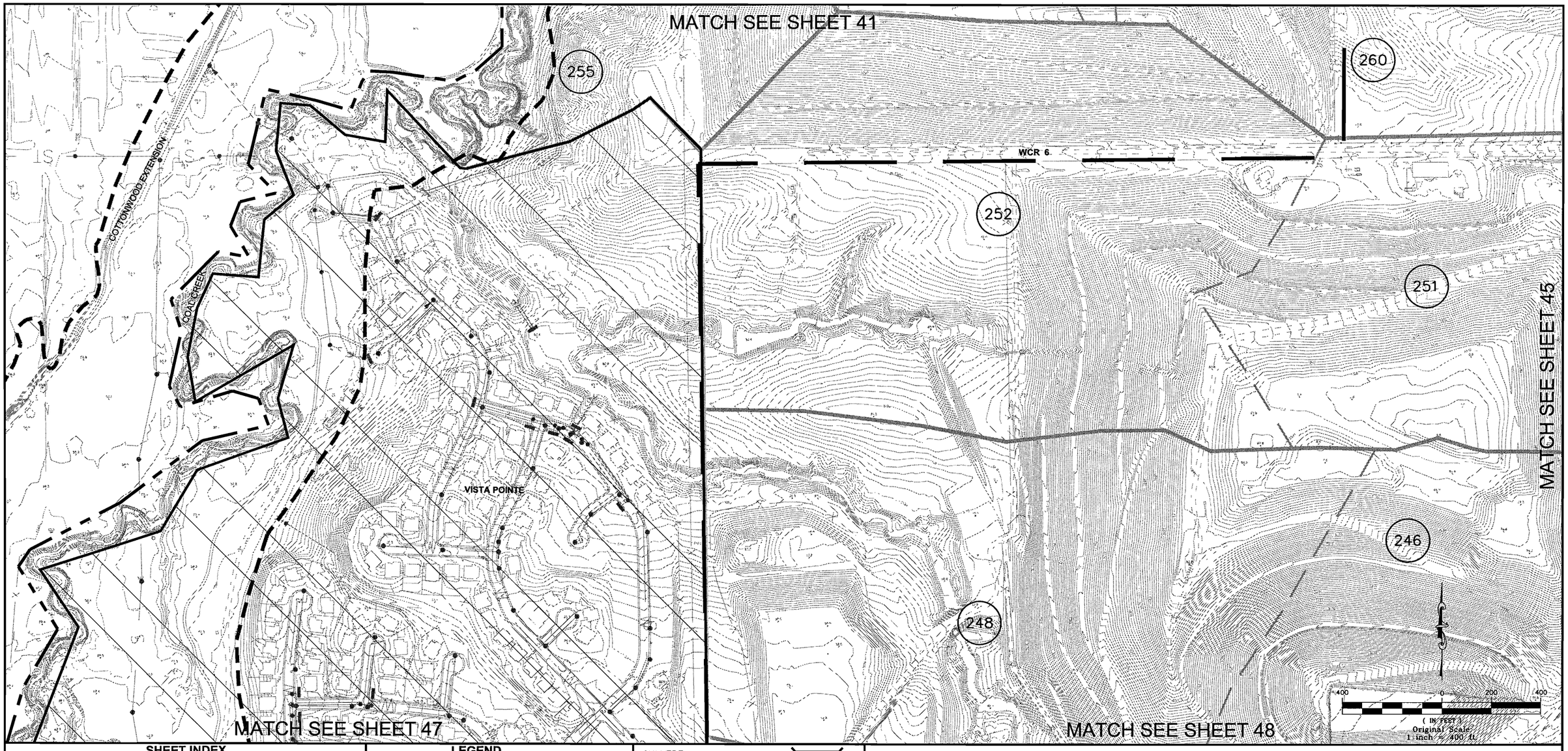

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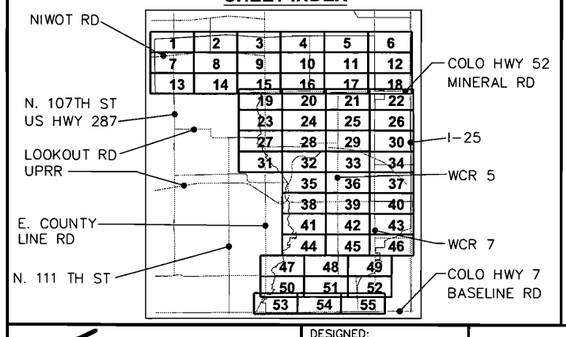

LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL – VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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800 Jefferson Avenue – Suite B
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Fax: 303-673-9796

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CHECKED:	DJL
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 44 OF 67

COMMENTARY ON SHEET 45

No Regional Outfall System improvements are required on this sheet.

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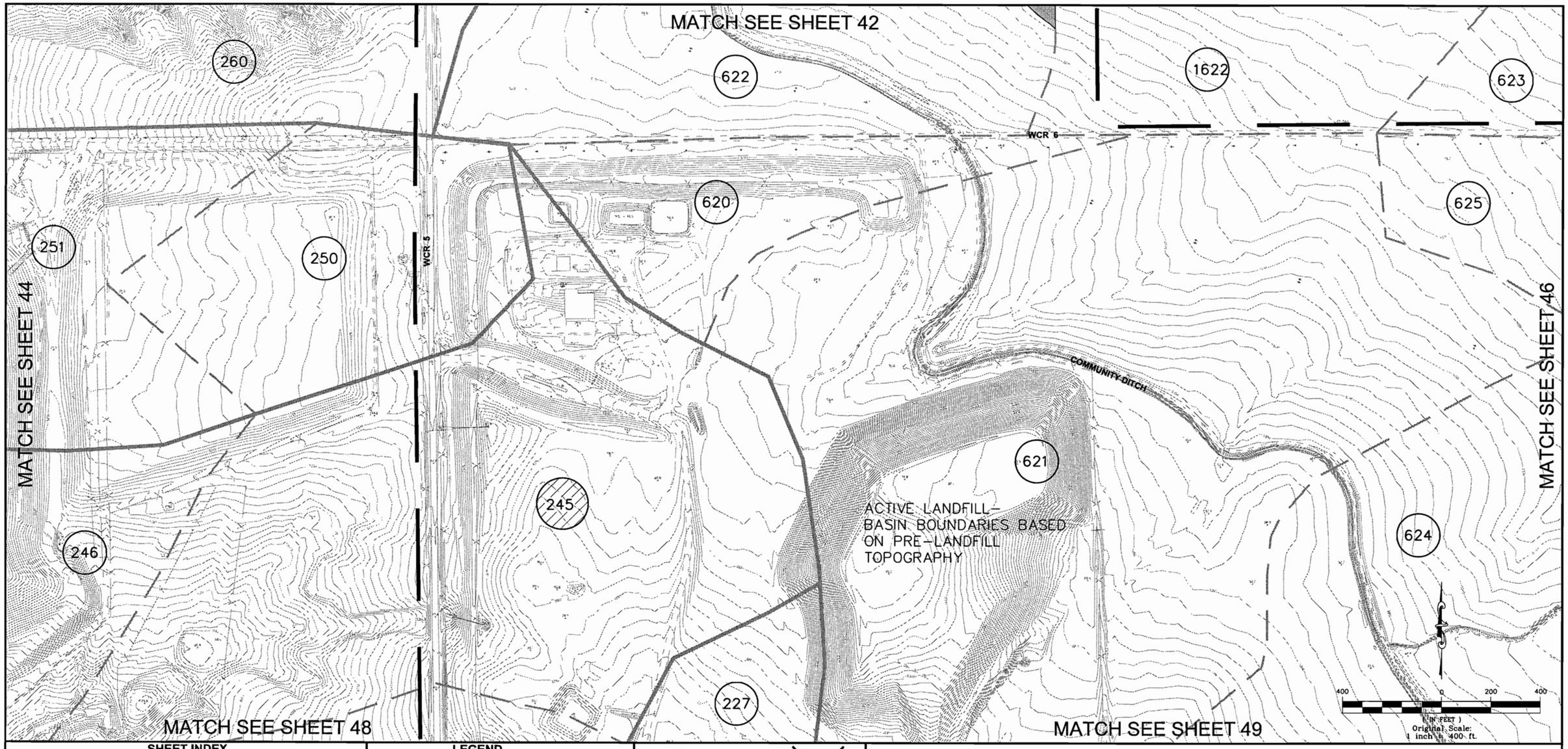
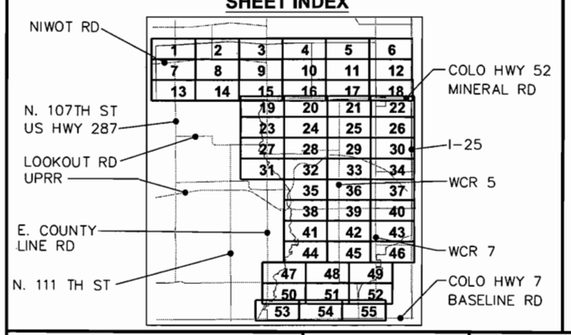


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100–YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON–SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR–53–1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED;

a. IF DEVELOPMENT OCCURS IN ANY SUB–CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON–SITE WATER QUALITY AND 10– AND 100–YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON–SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL – VOLUME 3 AND FOR 10– AND 100– YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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Phone: 303–673–9795
Fax: 303–673–9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6–07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 45 OF 67

COMMENTARY ON SHEET 46

The improvements for Outfall System LDC105 includes a 1370 -foot grass lined channel with a trickle channel, drop structures, and a 30-foot 2 x 4.5-ft RCP culvert below WCR 6.

Profiles for LDC105 are shown on Sheet 61.

Outfall	**Improvement**	**Linear Feet**	**Cost**
LDC105	Channel	1370	$ 596,000
LDC105	two 4.5' RCP	30	$ 26,500

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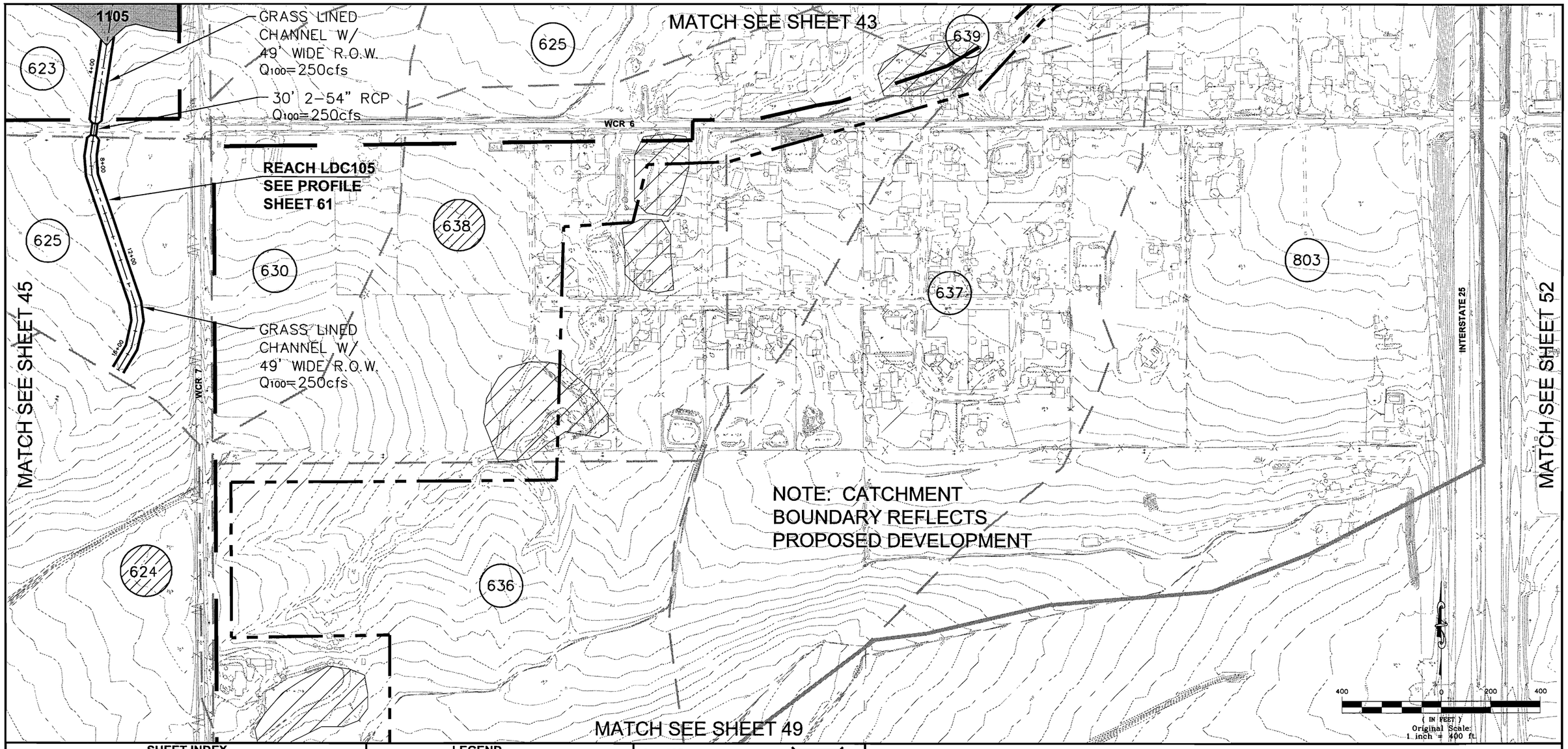
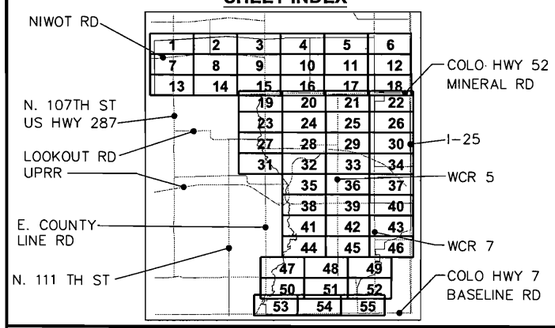


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 46 OF 67

COMMENTARY ON SHEET 47

The existing regional channel shown on this sheet downstream of Detention Facility 1101 was designed and constructed by others are requires no improvements.

Detention Facility 1101 with an existing 2 x 10- x 8-ft RCB outlet is presented on this sheet.

Outfall	**Improvement**	**Linear Feet**	**Cost**
1101	Detention Facility and Outlet		$ 494,000

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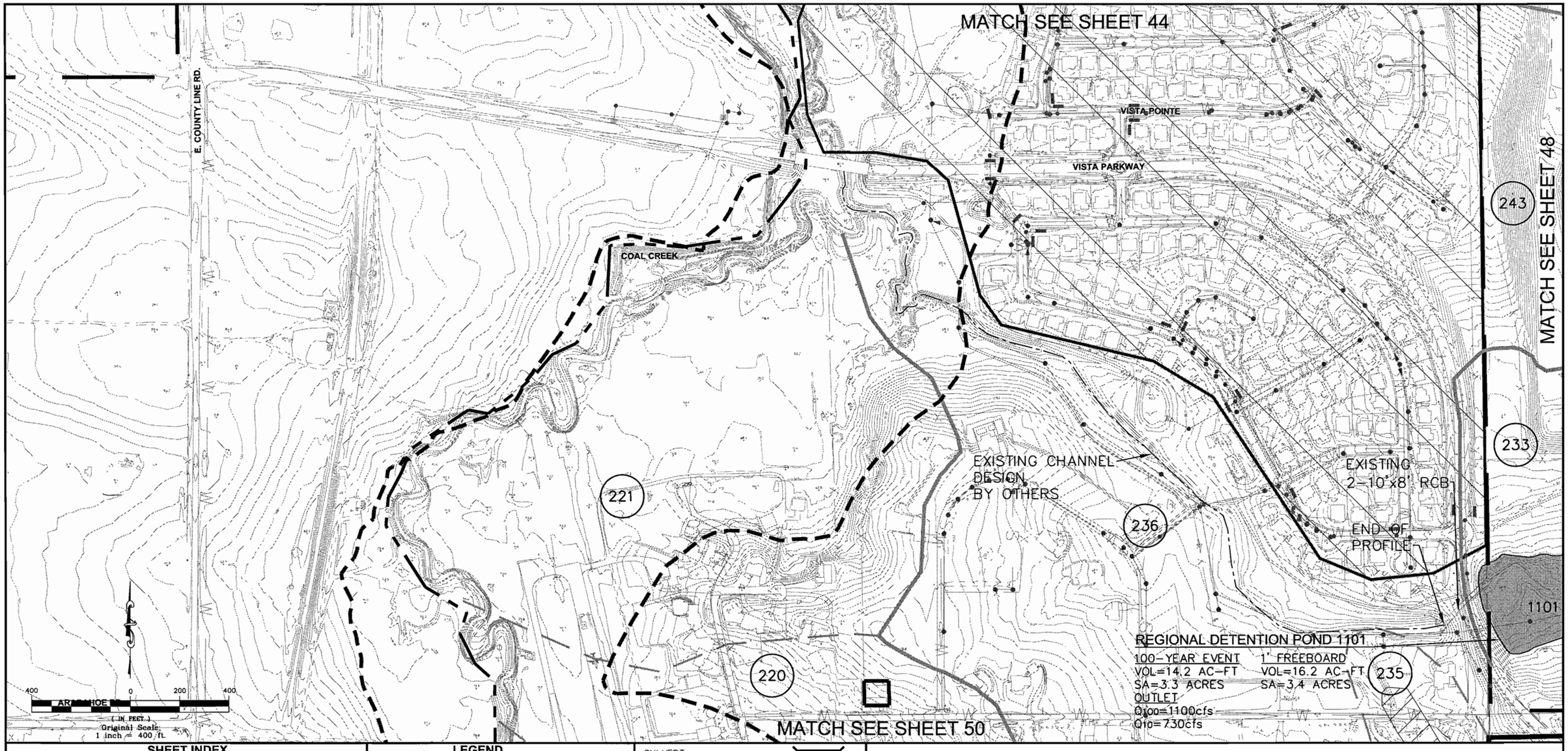
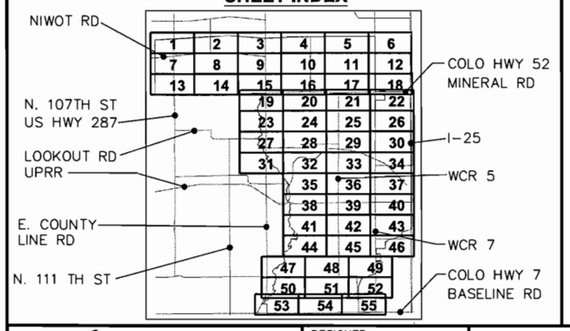


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100–YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON–SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE
- BURIED ELECTRIC — ELC
- CABLE TV — TV
- TELEPHONE — T
- GAS — GAS
- WATER — W
- SANITARY SEWER — S
- STORM SEWER — ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR–53–1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100–YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB–CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON–SITE WATER QUALITY AND 10– AND 100–YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON–SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL – VOLUME 3 AND FOR 10– AND 100– YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue – Suite B
Louisville, Colorado 80027–1873
Phone: 303–673–9795
Fax: 303–673–9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6–07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

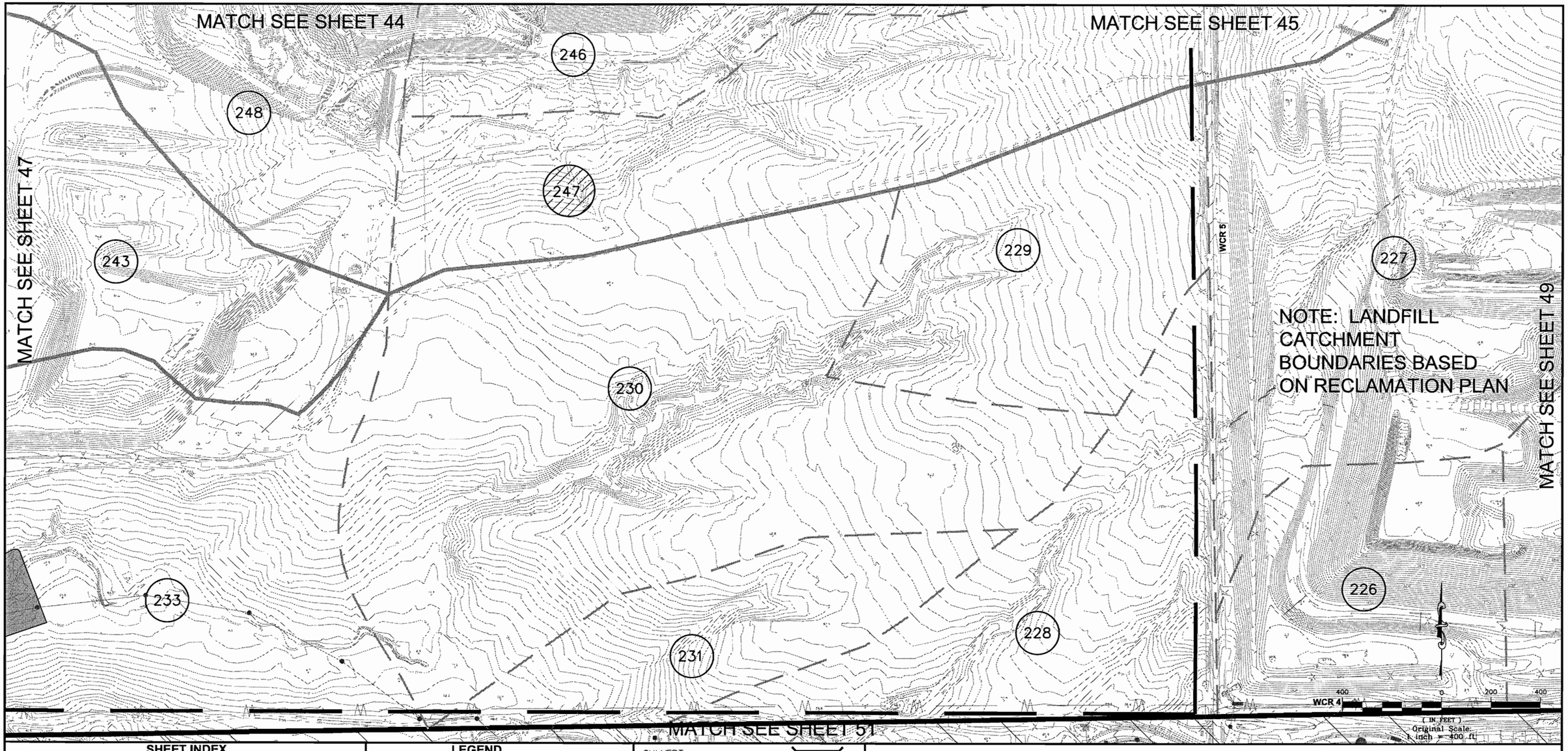
PRELIMINARY DESIGN PLAN

SHEET 47 OF 67

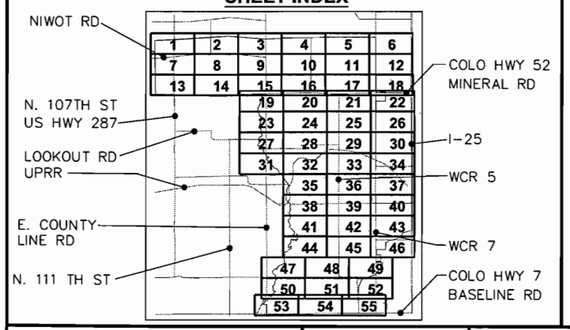
COMMENTARY ON SHEET 48

No Regional Outfall System improvements are required on this sheet. (See Sheet 47 for Regional Detention Facility 1101.)

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-43-48.dwg, 8/8/2007 11:35:46 AM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 48 OF 67

COMMENTARY ON SHEET 49

No Regional Outfall System improvements are required on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-49-55.dwg, 8/8/2007 1:17:51 PM, LOVE & ASSOCIATES, INC.

MATCH SEE SHEET 45

MATCH SEE SHEET 46

MATCH SEE SHEET 48

MATCH SEE SHEET 52

621

624

635

636

225

224

615

COMMUNITY DITCH

WCR 7

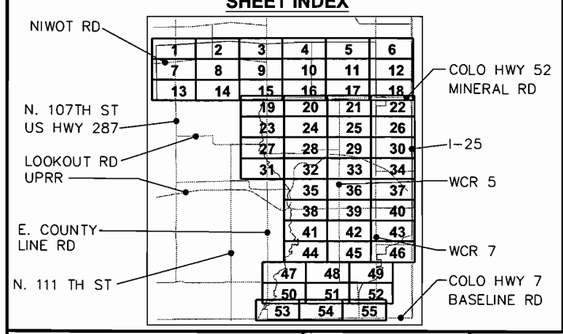
WCR 4

LANDFILL CATCHMENT BOUNDARIES BASED ON RECLAMATION PLAN

0 200 400

(IN FEET)
Original Scale:
1 inch = 400 ft.

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE
BURIED ELECTRIC	ELC
CABLE TV	TV
TELEPHONE	T
GAS	GAS
WATER	W
SANITARY SEWER	S
STORM SEWER	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 49 OF 67

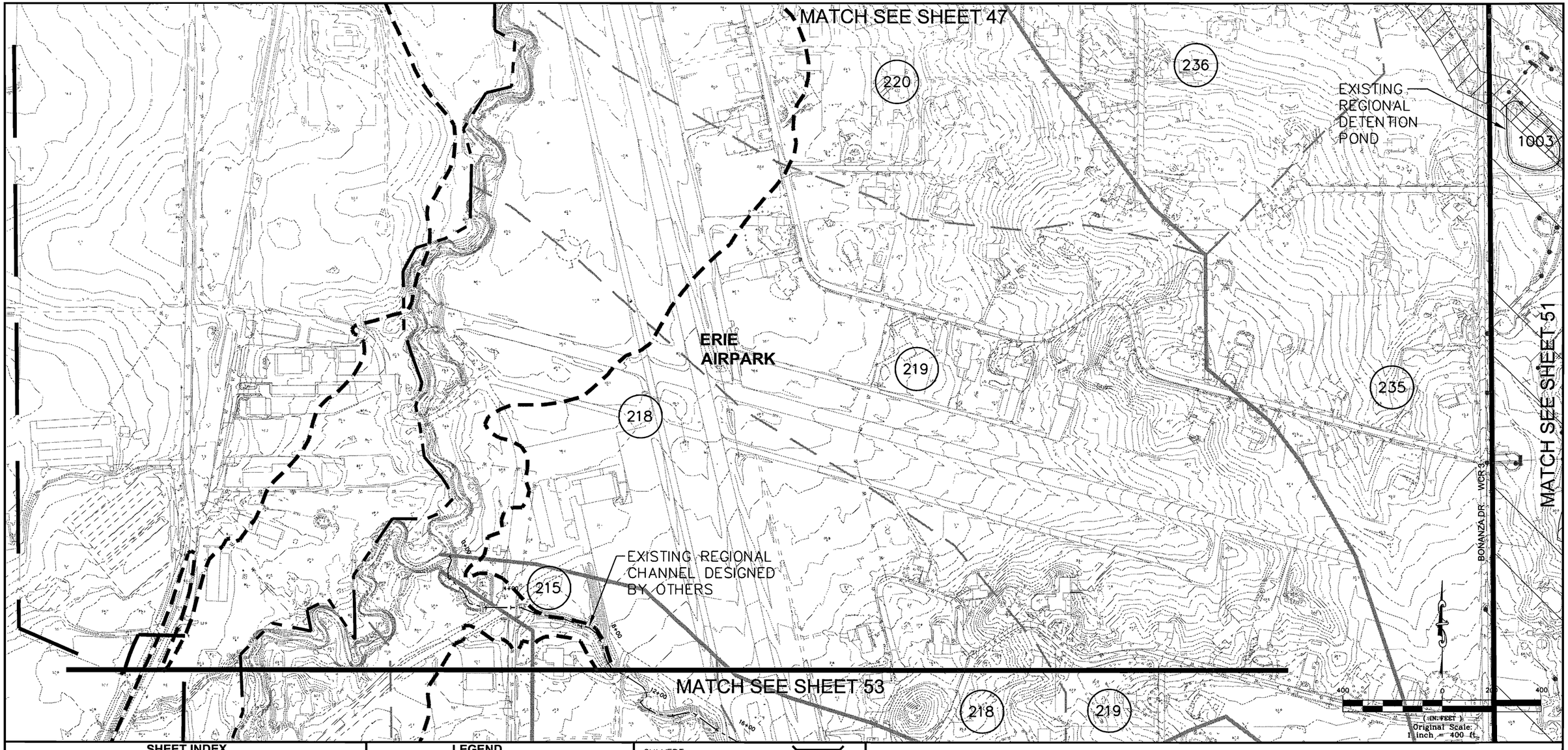
COMMENTARY ON SHEET 50

No Regional Outfall System improvements are required on this sheet.

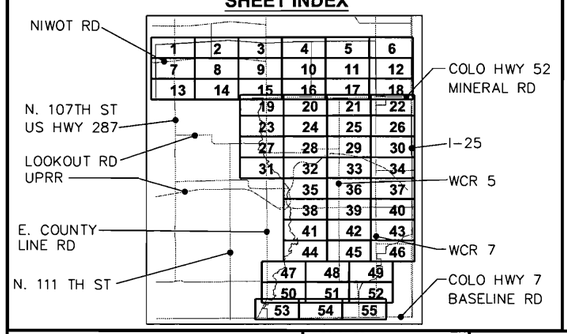
The existing regional channel shown on this Sheet was designed and constructed by others and requires no improvements.

Existing Detention Facility 1103 designed and constructed by others is also shown on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603\D\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-49-55.dwg, 8/8/2007 1:18:54 PM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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CHECKED:	DJL
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

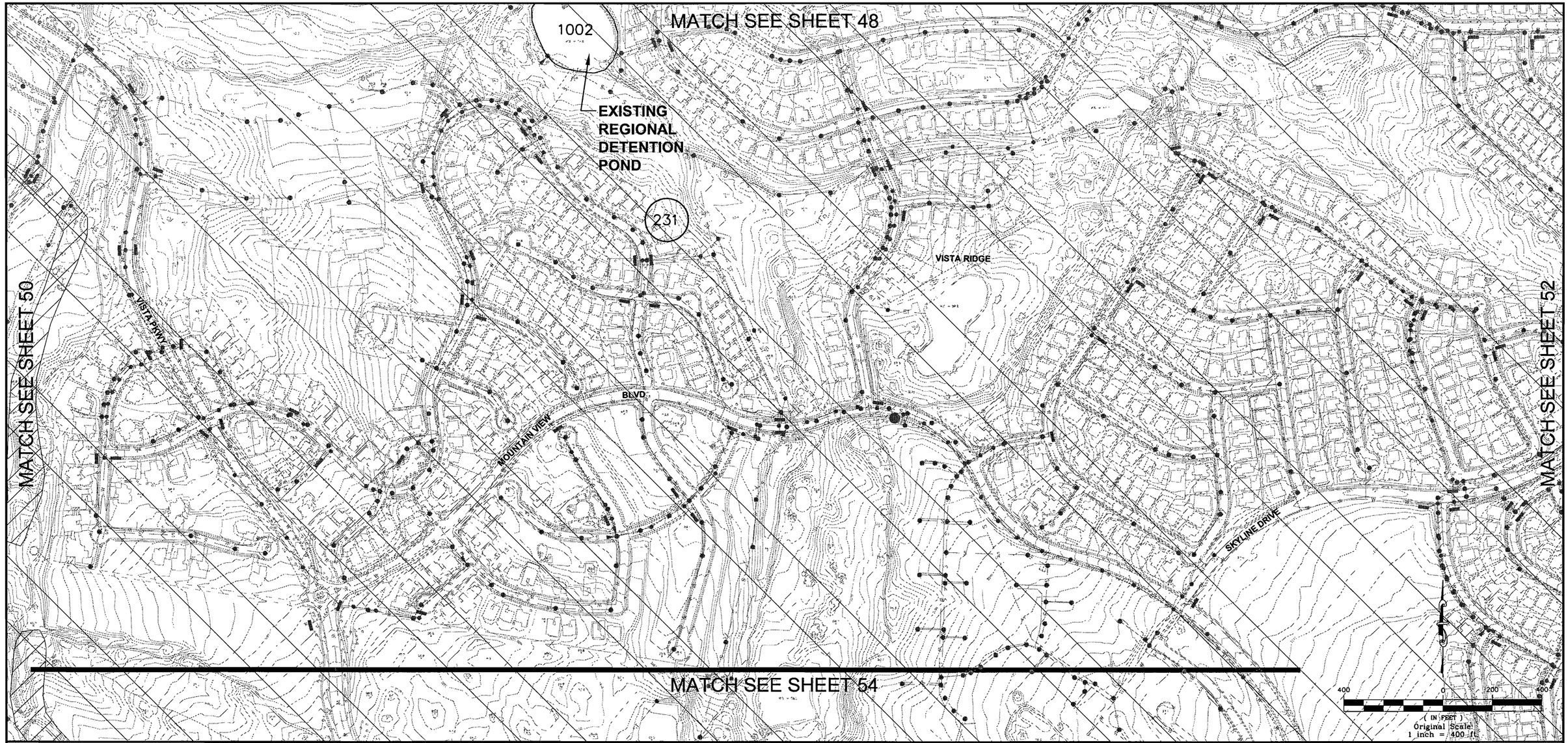
SHEET 50 OF 67

COMMENTARY ON SHEET 51

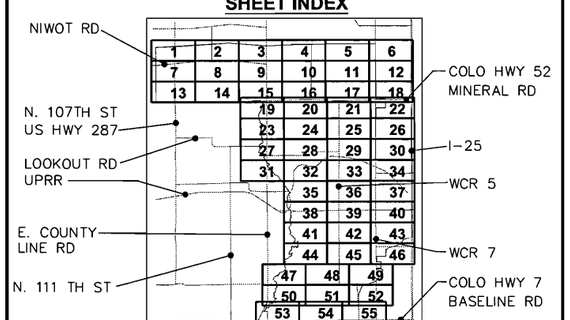
No Regional Outfall System improvements are required on this sheet.

Existing Detention Facility 1102 designed and constructed by others is also shown on this sheet.

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-49-55.dwg, 8/8/2007 1:20:02 PM, LOVE & ASSOCIATES, INC.



SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC (OE)
- BURIED ELECTRIC (ELC)
- CABLE TV (TV)
- TELEPHONE (T)
- GAS (GAS)
- WATER (W)
- SANITARY SEWER (S)
- STORM SEWER (ST)

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

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CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 51 OF 67

COMMENTARY ON SHEET 52

No Regional Outfall System improvements are required on this sheet.

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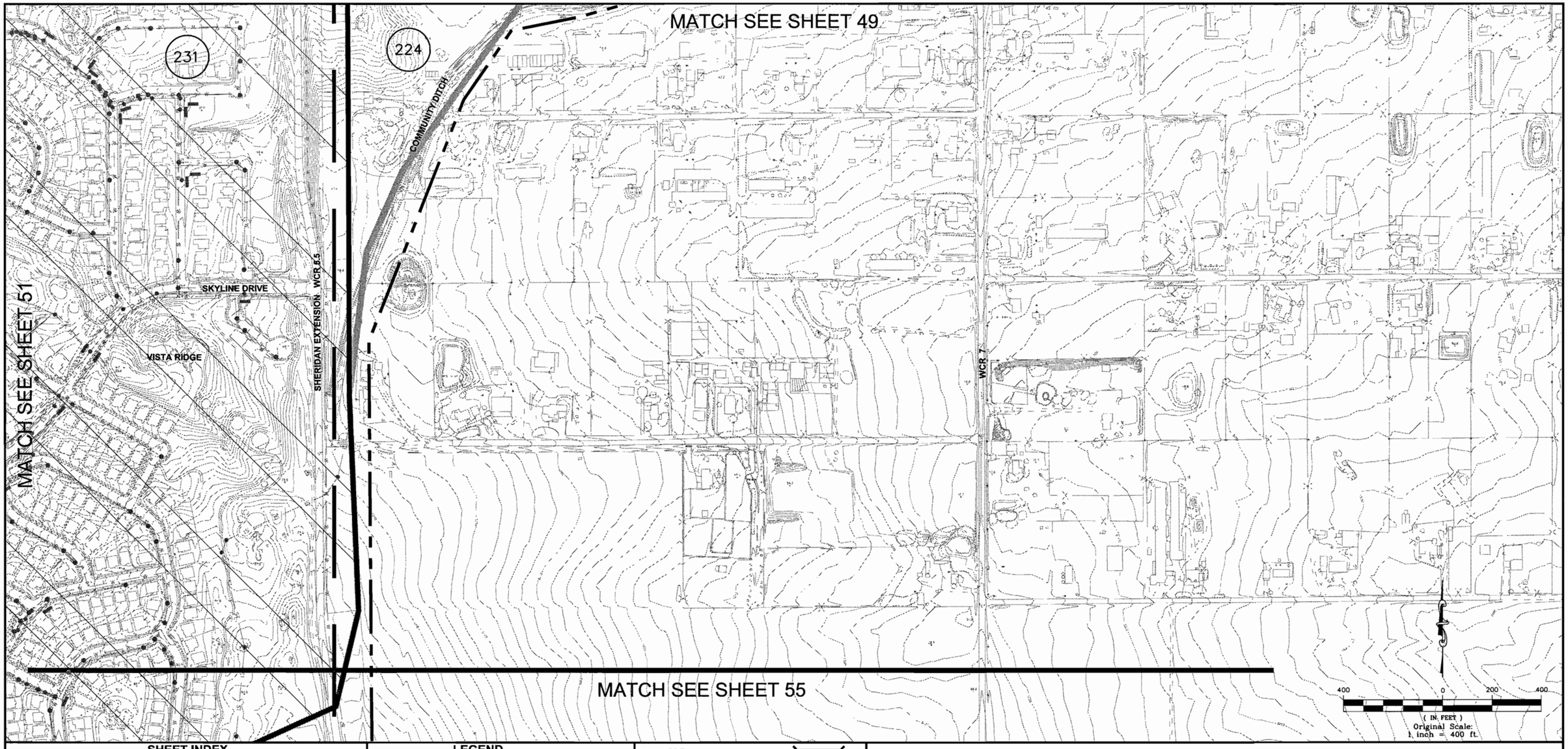
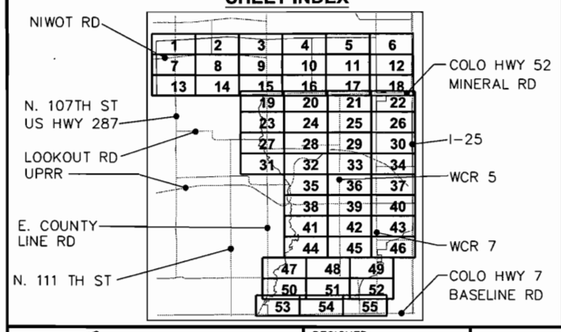


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

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DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 52 OF 67

COMMENTARY ON SHEET 53

The improvements for Outfall System CC120 includes a 2250 -foot grass lined channel with a trickle channel and drop structures.

Profiles for CC120 are shown on Sheet 60.

The existing regional channel shown on this Sheet from the match line with Sheet 50 to the inlet of the southern 2 x 6-ft RCP's was designed and constructed by others and requires no improvements.

The short segment of existing regional channel in the southwest corner of the Erie Planning Area requires no improvements at this time. It should, however, be examined yearly to identify if stabilization is required due to releases from the recently completed Anthem development detention facility in the City and County of Broomfield south of Baseline Road.

Outfall	**Improvement**	**Linear Feet**	**Cost**
CC120	Channel	2250	$ 1,242,000

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\PDP-SHTS-49-55.dwg, 8/8/2007 1:25:21 PM, LOVE & ASSOCIATES, INC.

400 0 200 400
(IN FEET)
Original Scale:
1 inch = 400 ft.

MATCH SEE SHEET 50

EXISTING 2-6' RCP

215

EXISTING REGIONAL CHANNEL DESIGNED BY OTHERS

218

219

ERIE AIRPARK

214

204

203

EXISTING 2-6' RCP

ERIE TOWN BOUNDARY

REACH CC120
SEE PROFILE
SHEET 60

202

212

213

GRASS LINED CHANNEL W/ 55' WIDE R.O.W. Q_{100}=540cfs

COAL CREEK

EXISTING CHANNEL

201

211

EXISTING 10'x7.5' RCB

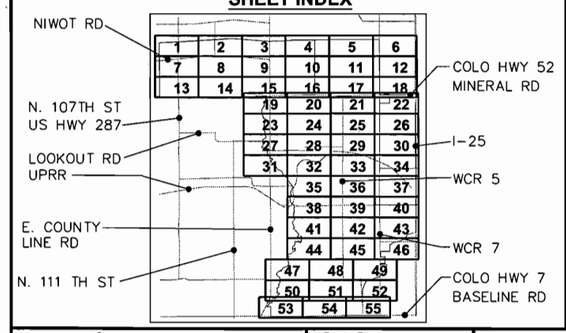
EXISTING 2-48" RCP

BASELINE RD

CO. HWY 7

MATCH SEE SHEET 54

SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS
- OVERHEAD ELECTRIC — OE —
- BURIED ELECTRIC — ELC —
- CABLE TV — TV —
- TELEPHONE — T —
- GAS — GAS —
- WATER — W —
- SANITARY SEWER — S —
- STORM SEWER — ST —

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
JR-53-1948

NOTES:

1. THIS DRAWING IS FOR MASTER PLANNING PURPOSES AND REPRESENTS PRELIMINARY AND CONCEPTUAL ENGINEERING. ALTERNATIVES TO THIS OUTFALL SYSTEM WILL BE CONSIDERED BY THE TOWN OF ERIE PROVIDED THE ALTERNATIVE OFFERS EQUAL HYDROLOGIC RESPONSE, HYDRAULIC CAPACITY AND STREAM STABILITY. THE ALTERNATIVE MUST COMPLY WITH ALL REQUIREMENTS OF THE TOWN OF ERIE. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.

2. THE TOWN OF ERIE, WELD AND BOULDER COUNTIES MANAGE AND REGULATE ALL LAND DEVELOPMENT AND REDEVELOPMENT WITHIN THE 100-YEAR FLOODPLAINS SO AS TO PREVENT FUTURE FLOOD DAMAGES BY FOLLOWING THE RECOMMENDATIONS OF THIS PLAN.

3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

a. IF DEVELOPMENT OCCURS IN ANY SUB-CATCHMENT SERVED BY ANY OF THE REGIONAL DETENTION BASINS BEFORE THE REGIONAL DETENTION BASIN IS IN EXISTENCE ON THE GROUND, DEVELOPMENT SHALL PROVIDE ON-SITE WATER QUALITY AND 10- AND 100-YEAR DETENTION.

b. STORAGE VOLUME AND THE ALLOWABLE RELEASE RATES FOR ALL ON-SITE DETENTION BASINS SHALL BE BASED ON THE EQUATIONS (CHARTS) FOR WATER QUALITY CAPTURE VOLUME CONTAINED IN UD&FCD URBAN STORM DRAINAGE CRITERIA MANUAL - VOLUME 3 AND FOR 10- AND 100- YEAR PEAK FLOW CONTROLS THE EQUATIONS DEVELOPED BY ENGINEER FOR THIS FINAL PLAN.

c. ALL DRAINAGE FACILITIES SHALL BE SIZED TO HANDLE FLOWS THAT ARE NOT REDUCED BY UPSTREAM DETENTION UNLESS THE DETENTION FACILITIES ARE PHYSICALLY IN PLACE AT THE TIME OF DESIGN. ASSUMING DETENTION WILL BE BUILT IN THE FUTURE IS NOT VALID AND WILL NOT BE ACCEPTED.

Love & Associates, Inc.
water resource consultants
800 Jefferson Avenue - Suite B
Louisville, Colorado 80027-1873
Phone: 303-673-9795
Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 53 OF 67

COMMENTARY ON SHEET 54

No Regional Outfall System improvements are required on this sheet.

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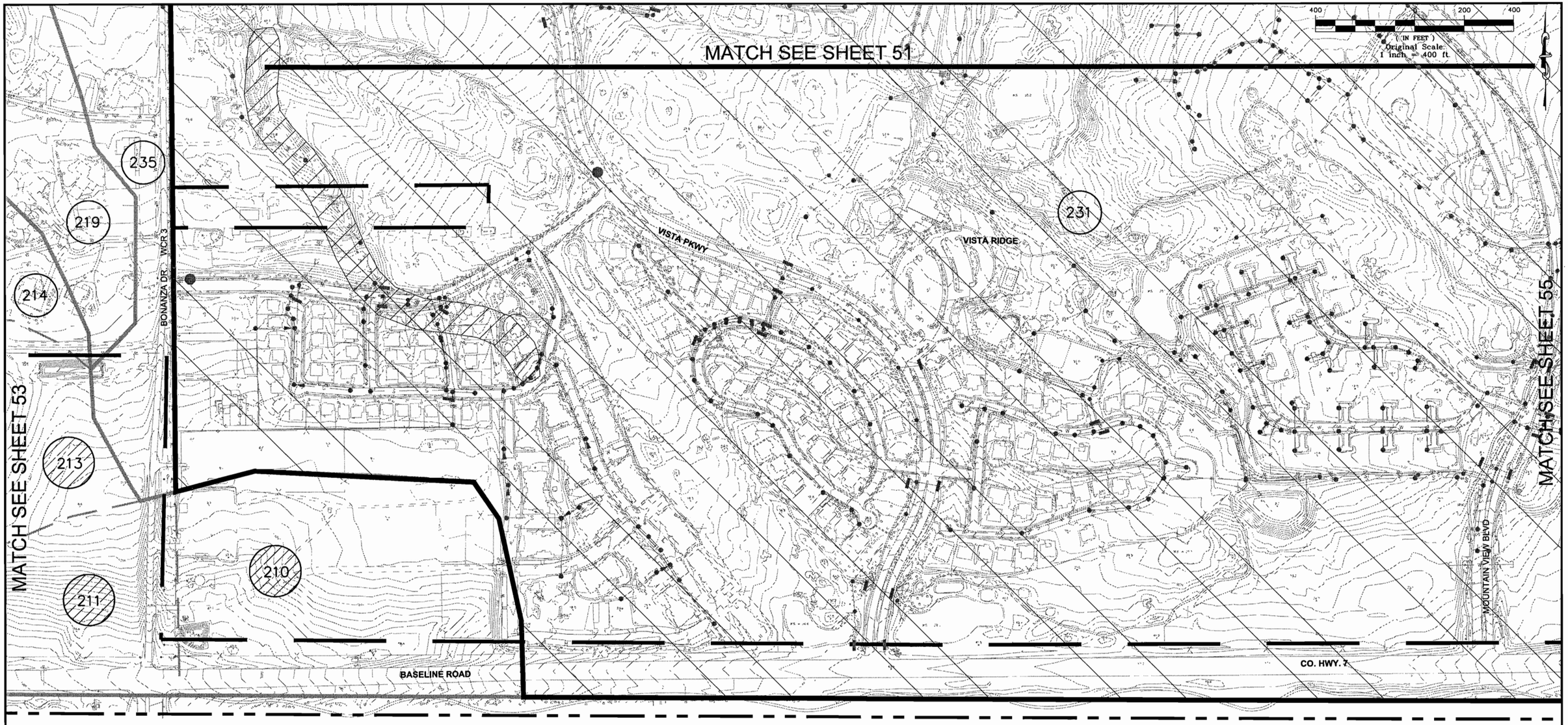
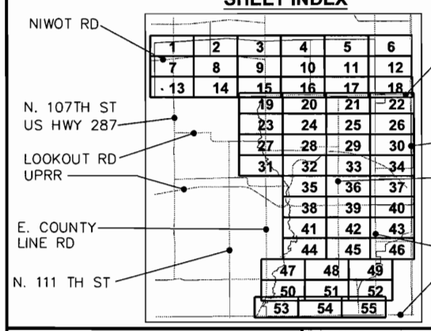


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN
- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
HORIZONTAL: COLORADO STATE PLANE NORTH ZONE, HARN ADJUSTMENT.
VERTICAL: NGVD 88

CONTROL POINTS:
USGS CONTROL POINT:
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3. WHEN REGIONAL BASINS ARE NOT CONSTRUCTED:

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 54 OF 67

COMMENTARY ON SHEET 55

No Regional Outfall System improvements are required on this sheet.

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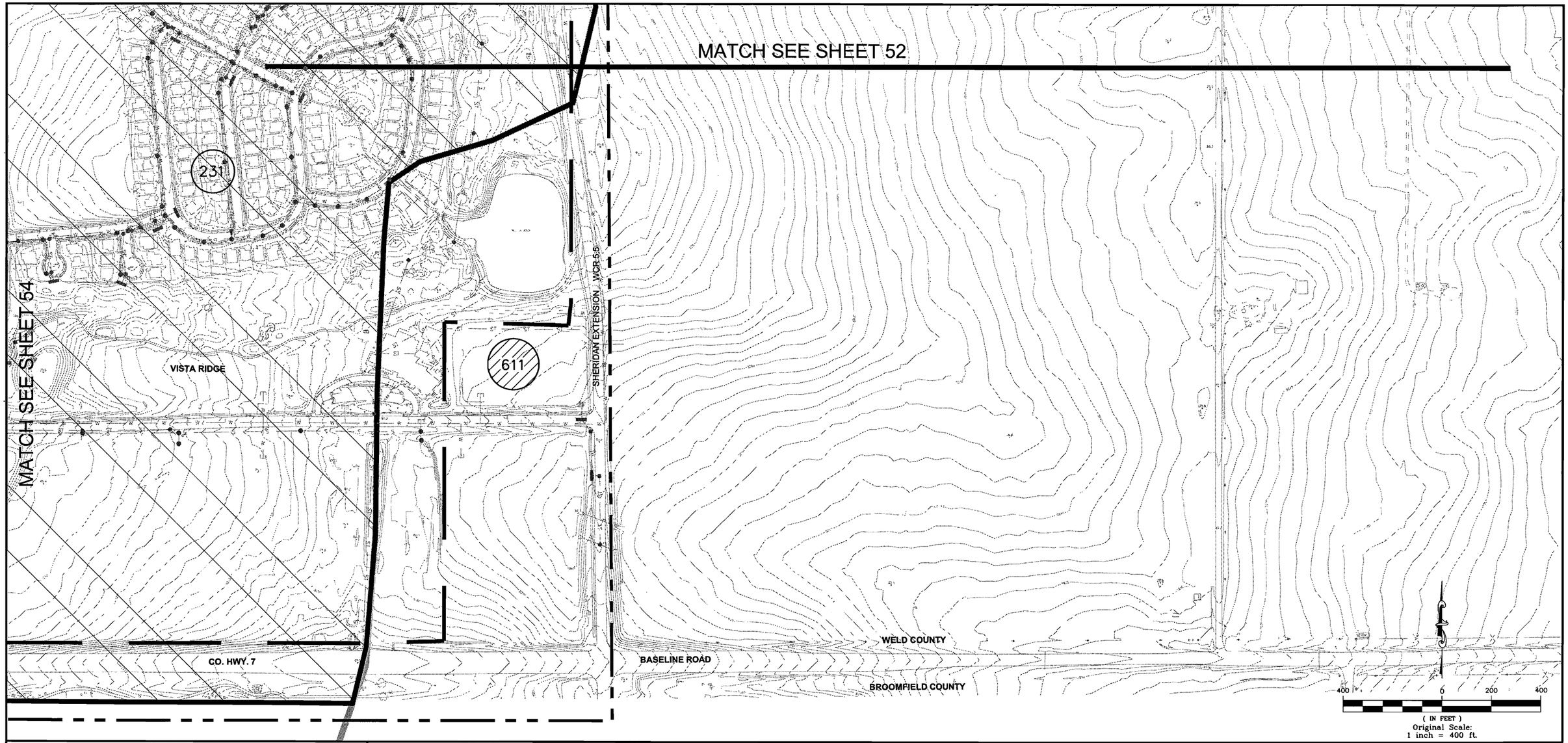
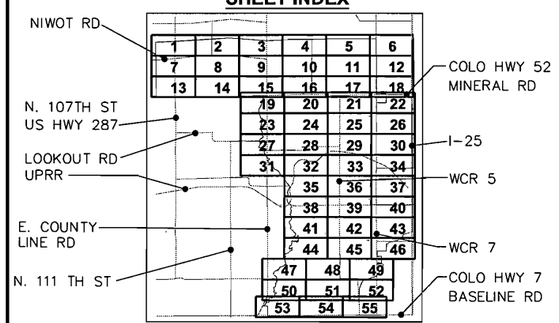


SHEET INDEX



LEGEND

- CATCHMENT BOUNDARY
- MINOR CATCHMENT BOUNDARY
- STUDY AREA
- 100-YEAR REGULATORY FLOODPLAIN
- CATCHMENT I.D. (800)
- ON-SITE OR LOCAL DETENTION REQUIRED (800)
- ERIE TOWN BOUNDARY
- CHANNEL CENTERLINE
- DRAINAGE R.O.W.
- DETENTION BASIN

- CULVERT
- STORM SEWER
- POTENTIAL WETLANDS

OVERHEAD ELECTRIC	OE	OE
BURIED ELECTRIC	ELC	ELC
CABLE TV	TV	TV
TELEPHONE	T	T
GAS	GAS	GAS
WATER	W	W
SANITARY SEWER	S	S
STORM SEWER	ST	ST

DATUM:
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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PLAN

SHEET 55 OF 67

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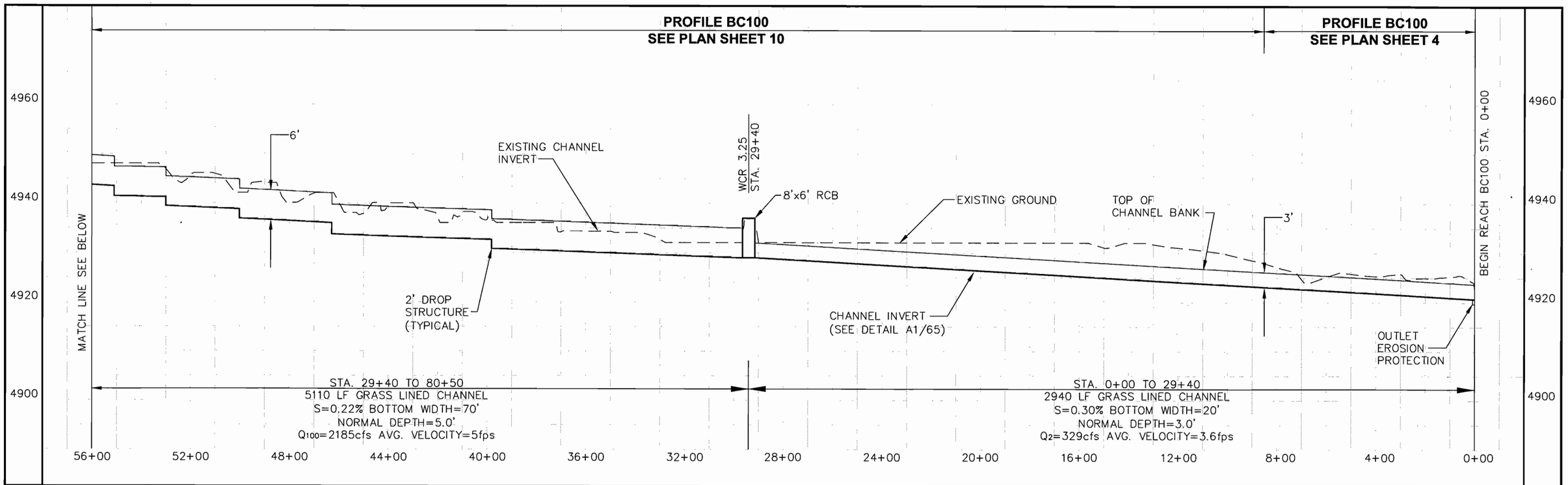

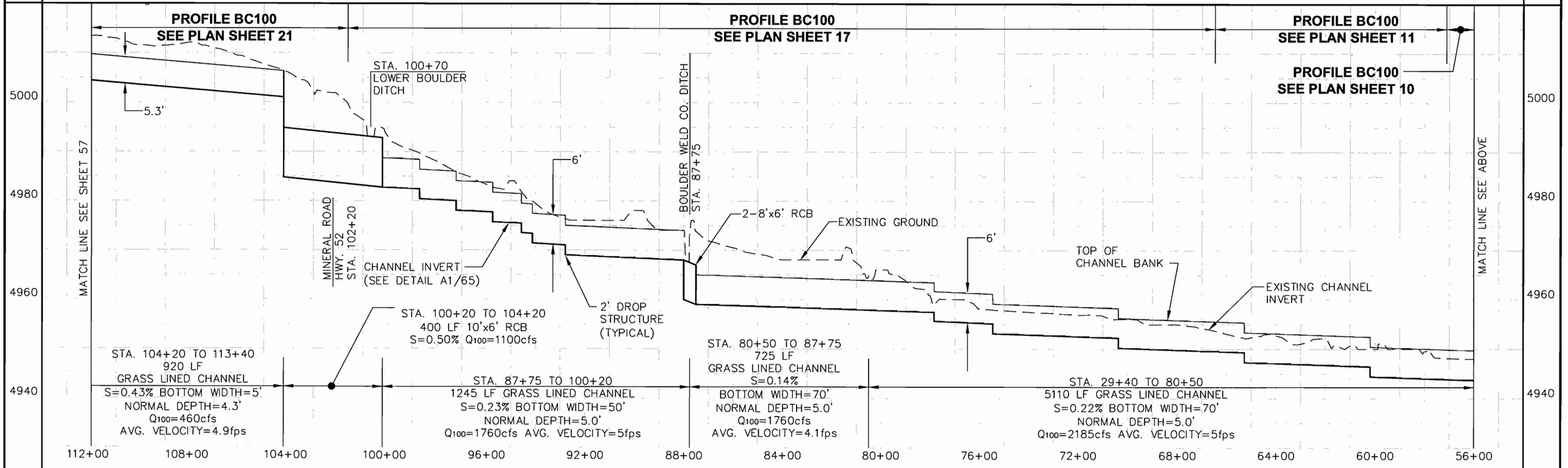

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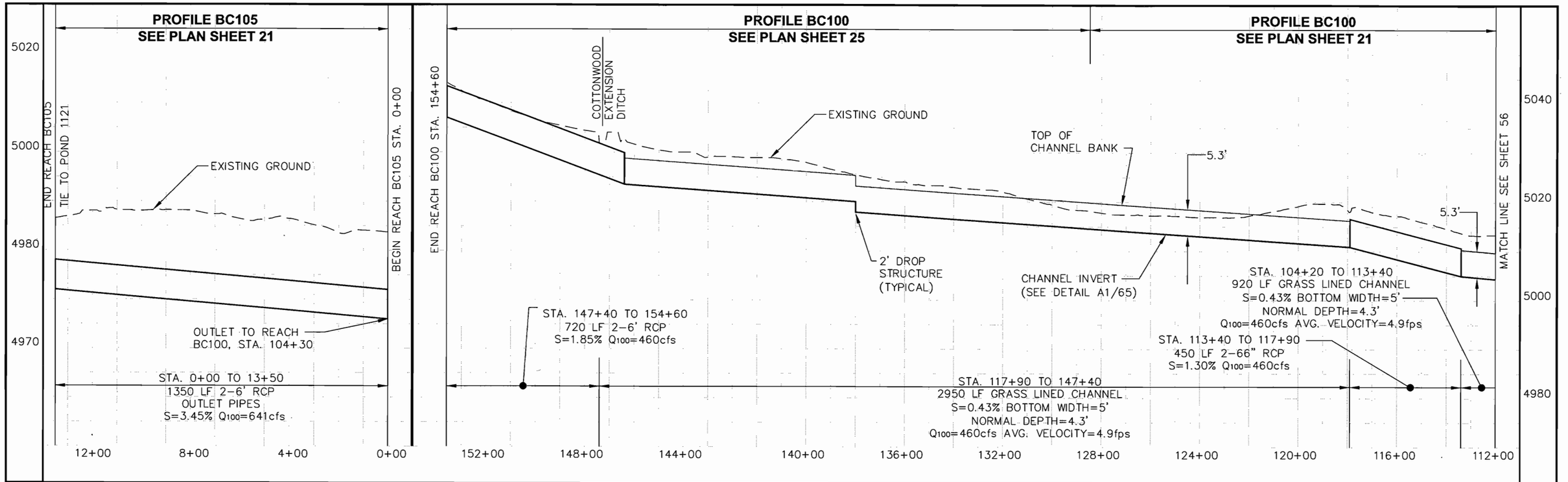
TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PROFILE

SHEET 56 OF 67



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PRELIMINARY DESIGN PROFILE

SHEET 57 OF 67

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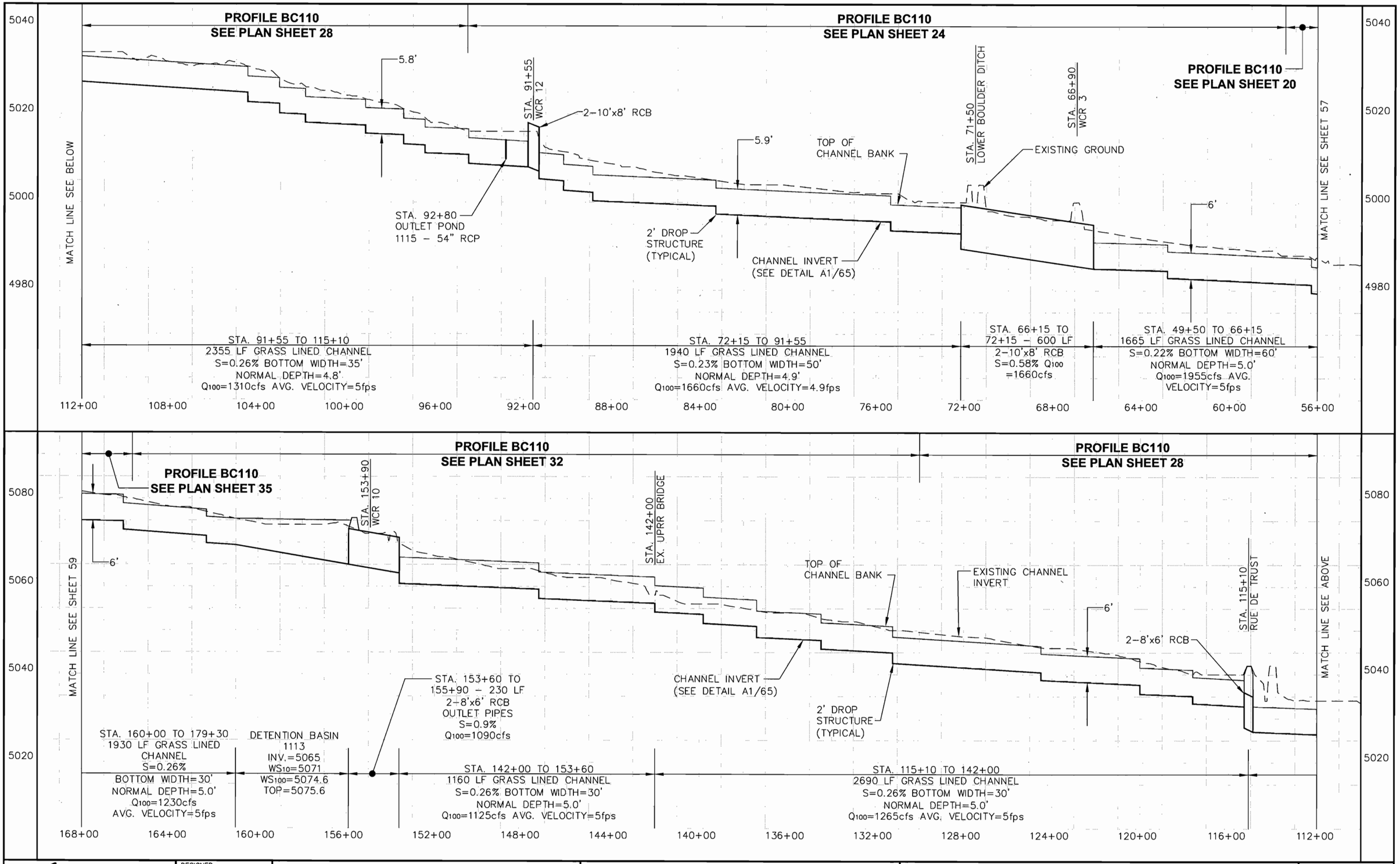

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TOWN OF ERIE

**ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING**

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DESIGN PROFILE**

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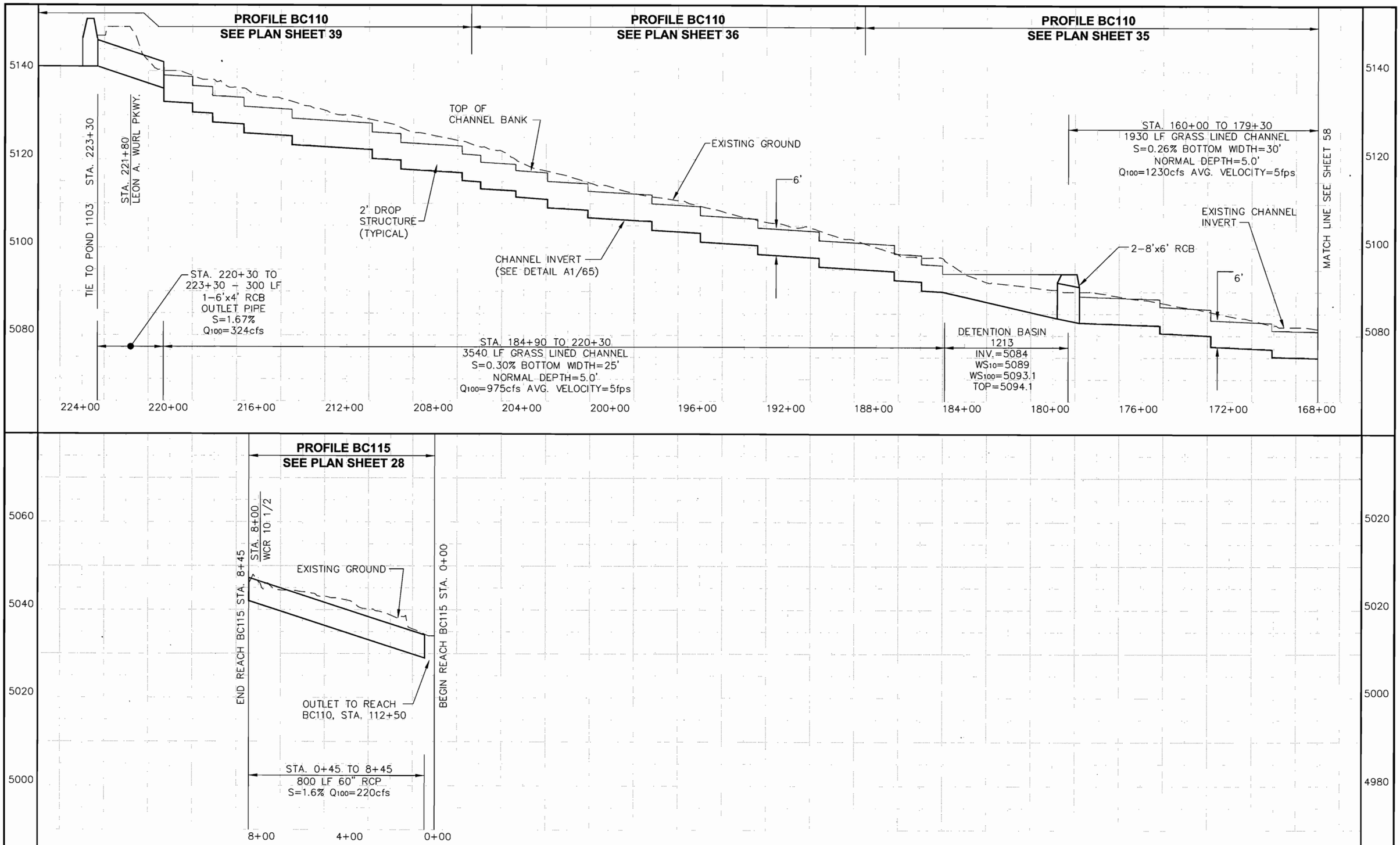

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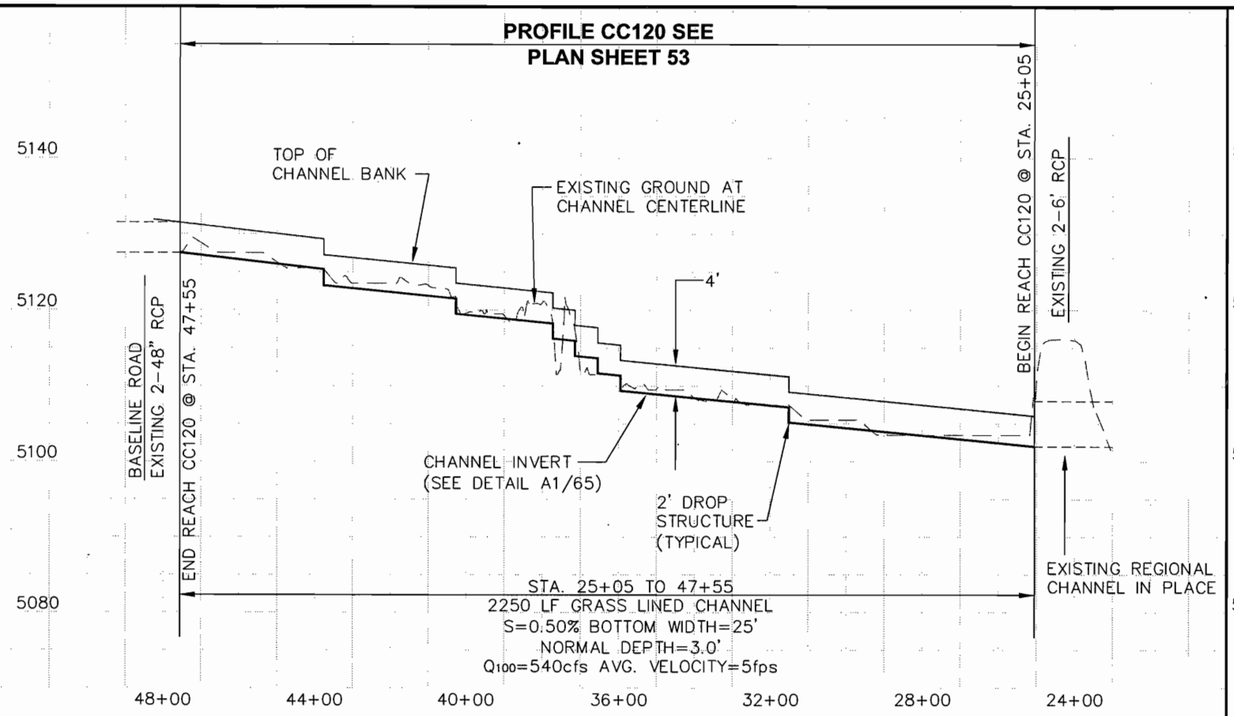

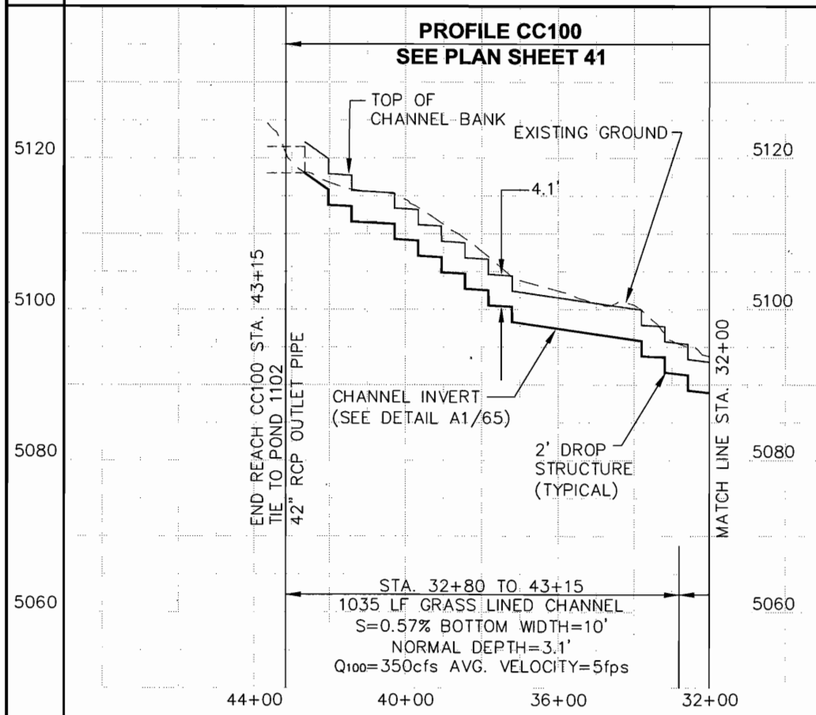

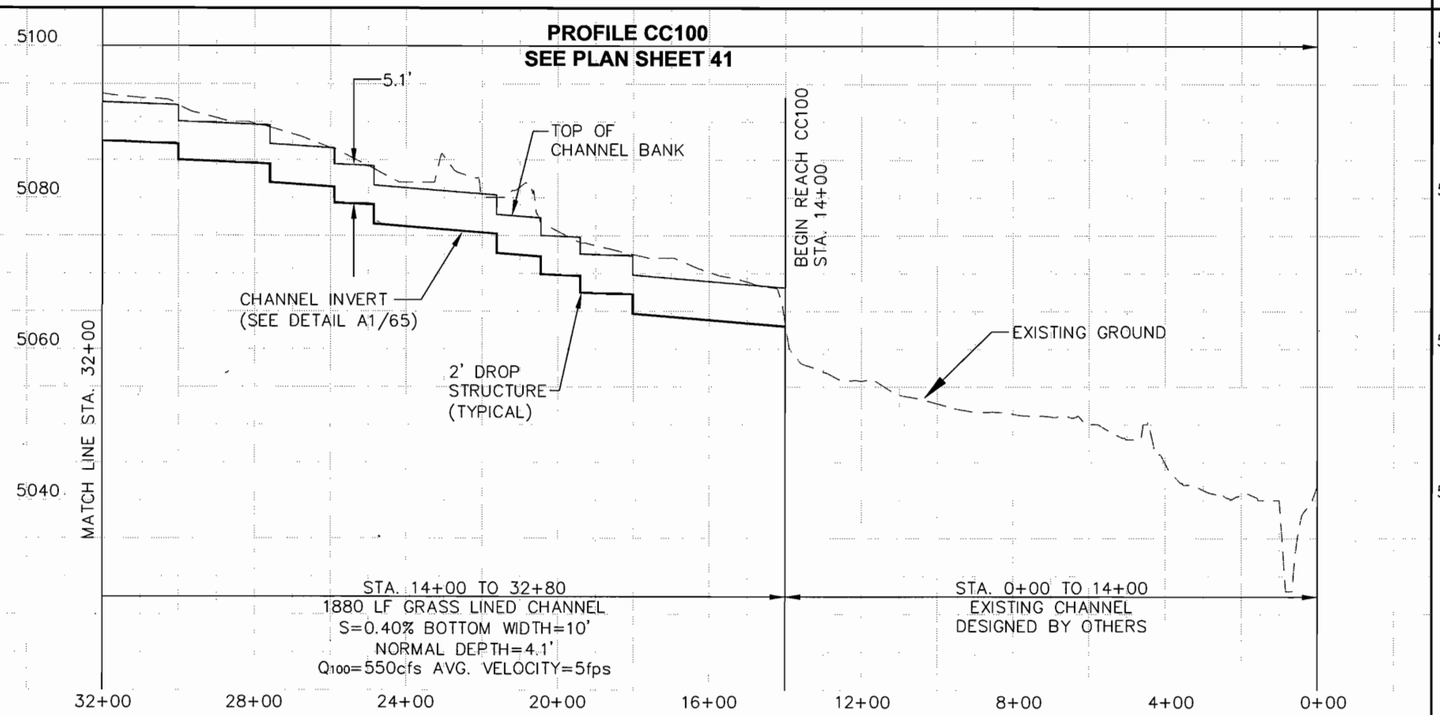

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TOWN OF ERIE

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OUTFALL SYSTEMS PLANNING

PRELIMINARY
DESIGN PROFILE

SHEET
60 OF 67

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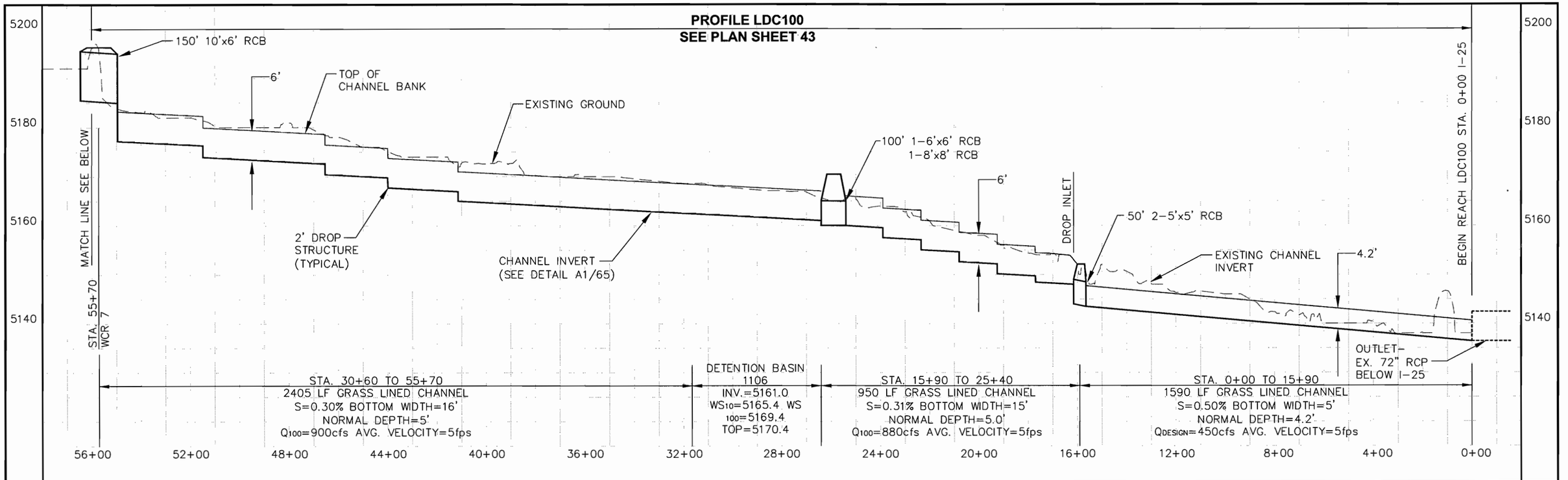

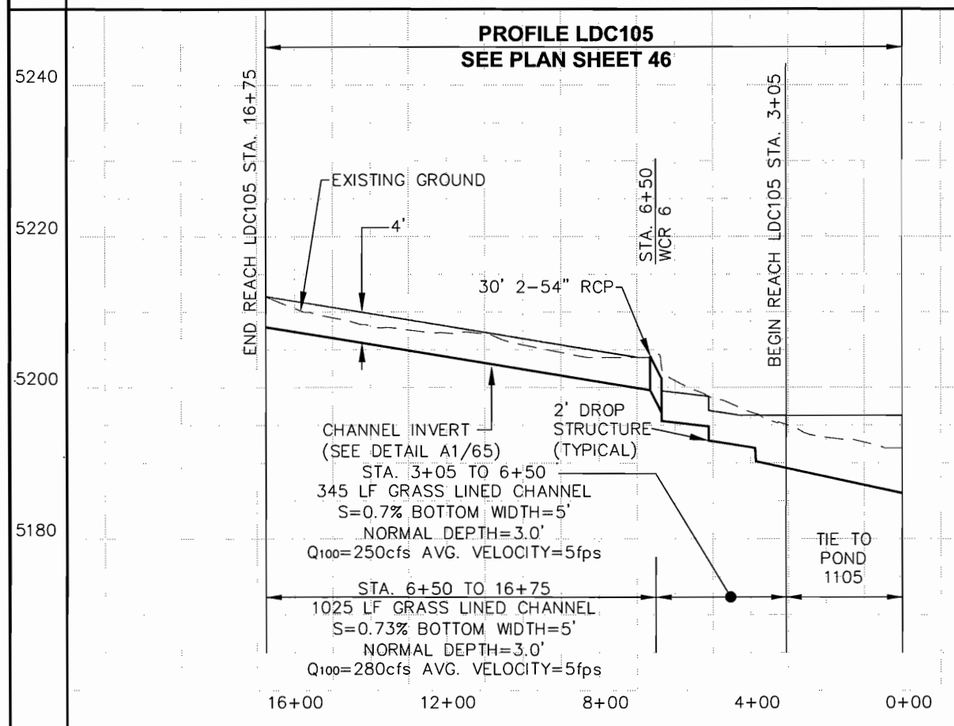

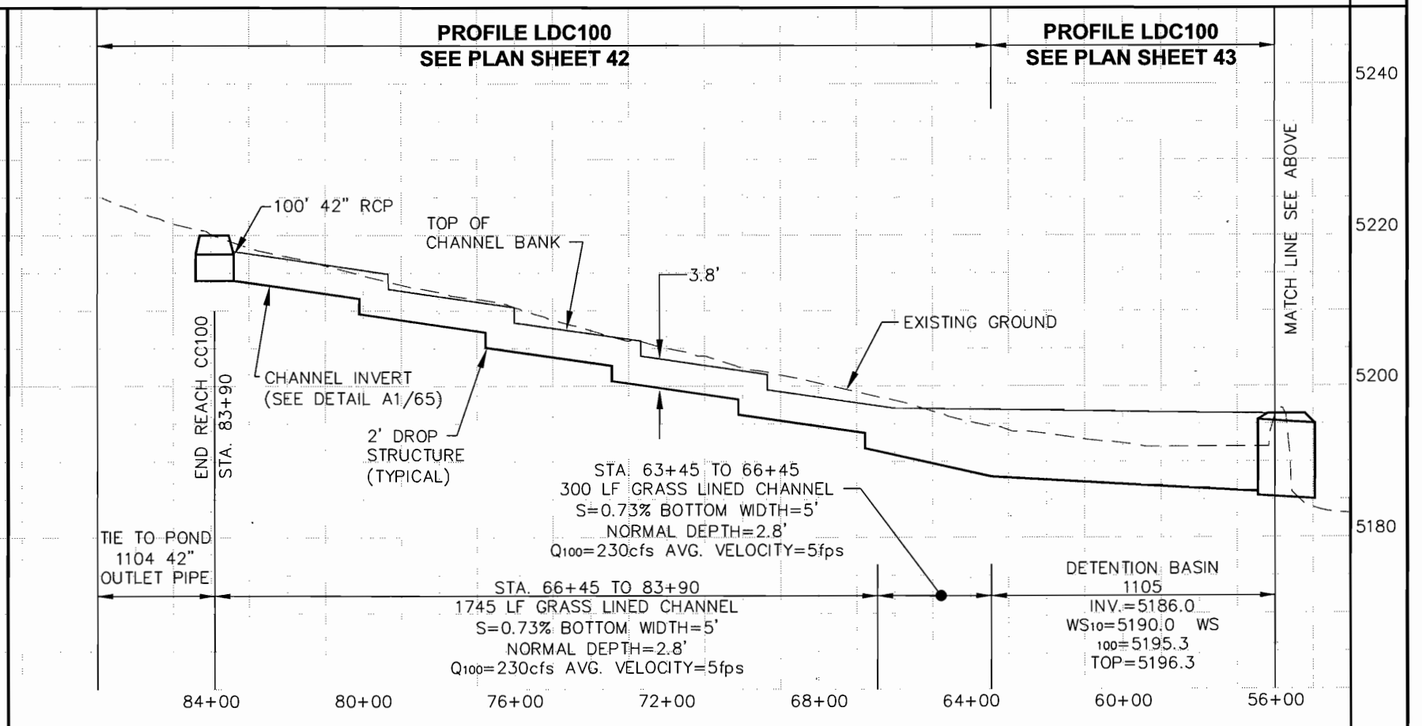

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN PROFILE

SHEET 61 OF 67

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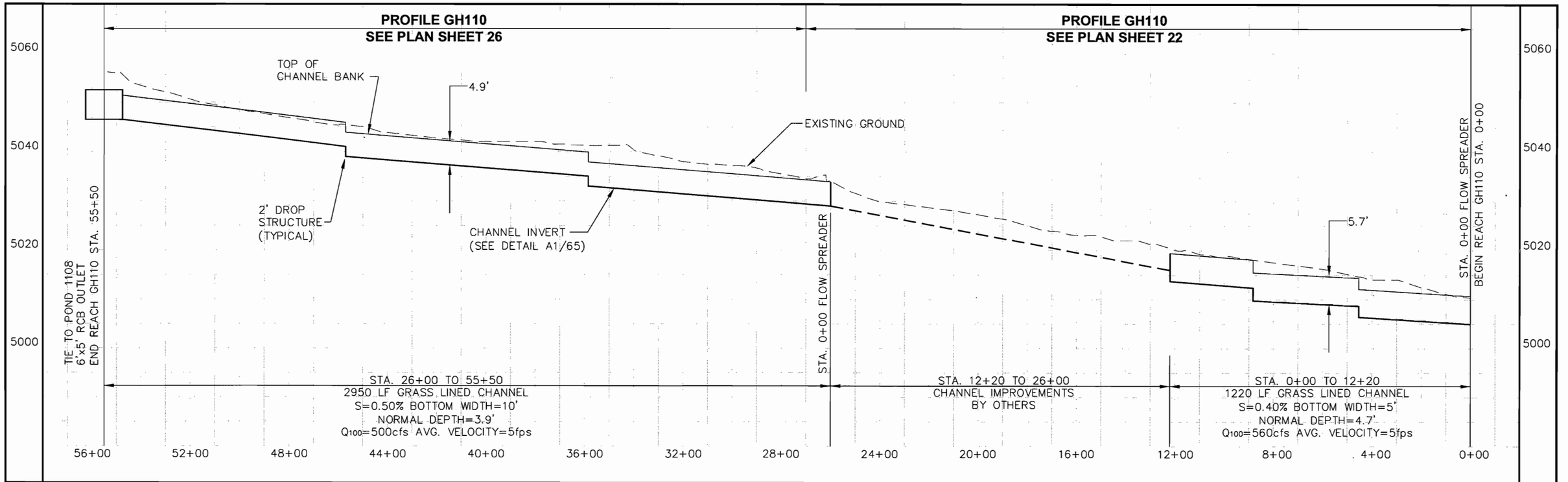

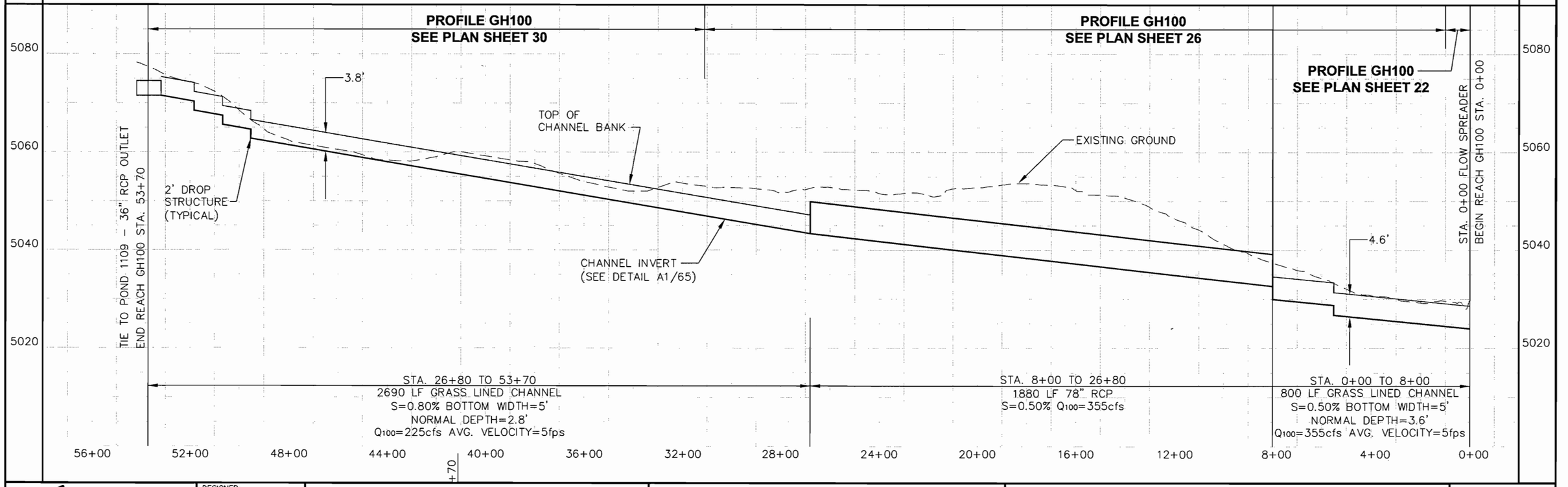

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TOWN OF ERIE

**ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING**

**PRELIMINARY
DESIGN PROFILE**

**SHEET
62 OF 67**

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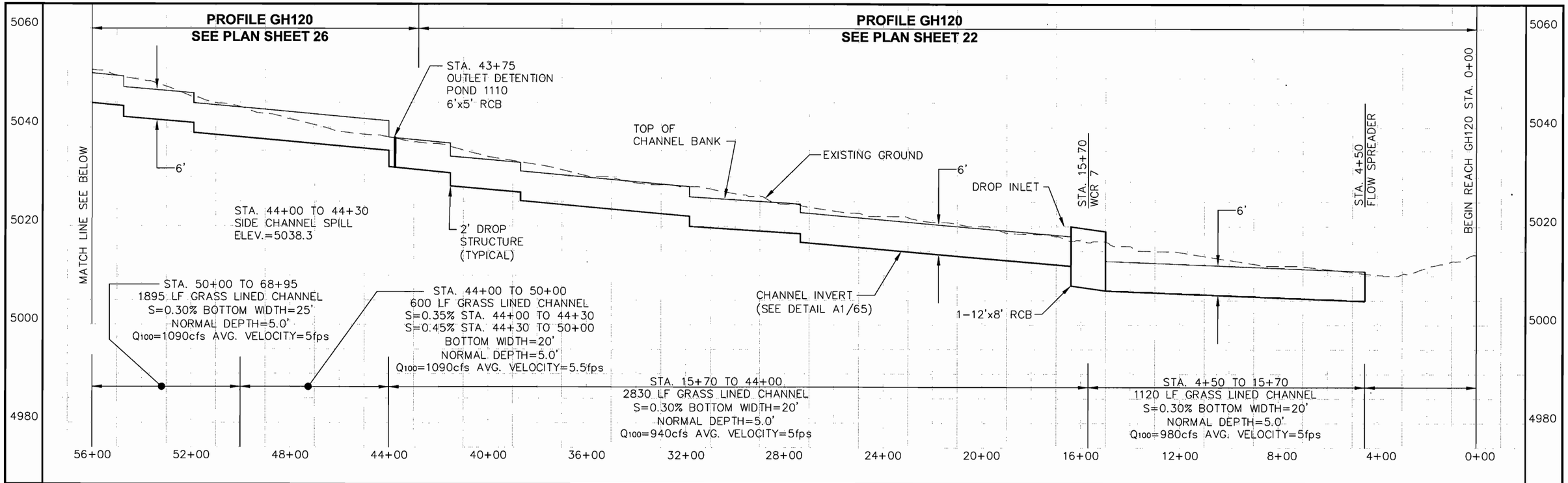

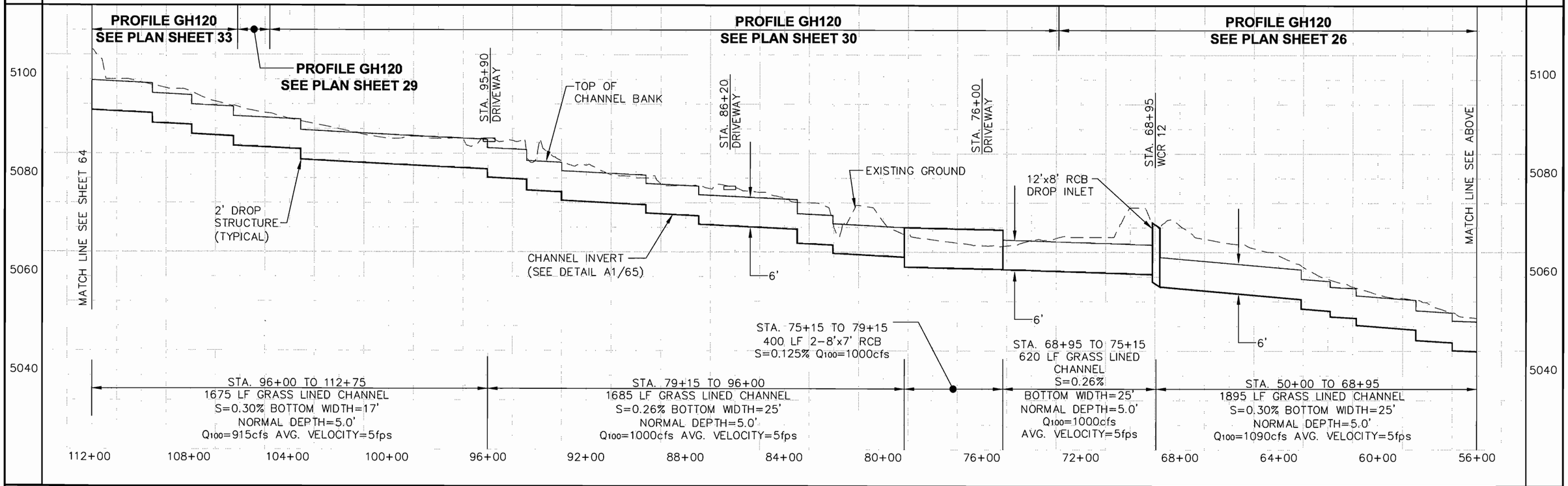

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OUTFALL SYSTEMS PLANNING

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DESIGN PROFILE

SHEET
63 OF 67

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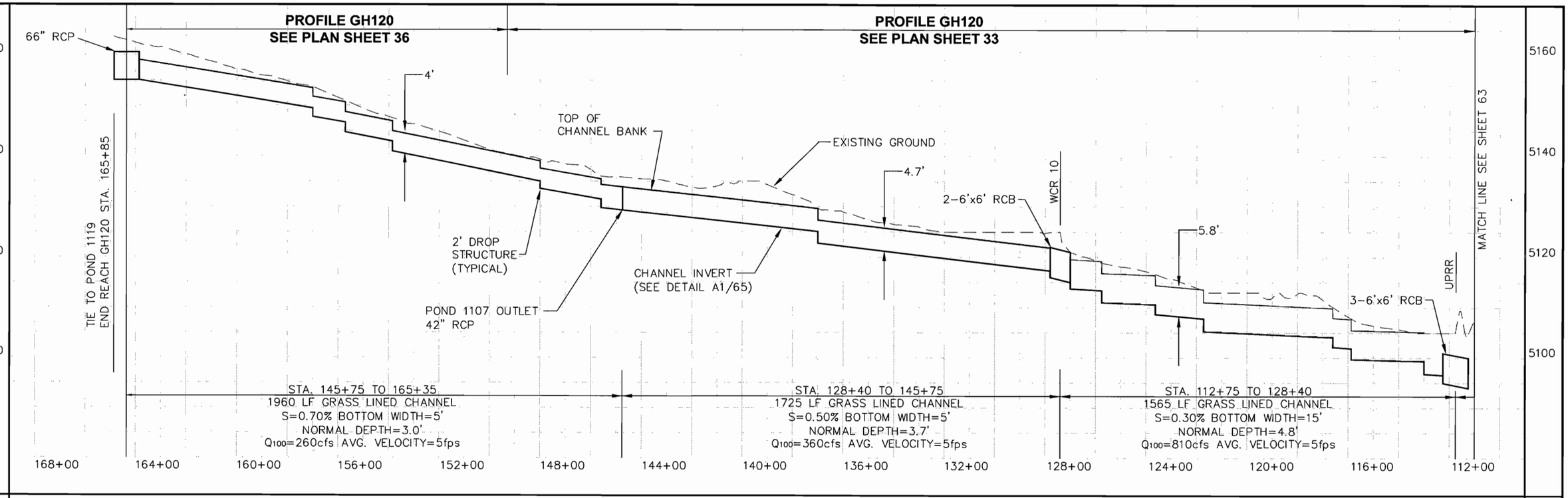

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OUTFALL SYSTEMS PLANNING**

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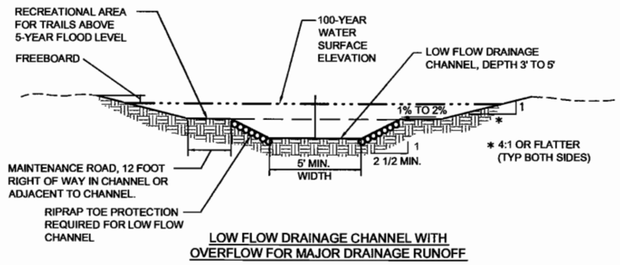
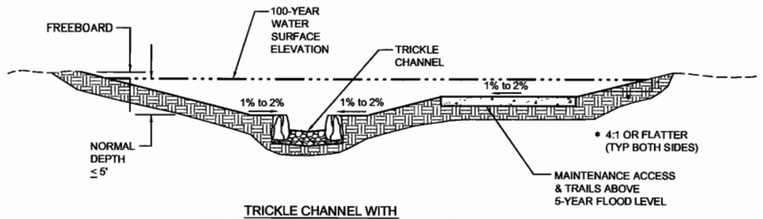
DESIGN PROFILE**

**SHEET
64 OF 67**



LOW FLOW DRAINAGE CHANNEL WITH OVERFLOW FOR MAJOR DRAINAGE RUNOFF

TYPICAL DRAINAGE CHANNEL — A1
NTS

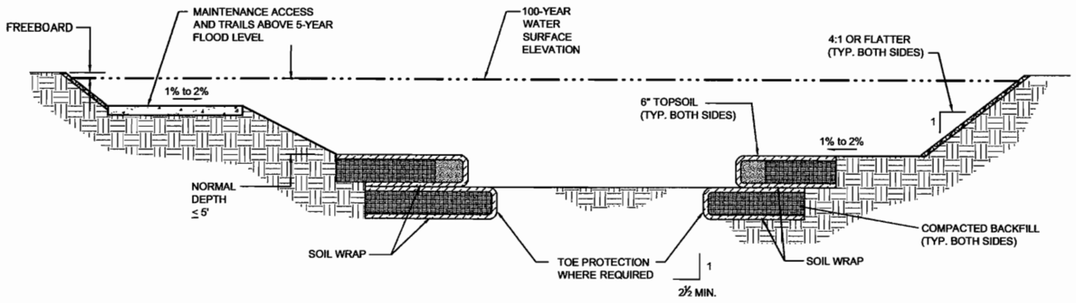


TRICKLE CHANNEL WITH OVERFLOW FOR MAJOR DRAINAGE RUNOFF

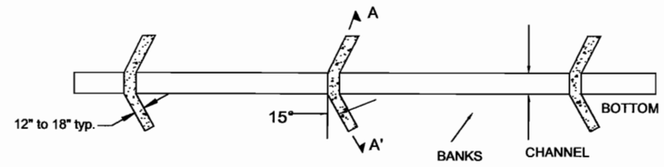
TYPICAL DRAINAGE CHANNEL — A2
NTS

TRICKLE CHANNEL WITH OVERFLOW FOR MAJOR DRAINAGE RUNOFF

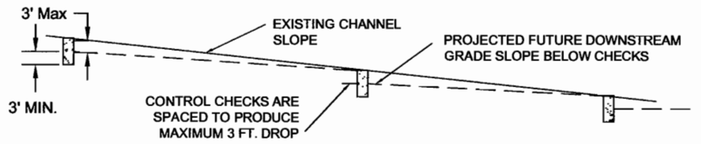
TYPICAL DRAINAGE CHANNEL — A3
NTS



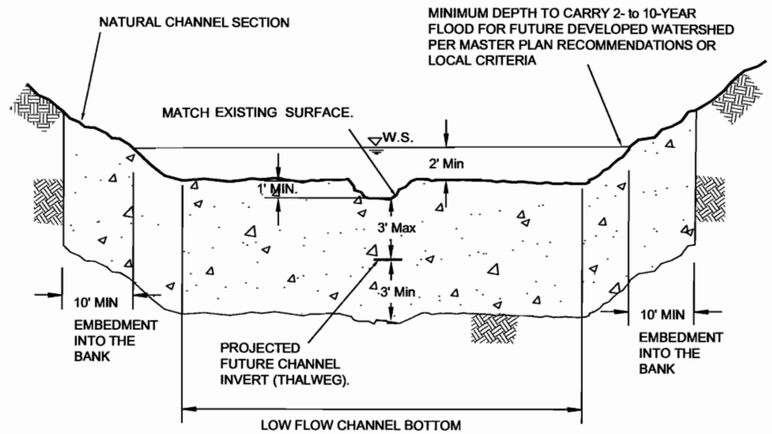
TYPICAL DRAINAGE CHANNEL — A4
NTS



PLAN VIEW



PROFILE



SECTION A-A'

NOTES:
1. TRENCH IN UNDISTURBED SOIL. DO NOT EXCAVATE TO FORM WALLS.
2. POUR AND VIBRATE CONCRETE INTO TRENCH.
3. IF SOIL CANNOT BE TRENCHED WITHOUT WALLS COLLAPSING, USE SHEET PILE CHECK.

GRADE CONTROL STRUCTURE (OPEN SPACE AREAS) — B
NTS

URBAN STORM DRAINAGE CRITERIA MANUAL (UDFCD, 1999). CHECK www.udfcd.org FOR LATEST INFORMATION

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DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	6-07

TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN DETAILS

SHEET 65 OF 67

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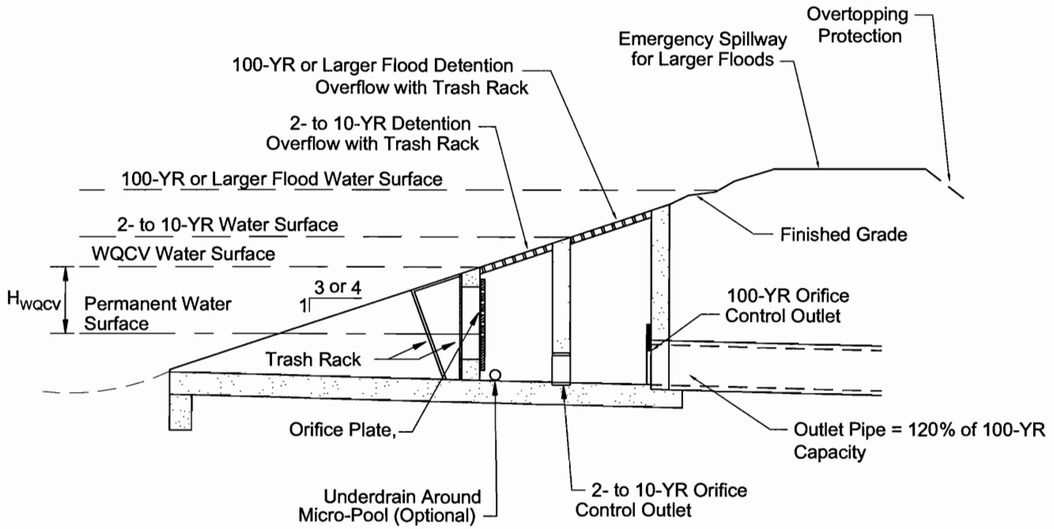
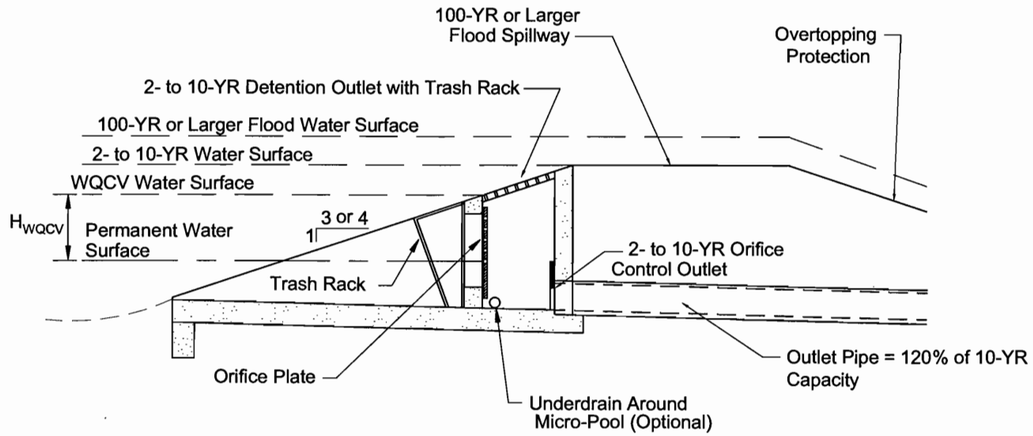


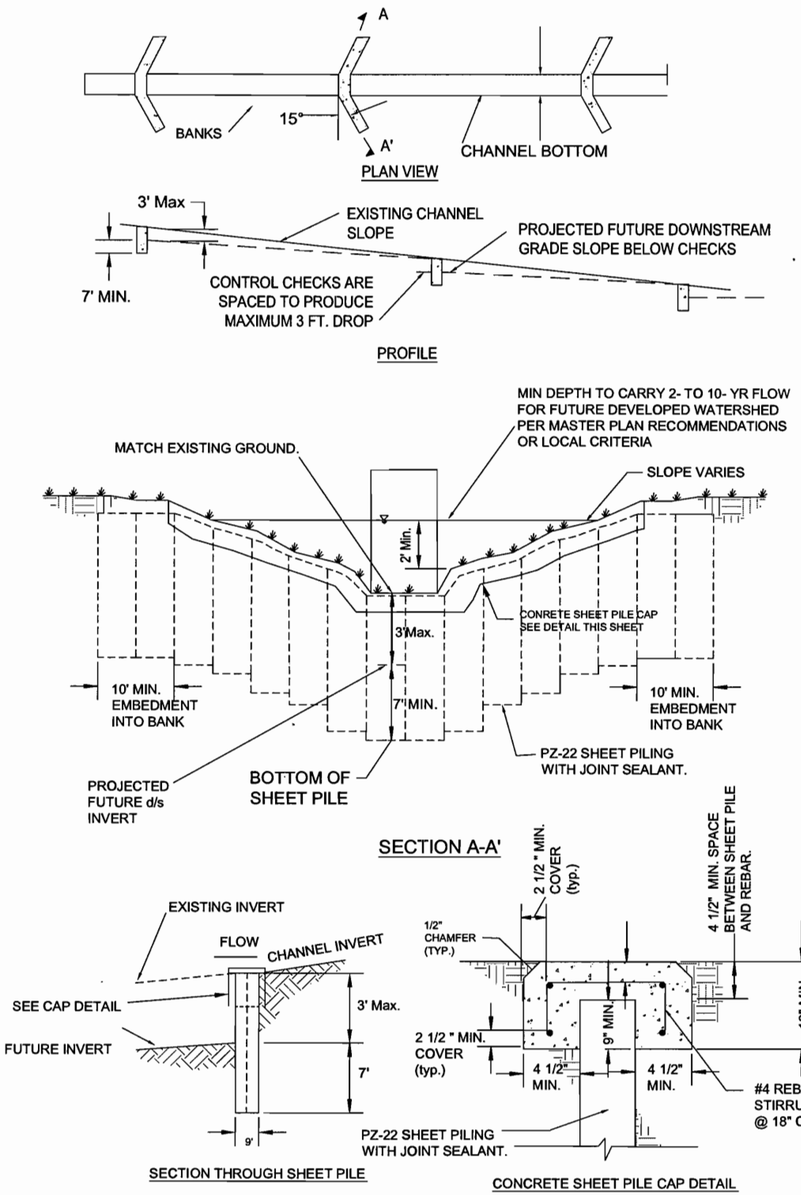
Drop Box Outlet Option



Overtopping Spillway Option

TYPICAL OUTLET STRUCTURE
NTS
C

URBAN STORM DRAINAGE CRITERIA MANUAL (UDFCD, 1999). CHECK www.udfcd.org FOR LATEST INFORMATION



GRADE CONTROL STRUCTURE
NTS
D

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ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN DETAILS

SHEET 66 OF 67

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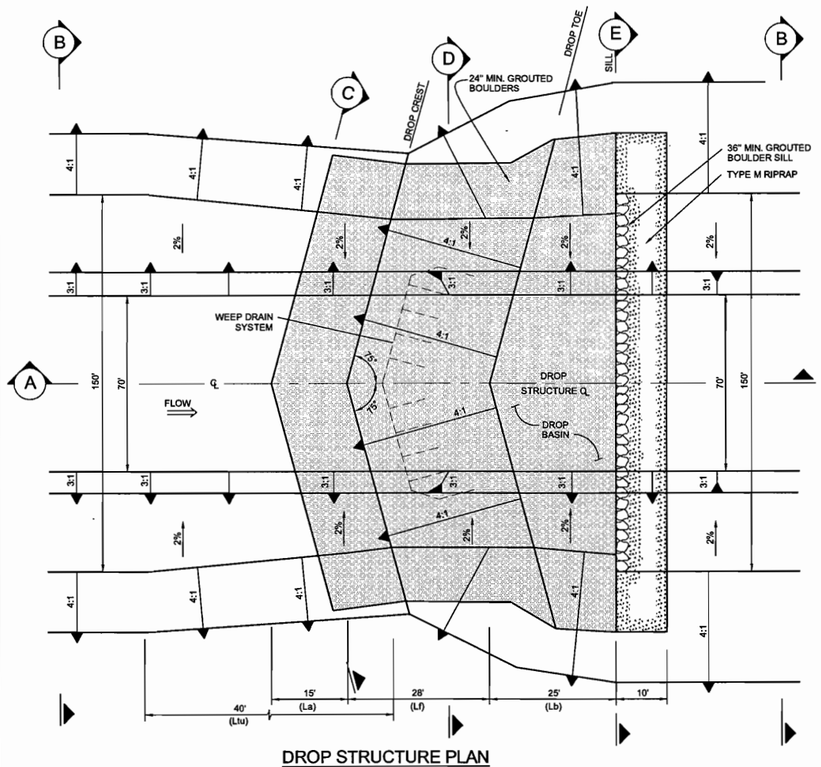
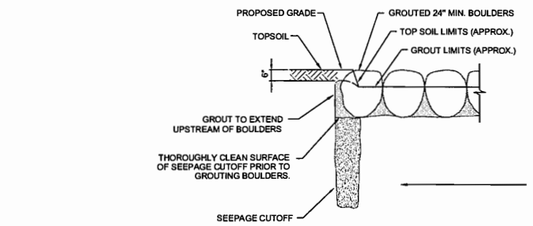
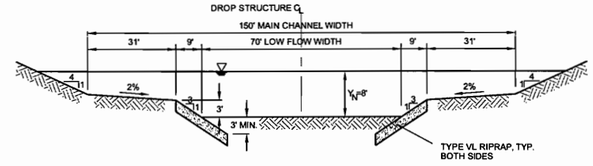


DROP STRUCTURE PLAN



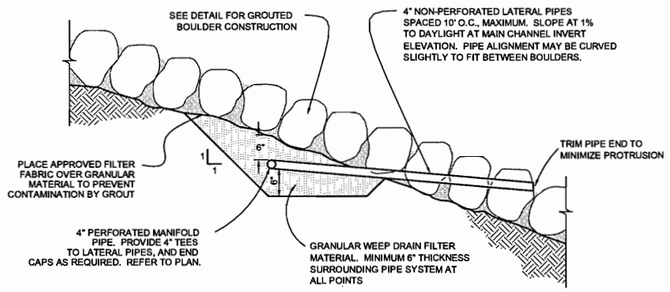
SEEPAGE CUTOFF DETAIL

NTS



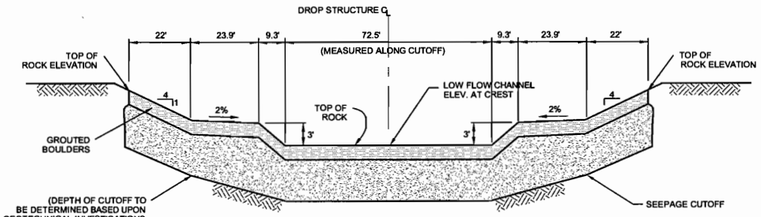
TYPICAL CHANNEL SECTION (UPSTREAM AND DOWNSTREAM OF DROP

NTS



WEEP DRAIN SYSTEM DETAIL

NTS



SEEPAGE CUTOFF SECTION

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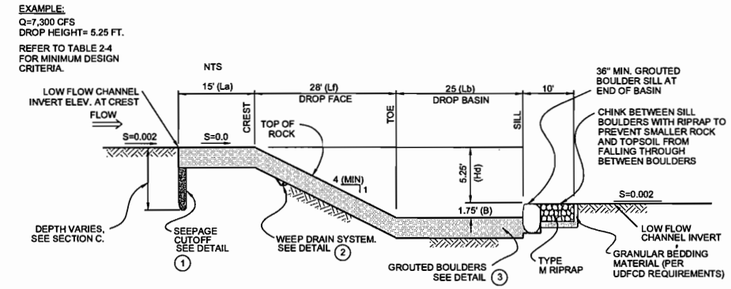
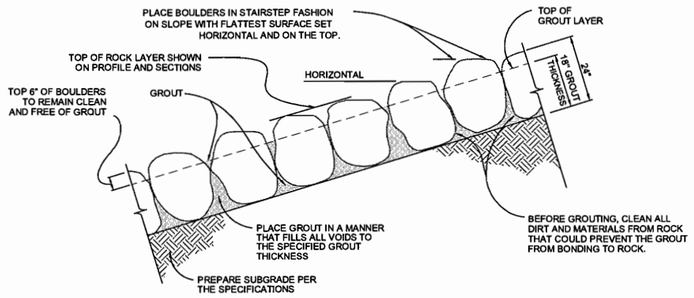


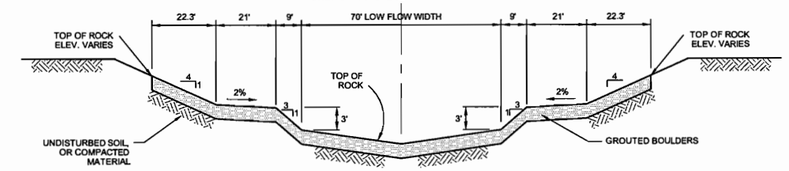
DROP STRUCTURE PROFILE

NTS



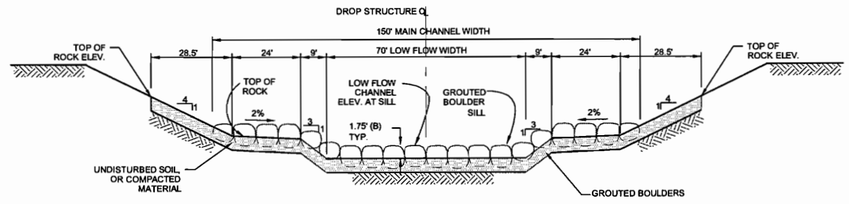
GROUTED BOULDER PLACEMENT DETAIL

NTS



TYPICAL DROP FACE SECTION

NTS



TYPICAL DROP BASIN SECTION AND SILL

NTS

EXAMPLE CONSTRUCTION DETAILS - GROUTED SLOPING BOULDER DROP WITH LOW FLOW CHANNEL

E

GROUT NOTES

Material Specifications

1. All grout shall have a minimum 28-day compressive strength equal to 3000 psi.
2. One cubic yard of grout shall have a minimum of six (6) sacks of Portland cement.
3. Type II cement shall be used. A maximum of 25% fly ash may be substituted for the Portland cement.
4. The aggregate shall be comprised of 70 % natural sand (fines) and 30 % 3/8 -inch rock (coarse).

Placement Specifications

1. All grout shall be delivered by means of a low pressure (less that 10 psi) grout pump using a 2" diameter nozzle.
2. Full depth penetration of the grout into the boulders shall be required. To achieve this, grout shall be injected starting with the nozzle near the bottom and raising it as grout fills and is vibrated into place using a pencil vibrator.
3. After placement, exposed boulder faces shall be cleaned with a wet broom.
4. All grout between boulders shall be finished with a broom finish.
5. The slump shall be 5-inches to 7-inches.
6. Air entrainment shall be 7 1/2 percent ± 1 1/2 percent.
7. To control shrinkage and cracking, 1.5 pounds of Fibermesh, or equivalent, shall be used per cubic yard of grout.
5. All grout shall be sprayed with a clear liquid membrane curing compound as specified in ASTM C-309.
6. Special procedures shall be required for grout placement when the air temperatures are less than 40 °F or greater than 90 °F. Contractor shall obtain prior approval from the design engineer of the procedures to be used for protecting the grout.

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

PRELIMINARY DESIGN DETAILS

SHEET 67 OF 67

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APPENDIX A1

UDSWM BASIN AND CONVEYANCE PARAMETERS
EXISTING CONDITION

APPENDIX A1

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions

Boulder Creek Tributaries, Existing Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
801	801	8576.	40.1	2.0	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
802	802	20498.	234.8	2.0	.0270	.020	.200	.100	.300	3.00	.50	.00180	1
402	402	8736.	151.3	2.0	.0220	.020	.200	.100	.300	3.95	.56	.00180	1
403	403	9213.	46.6	2.0	.0090	.020	.200	.100	.300	4.03	.57	.00180	1
404	404	13611.	280.4	2.1	.0060	.020	.200	.100	.300	3.35	.52	.00180	1
405	405	14054.	190.1	2.0	.0210	.020	.200	.100	.300	3.54	.54	.00180	1
406	406	13485.	200.9	2.0	.0220	.020	.200	.100	.300	3.45	.53	.00180	1
407	407	7501.	68.8	6.6	.0180	.020	.200	.100	.300	3.43	.53	.00180	1
408	408	13501.	118.0	24.9	.0110	.020	.200	.100	.300	3.20	.51	.00180	1
409	409	13248.	154.6	2.2	.0150	.020	.200	.100	.300	3.35	.52	.00180	1
410	410	6115.	38.3	4.0	.0120	.020	.200	.100	.300	3.20	.51	.00180	1
411	411	18870.	186.4	8.2	.0160	.020	.200	.100	.300	3.70	.55	.00180	1
412	412	5312.	40.4	29.3	.0270	.020	.200	.100	.300	3.95	.56	.00180	1
413	413	3467.	65.6	19.3	.0390	.020	.200	.100	.300	4.18	.58	.00180	1
414	414	10888.	102.4	10.9	.0100	.020	.200	.100	.300	3.20	.51	.00180	1
415	415	6704.	52.4	30.0	.0300	.020	.200	.100	.300	3.88	.56	.00180	1
416	416	4742.	43.4	30.0	.0250	.020	.200	.100	.300	4.16	.58	.00180	1
417	417	8342.	109.7	5.2	.0180	.020	.200	.100	.300	3.45	.53	.00180	1
418	418	9901.	152.6	2.0	.0150	.020	.200	.100	.300	3.80	.55	.00180	1
419	419	4714.	65.8	2.0	.0140	.020	.200	.100	.300	4.02	.57	.00180	1
420	420	13834.	64.5	8.8	.0200	.020	.200	.100	.300	4.12	.57	.00180	1
421	421	8917.	96.3	2.0	.0150	.020	.200	.100	.300	3.47	.53	.00180	1
422	422	17323.	243.2	2.0	.0170	.020	.200	.100	.300	3.65	.54	.00180	1
423	423	3552.	19.1	2.0	.0150	.020	.200	.100	.300	3.10	.51	.00180	1
424	424	5429.	22.5	2.0	.0070	.020	.200	.100	.300	3.25	.52	.00180	1
425	425	4726.	18.5	2.0	.0140	.020	.200	.100	.300	3.20	.51	.00180	1
426	426	6528.	71.1	6.2	.0120	.020	.200	.100	.300	3.42	.53	.00180	1
430	430	5878.	90.4	15.9	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
431	431	6942.	143.8	16.4	.0390	.020	.200	.100	.300	3.23	.49	.00170	1
432	432	11331.	119.9	10.2	.0320	.020	.200	.100	.300	3.85	.55	.00180	1
433	433	5680.	110.6	29.0	.0220	.020	.200	.100	.300	3.32	.52	.00180	1
434	434	4165.	91.1	2.0	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
435	435	5970.	67.3	2.0	.0170	.020	.200	.100	.300	3.02	.50	.00180	1
436	436	13261.	165.1	2.0	.0130	.020	.200	.100	.300	3.56	.54	.00180	1
437	437	8101.	198.5	2.0	.0070	.020	.200	.100	.300	3.48	.53	.00180	1
438	438	4640.	57.0	2.0	.0180	.020	.200	.100	.300	3.09	.51	.00180	1
439	439	5270.	72.1	2.0	.0330	.020	.200	.100	.300	3.86	.56	.00180	1
440	440	3643.	21.2	2.0	.0200	.020	.200	.100	.300	3.75	.55	.00180	1
441	441	3226.	92.5	9.5	.0070	.020	.200	.100	.300	3.31	.52	.00180	1
442	442	6034.	100.8	2.0	.0100	.020	.200	.100	.300	3.67	.54	.00180	1
443	443	1760.	51.4	24.5	.0110	.020	.200	.100	.300	3.62	.54	.00180	1
445	445	5546.	72.8	35.0	.0230	.020	.200	.100	.300	3.09	.51	.00180	1
446	446	9512.	103.8	2.0	.0180	.020	.200	.100	.300	4.34	.59	.00180	1
447	447	13936.	179.1	29.3	.0160	.020	.200	.100	.300	3.55	.54	.00180	1
448	448	5672.	43.3	2.0	.0230	.020	.200	.100	.300	4.50	.60	.00180	1
449	449	12243.	168.2	3.9	.0110	.020	.200	.100	.300	3.97	.56	.00180	1
450	450	3829.	66.4	2.0	.0100	.020	.200	.100	.300	4.46	.60	.00180	1
451	451	9155.	116.0	4.9	.0100	.020	.200	.100	.300	4.22	.58	.00180	1
452	452	7419.	171.7	2.0	.0350	.020	.200	.100	.300	4.39	.59	.00180	1
453	453	3384.	81.5	27.2	.0030	.020	.200	.100	.300	3.01	.50	.00180	1
454	454	8704.	53.5	5.8	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
455	455	7458.	158.1	3.6	.0010	.020	.200	.100	.300	3.01	.50	.00180	1
456	456	7854.	75.0	13.4	.0190	.020	.200	.100	.300	3.04	.50	.00180	1
457	457	11648.	245.8	3.1	.0050	.020	.200	.100	.300	2.95	.49	.00180	1
458	458	8762.	126.7	13.7	.0190	.020	.200	.100	.300	3.03	.50	.00180	1
459	459	7696.	124.8	2.0	.0160	.020	.200	.100	.300	4.05	.57	.00180	1
460	460	3472.	116.5	2.0	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
461	461	4966.	133.9	7.9	.0010	.020	.200	.100	.300	2.69	.45	.00170	1
462	462	7578.	142.1	13.9	.0170	.020	.200	.100	.300	3.11	.51	.00180	1
463	463	10826.	62.2	18.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
464	464	12586.	117.2	11.4	.0160	.020	.200	.100	.300	3.00	.50	.00180	1
466	466	7770.	63.8	2.0	.0190	.020	.200	.100	.300	3.70	.55	.00180	1
467	467	9046.	109.2	27.0	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
468	468	10614.	173.0	22.2	.0100	.020	.200	.100	.300	3.18	.51	.00180	1
469	469	6186.	122.4	19.5	.0170	.020	.200	.100	.300	3.97	.56	.00180	1
470	470	4355.	48.6	2.0	.0110	.020	.200	.100	.300	4.50	.60	.00180	1
471	471	5066.	45.8	2.0	.0110	.020	.200	.100	.300	3.95	.56	.00180	1
472	472	4446.	52.3	21.8	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
473	473	7179.	112.7	2.0	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
474	474	15501.	154.0	7.3	.0150	.020	.200	.100	.300	3.64	.54	.00180	1
475	475	15717.	207.5	2.0	.0140	.020	.200	.100	.300	3.16	.51	.00180	1
476	476	18333.	247.9	2.0	.0090	.020	.200	.100	.300	3.85	.56	.00180	1
477	477	7422.	67.0	2.0	.0180	.020	.200	.100	.300	4.40	.59	.00180	1
478	478	4165.	104.8	2.0	.0060	.020	.200	.100	.300	4.12	.57	.00180	1
479	479	10952.	152.7	3.0	.0180	.020	.200	.100	.300	4.31	.59	.00180	1
480	480	7981.	155.1	2.0	.0060	.020	.200	.100	.300	4.36	.59	.00180	1
481	481	7048.	72.9	2.0	.0100	.020	.200	.100	.300	4.08	.57	.00180	1
482	482	11912.	58.8	7.7	.0170	.020	.200	.100	.300	4.32	.59	.00180	1
483	483	14421.	97.2	2.0	.0180	.020	.200	.100	.300	4.47	.60	.00180	1
485	485	15318.	163.8	2.6	.0170	.020	.200	.100	.300	4.12	.57	.00180	1
486	486	9800.	95.5	2.0	.0170	.020	.200	.100	.300	4.44	.60	.00180	1
487	487	5566.	27.1	2.0	.0100	.020	.200	.100	.300	4.32	.59	.00180	1
488	488	7010.	22.8	2.0	.0220	.020	.200	.100	.300	4.50	.60	.00180	1
489	489	5123.	72.8	2.0	.0090	.020	.200	.100	.300	4.18	.58	.00180	1
490	490	11866.	86.4	2.0	.0180	.020	.200	.100	.300	4.19	.58	.00180	1
491	491	10710.	56.1	2.0	.0110	.020	.200	.100	.300	4.00	.57	.00180	1

Table A – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Boulder Creek Tributaries, Existing Conditions (con.)

492	492	7421.	123.7	2.0	.0110	.020	.200	.100	.300	3.86	.56	.00180	1
493	493	6262.	42.2	2.0	.0100	.020	.200	.100	.300	3.75	.55	.00180	1
494	494	5589.	69.2	2.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
495	495	9882.	82.6	9.3	.0060	.020	.200	.100	.300	2.01	.33	.00140	1
496	496	6451.	186.5	3.2	.0020	.020	.200	.100	.300	2.18	.35	.00150	1

TOTAL TRIBUTARY AREA (ACRES), 9692.50

1

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	SIDE SLOPES TO VERT R	OVERBANK/SURCHARGE MANNING N	OVERBANK/SURCHARGE DEPTH (FT)	JK
801	501	0	4	CHANNEL	5.0	2680.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2680.	.0210	20.0	20.0	.056	10.00	
802	502	0	4	CHANNEL	5.0	9151.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	9151.	.0270	20.0	20.0	.056	10.00	
402	505	0	4	CHANNEL	5.0	2730.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2730.	.0220	20.0	20.0	.056	10.00	
403	503	0	4	CHANNEL	5.0	2879.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2879.	.0090	20.0	20.0	.056	10.00	
404	522	0	4	CHANNEL	8.0	5317.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5317.	.0060	20.0	20.0	.056	10.00	
405	933	0	4	CHANNEL	5.0	4880.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4880.	.0210	20.0	20.0	.056	10.00	
406	934	0	4	CHANNEL	5.0	4682.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4682.	.0220	20.0	20.0	.056	10.00	
407	509	0	4	CHANNEL	5.0	2930.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2930.	.0180	20.0	20.0	.056	10.00	
408	511	0	4	CHANNEL	5.0	4688.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4688.	.0110	20.0	20.0	.056	10.00	
409	512	0	4	CHANNEL	5.0	4140.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4140.	.0150	20.0	20.0	.056	10.00	
410	512	0	4	CHANNEL	5.0	1911.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1911.	.0120	20.0	20.0	.056	10.00	
411	935	0	4	CHANNEL	8.0	5897.	.0160	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	5897.	.0160	20.0	20.0	.056	10.00	
412	514	0	4	CHANNEL	5.0	1660.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1660.	.0270	20.0	20.0	.056	10.00	
413	936	0	4	CHANNEL	8.0	1204.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1204.	.0390	20.0	20.0	.056	10.00	
414	515	0	4	CHANNEL	5.0	4253.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4253.	.0100	20.0	20.0	.056	10.00	
415	937	0	4	CHANNEL	8.0	2328.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2328.	.0300	20.0	20.0	.056	10.00	
416	938	0	4	CHANNEL	5.0	2470.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2470.	.0250	20.0	20.0	.056	10.00	
417	516	0	4	CHANNEL	5.0	2607.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2607.	.0180	20.0	20.0	.056	10.00	
418	518	0	4	CHANNEL	5.0	3438.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3438.	.0150	20.0	20.0	.056	10.00	
419	519	0	4	CHANNEL	8.0	1841.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1841.	.0120	20.0	20.0	.056	10.00	
420	519	0	4	CHANNEL	5.0	4323.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4323.	.0190	20.0	20.0	.056	10.00	
421	939	0	4	CHANNEL	5.0	3096.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3096.	.0150	20.0	20.0	.056	10.00	
422	940	0	4	CHANNEL	5.0	6015.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	6015.	.0170	20.0	20.0	.056	10.00	
423	941	0	4	CHANNEL	5.0	1110.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1110.	.0150	20.0	20.0	.056	10.00	
424	942	0	4	CHANNEL	5.0	1885.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1885.	.0070	20.0	20.0	.056	10.00	
425	946	0	4	CHANNEL	5.0	1477.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1477.	.0140	20.0	20.0	.056	10.00	
426	506	0	4	CHANNEL	8.0	3400.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	3400.	.0120	20.0	20.0	.056	10.00	
430	531	0	4	CHANNEL	5.0	3062.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3062.	.0260	20.0	20.0	.056	10.00	
431	531	0	4	CHANNEL	5.0	3616.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3616.	.0390	20.0	20.0	.056	10.00	
432	531	0	4	CHANNEL	5.0	4426.	.0320	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4426.	.0320	20.0	20.0	.056	10.00	
433	1010	0	4	CHANNEL	8.0	2536.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2536.	.0220	20.0	20.0	.044	10.00	
434	532	0	4	CHANNEL	5.0	1859.	.0290	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1859.	.0290	20.0	20.0	.056	10.00	
435	533	0	4	CHANNEL	5.0	2332.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2332.	.0170	20.0	20.0	.056	10.00	
436	533	0	4	CHANNEL	8.0	4144.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	4144.	.0130	20.0	20.0	.056	10.00	
437	534	0	4	CHANNEL	8.0	2813.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2813.	.0070	20.0	20.0	.056	10.00	
438	534	0	4	CHANNEL	5.0	2417.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2417.	.0180	20.0	20.0	.056	10.00	
439	535	0	4	CHANNEL	5.0	1830.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1830.	.0330	20.0	20.0	.056	10.00	
440	536	0	4	CHANNEL	5.0	1265.	.0200	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1265.	.0200	20.0	20.0	.056	10.00	
441	536	0	4	CHANNEL	8.0	1260.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1260.	.0070	20.0	20.0	.056	10.00	

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Boulder Creek Tributaries, Existing Conditions (con.)

442	537	0	4	CHANNEL	8.0	2095.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2095.	.0100	20.0	20.0	.056	10.00	
443	540	0	4	CHANNEL	8.0	917.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	917.	.0110	20.0	20.0	.056	10.00	
445	538	0	4	CHANNEL	5.0	2166.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2166.	.0230	20.0	20.0	.056	10.00	
446	542	0	4	CHANNEL	5.0	3303.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3303.	.0180	20.0	20.0	.056	10.00	
447	544	0	4	CHANNEL	5.0	5444.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5444.	.0160	20.0	20.0	.056	10.00	
448	544	0	4	CHANNEL	5.0	2532.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2532.	.0230	20.0	20.0	.056	10.00	
449	545	0	4	CHANNEL	5.0	4251.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4251.	.0110	20.0	20.0	.056	10.00	
450	545	0	4	CHANNEL	10.0	1994.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1994.	.0100	20.0	20.0	.056	10.00	
451	546	0	4	CHANNEL	10.0	3576.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3576.	.0100	20.0	20.0	.056	10.00	
452	548	0	4	CHANNEL	5.0	3312.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3312.	.0350	20.0	20.0	.056	10.00	
453	549	0	4	CHANNEL	8.0	1511.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1511.	.0030	20.0	20.0	.056	10.00	
454	943	0	4	CHANNEL	8.0	3400.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3400.	.0060	20.0	20.0	.056	10.00	
455	547	0	4	CHANNEL	10.0	2913.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2913.	.0010	20.0	20.0	.056	10.00	
456	567	0	4	CHANNEL	5.0	2727.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2727.	.0190	20.0	20.0	.056	10.00	
457	944	0	4	CHANNEL	8.0	3640.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3640.	.0050	20.0	20.0	.056	10.00	
458	568	0	4	CHANNEL	5.0	3042.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3042.	.0190	20.0	20.0	.056	10.00	
459	569	0	4	CHANNEL	8.0	2672.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2672.	.0160	20.0	20.0	.056	10.00	
460	572	0	4	CHANNEL	5.0	1550.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1550.	.0060	20.0	20.0	.056	10.00	
461	945	0	4	CHANNEL	8.0	2217.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2217.	.0010	20.0	20.0	.056	10.00	
462	550	0	4	CHANNEL	5.0	2631.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2631.	.0170	20.0	20.0	.056	10.00	
463	551	0	4	CHANNEL	8.0	3383.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3383.	.0170	20.0	20.0	.056	10.00	
464	551	0	4	CHANNEL	5.0	4370.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4370.	.0160	20.0	20.0	.056	10.00	
466	552	0	4	CHANNEL	5.0	2428.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2428.	.0190	20.0	20.0	.056	10.00	
467	553	0	4	CHANNEL	8.0	2827.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2827.	.0190	20.0	20.0	.056	10.00	
468	555	0	4	CHANNEL	8.0	4146.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	4146.	.0100	20.0	20.0	.056	10.00	
469	555	0	4	CHANNEL	5.0	3222.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3222.	.0170	20.0	20.0	.056	10.00	
470	556	0	4	CHANNEL	8.0	1361.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1361.	.0110	20.0	20.0	.056	10.00	
471	560	0	4	CHANNEL	8.0	1759.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1759.	.0110	20.0	20.0	.056	10.00	
472	554	0	4	CHANNEL	5.0	1544.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1544.	.0180	20.0	20.0	.056	10.00	
473	576	0	4	CHANNEL	8.0	3739.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3739.	.0130	20.0	20.0	.056	10.00	
474	557	0	4	CHANNEL	5.0	5382.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5382.	.0150	20.0	20.0	.056	10.00	
475	557	0	4	CHANNEL	5.0	5457.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5457.	.0140	20.0	20.0	.056	10.00	
476	559	0	4	CHANNEL	5.0	7161.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	7161.	.0090	20.0	20.0	.056	10.00	
477	559	0	4	CHANNEL	5.0	3866.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3866.	.0180	20.0	20.0	.056	10.00	
478	562	0	4	CHANNEL	10.0	1446.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1446.	.0060	20.0	20.0	.056	10.00	
479	561	0	4	CHANNEL	5.0	4278.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4278.	.0180	20.0	20.0	.056	10.00	
480	571	0	4	CHANNEL	10.0	3563.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3563.	.0060	20.0	20.0	.056	10.00	
481	571	0	4	CHANNEL	5.0	3671.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3671.	.0100	20.0	20.0	.056	10.00	
482	571	0	4	CHANNEL	5.0	5318.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5318.	.0170	20.0	20.0	.056	10.00	
483	571	0	4	CHANNEL	5.0	5007.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5007.	.0180	20.0	20.0	.056	10.00	
485	565	0	4	CHANNEL	5.0	4787.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4787.	.0170	20.0	20.0	.056	10.00	
486	565	0	4	CHANNEL	5.0	3828.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3828.	.0170	20.0	20.0	.056	10.00	
487	566	0	4	CHANNEL	5.0	1933.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1933.	.0100	20.0	20.0	.056	10.00	
488	955	0	4	CHANNEL	8.0	2738.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2738.	.0220	20.0	20.0	.056	10.00	
489	955	0	4	CHANNEL	8.0	1601.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1601.	.0090	20.0	20.0	.056	10.00	
490	954	0	4	CHANNEL	5.0	3708.	.0180	3.0	3.0	.044	3.00	0

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions

Boulder Creek Tributaries, Existing Conditions

				OVERFLOW	23.0	3708.	.0180	20.0	20.0	.056	10.00	
491	953	0	4	CHANNEL	5.0	4184.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4184.	.0110	20.0	20.0	.056	10.00	
492	953	0	4	CHANNEL	5.0	3865.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3865.	.0110	20.0	20.0	.056	10.00	
493	573	0	4	CHANNEL	5.0	1957.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1957.	.0100	20.0	20.0	.056	10.00	
494	952	0	4	CHANNEL	8.0	2183.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2183.	.0050	20.0	20.0	.056	10.00	
495	951	0	4	CHANNEL	10.0	3088.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3088.	.0060	20.0	20.0	.056	10.00	
496	950	0	4	CHANNEL	5.0	2520.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2520.	.0020	20.0	20.0	.056	10.00	
504	522	0	4	CHANNEL	8.0	5342.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5342.	.0080	20.0	20.0	.056	10.00	
507	933	0	4	CHANNEL	10.0	3979.	.0150	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3979.	.0150	20.0	20.0	.056	10.00	
510	512	0	4	CHANNEL	8.0	2643.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2643.	.0120	20.0	20.0	.056	10.00	
513	935	0	4	CHANNEL	8.0	706.	.0850	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	706.	.0850	20.0	20.0	.056	10.00	
517	518	0	4	CHANNEL	8.0	1021.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1021.	.0100	20.0	20.0	.056	10.00	
520	939	0	4	CHANNEL	10.0	901.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	901.	.0020	20.0	20.0	.056	10.00	
539	540	0	4	CHANNEL	8.0	762.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	762.	.0210	20.0	20.0	.056	10.00	
541	542	0	4	CHANNEL	8.0	506.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	506.	.0080	20.0	20.0	.056	10.00	
543	544	0	4	CHANNEL	10.0	664.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	664.	.0180	20.0	20.0	.056	10.00	
558	559	0	4	CHANNEL	8.0	1397.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1397.	.0160	20.0	20.0	.056	10.00	
563	571	0	4	CHANNEL	10.0	3189.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3189.	.0110	20.0	20.0	.056	10.00	
570	571	0	4	CHANNEL	8.0	3158.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3158.	.0030	20.0	20.0	.056	10.00	
564	553	0	4	CHANNEL	8.0	728.	.0080	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	728.	.0080	20.0	20.0	.044	10.00	
574	557	0	4	CHANNEL	8.0	2651.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2651.	.0090	20.0	20.0	.056	10.00	
575	560	0	4	CHANNEL	8.0	1004.	.0130	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1004.	.0130	20.0	20.0	.056	10.00	
1010	531	6	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0

RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW

.0	.0	.0	5.1	1.4	15.7	2.5	63.1	6.2	78.2	6.3	300.0

Coal Creek Tributaries, Existing Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
201	201	1338.	27.1	2.0	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
202	202	2069.	15.4	2.0	.0450	.020	.200	.100	.300	3.16	.51	.00180	1
203	203	2701.	23.3	2.6	.0370	.020	.200	.100	.300	3.98	.57	.00180	1
204	204	4674.	19.3	13.4	.0220	.020	.200	.100	.300	4.14	.58	.00180	1
210	210	2733.	27.4	2.0	.0250	.020	.200	.100	.300	3.00	.50	.00180	1
211	211	5211.	38.1	2.0	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
212	212	3059.	46.8	3.3	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
213	213	9930.	42.7	10.6	.0340	.020	.200	.100	.300	3.00	.50	.00180	1
214	214	9398.	40.8	32.4	.0320	.020	.200	.100	.300	3.00	.50	.00180	1
215	215	4202.	37.0	27.5	.0110	.020	.200	.100	.300	3.70	.55	.00180	1
218	218	9530.	60.7	36.9	.0220	.020	.200	.100	.300	3.86	.56	.00180	1
219	219	15589.	112.9	33.6	.0230	.020	.200	.100	.300	3.23	.52	.00180	1
220	220	5123.	50.4	31.3	.0240	.020	.200	.100	.300	3.09	.51	.00180	1
221	221	5923.	61.3	21.3	.0280	.020	.200	.100	.300	3.82	.55	.00180	1
224	224	6099.	52.7	8.9	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
225	225	7136.	61.0	10.0	.0450	.020	.200	.100	.300	3.00	.50	.00180	1
226	226	1923.	25.4	10.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
227	227	9379.	71.7	8.3	.0230	.020	.200	.100	.300	3.00	.50	.00180	1
228	228	5386.	33.6	2.0	.0300	.020	.200	.100	.300	3.00	.50	.00180	1
229	229	5806.	31.3	2.0	.0500	.020	.200	.100	.300	3.00	.50	.00180	1
230	230	6318.	78.0	2.0	.0230	.020	.200	.100	.300	3.08	.51	.00180	1
231	231	6742.	20.1	2.0	.0350	.020	.200	.100	.300	3.22	.51	.00180	1
233	233	6520.	58.6	3.3	.0040	.020	.200	.100	.300	3.43	.53	.00180	1
235	235	14950.	61.3	30.0	.0240	.020	.200	.100	.300	3.03	.50	.00180	1
236	236	7387.	86.3	17.2	.0090	.020	.200	.100	.300	3.58	.54	.00180	1
243	243	7046.	44.3	10.0	.0230	.020	.200	.100	.300	3.16	.51	.00180	1
245	245	9958.	87.3	4.9	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
246	246	6509.	59.8	10.0	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
247	247	10496.	52.0	2.0	.0390	.020	.200	.100	.300	3.00	.50	.00180	1
248	248	7966.	93.4	10.0	.0220	.020	.200	.100	.300	3.10	.51	.00180	1
250	250	6026.	29.9	10.0	.0350	.020	.200	.100	.300	3.73	.55	.00180	1
251	251	6394.	59.1	10.0	.0290	.020	.200	.100	.300	3.25	.52	.00180	1
252	252	5086.	79.0	10.0	.0330	.020	.200	.100	.300	3.66	.54	.00180	1
255	255	2526.	31.4	5.1	.0660	.020	.200	.100	.300	3.75	.55	.00180	1
260	260	10896.	107.1	4.0	.0400	.020	.200	.100	.300	3.59	.54	.00180	1
261	261	9885.	130.8	9.9	.0390	.020	.200	.100	.300	3.24	.52	.00180	1
262	262	9179.	44.9	3.9	.0330	.020	.200	.100	.300	3.49	.53	.00180	1
263	263	10234.	77.1	8.2	.0120	.020	.200	.100	.300	3.64	.54	.00180	1

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Coal Creek Tributaries, Existing Conditions (con.)

269	269	10323.	67.6	2.4	.0380	.020	.200	.100	.300	3.74	.55	.00180	1
270	270	3242.	20.2	2.0	.0390	.020	.200	.100	.300	4.38	.59	.00180	1
272	272	8781.	41.4	2.0	.0270	.020	.200	.100	.300	4.50	.60	.00180	1
273	273	7334.	52.1	2.0	.0320	.020	.200	.100	.300	4.50	.60	.00180	1
274	274	5578.	102.7	2.0	.0260	.020	.200	.100	.300	4.50	.60	.00180	1
275	275	5557.	54.1	2.0	.0230	.020	.200	.100	.300	4.50	.60	.00180	1
276	276	5120.	75.5	2.1	.0250	.020	.200	.100	.300	4.41	.59	.00180	1
277	277	4883.	52.1	2.0	.0590	.020	.200	.100	.300	3.67	.54	.00180	1
280	280	9450.	80.7	18.4	.0270	.020	.200	.100	.300	3.34	.52	.00180	1
281	281	8458.	75.7	4.4	.0360	.020	.200	.100	.300	3.59	.54	.00180	1
282	282	4390.	92.3	2.0	.0560	.020	.200	.100	.300	3.21	.51	.00180	1
283	283	4325.	96.6	2.3	.0070	.020	.200	.100	.300	3.57	.54	.00180	1
284	284	1778.	37.4	2.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
285	285	9238.	64.3	2.0	.0300	.020	.200	.100	.300	3.96	.56	.00180	1
286	286	5834.	32.6	2.0	.0550	.020	.200	.100	.300	4.50	.60	.00180	1
287	287	4730.	59.0	2.0	.0130	.020	.200	.100	.300	3.13	.51	.00180	1
288	288	4514.	66.9	4.7	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL TRIBUTARY AREA (ACRES), 3150.50

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ TO VERT L	R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
201	901	0	4	CHANNEL	5.0	557.	.0200	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	557.	.0200	20.0	20.0	.056	10.00	
202	902	0	4	CHANNEL	5.0	1293.	.0450	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1293.	.0450	20.0	20.0	.056	10.00	
203	903	0	4	CHANNEL	5.0	1688.	.0370	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1688.	.0370	20.0	20.0	.056	10.00	
204	904	0	4	CHANNEL	5.0	1623.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1623.	.0220	20.0	20.0	.056	10.00	
210	310	0	4	CHANNEL	5.0	1423.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1423.	.0250	20.0	20.0	.056	10.00	
211	311	0	4	CHANNEL	5.0	2714.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2714.	.0180	20.0	20.0	.056	10.00	
212	312	0	4	CHANNEL	5.0	1366.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1366.	.0140	20.0	20.0	.056	10.00	
213	312	0	4	CHANNEL	5.0	3103.	.0340	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3103.	.0340	20.0	20.0	.056	10.00	
214	312	0	4	CHANNEL	5.0	2937.	.0320	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2937.	.0320	20.0	20.0	.056	10.00	
215	905	0	4	CHANNEL	8.0	1876.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1876.	.0110	20.0	20.0	.056	10.00	
218	910	0	4	CHANNEL	8.0	2978.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2978.	.0220	20.0	20.0	.044	10.00	
219	911	0	4	CHANNEL	8.0	5413.	.0230	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5413.	.0230	20.0	20.0	.044	10.00	
220	912	0	4	CHANNEL	5.0	3202.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3202.	.0240	20.0	20.0	.056	10.00	
221	913	0	4	CHANNEL	5.0	1851.	.0280	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1851.	.0280	20.0	20.0	.056	10.00	
224	324	0	4	CHANNEL	5.0	2723.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2723.	.0330	20.0	20.0	.056	10.00	
225	326	0	4	CHANNEL	5.0	2478.	.0450	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2478.	.0450	20.0	20.0	.056	10.00	
226	327	0	4	CHANNEL	8.0	1202.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1202.	.0050	20.0	20.0	.056	10.00	
227	329	0	4	CHANNEL	5.0	2931.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2931.	.0230	20.0	20.0	.056	10.00	
228	330	0	4	CHANNEL	8.0	1683.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1683.	.0300	20.0	20.0	.056	10.00	
229	334	0	4	CHANNEL	5.0	2016.	.0500	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2016.	.0500	20.0	20.0	.056	10.00	
230	335	0	4	CHANNEL	5.0	2194.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2194.	.0230	20.0	20.0	.056	10.00	
231	332	0	4	CHANNEL	5.0	2107.	.0350	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	2107.	.0350	20.0	20.0	.056	10.00	
233	336	0	4	CHANNEL	10.0	2264.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2264.	.0040	20.0	20.0	.056	10.00	
235	340	0	4	CHANNEL	5.0	5191.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5191.	.0240	20.0	20.0	.056	10.00	
236	915	0	4	CHANNEL	10.0	3298.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3298.	.0090	20.0	20.0	.056	10.00	
243	916	0	4	CHANNEL	5.0	2202.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2202.	.0230	20.0	20.0	.056	10.00	
245	350	0	4	CHANNEL	5.0	3458.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3458.	.0260	20.0	20.0	.056	10.00	
246	352	0	4	CHANNEL	5.0	3390.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	3390.	.0330	20.0	20.0	.056	10.00	
247	352	0	4	CHANNEL	5.0	4100.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4100.	.0390	20.0	20.0	.056	10.00	
248	917	0	4	CHANNEL	10.0	2766.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2766.	.0220	20.0	20.0	.056	10.00	
250	360	0	4	CHANNEL	5.0	1883.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1883.	.0350	20.0	20.0	.056	10.00	
251	361	0	4	CHANNEL	8.0	1998.	.0290	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1998.	.0290	20.0	20.0	.056	10.00	
252	918	0	4	CHANNEL	10.0	1987.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1987.	.0330	20.0	20.0	.056	10.00	

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Coal Creek Tributaries, Existing Conditions (con.)

255	919	0	4	CHANNEL	5.0	1579.	.0660	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1579.	.0660	20.0	20.0	.056	10.00	
260	370	0	4	CHANNEL	5.0	4256.	.0400	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4256.	.0400	20.0	20.0	.056	10.00	
261	370	0	4	CHANNEL	5.0	4413.	.0390	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	4413.	.0390	20.0	20.0	.056	10.00	
262	372	0	4	CHANNEL	5.0	3187.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3187.	.0330	20.0	20.0	.056	10.00	
263	921	0	4	CHANNEL	10.0	3198.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3198.	.0120	20.0	20.0	.056	10.00	
269	922	0	4	CHANNEL	5.0	3226.	.0380	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3226.	.0380	20.0	20.0	.056	10.00	
270	923	0	4	CHANNEL	5.0	1688.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1688.	.0390	20.0	20.0	.056	10.00	
272	378	0	4	CHANNEL	5.0	2744.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2744.	.0270	20.0	20.0	.056	10.00	
273	382	0	4	CHANNEL	5.0	2292.	.0320	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2292.	.0320	20.0	20.0	.056	10.00	
274	383	0	4	CHANNEL	8.0	2179.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2179.	.0260	20.0	20.0	.056	10.00	
275	383	0	4	CHANNEL	5.0	2481.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2481.	.0230	20.0	20.0	.056	10.00	
276	925	0	4	CHANNEL	10.0	2000.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2000.	.0250	20.0	20.0	.056	10.00	
277	926	0	4	CHANNEL	10.0	1526.	.0590	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1526.	.0590	20.0	20.0	.056	10.00	
280	927	0	4	CHANNEL	5.0	3281.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3281.	.0270	20.0	20.0	.056	10.00	
281	928	0	4	CHANNEL	5.0	2643.	.0360	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2643.	.0360	20.0	20.0	.056	10.00	
282	390	0	4	CHANNEL	8.0	1372.	.0560	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1372.	.0560	20.0	20.0	.044	10.00	
283	391	0	4	CHANNEL	8.0	1931.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1931.	.0070	20.0	20.0	.056	10.00	
284	929	0	4	CHANNEL	10.0	926.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	926.	.0110	20.0	20.0	.056	10.00	
285	392	0	4	CHANNEL	5.0	2887.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2887.	.0300	20.0	20.0	.056	10.00	
286	393	0	4	CHANNEL	5.0	1823.	.0550	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1823.	.0550	20.0	20.0	.056	10.00	
287	930	0	4	CHANNEL	8.0	1478.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1478.	.0130	20.0	20.0	.056	10.00	
288	931	0	4	CHANNEL	10.0	2015.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2015.	.0110	20.0	20.0	.056	10.00	
325	326	0	4	CHANNEL	5.0	622.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	622.	.0240	20.0	20.0	.056	10.00	
328	330	0	4	CHANNEL	8.0	1286.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1286.	.0260	20.0	20.0	.056	10.00	
331	332	0	4	CHANNEL	8.0	1491.	.0280	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1491.	.0280	20.0	20.0	.056	10.00	
333	335	0	4	CHANNEL	10.0	545.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	545.	.0150	20.0	20.0	.056	10.00	
351	352	0	4	CHANNEL	8.0	1803.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1803.	.0220	20.0	20.0	.056	10.00	
379	383	0	4	CHANNEL	8.0	890.	.0380	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	890.	.0380	20.0	20.0	.056	10.00	
394	930	0	4	CHANNEL	8.0	1608.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1608.	.0060	20.0	20.0	.056	10.00	
1000	310	9	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0	.0	.3	.0	.7	145.0	1.3	377.0	2.0	505.0	2.3 505.0
		4.2	274.0	6.2	171.0	10.0	110.0					
1001	301	3	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0	.0	.7	400.0	10.0	400.0					
1002	332	5	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0	.0	1.2	140.0	1.3	1110.0	1.7	140.0	6.7	10.0	
1003	340	5	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0	.0	.9	200.0	1.1	275.0	1.6	200.0	6.7	5.0	

Godding Hollow Tributaries, Existing Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	PERV.	SURFACE STORAGE(IN) IMPERV.	PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	MINIMUM	DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
650	650	9374.	28.2	2.0	.0180	.020	.200	.100	.300	3.08	.46	.00160	1
651	651	1770.	29.1	2.0	.0280	.020	.200	.100	.300	3.62	.54	.00180	1
652	652	9698.	114.8	7.4	.0190	.020	.200	.100	.300	3.10	.51	.00180	1
653	653	5144.	83.0	2.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
654	654	10448.	123.9	34.7	.0290	.020	.200	.100	.300	3.08	.51	.00180	1
655	655	4595.	40.3	2.0	.0220	.020	.200	.100	.300	3.37	.52	.00180	1
656	656	7693.	36.2	2.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
660	660	4762.	34.2	2.0	.0330	.020	.200	.100	.300	3.26	.49	.00170	1
661	661	11786.	133.8	2.6	.0160	.020	.200	.100	.300	3.08	.51	.00180	1
662	662	9813.	70.5	2.8	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
663	663	15123.	101.0	8.5	.0140	.020	.200	.100	.300	3.00	.50	.00180	1

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Godding Hollow Tributaries, Existing Conditions (con.)

664	664	13549.	110.2	17.6	.0180	.020	.200	.100	.300	3.21	.51	.00180	1
665	665	5315.	91.1	14.3	.0130	.020	.200	.100	.300	3.20	.51	.00180	1
666	666	4902.	89.2	19.5	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
667	667	4349.	99.8	30.0	.0080	.020	.200	.100	.300	3.00	.50	.00180	1
668	668	10298.	199.8	2.0	.0090	.020	.200	.100	.300	3.00	.50	.00180	1
669	669	6637.	43.0	2.0	.0070	.020	.200	.100	.300	4.34	.59	.00180	1
670	670	12234.	48.4	15.0	.0160	.020	.200	.100	.300	3.36	.52	.00180	1
671	671	1728.	18.8	2.0	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
672	672	14486.	165.5	2.0	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
673	673	7163.	72.5	2.0	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
674	674	8021.	165.1	2.0	.0090	.020	.200	.100	.300	3.08	.51	.00180	1
675	675	7874.	89.4	2.0	.0060	.020	.200	.100	.300	3.01	.50	.00180	1
677	677	12672.	224.5	3.3	.0240	.020	.200	.100	.300	3.05	.50	.00180	1
678	678	9245.	196.1	2.2	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
679	679	9784.	108.1	3.1	.0260	.020	.200	.100	.300	3.00	.50	.00180	1
680	680	15840.	185.5	2.0	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
681	681	10080.	116.4	2.0	.0140	.020	.200	.100	.300	3.07	.50	.00180	1
683	683	4267.	35.4	2.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL TRIBUTARY AREA (ACRES), 2853.80

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	TO VERT R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
650	750	0	4	CHANNEL	5.0	1361.	.0480	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1361.	.0480	20.0	20.0	.056	10.00	
651	751	0	4	CHANNEL	5.0	790.	.0280	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	790.	.0280	20.0	20.0	.056	10.00	
652	752	0	4	CHANNEL	8.0	3788.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3788.	.0190	20.0	20.0	.056	10.00	
653	970	0	4	CHANNEL	8.0	1786.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1786.	.0050	20.0	20.0	.056	10.00	
654	754	0	4	CHANNEL	8.0	3628.	.0290	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3628.	.0290	20.0	20.0	.044	10.00	
655	755	0	4	CHANNEL	5.0	1795.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1795.	.0220	20.0	20.0	.056	10.00	
656	970	0	4	CHANNEL	5.0	3005.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3005.	.0170	20.0	20.0	.056	10.00	
660	760	0	4	CHANNEL	5.0	2126.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2126.	.0330	20.0	20.0	.056	10.00	
661	761	0	4	CHANNEL	5.0	4092.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4092.	.0160	20.0	20.0	.056	10.00	
662	761	0	4	CHANNEL	5.0	3407.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3407.	.0180	20.0	20.0	.056	10.00	
663	763	0	4	CHANNEL	5.0	4726.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4726.	.0140	20.0	20.0	.056	10.00	
664	763	0	4	CHANNEL	5.0	4234.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4234.	.0180	20.0	20.0	.056	10.00	
665	764	0	4	CHANNEL	8.0	1661.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1661.	.0130	20.0	20.0	.056	10.00	
666	765	0	4	CHANNEL	10.0	1915.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1915.	.0110	20.0	20.0	.056	10.00	
667	766	0	4	CHANNEL	10.0	2265.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2265.	.0080	20.0	20.0	.056	10.00	
668	767	0	4	CHANNEL	8.0	5363.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5363.	.0090	20.0	20.0	.056	10.00	
669	767	0	4	CHANNEL	5.0	3457.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3457.	.0070	20.0	20.0	.056	10.00	
670	770	0	4	CHANNEL	5.0	3823.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3823.	.0160	20.0	20.0	.056	10.00	
671	771	0	4	CHANNEL	5.0	675.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	675.	.0060	20.0	20.0	.056	10.00	
672	772	0	4	CHANNEL	8.0	5030.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5030.	.0140	20.0	20.0	.056	10.00	
673	772	0	4	CHANNEL	5.0	2798.	.0200	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2798.	.0200	20.0	20.0	.056	10.00	
674	773	0	4	CHANNEL	8.0	2785.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2785.	.0090	20.0	20.0	.056	10.00	
675	975	0	4	CHANNEL	10.0	2734.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2734.	.0060	20.0	20.0	.056	10.00	
677	777	0	4	CHANNEL	5.0	3960.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3960.	.0240	20.0	20.0	.056	10.00	
678	971	0	4	CHANNEL	8.0	3210.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3210.	.0150	20.0	20.0	.056	10.00	
679	971	0	4	CHANNEL	5.0	3397.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3397.	.0260	20.0	20.0	.056	10.00	
680	972	0	4	CHANNEL	5.0	4950.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4950.	.0190	20.0	20.0	.056	10.00	
681	973	0	4	CHANNEL	5.0	3500.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3500.	.0140	20.0	20.0	.056	10.00	
683	974	0	4	CHANNEL	5.0	1905.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1905.	.0110	20.0	20.0	.056	10.00	
756	970	0	4	CHANNEL	5.0	1462.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1462.	.0250	20.0	20.0	.056	10.00	
762	763	0	4	CHANNEL	5.0	1581.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1581.	.0090	20.0	20.0	.056	10.00	
768	975	0	4	CHANNEL	5.0	1279.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1279.	.0020	20.0	20.0	.056	10.00	
769	973	0	4	CHANNEL	8.0	2689.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2689.	.0090	20.0	20.0	.044	10.00	

Table A1 – UDSWM Basin and Conveyance Parameters, Existing Conditions (con.)

Little Dry Creek Tributaries, Existing Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
803	803	12083.	96.7	2.0	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
611	611	9374.	45.5	2.0	.0180	.020	.200	.100	.300	3.46	.53	.00180	1
615	615	4602.	55.5	7.7	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
620	620	4426.	18.9	8.7	.0140	.020	.200	.100	.300	3.41	.53	.00180	1
621	621	10590.	153.5	5.3	.0230	.020	.200	.100	.300	3.36	.52	.00180	1
622	622	12390.	158.7	2.0	.0120	.020	.200	.100	.300	3.85	.55	.00180	1
623	623	2688.	157.3	2.0	.0080	.020	.200	.100	.300	3.60	.52	.00170	1
624	624	11430.	154.0	2.3	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
625	625	2381.	29.6	2.0	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
628	628	2072.	31.3	35.4	.0140	.020	.200	.100	.300	3.48	.53	.00180	1
630	630	7098.	24.6	7.8	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
631	631	4216.	155.4	12.2	.0090	.020	.200	.100	.300	3.34	.52	.00180	1
632	632	4117.	97.6	2.0	.0090	.020	.200	.100	.300	3.12	.51	.00180	1
635	635	4694.	23.3	21.8	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
636	636	4568.	62.7	5.1	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
637	637	5216.	67.8	2.0	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
638	638	8205.	73.5	5.6	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
639	639	3448.	13.0	10.0	.0180	.020	.200	.100	.300	3.11	.51	.00180	1
640	640	4258.	107.4	2.0	.0040	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL TRIBUTARY AREA (ACRES), 1526.30

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	TO VERT R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
803	962	0	4	CHANNEL	5.0	3776.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3776.	.0150	20.0	20.0	.056	10.00	
611	960	0	4	CHANNEL	5.0	1258.	.0290	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1258.	.0290	20.0	20.0	.056	10.00	
615	961	0	4	CHANNEL	5.0	1598.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1598.	.0130	20.0	20.0	.056	10.00	
620	705	0	4	CHANNEL	5.0	1976.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1976.	.0140	20.0	20.0	.056	10.00	
621	707	0	4	CHANNEL	5.0	4137.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4137.	.0230	20.0	20.0	.056	10.00	
622	709	0	4	CHANNEL	5.0	4302.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	4302.	.0120	20.0	20.0	.056	10.00	
623	716	0	4	CHANNEL	8.0	1050.	.0080	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1050.	.0080	20.0	20.0	.056	10.00	
624	713	0	4	CHANNEL	5.0	3969.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3969.	.0210	20.0	20.0	.056	10.00	
625	714	0	4	CHANNEL	8.0	1063.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1063.	.0140	20.0	20.0	.056	10.00	
628	718	0	4	CHANNEL	8.0	925.	.0140	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	925.	.0140	20.0	20.0	.056	10.00	
630	718	0	4	CHANNEL	5.0	2218.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2218.	.0220	20.0	20.0	.056	10.00	
631	720	0	4	CHANNEL	10.0	1647.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1647.	.0090	20.0	20.0	.056	10.00	
632	738	0	4	CHANNEL	10.0	1608.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1608.	.0090	20.0	20.0	.056	10.00	
635	735	0	4	CHANNEL	5.0	1467.	.0290	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1467.	.0290	20.0	20.0	.056	10.00	
636	736	0	4	CHANNEL	5.0	1586.	.0190	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	1586.	.0190	20.0	20.0	.056	10.00	
637	737	0	4	CHANNEL	5.0	3260.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3260.	.0220	20.0	20.0	.056	10.00	
638	737	0	4	CHANNEL	8.0	2849.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2849.	.0110	20.0	20.0	.056	10.00	
639	738	0	4	CHANNEL	8.0	1197.	.0180	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1197.	.0180	20.0	20.0	.056	10.00	
640	962	0	4	CHANNEL	10.0	1663.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1663.	.0040	20.0	20.0	.056	10.00	
706	707	0	4	CHANNEL	8.0	1109.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1109.	.0180	20.0	20.0	.056	10.00	
708	709	0	4	CHANNEL	8.0	945.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	945.	.0160	20.0	20.0	.056	10.00	
715	716	0	4	CHANNEL	8.0	716.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	716.	.0170	20.0	20.0	.056	10.00	

APPENDIX A2

UDSWM BASIN AND CONVEYANCE PARAMETERS
FUTURE CONDITION

APPENDIX A2

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions

Boulder Creek Tributaries, Future Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
801	801	8576.	40.1	2.0	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
802	802	20498.	234.8	2.0	.0270	.020	.200	.100	.300	3.00	.50	.00180	1
402	402	8736.	151.3	2.0	.0220	.020	.200	.100	.300	3.95	.56	.00180	1
403	403	9213.	46.6	2.0	.0090	.020	.200	.100	.300	4.03	.57	.00180	1
404	404	13611.	280.4	2.3	.0060	.020	.200	.100	.300	3.35	.52	.00180	1
405	405	14054.	190.1	2.0	.0210	.020	.200	.100	.300	3.54	.54	.00180	1
406	406	13485.	200.9	2.3	.0220	.020	.200	.100	.300	3.45	.53	.00180	1
407	407	7501.	68.8	3.7	.0180	.020	.200	.100	.300	3.43	.53	.00180	1
408	408	13501.	118.0	26.0	.0110	.020	.200	.100	.300	3.20	.51	.00180	1
409	409	13248.	154.6	2.0	.0150	.020	.200	.100	.300	3.35	.52	.00180	1
410	410	6115.	38.3	30.0	.0120	.020	.200	.100	.300	3.20	.51	.00180	1
411	411	18870.	186.4	14.6	.0160	.020	.200	.100	.300	3.70	.55	.00180	1
412	412	5312.	40.4	30.0	.0270	.020	.200	.100	.300	3.95	.56	.00180	1
413	413	3467.	65.6	30.0	.0390	.020	.200	.100	.300	4.18	.58	.00180	1
414	414	10888.	102.4	24.6	.0100	.020	.200	.100	.300	3.20	.51	.00180	1
415	415	6704.	52.4	30.0	.0300	.020	.200	.100	.300	3.88	.56	.00180	1
416	416	4742.	43.4	30.0	.0250	.020	.200	.100	.300	4.16	.58	.00180	1
417	417	8342.	109.7	4.1	.0180	.020	.200	.100	.300	3.45	.53	.00180	1
418	418	9901.	152.6	2.0	.0150	.020	.200	.100	.300	3.80	.55	.00180	1
419	419	4714.	65.8	2.0	.0140	.020	.200	.100	.300	4.02	.57	.00180	1
420	420	13834.	64.5	8.6	.0200	.020	.200	.100	.300	4.12	.57	.00180	1
421	421	8917.	96.3	2.0	.0150	.020	.200	.100	.300	3.47	.53	.00180	1
422	422	17323.	243.2	2.0	.0170	.020	.200	.100	.300	3.65	.54	.00180	1
423	423	3552.	19.1	2.0	.0150	.020	.200	.100	.300	3.10	.51	.00180	1
424	424	5429.	22.5	2.0	.0070	.020	.200	.100	.300	3.25	.52	.00180	1
425	425	4726.	18.5	2.0	.0140	.020	.200	.100	.300	3.20	.51	.00180	1
426	426	6528.	71.1	2.0	.0120	.020	.200	.100	.300	3.42	.53	.00180	1
430	430	5878.	90.4	65.8	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
431	431	6942.	143.8	46.8	.0390	.020	.200	.100	.300	3.23	.49	.00170	1
432	432	11331.	119.9	56.2	.0320	.020	.200	.100	.300	3.85	.55	.00180	1
433	433	5680.	110.6	54.5	.0220	.020	.200	.100	.300	3.32	.52	.00180	1
434	434	4165.	91.1	57.4	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
435	435	5970.	67.3	43.0	.0170	.020	.200	.100	.300	3.02	.50	.00180	1
436	436	13261.	165.1	60.8	.0130	.020	.200	.100	.300	3.56	.54	.00180	1
437	437	8101.	198.5	44.8	.0070	.020	.200	.100	.300	3.48	.53	.00180	1
438	438	4640.	57.0	36.3	.0180	.020	.200	.100	.300	3.09	.51	.00180	1
439	439	5270.	72.1	30.0	.0330	.020	.200	.100	.300	3.86	.56	.00180	1
440	440	3643.	21.2	30.0	.0200	.020	.200	.100	.300	3.75	.55	.00180	1
441	441	322.	92.5	30.0	.0070	.020	.200	.100	.300	3.31	.52	.00180	1
442	442	6034.	100.8	30.0	.0100	.020	.200	.100	.300	3.67	.54	.00180	1
443	443	1760.	51.4	30.0	.0110	.020	.200	.100	.300	3.62	.54	.00180	1
445	445	5546.	72.8	35.1	.0230	.020	.200	.100	.300	3.09	.51	.00180	1
446	446	9512.	103.8	38.2	.0180	.020	.200	.100	.300	4.34	.59	.00180	1
447	447	13936.	179.1	34.3	.0160	.020	.200	.100	.300	3.55	.54	.00180	1
448	448	5672.	43.3	15.7	.0230	.020	.200	.100	.300	4.50	.60	.00180	1
449	449	12243.	168.2	30.0	.0110	.020	.200	.100	.300	3.97	.56	.00180	1
450	450	3829.	66.4	32.5	.0100	.020	.200	.100	.300	4.46	.60	.00180	1
451	451	9155.	116.0	40.4	.0100	.020	.200	.100	.300	4.22	.58	.00180	1
452	452	7419.	171.7	20.2	.0350	.020	.200	.100	.300	4.39	.59	.00180	1
453	453	3384.	81.5	27.3	.0030	.020	.200	.100	.300	3.01	.50	.00180	1
454	454	8704.	53.5	6.9	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
455	455	7458.	158.1	16.4	.0010	.020	.200	.100	.300	3.01	.50	.00180	1
456	456	7854.	75.0	55.9	.0190	.020	.200	.100	.300	3.04	.50	.00180	1
457	457	11648.	245.8	11.4	.0050	.020	.200	.100	.300	2.95	.49	.00180	1
458	458	8762.	126.7	40.8	.0190	.020	.200	.100	.300	3.03	.50	.00180	1
459	459	7696.	124.8	32.0	.0160	.020	.200	.100	.300	4.05	.57	.00180	1
460	460	3472.	116.5	2.0	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
461	461	4966.	133.9	7.2	.0010	.020	.200	.100	.300	2.69	.45	.00170	1
462	462	7578.	142.1	30.0	.0170	.020	.200	.100	.300	3.11	.51	.00180	1
463	463	10826.	62.2	30.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
464	464	12586.	117.2	30.0	.0160	.020	.200	.100	.300	3.00	.50	.00180	1
466	466	7770.	63.8	30.0	.0190	.020	.200	.100	.300	3.70	.55	.00180	1
467	467	9046.	109.2	32.5	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
468	468	10614.	173.0	30.0	.0100	.020	.200	.100	.300	3.18	.51	.00180	1
469	469	6186.	122.4	30.0	.0170	.020	.200	.100	.300	3.97	.56	.00180	1
470	470	4355.	48.6	2.0	.0110	.020	.200	.100	.300	4.50	.60	.00180	1
471	471	5066.	45.8	6.0	.0110	.020	.200	.100	.300	3.95	.56	.00180	1
472	472	4446.	52.3	30.0	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
473	473	7179.	112.7	30.9	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
474	474	15501.	154.0	41.6	.0150	.020	.200	.100	.300	3.64	.54	.00180	1
475	475	15717.	207.5	58.7	.0140	.020	.200	.100	.300	3.16	.51	.00180	1
476	476	18333.	247.9	21.3	.0090	.020	.200	.100	.300	3.85	.56	.00180	1
477	477	7422.	67.0	28.1	.0180	.020	.200	.100	.300	4.40	.59	.00180	1
478	478	4165.	104.8	18.2	.0060	.020	.200	.100	.300	4.12	.57	.00180	1
479	479	10952.	152.7	19.4	.0180	.020	.200	.100	.300	4.31	.59	.00180	1
480	480	7981.	155.1	30.0	.0060	.020	.200	.100	.300	4.36	.59	.00180	1
481	481	7048.	72.9	25.7	.0100	.020	.200	.100	.300	4.08	.57	.00180	1
482	482	11912.	58.8	25.0	.0170	.020	.200	.100	.300	4.32	.59	.00180	1
483	483	14421.	97.2	18.4	.0180	.020	.200	.100	.300	4.47	.60	.00180	1
485	485	15318.	163.8	14.6	.0170	.020	.200	.100	.300	4.12	.57	.00180	1
486	486	9800.	95.5	29.1	.0170	.020	.200	.100	.300	4.44	.60	.00180	1
487	487	5566.	27.1	30.0	.0100	.020	.200	.100	.300	4.32	.59	.00180	1
488	488	7010.	22.8	30.0	.0220	.020	.200	.100	.300	4.50	.60	.00180	1
489	489	5123.	72.8	30.0	.0090	.020	.200	.100	.300	4.18	.58	.00180	1
490	490	11866.	86.4	30.0	.0180	.020	.200	.100	.300	4.19	.58	.00180	1
491	491	10710.	56.1	30.0	.0110	.020	.200	.100	.300	4.00	.57	.00180	1

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Boulder Creek Tributaries, Future Conditions (con.)

492	492	7421.	123.7	29.3	.0110	.020	.200	.100	.300	3.86	.56	.00180	1
493	493	6262.	42.2	28.4	.0100	.020	.200	.100	.300	3.75	.55	.00180	1
494	494	5589.	69.2	4.8	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
495	495	9882.	82.6	9.8	.0060	.020	.200	.100	.300	2.01	.33	.00140	1
496	496	6451.	186.5	4.1	.0020	.020	.200	.100	.300	2.18	.35	.00150	1

TOTAL TRIBUTARY AREA (ACRES), 9692.50

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	SIDE SLOPES TO VERT R	OVERBANK/SURCHARGE MANNING N	OVERBANK/SURCHARGE DEPTH (FT)	JK
801	501	0	4	CHANNEL	5.0	2680.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2680.	.0210	20.0	20.0	.056	10.00	
802	502	0	4	CHANNEL	5.0	9151.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	9151.	.0270	20.0	20.0	.056	10.00	
402	505	0	4	CHANNEL	5.0	2730.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2730.	.0220	20.0	20.0	.056	10.00	
403	503	0	4	CHANNEL	5.0	2879.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2879.	.0090	20.0	20.0	.056	10.00	
404	522	0	4	CHANNEL	8.0	5317.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5317.	.0060	20.0	20.0	.056	10.00	
405	933	0	4	CHANNEL	5.0	4880.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4880.	.0210	20.0	20.0	.056	10.00	
406	934	0	4	CHANNEL	5.0	4682.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4682.	.0220	20.0	20.0	.056	10.00	
407	509	0	4	CHANNEL	5.0	2930.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2930.	.0180	20.0	20.0	.056	10.00	
408	511	0	4	CHANNEL	5.0	4688.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4688.	.0110	20.0	20.0	.056	10.00	
409	512	0	4	CHANNEL	5.0	4140.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4140.	.0150	20.0	20.0	.056	10.00	
410	512	0	4	CHANNEL	5.0	1911.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1911.	.0120	20.0	20.0	.056	10.00	
411	935	0	4	CHANNEL	8.0	5897.	.0160	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	5897.	.0160	20.0	20.0	.056	10.00	
412	514	0	4	CHANNEL	5.0	1660.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1660.	.0270	20.0	20.0	.056	10.00	
413	936	0	4	CHANNEL	8.0	1204.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1204.	.0390	20.0	20.0	.056	10.00	
414	515	0	4	CHANNEL	5.0	4253.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4253.	.0100	20.0	20.0	.056	10.00	
415	937	0	4	CHANNEL	8.0	2328.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2328.	.0300	20.0	20.0	.056	10.00	
416	938	0	4	CHANNEL	5.0	2470.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2470.	.0250	20.0	20.0	.056	10.00	
417	516	0	4	CHANNEL	5.0	2607.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2607.	.0180	20.0	20.0	.056	10.00	
418	518	0	4	CHANNEL	5.0	3438.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3438.	.0150	20.0	20.0	.056	10.00	
419	519	0	4	CHANNEL	8.0	1841.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1841.	.0120	20.0	20.0	.056	10.00	
420	519	0	4	CHANNEL	5.0	4323.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4323.	.0190	20.0	20.0	.056	10.00	
421	939	0	4	CHANNEL	5.0	3096.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3096.	.0150	20.0	20.0	.056	10.00	
422	940	0	4	CHANNEL	5.0	6015.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	6015.	.0170	20.0	20.0	.056	10.00	
423	941	0	4	CHANNEL	5.0	1110.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1110.	.0150	20.0	20.0	.056	10.00	
424	942	0	4	CHANNEL	5.0	1885.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1885.	.0070	20.0	20.0	.056	10.00	
425	946	0	4	CHANNEL	5.0	1477.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1477.	.0140	20.0	20.0	.056	10.00	
426	506	0	4	CHANNEL	8.0	3400.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	3400.	.0120	20.0	20.0	.056	10.00	
430	531	0	4	CHANNEL	5.0	3062.	.0260	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3062.	.0260	20.0	20.0	.044	10.00	
431	531	0	4	CHANNEL	5.0	3616.	.0390	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3616.	.0390	20.0	20.0	.044	10.00	
432	531	0	4	CHANNEL	5.0	4426.	.0320	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	4426.	.0320	20.0	20.0	.044	10.00	
433	1010	0	4	CHANNEL	8.0	2536.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2536.	.0220	20.0	20.0	.044	10.00	
434	532	0	4	CHANNEL	5.0	1859.	.0290	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	1859.	.0290	20.0	20.0	.044	10.00	
435	533	0	4	CHANNEL	5.0	2332.	.0170	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2332.	.0170	20.0	20.0	.044	10.00	
436	533	0	4	CHANNEL	8.0	4144.	.0130	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	4144.	.0130	20.0	20.0	.044	10.00	
437	534	0	4	CHANNEL	8.0	2813.	.0070	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	2813.	.0070	20.0	20.0	.044	10.00	
438	534	0	4	CHANNEL	5.0	2417.	.0180	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2417.	.0180	20.0	20.0	.044	10.00	
439	535	0	4	CHANNEL	5.0	1830.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1830.	.0330	20.0	20.0	.056	10.00	
440	536	0	4	CHANNEL	5.0	1265.	.0200	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1265.	.0200	20.0	20.0	.056	10.00	
441	536	0	4	CHANNEL	8.0	1260.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1260.	.0070	20.0	20.0	.056	10.00	

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Boulder Creek Tributaries, Future Conditions (con.)

442	537	0	4	CHANNEL	8.0	2095.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2095.	.0100	20.0	20.0	.056	10.00	
443	540	0	4	CHANNEL	8.0	917.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	917.	.0110	20.0	20.0	.056	10.00	
445	538	0	4	CHANNEL	5.0	2166.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2166.	.0230	20.0	20.0	.056	10.00	
446	542	0	4	CHANNEL	5.0	3303.	.0180	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3303.	.0180	20.0	20.0	.044	10.00	
447	544	0	4	CHANNEL	5.0	5444.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5444.	.0160	20.0	20.0	.056	10.00	
448	544	0	4	CHANNEL	5.0	2532.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2532.	.0230	20.0	20.0	.056	10.00	
449	545	0	4	CHANNEL	5.0	4251.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4251.	.0110	20.0	20.0	.056	10.00	
450	545	0	4	CHANNEL	10.0	1994.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1994.	.0100	20.0	20.0	.056	10.00	
451	546	0	4	CHANNEL	10.0	3576.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3576.	.0100	20.0	20.0	.056	10.00	
452	548	0	4	CHANNEL	5.0	3312.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3312.	.0350	20.0	20.0	.056	10.00	
453	549	0	4	CHANNEL	8.0	1511.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1511.	.0030	20.0	20.0	.056	10.00	
454	943	0	4	CHANNEL	8.0	3400.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3400.	.0060	20.0	20.0	.056	10.00	
455	547	0	4	CHANNEL	10.0	2913.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2913.	.0010	20.0	20.0	.056	10.00	
456	567	0	4	CHANNEL	5.0	2727.	.0190	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2727.	.0190	20.0	20.0	.044	10.00	
457	944	0	4	CHANNEL	8.0	3640.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3640.	.0050	20.0	20.0	.056	10.00	
458	568	0	4	CHANNEL	5.0	3042.	.0190	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3042.	.0190	20.0	20.0	.044	10.00	
459	569	0	4	CHANNEL	8.0	2672.	.0160	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	2672.	.0160	20.0	20.0	.044	10.00	
460	572	0	4	CHANNEL	5.0	1550.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1550.	.0060	20.0	20.0	.056	10.00	
461	945	0	4	CHANNEL	8.0	2217.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2217.	.0010	20.0	20.0	.056	10.00	
462	550	0	4	CHANNEL	5.0	2631.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2631.	.0170	20.0	20.0	.056	10.00	
463	551	0	4	CHANNEL	8.0	3383.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3383.	.0170	20.0	20.0	.056	10.00	
464	551	0	4	CHANNEL	5.0	4370.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4370.	.0160	20.0	20.0	.056	10.00	
466	552	0	4	CHANNEL	5.0	2428.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2428.	.0190	20.0	20.0	.056	10.00	
467	553	0	4	CHANNEL	8.0	2827.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2827.	.0190	20.0	20.0	.056	10.00	
468	555	0	4	CHANNEL	8.0	4146.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	4146.	.0100	20.0	20.0	.056	10.00	
469	555	0	4	CHANNEL	5.0	3222.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3222.	.0170	20.0	20.0	.056	10.00	
470	556	0	4	CHANNEL	8.0	1361.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1361.	.0110	20.0	20.0	.056	10.00	
471	560	0	4	CHANNEL	8.0	1759.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1759.	.0110	20.0	20.0	.056	10.00	
472	554	0	4	CHANNEL	5.0	1544.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1544.	.0180	20.0	20.0	.056	10.00	
473	576	0	4	CHANNEL	8.0	3739.	.0130	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	3739.	.0130	20.0	20.0	.044	10.00	
474	557	0	4	CHANNEL	5.0	5382.	.0150	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	5382.	.0150	20.0	20.0	.044	10.00	
475	557	0	4	CHANNEL	5.0	5457.	.0140	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	5457.	.0140	20.0	20.0	.044	10.00	
476	559	0	4	CHANNEL	5.0	7161.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	7161.	.0090	20.0	20.0	.056	10.00	
477	559	0	4	CHANNEL	5.0	3866.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3866.	.0180	20.0	20.0	.056	10.00	
478	562	0	4	CHANNEL	10.0	1446.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1446.	.0060	20.0	20.0	.056	10.00	
479	561	0	4	CHANNEL	5.0	4278.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4278.	.0180	20.0	20.0	.056	10.00	
480	571	0	4	CHANNEL	10.0	3563.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3563.	.0060	20.0	20.0	.056	10.00	
481	571	0	4	CHANNEL	5.0	3671.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3671.	.0100	20.0	20.0	.056	10.00	
482	571	0	4	CHANNEL	5.0	5318.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5318.	.0170	20.0	20.0	.056	10.00	
483	571	0	4	CHANNEL	5.0	5007.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5007.	.0180	20.0	20.0	.056	10.00	
485	565	0	4	CHANNEL	5.0	4787.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4787.	.0170	20.0	20.0	.056	10.00	
486	565	0	4	CHANNEL	5.0	3828.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3828.	.0170	20.0	20.0	.056	10.00	
487	566	0	4	CHANNEL	5.0	1933.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1933.	.0100	20.0	20.0	.056	10.00	
488	955	0	4	CHANNEL	8.0	2738.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2738.	.0220	20.0	20.0	.056	10.00	
489	955	0	4	CHANNEL	8.0	1601.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1601.	.0090	20.0	20.0	.056	10.00	

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Boulder Creek Tributaries, Future Conditions (con.)

490	954	0	4	CHANNEL	5.0	3708.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3708.	.0180	20.0	20.0	.056	10.00	
491	953	0	4	CHANNEL	5.0	4184.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4184.	.0110	20.0	20.0	.056	10.00	
492	953	0	4	CHANNEL	5.0	3865.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3865.	.0110	20.0	20.0	.056	10.00	
493	573	0	4	CHANNEL	5.0	1957.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1957.	.0100	20.0	20.0	.056	10.00	
494	952	0	4	CHANNEL	8.0	2183.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2183.	.0050	20.0	20.0	.056	10.00	
495	951	0	4	CHANNEL	10.0	3088.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3088.	.0060	20.0	20.0	.056	10.00	
496	950	0	4	CHANNEL	5.0	2520.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2520.	.0020	20.0	20.0	.056	10.00	
504	522	0	4	CHANNEL	8.0	5342.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5342.	.0080	20.0	20.0	.056	10.00	
507	933	0	4	CHANNEL	10.0	3979.	.0150	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3979.	.0150	20.0	20.0	.056	10.00	
510	512	0	4	CHANNEL	8.0	2643.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2643.	.0120	20.0	20.0	.056	10.00	
513	935	0	4	CHANNEL	8.0	706.	.0850	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	706.	.0850	20.0	20.0	.056	10.00	
517	518	0	4	CHANNEL	8.0	1021.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1021.	.0100	20.0	20.0	.056	10.00	
520	939	0	4	CHANNEL	10.0	901.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	901.	.0020	20.0	20.0	.056	10.00	
539	540	0	4	CHANNEL	8.0	762.	.0210	3.0	3.0	.022	3.00	0
				OVERFLOW	26.0	762.	.0210	20.0	20.0	.044	10.00	
541	542	0	4	CHANNEL	8.0	506.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	506.	.0080	20.0	20.0	.056	10.00	
543	544	0	4	CHANNEL	10.0	664.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	664.	.0180	20.0	20.0	.056	10.00	
558	559	0	4	CHANNEL	8.0	1397.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1397.	.0160	20.0	20.0	.056	10.00	
563	571	0	4	CHANNEL	10.0	3189.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3189.	.0110	20.0	20.0	.056	10.00	
570	571	0	4	CHANNEL	8.0	3158.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3158.	.0030	20.0	20.0	.056	10.00	
564	553	0	4	CHANNEL	8.0	728.	.0080	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	728.	.0080	20.0	20.0	.044	10.00	
574	557	0	4	CHANNEL	8.0	2651.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2651.	.0090	20.0	20.0	.056	10.00	
575	560	0	4	CHANNEL	8.0	1004.	.0130	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1004.	.0130	20.0	20.0	.056	10.00	
1010	531	6	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW												
					.0	.0	.0	5.1	1.4	15.7	2.5	63.1	6.2	78.2	6.3	300.0

Coal Creek Tributaries, Future Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
201	201	1338.	27.1	95.0	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
202	202	2069.	15.4	42.6	.0450	.020	.200	.100	.300	3.16	.51	.00180	1
203	203	2701.	23.3	61.0	.0370	.020	.200	.100	.300	3.98	.57	.00180	1
204	204	4674.	19.3	41.3	.0220	.020	.200	.100	.300	4.14	.58	.00180	1
210	210	2733.	27.4	95.0	.0250	.020	.200	.100	.300	3.00	.50	.00180	1
211	211	5211.	38.1	83.6	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
212	212	3059.	46.8	78.9	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
213	213	9930.	42.7	81.1	.0340	.020	.200	.100	.300	3.00	.50	.00180	1
214	214	9398.	40.8	32.5	.0320	.020	.200	.100	.300	3.00	.50	.00180	1
215	215	4202.	37.0	46.2	.0110	.020	.200	.100	.300	3.70	.55	.00180	1
218	218	9530.	60.7	36.9	.0220	.020	.200	.100	.300	3.86	.56	.00180	1
219	219	15589.	112.9	33.7	.0230	.020	.200	.100	.300	3.23	.52	.00180	1
220	220	5123.	50.4	31.4	.0240	.020	.200	.100	.300	3.09	.51	.00180	1
221	221	5923.	61.3	26.2	.0280	.020	.200	.100	.300	3.82	.55	.00180	1
224	224	6099.	52.7	57.7	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
225	225	7136.	61.0	10.0	.0450	.020	.200	.100	.300	3.00	.50	.00180	1
226	226	1923.	25.4	10.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
227	227	9379.	71.7	10.0	.0230	.020	.200	.100	.300	3.00	.50	.00180	1
228	228	5386.	33.6	30.0	.0300	.020	.200	.100	.300	3.00	.50	.00180	1
229	229	5806.	31.3	30.0	.0500	.020	.200	.100	.300	3.00	.50	.00180	1
230	230	6318.	78.0	30.0	.0230	.020	.200	.100	.300	3.08	.51	.00180	1
231	231	6742.	20.1	30.0	.0350	.020	.200	.100	.300	3.22	.51	.00180	1
233	233	6520.	58.6	37.6	.0040	.020	.200	.100	.300	3.43	.53	.00180	1
235	235	14934.	61.3	33.9	.0240	.020	.200	.100	.300	3.03	.50	.00180	1
236	236	7387.	86.3	30.1	.0090	.020	.200	.100	.300	3.58	.54	.00180	1
243	243	7046.	44.3	11.3	.0230	.020	.200	.100	.300	3.16	.51	.00180	1
245	245	9958.	87.3	12.7	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
246	246	6509.	59.8	10.0	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
247	247	10496.	52.0	25.6	.0390	.020	.200	.100	.300	3.00	.50	.00180	1
248	248	7966.	93.4	10.2	.0220	.020	.200	.100	.300	3.10	.51	.00180	1
250	250	6026.	29.9	10.0	.0350	.020	.200	.100	.300	3.73	.55	.00180	1
251	251	6394.	59.1	10.0	.0290	.020	.200	.100	.300	3.25	.52	.00180	1
252	252	5086.	79.0	10.0	.0330	.020	.200	.100	.300	3.66	.54	.00180	1
255	255	2526.	31.4	5.2	.0660	.020	.200	.100	.300	3.75	.55	.00180	1
260	260	10896.	107.1	24.9	.0400	.020	.200	.100	.300	3.59	.54	.00180	1
261	261	9885.	130.8	35.6	.0390	.020	.200	.100	.300	3.24	.52	.00180	1

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Coal Creek Tributaries, Future Conditions (con.)

262	262	9179.	44.9	23.5	.0330	.020	.200	.100	.300	3.49	.53	.00180	1
263	263	10234.	77.1	4.7	.0120	.020	.200	.100	.300	3.64	.54	.00180	1
269	269	10323.	67.6	41.9	.0380	.020	.200	.100	.300	3.74	.55	.00180	1
270	270	3242.	20.2	43.0	.0390	.020	.200	.100	.300	4.38	.59	.00180	1
272	272	8781.	41.4	43.0	.0270	.020	.200	.100	.300	4.50	.60	.00180	1
273	273	7334.	52.1	43.3	.0320	.020	.200	.100	.300	4.50	.60	.00180	1
274	274	5578.	102.7	66.9	.0260	.020	.200	.100	.300	4.50	.60	.00180	1
275	275	5557.	54.1	49.8	.0230	.020	.200	.100	.300	4.50	.60	.00180	1
276	276	5120.	75.5	2.1	.0250	.020	.200	.100	.300	4.41	.59	.00180	1
277	277	4883.	52.1	2.0	.0590	.020	.200	.100	.300	3.67	.54	.00180	1
280	280	9450.	80.7	7.0	.0270	.020	.200	.100	.300	3.34	.52	.00180	1
281	281	8458.	75.7	7.0	.0360	.020	.200	.100	.300	3.59	.54	.00180	1
282	282	4390.	92.3	2.0	.0560	.020	.200	.100	.300	3.21	.51	.00180	1
283	283	4325.	96.6	2.0	.0070	.020	.200	.100	.300	3.57	.54	.00180	1
284	284	1778.	37.4	20.2	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
285	285	9238.	64.3	17.3	.0300	.020	.200	.100	.300	3.96	.56	.00180	1
286	286	5834.	32.6	6.3	.0550	.020	.200	.100	.300	4.50	.60	.00180	1
287	287	4730.	59.0	6.8	.0130	.020	.200	.100	.300	3.13	.51	.00180	1
288	288	4514.	66.9	6.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL TRIBUTARY AREA (ACRES), 3150.50

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	SIDE SLOPES TO VERT R	OVERBANK/SURCHARGE MANNING N	OVERBANK/SURCHARGE DEPTH (FT)	JK
201	901	0	4	CHANNEL	5.0	557.	.0200	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	557.	.0200	20.0	20.0	.056	10.00	
202	902	0	4	CHANNEL	8.0	1293.	.0450	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1293.	.0450	20.0	20.0	.044	10.00	
203	903	0	4	CHANNEL	8.0	1688.	.0370	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1688.	.0370	20.0	20.0	.044	10.00	
204	904	0	4	CHANNEL	8.0	1623.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1623.	.0220	20.0	20.0	.044	10.00	
210	310	0	4	CHANNEL	8.0	1423.	.0250	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1423.	.0250	20.0	20.0	.044	10.00	
211	311	0	4	CHANNEL	8.0	2714.	.0180	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2714.	.0180	20.0	20.0	.044	10.00	
212	312	0	4	CHANNEL	8.0	1366.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1366.	.0140	20.0	20.0	.044	10.00	
213	312	0	4	CHANNEL	8.0	3103.	.0340	3.0	3.0	.020	.50	0
214	312	0	4	CHANNEL	5.0	2937.	.0320	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2937.	.0320	20.0	20.0	.056	10.00	
215	905	0	4	CHANNEL	8.0	1876.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1876.	.0110	20.0	20.0	.056	10.00	
218	910	0	4	CHANNEL	8.0	2978.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2978.	.0220	20.0	20.0	.044	10.00	
219	911	0	4	CHANNEL	8.0	5413.	.0230	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5413.	.0230	20.0	20.0	.044	10.00	
220	912	0	4	CHANNEL	5.0	3202.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3202.	.0240	20.0	20.0	.056	10.00	
221	913	0	4	CHANNEL	5.0	1851.	.0280	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1851.	.0280	20.0	20.0	.056	10.00	
224	324	0	4	CHANNEL	8.0	2723.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2723.	.0330	20.0	20.0	.044	10.00	
225	326	0	4	CHANNEL	5.0	2478.	.0450	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2478.	.0450	20.0	20.0	.056	10.00	
226	327	0	4	CHANNEL	8.0	1202.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1202.	.0050	20.0	20.0	.056	10.00	
227	329	0	4	CHANNEL	5.0	2931.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2931.	.0230	20.0	20.0	.056	10.00	
228	330	0	4	CHANNEL	8.0	1683.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1683.	.0300	20.0	20.0	.056	10.00	
229	334	0	4	CHANNEL	5.0	2016.	.0500	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2016.	.0500	20.0	20.0	.056	10.00	
230	335	0	4	CHANNEL	5.0	2194.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2194.	.0230	20.0	20.0	.056	10.00	
231	332	0	4	CHANNEL	5.0	2107.	.0350	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	2107.	.0350	20.0	20.0	.056	10.00	
233	336	0	4	CHANNEL	10.0	2264.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2264.	.0040	20.0	20.0	.056	10.00	
235	340	0	4	CHANNEL	5.0	5191.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5191.	.0240	20.0	20.0	.056	10.00	
236	915	0	4	CHANNEL	10.0	3298.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3298.	.0090	20.0	20.0	.056	10.00	
243	916	0	4	CHANNEL	5.0	2202.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2202.	.0230	20.0	20.0	.056	10.00	
245	350	0	4	CHANNEL	5.0	3458.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3458.	.0260	20.0	20.0	.056	10.00	
246	352	0	4	CHANNEL	5.0	3390.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	3390.	.0330	20.0	20.0	.056	10.00	
247	352	0	4	CHANNEL	5.0	4100.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4100.	.0390	20.0	20.0	.056	10.00	
248	917	0	4	CHANNEL	10.0	2766.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2766.	.0220	20.0	20.0	.056	10.00	
250	360	0	4	CHANNEL	5.0	1883.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1883.	.0350	20.0	20.0	.056	10.00	
251	361	0	4	CHANNEL	8.0	1998.	.0290	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1998.	.0290	20.0	20.0	.056	10.00	

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Coal Creek Tributaries, Future Conditions (con.)

252	918	0	4	CHANNEL	10.0	1987.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1987.	.0330	20.0	20.0	.056	10.00	
255	919	0	4	CHANNEL	5.0	1579.	.0660	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1579.	.0660	20.0	20.0	.056	10.00	
260	370	0	4	CHANNEL	5.0	4256.	.0400	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4256.	.0400	20.0	20.0	.056	10.00	
261	370	0	4	CHANNEL	5.0	4413.	.0390	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	4413.	.0390	20.0	20.0	.056	10.00	
262	372	0	4	CHANNEL	8.0	3187.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3187.	.0330	20.0	20.0	.044	10.00	
263	921	0	4	CHANNEL	10.0	3198.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3198.	.0120	20.0	20.0	.056	10.00	
269	922	0	4	CHANNEL	8.0	3226.	.0380	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3226.	.0380	20.0	20.0	.044	10.00	
270	923	0	4	CHANNEL	8.0	1688.	.0390	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1688.	.0390	20.0	20.0	.044	10.00	
272	378	0	4	CHANNEL	8.0	2744.	.0270	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2744.	.0270	20.0	20.0	.044	10.00	
273	382	0	4	CHANNEL	8.0	2292.	.0320	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2292.	.0320	20.0	20.0	.044	10.00	
274	383	0	4	CHANNEL	8.0	2179.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2179.	.0260	20.0	20.0	.056	10.00	
275	383	0	4	CHANNEL	8.0	2481.	.0230	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2481.	.0230	20.0	20.0	.044	10.00	
276	925	0	4	CHANNEL	10.0	2000.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2000.	.0250	20.0	20.0	.056	10.00	
277	926	0	4	CHANNEL	10.0	1526.	.0590	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1526.	.0590	20.0	20.0	.056	10.00	
280	927	0	4	CHANNEL	5.0	3281.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3281.	.0270	20.0	20.0	.056	10.00	
281	928	0	4	CHANNEL	5.0	2643.	.0360	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2643.	.0360	20.0	20.0	.056	10.00	
282	390	0	4	CHANNEL	8.0	1372.	.0560	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1372.	.0560	20.0	20.0	.044	10.00	
283	391	0	4	CHANNEL	8.0	1931.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1931.	.0070	20.0	20.0	.056	10.00	
284	929	0	4	CHANNEL	8.0	926.	.0110	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	926.	.0110	20.0	20.0	.044	10.00	
285	392	0	4	CHANNEL	8.0	2887.	.0300	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2887.	.0300	20.0	20.0	.044	10.00	
286	393	0	4	CHANNEL	5.0	1823.	.0550	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1823.	.0550	20.0	20.0	.056	10.00	
287	930	0	4	CHANNEL	8.0	1478.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1478.	.0130	20.0	20.0	.056	10.00	
288	931	0	4	CHANNEL	10.0	2015.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2015.	.0110	20.0	20.0	.056	10.00	
325	326	0	4	CHANNEL	5.0	622.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	622.	.0240	20.0	20.0	.056	10.00	
328	330	0	4	CHANNEL	8.0	1286.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1286.	.0260	20.0	20.0	.056	10.00	
331	332	0	4	CHANNEL	8.0	1491.	.0280	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1491.	.0280	20.0	20.0	.056	10.00	
333	335	0	4	CHANNEL	10.0	545.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	545.	.0150	20.0	20.0	.056	10.00	
351	352	0	4	CHANNEL	8.0	1803.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1803.	.0220	20.0	20.0	.056	10.00	
379	383	0	4	CHANNEL	8.0	890.	.0380	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	890.	.0380	20.0	20.0	.056	10.00	
394	930	0	4	CHANNEL	8.0	1608.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1608.	.0060	20.0	20.0	.056	10.00	
1000	310	9	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0 .0	.3 .0	.7 145.0	1.3 377.0	2.0 505.0	2.3 505.0					
		4.2 274.0	6.2 171.0	10.0 110.0								
1001	301	3	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0 .0	.7 400.0	10.0 400.0								
1002	332	5	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0 .0	1.2 140.0	1.3 1110.0	1.7 140.0	6.7 10.0						
1003	340	5	3		.0	0.	.0001	.0	.0	.001	.01	-1
		TIME IN HRS VS INFLOW IN CFS										
		.0 .0	.9 200.0	1.1 275.0	1.6 200.0	6.7 5.0						

Godding Hollow Tributaries, Future Conditions

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
650	650	9374.	28.2	93.2	.0180	.020	.200	.100	.300	3.08	.46	.00160	1
651	651	1770.	29.1	85.6	.0280	.020	.200	.100	.300	3.62	.54	.00180	1
652	652	9698.	114.8	85.1	.0190	.020	.200	.100	.300	3.10	.51	.00180	1
653	653	5144.	83.0	95.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
654	654	10448.	123.9	87.1	.0290	.020	.200	.100	.300	3.08	.51	.00180	1
655	655	4595.	40.3	95.0	.0220	.020	.200	.100	.300	3.37	.52	.00180	1
656	656	7693.	36.2	95.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
660	660	4762.	34.2	70.6	.0330	.020	.200	.100	.300	3.26	.49	.00170	1

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Godding Hollow Tributaries, Future Conditions (con.)

661	661	11786.	133.8	56.6	.0160	.020	.200	.100	.300	3.08	.51	.00180	1
662	662	9813.	70.5	48.8	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
663	663	15123.	101.0	43.3	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
664	664	13549.	110.2	32.7	.0180	.020	.200	.100	.300	3.21	.51	.00180	1
665	665	5315.	91.1	30.0	.0130	.020	.200	.100	.300	3.20	.51	.00180	1
666	666	4902.	89.2	30.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
667	667	4349.	99.8	30.0	.0080	.020	.200	.100	.300	3.00	.50	.00180	1
668	668	10298.	199.8	60.2	.0090	.020	.200	.100	.300	3.00	.50	.00180	1
669	669	6637.	43.0	2.0	.0070	.020	.200	.100	.300	4.34	.59	.00180	1
670	670	12234.	48.4	31.0	.0160	.020	.200	.100	.300	3.36	.52	.00180	1
671	671	1728.	18.8	35.5	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
672	672	14486.	165.5	38.3	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
673	673	7163.	72.5	64.3	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
674	674	8021.	165.1	89.7	.0090	.020	.200	.100	.300	3.08	.51	.00180	1
675	675	7874.	89.4	40.1	.0060	.020	.200	.100	.300	3.01	.50	.00180	1
677	677	12672.	224.5	74.6	.0240	.020	.200	.100	.300	3.05	.50	.00180	1
678	678	9245.	196.1	88.8	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
679	679	9784.	108.1	84.9	.0260	.020	.200	.100	.300	3.00	.50	.00180	1
680	680	15840.	185.5	83.4	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
681	681	10080.	116.4	95.0	.0140	.020	.200	.100	.300	3.07	.50	.00180	1
683	683	4267.	35.4	95.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL TRIBUTARY AREA (ACRES), 2853.80

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ TO VERT L	R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
650	750	0	4	CHANNEL	8.0	1361.	.0480	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1361.	.0480	20.0	20.0	.044	10.00	
651	751	0	4	CHANNEL	8.0	790.	.0280	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	790.	.0280	20.0	20.0	.044	10.00	
652	752	0	4	CHANNEL	8.0	3788.	.0190	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3788.	.0190	20.0	20.0	.044	10.00	
653	970	0	4	CHANNEL	8.0	1786.	.0050	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1786.	.0050	20.0	20.0	.044	10.00	
654	754	0	4	CHANNEL	8.0	3628.	.0290	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3628.	.0290	20.0	20.0	.044	10.00	
655	755	0	4	CHANNEL	8.0	1795.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1795.	.0220	20.0	20.0	.044	10.00	
656	970	0	4	CHANNEL	8.0	3005.	.0170	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3005.	.0170	20.0	20.0	.044	10.00	
660	760	0	4	CHANNEL	8.0	2126.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2126.	.0330	20.0	20.0	.044	10.00	
661	761	0	4	CHANNEL	8.0	4092.	.0160	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	4092.	.0160	20.0	20.0	.044	10.00	
662	761	0	4	CHANNEL	8.0	3407.	.0180	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3407.	.0180	20.0	20.0	.044	10.00	
663	763	0	4	CHANNEL	8.0	4726.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	4726.	.0140	20.0	20.0	.044	10.00	
664	763	0	4	CHANNEL	5.0	4234.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4234.	.0180	20.0	20.0	.056	10.00	
665	764	0	4	CHANNEL	8.0	1661.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1661.	.0130	20.0	20.0	.056	10.00	
666	765	0	4	CHANNEL	10.0	1915.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1915.	.0110	20.0	20.0	.056	10.00	
667	766	0	4	CHANNEL	10.0	2265.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2265.	.0080	20.0	20.0	.056	10.00	
668	767	0	4	CHANNEL	8.0	5363.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5363.	.0090	20.0	20.0	.044	10.00	
669	767	0	4	CHANNEL	5.0	3457.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3457.	.0070	20.0	20.0	.056	10.00	
670	770	0	4	CHANNEL	5.0	3823.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3823.	.0160	20.0	20.0	.056	10.00	
671	771	0	4	CHANNEL	8.0	675.	.0060	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	675.	.0060	20.0	20.0	.044	10.00	
672	772	0	4	CHANNEL	8.0	5030.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5030.	.0140	20.0	20.0	.044	10.00	
673	772	0	4	CHANNEL	8.0	2798.	.0200	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2798.	.0200	20.0	20.0	.044	10.00	
674	773	0	4	CHANNEL	8.0	2785.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2785.	.0090	20.0	20.0	.044	10.00	
675	975	0	4	CHANNEL	8.0	2734.	.0060	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2734.	.0060	20.0	20.0	.044	10.00	
677	777	0	4	CHANNEL	8.0	3960.	.0240	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3960.	.0240	20.0	20.0	.044	10.00	
678	971	0	4	CHANNEL	8.0	3210.	.0150	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3210.	.0150	20.0	20.0	.044	10.00	
679	971	0	4	CHANNEL	8.0	3397.	.0260	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3397.	.0260	20.0	20.0	.044	10.00	
680	972	0	4	CHANNEL	8.0	4950.	.0190	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	4950.	.0190	20.0	20.0	.044	10.00	
681	973	0	4	CHANNEL	8.0	3500.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3500.	.0140	20.0	20.0	.044	10.00	
683	974	0	4	CHANNEL	8.0	1905.	.0110	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1905.	.0110	20.0	20.0	.044	10.00	
756	970	0	4	CHANNEL	8.0	1462.	.0250	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1462.	.0250	20.0	20.0	.044	10.00	
762	763	0	4	CHANNEL	5.0	1581.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1581.	.0090	20.0	20.0	.056	10.00	

Table A2 – UDSWM Basin and Conveyance Parameters, Future Conditions (con.)

Godding Hollow Tributaries, Future Conditions (con.)

768	975	0	4	CHANNEL	8.0	1279.	.0020	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1279.	.0020	20.0	20.0	.044	10.00	
769	973	0	4	CHANNEL	8.0	2689.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2689.	.0090	20.0	20.0	.044	10.00	

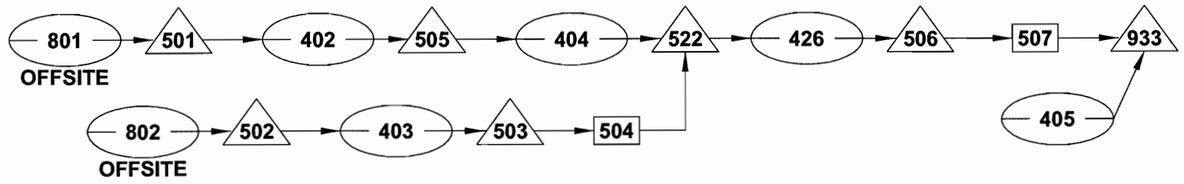
Little Dry Creek Tributaries, Future Conditions

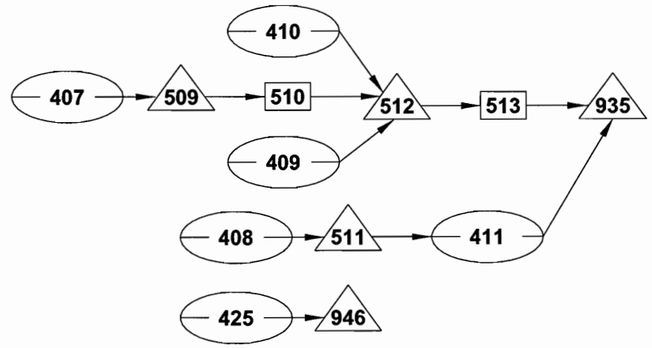
SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
803	803	12083.	96.7	2.0	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
611	611	9374.	45.5	49.2	.0180	.020	.200	.100	.300	3.46	.53	.00180	1
615	615	4602.	55.5	65.4	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
620	620	4426.	18.9	10.0	.0140	.020	.200	.100	.300	3.41	.53	.00180	1
621	621	10590.	153.5	10.2	.0230	.020	.200	.100	.300	3.36	.52	.00180	1
622	622	12390.	158.7	35.7	.0120	.020	.200	.100	.300	3.85	.55	.00180	1
623	623	2688.	157.3	41.0	.0080	.020	.200	.100	.300	3.60	.52	.00170	1
624	624	11430.	154.0	50.2	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
625	625	2381.	29.6	5.0	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
628	628	2072.	31.3	70.0	.0140	.020	.200	.100	.300	3.48	.53	.00180	1
630	630	7098.	24.6	86.1	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
631	631	4216.	155.4	70.0	.0090	.020	.200	.100	.300	3.34	.52	.00180	1
632	632	4117.	97.6	89.9	.0090	.020	.200	.100	.300	3.12	.51	.00180	1
635	635	4694.	23.3	21.8	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
636	636	4568.	62.7	5.0	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
637	637	10432.	67.8	2.0	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
638	638	8205.	73.5	46.3	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
639	639	3448.	13.0	61.1	.0180	.020	.200	.100	.300	3.11	.51	.00180	1
640	640	4258.	107.4	88.5	.0040	.020	.200	.100	.300	3.00	.50	.00180	1

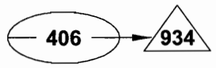
TOTAL TRIBUTARY AREA (ACRES), 1526.30

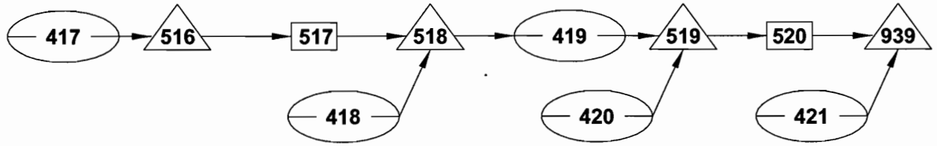
GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ TO VERT L	R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
803	962	0	4	CHANNEL	5.0	3776.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3776.	.0150	20.0	20.0	.056	10.00	
611	960	0	4	CHANNEL	8.0	1258.	.0290	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1258.	.0290	20.0	20.0	.044	10.00	
615	961	0	4	CHANNEL	8.0	1598.	.0130	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1598.	.0130	20.0	20.0	.044	10.00	
620	705	0	4	CHANNEL	5.0	1976.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1976.	.0140	20.0	20.0	.056	10.00	
621	707	0	4	CHANNEL	5.0	4137.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4137.	.0230	20.0	20.0	.056	10.00	
622	709	0	4	CHANNEL	5.0	4302.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	4302.	.0120	20.0	20.0	.056	10.00	
623	716	0	4	CHANNEL	8.0	1050.	.0080	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1050.	.0080	20.0	20.0	.056	10.00	
624	713	0	4	CHANNEL	8.0	3969.	.0210	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3969.	.0210	20.0	20.0	.044	10.00	
625	714	0	4	CHANNEL	8.0	1063.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1063.	.0140	20.0	20.0	.056	10.00	
628	718	0	4	CHANNEL	8.0	925.	.0140	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	925.	.0140	20.0	20.0	.056	10.00	
630	718	0	4	CHANNEL	8.0	2218.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2218.	.0220	20.0	20.0	.044	10.00	
631	720	0	4	CHANNEL	10.0	1647.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1647.	.0090	20.0	20.0	.056	10.00	
632	738	0	4	CHANNEL	10.0	1608.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1608.	.0090	20.0	20.0	.056	10.00	
635	735	0	4	CHANNEL	5.0	1467.	.0290	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1467.	.0290	20.0	20.0	.056	10.00	
636	736	0	4	CHANNEL	5.0	1586.	.0190	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	1586.	.0190	20.0	20.0	.056	10.00	
637	737	0	4	CHANNEL	5.0	3260.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3260.	.0220	20.0	20.0	.056	10.00	
638	737	0	4	CHANNEL	8.0	2849.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2849.	.0110	20.0	20.0	.056	10.00	
639	738	0	4	CHANNEL	8.0	1197.	.0180	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1197.	.0180	20.0	20.0	.056	10.00	
640	962	0	4	CHANNEL	10.0	1663.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1663.	.0040	20.0	20.0	.056	10.00	
706	707	0	4	CHANNEL	8.0	1109.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1109.	.0180	20.0	20.0	.056	10.00	
708	709	0	4	CHANNEL	8.0	945.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	945.	.0160	20.0	20.0	.056	10.00	
715	716	0	4	CHANNEL	8.0	716.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	716.	.0170	20.0	20.0	.056	10.00	

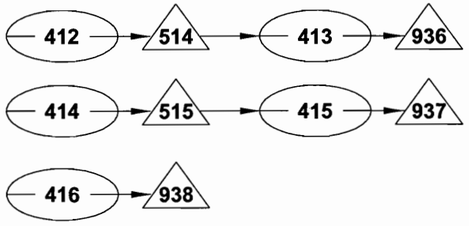
BOULDER CREEK TRIBUTARIES
(AREA WEST OF BOULDER CREEK)

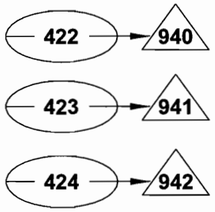












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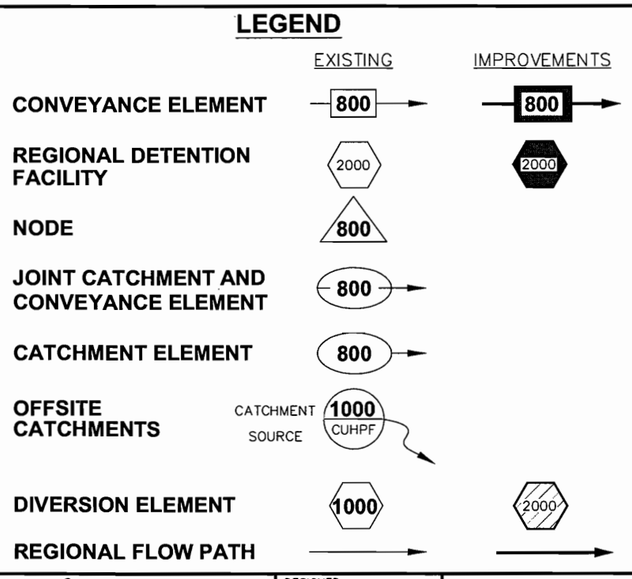

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CHECKED:	DJL
DATE:	8-06

TOWN OF ERIE

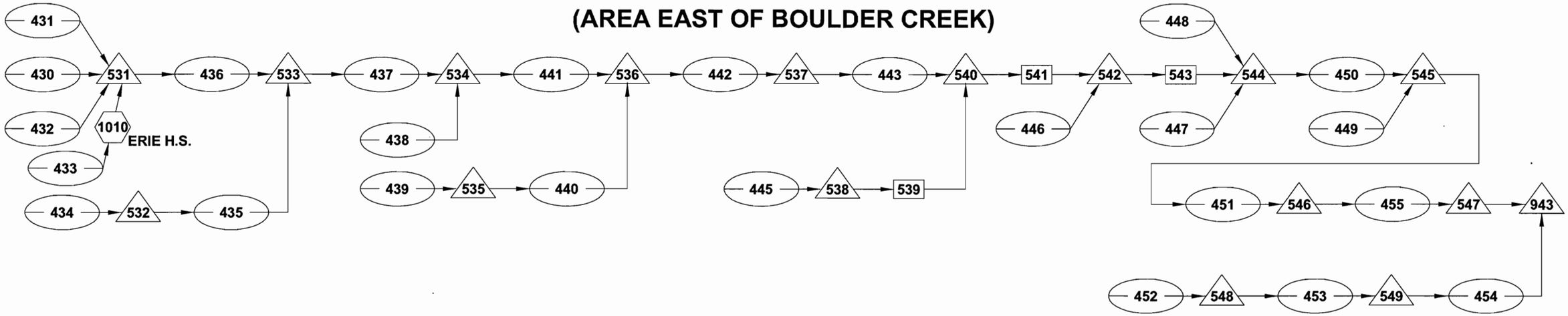
ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

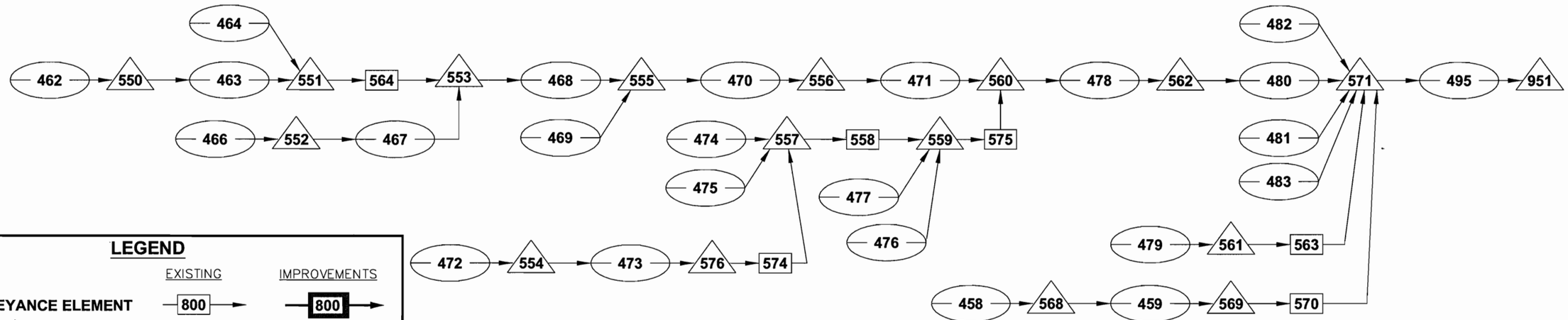
SWMM FLOW CHARTS EXISTING AND FUTURE CONDITIONS

Figure A-1

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\FLOW CHARTS_EX AND FUTURE.dwg, 8/9/2007 2:31:19 PM, LOVE & ASSOCIATES, INC.

BOULDER CREEK TRIBUTARIES
(AREA EAST OF BOULDER CREEK)





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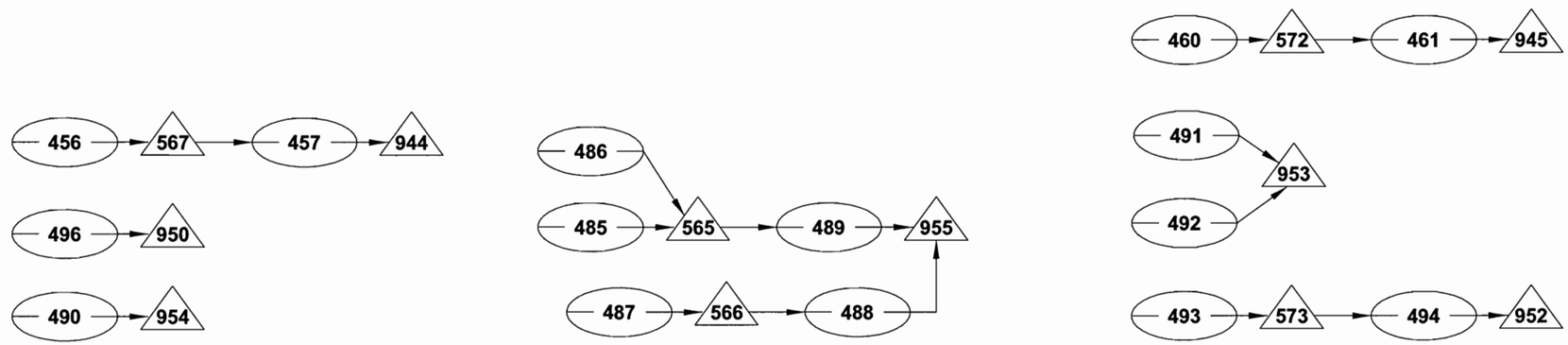
	EXISTING	IMPROVEMENTS
CONVEYANCE ELEMENT	800	800
REGIONAL DETENTION FACILITY	2000	2000
NODE	800	
JOINT CATCHMENT AND CONVEYANCE ELEMENT	800	
CATCHMENT ELEMENT	800	
OFFSITE CATCHMENTS	CATCHMENT 1000 / SOURCE CUHPF	
DIVERSION ELEMENT	1000	2000
REGIONAL FLOW PATH		



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TOWN OF ERIE

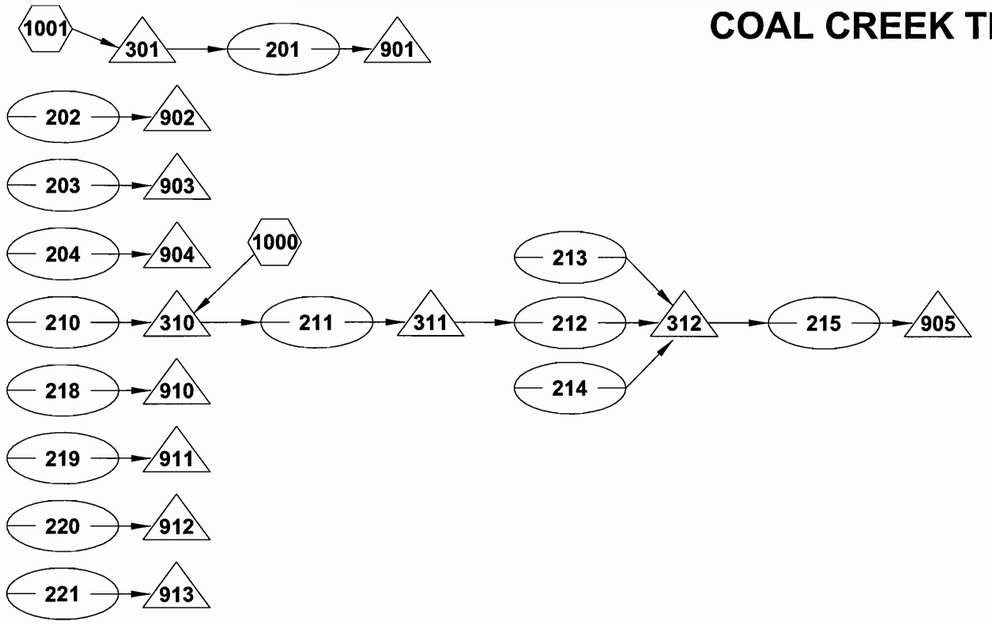
ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

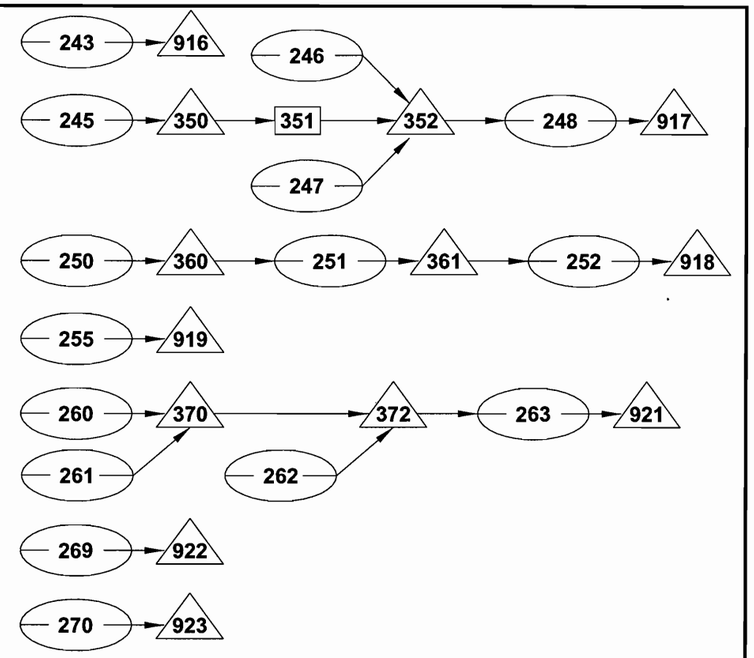
SWMM FLOW CHARTS EXISTING AND FUTURE CONDITIONS

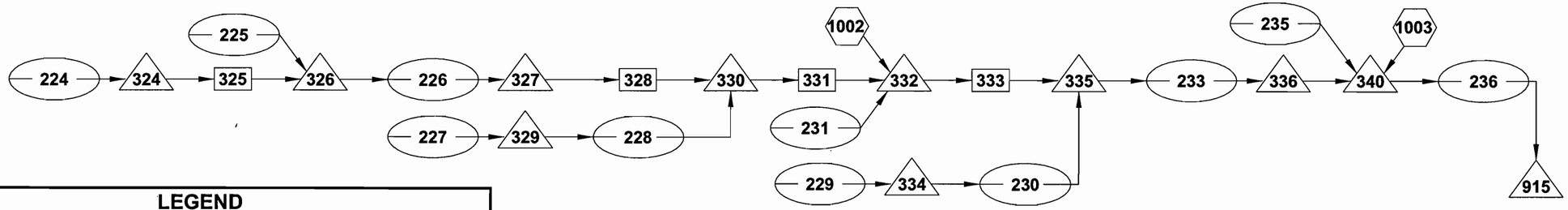
Figure A-2

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\FLOW CHARTS_EX AND FUTURE.dwg, 8/9/2007 2:31:48 PM, LOVE & ASSOCIATES, INC.

COAL CREEK TRIBUTARIES







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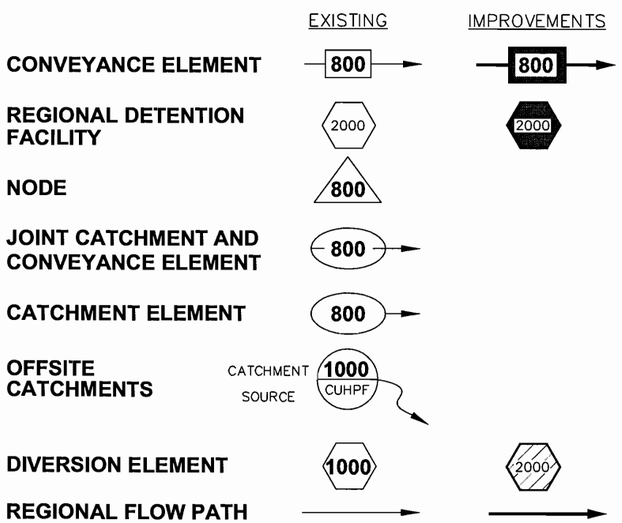

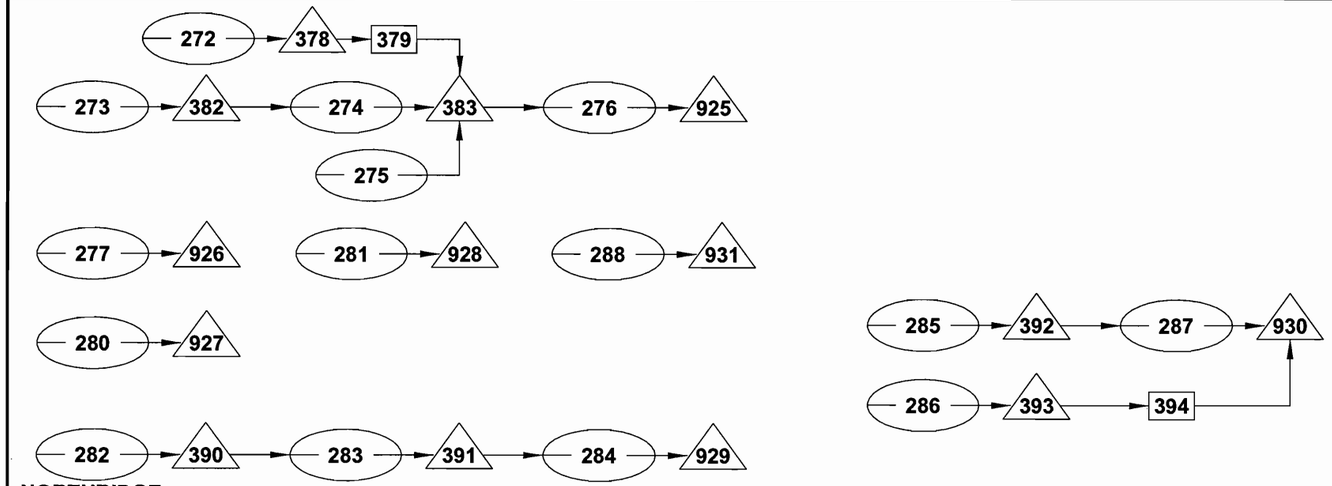

Love & Associates, Inc. water resource consultants 800 Jefferson Avenue – Suite B Louisville, Colorado 80027-1873 Phone: 303-673-9795 Fax: 303-673-9796	DESIGNED: RJP DRAWN: PEM CHECKED: DJL DATE: 8-06	TOWN OF ERIE	ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING	SWMM FLOW CHARTS EXISTING AND FUTURE CONDITIONS	Figure A-3 Page 7

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\FLOW CHARTS_EX AND FUTURE.dwg, 8/9/2007 2:32:13 PM, LOVE & ASSOCIATES, INC.

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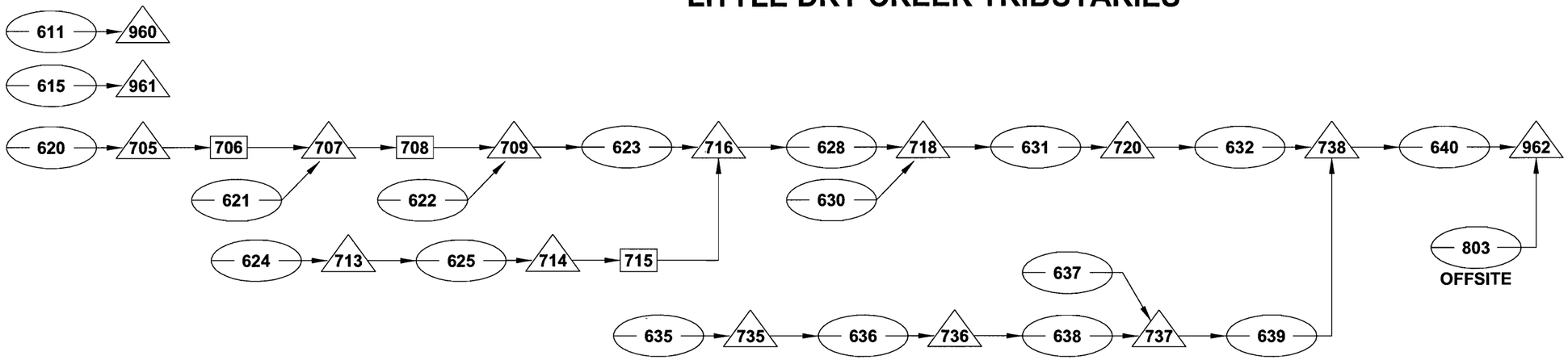
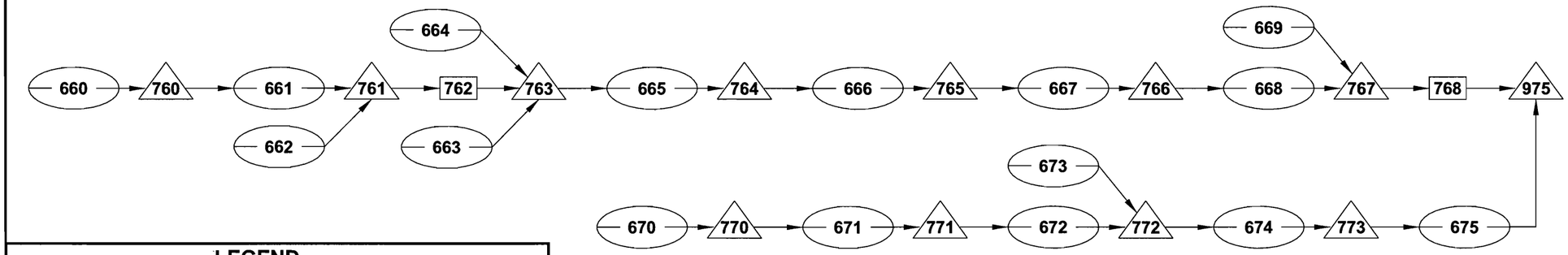
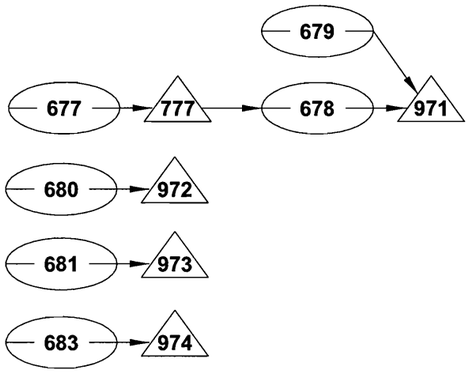
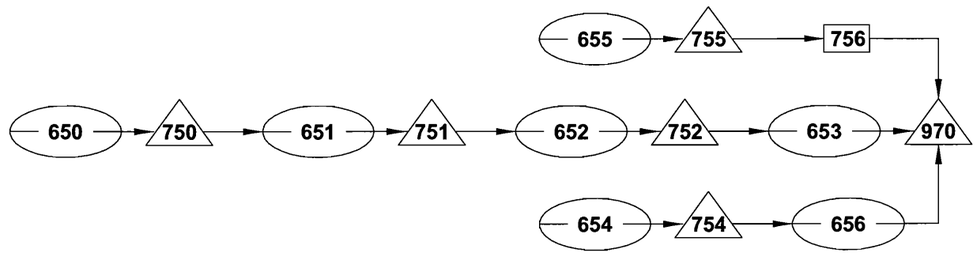
LITTLE DRY CREEK TRIBUTARIES



GODDING HOLLOW TRIBUTARIES







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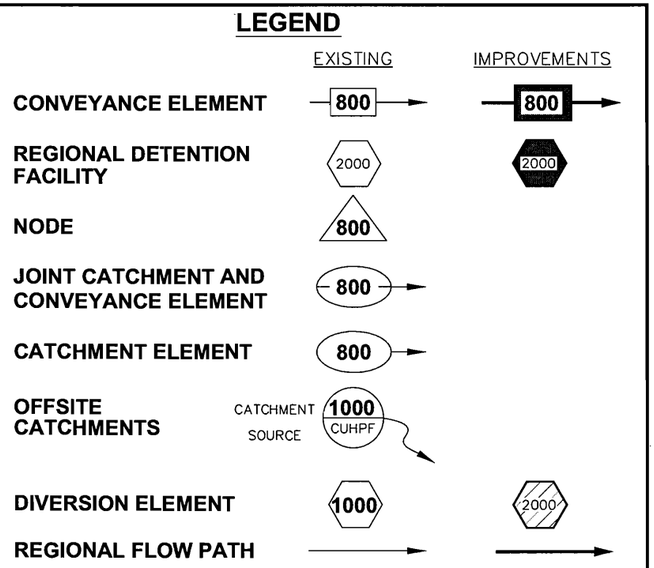

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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

SWMM FLOW CHARTS EXISTING AND FUTURE CONDITIONS

Figure A-4

APPENDIX B1

UDSWM BASIN AND CONVEYANCE PLAN
OUTFALL SYSTEMS PLAN

APPENDIX B1

Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan

Boulder Creek Tributaries, Outfall Systems Plan

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
801	801	8576.	40.1	2.0	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
802	802	20498.	234.8	2.0	.0270	.020	.200	.100	.300	3.00	.50	.00180	1
402	402	8736.	151.3	2.0	.0220	.020	.200	.100	.300	3.95	.56	.00180	1
403	403	9213.	46.6	2.0	.0090	.020	.200	.100	.300	4.03	.57	.00180	1
404	404	13611.	280.4	2.3	.0060	.020	.200	.100	.300	3.35	.52	.00180	1
405	405	14054.	190.1	2.0	.0210	.020	.200	.100	.300	3.54	.54	.00180	1
406	406	13485.	200.9	2.3	.0220	.020	.200	.100	.300	3.45	.53	.00180	1
407	407	7501.	68.8	3.7	.0180	.020	.200	.100	.300	3.43	.53	.00180	1
408	408	13501.	118.0	26.0	.0110	.020	.200	.100	.300	3.20	.51	.00180	1
409	409	13248.	154.6	2.0	.0150	.020	.200	.100	.300	3.35	.52	.00180	1
410	410	6115.	38.3	30.0	.0120	.020	.200	.100	.300	3.20	.51	.00180	1
411	411	18870.	186.4	14.6	.0160	.020	.200	.100	.300	3.70	.55	.00180	1
412	412	5312.	40.4	30.0	.0270	.020	.200	.100	.300	3.95	.56	.00180	1
413	413	3467.	65.6	30.0	.0390	.020	.200	.100	.300	4.18	.58	.00180	1
414	414	10888.	102.4	10.9	.0100	.020	.200	.100	.300	3.20	.51	.00180	1
415	415	6704.	52.4	30.0	.0300	.020	.200	.100	.300	3.88	.56	.00180	1
416	416	4742.	43.4	30.0	.0250	.020	.200	.100	.300	4.16	.58	.00180	1
417	417	8342.	109.7	4.1	.0180	.020	.200	.100	.300	3.45	.53	.00180	1
418	418	9901.	152.6	2.0	.0150	.020	.200	.100	.300	3.80	.55	.00180	1
419	419	4714.	65.8	2.0	.0140	.020	.200	.100	.300	4.02	.57	.00180	1
420	420	13834.	64.5	8.6	.0200	.020	.200	.100	.300	4.12	.57	.00180	1
421	421	8917.	96.3	2.0	.0150	.020	.200	.100	.300	3.47	.53	.00180	1
422	422	17323.	243.2	2.0	.0170	.020	.200	.100	.300	3.65	.54	.00180	1
423	423	3552.	19.1	2.0	.0150	.020	.200	.100	.300	3.10	.51	.00180	1
424	424	5429.	22.5	2.0	.0070	.020	.200	.100	.300	3.25	.52	.00180	1
425	425	4726.	18.5	2.0	.0140	.020	.200	.100	.300	3.20	.51	.00180	1
426	426	6528.	71.1	2.0	.0120	.020	.200	.100	.300	3.42	.53	.00180	1
430	430	5878.	90.4	15.9	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
431	431	6942.	143.8	46.8	.0390	.020	.200	.100	.300	3.23	.49	.00170	1
432	432	11331.	119.9	56.2	.0320	.020	.200	.100	.300	3.85	.55	.00180	1
433	433	5680.	110.6	29.0	.0220	.020	.200	.100	.300	3.32	.52	.00180	1
434	434	4165.	91.1	2.0	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
435	435	5970.	67.3	43.0	.0170	.020	.200	.100	.300	3.02	.50	.00180	1
436	436	13261.	165.1	60.8	.0130	.020	.200	.100	.300	3.56	.54	.00180	1
437	437	8101.	198.5	44.8	.0070	.020	.200	.100	.300	3.48	.53	.00180	1
438	438	4640.	57.0	36.3	.0180	.020	.200	.100	.300	3.09	.51	.00180	1
439	439	5270.	72.1	2.0	.0330	.020	.200	.100	.300	3.86	.56	.00180	1
440	440	3643.	21.2	30.0	.0200	.020	.200	.100	.300	3.75	.55	.00180	1
441	441	322.	92.5	30.0	.0070	.020	.200	.100	.300	3.31	.52	.00180	1
442	442	6034.	100.8	30.0	.0100	.020	.200	.100	.300	3.67	.54	.00180	1
443	443	1760.	51.4	30.0	.0110	.020	.200	.100	.300	3.62	.54	.00180	1
445	445	5546.	72.8	35.1	.0230	.020	.200	.100	.300	3.09	.51	.00180	1
446	446	8608.	147.1	31.6	.0180	.020	.200	.100	.300	4.39	.59	.00180	1
447	447	13936.	179.1	34.3	.0160	.020	.200	.100	.300	3.55	.54	.00180	1
449	449	12243.	168.2	30.0	.0110	.020	.200	.100	.300	3.97	.56	.00180	1
450	450	3829.	66.4	32.5	.0100	.020	.200	.100	.300	4.46	.60	.00180	1
451	451	9155.	116.0	40.4	.0100	.020	.200	.100	.300	4.22	.58	.00180	1
452	452	7419.	171.7	2.0	.0350	.020	.200	.100	.300	4.39	.59	.00180	1
453	453	3384.	81.5	27.3	.0030	.020	.200	.100	.300	3.01	.50	.00180	1
454	454	8704.	53.5	6.9	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
455	455	7458.	158.1	16.4	.0010	.020	.200	.100	.300	3.01	.50	.00180	1
456	456	7854.	75.0	13.4	.0190	.020	.200	.100	.300	3.04	.50	.00180	1
457	457	11648.	245.8	11.4	.0050	.020	.200	.100	.300	2.95	.49	.00180	1
458	458	8762.	126.7	13.7	.0190	.020	.200	.100	.300	3.03	.50	.00180	1
459	459	7696.	124.8	32.0	.0160	.020	.200	.100	.300	4.05	.57	.00180	1
460	460	3472.	116.5	2.0	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
461	461	4966.	133.9	7.2	.0010	.020	.200	.100	.300	2.69	.45	.00170	1
462	462	7578.	142.1	13.9	.0170	.020	.200	.100	.300	3.11	.51	.00180	1
463	463	10826.	62.2	2.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
464	464	12586.	117.2	11.4	.0160	.020	.200	.100	.300	3.00	.50	.00180	1
466	466	7770.	63.8	2.0	.0190	.020	.200	.100	.300	3.70	.55	.00180	1
467	467	9046.	109.2	32.5	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
468	468	10614.	173.0	30.0	.0100	.020	.200	.100	.300	3.18	.51	.00180	1
469	469	6186.	122.4	19.5	.0170	.020	.200	.100	.300	3.97	.56	.00180	1
470	470	4355.	48.6	2.0	.0110	.020	.200	.100	.300	4.50	.60	.00180	1
471	471	5066.	45.8	6.0	.0110	.020	.200	.100	.300	3.95	.56	.00180	1
472	472	4446.	52.3	30.0	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
473	473	7179.	112.7	30.9	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
474	474	11845.	107.8	38.5	.0150	.020	.200	.100	.300	3.64	.54	.00180	1
1474	1474	3654.	46.2	38.5	.0130	.020	.200	.100	.300	3.64	.54	.00180	1
475	475	25147.	207.5	58.7	.0140	.020	.200	.100	.300	3.16	.51	.00180	1
476	476	18333.	247.9	21.3	.0090	.020	.200	.100	.300	3.85	.56	.00180	1
477	477	7422.	67.0	28.1	.0180	.020	.200	.100	.300	4.40	.59	.00180	1
478	478	4165.	104.8	18.2	.0060	.020	.200	.100	.300	4.12	.57	.00180	1
479	479	10952.	152.7	19.4	.0180	.020	.200	.100	.300	4.31	.59	.00180	1
480	480	7981.	155.1	30.0	.0060	.020	.200	.100	.300	4.36	.59	.00180	1
481	481	7048.	72.9	25.7	.0100	.020	.200	.100	.300	4.08	.57	.00180	1
482	482	11912.	58.8	25.0	.0170	.020	.200	.100	.300	4.32	.59	.00180	1
483	483	14421.	97.2	18.4	.0180	.020	.200	.100	.300	4.47	.60	.00180	1
485	485	15318.	163.8	2.0	.0170	.020	.200	.100	.300	4.12	.57	.00180	1
486	486	7112.	85.2	2.0	.0150	.020	.200	.100	.300	4.44	.60	.00180	1
1486	1486	2688.	10.3	2.0	.0220	.020	.200	.100	.300	4.44	.60	.00180	1
487	487	5566.	27.1	2.0	.0100	.020	.200	.100	.300	4.32	.59	.00180	1
488	488	7010.	22.8	2.0	.0220	.020	.200	.100	.300	4.50	.60	.00180	1
489	489	5123.	72.8	2.0	.0090	.020	.200	.100	.300	4.18	.58	.00180	1
490	490	11866.	86.4	2.0	.0180	.020	.200	.100	.300	4.19	.58	.00180	1
491	491	10710.	56.1	30.0	.0110	.020	.200	.100	.300	4.00	.57	.00180	1
492	492	7421.	123.7	2.0	.0110	.020	.200	.100	.300	3.86	.56	.00180	1
493	493	6262.	42.2	28.4	.0100	.020	.200	.100	.300	3.75	.55	.00180	1
494	494	5589.	69.2	4.8	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
495	495	9882.	82.6	9.8	.0060	.020	.200	.100	.300	2.01	.33	.00140	1
496	496	6451.	186.5	4.1	.0020	.020	.200	.100	.300	2.18	.35	.00150	1

TOTAL NUMBER OF SUBCATCHMENTS, 92
TOTAL TRIBUTARY AREA (ACRES), 9692.50

Boulder Creek Tributaries, Outfall Systems Plan (con.)

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	SIDE SLOPES TO VERT R	OVERBANK/SURCHARGE MANNING N	OVERBANK/SURCHARGE DEPTH (FT)	JK
801	501	0	4	CHANNEL	5.0	2680.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2680.	.0210	20.0	20.0	.056	10.00	
802	502	0	4	CHANNEL	5.0	9151.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	9151.	.0270	20.0	20.0	.056	10.00	
402	505	0	4	CHANNEL	5.0	2730.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2730.	.0220	20.0	20.0	.056	10.00	
403	503	0	4	CHANNEL	5.0	2879.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2879.	.0090	20.0	20.0	.056	10.00	
404	522	0	4	CHANNEL	8.0	5317.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5317.	.0060	20.0	20.0	.056	10.00	
405	933	0	4	CHANNEL	5.0	4880.	.0210	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4880.	.0210	20.0	20.0	.056	10.00	
406	934	0	4	CHANNEL	5.0	4682.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4682.	.0220	20.0	20.0	.056	10.00	
407	509	0	4	CHANNEL	5.0	2930.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2930.	.0180	20.0	20.0	.056	10.00	
408	511	0	4	CHANNEL	5.0	4688.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4688.	.0110	20.0	20.0	.056	10.00	
409	512	0	4	CHANNEL	5.0	4140.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4140.	.0150	20.0	20.0	.056	10.00	
410	512	0	4	CHANNEL	5.0	1911.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1911.	.0120	20.0	20.0	.056	10.00	
411	935	0	4	CHANNEL	8.0	5897.	.0160	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	5897.	.0160	20.0	20.0	.056	10.00	
412	514	0	4	CHANNEL	5.0	1660.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1660.	.0270	20.0	20.0	.056	10.00	
413	936	0	4	CHANNEL	8.0	1204.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1204.	.0390	20.0	20.0	.056	10.00	
414	515	0	4	CHANNEL	5.0	4253.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4253.	.0100	20.0	20.0	.056	10.00	
415	937	0	4	CHANNEL	8.0	2328.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2328.	.0300	20.0	20.0	.056	10.00	
416	938	0	4	CHANNEL	5.0	2470.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2470.	.0250	20.0	20.0	.056	10.00	
417	516	0	4	CHANNEL	5.0	2607.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2607.	.0180	20.0	20.0	.056	10.00	
418	518	0	4	CHANNEL	5.0	3438.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3438.	.0150	20.0	20.0	.056	10.00	
419	519	0	4	CHANNEL	8.0	1841.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1841.	.0120	20.0	20.0	.056	10.00	
420	519	0	4	CHANNEL	5.0	4323.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4323.	.0190	20.0	20.0	.056	10.00	
421	939	0	4	CHANNEL	5.0	3096.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3096.	.0150	20.0	20.0	.056	10.00	
422	940	0	4	CHANNEL	5.0	6015.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	6015.	.0170	20.0	20.0	.056	10.00	
423	941	0	4	CHANNEL	5.0	1110.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1110.	.0150	20.0	20.0	.056	10.00	
424	942	0	4	CHANNEL	5.0	1885.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1885.	.0070	20.0	20.0	.056	10.00	
425	946	0	4	CHANNEL	5.0	1477.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1477.	.0140	20.0	20.0	.056	10.00	
426	506	0	4	CHANNEL	8.0	3400.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	3400.	.0120	20.0	20.0	.056	10.00	
430	531	0	4	CHANNEL	5.0	3062.	.0260	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3062.	.0260	20.0	20.0	.044	10.00	
431	1103	0	4	CHANNEL	5.0	3616.	.0390	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3616.	.0390	20.0	20.0	.044	10.00	
432	1103	0	4	CHANNEL	5.0	4426.	.0320	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	4426.	.0320	20.0	20.0	.044	10.00	
433	1010	0	4	CHANNEL	8.0	2536.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2536.	.0220	20.0	20.0	.044	10.00	
434	532	0	4	CHANNEL	5.0	1859.	.0290	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	1859.	.0290	20.0	20.0	.044	10.00	
435	533	0	4	CHANNEL	5.0	2332.	.0170	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2332.	.0170	20.0	20.0	.044	10.00	
436	533	0	4	CHANNEL	8.0	4144.	.0130	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	4144.	.0130	20.0	20.0	.044	10.00	
437	1113	0	4	CHANNEL	8.0	2813.	.0070	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	2813.	.0070	20.0	20.0	.044	10.00	
438	1113	0	4	CHANNEL	5.0	2417.	.0180	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2417.	.0180	20.0	20.0	.044	10.00	
439	535	0	4	CHANNEL	5.0	1830.	.0330	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1830.	.0330	20.0	20.0	.056	10.00	
440	536	0	4	CHANNEL	5.0	1265.	.0200	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1265.	.0200	20.0	20.0	.056	10.00	
441	536	0	4	CHANNEL	8.0	1260.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1260.	.0070	20.0	20.0	.056	10.00	

Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan (con.)

Boulder Creek Tributaries, Outfall Systems Plan (con.)

442	537	0	4	CHANNEL	8.0	2095.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2095.	.0100	20.0	20.0	.056	10.00	
443	540	0	4	CHANNEL	8.0	917.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	917.	.0110	20.0	20.0	.056	10.00	
445	538	0	4	CHANNEL	5.0	2166.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2166.	.0230	20.0	20.0	.056	10.00	
446	1115	0	4	CHANNEL	5.0	3843.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3843.	.0180	20.0	20.0	.056	10.00	
447	544	0	4	CHANNEL	5.0	5444.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5444.	.0160	20.0	20.0	.056	10.00	
449	545	0	4	CHANNEL	5.0	4251.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4251.	.0110	20.0	20.0	.056	10.00	
450	545	0	4	CHANNEL	10.0	1994.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1994.	.0100	20.0	20.0	.056	10.00	
451	546	0	4	CHANNEL	10.0	3576.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3576.	.0100	20.0	20.0	.056	10.00	
452	548	0	4	CHANNEL	5.0	3312.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3312.	.0350	20.0	20.0	.056	10.00	
453	549	0	4	CHANNEL	8.0	1511.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1511.	.0030	20.0	20.0	.056	10.00	
454	943	0	4	CHANNEL	8.0	3400.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3400.	.0060	20.0	20.0	.056	10.00	
455	547	0	4	CHANNEL	10.0	2913.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2913.	.0010	20.0	20.0	.056	10.00	
456	567	0	4	CHANNEL	5.0	2727.	.0190	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	2727.	.0190	20.0	20.0	.044	10.00	
457	944	0	4	CHANNEL	8.0	3640.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3640.	.0050	20.0	20.0	.056	10.00	
458	568	0	4	CHANNEL	5.0	3042.	.0190	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	3042.	.0190	20.0	20.0	.044	10.00	
459	569	0	4	CHANNEL	8.0	2672.	.0160	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	2672.	.0160	20.0	20.0	.044	10.00	
460	572	0	4	CHANNEL	5.0	1550.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1550.	.0060	20.0	20.0	.056	10.00	
461	945	0	4	CHANNEL	8.0	2217.	.0010	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2217.	.0010	20.0	20.0	.056	10.00	
462	550	0	4	CHANNEL	5.0	2631.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2631.	.0170	20.0	20.0	.056	10.00	
463	551	0	4	CHANNEL	8.0	3383.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3383.	.0170	20.0	20.0	.056	10.00	
464	551	0	4	CHANNEL	5.0	4370.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4370.	.0160	20.0	20.0	.056	10.00	
466	552	0	4	CHANNEL	5.0	2428.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2428.	.0190	20.0	20.0	.056	10.00	
467	553	0	4	CHANNEL	8.0	2827.	.0190	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2827.	.0190	20.0	20.0	.056	10.00	
468	555	0	4	CHANNEL	8.0	4146.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	4146.	.0100	20.0	20.0	.056	10.00	
469	555	0	4	CHANNEL	5.0	3222.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3222.	.0170	20.0	20.0	.056	10.00	
470	556	0	4	CHANNEL	8.0	1361.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1361.	.0110	20.0	20.0	.056	10.00	
471	560	0	4	CHANNEL	8.0	1759.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1759.	.0110	20.0	20.0	.056	10.00	
472	554	0	4	CHANNEL	5.0	1544.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1544.	.0180	20.0	20.0	.056	10.00	
473	576	0	4	CHANNEL	8.0	3739.	.0130	3.0	3.0	.020	3.00	0
				OVERFLOW	26.0	3739.	.0130	20.0	20.0	.044	10.00	
474	1576	0	4	CHANNEL	5.0	4113.	.0150	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	4113.	.0150	20.0	20.0	.044	10.00	
1474	557	0	4	CHANNEL	5.0	1269.	.0130	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	1269.	.0130	20.0	20.0	.044	10.00	
475	1477	0	4	CHANNEL	8.0	5457.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5457.	.0140	20.0	20.0	.056	10.00	
476	559	0	4	CHANNEL	5.0	7161.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	7161.	.0090	20.0	20.0	.056	10.00	
477	559	0	4	CHANNEL	5.0	3866.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3866.	.0180	20.0	20.0	.056	10.00	
478	562	0	4	CHANNEL	10.0	1446.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1446.	.0060	20.0	20.0	.056	10.00	
479	561	0	4	CHANNEL	5.0	4278.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4278.	.0180	20.0	20.0	.056	10.00	
480	571	0	4	CHANNEL	10.0	3563.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3563.	.0060	20.0	20.0	.056	10.00	
481	1117	0	4	CHANNEL	5.0	3671.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3671.	.0100	20.0	20.0	.056	10.00	
482	571	0	4	CHANNEL	5.0	5318.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5318.	.0170	20.0	20.0	.056	10.00	
483	571	0	4	CHANNEL	5.0	5007.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5007.	.0180	20.0	20.0	.056	10.00	
485	565	0	4	CHANNEL	5.0	4787.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4787.	.0170	20.0	20.0	.056	10.00	
486	1118	0	4	CHANNEL	5.0	2778.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2778.	.0150	20.0	20.0	.056	10.00	
1486	565	0	4	CHANNEL	5.0	1050.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1050.	.0220	20.0	20.0	.056	10.00	
1481	1477	0	4	CHANNEL	10.0	1680.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1680.	.0060	20.0	20.0	.056	10.00	
487	566	0	4	CHANNEL	5.0	1933.	.0100	3.0	3.0	.044	3.00	0

Boulder Creek Tributaries, Outfall Systems Plan (con.)

				OVERFLOW	23.0	1933.	.0100	20.0	20.0	.056	10.00	
488	955	0	4	CHANNEL	8.0	2738.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2738.	.0220	20.0	20.0	.056	10.00	
489	955	0	4	CHANNEL	8.0	1601.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1601.	.0090	20.0	20.0	.056	10.00	
490	954	0	4	CHANNEL	5.0	3708.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3708.	.0180	20.0	20.0	.056	10.00	
491	953	0	4	CHANNEL	5.0	4184.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4184.	.0110	20.0	20.0	.056	10.00	
492	953	0	4	CHANNEL	5.0	3865.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3865.	.0110	20.0	20.0	.056	10.00	
493	573	0	4	CHANNEL	5.0	1957.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1957.	.0100	20.0	20.0	.056	10.00	
494	952	0	4	CHANNEL	8.0	2183.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2183.	.0050	20.0	20.0	.056	10.00	
495	951	0	4	CHANNEL	10.0	3088.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3088.	.0060	20.0	20.0	.056	10.00	
496	950	0	4	CHANNEL	5.0	2520.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2520.	.0020	20.0	20.0	.056	10.00	
504	522	0	4	CHANNEL	8.0	5342.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	5342.	.0080	20.0	20.0	.056	10.00	
507	933	0	4	CHANNEL	10.0	3979.	.0150	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3979.	.0150	20.0	20.0	.056	10.00	
510	512	0	4	CHANNEL	8.0	2643.	.0120	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2643.	.0120	20.0	20.0	.056	10.00	
513	935	0	4	CHANNEL	8.0	706.	.0850	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	706.	.0850	20.0	20.0	.056	10.00	
517	518	0	4	CHANNEL	8.0	1021.	.0100	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1021.	.0100	20.0	20.0	.056	10.00	
520	939	0	4	CHANNEL	10.0	901.	.0020	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	901.	.0020	20.0	20.0	.056	10.00	
539	540	0	4	CHANNEL	8.0	762.	.0210	3.0	3.0	.022	3.00	0
				OVERFLOW	26.0	762.	.0210	20.0	20.0	.044	10.00	
541	544	0	4	CHANNEL	8.0	506.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	506.	.0080	20.0	20.0	.056	10.00	
563	571	0	4	CHANNEL	10.0	3189.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	3189.	.0110	20.0	20.0	.056	10.00	
570	1117	0	4	CHANNEL	8.0	3158.	.0030	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	3158.	.0030	20.0	20.0	.056	10.00	
564	1120	0	4	CHANNEL	8.0	2580.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2580.	.0090	20.0	20.0	.056	10.00	
574	557	0	5	PIPE	6.0	2651.	.0090	3.0	3.0	.016	6.00	0
				OVERFLOW	26.0	2651.	.0090	20.0	20.0	.056	10.00	
575	560	0	4	CHANNEL	8.0	1004.	.0130	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1004.	.0130	20.0	20.0	.056	10.00	
1482	1576	0	4	CHANNEL	10.0	2620.	.0050	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2620.	.0050	20.0	20.0	.056	10.00	
1480	557	0	4	CHANNEL	10.0	1680.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1680.	.0040	20.0	20.0	.056	10.00	
542	545	0	4	CHANNEL	10.0	2300.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2300.	.0090	20.0	20.0	.056	10.00	
501	402	0	3		.0	0.	.0001	.0	.0	.001	.01	0
502	403	0	3		.0	0.	.0001	.0	.0	.001	.01	0
503	504	0	3		.0	0.	.0001	.0	.0	.001	.01	0
505	404	0	3		.0	0.	.0001	.0	.0	.001	.01	0
506	507	0	3		.0	0.	.0001	.0	.0	.001	.01	0
509	510	0	3		.0	0.	.0001	.0	.0	.001	.01	0
511	411	0	3		.0	0.	.0001	.0	.0	.001	.01	0
512	513	0	3		.0	0.	.0001	.0	.0	.001	.01	0
514	413	0	3		.0	0.	.0001	.0	.0	.001	.01	0
515	415	0	3		.0	0.	.0001	.0	.0	.001	.01	0
516	517	0	3		.0	0.	.0001	.0	.0	.001	.01	0
518	419	0	3		.0	0.	.0001	.0	.0	.001	.01	0
519	520	0	3		.0	0.	.0001	.0	.0	.001	.01	0
522	426	0	3		.0	0.	.0001	.0	.0	.001	.01	0
531	436	0	3		.0	0.	.0001	.0	.0	.001	.01	0
532	435	0	3		.0	0.	.0001	.0	.0	.001	.01	0
533	1213	0	3		.0	0.	.0001	.0	.0	.001	.01	0
534	441	0	3		.0	0.	.0001	.0	.0	.001	.01	0
535	440	0	3		.0	0.	.0001	.0	.0	.001	.01	0
536	442	0	3		.0	0.	.0001	.0	.0	.001	.01	0
537	443	0	3		.0	0.	.0001	.0	.0	.001	.01	0
538	539	0	3		.0	0.	.0001	.0	.0	.001	.01	0
540	541	0	3		.0	0.	.0001	.0	.0	.001	.01	0
544	542	0	3		.0	0.	.0001	.0	.0	.001	.01	0
545	451	0	3		.0	0.	.0001	.0	.0	.001	.01	0
546	455	0	3		.0	0.	.0001	.0	.0	.001	.01	0
547	943	0	3		.0	0.	.0001	.0	.0	.001	.01	0
548	453	0	3		.0	0.	.0001	.0	.0	.001	.01	0
549	454	0	3		.0	0.	.0001	.0	.0	.001	.01	0
550	463	0	3		.0	0.	.0001	.0	.0	.001	.01	0
551	564	0	3		.0	0.	.0001	.0	.0	.001	.01	0
552	467	0	3		.0	0.	.0001	.0	.0	.001	.01	0
553	468	0	3		.0	0.	.0001	.0	.0	.001	.01	0
554	473	0	3		.0	0.	.0001	.0	.0	.001	.01	0
555	470	0	3		.0	0.	.0001	.0	.0	.001	.01	0
556	471	0	3		.0	0.	.0001	.0	.0	.001	.01	0
557	556	0	3		.0	0.	.0001	.0	.0	.001	.01	0
559	575	0	3		.0	0.	.0001	.0	.0	.001	.01	0
560	478	0	3		.0	0.	.0001	.0	.0	.001	.01	0
561	563	0	3		.0	0.	.0001	.0	.0	.001	.01	0
562	480	0	3		.0	0.	.0001	.0	.0	.001	.01	0
565	489	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1565	1486	0	3		.0	0.	.0001	.0	.0	.001	.01	0

Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan (con.)

Boulder Creek Tributaries, Outfall Systems Plan (con.)

566	488	0	3		.0	0.	.0001	.0	.0	.001	.01	0
567	457	0	3		.0	0.	.0001	.0	.0	.001	.01	0
568	459	0	3		.0	0.	.0001	.0	.0	.001	.01	0
569	570	0	3		.0	0.	.0001	.0	.0	.001	.01	0
571	495	0	3		.0	0.	.0001	.0	.0	.001	.01	0
572	461	0	3		.0	0.	.0001	.0	.0	.001	.01	0
573	494	0	3		.0	0.	.0001	.0	.0	.001	.01	0
576	1482	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1576	1481	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1577	1475	0	3		.0	0.	.0001	.0	.0	.001	.01	0
933	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
934	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
935	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
936	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
937	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
938	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
939	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
940	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
941	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
942	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
943	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
944	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
945	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
946	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
950	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
951	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
952	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
953	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
954	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
955	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1500	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1501	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1502	1503	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1477	1121	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1120	574	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1010	531	6	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	.0	5.1	1.4	15.7	2.5	63.1	6.2	78.2	6.3	500.0
1103	531	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	7.8	180.0	24.9	331.0	24.9	10000.0			
1113	534	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	8.7	360.0	37.8	1140.0	37.8	5000.0			
1213	437	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	7.3	504.0	23.6	1140.0	23.6	5000.0			
1115	544	3	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	.9	50.0	7.0	190.0					
1117	571	5	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	5.2	96.0	16.0	230.0	20.5	262.0	20.5	10000.0	
1118	1565	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	.1	35.0	.1	84.0	.1	10000.0			
1121	1480	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	10.5	310.0	33.7	694.0	33.7	100000.0			

TOTAL NUMBER OF GUTTERS/PIPES, 195

Coal Creek Tributaries, Outfall Systems Plan

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
201	201	1338.	27.1	95.0	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
202	202	2069.	15.4	42.6	.0450	.020	.200	.100	.300	3.16	.51	.00180	1
203	203	2701.	23.3	61.0	.0370	.020	.200	.100	.300	3.98	.57	.00180	1
204	204	4674.	19.3	41.3	.0220	.020	.200	.100	.300	4.14	.58	.00180	1
210	210	2733.	27.4	2.0	.0250	.020	.200	.100	.300	3.00	.50	.00180	1
211	211	5211.	38.1	2.0	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
212	212	3059.	46.8	3.3	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
213	213	9930.	42.7	10.6	.0340	.020	.200	.100	.300	3.00	.50	.00180	1
214	214	9398.	40.8	32.5	.0320	.020	.200	.100	.300	3.00	.50	.00180	1
215	215	4202.	37.0	46.2	.0110	.020	.200	.100	.300	3.70	.55	.00180	1
218	218	9530.	60.7	36.9	.0220	.020	.200	.100	.300	3.86	.56	.00180	1
219	219	15589.	112.9	33.7	.0230	.020	.200	.100	.300	3.23	.52	.00180	1
220	220	5123.	50.4	31.4	.0240	.020	.200	.100	.300	3.09	.51	.00180	1
221	221	5923.	61.3	26.2	.0280	.020	.200	.100	.300	3.82	.55	.00180	1
224	224	6099.	52.7	8.9	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
225	225	7136.	61.0	10.0	.0450	.020	.200	.100	.300	3.00	.50	.00180	1
226	226	1923.	25.4	10.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
227	227	9379.	71.7	10.0	.0230	.020	.200	.100	.300	3.00	.50	.00180	1
228	228	5386.	33.6	30.0	.0300	.020	.200	.100	.300	3.00	.50	.00180	1
229	229	5806.	31.3	30.0	.0500	.020	.200	.100	.300	3.00	.50	.00180	1
230	230	6318.	78.0	30.0	.0230	.020	.200	.100	.300	3.08	.51	.00180	1
231	231	6742.	20.1	30.0	.0350	.020	.200	.100	.300	3.22	.51	.00180	1
233	233	6520.	58.6	37.6	.0040	.020	.200	.100	.300	3.43	.53	.00180	1
235	235	14934.	61.3	33.9	.0240	.020	.200	.100	.300	3.03	.50	.00180	1
236	236	7387.	86.3	30.1	.0090	.020	.200	.100	.300	3.58	.54	.00180	1
243	243	7046.	44.3	11.3	.0230	.020	.200	.100	.300	3.16	.51	.00180	1
245	245	9958.	87.3	4.9	.0260	.020	.200	.100	.300	3.27	.52	.00180	1
246	246	6509.	59.8	10.0	.0330	.020	.200	.100	.300	3.00	.50	.00180	1
247	247	10496.	52.0	2.0	.0390	.020	.200	.100	.300	3.00	.50	.00180	1
248	248	7966.	93.4	10.2	.0220	.020	.200	.100	.300	3.10	.51	.00180	1
250	250	6026.	29.9	10.0	.0350	.020	.200	.100	.300	3.73	.55	.00180	1
251	251	6394.	59.1	10.0	.0290	.020	.200	.100	.300	3.25	.52	.00180	1
252	252	5086.	79.0	10.0	.0330	.020	.200	.100	.300	3.66	.54	.00180	1
255	255	2526.	31.4	5.2	.0660	.020	.200	.100	.300	3.75	.55	.00180	1
260	260	8394.	91.8	27.4	.0420	.020	.200	.100	.300	3.59	.54	.00180	1
261	261	9749.	130.8	9.9	.0410	.020	.200	.100	.300	3.24	.52	.00180	1
1261	1261	1443.	15.3	10.0	.0230	.020	.200	.100	.300	3.24	.52	.00180	1
262	262	9179.	44.9	23.5	.0330	.020	.200	.100	.300	3.49	.53	.00180	1
263	263	10234.	77.1	4.7	.0120	.020	.200	.100	.300	3.64	.54	.00180	1
269	269	10323.	67.6	2.4	.0380	.020	.200	.100	.300	3.74	.55	.00180	1
270	270	3242.	20.2	2.0	.0390	.020	.200	.100	.300	4.38	.59	.00180	1
272	272	8781.	41.4	2.0	.0270	.020	.200	.100	.300	4.50	.60	.00180	1
273	273	7334.	52.1	2.0	.0320	.020	.200	.100	.300	4.50	.60	.00180	1
274	274	5578.	102.7	66.9	.0260	.020	.200	.100	.300	4.50	.60	.00180	1
275	275	5557.	54.1	49.8	.0230	.020	.200	.100	.300	4.50	.60	.00180	1
276	276	5120.	75.5	2.1	.0250	.020	.200	.100	.300	4.41	.59	.00180	1
277	277	4883.	52.1	2.0	.0590	.020	.200	.100	.300	3.67	.54	.00180	1
280	280	9450.	80.7	7.0	.0270	.020	.200	.100	.300	3.34	.52	.00180	1
281	281	8458.	75.7	7.0	.0360	.020	.200	.100	.300	3.59	.54	.00180	1
282	282	4390.	92.3	2.0	.0560	.020	.200	.100	.300	3.21	.51	.00180	1
283	283	4325.	96.6	2.0	.0070	.020	.200	.100	.300	3.57	.54	.00180	1
284	284	1778.	37.4	20.2	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
285	285	9238.	64.3	17.3	.0300	.020	.200	.100	.300	3.96	.56	.00180	1
286	286	5834.	32.6	6.3	.0550	.020	.200	.100	.300	4.50	.60	.00180	1
287	287	4730.	59.0	6.8	.0130	.020	.200	.100	.300	3.13	.51	.00180	1
288	288	4514.	66.9	6.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL NUMBER OF SUBCATCHMENTS, 56
TOTAL TRIBUTARY AREA (ACRES), 3150.50

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ L	SIDE SLOPES TO VERT R	OVERBANK/SURCHARGE MANNING N	OVERBANK/SURCHARGE DEPTH (FT)	JK
201	901	0	4	CHANNEL	5.0	557.	.0200	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	557.	.0200	20.0	20.0	.056	10.00	
202	902	0	4	CHANNEL	8.0	1293.	.0450	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1293.	.0450	20.0	20.0	.044	10.00	
203	903	0	4	CHANNEL	8.0	1688.	.0370	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1688.	.0370	20.0	20.0	.044	10.00	
204	904	0	4	CHANNEL	8.0	1623.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1623.	.0220	20.0	20.0	.044	10.00	
210	310	0	4	CHANNEL	8.0	1423.	.0250	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1423.	.0250	20.0	20.0	.044	10.00	
211	311	0	4	CHANNEL	8.0	2714.	.0180	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2714.	.0180	20.0	20.0	.044	10.00	
212	312	0	4	CHANNEL	8.0	1366.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1366.	.0140	20.0	20.0	.044	10.00	
213	312	0	4	CHANNEL	8.0	3103.	.0340	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3103.	.0340	20.0	20.0	.044	10.00	
214	312	0	4	CHANNEL	5.0	2937.	.0320	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2937.	.0320	20.0	20.0	.056	10.00	
215	905	0	4	CHANNEL	8.0	1876.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1876.	.0110	20.0	20.0	.056	10.00	
218	910	0	4	CHANNEL	8.0	2978.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2978.	.0220	20.0	20.0	.044	10.00	
219	911	0	4	CHANNEL	8.0	5413.	.0230	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5413.	.0230	20.0	20.0	.044	10.00	
220	912	0	4	CHANNEL	5.0	3202.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3202.	.0240	20.0	20.0	.056	10.00	
221	913	0	4	CHANNEL	5.0	1851.	.0280	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1851.	.0280	20.0	20.0	.056	10.00	
224	324	0	4	CHANNEL	8.0	2723.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2723.	.0330	20.0	20.0	.044	10.00	
225	326	0	4	CHANNEL	5.0	2478.	.0450	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2478.	.0450	20.0	20.0	.056	10.00	
226	327	0	4	CHANNEL	8.0	1202.	.0050	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1202.	.0050	20.0	20.0	.056	10.00	
227	329	0	4	CHANNEL	5.0	2931.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2931.	.0230	20.0	20.0	.056	10.00	
228	330	0	4	CHANNEL	8.0	1683.	.0300	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1683.	.0300	20.0	20.0	.056	10.00	
229	334	0	4	CHANNEL	5.0	2016.	.0500	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2016.	.0500	20.0	20.0	.056	10.00	
230	335	0	4	CHANNEL	5.0	2194.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2194.	.0230	20.0	20.0	.056	10.00	
231	332	0	4	CHANNEL	5.0	2107.	.0350	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	2107.	.0350	20.0	20.0	.056	10.00	
233	1101	0	4	CHANNEL	10.0	2264.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2264.	.0040	20.0	20.0	.056	10.00	
235	340	0	4	CHANNEL	5.0	5191.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	5191.	.0240	20.0	20.0	.056	10.00	
236	915	0	4	CHANNEL	10.0	3298.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3298.	.0090	20.0	20.0	.056	10.00	

Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan (con.)

Coal Creek Tributaries, Outfall Systems Plan (con.)

243	916	0	4	CHANNEL	5.0	2202.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2202.	.0230	20.0	20.0	.056	10.00	
245	350	0	4	CHANNEL	5.0	3458.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3458.	.0260	20.0	20.0	.056	10.00	
246	352	0	4	CHANNEL	5.0	3390.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	3390.	.0330	20.0	20.0	.056	10.00	
247	352	0	4	CHANNEL	5.0	4100.	.0390	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4100.	.0390	20.0	20.0	.056	10.00	
248	917	0	4	CHANNEL	10.0	2766.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	2766.	.0220	20.0	20.0	.056	10.00	
250	360	0	4	CHANNEL	5.0	1883.	.0350	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1883.	.0350	20.0	20.0	.056	10.00	
251	361	0	4	CHANNEL	8.0	1998.	.0290	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1998.	.0290	20.0	20.0	.056	10.00	
252	918	0	4	CHANNEL	10.0	1987.	.0330	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1987.	.0330	20.0	20.0	.056	10.00	
255	919	0	4	CHANNEL	5.0	1579.	.0660	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1579.	.0660	20.0	20.0	.056	10.00	
260	1102	0	4	CHANNEL	5.0	3747.	.0420	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3747.	.0420	20.0	20.0	.056	10.00	
261	1362	0	4	CHANNEL	5.0	3808.	.0410	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	3808.	.0410	20.0	20.0	.056	10.00	
1261	370	0	4	CHANNEL	5.0	644.	.0230	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	644.	.0230	20.0	20.0	.056	10.00	
262	372	0	4	CHANNEL	8.0	3187.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3187.	.0330	20.0	20.0	.044	10.00	
263	921	0	4	CHANNEL	10.0	3198.	.0120	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	3198.	.0120	20.0	20.0	.056	10.00	
269	922	0	4	CHANNEL	8.0	3226.	.0380	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3226.	.0380	20.0	20.0	.044	10.00	
270	923	0	4	CHANNEL	8.0	1688.	.0390	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1688.	.0390	20.0	20.0	.044	10.00	
272	378	0	4	CHANNEL	8.0	2744.	.0270	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2744.	.0270	20.0	20.0	.044	10.00	
273	382	0	4	CHANNEL	8.0	2292.	.0320	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2292.	.0320	20.0	20.0	.044	10.00	
274	383	0	4	CHANNEL	8.0	2179.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	2179.	.0260	20.0	20.0	.056	10.00	
275	383	0	4	CHANNEL	8.0	2481.	.0230	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2481.	.0230	20.0	20.0	.044	10.00	
276	925	0	4	CHANNEL	10.0	2000.	.0250	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2000.	.0250	20.0	20.0	.056	10.00	
277	926	0	4	CHANNEL	10.0	1526.	.0590	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1526.	.0590	20.0	20.0	.056	10.00	
280	927	0	4	CHANNEL	5.0	3281.	.0270	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3281.	.0270	20.0	20.0	.056	10.00	
281	928	0	4	CHANNEL	5.0	2643.	.0360	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	2643.	.0360	20.0	20.0	.056	10.00	
282	390	0	4	CHANNEL	8.0	1372.	.0560	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1372.	.0560	20.0	20.0	.044	10.00	
283	391	0	4	CHANNEL	8.0	1931.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1931.	.0070	20.0	20.0	.056	10.00	
284	929	0	4	CHANNEL	8.0	926.	.0110	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	926.	.0110	20.0	20.0	.044	10.00	
285	392	0	4	CHANNEL	8.0	2887.	.0300	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2887.	.0300	20.0	20.0	.044	10.00	
286	393	0	4	CHANNEL	5.0	1823.	.0550	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1823.	.0550	20.0	20.0	.056	10.00	
287	930	0	4	CHANNEL	8.0	1478.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1478.	.0130	20.0	20.0	.056	10.00	
288	931	0	4	CHANNEL	10.0	2015.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2015.	.0110	20.0	20.0	.056	10.00	
325	326	0	4	CHANNEL	5.0	622.	.0240	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	622.	.0240	20.0	20.0	.056	10.00	
328	330	0	4	CHANNEL	8.0	1286.	.0260	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1286.	.0260	20.0	20.0	.056	10.00	
331	332	0	4	CHANNEL	8.0	1491.	.0280	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1491.	.0280	20.0	20.0	.056	10.00	
333	335	0	4	CHANNEL	10.0	545.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	545.	.0150	20.0	20.0	.056	10.00	
351	352	0	4	CHANNEL	8.0	1803.	.0220	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1803.	.0220	20.0	20.0	.056	10.00	
379	383	0	4	CHANNEL	8.0	890.	.0380	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	890.	.0380	20.0	20.0	.056	10.00	
394	930	0	4	CHANNEL	8.0	1608.	.0060	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1608.	.0060	20.0	20.0	.056	10.00	
1361	1362	0	4	CHANNEL	8.0	482.	.0040	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	482.	.0040	20.0	20.0	.056	10.00	
301	201	0	3		.0	0.	.0001	.0	.0	.001	.01	0
310	211	0	3		.0	0.	.0001	.0	.0	.001	.01	0
311	212	0	3		.0	0.	.0001	.0	.0	.001	.01	0
312	215	0	3		.0	0.	.0001	.0	.0	.001	.01	0
324	325	0	3		.0	0.	.0001	.0	.0	.001	.01	0
326	226	0	3		.0	0.	.0001	.0	.0	.001	.01	0
327	328	0	3		.0	0.	.0001	.0	.0	.001	.01	0
329	228	0	3		.0	0.	.0001	.0	.0	.001	.01	0
330	331	0	3		.0	0.	.0001	.0	.0	.001	.01	0
332	333	0	3		.0	0.	.0001	.0	.0	.001	.01	0
334	230	0	3		.0	0.	.0001	.0	.0	.001	.01	0

Coal Creek Tributaries, Outfall Systems Plan (con.)

335	233	0	3		.0	0.	.0001	.0	.0	.001	.01	0
336	340	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1336	1233	0	3		.0	0.	.0001	.0	.0	.001	.01	0
340	236	0	3		.0	0.	.0001	.0	.0	.001	.01	0
350	351	0	3		.0	0.	.0001	.0	.0	.001	.01	0
352	248	0	3		.0	0.	.0001	.0	.0	.001	.01	0
360	251	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1360	1361	0	3		.0	0.	.0001	.0	.0	.001	.01	0
361	252	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1362	1261	0	3		.0	0.	.0001	.0	.0	.001	.01	0
370	372	0	3		.0	0.	.0001	.0	.0	.001	.01	0
372	263	0	3		.0	0.	.0001	.0	.0	.001	.01	0
378	379	0	3		.0	0.	.0001	.0	.0	.001	.01	0
382	274	0	3		.0	0.	.0001	.0	.0	.001	.01	0
383	276	0	3		.0	0.	.0001	.0	.0	.001	.01	0
390	283	0	3		.0	0.	.0001	.0	.0	.001	.01	0
391	284	0	3		.0	0.	.0001	.0	.0	.001	.01	0
392	287	0	3		.0	0.	.0001	.0	.0	.001	.01	0
393	394	0	3		.0	0.	.0001	.0	.0	.001	.01	0
901	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
902	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
903	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
904	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
905	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
910	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
911	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
912	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
913	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
915	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
916	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
917	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
918	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
919	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
921	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
922	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
923	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
925	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
926	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
927	1501	0	3		.0	0.	.0001	.0	.0	.001	.01	0
928	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
929	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
930	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
931	1502	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1500	1503	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1501	1503	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1502	1503	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1503	1504	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1000	310	9	3		.0	0.	.0001	.0	.0	.001	.01	-1
				TIME IN HRS VS INFLOW IN CFS								
					.0	.0	.3	.0	.7	145.0	1.3	377.0	2.0	505.0	2.3	505.0
					4.2	274.0	6.2	171.0	10.0	110.0						
1001	301			3		3			.0	0.	.0001	.0	.0	.001	.01	-1
				TIME IN HRS VS INFLOW IN CFS								
					.0	.0	.7	400.0	10.0	400.0						
1002	332			5		3			.0	0.	.0001	.0	.0	.001	.01	-1
				TIME IN HRS VS INFLOW IN CFS								
					.0	.0	1.2	140.0	1.3	1110.0	1.7	140.0	6.7	10.0		
1003	340			5		3			.0	0.	.0001	.0	.0	.001	.01	-1
				TIME IN HRS VS INFLOW IN CFS								
					.0	.0	.9	200.0	1.1	275.0	1.6	200.0	6.7	5.0		
1101	336			4		2	PIPE		.0	0.	.0001	.0	.0	.001	.01	0
				RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW												
					.0	.0	5.6	460.0	24.8	1696.0	24.8	5000.0				
1102	1360			4		2	PIPE		.0	0.	.0001	.0	.0	.001	.01	0
				RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW												
					.0	.0	1.0	41.0	8.6	133.0	8.6	10000.0				

TOTAL NUMBER OF GUTTERS/PIPES, 128

Godding Hollow Tributaries, Outfall Systems Plan

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
650	650	9374.	28.2	2.0	.0180	.020	.200	.100	.300	3.08	.46	.00160	1
651	651	1770.	29.1	2.0	.0280	.020	.200	.100	.300	3.62	.54	.00180	1
652	652	9698.	114.8	7.4	.0190	.020	.200	.100	.300	3.10	.51	.00180	1
653	653	5144.	83.0	2.0	.0050	.020	.200	.100	.300	3.00	.50	.00180	1
654	654	10448.	123.9	34.7	.0290	.020	.200	.100	.300	3.08	.51	.00180	1
655	655	4595.	40.3	2.0	.0220	.020	.200	.100	.300	3.37	.52	.00180	1
656	656	7693.	36.2	2.0	.0170	.020	.200	.100	.300	3.00	.50	.00180	1
660	660	4762.	34.2	2.0	.0330	.020	.200	.100	.300	3.26	.49	.00170	1
661	661	11786.	110.0	62.3	.0140	.020	.200	.100	.300	3.08	.51	.00180	1
1661	1661	11168.	23.7	30.0	.0190	.020	.200	.100	.300	3.08	.51	.00180	1
662	662	3949.	50.6	52.6	.0160	.020	.200	.100	.300	3.00	.50	.00180	1
1662	1662	7150.	14.9	34.6	.0180	.020	.200	.100	.300	3.00	.50	.00180	1
663	663	2661.	67.2	49.0	.0160	.020	.200	.100	.300	3.00	.50	.00180	1
1663	1663	4790.	38.8	33.0	.0090	.020	.200	.100	.300	3.00	.50	.00180	1
664	664	13549.	110.2	32.7	.0180	.020	.200	.100	.300	3.21	.51	.00180	1
665	665	5315.	91.1	30.0	.0130	.020	.200	.100	.300	3.20	.51	.00180	1
666	666	4902.	89.2	30.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan (con.)

Godding Hollow Tributaries, Outfall Systems Plan (con.)

667	667	4349.	99.8	30.0	.0080	.020	.200	.100	.300	3.00	.50	.00180	1
668	668	4787.	108.5	36.0	.0070	.020	.200	.100	.300	3.00	.50	.00180	1
1668	1668	5512.	91.3	88.5	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
669	669	6637.	43.0	2.0	.0070	.020	.200	.100	.300	4.34	.59	.00180	1
670	670	12234.	48.4	15.0	.0160	.020	.200	.100	.300	3.36	.52	.00180	1
671	671	1728.	18.8	35.5	.0060	.020	.200	.100	.300	3.00	.50	.00180	1
672	672	14486.	165.5	38.3	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
673	673	7163.	72.5	64.3	.0200	.020	.200	.100	.300	3.00	.50	.00180	1
674	674	8021.	165.1	2.0	.0090	.020	.200	.100	.300	3.08	.51	.00180	1
675	675	7874.	89.4	40.1	.0060	.020	.200	.100	.300	3.01	.50	.00180	1
677	677	12672.	224.5	3.3	.0240	.020	.200	.100	.300	3.05	.50	.00180	1
678	678	9245.	196.1	2.2	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
679	679	9784.	108.1	3.1	.0260	.020	.200	.100	.300	3.00	.50	.00180	1
680	680	7702.	75.4	72.5	.0260	.020	.200	.100	.300	3.00	.50	.00180	1
1680	1680	8138.	110.1	2.0	.0120	.020	.200	.100	.300	3.00	.50	.00180	1
681	681	10080.	116.4	2.0	.0140	.020	.200	.100	.300	3.07	.50	.00180	1
683	683	4267.	35.4	2.0	.0110	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL NUMBER OF SUBCATCHMENTS, 34
TOTAL TRIBUTARY AREA (ACRES), 2853.70

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ TO VERT L	R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
650	750	0	4	CHANNEL	8.0	1361.	.0480	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1361.	.0480	20.0	20.0	.044	10.00	
651	751	0	4	CHANNEL	8.0	790.	.0280	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	790.	.0280	20.0	20.0	.044	10.00	
652	752	0	4	CHANNEL	8.0	3788.	.0190	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3788.	.0190	20.0	20.0	.044	10.00	
653	970	0	4	CHANNEL	8.0	1786.	.0050	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1786.	.0050	20.0	20.0	.044	10.00	
654	754	0	4	CHANNEL	8.0	3628.	.0290	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3628.	.0290	20.0	20.0	.044	10.00	
655	755	0	4	CHANNEL	8.0	1795.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1795.	.0220	20.0	20.0	.044	10.00	
656	970	0	4	CHANNEL	8.0	3005.	.0170	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3005.	.0170	20.0	20.0	.044	10.00	
660	760	0	4	CHANNEL	8.0	2126.	.0330	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2126.	.0330	20.0	20.0	.044	10.00	
661	1119	0	4	CHANNEL	8.0	3878.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3878.	.0140	20.0	20.0	.044	10.00	
1661	761	0	4	CHANNEL	8.0	1371.	.0190	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1371.	.0190	20.0	20.0	.044	10.00	
662	1119	0	4	CHANNEL	8.0	2483.	.0160	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2483.	.0160	20.0	20.0	.044	10.00	
1662	761	0	4	CHANNEL	8.0	924.	.0180	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	924.	.0180	20.0	20.0	.044	10.00	
663	1107	0	4	CHANNEL	8.0	3229.	.0160	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3229.	.0160	20.0	20.0	.044	10.00	
1663	763	0	4	CHANNEL	8.0	1497.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1497.	.0090	20.0	20.0	.044	10.00	
664	763	0	4	CHANNEL	5.0	4234.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4234.	.0180	20.0	20.0	.056	10.00	
665	764	0	4	CHANNEL	8.0	1661.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1661.	.0130	20.0	20.0	.056	10.00	
666	765	0	4	CHANNEL	10.0	1915.	.0110	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	1915.	.0110	20.0	20.0	.056	10.00	
667	766	0	4	CHANNEL	10.0	2265.	.0080	3.0	3.0	.044	3.00	0
				OVERFLOW	28.0	2265.	.0080	20.0	20.0	.056	10.00	
668	1210	0	4	CHANNEL	8.0	2493.	.0070	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2493.	.0070	20.0	20.0	.044	10.00	
1668	767	0	4	CHANNEL	8.0	2874.	.0110	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2874.	.0110	20.0	20.0	.044	10.00	
669	767	0	4	CHANNEL	5.0	3457.	.0070	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3457.	.0070	20.0	20.0	.056	10.00	
670	770	0	4	CHANNEL	5.0	3823.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3823.	.0160	20.0	20.0	.056	10.00	
671	771	0	4	CHANNEL	8.0	675.	.0060	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	675.	.0060	20.0	20.0	.044	10.00	
672	1108	0	4	CHANNEL	8.0	5030.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	5030.	.0140	20.0	20.0	.044	10.00	
673	1108	0	4	CHANNEL	8.0	2798.	.0200	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2798.	.0200	20.0	20.0	.044	10.00	
674	773	0	4	CHANNEL	8.0	2785.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2785.	.0090	20.0	20.0	.044	10.00	
675	975	0	4	CHANNEL	8.0	2734.	.0060	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2734.	.0060	20.0	20.0	.044	10.00	
677	777	0	4	CHANNEL	8.0	3960.	.0240	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3960.	.0240	20.0	20.0	.044	10.00	
678	971	0	4	CHANNEL	8.0	3210.	.0150	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3210.	.0150	20.0	20.0	.044	10.00	
679	971	0	4	CHANNEL	8.0	3397.	.0260	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3397.	.0260	20.0	20.0	.044	10.00	
680	1109	0	4	CHANNEL	8.0	2407.	.0260	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2407.	.0260	20.0	20.0	.044	10.00	
1680	972	0	4	CHANNEL	8.0	2543.	.0120	3.0	3.0	.020	.50	0

Godding Hollow Tributaries, Outfall Systems Plan (con.)

				OVERFLOW	11.0	2543.	.0120	20.0	20.0	.044	10.00	
681	973	0	4	CHANNEL	8.0	3500.	.0140	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3500.	.0140	20.0	20.0	.044	10.00	
683	974	0	4	CHANNEL	8.0	1905.	.0110	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1905.	.0110	20.0	20.0	.044	10.00	
756	970	0	4	CHANNEL	8.0	1462.	.0250	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1462.	.0250	20.0	20.0	.044	10.00	
762	763	0	4	CHANNEL	5.0	1581.	.0090	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1581.	.0090	20.0	20.0	.056	10.00	
768	975	0	4	CHANNEL	8.0	1279.	.0020	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1279.	.0020	20.0	20.0	.044	10.00	
769	973	0	4	CHANNEL	8.0	2689.	.0090	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2689.	.0090	20.0	20.0	.044	10.00	
1761	1763	0	4	CHANNEL	5.0	1920.	.0130	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1920.	.0130	20.0	20.0	.056	10.00	
1764	763	0	4	CHANNEL	8.0	1800.	.0070	3.0	3.0	.020	3.00	0
				OVERFLOW	23.0	1800.	.0070	20.0	20.0	.044	10.00	
750	651	0	3		.0	0.	.0001	.0	.0	.001	.01	0
751	652	0	3		.0	0.	.0001	.0	.0	.001	.01	0
752	653	0	3		.0	0.	.0001	.0	.0	.001	.01	0
754	656	0	3		.0	0.	.0001	.0	.0	.001	.01	0
755	756	0	3		.0	0.	.0001	.0	.0	.001	.01	0
760	661	0	3		.0	0.	.0001	.0	.0	.001	.01	0
761	762	0	3		.0	0.	.0001	.0	.0	.001	.01	0
763	665	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1763	1764	0	3		.0	0.	.0001	.0	.0	.001	.01	0
764	666	0	3		.0	0.	.0001	.0	.0	.001	.01	0
765	667	0	3		.0	0.	.0001	.0	.0	.001	.01	0
766	668	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1766	1668	0	3		.0	0.	.0001	.0	.0	.001	.01	0
767	768	0	3		.0	0.	.0001	.0	.0	.001	.01	0
770	671	0	3		.0	0.	.0001	.0	.0	.001	.01	0
771	672	0	3		.0	0.	.0001	.0	.0	.001	.01	0
772	674	0	3		.0	0.	.0001	.0	.0	.001	.01	0
773	675	0	3		.0	0.	.0001	.0	.0	.001	.01	0
777	678	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1780	1680	0	3		.0	0.	.0001	.0	.0	.001	.01	0
970	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
971	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
972	769	0	3		.0	0.	.0001	.0	.0	.001	.01	0
973	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
974	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
975	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1211	1110	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1107	1763	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	.4	42.0	2.9	133.0	2.9	10000.0			
1108	772	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	5.0	135.0	21.2	386.0	20.3	10000.0			
1109	1780	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	1.3	35.0	9.3	100.0	9.4	10000.0			
1110	1766	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	3.6	90.0	14.5	255.0	14.5	10000.0			
1119	1761	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0	.0	3.2	62.0	20.2	300.0	20.2	10000.0			
1210	1766	6	3		.0	0.	.0001	.0	.0	.001	.01	1211
		DIVERSION TO GUTTER NUMBER1211 - TOTAL Q VS DIVERTED Q IN CFS										
		.0	.0	400.0	.0	510.0	36.0	700.0	142.0	1100.0	400.0	1500.0	800.0

TOTAL NUMBER OF GUTTERS/PIPES, 73

Little Dry Creek Tributaries, Outfall Systems Plan

SUBAREA NUMBER	GUTTER OR MANHOLE	WIDTH (FT)	AREA (AC)	PERCENT IMPERV.	SLOPE (FT/FT)	RESISTANCE FACTOR IMPERV.	RESISTANCE FACTOR PERV.	SURFACE STORAGE(IN) IMPERV.	SURFACE STORAGE(IN) PERV.	INFILTRATION RATE(IN/HR) MAXIMUM	INFILTRATION RATE(IN/HR) MINIMUM	INFILTRATION RATE(IN/HR) DECAY RATE	GAGE NO
-1	0	2.	.0	1.0	1.0000	1.000	1.000	1.000	1.000	1.00	1.00	1.00000	
803	803	12083.	96.7	2.0	.0150	.020	.200	.100	.300	3.00	.50	.00180	1
611	611	9374.	45.5	2.0	.0180	.020	.200	.100	.300	3.46	.53	.00180	1
615	615	4602.	55.5	7.7	.0130	.020	.200	.100	.300	3.00	.50	.00180	1
620	620	4426.	18.9	10.0	.0140	.020	.200	.100	.300	3.41	.53	.00180	1
621	621	10590.	153.5	10.2	.0230	.020	.200	.100	.300	3.36	.52	.00180	1
622	622	7366.	93.4	34.5	.0130	.020	.200	.100	.300	3.85	.55	.00180	1
1622	1622	5022.	65.3	35.7	.0110	.020	.200	.100	.300	3.85	.55	.00180	1
623	623	2688.	157.3	41.0	.0080	.020	.200	.100	.300	3.60	.52	.00170	1
624	624	11430.	154.0	2.3	.0210	.020	.200	.100	.300	3.00	.50	.00180	1
625	625	2381.	29.6	5.0	.0140	.020	.200	.100	.300	3.00	.50	.00180	1
628	628	2072.	31.3	70.0	.0140	.020	.200	.100	.300	3.48	.53	.00180	1
630	630	7098.	24.6	86.1	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
631	631	4216.	155.4	70.0	.0090	.020	.200	.100	.300	3.34	.52	.00180	1
632	632	4117.	97.6	89.9	.0090	.020	.200	.100	.300	3.12	.51	.00180	1
635	635	4694.	23.3	21.8	.0290	.020	.200	.100	.300	3.00	.50	.00180	1
636	636	4568.	62.7	5.0	.0190	.020	.200	.100	.300	3.00	.50	.00180	1
637	637	10432.	67.8	2.0	.0220	.020	.200	.100	.300	3.00	.50	.00180	1
638	638	8205.	73.5	5.6	.0110	.020	.200	.100	.300	3.00	.50	.00180	1
639	639	3448.	13.0	61.1	.0180	.020	.200	.100	.300	3.11	.51	.00180	1
640	640	4258.	107.4	2.5	.0040	.020	.200	.100	.300	3.00	.50	.00180	1

TOTAL NUMBER OF SUBCATCHMENTS, 20
TOTAL TRIBUTARY AREA (ACRES), 1526.30

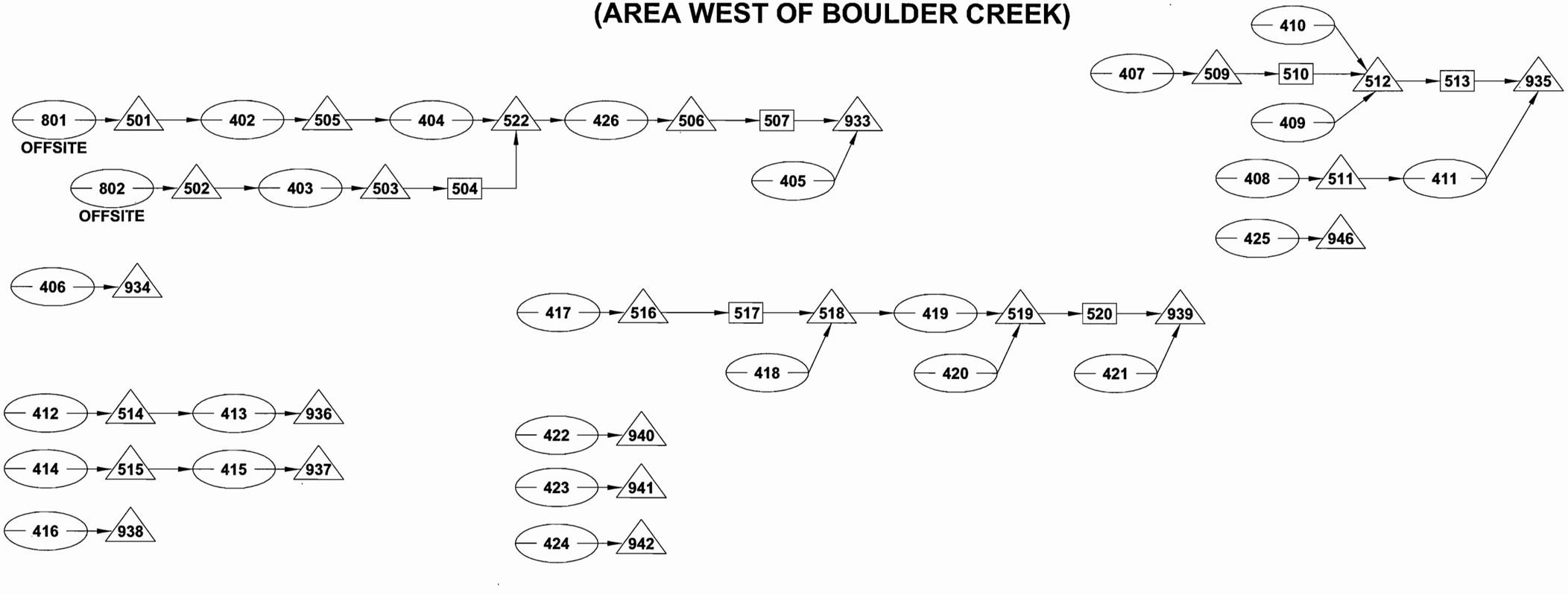
Table B1 – UDSWM Basin and Conveyance Parameters, Outfall Systems Plan (con.)

Little Dry Creek Tributaries, Outfall Systems Plan

GUTTER NUMBER	GUTTER CONNECTION	NDP	NP		WIDTH OR DIAM (FT)	LENGTH (FT)	INVERT SLOPE (FT/FT)	SIDE SLOPES HORIZ TO VERT L	R	OVERBANK/SURCHARGE MANNING N	DEPTH (FT)	JK
803	962	0	4	CHANNEL	5.0	3776.	.0150	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3776.	.0150	20.0	20.0	.056	10.00	
611	960	0	4	CHANNEL	8.0	1258.	.0290	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1258.	.0290	20.0	20.0	.044	10.00	
615	961	0	4	CHANNEL	8.0	1598.	.0130	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	1598.	.0130	20.0	20.0	.044	10.00	
620	705	0	4	CHANNEL	5.0	1976.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1976.	.0140	20.0	20.0	.056	10.00	
621	707	0	4	CHANNEL	5.0	4137.	.0230	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	4137.	.0230	20.0	20.0	.056	10.00	
622	1104	0	4	CHANNEL	5.0	2558.	.0130	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	2558.	.0130	20.0	20.0	.056	10.00	
1622	709	0	4	CHANNEL	5.0	1744.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	1744.	.0110	20.0	20.0	.056	10.00	
623	716	0	4	CHANNEL	8.0	1050.	.0080	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1050.	.0080	20.0	20.0	.056	10.00	
624	713	0	4	CHANNEL	8.0	3969.	.0210	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	3969.	.0210	20.0	20.0	.044	10.00	
625	714	0	4	CHANNEL	8.0	1063.	.0140	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1063.	.0140	20.0	20.0	.056	10.00	
628	718	0	4	CHANNEL	8.0	925.	.0140	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	925.	.0140	20.0	20.0	.056	10.00	
630	718	0	4	CHANNEL	8.0	2218.	.0220	3.0	3.0	.020	.50	0
				OVERFLOW	11.0	2218.	.0220	20.0	20.0	.044	10.00	
631	1106	0	4	CHANNEL	10.0	1647.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1647.	.0090	20.0	20.0	.056	10.00	
632	738	0	4	CHANNEL	10.0	1608.	.0090	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1608.	.0090	20.0	20.0	.056	10.00	
635	735	0	4	CHANNEL	5.0	1467.	.0290	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	1467.	.0290	20.0	20.0	.056	10.00	
636	736	0	4	CHANNEL	5.0	1586.	.0190	3.0	3.0	.038	3.00	0
				OVERFLOW	23.0	1586.	.0190	20.0	20.0	.056	10.00	
637	737	0	4	CHANNEL	5.0	3260.	.0220	3.0	3.0	.044	3.00	0
				OVERFLOW	23.0	3260.	.0220	20.0	20.0	.056	10.00	
638	737	0	4	CHANNEL	8.0	2849.	.0110	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	2849.	.0110	20.0	20.0	.056	10.00	
639	738	0	4	CHANNEL	8.0	1197.	.0180	3.0	3.0	.038	3.00	0
				OVERFLOW	26.0	1197.	.0180	20.0	20.0	.056	10.00	
640	962	0	4	CHANNEL	10.0	1663.	.0040	3.0	3.0	.038	3.00	0
				OVERFLOW	28.0	1663.	.0040	20.0	20.0	.056	10.00	
706	707	0	4	CHANNEL	8.0	1109.	.0180	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	1109.	.0180	20.0	20.0	.056	10.00	
708	709	0	4	CHANNEL	8.0	945.	.0160	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	945.	.0160	20.0	20.0	.056	10.00	
715	716	0	4	CHANNEL	8.0	716.	.0170	3.0	3.0	.044	3.00	0
				OVERFLOW	26.0	716.	.0170	20.0	20.0	.056	10.00	
705	706	0	3		.0	0.	.0001	.0	.0	.001	.01	0
707	708	0	3		.0	0.	.0001	.0	.0	.001	.01	0
709	623	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1709	1622	0	3		.0	0.	.0001	.0	.0	.001	.01	0
713	625	0	3		.0	0.	.0001	.0	.0	.001	.01	0
714	715	0	3		.0	0.	.0001	.0	.0	.001	.01	0
716	1105	0	3		.0	0.	.0001	.0	.0	.001	.01	0
717	628	0	3		.0	0.	.0001	.0	.0	.001	.01	0
718	631	0	3		.0	0.	.0001	.0	.0	.001	.01	0
720	632	0	3		.0	0.	.0001	.0	.0	.001	.01	0
735	636	0	3		.0	0.	.0001	.0	.0	.001	.01	0
736	638	0	3		.0	0.	.0001	.0	.0	.001	.01	0
737	639	0	3		.0	0.	.0001	.0	.0	.001	.01	0
738	640	0	3		.0	0.	.0001	.0	.0	.001	.01	0
960	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
961	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
962	1500	0	3		.0	0.	.0001	.0	.0	.001	.01	0
1104	1709	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0 .0 .7 42.0 6.0 133.0 6.0 1000.0										
1105	717	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0 .0 11.6 409.0 28.2 710.0 28.2 1500.0										
1106	720	4	2	PIPE	.0	0.	.0001	.0	.0	.001	.01	0
		RESERVOIR STORAGE IN ACRE-FEET VS SPILLWAY OUTFLOW										
		.0 .0 6.1 317.0 26.9 995.0 27.0 2000.0										

TOTAL NUMBER OF GUTTERS/PIPES, 43

BOULDER CREEK TRIBUTARIES
(AREA WEST OF BOULDER CREEK)



LEGEND

	EXISTING	IMPROVEMENTS
CONVEYANCE ELEMENT	800	800
REGIONAL DETENTION FACILITY	2000	2000
NODE	800	
JOINT CATCHMENT AND CONVEYANCE ELEMENT	800	
CATCHMENT ELEMENT	800	
OFFSITE CATCHMENTS	800 OFFSITE	
DIVERSION ELEMENT	1000	2000
REGIONAL FLOW PATH		

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Fax: 303-673-9796

DESIGNED:	RJP
DRAWN:	PEM
CHECKED:	DJL
DATE:	1-07

TOWN OF ERIE

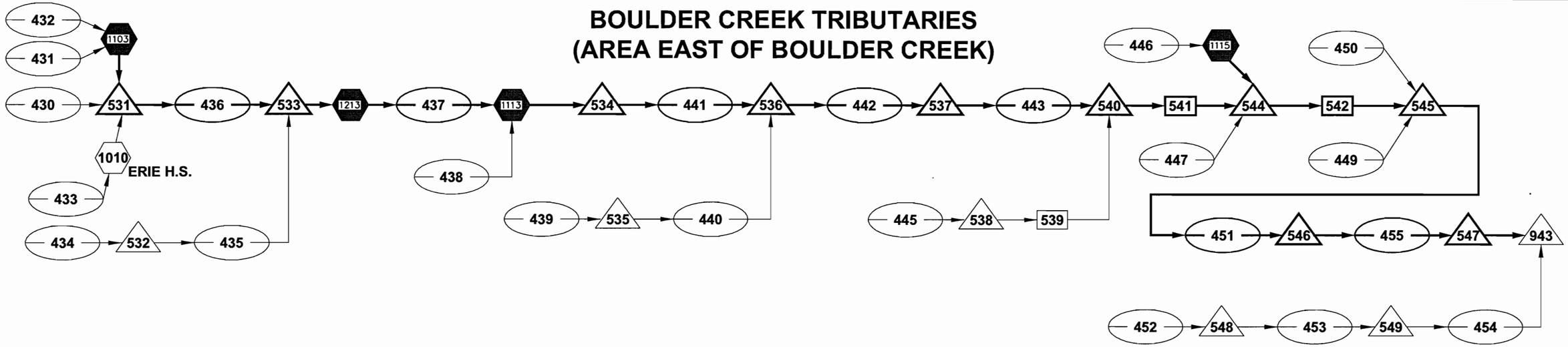
ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

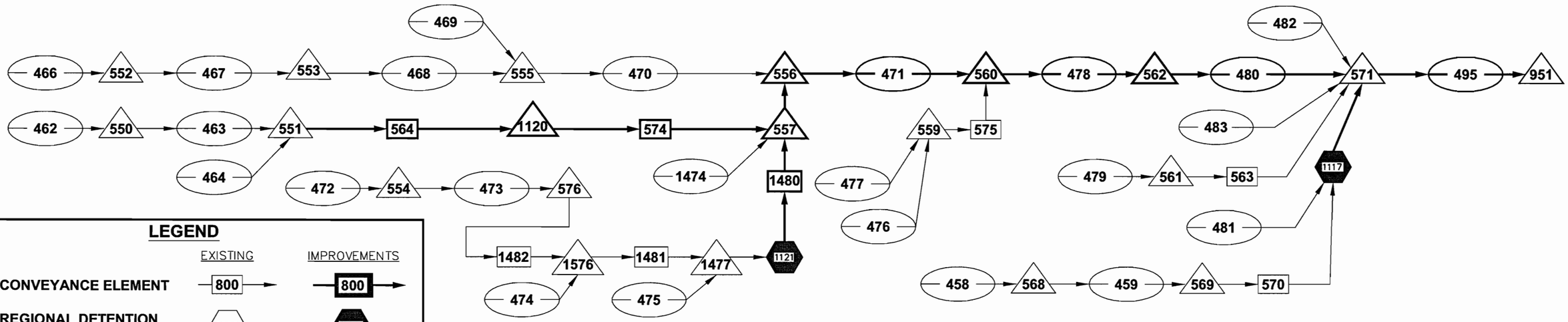
SWMM FLOW CHARTS
OUTFALL SYSTEMS PLAN

Figure B-1

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\SWMM FLOW CHARTS.dwg, 8/9/2007 2:20:48 PM, LOVE & ASSOCIATES, INC.

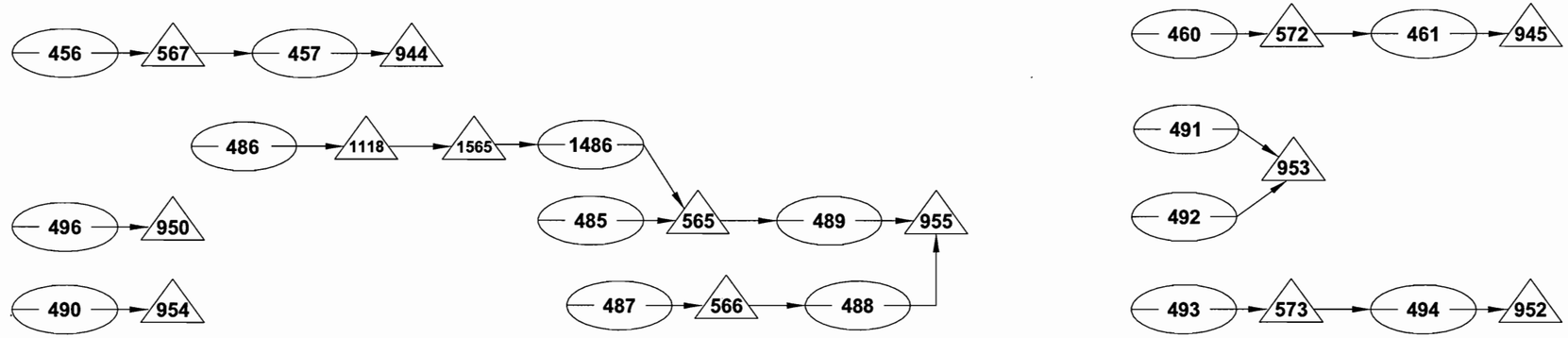
BOULDER CREEK TRIBUTARIES
(AREA EAST OF BOULDER CREEK)





LEGEND

	EXISTING	IMPROVEMENTS
CONVEYANCE ELEMENT	800 →	800 →
REGIONAL DETENTION FACILITY	2000	2000
NODE	800	
JOINT CATCHMENT AND CONVEYANCE ELEMENT	800 →	
CATCHMENT ELEMENT	800 →	
OFFSITE CATCHMENTS	800 OFFSITE	
DIVERSION ELEMENT	1000	2000
REGIONAL FLOW PATH	→	→



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TOWN OF ERIE

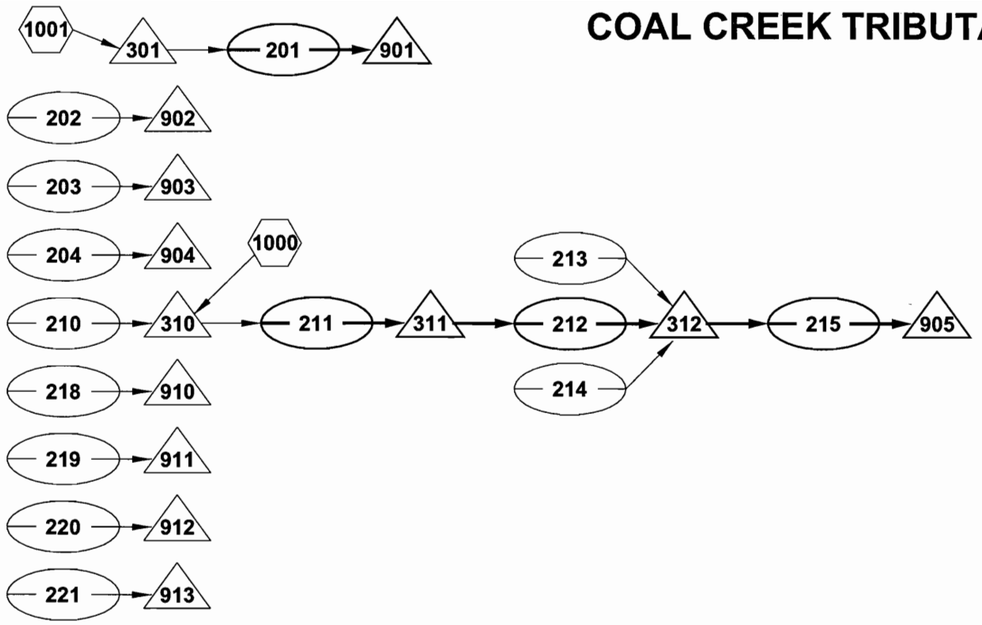
ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

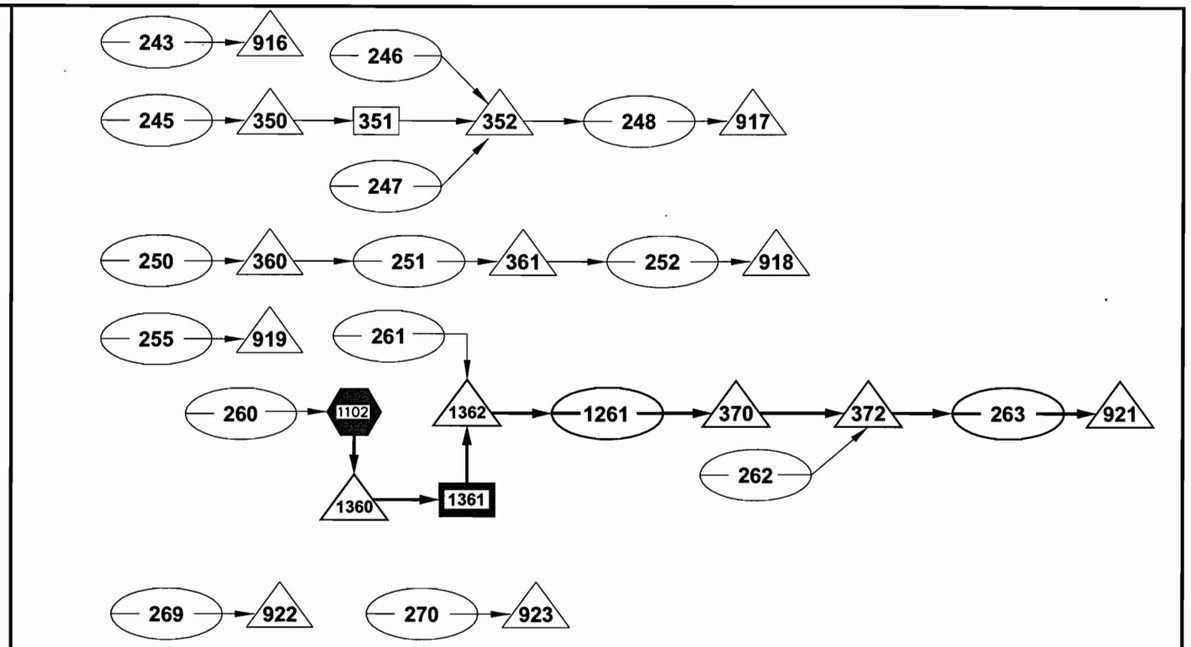
SWMM FLOW CHARTS
OUTFALL SYSTEMS PLAN

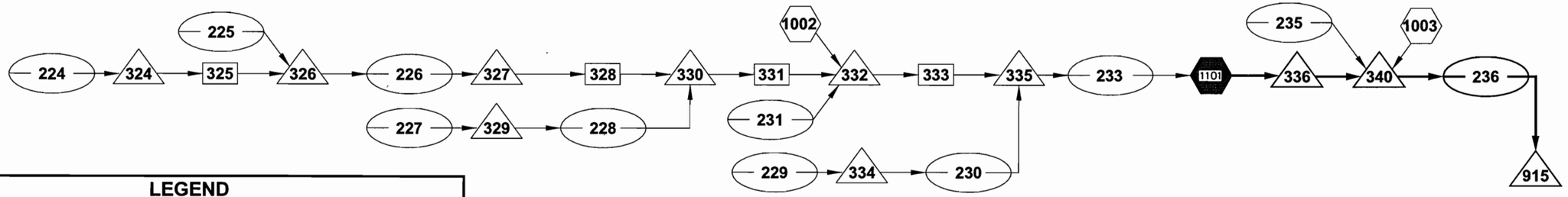
Figure B-2

\\Server\Data\PROJECTS - CURRENT\0603\DRAWINGS\PRELIM BY SHEETS\SWMM FLOW CHARTS.dwg, 8/9/2007 2:22:00 PM, LOVE & ASSOCIATES, INC.

COAL CREEK TRIBUTARIES

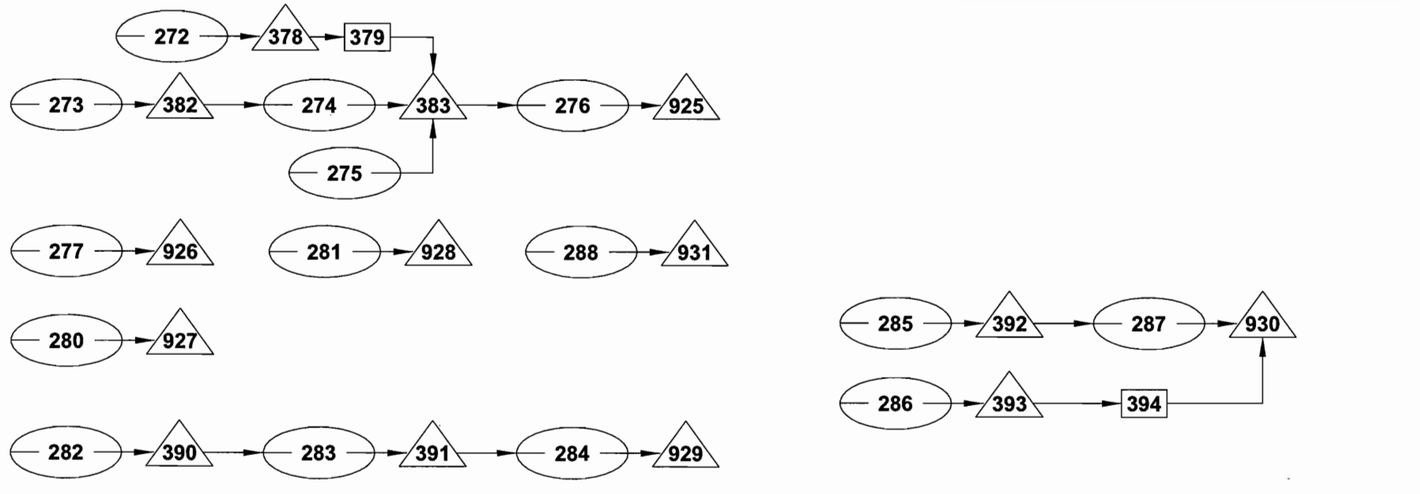






LEGEND

	EXISTING	IMPROVEMENTS
CONVEYANCE ELEMENT	800	800
REGIONAL DETENTION FACILITY	2000	2000
NODE	800	
JOINT CATCHMENT AND CONVEYANCE ELEMENT	800	
CATCHMENT ELEMENT	800	
OFFSITE CATCHMENTS	800 OFFSITE	
DIVERSION ELEMENT	1000	2000
REGIONAL FLOW PATH		



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TOWN OF ERIE

ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING

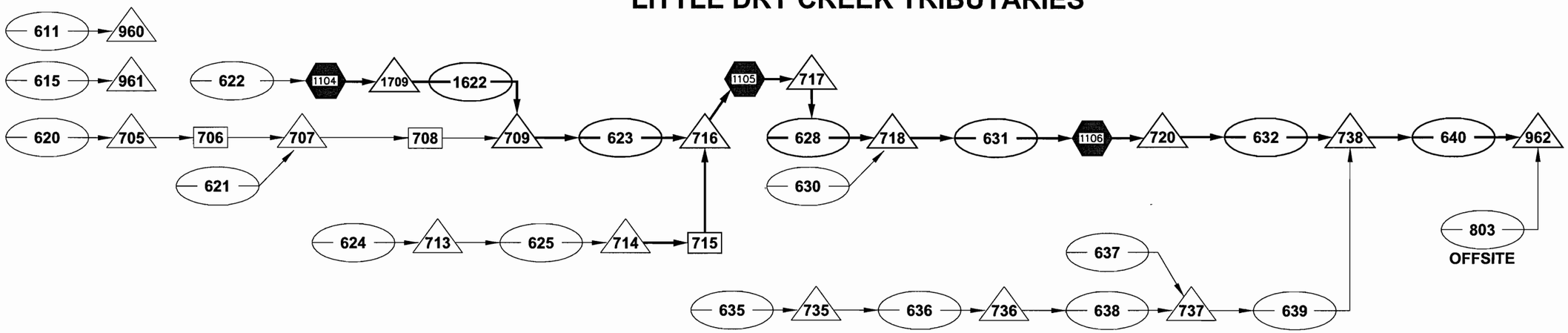
SWMM FLOW CHARTS OUTFALL SYSTEMS PLAN

Figure B-3

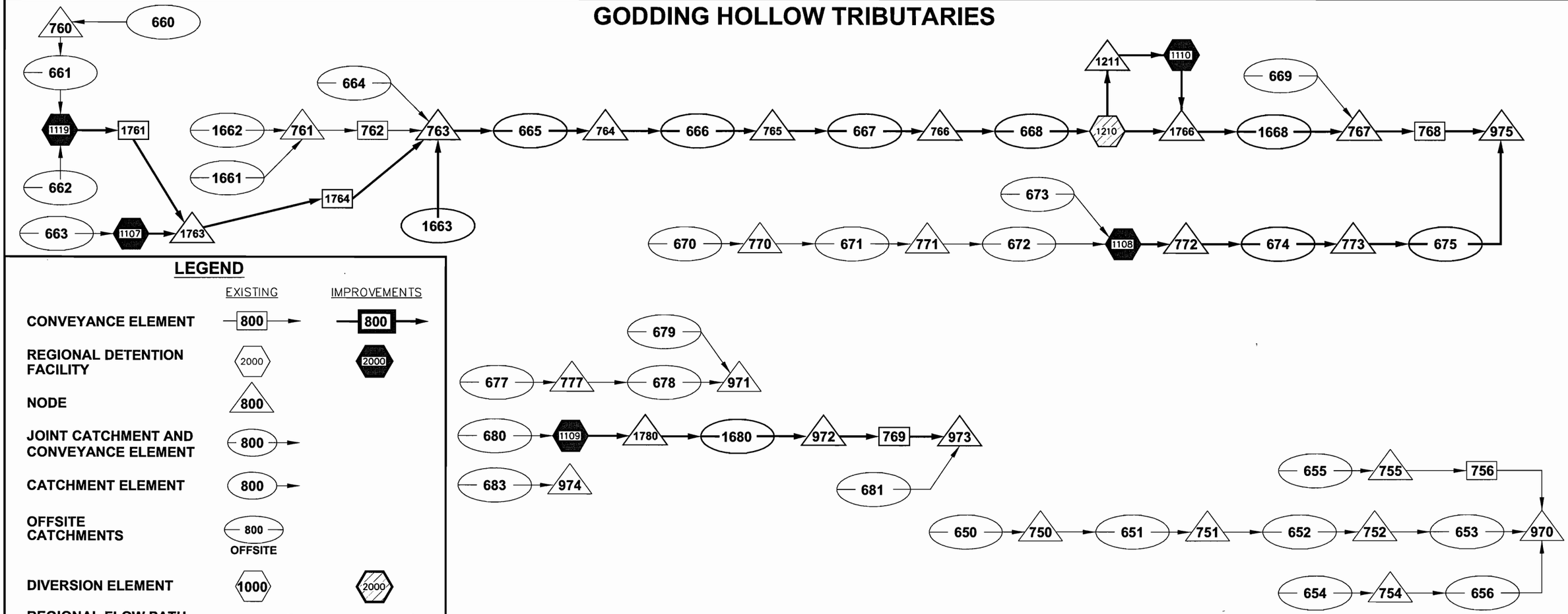
\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\SWMM FLOW CHARTS.dwg, 8/9/2007 2:23:04 PM, LOVE & ASSOCIATES, INC.

\\Server\Data\PROJECTS - CURRENT\0603B\DRAWINGS\PRELIM BY SHEETS\SWMM FLOW CHARTS.dwg, 8/9/2007 2:24:10 PM, LOVE & ASSOCIATES, INC.

LITTLE DRY CREEK TRIBUTARIES



GODDING HOLLOW TRIBUTARIES



LEGEND

	EXISTING	IMPROVEMENTS
CONVEYANCE ELEMENT	800 →	800 →
REGIONAL DETENTION FACILITY	2000	2000
NODE	800	
JOINT CATCHMENT AND CONVEYANCE ELEMENT	800 →	
CATCHMENT ELEMENT	800 →	
OFFSITE CATCHMENTS	800 OFFSITE	
DIVERSION ELEMENT	1000	2000
REGIONAL FLOW PATH	→	→

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TOWN OF ERIE

ERIE AND ADJACENT AREAS
OUTFALL SYSTEMS PLANNING

SWMM FLOW CHARTS
OUTFALL SYSTEMS PLAN

APPENDIX B2

UDSWM OUTPUT
OUTFALL SYSTEMS PLAN

APPENDIX B2

Table B2 – UDSWM Output, Outfall Systems Plan

Boulder Creek Tributaries, 4T Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	34.	.6		0 40.
431	34.	.6		0 40.
433	16.	.4		0 38.
1103	33.	.0	1.4	1 6.
1010	7.	.0	.3	1 8.
430	8.	.3		0 36.
434	1.	.1		0 36.
531	44.	(DIRECT FLOW)		1 4.
532	1.	(DIRECT FLOW)		0 36.
436	70.	.9		1 0.
435	16.	.5		0 38.
472	8.	.5		0 38.
533	80.	(DIRECT FLOW)		0 54.
554	8.	(DIRECT FLOW)		0 38.
1213	74.	.0	1.1	1 8.
473	19.	.5		0 46.
438	11.	.4		0 38.
437	94.	1.3		1 8.
576	19.	(DIRECT FLOW)		0 46.
462	8.	.5		0 42.
1113	84.	.0	2.0	1 24.
439	1.	.1		0 40.
1482	13.	.6		1 8.
474	18.	.5		0 40.
550	8.	(DIRECT FLOW)		0 42.
466	0.	.1		1 0.
534	84.	(DIRECT FLOW)		1 24.
535	1.	(DIRECT FLOW)		0 40.
1576	25.	(DIRECT FLOW)		1 0.
464	3.	.3		0 48.
463	5.	.3		1 8.
552	0.	(DIRECT FLOW)		1 0.
441	86.	1.9		1 28.
440	4.	.3		0 36.
1481	23.	.9		1 8.
475	35.	1.0		0 52.
551	8.	(DIRECT FLOW)		1 4.
467	14.	.5		0 42.
536	87.	(DIRECT FLOW)		1 28.
1477	56.	(DIRECT FLOW)		1 2.
564	7.	.4		1 22.
553	14.	(DIRECT FLOW)		0 42.
445	12.	.6		0 40.
442	87.	1.7		1 34.
1121	43.	.0	1.5	1 22.
1120	7.	(DIRECT FLOW)		1 22.
469	8.	.5		0 46.
468	24.	.9		1 2.
538	12.	(DIRECT FLOW)		0 40.
537	87.	(DIRECT FLOW)		1 34.
1480	41.	1.2		1 32.
574	7.	.6		1 30.
1474	10.	.4		0 36.
555	31.	(DIRECT FLOW)		1 0.
539	12.	.3		0 42.
443	87.	1.7		1 36.
477	6.	.4		0 46.
476	11.	.7		1 4.
557	49.	(DIRECT FLOW)		1 30.
470	30.	1.0		1 4.
446	15.	.7		0 48.
540	89.	(DIRECT FLOW)		1 36.
802	1.	.1		1 10.
801	0.	.0		1 0.
458	9.	.3		0 36.
559	16.	(DIRECT FLOW)		1 2.
556	72.	(DIRECT FLOW)		1 20.
1115	13.	.0	.2	1 6.
541	89.	1.9		1 36.
447	17.	.8		0 54.
502	1.	(DIRECT FLOW)		1 10.
501	0.	(DIRECT FLOW)		1 0.
568	9.	(DIRECT FLOW)		0 36.
575	16.	.6		1 4.
471	71.	1.5		1 26.
544	105.	(DIRECT FLOW)		1 30.
417	1.	.2		0 42.
403	0.	.1		1 34.
402	1.	.1		0 44.
486	0.	.1		1 0.
459	27.	.5		0 40.
560	83.	(DIRECT FLOW)		1 24.
542	104.	1.7		1 36.
450	7.	.4		0 50.
449	14.	.8		0 52.
516	1.	(DIRECT FLOW)		0 42.
503	0.	(DIRECT FLOW)		1 34.

Boulder Creek Tributaries, 4T Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
505	1.	(DIRECT FLOW)		0 44.
1118	0.	.0	.0	1 2.
569	27.	(DIRECT FLOW)		0 40.
479	9.	.5		0 46.
478	83.	1.8		1 28.
545	112.	(DIRECT FLOW)		1 32.
452	1.	.1		0 42.
517	1.	.1		1 6.
418	1.	.1		1 0.
407	1.	.1		1 0.
504	0.	.1		3 54.
404	1.	.2		1 14.
1565	0.	(DIRECT FLOW)		1 2.
570	13.	.9		1 10.
481	5.	.4		0 54.
561	9.	(DIRECT FLOW)		0 46.
562	83.	(DIRECT FLOW)		1 28.
451	111.	1.8		1 42.
548	1.	(DIRECT FLOW)		0 42.
518	2.	(DIRECT FLOW)		1 4.
509	1.	(DIRECT FLOW)		1 0.
522	1.	(DIRECT FLOW)		1 14.
1486	0.	.1		1 10.
485	1.	.1		1 2.
487	0.	.0		1 2.
493	5.	.4		0 42.
1117	12.	.0	.6	1 36.
563	6.	.3		1 16.
483	4.	.4		0 50.
482	3.	.3		1 0.
480	80.	1.7		1 42.
460	1.	.2		0 44.
456	5.	.3		0 36.
546	111.	(DIRECT FLOW)		1 42.
453	7.	.6		1 2.
420	1.	.2		1 0.
419	2.	.2		1 16.
414	2.	.3		1 0.
412	7.	.4		0 36.
510	0.	.1		1 34.
410	5.	.4		0 40.
409	1.	.1		1 2.
408	8.	.6		0 56.
426	1.	.1		1 56.
565	1.	(DIRECT FLOW)		1 4.
566	0.	(DIRECT FLOW)		1 2.
573	5.	(DIRECT FLOW)		0 42.
571	100.	(DIRECT FLOW)		1 38.
572	1.	(DIRECT FLOW)		0 44.
567	5.	(DIRECT FLOW)		0 36.
455	99.	3.0		2 6.
549	7.	(DIRECT FLOW)		1 2.
519	3.	(DIRECT FLOW)		1 10.
515	2.	(DIRECT FLOW)		1 0.
514	7.	(DIRECT FLOW)		0 36.
512	5.	(DIRECT FLOW)		0 42.
511	8.	(DIRECT FLOW)		0 56.
506	1.	(DIRECT FLOW)		1 56.
489	1.	.1		1 12.
488	0.	.0		1 12.
490	0.	.1		1 2.
492	0.	.1		1 2.
491	4.	.4		0 58.
494	4.	.4		1 6.
495	95.	1.9		1 52.
496	1.	.4		1 4.
425	0.	.0		1 0.
461	2.	.4		1 14.
457	9.	.6		1 2.
547	99.	(DIRECT FLOW)		2 6.
454	5.	.4		1 24.
424	0.	.0		1 2.
423	0.	.0		0 42.
422	1.	.1		1 2.
520	2.	.3		1 26.
421	0.	.1		1 0.
416	5.	.4		0 40.
415	8.	.3		0 40.
413	18.	.5		0 38.
513	5.	.2		0 44.
411	12.	.5		1 6.
406	1.	.1		1 0.
507	1.	.1		3 12.
405	1.	.1		1 2.
955	1.	(DIRECT FLOW)		1 12.
954	0.	(DIRECT FLOW)		1 2.
953	5.	(DIRECT FLOW)		1 0.
952	4.	(DIRECT FLOW)		1 6.
951	95.	(DIRECT FLOW)		1 52.
950	1.	(DIRECT FLOW)		1 4.
946	0.	(DIRECT FLOW)		1 0.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 4T Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
945	2.	(DIRECT FLOW)		1 14.
944	9.	(DIRECT FLOW)		1 2.
943	103.	(DIRECT FLOW)		2 4.
942	0.	(DIRECT FLOW)		1 2.
941	0.	(DIRECT FLOW)		0 42.
940	1.	(DIRECT FLOW)		1 2.
939	3.	(DIRECT FLOW)		1 24.
938	5.	(DIRECT FLOW)		0 40.
937	8.	(DIRECT FLOW)		0 40.
936	18.	(DIRECT FLOW)		0 38.
935	16.	(DIRECT FLOW)		1 2.
934	1.	(DIRECT FLOW)		1 0.
933	1.	(DIRECT FLOW)		2 52.
1501	206.	(DIRECT FLOW)		1 54.
1500	45.	(DIRECT FLOW)		0 42.
1502	219.	(DIRECT FLOW)		1 50.
1577	0.	(DIRECT FLOW)		0 0.
1503	219.	(DIRECT FLOW)		1 50.
1475	0.	(DIRECT FLOW)		0 0.

Boulder Creek Tributaries, 2 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	124.	1.2		0 30.
431	125.	1.2		0 30.
433	54.	.7		0 30.
1103	96.	.0	4.2	0 46.
1010	14.	.0	1.2	1 0.
430	27.	.6		0 28.
434	4.	.2		0 26.
531	121.	(DIRECT FLOW)		0 44.
532	4.	(DIRECT FLOW)		0 26.
436	227.	1.8		0 34.
435	58.	1.0		0 30.
472	28.	1.0		0 30.
533	275.	(DIRECT FLOW)		0 34.
554	28.	(DIRECT FLOW)		0 30.
1213	218.	.0	3.2	0 46.
473	75.	1.0		0 32.
438	39.	.8		0 30.
437	281.	2.3		0 46.
576	75.	(DIRECT FLOW)		0 32.
462	29.	1.0		0 32.
1113	241.	.0	5.8	1 6.
439	2.	.2		0 30.
1482	49.	1.3		0 44.
474	68.	1.1		0 30.
550	29.	(DIRECT FLOW)		0 32.
466	1.	.2		0 32.
534	241.	(DIRECT FLOW)		1 6.
535	2.	(DIRECT FLOW)		0 30.
1576	95.	(DIRECT FLOW)		0 36.
464	13.	.7		0 34.
463	20.	.7		0 46.
552	1.	(DIRECT FLOW)		0 32.
441	250.	3.1		1 12.
440	13.	.6		0 28.
1481	84.	1.8		0 46.
475	134.	2.0		0 34.
551	32.	(DIRECT FLOW)		0 42.
467	54.	1.1		0 32.
536	253.	(DIRECT FLOW)		1 12.
1477	206.	(DIRECT FLOW)		0 40.
564	27.	.9		0 58.
553	54.	(DIRECT FLOW)		0 32.
445	44.	1.2		0 30.
442	260.	3.0		1 16.
1121	134.	.0	4.5	1 4.
1120	27.	(DIRECT FLOW)		0 58.
469	31.	1.1		0 32.
468	86.	1.7		0 40.
538	44.	(DIRECT FLOW)		0 30.
537	260.	(DIRECT FLOW)		1 16.
1480	131.	2.3		1 10.
574	26.	1.2		1 4.
1474	36.	.8		0 28.
555	114.	(DIRECT FLOW)		0 38.
539	43.	.7		0 32.
443	264.	2.9		1 18.
477	22.	.9		0 32.
476	37.	1.3		0 40.
557	163.	(DIRECT FLOW)		1 8.
470	109.	1.9		0 42.

Boulder Creek Tributaries, 2 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
446	58.	1.4		0 34.
540	273.	(DIRECT FLOW)		1 16.
802	4.	.3		1 34.
801	1.	.2		1 2.
458	32.	.7		0 28.
559	56.	(DIRECT FLOW)		0 36.
556	236.	(DIRECT FLOW)		1 0.
1115	41.	.0	.8	0 46.
541	273.	3.2		1 20.
447	63.	1.5		0 34.
502	4.	(DIRECT FLOW)		1 34.
501	1.	(DIRECT FLOW)		1 2.
568	32.	(DIRECT FLOW)		0 28.
575	55.	1.2		0 40.
471	235.	2.8		1 6.
544	326.	(DIRECT FLOW)		1 12.
417	5.	.4		0 32.
403	4.	.4		1 52.
402	4.	.3		0 32.
486	1.	.2		0 32.
459	101.	1.1		0 30.
560	276.	(DIRECT FLOW)		1 2.
542	323.	3.0		1 18.
450	28.	.8		0 34.
449	53.	1.5		0 34.
516	5.	(DIRECT FLOW)		0 32.
503	4.	(DIRECT FLOW)		1 52.
505	4.	(DIRECT FLOW)		0 32.
1118	1.	.0	.0	0 36.
569	101.	(DIRECT FLOW)		0 30.
479	35.	1.1		0 32.
478	278.	3.2		1 8.
545	353.	(DIRECT FLOW)		1 16.
452	4.	.3		0 32.
517	4.	.3		0 42.
418	2.	.3		0 34.
407	2.	.3		0 32.
504	3.	.3		2 42.
404	5.	.4		1 16.
1565	1.	(DIRECT FLOW)		0 36.
570	47.	1.7		0 46.
481	18.	.9		0 34.
561	35.	(DIRECT FLOW)		0 32.
562	278.	(DIRECT FLOW)		1 8.
451	356.	3.2		1 26.
548	4.	(DIRECT FLOW)		0 32.
518	7.	(DIRECT FLOW)		0 42.
509	2.	(DIRECT FLOW)		0 32.
522	7.	(DIRECT FLOW)		2 2.
1486	1.	.2		0 46.
485	2.	.2		0 40.
487	0.	.1		0 32.
493	17.	.9		0 32.
1117	36.	.0	2.0	1 20.
563	22.	.7		0 50.
483	17.	.8		0 32.
482	13.	.7		0 34.
480	274.	3.2		1 22.
460	3.	.4		0 32.
456	19.	.5		0 26.
546	356.	(DIRECT FLOW)		1 26.
453	25.	1.2		0 38.
420	5.	.4		0 32.
419	6.	.4		0 56.
414	9.	.6		0 36.
412	23.	.8		0 28.
510	2.	.2		1 18.
410	18.	.9		0 30.
409	2.	.3		0 48.
408	29.	1.1		0 34.
426	7.	.4		2 10.
565	3.	(DIRECT FLOW)		0 42.
566	0.	(DIRECT FLOW)		0 32.
573	17.	(DIRECT FLOW)		0 32.
571	338.	(DIRECT FLOW)		1 20.
572	3.	(DIRECT FLOW)		0 32.
567	19.	(DIRECT FLOW)		0 26.
455	325.	4.6		1 54.
549	25.	(DIRECT FLOW)		0 38.
519	10.	(DIRECT FLOW)		0 48.
515	9.	(DIRECT FLOW)		0 36.
514	23.	(DIRECT FLOW)		0 28.
512	20.	(DIRECT FLOW)		0 32.
511	29.	(DIRECT FLOW)		0 34.
506	7.	(DIRECT FLOW)		2 10.
489	4.	.3		0 56.
488	0.	.1		1 4.
490	1.	.2		0 36.
492	1.	.2		0 40.
491	16.	.8		0 34.
494	13.	.8		0 44.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 2 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
495	329.	3.4		1 34.
496	5.	.7		0 42.
425	1.	.1		0 56.
461	7.	.8		0 50.
457	34.	1.3		0 40.
547	325.	(DIRECT FLOW)		1 54.
454	19.	.9		1 0.
424	0.	.1		1 6.
423	1.	.1		0 42.
422	3.	.3		0 42.
520	9.	.7		1 4.
421	2.	.2		0 40.
416	20.	.8		0 30.
415	32.	.7		0 30.
413	62.	1.0		0 28.
513	20.	.4		0 32.
411	41.	.9		0 42.
406	4.	.3		0 40.
507	7.	.3		2 36.
405	3.	.3		0 42.
955	4.	(DIRECT FLOW)		0 56.
954	1.	(DIRECT FLOW)		0 36.
953	17.	(DIRECT FLOW)		0 34.
952	13.	(DIRECT FLOW)		0 44.
951	329.	(DIRECT FLOW)		1 34.
950	5.	(DIRECT FLOW)		0 42.
946	1.	(DIRECT FLOW)		0 56.
945	7.	(DIRECT FLOW)		0 50.
944	34.	(DIRECT FLOW)		0 40.
943	336.	(DIRECT FLOW)		1 54.
942	0.	(DIRECT FLOW)		1 6.
941	1.	(DIRECT FLOW)		0 42.
940	3.	(DIRECT FLOW)		0 42.
939	11.	(DIRECT FLOW)		1 4.
938	20.	(DIRECT FLOW)		0 30.
937	32.	(DIRECT FLOW)		0 30.
936	62.	(DIRECT FLOW)		0 28.
935	57.	(DIRECT FLOW)		0 38.
934	4.	(DIRECT FLOW)		0 40.
933	8.	(DIRECT FLOW)		2 20.
1501	693.	(DIRECT FLOW)		1 42.
1500	175.	(DIRECT FLOW)		0 32.
1502	763.	(DIRECT FLOW)		1 40.
1577	0.	(DIRECT FLOW)		0 0.
1503	763.	(DIRECT FLOW)		1 40.
1475	0.	(DIRECT FLOW)		0 0.

Boulder Creek Tributaries, 5 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	185.	1.5		0 28.
431	188.	1.4		0 28.
433	80.	.8		0 30.
1103	145.	.0	6.3	0 46.
1010	33.	.0	1.8	0 56.
430	43.	.7		0 26.
434	11.	.3		0 42.
531	197.	(DIRECT FLOW)		0 48.
532	11.	(DIRECT FLOW)		0 42.
436	346.	2.2		0 34.
435	89.	1.2		0 28.
472	44.	1.2		0 28.
533	426.	(DIRECT FLOW)		0 32.
554	44.	(DIRECT FLOW)		0 28.
1213	339.	.0	4.9	0 48.
473	118.	1.3		0 32.
438	59.	1.0		0 28.
437	430.	2.8		0 46.
576	118.	(DIRECT FLOW)		0 32.
462	47.	1.3		0 32.
1113	383.	.0	9.6	1 16.
439	9.	.4		0 44.
1482	82.	1.7		0 42.
474	104.	1.3		0 30.
550	47.	(DIRECT FLOW)		0 32.
466	9.	.5		0 52.
534	383.	(DIRECT FLOW)		1 16.
535	9.	(DIRECT FLOW)		0 44.
1576	155.	(DIRECT FLOW)		0 36.
464	28.	1.0		0 42.
463	46.	1.1		0 46.
552	9.	(DIRECT FLOW)		0 52.
441	400.	3.7		1 20.

Boulder Creek Tributaries, 5 Year Event (con)

440	21.	.8		0 30.
1481	141.	2.3		0 44.
475	212.	2.5		0 34.
551	74.	(DIRECT FLOW)		0 46.
467	86.	1.4		0 32.
536	413.	(DIRECT FLOW)		1 18.
1477	333.	(DIRECT FLOW)		0 38.
564	69.	1.5		1 0.
553	86.	(DIRECT FLOW)		0 32.
445	67.	1.4		0 30.
442	430.	3.6		1 24.
1121	218.	.0	7.4	1 4.
1120	69.	(DIRECT FLOW)		1 0.
469	48.	1.3		0 32.
468	141.	2.2		0 38.
538	67.	(DIRECT FLOW)		0 30.
537	430.	(DIRECT FLOW)		1 24.
1480	215.	3.0		1 12.
574	68.	1.9		1 4.
1474	56.	1.0		0 26.
555	185.	(DIRECT FLOW)		0 36.
539	66.	.8		0 30.
443	438.	3.5		1 26.
477	34.	1.1		0 32.
476	60.	1.7		0 40.
557	296.	(DIRECT FLOW)		1 10.
470	182.	2.4		0 42.
446	90.	1.8		0 32.
540	458.	(DIRECT FLOW)		1 24.
802	32.	1.0		1 18.
801	10.	.5		0 48.
458	51.	.9		0 26.
559	92.	(DIRECT FLOW)		0 36.
556	429.	(DIRECT FLOW)		1 2.
1115	57.	.0	1.2	0 48.
541	458.	3.8		1 26.
447	101.	1.9		0 34.
502	32.	(DIRECT FLOW)		1 18.
501	10.	(DIRECT FLOW)		0 48.
568	51.	(DIRECT FLOW)		0 26.
575	90.	1.5		0 40.
471	429.	3.5		1 10.
544	550.	(DIRECT FLOW)		1 20.
417	14.	.7		0 48.
403	35.	1.3		1 28.
402	22.	.8		1 0.
486	6.	.4		0 58.
459	152.	1.4		0 30.
560	500.	(DIRECT FLOW)		1 8.
542	543.	3.6		1 28.
450	43.	1.1		0 32.
449	84.	1.9		0 34.
516	14.	(DIRECT FLOW)		0 48.
503	35.	(DIRECT FLOW)		1 28.
505	22.	(DIRECT FLOW)		1 0.
1118	6.	.0	.0	1 2.
569	152.	(DIRECT FLOW)		0 30.
479	54.	1.4		0 32.
478	509.	3.9		1 14.
545	595.	(DIRECT FLOW)		1 26.
452	11.	.5		0 50.
517	14.	.6		0 56.
418	12.	.7		1 14.
407	10.	.6		0 54.
504	29.	1.0		2 0.
404	33.	1.2		1 32.
1565	6.	(DIRECT FLOW)		1 2.
570	80.	2.2		0 44.
481	30.	1.2		0 34.
561	54.	(DIRECT FLOW)		0 32.
562	509.	(DIRECT FLOW)		1 14.
451	606.	3.8		1 36.
548	11.	(DIRECT FLOW)		0 50.
518	26.	(DIRECT FLOW)		1 4.
509	10.	(DIRECT FLOW)		0 54.
522	60.	(DIRECT FLOW)		1 50.
1486	7.	.4		0 58.
485	14.	.7		1 10.
487	3.	.3		0 54.
493	27.	1.1		0 30.
1117	68.	.0	3.7	1 32.
563	38.	1.0		0 50.
483	29.	1.0		0 34.
482	22.	.9		0 36.
480	509.	3.9		1 30.
460	6.	.6		1 16.
456	31.	.7		0 30.
546	606.	(DIRECT FLOW)		1 36.
453	43.	1.6		0 38.
420	13.	.7		0 46.
419	30.	.9		1 12.
414	19.	.9		0 48.
412	36.	1.0		0 26.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 5 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
510	9.	.5		1 20.
410	28.	1.1		0 30.
409	17.	.8		1 14.
408	49.	1.5		0 36.
426	64.	1.3		1 58.
565	21.	(DIRECT FLOW)		1 6.
566	3.	(DIRECT FLOW)		0 54.
573	27.	(DIRECT FLOW)		0 30.
571	633.	(DIRECT FLOW)		1 26.
572	6.	(DIRECT FLOW)		1 16.
567	31.	(DIRECT FLOW)		0 30.
455	574.	5.5		2 0.
549	43.	(DIRECT FLOW)		0 38.
519	42.	(DIRECT FLOW)		1 4.
515	19.	(DIRECT FLOW)		0 48.
514	36.	(DIRECT FLOW)		0 26.
512	38.	(DIRECT FLOW)		1 10.
511	49.	(DIRECT FLOW)		0 36.
506	64.	(DIRECT FLOW)		1 58.
489	25.	.9		1 14.
488	6.	.3		1 0.
490	9.	.5		0 58.
492	8.	.6		1 18.
491	26.	1.1		0 34.
494	25.	1.1		0 44.
495	630.	4.2		1 40.
496	13.	1.2		1 28.
425	5.	.4		0 46.
461	15.	1.2		1 22.
457	59.	1.7		0 40.
547	574.	(DIRECT FLOW)		2 0.
454	41.	1.3		1 4.
424	4.	.4		1 0.
423	4.	.4		0 44.
422	21.	.9		1 18.
520	41.	1.6		1 12.
421	11.	.6		1 8.
416	31.	1.0		0 30.
415	51.	1.0		0 32.
413	94.	1.3		0 26.
513	38.	.6		1 12.
411	79.	1.3		0 48.
406	21.	.8		1 14.
507	63.	1.1		2 8.
405	19.	.8		1 14.
955	30.	(DIRECT FLOW)		1 10.
954	9.	(DIRECT FLOW)		0 58.
953	30.	(DIRECT FLOW)		0 36.
952	25.	(DIRECT FLOW)		0 44.
951	630.	(DIRECT FLOW)		1 40.
950	13.	(DIRECT FLOW)		1 28.
946	5.	(DIRECT FLOW)		0 46.
945	15.	(DIRECT FLOW)		1 22.
944	59.	(DIRECT FLOW)		0 40.
943	602.	(DIRECT FLOW)		2 0.
942	4.	(DIRECT FLOW)		1 0.
941	4.	(DIRECT FLOW)		0 44.
940	21.	(DIRECT FLOW)		1 18.
939	52.	(DIRECT FLOW)		1 12.
938	31.	(DIRECT FLOW)		0 30.
937	51.	(DIRECT FLOW)		0 32.
936	94.	(DIRECT FLOW)		0 26.
935	116.	(DIRECT FLOW)		0 50.
934	21.	(DIRECT FLOW)		1 14.
933	75.	(DIRECT FLOW)		2 2.
1501	1343.	(DIRECT FLOW)		1 44.
1500	325.	(DIRECT FLOW)		1 16.
1502	1628.	(DIRECT FLOW)		1 40.
1577	0.	(DIRECT FLOW)		0 0.
1503	1628.	(DIRECT FLOW)		1 40.
1475	0.	(DIRECT FLOW)		0 0.

Boulder Creek Tributaries, 10 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	243.	1.7		0 28.
431	247.	1.6		0 26.
433	105.	.9		0 30.
1103	186.	.0	8.5	0 48.
1010	52.	.0	2.3	0 54.
430	58.	.9		0 30.
434	24.	.5		0 46.

Boulder Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
531	274.	(DIRECT FLOW)		0 48.
532	24.	(DIRECT FLOW)		0 46.
436	463.	2.5		0 34.
435	120.	1.4		0 28.
472	58.	1.4		0 28.
533	575.	(DIRECT FLOW)		0 32.
554	58.	(DIRECT FLOW)		0 28.
1213	469.	.0	6.8	0 50.
473	161.	1.5		0 32.
438	78.	1.1		0 26.
437	578.	3.2		0 50.
576	161.	(DIRECT FLOW)		0 32.
462	66.	1.6		0 32.
1113	520.	.0	14.7	1 22.
439	22.	.7		0 44.
1482	116.	2.0		0 42.
474	140.	1.6		0 30.
550	66.	(DIRECT FLOW)		0 32.
466	22.	.8		0 48.
534	520.	(DIRECT FLOW)		1 22.
535	22.	(DIRECT FLOW)		0 44.
1576	220.	(DIRECT FLOW)		0 36.
464	50.	1.4		0 48.
463	81.	1.4		0 46.
552	22.	(DIRECT FLOW)		0 48.
441	540.	4.1		1 26.
440	35.	1.1		0 36.
1481	202.	2.8		0 42.
475	288.	2.9		0 34.
551	130.	(DIRECT FLOW)		0 46.
467	120.	1.7		0 32.
536	562.	(DIRECT FLOW)		1 24.
1477	463.	(DIRECT FLOW)		0 38.
564	124.	2.0		0 58.
553	120.	(DIRECT FLOW)		0 32.
445	89.	1.7		0 30.
442	586.	3.9		1 28.
1121	302.	.0	10.3	1 4.
1120	124.	(DIRECT FLOW)		0 58.
469	66.	1.6		0 32.
468	201.	2.6		0 38.
538	89.	(DIRECT FLOW)		0 30.
537	586.	(DIRECT FLOW)		1 28.
1480	295.	3.3		1 14.
574	123.	2.6		1 2.
1474	72.	1.2		0 26.
555	262.	(DIRECT FLOW)		0 36.
539	89.	1.0		0 30.
443	598.	3.9		1 30.
477	48.	1.3		0 34.
476	88.	2.1		0 46.
557	435.	(DIRECT FLOW)		1 10.
470	264.	2.9		0 42.
446	122.	2.1		0 32.
540	624.	(DIRECT FLOW)		1 26.
802	71.	1.4		1 14.
801	22.	.8		0 44.
458	72.	1.1		0 30.
559	132.	(DIRECT FLOW)		0 38.
556	640.	(DIRECT FLOW)		1 4.
1115	73.	.0	1.9	0 52.
541	624.	4.2		1 28.
447	141.	2.3		0 34.
502	71.	(DIRECT FLOW)		1 14.
501	22.	(DIRECT FLOW)		0 44.
568	72.	(DIRECT FLOW)		0 30.
575	131.	1.9		0 40.
471	647.	4.0		1 10.
544	760.	(DIRECT FLOW)		1 22.
417	32.	1.0		0 50.
403	80.	2.0		1 20.
402	52.	1.3		0 54.
486	17.	.8		1 0.
459	204.	1.6		0 30.
560	760.	(DIRECT FLOW)		1 8.
542	750.	4.0		1 30.
450	58.	1.3		0 32.
449	116.	2.3		0 34.
516	32.	(DIRECT FLOW)		0 50.
503	80.	(DIRECT FLOW)		1 20.
505	52.	(DIRECT FLOW)		0 54.
1118	17.	.0	.0	1 2.
569	204.	(DIRECT FLOW)		0 30.
479	77.	1.6		0 34.
478	777.	4.5		1 14.
545	826.	(DIRECT FLOW)		1 26.
452	31.	.9		0 56.
517	31.	1.0		0 56.
418	31.	1.1		1 14.
407	23.	.9		0 52.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
504	68.	1.6		1 42.
404	80.	1.9		1 24.
1565	17.	(DIRECT FLOW)		1 2.
570	118.	2.7		0 46.
481	42.	1.4		0 34.
561	77.	(DIRECT FLOW)		0 34.
562	777.	(DIRECT FLOW)		1 14.
451	842.	4.3		1 34.
548	31.	(DIRECT FLOW)		0 56.
518	62.	(DIRECT FLOW)		1 2.
509	23.	(DIRECT FLOW)		0 52.
522	146.	(DIRECT FLOW)		1 36.
1486	20.	.8		1 0.
485	38.	1.2		1 6.
487	8.	.6		0 50.
493	38.	1.3		0 32.
1117	103.	.0	5.7	1 34.
563	60.	1.3		0 52.
483	47.	1.3		0 38.
482	35.	1.1		0 38.
480	778.	4.5		1 28.
460	13.	.9		1 16.
456	47.	.8		0 32.
546	842.	(DIRECT FLOW)		1 34.
453	64.	2.0		0 40.
420	28.	1.0		0 46.
419	74.	1.5		1 10.
414	35.	1.3		0 58.
412	48.	1.2		0 26.
510	21.	.8		1 12.
410	40.	1.3		0 32.
409	41.	1.3		1 8.
408	72.	1.8		0 36.
426	156.	2.1		1 42.
565	57.	(DIRECT FLOW)		1 4.
566	8.	(DIRECT FLOW)		0 50.
573	38.	(DIRECT FLOW)		0 32.
571	975.	(DIRECT FLOW)		1 24.
572	13.	(DIRECT FLOW)		1 16.
567	47.	(DIRECT FLOW)		0 32.
455	803.	6.1		2 0.
549	64.	(DIRECT FLOW)		0 40.
519	99.	(DIRECT FLOW)		1 2.
515	35.	(DIRECT FLOW)		0 58.
514	48.	(DIRECT FLOW)		0 26.
512	81.	(DIRECT FLOW)		1 4.
511	72.	(DIRECT FLOW)		0 36.
506	156.	(DIRECT FLOW)		1 42.
489	69.	1.6		1 12.
488	16.	.5		0 52.
490	25.	.9		0 54.
492	21.	1.0		1 18.
491	39.	1.3		0 36.
494	42.	1.4		0 46.
495	970.	4.9		1 36.
496	23.	1.5		1 26.
425	10.	.6		0 42.
461	26.	1.7		1 26.
457	91.	2.1		0 46.
547	803.	(DIRECT FLOW)		2 0.
454	74.	1.8		1 10.
424	9.	.7		0 54.
423	10.	.6		0 42.
422	54.	1.4		1 16.
520	98.	2.5		1 8.
421	26.	1.0		1 0.
416	43.	1.1		0 30.
415	75.	1.2		0 32.
413	124.	1.5		0 26.
513	81.	.9		1 4.
411	133.	1.8		0 50.
406	51.	1.3		1 6.
507	152.	1.8		1 52.
405	48.	1.2		1 6.
955	83.	(DIRECT FLOW)		1 6.
954	25.	(DIRECT FLOW)		0 54.
953	50.	(DIRECT FLOW)		0 46.
952	42.	(DIRECT FLOW)		0 46.
951	970.	(DIRECT FLOW)		1 36.
950	23.	(DIRECT FLOW)		1 26.
946	10.	(DIRECT FLOW)		0 42.
945	26.	(DIRECT FLOW)		1 26.
944	91.	(DIRECT FLOW)		0 46.
943	855.	(DIRECT FLOW)		1 56.
942	9.	(DIRECT FLOW)		0 54.
941	10.	(DIRECT FLOW)		0 42.

Boulder Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
940	54.	(DIRECT FLOW)		1 16.
939	124.	(DIRECT FLOW)		1 8.
938	43.	(DIRECT FLOW)		0 30.
937	75.	(DIRECT FLOW)		0 32.
936	124.	(DIRECT FLOW)		0 26.
935	211.	(DIRECT FLOW)		0 56.
934	51.	(DIRECT FLOW)		1 6.
933	185.	(DIRECT FLOW)		1 46.
1501	2051.	(DIRECT FLOW)		1 40.
1500	693.	(DIRECT FLOW)		1 16.
1502	2663.	(DIRECT FLOW)		1 32.
1577	0.	(DIRECT FLOW)		0 0.
1503	2663.	(DIRECT FLOW)		1 32.
1475	0.	(DIRECT FLOW)		0 0.

Boulder Creek Tributaries, 50 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	467.	2.3		0 32.
431	468.	2.2		0 32.
433	197.	1.2		0 34.
1103	277.	.0	18.8	1 2.
1010	76.	.0	5.7	1 20.
430	130.	1.3		0 34.
434	83.	1.0		0 50.
531	448.	(DIRECT FLOW)		0 52.
532	83.	(DIRECT FLOW)		0 50.
436	826.	3.3		0 38.
435	246.	2.0		0 32.
472	117.	2.0		0 32.
533	1056.	(DIRECT FLOW)		0 36.
554	117.	(DIRECT FLOW)		0 32.
1213	820.	.0	15.4	0 58.
473	315.	2.1		0 36.
438	153.	1.6		0 32.
437	1013.	3.9		0 56.
576	315.	(DIRECT FLOW)		0 36.
462	149.	2.3		0 42.
1113	894.	.0	28.6	1 24.
439	83.	1.5		0 44.
1482	252.	3.0		0 46.
474	275.	2.2		0 34.
550	149.	(DIRECT FLOW)		0 42.
466	80.	1.7		0 48.
534	894.	(DIRECT FLOW)		1 24.
535	83.	(DIRECT FLOW)		0 44.
1576	468.	(DIRECT FLOW)		0 40.
464	145.	2.3		0 50.
463	229.	2.5		0 50.
552	80.	(DIRECT FLOW)		0 48.
441	925.	4.8		1 28.
440	118.	2.0		0 44.
1481	424.	3.7		0 50.
475	495.	3.5		0 40.
551	374.	(DIRECT FLOW)		0 50.
467	261.	2.6		0 40.
536	974.	(DIRECT FLOW)		1 24.
1477	884.	(DIRECT FLOW)		0 44.
564	348.	3.2		0 58.
553	261.	(DIRECT FLOW)		0 40.
445	175.	2.3		0 34.
442	1020.	4.7		1 28.
1121	528.	.0	23.7	1 14.
1120	348.	(DIRECT FLOW)		0 58.
469	139.	2.2		0 40.
468	423.	3.5		0 52.
538	175.	(DIRECT FLOW)		0 34.
537	1020.	(DIRECT FLOW)		1 28.
1480	518.	4.1		1 22.
574	344.	5.3		1 2.
1474	132.	1.6		0 32.
555	550.	(DIRECT FLOW)		0 48.
539	175.	1.4		0 34.
443	1042.	4.6		1 28.
477	110.	2.0		0 40.
476	217.	3.1		0 56.
557	866.	(DIRECT FLOW)		1 10.
470	585.	3.9		0 52.
446	242.	2.8		0 36.
540	1083.	(DIRECT FLOW)		1 26.
802	228.	2.5		1 0.
801	69.	1.5		0 44.
458	164.	1.6		0 36.
559	314.	(DIRECT FLOW)		0 48.
556	1395.	(DIRECT FLOW)		1 4.
1115	143.	.0	5.0	1 4.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 50 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
541	1083.	4.9		1 28.
447	285.	3.1		0 42.
502	228.	(DIRECT FLOW)		1 0.
501	69.	(DIRECT FLOW)		0 44.
568	164.	(DIRECT FLOW)		0 36.
575	313.	2.9		0 50.
471	1418.	5.1		1 8.
544	1354.	(DIRECT FLOW)		1 18.
417	111.	2.0		0 50.
403	251.	3.3		1 8.
402	193.	2.4		0 52.
486	73.	1.7		0 54.
459	410.	2.3		0 34.
560	1700.	(DIRECT FLOW)		1 6.
542	1342.	4.9		1 24.
450	113.	1.8		0 36.
449	234.	3.1		0 42.
516	111.	(DIRECT FLOW)		0 50.
503	251.	(DIRECT FLOW)		1 8.
505	193.	(DIRECT FLOW)		0 52.
1118	74.	.0	.1	0 52.
569	410.	(DIRECT FLOW)		0 34.
479	183.	2.5		0 42.
478	1739.	5.9		1 12.
545	1509.	(DIRECT FLOW)		1 18.
452	135.	1.8		0 52.
517	109.	1.9		0 54.
418	119.	2.1		0 56.
407	81.	1.7		0 50.
504	220.	2.9		1 26.
404	266.	3.3		1 16.
1565	74.	(DIRECT FLOW)		0 52.
570	264.	3.7		0 56.
481	95.	2.1		0 42.
561	183.	(DIRECT FLOW)		0 42.
562	1739.	(DIRECT FLOW)		1 12.
451	1554.	5.2		1 24.
548	135.	(DIRECT FLOW)		0 52.
518	227.	(DIRECT FLOW)		0 56.
509	81.	(DIRECT FLOW)		0 50.
522	479.	(DIRECT FLOW)		1 22.
1486	85.	1.6		0 54.
485	150.	2.3		0 56.
487	34.	1.3		0 50.
493	81.	1.9		0 36.
1117	208.	.0	14.2	1 36.
563	164.	2.1		0 56.
483	136.	2.2		0 46.
482	93.	1.8		0 44.
480	1725.	5.9		1 24.
460	44.	1.6		1 8.
456	118.	1.4		0 40.
546	1554.	(DIRECT FLOW)		1 24.
453	189.	3.3		0 58.
420	96.	1.8		0 46.
419	275.	2.9		0 58.
414	105.	2.2		0 54.
412	104.	1.7		0 32.
510	72.	1.5		1 0.
410	84.	1.9		0 36.
409	143.	2.3		0 56.
408	168.	2.7		0 44.
426	501.	3.5		1 30.
565	234.	(DIRECT FLOW)		0 56.
566	34.	(DIRECT FLOW)		0 50.
573	81.	(DIRECT FLOW)		0 36.
571	2154.	(DIRECT FLOW)		1 20.
572	44.	(DIRECT FLOW)		1 8.
567	118.	(DIRECT FLOW)		0 40.
455	1484.	7.5		1 48.
549	189.	(DIRECT FLOW)		0 58.
519	359.	(DIRECT FLOW)		0 56.
515	105.	(DIRECT FLOW)		0 54.
514	104.	(DIRECT FLOW)		0 32.
512	266.	(DIRECT FLOW)		0 54.
511	168.	(DIRECT FLOW)		0 44.
506	501.	(DIRECT FLOW)		1 30.
489	276.	3.1		1 0.
488	64.	1.2		0 50.
490	100.	1.9		0 52.
492	78.	1.9		1 6.
491	93.	2.0		0 42.
494	115.	2.4		0 52.
495	2137.	6.3		1 30.
496	60.	2.5		1 22.
425	33.	1.2		0 42.
461	75.	2.9		1 22.

Boulder Creek Tributaries, 50 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
457	234.	3.3		0 56.
547	1484.	(DIRECT FLOW)		1 48.
454	222.	3.1		1 8.
424	29.	1.3		0 50.
423	32.	1.1		0 42.
422	193.	2.6		1 2.
520	343.	4.1		1 4.
421	95.	1.9		0 54.
416	92.	1.7		0 36.
415	182.	1.9		0 42.
413	249.	2.1		0 32.
513	266.	1.8		0 56.
411	367.	2.9		0 52.
406	182.	2.4		0 56.
507	487.	3.2		1 40.
405	174.	2.3		0 56.
955	333.	(DIRECT FLOW)		0 58.
954	100.	(DIRECT FLOW)		0 52.
953	156.	(DIRECT FLOW)		0 52.
952	115.	(DIRECT FLOW)		0 52.
951	2137.	(DIRECT FLOW)		1 30.
950	60.	(DIRECT FLOW)		1 22.
946	33.	(DIRECT FLOW)		0 42.
945	75.	(DIRECT FLOW)		1 22.
944	234.	(DIRECT FLOW)		0 56.
943	1631.	(DIRECT FLOW)		1 42.
942	29.	(DIRECT FLOW)		0 50.
941	32.	(DIRECT FLOW)		0 42.
940	193.	(DIRECT FLOW)		1 2.
939	432.	(DIRECT FLOW)		1 2.
938	92.	(DIRECT FLOW)		0 36.
937	182.	(DIRECT FLOW)		0 42.
936	249.	(DIRECT FLOW)		0 32.
935	631.	(DIRECT FLOW)		0 54.
934	182.	(DIRECT FLOW)		0 56.
933	583.	(DIRECT FLOW)		1 32.
1501	4475.	(DIRECT FLOW)		1 28.
1500	2186.	(DIRECT FLOW)		1 2.
1502	6327.	(DIRECT FLOW)		1 18.
1577	0.	(DIRECT FLOW)		0 0.
1503	6327.	(DIRECT FLOW)		1 18.
1475	0.	(DIRECT FLOW)		0 0.

Boulder Creek Tributaries, 100 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
432	557.	2.5		0 32.
431	557.	2.4		0 32.
433	241.	1.3		0 36.
1103	324.	.0	24.1	1 6.
1010	216.	.0	6.2	0 56.
430	169.	1.5		0 36.
434	114.	1.2		0 46.
531	664.	(DIRECT FLOW)		0 56.
532	114.	(DIRECT FLOW)		0 46.
436	974.	3.5		0 38.
435	309.	2.2		0 34.
472	144.	2.2		0 34.
533	1266.	(DIRECT FLOW)		0 36.
554	144.	(DIRECT FLOW)		0 34.
1213	1002.	.0	20.1	1 6.
473	391.	2.3		0 36.
438	184.	1.7		0 32.
437	1232.	4.2		1 4.
576	391.	(DIRECT FLOW)		0 36.
462	196.	2.6		0 44.
1113	1092.	.0	36.0	1 26.
439	115.	1.7		0 44.
1482	307.	3.3		0 48.
474	339.	2.4		0 34.
550	196.	(DIRECT FLOW)		0 44.
466	110.	1.9		0 46.
534	1092.	(DIRECT FLOW)		1 26.
535	115.	(DIRECT FLOW)		0 44.
1576	572.	(DIRECT FLOW)		0 40.
464	195.	2.6		0 50.
463	306.	2.8		0 50.
552	110.	(DIRECT FLOW)		0 46.
441	1126.	5.1		1 30.
440	161.	2.3		0 44.
1481	525.	4.0		0 50.
475	590.	3.7		0 40.
551	501.	(DIRECT FLOW)		0 50.
467	337.	2.9		0 42.
536	1184.	(DIRECT FLOW)		1 26.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Boulder Creek Tributaries, 100 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
1477	1074.	(DIRECT FLOW)		0 44.
564	462.	3.5		1 0.
553	337.	(DIRECT FLOW)		0 42.
445	216.	2.5		0 34.
442	1237.	5.0		1 28.
1121	641.	.0	30.5	1 16.
1120	462.	(DIRECT FLOW)		1 0.
469	178.	2.5		0 40.
468	542.	3.8		0 52.
538	216.	(DIRECT FLOW)		0 34.
537	1237.	(DIRECT FLOW)		1 28.
1480	628.	4.3		1 24.
574	412.	6.8		1 14.
1474	158.	1.7		0 32.
555	708.	(DIRECT FLOW)		0 50.
539	214.	1.6		0 34.
443	1264.	4.9		1 30.
477	142.	2.2		0 42.
476	280.	3.4		1 4.
557	1065.	(DIRECT FLOW)		1 18.
470	758.	4.2		0 54.
446	294.	3.1		0 38.
540	1309.	(DIRECT FLOW)		1 24.
802	317.	2.9		1 0.
801	93.	1.7		0 44.
458	215.	1.8		0 36.
559	397.	(DIRECT FLOW)		0 50.
556	1731.	(DIRECT FLOW)		1 8.
1115	182.	..0	6.6	1 8.
541	1308.	5.2		1 26.
447	345.	3.3		0 44.
502	317.	(DIRECT FLOW)		1 0.
501	93.	(DIRECT FLOW)		0 44.
568	215.	(DIRECT FLOW)		0 36.
575	396.	3.1		0 54.
471	1763.	5.5		1 10.
544	1682.	(DIRECT FLOW)		1 10.
417	153.	2.3		0 50.
403	349.	3.6		1 8.
402	268.	2.8		0 50.
486	105.	2.0		0 54.
459	510.	2.5		0 34.
560	2131.	(DIRECT FLOW)		1 8.
542	1660.	5.2		1 18.
450	140.	2.0		0 36.
449	284.	3.3		0 44.
516	153.	(DIRECT FLOW)		0 50.
503	349.	(DIRECT FLOW)		1 8.
505	268.	(DIRECT FLOW)		0 50.
1118	105.	.0	.1	0 54.
569	510.	(DIRECT FLOW)		0 34.
479	241.	2.8		0 44.
478	2188.	6.3		1 12.
545	1912.	(DIRECT FLOW)		1 12.
452	193.	2.2		0 52.
517	151.	2.3		0 54.
418	169.	2.5		0 58.
407	111.	2.0		0 50.
504	292.	3.2		1 26.
404	371.	3.7		1 14.
1565	105.	(DIRECT FLOW)		0 54.
570	343.	4.0		0 58.
481	123.	2.4		0 44.
561	241.	(DIRECT FLOW)		0 44.
562	2188.	(DIRECT FLOW)		1 12.
451	1955.	5.6		1 18.
548	193.	(DIRECT FLOW)		0 52.
518	320.	(DIRECT FLOW)		0 54.
509	111.	(DIRECT FLOW)		0 50.
522	653.	(DIRECT FLOW)		1 20.
1486	120.	1.9		0 52.
485	212.	2.7		0 56.
487	47.	1.5		0 48.
493	103.	2.2		0 36.
1117	251.	.0	19.0	1 38.
563	220.	2.5		0 56.
483	183.	2.5		0 46.
482	122.	2.1		0 44.
480	2185.	6.3		1 24.
460	64.	2.0		1 6.
456	155.	1.6		0 36.
546	1955.	(DIRECT FLOW)		1 18.
453	261.	3.7		1 0.
420	130.	2.1		0 46.
419	383.	3.3		1 2.
414	143.	2.5		0 54.
412	130.	1.9		0 34.

Boulder Creek Tributaries, 100 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
510	101.	1.8		1 0.
410	106.	2.1		0 36.
409	200.	2.7		0 56.
408	217.	3.0		0 46.
426	682.	3.8		1 28.
565	332.	(DIRECT FLOW)		0 54.
566	47.	(DIRECT FLOW)		0 48.
573	103.	(DIRECT FLOW)		0 36.
571	2726.	(DIRECT FLOW)		1 18.
572	64.	(DIRECT FLOW)		1 6.
567	155.	(DIRECT FLOW)		0 36.
455	1847.	8.0		1 42.
549	261.	(DIRECT FLOW)		1 0.
519	490.	(DIRECT FLOW)		0 56.
515	143.	(DIRECT FLOW)		0 54.
514	130.	(DIRECT FLOW)		0 34.
512	368.	(DIRECT FLOW)		0 54.
511	217.	(DIRECT FLOW)		0 46.
506	682.	(DIRECT FLOW)		1 28.
489	393.	3.5		1 2.
488	88.	1.4		0 48.
490	140.	2.2		0 50.
492	114.	2.2		1 6.
491	120.	2.3		0 44.
494	154.	2.7		0 52.
495	2709.	6.8		1 28.
496	83.	2.9		1 16.
425	45.	1.3		0 42.
461	102.	3.2		1 22.
457	309.	3.6		1 2.
547	1847.	(DIRECT FLOW)		1 42.
454	300.	3.4		1 10.
424	40.	1.5		0 50.
423	43.	1.3		0 42.
422	274.	3.0		1 4.
520	476.	4.6		1 4.
421	133.	2.2		0 52.
416	117.	1.9		0 36.
415	239.	2.2		0 44.
413	303.	2.3		0 32.
513	367.	2.1		0 54.
411	468.	3.2		0 54.
406	256.	2.8		0 56.
507	660.	3.5		1 38.
405	245.	2.7		0 56.
955	469.	(DIRECT FLOW)		0 58.
954	140.	(DIRECT FLOW)		0 50.
953	213.	(DIRECT FLOW)		0 52.
952	154.	(DIRECT FLOW)		0 52.
951	2709.	(DIRECT FLOW)		1 28.
950	83.	(DIRECT FLOW)		1 16.
946	45.	(DIRECT FLOW)		0 42.
945	102.	(DIRECT FLOW)		1 22.
944	309.	(DIRECT FLOW)		1 2.
943	2071.	(DIRECT FLOW)		1 38.
942	40.	(DIRECT FLOW)		0 50.
941	43.	(DIRECT FLOW)		0 42.
940	274.	(DIRECT FLOW)		1 4.
939	599.	(DIRECT FLOW)		1 2.
938	117.	(DIRECT FLOW)		0 36.
937	239.	(DIRECT FLOW)		0 44.
936	303.	(DIRECT FLOW)		0 32.
935	835.	(DIRECT FLOW)		0 54.
934	256.	(DIRECT FLOW)		0 56.
933	784.	(DIRECT FLOW)		1 30.
1501	5759.	(DIRECT FLOW)		1 24.
1500	3027.	(DIRECT FLOW)		1 4.
1502	8329.	(DIRECT FLOW)		1 14.
1577	0.	(DIRECT FLOW)		0 0.
1503	8329.	(DIRECT FLOW)		1 14.
1475	0.	(DIRECT FLOW)		0 0.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Coal Creek Tributaries, 4T Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	2.	.1		0 36.
324	2.	(DIRECT FLOW)		0 36.
325	2.	.2		0 42.
225	3.	.2		0 36.
326	5.	(DIRECT FLOW)		0 40.
226	4.	.4		0 56.
227	2.	.2		0 40.
327	4.	(DIRECT FLOW)		0 56.
329	2.	(DIRECT FLOW)		0 40.
328	4.	.2		1 6.
228	7.	.3		0 38.
330	8.	(DIRECT FLOW)		1 0.
260	11.	.5		0 40.
1002	1110.	(DIRECT FLOW)		1 20.
331	8.	.3		1 4.
231	3.	.2		0 36.
229	6.	.3		0 36.
1102	7.	.0	.2	1 2.
332	1118.	(DIRECT FLOW)		1 20.
334	6.	(DIRECT FLOW)		0 36.
1360	7.	(DIRECT FLOW)		1 2.
333	1057.	4.3		1 22.
230	15.	.7		0 40.
1000	505.	(DIRECT FLOW)		2 2.
210	0.	.0		0 36.
1361	7.	.6		1 6.
261	5.	.3		0 38.
335	1061.	(DIRECT FLOW)		1 22.
310	505.	(DIRECT FLOW)		2 2.
282	1.	.1		0 32.
272	0.	.0		0 42.
273	0.	.0		0 40.
1362	11.	(DIRECT FLOW)		1 0.
250	1.	.1		0 36.
245	1.	.1		0 42.
233	725.	4.6		1 30.
211	504.	1.9		2 20.
390	1.	(DIRECT FLOW)		0 32.
378	0.	(DIRECT FLOW)		0 42.
382	0.	(DIRECT FLOW)		0 40.
1261	11.	.5		1 2.
360	1.	(DIRECT FLOW)		0 36.
350	1.	(DIRECT FLOW)		0 42.
1101	588.	.0	7.6	1 38.
311	504.	(DIRECT FLOW)		2 20.
286	1.	.1		0 36.
285	6.	.2		0 36.
283	1.	.1		1 0.
379	0.	.0		1 10.
275	14.	.3		0 38.
274	28.	.7		0 44.
370	11.	(DIRECT FLOW)		1 2.
262	6.	.2		0 36.
251	3.	.2		0 40.
351	1.	.1		1 12.
247	0.	.0		1 2.
246	2.	.2		0 40.
1003	275.	(DIRECT FLOW)		1 4.
336	588.	(DIRECT FLOW)		1 38.
235	6.	.4		0 44.
214	6.	.4		0 38.
213	2.	.1		0 36.
212	504.	2.0		2 22.
1001	400.	(DIRECT FLOW)		0 42.
393	1.	(DIRECT FLOW)		0 36.
392	6.	(DIRECT FLOW)		0 36.
391	1.	(DIRECT FLOW)		1 0.
383	41.	(DIRECT FLOW)		0 42.
372	14.	(DIRECT FLOW)		1 0.
361	3.	(DIRECT FLOW)		0 40.
352	3.	(DIRECT FLOW)		1 0.
340	788.	(DIRECT FLOW)		1 38.
312	504.	(DIRECT FLOW)		2 22.
301	400.	(DIRECT FLOW)		0 42.
288	1.	.1		0 48.
394	0.	.1		1 12.
287	6.	.4		0 44.
284	5.	.2		0 38.
281	2.	.2		0 38.
280	2.	.2		0 42.
277	0.	.0		0 40.
276	36.	.8		0 50.
270	0.	.0		0 40.
269	0.	.0		0 40.
263	12.	.5		1 12.
255	1.	.1		0 36.

Coal Creek Tributaries, 4T Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
252	6.	.2		0 42.
248	5.	.2		1 0.
243	2.	.2		0 38.
236	715.	4.0		1 46.
221	9.	.5		0 36.
220	6.	.4		0 42.
219	16.	.3		0 40.
218	12.	.3		0 36.
215	503.	3.5		2 26.
204	5.	.2		0 36.
203	9.	.2		0 36.
202	5.	.1		0 34.
201	409.	3.2		0 44.
931	1.	(DIRECT FLOW)		0 48.
930	6.	(DIRECT FLOW)		0 46.
929	5.	(DIRECT FLOW)		0 38.
928	2.	(DIRECT FLOW)		0 38.
927	2.	(DIRECT FLOW)		0 42.
926	0.	(DIRECT FLOW)		0 40.
925	36.	(DIRECT FLOW)		0 50.
923	0.	(DIRECT FLOW)		0 40.
922	0.	(DIRECT FLOW)		0 40.
921	12.	(DIRECT FLOW)		1 12.
919	1.	(DIRECT FLOW)		0 36.
918	6.	(DIRECT FLOW)		0 42.
917	5.	(DIRECT FLOW)		1 0.
916	2.	(DIRECT FLOW)		0 38.
915	715.	(DIRECT FLOW)		1 46.
913	9.	(DIRECT FLOW)		0 36.
912	6.	(DIRECT FLOW)		0 42.
911	16.	(DIRECT FLOW)		0 40.
910	12.	(DIRECT FLOW)		0 36.
905	503.	(DIRECT FLOW)		2 26.
904	5.	(DIRECT FLOW)		0 36.
903	9.	(DIRECT FLOW)		0 36.
902	5.	(DIRECT FLOW)		0 34.
901	409.	(DIRECT FLOW)		0 44.
1502	13.	(DIRECT FLOW)		0 42.
1501	59.	(DIRECT FLOW)		0 52.
1500	1537.	(DIRECT FLOW)		1 48.
1503	1557.	(DIRECT FLOW)		1 48.
1336	0.	(DIRECT FLOW)		0 0.
1504	1557.	(DIRECT FLOW)		1 48.
1233	0.	(DIRECT FLOW)		0 0.

Coal Creek Tributaries, 2 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	8.	.2		0 30.
324	8.	(DIRECT FLOW)		0 30.
325	8.	.5		0 32.
225	10.	.4		0 30.
326	18.	(DIRECT FLOW)		0 30.
226	17.	.9		0 38.
227	10.	.5		0 32.
327	17.	(DIRECT FLOW)		0 38.
329	10.	(DIRECT FLOW)		0 32.
328	15.	.5		0 44.
228	25.	.7		0 30.
330	33.	(DIRECT FLOW)		0 38.
260	39.	.9		0 30.
1002	1110.	(DIRECT FLOW)		1 20.
331	32.	.7		0 42.
231	11.	.5		0 26.
229	19.	.6		0 26.
1102	22.	.0	.6	0 44.
332	1129.	(DIRECT FLOW)		1 20.
334	19.	(DIRECT FLOW)		0 26.
1360	22.	(DIRECT FLOW)		0 44.
333	1068.	4.3		1 22.
230	55.	1.3		0 30.
1000	505.	(DIRECT FLOW)		2 2.
210	1.	.1		0 32.
1361	22.	1.1		0 48.
261	20.	.6		0 30.
335	1079.	(DIRECT FLOW)		1 22.
310	505.	(DIRECT FLOW)		2 2.
282	4.	.1		0 24.
272	1.	.1		0 30.
273	1.	.1		0 30.
1362	34.	(DIRECT FLOW)		0 42.
250	5.	.3		0 30.
245	5.	.3		0 32.
233	748.	4.6		1 30.
211	505.	1.9		2 20.
390	4.	(DIRECT FLOW)		0 24.
378	1.	(DIRECT FLOW)		0 30.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Coal Creek Tributaries, 2 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
382	1.	(DIRECT FLOW)		0 30.
1261	35.	1.0		0 42.
360	5.	(DIRECT FLOW)		0 30.
350	5.	(DIRECT FLOW)		0 32.
1101	609.	.0	7.9	1 38.
311	505.	(DIRECT FLOW)		2 20.
286	3.	.2		0 30.
285	22.	.4		0 26.
283	4.	.3		0 38.
379	1.	.1		0 44.
275	47.	.6		0 30.
274	109.	1.5		0 32.
370	35.	(DIRECT FLOW)		0 42.
262	20.	.4		0 26.
251	13.	.4		0 30.
351	4.	.2		0 50.
247	2.	.2		1 4.
246	8.	.4		0 32.
1003	275.	(DIRECT FLOW)		1 4.
336	609.	(DIRECT FLOW)		1 38.
235	22.	.8		0 32.
214	21.	.7		0 30.
213	8.	.2		0 30.
212	505.	2.0		2 22.
1001	400.	(DIRECT FLOW)		0 42.
393	3.	(DIRECT FLOW)		0 30.
392	22.	(DIRECT FLOW)		0 26.
391	4.	(DIRECT FLOW)		0 38.
383	156.	(DIRECT FLOW)		0 32.
372	46.	(DIRECT FLOW)		0 32.
361	13.	(DIRECT FLOW)		0 30.
352	11.	(DIRECT FLOW)		0 40.
340	815.	(DIRECT FLOW)		1 38.
312	507.	(DIRECT FLOW)		2 20.
301	400.	(DIRECT FLOW)		0 42.
288	4.	.3		0 32.
394	1.	.2		0 46.
287	23.	.8		0 32.
284	17.	.4		0 28.
281	8.	.4		0 30.
280	7.	.4		0 32.
277	2.	.1		0 30.
276	139.	1.6		0 36.
270	1.	.0		0 30.
269	2.	.1		0 32.
263	41.	.9		0 50.
255	3.	.2		0 26.
252	24.	.5		0 32.
248	20.	.5		0 34.
243	7.	.4		0 30.
236	751.	4.0		1 46.
221	30.	.9		0 28.
220	22.	.8		0 32.
219	51.	.6		0 32.
218	39.	.6		0 30.
215	506.	3.5		2 24.
204	18.	.4		0 26.
203	32.	.4		0 26.
202	16.	.3		0 26.
201	422.	3.2		0 42.
931	4.	(DIRECT FLOW)		0 32.
930	24.	(DIRECT FLOW)		0 32.
929	17.	(DIRECT FLOW)		0 28.
928	8.	(DIRECT FLOW)		0 30.
927	7.	(DIRECT FLOW)		0 32.
926	2.	(DIRECT FLOW)		0 30.
925	139.	(DIRECT FLOW)		0 36.
923	1.	(DIRECT FLOW)		0 30.
922	2.	(DIRECT FLOW)		0 32.
921	41.	(DIRECT FLOW)		0 50.
919	3.	(DIRECT FLOW)		0 26.
918	24.	(DIRECT FLOW)		0 32.
917	20.	(DIRECT FLOW)		0 34.
916	7.	(DIRECT FLOW)		0 30.
915	751.	(DIRECT FLOW)		1 46.
913	30.	(DIRECT FLOW)		0 28.
912	22.	(DIRECT FLOW)		0 32.
911	51.	(DIRECT FLOW)		0 32.
910	39.	(DIRECT FLOW)		0 30.
905	506.	(DIRECT FLOW)		2 24.
904	18.	(DIRECT FLOW)		0 26.
903	32.	(DIRECT FLOW)		0 26.
902	16.	(DIRECT FLOW)		0 26.
901	422.	(DIRECT FLOW)		0 42.
1502	52.	(DIRECT FLOW)		0 32.
1501	230.	(DIRECT FLOW)		0 36.

Coal Creek Tributaries, 2 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
1500	1616.	(DIRECT FLOW)		1 48.
1503	1696.	(DIRECT FLOW)		1 48.
1336	0.	(DIRECT FLOW)		0 0.
1504	1696.	(DIRECT FLOW)		1 48.
1233	0.	(DIRECT FLOW)		0 0.

Coal Creek Tributaries, 5 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	18.	.3		0 32.
324	18.	(DIRECT FLOW)		0 32.
325	17.	.7		0 36.
225	22.	.7		0 34.
326	40.	(DIRECT FLOW)		0 36.
226	40.	1.4		0 44.
227	21.	.8		0 40.
327	40.	(DIRECT FLOW)		0 44.
329	21.	(DIRECT FLOW)		0 40.
328	39.	.9		0 48.
228	44.	.9		0 32.
330	75.	(DIRECT FLOW)		0 44.
260	61.	1.2		0 30.
1002	1110.	(DIRECT FLOW)		1 20.
331	75.	1.1		0 48.
231	19.	.6		0 30.
229	30.	.8		0 26.
1102	37.	.0	.9	0 46.
332	1171.	(DIRECT FLOW)		1 20.
334	30.	(DIRECT FLOW)		0 26.
1360	37.	(DIRECT FLOW)		0 46.
333	1111.	4.4		1 22.
230	87.	1.6		0 30.
1000	505.	(DIRECT FLOW)		2 2.
210	6.	.2		0 42.
1361	37.	1.4		0 50.
261	36.	.8		0 32.
335	1140.	(DIRECT FLOW)		1 22.
310	507.	(DIRECT FLOW)		2 2.
282	14.	.2		0 40.
272	7.	.2		0 42.
273	8.	.2		0 40.
1362	68.	(DIRECT FLOW)		0 44.
250	11.	.5		0 34.
245	17.	.7		0 48.
233	816.	4.7		1 30.
211	508.	1.9		2 20.
390	14.	(DIRECT FLOW)		0 40.
378	7.	(DIRECT FLOW)		0 42.
382	8.	(DIRECT FLOW)		0 40.
1261	71.	1.4		0 46.
360	11.	(DIRECT FLOW)		0 34.
350	17.	(DIRECT FLOW)		0 48.
1101	670.	.0	8.9	1 38.
311	508.	(DIRECT FLOW)		2 20.
286	9.	.4		0 36.
285	34.	.5		0 26.
283	18.	.8		1 4.
379	7.	.3		0 48.
275	67.	.7		0 28.
274	166.	1.9		0 30.
370	71.	(DIRECT FLOW)		0 46.
262	32.	.5		0 30.
251	28.	.6		0 36.
351	17.	.5		0 58.
247	14.	.6		0 48.
246	18.	.6		0 38.
1003	275.	(DIRECT FLOW)		1 4.
336	670.	(DIRECT FLOW)		1 38.
235	40.	1.1		0 34.
214	36.	1.0		0 32.
213	21.	.4		0 34.
212	510.	2.0		2 20.
1001	400.	(DIRECT FLOW)		0 42.
393	9.	(DIRECT FLOW)		0 36.
392	34.	(DIRECT FLOW)		0 26.
391	18.	(DIRECT FLOW)		1 4.
383	234.	(DIRECT FLOW)		0 30.
372	92.	(DIRECT FLOW)		0 40.
361	28.	(DIRECT FLOW)		0 36.
352	47.	(DIRECT FLOW)		0 50.
340	883.	(DIRECT FLOW)		1 38.
312	514.	(DIRECT FLOW)		2 18.
301	400.	(DIRECT FLOW)		0 42.
288	9.	.4		0 42.
394	6.	.5		0 52.
287	40.	1.1		0 34.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Coal Creek Tributaries, 5 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
284	26.	.6		0 30.
281	18.	.6		0 38.
280	18.	.7		0 42.
277	10.	.3		0 42.
276	219.	2.0		0 34.
270	4.	.1		0 40.
269	15.	.3		0 42.
263	96.	1.5		0 52.
255	7.	.3		0 36.
252	44.	.7		0 34.
248	64.	1.0		0 56.
243	16.	.7		0 36.
236	828.	4.2		1 46.
221	46.	1.1		0 26.
220	35.	1.0		0 32.
219	77.	.8		0 32.
218	56.	.7		0 30.
215	514.	3.5		2 22.
204	27.	.5		0 26.
203	45.	.5		0 26.
202	24.	.4		0 24.
201	429.	3.3		0 42.
931	9.	(DIRECT FLOW)		0 42.
930	44.	(DIRECT FLOW)		0 34.
929	26.	(DIRECT FLOW)		0 30.
928	18.	(DIRECT FLOW)		0 38.
927	18.	(DIRECT FLOW)		0 42.
926	10.	(DIRECT FLOW)		0 42.
925	219.	(DIRECT FLOW)		0 34.
923	4.	(DIRECT FLOW)		0 40.
922	15.	(DIRECT FLOW)		0 42.
921	96.	(DIRECT FLOW)		0 52.
919	7.	(DIRECT FLOW)		0 36.
918	44.	(DIRECT FLOW)		0 34.
917	64.	(DIRECT FLOW)		0 56.
916	16.	(DIRECT FLOW)		0 36.
915	828.	(DIRECT FLOW)		1 46.
913	46.	(DIRECT FLOW)		0 26.
912	35.	(DIRECT FLOW)		0 32.
911	77.	(DIRECT FLOW)		0 32.
910	56.	(DIRECT FLOW)		0 30.
905	514.	(DIRECT FLOW)		2 22.
904	27.	(DIRECT FLOW)		0 26.
903	45.	(DIRECT FLOW)		0 26.
902	24.	(DIRECT FLOW)		0 24.
901	429.	(DIRECT FLOW)		0 42.
1502	95.	(DIRECT FLOW)		0 34.
1501	445.	(DIRECT FLOW)		0 38.
1500	1745.	(DIRECT FLOW)		1 46.
1503	1989.	(DIRECT FLOW)		1 44.
1336	0.	(DIRECT FLOW)		0 0.
1504	1989.	(DIRECT FLOW)		1 44.
1233	0.	(DIRECT FLOW)		0 0.

Coal Creek Tributaries, 10 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	33.	.5		0 34.
324	33.	(DIRECT FLOW)		0 34.
325	32.	1.0		0 36.
225	41.	.9		0 36.
326	73.	(DIRECT FLOW)		0 36.
226	75.	1.9		0 44.
227	39.	1.1		0 40.
327	75.	(DIRECT FLOW)		0 44.
329	39.	(DIRECT FLOW)		0 40.
328	73.	1.2		0 48.
228	69.	1.1		0 34.
330	135.	(DIRECT FLOW)		0 44.
260	87.	1.4		0 32.
1002	1110.	(DIRECT FLOW)		1 20.
331	134.	1.5		0 48.
231	30.	.8		0 30.
229	45.	1.0		0 30.
1102	48.	.0	1.6	0 56.
332	1211.	(DIRECT FLOW)		1 20.
334	45.	(DIRECT FLOW)		0 30.
1360	48.	(DIRECT FLOW)		0 56.
333	1150.	4.4		1 22.
230	121.	1.9		0 32.
1000	505.	(DIRECT FLOW)		2 2.
210	12.	.3		0 38.
1361	48.	1.6		1 0.

Coal Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
261	63.	1.1		0 36.
335	1192.	(DIRECT FLOW)		1 22.
310	509.	(DIRECT FLOW)		2 0.
282	31.	.4		0 36.
272	20.	.4		0 38.
273	21.	.4		0 38.
1362	105.	(DIRECT FLOW)		0 44.
250	22.	.7		0 34.
245	37.	1.0		0 46.
233	879.	4.9		1 28.
211	510.	1.9		2 18.
390	31.	(DIRECT FLOW)		0 36.
378	20.	(DIRECT FLOW)		0 38.
382	21.	(DIRECT FLOW)		0 38.
1261	111.	1.7		0 44.
360	22.	(DIRECT FLOW)		0 34.
350	37.	(DIRECT FLOW)		0 46.
1101	729.	.0	9.8	1 38.
311	510.	(DIRECT FLOW)		2 18.
286	21.	.6		0 36.
285	49.	.6		0 32.
283	40.	1.3		1 0.
379	19.	.5		0 42.
275	87.	.8		0 30.
274	221.	2.2		0 30.
370	111.	(DIRECT FLOW)		0 44.
262	48.	.6		0 32.
251	52.	.9		0 36.
351	36.	.8		0 54.
247	30.	.8		0 44.
246	33.	.8		0 40.
1003	275.	(DIRECT FLOW)		1 4.
336	729.	(DIRECT FLOW)		1 38.
235	61.	1.4		0 34.
214	54.	1.2		0 32.
213	39.	.5		0 34.
212	515.	2.0		2 20.
1001	400.	(DIRECT FLOW)		0 42.
393	21.	(DIRECT FLOW)		0 36.
392	49.	(DIRECT FLOW)		0 32.
391	40.	(DIRECT FLOW)		1 0.
383	313.	(DIRECT FLOW)		0 30.
372	150.	(DIRECT FLOW)		0 38.
361	52.	(DIRECT FLOW)		0 36.
352	95.	(DIRECT FLOW)		0 46.
340	946.	(DIRECT FLOW)		1 38.
312	520.	(DIRECT FLOW)		2 16.
301	400.	(DIRECT FLOW)		0 42.
288	18.	.6		0 56.
394	15.	.8		0 48.
287	65.	1.4		0 36.
284	52.	.8		1 4.
281	37.	1.0		0 38.
280	37.	1.0		0 44.
277	25.	.5		0 38.
276	308.	2.4		0 34.
270	10.	.2		0 36.
269	37.	.5		0 38.
263	164.	1.9		0 50.
255	15.	.5		0 36.
252	81.	1.0		0 40.
248	129.	1.5		0 52.
243	28.	.9		0 36.
236	901.	4.3		1 44.
221	62.	1.3		0 26.
220	49.	1.2		0 32.
219	107.	.9		0 34.
218	76.	.8		0 30.
215	521.	3.6		2 20.
204	34.	.5		0 26.
203	57.	.6		0 26.
202	32.	.4		0 26.
201	435.	3.3		0 42.
931	18.	(DIRECT FLOW)		0 56.
930	77.	(DIRECT FLOW)		0 40.
929	52.	(DIRECT FLOW)		1 4.
928	37.	(DIRECT FLOW)		0 38.
927	37.	(DIRECT FLOW)		0 44.
926	25.	(DIRECT FLOW)		0 38.
925	308.	(DIRECT FLOW)		0 34.
923	10.	(DIRECT FLOW)		0 36.
922	37.	(DIRECT FLOW)		0 38.
921	164.	(DIRECT FLOW)		0 50.
919	15.	(DIRECT FLOW)		0 36.
918	81.	(DIRECT FLOW)		0 40.
917	129.	(DIRECT FLOW)		0 52.
916	28.	(DIRECT FLOW)		0 36.
915	901.	(DIRECT FLOW)		1 44.
913	62.	(DIRECT FLOW)		0 26.
912	49.	(DIRECT FLOW)		0 32.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Coal Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
911	107.	(DIRECT FLOW)		0 34.
910	76.	(DIRECT FLOW)		0 30.
905	521.	(DIRECT FLOW)		2 20.
904	34.	(DIRECT FLOW)		0 26.
903	57.	(DIRECT FLOW)		0 26.
902	32.	(DIRECT FLOW)		0 26.
901	435.	(DIRECT FLOW)		0 42.
1502	177.	(DIRECT FLOW)		0 44.
1501	759.	(DIRECT FLOW)		0 40.
1500	1850.	(DIRECT FLOW)		1 46.
1503	2261.	(DIRECT FLOW)		1 40.
1336	0.	(DIRECT FLOW)		0 0.
1504	2261.	(DIRECT FLOW)		1 40.
1233	0.	(DIRECT FLOW)		0 0.

Coal Creek Tributaries, 50 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	89.	.8		0 42.
324	89.	(DIRECT FLOW)		0 42.
325	88.	1.6		0 44.
225	117.	1.6		0 40.
326	203.	(DIRECT FLOW)		0 42.
226	209.	3.1		0 48.
227	115.	1.9		0 42.
327	209.	(DIRECT FLOW)		0 48.
329	115.	(DIRECT FLOW)		0 42.
328	207.	2.1		0 50.
228	181.	1.9		0 42.
330	375.	(DIRECT FLOW)		0 46.
260	191.	2.1		0 36.
1002	1110.	(DIRECT FLOW)		1 20.
331	372.	2.6		0 50.
231	69.	1.2		0 32.
229	101.	1.5		0 32.
1102	86.	.0	4.7	1 8.
332	1315.	(DIRECT FLOW)		1 20.
334	101.	(DIRECT FLOW)		0 32.
1360	86.	(DIRECT FLOW)		1 8.
333	1252.	4.6		1 22.
230	254.	2.7		0 36.
1000	505.	(DIRECT FLOW)		2 2.
210	38.	.6		0 42.
1361	86.	2.2		1 10.
261	186.	1.9		0 42.
335	1319.	(DIRECT FLOW)		1 22.
310	511.	(DIRECT FLOW)		2 0.
282	105.	.7		0 42.
272	70.	.7		0 42.
273	80.	.7		0 42.
1362	250.	(DIRECT FLOW)		0 48.
250	65.	1.3		0 38.
245	120.	1.9		0 46.
233	1056.	5.2		1 28.
211	514.	1.9		2 14.
390	105.	(DIRECT FLOW)		0 42.
378	70.	(DIRECT FLOW)		0 42.
382	80.	(DIRECT FLOW)		0 42.
1261	269.	2.6		0 48.
360	65.	(DIRECT FLOW)		0 38.
350	120.	(DIRECT FLOW)		0 46.
1101	913.	.0	12.6	1 36.
311	514.	(DIRECT FLOW)		2 14.
286	70.	1.2		0 38.
285	121.	.9		0 40.
283	145.	2.4		0 54.
379	70.	1.1		0 44.
275	162.	1.1		0 34.
274	428.	3.0		0 34.
370	269.	(DIRECT FLOW)		0 48.
262	107.	.8		0 36.
251	159.	1.7		0 42.
351	117.	1.5		0 52.
247	95.	1.5		0 44.
246	97.	1.5		0 42.
1003	275.	(DIRECT FLOW)		1 4.
336	913.	(DIRECT FLOW)		1 36.
235	139.	2.0		0 40.
214	118.	1.8		0 36.
213	96.	.8		0 40.
212	524.	2.0		2 16.
1001	400.	(DIRECT FLOW)		0 42.

Coal Creek Tributaries, 50 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
393	70.	(DIRECT FLOW)		0 38.
392	121.	(DIRECT FLOW)		0 40.
391	145.	(DIRECT FLOW)		0 54.
383	626.	(DIRECT FLOW)		0 34.
372	365.	(DIRECT FLOW)		0 42.
361	159.	(DIRECT FLOW)		0 42.
352	299.	(DIRECT FLOW)		0 46.
340	1139.	(DIRECT FLOW)		1 34.
312	531.	(DIRECT FLOW)		2 12.
301	400.	(DIRECT FLOW)		0 42.
288	58.	1.2		0 52.
394	56.	1.6		0 46.
287	179.	2.3		0 44.
284	175.	1.3		0 56.
281	121.	1.7		0 42.
280	117.	1.8		0 44.
277	87.	1.0		0 40.
276	642.	3.3		0 40.
270	38.	.5		0 38.
269	114.	.8		0 42.
263	425.	3.1		0 52.
255	51.	1.0		0 40.
252	252.	1.9		0 42.
248	405.	2.6		0 50.
243	81.	1.6		0 40.
236	1127.	4.6		1 40.
221	133.	1.9		0 32.
220	103.	1.8		0 36.
219	222.	1.2		0 40.
218	151.	1.1		0 36.
215	534.	3.6		2 16.
204	66.	.7		0 32.
203	102.	.8		0 32.
202	59.	.6		0 32.
201	476.	3.4		0 42.
931	58.	(DIRECT FLOW)		0 52.
930	234.	(DIRECT FLOW)		0 44.
929	175.	(DIRECT FLOW)		0 56.
928	121.	(DIRECT FLOW)		0 42.
927	117.	(DIRECT FLOW)		0 44.
926	87.	(DIRECT FLOW)		0 40.
925	642.	(DIRECT FLOW)		0 40.
923	38.	(DIRECT FLOW)		0 38.
922	114.	(DIRECT FLOW)		0 42.
921	425.	(DIRECT FLOW)		0 52.
919	51.	(DIRECT FLOW)		0 40.
918	252.	(DIRECT FLOW)		0 42.
917	405.	(DIRECT FLOW)		0 50.
916	81.	(DIRECT FLOW)		0 40.
915	1127.	(DIRECT FLOW)		1 40.
913	133.	(DIRECT FLOW)		0 32.
912	103.	(DIRECT FLOW)		0 36.
911	222.	(DIRECT FLOW)		0 40.
910	151.	(DIRECT FLOW)		0 36.
905	534.	(DIRECT FLOW)		2 16.
904	66.	(DIRECT FLOW)		0 32.
903	102.	(DIRECT FLOW)		0 32.
902	59.	(DIRECT FLOW)		0 32.
901	476.	(DIRECT FLOW)		0 42.
1502	562.	(DIRECT FLOW)		0 48.
1501	2121.	(DIRECT FLOW)		0 44.
1500	2187.	(DIRECT FLOW)		1 6.
1503	4797.	(DIRECT FLOW)		0 46.
1336	0.	(DIRECT FLOW)		0 0.
1504	4797.	(DIRECT FLOW)		0 46.
1233	0.	(DIRECT FLOW)		0 0.

Coal Creek Tributaries, 100 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
224	117.	.9		0 42.
324	117.	(DIRECT FLOW)		0 42.
325	116.	1.9		0 44.
225	153.	1.8		0 40.
326	266.	(DIRECT FLOW)		0 42.
226	273.	3.4		0 48.
227	152.	2.2		0 42.
327	273.	(DIRECT FLOW)		0 48.
329	152.	(DIRECT FLOW)		0 42.
328	271.	2.4		0 50.
228	236.	2.2		0 42.
330	490.	(DIRECT FLOW)		0 46.
260	245.	2.3		0 36.
1002	1110.	(DIRECT FLOW)		1 20.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Coal Creek Tributaries, 100 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
331	487.	2.9		0 48.
231	87.	1.4		0 34.
229	127.	1.6		0 34.
1102	106.	.0	6.4	1 10.
332	1366.	(DIRECT FLOW)		1 20.
334	127.	(DIRECT FLOW)		0 34.
1360	106.	(DIRECT FLOW)		1 10.
333	1301.	4.6		1 22.
230	319.	3.0		0 36.
1000	505.	(DIRECT FLOW)		2 2.
210	51.	.6		0 44.
1361	106.	2.4		1 12.
261	248.	2.2		0 42.
335	1376.	(DIRECT FLOW)		1 22.
310	512.	(DIRECT FLOW)		2 0.
282	143.	.8		0 44.
272	95.	.8		0 42.
273	109.	.8		0 42.
1362	324.	(DIRECT FLOW)		0 46.
250	86.	1.5		0 36.
245	163.	2.2		0 46.
233	1139.	5.3		1 26.
211	515.	1.9		2 14.
390	143.	(DIRECT FLOW)		0 44.
378	95.	(DIRECT FLOW)		0 42.
382	109.	(DIRECT FLOW)		0 42.
1261	351.	3.0		0 46.
360	86.	(DIRECT FLOW)		0 36.
350	163.	(DIRECT FLOW)		0 46.
1101	1011.	.0	14.2	1 34.
311	515.	(DIRECT FLOW)		2 14.
286	96.	1.4		0 36.
285	158.	1.0		0 40.
283	203.	2.9		0 54.
379	94.	1.3		0 44.
275	197.	1.2		0 34.
274	501.	3.2		0 34.
370	351.	(DIRECT FLOW)		0 46.
262	137.	.9		0 36.
251	211.	1.9		0 40.
351	159.	1.8		0 50.
247	127.	1.7		0 42.
246	128.	1.7		0 42.
1003	275.	(DIRECT FLOW)		1 4.
336	1011.	(DIRECT FLOW)		1 34.
235	175.	2.3		0 40.
214	149.	2.0		0 36.
213	124.	.9		0 40.
212	527.	2.0		2 14.
1001	400.	(DIRECT FLOW)		0 42.
393	96.	(DIRECT FLOW)		0 36.
392	158.	(DIRECT FLOW)		0 40.
391	203.	(DIRECT FLOW)		0 54.
383	762.	(DIRECT FLOW)		0 36.
372	471.	(DIRECT FLOW)		0 44.
361	211.	(DIRECT FLOW)		0 40.
352	403.	(DIRECT FLOW)		0 46.
340	1242.	(DIRECT FLOW)		1 32.
312	535.	(DIRECT FLOW)		2 10.
301	400.	(DIRECT FLOW)		0 42.
288	80.	1.5		0 52.
394	76.	1.8		0 46.
287	238.	2.7		0 44.
284	244.	1.5		0 56.
281	162.	2.0		0 42.
280	159.	2.1		0 44.
277	116.	1.1		0 40.
276	805.	3.6		0 42.
270	50.	.6		0 40.
269	153.	.9		0 42.
263	547.	3.4		0 52.
255	68.	1.1		0 40.
252	338.	2.2		0 42.
248	541.	3.0		0 50.
243	107.	1.8		0 40.
236	1248.	4.8		1 38.
221	168.	2.1		0 34.
220	131.	2.0		0 36.
219	278.	1.4		0 42.
218	189.	1.2		0 36.
215	538.	3.6		2 14.
204	80.	.8		0 34.
203	120.	.9		0 32.
202	71.	.6		0 32.
201	490.	3.4		0 42.
931	80.	(DIRECT FLOW)		0 52.

Coal Creek Tributaries, 100 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
930	313.	(DIRECT FLOW)		0 44.
929	244.	(DIRECT FLOW)		0 56.
928	162.	(DIRECT FLOW)		0 42.
927	159.	(DIRECT FLOW)		0 44.
926	116.	(DIRECT FLOW)		0 40.
925	805.	(DIRECT FLOW)		0 42.
923	50.	(DIRECT FLOW)		0 40.
922	153.	(DIRECT FLOW)		0 42.
921	547.	(DIRECT FLOW)		0 52.
919	68.	(DIRECT FLOW)		0 40.
918	338.	(DIRECT FLOW)		0 42.
917	541.	(DIRECT FLOW)		0 50.
916	107.	(DIRECT FLOW)		0 40.
915	1248.	(DIRECT FLOW)		1 38.
913	168.	(DIRECT FLOW)		0 34.
912	131.	(DIRECT FLOW)		0 36.
911	278.	(DIRECT FLOW)		0 42.
910	189.	(DIRECT FLOW)		0 36.
905	538.	(DIRECT FLOW)		2 14.
904	80.	(DIRECT FLOW)		0 34.
903	120.	(DIRECT FLOW)		0 32.
902	71.	(DIRECT FLOW)		0 32.
901	490.	(DIRECT FLOW)		0 42.
1502	764.	(DIRECT FLOW)		0 46.
1501	2785.	(DIRECT FLOW)		0 44.
1500	2589.	(DIRECT FLOW)		1 4.
1503	6066.	(DIRECT FLOW)		0 46.
1336	0.	(DIRECT FLOW)		0 0.
1504	6066.	(DIRECT FLOW)		0 46.
1233	0.	(DIRECT FLOW)		0 0.

Godding Hollow Tributaries, 4T Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	0.	.0		0 40.
760	0.	(DIRECT FLOW)		0 40.
662	12.	.3		0 42.
661	27.	.5		0 44.
663	11.	.3		0 50.
1119	20.	.0	1.1	1 14.
1107	10.	.0	.1	1 0.
1761	20.	.9		1 22.
1662	4.	.2		0 32.
1661	5.	.2		0 34.
1763	27.	(DIRECT FLOW)		1 14.
761	10.	(DIRECT FLOW)		0 32.
1764	27.	.7		1 20.
762	5.	.5		0 44.
664	12.	.6		0 44.
1663	7.	.3		0 38.
763	39.	(DIRECT FLOW)		1 10.
665	43.	1.1		1 12.
764	43.	(DIRECT FLOW)		1 12.
666	47.	1.1		1 14.
670	2.	.2		1 0.
765	47.	(DIRECT FLOW)		1 14.
770	2.	(DIRECT FLOW)		1 0.
667	50.	1.2		1 18.
671	5.	.3		0 40.
766	50.	(DIRECT FLOW)		1 18.
771	5.	(DIRECT FLOW)		0 40.
650	0.	.0		0 34.
668	53.	.9		1 24.
1211	0.	(DIRECT FLOW)		0 4.
673	23.	.4		0 40.
672	26.	.5		0 46.
680	30.	.5		0 38.
750	0.	(DIRECT FLOW)		0 34.
1210	53.	(DIRECT FLOW)		1 24.
1110	0.	.0	.0	5 0.
1108	30.	.0	1.1	1 10.
1109	15.	.0	.5	1 2.
651	1.	.0		0 36.
1766	53.	(DIRECT FLOW)		1 24.
772	30.	(DIRECT FLOW)		1 10.
1780	15.	(DIRECT FLOW)		1 2.
751	1.	(DIRECT FLOW)		0 36.
669	0.	.0		1 10.
1668	62.	.8		1 22.
674	28.	.6		1 22.
1680	14.	.4		1 10.
677	3.	.1		0 40.
655	0.	.0		0 40.
654	23.	.4		0 38.
652	3.	.1		0 40.
767	62.	(DIRECT FLOW)		1 22.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Godding Hollow Tributaries, 4T Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
773	28.	(DIRECT FLOW)		1 22.
972	14.	(DIRECT FLOW)		1 10.
777	3.	(DIRECT FLOW)		0 40.
755	0.	(DIRECT FLOW)		0 40.
754	23.	(DIRECT FLOW)		0 38.
752	3.	(DIRECT FLOW)		0 40.
768	60.	1.2		1 34.
675	30.	.7		1 26.
683	0.	.0		0 42.
769	13.	.4		1 20.
681	1.	.1		1 0.
679	1.	.1		0 40.
678	3.	.2		0 56.
756	0.	.0		1 6.
656	18.	.4		0 48.
653	3.	.2		1 0.
975	90.	(DIRECT FLOW)		1 32.
974	0.	(DIRECT FLOW)		0 42.
973	14.	(DIRECT FLOW)		1 20.
971	4.	(DIRECT FLOW)		0 52.
970	21.	(DIRECT FLOW)		0 48.
1500	114.	(DIRECT FLOW)		1 22.

Godding Hollow Tributaries, 2 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	1.	.1		0 40.
760	1.	(DIRECT FLOW)		0 40.
662	41.	.6		0 32.
661	87.	.9		0 34.
663	39.	.6		0 36.
1119	58.	.0	3.0	0 58.
1107	35.	.0	.3	0 44.
1761	57.	1.5		1 8.
1662	14.	.3		0 24.
1661	17.	.4		0 24.
1763	81.	(DIRECT FLOW)		0 56.
761	31.	(DIRECT FLOW)		0 24.
1764	80.	1.2		1 0.
762	19.	1.0		0 32.
664	44.	1.3		0 32.
1663	23.	.6		0 30.
763	118.	(DIRECT FLOW)		0 52.
665	131.	2.0		0 44.
764	131.	(DIRECT FLOW)		0 44.
666	148.	2.0		0 44.
670	7.	.5		0 32.
765	148.	(DIRECT FLOW)		0 44.
770	7.	(DIRECT FLOW)		0 32.
667	161.	2.3		0 52.
671	18.	.5		0 30.
766	161.	(DIRECT FLOW)		0 52.
771	18.	(DIRECT FLOW)		0 30.
650	1.	.1		0 40.
668	174.	1.5		1 4.
1211	0.	(DIRECT FLOW)		0 4.
673	73.	.8		0 32.
672	82.	.9		0 36.
680	95.	.8		0 30.
750	1.	(DIRECT FLOW)		0 40.
1210	174.	(DIRECT FLOW)		1 4.
1110	0.	.0	.0	5 0.
1108	84.	.0	3.1	0 56.
1109	38.	.0	1.7	0 50.
651	2.	.1		0 26.
1766	174.	(DIRECT FLOW)		1 4.
772	84.	(DIRECT FLOW)		0 56.
1780	38.	(DIRECT FLOW)		0 50.
751	2.	(DIRECT FLOW)		0 26.
669	0.	.1		0 42.
1668	208.	1.4		1 6.
674	81.	1.0		1 8.
1680	39.	.7		1 4.
677	11.	.3		0 30.
655	1.	.1		0 32.
654	71.	.7		0 30.
652	14.	.3		0 32.
767	208.	(DIRECT FLOW)		1 6.
773	81.	(DIRECT FLOW)		1 8.
972	39.	(DIRECT FLOW)		1 4.
777	11.	(DIRECT FLOW)		0 30.
755	1.	(DIRECT FLOW)		0 32.
754	71.	(DIRECT FLOW)		0 30.

Godding Hollow Tributaries, 2 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
752	14.	(DIRECT FLOW)		0 32.
768	204.	2.0		1 14.
675	89.	1.1		1 18.
683	1.	.1		0 42.
769	37.	.7		1 18.
681	3.	.1		0 40.
679	5.	.2		0 32.
678	14.	.4		0 36.
756	1.	.1		0 46.
656	55.	.7		0 38.
653	13.	.5		0 38.
975	292.	(DIRECT FLOW)		1 16.
974	1.	(DIRECT FLOW)		0 42.
973	39.	(DIRECT FLOW)		1 18.
971	18.	(DIRECT FLOW)		0 36.
970	69.	(DIRECT FLOW)		0 38.
1500	372.	(DIRECT FLOW)		1 10.

Godding Hollow Tributaries, 5 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	8.	.2		0 42.
760	8.	(DIRECT FLOW)		0 42.
662	60.	.8		0 32.
661	132.	1.1		0 34.
663	59.	.7		0 34.
1119	86.	.0	4.9	1 8.
1107	47.	.0	.5	0 46.
1761	85.	1.9		1 16.
1662	21.	.4		0 24.
1661	27.	.5		0 26.
1763	124.	(DIRECT FLOW)		1 0.
761	48.	(DIRECT FLOW)		0 24.
1764	122.	1.5		1 2.
762	36.	1.3		0 34.
664	72.	1.6		0 32.
1663	34.	.7		0 30.
763	194.	(DIRECT FLOW)		0 52.
665	221.	2.6		0 46.
764	221.	(DIRECT FLOW)		0 46.
666	247.	2.7		0 46.
670	16.	.8		0 42.
765	247.	(DIRECT FLOW)		0 46.
770	16.	(DIRECT FLOW)		0 42.
667	272.	3.0		0 54.
671	29.	.7		0 32.
766	272.	(DIRECT FLOW)		0 54.
771	29.	(DIRECT FLOW)		0 32.
650	11.	.2		0 36.
668	298.	1.8		1 6.
1211	0.	(DIRECT FLOW)		0 4.
673	108.	.9		0 30.
672	126.	1.1		0 36.
680	140.	1.0		0 30.
750	11.	(DIRECT FLOW)		0 36.
1210	298.	(DIRECT FLOW)		1 6.
1110	0.	.0	.0	5 0.
1108	133.	.0	4.9	1 0.
1109	47.	.0	2.8	0 54.
651	14.	.3		0 38.
1766	298.	(DIRECT FLOW)		1 6.
772	133.	(DIRECT FLOW)		1 0.
1780	47.	(DIRECT FLOW)		0 54.
751	14.	(DIRECT FLOW)		0 38.
669	3.	.4		1 18.
1668	350.	1.8		1 12.
674	141.	1.3		1 16.
1680	59.	.8		1 10.
677	30.	.5		0 44.
655	7.	.2		0 42.
654	106.	.8		0 30.
652	34.	.6		0 46.
767	353.	(DIRECT FLOW)		1 12.
773	141.	(DIRECT FLOW)		1 16.
972	59.	(DIRECT FLOW)		1 10.
777	30.	(DIRECT FLOW)		0 44.
755	7.	(DIRECT FLOW)		0 42.
754	106.	(DIRECT FLOW)		0 30.
752	34.	(DIRECT FLOW)		0 46.
768	349.	2.6		1 20.
675	163.	1.5		1 22.
683	6.	.2		0 50.
769	58.	.8		1 24.
681	16.	.4		0 58.
679	21.	.4		0 44.
678	48.	.7		1 14.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Godding Hollow Tributaries, 5 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
756	7.	.2		0 48.
656	92.	.9		0 40.
653	38.	.8		1 0.
975	512.	(DIRECT FLOW)		1 22.
974	6.	(DIRECT FLOW)		0 50.
973	72.	(DIRECT FLOW)		1 18.
971	67.	(DIRECT FLOW)		1 0.
970	130.	(DIRECT FLOW)		0 42.
1500	745.	(DIRECT FLOW)		1 16.

Godding Hollow Tributaries, 10 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	19.	.3		0 38.
760	19.	(DIRECT FLOW)		0 38.
662	78.	.8		0 32.
661	178.	1.3		0 34.
663	78.	.8		0 34.
1119	113.	.0	6.9	1 12.
1107	58.	.0	.8	0 48.
1761	113.	2.1		1 18.
1662	29.	.5		0 26.
1661	39.	.6		0 30.
1763	161.	(DIRECT FLOW)		1 6.
761	66.	(DIRECT FLOW)		0 26.
1764	160.	1.7		1 8.
762	55.	1.6		0 34.
664	102.	1.9		0 32.
1663	45.	.7		0 30.
763	268.	(DIRECT FLOW)		0 48.
665	309.	3.0		0 46.
764	309.	(DIRECT FLOW)		0 46.
666	347.	3.1		0 50.
670	30.	1.0		0 42.
765	347.	(DIRECT FLOW)		0 50.
770	30.	(DIRECT FLOW)		0 42.
667	379.	3.4		1 0.
671	42.	.8		0 36.
766	379.	(DIRECT FLOW)		1 0.
771	42.	(DIRECT FLOW)		0 36.
650	24.	.4		0 34.
668	418.	2.1		1 10.
1211	6.	(DIRECT FLOW)		1 12.
673	142.	1.1		0 30.
672	173.	1.2		0 36.
680	181.	1.1		0 30.
750	24.	(DIRECT FLOW)		0 34.
1210	418.	(DIRECT FLOW)		1 10.
1110	3.	.0	.1	1 24.
1108	169.	.0	7.2	1 10.
1109	55.	.0	3.8	0 58.
651	32.	.5		0 34.
1766	414.	(DIRECT FLOW)		1 14.
772	169.	(DIRECT FLOW)		1 10.
1780	55.	(DIRECT FLOW)		0 58.
751	32.	(DIRECT FLOW)		0 34.
669	9.	.7		1 16.
1668	476.	2.0		1 14.
674	196.	1.5		1 20.
1680	83.	.9		1 10.
677	63.	.7		0 58.
655	17.	.4		0 40.
654	141.	1.0		0 30.
652	66.	.8		0 48.
767	485.	(DIRECT FLOW)		1 14.
773	196.	(DIRECT FLOW)		1 20.
972	83.	(DIRECT FLOW)		1 10.
777	63.	(DIRECT FLOW)		0 58.
755	17.	(DIRECT FLOW)		0 40.
754	141.	(DIRECT FLOW)		0 30.
752	66.	(DIRECT FLOW)		0 48.
768	481.	2.9		1 20.
675	227.	1.7		1 22.
683	13.	.4		0 46.
769	81.	1.0		1 22.
681	34.	.6		1 0.
679	42.	.6		0 46.
678	103.	1.0		1 14.
756	16.	.3		0 46.
656	134.	1.1		0 40.
653	76.	1.1		1 2.
975	708.	(DIRECT FLOW)		1 22.
974	13.	(DIRECT FLOW)		0 46.

Godding Hollow Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
973	113.	(DIRECT FLOW)		1 16.
971	140.	(DIRECT FLOW)		1 6.
970	209.	(DIRECT FLOW)		0 44.
1500	1128.	(DIRECT FLOW)		1 16.

Godding Hollow Tributaries, 50 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	59.	.6		0 42.
760	59.	(DIRECT FLOW)		0 42.
662	141.	1.1		0 36.
661	337.	1.7		0 38.
663	142.	1.1		0 38.
1119	207.	.0	13.5	1 12.
1107	100.	.0	2.0	0 56.
1761	206.	2.8		1 16.
1662	62.	.7		0 32.
1661	86.	.9		0 32.
1763	294.	(DIRECT FLOW)		1 8.
761	148.	(DIRECT FLOW)		0 32.
1764	293.	2.3		1 12.
762	119.	2.4		0 38.
664	218.	2.7		0 40.
1663	85.	1.0		0 34.
763	543.	(DIRECT FLOW)		0 48.
665	645.	3.9		0 50.
764	645.	(DIRECT FLOW)		0 50.
666	727.	4.0		0 54.
670	84.	1.8		0 44.
765	727.	(DIRECT FLOW)		0 54.
770	84.	(DIRECT FLOW)		0 44.
667	786.	4.3		1 2.
671	110.	1.2		0 44.
766	786.	(DIRECT FLOW)		1 2.
771	110.	(DIRECT FLOW)		0 44.
650	69.	.6		0 36.
668	856.	2.9		1 8.
1211	243.	(DIRECT FLOW)		1 10.
673	255.	1.4		0 34.
672	359.	1.7		0 44.
680	326.	1.4		0 32.
750	69.	(DIRECT FLOW)		0 36.
1210	856.	(DIRECT FLOW)		1 8.
1110	146.	.0	7.3	1 36.
1108	308.	.0	16.2	1 14.
1109	84.	.0	7.3	1 4.
651	96.	.8		0 40.
1766	729.	(DIRECT FLOW)		1 20.
772	308.	(DIRECT FLOW)		1 14.
1780	84.	(DIRECT FLOW)		1 4.
751	96.	(DIRECT FLOW)		0 40.
669	35.	1.4		1 2.
1668	795.	2.5		1 18.
674	390.	2.0		1 18.
1680	173.	1.3		1 0.
677	206.	1.2		0 54.
655	55.	.7		0 44.
654	274.	1.3		0 36.
652	205.	1.3		0 50.
767	826.	(DIRECT FLOW)		1 16.
773	390.	(DIRECT FLOW)		1 18.
972	173.	(DIRECT FLOW)		1 0.
777	206.	(DIRECT FLOW)		0 54.
755	55.	(DIRECT FLOW)		0 44.
754	274.	(DIRECT FLOW)		0 36.
752	205.	(DIRECT FLOW)		0 50.
768	821.	3.7		1 22.
675	441.	2.3		1 20.
683	41.	.7		0 50.
769	165.	1.3		1 14.
681	110.	1.0		0 56.
679	134.	1.0		0 50.
678	331.	1.6		1 4.
756	54.	.6		0 50.
656	294.	1.5		0 44.
653	239.	1.8		1 0.
975	1262.	(DIRECT FLOW)		1 22.
974	41.	(DIRECT FLOW)		0 50.
973	266.	(DIRECT FLOW)		1 6.
971	450.	(DIRECT FLOW)		0 58.
970	554.	(DIRECT FLOW)		0 52.
1500	2399.	(DIRECT FLOW)		1 4.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Godding Hollow Tributaries, 100 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
660	78.	.7		0 42.
760	78.	(DIRECT FLOW)		0 42.
662	171.	1.2		0 36.
661	411.	1.8		0 38.
663	171.	1.2		0 38.
1119	253.	.0	16.9	1 12.
1107	120.	.0	2.5	0 56.
1761	250.	3.1		1 18.
1662	76.	.8		0 32.
1661	106.	.9		0 32.
1763	357.	(DIRECT FLOW)		1 10.
761	182.	(DIRECT FLOW)		0 32.
1764	357.	2.6		1 12.
762	149.	2.7		0 38.
664	275.	3.0		0 40.
1663	105.	1.1		0 36.
763	673.	(DIRECT FLOW)		0 46.
665	806.	4.2		0 50.
764	806.	(DIRECT FLOW)		0 50.
666	913.	4.3		0 54.
670	111.	2.0		0 44.
765	913.	(DIRECT FLOW)		0 54.
770	111.	(DIRECT FLOW)		0 44.
667	998.	4.7		1 4.
671	144.	1.4		0 44.
766	998.	(DIRECT FLOW)		1 4.
771	144.	(DIRECT FLOW)		0 44.
650	92.	.7		0 36.
668	1093.	3.2		1 8.
1211	396.	(DIRECT FLOW)		1 10.
673	305.	1.5		0 34.
672	454.	1.9		0 46.
680	383.	1.5		0 34.
750	92.	(DIRECT FLOW)		0 36.
1210	1093.	(DIRECT FLOW)		1 8.
1110	231.	.0	12.9	1 38.
1108	378.	.0	20.7	1 14.
1109	97.	.0	9.0	1 6.
651	128.	.9		0 38.
1766	874.	(DIRECT FLOW)		1 20.
772	378.	(DIRECT FLOW)		1 14.
1780	97.	(DIRECT FLOW)		1 6.
751	128.	(DIRECT FLOW)		0 38.
669	51.	1.7		1 2.
1668	941.	2.7		1 16.
674	494.	2.2		1 16.
1680	222.	1.4		1 2.
677	284.	1.4		0 54.
655	75.	.8		0 44.
654	340.	1.4		0 36.
652	276.	1.4		0 50.
767	985.	(DIRECT FLOW)		1 14.
773	494.	(DIRECT FLOW)		1 16.
972	222.	(DIRECT FLOW)		1 2.
777	284.	(DIRECT FLOW)		0 54.
755	75.	(DIRECT FLOW)		0 44.
754	340.	(DIRECT FLOW)		0 36.
752	276.	(DIRECT FLOW)		0 50.
768	978.	4.0		1 22.
675	557.	2.5		1 18.
683	55.	.8		0 50.
769	212.	1.5		1 12.
681	152.	1.2		0 56.
679	181.	1.1		0 48.
678	465.	1.9		1 4.
756	73.	.7		0 48.
656	373.	1.7		0 46.
653	327.	2.1		1 0.
975	1534.	(DIRECT FLOW)		1 20.
974	55.	(DIRECT FLOW)		0 50.
973	353.	(DIRECT FLOW)		1 6.
971	624.	(DIRECT FLOW)		1 0.
970	732.	(DIRECT FLOW)		0 52.
1500	3101.	(DIRECT FLOW)		1 6.

Little Dry Creek Tributaries, 4T Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	1.	.1		0 42.
705	1.	(DIRECT FLOW)		0 42.
622	13.	.7		0 44.
624	1.	.1		0 42.
706	0.	.1		1 12.

Little Dry Creek Tributaries, 4T Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
621	5.	.3		0 44.
1104	10.	.0	.2	1 0.
713	1.	(DIRECT FLOW)		0 42.
707	5.	(DIRECT FLOW)		0 44.
1709	10.	(DIRECT FLOW)		1 0.
625	1.	.1		1 0.
708	5.	.3		1 0.
1622	16.	.8		1 0.
714	1.	(DIRECT FLOW)		1 0.
709	21.	(DIRECT FLOW)		1 0.
715	1.	.1		1 4.
623	36.	1.1		1 2.
716	37.	(DIRECT FLOW)		1 2.
1105	30.	.0	.8	1 20.
635	3.	.2		0 36.
717	30.	(DIRECT FLOW)		1 20.
735	3.	(DIRECT FLOW)		0 36.
630	13.	.3		0 36.
628	33.	.9		1 16.
636	3.	.3		0 42.
718	36.	(DIRECT FLOW)		1 12.
736	3.	(DIRECT FLOW)		0 42.
631	59.	1.2		1 10.
638	3.	.2		1 2.
637	0.	.1		1 0.
1106	53.	.0	1.0	1 22.
737	3.	(DIRECT FLOW)		1 2.
720	53.	(DIRECT FLOW)		1 22.
639	5.	.3		0 40.
632	67.	1.3		1 18.
738	71.	(DIRECT FLOW)		1 16.
640	69.	1.7		1 24.
803	0.	.1		1 2.
615	2.	.1		0 36.
611	0.	.0		0 34.
962	70.	(DIRECT FLOW)		1 24.
961	2.	(DIRECT FLOW)		0 36.
960	0.	(DIRECT FLOW)		0 34.
1500	70.	(DIRECT FLOW)		1 24.

Little Dry Creek Tributaries, 2 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	2.	.3		0 32.
705	2.	(DIRECT FLOW)		0 32.
622	48.	1.3		0 32.
624	4.	.2		0 32.
706	2.	.2		0 46.
621	19.	.7		0 32.
1104	33.	.0	.6	0 42.
713	4.	(DIRECT FLOW)		0 32.
707	19.	(DIRECT FLOW)		0 32.
1709	33.	(DIRECT FLOW)		0 42.
625	6.	.3		0 40.
708	18.	.6		0 38.
1622	52.	1.4		0 36.
714	6.	(DIRECT FLOW)		0 40.
709	70.	(DIRECT FLOW)		0 38.
715	5.	.3		0 46.
623	131.	2.1		0 38.
716	136.	(DIRECT FLOW)		0 38.
1105	93.	.0	2.6	1 0.
635	10.	.5		0 26.
717	93.	(DIRECT FLOW)		1 0.
735	10.	(DIRECT FLOW)		0 26.
630	40.	.6		0 28.
628	103.	1.6		1 2.
636	13.	.6		0 32.
718	111.	(DIRECT FLOW)		1 0.
736	13.	(DIRECT FLOW)		0 32.
631	198.	2.3		0 38.
638	12.	.5		0 42.
637	2.	.2		1 4.
1106	168.	.0	3.2	1 6.
737	14.	(DIRECT FLOW)		0 44.
720	168.	(DIRECT FLOW)		1 6.
639	21.	.6		0 32.
632	213.	2.4		1 0.
738	229.	(DIRECT FLOW)		0 58.
640	227.	3.0		1 6.
803	2.	.3		1 6.
615	8.	.3		0 26.
611	2.	.1		0 26.
962	229.	(DIRECT FLOW)		1 6.
961	8.	(DIRECT FLOW)		0 26.
960	2.	(DIRECT FLOW)		0 26.
1500	232.	(DIRECT FLOW)		1 6.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Little Dry Creek Tributaries, 5 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	5.	.4		0 42.
705	5.	(DIRECT FLOW)		0 42.
622	73.	1.6		0 30.
624	23.	.4		0 52.
706	5.	.3		0 50.
621	33.	1.0		0 34.
1104	45.	.0	.9	0 44.
713	23.	(DIRECT FLOW)		0 52.
707	37.	(DIRECT FLOW)		0 38.
1709	45.	(DIRECT FLOW)		0 44.
625	27.	.8		0 58.
708	36.	1.0		0 44.
1622	80.	1.8		0 34.
714	27.	(DIRECT FLOW)		0 58.
709	113.	(DIRECT FLOW)		0 36.
715	27.	.8		1 0.
623	208.	2.6		0 36.
716	222.	(DIRECT FLOW)		0 36.
1105	166.	.0	4.7	1 10.
635	16.	.7		0 30.
717	166.	(DIRECT FLOW)		1 10.
735	16.	(DIRECT FLOW)		0 30.
630	58.	.7		0 26.
628	180.	2.1		1 10.
636	26.	.9		0 34.
718	194.	(DIRECT FLOW)		1 10.
736	26.	(DIRECT FLOW)		0 34.
631	307.	2.9		0 36.
638	34.	.9		0 48.
637	14.	.7		0 54.
1106	272.	.0	5.2	1 16.
737	48.	(DIRECT FLOW)		0 50.
720	272.	(DIRECT FLOW)		1 16.
639	54.	1.1		0 52.
632	332.	3.0		1 12.
738	383.	(DIRECT FLOW)		1 4.
640	386.	3.7		1 16.
803	15.	.8		1 8.
615	14.	.4		0 30.
611	12.	.3		0 36.
962	401.	(DIRECT FLOW)		1 14.
961	14.	(DIRECT FLOW)		0 30.
960	12.	(DIRECT FLOW)		0 36.
1500	416.	(DIRECT FLOW)		1 14.

Little Dry Creek Tributaries, 10 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	11.	.6		0 40.
705	11.	(DIRECT FLOW)		0 40.
622	99.	1.9		0 30.
624	47.	.6		0 56.
706	10.	.5		0 48.
621	56.	1.3		0 44.
1104	54.	.0	1.4	0 50.
713	47.	(DIRECT FLOW)		0 56.
707	66.	(DIRECT FLOW)		0 46.
1709	54.	(DIRECT FLOW)		0 50.
625	56.	1.3		1 0.
708	65.	1.3		0 48.
1622	105.	2.0		0 32.
714	56.	(DIRECT FLOW)		1 0.
709	159.	(DIRECT FLOW)		0 38.
715	56.	1.2		1 2.
623	282.	3.0		0 36.
716	316.	(DIRECT FLOW)		0 38.
1105	250.	.0	7.1	1 16.
635	26.	.8		0 32.
717	250.	(DIRECT FLOW)		1 16.
735	26.	(DIRECT FLOW)		0 32.
630	74.	.8		0 26.
628	268.	2.6		1 14.
636	45.	1.2		0 36.
718	285.	(DIRECT FLOW)		1 14.
736	45.	(DIRECT FLOW)		0 36.
631	400.	3.2		0 36.
638	64.	1.3		0 48.
637	31.	1.0		0 48.
1106	369.	.0	7.7	1 24.
737	95.	(DIRECT FLOW)		0 48.
720	369.	(DIRECT FLOW)		1 24.
639	103.	1.5		0 50.
632	434.	3.3		1 16.

Little Dry Creek Tributaries, 10 Year Event (con)

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
738	523.	(DIRECT FLOW)		1 0.
640	534.	4.1		1 16.
803	34.	1.1		0 58.
615	22.	.5		0 32.
611	27.	.4		0 34.
962	565.	(DIRECT FLOW)		1 14.
961	22.	(DIRECT FLOW)		0 32.
960	27.	(DIRECT FLOW)		0 34.
1500	596.	(DIRECT FLOW)		1 14.

Little Dry Creek Tributaries, 50 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	33.	1.1		0 42.
705	33.	(DIRECT FLOW)		0 42.
622	192.	2.6		0 34.
624	154.	1.1		0 54.
706	31.	.9		0 48.
621	169.	2.3		0 50.
1104	96.	.0	3.8	1 4.
713	154.	(DIRECT FLOW)		0 54.
707	200.	(DIRECT FLOW)		0 50.
1709	96.	(DIRECT FLOW)		1 4.
625	182.	2.3		0 56.
708	199.	2.3		0 52.
1622	188.	2.6		0 36.
714	182.	(DIRECT FLOW)		0 56.
709	370.	(DIRECT FLOW)		0 50.
715	181.	2.2		0 56.
623	563.	3.9		0 44.
716	720.	(DIRECT FLOW)		0 50.
1105	524.	.0	17.9	1 18.
635	62.	1.3		0 34.
717	524.	(DIRECT FLOW)		1 18.
735	62.	(DIRECT FLOW)		0 34.
630	126.	1.0		0 32.
628	544.	3.5		1 18.
636	125.	1.9		0 40.
718	561.	(DIRECT FLOW)		1 16.
736	125.	(DIRECT FLOW)		0 40.
631	746.	4.0		0 52.
638	196.	2.4		0 50.
637	100.	1.8		0 46.
1106	668.	.0	16.9	1 26.
737	295.	(DIRECT FLOW)		0 48.
720	668.	(DIRECT FLOW)		1 26.
639	312.	2.6		0 50.
632	738.	4.0		1 20.
738	988.	(DIRECT FLOW)		0 54.
640	1013.	5.1		1 6.
803	112.	2.1		0 52.
615	60.	.8		0 46.
611	85.	.8		0 40.
962	1112.	(DIRECT FLOW)		1 4.
961	60.	(DIRECT FLOW)		0 46.
960	85.	(DIRECT FLOW)		0 40.
1500	1208.	(DIRECT FLOW)		1 0.

Table B2 – UDSWM Output, Outfall Systems Plan (con)

Little Dry Creek Tributaries, 100 Year Event

CONVEYANCE ELEMENT	PEAK (CFS)	STAGE (FT)	STORAGE (AC-FT)	TIME (HR/MIN)
620	44.	1.3		0 42.
705	44.	(DIRECT FLOW)		0 42.
622	237.	2.8		0 36.
624	211.	1.2		0 54.
706	42.	1.0		0 46.
621	229.	2.6		0 50.
1104	118.	.0	5.1	1 6.
713	211.	(DIRECT FLOW)		0 54.
707	271.	(DIRECT FLOW)		0 48.
1709	118.	(DIRECT FLOW)		1 6.
625	249.	2.7		0 56.
708	270.	2.7		0 50.
1622	227.	2.9		0 36.
714	249.	(DIRECT FLOW)		0 56.
709	483.	(DIRECT FLOW)		0 50.
715	249.	2.6		0 56.
623	710.	4.2		0 46.
716	939.	(DIRECT FLOW)		0 50.
1105	654.	.0	25.1	1 20.
635	80.	1.5		0 34.
717	654.	(DIRECT FLOW)		1 20.
735	80.	(DIRECT FLOW)		0 34.
630	146.	1.0		0 32.
628	673.	3.7		1 20.
636	165.	2.2		0 40.
718	688.	(DIRECT FLOW)		1 16.
736	165.	(DIRECT FLOW)		0 40.
631	898.	4.3		0 48.
638	264.	2.7		0 48.
637	136.	2.1		0 46.
1106	805.	.0	21.1	1 26.
737	399.	(DIRECT FLOW)		0 48.
720	805.	(DIRECT FLOW)		1 26.
639	418.	3.0		0 50.
632	878.	4.2		1 16.
738	1214.	(DIRECT FLOW)		0 54.
640	1258.	5.5		1 6.
803	154.	2.4		0 52.
615	82.	.9		0 46.
611	113.	.9		0 38.
962	1394.	(DIRECT FLOW)		1 4.
961	82.	(DIRECT FLOW)		0 46.
960	113.	(DIRECT FLOW)		0 38.
1500	1524.	(DIRECT FLOW)		1 2.

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APPENDIX C

MEETING MINUTES AND BOARD OF TRUSTEES RESOLUTION

APPENDIX C
MEETING MINUTES

Meeting No. 1
Town of Erie Outfall Systems Planning East of Coal Creek
Alternate Evaluation

Held on Friday, April 21, 2006 @ 9:00 AM
At the Town of Erie Offices

The following persons were in attendance at this meeting:

Wendi Palmer	Town of Erie	303-926-2875
David Love	Love & Associates, Inc.	303-673-9795
Roger Peterson	Love & Associates, Inc.	303-673-9795
Rebecca Baker	Love & Associates, Inc.	303-673-9795

These Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Love & Associates, Inc. (303-673-9795, fax 303-673-9796) with any additions or corrections to these minutes prior to May 5, 2006.

1. The following entities may have with interest in this Master Plan Project – Love may contact adjacent jurisdictions on behalf of the Town in regards to this project:
   - UDFCD (water quality, possible review)
   - Boulder County (inform of meetings)
   - Weld County (inform of meetings)
   - Broomfield (inform of meetings, request Master Plans/ Development Plans)
   - Dacono (inform of meetings, interact with one-on-one)
   - Frederick (inform of meetings)
   - Utilities (Love to contact for information)
   - CDOT
   - Irrigation Companies

2. Wendi will join Love for site investigation if time works with her schedule.

3. The name of the contact at Clarion, the firm spearheading the Comprehensive Plan for the Town, is Darcy. If Clarion requires compensation for answering questions, it is not to be billed to the Comprehensive Plan (Erie Planning); Love will contact Wendi.

4. Love requested the following information from the Town if available:
   - As-builts for detention in existing development and drainage if required.
   - Electronic copy of Comprehensive Plan (area annexed by Frederick will be shown on the plan).
   - Update of Town of Erie Street Location Guide
   - Map of property ownership blocks (Love to contact Weld and Boulder County and Erie GIS, Deb Jenkins)
   - Water/sewer/utility Master update (Love to contact Erie Deb Pearson)
   - Storm sewer update (2004)
   - Ultimate build-out of roads (Love to contact Boulder County for Highway 52)
   - New Sanitary Treatment Plant near Boulder Creek
   - Any new information on Godding Hollow Watershed postdating the 2000 Master Plan
   - Underground and surface mine location maps
   - Landfill drainage/reclamation information (Love to review available information in Town offices)
   - Identification of areas of historic significance
   - Corridor planning information from CDOT
   - FIRM Map update (Love to check Weld Co. web site for DFIRM update)
   - BMP/Water Quality information Wendi feels appropriate to send to us

5. Wendi will gather the following documents for Love to review; pages to be copied by Erie will be flagged:
   - I-25 Plans (showing ditch crossings, drainage features)
   - Broomfield Drainage Report
   - As-constructed drawings for Vista Ridge
   - Landfill Information

6. Status of Railroads in the study area:
   - UPRR: Active
   - BNSF: Abandoned

7. The following are priority areas where Love will concentrate initial efforts:
   - Tall Grass subdivision (in process) (Section 17 and N. ½ of Section 20)
   - Dearmin (south part of Section 6 near the creek, north of the landfill)

8. Town Design Criteria:
   - Minimize regional detention at major intersections and commercial areas
   - Avoid regional detention at Mineral and County Line Road intersection (tentative plan for new Sewer Plant near this location)
   - Love to research for the Town alternate water quality measures (i.e. depressed medians, clay soil, porous pavement, etc.)
   - Love to address detention methods other than regional in commercial areas.

9. Irrigation Ditch Information
   - Love to review: Erie Commons – Coal Creek Extension Ditch through Grandview; Lower Boulder, FRICO – Farmers by Broomfield
   - I-25 Plans show Ditch Crossings, drainage
   - Ditches define low point in some instances
   - Love to request information from the Water Commissioner

10. Other resources Love to review:
   - Property Ownership Blocks - Weld County website and Deb Jenkins (GIS)
   - No drainage report is available for Dearmin West, however the existing conditions map shows wells
   - Grandview plans show offsite basins
   - Landfill locations should be evident from aerial photos. Erie has DRCOG Aerial photos form 2004 or 2005 which may be used.
   - WASH website (www.basin.org\wash) may have useful water quality alternative information
   - Wendi provided a list of developments and the counties they are in. List organized by subdivision

11. It was agreed to delineate Catchments for the Alternate Analysis using USGS mapping. This information will be updated using project mapping for the Preliminary Design Phase.

12. Wendi provided the following documents to Love which are to be returned when the project is complete:
   - Nuszer Kopatz, 2005. Dearmin West Development Plan (notebook).
   - Carroll & Lange, Inc. 2002. Phase III Drainage Report for Vista Pointe March 20, 2002 (2 copies) Prepared for Vista Pointe Land Development Company
   - Hurst & Associates, Inc. 2001. Vista Ridge Golf Course Development Master Drainage Report Addendum. Prepared for Vista Ridge Development, LLC.
   - Hurst & Associates, Inc. 2001. Vista Ridge Golf Course Development Master Drainage Report with Appendix A, B, & C. Prepared for Vista Ridge Development, LLC.
   - Hurst & Associates, Inc. 2001. Vista Ridge Golf Course Development Master Drainage Report Appendix D, E, F, & G. Prepared for Vista Ridge Development, LLC.
   - Nuszer Kopatz, 2006. Wyndham Hill Final PUD Development Plan – Filing 2 (two sheets).
   - Carroll & Lange, Inc. 2001. Phase III Drainage Report for Sheridan Parkway Extension and County Road No. 4. Prepared for Vista Ridge Development Corporation.
   - Carroll & Lange, Inc. 2002. Phase III Drainage Report for Vista Parkway Construction. Prepared for Vista Ridge Development Corporation.
   - Ehrhart Griffin & Associates, Inc. 1997. Northridge Subdivision Filing No. 3 Final Drainage Report. Prepared for Northridge Development L.L.C.
   - Kirkham Michael Consulting Engineers, 2001. Grandview Subdivision Filing No. 1. Prepared for Kaufman Broad.

13. Other Items:
   - Love to provide Wendi panel point locations and the report with set monuments tied to the overall map as soon as possible to avoid makers being disturbed.
   - The Town was provided a preliminary Table of Contents of the Alternate Evaluation for Review and comment (copy attached)
   - Mapping priority include Sections 5, 6, 7, 8, 17, 18, and 20 bounded by Coal Creek to the west.
   - Love to provide Wendi with a progress update before May 1.

MEETING MINUTES

Meeting No. 2
Town of Erie Outfall Systems Planning East of Coal Creek
Alternate Evaluation

Held on Tuesday, August 29, 2006 @ 2:00 PM
At the Town of Erie Offices

The following persons were in attendance at this meeting:

Gary Behlen	Town of Erie	303-926-2875
Wendi Palmer	Town of Erie	303-926-2875
David Love	Love & Associates, Inc.	303-673-9795
Roger Peterson	Love & Associates, Inc.	303-673-9795
Rebecca Baker	Love & Associates, Inc.	303-673-9795

These Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Love & Associates, Inc. (303-673-9795, fax 303-673-9796) with any additions or corrections to these minutes prior to September 12, 2006. If no comments are received by this date, it will be assumed the minutes correctly reflect and document this meeting and will be considered final.

Exhibits

The following exhibits were presented by Love & Associates, Inc. for review and comment by the Town:

- Basin Delineation Map:
  - More conveyance elements are incorporated into the model for the East of Coal Creek study as compared to the Master Plan completed for West of Coal Creek.
  - The Town will review the delineations and provide direction for modifications, where necessary, and indicate whether any basins should be subdivided.
  - Love reviewed model development and calibration and noted different hydrologic methods were used for flood peak prediction yield similar flood peaks
  - The area of the future Bridgewater development was delineated to match the development's basin delineation. Love noted conveyance downstream of Bridgewater is not well defined and new structures may be prone to flooding.
  - The Town noted large developments without adequate outfalls are a concern.
- Sheet Layout for Report (11x17)
  - The Town will review the sheet layout.
  - The Town requested a bar scale be included in the figures and that a note be added indicating the 1" = 1800' scale was plotted originally on 11" x 17". This information may be helpful for someone viewing the information electronically should they wish to plot it.
- Preliminary Soil Delineation Map: Love briefly described the soil types and their degree of infiltration.
- Land Use Maps
  - Existing – Developed from review of the aerial photos and town data.
  - Future – Land use from the Town's Comp Plan

- UDSWMM Flow Charts

Field Visit Summary

Love described field conditions observed during July's site visits including:

Conditions and sizes of irrigation structures and other structures –

- Irrigation crossings are typically CMP's. Larger RBC's are used for ditch crossings of major roads. Drainage crossing culverts are typically small/inadequate and in many locations drainageways cross at low points in the road with no culverts.

Possible problem area at Old SH52

- Along Old Highway 52, the road embankment is 3-4 feet high on the south side of the curve. There are 3-18" CMP's under Old Highway 52 through which water can enter the Lower Boulder Ditch. Houses located on the outside of the curve may be prone to flooding.

Condition of railroad embankment

- Houses have been constructed near the high point where the Burlington Northern Railroad used to exist on the south side of HWY 52 between County Line Road and WCR 3. Northeast of this location where the Burlington Northern line crosses WCR 3¼, the railroad embankments still exists and a 12" RCP crosses under the railroad. This insufficient culvert may lead to ponding at the embankment.

- The Burlington Northern line has been abandoned; the track and rails have been removed. The railroad embankment has been breeched in several places. Where Coal Creek and Lower Boulder

Ditch cross the railroad, there are no culverts and little remains of the embankment on either side.

- The UPRR railroad embankment is generally intact with track and ties in place in most locations. Timber bridge crossings and some small culverts are in place. There are locations where ponding may occur against the embankment and only a few breeches in the embankment. The embankment for the spur on the north side of Leon A. Wurl Parkway is less consistent.

I-25 Crossings:

- The Little Dry Creek Watershed includes three crossings under I-25 between WCR 6 and Leon A. Wurl Parkway. Two of the crossings are 13' x 7'h RBC's with concrete levees where the Stanley Ditch crosses under I-25 twice. Between these two crossings, a 60" RCP crosses under the frontage road on the west side of I-25 leading to a 72" RCP which crosses under I-25.

- In the Godding Hollow Watershed between Leon A. Wurl Parkway and WCR 10 near I-25 a 6.5' CMP crosses under the UPRR railroad spur followed by 2-10' x 5'h RBC's which cross under I-25 and the Frontage Road on the east side of I-25.

- North of WCR 10 2-14' x 6'h RBC's cross under I-25 and the Frontage Road.

Discussion

The Town and Love will perform site investigation for selected problem areas on Friday, September 8, 2006.

Love presented a revised project schedule which includes a month between the Alternate Evaluation Report Submittal and the Preliminary Analysis Phase. The revised schedule also includes additional time around the winter holidays. The Town indicated that the town may not have its second board meeting of the month for December and that that could possibly extend the finish time of the Alternate Evaluation Phase. The schedule may be updated to reflect Town Board meetings which are scheduled on the second and fourth Tuesdays.

The Town requested Basin Area totals by watershed. The table below was provided following the meeting.

Erie Master Plan - East of Coal Creek Watershed Area

Major Watershed	Area	
	Acres	Sq. Mi.
Coal Creek	4061	6.3
Boulder Creek	9392	14.7
Little Dry Creek	1430	2.2
Godding Hollow	2854	4.5
Total Study Area	17737	27.7

The Town inquired when the completion of the mapping is anticipated. According to the revised schedule mapping for the East of Coal Creek study area is anticipated by mid October. This is a shift from the prior September date. The Town requested verification that they have received all topo provided thus far by Benchmark Mapping. Love will send the Town a CD including all mapping completed to date.

Love described the large detention pond on the south side of Baseline Road which releases flow that crosses Baseline and continues in a channel and through culvert crossings under the airport runway just north of Baseline Road. This flow continues to the northwest to Coal Creek. Love has received the hydrologic model from Carter Burgess who prepared the drainage report for the Broomfield development, Anthem, south of Baseline Road. The information from Carter Burgess was input into the project model. Love also discussed the channel though the airport and its capacity (about 800 cfs) and the discharge from Anthem (about 550 cfs).

The Town requested Love attempt to contact the Town of Frederick again. The Town may be able to provide a contact person's name. In addition Love will meet with stormwater engineers from Weld County to obtain data pertinent to this study.

Love indicated detention facilities will be designed so that flow can physically get into the facility as well as be released to the downstream property at the appropriate rate.

The Town instructed Love to show required detention volume only (without freeboard) for all facilities designed for this project.

The Town inquired whether the existing land use at Vista Ridge could be updated to reflect the existing golf course layout.

Comparison of Current Land Use and Future Land Use Designated in the Comp Plan: Love pointed out discrepancies between the current land use and what is proposed in the Comp Plan. The Town indicated Love should use the land use which illustrates how the land is being used.

The Town suggested Love contact PBS&J to see if we can get unofficial DFIRM maps; however it was agreed the current flood mapping combined with the aerials will be sufficient.

Basin delineations in the Little Dry Creek watershed which cross the planning boundary were examined. The Town agreed it made sense to define the basin based on hydrology where the planning boundary jogs in and out.

Fredrick Annexations: Love discussed the area annexed by Frederick (Fox Chase) which lies within Erie's Planning Area. The Town requested leaving that area in the hydrologic model. The general consensus it that the area is not significant; and because it flows to the northeast out of the planning area, it will not significantly affect the model or the study.

Detention requirements, I-25 Corridor Plan: The South Weld County I-25 Corridor Plan (Anderson) has not been adopted and therefore, planned detention upstream of I-25 has not been implemented. In addition, Love noted discrepancies in the plan's drainageway flow path. The consensus was to have our study recommend maintaining the historic discharges for developed conditions.

Maintenance Responsibilities - Detention: The west side of Coal Creek lies in Boulder County and within the UDFCD boundary. As a result, detention design for the Erie Master Plan – West of Coal Creek followed District criteria incorporating regional detention which the District helps to maintain. The Town stated that should Erie eventually join UDFCD, the Town should be in compliance with UDFCD standards and design criteria and therefore, regional detention (with the town taking on maintenance responsibilities) is preferable to on site detention.

Percent Impervious: For the landfill and for areas upstream of existing development 2% imperviousness was assumed. As a result, detention will be necessary for future development so as to maintain historic discharges rates.

Modeling Assumptions Irrigation Facilities and Railroads:

- Irrigation ditches are considered full and will not convey storm runoff.
- Railroad embankments will fail during the major storm and will not provide detention.
- UPRR could be reactivated in the future or may be sold to RTD.

Natural Gas Facilities: Oil and Gas facilities following the Town's criteria for visual screening, may impact the drainage. This is something to be aware of. Love will include verbiage in the Alternative Analysis report addressing this issue.

Potential Problem Areas

- The Town is concerned that the capacity of the Vista Point/Vista Ridge pond may not be adequate and the channel may be undersized.
- The Town requested that Love identify problem areas before the September 8th field trip.
- The Town requested that Bridgewater receive a heads-up regarding potential drainage issues as soon as possible. Love has addressed drainage concerns in their review letter to the Bridgewater development.
- The Town acknowledged we should maintain historic discharges to downstream communities but wishes to avoid major drainage features (large channels) where possible.

Other

CDOT is looking at replacing the SH 52 Bridge over Boulder Creek. The new structure is not anticipated to pass the 100-year event.

Love will review infiltration rates above the clay layer at the landfill and will make recommendations if the hydrology should be modified.

The location of the proposed sewer plant north of SH 52 has been released for public knowledge.

Deb Pearson may be able to provide a list of annexation locations.

The Master Plan will be sent to adjacent jurisdictions during the review process for comments.

MEETING MINUTES

Meeting No. 3
Town of Erie Outfall Systems Planning East of Coal Creek
Alternate Evaluation

Held on Wednesday, November 15, 2006 @ 3:30 PM
At the Town of Erie Offices

The following persons were in attendance at this meeting:

Gary Behlen	Town of Erie	303-926-2871
Dennis Crock	Town of Erie	303-926-2875
Wendi Palmer	Town of Erie	303-926-2875
Deborah Bachelder	Town of Erie	303-926-2775
Marty Ostholthoff	Town of Erie	303-926-2770
David Love	Love & Associates, Inc.	303-673-9795
Roger Peterson	Love & Associates, Inc.	303-673-9795
Rebecca Baker	Love & Associates, Inc.	303-673-9795

These Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Rebecca Baker of Love & Associates, Inc. (phone 303-673-9795, fax 303-673-9796 or rbaker@loveassociates.com) with any additions or corrections to these minutes prior to November 28, 2006. If no comments are received by this date, it will be assumed the minutes correctly reflect and document this meeting and will be considered final.

Exhibits

The following exhibits were presented by Love & Associates, Inc. for aids in discussion:

- Design Guideline Table
- Advantages/Disadvantages Table
- Area of Concern Table
- Property Block Map:
- Existing Percent Impervious Figures
- Future Percent Impervious Figures
- Alternate 1 Figures (full size and half size)

Overview

- Love described the general study area within the Town planning area and gave a brief synopsis of the progress to date. Items of note include:
  - Hydrology obtained from Carter Burgess for the Anthem subdivision was used for determining discharges from Anthem into the study area.
  - The channel though the Erie Air Park is adequate though the runway and downstream, however from Highway 7 (Baseline) to the runway a stable regional channel is needed and onsite detention will be required for developed property.
  - Irrigation crossings in the study area are well maintained and in better shape than many stream crossings.
  - Love noted the option of 100 year culverts vs. ponding with wetlands upstream of crossings. A water quality discussion will be included in the Phase B report.
  - The detention pond at Erie High School is smaller than required. Upstream development will require onsite detention.
- Love pointed out that the Design Guidelines have been discussed previously and used for the Master Plan West of Coal Creek. Love noted aspects of the design guidelines which have been modified. Love reiterated the intent to incorporate Erie's request to maintain open space areas, preserve the floodplains, locate regional ponds in areas other than commercial.
- The Town informed Love that the Town's mayor has stepped down from UDFCD's Board and intends to actively pursue the entire Town being included in the District. Given this possible eventuality, it was requested that Love use the District's nomenclature for the current study.

Discussion of Alternate 1

- Love presented briefly the Advantages/Disadvantages Table and stepped though the general categories of Detention Facilities, Conveyance, Road/Railroad Crossings – Cross Flow and Diversions. Love encouraged the Town to respond with any comments/issues regarding the content.
- General methodology and discussion of Alternate 1 include:
  - In general ponds are located upstream of future commercial zones and near ownership block boundaries.
  - Love discussed placement and sizing of ponds to meet Town requests while maintaining historic release rates.
  - Regional channel through Little Dry Creek north of Sheridan with ponds upstream of future commercial areas

- Regional channel along I-25 in the Godding Hollow Watershed from design point 972 to design point 973 and designed to meet the historic discharge at Point 973.
- Regional channel through basin 455 where there are large homes and no well defined channel.
- Other pond/regional channel locations as shown on the Alternate figures.

- Love presented the Drainage Concerns Within the Study area particularly:
  - The large pond required to regulate flows leaving the future Bridgewater development and the subsequent flow though the Eureka Cattle Company parcel.
  - Potential Flooding at Carmacarr Estates and Boulder Creek West:
  - Outfall Point 933 of WCR 10 2-14' x 6'h RCB's cross under I-25 and the Frontage Road.
- The Town's response to Alternate 1 included:
  - The land use for some areas in the comp plan has been revised since it was originally provided to Love in May, 2006. Revisions include land use in Basin 414 west of Boulder Creek which will remain open space. As a result no onsite detention will be required for this basin as previously recommended.
  - Love was informed by the town that no development or annexation is anticipated for the area west of Boulder Creek and north of SH 52. While noting the amount of flow to Point 933 (as discussed above) is beneficial information to have, no plan for improvement is anticipated in this area.

Alternate 2

- Alternate 2 will include the following modifications to Alternate 1 (presented):
  - Onsite detention rather than regional pond 1101 at basin 233 as a result in land use changes.
  - Possible variation in the combination of Onsite/local Ponds and Regional Ponds by decreasing pond size upstream of commercial areas and increasing channel size through commercial area
  - Possible decrease size of Pond 1113 and/or channel from 1113 to 1116 and add Ponds at 1114 and 1115 for additional detention.
- Comments from Town Planning Department
  - Revised Comp Plan includes minor changes to land use
  - Area west of Boulder Creek is not anticipated to be annexed nor to have development
  - New unified development code (UDC) specifies berm criteria for stormwater detention facilities which may significantly increase lands required for Ponds. This is a new requirement and may require changes to the current proposed alternate 1 land area used for detention ponds.
  - A water feature is anticipated at SE corner of Bridgewater Development (Section 17) on the Northwest corner of the WCR 5 and Leon A. Wurl Parkway intersection could provide detention for property at SE corner of intersection. Commercial at SE corner of this intersection will still be required to provide water quality pond on site.
- The Town suggested a public meeting be held inviting the Development Community to comment and receive suggestions for Alternate 2. The delay to the schedule and the meeting being beyond the scope of Love's proposal was noted.
  - Open House meeting to be scheduled between Dec. 4 (UDFCD meeting on Master Plan) and Christmas holiday. Love to be prepared to offer information regarding pond size (acres) and channel size (width) or pipe size and a table of discharges from design points for multiple events.
  - Town is potentially pursuing inclusion in UDFCD for entire town. A Strategy in compliance with District guidelines is encouraged
  - Modification at site of Pond 1101 as proposed school is no longer anticipated.

Other

- Love and the Town will meet with UDFCD in an effort to stay in keeping with District strategy and to present progress.
- Love will complete the cost analysis for Alternate 1 and prepare drawings similar to those presented at the meeting for the Open House.
- Comments were again made with regard to adjacent communities. Peak discharges will remain consistent with historical discharges at points leaving the Town Planning Area.
- Adjacent communities will be given an opportunity for comment on the Alternative Analysis Report once it has been completed. Of particular interest is to have input/comments from Weld County.

MEETING MINUTES

Meeting No. 4
Town of Erie Outfall Systems Planning - East of Coal Creek Alternate Evaluation

Held on Monday, December 4, 2006 @ 9:00 AM
At the UDFCD Offices

The following persons were in attendance at this meeting:

Wendi Palmer	Town of Erie	303-926-2875
Ben Urbonas	UDFCD	303-455-6277
Ken MacKenzie	UDFCD	303-455-6277
David Love	Love & Associates, Inc.	303-673-9795
Roger Peterson	Love & Associates, Inc.	303-673-9795
Rebecca Baker	Love & Associates, Inc.	303-673-9795

These Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Rebecca Baker of Love & Associates, Inc. (phone 303-673-9795, fax 303-673-9796 or rbaker@loveassociates.com) with any additions or corrections to these minutes prior to December 8, 2006. If no comments are received by this date, it will be assumed the minutes correctly reflect and document this meeting and will be considered final.

Overview

- The Town began the meeting by describing its reasons for requesting UDFCD's review of this master plan.
  - The Town's mayor has stepped down from UDFCD's Board and may intend to actively pursue the entire Town being included in the District.
  - Given the possibility of the entire Town being annexed into the District, the Town wishes to ensure that the Master Plan currently underway can be accepted by the District.
  - The Town wishes to avoid having to redo the Master Plan from scratch.
  - Due to issues in existing development and the rapid development and potential new annexations, the Town has chosen to pursue a Master Plan at this time rather than waiting until the Weld County portion of the Town is annexed into the District.

- Love described the approach and progress made to date for the current study including:
  - Proposal stated this Master Plan will utilize the exact same scope of work as the previous Master Plan for the Boulder County portion of the Erie regional planning area.
  - Hydrologic modeling using UDSWM2000 with a CUHP calibration.
  - Comparisons of results to other studies where applicable (South Weld County I-25 Corridor Master Plan, Anderson).
  - Love noted the preponderance of open space and rural land use on the east side of Coal Creek.
  - Love described the rationale of placing regional detention ponds to comply with the Town's request to avoid placing regional detention at commercial corners.
    - Love utilized property blocks of substantial size for placing ponds.
    - Ponds in Alternate 1 are sized large enough so that the release from downstream commercial areas meets the historic discharge.
    - Ben does not support compensatory detention for large commercial areas downstream of the regional pond.
    - The Town and Love noted that commercial properties will still be responsible for water quality and will require onsite detention for events more frequent than the 100-year event.

Discussion of Alternate 2

- The Town will hold a public meeting where Love will present Alternate 1. The Development Community will be invited to comment on Alternate 1 and make suggestions/requests for Alternate 2.

- Love described the intended modifications to Alternate 1 for Alternate 2 including the following:
  - Possible variation in the combination of Onsite/local Ponds and Regional Ponds by decreasing pond size upstream of commercial areas and increasing channel size through commercial areas.
  - Modifications resulting from Open House.
  - Alternative solutions in problem areas.

Hydrologic Modeling

- Love discussed with the District the following modeling programs and issues:
  - Love stated success in converting and running data using EPA SWMM5.0
  - Love used a universal time step of 2 minutes.
  - The converted model yields lower flood peaks (approximately 7% lower than UDSWMM2000) for one large area in Boulder Creek.
  - A calibration may be performed by adjusting the catchment width in the EPA SWMM5.0.
  - Love stated the overflow elements were not removed for this run.
  - Ben suggested that parameters could be changed in the base/overflow sections by using the global editing option.
  - Love asked if the storage element was guided by an exponential function.
  - The District described the two elements required for each pond (Storage Node and Outlet Link) and the program's use of a 1 acre footprint for the pond which results in a large stage value.
  - The Outlet Link should be created automatically in the conversion process.

- Ben suggested examining the Flow Link Summary to determine if there are errors in the pond input.
- Ben stated that he was unaware of an exponential output result and requested Love to investigate and let him know if this continued.

- Ben suggested that the conversion to SWMM5.0 at this time made the most sense. However, given the work which would have to be redone, it was acknowledged that the conversion could take place upon annexation of the Weld County portion of the Town to the District.

How to Proceed in Securing District Acceptance

- Love will perform the conversion and calibration for a small portion of the study area to get an idea about the time required to convert all the models from UDSWMM2000 to SWMM5.0.

- Love will prepare a proposal for the Town indicating the additional cost for converting the models and updating the text and figures to reflect the SWMM5.0 elements.

- The Town noted the residents would need to vote for the tax necessary to joining the District.

- The District encouraged the Town to present the environmental benefits to the residents.

- The Town will determine if the conversion will be done at this time as part of the Master Plan or when/if the entire Town is annexed to the District. Ben indicated that converting the models in this Master Plan from UDSWMM2000 to SWMM5.0 would be a condition for annexation.

Exhibits

- The following exhibits were distributed by Love & Associates, Inc. for review:
  - Draft Figures to be included in the Alternative Analysis Report
  - Comparison of Peak Discharge: Existing vs. Alternate 1
  - Peak Discharges for multiple events (Existing)
  - Peak Discharges for multiple events (Future)
  - CD containing model resulting from the SWMM conversion

- Minimal discussion of the above exhibits included:
  - The District noting the prominence of C/D soil.
  - The District requesting Love verify the CUHP Calibration percentage.
  - The District inquired what the plan was for reaches where the flow increases between the existing and the alternate models. Love stated that those would be few and would be looked at on a case by case basis. In most cases onsite detention would be recommended.
  - The District inquired about the upstream watershed area tributary to a water quality catchment and stated the District's criteria of having no more than 1 square mile tributary.

Other

- The District noted that some communities have compromised on the required detention volume especially when a large portion of the watershed upstream has already been developed. An example in Adams County entailed waving the 100-year detention volume for a facility sized for a smaller event and the WQCV.

- The District will send to Love and the Town an updated checklist of what is to be included in Phase A and Phase B.

MEETING MINUTES

Public Meeting
Town of Erie Outfall Systems Planning
East of Coal Creek Alternate Evaluation

Held on Monday, December 13, 2006
2:30-5:30 PM
Town Hall Board Room – Lower Level
Draft Meeting Minutes

The following persons were in attendance at this meeting:

Wendi Palmer	Town of Erie	303-926-2875
Dennis Crock	Town of Erie	303-926-2875
David Love	Love & Associates, Inc.	303-673-9795
Roger Peterson	Love & Associates, Inc.	303-673-9795
Rebecca Baker	Love & Associates, Inc.	303-673-9795
Developers:		
Jonathan Nelson	Pratt Management Company/ WWD, LLC	303-776-4496
Yvonne Seaman	F.S. Land	303-947-8831
Bob Kelsey	Peak Civil Consultants	720-855-3859
Mike Barus	Community Development Group	
Phil Irwin		

These Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Rebecca Baker of Love & Associates, Inc. (phone 303-673-9795, fax 303-673-9796 or rbaker@loveassociates.com) with any additions or corrections to these minutes. If no comments are received by this date, it will be assumed the minutes correctly reflect and document this meeting and will be considered final.

1. Introduction: Love began with an introduction describing the reason for the meeting and the current study:
   a. The Town of Erie has contracted with Love to prepare a Drainage Master Plan for the Weld County portion of its Planning Area.
   b. The Master Plan will identify critical areas of stormwater management and will provide an analysis of alternates which may be used as a guideline for addressing water quality degradation and flood peak increases resulting from current and future development anticipated within the study area.
   c. Master Plan has utilized the same scope of work as the previous Master Plan for the Boulder County portion of the Erie regional planning area.
   d. Hydrologic modeling was performed using UDSWM2000 with a CUHP calibration.
   e. Comparisons of results to other studies where applicable (South Weld County I-25 Corridor Master Plan, Anderson).

2. Love presented several drawings to illustrate the process to date including:
   a. Basin delineation maps illustrating existing and future land use
   b. Ownership property block illustration used in selecting locations for regional detention ponds.
   c. Figure illustrating Alternate 1
   d. Figure identical to Alternate 1 to be used during the meeting for discussion of Alternate 2.
   e. Figure illustrating several typical regional channel sections.
3. Alternate 1 includes regional ponds and channels. In general, ponds have been placed in locations at the downstream limit of a large property block or at the downstream limit of a residential area within a property block where residential and commercial development is planned.
4. Some comments by Love and others on Alternate 2 include:
   a. Option of using ponds in series through a property rather than one very large pond at the downstream property boundary
   b. Incorporation of onsite detention in commercial areas with smaller ponds upstream.
5. Love provided opportunity for comment via email, comment sheet, as well as time for individual Q&A at the meeting.
6. Love agreed to provide to interested developers copies of the maps presented at the meeting.

After the meeting the input was received from concerned parties. Correspondence regarding this input is located in the Correspondence Appendix.

KICKOFF MEETING MINUTES
Outfall Systems Planning Preliminary Design Report
Erie and Adjacent Areas
Weld County and Boulder County

Held on March 20, 2007
Town of Erie Offices

Participants: Wendi Palmer, P.E., Town of Erie Public Works
Roger Peterson, P.E., Love & Associates, Inc.

The following Meeting Minutes generally summarize the issues, decisions, and information generated during this meeting. Please advise Love & Associates, Inc. (phone: 303-673-9795, fax: 303-673-9796 or email: rpeterson@loveassociates.com) of any additions or corrections prior to 5:00 PM on Thursday, March 29, 2007. If no changes are requested by that date, these minutes will stand as written.

Discussion Items

1. The Town will provide Love a copy of the Agenda Item for the Alternate Selection before the Board of Trustees on March 13, 2007 and a copy of the Resolution by the Board of Trustees.

2. Love to write Selected Plan Summary to be included in the Report and to suggest a revision to the title of the Preliminary Design Report.

3. Land cost estimates are to be included in the conceptual cost estimate update in the Preliminary Design Report. Use the same cost per acre as in the Alternate Report.

4. The Town will distribute copies of the Alternate Analysis to UDFCD, Weld County, Boulder County, and City of Broomfield.

5. Accepted Alternate - Love briefly reviewed the Accepted Alternate, Alternate 2, with the Town.

6. Preliminary Design Report Contents

    a. Love reviewed the proposed contents of the Preliminary Design Report, including a proposed Table of Contents, with the Town. Revisions to the proposed Table of Contents discussed during the meeting were made, and the revisions are attached to these Meeting Minutes.
    b. Love and the Town generally discussed the UDSWM model summary document, written separately from the Preliminary Design Report which could be used by developer's engineers and others working on the UDSWM model.
    c. Hydraulic detention volumes not including freeboard will be reported on the Preliminary Design Drawings in the Preliminary Design Report.
    d. An example will be provided in the report to calculate on-site and local detention (variable discharge method) and example design drawings used for cost estimates will be included using the latest UDFCD Criteria. Recognizing these methods can change in the future, a disclaimer will be added to the text and drawings indicating the most recent UDFCD revisions should be used for design purposes. Current Erie Drainage Standards may need to be revised due to recent changes in UDFCD design requirements and drawings.

7. Water quality section

    The Town requested Love include a water quality Chapter in the Preliminary Design Report, to review methods used by UDFCD and other jurisdictions, and consider and incorporate innovative methods to improve water quality. Items discussed during the meeting included; UDFCD standards from Volume 3 of the UDSCM and new information on the UDFCD web site, using concepts and text from the recent (2006) revision of the City and County of Denver Water Quality portion of the SDDTC, de-emphasizing the general concept of Minimizing Directly Connected Impervious Areas (MDCIA) but reviewing the components of MDCIA individually, reviewing Low Impact Development (LID) individual concepts, examining alluvial infiltration trench concepts for use in-channel where not destructive to streets or structures, and reviewing typical fertilization and irrigation practices.

RESOLUTION NO. 07-48
TOWN OF ERIE, COLORADO

A RESOLUTION APPROVING, ACCEPTING AND ADOPTING ALTERNATE 2 FOR ERIE AND ADJACENT AREAS OUTFALL SYSTEMS PLANNING; AND SETTING FORTH DETAILS THERETO.

WHEREAS, the Board of Trustees of the Town of Erie, understands an Outfall Systems Plan is an important planning document to insure regional drainage facilities safely direct and mitigate 100-year flood peak discharges which is critical to insured the management of quality growth and development of the Town; and

WHEREAS, the Board of Trustees of the Town of Erie in 2001 adopted an Outfall Systems Plan in the Erie Planning Area for land in the Town west of Coal Creek and south of Highway 52 which was sponsored by the Town and Urban Drainage and Flood Control District; and

WHEREAS, in 2006 the Town contract to complete the Outfall Systems Plan for the remaining approximately 28 square miles in the Erie Planning Area, including lands east of Coal Creek and north of Highway 52; and

WHEREAS, Alternate 2 meets the development consideration of property owners and was modified to work with property owners;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF ERIE, COLORADO, AS FOLLOWS:

Section 1. That the Town of Erie Alternate 2 for Erie and Adjacent Areas Outfall Systems Planning is hereby approved, accepted and adopted.

ADOPTED AND APPROVED THIS 13TH DAY OF MAY, 2003, BY THE BOARD OF TRUSTEES OF THE TOWN OF ERIE, COLORADO.

TOWN OF ERIE,
a Colorado municipal corporation

By: _____
Andrew J. Moore, Mayor

ATTEST:

By: _____
Nancy J. Parker, Town Clerk

TOWN OF ERIE CORPORATE SEAL COLORADO

APPENDIX D

SUMMARY
DRAINAGE CALCULATIONS FOR DEVELOPMENTS

Appendix D

Summary: Drainage Calculations for Developments

1. Hydrologic Model

The hydrologic model for the Erie North and East OSP is the UDFCD UDSWM2000 (not EPASWMM) which has been calibrated to the CUHP. The model is available on the UDFCD web site.

There are three hydrologic models used in the OSP; one representing existing percent impervious, a second using future percent imperviousness, and the third which includes the detention facilities and conveyance planned for the OSP. Engineers using the model should work only with the OSP model.

The procedure in working with the model is:

- Contact the Town to obtain a copy of the OSP and an electronic form of the model,
- Ensure the model being used is the latest version of the model,
- Insert the proposed development onto the appropriate pages in the OSP Preliminary Design, Sheets 1 through 55,
- Identify any differences in hydrologic parameters such as basin delineation, conveyance areas, flow paths, percent imperviousness, and detention areas from the OSP,
- Meet with the Town and discuss the differences, and,
- Make changes to the model agreed to by the Town.

UDSWM2000 is calibrated to CUHP2000 for the 100-year storm event. Thus, is no need to use the CUHP for hydrologic analysis. The UDSWMM contains all the information needed to identify the hydrologic impact of a development.

The model parameters have been standardized to make it easy to modify. A brief description of the methods to be used for modification of parameters follows:

Precipitation: do not change, no modifications.

Catchment Area: modify as needed, maintain discharge points shown in the OSP.

Stream and Basin Length and Slopes: modify as needed.

Soil Parameters: do not change, no modifications.

Percent Imperviousness: modify as needed, use information in Table D-1.

Table D-1. Percent Impervious for Land Uses in Study Area

Land Use	% Impervious
Open Space/Parks/Agricultural	2
Cemetery/Golf Course/Recreation	7
Landfill Mines/Oil & Gas Fields	10
Rural Residential	30
Low Density Residential	43
Medium Density Residential/ Schools/Airports	50
High Density Residential	70
Industrial	90
Commercial	95

UDSWM Catchment Width: modify as needed using,

$$W = L_c \{ 2 - [(A_2 - A_1)/A_t] \},$$

where L_c = length of the channel, A_i = area on i^{th} side of the channel, and A_t = the total area of the catchment.

Conveyance Elements: modify as needed using the following schemes:

- include a main element and an overbank element,
- increase roughness coefficients for conveyance elements by 25 percent
- use typical parameters used for conveyance elements shown in Table D-2.

Table D-2. Typical Conveyance Element Parameters

	Depth (ft)	Side Slopes H:V	Manning *n* *	Bottom Width		
				1st Order	2nd Order	3rd Order
Channel						
Main	3	3:1	0.044	5	7.5	10
Overflow	10	20:1	0.056	23	25.5	28
Street						
Main	0.5	3:1	0.020	8	8	8
Overflow	10	20:1	0.044	11	11	11

* increased by 25%, see text

2. On-Site and Local Detention

On-site and/or local detention is required on some catchments identified in the OSP to maintain historic flood peaks. For these basins, there are three methods to calculate detention requirements preferred by Erie. These include:

- Routing methods using the hydrologic model,
- UDFCD equations, and,
- Full spectrum detention.

The Town should be consulted on detention calculation methods.

a. Hydrologic Model

For larger catchments which contribute discharge to a single detention pond, the UDSWMM developed for the OSP can be used for detention calculations. Use of this method requires the detention pond hydraulics be well defined. This means a complete stage/storage/discharge relationship must be identified for the pond.

The outlet should be designed where possible using the FHWA HY-8 program available through the FHWA web site. Inlet or outlet control should be considered carefully in the design. This pond will have a two stage outlet, typically a 10-year and 100-year design. It is also likely to incorporate water quality improvements.

The result of the model should be examined and the pond design should show:

- flood peak discharges are maintained at existing conditions, and,
- the pond did not increase flood peak discharges downstream beyond those identified in the OSP due to hydrograph timing impacts.

b. UDFCD Equations

The UDFCD equations are an empirical approach to calculate on-site detention and is recommended only for small drainage areas. It can be applied to areas in Erie with drainage areas on the order of 1 acre or less. The equations are occasionally updated and the UDFCD web site should be checked to confirm the latest version of the equations. They are discussed in the UDFCD Manual, Volume 2, Chapter 10. The current equations can be summarized as follows:

For B, C, and D NRCS Soil Types:

$$V_i = K_i \ A$$

$$K_{100} = (1.78\ I - 0.002\ I^2 - 3.56) / 900$$

$$K_{10} = (0.95\ I - 1.9) / 1000$$

For Type A soils, use:

$$V_{100A} = (-0.5501\ I^2 + 3.0148 I - 0.12) * (A/12)$$

where,

V_i = detention volume (ac-ft),
K_i = coefficient,
I = percent imperviousness, developed conditions (%), and,
A = area (ac).

Release rates in cfs/ac for the 10- and 100-year event are, respectively,

- A soils: 0.13 and 0.50
- B soils: 0.23 and 0.85
- C & D soils: 0.30 and 1.0

c. Full Spectrum Detention

Full spectrum detention calculations are available on the UDFCD website, within the UD-Detention Spreadsheet. This method should be applied to areas less than 160 acres in area. It addresses release of frequently occurring events at a slow rate over a 72-hour period to reduce the impact of urbanization on events most recognizable by the public. In summary, the volume for slow release is called Excess Urban Runoff Volume or EURV which is dependent on soil type. This volume is added to the 100-year volume in the equations presented in Section **2b** of this Appendix.

APPENDIX E

WATER QUALITY

Appendix E

Water Quality

The Erie North and East Outfall Systems Plan (OSP) primarily discusses and identifies the location and conceptual design of regional conveyance facilities, including detention facilities, open channels, culverts, and storm sewers designed to reduce flood peaks and safely convey water within the Erie Planning Area. If required in the OSP, developments discharging into the regional system may require local and/or on-site 100-year detention facilities, and all developments are required to provide 10-year detention to reduce the magnitude of frequently occurring flood peaks and conveyance of the 100-year event from the development to the regional conveyance facility.

Water quality improvements are required by the Town as part of the stormwater conveyance system, but they are not emphasized in the OSP. As discussed in the *Urban Storm Drainage Criteria Manual, Volume 3, Best Management Practices* (UDFCD, 1999), water quality features can include those incorporated directly into regional, local, and on-site detention facilities and a potpourri of other structural and nonstructural Best Management Practices (BMP's). This Appendix discusses the BMP's which are preferred by the Town for water quality improvements. Table E-1 summarizes Structural BMP's in UDFCD (1999) and identifies those preferred by the Town. Table E-2 summarizes additional structural BMP's preferred by the Town. Table E-3 summarizes nonstructural BMP's preferred by the Town.

Design information for many of the BMP's are available on the UDFCD website (http://www.udfcd.org). For BMP's without a UDFCD design, volume requirements should be identified using the UDFCD storm of 0.4 inch assumed to occur over a 1-hour period. The Town should be contacted for additional design requirements prior to beginning design. The Town will identify if the proposed plan satisfies detention water quality requirements for the development.

Structural BMP's For Regional Facilities

Detention Facilities

Erie requires water quality improvements be incorporated into regional detention facilities. The preferred improvements include the UDFCD *Constructed Wetland Basin* shown in Detail F and *Extended Detention Basin* shown in Detail G. These facilities act to capture sediment, enhance water quality, and provide a habitat for a diverse group of native plants, animals, and insects.

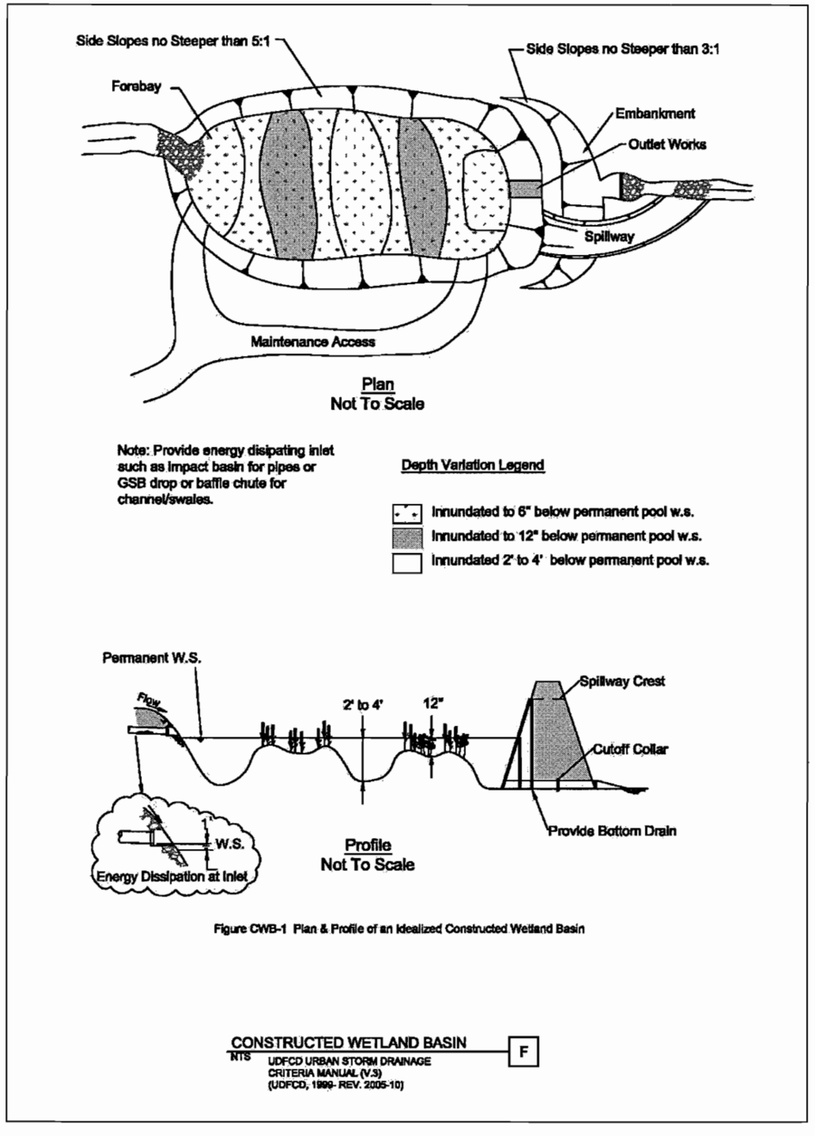
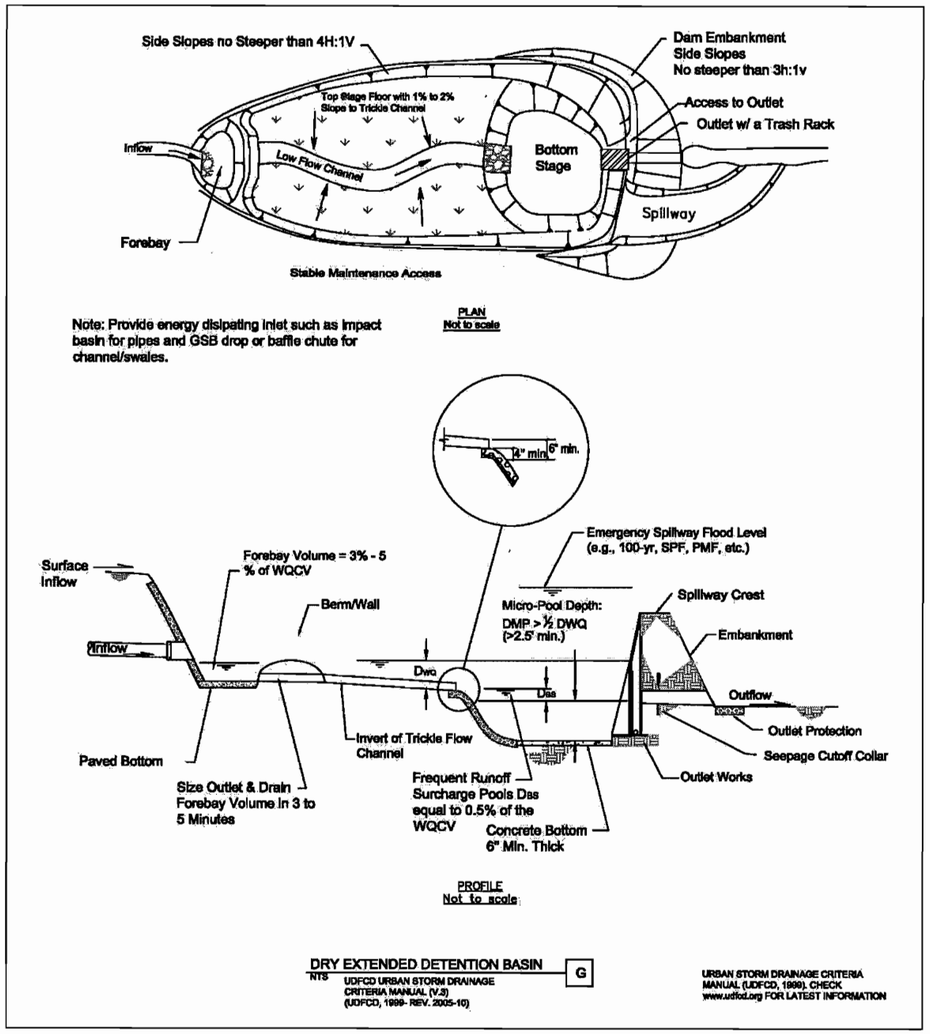
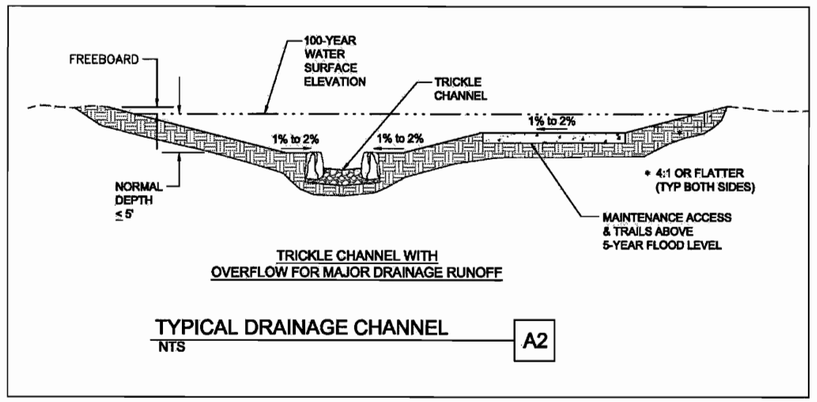


Figure CWB-1 Plan & Profile of an Idealized Constructed Wetland Basin



Regional Channels

Regional channels convey stormwater, and channel stability which reduces channel erosion is the principal contribution of these channels to water quality improvements. Regional channel profiles in the OSP are designed for stability following the most conservative velocity and Froude Number recommendations by UDFCD. Preferred channel cross sections are shown in *Grassed Swale with Trickle Channel* Detail A2, *Grassed Swale with Log Rolls* Detail A3, and *Grassed Swale with Soil Wrap* Detail A4. If water is available, the channel can support a wetland rather than a grass or armored lining.



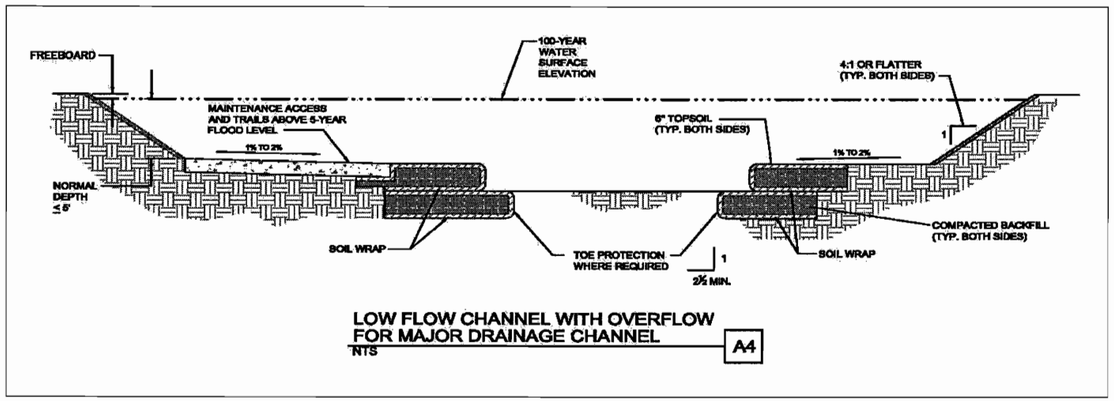


Table E-1 Structural BMP's Preferred by Erie

BMP from UDFCD	Erie Preference	Comments	Primary Application
Grass Buffer	Limited		Parking Lots, Streets
Grass Swale	Recommended		Drainage Areas less than 1 acre
Modular Block Porous Pavement	Not Recommended		
Porous Pavement Detention	Porous Concrete Recommended	Porous Asphalt Not Recommended	Parking Lots, Driveways
Porous Landscape Detention	Recommended	Design – City and County of Denver	Parking Lots
Extended Detention Basin	Recommended		Regional/Onsite/Local Detention
Sand Filter Extended Detention Basin	Not Recommended		
Constructed Wetlands Basin	Recommended		Regional/Onsite Detention (if water is available)
Retention Pond	Not Recommended	Not Required	Temporary Use Only
Constructed Wetlands Channel	Recommended		Regional Channel (if water is available)
Covering Storage & Handling Areas	Recommended		Industry
Spill Containment & Control	Recommended		Municipality

Table E-2 Additional Structural BMP's Preferred by Erie

Additional BMP	Erie Preference	Comments	Primary Application
Enhanced Grass Swale	Recommended	See Text	Drainage Areas 1 to 5 acres
Rain Gardens	Recommended	See Text	Individual Lots

Table E-3 Nonstructural BMP's Preferred by Erie

BMP from UDFCD	Erie Preference	Comments	Primary Application
Household Waste Disposal	Recommended	Educate, Collect, & Dispose Safely	Individuals
Pesticides, Herbicides, Fertilizer	Recommended	Educate	Landscape Companies, Industry, Individuals
Illicit Discharge	Recommended	Emergency Response	Town
Good Housekeeping	Recommended		Industry
Preventative Maintenance	Recommended		Industry, Individuals
Spill Prevention and Response	Recommended		Industry

UDFCD (UDFCD, 1999) indicates the *Constructed Wetland Channel* can enhance water quality. Spreadsheets for the design of these ponds are provided by UDFCD and are described in UDFCD, 1999.

Structural BMP's for Neighborhoods

Erie encourages the formation of depression storage integrated within the landscape with some of the other concepts of low impact development to reduce frequently occurring stormwater flows and enhance water quality. Water quality improvement devices, where practical, are to be incorporated with conveyance drainage facilities ordinarily required for the development, within the overall landscape, and on individual lots. This section discusses water quality enhancements preferred by the Town for neighborhoods including the portion of the drainage infrastructure which is required to convey stormwater to the regional system on the scale of zero to approximately 200 acres.

Detention Facilities

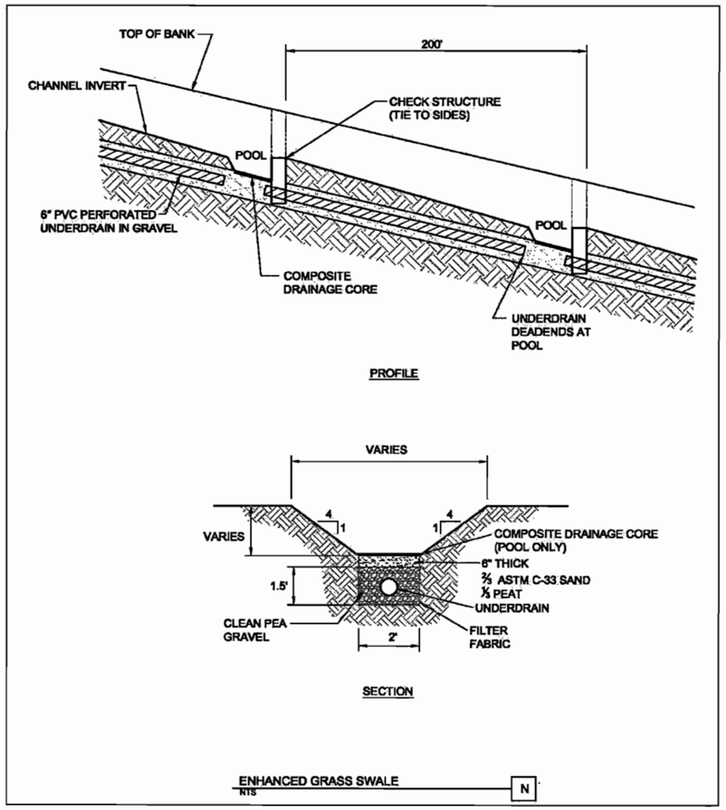
UDFCD *Extended Detention Basin* (Detail G) can be used as local or on-site 10- or 100- year detention facilities, and, as a result, will likely remain the most popular way to address water quality improvements in drainage leaving the neighborhood.

The water quality portion of the Extended Detention Basin can be unattractive if it dries-up, and a continuous water source for the pond (groundwater or surface water) should be identified. If a continuous water source cannot be found, the potential drying of the water quality portion of the pond should be addressed by landscaping and minimizing the surface area, or other water quality improvement measures should be employed. The Extended Detention Basin is most likely to be used under the following conditions:

- Larger developments which require detention,
- Untreated stormwaters conveyed by storm sewers, and
- Areas with shallow groundwater.

Enhanced Grass Swale

The *Enhanced Grass Swale* shown in Detail N is a modified grass swale, including shallow infiltration pools approximately every 200-ft, a sand and peat mix biofilter at the bottom of the swale below the grass, and a gravel sublayer with a 6-inch PVC perforated underdrain surrounded on three sides by fabric below the biofilter. Depending largely on channel slope, grade control structures may be required along the swale and/or at the downstream end of the pools. Vertical infiltration at the base of infiltration pools is encouraged by the placement of a composite drainage core below the base of the pool. The drainage area contributing stormwater to the Enhanced Grass Swale should be between approximately 1 and 5 acres.

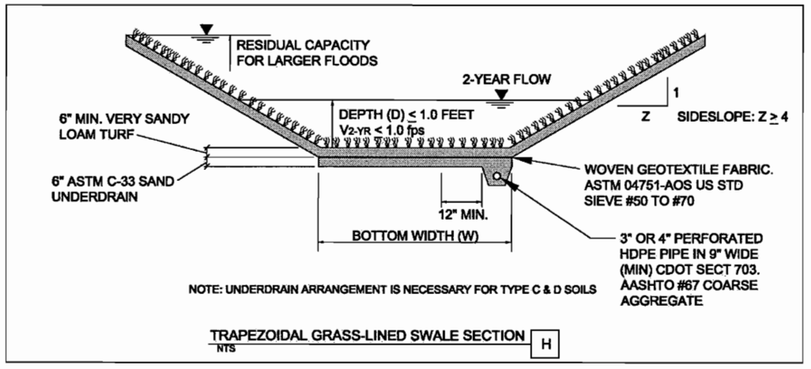


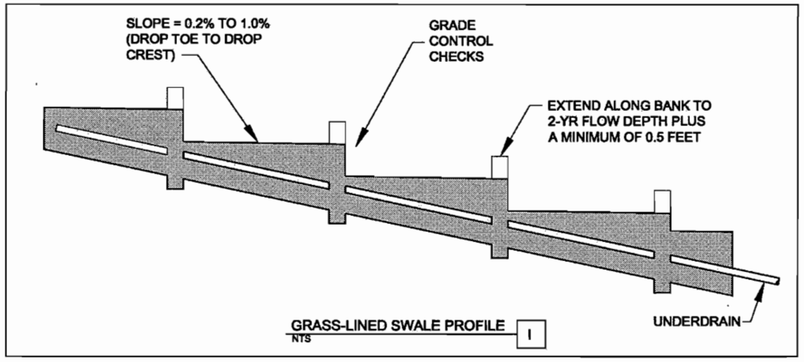
When the drainage area criteria is met, the Enhanced Grass Swale is most likely to be used under the following conditions:

- Discharge from small storm sewers carrying untreated stormwaters,
- Discharge from grass swales conveying stormwater, and,
- Point stormwater discharge from streets.

Grass Swale

UDFCD *Grass Swale* shown in Details H and I is applicable for drainage areas less than 1 acre. It is an option to consider when an open channel is planned for stormwater transport. Compared to the typical grass channel, the UDFCD Grass Swale includes 6-inches of sand below 6-inches of sandy loan soil and an underdrain.



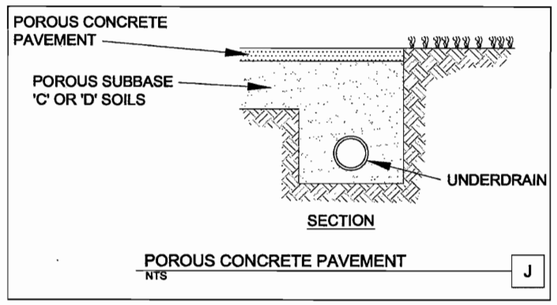


When the drainage area criteria is met, the UDFCD Grass Swale is most likely to be used under the following conditions:

- Within a street median,
- Paralleling one or both sides of a street,
- Point discharge from streets, and,
- Behind homes along lot lines.

Porous Concrete Pavement

Porous Concrete Pavement shown in Detail J captures stormwater directly and allows it to infiltrate into the ground. Porous concrete consists of almost no fine aggregate; pea gravel can dominate the mix. Compressive strength is lower than concrete, averaging about 2500 psi (National Ready Mixed Concrete Association, 2006). Working time of the mix is short, about an hour without admixtures. High infiltration rates are common, and infiltration is usually not an issue for design. A subbase provides a flow path and storage for stormwater, and the depth and slope of the subbase is an important part of the design. An underdrain can be placed in the subbase to transport captured water. Maintenance consists of sweeping the surface once or twice a year.

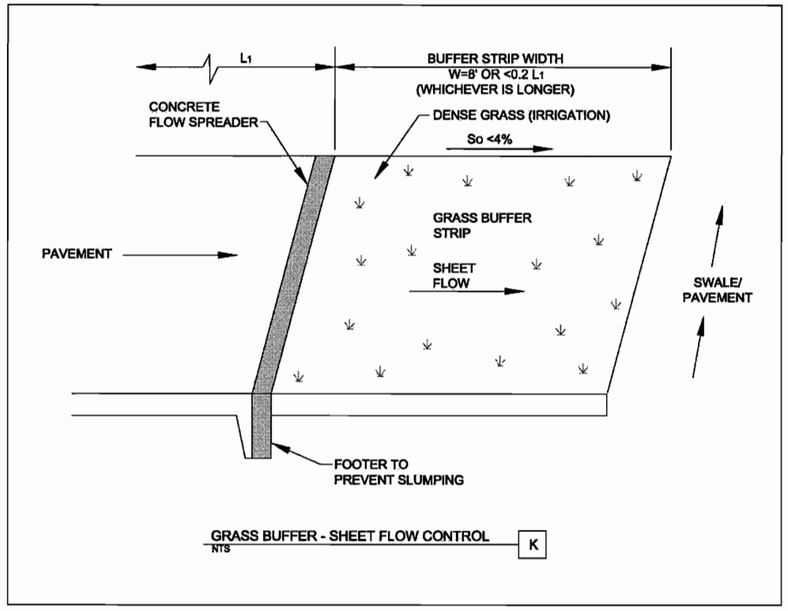


Although Concrete Porous Pavement is chemically inert and should not decrease water quality, alone, it is unlikely to improve water quality. Its primary hydrologic function is reduce times of concentration, increase infiltration into the ground, reduce percent imperviousness, and, if a design is provided, it can provide stormwater detention storage. It may be an excellent substitute to parking lot detention which seldom works correctly. Porous Concrete Pavement is most likely to be used for the following:

- Driveways,
- Parking lots,
- Sidewalks, and,
- Patios.

Grass Buffer

UDFCD *Grass Buffer* shown in Detail K separates pavement and other pavement or conveyance. It is a fundamental part of the UDFCD "minimize directly connected impervious areas" (MDCIA) concept. It will slow the velocity of water leaving a paved area and is primarily a sedimentation device.

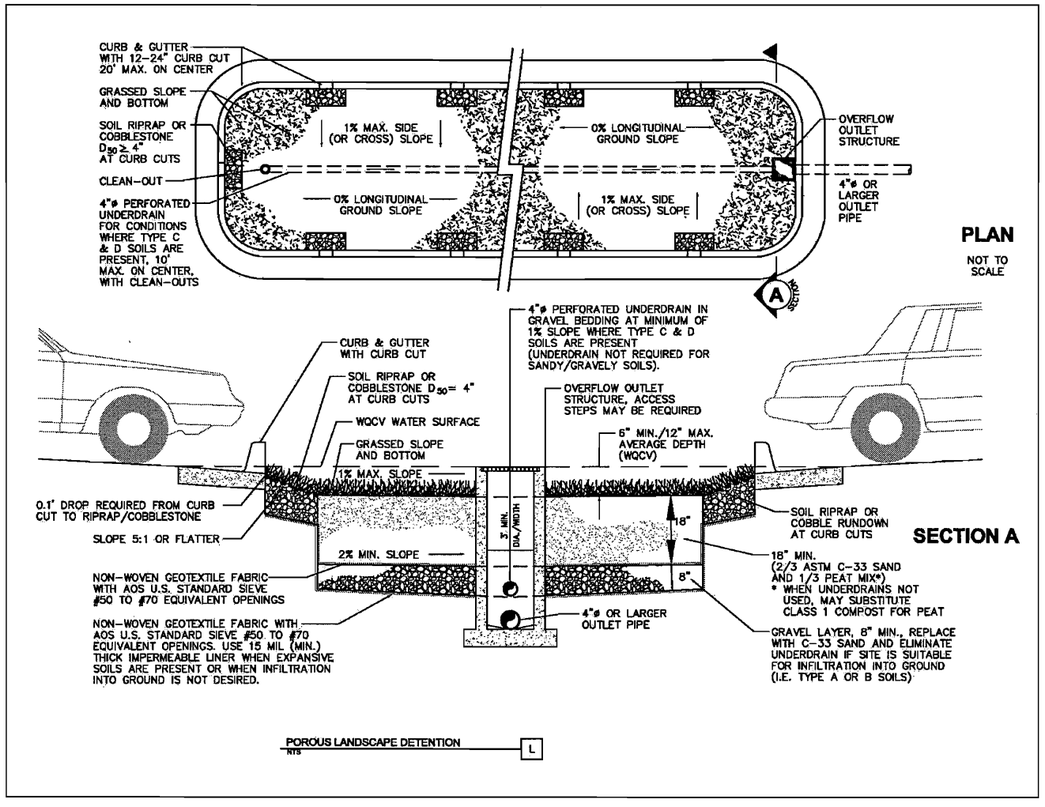


Grass Buffers are expected to see only limited use and are most likely to be used under the following conditions:

- End of parking lots, and,
- Separating paved areas and other BMP's.

Porous Landscape Detention

Porous Landscape Detention shown in Detail L is used to treat stormwater and improve water quality through biofiltration. The detail was obtained from the City and County of Denver Storm Drainage and Design and Criteria Manual, and this detail is preferred over the Porous Landscape Detention detail in the UDFCD manual. This BMP is an elongated below-grade area receiving water from paved areas. It will remove sediment from stormwater and can act as a small stormwater detention basin reducing storm peak discharges from paved areas.

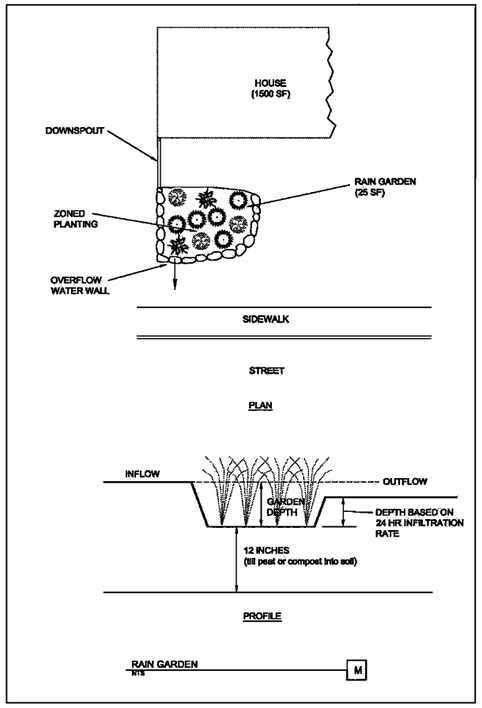


Porous Landscape Detention is most likely to be used for the following situations:

- A street median,
- Paralleling one or both sides of a street, and,
- Parking lots.

Rain Gardens

Rain Gardens shown in Detail M are lot specific water quality treatment devices. Although only one detail is shown, there are an infinite number of possible configurations limited only by the imagination of the homeowner or landscape architect. Rain Gardens receive point discharge from small discharge areas, such as from one of the downspouts of a home. The Rain Garden may be a raised pond or it may be depressed in the landscape. One function of the Rain Garden is to intercept runoff from roofs, and it can be designed to hold the 0.4-inch storm from a portion of the roof. For example, as shown on the Detail, a 1500 sq-ft home with four downspouts would require approximately a 6-inch deep 25 sq-ft rain garden per downspout. It may also be used to trap water from impervious areas or excess water from sprinkler systems left running for too long a period of time. The Rain Garden should be not deeper than the infiltration rate required to remove accumulated runoff in 24 hours to eliminate mosquito proliferation, and it should include a defined area to spill excess discharge. The Rain Garden could be planted with plants and flowers in zones reflecting potential water availability.



Rain Gardens are most likely to be used at the following:

- Homes, and,
- Small businesses.

Nonstructural BMP's

Nonstructural BMP's require active training and participation by Government and Industry (such as emergency response to spills), facilities, and education of citizens (such as hazardous waste disposal). For a discussion of nonstructural BMP's, please refer to UDFCD (1999).

Fertilizers, pesticides, and herbicides deserve special emphasis. Excess applications of these items will end up in stormwater and degrade water quality. Some methods to reduce the impact of these items on the environment include:

- Educate the public and landscape companies on application methods and amounts,
- Educate the public on acceptable lawn watering practices,
- Inform the public on the availability of irrigation system inspections,
- Encourage drip irrigation practices,
- Provide information on xeriscaping, and,
- Locate Rain Gardens to capture excess water from lawns.

Education on these items can take place at schools, local garden centers, homeowner association meetings, and on a summary sheet distributed in the spring to residents by the Town.

Ongoing Research and Development

Members and committees of EWRI are in the early stages of exploring several Low Impact Development (LID) initiatives. These initiatives include:

- The EWRI Green Roof Technology Initiative
- The EWRI Porous and Permeable Pavement Initiative
- The EWRI Rainwater Harvesting Technology Initiative

The committee's work will include review of available literature related to LID technologies, report of technologies to harness stormwater, development of national guidelines for use of these technologies, and hosting a mini-symposium on Low Impact Development Technologies

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