Prepared For

City of Laramie

The North Laramie Drainage Master Plan

SEH Job Number - LARAM 112351

Final Report

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Prepared By

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SEH

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1.0 ACKNOWLEDGEMENT

SEH wishes to acknowledge the various individuals who assisted in the preparation of this North Laramie Drainage Master Plan. The City of Laramie provided the guidance and knowledge of the North Laramie drainage issues that made this Drainage Master Plan possible. In addition, several residents provided insight regarding specific problem areas, observations during rainfall events and photographs of problem areas.

The following members of the SEH project team have contributed in the preparation of this report.

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2.0 INTRODUCTION

2.1 Authorization

The City of Laramie has contracted Short Elliott Hendrickson Inc. (SEH) to complete a drainage master plan for the northern portion of the City of Laramie in response to many drainage problems in the area.

2.2 Purpose and Scope

The purpose of the North Laramie Drainage Master Plan is to analyze the existing and future drainage conditions, identify problem areas within the study area, and provide alternate methods to convey stormwater within the study area to enhance public safety and minimize property damage. The drainage master plan document may serve as a guideline for addressing water quality degradation and flood peak increases resulting from current and future development within the study area. It may also be used to standardize storm drainage criteria for the City of Laramie and may be used to establish framework for future storm modeling of development.

The drainage master plan entailed:

- Holding three public meetings;
- Obtaining survey data of existing stormwater management facilities;
- Obtaining documents and files from the City including existing drainage and development plans and GIS data;
- Performing a geotechnical investigation;
- Performing a rainfall analysis for the study area;
- Identifying probable flow paths and catchment areas under current land use;
- Developing base hydrologic prediction models for existing and project future percent imperviousness for the 2-, 5-, 10-, 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;
- Qualitative analysis of possible alternatives to alleviate critical areas of potential flooding;
- Quantitative analysis of the top alternatives from the qualitative analysis and size the necessary improvements,
- Cost analysis of the top alternatives; and
- Providing a recommended plan of improvements and correspond cost analysis.

2.3 Public Process

Two initial public meetings were held at Fire Station No. 2 on Wednesday, June 23rd and Thursday, June 24th, 2010 from 6 to 8 pm. The purpose of the public meetings was to make the public aware of the drainage master plan being developed and to gather insight and information on problem areas from the citizens living within the study area. Information collected from the public meeting attendees can be found in Appendix A. A third public meeting was held on January 26, 2011 to inform the citizens of hydrologic model findings and possible solutions to the existing drainage problems. During these meetings, the public identified multiple locations of local drainage. These local issues are described throughout the report. A meeting sign in sheet can be found in Appendix A.

2.4 Baseline Information

Information used for the outfall study includes:

- Topographic mapping information, mapped using aerial photogrammetry, was obtained from the City of Laramie as GIS contours at two-foot contour intervals (City of Laramie, 2010);
- Existing Zoning and Proposed Land Use maps for the City of Laramie (City of Laramie, 2010);
- NRCS soils maps for Albany County (NRCS, 2007);
- Flood Insurance Studies (FIS) and Flood Insurance Rate Maps (FIRM) updated in 1996;
- Various drainage reports and development plans within the study area provided by the City of Laramie.

2.4.1 Survey Data Collection and Structure Inventory

Existing storm sewer infrastructure data was collected by Coffey Engineering and Surveying throughout the months of June and July 2010. Additional survey data was collected by Coffey Engineering and Surveying on August 26, 2011 and September 12, 2011. Survey notes are located in Appendix B.

During the survey data collection, photos were obtained of each of the structures surveyed, and the size, material, and overall maintenance condition was noted. A copy of the photos and notes obtained is located in Appendix C.

2.4.2 Geotechnical Investigation

A geotechnical investigation of the North Laramie study area was performed by Terracon to determine soil strata within the basin. The geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations concerning drainage and slope stability. A copy of the Geotechnical Report is located in Appendix D.

As discussed in the geotechnical report, groundwater was encountered at depths of 6 to 11 feet below the ground surface. In agreement with this statement, local staff has verified that prior to development a small channel ran along what now is Reynolds Street. Also verifying this statement, the groundwater level appears to be evident in lower basin detention ponds after a rain event.

2.5 Design Procedures

Design procedures and parameters used in the study follow those recommended by the City of Laramie in the Request for Proposal for the North Laramie Drainage Master Plan. Computer models used in the study include Colorado Urban Hydrograph Procedure (CUHP) 2005 version 1.3.3 (Urban Drainage and Flood Control District, 2010) and XPSWMM (XP Software, 2010).

3.0 STUDY AREA DESCRIPTION

3.1 Location

The study area is approximately four square miles located within the City of Laramie, Albany County, Wyoming. It is generally located within the area bounded by 45th Street on the east, north of the Jacoby Golf Course; north of the University of Wyoming campus; north of Ivinson Street; and bounded on the west by Union Pacific Railroad. See Figure 1 below.

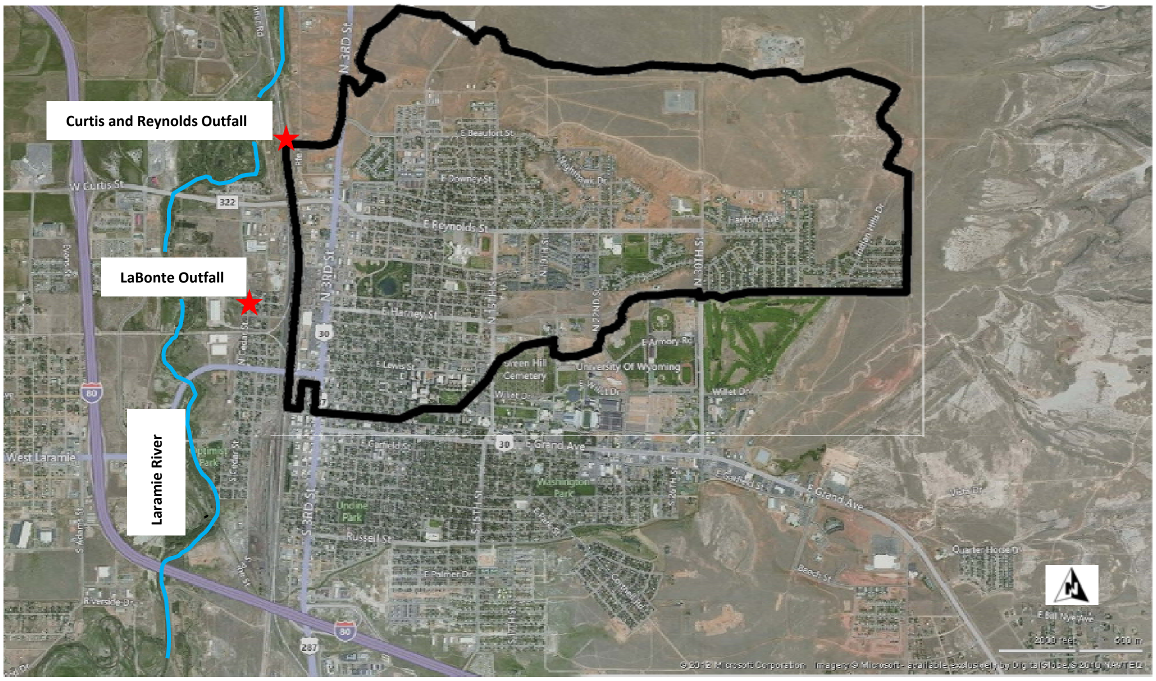

Figure 1: Location Map

3.2 Existing Outfalls

The North Laramie study area has two outfalls at a common location at the northwest corner of the site and one outfall at the southwest corner of the site. See Figure 1, above, for outfall locations. The systems outfall into drainage ditches and eventually into the Laramie River, which is located parallel to the west boundary of the study area and flows north. In this report, the three systems will be commonly referred to as the Curtis Street system, the Reynolds Street system and the LaBonte system.

3.3 Flood History

The North Laramie area can generally be divided into two halves, with the basins east of 15th Street referred to as "upstream" and the basins west of 15th Street referred to as "downstream." As evidenced during the public meetings, North Laramie has experienced flooding within recent years. Stakeholders within the neighborhood have noted flooding along Reynolds Street and Curtis Street, as well as localized low spots within the area. It was also noted that certain detention facilities in the downstream portions of the basin have reached maximum volume during many rainfall events. A majority of the flooding appears to occur within the downstream basins near major trunk lines, though many localized spots were discussed during the public meetings.

3.4 Land Characteristics

Topography within the study area is characterized as generally flat terrain at the downstream end (west end) of the site near the Laramie River and moderate slopes upstream.

Vegetation in the study area consists of mostly irrigated turf areas due to urbanization, however in the upper portions of the study the historic vegetation is shown as prairie with minimal coverage.

Soils within the study area are primarily Hydrologic Soils Group B interspersed with Hydrologic Soils Group C and D, as show in Figure 5. Soil information within the study area was obtained using the Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database (NRCS, 2007).

3.5 Land Use

The study area currently includes medium density residential, commercial, and industrial development in the southwest portion of the site; low density residential development in the southeast portion of the site; and is mostly undeveloped along the north boundary of the site.

Current percent imperviousness for on-site areas was determined using the City of Laramie existing Zoning Map (City of Laramie, 2010), shown in Figure 6. Projected percent impervious for the study area was determined using a Future Land Use map created as part of the Laramie Comprehensive Plan adopted by the City Council on May 30, 2003 (City of Laramie, 2003), shown in Figure 7.

4.0 HYDROLOGIC MODEL

4.1 General

Flood Peaks and hydrographs for the study area were determined using XPSWMM, calibrated to CUHP for the 100-year storm event. AutoCad Civil 3D and ArcInfo GIS were used to identify basin parameters required for CUHP and XPSWMM. The CUHP calibration input is in Appendix E. The Detention Pond Calculations are found in Appendix F. Input and Output data from XPSWMM for both the existing and future model are in Appendix G and H, respectively.

4.2 Rainfall Data

Rainfall data for three weather stations near the study area was obtained from the University of Wyoming Water Resources Data System (WRDS). See Figure 8 for the location of the three rain gage locations. Data received was 24-hour rainfall depths from 1970 to present for two of the stations and from 1998 to present for the third station. The data was evaluated for each of the stations and 24-hour point rainfall depths for the 2-, 5-, 10-, and 25-year storm event were calculated. An insufficient amount of data was collected to determine the 100-year storm event rainfall depth. The overall lack of data points reduces the confidence in the larger storm events. To determine the 24-hour point rainfall depths for the study area, the point rainfall depth values from each of the stations were weighted based on their distance from the study area. Appendix I shows the values for each station. The calculated 24-hour point rainfall depths were compared to National Oceanic and Atmospheric Administration (NOAA) values calculated from NOAA Atlas Volume II-Wyoming for the City of Laramie (NOAA 1973). Table 1 below shows a comparison of the 24-hour point rainfall depths.

Table 1: Weather Station Data vs. NOAA Atlas Data for 24-hour Point Rainfall Depths

Design Storm	Weighted Average of Weather Station Data (inches)	NOAA (inches)
2-year	1.1	1.2
5-year	1.6	1.6
10-year	2.1	1.8
25-year	2.1	2.2
100-year		2.6

The 24-hour point rainfall data from WRDS was comparable to the NOAA Atlas values, and given the limited data available, it was concluded that the current NOAA values are a more accurate representation. Therefore, one-hour point rainfall values from the NOAA Atlas were used for the hydrologic model. The values used are shown in Table 2. A comparison between the NOAA atlas and the latest City of Laramie publication shows that the NOAA value used for the 100-year design storm is slightly higher (0.1 inches), and therefore more conservative, than the 100-year rainfall intensity used in the Informational Bulletin #2 of the City of Laramie Community Development Department – Code Administration Division.

Table 2: NOAA 1-hour Point Rainfall Depths

Design Storm	Point Rainfall Depth (inches)
2-year	0.6
5-year	0.9
10-year	1.1
100-year	1.9

4.3 XPSWMM and CUHP Parameters

CUHP was used to determine two-hour precipitation values for the 2-, 5-, 10-, and 100-year storm events. Because of input requirements specific to CUHP, the one-hour point rainfall depths shown in Table 2 are distributed over two hours in five minute increments. The precipitation distribution depths, shown in Table 3 below, were input into the hydrologic model.

Table 3: 2-hour Precipitation Distribution Depths from CUHP

Time (minutes)	2-year (inches)	5-year (inches)	10-year (inches)	100-year (inches)
0:05	0.012	0.018	0.022	0.019
0:10	0.024	0.033	0.041	0.057
0:15	0.050	0.078	0.090	0.087
0:20	0.096	0.138	0.165	0.152
0:25	0.150	0.225	0.275	0.266
0:30	0.084	0.117	0.132	0.475
0:35	0.038	0.052	0.062	0.266
0:40	0.030	0.040	0.047	0.152
0:45	0.018	0.032	0.042	0.118
0:50	0.018	0.032	0.035	0.095
0:55	0.018	0.027	0.035	0.076
1:00	0.018	0.027	0.035	0.076
1:05	0.018	0.027	0.035	0.076
1:10	0.012	0.027	0.035	0.038
1:15	0.012	0.023	0.035	0.038
1:20	0.012	0.020	0.028	0.023
1:25	0.012	0.020	0.021	0.023
1:30	0.012	0.020	0.021	0.023
1:35	0.012	0.020	0.021	0.023
1:40	0.012	0.014	0.021	0.023
1:45	0.012	0.014	0.021	0.023
1:50	0.012	0.014	0.021	0.023
1:55	0.006	0.014	0.019	0.023
2:00	0.006	0.012	0.014	0.023
2:05	0.000	0.000	0.000	0.000

Subbasin catchment parameters, including area, basin length, slope and distance to centroid were identified using recent topographic mapping provided by the City of Laramie. 44 subbasins were delineated within the study area, shown in both Figure 9a and Figure 9b. Area, length, and slope measurements were obtained using GIS. A routing schematic for these basins is shown in Figures 10a through 10d.

Areas for each of the hydrologic soil groups within each of the subbasins were determined using GIS. Weighted soil infiltration parameters, including initial and final infiltration rates and decay coefficients, were calculated for each of the basins using the soil infiltration parameters listed in Table 4. Note that infiltration rates were estimated in the geotechnical investigation using the Hazen equation. Comparing the results of the geotechnical investigation and the values recommended by the Urban Drainage and Flood Control District (UDFCD) showed that the recommended infiltration parameters are more conservative and were therefore used for this study.

Table 4: Soil Infiltration Parameters

SCS Soil Type	Infiltration (inches/hour) Fi	Fo	Decay Coefficient
B	4.5	0.6	0.0018
C/D	3	0.5	0.0018

The type and density of land use defines the magnitude of percent impervious parameters used in the hydrologic model. Percent impervious used for each of the existing land use types and future land use types are listed in Table 5 and Table 6, respectively, below. Weight percent impervious was determined for each of the subbasins using GIS. In some instances, the weighted future percent impervious was lower than the existing percent impervious, due to the limited accuracy of the future land use map. In these instances, the existing percent impervious was used for the future percent impervious.

Table 5: Percent Impervious for Existing Land Uses in Study Area

Existing Land Use	Percent Impervious
Undeveloped	2
Low Density Residential	40
Medium Density Residential	60
Medium Density Residential w/ Independent Mobile Homes	60
Multifamily	75
Neighborhood Business	80
General Business	85
Limited Business	85
Industrial	90
Commercial Wholesale	95

Table 6: Percent Impervious for Future Land Uses in Study Area

Future Land Use	Percent Impervious
Agriculture	2
Park/ Open Space	5
Auto-Urban Residential	40
Suburban Residential	40
Urban Residential	40
Public/ Institutional	50
Urban University	50
Auto-Urban Multi-Family	75
Industrial	90
Auto-Urban Commercial	95
Suburban Commercial	95
Urban Commercial	95

XPSWMM Catchment width (w) parameters were calculated using,

$$W = L_c[2-(A_{i+1}-A_i)/A_t] \text{ (Huber et al., 1984)}$$

Where L_c= length of the channel,
A_i= area on the i^{th} side of the channel, and
A_t = the total area of the catchment.

Most conveyance elements were simulated with a main element and an overflow element. Following recommendations in the UDSWM manual (Boyle Engineering Corp., 1985), and in accordance with UDFCD recommendations, coefficients for overflow conveyance elements were increased by 25 percent to yield more accurate, dependable results. Two types of overflow conveyance elements were used within the catchments; a grassed channel, and a street. Typical parameters used for each of the conveyance elements are shown in Table 7 below.

Table 7: Typical Conveyance Element Parameters

	Depth (feet)	**Side Slopes H:V**	**Manning *n***	**Bottom Width (feet)**
Pipe				
Concrete			0.013	
HDPE			0.011	
Channel				
Main	3	3:1	0.044*	5
Overflow		10:1	0.056*	
Street				
Main	0.5		0.020*	45
Overflow	1	10:1	0.044*	

*increased by 25%

4.4 Calibration

Hydrographs produced by XPSWMM are calibrated to CUHP hydrographs for the 100-year event using two catchments within the study area. Hydrograph model calibration is an iterative procedure of parameter evaluation and refinement used to compare simulated and observed values to ensure realistic results. Flood peak calibration in cubic feet per second (cfs) is summarized on Table 8 below. Flood peak and hydrograph calibration was achieved by multiplying the XPSWMM catchment width parameters for all catchments by 1.3. This multiplication factor was applied to the catchment width parameter for all other storm events. For future development within the North Laramie basin, we recommend using this XPSWMM model or requiring that the model used is calibrated to yield the same results as this model.

Table 8: Flood Peak Calibration, XPSWMM to CUHP

	Flood Peak (cfs)		**Percent different from CUHP**
Catchment	**CUHP**	**XPSWMM**	**Coefficient**
CL	150	174	15%
CU	253	220	-16%

4.5 Street Capacity

A typical urban street section was obtained from the City and used to determine street capacities. The Urban Typical Section with Curb, Gutter and Sidewalk used for modeling purposes is shown in Figure 2.

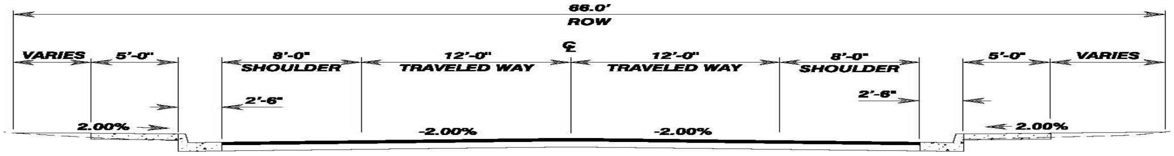

Figure 2: Typical Urban Street Section

For modeling purposes, it was assumed that the streets could carry a maximum of one foot of flow above the flow line during the 100-year event. Figure 3 is a rating curve of Discharge vs. Slope. The maximum street capacity should be examined further in final design using City of Laramie design criteria that is to be produced in the future.

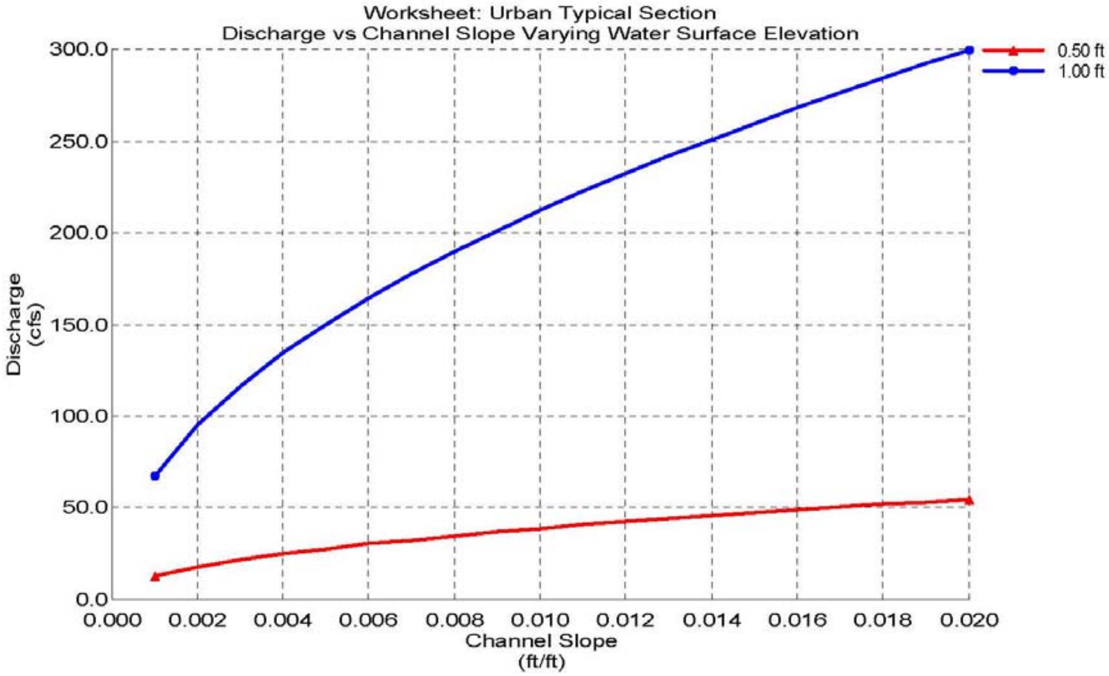

Figure 3: Typical Urban Street Section Capacity Rating Curve

4.6 Detention Areas

Eleven existing detention facilities were incorporated into the existing and future condition hydrologic models. Volumes were determined using the existing two-foot contour interval topography provided by the City of Laramie. Outlet and spill crest information was collected by Coffey Engineering and Surveying throughout the months of June and July of 2010. See Table 9 for location and approximate volume of each of the detention areas.

Table 9: Location and Approximate Volume of Detention Areas

XPSWMM Node Name	Location	Approximate Volume (acre-feet)
2122 (CM02)	10th Street and Beaufort Street	1.9
RM07	22nd Street and Reynolds Street	3.2
2407 (RM02)	22nd Street and Binford Street	7.8
RU05	30th Street and Reynolds Street (NE)	1.3
2634 (RU04)	30th Street and Reynolds Street (SE)	11.7
2490 (RM03)	Bath Street and Reynolds Street	4.4
RM08	22nd Street and Nighthawk Drive	7.4
RM06	17th Street and Reynolds Street	3.7
LM01	15th Street and Harney Street (NE)	1.4
LM02	15th Street and Harney Street (SE)	1.4
LL10	LaBonte Park (9th Street and Canby Street)	20.0

4.7 Addition of LaBonte Subbasins

The original North Laramie Drainage Master Plan did not contain subbasins LL05 through LL09, located just south of LaBonte Park. At the 75% submittal, it was recommended to the City of Laramie to add these subbasins to the study. LaBonte Park pond appeared to be the best opportunity to reduce peak flows in the lower portions of the basin.

For the hydrologic analysis of these additional subbasins, the delineation for these subbasins was adapted from the West Campus Drainage Study and Recommended Improvements Report for City of Laramie prepared by Nolte Associates, Inc. and dated June 2009. The remainder of the basin characteristics were calculated and determined using the same procedure as discussed in the beginning of this section. The XPSWMM model was updated to include these six additional subbasins. Since LaBonte Park pond does not have one specific outfall and it uses a few of the inflow pipes as pond outfalls, LaBonte Park pond was modeled as a retention pond with no outlet except an overflow weir.

4.8 Results

Flood peaks for the 2-, 5-, 10-, and 100-year flood events for each of the subbasins are summarized in Tables 10 and 11. Table 12 shows the percent increase of flows from existing to future percent impervious values, calculated by taking the Future Flow minus the Existing Flow and then the difference divided by the Existing Flow.

A significant increase in flows occurs in all subbasins which are currently undeveloped. These are primarily located in the upstream portion of the North Laramie basin. The existing percent imperviousness in these subbasins is 2% allowing many flows to infiltrate prior to leaving the basin. The significant increase in flows is caused by the significant increase in percent impervious upon development of these subbasins.

Table 10: Existing Flood Peaks

Subbasin	Percent Impervious	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
CL01	2	2	3	4	66
CL02	2	3	4	5	70
CL03	23	27	40	49	106
CL04	58	50	78	96	184
CL05	52	76	117	144	273
CL06	67	56	93	118	228
CL07	62	46	71	88	166
CL08	53	38	58	71	146
CL09	5	2	4	4	52
CM01	2	3	5	6	79
CM02	19	42	63	78	209
CU01	2	10	15	18	256
LL01	73	83	133	166	320
LL02	73	66	110	140	274
LL03	61	28	43	53	101
LL04	64	52	81	101	190
LL05	71	17	28	35	66
LL06	75	30	47	59	111
LL07	75	79	124	155	300
LL08	87	39	63	82	170
LL09	86	56	95	122	245
LL10	61	22	35	44	90
LM01	75	26	41	51	105
LM02	75	55	84	104	216
RL01	66	40	63	79	147
RL02	71	54	89	115	236
RL03	93	38	62	80	168
RM01	47	16	25	30	58
RM02	40	45	71	88	170
RM03	40	34	51	63	142
RM04	35	20	31	37	90
RM05	63	43	66	81	181
RM06	74	79	125	156	299
RM07	34	27	40	49	111
RM08	27	25	38	47	104
RM09	45	30	46	57	107
RM10	2	2	3	4	64
RM11	56	50	77	96	183
RU01	31	47	71	88	207
RU02	40	33	49	61	130
RU03	41	24	37	46	94
RU04	40	40	60	74	190
RU05	35	15	22	27	71
RU06	45	82	126	156	302

Table 11: Future Flow Peaks

Subbasin	Percent Impervious	2-year (cfs)	5-year (cfs)	10-year (cfs)	100-year (cfs)
CL01	40	42	65	80	158
CL02	52	56	88	109	215
CL03	47	51	78	97	186
CL04	58	50	78	96	184
CL05	52	76	117	144	273
CL06	67	56	93	118	228
CL07	62	46	71	88	166
CL08	70	49	75	92	183
CL09	92	39	60	75	142
CM01	45	67	102	126	234
CM02	40	86	130	160	319
CU01	43	177	277	345	691
LL01	73	83	133	166	320
LL02	73	66	110	140	274
LL03	61	28	43	53	101
LL04	64	52	81	101	190
LL05	71	17	28	35	66
LL06	75	30	47	59	111
LL07	75	79	124	155	300
LL08	87	39	63	82	170
LL09	91	58	98	126	255
LL10	61	22	35	44	90
LM01	75	26	41	51	105
LM02	75	55	84	104	216
RL01	66	40	63	79	147
RL02	71	54	89	115	236
RL03	93	38	62	80	168
RM01	47	16	25	30	58
RM02	40	45	71	88	170
RM03	42	36	54	66	148
RM04	37	21	32	40	94
RM05	63	43	66	81	181
RM06	74	79	125	156	299
RM07	38	30	45	55	121
RM08	40	36	55	68	141
RM09	45	30	46	57	107
RM10	40	42	65	79	150
RM11	56	50	77	96	183
RU01	40	59	91	112	249
RU02	40	33	49	61	130
RU03	41	24	37	46	94
RU04	40	40	60	74	190
RU05	39	17	25	31	76
RU06	45	82	126	156	302

Table 12: Percent Increase of Flows from Existing to Future

Subbasin	2-year	5-year	10-year	100-year
CL01	2000%	2067%	1900%	139%
CL02	1767%	2100%	2080%	207%
CL03	89%	95%	98%	75%
CL04	0%	0%	0%	0%
CL05	0%	0%	0%	0%
CL06	0%	0%	0%	0%
CL07	0%	0%	0%	0%
CL08	29%	29%	30%	25%
CL09	1850%	1400%	1775%	173%
CM01	2133%	1940%	2000%	196%
CM02	105%	106%	105%	53%
CU01	1670%	1747%	1817%	170%
LL01	0%	0%	0%	0%
LL02	0%	0%	0%	0%
LL03	0%	0%	0%	0%
LL04	0%	0%	0%	0%
LL05	0%	0%	0%	0%
LL06	0%	0%	0%	0%
LL07	0%	0%	0%	0%
LL08	0%	0%	0%	0%
LL09	4%	3%	3%	4%
LL10	0%	0%	0%	0%
LM01	0%	0%	0%	0%
LM02	0%	0%	0%	0%
RL01	0%	0%	0%	0%
RL02	0%	0%	0%	0%
RL03	0%	0%	0%	0%
RM01	0%	0%	0%	0%
RM02	0%	0%	0%	0%
RM03	6%	6%	5%	4%
RM04	5%	3%	8%	4%
RM05	0%	0%	0%	0%
RM06	0%	0%	0%	0%
RM07	11%	13%	12%	9%
RM08	44%	45%	45%	36%
RM09	0%	0%	0%	0%
RM10	2000%	2067%	1875%	134%
RM11	0%	0%	0%	0%
RU01	26%	28%	27%	20%
RU02	0%	0%	0%	0%
RU03	0%	0%	0%	0%
RU04	0%	0%	0%	0%
RU05	13%	14%	15%	7%
RU06	0%	0%	0%	0%

5.0 PRELIMINARY IDENTIFICATION OF FLOOD PRONE AREAS

One major cause of flooding in the North Laramie basin is caused by a backwater effect; most significantly in low slope areas. Backwater or ponding downstream increases water surface elevations downstream and results in a reduction in hydraulic head between downstream and upstream areas. This reduces the ability of the stormwater conveyance system to quickly pass stormwater downstream. When the capacity of the stormwater conveyance system is limited by a small change in hydraulic head, the stormwater cannot be directly conveyed downstream and the model “ponds” this water. Consequently, this water is “stored” or ponded in the streets and neighborhoods until it can be removed by gravity flow and this ponded water creates flooding in the neighborhood. This cause of flooding predominately occurs along the low slope areas near the outfall.

A second major cause of flooding in the study area is inadequate conveyance to transport the peak flows. Under these cases, the model “stores” waters upstream of the reach with inadequate conveyance until it has the capacity to transport the flows. This flooding can occur anywhere in the catchment, but it is most common when flow conveyance is limited by storm sewer capacity and where the discharge from a number of catchments combines and overwhelms the carrying capacity of the streets, channels, and storm sewers downstream.

To simplify the discussion of flood prone areas, the major stormwater conveyance routes in the study were divided into reaches. Reaches are identified in Figure 11. Tables 13 and 14 identify flood prone areas for the 2-, 5-, 10-, and 100-year events, for the existing and future conditions, respectively, while the below discussion focuses on both the minor (2-year) and major (100-year) events. The analysis incorporated the best available information on existing detention areas, but assumes no new detention areas for future conditions.

5.1 Existing Percent Imperviousness

Refer to Figure 12 for location of flooding areas for the 2- and 100-year events with the existing percent imperviousness. A majority of these local flooding areas were also identified by local citizens during the public meetings described in Section 2.3.

Reach 1, located in the northern part of the study area, shows no flooding areas for the 2-year event. Minor flooding is observed along Beaufort Street between 9th Street and 10th Street during the 100-year event.

Reach 2, located in the northwest part of the study area, shows flooding at the intersection of Downey Street and 9th Street during the 2-year event. During the 100-year event, 9th Street between Curtis Street and Downey Street will flood.

Reach 3, located in the eastern section of the study area, will experience no significant flooding during the 2-year event. Reynolds Street between 22nd Street and 30th Street, as well as 30th Street between Grays Gable Road and Reynolds Street, will experience flooding during the 100-year event.

Reach 4 is located north of Reynolds Street along 22nd Street. No significant flooding will be experienced in this reach during the 2-year event. During the 100-year event, flooding is anticipated at the intersection of 22nd Street and Reynolds Street.

Reach 5 is located south of Reynolds Street along 22nd Street. No significant flooding will be experienced in this reach during the 2-year event. Flooding will be experienced from Hancock Street to Reynolds Street along 22nd Street during the 100-year event.

Reach 6 receives runoff from Reaches 3, 4, and 5 which influences flooding in the Reach. During the two year event, flooding is anticipated in the lower part of the Reach, bounded on the west and east by 4th Street and 9th Street, and bounded on the north and south by Reynolds Street and Hancock Street. During the 100-year event, flooding is anticipated in the reach during the 2-year event and along Reynolds Street from 9th Street to the west to 22nd Street to the east.

Flooding in Reach 7, located in the southwest part of the Study area, is strongly influenced by the multifamily development in the upper part of the reach which causes large flood peak discharges. Flooding is anticipated all along the Reach, roughly a diagonal between the intersection of Shield Street and 9th Street to the intersection of Harney Street and 15th Street during the 2- and 100-year event.

Reach 8 is the outfall area and receives runoff from all Reaches in the Study area. Reach 8 is strongly influenced by backwater effects. Due to topographic conditions, stormwater flows are directed in two paths at the intersection of Curtis Street and 7th Street, one path located along Curtis Street, the other flowing to the southwest towards Hancock Street. Once the storm sewer in Curtis Street is filled to capacity, stormwater flows tend to follow the southwestern path. During the 2-year event, lands south of Curtis Street are flooded. During the 100-year event, all lands in the Reach are flooded.

Reach 9, located south of LaBonte Park, is independent of all other reaches. Flooding at the intersection of 3rd Street and Canby Street will occur in this reach during a 2-year event. During a 100-year event, flooding will occur at the intersections of 6th Street and Canby Street and 3rd Street and Canby Street and along 3rd Street, 6th Street, Canby Street and Harney Street west of 3rd Street. Flooding is this reach is a result of extremely low slopes within the reach.

5.2 Future Percent Imperviousness

Refer to the Figure 13 for location of flooding areas for the 2- and 100-year events with future percent imperviousness.

Future condition flooding is similar to existing condition flooding. The only exception is additional flooding in Reach 2.

In Reach 2, flooding will appear along 9th Street between Curtis Street and Downey Street. For the 100-year event, flooding is anticipated on 9th Street between Curtis Street and Beaufort Street as existing conditions but will extend north of Beaufort Street along 9th Street to Seeton Street.

5.3 Existing Detention Ponds

The hydrologic analysis indicates some existing detention ponds successfully detain the 100-year event while others do not. Ponds working properly include those identified as nodes RM03 (2490), RM02, RM07 and RM08. Ponds overtopping during the 100-year event include RU04 (2634), RU05, RM06, LM01, LM02, CM02 (2122) and LL10.

Table 13: North Laramie Problem Areas - Existing Percent Impervious

Reach	Location	Major Areas, Streets	2-year event	5-year event	10-year event	100-year event
1	Northeast	Undeveloped upstream areas, Beaufort St.	No significant flooding	No significant flooding	No significant flooding	Along Beaufort St. between 9th St. and 10th St.
2	Northwest	9th St., Curtis St.	Intersection Downey St. and 9th St.	Along 9th St. between Curtis St. and Beaufort St.	Along 9th St. between Curtis St. and Seeton St.	Along 9th St. between Curtis St. and Seeton St.
3	Southeast	Grays Gable Road, Alta Vista Drive, 30th St.	No significant flooding	No significant flooding	Intersection 30th St. and Reynolds St.	Along 30th St. between Grays Gable Road Road and Reynolds St.
		Reynolds St.				Along Reynolds St. between 22nd St. and 30th St.
4	North Central	22nd St. north of Reynolds St.	No significant flooding	No significant flooding	No significant flooding	Intersection 22nd St. and Reynolds St.
5	South Central	22nd St. south of Reynolds St.	No significant flooding	Near Hancock St. and 22nd St.	Near Hancock St. and 22nd St.	Hancock St. to Reynolds St.
6	Central	Reynolds St., 9th St., and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along Reynolds St. between 22nd St. and 9th St.
			Along Hancock St. between 9th St. and 4th St.	Near 15th St. and Reynolds St.	Near 15th St. and Reynolds St.	Along 9th St. between Reynolds St. and Hancock St.
				Along Hancock St. between 9th St. and 4th St.	Along Hancock St. between 9th St. and 4th St.	Along Hancock St. between 9th St. and 4th St.
7	South	Harney St., 14th St., Gibbon St., 11th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.
		Canby, 9th St., Hancock St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.
			Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.
			Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.
			Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.

Reach	Location	Major Areas, Streets	2-year event	5-year event	10-year event	100-year event
7	South	Canby, 9th St., Hancock St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.
			From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.
8	West, Outfall		Curtis St. from 7th St. to 3rd not flooded	Curtis St. from 7th St. to 3rd not flooded	Curtis St. from 7th St. to 3rd not flooded	Entire area flooded
			Entire area to south of Curtis St. flooded	Area south of Curtis St. flooded	Area south of Curtis St. flooded	Area south of Curtis St. flooded
9	South of LaBonte Park	Canby St., Harney St. Outfall	Intersection of 3rd St. and Canby St. Flooded	Intersection of 3rd St. and Canby St. Flooded	Along Canby St. from 3rd St. to 6th St.	Entire area flooded
				Intersection of 6th St. and Canby St. Flooded	Along 6th St. from Lewis St. to Canby St.	
					Along 3rd St. between Canby St. and Harney St.	

Table 14: North Laramie Problem Areas - Future Percent Impervious

Reach	Location	Major Areas, Streets	2-year event	5-year event	10-year event	100-year event
1	Northeast	Undeveloped upstream areas, Beaufort St.	No significant flooding	Along Beaufort St. between 9th St. and 10th St.	Along Beaufort St. between 9th St. and 10th St.	Along Beaufort St. between 9th St. and 10th St.
2	Northwest	9th St., Curtis St.	Along 9th St. between Curtis St. and Downey St.	Along 9th St. between Curtis St. and Beaufort St.	Along 9th St. between Curtis St. and Seeton St.	Along 9th St. between Curtis St. and Seeton St.
3	Southeast	Grays Gable Road, Alta Vista Drive, 30th St.	No significant flooding	No significant flooding	Intersection 30th St. and Reynolds St.	Along 30th St. between Grays Gable Road and Reynolds St.
		Reynolds St.				Along Reynolds St. between 22nd St. and 30th St.
4	North Central	22nd St. north of Reynolds St.	No significant flooding	No significant flooding	No significant flooding	Intersection 22nd St. and Reynolds St.
5	South Central	22nd St. south of Reynolds St.	No significant flooding	Near Hancock St. and 22nd St.	Near Hancock St. and 22nd St.	Hancock St. to Reynolds St.
6	Central	Reynolds St., 9th St., and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along 9th St. between Reynolds St. and Hancock St.	Along Reynolds St. between 22nd St. and 9th St.
			Along Hancock St. between 9th St. and 4th St.	Near 15th St. and Reynolds St.	Near 15th St. and Reynolds St.	Along 9th St. between Reynolds St. and Hancock St.
				Along Hancock St. between 9th St. and 4th St.	Along Hancock St. between 9th St. and 4th St.	Along Hancock St. between 9th St. and 4th St.
7	South	Harney St., 14th St., Gibbon St., 11 th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.	Along Harney St. between 14th St. and 15th St.
		Canby, 9th St., Hancock St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.	Along 14th St. between Harney St. and Gibbon St.
			Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.	Along Gibbon St. between 14th St. and 11th St.
			Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.	Along 11th St. between Gibbon St. and Canby St.
			Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.	Along Canby St. between 11th St. and 9th St.

Reach	Location	Major Areas, Streets	2-year event	5-year event	10-year event	100-year event
7	South	Canby, 9th St., Hancock St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.	Along 9th St. between Canby St. and Shield St.
			From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.	From Shield St. and 9th St. to 4th St. and Hancock St.
8	West, Outfall		Curtis St. from 7th St. to 3rd not flooded	Curtis St. from 7th St. to 3rd not flooded	Curtis St. from 7th St. to 3rd not flooded	Entire area flooded
			Entire area to south of Curtis St. flooded	Area south of Curtis St. flooded	Area south of Curtis St. flooded	Area south of Curtis St. flooded
9	South of LaBonte Park	Canby St., Harney St. Outfall	Intersection of 3rd St. and Canby St. Flooded	Intersection of 3rd St. and Canby St. Flooded	Along Canby St. from 3rd St. to 6th St.	Entire area flooded
				Intersection of 6th St. and Canby St. Flooded	Along 6th St. from Lewis St. to Canby St.	
					Along 3rd St. between Canby St. and Harney St.	

6.0 ANALYSIS OF ALTERNATIVE IMPROVEMENTS

6.1 General

The hydrologic analysis indicated development in the study area will increase the magnitude of flood peaks for basins that are currently undeveloped. The hydrologic analysis also indicated that the existing system floods under the existing conditions. The three major areas of potential flooding identified in the North Laramie drainage area are:

- Increased discharge due to development in the north and east (Curtis Street system);
- Upstream capacity during large events (especially in the Reynolds Street system); and
- Downstream capacity/backwater effect toward all outfalls.

The additional LaBonte subbasins described in Section 4.7 are not included in this analysis as they were added later in the study.

6.2 Qualitative Analysis of Alternative Improvements

In response to the three major areas of potential flooding, a scoring matrix was developed to qualitatively analyze possible solutions. See Appendix J for the Conceptual Solution Scoring Matrix. The matrix involved determining all possible solutions to each of the three major areas of potential flooding mentioned above and rating each of the solutions based on costs, maintenance, proven acceptance, and hydrologic impact on the minor and major storm events. Each of the categories was scored according to the effectiveness within the North Laramie project area using a *"+"* for positive impacts, *"0"* for no impact and *"-"* for negative impacts. The scores were completed independently by three team members. The scores were summed for an overall rating for each of the solutions. The solutions were then ranked, by problem, according to their overall score and the highest ranked solutions were chosen for the alternative improvements.

It was noted that for the *"Increased discharge due to development"* and the *"Upstream capacity during large events"*, a potential solution for each by far out-weighed the others in its positive impacts. Therefore, for these two major areas of potential flooding, one solution was used. The highest ranked solution for "Increased discharge due to development" was the requirement for detention within the basin upon future development. Note that Low Impact Development also ranked high and is encouraged within these basins to detain the smaller events to historic flows. However, detention will still be needed for large events.

The highest ranked solutions for *"Upstream capacity during large events"* were to modify/optimize existing detention and, if necessary, provide additional detention. This would include modifying the existing outlet structure to release at historic rates for all storm events (full-spectrum detention), enlarge existing ponds when possible and necessary, and add new detention ponds when possible and necessary.

The four highest ranked solutions for *"Downstream capacity / backwater effect"* were floodplain management/floodproofing, additional trunk line systems, upsize existing trunk line system, and providing regional detention. It was noted that floodplain management/floodproofing should be a part of all solutions in some manner and therefore was not included into the structural alternatives. The solutions for each of the three major areas of potential flooding were combined to form the following three alternative solutions to quantitatively analyze. The three alternatives are:

1. Require detention for future development, modify/optimize existing detention and add additional detention, upsize the existing trunk line storm sewer system and provide floodproofing where necessary.
2. Require detention for future development, modify/optimize existing detention and add additional detention, add additional trunk line storm sewer systems and provide floodproofing where necessary.
3. Require detention for future development, modify/optimize existing detention and add additional detention and provide downstream regional detention, upsize existing trunk line storm sewer system and provide floodproofing where necessary.

6.3 Quantitative Analysis of Alternative Improvements

The solutions for both *"Increased discharge due to development"* and *"Upstream capacity during large events"* are the same for all three alternatives; therefore, they were analyzed first and added to each base alternative model created. Design Criteria was used throughout all qualitative analyses. One foot of flow depth within the street was considered allowable and was checked with FlowMaster using normal depth for different slopes. A depth greater than one foot within the street was considered flooding. Pipe capacities were also checked with FlowMaster.

6.3.1 Upstream Improvements

Upstream improvements include requiring detention for future development in undeveloped areas, modifying existing detention ponds, and adding new detention in developed areas. Figure 14 shows pond modifications and required detention for undeveloped areas.

Subbasins CU01, CM01, CL01, CL02 and RM10 are currently undeveloped basins (existing percent impervious is 2%). For these subbasins, detention is required for all future development and release rates for the detention must not exceed existing or "historic" rates. It is recommended that these undeveloped areas release the 100-year event at 10-year "historic" release rates to help reduce the flooding in the lower portions of North Laramie. Assuming that these basins will release at "historic" rates after development, existing percent impervious was used in the base alternative model. Future regional detention for these subbasins was estimated using the SCS method and an estimated hydrograph using the 10-year and 100-year peak flow rate and the time of peak. The estimated regional detention volume for each of the ponds, for both 100-year and 10-year "historic" release rates, is listed in Table 15. Subbasins RU01, RM10, RM08, CM02 and CL03 are partially undeveloped. Local detention is also required for future development in these undeveloped areas, though each will need to be done on an individual basis and not on a regional level due to the existing grade of the basin and the existing development. For modeling purposes, existing percent impervious values were used for these basins as well.

Table 15: Estimated Regional 100-Year Detention Volumes for Undeveloped Subbasins

Subbasin	Estimated Regional Detention Volume (w/ 100-yr Release Rate) (acre-feet)	Estimated Regional Detention Volume (w/ 10-yr Release Rate) (acre-feet)
CU01	21.9	36.7
CM01	7.8	12.4
CL01	4.7	8.4
CL02	7.4	11.5
RM10	4.4	8.0

Each of the existing eleven detention ponds was optimized for full spectrum detention. Therefore, each pond was optimized to release at "historic rates" for all four storm events: 2-, 5-, 10- and 100-

year. Because development has already occurred in the subbasins in which these ponds are located, a historic release rate for each of the storm events was estimated. The four undeveloped subbasins, CU01, CM01, CL01 and CL02, were used to estimate the “historic” release rates. The existing flow rates and potential future flow rates for each of the four storm events were compared to determine the increase from existing to future flows. This increase for each of the storm events was averaged for each of the four undeveloped basins and a multiplier for each of the storm events was determined. This new multiplier was used to determine an acceptable release rate for each existing pond to mimic “historic” conditions. Each of the existing ponds was modeled separately to accurately model the optimized outlet without the influence of backwater.

Existing detention ponds located in subbasins LM01, RU05, RM06, CM02 and LL10 were enlarged to their maximum potential volumes given land constraints and outlet and spill crest elevation constraints to help reduce flooding downstream. Table 16 shows the increase in volume for each pond.

Table 16: Estimated Increase in Detention Volumes for Existing Detention Ponds

Detention Pond	Estimated Increase in Detention Volume (acre-feet)
LM01	1.1
RU05	1.7
RM06	1.6
CM02	2.9

After modifying/optimizing all existing ponds, flooding still occurred at 22nd Street and Reynolds Street. Existing detention ponds located in subbasins RU04 and RU05, were unable to reduce this flooding and could not be further enlarged due to site constraints. To remove this flooding issue, a new detention pond of approximately 10 acre-feet was located on an undeveloped parcel of land located at the southwest corner of the intersection of 22nd Street and Reynolds Street in basin RM02.

The additional pond RM02, the modification/optimization of the existing ponds, plus the required detention for future developments removed the two major areas of potential flooding described above.

Note that ponds CM02, LM02 and the new pond RM02 overtop during normal 100-year event operations and do not cause flooding within the downstream area based on the Design Criteria stated. Also note that basin RU02, RU03, and RU06 cause potential flooding along Grays Gable Road and 30th Street. The new pond located in RM02 is sized to capture this flow and remove flooding downstream. There is a current inlet diversion system at the end of Basin RU06 that diverts flow to the Jacoby Golf Course, which if possible, could be increased to remove flow and flooding from Grays Gable Road. This removal of flow may decrease the size of the new pond RM02 depending on the amount of flow diverted to the Jacoby Golf Course. For this study, it was assumed no flow was diverted.

6.3.2 Downstream Alternative 1: Upsize Existing Trunk Line Sewers

In addition to the upstream improvements discussed above, Alternative 1 involves upsizing the existing trunk line sewers in the downstream area of the North Laramie drainage basin as shown in Figure 15. In this alternative, pipe sizes would be increased so that streets met the Design Criteria stated. Flat slopes (less than 0.5%) in the area limit the size of pipe available due to cover. Alternative 1 requires increases to the trunk line sewer system of the Curtis Street system from

Beaufort Street and 9th Street downstream to the outfall, increases to the trunk line sewer system of the Reynolds Street system from 15th Street and Reynolds Street downstream to the outfall, and increases to the trunk line sewer system of the LaBonte system from 11th and Gibbon downstream to the Reynolds Street system. The results are an 8'x8' reinforced concrete box culvert (RCBC) at the outfall of the Curtis Street system which would convey approximately 800 cfs, a 6'x20' RCBC at the outfall of the Reynolds Street system which would convey approximately 1000 cfs, and a 5'x10' concrete box at the connection of the LaBonte system to the Reynolds Street system.
Alternative 1 removes the *"Downstream capacity / backwater effect"* area of potential flooding.

6.3.3 Downstream Alternative 2: Additional Trunk Line Sewers

As illustrated in Figure 16, Alternative 2 consists of adding additional interceptor trunk line systems which would remove flows from the Curtis Street and Reynolds Street systems and discharge the flows directly to the outfall.

The Curtis Street system would be intercepted at 9th Street and Downey Street with a 6'x8' RCBC that would remove 450 cfs from the system and convey the flows directly to the outfall channel west of Highway 287 at the northwest corner of the North Laramie drainage basin. The trunk line system would run west along Downey Street to 7th Street and then run south along 7th Street to Mitchell Street; west along Mitchell Street to 3rd Street, south on 3rd to Superior Court west, and then north on Superior Court to the outfall. The additional trunk line sewer system interceptor would prevent flooding from occurring downstream of 9th Street and Downey Street for the remainder of the existing Curtis Street system. However, potential flooding would occur upstream of 9th Street to Beaufort Street.

The LaBonte system would be intercepted at 9th Street and Shield Street with a 6'x9' RCBC which would convey approximately 450 cfs directly to the outfall channel. The interceptor system would run west along Shield Street to the railroad tracks and north along the railroad tracks to the outfall. Removing flow from the Reynolds Street system would prevent flooding of the existing system along Shield Street and 4th Street, but the remainder of the LaBonte system would have potential flooding during large storm events upstream of 11th Street to Gibson Street. Though removing a majority of the LaBonte system from the Reynolds Street system improves the potential flooding situation, the Reynolds Street system still has potential flooding and no other alternative path to take for a trunk line.

This alternative does not remove the *"Downstream capacity / backwater effect"* area of potential flooding, but does improve the situation.

6.3.4 Downstream Alternative 3: LaBonte Discharge and Upsize Trunk Line Sewers

It was anticipated that Alternative 3 would consist of regional detention within the downstream area of North Laramie. However, there is no undeveloped land available for regional detention. Therefore, Alternative 3 consists of utilizing the LaBonte Park pond as a retention or detention pond and discharging all of the 100-year flow, approximately 700 cfs, upstream of 9th Street and Shield Street directly into the LaBonte Park pond through a 4'x20' RCBC. As shown in Figure 17, Alternative 3 also consists of upsizing the Curtis Street system and Reynolds Street system. Alternative 3 would yield the same results as Alternative 1 for the Curtis Street system and would end with an 8'x8' box culvert at the outfall of the system. The Reynolds Street system upstream of the LaBonte Park discharge would also yield the same results as Alternative 1. However, the LaBonte Park Pond discharge would reduce the size of the box culvert downstream of the discharge from Alternative 1 to a 6'x12' RCBC.

This alternative does remove the *"Downstream capacity / backwater effect"* area of potential flooding.

6.4 Cost Analysis of Alternative Improvements

Cost estimates are presented in Tables 17 through 19 for the three alternatives. **Alternative 1** includes modification of existing ponds, adding detention ponds, and upsizing existing storm sewers for a total estimated cost of **$24,000,000**. **Alternative 2** modifies the existing ponds and adds detention ponds, but only adds additional trunk line sewers to the existing storm sewer system, for a total estimated cost of **$13,900,000**. **Alternative 3** has an estimated total cost of **$19,200,000** and includes modification of existing ponds, adding detention ponds, directing flows to LaBonte Park pond, and upsizing existing storm sewers. The cost estimates are divided into Storm Sewer, Detention, and Utility Relocation categories, and are intended to provide a basis for comparing the three alternatives.

The construction cost estimates presented are based on construction unit costs for recently completed drainage projects in the Denver metro area, a bid tabulation database maintained by the UDFCD, and engineering judgment. Because of the unique sizes of the proposed reinforced concrete box culverts, a one-foot wall, floor, and ceiling thickness and a $625 per cubic yard price for concrete was assumed. Construction cost estimates are increased by 20 percent to account for contingencies, engineering, administration, and legal fees. Costs were also increased by assuming a 5 percent traffic control component, 8 percent for mobilization/demolition, 5 percent for material remediation and disposal, and 20 percent for utility relocation. Land acquisition costs are not included in the estimate because the additional ponds are common to all alternatives, and because land values vary over time.

The cost estimates included in this master plan are conceptual in nature and are to be used for comparative purposes only. All construction costs are presented in 2010 dollars, and no financing costs or phased construction alternatives are included.

Table 17: Conceptual Cost Estimate for Alternative 1

Item No.	Description	Quantity	Unit	Unit Price	Total Cost
	Traffic Control (5%)	1	LS	$848,336	$848,336
	Mobilization/Demolition (8%)	1	LS	$1,357,337	$1,357,337
	Material Management (environmental remediation and disposal) (5%)	1	LS	$848,336	$848,336
Storm Sewer*					
	54" RCP	1442	LF	$210	$302,820
	60" RCP	3673	LF	$230	$844,790
	72" RCP	601	LF	$265	$159,265
	8'x8' RCBC	3342	LF	$750	$2,506,500
	7'x9' RCBC	750	LF	$750	$562,500
	6'x8' RCBC	1577	LF	$650	$1,025,050
	6'x20' RCBC	1976	LF	$1,200	$2,371,200
	5'x20' RCBC	1878	LF	$1,150	$2,159,700
	5'x10' RCBC	2171	LF	$700	$1,519,700
	5'x8' RCBC	1798	LF	$600	$1,078,800
	5'x16' RCBC	936	LF	$975	$912,600
				Sub-Total	*$13,442,925*
Detention					
	Detention Volume	17.4	AC-FT	$40,000	$696,000
				Sub-Total	*$696,000*
Utility Relocates					
	Dry Utility Administration (20%)	1	LS	$2,827,385	$2,827,785
				Sub-Total	*$2,827,785*
				Sub-Total for Alternative	$20,017,886
				Contingency (20%)	$4,004,144
				Total For Alternative	**$24,000,000**

*Box culvert sizes are height x width; assumes 1 foot slab thickness and $625/CY

Table 18: Conceptual Cost Estimate for Alternative 2

Item No.	Description	Quantity	Unit	Unit Price	Total Cost
	Traffic Control (5%)	1	LS	$490,110	$490,230
	Mobilization/Demolition (8%)	1	LS	$784,176	$784,368
	Material Management (environmental remediation and disposal) (5%)	1	LS	$490,110	$490,230
Storm Sewer					
	6'x9' RCBC	5970	LF	$700	$4,179,000
	6'x8' RCBC	5070	LF	$650	$3,295,500
				Sub-Total	*$7,474,500*
Detention					
	Detention Volume	17.4	AC-FT	$40,000	$696,000
				Sub-Total	*$696,000*
Utility Relocates					
	Dry Utility Administration (20%)	1	LS	$1,633,700	$1,634,100
				Sub-Total	*$1,634,100*
				Sub-Total for Alternative	$11,569,428
				Contingency (20%)	$2,313,886
				Total For Alternative	**$13,900,000**

*Box culvert sizes are height x width; assumes 1 foot slab thickness and $625/CY

Table 19: Conceptual Cost Estimate for Alternative 3

Item No.	Description	Quantity	Unit	Unit Price	Total Cost
	Traffic Control (5%)	1	LS	$676,100	$676,220
	Mobilization/Demolition (8%)	1	LS	$1,081,759	$1,081,951
	Material Management (environmental remediation and disposal) (5%)	1	LS	$676,100	$676,220
Storm Sewer					
	54" RCP	1442	LF	$210	$302,820
	60" RCP	3673	LF	$230	$844,790
	72" RCP	601	LF	$265	$159,265
	8'x8' RCBC	3342	LF	$750	$2,506,500
	7'x9' RCBC	750	LF	$750	$562,500
	6'x8' RCBC	1577	LF	$650	$1,025,050
	6'x12' RCBC	1976	LF	$850	$1,679,600
	5'x12' RCBC	1878	LF	$800	$1,502,400
	5'x8' RCBC	1798	LF	$600	$1,078,800
	5'x16' RCBC	936	LF	$975	$912,600
				Sub-Total	*$10,574,325*
Detention					
	Detention Volume	17.4	AC-FT	$40,000	$696,000
				Sub-Total	*$696,000*
Utility Relocates					
	Dry Utility Administration (20%)	1	LS	$2,253,665	$2,254,065
				Sub-Total	*$2,254,065*
				Sub-Total for Alternative	$15,958,780
				Contingency (20%)	$3,191,756
				Total For Alternative	**$19,200,000**

6.5 Water Quality and Erosion Control

The provision for permanent water quality BMPs and erosion protection at all outfalls to North Laramie is assumed included in all alternatives. Where possible, combining water quality BMPs with sub-regional detention is a top priority. Opportunities to incorporate low impact development (LID) BMPs are abundant in the upper undeveloped portions of the watershed. The abundance of Type B soils in this watershed (see Figure 5) is conducive to infiltration BMPs such as porous landscape detention, sand filters, and porous pavements. However, the possibility of high groundwater noted earlier must be considered in the design.

7.0 RECOMMENDED PLAN

The following is a discussion of improvements recommended by SEH and explanation of how the recommended plan mitigates and addresses each problem area. The Recommended Plan is shown in Figure 18.

7.1 Plan Description

The plan recommended by SEH is a combination of all three alternative improvement plans in addition to optimizing LaBonte Park pond. The alternative analyses concluded that modifying and optimizing existing detention and providing new detention in the upper portions of the basin optimizes the use of the existing storm sewer and street system, providing 100-year conveyance capacity along Reynolds, upstream of 17th Street. The maturity of the lower portion of the basin remains the most significant constraint to providing upgraded infrastructure that would meet City of Laramie and UDFCD criteria for new development.

As discussed in Section 4.7, LaBonte Park pond was added to the selected alternatives to create the Recommended Plan. LaBonte Park pond had the best potential opportunity for regional detention in the lower basin. In order to include LaBonte Park pond modifications in the Recommended Plan, additional subbasins that were not a part of the original North Laramie Drainage Master Plan were added to the study. The recommended plan is presented below on a reach by reach basis, as presented in Figure 18. As a part of the recommended plan, conceptual grading for existing ponds is presented in Figure 19. The costs associated with the components of the recommended plan are summarized in Table 20.

As discussed in Section 6.3.1, Subbasins CU01, CM01, CL01, CL02 and RM10 are currently undeveloped basins (existing percent impervious is 2%). For these subbasins, detention is required for all future development and release rates for the detention must not exceed existing or "historic" 10-year peak flow rates. Subbasins RU01, RM08, CM02 and CL03 are partially undeveloped, based on the existing zoning and future land use maps. Local detention is also required for future development in these undeveloped areas, though each will need to be done on an individual basis and not on a regional level due to the existing grade of the basin and the existing development. Also discussed in Section 6.3.1, each of the existing eleven detention ponds was optimized for full spectrum detention. Therefore, each pond was optimized to release at "historic rates" for all four storm events: 2-, 5-, 10- and 100-year.

Subbasins CU01, CM01, CM02 and RM10 currently flow from east to west. At the time of development of future 22nd Street and 30th Street extensions, the hydrology will have to be reviewed. The best option would be to direct flows underneath the street extensions to keep consistent with the flow paths assumed in the hydrologic model for this project. However, if directing flows underneath the road is not an option, additional detention for flows from these subbasins will be necessary to release flows south into the storm sewer system.

Reach 1

Reach 1 consists of upstream improvements, as discussed in Section 6.3.1, including requiring detention for future development in undeveloped areas and modifying existing detention ponds.

Subbasins CU01 and CM01 are currently undeveloped basins. Approximate detention volumes needed to detain the 100-year event upon development of these basins are presented in Table 15 in Section 6.3.1.

Currently, subbasin CU01 flows to a sump condition that appears to infiltrate. Infiltration, in addition to localized detention, could be used to in future development to reduce flows to "historic" rates. However, future analysis of infiltration rates would be required.

The existing detention pond located in subbasin CM02 is enlarged by approximately 1.7 acre-feet, the maximum potential volume given land constraints and outlet/spill crest elevation constraints, to help reduce flooding downstream.

In summary, the recommended plan for Reach 1 will mitigate the flooding problems that would occur downstream upon future development of these subbasins by detaining flows and significantly reducing peak flows. Water quality is also enhanced through extended detention.

Reach 2

Reach 2 consists of upstream improvements as well as upsizing existing pipe and adding additional pipe.

Subbasins CL01 and CL02 are currently undeveloped subbasins. Approximate detention volumes needed to detain the 100-year event upon development of these basins are presented in Table 15 in Section 6.3.1.

Subbasins CL03, CL04, CL05, CL06 and CL 07 are fully developed subbasins based on existing zoning and future land use maps (existing percent impervious is equal to future percent impervious). Improvements for these subbasins include upsizing the existing 18" reinforced concrete pipe (RCP) along Beaufort Street between 8th Street and 9th Street and 30" RCP storm sewer 9th Street between Beaufort Street and Downey Street to 54" RCP and installing a new 6'x8' RCBC trunkline storm sewer that intercepts flows at the intersection of 9th Street and Downey Street and carries them to the outfall channel via Downey Street to 7th Street south to Mitchell Street and west toward the existing outfall channel.

The recommended plan for Reach 2 will mitigate the flooding problems that would occur downstream upon future development of these subbasins by detaining flows and significantly reducing peak flows. Water quality is also enhanced through extended detention. In addition, upsizing the pipe along 9th and Beaufort Streets and adding an additional trunkline system to the outfall removes flows and reduces flooding downstream along Curtis Street.

Reach 3

Reach 3 consists only of upstream improvements, as discussed in Section 6.3.1, including requiring detention for future development and modifying/ optimizing existing detention ponds.

Improvements consist of upsizing the existing pond at the northeast corner of 30th and Reynolds Streets approximately 1.7 acre-feet, as well as optimizing the outlet of this pond and the outlet of the existing pond at the southeast corner of 30th and Reynolds to accommodate full spectrum detention.

Subbasin RU06 currently flows west along Grays Gable to 30th Street and contributes to flooding along 30th Street. It is assumed that the flows from subbasin RU05, approximately 300 cfs during the 100-year event, will be intercepted and redirected to Jacoby Golf Course irrigation ditch located just south of Grays Gable. However, if these flows are not intercepted from the Golf Course, it is recommended to upsize the existing 24" RCP storm sewer in 30th Street, from Grays Gable to

Reynolds, to 60” RCP. The 10 acre-foot pond at the southeast corner of 30th Street and Reynolds Street is sized to handle the 300 cfs discussed above. If the Jocoby Golf Course does intercept the flow from subbasin RU05, the size of this pond may be reduced.

The recommended improvements for Reach 3 will eliminate the flooding which occurs along 30th and Reynolds Street and reduce flooding downstream.

Reach 4

Reach 4 consists of upstream improvements, as discussed in Section 6.3.1, including requiring detention for future development and optimizing existing detention ponds.

Subbasin RM10 is currently an undeveloped subbasin. The approximate detention volume needed to detain the 100-year event upon development of these basins are presented in Table 15 in Section 6.3.1.

Subasins RM07 and RM08 are partially developed. Improvements for these subbasins include optimizing the outlets of the existing ponds at the northwest corner of Nighthawk and 22nd Streets and at the northwest corner of 22nd and Reynolds Streets to accommodate for full-spectrum detention.

In summary, the improvements for Reach 4 will reduce flooding along Reynolds Street upon future development of these subbasins.

Reach 5

Reach 5 consists of upstream improvements, as discussed in Section 6.3.1, including requiring detention for future development and optimizing existing detention ponds.

Subbasins RM02 and RM05 are fully developed subbasins. Improvements for these subbasins include optimizing the pond outlet structure in the existing pond at the southeast corner of 22nd and Binford Streets to accommodate full spectrum detention. The addition of a 10 acre-feet pond at the southwest corner of 30th and Reynolds, which would work in series with the pond at the southeast corner of this intersection, would alleviate flooding issues at the corner of 30th and Reynolds Streets and downstream along Reynolds.

Reach 6

Reach 6 consists of upstream improvements, as discussed in Section 6.3.1, including modifying and optimizing an existing detention pond as well as upsizing existing storm sewer pipe.

All subbasins within this reach are fully developed subbasins. Improvements in subbasin RM06 consists of increasing the size of the existing detention at on the south side of Reynolds Street between 17th and 19th Streets approximately 1.6 acre-feet and modifying the outlet structure to accommodate full spectrum detention.

Additional improvements in this reach include upsizing the existing 42” and 48” RCP storm sewer in Reynolds Street to 60” RCP from about Coughlin St. west to 9th Street and continuing south down 9th Street to Hancock Street. A flow split will be installed at the intersection of 9th Street and Hancock Street allowing some flow to utilize the existing 48” RCP along Hancock Street in Reach 8. An additional 5’x8’ RCBC storm sewer is installed from the intersection of 9th Street and Hancock Street south to Shields Street to direct the remaining flows to LaBonte Park pond.

Improvements in Reach 6 will remove flooding from Reynolds street and direct more flows to LaBonte Park Pond, reducing flooding within Reach 8.

Reach 7

Reach 7 consists of upstream improvements, as discussed in Section 6.3.1, including modifying and optimizing an existing detention pond as well as upsizing existing storm sewer pipe.

All subbasins within this reach are fully developed subbasins. Improvements in subbasin LM01 consist of increasing the size of the existing detention at on the northeast corner of 15th Street and Harney Street approximately 1.1 acre-feet and modifying the outlet structure to accommodate full spectrum detention. Improvements in subbasin LM02 consists of optimizing the outlet structure to the existing pond at the southeast corner of 15th Street and Harney Street to accommodate full spectrum detention.

Improvements within subbasins LL01, LL02, LL03, LL04 and LL05 consist of upsizing the existing 24", 30" and 36" RCP storm sewer pipe to 60" RCP from 11th Street and Gibbon Street north to 11th Street and Canby Street and west along Canby Street to 9th Street as well as from 9th Street and Gibbon Street north along 9th Street to Canby Street. Continuing west along Canby Street from 9th Street to 8th Street, new 5'x8' RCBC pipe is installed. At 8th Street and Canby Street, the 5'x8' RCBC will join 42" RCP, upsized from 18" RCP, from 8th Street and Harney Street and continues to LaBonte Park pond as a 5'x10' RCBC.

Improvements in Reach 7 also consist of regrading LaBonte Park pond and 9th Street to increase the volume of the pond approximately 36.4 acre-feet and more directly convey flows from 9th Street into the pond. This would include inverting the crown of 9th Street to slope the street towards LaBonte Park pond and possibly removing the curb and gutter on the west side of the street to allow flows into the pond. Improvements to LaBonte Park pond also include upsizing the existing 36"x60" elliptical RCP storm sewer outfall into LaBonte Park pond at 9th and Shields to 5'x10' RCBC and installing a new 36" RCP outfall from LaBonte Park pond to 7th and Shields Street.

During the initial discussion of LaBonte Park as a potential location for detention, it was noted by the City of Laramie Parks and Recreation Department that the existing trees would not survive any grading. It was concluded that the City would not want to grade LaBonte Park to create additional storage. However, the current sump condition of the park will still allow for the 10- and 100-year event to be detained as long as the following items are allowed:

- A berm on the west side of LaBonte Park pond at a minimum elevation of 7146.0 is needed to contain the 100-year water surface elevation of 7145.9.
- The 100-year event will cause water to discharge to the south into Canby Street and pond, with minimal depth of water in the street but no apparent inundation of structures. This area within Canby Street will be part of the detention pond volume and will eventually discharge back through the LaBonte Park pond during the draining portion of the event. (Note that during design of the west side berm and upstream improvements into LaBonte Park, the exact elevation of the berm will need to be compared to the elevations of the structures on Canby Street, so as to prevent any impact to any dwellings. It is possible that an additional berm along the south side of LaBonte Park pond could contain the 100-year event.)
- The detention pond will have minimal to no freeboard during the 100-year event and will have no defined spillway. Any additional stormwater above the 100-year event will overtop the proposed west side berm and other locations and will spill most-likely to the northwest.

> Although LaBonte Park pond does not have the typical freeboard required for the 100-year event, it should be noted that the proposed downstream Reach 8 will be sized for the 10-year storm event and LaBonte Park pond has the required freeboard for the 10-year event.

Reach 7 improvements will mitigate flooding during the 100-year event within the reach specifically along 9th Street. Improvements to LaBonte Park pond also reduce flooding downstream in Reach 8 by intercepting and detaining all flows from Reach 7 and a portion of flow from Reaches upstream along Reynolds Street. Reach 7 may be subject to minor localized flooding within the Reach near the intersection of 14th and Harney Streets.

Reach 8

Improvements within Reach 8 consist of upsizing existing storm sewer pipe. Due to physical constraints, this Reach is sized to convey the 10-year storm event.

Storm sewer is upsized beginning at 7th Street and Shields Street with 36” RCP, replacing 24” RCP, and continues west to 4th Street, north along 4th Street to Hancock Street at which it increases to a 4’x8’ RCBC. At this point, the existing 48” RCP, carrying the flows split west from 9th Street and Hancock Street, join the system. The 4’x8’ RCBC, replacing existing 48” RCP, continues west along Hancock Street to 2nd Street where it turns north towards McConnnell Street and then turns west toward the railroad track. The pipe is then increased to a 4’x10’ RCBC, replacing the existing 48” RCP outfall, which parallels the railroad tracks to the existing Reynolds Street outfall.

It is recommended, if possible, that the existing outfall channel which runs parallel to the railroad tracks and begins perpendicular to Beaufort Street be extended upstream to McConnell Street in lieu of the proposed 4’x10’ RCBC, reducing backwater effects and allowing for more conveyance to the Laramie River.

In summary, improvements within Reach 8 help mitigate flooding within the Reach however, flooding will still occur in the Reach along Hancock Street, 2nd Street and McConnell Street during any event larger than a 10-year event.

Reach 9

Improvements within Reach 9 consist of upsizing existing storm sewer pipe. These improvements are independent of all other reaches.

Storm sewer is upsized from existing 24” RCP to 60” RCP beginning in 6th Street from Lewis Street north to Canby. At 6th and Canby Street the 60” RCP meets a 4’x10’ RCBC, upsized from 24” RCP, which runs along Canby Street from 6th Street to 3rd Street and continues south along 3rd Street to Harney Street where it joins a 42” RCP, upsized from 24” RCP, that runs along 3rd Street from Lewis to Harney. At 3rd and Harney Street the existing 42” RCP storm sewer is upsized to a 4’x10” RCBC that continues west along Harney clearing beneath the railroad tracks and above the existing sanitary sewer line and eventually outfalls into the Laramie River. Local improvements due localized flooding will also be needed on Canby between 3rd and 6th Street. The outfall to the Laramie River is limited due to the railroad tracks and existing sanitary sewer. See Appendix K for a preliminary plan and profile of the outfall.

Improvements in Reach 9 mitigate flooding in the reach during the 100-year event with exception to minor localized flooding along Canby Street near 3rd Street.

7.2 Floodproofing

Improvements as recommended above provide protection against the 100-year event in all Reaches except Reach 8, with exception to minor localized flooding areas mentioned above. Improvements within Reach 8 will protect against the 10-year event but the reach will experience flooding during any event larger than a 10-year event. Floodproofing of existing buildings and structures within Reach 8 may be cost effective if they flood regularly. Floodproofing may include installing berms/ levees around the structure or physically making structural improvements, which range from installing watertight doors and windows to physically raising the structures elevation, using fill or piles. The purpose of floodproofing is to minimize damages by redirecting flows around a structure or making the property less vulnerable to damages if the flood waters reach the structure. Floodproofing does not eliminate all flood damages but, if installed correctly, may significantly reduce the severity of damages.

7.3 Cost Analysis of Recommended Plan

A cost estimate for the recommended plan is presented in Tables 20. The construction cost estimate presented is based on construction unit costs for recently completed drainage projects in the Denver metro area, a bid tabulation database maintained by the UDFCD, and engineering judgment. Because of the unique sizes of the proposed reinforced box culverts, a one-foot wall, floor, and ceiling thickness and a $625 per cubic yard price for concrete was assumed. The construction cost estimate is increased by 20 percent to account for contingencies, engineering, administration, and legal fees. Costs were also increased by assuming a 5 percent traffic control component, 8 percent for mobilization/demolition, 5 percent for material remediation and disposal, and 20 percent for utility relocation.

Table 20: Conceptual Cost Estimate Recommended Plan

Item No.	Description	Quantity	Unit	Unit Price	Total Cost
	Traffic Control (5%)	1	LS	$814,158	$814,158
	Mobilization/Demolition (8%)	1	LS	$1,302,653	$1,302,653
	Material Management (environmental remediation and disposal) (5%)	1	LS	$814,158	$814,158
Storm Sewer					
	36" RCP	1900	LF	$150	$285,000
	42" RCP	1710	LF	$190	$324,900
	54" RCP	1440	LF	$210	$302,400
	60" RCP	7950	LF	$230	$1,828,500
	4'x8' RCBC	1880	LF	$550	$1,034,000
	5'x8' RCBC	650	LF	$600	$390,000
	6'x8' RCBC	5070	LF	$650	$3,295,500
	4'x10' RCBC	5630	LF	$650	$3,659,500
	5'x10' RCBC	425	LF	$700	$297,500
				Sub-Total	*$11,417,300*
Detention					
	Detention Volume	53.8	AC-FT	$40,000	$2,152,000
				Sub-Total	*$2,152,000*
Utility Relocates					
	Dry Utility Administration (20%)	1	LS	$2,735,460	$2,713,860
				Sub-Total	*$2,713,860*
				Sub-Total for Recommended Plan	$19,214,129
				Contingency (20%)	$3,842,826
				Total For Recommended Plan	**$23,100,000**

7.4 Recommendation of Construction Phasing

Given the complexity and expense of the recommended plan, a recommended construction phasing plan has been prepared to prioritize the construction of the improvements while maximizing the potential benefits of the individual improvements. The recommended plan has been divided up into nine construction phases as discussed below. Figure 20 depicts these phases. Benefits, predecessors and protection provided by construction of each of the phases is listed in Table 21

Table 21: Benefits-Predecessor-Protection by Phase

Phase	Description	Benefits	Predecessors	Protection
As-needed	Regional Detention (based on development)	• Reduces post development 100-year flows to 10-year "historic" rates. • Ultimately reduces flooding in Reach 8	• As-needed based on development in the basin	100-year in Reach 1
	(Note: The 10 acre-foot pond at 30th Street and Reynolds Street depends on availability of the land, the potential for removing flow at Gray's Gable and other phased improvements. At a minimal, the pond should be considered part of Phase 3.)			
1	Optimize existing ponds at 15th Street and Harney Street	• Inexpensive improvements • Reduces flooding immediately downstream	• None	
2	Optimize existing ponds at 30th Street and Reynolds Street	• Inexpensive improvements • Reduces flooding in lower portions of the basin	• None	100-year in Reach 3
3	Optimize existing ponds along Reynolds Street (Note: See above note about new 10 acre-foot pond)	• Inexpensive improvements • Reduces flooding in the lower portions of the basin	• None	100-year in Reaches 4 and 5
4	Optimize existing pond at 10th Street and Beaufort Street	• Inexpensive improvements • Reduces flooding in lower portions of the basin	• None	
5	Reach 8 improvements from LaBonte Park pond outfall to the outfall channel	• Reduces local flooding in Reach 8 • Allows flows to be released from LaBonte Park pond	• Phases 2 and 3	
6	LaBonte Park pond improvements and upstream connection	• Optimizes flow into LaBonte Park pond from Reach 7 • Conveys more flows from Reynolds Street into LaBonte Park pond	• Phase 5	100-year in Reach 7
7	Harney Street outfall	• Increases conveyance in Reach 7 • Removes flows from LaBonte Park pond to allow for more capacity from Reynolds Street	• None (If done before Phase 6, the current connection between LaBonte Park pond will need to be examined.)	100-year in Reach 9
8	Additional Curtis Street outfall	• Provides an additional outfall for flows from Reach 2 • Removes flows from entering Reach 8	• Phase 4	100-year in Reach 2
9	Reynolds Street and 9th Street improvements	• Provides local capacity in Reach 6 • Optimizes flows from Reynolds Street into LaBonte Park pond	• Phase 6	100-year in Reach 6, 10-year in Reach 8

Phase 1 begins with improvements to the detention ponds located at the northeast and southeast corners of the intersection of 15th and Harney Streets. Phase 2 includes improvements the two detention ponds located at the northeast and southeast corners of the intersection of 30th and Reynolds Streets. Phase 2 is followed by improvements to five detention ponds located at the intersection of 22nd and Nighthawk Streets, 22nd and Hancock Streets and 22nd and Reynolds Streets and along Reynolds Street between Bath and Dillon Streets, and between 17th and 18th Streets in Phase 3. Phase 4 includes includes improvements to the detention pond at the intersection of 10th and Beaufort Streets. Improvements to the trunkline system downstream of LaBonte Park pond are a part of Phase 5, followed by improvements to LaBonte Park pond and storm sewer improvements upstream along Canby and 11th Streets in Phase 6. Phase 7 includes improvements to the trunkline sewer system south of, and independent of, LaBonte Park pond including the outfall along Harney Street. Installing improvements along 9th Street north of Downey as well as the construction of the new outfall along Mitchell Street are a part of Phase 8. Lastly, Phase 9 improvements involve replacement of the storm sewer system along 9th Street north of Hancock Street and along Reynolds Street west of 9th Street.

Construction of additional detention ponds within the undeveloped upstream basins are to be constructed as-needed upon development of these basins.

7.5 Water Quality Impacts

Although portions of the basin are considered fully developed, and sediment-laden runoff is not a primary concern, the Laramie River receiving waters will benefit from the water quality improvements in the recommended plan. The outfall protection that is recommended for the outfalls will reduce stream and bank erosion in the outfall channels.

A majority of the water quality improvements will be from extended detention, which occurs in the upper portions of the basin. A focus on Low Impact Development in local drainage projects in the lower portion of the basin will also increase water quality, especially in areas of B soils.

7.6 Operations and Maintenance

The replacement of the storm sewers and inlets required for the full implementation of the recommended plan will result in the same or less maintenance, as new inlets are less likely to clog. Also, an appropriate number of inlets will be provided in key locations to ensure that storm sewers receive the expected flowrates, ensuring that debris and minor sediment that enters the system is properly flushed out. The addition of water quality components will also have a positive impact on lessening the frequency and scope of inlet and storm sewer maintenance required.

The implementation of the recommended sub-regional detention and water quality ponds, however, will require additional maintenance to ensure proper operation of these facilities. The new regional detention/water quality ponds will require additional time, materials, and equipment to maintain in perpetuity. Inspections, debris and litter removal, routine mowing, and mosquito control will all become potential routine maintenance activities. Based on the fully developed nature of the basin, routine sediment removal should not be expected, but is anticipated to be required every 5-15 years.

The upgrades to the LaBonte Park detention pond will increase the frequency of required inspection and maintenance, as litter and debris removal, maintenance path repairs, and retaining walls/benched areas may require more attention.

8.0 DEVELOPING A STORMWATER UTILITY

SEH recommends developing a stormwater utility in the City of Laramie for means of funding stormwater improvements within the City. The following is a recommended two-phase approach toward establishing a stormwater utility or other means of funding for the stormwater program.

The first phase, which will culminate in a Technical Feasibility Study, is essentially an action plan that incorporates reconnaissance level investigations focused on the feasibility and applicability of a stormwater utility. The purpose of the Technical Feasibility Study is to determine preliminary direction and answers to key questions, all of which will likely have cost and schedule implications. Through this technical feasibility investigation, the approach taken and the associated costs with respect to the second phase can be refined and used to provide the City of Laramie with a roadmap for implementation of the ultimate funding mechanism selected. Figure 4 below depicts the progression of the stages recommended by SEH for the first phase of developing a stormwater utility.

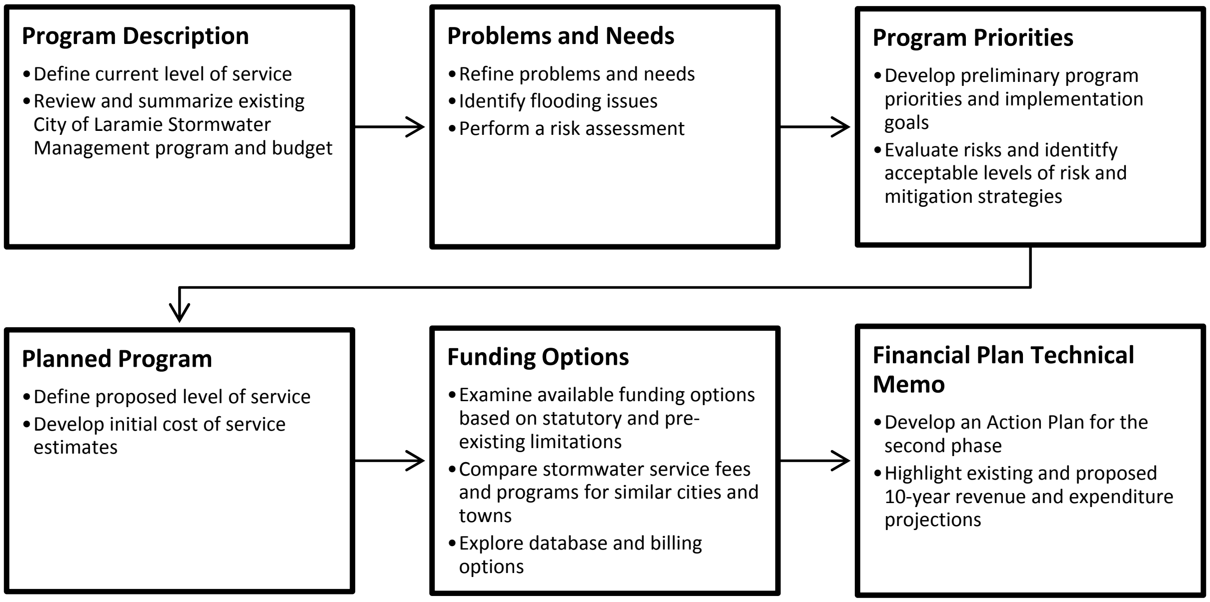

Figure 4: Flowchart for Phase One of Developing a Stormwater Utility

The City will need to assess the current stormwater management program, refine the problems and needs, establish proposed program priorities, develop an improved stormwater management program, and explore the advantages and disadvantages of the possible funding options. Potential funding options may include:

- General fund appropriations (sales and/or property taxes),
- Stormwater utility service fees,
- Public improvement districts,
- Bonding for capital improvements,
- System development fees,
- Plan review, development inspection, and special inspection fees,
- Impact fees,
- Federal and state grants and funding opportunities, or
- Formation of a regional drainage and flood control district.

Based on this effort, a 10-year financial plan will need to be evaluated and developed as the capstone to the Technical Feasibility Study. The existing and proposed stormwater program categories evaluated will include:

- Operation and maintenance,
- Capital needs,
- Water quality and NPDES MS4 programs,
- Floodplain management and master planning,
- Land development,
- Billing and finance, and
- Engineering support.

The results of the financial plan will be used to develop an action plan for the second phase of the work. The action plan for the second phase of work will:

- Test the political feasibility/acceptability of the proposed program and fee structure,
- Refine the program strategy and preliminary cost of service estimates,
- Identify the preferred service fee rate methodology,
- Investigate appropriate governance mechanisms, and
- Determine the best master account file, billing, collection, and accounting methods.

9.0 REFERENCES

Nolte Associates, Inc., 2009. *West Campus Drainage Study and Recommended Improvements Report.*

Urban Drainage and Flood Control District, 2005. *Colorado Urban Hydrograph Procedure, Version 1.3.3.*

Urban Drainage and Flood Control District, 2001. *Urban Storm Drainage Criteria Manual.*

Figures

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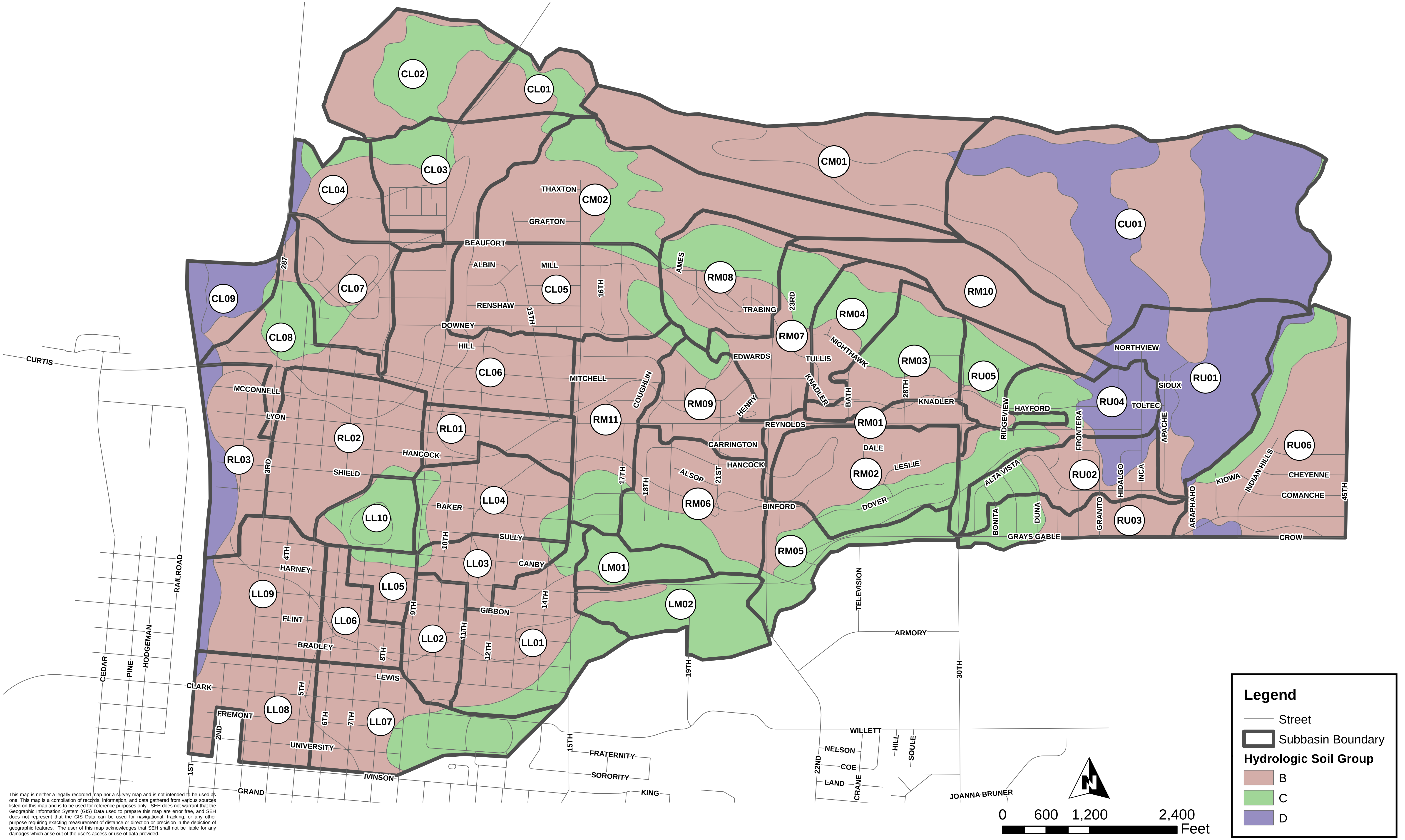


Legend

Street

Subbasin Boundary

Hydrologic Soil Group

🟫	B
🟩	C
🟪	D

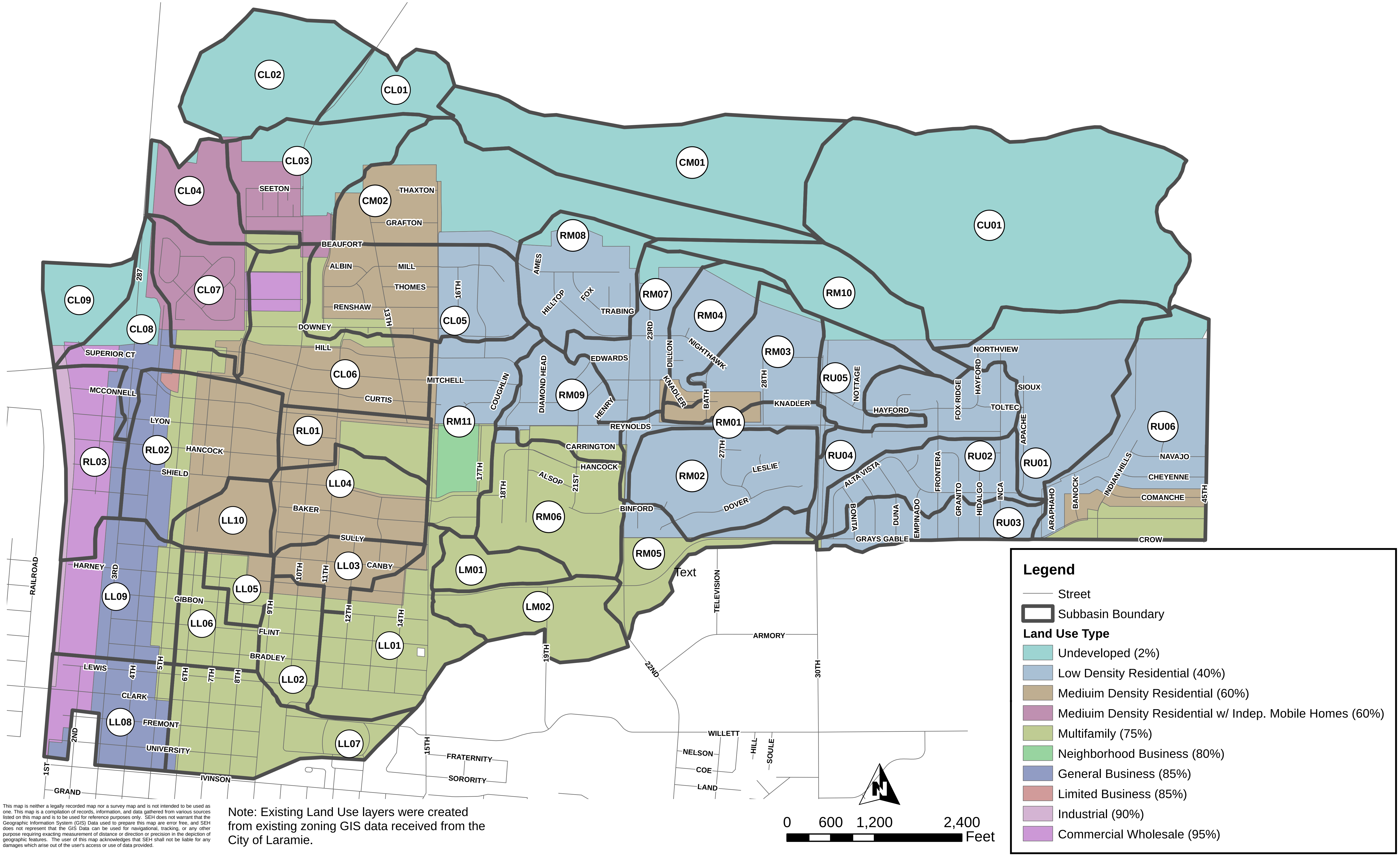
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 5
Hydrologic Soil Groups



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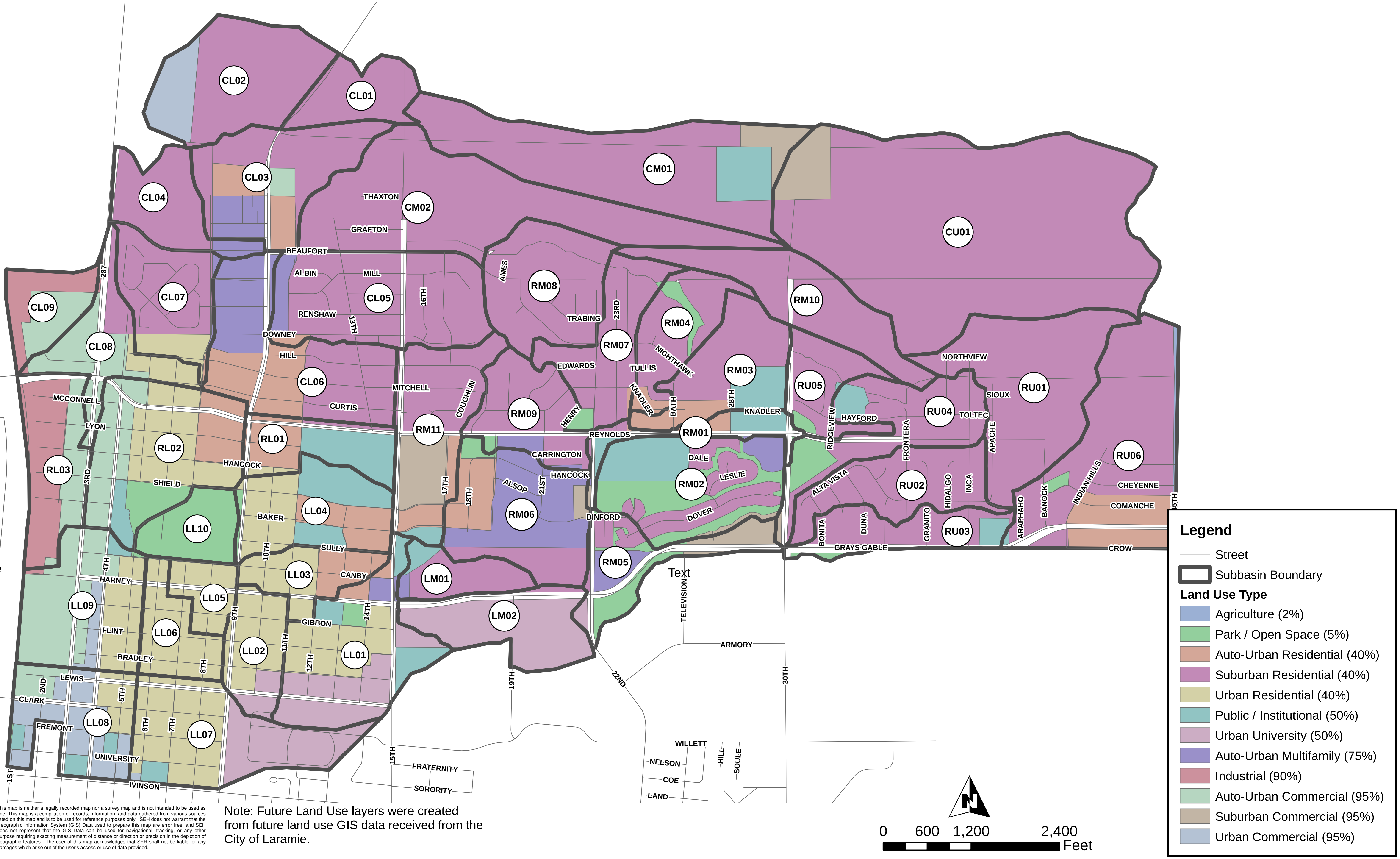
Note: Existing Land Use layers were created from existing zoning GIS data received from the City of Laramie.

Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 6
Existing Land Use



Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

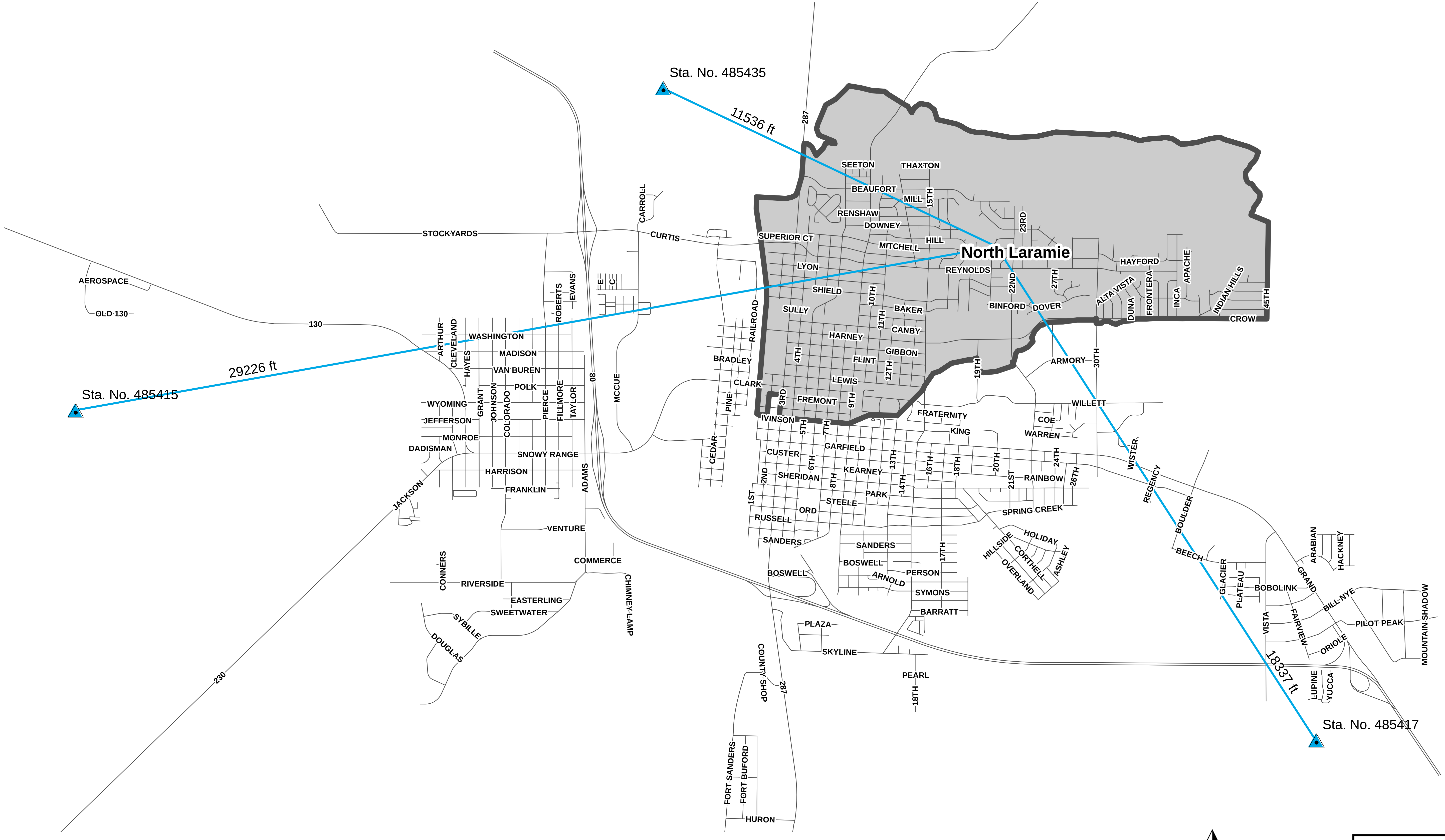
Note: Future Land Use layers were created from future land use GIS data received from the City of Laramie.

Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 7
Future Land Use



Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

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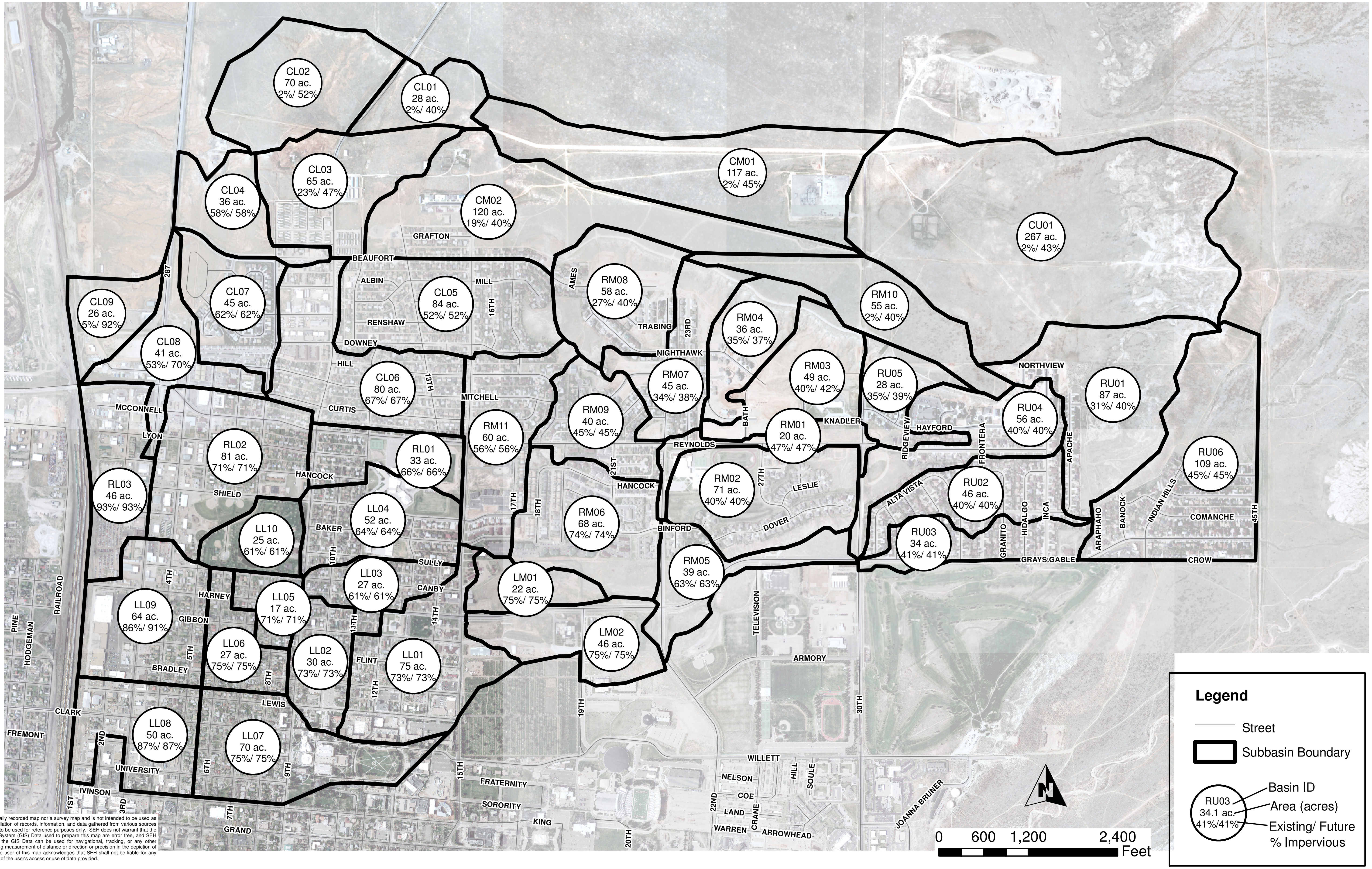
Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 8
Rain Gage Locations



This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

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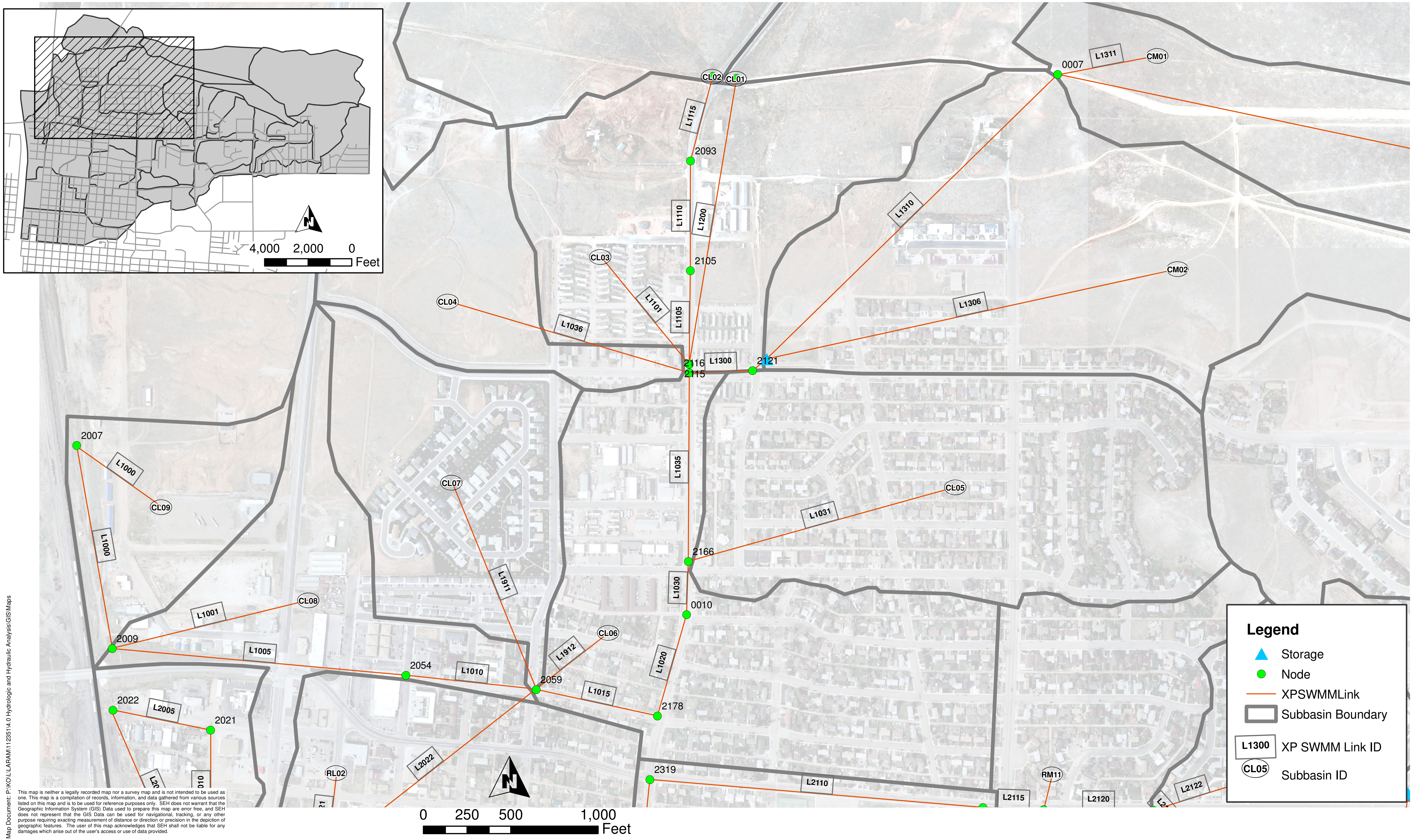
Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 9a
Subbasin Delineation Map



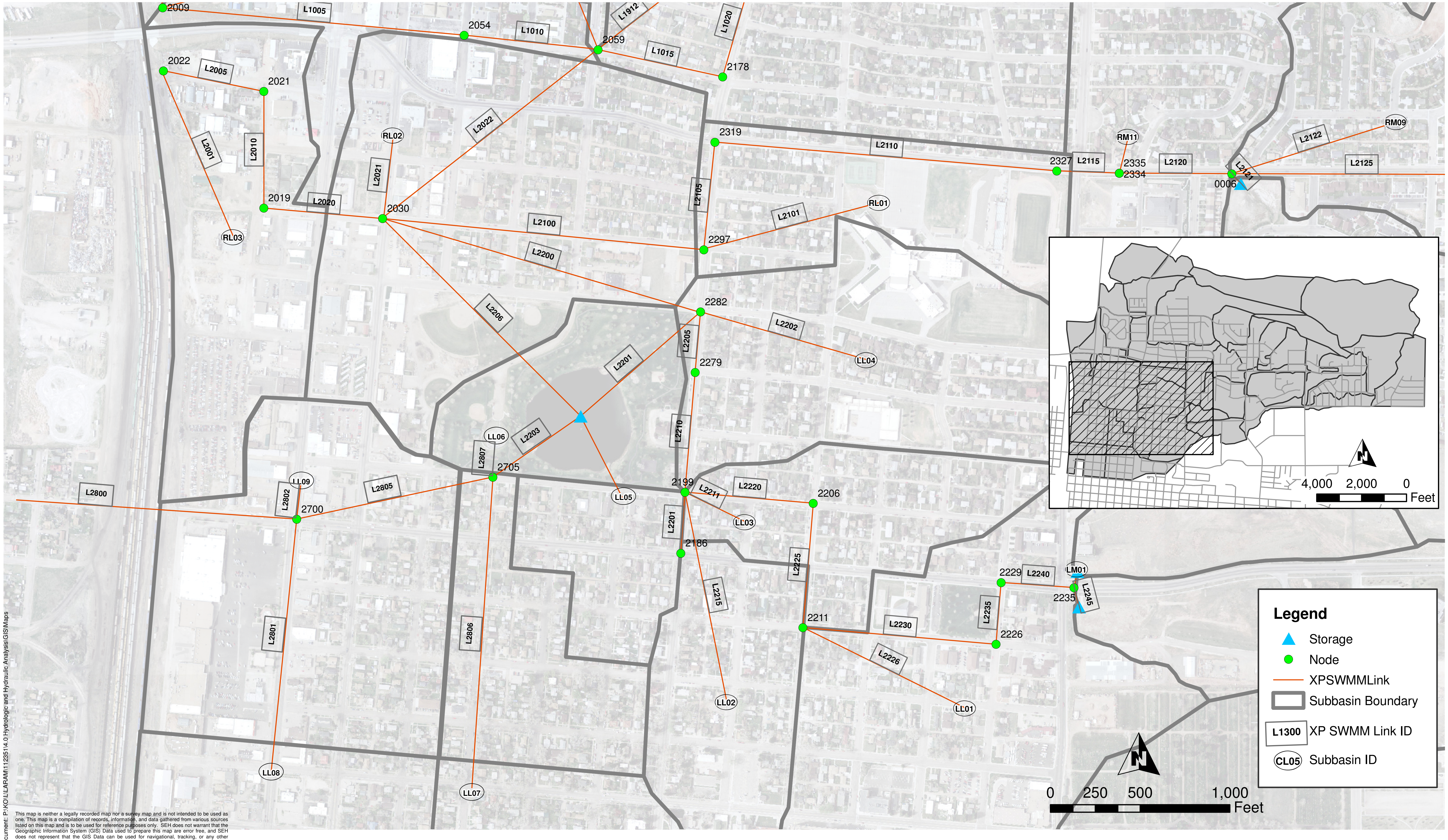
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 10a
Routing Schematic



Legend

- ▲ Storage
- ● Node
- — XPSWMMLink
- ▭ Subbasin Boundary
- L1300 XP SWMM Link ID
- CL05 Subbasin ID

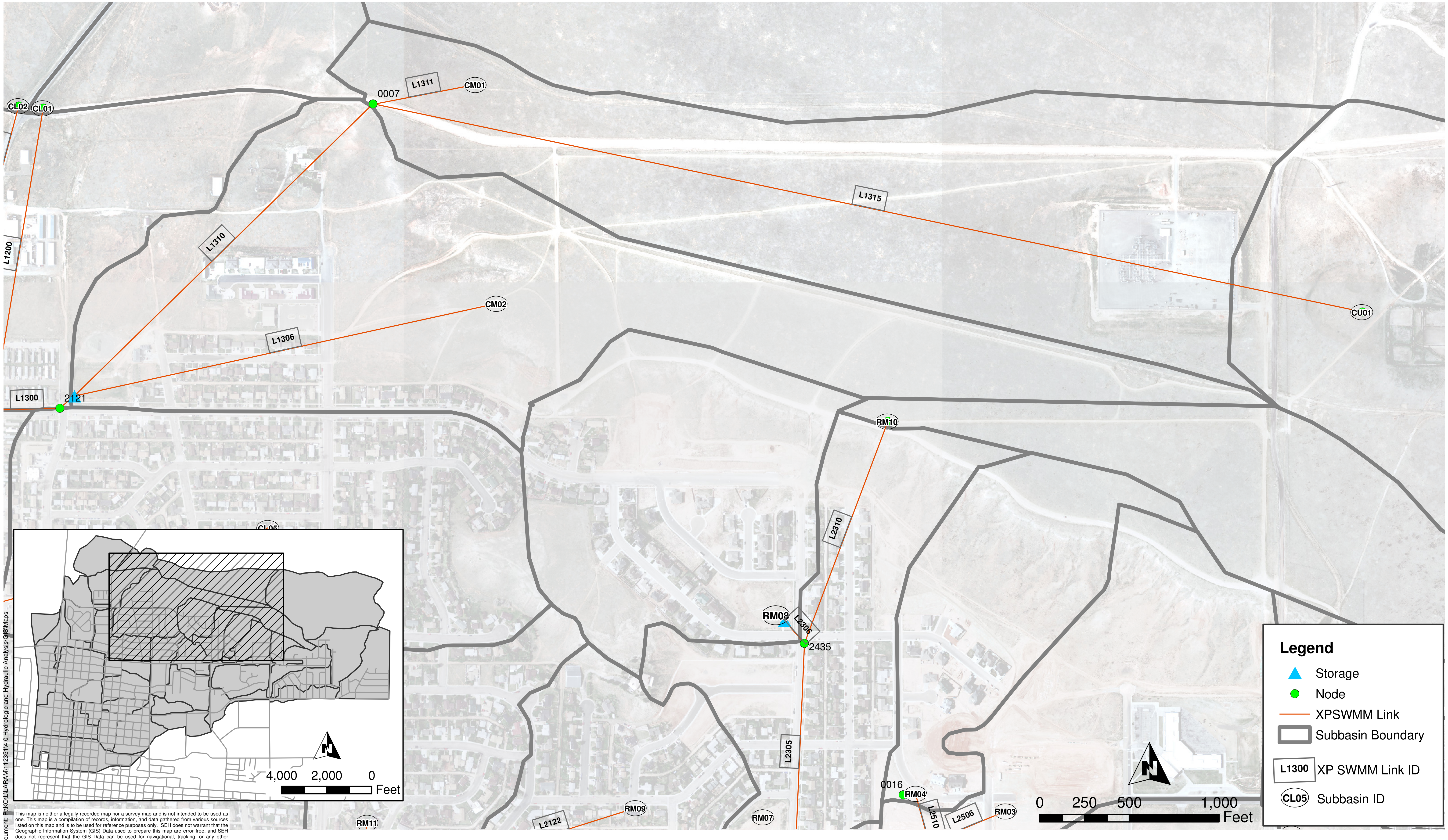
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 10b
Routing Schematic



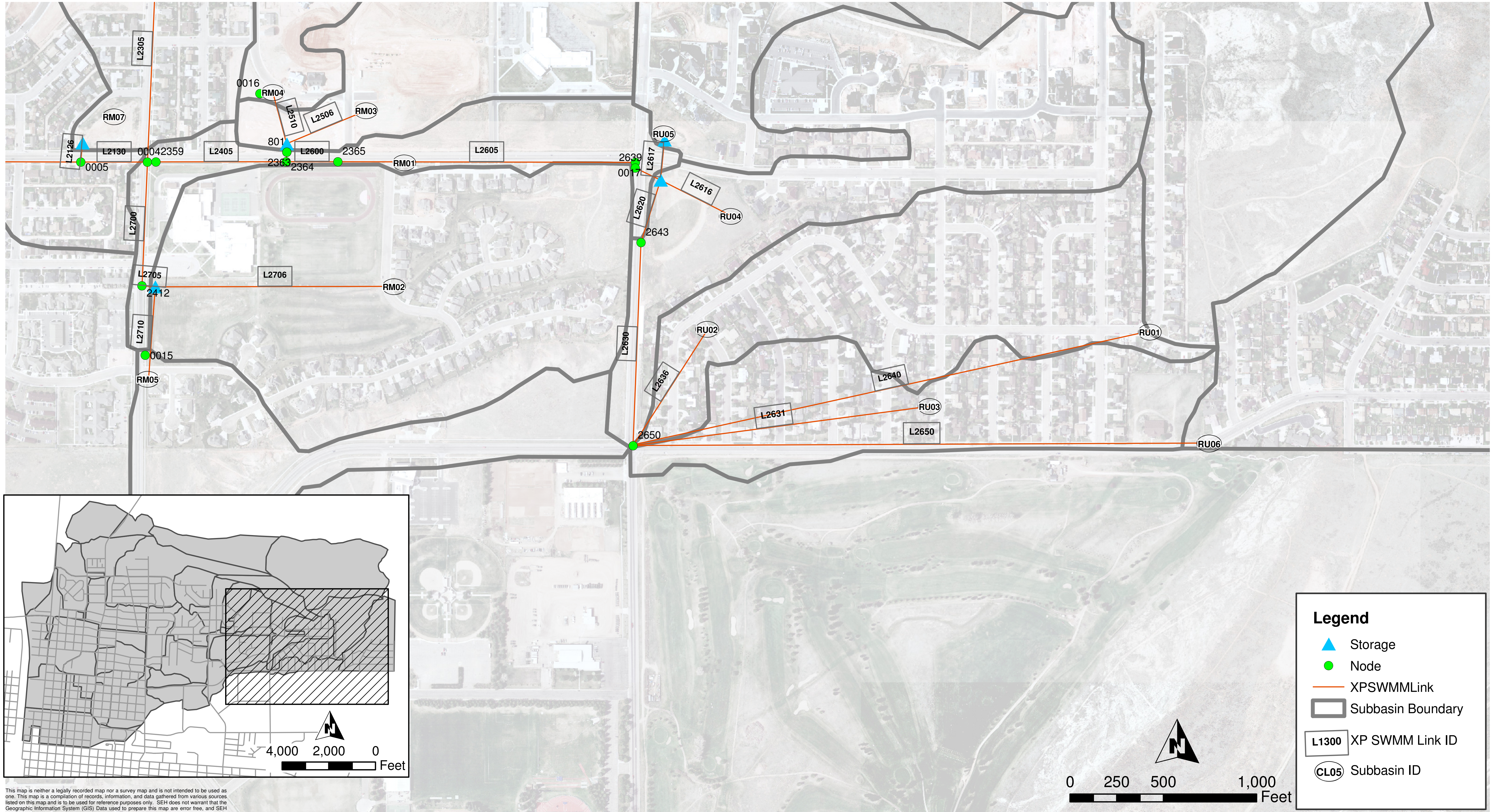
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 10c
Routing Schematic



Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

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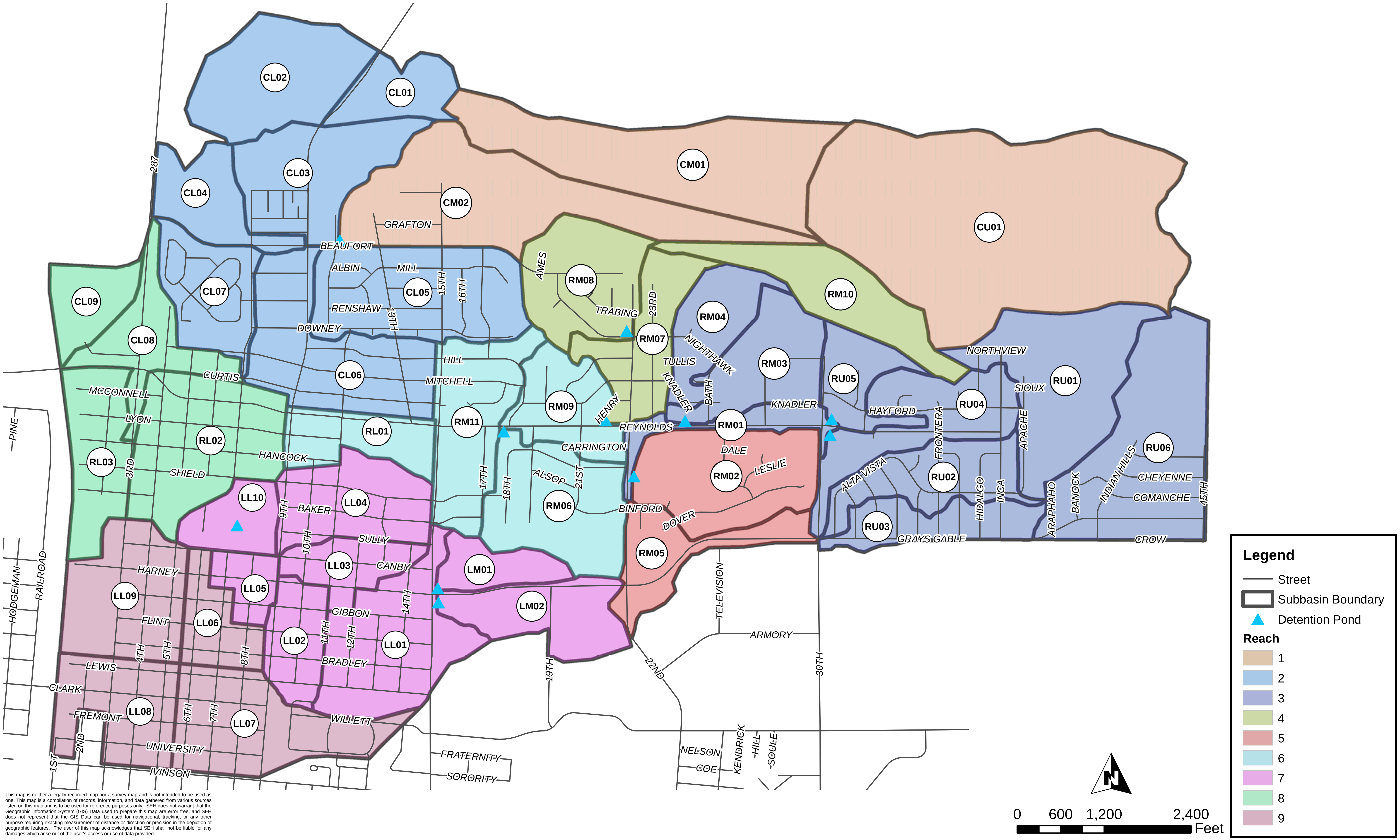
Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 10d
Routing Schematic



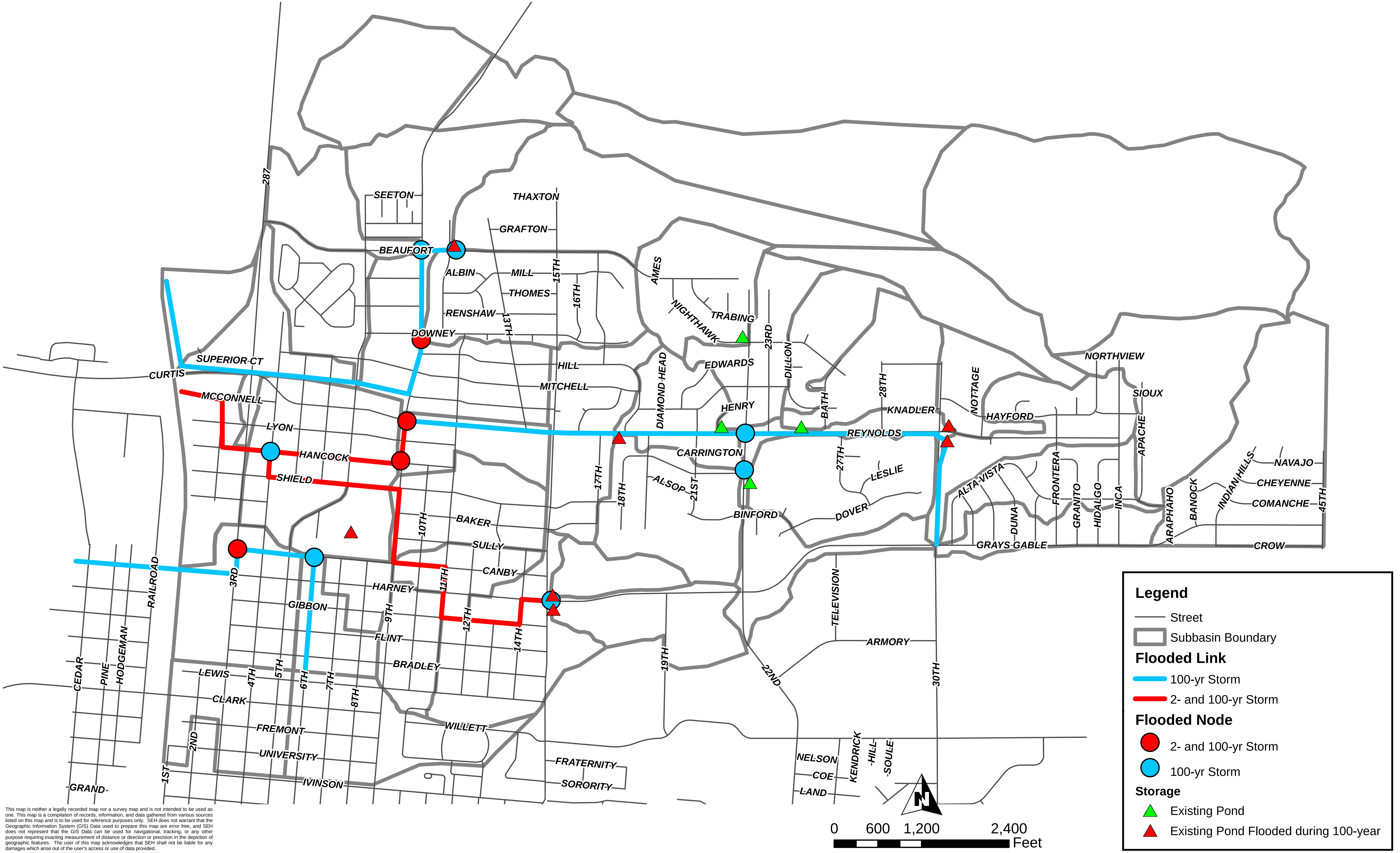
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 11
Reach Designations



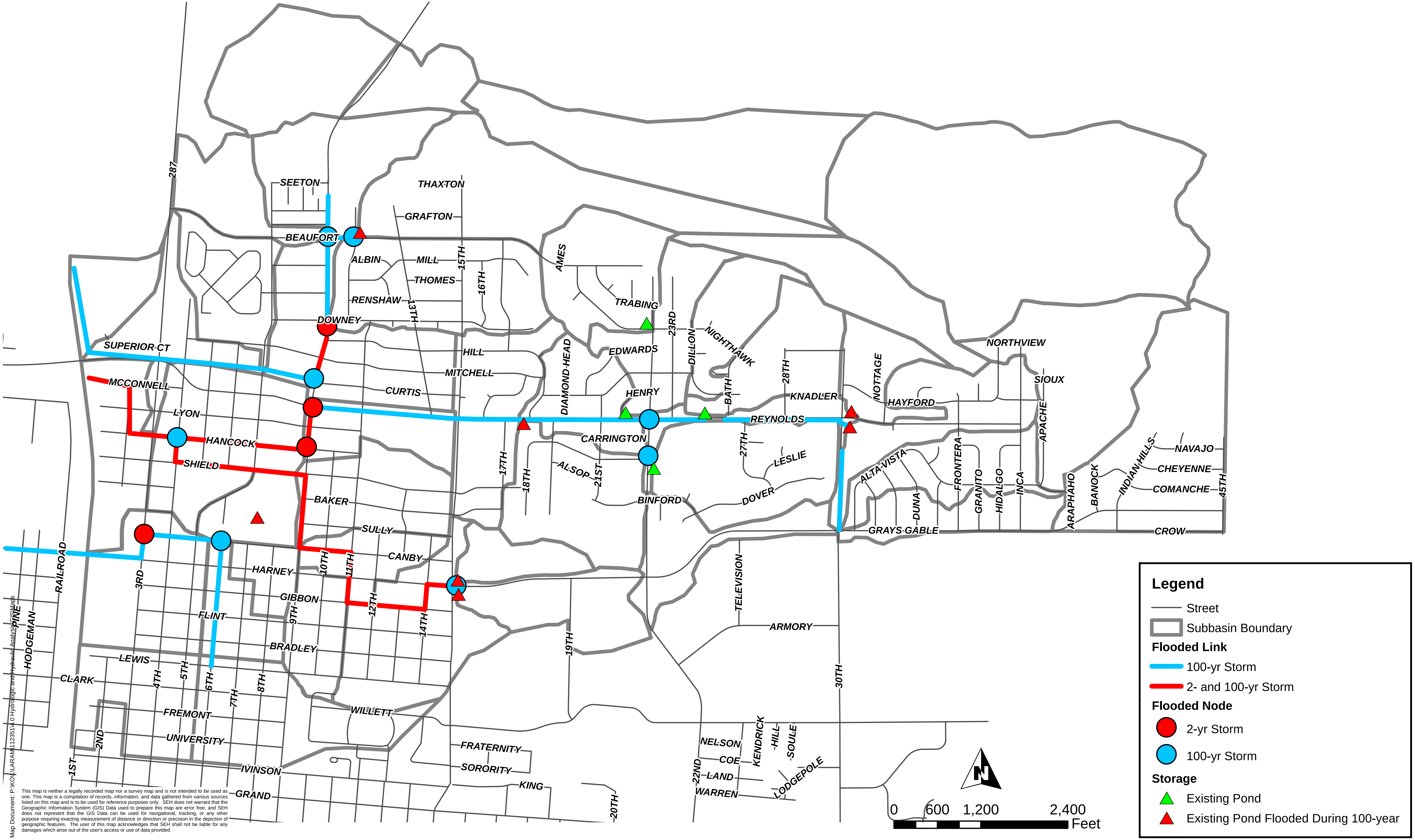
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 03/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 12
Areas of Flooding: 2- and 100-year Events
Existing Percent Impervious

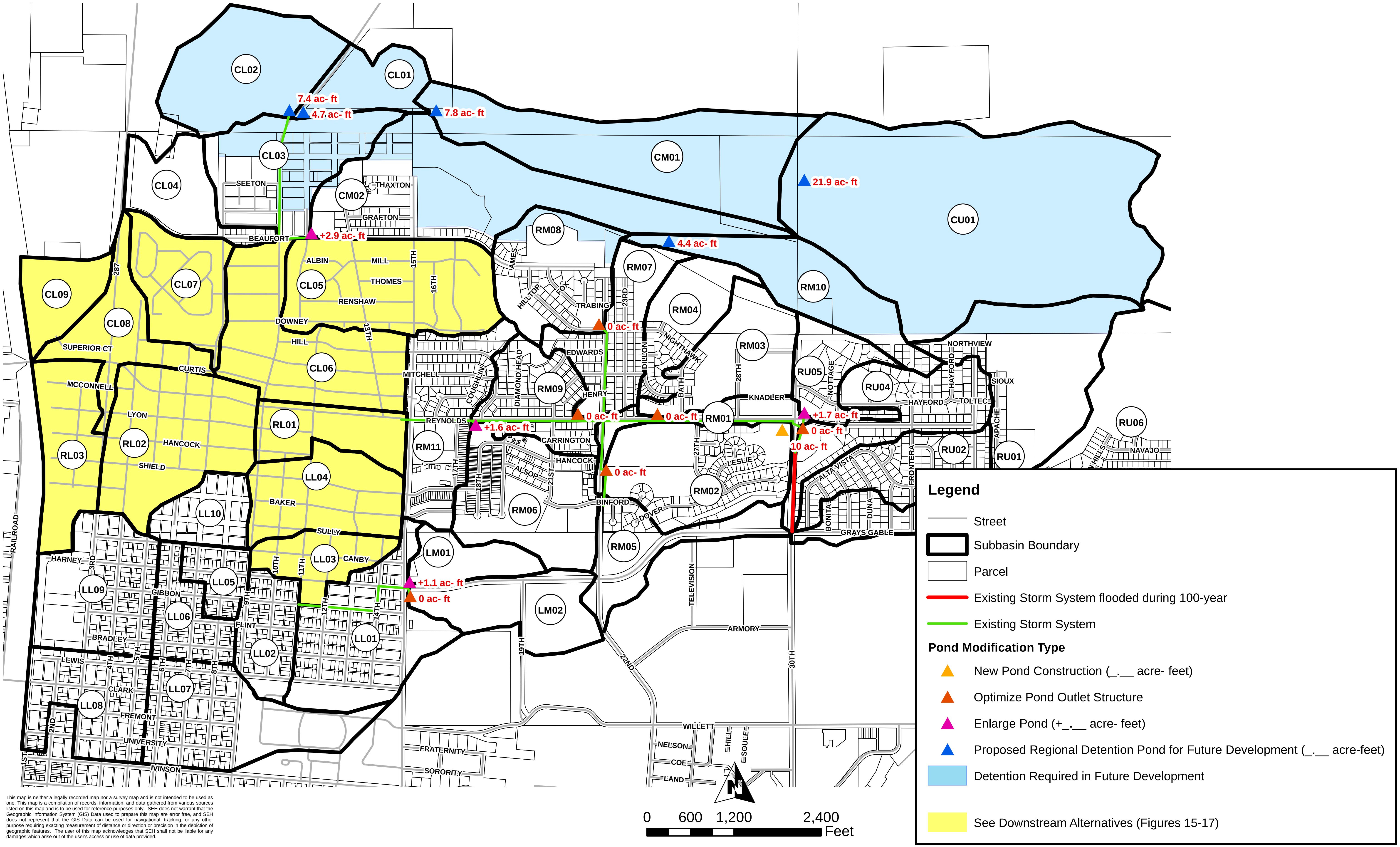


Project Number: LARAM 112351
Print Date: 02/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 13
Areas of Flooding: 2- and 100-year Events
Future Percent Impervious



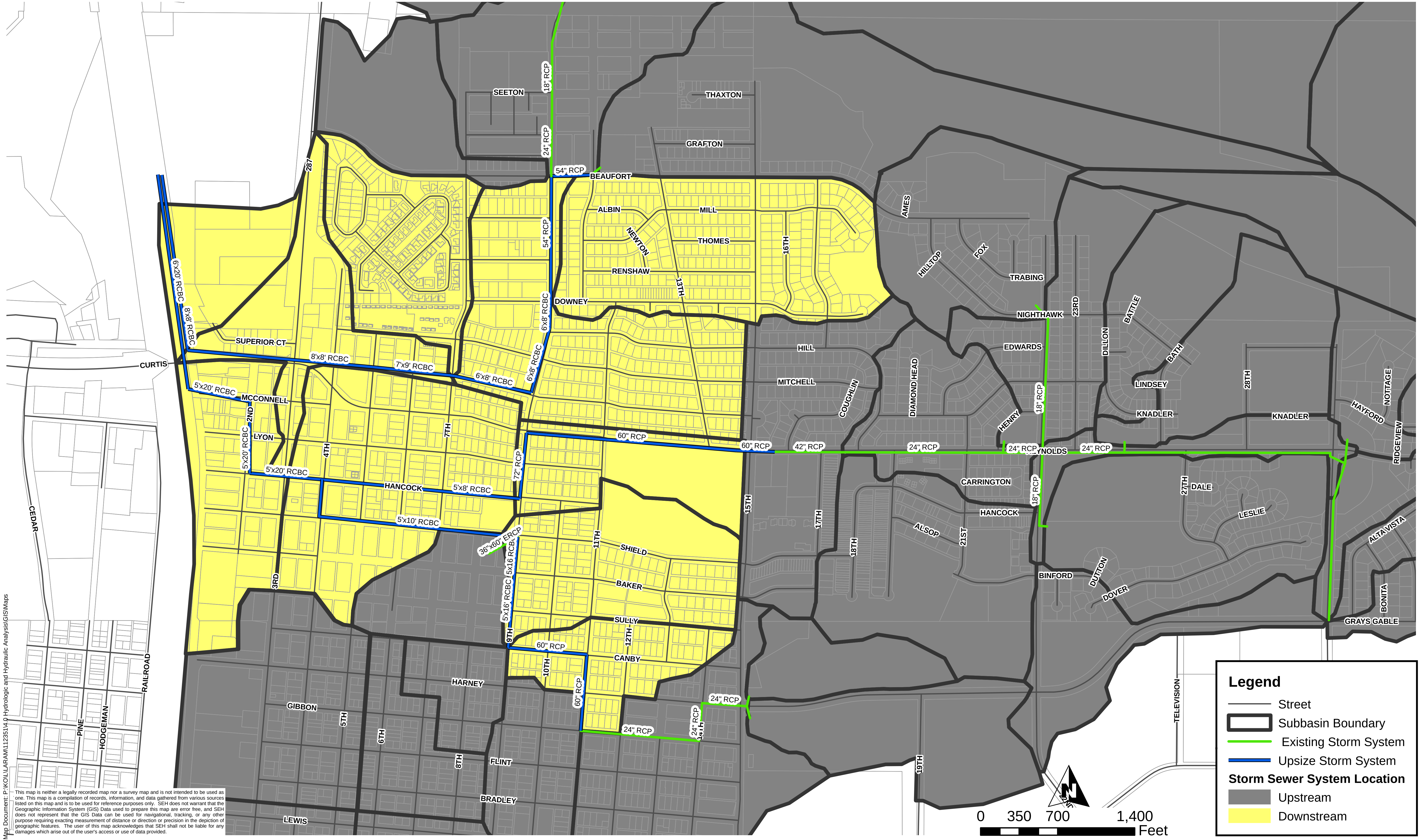
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 14
Upstream Improvements: Pond Modifications



Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
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Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

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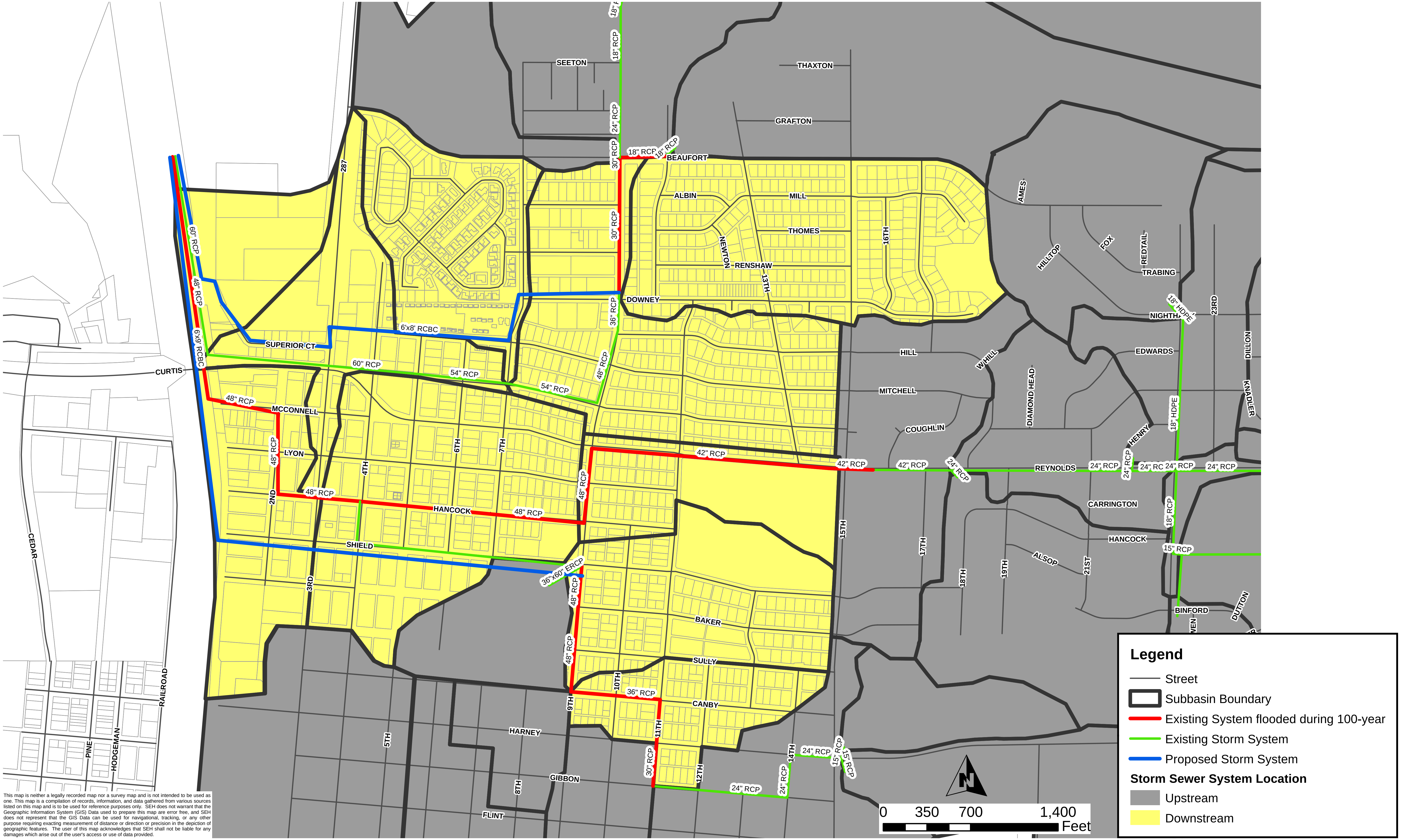
NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 15
Alternative 1: Upsize Existing Trunk Line Sewers



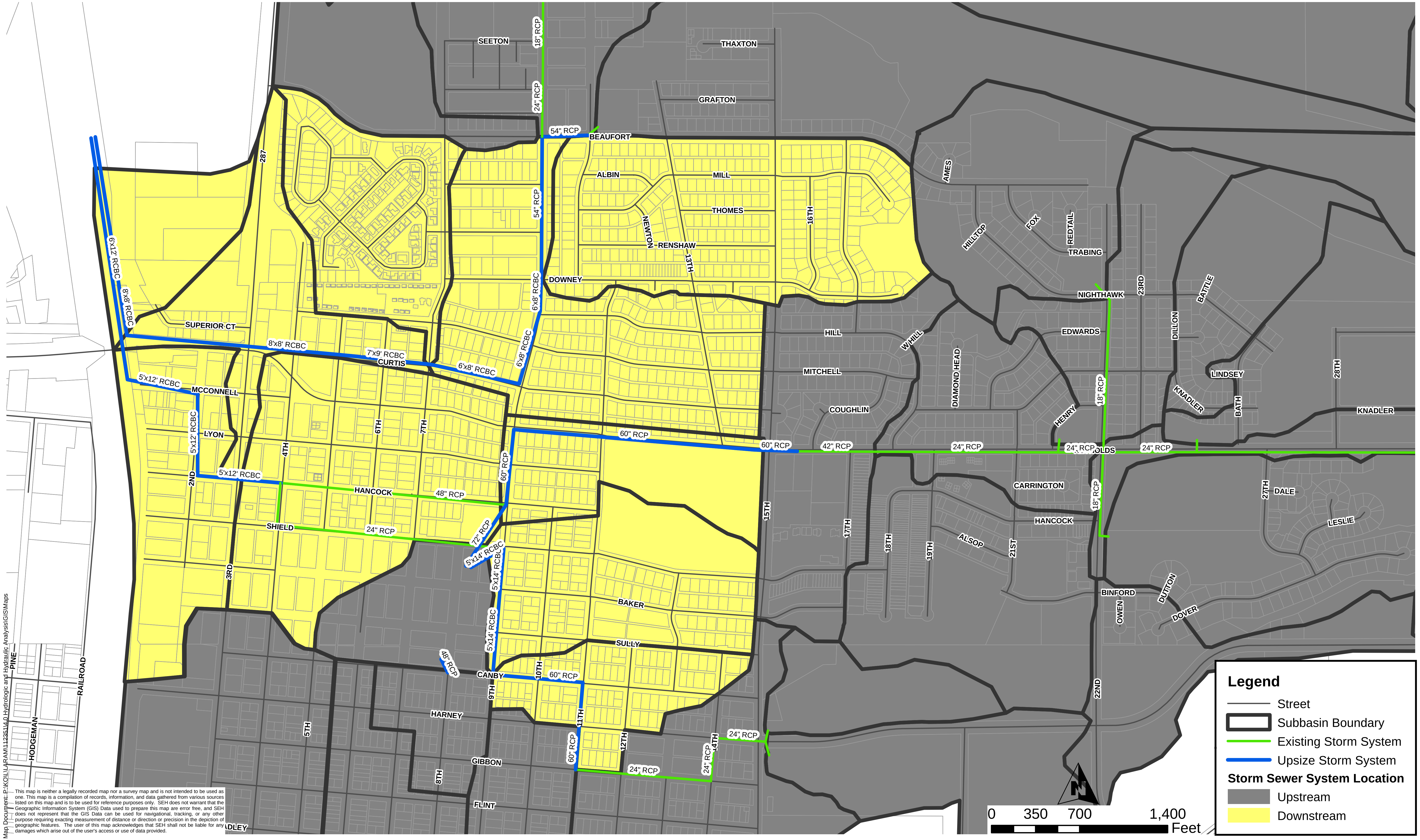
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 16
Alternative 2: Additional Trunk Line Sewers



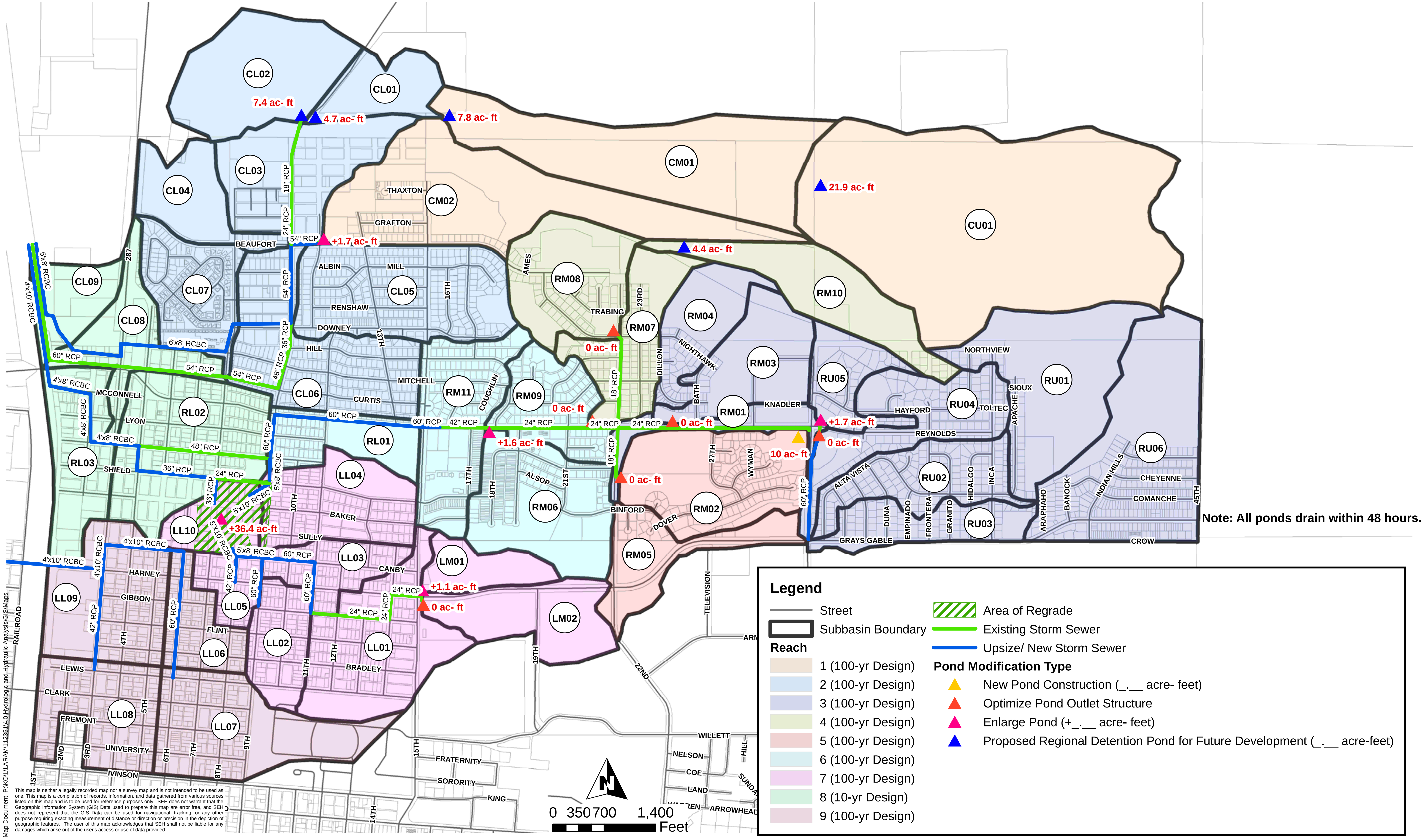
Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

Project Number: LARAM 112351
Print Date: 09/2010

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 17
Alternative 3: LaBonte Discharge and Upsize Trunk Line Sewers



Note: All ponds drain within 48 hours.

Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

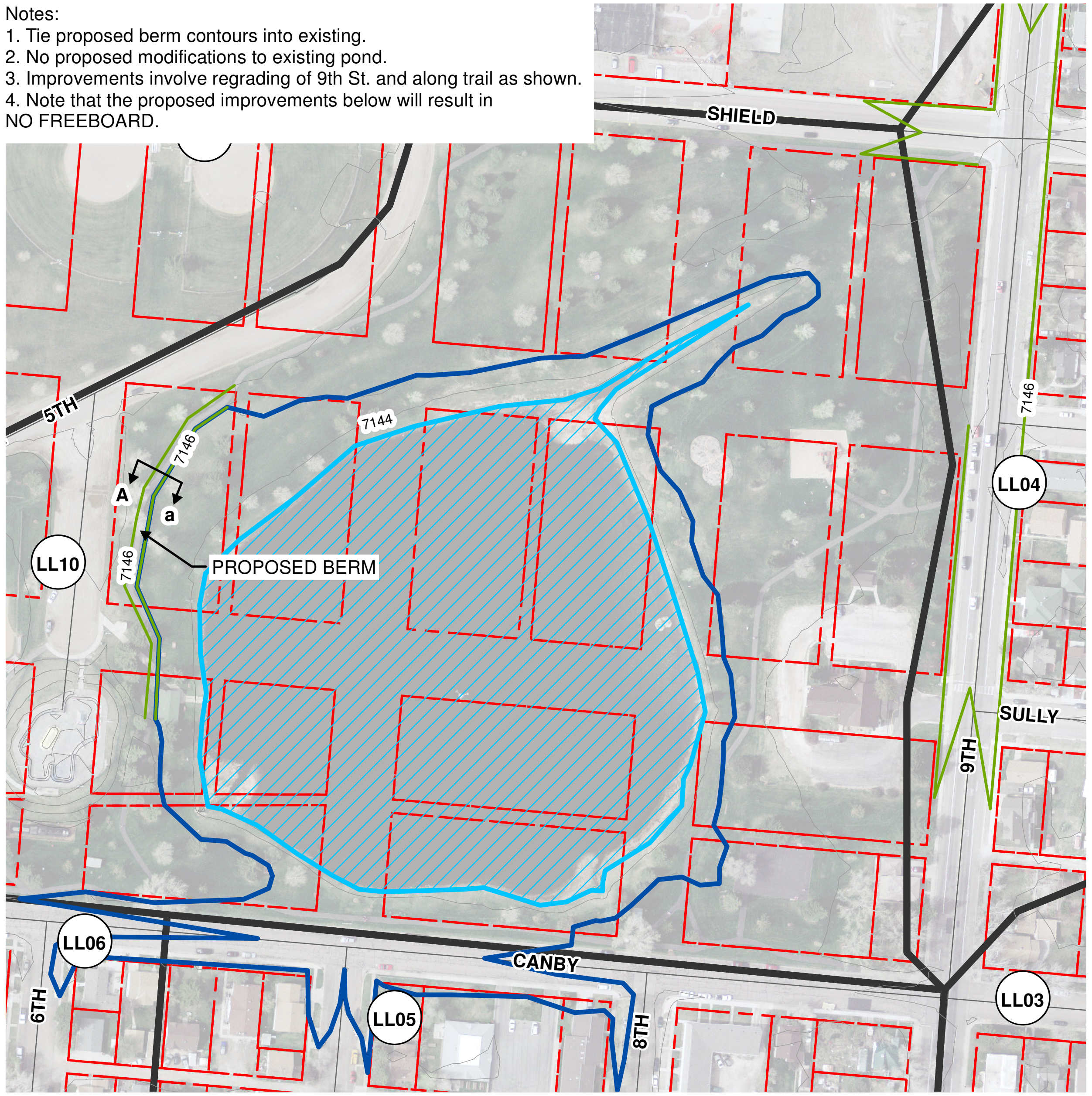
Project Number: LARAM 112351
Print Date: 03/2012

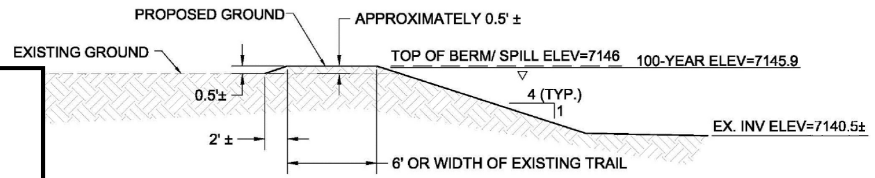
Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 18
Recommended Plan

Notes:
1. Tie proposed berm contours into existing.
2. No proposed modifications to existing pond.
3. Improvements involve regrading of 9th St. and along trail as shown.
4. Note that the proposed improvements below will result in NO FREEBOARD.





LaBonte Park Pond
Typical Cross Section A-a
N.T.S.

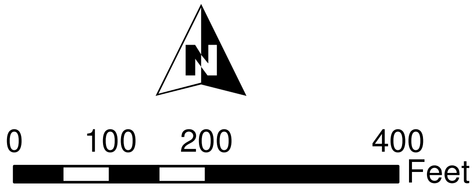
Legend

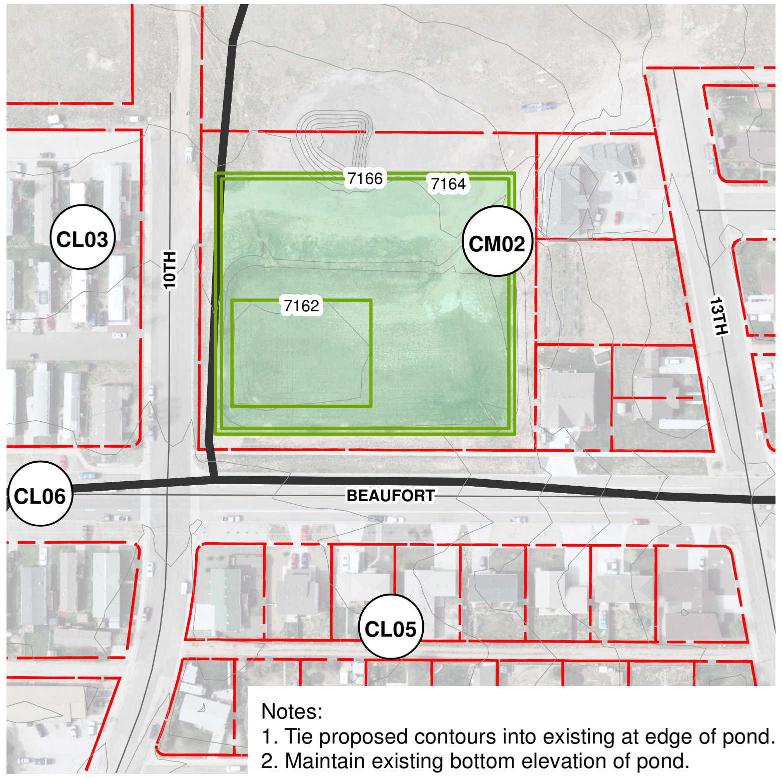
― Street
▭ Parcel Boundary

Flood

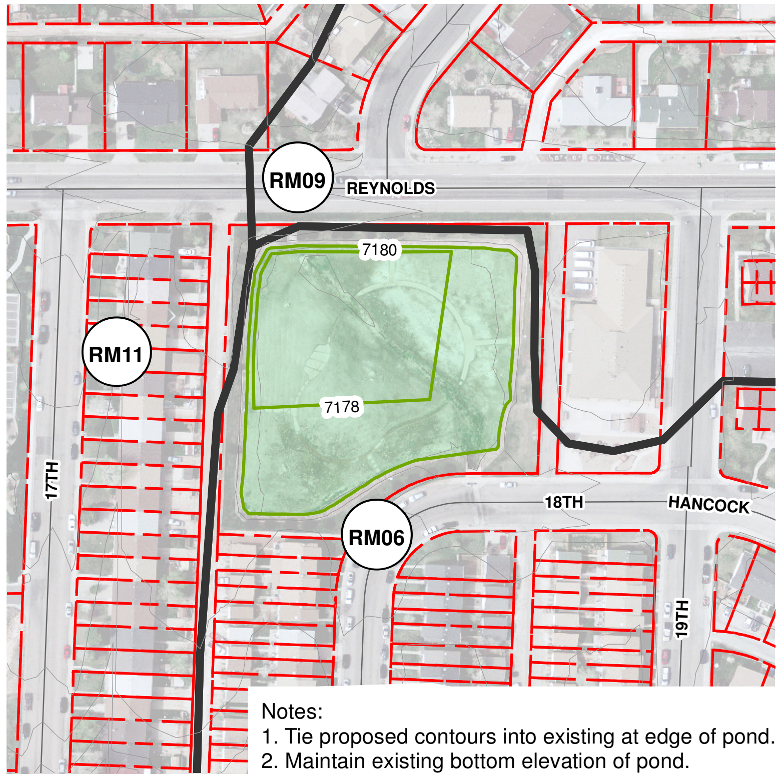
▨ 10-Year Storm
▭ 100-Year Storm
▭ Subbasin Boundary

Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

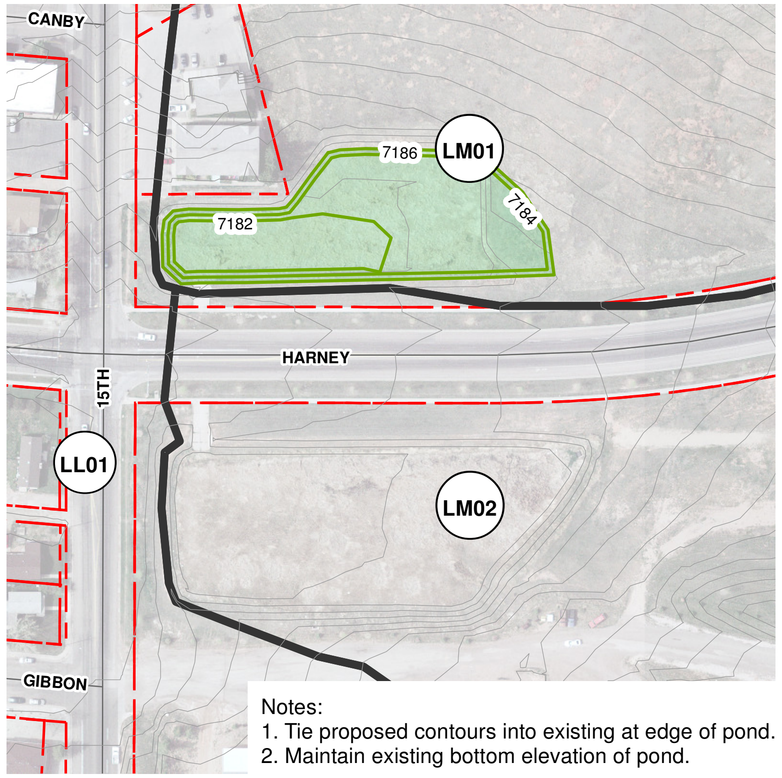




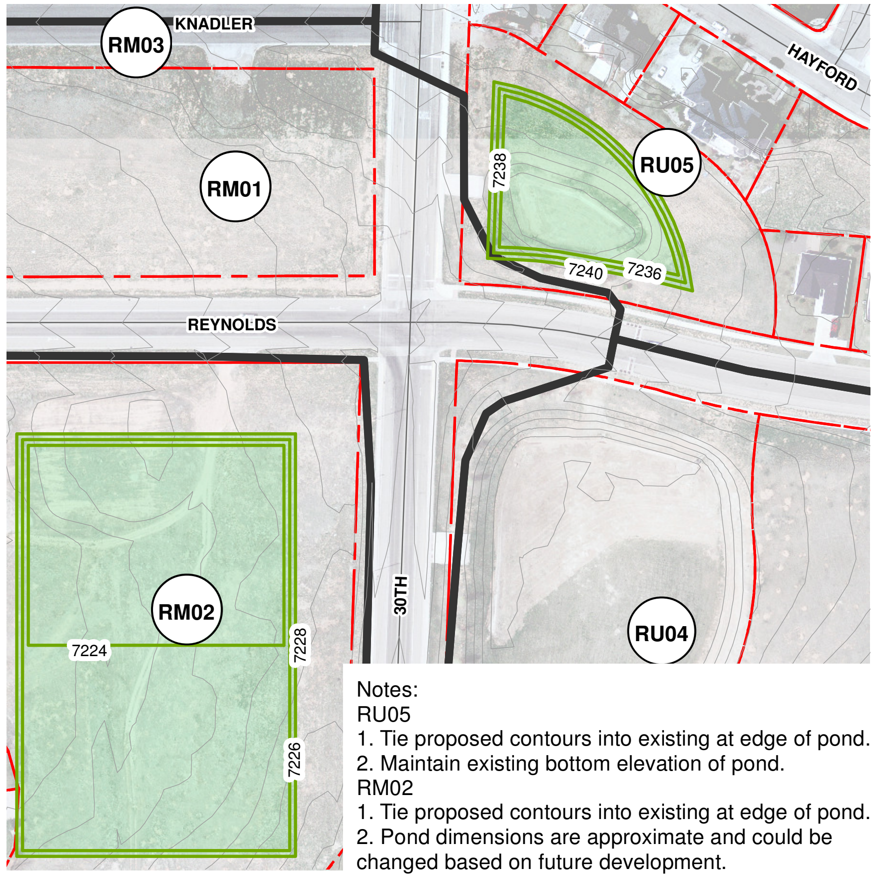
Notes:
1. Tie proposed contours into existing at edge of pond.
2. Maintain existing bottom elevation of pond.



Notes:
1. Tie proposed contours into existing at edge of pond.
2. Maintain existing bottom elevation of pond.



Notes:
1. Tie proposed contours into existing at edge of pond.
2. Maintain existing bottom elevation of pond.



Notes:
RU05
1. Tie proposed contours into existing at edge of pond.
2. Maintain existing bottom elevation of pond.
RM02
1. Tie proposed contours into existing at edge of pond.
2. Pond dimensions are approximate and could be changed based on future development.

Legend

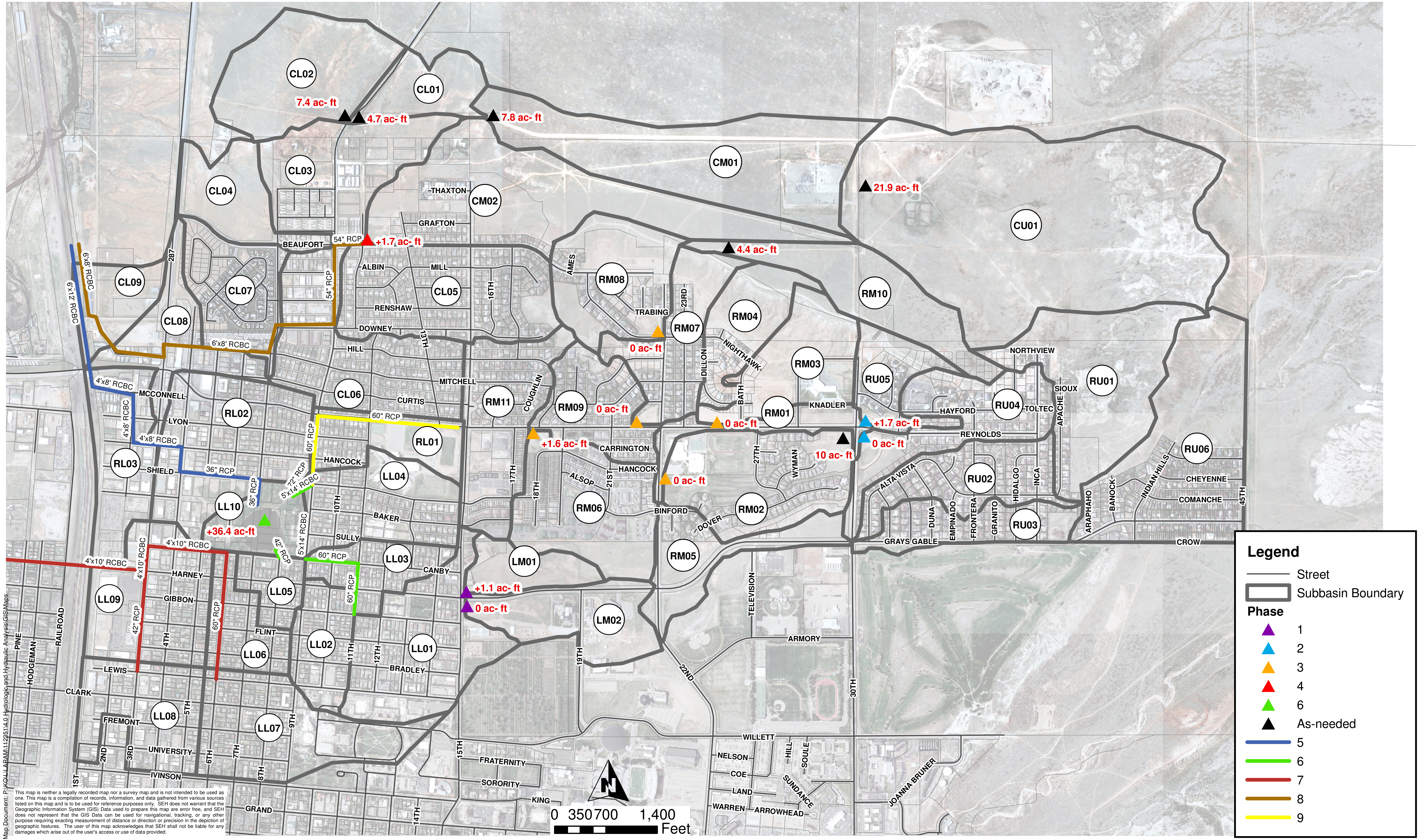
🟩 Estimated Area of Regrading

Project Number: LARAM 112351
Print Date: 03/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

NORTH LARAMIE DRAINAGE MASTER PLAN
Laramie, Wyoming

FIGURE 19
Recommended Plan - Proposed Pond Contours



Map Document: P:\KO\L\LARAM\112351\4.0 Hydrologic and Hydraulic Analysis\GIS\Maps

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Project Number: LARAM 112351
Print Date: 03/2012

Map by: KRJ
Projection: NAD_1983_StatePlane_Wyoming_East_FIPS_4901_Feet
Source:

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Laramie, Wyoming

FIGURE 20
Recommended Phasing Plan

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Appendices

Appendix A – Public Meeting Comments

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Public Meeting –
North Laramie Drainage Master Plan
June 24, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072

Name	Address	Phone	Email
Grant Lindstrom	1651 Nottage Ct.	760-9557	@Gmail laramieridge.com [redacted]
Norma Reiners	3401 Alta Vista	721-8803	
SIOBHAN ROWELL	1761 NOTTAGE CT	760-6905	
Deirdre O'Dwyer	1414 Thomes	742-3900	

Public Meeting –
North Laramie Drainage Master Plan
June 23, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072

Name	Address	Phone	Email
Bev Hagel	617 Reynolds	755-5460	
Faith Perue	620 Curtis	742 4931	fperue@aol.com
Georgia Mitchell	1570 N. 7th	745-5616	gmitch@uwyo.edu
BILL BIRD	1213 Downey	742-6310	
Bruce Parrill	803 Mitchell	742-3147	
ALAN SCHIMEK	2118 E. CURTIS ST.	745-3154	
Peggy Cooney & Ed Paradis	2438 Knadler	745-4595	
BOB & SYLVIA HANSEN	2620 NIGHTHAWK	745-3287	
Peggy & Bill Lindberg	1667 N. 30th	742-3064	
Carl Maass	2102 Carrington Ct Lar 82072	745-5426	
MIKE VASSALLO	907 E LYONS	742-9777	
HANK ADAMI	1829 N. 13TH	755-1856	

Public Meeting –
North Laramie Drainage Master Plan

June 23, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072

Name	Address	Phone	Email
TODD PEARSON	2410 NIGHTHAWK DR.	742-9011	toDD_pearson@Juno.com
MIKE SCHLUCK	2518 NIGHTHAWK DR.	760-4799	N/A
NANCY GOLDSMITH-PERRY	2102 REYNOLDS	745-9202	ngoldsmith-perry@acsd1.org

Comment Card

North Laramie Drainage Master Plan
Public Meeting
June 23 & 24, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

Name (optional): MIKE SCHRUCK

Address (optional): 2518 NIGHTHAWK DR.

Phone (optional): 760-4799

Email (optional): MNASHARED@Q.COM

Comments/ Concerns:

DRAINAGE ON THE BACK (SOUTH SIDE) OF MY LOT IS TO RUN TO THE EAST AND [illegible] THEN DOUBLE-BACK AROUND TO THE SOUTH AND WEST OF THE LOTS ON TOLLIS CT. I HAVE ALREADY SEEN ISSUES WITH RUN OFF NOT TRAVELING THE DRAINAGE EASEMENT DISTANCE AND BACKING-UP. FURTHER, THE EASEMENT WAS CHANGED & LENGTHED FROM ORIGINAL PLAN THUS COMPLICATING POSITIVE DRAINAGE. I WOULD WELCOME INSPECTION OF MY PROPERTY & DRAINAGE EASEMENT TO OBTAIN SUGGESTIONS TO REMEDY. THANKS.

Comment Card

North Laramie Drainage Master Plan
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1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

Name (optional): Todd Pearson

Address (optional): 2410 Nighthawk Dr.

Phone (optional): 742-9011

Email (optional): todd_pearson@Juno.com

Comments/ Concerns:

Positive Drainage On South Side Of Nighthawk Is An Issue. Drainage Easement Changed After Final Plat Along with Original Flow Plan.

Examination Of My Property would Be Welcomed.

Comment Card

North Laramie Drainage Master Plan
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Laramie, WY 82072
http://www.sehinc.com/online/laramie

Name (optional): Faith Perue

Address (optional): 620 E Curtis st

Phone (optional): 742 4931

Email (optional): fperue@aol.com

Comments/ Concerns:

curtis st has no drain from 7th untill the water gets to 6th and Reynolds

The rain when heavy can not run off fast enough

When it snows when melting it doesn't reach the drain on Reynolds so it backs up about 15 ft across our walk at 7th st on Curtis st to 6th

SEH

Comment Card

North Laramie Drainage Master Plan
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Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

LARAMIE

Name (optional): Georgia Mitchell

Address (optional): 1570 N. 7th

Phone (optional): 745-5616

Email (optional): gmitch@uwyo.edu

Comments/ Concerns:

Two-fold:

Heavy rains water runs completely over the street and floods some houses and puts red mud on sidewalks which is hard to remove. Water washes higher as cars go by.

Winter time - snow melt can't drain off and ends up causing a skating rink from about halfway up sidewalk and out onto the street. Makes a dangerous situation for visitors as well as myself. After several Months, the city brought a front loader, a grader & a dump truck to clear it out.

Comment Card

North Laramie Drainage Master Plan
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1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

Name (optional): Bruce Parrill

Address (optional): 803 Mitchell

Phone (optional): 742-3147

Email (optional): bparrill@uwyo.edu

Comments/ Concerns:

My house is across the alley from the apartment houses on Downey so some of their drainage is in the alley which does not drain out if the alley has big low spots. The big problem in front of my house, on Mitchell, comes from rain. There is a very large area North and Northeast which drains down to 9th Street which becomes a big stream towards Reynolds. The 9th Street stream can get so deep it also heads West on Mitchell deep enough to come into the grass on my front yard.

Thank you
Bruce Parrill

SEH

Comment Card

North Laramie Drainage Master Plan
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Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

LARAMIE

Name (optional): Beverly Kagel

Address (optional): 617 Reynolds

Phone (optional): 307-755-5460

Email (optional):

Comments/ Concerns:

I live at the NW corner of 7th and Reynolds.

When they built Prairie's Edge and all the new Apt building on North 9th they did <u>NOT</u> put in any drainage on 7th. We set lower on our side and the drain is across the street on NE corner.

When all the water comes down Reynolds toward 3rd street and when it comes South on 7th from the hill it meets at my corner. It flooded against our house, on the front and East side of our house. It came in the drive behind our house 75-100 ft, Into our patio room. In the winter we contend with the snow and ice buildup because it just sits and no where to go. When we have a big snow the snow plows push the snow from the middle of street toward my sidewalk and then when it does melt it ices up at night. I often have ice on sidewalk.

Thank you

SEH

LARAMIE

Comment Card

North Laramie Drainage Master Plan
Public Meeting
June 23 & 24, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

Name (optional): Bill / Peggy Lindberg

Address (optional): 1667 N. 30

Phone (optional): 742-3064

Email (optional): wlindberg@aol.com

Comments/ Concerns:

We take the brunt of drainage off the escarpment east of 30TH (N. of Reynolds / Hayford)
This includes water from all properties above us (undeveloped land delivers silt as well as water)
We have had to develop our own berm system, which continues to silt up, requiring us to periodically excavate (at our expense) & not allowing us to landscape, since the areas just silt back up —

Basically, the property owners (above us) & the developer have ignored any requests for help — Additionally, the original water drainage easments for this area (as have been filed by the city engineer) have been ignored, including building a house right in the path of a drainage easment.

We have been severly flooded out w/ severe building damage due to these problems —

Comment Card

North Laramie Drainage Master Plan
Public Meeting
June [✓ 23] & 24, 2010 6:00pm to 8:00pm
Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

6/23/10

Name (optional): Carl Maass

Address (optional): 2102 carrington ct

Phone (optional): 307 760-9324

Email (optional):

Comments/ Concerns:

Ground water is a significant issue. I have measured ground water @ the base of my below-grade foundation @ 42" below grade.

The ground water does not flow away from my house, instead it seems to dam up and infiltrate my basement. I have taken steps to seal and pump water away, and I hope they work. The solution is to move the ground water away into some sort of storm sewer system.

Thanks,

Carl

Comment Card

North Laramie Drainage Master Plan
Public Meeting

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Fire Station No. 2
1558 N. 23rd Street
Laramie, WY 82072
http://www.sehinc.com/online/laramie

(Informational Comments.)

Name (optional): MIKE VASSALLO

Address (optional): 907 E LYONS

Phone (optional): 307-742-9777   307-760 4500

Email (optional): MVASSALLO@WYOMING.COM

Comments/ Concerns:

Informational Points:

* (1) After the last hail storm that hit the norther part of the city I noticed the following. 10-15 min. after the storm had passed, large amounts of water began flowing south on 9th street. ~~I do~~ Water was coming down Renolds and other streets to the north, (Downy). This water then pools at Lyons and 9th. Houses in the 800 block of Lyons are becoming more at risk for surface runoff flooding.

* (2) I own a duplex at the corner of Renshaw and Newton. After water came in the basement I put in a french drain with a sump pump below the footers. During the past 2 springs ground water has collected below the drain lines. In short, there is substantial ground water in this area. Other houses ~~are~~ have ground water in their basements depending on the spring.

Mike Vassallo

NORTH LARAMIE MASTER DRAINAGE PLAN

Public Meeting #3

January 26, 2011

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Appendix B – Survey Notes

Pg. 1 of 3

Daily GPS Setup: 1608.00 Date: 6-7-10

DC File Name: 160800 100607MC Crew: MC/K

GPS Base at Point: UW-P13

GPS Unit: Unit C R8

Antenna Height: 5.97

Mesured to: Center Bumper

Base Coordinates

North: 296,647.374

East: 549,987.907

Elev.: 7311.626

Lat.: 41° 18' 48.96112" N

Lon.: 105° 33' 11.48806" W

Ellip.: 7273.790

Rover Unit: Unit C R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: ____ △ H= ____

Stored As: ____ △ V= ____

Date: 6-7-10 Pg. 2 of 3

DC File Name: 160800 100607MC

Pt. #	Description
2000-2004	X-section outlet ditch
2005	Top wall @ 60" RCP 8^{84} to invert
2006	Top wall @ 48" RCP 8^{89} to invert
2007	MHST Rim 14^{12} to invert 60" RCP N+S
2008	MHST Rim 9^{22} to invert 60" RCP N+S
2009	MHST Rim 8^{42} to invert 60" RCP E+W
2010	IE 12" steel - pond outlet
2011	IE 18" RCP - pond inlet
2012	CBS rim 38×24 2^{40} rim - invert ±
2013	MHST Rim 11^{00} rim - invert 60" RCP E+W
2014	CBS rim 42×26 (Needs vac'd)
2015	CBS rim 3^{52} 18" CMP No. 4^{92} 18" RCP East

Scale 1 square= ____

Date: 6-7-10 Pg. 3 of 3

DC File Name: 160800 100607MC

Pt. #	Description
~~2016~~ 2020	MH ST 18^{44} rim - invert 60" RCP E+W 18" RCP from inlet (Possible vault)
2016 2017	Misc. strip inlet 1^{72} rim - invert @ 2017
2018	CBS 27×22 2nd + Lyon 1^{70} rim - inv. 12" PVC NW
2019	MH ST 5^{60} rim - invert 48" RCP E+W

Scale 1 square= ____

Pg. 1 of 4

Daily GPS Setup: 1608.00 Date: 6-9-10

DC File Name: 160800 100609mc Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: Unit C R-8

Antenna Height: 5.95

Mesured to: Center Bumper

Base Coordinates

North: 296,647.373

East: 549,987.909

Elev.: 7311.626

Lat.: 41°18'48.96110"N

Lon.: 105° 33' 11.48804" W

Ellip.: 7273.790

Rover Unit: Unit C R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △ H=

Stored As: △ V=

Date: 6-9-10 Pg. 2 of 4

DC File Name: 160800 100609mc

Pt. #	Description
2021	MHST poss 48" 54"? RCP NW-SE 8.62 rim - invert
2022	MHST 48" RCP NNW + SSE 6.57' rim - invert
2023	MHST 60" RCP E + W 15.09 rim - invert
2024	CBS 40 x 24 NW^{c} 4th + Curtis 2^{75} FL ~~rim~~ - invert 15" ~~18"~~ VCP SE to MH So. side Curtis in 4th
2025	MHST So. side Curtis in 4th 7^{10} rim - invert 24" RCP ~~VCP~~ E + W, 15" RCP NW to inlet
2026	MHST 4th + McConnell 5^{76} rim - invert 24" RCP N + S 15" RCP NW to inlet ± 0.2 ap

Scale 1 square=

Date: 6-9-10
Pg. 3 of 4
DC File Name: 160800 100609MH

Pt. #	Description
2027	CBS NW^{c} 4th + McConnell 2^{65} rim-invert. ~1" sed. in box - grate covered w/ fine debris - Hole in pave SW^{c} box (40x24) ~3' deep
2028	CBS. 40x24 NE^{c} 4th + Lyon 2^{20} ~~rim~~ grate - invert, 0" standing water, pipe SW not visible grate covered w/ Debris
2029	CBS 40x24 NW^{c} 4th + Lyons 2^{90} grate - invert ~12" RCP SSE to MH
2030	MHST 4th + Hancock 5.12' rim - invert * see 6/25 notes for pipe sizes
2031	CBS 40x24 SW^{c} 4th + Han 2^{90} grate - invert ~12" RCP NE to MH ~ concrete debris in bottom

Scale 1 square= ______

Date: 6-9-10
Pg. 4 of 4
DC File Name: 160800 100609MH

Pt. #	Description
2032	CBS NW^{c} 4th + Hancock Debris covering grate 2^{88} grate - invert 15" RCP SE to MH
2033	CBR 15" Dia. plastic 2^{51} grate - invert ~1" Debris NE^{c} 4th + Hancock
2034	CBS SE^{c} 4th + Hancock 40x24, square opening No. side to pipe (can't meas.) 2^{50} grate - invert, some Debris
2035	CBR - 15" SE^{c} 4th + Shields 2^{44} grate - invert
2036	CBR - 15" SW^{c} 4th + Shields 3^{05} grate - invert, some Debris

Scale 1 square= ______

Pg. 1 of 8

Daily GPS Setup: 1608.00 Date: 6-10-10
DC File Name: 160800 100610mr Crew: MC/KR
GPS Base at Point: UW-P13
GPS Unit: R-8
Antenna Height: 5.95
Mesured to: Center Bumper

Base Coordinates
North:
East:
Elev.:
Lat.:
Lon.:
Ellip.:

Rover Unit:
Rover Antenna Height:
Measured to:

Initialization Point or Check Shot
Point Number: Δ H=
Stored As: Δ V=

Date: 6-10-10 Pg. 2 of 8
DC File Name: 160800 100610 MC

Pt. #	Description
2037	MHST 5^{76} + Shields 3^{59} rim-invert, 24"RCP E+W, 3" sediment 15" RCP NE to inlet
2038	CBS 40×24, NE^{c} 5^{72} + Shields, 3^{45} grate-invert 15" RCP to MH, some sed.
2039	MHST, 6^{31} + Shields lid paved over * see notes 6/25 for pipes
2040	CBS, 40×24, NE^{c} 6^{71} + Shields, 2^{70} grate-invert 3^{00} to 15" RCP invert hole between pipe + box
2041	MHST 5^{24} + Hancock 6^{05} rim-invert 48" RCP E+W, 5^{0}± to invert North 15" RCP

Scale 1 square=

Date: 6-10-10 Pg. 3 of 8

DC File Name: 160800 100610NC

Pt. #	Description
2042	CBS, NE^{c} 5th + Hancock 3^{00} grate-invert, 15" RCP to MH
2043	MHST, 6th + Hancock 6^{55} rim-invert 48" RCP E-W 6^{80} rim-invert ~24" RCP N. -No visible pipe to inlet
2044	CBS, NE^{c} 6th + Hancock 3^{00} grate-invert, ~15" RCP South, appears to connect to 48" east of MH
2045	CBR, SE^{c} 6th & Lyon 12" plastic, 2^{10} grate to sediment (2" sed) pipe west to storm line

Scale 1 square= ____________

Date: 6-10-10 Pg. 4 of 8

DC File Name: 160800 100610NC

Pt. #	Description
2046	MHST - 6th + Lyon, 4^{49} rim-ie. 24" RCP N+S, 15" RCP NE to inlet (No pipe blend together w/ 2 inverts
2047	CBS, 40x24, NE^{c} 6th + Lyon, 2^{65} grate-invert 15" RCP So to MH
2048	MHST, 6th + Reynolds 3^{50} rim-invert, 24" RCP So. 18" RCP NE to inlet
2049	CBS, NE^{c} 6th + Reynolds 2^{25} grate-invert, 18" RCP SW to MH
2050	CBS, 40x24, SW^{c} 4th + Baker 2^{40} grate-invert, 18" RCP NE ✩ MH paved over
2051	CBS, East side 4th @ Baker 2^{60} grate-invert, 15" RCP west

Scale 1 square= ____________

Date: 6-10-10 Pg. 5 of 8
DC File Name: 160800 100610NC

Pt. #	Description
2052	CBS, NE^c 5th + Reynolds 2^{65} grate - inv. 18" RCP SW
2053	CBS, NW^c 5th + Reynolds 2^{40} to debris, ~ 2-3" debris ~ 18" RCP South
2054	MHST, 5th + Curtis 10^{14} rim- invert 60" RCP E+W
2055	CBS, 42 × 26, NW^c 6th + Curtis, 2^{90} grate - invert 18" RCP SE
2056	CBS, 42×26, NE^c 6th + Curtis 2^{49} grate- invert, 18" RCP So.
2057	CBS - 42×26, NE^c 7th + Curtis on 7th, 3^{17} grate- invert, 18" RCP SW
2058	CBS - as above on Curtis 3^{10} grate- invert, 18" RCP So.

Scale 1 square= ____________

Date: 6-10-10 Pg. 6 of 8
DC File Name: 160800 100610NC

Pt. #	Description
2059	MHST, 7th + Curtis 6^{58} rim- invert, 54" RCP E+W
2060	MHST - 7th + Mitchell 3^{78} rim- invert, 24" RCP So. 18" RCP No., 12" HDPE west
2061	Misc. pond outlet 8" orifice, i.e ;
2062-65	Misc. conc. spillway
2066-67	CBS NE^c 7th + Mitchell 2^{32} grate to invert, 15" RCP west
2068-69	CBS SW^c 7th + Mitchell 2^{61} grate- invert 18" RCP East
2070	MHST, 7th + Downey 4^{10} rim- invert, 15" RCP NE to inlet 24" RCP So., 15" RCP W to inlet, 15" HDPE NW to pond 0.15' up from invert

Scale 1 square= ____________

Date: 6-10-10 Pg. 7 of 8
DC File Name: 160800 100610MC

Pt. #	Description
2071-72	CBS, westside 7th + Downey 3^{19} grate-invert 15" RCP E to MH
2073-74	CBS, NE^{c} 7th + Downey 2^{42} grate + invert, 15" RCP SW to MH
2075-76	Misc. spill - pond
2077	IE 15" HDPE to MH
2078	IE 12 ~~24~~" HDPE outlet ~~Pond 2~~ FES
2079	IE 24" HDPE Outlet from Pond 2
2080	IE 12" HDPE Outlet from Pond 3
2081	IE 4" PVC outlet origin unknown (Found. Drain?)
2082	IE 24" HDPE to Pond 1
2083	IE 12"W×10.5"H Orifice
2084	CBS 38×32 3^{33} Grate-invert 24" HDPE ~~So.~~ So. to MH
2085	MH ST, 6^{02} rim to invert 24" HDPE N, 12" HDPE SW, (1.3 up) to inlet

Scale 1 square= 24" HDPE SE to Pond 2

Date: 6-10-10 Pg. 8 of 8
DC File Name: 160800 100610MC

Pt. #	Description
2086	CBS, 36×24, 5^{28} grate-invert, 12" HDPE NE to MH
2087	IE 24" HDPE w/FES from MH (Pond. #2)
2088	IE 18" HDPE, Pond 2 outlet to Pond 1
2089	MISC IE 4W×6.5"H Orifice

Scale 1 square=

Pg. 1 of 5

Daily GPS Setup: 1608.00 Date: 6-11-10

DC File Name: 160800100611MK Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 5.81

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: A-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 6-11-10 Pg. 2 of 5

DC File Name: 160800 100611MK

Pt. #	Description
2090	CBS, 42 x 24, Curb's 7-9^{75} 3^{04}, 18" RCP South
2091	IE 24" RCP, FES -pipe has metal plate installed in FES w/ 2" slot at bottom
2092	MHST, 9^{th} St. No. 5^{02} rim-invert 18" RCP N+S
2093	MH ST, 9^{th} St. No. 4^{43} rim-invert 18" RCP N+S
2094	CBS, 36 x 24, ~~2~~ 2^{87} grate-invert. 15" RCP W.
2095	MHST 9^{th} No. of Secton 5^{19} rim-invert 18" RCP N+S

Scale 1 square=

Date: 6-11-10 Pg. 3 of 5
DC File Name: 160800 100611MC

Pt. #	Description
2096	CBS, 36×24, 2^{44} grate - invert 15" RCP west
2097	CBS, 36×24, 3^{41} grate - invert 15" RCP west
2098	CBS, 36×24, 1^{98} grate - invert 18" RCP west
2099 - 2102	Misc. spillway
2103 ~~2104~~	IE 8" PVC } pond outlet
2104	IE 8" PVC
2105	MHST, 9th So. of Seeton 5^{99} rim - invert, 18" RCP No. 24" RCP So.
2106	CBS, 36×24, 3.01 grate - inv. 15" RCP W.
2107 - 8	Misc. strip inlet, WYDOT type 18" to invert

Scale 1 square= __________

Date: 6-11-10 Pg. 4 of 5
DC File Name: 160800 100611MC

Pt. #	Description
2109	MHST, 9th + Grafton 5^{91} rim - invert 24" RCP N + S 18" RCP E + W to inlets up ~ 1^{0}
2110	CBS, W. 9th & Grafton 3^{19} Grate - invert, 18" RCP E. to MH
2111	CBS, E. 9th & Grafton 2^{97} grate - invert, 18" RCP W. to MH
2112	CBS, 9th N. of Beaufort 2^{65} grate - invert, 18" RCP E.
2113	CBS, NW^{c} 9th + Beaufort 2^{18} grate - invert 18" RCP E.
2114	CBS, NE^{c} 9th + Beaufort 2^{71} grate - invert 18" RCP W.

Scale 1 square= __________

Date: 6-11-10 Pg. 5 of 5

DC File Name: 1608CO 100611MC

Pt. #	Description
2115	MHST, No. 9th & Beaufort $5^{\underline{32}}$ rim - invert 30" RCP So. 24" RCP No.
2116	MHST, 9th & Beaufort $5^{\underline{63}}$ rim - invert 30" RCP N-S, 18" RCP W. up $\sim 0^{5}$

Scale 1 square= ______________

Pg. 1 of 5

Daily GPS Setup: 1608.00 Date: 6-14-10

DC File Name: 160800 100614MC Crew: MC / KR

GPS Base at Point: UW-P13

GPS Unit: R8

Antenna Height: 5.95

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit:

Rover Antenna Height:

Measured to:

Initialization Point or Check Shot

Point Number: △ H=

Stored As: △ V=

Date: 6-14-10 Pg. 2 of 5

DC File Name: 160800 100614MC

Pt. #	Description
2117-18	CBS No. side Beaufort 2^{32} grate-invert 15" RCP SE to MH
2119	CBS So. side Beaufort 2^{30} grate-invert 15" RCP NE to MH
2120	MHST Beaufort, west of 9th 4^{53} rim-invert, 15" RCP NW to inlets SW to inlet + E
2121	MHST 10th + Beaufort 2^{70} rim-invert, 18" RCP W + NE to pond
2122	IE 24" RCP FES w/ restrictor plate cocked 15° side ways
2123	CBS 40x32, 4^{23} G-I 24" HDPE w.
2124	CBS " , 4^{24} G-I 24" HDPE w.
2125	CBS 4^{54} Grate-inv. 24" HDPE W.

Scale 1 square=

Date: 6-14-10 Pg. 3 of 5
DC File Name: 160800 100614MC

Pt. #	Description
2126	IE 24" HDPE outlet from previous 3 inlets, 6" sediment pond inlet, i.e. well below pond bottom, 18" standing water
2127	MHST, 13th & alley N. Beacon 5^{93} rim-invert, 15" HDPE E & SW towards pond
2128	IE 15" HDPE from MH 2127 inlet to pond
2129	IE 15" HDPE, pond outlet to MH 2127
2130 - 31	CBS 3^{35} Grate-inv. 18" HDPE West to MH
2132	MH ST Gross W. and Thaxton 3^{75} rim-inv. 18" HDPE E + So. to pond
2133	IE 18" HDPE, pond inlet w/trickle channel

Scale 1 square= ____________

Date: 6-14-10 Pg. 4 of 5
DC File Name: 160800 100614MC

Pt #	Description
2134	CBS NWc 9th & Mill, 36x24 2^{62} grate-inv., 18" RCP E to MH
2135	CBS E. side 9th @ Mill 2^{54} grate-inv. 18" RCP W. to MH
2136 37	Misc. strip inlet (WYDOT type) 12" CMP below
2138	MHST 9th St. N. of Mill 6^{55} rim-inv. 30" RCP N & S. 18" RCP E & W to inlets (ap 1º from invert) 4" sediment
2139	MHST, 9th & Mill 6^{21} rim-invert, 30" RCP N & S,
2140	MHST, Mill St. W. of 9th 4^{55} rim-invert, 15" RCP W, 18" RCP East

Scale 1 square= ____________

Date: 6-14-10 Pg. 5 of 5

DC File Name: 1608.00 100614MC

Px. #	Description
2141	CBS, 40×24, So. side Mill 2^{15} grate - inv. ~~15~~ 12" RCP E to MH
2142	CBS, No. side Mill, 40×24 2^{58} grate - inv. 15" RCP SE to MH
2143	CBS, adjacent to 2142
2144	MHST, So. side Mill 3^{22} rim - invert, 12" RCP SW to inlet, 15" RCP NW to inlet 2142, 15" RCP E. to MH 2140

Scale 1 square= ______________

Pg. 1 of 9

Daily GPS Setup: 1608.00 Date: 6-15-10

DC File Name: 160800 100615MC Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 6.00

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit:

Rover Antenna Height:

Measured to:

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 6-15-10 Pg. 2 of 9

DC File Name: 160800 100615MC

Pt. #	Description
2145 - 46	Misc spill, upstream side 4^{0} wide concrete
2147	CBS, 36×24, NE 9^{3} + Renshaw, 2^{87} grate-inv. 18" RCP west
2148	CBS, 36×24, NW 9^{3} + Renshaw, 3^{63} grate-inv. 18" RCP E. (1" water + debris)
21~~50~~49	MHST, No. of Renshaw in 9^{3} 5^{83} rim-inv., 30" RCP N+S, 18" RCP E+W to inlets, up 1^{0} ± from invert
2150	MHST, 9^{3} + Renshaw, 5^{76} rim-inv. 30" RCP N+S, 15" RCP W up 0^{3} ± 3" sediment
2151	CBS, No. side Renshaw, 2^{24} grate-inv., 15" RCP SE to MH
2152	CBS, connects to 2151

Scale 1 square=

Date: 6-15-10 Pg. 3 of 9
DC File Name: 160800 100615MC

Pt. #	Description
(2153)	CBS, 40x24, So. side Renshaw * Car parked on inlet 2^{60} grate-inv.
(2154)	MHST, Renshaw W. of 9th 3^{82} rim-inv., 15" RCP E + NW to inlet, 12" RCP SW to inlet
(2155)	CBR, 24", So. of Renshaw in Bottger Drywall property. 1^{95} grate-inv. 8" PVC NW to inlet (2153)? 6' valley pan both directions E+W
(2156)	CBS, 38x32, in private between Heatter Plumbing + Apartments, 6' valley pan to west, 2^{45} grate-inv. 15" HDPE East 1^{0} water below invert
(2157)	MHST, 9th St between Renshaw + Downey, 5^{62} rim-inv. 30" RCP N+S, 15" HDPE W. to inlet @ same invert

Scale 1 square= ____________

Date: 6-15-10 Pg. 4 of 9
DC File Name: 160800 100615MC

Pt. #	Description
(2158) -(59)	Misc. Strip inlet, WYDOT
(2160)	CBS, 36x24, NW^{c} 9th + Downey 3^{25} grate-inv., 18" RCP E.
(2161) -(62)	Misc. Strip inlet - WYDOT Type
(2163)	CBS, 36x24, NE^{c} 9th + Downey, 9th 3^{14} grate-inv., 18" RCP West unknown SW to next inlet
(2164)	CBS 36x24, NE^{c} 9th + Downey (Downey) 3^{43} grate-inv., unknown pipe NW to inlet (2163), 18" RCP South to inlet, water in swale between pipe
(2165)	CBS, 36x24, SE^{c} 9th + Downey 3^{45} grate-inv., 18" RCP No. w/ water ~1-2"
(2166)	MHST, 9th St. north of Downey 6^{26} rim-inv., 30" RCP No. 36" RCP So
(2167)	CBS. 38x32, NE^{c} 9th + W Hill 3^{22} grate-inv., 3^{90} to 18" RCP West
(2168)	CBS, 38x32, SE^{c} 9th + W Hill 3^{57} grate-inv., 18" RCP W.

Scale 1 square= ____________

Date: 6-15-10 Pg. 5 of 9
DC File Name: 160800 100615MC

Pt. #	Description
2169	CBS, 36x24, NW^{c} 9th + Mitchell 2^{16} grate-inv., 18" RCP E
2170	CBS, 36x24, NE^{c} 9th + Mitchell
2171	" " " 2^{63} grate-inv., ? 18" RCP SW between grates
2172	CBS, 36x24, SE^{c} 9th + Mitchell 3^{22} grate-inv., 18" RCP W
2173	MHST, 9th St. No. of Mitchell 7^{42} rim-inv., 48" RCP N+S 5^{30} to i.e. 18" RCP SW to inlet -Hole in east wall MH plugged w/ concrete, 2" water in pipe
2174	CBS, 42x26, NW^{c} 9th + Curtis 4^{55} grate-inv., 24" RCP So., E½ filled with asphalt ~1^{0} high 
2175	CBS, 42x26, NE^{c} 9th + Curtis 5^{06} grate-inv., 18" RCP So.
2176	CBS, 42x26, NE^{c} 9th + Curtis 5^{81} grate-inv., 24" RCP W. 18" RCP So. up 1^{20}

Scale 1 square= __________

Date: 6-15-10 Pg. 6 of 9
DC File Name: 160800 100615MC

Pt #	Description
2177	CBS, 42x26, SE^{c} 9th + Curtis 3^{95} Grate-inv., 18" RCP No.
2178	MHST, 9th + Curtis 7^{08} rim-inv. 54" RCP NE-SW * NE inlet on 9th connects slightly upstream, up ~0^{3} * NW inlet assumed to connect slightly down stream (can't see)
2179	CBR, 10" ϕ, curb inlet, connections unknown SW^{c} 9th + Gibbon
100	TCP - marker X Front of 9th St. walk + back of Gibbon St. walk
101	PMON, 1½" AC PE/LS 4259 SE^{c} 658 No. 9th
2180	MHST, 9th + Gibbon 5^{72} rim-inv., 10" VCP SW, 0^{70} up 10" VCP SE up 0^{2}, ~12" VCP No. @ invert, 10" VCP NW up 0^{6}

Scale 1 square= __________

Date: 6-15-10 Pg. 7 of 9
DC File Name: 160800 100615MC

Pt. #	Description
2181	MHST, NE 9th + Gibbon 4^{42} rim-inv., 24" RCP SE 30" RCP No., 2" + sediment
2182	MHST, E 9th + Gibbon 3^{20} rim-invert, 18" HDPE So. to inlets not shot yet (Tree vs. satellites) 24" RCP NW to MH 2181, 18" HDPE No.
2183	CBR - 18", NE^{c} 9th + Gibbon appears to head to MH 2182 2^{50} grate-inv.

☆ Still need total Station for 2 inlets SE^{c} + / NW^{c} 9th + Gibbon

2184	CBS, 36x24, NE^{c} 9th + Harney 2^{90} Grate-inv., 15" RCP SW to MH
2185	CBS, 36x24, SE^{c} 9th + Harney 2^{87} grate-inv., 15" RCP NW to MH

Scale 1 square= ______

Date: 6-15-10 Pg. 8 of 9
DC File Name: 160800 100615MC

Pt. #	Description
2186	MHST N. in 9th + ~~Gibbon~~ Harney 4^{14} rim-inv. 2" sediment 15" RCP NE to inlet 2184 15" RCP SE to inlet 2185 ?" RCP N + S. (30" per 9th + Gibbon)
2187	MHST S. in 9th + Harney 5^{33} rim-inv. 15" RCP W, SW to inlet, SE to inlet

☆ Need total Station for 2 inlets either side of 9th St. So. of Harney

2188	CBS, NE^{c} 8th + Harney, 2^{23} grate-inv. 15" ~~CB~~ RCP SW to MH
2189	CBS, NW^{c} 8th + Harney, 2^{25} grate-inv. 15" RCP SE to MH
2190	CBS, SW^{c} 8th + Harney, 2^{05} grate-inv. 12" RCP NE to MH
2191	CBS, SE^{c} 8th + Harney, 2^{36} grate-inv. 15" RCP NW to MH
2192	MHST, 8th + Harney, 5^{10} rim-invert N 18" RC, NE 15" RCP, E 15" RCP, SE 16" PVC SW 12" RCP, NW 15" RCP

Scale 1 square= ______

Date: 6-15-10 Pg. 9 of 9

DC File Name: 160800 100615MC

Pt. #	Description
2193	CBR, ~~40x24~~ 24", SE^{c} 8^{th} + Canby 3^{75} grate-inv., 8" PVC NW to MH
2194	CBS, 40x24, SW^{c} 8^{th} + Canby 3^{00} grate-inv., 15" RCP NE to MH filled with conc. 3"
2195	IE 20" PVC, outlet into Labonte Lake
2196	MHST, 8^{th} + Canby, 5^{60} rim-inv. 12" HDPE S, 24" HDPE SE. 12" HDPE ESE, 18" HDPE NW to Lake
2197	CBR, 24", 9^{th} + Candby, SE^{c} 2^{05} grate inv. 16" RCP NW to MH
2198	CBS, 40x24, NE^{c} 9^{th} + Canby 2^{34} grate-inv., 15" RCP SW to MH
2199	MHST, 9^{th} + Canby, 5^{52} rim-inv. 48" RCP N, 36" RCP E, 30" RCP S. 1^{2} standing water
2200	CBS SE^{c} 10^{th} + Canby 1^{29} grate-inv. 12" RCP N.
2201	CBS. NE^{c} 10^{th} + Candy 2^{35} grate-inv. 15" RCP SW to MH
2202	MHST, 10^{th} + Canby, 4^{75} rim-inv. 12" RCP SE, 15" RCP NE, 36" RCP E-W

Scale 1 square= 3^{72} top of 6" pipe N.S waterfall

End

Pg. 1 of 6

Daily GPS Setup: 1608.00 Date: 6-16-10

DC File Name: 160800 100616MC Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 6.00

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △ H=

Stored As: △ V=

Date: 6-16-10 Pg. 2 of 6

DC File Name: 160800 100616MC

Pt.-#	Description
2203	CBS, SE^{c} 11th + Canby, 40x24 2^{97} grate-inv., 12" RCP NW to MH
2204	CBS. NE^{c} 11th + Canby, 40x24 2^{33} grate-inv. 18" RCP SW to MH
2205	CBS - with previous
2206	MHST, 11th + Canby. 8^{62} rim-inv. $3^{3}\pm$ 18" RCP NE, $5^{6}\pm$ 15" RCP SE 8^{25} 36" RCP W. 8^{65} 30" RCP So.
2207	CBS 36x24, NE^{c} 11th + Harney 2^{97} grate-inv.; 15" RCP SW to MH
2208	CBS 36x24, SE^{c} 11th + Harney 3^{08} grate-inc., 15" RCP NW to MH
2209	MHST, 11th + Harney, $6^{02}\pm$ rim-inv. (tilted slightly), 15" RPP NE, up 0^{4} 16" PVC SE up 1^{2}, 30" RCP N+S
2210	CBS. 40x24, SE^{c} 11th + Gibbon 2^{68} grate-inv., 15" RCP NW to MH ~½" standing water
2211	MHST, 11th + Gibbon, 7^{42} rim-inv. $5^{1}\pm$ 15" RCP SE, 30" RCP N+S, 24" ~~48~~" RCP E
2212	CBS 40x24, NE^{c} 11th + Flint 2^{46} grate-inv., 2^{16} 12" RCP SW to MH conc debris No. and box

Cont.

Scale 1 square=

Date: 6-16-10 Pg. 3 of 6
DC File Name: 160800 100616MC

Pt. #	Description
2213	MHST, 11th + Flint, 6^{40} rim-inv 5^{0}± 12"RCP NE, 30"RCP N+S 2" + rocks + debris
need TS ~~2214~~	CBS 40x24, NE^{c} 11th + Bradley ~15" PVC SW to MH
Need T ~~2215~~	CBS 40x24, NE^{c} 11th + Bradley
2214	MHST, 11th + Bradley N-S, 3^{76} rim-inv. * This is a 4'4" x 5'10" box 15"PVC NE + SE, 4" HDPE E. 30" RCP No., 15" PVC So., * see 6/25 notes → two other inlets SE^{c} for total Station
2215 - 2216	CBS, 40x24, SW^{c} 11th + Lewis → sediment filters nailed over grate.
2217	MHST, 11th + Lewis, 5^{02} rim-inv. 15" PVC N., 15" PVC N, 15" RCP SW, 12" VCP SE to UW
2218	CBS 40x24, SE^{c} 12th + Gibbon, 3^{10} G-in ~~15~~ 12" RCP NW, box obstructs front half of grate
2219	CBS 40x24, NE^{c} 12th + Gibbon 3^{44} grate-inv., ~~15~~ 12" RCP SW to MH

Scale 1 square= ____________

Date: 6-16-10 Pg. 4 of 6
DC File Name: 160800 100616MC

Pt. #	Description
2220	MHST, 12th + Gibbon, 6^{12} rim inv 4^{8}± 12" RCP SE, 4^{5}± 12" RCP NE 24" RCP E+W
2221	CBS 40x24, SE^{c} 13th + Gibbon 3^{45} grate-inv, ~~15~~ 12" RCP NW
2222	CBS 40x24, No. side Gibbon @ 13th 3^{17} grate-inv, 12" PVC So. to MH
2223	MHST, 13th + Gibbon, 5^{82} rim inv 12" PVC N. up 1^{0}±, 12" RCP SE up 1^{3}±, 4" PVC S. up 2^{5}± 18" RCP E+W
2224	CBS, 40x24, SE^{c} 14th + Gibbon 2^{44} grate-inv., 12" RCP NW
2225	CBS 40x24, NE^{c} 14th + Gibbon 1^{20} grate-inv., 1" Debris 12" RCP SW - ½ block w/Debris (cone, broom, etc)
2226	MHST, 14th + Gibbon 5^{97} rim-inv, 12" RCP NE+ SE up 0^{3}±, 18" RCP W, 20" RCP N (measured at 20-21")

Scale 1 square= ____________

Date: 6-16-10
Pg. 5 of 6
DC File Name: 160800 100616MC

Pt. #	Description
2227	CBS NE^{c} 14th + Harney, 2" Debris 15" RCP E to 2228 fill. 3" 1^{98} grate-inv, 15" ~~RCP~~ PVC SW filled 3"
2228	CBS NE^{c} 14th + Harney ~~1^{98} grate-inv. 2" Deb~~ 2^{18} grate-inv, 2" water 15" RCP W to 2227 filled 3"
2229	MHST, 14th + Harney 15" PVC NW to inlet, 15" PVC NE to inlet 24" RCP So., 24" RCP E 3^{52} rim-inv,
2230	CBS 40x24, NW^{c} 14th + Harney 2^{25} grate-inv. 15" PVC SE to MH 8" filled, 2" Debris in box w/ conc. chunks
2231	CBS 36x24, SE^{c} 15th + Harney 2^{25} grate-inv., 15" RCP NW
2232	CBS 36x24, NE^{c} 15th + Harney 2^{25} grate-inv., 15" RCP SW
2233	CBS 36x24, W. side 15th No. of Harney 2^{60} grate-inv. 15" RCP S. w/ 5" sediment

Scale 1 square= ____________

Date: 6-16-10
Pg. 6 of 6
DC File Name: 160800 100616MC

Pt. #	Description
2234	MHST, 15th + Harney, very dirty 3^{23} rim-debris, 15" RCP SE to inlet 15" RCP NE to inlet, presumed 24" RCP west (can't reach)
2235	MHST in Harney E. of 15th 4^{23} rim-inv., 6" PVC NE to pond 6" PVC SW to pond, 2" PVC from sump MH to south 15" RCP NES, 24" RCP west ☆ This must connect to 2234 with the 24"
2236	MH sump. dumps into 2235 ~ every couple minutes
2237 -40	Misc. pond spillway
2241	IE 15" RCP FES to 2235
2242 -45	Misc. pond spillway
2246	IE 15" RCP FES to 2235

End

Scale 1 square= ____________

Pg. 1 of 3

Daily GPS Setup: 1608.00 Date: 6-21-10

DC File Name: 160800 10062IME Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 5.45

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.642

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: ~~800~~ UW-520 △H= ΔN: -0.047 ΔE: 0.065

Stored As: 800 △V= Cut 0.002

Date: 6-21-10 Pg. 2 of 3

DC File Name: 160800 10062IME

Pt. #	Description
(2247) -48	CBS - No. side Harney @ power plant ~~8~~ 2^{85} grate - inv., 12" RCP So. to MH
(2249) -(50)	CBS - So. side Harney @ power plant 2^{55} grate - inv., 12" RCP No. to MH
(2251)	MH ST, 8^{85} rim - inv. 18" RCP W., 12" RCP's N + S @ ~ 5^{3} r - inv., 18" plastic ESE ~ 6^{0} r - inv. - destination unknown
(2252) -(4)	CBS No. side Harney 2^{83} grate - inv., 15" RCP So. to MH
(2255) - (7)	CBS So. side Harney 3^{05} grate - inv. 15" RCP No. to MH
(2258)	MH ST - Harney E. of 15th St Pond 7^{48} rim - inv., 6^{02} inv. 18" RCP E. 5^{75} 15" RCP N + S to inlets 24" RCP SW to pond
(2259)	IE 24" RCP @ pond
(2260) -(61)	Misc. top. conc. weir

★ To total Station (VX)

⊼@ TCP 100, HI = 5.55 True

BC TCP 101, (PNIEN) HR = 7.00

ΔH: -0.067 ΔV: 0.125

Scale 1 square=

Date: 6-21-10 Pg. 3 of 3

DC File Name: 160800 100621mc (TS2)

Pt. #	Description
2262	CBR, SE^{c} 9th + ~~B~~Gibbon, 12" 3^{05} grate-inv. (plastic) North
2263	CBR, SE^{c} 9th + Gibbon 18" 2^{68} grate-inv. No. (plastic) – Both have some debris in bottom
2264	CBR, NW^{c} 9th + Gibbon, 24" RCP 2^{25} to debris at top of PVC SE
102	TCP, set 60d SW^{c} 9th + Harney

⊼@ TCP 102 HZ = 5.58 True

BS TCP 100 HR = 7.00

ΔH = -0.013 ΔV: 0.096

Pt. #	Description
2265	CBS - SW^{c} 9th + Harney 3^{00} grate-inv. 15" RCP NE to MH So.
2266 - (8)	CBS - SE^{c} 9th + Harney 2^{74} grate-inv., 15" RCP west to next MH
2269	MH ST, So. of Harney in 9th 4^{43} rim-invert, ~1" sediment 30" RCP N+S, 15" ~~R~~RCP E. from inlet - connects to No. MH in intersection

END

Scale 1 square=

Pg. 1 of 7

Daily GPS Setup: 1608.00 Date: 6-25-10

DC File Name: 1608.00 100625 MC Crew: MC/KR

GPS Base at Point: UW-PB

GPS Unit: R-8

Antenna Height: 6.03

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 6-25-10 Pg. 2 of 7

DC File Name: 160800 100625 MC

Pt. #	Description
2270	MHST - 4th + Baker 4^{40} rim-invert, 24" RCP N. 18" RCP SW to inlet & E. to inlet 48" barrel, 1-2" sediment
2030	Shot previously 5A HST 4th + Hancock 5^{12} rim-invert, 48" RCP E+W 28"? RCP N+S, sediment south
2271	MHST - 4th + Lyon, 3^{97} rim-sediment (~ 2") 18" RCP NW to inlet 28"? RCP So., 18" RCP NE to inlet, 22"? RCP No,
2039	shot previously, 6th + Shields MHST 3^{46} rim-invert, 15" RCP NE to inlet 24"? RCP W. - brick barrel 48", 6' standing water

→ End. GPS Survey Begin Conv.

Keyed in CP 107

N 297,064. 285

From 1221.37 E 541, 855. 349 7184.24

UW-52 N 297, 281. 006

E 541, 774. 796

El. 7169. 97

Scale 1 square=

Date: 6-25-10 Pg. 3 of 7
DC File Name: 160800 100625MC

Pt. #	Description
	⊼ @ TCP 107 HI= 5.57' true BS UW-52 HR= 7.00 DH= 0.021 ΔV= 0.024
(2272) -(73)	CBS SE^{c} 11th & Bradley (40x24) 3^{25} grate-inv., 15" PVC NW to box
(2274) -(75)	CBS- NE^{c} 9th & Sully (40x24) 3^{05} grate-inv., 20"H x 16"W square opening - can see pipe but not measure (RCP) SW to MH
(2276)	CBS, SE^{c} 9th & Sully (40x24) 19"W x 22"H square opening NW to manhole - can see RCP but not measure
(2277)	MHST - 9th & Sully, 8" sediment 6^{14} rim-inv., 48' RCP N&S 18" RCP NE & SE up ~0^{5}
(2278)	CBS SE^{c} 9th & Baker (40x24) 2^{53} grate-inv., 15" HDPE NW to MH
(2279)	MHST, 9th & Baker, 4" sediment 5^{96} rim-invert, 48" RCP N&S 15" HDPE SE up ~1^{0} 5" standing water

Scale 1 square=

Date: 6-25-10 Pg. 4 of 7
DC File Name: 160800 100625MC

Pt. #	Description
(2280)	CBS, NE^{c} 9th & Shields 40x24 2^{64} grate-inv., 18"RCP SW to MH
(2281)	CBS, SE^{c} 9th & Shields, 40x24 2^{35} grate-inv., 18"RCP NW (not towards MH)
(2282)	MHST, 9th & Shields, 7" water, 5" sediment 6^{51} rim-inv., 18" RCP So. -large pipe going west (can't measure) This is a vault
(2283)	CBS, W. side 9th So. of Shield's 3^{62} grate-top of debris - this appears to be set over RCP SE-NW, can't measure.
(2284)	MHST, 9th St. So. of Shields 5^{36} rim-sediment, assume RCP So. to MH in Baker, large RCP NW to inlet (2283) - this appears to be a vault
(2285)	IE 36x60 Elliptical FES -outlet into La Bonte Lake ~3" sediment

Scale 1 square=

Date: 6.25.10 Pg. 5 of 7
DC File Name: 160800 100625MC

Pt. #	Description
2286 - 87	CBS SE^{c} 11th + Shields 15" RCP NW to MH
2288 - 89	CBS - NE^{c} 11th + Shields 15" RCP SW to MH
2290	MHST - 11th + Shields 4^{72} rim-invert, 24" RCP W 18" VCP NNE, 15" RCP NE + SE to inlets, 18" RCP Sou - brick MH * Destination of VCP not found, but is the source of most of the water through this MH
2291 - 92	CBS, SE^{c} 11th + Baker 18" RCP NW

* MH paved over

Pt. #	Description
2293	MHST, 10th + Baker 3^{14} rim-invert, 21" RCP E+W brick MH
2294	CBS- NW^{c} 9th + Hancock 2^{53} grate- bottom box 6^{60} grate-inv. 48" RCP NE-SW ~12" ϕ hole into pipe

Scale 1 square=

Date: 6.25.10 Pg. 6 of 7
DC File Name: 160800 100625MC

Pt. #	Description
2295	CBR · NE^{c} 9th + Hancock 15" ϕ plastic, 2^{81} grate-inv. So. 15"
2296	CBR - SE^{c} 9th + Hancock 2^{96} grate-inv., 15" plastic No. 18" plastic W. to MH
2297	MHST, 9th + Hancock 8^{35} rim-inv. 48" RCP SE+NW 7" Sediment
2298 - 99	CBS - NE^{c} 7th + Hancock 3^{50} grate-inv., 18" RCP So. to MH
2300	MHST - 7th + Hancock, 8^{10} rim-inv. 48" RCP E+W, 18" RCP N. up 1^{0}
Duplicate ~~2301~~	CBS, 40x24, NE^{c} 5th + Hancock 3^{00} grate-inv., 15" RCP So. to MH
Dup ~~2302~~	MHST, 5th + Hancock 6^{08} rim-inv. 48" RCP E+W 15" RCP No. up 1^{5}
2301	CBR 12", SW^{c} 9th + Lyon 3^{17} grate-inv. 15" plastic No.
2302	CBR 15", SE^{c} 9th + Lyon 2^{70} grate-inv. 15" plastic NW
2303	CBR, NE^{c} 9th + Lyon, 3^{74} 18" plastic So.

Scale 1 square=

Date: 6-25-10 Pg. 7 of 7

DC File Name: 160600 100625MC

Pt. #	Description
2304	MHST, 9th + Lyon, 7^{42} rim - inv. 48" RCP N+S, 18" RCP E+W up 2^{5}±
2305 - 6	CBS, 40x24, SE^{c} 9th + Reynolds 2^{94} 15"± RCP NW
2307 - 13	CBS, 40x24, NE^{c} 9th + Reynolds 3^{07} grate - inv. 18" RCP So.
2314 - 18	CBS, 40x24, NW^{c} 9th + Reynolds 3^{03} grate - inv., ~18" RCP So.
2319	MHST 9th + Reynolds

Started bleeding - end survey

Scale 1 square=

Pg. 1 of 4

Daily GPS Setup: 1608.00 Date: 6-29-10

DC File Name: 160800 100629MR Crew: MC/KR

GPS Base at Point: CW-P13

GPS Unit: R-8

Antenna Height: 6.01

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 6-29-10 Pg. 2 of 4

DC File Name: 160800 100629MC

Pt. #	Description
2319	MH ST, 9th & Reynolds 7^{20} rim-inv. 48" RCP South pipe NE & SE (RCP) can't meas. size, invert up higher, possible large RCP No. inv. up 1'+, 1" sed., standing water ~2"
2320	MH ST, mid block Reynolds between 9th & 11th
	6^{55} rim-inv., 42" RCP E&W
2321	MH ST, Reynolds west of 11th 6^{21} rim-inv., 42" RCP E&W
2322	CBS, 29x22, SE^{c} 11th & Reynolds 3^{47} grate-inv. 18" RCP No.
2323	CBS, 29x22, NE^{c} 11th & Reynolds 3^{58} grate-inv., 18" RCP So.
2324	MH ST, Reynolds & LHS Parking 6^{54} rim-inv., 42" RCP E&W - Bent [illegible]
2325	MH ST, Reynolds @ LHS field 6^{21} rim-inv., 42" RCP E&W
2326	MH ST, Reynolds @ LHS Stadium W. 6^{62} rim-inv., 42" RCP E&W, 15" HDPE SE @ 4^{42} from rim

Scale 1 square=

Date: 6-29-10 Pg. 3 of 4

DC File Name: 160800100629MC

Pt. #	Description
2327	MHST, Reynolds @ LHS Stadium East 6^{26} rim-inv., 42" RCP E+W
1107	TCP 107 Proj. 1550.01
2328	CBR 12", Back Entrance to Snowy's/UniWyo 1^{42} grate-top inside pipe - full of sediment to north
2329	CBR 12", Back Entrance to Snowy's/UniWyo 1^{40} grate-top inside of pipe south, ~2½" of open pipe, remainder sediment
2330-31	Misc. spill - @ BOW near Snowy's
2332	IE 12" HDPE, with 8" Dia orifice Snowy's pond outlet
2333	IE 18" HDPE with 5" sediment Snowy's pond inlet from UniWyo
in MH 2334	IE 42" RCP E+W in MH
in MH 2335	IE 12" HDPE So. to Snowy's pond outlet, rim not set yet
2326	CBR-15", Snowy's/UniWyo entrance, 3^{41} grate-inv 4" water
2337	CBR-15", Snowy's/UniWyo entrance, 3^{51} grate-invert

Scale 1 square= __________

Date: 6-29-10 Pg. 4 of 4

DC File Name: 160800100629MC

Pt. #	Description
2338	Misc. ie vault, 8' Dia, 42" RCP E+W, 24" HDPE No. up 1^{0} (new constr.)
2339-40	Misc. spill, 18th St. pond outlet
2341	IE 24" RCP, 18th St. pond outlet w/ gate valve
2342	CBS 29x22, Reynolds E. of 19th 3^{85} grate-inv., 24" RCP E+W, 18" RCP No.
2343	CBS 29x22, Reynolds E. of 19th 3^{31} grate-inv, 18" RCP So. to inlet 2342 6" PVC No. (destination unknown)

End survey

Scale 1 square= __________

Pg. 1 of 5

Daily GPS Setup: 1608.00 Date: 6/30/10

DC File Name: 160800 100630AA Crew: Rc /KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 6.01

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 6-30-10 Pg. 2 of 5

DC File Name: 160800100630AAC

Pt. #	Description
⓶2344	CBS, 29x22, Reynolds 19th-20th 3 25 grate - inv 18" PVC So. 2 7# grate inv. 6" PVC No. 4" standing water
2345 -(6)	Misc. spill, Pond on 19th So. of Alcop
2347	IE 18" HDPE pond outlet
2348	IE 18" HDPE "
2349	CBS, 40x24, Hancock between 18+19th 2 10 grate - inv 18" RCP to pond. water 16"
2350 -(1)	CBS, same as above
2352	IE 18" RCP pond inlet completely full of water, ~2" sediment
103	TCP, set 60d near pond, Reynolds Henry - 22nd
104	TCP, marker X, 2010 Reynolds

→ Begin integrated Survey, Trimble S6

⊼ @ CP 103 HI = 5.57 true

BS CP 104 HR = 6.00

ΔH = -0.035 ΔV: 0.102

Scale 1 square=

Date: 6-30-10 Pg. 3 of 5
DC File Name: 160800 100630mc

Pt. #	Description
2353	CBS, 30X22, So. side Reynolds @ 2002 Reynolds 3^{75} grate-inv. 24" RCP E&W 18" RCP No. from inlet
2354	CBS, 30x22 So. Reynolds @ 21st ~~4~~ 4^{00} grate-inv. 24" RCP E&W 18" RCP No.
2355	CBS, 30x22 No. Reynolds @ 21st 3^{44} grate-inv. 18" RCP So. to inlet (2354) 3.05 grate-inv. 6" PVC No.
2356	CBS, 30x22 No. Reynolds @ Henry pond 2^{83} grate-inv. 18" RCP So. to next inlet
2357	CBS, 30x22, So. Reynolds @ Henry pond 5^{30} grate-inv. 24" RCP E&W 18" RCP No.
2358	IE 24" RCP, Henry pond outlet SW to Reynolds
2359	CBS, 30x22, So. Reynolds @ 23rd 7^{57} grate-inv. 24" RCP E&W + 18" RCP No. to inlet, 3^{95} grate-inv 10" PVC So. possibly to Lift Station

Scale 1 square=

Date: 6-30-10 Pg. 4 of 5
DC File Name: 160800 100630mc

Pt. #	Description
2360	CBS, 30x22, No. Reynolds @ 22nd 3^{80} grate-inv. 18" RCP So.
2361	CBS, 30x22, So. Reynolds @ 23rd 3^{93} grate-inv. 24" RCP E&W 18" RCP No. to inlet
2362	CBS, 30x22 No. Reynolds @ 23rd 3^{36} grate-inv 18" RCP So.
2363	CBS, 30x22 No. Reynolds @ E. pond 3^{42} grate-inv. 12" ~~HDP~~ HOPE N. from pond, 18" RCP So.
2364 TS	CBS 30x22 So. Reynolds @ E. pond 3^{97} grate-inv. 24" RCP E&W 18" RCP No.
2365 TS	CBS 30x22 So. Reynolds @ Bath 3^{65} grate-inv. 24" RCP W 18" RCP E&N
2366	CBS, 30x22, No. Reynolds @ Bath 3^{27} grate-inv. 18" RCP So.
2367	CBS, 30x20, So. Reynolds @ 27th 3^{88} grate-inv. 18" RCP E, W&N
2368	CBS, 30x22, No Reynolds @ 27th 2^{98} grate-inv. 18" RCP So. 5" debris in pipe

Scale 1 square=

Date: 6.30-10 Pg. 5 of 5

DC File Name: 160800100630W

Pt. #	Description
2369	CBS, 30x22, So. Reynolds W. of 28^{th}, $3^{\underline{78}}$ grate-inv. 18" RCP E, W & N
2370	CBS, 30x22, No. Reynolds W. of 28^{th}, $2^{\underline{88}}$ grate-inv. 18" RCP So. w/ ~1" tar in pipe
2371	CBS 30x22, So. Reynolds East of 28^{th}, $3^{\underline{74}}$ grate-inv 18" RCP E, W, N
2372	CBS 30x22, No. Reynolds E. of 28^{th} $3^{\underline{34}}$ grate-inv. 18" RCP S. 2-3" sediment
2373	CBS 30x22, So Reynolds. W. of 30^{th} $3^{\underline{76}}$ grate-inv. 18" RCP E, W & N
2374	CBS 30x22 No Reynolds W. of 30^{th} $3^{\underline{10}}$ grate-inv. 18" RCP So. ~1" sed.

Scale 1 square=

Pg. 1 of 5

Daily GPS Setup: 11608.00 Date: 7-1-10

DC File Name: 160800 100701MC Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 6.00

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 7-1-10 Pg. 2 of 5

DC File Name: 160800 100701MC

Pt. #	Description
2375	MH ST, 22nd St No. of Harney 8^{03} rim - inv., 18" RCP So. 30" RCP N, 18" RCP W up 2', 12" RCP SE up 3^{8}
2376	CBS, 36x24. E. 22nd St. 2^{90} grade - inv., 12" RCP NW to MH
2377	CBS, 36x24, W. 22nd St. Spring Wine 2^{76} grate - inv., 12" RCP E to MH
2378	CBS, 36x24, NE^{c} 22nd + Harney 2^{70} grate - inv., 12" RCP SW to MH
2379	CBS, 36x24, SE^{c} 22nd + Harney 2^{89} grate - inv., 12" RCP NW to MH
2380	CBS, 36x24, SW^{c} 22nd + Harney 2^{95} grate - inv., 12" RCP NE to MH
2381	MHST, 22nd + Harney 7^{50} rim - inv. 12" RCP SW, SE, NE 18" RCP North
2382	MHST, 22nd St. No. of Harney 7^{65} rim - inv 18" RCP So. 10^{25} rim - inv. 18" RCP No.
2383	MHST - Richards Park 10^{0} x 6^{6} Vault, 3^{95} rim - inv. 6" sed., 30" ACP SW, 24" RCP ~~NE~~ NE to pond

Scale 1 square=

Date: 7-1-10 Pg. 3 of 5
DC File Name: 160800 100701MC

Pt. #	Description
2324 2385	IE 24" RCP, Richard's Park Pond inlet
2386	CBS, 26x26, in pond. 1^{55} grate-inv. 8" PVC North
2387	CBS, 38x32, No. Binford E of 22nd 3^{25} grate-inv. box, 3^{36} grate-inv. 18" HDPE No., 18" HDPE So. w ~1" sediment
2388	CBS, 38x32. So. Binford E. of 22nd 3^{05} grate-inv. 18" HDPE North
2389	CBS 38x32 next to 2388 24" Φ hole between boxes ½ full of sediment
2390	IE 18" HDPE from 2387 pond inlet
2391	CBS, 38x32, So. Binford E of Owen 2^{65} grate-inv. 12" HDPE No. to pond
2392	IE 12" HDPE from 2391 pond inlet
2393	CBS, 26x26, 1^{75} grate-inv. 6" PVC North, SE^{c} pond
2394	CBS, 26x26, NE^{c} pond 1^{46} grate-inv. 6" PVC South 1^{80} grate-inv. 8" PVC West

see Comp pad sketch

Scale 1 square=

Date: 7-1-10 Pg. 4 of 5
DC File Name: 160800 100701MC

Pt. #	Description
2395	IE 10" PVC, pond inlet, source unknown
2396 (7) 2398 (9)	IE 6" HDPE " } Double pipe | pond inlet
2400	IE 6" PVC, (Junior High roof drain)
2401	CBS, 26x26, 1^{95} grate-inv. 8" PVC E W
2402	IE 6" PVC (Junior High roof drain)
2403	CBS, 26x26, 2^{32} grate-inv. 8" PVC E+W
2404	IE 15" HDPE from junior high
2405	CBS, 38x38, 2^{85} grate-inv. 8" PVC E+W
2406	CBS, 38x38, NW^{c} pond, 2^{85} grate-inv 8" PVC E+S, 12" HDPE W.
2407	IE 15" RCP FES, west, pond outlet
2408 (9)	Misc spillway, pond overflow
2410	Misc. Lift Station, 7^{o} Dia 6" PVC outlet south
2411	CBS, 36x24, E. 22nd @ NW^{c} pond 2^{55} grate-inv. 15" RCP NW to MH
2412	MHST, 22nd St. So. of junior high 3^{23} rim-inv. 18" RCP No. 15" RCP SW + SE, 15" RCP E from pond + lift station
2413	CBS, 36x24, W. 22nd So. Junior High 2^{43} 15" RCP N, 3" sed.

Scale 1 square=

Date: 7-1-10 Pg. 5 of 5

DC File Name: 160800 100701MC

Pt #	Description
2414	MH ST, 22nd at Junior high 4^{48} rim-inv. 18"RCP N+S

End Survey

Scale 1 square=

Pg. 1 of 3

Daily GPS Setup: 1608.00 Date: 7-7-10

DC File Name: 160800 100707MC Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 5.92

Mesured to: Center Bump

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 7-7-10 Pg. 2 of 3

DC File Name: 160800 100707MC

Pt. #	Description
②④①⑤ 2415	MHST, 22nd St. No. of Reynolds 7^{14} rim-inv. 18" RCP So., 18" PVC No.
2416	CBS, 40x24. NW ¢ 22nd & Henry 3^{17} grate-inv. 15" PVC SE to MH
2417-18	CBS, 40x24. SW ¢ 22nd & Henry 2^{58} grate-inv 18" PVC SW to pond
2419	CBS, 40x24, SW ¢ 22nd & Henry 5^{50} grate - sediment 24" RCP SW to pond & NE to MH, ~2" sediment, sits on top of pipe w ~12x16" opening
2420	CBS, 40x24. E. side 22nd @ Henry 2^{10} grate-inv. 15" PVC NW to MH
2421	MHST, So. 22nd & Henry 6^{19} rim-inv., 30" RCP N & SW to pond 15" RCP NW to inlet, 12" PVC SE to inlet up ~1^{0}
2422	MHST, NE 22nd & Reynolds. 4^{74} rim-inv., 18" PVC N&S
2423	IE 18" PVC, pond inlet
2424	IE 33" RCP, pond inlet

Scale 1 square=

Date: 7-7-10 Pg. 3 of 3

DC File Name: 160800 100707MC

Pt. #	Description
2425 - 26	CBS, 40x24, NEc 22nd + Curtis 2^{01} grate - inv., 15" PVC SW to MH
2427 - 28	CBS, 40x24, NWc 22nd + Curtis 2^{56} grate - inv. 15" PVC SE to MH
2429	MHST, So. 22nd + Curtis 5^{45} rim - inv. 15" RCP NE to inlt 30" RCP E, 15" PVC NW to inlt up ~1^{5}, 30" RCP So.
2430	MVST, NE 22nd + Curtis 6^{93} rim - inv. 18" PVC N+S

End Survey

Scale 1 square=

Pg. 1 of 6

Daily GPS Setup: 1608.00 Date: 7-8-10

DC File Name: 160800 100708AM Crew: MC

GPS Base at Point: UW-P-13

GPS Unit: R-8

Antenna Height: 6.05

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 7-8-10 Pg. 2 of 6

DC File Name: 160800 100708AM

Pt. #	Description
2431	MHST, 22nd & Edward 6^{94} rim-inv. 18" PVC N&S
2432	CBS. NWc 22nd & Nighthawk 4^{60} grate-inv. 18" RCP N&S
2433-34	CBS 36x24, SWc 22nd & Nighthawk 3^{75} grate-inv. 18" RCP N to inlet 15" RCP W. to 2439
2435	MHST, 22nd & Nighthawk 8^{35} rim-inv. 18" RCP S & NW → sluffed conc. fills ~3-4" of inv.
2436-37	Misc. spillway pond NWc 22nd & Nighthawk
2438	IE 18" PVC (Green) pond outlet to MH 2435 most likely
2439	IE 18" PVC (white) pond inlet from inlet 2432, half full of sediment
2440	CBS, 38x32, alley No. of Nighthawk 4^{03} grate-inv. 18" HDPE NE to pond
2441	IE 18" HDPE, pond inlet from inlet 2440

Scale 1 square=

Date: 7-8-10 Pg. 3 of 6
DC File Name: 160800 100708MK

Pt. No.	Description
2442	IE 18" RCP FES, pond inlet, half full of Sediment
2443	CBS, 36×24, SW c 22nd + Trabing 4^{4} grate-inv. 18" RCP SW to pond. 15" RCP E to inlet
2444 - 45	CBS, E side 22nd @ Trabing. 3^{14} grate-inv. 15" RCP W. 15" RCP to 2445
2446	CBS, 38×32, So. side Trabing @ Redtail 3^{23} grate-inv. 18" HOPE So. to pond + No. to inlet
2447 - 48	CBS, 36×24, NW c Trabing + Redtail, 2^{94} grate-inv. 18" HOPE So. to inlet 2446 12" HOPE to 2448
2449	IE 18" HDPE, from inlet 2446
2460	IE 36" HDPE TO MH, pond inlet
2451	MHST, Trabing west of Redtail 5^{20} ± rim-inv. 36" HDPE SE to pond + NW
2452	MHST, Trabing + Fox 5^{52} rim-inv. 36" HOPE SE + NW

Scale 1 square=

Date: 7-8-10 Pg. 4 of 6
DC File Name: 160860 100708MK

Pt. #	Description
2453	MHST, Trabing NW of Fox 5^{70} rim-inv. 36" HDPE SE + NW
2454	MHST, Trabing So. of Beaufort 5^{21} rim-inv. 36" HOPE SE + N
2455 - 58	CBS, 38×32, SW c Trabing + Beaufort, 3^{20} grate-inv. 18" HOPE SE to main
2459 - 60	CBS, 38×32, SE c Trabing + Beaufort, 2^{73} grate-inv. 18" HDPE SW to main
2461	MHST, Beaufort + Trabing 5^{41} rim-inv. 36" HOPE So. 24" HOPE No. to inlets 24" HOPE E
2462 - 67	CBS, 38×32, No. side Beaufort @ Trabing, 3^{25} grate-inv. 24" HOPE So. - These are in pairs with 15" HOPE between 3 boxes
2468	MHST, Beaufort E. of Trabing 4^{88} rim-inv. 24" HOPE W, + N to inlets

Scale 1 square=

Date: 7-8-10 Pg. 5 of 6

DC File Name: 160800 100708MC

Pt. No.	Description
(2469) -(73)	CBS, 38x32, No. side Beaufort. 3^{29} grate-inv. 24" HDPE So. 15" HDPE between boxes in pairs, East 2, next 2, 1 single.
(2474) - (75)	CBS, 38x26, Dover St. So. 2^{96} grate-inv. 15" HDPE No. to next inlets, 15" PVC between grates
(2476) -(77)	CBS, 38x26, Dover St. No. 2^{87} grate-inv. 15" HDPE So. 15" HDPE No. to surface drain, 15" PVC between grates
(2478)	IE 15" HDPE from inlets above, → surface drain, berm to west of riprap ~ 2' high <50' long
(2479)	CBS, 40x24, So. side Dover @ 27th, 3^{48} grate-inv. (2" water) 15" RCP No. to inlet (2480)
(2480)	CBS 40x24, No. side Dover @ 27th 3^{75} grate-inv. 15" RCP So. to inlet 18" RCP No. to swale outlet 3" standing water, ~1" sediment

Scale 1 square=

Date: 7-8-10 Pg. 6 of 6

DC File Name: 160800

Pt. No.	Description
(2481)	IE 18" RCP from inlet (2480) 6" sediment
(2482)	IE 18" RCP xing 27th 4" sediment
(2483)	IE 18" RCP FES, 2° valley pan upstream
(2484)	IE 24" RCP FES xing 27th
(2485)	IE 24" RCP FES xing 27th ~4" sediment
(2486) -(87)	CBS, 26x26, E. side 27th 1^{63} grate-inv. 15" HDPE W, 15" HDPE between grates
(2488)	CBS, 40x24, W. side 27th 1^{95} grate-inv. 15" RCP E+W (pipe different than (2486)
(2489)	I.E. 15" RCP outlet

END SURVEY

Scale 1 square=

Pg. 1 of 6

Daily GPS Setup: 1608.00 Date: 7-12-10

DC File Name: 160800 100712MC Crew: MC/KR

GPS Base at Point: UW-P13 (Crew B)

GPS Unit:

Antenna Height:

Mesured to:

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: 2363 △H= ΔN: 0.078 ΔE: 0.068

Stored As: 801 △V= F 0.009

Date: 7-12-10 Pg. 2 of 6

DC File Name: 160800 100712MC

Pt #	Description
(2490)	IE 12" HOPE, pond outlet to inlet (2363)
(2491)-(94)	Misc spillway
(2495)	IE 24" HDPE, pond inlet ~ 2" sediment
(2496)	same as previous
(2497) ~~-(98)~~	CBS, 38x32 SW. side Knadler 24" HDPE SW to pond, 3^{19} inv 18" HDPE NE
(2498)	CBS, 38x32, SW side Knadler 3^{02} grate-inv. 24" HDPE SW to Pond
(2499)	CBS, 38x32, SW side Knadler 3^{00} g. inv / 18" HOPE SE to inlet 2497+8
(2500)	CBS 38x32, 2^{25} grate. inv 24" HDPE No. to MH
	✱ 2497+98 are one box, both outlets to pond from here - 2499+2500 are one box, outlet to first box, inlet from ~~MH~~ inlet No.
(2501)-②	CBS, 38x32, NE side Knadler 2^{60} grate-inv. 18" HOPE SW to inlet across street,
(2503)-(4)	CBS, 38x32, NE side 2^{40} grate-inv. 18" HDPE SE to inlet

Scale 1 square=

Date: 7-12-10 Pg. 3 of 6
DC File Name: 160800 100712NK

pt. #	Description
2505 - ⑥	~~MHST~~ CBS 38×32, E. side Knadler 2^{41} grate-inv. 18" HDPE west to inlet across street
2507 - ⑧	CBS, 38×32, W. side Knadler 2^{22} grate-inv. 24" HDPE So. to inlet 2500, 18" HDPE NE to inlet 2505+6
2509	IE 48" HDPE, pond inlet, pipe NE to ~~next inlet~~ MH
2510 - ⑪	CBS, 38×32, W. side Bath. 3^{34} grate-inv 18" HDPE to pond inlet pipe
2512	MHST, Bath St. So. of Knadler. 6^{50} rim-inv. 48" HDPE SW to pond, ~~36~~ 48" HDPE SE, 42" HDPE No. - this is a $6^{0} \times 6^{0}$ vault
2513	~~IE~~ Misc top 48" HDPE half full of sediment
2514 - ⑮	CBS, 38×22. E. side Bath South of Knadler, , 3^{22} grate-inv. 18" HDPE West to pipe

Scale 1 square=

Date: 7-12-10 Pg. 4 of 6
DC File Name: 160800 100712NK

pt. #	Description
2516 ⑰	CBS, 38×22, E. side Bath So. of Knadler. , 3^{33} gr-inv. HDPE W.
2518 - ⑲	CBS, 38×22, E. side Bath So. of Knadler, 3^{58} gr-inv. 18" HDPE W.
2520 - ㉑	CBS, 38×22, E side Bath N. of Knadler, 3^{42} gr.-inv. 18" HDPE W. to MH
2522 - ㉓	CBS, 38×22, NW corner Bath + Knadler 3^{20} gr.-inv. 18" HDPE to MH
2524	MHST, Bath St. No. of Knadler, 6^{64} rim-inv., 36" HDPE No. 42" HDPE So. 18" HDPE NW + NE to inlets
2525 - ㉖	CBS, 38×22, E. side Bath 3^{45} gr-inv. 18" HDPE W. - 15" HDPE between boxes
2527	CBS, 38×22, E. side Bath @ Lindsey 2^{74} gr-inv. 18" HDPE W. to MH
2528	CBS, 38×22. SW corner Bath + Lindsey 2^{84} gr-inv. 18" HDPE E. to MH
2529	MHST, Bath So. of Lindsey Ct. 5^{83} rim-inv. 36" HDPE N+S 18" HDPE E. up 1^{5}, 18" HDPE W. up 2^{0}

Scale 1 square=

Date: 7-12-10 Pg. 5 of 6

DC File Name: 160800 100612MC

Pt. #	Description
2530	MHST, Bath No. of Lindsay 7^{22} rim - inv. 36" HDPE So. + NE
2531	CBS, 38×22, SW^{c} Bath + Nighthawk 2^{26} gr. - inv. 18" HDPE SE to MH
2532	CBS, 38×22, SE^{c} Bath + Nighthawk 2^{23} gr - inv. 18" HDPE NW to MH
2533	MHST, Bath @ Nighthawk 6^{13} rim-inv. 36" HDPE SW + NE, 18" HDPE SE + NW to inlets up 2 E t
2534	MHST, End Bath, top of bell; rim not set, 7^{55} top - inv 36" HDPE NE + SW, flow line not poured
2535	IE. 36" HDPE in pit end of Bath
2536	IE 24" PVC, system outlet
2537	MHST, 28th + Knadler 3^{93} rim-inv. 24" PVC W. + N 15' PVC NE to inlets
2538	CBS, 36×24 NE^{c} Knadler + 28th 3^{15} grate - inv. 15" PVC W.

Scale 1 square=

Date: 7-12-10 Pg. 6 of 6

DC File Name: 160800 100712NK

Pt. #	Description
2539	CBS, 36×24, NE^{c} 28th + Knadler 3^{06} grate - inv. 15" PVS So.
2540	MHST, 28th St. @ School 4^{01} rim - inv. 24" PVC So. 18" PVC No., NE + E
2541	MHST, front of Indian Paintbrush School, 8^{02} rim - inv. 18" PVC W, 12" PVC E, 8" PVC SE
2542	CBS, 36×24, entrance to IP School 4^{26} grate - inv 18" PVC SW to MH NE to next inlet
2542	CBS, 36×24, IP School pkg. lot 4^{13} grate - inv. 18" PVC SW to inlet 15" PVC NE

End Survey

Scale 1 square=

Pg. 1 of 5

Daily GPS Setup: 1608.00

Date: 7-13-10

DC File Name: 160800 100713MC

Crew: MC/KR

GPS Base at Point: UW - P13

GPS Unit: R-8

Antenna Height: 6.18

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.092

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △ H=

Stored As: △ V=

Date: 7-13-10 160800

Pg. 2 of 5

DC File Name: ~~F7100~~ 100713MC

Pt. #	Description
2544	MH ST, 3^{rd} + Hancock 6^{10} rim-inv. 48" RCP E+W 18" RCP NE, up 1.5 Destination unknown - no inlet
2545	MH ST, 3^{rd} St. No. of Lyon. 5^{12} rim-top sediment. ~42" RCP N+S, ~1/2 full
2546	MH ST, 3^{rd} St. No. of McConnell 9^{10} rim-water. 10^{26} rim-inv. ~3" sed., ~42" RCP N+S 6^{30} rim-inv. 18" RCP E 5^{70} rim-inv. 18" RCP W.
2547	CBS, 27x20, SW c. 3^{rd} + Hancock, 2^{30} grate-inv. 12" RCP NNW
2548 (49)	CBS, 42x27, E. side 3^{rd} between Hancock + Lyon, 3^{25} grate-inv. 18" RCP W.
2550	CBS, 42x27, W. side 3^{rd} 2^{90} grate-inv. 18" RCP E. ~2" sed.
2551	CBS, 42x27, E. side 3^{rd} 2^{94} grate-sed. 18" RCP W. w/ 6" sed. 15" CMP No. to strip inlet lots of sed.

Scale 1 square=

Date: 7-13-10 Pg. 3 of 5
DC File Name: 160800 100713MC

Pt. #	Description
2552 - 53	Misc. strip inlet - WYDT type 1/3 plugged
2554	CBS, 42x26, NE¢ 3rd + Lyon 3^{22} grate-inv. 18" RCP W ~~to MH~~, 15" CMP No. to strip inlet
2555 - 56	Misc. strip inlet, wydot type
2557	CBS. 42x27, NW¢ 3rd + Lyon 3^{93} grate-inv. 18" RCP E. ~~to MH~~
2558	CBS, 42x27, NE¢ 3rd + McConnell 3^{85} grate-inv. 18" RCP W. to MH
2559	CBS, 42x27, NW¢ 3rd + McConnell 3^{05} grate-inv., 18" RCP E. to MH
2560	MHST, Indian Paintbrush parking. 6^{64} rim-inv 15" PVC E + SW to inlet
2561	CBS, 30x18, No. side School Expended metal screen cover couldn't be removed
2562	MHST, NE¢ School 3^{00} rim-inv. 15" PVC W. SE pipe can't measure

Scale 1 square=

Date: 7-13-10 Pg. 4 of 5
DC File Name: 160800 100713MC

Pt. #	Description
2563	CBS, 36x24 in playground under 6" chip mulch w/ expanded metal screen - no others found
2564	CBS, 36x24, No End 28th 3^{93} grate-inv. 15" PVC NW to MH
2565 - 66	CBS, 36x24, No. end 28th 3^{98} grate-inv. 18" PVC SW to MH
2567	MHST, No. end 28th 4^{90} rim-inv. 18" PVC So. 15" PVC SE to inlet 18" PVC NE to inlet
2568	CBS. 36x24, E. side 30th @ Knadle 4^{28} grate-inv. 24" PVS ESE to MH
2569	CBS 36x24, E. side 30th @ Knadle - Double box with 2568 4^{30} grate-inv 18" HDPE to next inlet
2570	CBS, 36x24, E. side 30th @ Knadler 4^{58} grate-inv. 15" HDPE So. to 2569 15" PVC W to MH
2571	MHST, 30th @ Knadler 4^{15} rim-inv. 18" PVC No. + E to inlet 2570

Scale 1 square=

Date: 7-13-10 Pg. 5 of 5

DC File Name:

Pt. #	Description
2572	MH ST, E. of 30^{th} @ Knadler 6^{42} rim-inv. 24" PVC west to inlet 2568 24" HDPE SE to pond
2573	IE. 24" HDPE FES, pond inlet 5" sediment
2574	IE 30" HDPE FES, pond outlet
2575	IE 18" HDPE FES, pond inlet So. to Reynolds
2576	IE 18" HDPE FES, pond inlet NE to Street (Hayford)
2577-78	Misc spillway, pond overflow NE ≤ 30^{th} + Reynolds
2579	CBS, 38×32, So. side Hayford 3^{38} grate-inv. 18' HDPE SW to pond & NE across street
2580 81	CBS, 38×32, No side Hayford 2^{96} grate-inv 18" HDPE SW to inlet 2579, 18" DIA. conc. hole between boxes

End Survey

Scale 1 square=

Pg. 1 of 6

Daily GPS Setup: 1608.00 Date: 7-14-10

DC File Name: 160800 100714HK Crew: MC/KR

GPS Base at Point: UW-P13

GPS Unit: R-8

Antenna Height: 6.09

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892'

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △H=

Stored As: △V=

Date: 7-14-10 Pg. 2 of 6

DC File Name: 160800 100714HK

Pt. #	Description
2582	FE 36" HDPE, pond inlet SE^{ly} 30th + Reynolds NW to MH
2583	MHST, Reynolds E. of 30th 5^{90} ± rim-inv. 36" HDPE SW to pond + E
2584	MHST, Reynolds + Ridgeview 6^{40} rim-inv 36" HDPE W. 30" HDPE E., 30" HDPE N up 0^{8}
2585 - 88	CBS, 38x32, SE^{ly} Ridgeview + Hayford, 3^{20} grate-inv. 24" HDPE N. to MH ★ These are 4 individual boxes with 24" HDPE between them to inlet 2585
2589 - 92	CBS, 38x32, No. side Hayford @ Ridgeview, 3^{18} grate-inv. 24" HDPE So. to MH ★ Same setup as 85-88
2593	MHST, Hayford E. of Ridgeview 5^{00} rim-inv 24" HDPE N + S to inlets, 18" HDPE E. 30" HDPE W., ~1" sed. to south

Scale 1 square=

Date: 7-14-10 Pg. 3 of 6
DC File Name: 160800 100714MC

Pt. #	Description
2594	MHST, Hayford + Ridgeview 4^{25} ± rim-inv. 30" HDPE East + South
2595	MHST, Hayford @ LDS church 4^{27} rim-inv. 18" HDPE W. 18" HDPE No.
2596	CBS, 40x24 LDS church west 3^{12} grate-inv. 18" RCP S to MH 2595
2597	CBS, ~~40~~ 36x24, LDS 2 3^{15} grate-inv. 18" RCP W, 18" RCP E.
2598	CBS, 36x24, LDS 3 3^{19} grate-inv. 18" RCP E+W 8" plastic No. w/ 2" sediment - destination unknown
2599	CBS, 36x24, LDS 4 2^{95} grate-inv. 18" PVC W. 8" plastic No. - destination unknown
2600	CBS, 38x32, So. side Reynolds @ Court, 2^{90} grate-inv 18" HDPE NW to MH

Scale 1 square=

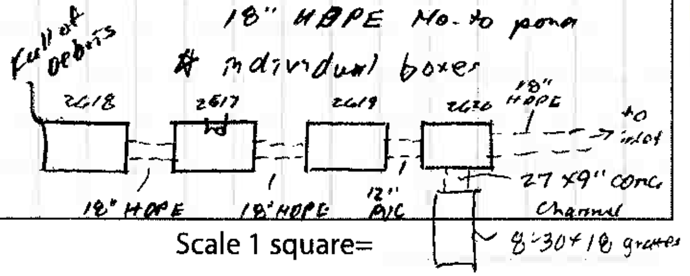
Date: 7-14-10 Pg. 4 of 6
DC File Name: 160800 100714MC

Pt. #	Description
2601 ②	CBS, 38x32, No. side Reynolds @ Court, 3^{20} grate-inv 18" HDPE SW to MH, 18" HDPE between boxes
2603	MHST, Reynolds E. of Ridgeview 4^{88} rim-inv. 18" HDPE NE+SE. 30" HDPE W., 24" HDPE E.
2604	MHST, Reynolds E. 5^{02} rim-inv. 24" HDPE W. 24" RCP E.
2605	CBS. So. side Reynolds, 36x24 2^{68} grate-inv. 12" RCP NW to MH
2606	CBS, 36x24, No. side Reynolds 2^{60} grate-inv. 12" RCP SW to MH
2607	MHST. Reynolds E., 7^{30} rim-inv. 24" RCP, 12" RCP SE+NE to inlets, can't meas. E. pipe
2608	MHST, Reynolds E., 4^{43} rim-inv. 24" RCP W. 18" RCP E.
2609	CBS, 40x24, SE^{c} Reynolds + Frontera, 2^{24} grate-inv. ~~15"~~ 12" RCP NW to MH

Scale 1 square=

Date: 7-14-10 Pg. 5 of 6
DC File Name: 160800 100714NE

Pt #	Description
(2610) - (11)	CBS, NE ¢ Reynolds + Frontera 40x24, 3^{00} grate-inv. 15" RCP SW to MH, ~1" water due to chunk of conc ~3" in half of invert
(2612)	MHST. Reynolds + Frontera 4^{12} rim-inv. 18" RCP W. 12" RCP SE to inlet 15' RCP NE to inlet
(2613)	IE 15" RCP, outlet into Jacoby Golf Course
(2614)	CBS, 40x24. So side Grays Gables 4^{75} grate-inv. 15" RCP S. to outlet N. to inlet across street
(2615) - (16)	CBS, 40x24, No. side Grays Gables 3^{78} grate-inv. 15" RCP S.
(2617) - (20)	CBS, 38x32, No. side Reynolds @ No. pond., 3^{25} grate-inv. 18" HDPE No. to pond * individual boxes



Scale 1 square=

Date: 7-14-10 Pg. 6 of 6
DC File Name: 160800100714NE

Pt. #	Description
(2621) - (22)	Misc Grate Row * 8 - 30x18" grates drop 1^{3} into 27"W x 9" D trench into inlet (2620), much cobble + debris
(2623)	CBS, 36x24, No. side Reynolds 2^{73} grate-inv. 18" HDPE West to (2620) + E to next inlet
(2624)	CBS, 36x24, No. side Reynolds 3^{15} grate-inv. 18" HDPE W. to inlet (2623)

Scale 1 square=

/ Pg. / of 5

Daily GPS Setup: 1608.00 Date: 7-15-10

DC File Name: 160800 100715MC Crew: MC/KR

GPS Base at Point: UW - P13

GPS Unit: R-8

Antenna Height: 6.14

Mesured to: Center Bumper

Base Coordinates

North:

East:

Elev.:

Lat.:

Lon.:

Ellip.:

Rover Unit: R-8

Rover Antenna Height: 6.892

Measured to: Bottom mount

Initialization Point or Check Shot

Point Number: △ H=

Stored As: △ V=

Date: 7-15-10 Pg. 2 of 5

DC File Name: 160800 100715MC

Pt. #	Description
2625	CBS, 36×24, So. Side Reynolds @ Park 3^{30} grate - inv. 18" HDPE W. to inlet
2626	CBS, 36×24, So. side Reynolds 2^{81} grate-inv. 18" HDPE E & W
2627 -29	CBS, 38×32, So. side Reynolds 3^{25} grate - inv. 18" HDPE So. to pond 19" Ø opening to next box, 12" PVC between boxes 2628 & 2629
2630 -31	Misc. grate row, 8 30×18 grates drop into 27"w × 9"D Channel to inlet 2629
2632	IE 18" HDPE pond inlet
2633	IE 30" HDPE to North pond? 8" sediment
2634	IE 24" RCP pond outlet, with gate valve
2638	MOST, NW^{4} pond 30th & Reynolds 5^{03} rim-inv. 24" RCP SE to pond & W, to inlet w. side 30th
2635 -36	Misc. spill way, pond SE^{t} 30th Reynolds
2637	IE 24" RCP FES, pond inlet from 30th Street

Scale 1 square=

Date: 7-15-10 Pg. 3 of 5
DC File Name: 160800 100715W

Pt. #	Description
2638	(see previous page)
2639	CBS. 30 x 22, SW^{c} 30th & Reynolds, ~~3^{69}~~ 3^{69} grate-inv. 18" RCP E to MH (must be reduced) 2638 18" RCP No. - most likely to vault in Reynolds not visible
2640	CBS, 27x21, W. side 30th 3^{52} grate-inv. 18" RCP N&S
2641	CBS, 29x21, W. side 30th 3^{27} grate-inv. 18" RCP N&S, 12" RCP East
2642	CBS, 29x21, W. side 30th 3^{18} grate-inv. 18" RCP No - End of system
2643	MHST, E. side 80th, 3^{44} rim-inv. 24" RCP NE to pond, 24" RCP So. 12" RCP W to inlet 2641 w/ top half full of concrete
2644	MHST, E- side 30th 4^{63} rim-inv. 24" RCP No. & So.

Scale 1 square=

Date: 7-15-10 Pg. 4 of 5
DC File Name: 160800 100716MC

Pt. #	Description
2645	MHST, E. side 30th 5^{30} rim-inv. 24" RCP No. & So.
2646	MHST, E side 30th 7^{39} rim-inv. 24" RCP No & So.
2647	CBS, 36x24 SE^{c} 30th - Grays Gable 2^{25} grate-inv. 18" RCP NW to MH, combined with next 2
2648 - 49	CBS, 36x24; depth 1^{10} & 0^{95} respectively, drain to 2647
2650	MHST, 30th & Harney / Grays Gable, 4^{30}± rim-inv. 24" RCP No. 18" RCP SE & SW to inlets

Conventional Survey - Trimble VX

⊼ @ UW-P10 HI = 5.28 True
BS UW-S24 HR = 7.00
ΔH = 0.000 ΔV = 0.141

Scale 1 square=

Date: 7-15-10 Pg. 5 of 5

DC File Name: 160800 10071575

Pt. #	Description
② 2651	CBS, 36x24, NE^{c} $30^{\pm}$ + Grays Gable, 2^{55} grate-inv. 18" RCP SW to MH, 12" PVC so. to grate row up 0.6
2652 + ③	CBS, 36x24, NE^{c} $30^{\pm}$ + Grays Gable., depth $0.^{9}$ + $0.^{75}$ respectively, drain to 2651
2654 + ⑤	℄ 6 30x16 grates 2^{05} grate-inv. 12" PVC No. to 2651

End. Conv. survey

Scale 1 square=

Date: 8-26-11 Pg. 1 of 3

DC File Name: ~~4066~~ 160800 110826XR

Additional Storm Data

Trimble R8

Base @ UW-P13 HI = 6.14' C.B.

UW-P13 = N 296,647.373

E 549,987.908

El 7311.646

Pt. #	Description
2672	IE 42 RCP - West End Harney - South
2673	" - North
2674	CBS 24×40 NE^c Cedar + Harney 2^{35} grate - inv. 12" RCP South ~1½" water in inlet below invert
2675	MHST, Pino + Harney 24" barrel 42" RCP E+W, 4^{78} rim - invert 6" steel through MH top down 3^{32}
2676	MHST Railroad + Harney 5^{92} rim-inv 42" RCP E+W

Scale 1 square= ______

Date: 8-26-11 Pg. 2 of 3

DC File Name: 160800 110826 MC

Pt. #	Description
2677	CBS 24×38, 3^{60} grate to silt ½ way up pipe So. to MH
2678	MHST, 1st + Harney, 24" throat 5^{3} rim-inv. 15" RCP So. to double inlet 5^{9} rim-inv. 12" RCP No. to inlet 8^{33} rim-inv. 42" RCP E+W
2679	CBS 24×40 3^{45} grate - inv. 15" RCP No. to MH - open slot to 2680
2680	CBS 24×40 - to 2679 * inlets have 27" × 20" boxes slot between them - 2^{59} to top of slot
2681	CBS 24×40 No. side Harney 3^{55} to silt - 15" RCP So. with ~3" silt, slot between 2682 2^{8} down
2682	CBS 24×40, No. side Harney - connects to 2681 both boxes 20"×27"
2683	MHST, 24" barrel, 8^{75} rim-inv. 42" RCP E+W, 5^{03} rim-inv. 21" RCP So. 18" RCP No. (42" has 18"×18" square hole cut in top - will fill some what before spilling

Scale 1 square= ______

Date: 8-26-11 Pg. 3 of 3

DC File Name: 160800 110826MC

Pt. #	Description
2684	CBS, 24×40, So. side Harmar $4^{\underline{21}}$ grate - inv. 21" RCP No. to MH - connects to 2685 - also 21" RCP So., $3^{\underline{10}}$ to top of slot
2685	CBS, 24×40, box 20"×27"
2686	CBS, 28×28, Safeway/K-mart parking lot, $3^{\underline{74}}$ grate - inv. 21" RCP NW + 18" RCP So.
2687	CBS, 18×18, $3^{\underline{97}}$ grate - inv 18" RCP No., 18" RCP So.
2688	CBS, 20"×27", $4^{\underline{98}}$ grate - inv 18" RCP No., $3^{\underline{80}}$ grate - inv. 8" PVC So. (Destination Unknown)

End Survey

Scale 1 square= ______________

Pg. 1 of 6

Daily GPS Setup: 1

Date: 9/12/11

DC File Name: 160800_110912MRH

Crew: MRH

GPS Base at Point: UW-P13

GPS Unit: UNIT C BASE

Antenna Height: 5^{95}

Mesured to: Center

Base Coordinates

North: 296647.373

East: 549987.908

Elev.: 7311.646

Lat.: 41°18'48.96111"N

Lon.: 105°33'11.48805"W

Ellip.: 7273.810

Rover Unit: UNIT C ROVER

Rover Antenna Height: 6^{30}

Measured to: Bottom

Initialization Point or Check Shot

Point Number: UW-P9

△H= 0.006

Stored As: 810

△V= 0.010

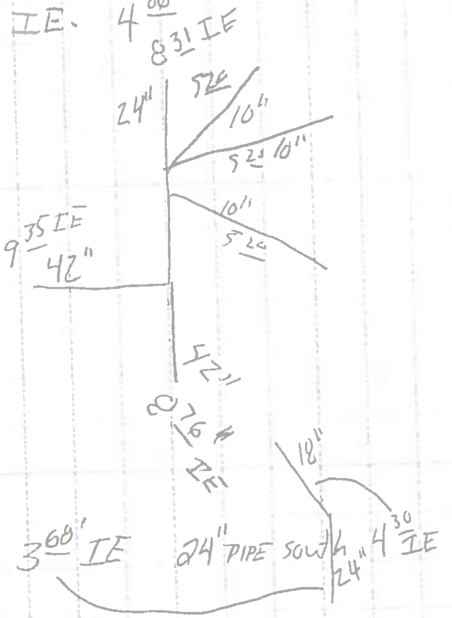
Date:

Pg. 2 of 6

DC File Name: 160800_110912MRH

2689 CBS IE 4^{06}'

2690 MHST



2691 CBS

~~2692 CBS~~

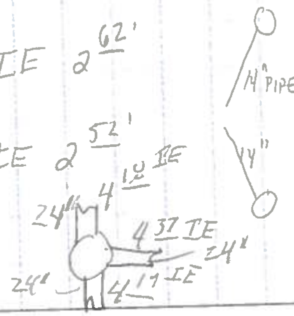
~~2693 CBS~~

2692 MISC TRENCH DRAIN 30'
IE 2^{48}' North END

2693 CBS IE 2^{62}'

2694 CBS IE 2^{52}'

2695 MHST

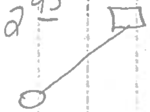


Scale 1 square=

Date:
DC File Name: 166000_1109RWRH

Pg. 3 of 6

2696 CBS 24" PIPE IE 2$^{93'}$

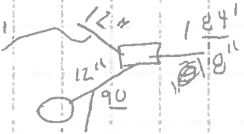


2697 CBS IE 2$^{95'}$

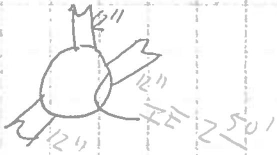
2698 CBS IE 3$^{02'}$ 12" PIPE

2699 CBS IE 2$^{82'}$

2700 CBS IE 1$^{78'}$



2701 MHST

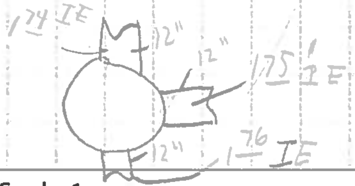


2702 CBS

2703 CBS

4^{50}

2704 MHST



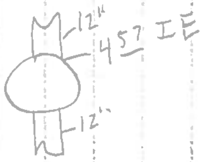
Scale 1 square=

Date:
DC File Name:

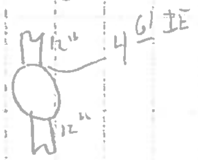
Pg. 4 of 6

2705 MISC DRAIN 12" PVC

2706 MAST

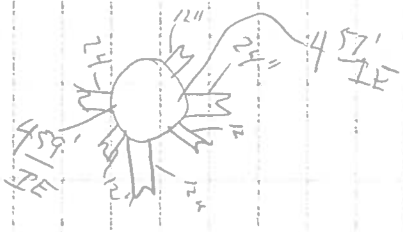


2707 MAST



2708 MISC TRENCH DRAIN 0.8 IE

2709



2710 CBS IE 1$^{31'}$ 10" PIPE

2711 CBS IE 2$^{09'}$ 10" PIPE

2712 CBS IE 3$^{25'}$ 12" PIPE

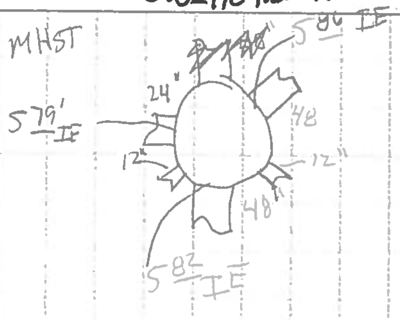
2713 CBS IE 3^{11} 12" PIPE

Scale 1 square=

Date:
DC File Name: 160860_110912MM

Pg. 5 of 6

2714 MHST



2715 MISC OUTLET 30" PIPE

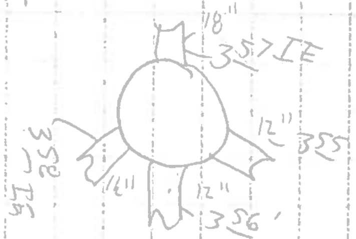
2716 CBS IE $1^{56'}$

2717 CBS IE 2^{12}

2718 CBS IE $3^{32'}$

2719 OUTLET PIPE

2720 MHST



Scale 1 square=

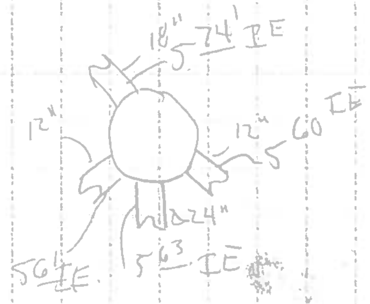
Date:
DC File Name: 160860-110912MM

Pg. 6 of 6

2721 CBS 8" PIPE IE $3^{75'}$

2722 CBS 12" PIPE IE $3^{08'}$

2723 MHST



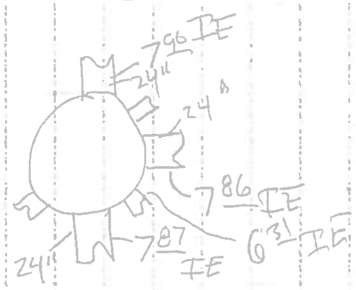
2724 MISC OUTLET

2725 CBR 10" PIPE IE $1^{70'}$

2726 CBR 10" PIPE IE $3^{10'}$

2727 CBR 10" PIPE IE $2^{86'}$

2728 MHST



Scale 1 square=

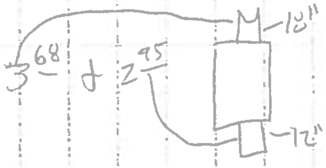
Date: Pg. 7 of 7

DC File Name: 66800_110912MKM

2729 CBS IE - $3^{\underline{01}}$ 1" PIPE

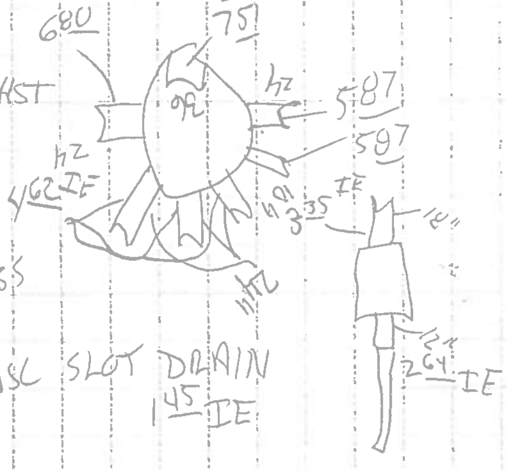
2730 CBS IE $2^{\underline{68}}$

2731 CBS IE $3^{\underline{68}}$ & $2^{\underline{95}}$



2732 MISC SLOT DRAIN IE $1^{\underline{45}}$'

2733 MHST



2734 CBS

2735 MISC SLOT DRAIN $1^{\underline{45}}$ IE

Scale 1 square=

Appendix C – Inventory of Existing Storm Structures

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Appendix D – Geotechnical Report

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Geotechnical Engineering Report

North Laramie Drainage Master Plan

Laramie, Wyoming

July 21, 2010

Terracon Project No. 24105015

Prepared for:

SEH, Inc.
216 East Grand Avenue
Suite A
Laramie, Wyoming 82070

Prepared by:

Terracon Consultants, Inc.
1505 Old Happy Jack Road
Cheyenne, Wyoming 82001
Phone: 307-632-9224
Fax: 307-635-5756

July 21, 2010

Terracon

SEH, Inc.
216 East Grand Avenue
Suite A
Laramie, Wyoming 82070

Attn: Mr. George Walton, P.E.

Re: Geotechnical Engineering Report
North Laramie Drainage Master Plan
Laramie, Wyoming
Terracon Project No. 24105015

Dear Mr. Walton:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number 2410G013/P24100036 dated February 19, 2010 and signed agreement dated February 19, 2010. This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations concerning drainage and slope stability for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Brianna Forrest for:
Selene L. Leleu, E.I.T.
Project Geotechnical Engineer

Brent F Wilkins
Brent F. Wilkins, P.E.
Geotechnical Department Manager

BRENT F. WILKINS
9459
Date 7/21/10

sll/bfw

Copies to: Addressee (1 via email, 3 via mail)

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A geotechnical investigation has been performed for the drainage study master plan for North Laramie in Wyoming. Eleven borings, designated Exhibits A-10 through A-20, were performed to an approximate depth of 10 feet below the existing ground surface. This report addresses drainage and slope stability concerns within the study area.

The following geotechnical considerations were identified during our analysis of the drainage study area:

- In general, the soils encountered in the study area consisted of low permeability, lean clay with various amounts of fine sand and highly weathered claystone/siltstone bedrock to bedrock.
- The materials typically exhibit poor drainage characteristics because the low porosity of clays causes water to be trapped in the minute pore spaces between the fine particles.
- Vegetation, water flow diversion and retention control, retaining walls and development (such as pavements and buildings) can be used to manage the drainage characteristics and stabilize surface erosion along the ridge line north of Laramie.

GEOTECHNICAL ENGINEERING REPORT
North Laramie Drainage Master Plan
Laramie, Wyoming

Terracon Project No. 24105015
July 21, 2010

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed drainage master plan for northern Laramie, Wyoming. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil and bedrock conditions
- groundwater conditions
- drainage
- surficial slope erosion

Our geotechnical engineering scope of work for this project included the initial site visit, the advancement of eleven test borings to an approximate depth of 10 feet below existing site grades, lab testing for soil engineering indices and engineering analyses for drainage recommendations. A qualitative evaluation of the slope erosion along the ridge line is provided to identify potential methods and means of mitigating the erosion issues. However, a more detailed study is needed prior to final engineering recommendations.

Logs of the borings along with a Boring Location Diagrams (Exhibits A-2 to A-8) are included in Appendix A of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in Appendix B of this report.

2.0 PROJECT INFORMATION

2.1 Site and Project Description

ITEM	DESCRIPTION
Location	The drainage study area is generally bounded by 45th Street on the east, the Union Pacific Railroad on the west and the undeveloped ridge line to the north of Laramie. The area is north of the Jacoby Golf Course and the University of Wyoming campus, and is north of and incorporating portions of Labonte Park. Refer to the Site Location Map and Boring Location Diagrams (Exhibits A-1 to A-8 in Appendix A)

Existing Improvements	The drainage project is within the developed part of the City with roadways, parks and residential, school and commercial development.
Description	The drainage study encompasses the comprehensive evaluation of existing data and field conditions in order to effectively analyze and recommend an effective means to manage the overall storm water system in North Laramie. The project includes geotechnical exploration, hydrologic and hydraulic analysis, water quality planning, and a host of ancillary operations.

3.0 SUBSURFACE CONDITIONS

3.1 Typical Subsurface Profile

Specific conditions encountered at each boring location are indicated on the individual boring logs included in Appendix A of this report. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual.

In borings located in paved areas, the asphalt and granular base layers varied in thickness from 2 to 5.5 inches and 0 to 6.5 inches, respectively. In Borings 1, 2, 5, 7 and 8, underlying the asphalt and base or extending from the ground surface was 0.2 to 2 feet of existing fill. Due to the presence of flow fill fragments in the 9 feet sample, we believe that Boring 6 was performed within a utility trench, thus accounting for the presence of existing fill to the maximum depth of exploration. The material encountered in this boring is likely not representative of the surrounding subgrade conditions.

Along the ridge line in the north section of the study area (Borings 2, 3, 6, 7, 8, 11), the surface soils extend relatively deep toward the west and east: in Boring 8, medium stiff, reddish brown, sandy lean clay was underlain by claystone/siltstone bedrock at approximately 8 feet below grade and in Borings 2 and 11, loose, medium brown, clayey sand and stiff to very stiff, reddish brown, lean clay were encountered to the full depth of drilling. In Borings performed roughly in the middle of the ridge line (Borings 3 and 7) there is a thin layer of surficial reddish brown, sandy lean clay underlain by reddish brown to dark reddish brown, weathered claystone/siltstone bedrock and bedrock extending from approximately 1 to 1.5 feet below the ground surface to the maximum depth of exploration.

In Borings 5 and 9 performed near the western side of Reynolds Street, medium stiff to stiff, reddish brown to whitish gray, lean clay to silt with sand extends to the maximum depths of exploration. There is moderate gypsum content in soils encountered in Boring 5. Towards the east end of Reynolds Street and south of Reynolds Street, approximately 8 to 10 feet of medium stiff, reddish brown, sandy lean clay to lean clay to medium dense, reddish brown, clayey sand is underlain by reddish brown, highly weathered claystone/siltstone bedrock to bedrock.

3.2 Groundwater

Groundwater was encountered at depths of 6 to 11 feet below ground surface in Borings 5 and 6 at the time of field exploration. Due to safety concerns, borings were backfilled with soil auger cuttings and grouted upon completion of drilling activities. Groundwater conditions can change with varying seasonal and weather conditions, and other factors. The possibility of groundwater fluctuations should be considered when developing the project plans.

4.0 RECOMMENDATIONS

4.1 Drainage Considerations

In general, the soils encountered in the study area consisted of low permeability, lean clay with various amounts of fine sand and highly weathered claystone/siltstone bedrock to bedrock. The materials typically exhibit poor drainage characteristics because the low porosity of clay causes water to be trapped in the minute pore spaces between the fine particles.

The Hazen equation was used to estimate the coefficient of permeability (k) of the near surface soils encountered in select borings. Typically, the Hazen equation is used for sands and permeability results for clays should be used with caution. The Hazen equation is given as:

$$k = C^* (D_{10})^2$$

where, k = coefficient of permeability (cm/sec)

C = empirically based coefficient varying from 90 to 120 (see Seepage, Drainage and Flow Nets, 3rd Edition; Cedergren, Harry, page 43). Assume 90 for clay with fine sand.

D_{10} = effective grain size of 10% passing (cm)

Results of the hydrometer laboratory tests and correlations to Hazen permeability coefficients are given below:

Boring	Depth (feet)	D_{10} (cm)	Coefficient of Permeability (cm/sec)
1	1	<0.00013	$<1.52 \times 10^{-6}$
4	1	<0.00012	$<1.30 \times 10^{-6}$
5	1 to 4	<0.00012	$<1.30 \times 10^{-6}$
6	1 to 4	0.00363	11.86×10^{-4}
8	1	<0.00015	$<2.03 \times 10^{-6}$
9	4	0.00033	9.80×10^{-6}
10	1 to 4	<0.00014	$<1.76 \times 10^{-6}$

A brief summary of a study conducted by Rawls and Brakensiek (1989) is presented in a paper entitled "Literature Review: Equations for Predicting Hydraulic Conductivity Based on Grain-Size Data" (Cronican and Gribb, 2007). The Rawls and Brakensiek study evaluated field data from across the United States and presented an equation relating porosity to sand and clay percentages. A graphical form of the equation shown in the Cronican and Gribb paper shows that soils with approximately 30% clay have coefficients of permeability on the order of 10^{-4}. As the percentage of clay particles increases, the permeability decreases to the order of 10^{-6}.

4.2 Slope Considerations

We understand that there are slope erosion issues along the ridge line spanning the northern side of Laramie. The bare lean clay and weathered bedrock slopes are susceptible to soil erosion due to the very low permeability of clay and the unconsolidated nature of the soils. There are at least three slope stability remediation options available: flow diversion, vegetative soil erosion prevention and retaining walls.

Erosion of the slopes can be mitigated using surface water flow control. Specific channel and detention basins along the top and the bottom of the ridge should be designed based on existing and future topography of the area to ensure that surface water flows to designated areas, thus controlling runoff due to seasonal conditions.

Vegetation can also be used to stabilize slopes in some areas. Trees and landscaped vegetative areas will absorb the surface water and lessen runoff. Vegetation also can provide a ground cover and prevent soil particles from migrating downhill during wet seasons.

Retaining walls can be used in select areas along developed sections of the ridge to prevent saturated soils from encroaching on residential and business lots. The retaining walls should be designed individually for each area after additional subgrade studies are performed. The specifics of each wall and design parameters such as lateral earth pressures and bearing pressures are dependent upon the wall's location.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the project area, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after implementation of the drainage master plan. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

N

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
PH. (307) 632-9224 FAX. (307) 635-5756

SITE LOCATION MAP
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-1

● APPROXIMATE LOCATION OF BORING.

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
PH. (307) 632-9224 FAX. (307) 635-5756

BORING LOCATION DIAGRAM
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-2

NOTE: Diagram is for general location only, and is not for construction purposes.

◐ APPROXIMATE LOCATION OF BORING.

Project Mngr: BFW	Project No. 24105015	**Terracon** Consulting Engineers and Scientists	BORING LOCATION DIAGRAM	Exhibit
Drawn By: SLL	Scale: NOT TO SCALE		SEH, INC.	
Checked By: BFW	File No. 5015 BLD	1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001	NORTH LARAMIE DRAINAGE MASTER PLAN	A-3
Approved By: BFW	Date: 07/2010	PH. (307) 632-9224 FAX. (307) 635-5756	LARAMIE WYOMING	

NOTE: Diagram is for general location only, and is not for construction purposes.

⊕ APPROXIMATE LOCATION OF BORING.

Project Mngr: BFW	Project No. 24105015
Drawn By: SLL	Scale: NOT TO SCALE
Checked By: BFW	File No. 5015 BLD
Approved By: BFW	Date: 07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
PH. (307) 632-9224 FAX. (307) 635-5756

BORING LOCATION DIAGRAM
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-4

● APPROXIMATE LOCATION OF BORING.

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
PH. (307) 632-9224 FAX. (307) 635-5756

BORING LOCATION DIAGRAM
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-5

⊕ APPROXIMATE LOCATION OF BORING.

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
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BORING LOCATION DIAGRAM
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-6

● APPROXIMATE LOCATION OF BORING.

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
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BORING LOCATION DIAGRAM

SEH, INC.

NORTH LARAMIE DRAINAGE MASTER PLAN

LARAMIE WYOMING

Exhibit
A-7

● APPROXIMATE LOCATION OF BORING.

NOTE: Diagram is for general location only, and is not for construction purposes.

Project Mngr:	BFW	Project No.	24105015
Drawn By:	SLL	Scale:	NOT TO SCALE
Checked By:	BFW	File No.	5015 BLD
Approved By:	BFW	Date:	07/2010

Terracon
Consulting Engineers and Scientists
1505 OLD HAPPY JACK ROAD CHEYENNE, WY 82001
PH. (307) 632-9224 FAX. (307) 635-5756

BORING LOCATION DIAGRAM
SEH, INC.
NORTH LARAMIE DRAINAGE MASTER PLAN
LARAMIE WYOMING

Exhibit
A-8

Exhibit A-9: Field Exploration

The scope of the services performed for this project included site reconnaissance by a geotechnical engineer, subsurface exploration program and laboratory testing.

Ten test borings were performed on June 4, 2010 and one test boring was performed on June 9, 2010. The borings were advanced to an approximate depth of 10 feet at the approximate locations shown on the Boring Location Diagrams, Exhibits A-2 to A-8. The borings were advanced with a truck-mounted drilling rig, utilizing 4-inch-diameter, solid-stem augers. The borings were located in the field by measurement from existing site features. The accuracy of boring locations should only be assumed to the level implied by the method used to determine them.

A lithologic log of each boring was recorded by the geotechnical engineer during the drilling operation. The logs of borings are presented in Appendix A. Relatively undisturbed samples were obtained at selected intervals utilizing a standard split-spoon sampler. Penetration resistance values were recorded in general accordance with the standard penetration test (SPT) or similar manner with the California barrel. This test consists of driving the sampler into the ground with a 140-pound hammer free-falling through a distance of 30 inches. The number of blows required to advance the sampler the final 12 inches, or the interval indicated on the boring log, is recorded as the penetration resistance value which is recorded or correlated to a standard penetration resistance value (N-value). The blow count values are indicated on the boring logs at the respective sample depths.

A CME automatic SPT hammer was used to advance the samplers in the borings performed on this site. A greater efficiency is typically achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. Published correlations between the SPT values and soil properties are based on the lower efficiency cathead and rope method. This higher efficiency affects the standard penetration resistance blow count value by increasing the penetration per hammer blow over what would be obtained using the cathead and rope method. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

The penetration test provides a reasonable indication of the in-place density of sandy type materials, but only provides an indication of the relative stiffness of cohesive materials since the blow count in these soils may be affected by the soils moisture content. In addition, considerable care should be exercised in interpreting the blow counts in bedrock.

Groundwater conditions were observed in each boring at the time of site exploration. Due to safety concerns, the borings were backfilled with soil auger cuttings and grouted, if appropriate, at the completion of drilling activities.

LOG OF BORING NO. 1

Page 1 of 1

CLIENT	
SEH, Inc.	
SITE **Laramie, Wyoming**	PROJECT **North Laramie Drainage Master Plan**

Boring Location: Reynolds St. & Frontera St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf		
0.3	**ASPHALT**, 3"										
0.8	**GRANULAR BASE**, 6"			1	GRAB			5			
1	**FILL**, silty sand with gravel, fine to medium sand, reddish brown		SC	2	SS	24	13	11			
	CLAYEY SAND, fine sand, medium dense, reddish brown with gray seams										
	Intermittent silty sand seams at approximately 4'		SC	3	SS	24	17	8			
		5									
			SC	4	SS	24	12	13			
		10									
10.8				5	GRAB			3			
11	**BEDROCK**, claystone/siltstone, dark reddish brown										
	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-10

WATER LEVEL OBSERVATIONS, ft		
WL	∇ No Water WD	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

GEOTECH BORING LOGS 24105015.GPJ TERRACON.GDT 7/21/10

LOG OF BORING NO. 2

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: North end of 30th St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf		
▨	**FILL**, clayey sand, trace gravel, reddish brown			1	SS	6	24	8			
2											
░	**SILTY SAND with GRAVEL**, medium dense to loose, reddish brown, calcareous fragments Note: Lab testing results designated this soil layer as silty gravel with sand. However, due to the presence of gravel fragments relative to the sample size, the lab test is not indicative of actual in-situ subgrade conditions.		SM	2	SS	4	12	5			
		5									
			SM	3	SS	8	9	8			
		10									
11											
	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-11

WATER LEVEL OBSERVATIONS, ft		
WL	▽ No Water WD	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 3

Page 1 of 1

CLIENT **SEH, Inc.**	
SITE **Laramie, Wyoming**	PROJECT **North Laramie Drainage Master Plan**

Boring Location: East end of Beaufort St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	PENETRATION BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		
▨	**SANDY LEAN CLAY**, reddish brown			1	GRAB			9			
	1										
×	**BEDROCK**, claystone/siltstone, medium hard to hard, reddish brown			2	SS	10	51/0.8'	8			
				3	SS	10	51/0.9'	11			
		5									
				4	SS	10	52/0.9'	8			
	10.3	10									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-12

WATER LEVEL OBSERVATIONS, ft		
WL	▽ No Water WD	▼
WL	▼	▼
WL		

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 4

Page 1 of 1

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: Reynolds St. & 22nd St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS	TESTS
▨	**LEAN CLAY**, medium stiff, reddish brown										
▨			CL	1	SS	16	6	18			
▨	Trace gypsum content at approximately 1.5'										
▨			CL	2	SS	12	4	20			
▨		5									
▨	8.5										
×××	**BEDROCK**, claystone/siltstone, very hard, reddish brown, slightly blocky structure			3	SS	6	50/0.6'	9			
×××	9.6										
	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-13

WATER LEVEL OBSERVATIONS, ft			
WL	▽ No Water WD	▼	
WL	▼	▼	
WL			

BORING STARTED	6-4-10		
BORING COMPLETED	6-4-10		
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 5

Page 1 of 1

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: Reynolds St. & 15th St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	PENETRATION BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		
0.5	**ASPHALT**, 5.5"										
1	**FILL**, silty sand with gravel, fine to medium sand, medium brown			1	GRAB			2			
	SILT with SAND, stiff, whitish gray, moderate gypsum content		ML	2	SS	5	7	51			
			ML	3	SS	24	6	71			
		5									
	∇										
	Color change to reddish brown at approximately 9'-10'		ML	4	SS	24	7				
		10									
11	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-14

WATER LEVEL OBSERVATIONS, ft		
WL	∇ 6	WD ▼
WL	▼	▼
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 6

Page 1 of 1

CLIENT **SEH, Inc.**	
SITE **Laramie, Wyoming**	PROJECT **North Laramie Drainage Master Plan**

Boring Location: 15th St. & Downey St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	PENETRATION BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		
0.3	**ASPHALT**, 3"										
0.6	**GRANULAR BASE**, 2.5"										
	FILL, silty sand with gravel to poorly-graded sand with gravel to sandy lean clay with gravel, fine to medium sand, reddish brown			1	SS	7	5	4			
				2	SS	3	4	8			
		5									
				3	GRAB			10			
	Utility trench backfill, flow fill fragments encountered at approximately 11'			4	SS	6	3	11			
		10									
11	∇										
	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-15

WATER LEVEL OBSERVATIONS, ft			
WL	∇ 11	WD	▼
WL	▼		▼
WL			

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 7

Page 1 of 1

CLIENT **SEH, Inc.**	
SITE **Laramie, Wyoming**	PROJECT **North Laramie Drainage Master Plan**

Boring Location: North end of 15th St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf		
	FILL, lean clay, light reddish brown			1	GRAB			4			
1.5				2	SS	18	30	12			
4	**WEATHERED BEDROCK**, silt with sand, residual claystone/siltstone, medium hard, red brown										
	BEDROCK, claystone/siltstone, very hard, red			3	SS	4	50/0.4'	9			
		5									
				4	GRAB			6			
9.5	Gray mottling at approximately 9'			5	SS	5	50/0.5'	7			
	END OF BORING										

GEOTECH BORING LOGS 24105015.GPJ TERRACON.GDT 7/21/10

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-16

WATER LEVEL OBSERVATIONS, ft		
WL	▽ No Water WD	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 8

Page 1 of 1

CLIENT	**SEH, Inc.**
SITE	**Laramie, Wyoming**
PROJECT	**North Laramie Drainage Master Plan**

Boring Location: 7th St. & Renshaw St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES				TESTS			
				NUMBER	TYPE	RECOVERY, in.	PENETRATION BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		
0.2	**ASPHALT**, 2"										
1	**FILL**, clayey sand with gravel, fine to medium sand, reddish brown			1	GRAB			5			
	SANDY LEAN CLAY, medium stiff, reddish brown		CL	2	SS	24	7	15			
		5	CL	3	SS	7	5	18			
8											
	BEDROCK, claystone/siltstone, medium hard, red brown										
9.7				4	SS	6	50/0.7'	9			
	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-17

WATER LEVEL OBSERVATIONS, ft		
WL	▽ No Water WD	▼
WL	▼	▼
WL		

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 9

Page 1 of 1

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: 7th St. & Reynolds St.

GRAPHIC LOG		DESCRIPTION
■	0.3	**ASPHALT**, 3"
▨	0.5	**GRANULAR BASE**, 2"
▨		**LEAN CLAY**, medium stiff to stiff, reddish brown, trace gypsum
	11	END OF BORING

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf		
	CL	1	SS	14	8	36			
5	CL	2	SS	24	10	32			
10	CL	3	SS	24	12	21			

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-18

WATER LEVEL OBSERVATIONS, ft		
WL	▽ No Water WD	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 10

Page 1 of 1

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: 13th St. & Sully St.

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES PENETRATION BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS	TESTS
0.3	**ASPHALT**, 2.5"										
0.8	**GRANULAR BASE**, 6.5"										
	SANDY LEAN CLAY, medium stiff, reddish brown		CL	1	SS	10	5	15			
		5	CL	2	SS	10	6	14			
8	**HIGHLY WEATHERED BEDROCK**, claystone/siltstone, firm, reddish brown, slightly blocky structure										
		10		3	SS	12	23	11			
11	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-19

WATER LEVEL OBSERVATIONS, ft		
WL	⊻ No Water WD	⊻
WL	⊻	⊻
WL		

Terracon

BORING STARTED			6-4-10
BORING COMPLETED			6-4-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

LOG OF BORING NO. 11

Page 1 of 1

CLIENT
SEH, Inc.

SITE
Laramie, Wyoming

PROJECT
North Laramie Drainage Master Plan

Boring Location: North end of 30th St.

				SAMPLES				TESTS			
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	PENETRATION BLOWS / ft.	WATER CONTENT, %	DRY UNIT WT pcf		
▨	**CLAYEY SAND**, fine to medium sand, trace gravel, loose, medium brown		SC	1	SS	7	4	13			
▨ 4.5				2	SS	18	10	7			
▨	**LEAN CLAY**, stiff to very stiff, reddish brown Thin poorly-graded sand seam at approximately 5'	5									
▨	Slightly blocky structure at approximately 9'	10	CL	3	SS	8	15	12			
10.5	END OF BORING										

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

EXHIBIT A-20

WATER LEVEL OBSERVATIONS, ft		
WL	∇ No Water WD	▼
WL	▼	▼
WL		

BORING STARTED			6-9-10
BORING COMPLETED			6-9-10
RIG	CME-55	FOREMAN	SLL
APPROVED	BFW	JOB #	24105015

APPENDIX B

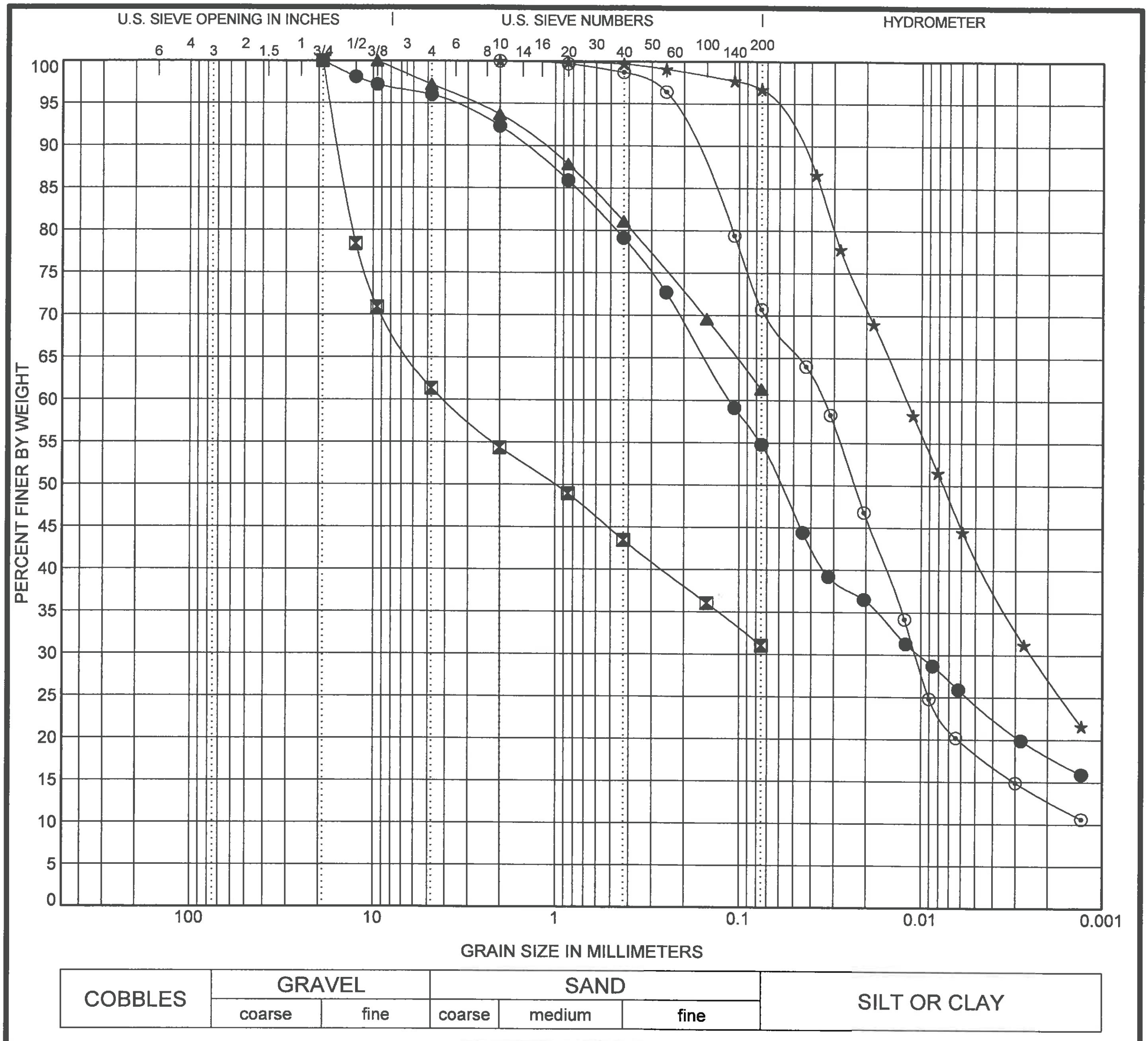
Terracon

Exhibit B-1: Laboratory Testing

The soil samples retrieved during the field exploration were returned to the laboratory for observation by the project geotechnical engineer. At that time, the field descriptions were reviewed and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples. The results of these tests are presented in Appendix B. The test results were used for the geotechnical engineering analyses. The laboratory tests were performed in general accordance with applicable locally accepted standards. Soil samples were classified in general accordance with the Unified Soil Classification System described in Appendix C.

- Water Content
- Grain Size Distribution
- Plasticity Index



Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	1	1.0ft	**CLAYEY SAND (SC)**					
☒	2	1.0ft	**SILTY GRAVEL with SAND(GM)**	**NP**	**NP**	**NP**		
▲	3	0.0ft	**SANDY LEAN CLAY(CL)**	**25**	**16**	**9**		
★	4	1.0ft	**LEAN CLAY (CL)**					
⊙	5	1.0ft	**SILT with SAND(ML)**	**39**	**29**	**10**		

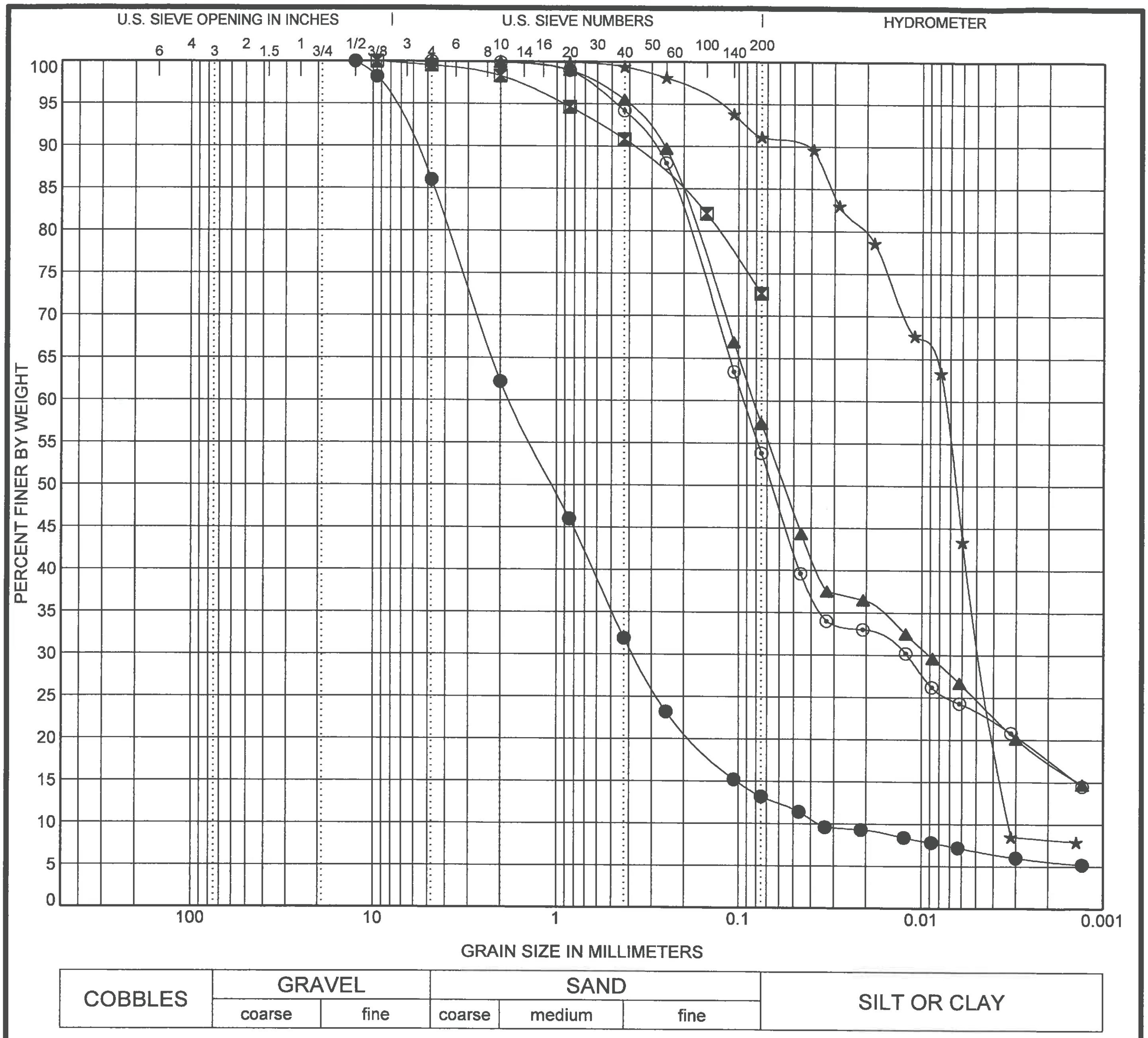
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1	1.0ft	**19**	**0.112**	**0.01**		**4.0**	**41.2**	**54.8**	
☒	2	1.0ft	**19**	**4.031**			**38.7**	**30.3**	**31.0**	
▲	3	0.0ft	**9.5**				**2.8**	**35.9**	**61.3**	
★	4	1.0ft	**2**	**0.012**	**0.002**		**0.0**	**3.3**	**96.7**	
⊙	5	1.0ft	**2**	**0.034**	**0.011**		**0.0**	**29.3**	**70.7**	

Terracon

GRAIN SIZE DISTRIBUTION - EXHIBIT B-2

Project: North Laramie Drainage Master Plan
Site: Laramie, Wyoming
Job #: 24105015
Date: 7-21-10

TC_GRAIN_SIZE 24105015.GPJ TERRACON.GDT 7/21/10



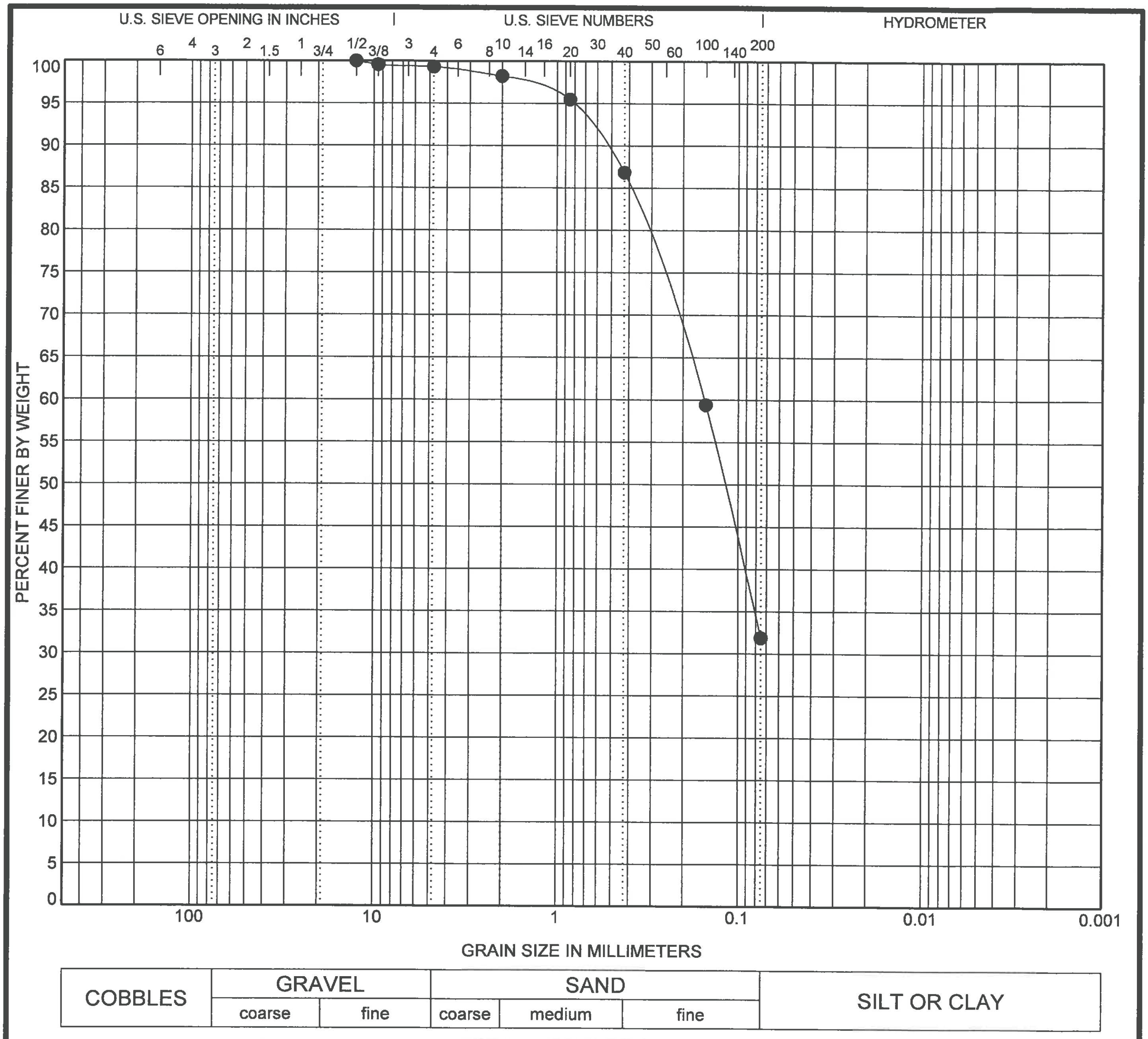
Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	6	1.0ft	**FILL - Silty Sand with Gravel**				**2.23**	**49.42**
⊠	7	1.5ft	**WEATHERED BEDROCK**	**21**	**20**	**1**		
▲	8	1.0ft	**SANDY LEAN CLAY (CL)**					
★	9	4.0ft	**LEAN CLAY (CL)**				**0.90**	**2.30**
⊙	10	1.0ft	**SANDY LEAN CLAY (CL)**					

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	6	1.0ft	**12.5**	**1.781**	**0.378**	**0.036**	**14.0**	**72.8**	**13.2**	
⊠	7	1.5ft	**9.5**				**0.5**	**26.9**	**72.6**	
▲	8	1.0ft	**4.75**	**0.083**	**0.009**		**0.0**	**42.7**	**57.3**	
★	9	4.0ft	**2**	**0.008**	**0.005**	**0.003**	**0.0**	**8.9**	**91.1**	
⊙	10	1.0ft	**4.75**	**0.094**	**0.012**		**0.0**	**46.2**	**53.8**	

Terracon

GRAIN SIZE DISTRIBUTION - EXHIBIT B-3

Project: North Laramie Drainage Master Plan
Site: Laramie, Wyoming
Job #: 24105015
Date: 7-21-10



Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	11	1.0ft	CLAYEY SAND(SC)	21	12	9		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	11	1.0ft	12.5	0.153			0.7	67.4	31.9	

TC GRAIN SIZE 24105015.GPJ TERRACON.GDT 7/21/10

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GRAIN SIZE DISTRIBUTION - EXHIBIT B-4

Project: North Laramie Drainage Master Plan
Site: Laramie, Wyoming
Job #: 24105015
Date: 7-21-10

APPENDIX C

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS: Split Spoon - 1-^{3}/8" I.D., 2" O.D., unless otherwise noted
ST: Thin-Walled Tube - 2" O.D., unless otherwise noted
RS: Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted
DB: Diamond Bit Coring - 4", N, B
BS: Bulk Sample or Auger Sample

HS: Hollow Stem Auger
PA: Power Auger
HA: Hand Auger
RB: Rock Bit
WB: Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value". For 3" O.D. ring samplers (RS) the penetration value is reported as the number of blows required to advance the sampler 12 inches using a 140-pound hammer falling 30 inches, reported as "blows per foot," and is not considered equivalent to the "Standard Penetration"or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL: Water Level
WCI: Wet Cave in
DCI: Dry Cave in
AB: After Boring

WS: While Sampling
WD: While Drilling
BCR: Before Casing Removal
ACR: After Casing Removal

N/E: Not Encountered

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-value (SS) Blows/Ft.	Consistency
< 500	0 - 1	Very Soft
500 – 1,000	2 - 4	Soft
1,000 – 2,000	4 - 8	Medium Stiff
2,000 – 4,000	8 -15	Stiff
4,000 – 8,000	15 - 30	Very Stiff
8,000+	> 30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Standard Penetration or N-value (SS) Blows/Ft.	Ring Sampler (RS) Blows/Ft.	Relative Density
0 – 3	0-6	Very Loose
4 – 9	7-18	Loose
10 – 29	19-58	Medium Dense
30 – 49	59-98	Dense
> 50	> 99	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 – 29
Modifier	> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1-10
Medium	11-30
High	> 30

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GENERAL NOTES

Description of Rock Properties

WEATHERING

Fresh	Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.
Very slight	Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.
Slight	Rock generally fresh, joints stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some show clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.
Moderately severe	All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick.
Severe	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.
Very severe	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
Complete	Rock reduced to "soil". Rock "fabric" not discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.

HARDNESS (for engineering description of rock – not to be confused with Moh's scale for minerals)

Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. Gouges or grooves to ¼ in. deep can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 in. deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-in. maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

Joint, Bedding and Foliation Spacing in Rock[a]

Spacing	Joints	Bedding/Foliation
Less than 2 in.	Very close	Very thin
2 in. – 1 ft.	Close	Thin
1 ft. – 3 ft.	Moderately close	Medium
3 ft. – 10 ft.	Wide	Thick
More than 10 ft.	Very wide	Very thick

Rock Quality Designator (RQD)[b]

RQD, as a percentage	Diagnostic description
Exceeding 90	Excellent
90 – 75	Good
75 – 50	Fair
50 – 25	Poor
Less than 25	Very poor

Joint Openness Descriptors

Openness	Descriptor
No Visible Separation	Tight
Less than 1/32 in.	Slightly Open
1/32 to 1/8 in.	Moderately Open
1/8 to 3/8 in.	Open
3/8 in. to 0.1 ft.	Moderately Wide
Greater than 0.1 ft.	Wide

[a] Spacing refers to the distance normal to the planes, of the described feature, which are parallel to each other or nearly so.

[b] RQD (given as a percentage) = length of core in pieces 4 in. and longer/length of run.

References: American Society of Civil Engineers. Manuals and Reports on Engineering Practice - No. 56. Subsurface Investigation for Design and Construction of Foundations of Buildings. New York: American Society of Civil Engineers, 1976.
U.S. Department of the Interior, Bureau of Reclamation, Engineering Geology Field Manual.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]					Soil Classification	
					Group Symbol	Group Name[B]
Coarse Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3[E]		GWW	ell-graded gravel[F]
			Cu < 4 and/or 1 > Cc > 3[E]		GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH		GM	Silty gravel[F,G, H]
			Fines classify as CL or CH		GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3[E]		SW	Well-graded sand[I]
			Cu < 6 and/or 1 > Cc > 3[E]		SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH		SM	Silty sand[G,H,I]
			Fines Classify as CL or CH		SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]		CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]		ML	Silt[K,L,M]
		organic	Liquid limit - oven dried	< 0.75	OL	Organic clay[K,L,M,N]
			Liquid limit - not dried			Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line		CH	Fat clay[K,L,M]
			PI lots below "A" line		MH	Elastic Silt[K,L,M]
		organic	Liquid limit - oven dried	< 0.75	OH	Organic clay[K,L,M,P]
			Liquid limit - not dried			Organic silt[K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

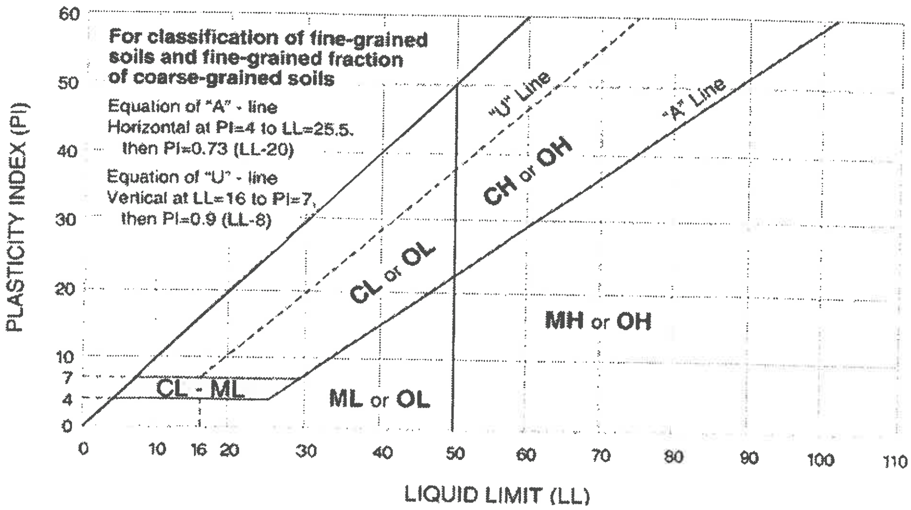
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Form 111—6/98

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Appendix E – CUHP Input

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Summary of CUHP Input Parameters (Version 1.3.3)

							Depression Storage		Horton's Infiltration Parameters			DCIA Level and Fractions			
Catchment Name/ID	Raingage Name/ID	Area (sq.mi.)	Dist. to Centroid (miles)	Length (miles)	Slope (ft./ft.)	Percent Imperv.	Pervious (inches)	Imperv. (inches)	Initial Rate (in./hr.)	Final Rate (in.hr.)	Decay Coeff. (1/sec.)	DCIA Level	Dir. Con'ct Imperv. Fraction	Receiv. Perv. Fraction	Percent Eff. Imperv.
CL	100	0.256	0.355	0.629	0.023	0.1	0.35	0.10	3.99	0.55	0.0018	0.00	0.00	0.00	0.09
RU	100	0.394	0.374	0.926	0.030	0.4	0.35	0.10	3.49	0.53	0.0018	0.00	0.01	0.00	0.29
CU	100	0.415	0.426	0.880	0.054	0.0	0.35	0.10	3.69	0.55	0.0018	0.00	0.00	0.00	0.02

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Appendix F – Detention Pond Calculations

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CM02

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above Invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7161.09	0	7161.09	0	0	0	0	0
Spill Elev =	7164.85	0.91	7162	13176.00	0.303	3996.72	3997	0.09
		2.91	7164	46590.00	1.07	56361.60	60358	1.39
Approximate Total Volume =							**84312**	**1.9**

Proposed

		Elevation above Invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7161.09	0	7161.09	0	0	0	0	0
Spill Elev =	7165.5	0.91	7162	15930.00	0.366	4832.10	4832	0.11
		2.91	7164	77744.00	1.785	85910.53	90743	2.08
		4.91	7166	84596.00	1.943	162291.78	253034	5.81
Approximate Total Volume =							**212461**	**4.9**

LM01

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

Invert Elev= 7180.98
Spill Elev = 7185.52

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7180.98	0	0	0	0	0
3.02	7184	18587	0.427	18710.91	18711	0.43
5.02	7186	35824.00	0.823	53476.85	72188	1.66

Approximate Total Volume = **59353** **1.4**

Proposed

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7180.98	0.00	0	0.00	0	0.00
1.02	7182	11529.00	0.265	3919.86	3920	0.09
3.02	7184	36315.00	0.834	45537.04	49457	1.14
5.02	7186	42060.00	0.966	78304.72	127762	2.93

Approximate Total Volume = **108968** **2.5**

LM02

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7180.95	0	7180.95	0	0	0.00	0	0.00
Spill Elev =	7184.69	3.05	7184	30210	0.694	30713.50	30714	0.71
		5.05	7186	63756.00	1.464	91902.00	122615	2.81
Approximate Total Volume =							**62420**	**1.4**

RM02

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev	7192.86	0	7192.86	0	0	0	0	0
Spill Elev =	7196.28	1.14	7194	84982	1.951	32293.16	32293	0.74
		3.14	7196	191763.00	4.403	269601.58	301895	6.93

Approximate Total Volume = **339639** **7.8**

Additional Pond

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev	7223	0	7223	0	0	0	0	0
Spill Elev =	7228	1	7224	55316	1.27	18438.67	18439	0.42
		3	7226	118960	2.731	170263.74	188702	4.33
		5	7228	127570.00	2.929	246479.87	435182	9.99

Approximate Total Volume = **435182** **10.0**

RM03

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7201.05	0	7201.05	0	0	0	0	0
Spill Elev =	7204.53	0.95	7202	58863	1.352	18639.95	18640	0.43
		2.95	7204	76534.00	1.757	135010.97	153651	3.53
Approximate Total Volume =							**191664**	**4.4**

RM06

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

Invert Elev= 7176.5

Spill Elev = 7181.57

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7176.5	0	0	0	0	0
1.5	7178	1632	0.038	816.00	816	0.02
3.5	7180	59061.00	1.356	47007.14	47823	1.10
5.5	7182	84448.00	1.939	142754.55	190578	4.38

Approximate Total Volume = **159885** **3.7**

Proposed

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7176.5	0	0	0	0	0
1.5	7178	30140	0.692	15070.00	15070.00	0.35
3.5	7180	66523.00	1.528	94293.51	109363.51	2.51
5.5	7182	84448.00	1.939	150615.03	259978.54	5.97

Approximate Total Volume = **227596** **5.2**

RM07

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7188.51	0	7188.51	0	0	0	0	0
Spill Elev =	7193	1.49	7190	33975	0.78	16874.25	16874	0.39
		3.49	7192	47381.00	1.088	80985.29	97860	2.25
Approximate Total Volume =							**138352**	**3.2**

RM08

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

Invert Elev= 7203.19
Spill Elev = 7212.02

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (acres)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7203.19	0	0	0	0	0
0.81	7204	385	0.009	103.95	104	0.00
2.81	7206	33083.00	0.76	24691.26	24795	0.57
4.81	7208	47239.00	1.085	79902.91	104698	2.40
6.81	7210	54171.00	1.244	101330.93	206029	4.73
8.81	7212	61890.00	1.421	115975.34	322004	7.39

Approximate Total Volume = **322004** **7.4**

RU04

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

Invert Elev= 7232.56

Spill Elev = 7240.43

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7232.56	0	0	0	0	0
1.44	7234	15402	0.354	7392.96	7393	0.17
3.44	7236	81990.00	1.883	88618.69	96012	2.20
5.44	7238	92493.00	2.124	174377.53	270389	6.21
7.44	7240	102892.00	2.363	195292.69	465682	10.69

Approximate Total Volume = **507670** **11.7**

RU05

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

Invert Elev= 7233.11

Spill Elev = 7240.42

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7233.11	0	0	0	0	0
2.89	7236	6969	0.16	6713.47	6713	0.15
4.89	7238	10831.00	0.249	17658.66	24372	0.56
6.89	7240	15302.00	0.352	26004.57	50377	1.16

Approximate Total Volume = **55838** **1.3**

Proposed

Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
0	7233.11	0.00	0	0	0	0
2.89	7236	20949.00	0.481	20180.87	20181	0.46
4.89	7238	24834.00	0.571	45727.96	65909	1.51
6.89	7240	29021.00	0.667	53800.66	119709	2.75

Approximate Total Volume = **131008** **3.0**

CL04

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Proposed

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7175	0	7175	0.00	0	0	0	0
Spill Elev =	7180	1	7176	47366.00	1.088	15788.67	15789	0.36
		3	7178	52829.00	1.213	100145.32	115934	2.66
		5	7180	58581.00	1.345	111360.47	227294	5.22
Approximate Total Volume =							**216079**	**5.0**

LL10 (LaBonte Park Pond)

Volume = 1/3*(h2-h1)*(A1+A2+(A1A2)0.5)

Existing

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7140.43	0	7140.43	0.00	0	0	0	0
Spill Elev =	7144.3	1.57	7142	284566.00	6.533	148922.87	148923	3.42
		3.57	7144	319408.00	7.333	603638.73	752562	17.28
		5.57	7146	468773.00	10.762	783420.27	1535982	35.26

Approximate Total Volume = **870075** **20.0**

Proposed

		Elevation above invert	Elevation, h	Area, A (sf)	Area, A (ac)	Volume (cu-ft)	Cumulative Volume (cu-ft)	Cumulative Volume (acre-ft)
Invert Elev=	7140.43	0	7140.43	0.00	0	0	0	0
Spill Elev =	7147	1.57	7142	284566.00	6.533	148922.87	148923	3.42
		3.57	7144	319408.00	7.333	603638.73	752562	17.28
		5.57	7146	695346.00	15.963	990685.26	1743247	40.02
		6.57	7147	733420.00	16.838	714298.43	2457545	56.42
		7.57	7148	772347.00	17.731	752799.62	3210345	73.70

Approximate Total Volume = **2457545** **56.4**

Appendix G – XPSWMM Input/ Output – Existing Conditions

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HORTON INFILTRATION PARAMETERS

<<USDCM Volume 1>>

SCS Soil Type	Infiltration (in/hr) Fi	 Fo	Decay Coeff.
A	5	1	0.0007
B	4.5	0.6	0.0018
C/D	3	0.5	0.0018

Fi = {Fi(A)*A%+Fi(B)*B%+Fi(C/D)*C/D%}
Fo = {Fo(A)*A%+Fo(B)*B%+Fo(C/D)*C/D%}

Basin ID	Basin Area sf	A Area sf	A %	B Area sf	B %	C Area sf	C %	D Area sf	D %	Initial Infil. Fi (in/hr)	Final Infil. Fo (in/hr)	Decay Coeff.
CL01	1233262	0	0%	832797	68%	400465	32%	0	0%	4.0130	0.5676	0.0018
CL02	3048085	0	0%	1613456	53%	1434630	47%	0	0%	3.7941	0.5530	0.0018
CL03	2848972	0	0%	2204705	77%	644268	23%	0	0%	4.1608	0.5774	0.0018
CL04	1564421	0	0%	1186006	76%	224317	14%	154096	10%	4.1372	0.5759	0.0018
CL05	3643200	0	0%	3214655	88%	428544	12%	0	0%	4.3236	0.5883	0.0018
CL06	3466605	0	0%	3466605	100%	0	0%	0	0%	4.5000	0.6000	0.0018
CL07	1943140	0	0%	1680561	86%	259461	13%	3114	0%	4.2973	0.5865	0.0018
CL08	1795523	0	0%	1066687	59%	644767	36%	84069	5%	3.8912	0.5595	0.0018
CL09	1145765	0	0%	178944	16%	40409	4%	926413	81%	3.2343	0.5157	0.0018
CM01	5107018	0	0%	5091700	100%	80	0%	15236	0%	4.4955	0.5997	0.0018
CM02	5242537	0	0%	4008230	76%	1234310	24%	0	0%	4.1469	0.5765	0.0018
CU01	11621568	0	0%	5322850	46%	68088	1%	6230630	54%	3.6871	0.5459	0.0018
LL01	3263369	0	0%	2156233	66%	1107140	34%	0	0%	3.9912	0.5661	0.0018
LL02	1288415	0	0%	1287829	100%	586	0%	0	0%	4.4994	0.6000	0.0018
LL03	1181231	0	0%	1069954	91%	111277	9%	0	0%	4.3587	0.5906	0.0018
LL04	2282420	0	0%	1892279	83%	390140	17%	0	0%	4.2436	0.5830	0.0018
LL05	725160	0	0%	561054	77%	164106	23%	0	0%	4.1606	0.5774	0.0018
LL06	1191111	0	0%	1191111	100%	0	0%	0	0%	4.5000	0.6000	0.0018
LL07	3034288	0	0%	1844793	61%	1189496	39%	0	0%	3.9120	0.5608	0.0018
LL08	2166657	0	0%	2130129	98%	0	0%	36528	2%	4.4748	0.5984	0.0018
LL09	2799306	0	0%	2549957	91%	0	0%	249349	9%	4.3664	0.5911	0.0018
LL10	1085884	0	0%	149693	14%	936191	86%	0	0%	3.2068	0.5138	0.0018
LM01	956505	0	0%	102876	11%	853629	89%	0	0%	3.1614	0.5108	0.0018
LM02	2000409	0	0%	250229	13%	1750180	87%	0	0%	3.1877	0.5126	0.0018
RL01	1452753	0	0%	1452753	100%	0	0%	0	0%	4.5001	0.6001	0.0018
RL02	3512833	0	0%	3452026	98%	60811	2%	0	0%	4.4741	0.5983	0.0018
RL03	1983980	0	0%	1359133	69%	0	0%	624852	31%	4.0276	0.5686	0.0018
RM01	851111	0	0%	851112	100%	0	0%	0	0%	4.5001	0.6001	0.0018
RM02	3109402	0	0%	2182532	70%	926872	30%	0	0%	4.0529	0.5702	0.0018
RM03	2128895	0	0%	1064765	50%	1064130	50%	0	0%	3.7503	0.5501	0.0018
RM04	1562967	0	0%	897304	57%	665663	43%	0	0%	3.8612	0.5575	0.0018
RM05	1697489	0	0%	357694	21%	1339794	79%	0	0%	3.3161	0.5211	0.0018
RM06	2965536	0	0%	2078594	70%	886940	30%	0	0%	4.0514	0.5701	0.0018
RM07	1959129	0	0%	1307229	67%	651900	33%	0	0%	4.0009	0.5668	0.0018
RM08	2506425	0	0%	1394068	56%	1112357	44%	0	0%	3.8343	0.5557	0.0018
RM09	1759089	0	0%	1560808	89%	198280	11%	0	0%	4.3310	0.5888	0.0018
RM10	2375665	0	0%	2318460	98%	0	0%	57206	2%	4.4639	0.5976	0.0018
RM11	2624876	0	0%	2010937	77%	613944	23%	0	0%	4.1492	0.5767	0.0018
RU01	3805262	0	0%	722721	19%	10260	0%	3072282	81%	3.2849	0.5190	0.0018
RU02	2020694	0	0%	1156730	57%	498964	25%	365002	18%	3.8587	0.5573	0.0018
RU03	1485810	0	0%	947038	64%	538773	36%	0	0%	3.9561	0.5638	0.0018
RU04	2456761	0	0%	246151	10%	1299514	53%	911095	37%	3.1503	0.5101	0.0018
RU05	1219094	0	0%	527150	43%	691944	57%	0	0%	3.6487	0.5433	0.0018
RU06	4750096	0	0%	3565821	75%	897413	19%	285543	6%	4.1252	0.5750	0.0018

ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
0004	100	1	0004	7190.720	7198.270	546186.978	300775.346	0.000	0.000
0005	100	1	0005	7187.790	7192.950	545822.106	300779.607	0.000	0.000
0006	100	1	0006	7175.970	7181.180	544374.092	300786.409	0.000	0.000
0007	100	1	0007	7249.000	7252.000	543827.562	304985.939	0.000	0.000
0010	100	1	0010	7146.110	7152.920	541703.236	301901.472	0.000	0.000
0017	100	1	0017	7230.470	7233.460	548793.525	300776.879	0.000	0.000
2007	100	1	2007	7130.910	7145.028	538220.731	302871.047	0.000	0.000
2009	100	1	2009	7135.150	7143.573	538417.040	301709.140	0.000	0.000
2019	100	1	2019	7135.570	7141.174	538979.775	300594.717	0.000	0.000
2021	100	1	2021	7134.120	7142.736	538979.730	301243.849	0.000	0.000
2022	100	1	2022	7133.020	7139.591	538405.766	301328.742	0.000	0.000
2030	100	1	2030	7137.000	7142.122	539640.745	300542.725	0.000	0.000
2054	100	1	2054	7139.900	7150.039	540096.607	301556.564	0.000	0.000
2059	100	1	2059	7142.490	7149.073	540843.120	301473.116	0.000	0.000
2093	100	1	2093	7182.210	7186.842	541725.925	304496.790	0.000	0.000
2105	100	1	2105	7164.770	7170.760	541725.529	303869.909	0.000	0.000
2115	100	1	2115	7157.160	7162.485	541718.169	303335.690	0.000	0.000
2116	100	1	2116	7156.140	7161.768	541719.190	303279.585	0.000	0.000
2121	100	1	2121	7159.799	7162.799	542081.992	303298.339	0.000	0.000
2122	100	1	2122	7161.090	7165.850	542162.282	303363.965	0.000	0.000
2166	100	1	2166	7147.840	7154.097	541713.280	302205.545	0.000	0.000
2178	100	1	2178	7143.730	7150.808	541536.559	301324.189	0.000	0.000
2199	100	1	2199	7143.170	7148.687	541326.336	299013.777	0.000	0.000
2206	100	1	2206	7148.610	7157.359	542042.093	298952.321	0.000	0.000
2211	100	1	2211	7154.940	7160.037	541984.051	298249.668	0.000	0.000
2226	100	1	2226	7173.680	7179.648	543060.454	298167.942	0.000	0.000
2229	100	1	2229	7176.550	7180.072	543154.406	298523.197	0.000	0.000
2235	100	1	2235	7178.780	7183.012	543494.955	298480.860	0.000	0.000
2279	100	1	2279	7142.500	7148.462	541383.691	299680.656	0.000	0.000
2282	100	1	2282	7141.570	7148.080	541425.334	300014.008	0.000	0.000
2297	100	1	2297	7140.630	7148.983	541426.625	300370.932	0.000	0.000
2319	100	1	2319	7143.160	7150.355	541493.796	300960.950	0.000	0.000
2327	100	1	2327	7167.530	7173.789	543399.378	300800.856	0.000	0.000
2335	100	1	2335	7171.210	7175.000	543747.505	300788.750	0.000	0.000

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
0004	100	1	0.000	0.000	Allowed	☐
0005	100	1	0.000	0.000	Allowed	☐
0006	100	1	0.000	0.000	Allowed	☐
0007	100	1	0.000	0.000	Allowed	☐
0010	100	1	0.000	0.000	Allowed	☐
0017	100	1	0.000	0.000	Allowed	☐
2007	100	1	0.000	0.000	Allowed	☐
2009	100	1	0.000	0.000	Allowed	☐
2019	100	1	0.000	0.000	Allowed	☐
2021	100	1	0.000	0.000	Allowed	☐
2022	100	1	0.000	0.000	Allowed	☐
2030	100	1	0.000	0.000	Allowed	☐
2054	100	1	0.000	0.000	Allowed	☐
2059	100	1	0.000	0.000	Allowed	☐
2093	100	1	0.000	0.000	Allowed	☐
2105	100	1	0.000	0.000	Allowed	☐
2115	100	1	0.000	0.000	Allowed	☐
2116	100	1	0.000	0.000	Allowed	☐
2121	100	1	0.000	0.000	Allowed	☐
2122	100	1	0.000	0.000	Allowed	☒
2166	100	1	0.000	0.000	Allowed	☐
2178	100	1	0.000	0.000	Allowed	☐
2199	100	1	0.000	0.000	Allowed	☐
2206	100	1	0.000	0.000	Allowed	☐
2211	100	1	0.000	0.000	Allowed	☐
2226	100	1	0.000	0.000	Allowed	☐
2229	100	1	0.000	0.000	Allowed	☐
2235	100	1	0.000	0.000	Allowed	☐
2279	100	1	0.000	0.000	Allowed	☐
2282	100	1	0.000	0.000	Allowed	☐
2297	100	1	0.000	0.000	Allowed	☐
2319	100	1	0.000	0.000	Allowed	☐
2327	100	1	0.000	0.000	Allowed	☐
2335	100	1	0.000	0.000	Allowed	☐

ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
2359	100	1	2359	7191.050	7198.620	546225.385	300777.564	0.000	0.000
2363	100	1	2363	7200.920	7204.340	546925.840	300833.088	0.000	0.000
2364	100	1	2364	7200.270	7204.242	546922.889	300779.036	0.000	0.000
2365	100	1	2365	7202.690	7205.344	547199.257	300781.782	0.000	0.000
2407	100	1	2407	7192.860	7197.280	546219.230	300107.917	0.000	0.000
2412	100	1	2412	7191.900	7195.232	546150.124	300118.278	0.000	0.000
2435	100	1	2435	7200.150	7208.500	546239.729	301973.462	0.000	0.000
2490	100	1	2490	7201.050	7206.480	546923.210	300875.848	0.000	0.000
2634	100	1	2634	7232.560	7241.430	548929.471	300680.548	0.000	0.000
2639	100	1	2639	7230.990	7234.679	548792.472	300745.960	0.000	0.000
2643	100	1	2643	7236.930	7240.373	548825.430	300348.497	0.000	0.000
2650	100	1	2650	7271.300	7275.595	548788.081	299251.595	0.000	0.000
2673	100	1	2673	7133.210	7136.710	537118.424	298930.782	0.000	0.000
2690	100	1	2690	7138.350	7147.700	539080.421	298865.279	0.000	0.000
2695	100	1	2695	7140.040	7144.210	539108.301	299107.351	0.000	0.000
2714	100	1	2714	7140.510	7146.370	540202.102	299180.353	0.000	0.000
CL01	100	1	CL01	7191.050	7194.050	541989.629	304963.307	2.000	4710.502
CL02	100	1	CL02	7190.460	7195.000	541853.363	304979.649	2.000	4683.548
CL03	100	1	CL03	7157.325	7162.485	541570.427	303498.690	23.000	5598.002
CL04	100	1	CL04	7156.305	7161.768	541538.902	303318.259	58.000	4736.463
CL05	100	1	CL05	7148.005	7154.097	541956.463	302198.247	52.000	9160.185
CL06	100	1	CL06	7142.655	7149.073	540956.792	301569.584	67.000	6309.050
CL07	100	1	CL07	7145.830	7149.000	540813.203	301610.254	62.000	6459.803
CL08	100	1	CL08	7135.150	7143.573	538582.882	301821.785	53.000	7453.850
CL09	100	1	CL09	7130.910	7145.028	538307.702	302871.329	5.000	2715.746
CM01	100	1	CM01	7249.165	7252.165	543818.634	305151.328	2.000	13626.560
CM02	100	1	CM02	7161.255	7164.850	542176.503	303522.115	19.000	17819.625
CU01	100	1	CU01	7285.000	7288.000	549355.919	303806.472	2.000	10317.763
LL01	100	1	LL01	7155.105	7160.037	541883.945	298148.456	73.000	5503.573
LL02	100	1	LL02	7145.050	7149.189	541303.629	298673.936	73.000	3580.810
LL03	100	1	LL03	7143.335	7148.687	541347.309	298995.022	61.000	4254.267
LL04	100	1	LL04	7141.735	7148.080	541468.358	300041.519	64.000	4281.098
LL05	100	1	LL05	7140.900	7146.640	540813.736	298993.356	71.000	2311.969
LL06	100	1	LL06	7140.840	7146.370	540186.027	299309.056	75.000	4427.300

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
2359	100	1	0.000	0.000	Allowed	☐
2363	100	1	0.000	0.000	Allowed	☐
2364	100	1	0.000	0.000	Allowed	☐
2365	100	1	0.000	0.000	Allowed	☐
2407	100	1	0.000	0.000	Allowed	☒
2412	100	1	0.000	0.000	Allowed	☐
2435	100	1	0.000	0.000	Allowed	☐
2490	100	1	0.000	0.000	Allowed	☒
2634	100	1	0.000	0.000	Allowed	☒
2639	100	1	0.000	0.000	Allowed	☐
2643	100	1	0.000	0.000	Allowed	☐
2650	100	1	0.000	0.000	Allowed	☐
2673	100	1	0.000	0.000	Allowed	☐
2690	100	1	0.000	0.000	Allowed	☐
2695	100	1	0.000	0.000	Allowed	☐
2714	100	1	0.000	0.000	Allowed	☐
CL01	100	1	63.170	0.033	Allowed	☐
CL02	100	1	69.970	0.025	Allowed	☐
CL03	100	1	65.430	0.028	Allowed	☐
CL04	100	1	53.060	0.033	Allowed	☐
CL05	100	1	86.530	0.034	Allowed	☐
CL06	100	1	70.240	0.005	Allowed	☐
CL07	100	1	44.610	0.020	Allowed	☐
CL08	100	1	41.220	0.021	Allowed	☐
CL09	100	1	26.300	0.053	Allowed	☐
CM01	100	1	87.800	0.011	Allowed	☐
CM02	100	1	123.310	0.019	Allowed	☐
CU01	100	1	266.790	0.054	Allowed	☐
LL01	100	1	79.570	0.027	Allowed	☐
LL02	100	1	79.570	0.019	Allowed	☐
LL03	100	1	27.120	0.029	Allowed	☐
LL04	100	1	52.400	0.026	Allowed	☐
LL05	100	1	16.650	0.008	Allowed	☐
LL06	100	1	27.300	0.006	Allowed	☐

ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
LL07	100	1	LL07	7151.540	7159.440	540123.911	297440.063	75.000	8142.862
LL08	100	1	LL08	7147.440	7154.940	538983.800	297524.918	87.000	3346.457
LL09	100	1	LL09	7138.680	7147.700	538953.099	298970.711	86.000	5975.939
LL10	100	1	LL10	7140.430	7146.000	540893.556	299543.322	61.000	2875.600
LM01	100	1	LM01	7180.980	7186.520	543513.714	298569.428	75.000	2637.362
LM02	100	1	LM02	7180.950	7185.690	543523.134	298374.003	75.000	8579.165
OutFall	100	1	OutFall	7129.580	7144.863	537658.180	304601.349	0.000	0.000
RL01	100	1	RL01	7140.795	7148.983	541523.670	300236.959	66.000	4830.136
RL02	100	1	RL02	7137.165	7142.122	539627.941	300387.257	71.000	5800.339
RL03	100	1	RL03	7133.020	7139.591	538456.088	301215.976	93.000	3805.253
RM01	100	1	RM01	7190.720	7198.270	546214.719	300745.532	47.000	6278.563
RM02	100	1	RM02	7192.860	7196.280	546350.768	300142.048	40.000	6433.843
RM03	100	1	RM03	7201.850	7209.890	546950.869	300906.078	40.000	6509.392
RM04	100	1	RM04	7202.030	7205.030	546781.886	301146.171	35.000	6600.216
RM05	100	1	RM05	7193.860	7197.810	546201.103	299652.095	63.000	10425.899
RM06	100	1	RM06	7176.500	7182.570	544422.985	300730.006	74.000	7033.576
RM07	100	1	RM07	7188.510	7194.000	545864.291	300909.179	34.000	7457.943
RM08	100	1	RM08	7203.190	7213.020	546120.911	302113.768	27.000	4774.371
RM09	100	1	RM09	7176.135	7181.180	544406.034	300872.603	45.000	4523.379
RM10	100	1	RM10	7292.000	7293.000	546696.988	303221.742	2.000	11814.423
RM11	100	1	RM11	7171.540	7175.000	543750.661	301076.767	56.000	3926.521
RU01	100	1	RU01	7307.200	7308.200	551624.561	299921.715	31.000	7933.821
RU02	100	1	RU02	7274.595	7275.595	548963.882	299362.475	40.000	11383.696
RU03	100	1	RU03	7272.810	7275.060	548785.483	299235.044	41.000	6867.514
RU04	100	1	RU04	7232.560	7240.430	549074.696	300662.333	40.000	8835.960
RU05	100	1	RU05	7233.110	7241.420	548949.252	300898.473	35.000	4510.611
RU06	100	1	RU06	7309.500	7310.000	551834.694	299356.787	45.000	10700.590

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
LL07	100	1	69.660	0.015	Allowed	☐
LL08	100	1	49.740	0.004	Allowed	☐
LL09	100	1	64.260	0.004	Allowed	☐
LL10	100	1	24.900	0.007	Allowed	☒
LM01	100	1	21.960	0.025	Allowed	☒
LM02	100	1	43.780	0.016	Allowed	☒
OutFall	100	1	0.000	0.000	Allowed	☐
RL01	100	1	40.800	0.010	Allowed	☐
RL02	100	1	80.640	0.003	Allowed	☐
RL03	100	1	45.550	0.003	Allowed	☐
RM01	100	1	19.540	0.013	Allowed	☐
RM02	100	1	71.380	0.012	Allowed	☐
RM03	100	1	47.930	0.041	Allowed	☐
RM04	100	1	32.220	0.033	Allowed	☐
RM05	100	1	38.970	0.021	Allowed	☐
RM06	100	1	71.600	0.019	Allowed	☒
RM07	100	1	43.810	0.035	Allowed	☒
RM08	100	1	52.790	0.034	Allowed	☒
RM09	100	1	40.380	0.014	Allowed	☐
RM10	100	1	60.990	0.011	Allowed	☐
RM11	100	1	55.160	0.044	Allowed	☐
RU01	100	1	87.360	0.026	Allowed	☐
RU02	100	1	46.390	0.009	Allowed	☐
RU03	100	1	34.110	0.011	Allowed	☐
RU04	100	1	56.400	0.030	Allowed	☐
RU05	100	1	23.660	0.039	Allowed	☒
RU06	100	1	109.050	0.024	Allowed	☐

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
0004	2	0004	0.000	0.000	7198.028
0004	5	0004	0.000	0.000	7198.122
0004	10	0004	0.000	0.000	7198.168
0004	100	0004	0.000	20125.270	7198.629
0005	2	0005	0.000	0.000	7192.747
0005	5	0005	0.000	0.000	7192.874
0005	10	0005	0.000	0.000	7192.907
0005	100	0005	0.000	36468.300	7193.408
0006	2	0006	0.000	0.000	7178.459
0006	5	0006	0.000	0.000	7179.082
0006	10	0006	0.000	0.000	7179.630
0006	100	0006	0.000	15202.810	7181.653
0007	2	0007	0.000	0.000	7249.147
0007	5	0007	0.000	0.000	7249.174
0007	10	0007	0.000	0.000	7249.189
0007	100	0007	0.000	0.000	7249.718
0010	2	0010	0.000	0.000	7152.429
0010	5	0010	0.000	2723.430	7153.009
0010	10	0010	0.000	6445.380	7153.115
0010	100	0010	0.000	30446.900	7153.676
0017	2	0017	0.000	0.000	7233.257
0017	5	0017	0.000	0.000	7233.314
0017	10	0017	0.000	0.000	7233.336
0017	100	0017	0.000	43002.440	7233.800
2007	2	2007	0.000	0.000	7134.736
2007	5	2007	0.000	0.000	7134.936
2007	10	2007	0.000	0.000	7135.051
2007	100	2007	0.000	0.000	7136.127
2009	2	2009	0.000	0.000	7139.807
2009	5	2009	0.000	0.000	7140.715
2009	10	2009	0.000	0.000	7141.569
2009	100	2009	0.000	6855.450	7144.144
2019	2	2019	0.000	50607.640	7142.384
2019	5	2019	0.000	70074.250	7142.967
2019	10	2019	0.000	76652.690	7143.141
2019	100	2019	0.000	152634.700	7144.118
2021	2	2021	0.000	0.000	7142.430
2021	5	2021	0.000	15387.520	7143.003
2021	10	2021	0.000	23224.820	7143.204
2021	100	2021	0.000	84583.510	7144.335
2022	2	2022	0.000	0.000	7138.273
2022	5	2022	0.000	0.000	7139.460
2022	10	2022	0.000	4251.210	7140.134
2022	100	2022	0.000	80583.030	7142.296
2030	2	2030	0.000	82743.550	7142.611
2030	5	2030	0.000	182838.220	7143.151
2030	10	2030	0.000	225448.000	7143.385
2030	100	2030	0.000	504955.890	7144.742
2054	2	2054	0.000	0.000	7144.625
2054	5	2054	0.000	0.000	7145.304
2054	10	2054	0.000	0.000	7146.054

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2054	100	2054	0.000	0.000	7147.546
2059	2	2059	0.000	0.000	7148.899
2059	5	2059	0.000	16261.000	7149.257
2059	10	2059	0.000	28621.120	7149.411
2059	100	2059	0.000	109479.770	7150.194
2093	2	2093	0.000	0.000	7182.595
2093	5	2093	0.000	0.000	7182.695
2093	10	2093	0.000	0.000	7182.742
2093	100	2093	0.000	0.000	7185.068
2105	2	2105	0.000	0.000	7165.177
2105	5	2105	0.000	0.000	7165.275
2105	10	2105	0.000	0.000	7165.368
2105	100	2105	0.000	0.000	7168.266
2115	2	2115	0.000	0.000	7161.283
2115	5	2115	0.000	0.000	7161.917
2115	10	2115	0.000	0.000	7162.217
2115	100	2115	0.000	1521.700	7162.584
2116	2	2116	0.000	0.000	7161.263
2116	5	2116	0.000	349.320	7161.764
2116	10	2116	0.000	4472.750	7161.836
2116	100	2116	0.000	38520.920	7162.289
2121	2	2121	0.000	0.000	7161.965
2121	5	2121	0.000	0.000	7162.081
2121	10	2121	0.000	0.000	7162.103
2121	100	2121	0.000	5181.940	7163.020
2122	2	2122	0.000	0.000	7162.210
2122	5	2122	0.000	0.000	7162.510
2122	10	2122	0.000	0.000	7162.691
2122	100	2122	0.000	0.000	7166.053
2166	2	2166	0.000	1514.710	7154.159
2166	5	2166	0.000	5151.310	7154.311
2166	10	2166	0.000	8275.630	7154.392
2166	100	2166	0.000	38200.470	7154.934
2178	2	2178	0.000	0.000	7150.299
2178	5	2178	0.000	2597.780	7150.880
2178	10	2178	0.000	5050.890	7151.025
2178	100	2178	0.000	28579.190	7151.693
2199	2	2199	0.000	28332.900	7149.249
2199	5	2199	0.000	49853.650	7149.559
2199	10	2199	0.000	59219.240	7149.697
2199	100	2199	0.000	113814.130	7150.419
2206	2	2206	0.000	0.000	7157.156
2206	5	2206	0.000	1212.970	7157.405
2206	10	2206	0.000	2573.750	7157.469
2206	100	2206	0.000	7268.850	7157.677
2211	2	2211	0.000	0.000	7160.015
2211	5	2211	0.000	3999.050	7160.134
2211	10	2211	0.000	6719.690	7160.207
2211	100	2211	0.000	17354.390	7160.472
2226	2	2226	0.000	0.000	7174.895
2226	5	2226	0.000	0.000	7174.952

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2226	10	2226	0.000	0.000	7174.989
2226	100	2226	0.000	2011.550	7179.704
2229	2	2229	0.000	0.000	7178.138
2229	5	2229	0.000	0.000	7178.223
2229	10	2229	0.000	0.000	7178.306
2229	100	2229	0.000	11078.380	7180.496
2235	2	2235	0.000	0.000	7180.946
2235	5	2235	0.000	0.000	7181.462
2235	10	2235	0.000	0.000	7181.832
2235	100	2235	0.000	4644.370	7183.187
2279	2	2279	0.000	8838.600	7148.784
2279	5	2279	0.000	15664.990	7149.046
2279	10	2279	0.000	17565.270	7149.166
2279	100	2279	0.000	34715.740	7149.824
2282	2	2282	0.000	19954.550	7148.322
2282	5	2282	0.000	41763.830	7148.544
2282	10	2282	0.000	48147.750	7148.651
2282	100	2282	0.000	90172.190	7149.243
2297	2	2297	0.000	127.090	7148.976
2297	5	2297	0.000	6319.850	7149.089
2297	10	2297	0.000	10126.390	7149.144
2297	100	2297	0.000	47830.610	7149.773
2319	2	2319	0.000	2868.120	7150.426
2319	5	2319	0.000	9338.420	7150.496
2319	10	2319	0.000	12604.600	7150.541
2319	100	2319	0.000	69230.490	7151.285
2327	2	2327	0.000	0.000	7171.038
2327	5	2327	0.000	0.000	7173.614
2327	10	2327	0.000	0.000	7173.731
2327	100	2327	0.000	24346.180	7174.241
2335	2	2335	0.000	0.000	7174.588
2335	5	2335	0.000	4081.990	7175.167
2335	10	2335	0.000	5762.460	7175.235
2335	100	2335	0.000	29801.160	7175.825
2359	2	2359	0.000	0.000	7198.344
2359	5	2359	0.000	0.000	7198.476
2359	10	2359	0.000	0.000	7198.511
2359	100	2359	0.000	6221.820	7199.158
2363	2	2363	0.000	0.000	7204.004
2363	5	2363	0.000	0.000	7204.094
2363	10	2363	0.000	0.000	7204.126
2363	100	2363	0.000	4449.050	7204.862
2364	2	2364	0.000	0.000	7204.004
2364	5	2364	0.000	0.000	7204.094
2364	10	2364	0.000	0.000	7204.126
2364	100	2364	0.000	20900.440	7204.664
2365	2	2365	0.000	0.000	7205.242
2365	5	2365	0.000	0.000	7205.321
2365	10	2365	0.000	748.020	7205.347
2365	100	2365	0.000	32634.030	7205.954
2407	2	2407	0.000	0.000	7194.734

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2407	5	2407	0.000	0.000	7195.232
2407	10	2407	0.000	0.000	7195.471
2407	100	2407	0.000	0.000	7196.891
2412	2	2412	0.000	0.000	7194.734
2412	5	2412	0.000	6.680	7195.232
2412	10	2412	0.000	1688.540	7195.471
2412	100	2412	0.000	52319.000	7196.891
2435	2	2435	0.000	0.000	7204.194
2435	5	2435	0.000	0.000	7204.652
2435	10	2435	0.000	0.000	7204.866
2435	100	2435	0.000	0.000	7208.451
2490	2	2490	0.000	0.000	7202.667
2490	5	2490	0.000	0.000	7203.229
2490	10	2490	0.000	0.000	7203.540
2490	100	2490	0.000	0.000	7205.585
2634	2	2634	0.000	0.000	7236.520
2634	5	2634	0.000	0.000	7237.881
2634	10	2634	0.000	0.000	7238.643
2634	100	2634	0.000	0.000	7241.752
2639	2	2639	0.000	0.000	7234.385
2639	5	2639	0.000	0.000	7234.449
2639	10	2639	0.000	0.000	7234.473
2639	100	2639	0.000	6963.120	7234.936
2643	2	2643	0.000	0.000	7238.498
2643	5	2643	0.000	0.000	7239.176
2643	10	2643	0.000	0.000	7239.463
2643	100	2643	0.000	296135.660	7241.678
2650	2	2650	0.000	0.000	7275.491
2650	5	2650	0.000	9079.710	7275.649
2650	10	2650	0.000	15497.260	7275.693
2650	100	2650	0.000	51424.670	7275.979
2673	2	2673	0.000	0.000	7133.489
2673	5	2673	0.000	0.000	7133.598
2673	10	2673	0.000	0.000	7133.666
2673	100	2673	0.000	0.000	7135.575
2690	2	2690	56.311	0.000	7146.728
2690	5	2690	95.441	6066.370	7147.743
2690	10	2690	122.341	16946.260	7147.810
2690	100	2690	245.335	72928.110	7148.181
2695	2	2695	0.000	4979.150	7144.353
2695	5	2695	0.000	50534.700	7145.438
2695	10	2695	0.000	74632.230	7145.883
2695	100	2695	0.000	231995.560	7147.437
2714	2	2714	46.974	0.000	7146.234
2714	5	2714	76.247	8102.710	7146.535
2714	10	2714	96.005	11841.240	7146.632
2714	100	2714	188.571	64370.370	7147.428
CL01	2	CL01	2.288	0.000	7191.237
CL01	5	CL01	3.434	0.000	7191.279
CL01	10	CL01	4.199	0.000	7191.307
CL01	100	CL01	65.857	0.000	7192.496

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
CL02	2	CL02	2.534	0.000	7190.934
CL02	5	CL02	3.804	0.000	7191.047
CL02	10	CL02	4.651	0.000	7191.113
CL02	100	CL02	69.543	0.000	7193.501
CL03	2	CL03	26.491	0.000	7161.284
CL03	5	CL03	40.195	0.000	7161.923
CL03	10	CL03	49.338	0.000	7162.257
CL03	100	CL03	105.761	998.490	7162.604
CL04	2	CL04	50.029	22.390	7161.769
CL04	5	CL04	77.561	824.980	7161.877
CL04	10	CL04	95.983	1262.600	7161.936
CL04	100	CL04	183.963	5158.410	7162.288
CL05	2	CL05	76.073	896.120	7154.218
CL05	5	CL05	116.747	2005.390	7154.365
CL05	10	CL05	143.934	2418.450	7154.428
CL05	100	CL05	272.720	9770.370	7154.929
CL06	2	CL06	56.156	194.530	7149.098
CL06	5	CL06	92.866	1389.780	7149.264
CL06	10	CL06	117.812	2576.070	7149.407
CL06	100	CL06	227.940	12457.310	7150.187
CL07	2	CL07	46.051	24.860	7149.001
CL07	5	CL07	70.959	1844.260	7149.256
CL07	10	CL07	87.614	3065.340	7149.406
CL07	100	CL07	165.489	13351.440	7150.189
CL08	2	CL08	37.887	0.000	7139.814
CL08	5	CL08	57.740	0.000	7140.734
CL08	10	CL08	70.996	0.000	7141.596
CL08	100	CL08	146.416	4199.740	7144.149
CL09	2	CL09	2.381	0.000	7134.738
CL09	5	CL09	3.575	0.000	7134.931
CL09	10	CL09	4.370	0.000	7135.043
CL09	100	CL09	51.576	0.000	7137.692
CM01	2	CM01	3.180	0.000	7249.565
CM01	5	CM01	4.773	0.000	7249.650
CM01	10	CM01	5.836	0.000	7249.699
CM01	100	CM01	78.640	0.000	7250.813
CM02	2	CM02	42.040	0.000	7163.075
CM02	5	CM02	63.377	0.000	7163.398
CM02	10	CM02	77.595	0.000	7163.579
CM02	100	CM02	209.020	12240.270	7166.054
CU01	2	CU01	9.662	0.000	7285.428
CU01	5	CU01	14.504	0.000	7285.553
CU01	10	CU01	17.732	0.000	7285.621
CU01	100	CU01	255.858	30291.340	7288.428
LL01	2	LL01	82.963	1005.450	7160.170
LL01	5	LL01	132.546	2082.750	7160.305
LL01	10	LL01	165.870	2824.940	7160.389
LL01	100	LL01	320.393	6652.780	7160.739
LL02	2	LL02	65.973	3236.710	7149.402
LL02	5	LL02	109.999	7250.380	7149.653
LL02	10	LL02	140.023	9396.030	7149.778

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
LL02	100	LL02	273.604	23616.390	7150.458
LL03	2	LL03	28.403	4211.030	7149.248
LL03	5	LL03	43.407	7638.010	7149.559
LL03	10	LL03	53.431	9496.360	7149.697
LL03	100	LL03	101.145	24526.200	7150.418
LL04	2	LL04	51.453	1784.290	7148.322
LL04	5	LL04	80.896	3581.440	7148.543
LL04	10	LL04	100.628	4567.210	7148.650
LL04	100	LL04	190.205	12195.280	7149.237
LL05	2	LL05	17.438	0.000	7145.751
LL05	5	LL05	27.664	0.000	7146.448
LL05	10	LL05	34.527	0.000	7146.530
LL05	100	LL05	65.760	670.090	7146.692
LL06	2	LL06	29.854	0.000	7146.233
LL06	5	LL06	47.483	1029.610	7146.537
LL06	10	LL06	59.320	1593.880	7146.637
LL06	100	LL06	110.571	11633.670	7147.431
LL07	2	LL07	78.773	0.000	7159.427
LL07	5	LL07	124.351	9349.180	7159.535
LL07	10	LL07	154.913	13865.350	7159.584
LL07	100	LL07	299.661	33169.960	7159.820
LL08	2	LL08	39.086	0.000	7149.329
LL08	5	LL08	63.069	0.000	7154.138
LL08	10	LL08	81.728	0.000	7154.605
LL08	100	LL08	169.703	6404.870	7155.105
LL09	2	LL09	56.311	0.000	7146.777
LL09	5	LL09	95.441	1952.010	7147.803
LL09	10	LL09	122.341	2965.980	7147.834
LL09	100	LL09	245.335	5637.800	7148.404
LL10	2	LL10	21.803	0.000	7142.815
LL10	5	LL10	34.796	0.000	7143.350
LL10	10	LL10	43.526	0.000	7143.574
LL10	100	LL10	89.832	0.000	7144.462
LM01	2	LM01	26.333	0.000	7182.827
LM01	5	LM01	40.994	0.000	7183.574
LM01	10	LM01	50.807	0.000	7183.864
LM01	100	LM01	104.487	0.000	7185.697
LM02	2	LM02	54.674	0.000	7183.543
LM02	5	LM02	84.245	0.000	7184.385
LM02	10	LM02	104.018	0.000	7184.755
LM02	100	LM02	215.622	0.000	7185.399
OutFall	2	OutFall	0.000	0.000	7133.170
OutFall	5	OutFall	0.000	0.000	7133.319
OutFall	10	OutFall	0.000	0.000	7133.406
OutFall	100	OutFall	0.000	0.000	7135.247
RL01	2	RL01	39.980	1.480	7148.976
RL01	5	RL01	63.333	622.100	7149.089
RL01	10	RL01	79.002	961.380	7149.144
RL01	100	RL01	146.951	6910.010	7149.774
RL02	2	RL02	54.310	3493.080	7142.612
RL02	5	RL02	89.295	9414.930	7143.152

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
RL02	10	RL02	115.244	13221.470	7143.386
RL02	100	RL02	235.859	65731.870	7144.744
RL03	2	RL03	38.355	0.000	7138.274
RL03	5	RL03	61.943	0.000	7139.462
RL03	10	RL03	80.254	3837.330	7140.136
RL03	100	RL03	168.323	80102.410	7142.304
RM01	2	RM01	16.335	0.000	7198.123
RM01	5	RM01	24.703	0.000	7198.223
RM01	10	RM01	30.282	2.360	7198.263
RM01	100	RM01	58.055	3404.820	7198.630
RM02	2	RM02	45.442	0.000	7194.734
RM02	5	RM02	70.822	0.000	7195.232
RM02	10	RM02	87.812	0.000	7195.471
RM02	100	RM02	169.948	4539.520	7196.891
RM03	2	RM03	33.919	0.000	7203.340
RM03	5	RM03	51.385	0.000	7203.630
RM03	10	RM03	63.034	0.000	7203.795
RM03	100	RM03	142.265	0.000	7205.585
RM04	2	RM04	20.241	0.000	7203.188
RM04	5	RM04	30.511	0.000	7203.437
RM04	10	RM04	37.354	0.000	7203.578
RM04	100	RM04	90.170	4898.800	7205.585
RM05	2	RM05	43.191	0.000	7197.090
RM05	5	RM05	65.546	0.000	7197.616
RM05	10	RM05	80.462	0.000	7197.697
RM05	100	RM05	180.835	672.130	7197.891
RM06	2	RM06	79.063	0.000	7179.491
RM06	5	RM06	125.103	0.000	7180.184
RM06	10	RM06	155.988	0.000	7180.513
RM06	100	RM06	298.930	0.000	7182.108
RM07	2	RM07	26.653	0.000	7190.175
RM07	5	RM07	40.223	0.000	7190.629
RM07	10	RM07	49.266	0.000	7190.884
RM07	100	RM07	111.328	0.000	7192.862
RM08	2	RM08	25.080	0.000	7204.913
RM08	5	RM08	38.059	0.000	7205.378
RM08	10	RM08	46.718	0.000	7205.578
RM08	100	RM08	103.472	0.000	7208.548
RM09	2	RM09	29.777	0.000	7179.060
RM09	5	RM09	46.071	0.000	7179.478
RM09	10	RM09	56.970	0.000	7179.846
RM09	100	RM09	107.216	3335.390	7181.654
RM10	2	RM10	2.209	0.000	7292.595
RM10	5	RM10	3.316	0.000	7292.613
RM10	10	RM10	4.054	0.000	7292.623
RM10	100	RM10	64.271	0.000	7292.932
RM11	2	RM11	49.830	0.000	7174.602
RM11	5	RM11	77.402	1037.490	7175.174
RM11	10	RM11	95.853	1519.700	7175.248
RM11	100	RM11	183.359	7506.690	7175.827
RU01	2	RU01	46.798	0.000	7308.107

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
RU01	5	RU01	71.392	1195.500	7308.202
RU01	10	RU01	87.817	4491.220	7308.236
RU01	100	RU01	206.716	40247.220	7308.456
RU02	2	RU02	32.539	1037.390	7275.731
RU02	5	RU02	49.429	4087.940	7276.088
RU02	10	RU02	60.701	3646.010	7275.960
RU02	100	RU02	130.247	5858.070	7276.035
RU03	2	RU03	24.327	3057.220	7275.490
RU03	5	RU03	37.042	4509.540	7275.647
RU03	10	RU03	45.531	4999.400	7275.690
RU03	100	RU03	94.201	8504.820	7275.978
RU04	2	RU04	39.888	0.000	7236.520
RU04	5	RU04	60.439	0.000	7237.881
RU04	10	RU04	74.147	0.000	7238.643
RU04	100	RU04	190.004	45955.710	7241.697
RU05	2	RU05	14.867	0.000	7236.415
RU05	5	RU05	22.408	0.000	7237.293
RU05	10	RU05	27.433	0.000	7237.762
RU05	100	RU05	70.728	0.000	7241.040
RU06	2	RU06	81.941	2204.620	7310.005
RU06	5	RU06	126.165	13294.580	7310.079
RU06	10	RU06	155.736	18793.550	7310.119
RU06	100	RU06	302.148	46377.400	7310.298

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
DummyOut	100	DummyOut	2673	7133.210	OutFall	7129.580	100.000	0.000	0.000
L0001	100	L0001	CL09	7130.910	2007	7130.910	33.000	0.000	0.000
L1000	100	L1000	2009	7135.150	2007	7130.910	1206.000	0.000	0.000
L1010	100	L1010	2059	7142.490	2054	7139.900	750.000	0.000	0.000
L1200	100	L1200	CL01	7191.050	2116	7158.768	2014.000	2014.000	2014.000
L1310	100	L1310	0007	7249.000	2122	7161.590	3155.000	3155.000	3155.000
L1311	100	L1311	CM01	7249.165	0007	7249.000	33.000	33.000	33.000
L1315	100	L1315	CU01	7285.000	0007	7249.000	5816.000	5816.000	5816.000
L2022	100	L2022	2059	7148.573	2030	7141.622	2161.000	2161.000	2161.000
L2201	100	L2201	2282	7141.570	LL10	7141.950	300.000	0.000	0.000
L2203	100	L2203	2714	7140.510	LL10	7140.430	217.000	0.000	0.000
L2310	100	L2310	RM10	7292.500	2435	7208.000	2856.000	2856.000	2856.000
L2510	100	L2510	RM04	7202.030	2490	7201.280	143.000	143.000	143.000
L2636	100	L2636	RU02	7275.095	2650	7275.095	33.000	33.000	33.000
L2640	100	L2640	RU01	7307.700	2650	7275.095	3920.000	3920.000	3920.000
L2650	100	L2650	RU06	7309.500	2650	7275.095	2993.000	2993.000	2993.000
L2700	100	L2700	2412	7191.900	0004	7190.720	662.000	0.000	0.000
L2802	100	L2802	LL09	7138.680	2690	7138.350	33.000	0.000	0.000
L2807	100	L2807	LL06	7140.840	2714	7140.510	33.000	0.000	0.000
P0000	100	L0000	2007	7130.910	OutFall	7129.580	450.000	0.000	0.000
P1001	100	L1001	CL08	7135.315	2009	7135.150	33.000	0.000	0.000
P1005	100	L1005	2054	7139.900	2009	7135.150	1686.000	0.000	0.000
P1015	100	L1015	2178	7143.730	2059	7142.490	710.000	0.000	0.000
P1020	100	L1020	0010	7146.110	2178	7143.730	563.000	0.000	0.000
P1030	100	L1030	2166	7147.840	0010	7146.110	304.000	0.000	0.000
P1035	100	L1035	2116	7156.140	2166	7147.840	1079.000	0.000	0.000
P1036	100	L1036	CL04	7156.305	2116	7156.140	33.000	0.000	0.000
P1081	100	L1031	CL05	7148.005	2166	7147.840	33.000	0.000	0.000
P1100	100	L1100	2115	7157.160	2116	7156.140	49.000	0.000	0.000
P1101	100	L1101	CL03	7157.325	2115	7157.160	33.000	0.000	0.000
P1105	100	L1105	2105	7164.770	2115	7157.160	534.000	0.000	0.000
P1110	100	L1110	2093	7182.210	2105	7164.770	627.000	0.000	0.000
P1115	100	L1115	CL02	7190.460	2093	7182.210	499.000	0.000	0.000
P1300	100	L1300	2121	7160.100	2116	7156.140	363.000	0.000	0.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
DummyOut	100	3.000	Trapezoidal		3.630	0.013	3.000	3.000	3.630
L0001	100	2.000	Circular		0.000	0.013	0.000	0.000	0.000
L1000	100	5.000	Circular		0.352	0.013	0.000	0.000	0.352
L1010	100	4.500	Circular		0.350	0.013	0.000	0.000	0.350
L1200	100	3.000	Natural	UrbanTypCh	1.600	0.044	3.000	3.000	1.600
L1310	100	0.500	Natural	UrbanTypStr	2.771	0.020	0.000	0.000	2.771
L1311	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
L1315	100	3.000	Natural	UrbanTypCh	0.620	0.044	3.000	3.000	0.620
L2022	100	0.500	Natural	UrbanTypStr	0.322	0.020	0.000	0.000	0.322
L2201	100	3.000	Special		-0.127	0.013	0.000	0.000	-0.127
L2203	100	2.500	Circular		0.037	0.013	0.000	0.000	0.037
L2310	100	0.500	Natural	UrbanTypStr	3.060	0.020	0.000	0.000	3.060
L2510	100	3.000	Natural	BasinConve	0.524	0.013	0.000	0.000	0.524
L2636	100	0.500	Natural	UrbanTypStr	0.000	0.020	0.000	0.000	0.000
L2640	100	0.500	Natural	UrbanTypStr	0.845	0.020	0.000	0.000	0.845
L2650	100	0.500	Natural	UrbanTypStr	1.150	0.020	0.000	0.000	1.150
L2700	100	1.500	Circular		0.180	0.013	0.000	0.000	0.180
L2802	100	5.000	Circular		1.000	0.014	0.000	0.000	1.000
L2807	100	5.000	Circular		1.000	0.013	0.000	0.000	1.000
P0000	100	6.000	Circular		0.296	0.013	0.000	0.000	0.296
P1001	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P1005	100	5.000	Circular		0.280	0.013	0.000	0.000	0.280
P1015	100	4.500	Circular		0.170	0.013	0.000	0.000	0.170
P1020	100	4.000	Circular		0.423	0.013	0.000	0.000	0.423
P1030	100	3.000	Circular		0.570	0.013	0.000	0.000	0.570
P1035	100	2.500	Circular		0.770	0.013	0.000	0.000	0.770
P1036	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P1081	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P1100	100	2.500	Circular		2.080	0.013	0.000	0.000	2.080
P1101	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P1105	100	2.000	Circular		1.430	0.013	0.000	0.000	1.430
P1110	100	1.500	Circular		2.780	0.013	0.000	0.000	2.780
P1115	100	1.500	Circular		1.650	0.013	0.000	0.000	1.650
P1300	100	1.500	Circular		1.090	0.013	0.000	0.000	1.090

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
DummyOut	100	Free	
L0001	100	Free	
L1000	100	Downhill Onl	
L1010	100	Downhill Onl	
L1200	100	Downhill Onl	
L1310	100	Downhill Onl	
L1311	100	Downhill Onl	
L1315	100	Downhill Onl	
L2022	100	Free	
L2201	100	Free	
L2203	100	Downhill Onl	
L2310	100	Downhill Onl	
L2510	100	Downhill Onl	
L2636	100	Downhill Onl	
L2640	100	Downhill Onl	
L2650	100	Free	
L2700	100	Downhill Onl	
L2802	100	Free	
L2807	100	Free	
P0000	100	Downhill Onl	0.000
P1001	100	Downhill Onl	0.000
P1005	100	Downhill Onl	0.000
P1015	100	Downhill Onl	0.000
P1020	100	Downhill Onl	0.000
P1030	100	Downhill Onl	0.000
P1035	100	Downhill Onl	0.000
P1036	100	Downhill Onl	0.000
P1081	100	Downhill Onl	0.000
P1100	100	Downhill Onl	0.000
P1101	100	Downhill Onl	0.000
P1105	100	Downhill Onl	0.000
P1110	100	Downhill Onl	0.000
P1115	100	Downhill Onl	0.000
P1300	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
P1305	100	L1305	2122	7161.090	2121	7160.100	104.000	0.000	0.000
P1306	100	L1306	CM02	7161.255	2122	7161.090	33.000	0.000	0.000
P1911	100	L1911	CL07	7145.830	2059	7145.550	56.000	0.000	0.000
P1912	100	L1912	CL06	7142.655	2059	7142.490	33.000	0.000	0.000
P2000	100	L2000	2022	7133.020	OutFall	7129.581	1976.000	0.000	0.000
P2001	100	L2001	RL03	7133.185	2022	7133.020	33.000	0.000	0.000
P2005	100	L2005	2021	7134.120	2022	7133.020	570.000	0.000	0.000
P2010	100	L2010	2019	7135.570	2021	7134.190	643.000	0.000	0.000
P2020	100	L2020	2030	7137.000	2019	7135.570	665.000	0.000	0.000
P2021	100	L2021	RL02	7137.165	2030	7137.000	33.000	0.000	0.000
P2100	100	L2100	2297	7140.630	2030	7137.000	1798.000	0.000	0.000
P2101	100	L2101	RL01	7140.795	2297	7140.630	33.000	0.000	0.000
P2105	100	L2105	2319	7143.160	2297	7140.630	601.000	0.000	0.000
P2110	100	L2110	2327	7167.530	2319	7143.160	1912.000	0.000	0.000
P2115	100	L2115	2335	7171.210	2327	7167.530	348.000	0.000	0.000
P2116	100	L2116	RM11	7171.540	2335	7171.210	33.000	0.000	0.000
P2120	100	L2120	0006	7175.970	2335	7171.210	627.000	0.000	0.000
P2121	100	L2121	RM06	7176.500	0006	7175.970	74.000	0.000	0.000
P2122	100	L2122	RM09	7176.135	0006	7175.970	33.000	0.000	0.000
P2125	100	L2125	0005	7187.790	0006	7175.970	1447.000	0.000	0.000
P2126	100	L2126	RM07	7188.510	0005	7187.790	103.000	0.000	0.000
P2130	100	L2130	0004	7190.720	0005	7187.790	358.000	0.000	0.000
P2131	100	L2131	RM01	7190.885	0004	7190.720	33.000	0.000	0.000
P2200	100	L2200	2282	7141.570	2030	7137.000	2171.000	0.000	0.000
P2202	100	L2202	LL04	7141.735	2282	7141.570	33.000	0.000	0.000
P2204	100	L2204	LL05	7140.900	LL10	7140.430	118.000	0.000	0.000
P2205	100	L2205	2279	7142.500	2282	7141.570	338.000	0.000	0.000
P2210	100	L2210	2199	7143.170	2279	7142.660	669.000	0.000	0.000
P2211	100	L2211	LL03	7143.335	2199	7143.170	33.000	0.000	0.000
P2215	100	L2215	LL02	7145.050	2199	7143.170	341.000	0.000	0.000
P2220	100	L2220	2206	7148.610	2199	7143.170	718.000	0.000	0.000
P2225	100	L2225	2211	7154.940	2206	7148.710	695.000	0.000	0.000
P2226	100	L2226	LL01	7155.105	2211	7154.940	33.000	0.000	0.000
P2230	100	L2230	2226	7173.680	2211	7154.940	1080.000	0.000	0.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
P1305	100	1.500	Circular		0.950	0.013	0.000	0.000	0.950
P1306	100	1.250	Circular		0.500	0.013	0.000	0.000	0.500
P1911	100	2.000	Circular		0.500	0.013	0.000	0.000	0.500
P1912	100	2.000	Circular		0.500	0.013	0.000	0.000	0.500
P2000	100	4.000	Circular		0.174	0.013	0.000	0.000	0.174
P2001	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2005	100	4.000	Circular		0.190	0.013	0.000	0.000	0.190
P2010	100	4.000	Circular		0.215	0.013	0.000	0.000	0.215
P2020	100	4.000	Circular		0.220	0.013	0.000	0.000	0.220
P2021	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2100	100	4.000	Circular		0.200	0.013	0.000	0.000	0.200
P2101	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2105	100	4.000	Circular		0.420	0.013	0.000	0.000	0.420
P2110	100	3.500	Circular		1.270	0.013	0.000	0.000	1.270
P2115	100	3.500	Circular		1.057	0.013	0.000	0.000	1.057
P2116	100	1.000	Circular		1.000	0.013	0.000	0.000	1.000
P2120	100	3.500	Circular		0.759	0.013	0.000	0.000	0.759
P2121	100	2.000	Circular		0.720	0.013	0.000	0.000	0.720
P2122	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2125	100	2.000	Circular		0.820	0.013	0.000	0.000	0.820
P2126	100	2.000	Circular		0.700	0.013	0.000	0.000	0.700
P2130	100	2.000	Circular		0.820	0.013	0.000	0.000	0.820
P2131	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2200	100	2.000	Circular		0.210	0.013	0.000	0.000	0.210
P2202	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2204	100	1.500	Circular		0.398	0.013	0.000	0.000	0.398
P2205	100	4.000	Circular		0.275	0.013	0.000	0.000	0.275
P2210	100	4.000	Circular		0.076	0.013	0.000	0.000	0.076
P2211	100	3.000	Circular		0.500	0.013	0.000	0.000	0.500
P2215	100	2.500	Circular		0.550	0.013	0.000	0.000	0.550
P2220	100	3.000	Circular		0.760	0.013	0.000	0.000	0.760
P2225	100	2.500	Circular		0.900	0.013	0.000	0.000	0.900
P2226	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2230	100	2.000	Circular		1.740	0.013	0.000	0.000	1.740

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
P1305	100	Downhill Onl	0.000
P1306	100	Downhill Onl	0.000
P1911	100	Downhill Onl	0.000
P1912	100	Downhill Onl	0.000
P2000	100	Downhill Onl	0.000
P2001	100	Downhill Onl	0.000
P2005	100	Downhill Onl	0.000
P2010	100	Downhill Onl	0.000
P2020	100	Downhill Onl	0.000
P2021	100	Downhill Onl	0.000
P2100	100	Downhill Onl	0.000
P2101	100	Downhill Onl	0.000
P2105	100	Downhill Onl	0.000
P2110	100	Downhill Onl	0.000
P2115	100	Downhill Onl	0.000
P2116	100	Downhill Onl	0.000
P2120	100	Downhill Onl	0.000
P2121	100	Downhill Onl	0.000
P2122	100	Downhill Onl	0.000
P2125	100	Downhill Onl	0.000
P2126	100	Downhill Onl	0.000
P2130	100	Downhill Onl	0.000
P2131	100	Downhill Onl	0.000
P2200	100	Downhill Onl	0.000
P2202	100	Downhill Onl	0.000
P2204	100	Free	0.000
P2205	100	Downhill Onl	0.000
P2210	100	Downhill Onl	0.000
P2211	100	Downhill Onl	0.000
P2215	100	Downhill Onl	0.000
P2220	100	Downhill Onl	0.000
P2225	100	Downhill Onl	0.000
P2226	100	Downhill Onl	0.000
P2230	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
P2235	100	L2235	2229	7176.550	2226	7173.680	344.000	0.000	0.000
P2240	100	L2240	2235	7178.780	2229	7176.550	408.000	0.000	0.000
P2245	100	L2245	LM02	7180.950	2235	7178.780	112.000	0.000	0.000
P2250	100	L2250	LM01	7180.980	2235	7178.780	90.000	0.000	0.000
P2305	100	L2305	2435	7200.150	0004	7190.720	1211.000	0.000	0.000
P2306	100	L2306	RM08	7203.190	2435	7200.150	167.000	0.000	0.000
P2400	100	L2400	2359	7191.050	0004	7190.720	46.000	0.000	0.000
P2405	100	L2405	2364	7200.270	2359	7191.050	698.000	0.000	0.000
P2500	100	L2500	2363	7200.920	2364	7200.270	52.000	0.000	0.000
P2505	100	L2505	2490	7201.050	2363	7200.920	45.000	0.000	0.000
P2506	100	L2506	RM03	7201.850	2490	7201.480	74.000	0.000	0.000
P2600	100	L2600	2365	7202.690	2364	7200.270	276.000	0.000	0.000
P2605	100	L2605	0017	7230.470	2365	7202.690	1594.000	0.000	0.000
P2610	100	L2610	2639	7230.990	0017	7230.470	33.000	0.000	0.000
P2615	100	L2615	2634	7232.560	2639	7230.990	162.000	0.000	0.000
P2616	100	L2616	RU04	7232.725	2634	7232.560	33.000	0.000	0.000
P2617	100	L2617	RU05	7233.110	2634	7232.560	205.000	0.000	0.000
P2620	100	L2620	2643	7236.930	2634	7233.830	156.000	0.000	0.000
P2630	100	L2630	2650	7271.300	2643	7236.930	1087.000	0.000	0.000
P2631	100	L2631	RU03	7272.810	2650	7271.300	33.000	0.000	0.000
P2705	100	L2705	2407	7192.860	2412	7191.900	71.000	0.000	0.000
P2706	100	L2706	RM02	7193.025	2407	7192.860	33.000	0.000	0.000
P2710	100	L2710	RM05	7193.860	2407	7193.120	54.000	0.000	0.000
P2800	100	L2800	2690	7138.350	2673	7133.210	2240.000	0.000	0.000
P2801	100	L2801	LL08	7147.440	2690	7138.350	1358.000	0.000	0.000
P2804	100	L2804	2695	7140.040	2690	7138.350	340.000	0.000	0.000
P2805	100	L2805	2714	7140.510	2695	7140.040	1075.000	0.000	0.000
P2806	100	L2806	LL07	7151.540	2714	7140.550	1725.000	0.000	0.000
S0000	100	L0000	2007	7142.028	OutFall	7141.863	33.000	33.000	33.000
S1001	100	L1001	CL08	7140.573	2009	7140.408	33.000	33.000	33.000
S1005	100	L1005	2054	7149.539	2009	7143.073	1686.000	1686.000	1686.000
S1015	100	L1015	2178	7150.308	2059	7148.573	710.000	710.000	710.000
S1020	100	L1020	0010	7152.420	2178	7150.308	563.000	563.000	563.000
S1030	100	L1030	2166	7153.597	0010	7152.420	304.000	304.000	304.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
P2235	100	2.000	Circular		0.830	0.013	0.000	0.000	0.830
P2240	100	2.000	Circular		0.547	0.013	0.000	0.000	0.547
P2245	100	1.250	Circular		1.940	0.013	0.000	0.000	1.940
P2250	100	1.250	Circular		2.440	0.013	0.000	0.000	2.440
P2305	100	1.500	Circular		0.779	0.011	0.000	0.000	0.779
P2306	100	1.500	Circular		1.820	0.011	0.000	0.000	1.820
P2400	100	2.000	Circular		0.720	0.013	0.000	0.000	0.720
P2405	100	2.000	Circular		1.320	0.013	0.000	0.000	1.320
P2500	100	1.500	Circular		1.250	0.013	0.000	0.000	1.250
P2505	100	1.000	Circular		0.290	0.011	0.000	0.000	0.290
P2506	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2600	100	2.000	Circular		0.880	0.013	0.000	0.000	0.880
P2605	100	1.500	Circular		1.740	0.013	0.000	0.000	1.740
P2610	100	1.500	Circular		1.730	0.013	0.000	0.000	1.730
P2615	100	2.000	Circular		0.969	0.013	0.000	0.000	0.969
P2616	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2617	100	2.500	Circular		0.250	0.011	0.000	0.000	0.250
P2620	100	2.000	Circular		1.990	0.013	0.000	0.000	1.990
P2630	100	2.000	Circular		3.160	0.013	0.000	0.000	3.160
P2631	100	1.500	Circular		4.576	0.013	0.000	0.000	4.576
P2705	100	1.250	Circular		1.350	0.013	0.000	0.000	1.350
P2706	100	2.000	Circular		0.500	0.011	0.000	0.000	0.500
P2710	100	2.000	Circular		1.370	0.013	0.000	0.000	1.370
P2800	100	3.500	Circular		0.273	0.013	0.000	0.000	0.273
P2801	100	3.500	Circular		0.669	0.013	0.000	0.000	0.669
P2804	100	2.000	Circular		0.497	0.013	0.000	0.000	0.497
P2805	100	2.000	Circular		0.044	0.013	0.000	0.000	0.044
P2806	100	2.000	Circular		0.637	0.013	0.000	0.000	0.637
S0000	100	3.000	Natural	BasinConve	0.500	0.044	0.000	0.000	0.500
S1001	100	3.000	Natural	BasinConve	0.500	0.020	3.000	3.000	0.500
S1005	100	0.500	Natural	UrbanTypStr	0.384	0.020	0.000	0.000	0.384
S1015	100	0.500	Natural	UrbanTypStr	0.244	0.020	0.000	0.000	0.244
S1020	100	0.500	Natural	UrbanTypStr	0.375	0.020	0.000	0.000	0.375
S1030	100	0.500	Natural	UrbanTypStr	0.387	0.020	0.000	0.000	0.387

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
P2235	100	Downhill Onl	0.000
P2240	100	Downhill Onl	0.000
P2245	100	Downhill Onl	0.000
P2250	100	Downhill Onl	0.000
P2305	100	Downhill Onl	0.000
P2306	100	Downhill Onl	0.000
P2400	100	Downhill Onl	0.000
P2405	100	Downhill Onl	0.000
P2500	100	Downhill Onl	0.000
P2505	100	Downhill Onl	0.000
P2506	100	Downhill Onl	0.000
P2600	100	Downhill Onl	0.000
P2605	100	Downhill Onl	0.000
P2610	100	Downhill Onl	0.000
P2615	100	Downhill Onl	0.000
P2616	100	Downhill Onl	0.000
P2617	100	Downhill Onl	0.000
P2620	100	Downhill Onl	0.000
P2630	100	Downhill Onl	0.000
P2631	100	Downhill Onl	0.000
P2705	100	Downhill Onl	0.000
P2706	100	Downhill Onl	0.000
P2710	100	Downhill Onl	0.000
P2800	100	Free	0.000
P2801	100	Free	0.000
P2804	100	Downhill Onl	0.000
P2805	100	Downhill Onl	0.000
P2806	100	Free	0.000
S0000	100	Free	0.000
S1001	100	Downhill Onl	0.000
S1005	100	Downhill Onl	0.000
S1015	100	Downhill Onl	0.000
S1020	100	Downhill Onl	0.000
S1030	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
S1035	100	L1035	2116	7161.268	2166	7153.597	1079.000	1079.000	1079.000
S1036	100	L1036	CL04	7161.268	2116	7161.103	33.000	33.000	33.000
S1081	100	L1031	CL05	7153.597	2166	7153.432	33.000	33.000	33.000
S1100	100	L1100	2115	7161.985	2116	7161.268	49.000	49.000	49.000
S1101	100	L1101	CL03	7161.985	2115	7161.820	33.000	33.000	33.000
S1105	100	L1105	2105	7167.760	2115	7161.985	534.000	534.000	534.000
S1110	100	L1110	2093	7183.842	2105	7167.760	627.000	627.000	627.000
S1115	100	L1115	CL02	7192.000	2093	7183.842	499.000	499.000	499.000
S1300	100	L1300	2121	7161.799	2116	7161.268	363.000	363.000	363.000
S1305	100	L1305	2122	7164.850	2121	7161.799	104.000	104.000	104.000
S1306	100	L1306	CM02	7161.850	2122	7161.685	33.000	33.000	33.000
S1911	100	L1911	CL07	7148.500	2059	7148.335	33.000	33.000	33.000
S1912	100	L1912	CL06	7148.573	2059	7148.408	33.000	33.000	33.000
S2000	100	L2000	2022	7136.591	OutFall	7136.426	33.000	33.000	33.000
S2001	100	L2001	RL03	7136.591	2022	7136.426	33.000	33.000	33.000
S2005	100	L2005	2021	7142.236	2022	7139.091	570.000	570.000	570.000
S2010	100	L2010	2019	7140.674	2021	7137.459	643.000	643.000	643.000
S2020	100	L2020	2030	7141.622	2019	7140.674	665.000	665.000	665.000
S2021	100	L2021	RL02	7139.122	2030	7138.957	33.000	33.000	33.000
S2100	100	L2100	2297	7148.483	2030	7141.622	1798.000	1798.000	1798.000
S2101	100	L2101	RL01	7145.983	2297	7145.818	33.000	33.000	33.000
S2105	100	L2105	2319	7149.855	2297	7148.483	601.000	601.000	601.000
S2110	100	L2110	2327	7173.289	2319	7149.855	1912.000	1912.000	1912.000
S2115	100	L2115	2335	7174.500	2327	7173.289	348.000	348.000	348.000
S2116	100	L2116	RM11	7172.000	2335	7171.835	33.000	33.000	33.000
S2120	100	L2120	0006	7180.680	2335	7174.500	627.000	627.000	627.000
S2121	100	L2121	RM06	7181.570	0006	7178.180	74.000	74.000	74.000
S2122	100	L2122	RM09	7178.180	0006	7178.015	33.000	33.000	33.000
S2125	100	L2125	0005	7192.450	0006	7180.680	1447.000	1447.000	1447.000
S2126	100	L2126	RM07	7193.000	0005	7189.950	103.000	103.000	103.000
S2130	100	L2130	0004	7197.770	0005	7192.450	358.000	358.000	358.000
S2131	100	L2131	RM01	7197.770	0004	7197.605	33.000	33.000	33.000
S2200	100	L2200	2282	7147.580	2030	7141.622	2171.000	2171.000	2171.000
S2202	100	L2202	LL04	7147.580	2282	7147.415	33.000	33.000	33.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S1035	100	0.500	Natural	UrbanTypStr	0.711	0.020	0.000	0.000	0.711
S1036	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1081	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1100	100	0.500	Natural	UrbanTypStr	1.463	0.020	0.000	0.000	1.463
S1101	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1105	100	0.500	Natural	UrbanTypStr	1.550	0.020	0.000	0.000	1.550
S1110	100	3.000	Natural	UrbanTypCh	2.565	0.044	3.000	3.000	2.565
S1115	100	3.000	Natural	UrbanTypCh	1.635	0.044	3.000	3.000	1.635
S1300	100	0.500	Natural	UrbanTypStr	0.284	0.020	0.000	0.000	0.284
S1305	100	1.000	Natural	PondOverflo	2.934	0.044	3.000	3.000	2.934
S1306	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S1911	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1912	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2000	100	3.000	Natural	BasinConve	0.500	0.044	0.000	0.000	0.500
S2001	100	3.000	Natural	BasinConve	0.500	0.020	3.000	3.000	0.500
S2005	100	0.500	Natural	UrbanTypStr	0.552	0.020	0.000	0.000	0.552
S2010	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2020	100	0.500	Natural	UrbanTypStr	0.143	0.020	0.000	0.000	0.143
S2021	100	3.000	Natural	BasinConve	0.500	0.020	0.000	0.000	0.500
S2100	100	0.500	Natural	UrbanTypStr	0.382	0.020	0.000	0.000	0.382
S2101	100	3.000	Natural	BasinConve	0.500	0.020	0.000	0.000	0.500
S2105	100	0.500	Natural	UrbanTypStr	0.228	0.020	0.000	0.000	0.228
S2110	100	0.500	Natural	UrbanTypStr	1.226	0.020	0.000	0.000	1.226
S2115	100	0.500	Natural	UrbanTypStr	0.348	0.020	0.000	0.000	0.348
S2116	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S2120	100	0.500	Natural	UrbanTypStr	0.986	0.020	0.000	0.000	0.986
S2121	100	1.000	Natural	PondOverflo	4.581	0.044	3.000	3.000	4.581
S2122	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S2125	100	0.500	Natural	UrbanTypStr	0.813	0.020	0.000	0.000	0.813
S2126	100	1.000	Natural	PondOverflo	1.990	0.044	3.000	3.000	1.990
S2130	100	0.500	Natural	UrbanTypStr	1.486	0.020	0.000	0.000	1.486
S2131	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2200	100	0.500	Natural	UrbanTypStr	0.274	0.020	0.000	0.000	0.274
S2202	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S1035	100	Downhill Onl	0.000
S1036	100	Downhill Onl	0.000
S1081	100	Downhill Onl	0.000
S1100	100	Downhill Onl	0.000
S1101	100	Downhill Onl	0.000
S1105	100	Downhill Onl	0.000
S1110	100	Downhill Onl	0.000
S1115	100	Downhill Onl	0.000
S1300	100	Downhill Onl	0.000
S1305	100	Downhill Onl	20.000
S1306	100	Downhill Onl	0.000
S1911	100	Downhill Onl	0.000
S1912	100	Downhill Onl	0.000
S2000	100	Free	0.000
S2001	100	Downhill Onl	0.000
S2005	100	Downhill Onl	0.000
S2010	100	Free	0.000
S2020	100	Downhill Onl	0.000
S2021	100	Downhill Onl	0.000
S2100	100	Downhill Onl	0.000
S2101	100	Downhill Onl	0.000
S2105	100	Downhill Onl	0.000
S2110	100	Downhill Onl	0.000
S2115	100	Downhill Onl	0.000
S2116	100	Downhill Onl	0.000
S2120	100	Downhill Onl	0.000
S2121	100	Downhill Onl	20.000
S2122	100	Downhill Onl	0.000
S2125	100	Downhill Onl	0.000
S2126	100	Downhill Onl	20.000
S2130	100	Downhill Onl	0.000
S2131	100	Downhill Onl	0.000
S2200	100	Downhill Onl	0.000
S2202	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
S2204	100	L2204	LL05	7146.140	LL10	7145.500	118.000	0.000	0.000
S2205	100	L2205	2279	7147.962	2282	7147.580	338.000	338.000	338.000
S2206	100	L2206	LL10	7145.000	2030	7137.000	1200.000	0.000	0.000
S2210	100	L2210	2199	7148.187	2279	7147.962	669.000	669.000	669.000
S2211	100	L2211	LL03	7148.187	2199	7148.022	33.000	33.000	33.000
S2215	100	L2215	LL02	7148.689	2199	7148.187	341.000	341.000	341.000
S2220	100	L2220	2206	7156.859	2199	7148.187	718.000	718.000	718.000
S2225	100	L2225	2211	7159.372	2206	7156.859	695.000	695.000	695.000
S2226	100	L2226	LL01	7159.537	2211	7159.372	33.000	33.000	33.000
S2230	100	L2230	2226	7179.148	2211	7159.537	1080.000	1080.000	1080.000
S2235	100	L2235	2229	7179.572	2226	7179.148	344.000	344.000	344.000
S2240	100	L2240	2235	7182.512	2229	7179.572	408.000	408.000	408.000
S2245	100	L2245	LM02	7184.690	2235	7180.012	112.000	112.000	112.000
S2250	100	L2250	LM01	7185.520	2235	7180.012	90.000	90.000	90.000
S2305	100	L2305	2435	7208.000	0004	7197.770	1211.000	1211.000	1211.000
S2306	100	L2306	RM08	7212.020	2435	7207.500	167.000	167.000	167.000
S2400	100	L2400	2359	7198.120	0004	7197.770	46.000	46.000	46.000
S2405	100	L2405	2364	7203.742	2359	7198.120	698.000	698.000	698.000
S2500	100	L2500	2363	7203.340	2364	7203.742	52.000	52.000	52.000
S2505	100	L2505	2490	7205.480	2363	7203.340	45.000	45.000	45.000
S2506	100	L2506	RM03	7202.850	2490	7202.480	74.000	74.000	74.000
S2600	100	L2600	2365	7204.844	2364	7203.742	276.000	276.000	276.000
S2605	100	L2605	0017	7232.960	2365	7204.844	1594.000	1594.000	1594.000
S2610	100	L2610	2639	7234.179	0017	7232.960	33.000	33.000	33.000
S2615	100	L2615	2634	7240.430	2639	7231.679	162.000	162.000	162.000
S2616	100	L2616	RU04	7237.430	2634	7236.430	33.000	33.000	33.000
S2617	100	L2617	RU05	7240.420	2634	7237.255	33.000	33.000	33.000
S2620	100	L2620	2643	7237.373	2634	7232.560	156.000	0.000	0.000
S2630	100	L2630	2650	7275.095	2643	7239.873	1087.000	1087.000	1087.000
S2631	100	L2631	RU03	7274.560	2650	7274.395	33.000	33.000	33.000
S2705	100	L2705	2407	7196.280	2412	7192.232	71.000	71.000	71.000
S2706	100	L2706	RM02	7193.280	2407	7193.115	33.000	33.000	33.000
S2710	100	L2710	RM05	7197.310	2407	7195.780	54.000	0.000	0.000
S2800	100	L2800	2690	7147.200	2673	7136.210	2240.000	2240.000	2240.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S2204	100	0.500	Natural	UrbanTypStr	0.542	0.020	0.000	0.000	0.542
S2205	100	0.500	Natural	UrbanTypStr	0.113	0.020	0.000	0.000	0.113
S2206	100	1.000	Natural	PondOverflo	0.662	0.044	0.000	0.000	0.662
S2210	100	0.500	Natural	UrbanTypStr	0.034	0.020	0.000	0.000	0.034
S2211	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2215	100	0.500	Natural	UrbanTypStr	0.147	0.020	0.000	0.000	0.147
S2220	100	0.500	Natural	UrbanTypStr	1.208	0.020	0.000	0.000	1.208
S2225	100	0.500	Natural	UrbanTypStr	0.362	0.020	0.000	0.000	0.362
S2226	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2230	100	0.500	Natural	UrbanTypStr	1.816	0.020	0.000	0.000	1.816
S2235	100	0.500	Natural	UrbanTypStr	0.123	0.020	0.000	0.000	0.123
S2240	100	0.500	Natural	UrbanTypStr	0.721	0.020	0.000	0.000	0.721
S2245	100	1.000	Natural	PondOverflo	4.177	0.044	3.000	3.000	4.177
S2250	100	1.000	Natural	PondOverflo	6.120	0.044	3.000	3.000	6.120
S2305	100	0.500	Natural	UrbanTypStr	0.845	0.020	0.000	0.000	0.845
S2306	100	1.000	Natural	PondOverflo	2.707	0.044	3.000	3.000	2.707
S2400	100	0.500	Natural	UrbanTypStr	0.761	0.020	0.000	0.000	0.761
S2405	100	0.500	Natural	UrbanTypStr	0.805	0.020	0.000	0.000	0.805
S2500	100	0.500	Natural	UrbanTypStr	0.188	0.020	0.000	0.000	0.188
S2505	100	1.000	Natural	PondOverflo	4.756	0.044	3.000	3.000	4.756
S2506	100	3.000	Natural	BasinConve	0.500	0.044	3.000	3.000	0.500
S2600	100	0.500	Natural	UrbanTypStr	0.399	0.020	0.000	0.000	0.399
S2605	100	0.500	Natural	UrbanTypStr	1.889	0.020	0.000	0.000	1.889
S2610	100	0.500	Natural	UrbanTypStr	3.694	0.020	0.000	0.000	3.694
S2615	100	1.000	Natural	PondOverflo	5.402	0.044	3.000	3.000	5.402
S2616	100	3.000	Natural	BasinConve	3.030	0.044	3.000	3.000	3.030
S2617	100	1.000	Natural	PondOverflo	9.591	0.044	3.000	3.000	9.591
S2620	100	3.000	Natural	UrbanTypCh	3.085	0.044	0.000	0.000	3.085
S2630	100	0.500	Natural	UrbanTypStr	3.240	0.020	0.000	0.000	3.240
S2631	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2705	100	1.000	Natural	PondOverflo	5.701	0.044	3.000	3.000	5.701
S2706	100	3.000	Natural	BasinConve	0.500	0.044	3.000	3.000	0.500
S2710	100	0.500	Natural	UrbanTypStr	2.833	0.020	0.000	0.000	2.833
S2800	100	0.500	Natural	UrbanTypStr	0.512	0.020	0.000	0.000	0.512

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S2204	100	Free	0.000
S2205	100	Downhill Onl	0.000
S2206	100	Downhill Onl	300.000
S2210	100	Downhill Onl	0.000
S2211	100	Downhill Onl	0.000
S2215	100	Downhill Onl	0.000
S2220	100	Downhill Onl	0.000
S2225	100	Downhill Onl	0.000
S2226	100	Downhill Onl	0.000
S2230	100	Downhill Onl	0.000
S2235	100	Downhill Onl	0.000
S2240	100	Downhill Onl	0.000
S2245	100	Downhill Onl	20.000
S2250	100	Downhill Onl	20.000
S2305	100	Downhill Onl	0.000
S2306	100	Downhill Onl	20.000
S2400	100	Downhill Onl	0.000
S2405	100	Downhill Onl	0.000
S2500	100	Downhill Onl	0.000
S2505	100	Downhill Onl	20.000
S2506	100	Downhill Onl	0.000
S2600	100	Downhill Onl	0.000
S2605	100	Downhill Onl	0.000
S2610	100	Downhill Onl	0.000
S2615	100	Downhill Onl	20.000
S2616	100	Downhill Onl	0.000
S2617	100	Downhill Onl	20.000
S2620	100	Downhill Onl	0.000
S2630	100	Downhill Onl	0.000
S2631	100	Downhill Onl	0.000
S2705	100	Downhill Onl	20.000
S2706	100	Downhill Onl	0.000
S2710	100	Free	0.000
S2800	100	Free	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation	Downstream Node Name	Downstream Invert Elevation	Length ft	Left Channel Length ft	Right Channel Length ft
S2801	100	L2801	LL08	7154.440	2690	7147.200	1358.000	1345.000	1345.000
S2804	100	L2804	2695	7143.710	2690	7143.540	340.000	0.000	0.000
S2805	100	L2805	2714	7145.870	2695	7143.700	1075.000	1385.000	1385.000
S2806	100	L2806	LL07	7158.940	2714	7145.870	1725.000	1680.000	1680.000
W1305	100	L1305	2122	7164.850	2121	7161.799	104.000	104.000	104.000
W2121	100	L2121	RM06	7181.570	0006	7178.180	74.000	74.000	74.000
W2126	100	L2126	RM07	7193.000	0005	7189.950	103.000	103.000	103.000
W2206	100	L2206	LL10	7145.000	2030	7137.000	1200.000	0.000	0.000
W2245	100	L2245	LM02	7184.690	2235	7180.012	112.000	112.000	112.000
W2250	100	L2250	LM01	7185.520	2235	7180.012	90.000	90.000	90.000
W2306	100	L2306	RM08	7212.020	2435	7207.500	167.000	167.000	167.000
W2505	100	L2505	2490	7205.480	2363	7203.340	45.000	45.000	45.000
W2615	100	L2615	2634	7240.430	2639	7231.679	162.000	162.000	162.000
W2617	100	L2617	RU05	7240.420	2634	7237.255	33.000	33.000	33.000
W2705	100	L2705	2407	7196.280	2412	7192.232	71.000	71.000	71.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S2801	100	0.500	Natural	UrbanTypStr	0.533	0.020	0.000	0.000	0.533
S2804	100	0.500	Natural	UrbanTypStr	0.050	0.020	0.000	0.000	0.050
S2805	100	0.500	Natural	UrbanTypStr	0.202	0.020	0.000	0.000	0.202
S2806	100	0.500	Natural	UrbanTypStr	0.758	0.020	0.000	0.000	0.758
W1305	100	1.000	Natural	PondOverflo	2.934	0.044	3.000	3.000	2.934
W2121	100	1.000	Natural	PondOverflo	4.581	0.044	3.000	3.000	4.581
W2126	100	1.000	Natural	PondOverflo	1.990	0.044	3.000	3.000	1.990
W2206	100	1.000	Natural	PondOverflo	0.662	0.044	0.000	0.000	0.662
W2245	100	1.000	Natural	PondOverflo	4.177	0.044	3.000	3.000	4.177
W2250	100	1.000	Natural	PondOverflo	6.120	0.044	3.000	3.000	6.120
W2306	100	1.000	Natural	PondOverflo	2.707	0.044	3.000	3.000	2.707
W2505	100	1.000	Natural	PondOverflo	4.756	0.044	3.000	3.000	4.756
W2615	100	1.000	Natural	PondOverflo	5.402	0.044	3.000	3.000	5.402
W2617	100	1.000	Natural	PondOverflo	9.591	0.044	3.000	3.000	9.591
W2705	100	1.000	Natural	PondOverflo	5.701	0.044	3.000	3.000	5.701

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S2801	100	Free	0.000
S2804	100	Downhill Onl	0.000
S2805	100	Free	0.000
S2806	100	Free	0.000
W1305	100	Downhill Onl	20.000
W2121	100	Downhill Onl	20.000
W2126	100	Downhill Onl	20.000
W2206	100	Downhill Onl	300.000
W2245	100	Downhill Onl	20.000
W2250	100	Downhill Onl	20.000
W2306	100	Downhill Onl	20.000
W2505	100	Downhill Onl	20.000
W2615	100	Downhill Onl	20.000
W2617	100	Downhill Onl	20.000
W2705	100	Downhill Onl	20.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
DummyOut	2	Trapezoidal	52.569	3.590	4.110
DummyOut	5	Trapezoidal	91.505	3.739	5.090
DummyOut	10	Trapezoidal	117.940	3.828	5.950
DummyOut	100	Trapezoidal	344.625	5.669	8.400
L0001	2	Circular	2.315	3.828	2.030
L0001	5	Circular	3.547	4.033	2.150
L0001	10	Circular	4.382	4.150	2.180
L0001	100	Circular	51.525	6.777	16.160
L1000	2	Circular	172.148	4.657	9.220
L1000	5	Circular	184.882	5.573	9.240
L1000	10	Circular	193.862	6.545	9.970
L1000	100	Circular	216.585	8.998	11.020
L1010	2	Circular	154.954	6.409	9.750
L1010	5	Circular	155.938	6.768	9.800
L1010	10	Circular	155.292	6.921	9.780
L1010	100	Circular	154.992	7.705	9.730
L1200	2	Natural	1.363	2.497	0.990
L1200	5	Natural	1.921	2.997	1.040
L1200	10	Natural	2.343	3.068	1.030
L1200	100	Natural	55.990	3.521	3.110
L1310	2	Natural	2.307	0.620	1.480
L1310	5	Natural	3.666	0.920	1.310
L1310	10	Natural	4.554	1.101	1.210
L1310	100	Natural	257.849	4.464	5.220
L1311	2	Natural	3.186	0.400	1.400
L1311	5	Natural	4.770	0.485	1.680
L1311	10	Natural	5.850	0.534	1.820
L1311	100	Natural	78.221	1.648	5.300
L1315	2	Natural	2.506	0.428	1.000
L1315	5	Natural	3.934	0.553	1.150
L1315	10	Natural	4.838	0.621	1.230
L1315	100	Natural	203.448	3.429	3.710
L2022	2	Natural	6.574	0.989	1.160
L2022	5	Natural	75.523	1.530	2.700
L2022	10	Natural	138.044	1.764	3.460
L2022	100	Natural	645.351	3.121	6.150
L2201	2	Special	41.106	6.373	10.220
L2201	5	Special	42.034	6.595	10.420
L2201	10	Special	42.470	6.701	10.520
L2201	100	Special	43.922	7.293	10.810
L2203	2	Circular	49.890	5.724	10.610
L2203	5	Circular	53.547	6.025	11.220
L2203	10	Circular	54.422	6.122	11.350
L2203	100	Circular	60.629	6.918	12.500
L2310	2	Natural	0.752	0.095	1.650
L2310	5	Natural	1.180	0.113	1.850
L2310	10	Natural	1.490	0.123	1.960
L2310	100	Natural	42.396	0.451	4.540
L2510	2	Natural	19.976	1.387	2.140
L2510	5	Natural	30.325	1.949	2.450
L2510	10	Natural	37.316	2.260	2.610

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
L2510	100	Natural	85.373	4.305	3.310
L2636	2	Natural	30.640	0.638	1.460
L2636	5	Natural	36.591	0.995	1.440
L2636	10	Natural	102.751	0.931	2.630
L2636	100	Natural	120.961	0.940	2.820
L2640	2	Natural	18.639	0.407	2.270
L2640	5	Natural	35.632	0.554	2.770
L2640	10	Natural	48.558	0.598	3.130
L2640	100	Natural	165.355	0.928	5.200
L2650	2	Natural	43.174	0.508	3.390
L2650	5	Natural	81.952	0.640	4.370
L2650	10	Natural	106.599	0.714	4.850
L2650	100	Natural	245.965	1.037	6.730
L2700	2	Circular	6.023	7.308	3.460
L2700	5	Circular	6.415	7.402	3.670
L2700	10	Circular	6.583	7.452	3.740
L2700	100	Circular	8.244	7.909	4.600
L2802	2	Circular	56.036	8.379	5.810
L2802	5	Circular	95.212	9.393	7.040
L2802	10	Circular	121.780	9.460	6.520
L2802	100	Circular	227.339	9.832	11.510
L2807	2	Circular	29.813	5.724	3.870
L2807	5	Circular	47.413	6.025	4.040
L2807	10	Circular	56.044	6.122	4.070
L2807	100	Circular	98.810	6.918	4.980
P0000	2	Circular	173.523	3.827	9.200
P0000	5		187.741	4.029	9.410
P0000	10		196.100	4.141	9.540
P0000	100		265.197	5.669	10.560
P1001	2	Circular	37.668	4.657	5.880
P1001	5		57.049	5.573	6.660
P1001	10		65.834	6.545	6.640
P1001	100		64.104	8.998	6.930
P1005	2	Circular	151.194	4.725	8.120
P1005	5		153.338	5.573	8.090
P1005	10		153.204	6.545	8.090
P1005	100		153.997	8.998	8.160
P1015	2	Circular	88.523	6.599	5.550
P1015	5		94.335	7.150	5.910
P1015	10		94.887	7.296	5.940
P1015	100		119.467	7.963	7.460
P1020	2	Circular	88.620	6.599	7.740
P1020	5		93.440	7.150	7.890
P1020	10		93.843	7.296	7.750
P1020	100		94.271	7.963	7.830
P1030	2	Circular	81.658	6.346	11.470
P1030	5		82.283	6.899	11.560
P1030	10		82.369	7.005	11.550
P1030	100		82.011	7.567	11.500
P1035	2	Circular	40.710	6.319	8.260
P1035	5		41.151	6.472	8.300

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P1035	10		40.432	6.552	8.260
P1035	100		42.708	7.100	8.700
P1036	2	Circular	28.363	5.464	15.810
P1036	5		29.332	5.625	16.360
P1036	10		29.032	5.696	16.190
P1036	100		28.559	6.149	15.930
P1081	2	Circular	32.782	6.319	18.260
P1081	5		32.858	6.472	18.300
P1081	10		32.721	6.552	18.220
P1081	100		31.636	7.100	17.600
P1100	2	Circular	27.491	5.125	6.150
P1100	5		43.441	5.625	8.800
P1100	10		49.171	5.696	9.960
P1100	100		47.988	6.149	9.720
P1101	2	Circular	26.146	4.124	5.160
P1101	5		40.126	4.757	5.350
P1101	10		46.645	5.065	5.340
P1101	100		56.167	5.425	5.310
P1105	2	Circular	2.922	4.124	4.180
P1105	5		3.755	4.757	4.280
P1105	10		4.578	5.065	4.450
P1105	100		23.514	5.425	7.450
P1110	2	Circular	2.530	0.407	7.010
P1110	5		3.896	0.506	7.940
P1110	10		4.717	0.601	8.330
P1110	100		18.130	3.496	10.920
P1115	2	Circular	2.556	0.474	5.560
P1115	5		3.856	0.589	6.270
P1115	10		4.722	0.656	6.660
P1115	100		14.065	3.042	8.500
P1300	2	Circular	9.411	5.125	6.810
P1300	5		11.442	5.625	7.080
P1300	10		11.653	5.696	7.040
P1300	100		12.125	6.149	6.950
P1305	2	Circular	9.210	1.866	6.560
P1305	5		11.425	1.981	6.740
P1305	10		11.600	2.003	6.600
P1305	100		18.159	4.964	10.140
P1306	2	Circular	11.484	1.820	9.540
P1306	5		12.848	2.142	10.600
P1306	10		13.413	2.324	11.000
P1306	100		15.082	4.964	12.180
P1911	2	Circular	35.005	3.349	11.130
P1911	5		34.962	3.708	11.110
P1911	10		35.146	3.861	11.170
P1911	100		34.878	4.645	11.090
P1912	2	Circular	44.957	6.443	14.140
P1912	5		44.437	6.768	13.970
P1912	10		44.714	6.921	14.070
P1912	100		43.411	7.705	13.670
P2000	2	Circular	76.127	5.253	6.190

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2000	5		83.438	6.444	6.760
P2000	10		86.721	7.114	6.930
P2000	100		88.056	9.279	7.040
P2001	2	Circular	35.557	5.253	6.280
P2001	5		55.491	6.444	7.110
P2001	10		59.542	7.114	7.150
P2001	100		82.736	9.279	6.910
P2005	2	Circular	123.404	8.311	9.760
P2005	5		124.829	8.883	9.870
P2005	10		125.181	9.085	9.900
P2005	100		125.668	10.216	9.930
P2010	2	Circular	79.916	8.241	6.420
P2010	5		80.707	8.813	6.400
P2010	10		81.318	9.015	6.430
P2010	100		80.727	10.146	6.390
P2020	2	Circular	86.939	6.816	6.670
P2020	5		89.933	7.398	6.910
P2020	10		88.488	7.571	6.860
P2020	100		87.837	8.549	6.800
P2021	2	Circular	39.426	5.611	5.430
P2021	5		49.802	6.152	6.940
P2021	10		48.538	6.386	6.230
P2021	100		45.907	7.743	6.570
P2100	2	Circular	90.693	8.346	7.150
P2100	5		91.565	8.459	7.240
P2100	10		92.101	8.514	7.250
P2100	100		91.778	9.143	7.230
P2101	2	Circular	37.271	8.346	5.200
P2101	5		41.771	8.459	5.910
P2101	10		41.574	8.514	5.780
P2101	100		38.566	9.143	6.180
P2105	2	Circular	73.634	8.346	7.240
P2105	5		78.354	8.459	7.350
P2105	10		75.020	8.514	7.220
P2105	100		80.451	9.143	7.370
P2110	2	Circular	107.462	7.266	12.810
P2110	5		111.270	7.336	12.970
P2110	10		111.537	7.381	12.870
P2110	100		111.814	8.125	12.860
P2115	2	Circular	114.003	3.509	12.390
P2115	5		115.755	6.085	12.280
P2115	10		115.624	6.202	12.410
P2115	100		115.488	6.711	12.410
P2116	2	Circular	3.769	3.379	5.330
P2116	5		3.590	3.957	5.350
P2116	10		3.680	4.026	5.400
P2116	100		4.279	4.615	5.620
P2120	2	Circular	69.853	3.379	9.980
P2120	5		83.124	3.957	10.230
P2120	10		86.963	4.026	10.380
P2120	100		98.992	5.683	10.500

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2121	2	Circular	29.658	2.991	9.370
P2121	5		34.061	3.684	10.780
P2121	10		35.650	4.014	11.280
P2121	100		34.488	5.683	10.900
P2122	2	Circular	15.041	2.926	8.470
P2122	5		15.425	3.343	8.690
P2122	10		15.426	3.726	8.690
P2122	100		15.197	5.683	8.560
P2125	2	Circular	23.355	4.957	7.490
P2125	5		23.441	5.084	7.500
P2125	10		23.457	5.117	7.500
P2125	100		23.494	5.683	7.500
P2126	2	Circular	7.968	4.957	3.930
P2126	5		7.337	5.084	3.630
P2126	10		7.072	5.117	3.530
P2126	100		7.799	5.619	3.850
P2130	2	Circular	33.455	7.308	10.460
P2130	5		33.764	7.402	10.540
P2130	10		33.627	7.452	10.510
P2130	100		33.543	7.909	10.510
P2131	2	Circular	9.999	7.308	5.550
P2131	5		13.079	7.402	7.320
P2131	10		12.443	7.452	6.990
P2131	100		12.350	7.909	6.950
P2200	2	Circular	14.416	6.753	4.520
P2200	5		14.563	6.975	4.580
P2200	10		14.429	7.081	4.540
P2200	100		14.584	7.743	4.590
P2202	2	Circular	25.570	6.753	14.230
P2202	5		28.913	6.975	16.070
P2202	10		27.227	7.081	15.130
P2202	100		27.418	7.673	15.230
P2204	2	Circular	17.367	4.854	10.230
P2204	5		21.083	5.552	12.020
P2204	10		21.491	5.633	12.210
P2204	100		22.074	5.795	12.520
P2205	2	Circular	58.486	6.753	4.640
P2205	5		60.896	6.975	4.830
P2205	10		62.445	7.081	4.950
P2205	100		62.295	7.673	4.930
P2210	2	Circular	53.299	6.124	4.600
P2210	5		63.772	6.390	4.900
P2210	10		56.989	6.527	4.760
P2210	100		60.853	7.249	4.670
P2211	2	Circular	16.935	6.079	4.060
P2211	5		22.057	6.390	4.000
P2211	10		22.606	6.527	4.130
P2211	100		19.654	7.249	4.950
P2215	2	Circular	24.015	6.079	5.370
P2215	5		28.858	6.390	5.950
P2215	10		29.011	6.527	5.890

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2215	100		27.573	7.249	5.810
P2220	2	Circular	70.839	8.546	9.910
P2220	5		71.479	8.795	10.000
P2220	10		71.446	8.859	9.990
P2220	100		71.439	9.068	9.990
P2225	2	Circular	44.999	8.446	9.150
P2225	5		45.363	8.695	9.190
P2225	10		45.008	8.759	9.100
P2225	100		45.489	8.968	9.240
P2226	2	Circular	31.654	5.075	17.650
P2226	5		32.750	5.201	18.230
P2226	10		31.557	5.285	17.640
P2226	100		32.028	5.640	17.840
P2230	2	Circular	19.199	5.075	9.510
P2230	5		20.373	5.195	9.680
P2230	10		21.523	5.267	9.930
P2230	100		30.726	6.025	10.180
P2235	2	Circular	19.190	1.588	7.360
P2235	5		20.366	1.673	7.440
P2235	10		21.316	1.756	7.480
P2235	100		26.057	6.025	8.350
P2240	2	Circular	19.192	2.166	6.140
P2240	5		20.367	2.682	6.540
P2240	10		21.316	3.052	6.810
P2240	100		22.774	4.409	7.180
P2245	2	Circular	10.697	2.593	8.630
P2245	5		11.856	3.435	9.540
P2245	10		12.235	3.805	9.840
P2245	100		11.180	4.449	8.990
P2250	2	Circular	9.462	2.166	7.670
P2250	5		10.197	2.682	8.260
P2250	10		10.370	3.052	8.400
P2250	100		11.437	4.717	9.200
P2305	2	Circular	10.588	7.308	6.490
P2305	5		10.878	7.402	6.660
P2305	10		10.737	7.452	6.730
P2305	100		11.659	8.301	6.740
P2306	2	Circular	12.145	4.044	9.750
P2306	5		13.113	4.502	9.810
P2306	10		12.558	4.716	9.800
P2306	100		12.455	8.301	9.760
P2400	2	Circular	26.058	7.308	8.160
P2400	5		26.553	7.426	8.320
P2400	10		26.569	7.461	8.320
P2400	100		26.451	8.108	8.290
P2405	2	Circular	22.909	7.295	7.920
P2405	5		22.907	7.426	7.700
P2405	10		22.905	7.461	7.630
P2405	100		22.273	8.108	7.480
P2500	2	Circular	5.312	3.734	6.420
P2500	5		6.831	3.824	6.920

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2500	10		7.544	3.856	7.120
P2500	100		10.225	4.396	7.600
P2505	2	Circular	5.305	3.084	6.880
P2505	5		6.822	3.174	8.730
P2505	10		7.536	3.206	9.590
P2505	100		9.330	4.535	11.730
P2506	2	Circular	29.924	1.490	7.010
P2506	5		41.374	1.780	7.660
P2506	10		48.310	2.060	7.970
P2506	100		81.925	4.105	8.920
P2600	2	Circular	21.501	3.734	7.190
P2600	5		19.295	3.824	7.090
P2600	10		18.757	3.856	7.160
P2600	100		17.613	4.396	7.170
P2605	2	Circular	14.639	2.787	8.940
P2605	5		14.572	2.844	8.930
P2605	10		14.626	2.866	8.930
P2605	100		14.791	3.334	8.830
P2610	2	Circular	19.780	3.395	11.110
P2610	5		20.079	3.459	11.280
P2610	10		20.203	3.483	11.350
P2610	100		21.229	3.948	11.900
P2615	2	Circular	26.110	3.960	8.260
P2615	5		33.209	5.322	10.470
P2615	10		36.674	6.083	11.530
P2615	100		47.243	9.201	14.730
P2616	2	Circular	39.792	3.960	6.200
P2616	5		60.243	5.322	7.710
P2616	10		74.088	6.083	8.350
P2616	100		189.770	9.201	14.460
P2617	2	Circular	7.396	3.960	2.960
P2617	5		10.709	5.322	3.070
P2617	10		12.518	6.083	3.060
P2617	100		14.109	9.201	3.260
P2620	2	Circular	29.965	2.690	11.500
P2620	5		34.245	4.052	11.480
P2620	10		35.136	4.813	11.430
P2620	100		35.301	7.931	11.430
P2630	2	Circular	41.917	4.191	13.770
P2630	5		42.225	4.349	13.960
P2630	10		42.229	4.393	14.610
P2630	100		42.175	4.758	14.090
P2631	2	Circular	13.795	4.191	10.170
P2631	5		15.075	4.349	10.320
P2631	10		13.260	4.393	10.350
P2631	100		13.341	4.681	10.370
P2705	2	Circular	5.996	2.834	5.040
P2705	5		6.392	3.332	5.190
P2705	10		6.560	3.571	5.310
P2705	100		7.408	4.991	5.980
P2706	2	Circular	22.090	1.874	10.180

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2706	5		30.808	2.372	11.640
P2706	10		34.852	2.611	12.180
P2706	100		41.626	4.031	12.830
P2710	2	Circular	43.227	3.230	13.710
P2710	5		48.822	3.756	15.460
P2710	10		49.612	3.837	15.710
P2710	100		51.458	4.032	16.280
P2800	2	Circular	52.570	8.379	5.990
P2800	5		54.687	9.393	6.210
P2800	10		54.904	9.460	6.220
P2800	100		65.512	9.832	7.080
P2801	2	Circular	37.859	8.379	6.910
P2801	5		62.058	9.393	7.090
P2801	10		74.512	9.460	7.690
P2801	100		74.570	9.832	7.700
P2804	2	Circular	18.092	8.379	5.730
P2804	5		21.607	9.393	6.820
P2804	10		22.040	9.460	6.950
P2804	100		17.473	9.832	5.530
P2805	2	Circular	13.589	5.724	4.310
P2805	5		13.933	6.025	4.450
P2805	10		14.120	6.122	4.450
P2805	100		13.898	7.397	4.370
P2806	2	Circular	22.488	7.887	7.070
P2806	5		22.520	7.995	7.060
P2806	10		22.498	8.045	7.040
P2806	100		22.586	8.280	7.090
S0000	2	Natural	0.000	-8.693	0.000
S0000	5		0.000	-8.544	0.000
S0000	10		0.000	-8.455	0.000
S0000	100		0.000	-6.614	0.000
S1001	2	Natural	0.000	-0.601	0.000
S1001	5		0.261	0.315	0.260
S1001	10		8.812	1.287	1.050
S1001	100		91.349	3.740	1.680
S1005	2	Natural	0.000	-3.266	0.000
S1005	5		0.000	-2.350	0.000
S1005	10		0.000	-1.378	0.000
S1005	100		0.000	1.075	0.000
S1015	2	Natural	0.000	0.326	0.000
S1015	5		34.469	0.685	1.850
S1015	10		76.162	0.838	2.580
S1015	100		398.312	1.622	4.980
S1020	2	Natural	0.001	0.036	0.100
S1020	5		44.408	0.589	2.410
S1020	10		85.680	0.718	3.160
S1020	100		403.340	1.584	5.670
S1030	2	Natural	37.011	0.562	2.290
S1030	5		95.609	0.743	3.330
S1030	10		131.996	0.868	3.760
S1030	100		449.223	1.684	5.780

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S1035	2	Natural	0.000	0.562	0.000
S1035	5		31.567	0.715	2.310
S1035	10		57.356	0.795	2.990
S1035	100		342.392	1.375	6.330
S1036	2	Natural	26.478	0.501	2.170
S1036	5		61.839	0.662	3.010
S1036	10		83.383	0.733	3.310
S1036	100		172.379	1.186	3.990
S1081	2	Natural	66.406	0.727	3.080
S1081	5		110.769	0.880	3.330
S1081	10		137.136	0.960	3.620
S1081	100		254.763	1.508	4.130
S1100	2	Natural	0.000	-0.003	0.000
S1100	5		0.000	0.497	0.000
S1100	10		5.674	0.568	1.860
S1100	100		96.620	1.021	4.380
S1101	2	Natural	0.000	-0.536	0.000
S1101	5		0.000	0.097	0.000
S1101	10		3.290	0.405	0.800
S1101	100		52.774	0.765	2.380
S1105	2	Natural	0.000	-0.701	0.000
S1105	5		0.000	-0.068	0.000
S1105	10		0.000	0.240	0.000
S1105	100		42.141	0.600	3.130
S1110	2	Natural	0.000	-2.583	0.000
S1110	5		0.000	-2.484	0.000
S1110	10		0.000	-2.389	0.000
S1110	100		48.463	1.226	4.600
S1115	2	Natural	0.000	-1.247	0.000
S1115	5		0.000	-1.146	0.000
S1115	10		0.000	-1.098	0.000
S1115	100		54.068	1.502	3.900
S1300	2	Natural	0.580	0.167	0.450
S1300	5		2.982	0.497	0.750
S1300	10		3.683	0.568	0.790
S1300	100		235.797	1.221	3.570
S1305	2	Natural	0.000	-9e+099	0.000
S1305	5		0.000	-9e+099	0.000
S1305	10		0.000	-9e+099	0.000
S1305	100		65.819	-9e+099	0.000
S1306	2	Natural	30.546	1.225	2.980
S1306	5		50.666	1.547	3.510
S1306	10		64.581	1.729	3.790
S1306	100		194.212	4.369	5.250
S1911	2	Natural	26.093	0.564	2.140
S1911	5		57.048	0.923	2.910
S1911	10		75.508	1.076	3.040
S1911	100		138.154	1.860	3.100
S1912	2	Natural	32.787	0.525	2.320
S1912	5		71.388	0.850	3.170
S1912	10		97.021	1.003	3.450

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S1912	100		201.120	1.787	3.930
S2000	2	Natural	60.815	1.682	3.720
S2000	5		202.537	2.873	5.320
S2000	10		314.244	3.543	5.450
S2000	100		1243.137	5.708	7.860
S2001	2	Natural	5.828	1.847	0.610
S2001	5		17.920	3.038	1.200
S2001	10		25.023	3.708	1.500
S2001	100		97.325	5.873	2.620
S2005	2	Natural	1.818	0.195	1.000
S2005	5		146.145	0.914	4.370
S2005	10		272.524	1.272	5.510
S2005	100		1274.514	3.208	9.130
S2010	2	Natural	163.788	4.972	2.540
S2010	5		280.708	5.544	3.210
S2010	10		389.480	5.746	3.480
S2010	100		1369.394	6.877	5.300
S2020	2	Natural	139.360	1.712	2.830
S2020	5		279.672	2.294	3.630
S2020	10		364.941	2.467	3.990
S2020	100		1324.176	3.445	6.270
S2021	2	Natural	31.673	3.654	0.800
S2021	5		54.149	4.195	1.310
S2021	10		72.589	4.429	1.720
S2021	100		158.373	5.786	2.140
S2100	2	Natural	22.628	0.989	1.690
S2100	5		53.870	1.530	2.180
S2100	10		73.229	1.764	2.410
S2100	100		431.962	3.121	5.180
S2101	2	Natural	16.176	3.158	0.420
S2101	5		34.956	3.271	0.910
S2101	10		47.727	3.326	1.150
S2101	100		100.767	3.955	1.820
S2105	2	Natural	29.783	0.571	1.720
S2105	5		47.892	0.641	2.110
S2105	10		61.559	0.686	2.360
S2105	100		410.838	1.598	4.930
S2110	2	Natural	0.000	0.571	0.000
S2110	5		12.833	0.641	1.870
S2110	10		29.121	0.686	2.610
S2110	100		377.042	1.430	7.600
S2115	2	Natural	0.163	0.089	0.440
S2115	5		69.148	0.667	2.800
S2115	10		98.382	0.753	3.260
S2115	100		421.405	1.622	5.520
S2116	2	Natural	47.695	2.754	1.800
S2116	5		72.342	3.332	1.970
S2116	10		89.933	3.401	1.920
S2116	100		174.297	3.990	2.730
S2120	2	Natural	0.000	0.089	0.000
S2120	5		0.000	0.667	0.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2120	10		0.000	0.736	0.000
S2120	100		357.311	1.325	7.080
S2121	2	Natural	0.000	-9e+099	0.000
S2121	5		0.000	-9e+099	0.000
S2121	10		0.000	-9e+099	0.000
S2121	100		20.788	-9e+099	0.000
S2122	2	Natural	15.125	0.881	2.350
S2122	5		33.398	1.298	2.980
S2122	10		46.937	1.681	3.130
S2122	100		101.876	3.638	3.090
S2125	2	Natural	7.512	0.297	1.730
S2125	5		20.038	0.424	2.250
S2125	10		24.773	0.457	2.400
S2125	100		337.389	1.319	6.830
S2126	2	Natural	0.000	-9e+099	0.000
S2126	5		0.000	-9e+099	0.000
S2126	10		0.000	-9e+099	0.000
S2126	100		0.000	-9e+099	0.000
S2130	2	Natural	7.582	0.297	2.280
S2130	5		17.430	0.424	2.810
S2130	10		24.205	0.457	3.050
S2130	100		336.217	1.133	8.120
S2131	2	Natural	9.517	0.423	1.510
S2131	5		18.254	0.517	1.770
S2131	10		24.394	0.567	1.940
S2131	100		50.898	1.024	2.550
S2200	2	Natural	89.915	0.989	2.910
S2200	5		184.533	1.530	3.780
S2200	10		238.514	1.764	4.150
S2200	100		628.217	3.121	5.780
S2202	2	Natural	40.447	0.908	2.510
S2202	5		70.998	1.130	3.150
S2202	10		91.767	1.236	3.400
S2202	100		165.747	1.828	3.590
S2204	2	Natural	0.000	-2.685	0.000
S2204	5		6.408	0.312	1.420
S2204	10		12.350	0.393	1.670
S2204	100		40.054	0.555	2.550
S2205	2	Natural	75.111	0.822	2.100
S2205	5		158.968	1.085	2.880
S2205	10		204.906	1.204	3.190
S2205	100		514.743	1.862	4.520
S2206	2	Natural	0.000	-9e+099	0.000
S2206	5		0.000	-9e+099	0.000
S2206	10		0.000	-9e+099	0.000
S2206	100		-264.333	-9e+099	0.000
S2210	2	Natural	94.195	1.062	1.790
S2210	5		181.501	1.373	2.400
S2210	10		227.450	1.510	2.650
S2210	100		533.743	2.232	3.830
S2211	2	Natural	13.357	1.227	0.810

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2211	5		26.522	1.538	0.780
S2211	10		30.067	1.675	0.890
S2211	100		66.416	2.397	0.840
S2215	2	Natural	48.879	1.062	1.800
S2215	5		89.409	1.373	2.210
S2215	10		115.202	1.510	2.350
S2215	100		230.577	2.232	2.550
S2220	2	Natural	9.971	1.062	1.080
S2220	5		63.302	1.373	3.030
S2220	10		98.488	1.510	3.730
S2220	100		250.425	2.232	5.470
S2225	2	Natural	60.561	0.643	2.660
S2225	5		112.590	0.806	3.490
S2225	10		146.143	0.916	3.850
S2225	100		293.458	1.327	5.030
S2226	2	Natural	70.522	0.653	3.170
S2226	5		121.282	0.837	3.690
S2226	10		153.973	0.942	3.910
S2226	100		297.591	1.345	4.550
S2230	2	Natural	0.000	0.478	0.000
S2230	5		0.000	0.598	0.000
S2230	10		0.000	0.670	0.000
S2230	100		83.996	0.935	4.510
S2235	2	Natural	0.000	-4.253	0.000
S2235	5		0.000	-4.196	0.000
S2235	10		0.000	-4.159	0.000
S2235	100		107.030	0.924	2.480
S2240	2	Natural	0.000	-1.434	0.000
S2240	5		0.000	-1.349	0.000
S2240	10		0.000	-1.266	0.000
S2240	100		108.217	0.924	4.040
S2245	2	Natural	0.000	-9e+099	0.000
S2245	5		0.000	-9e+099	0.000
S2245	10		0.388	-9e+099	0.000
S2245	100		32.552	-9e+099	0.000
S2250	2	Natural	0.000	-9e+099	0.000
S2250	5		0.000	-9e+099	0.000
S2250	10		0.000	-9e+099	0.000
S2250	100		2.842	-9e+099	0.000
S2305	2	Natural	0.000	0.258	0.000
S2305	5		0.000	0.352	0.000
S2305	10		0.000	0.402	0.000
S2305	100		25.586	0.859	2.150
S2306	2	Natural	0.000	-9e+099	0.000
S2306	5		0.000	-9e+099	0.000
S2306	10		0.000	-9e+099	0.000
S2306	100		0.000	-9e+099	0.000
S2400	2	Natural	3.450	0.258	1.400
S2400	5		12.376	0.356	1.970
S2400	10		15.905	0.402	2.110
S2400	100		294.441	1.252	5.420

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2405	2	Natural	5.282	0.262	1.570
S2405	5		12.664	0.356	2.060
S2405	10		16.179	0.391	2.180
S2405	100		299.377	1.245	6.450
S2500	2	Natural	-1.591	0.664	0.000
S2500	5		-2.281	0.754	0.000
S2500	10		-2.523	0.786	0.000
S2500	100		-10.374	1.326	0.000
S2505	2	Natural	0.000	-9e+099	0.000
S2505	5		0.000	-9e+099	0.000
S2505	10		0.000	-9e+099	0.000
S2505	100		1.027	-9e+099	0.000
S2506	2	Natural	3.849	0.490	1.280
S2506	5		9.821	0.780	1.800
S2506	10		14.619	1.060	2.070
S2506	100		55.174	3.105	3.190
S2600	2	Natural	10.660	0.398	1.400
S2600	5		17.984	0.477	1.650
S2600	10		21.539	0.503	1.770
S2600	100		306.328	1.353	5.110
S2605	2	Natural	12.088	0.398	2.600
S2605	5		19.194	0.477	2.840
S2605	10		22.654	0.503	2.970
S2605	100		325.478	1.112	8.170
S2610	2	Natural	6.552	0.297	2.790
S2610	5		13.574	0.354	3.470
S2610	10		17.025	0.376	3.690
S2610	100		347.487	0.928	10.550
S2615	2	Natural	0.000	-9e+099	0.000
S2615	5		0.000	-9e+099	0.000
S2615	10		0.000	-9e+099	0.000
S2615	100		68.988	-9e+099	0.000
S2616	2	Natural	0.000	0.090	0.000
S2616	5		0.514	1.452	0.130
S2616	10		3.828	2.213	0.380
S2616	100		135.228	5.331	3.520
S2617	2	Natural	0.000	-9e+099	0.000
S2617	5		0.000	-9e+099	0.000
S2617	10		0.000	-9e+099	0.000
S2617	100		5.122	-9e+099	0.000
S2620	2	Natural	47.273	3.960	3.740
S2620	5		121.733	5.322	5.250
S2620	10		165.831	6.083	5.880
S2620	100		852.318	9.201	8.600
S2630	2	Natural	35.147	0.396	4.480
S2630	5		113.600	0.596	6.790
S2630	10		156.514	0.675	7.720
S2630	100		550.007	1.815	12.690
S2631	2	Natural	21.783	1.096	1.010
S2631	5		31.855	1.254	0.890
S2631	10		38.433	1.298	1.050

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2631	100		87.155	1.586	1.180
S2705	2	Natural	0.000	-9e+099	0.000
S2705	5		0.000	-9e+099	0.000
S2705	10		0.000	-9e+099	0.000
S2705	100		5.860	-9e+099	0.000
S2706	2	Natural	23.230	1.619	2.690
S2706	5		39.808	2.117	3.240
S2706	10		52.776	2.356	3.540
S2706	100		129.682	3.776	4.660
S2710	2	Natural	0.000	-1.046	0.000
S2710	5		16.510	0.306	3.520
S2710	10		30.772	0.387	4.120
S2710	100		126.049	1.111	6.680
S2800	2	Natural	0.000	-2.721	0.000
S2800	5		36.871	0.543	2.430
S2800	10		62.893	0.617	3.040
S2800	100		273.952	1.273	5.410
S2801	2	Natural	0.000	-0.471	0.000
S2801	5		0.000	0.543	0.000
S2801	10		1.387	0.610	0.660
S2801	100		88.588	0.982	3.350
S2804	2	Natural	18.107	3.189	0.870
S2804	5		31.615	4.203	1.040
S2804	10		36.188	4.270	1.090
S2804	100		44.252	4.642	0.940
S2805	2	Natural	6.985	0.653	1.050
S2805	5		54.525	1.738	2.090
S2805	10		83.217	2.183	2.480
S2805	100		260.047	3.737	3.690
S2806	2	Natural	28.830	0.487	2.470
S2806	5		73.621	0.665	3.690
S2806	10		94.868	0.762	4.050
S2806	100		241.509	1.558	5.630
W1305	2	Natural	0.000	-9e+099	0.000
W1305	5		0.000	-9e+099	0.000
W1305	10		0.000	-9e+099	0.000
W1305	100		65.819	-9e+099	0.000
W2121	2	Natural	0.000	-9e+099	0.000
W2121	5		0.000	-9e+099	0.000
W2121	10		0.000	-9e+099	0.000
W2121	100		20.788	-9e+099	0.000
W2126	2	Natural	0.000	-9e+099	0.000
W2126	5		0.000	-9e+099	0.000
W2126	10		0.000	-9e+099	0.000
W2126	100		0.000	-9e+099	0.000
W2206	2	Natural	0.000	-9e+099	0.000
W2206	5		0.000	-9e+099	0.000
W2206	10		0.000	-9e+099	0.000
W2206	100		-264.333	-9e+099	0.000
W2245	2	Natural	0.000	-9e+099	0.000
W2245	5		0.000	-9e+099	0.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
W2245	10		0.388	-9e+099	0.000
W2245	100		32.552	-9e+099	0.000
W2250	2	Natural	0.000	-9e+099	0.000
W2250	5		0.000	-9e+099	0.000
W2250	10		0.000	-9e+099	0.000
W2250	100		2.842	-9e+099	0.000
W2306	2	Natural	0.000	-9e+099	0.000
W2306	5		0.000	-9e+099	0.000
W2306	10		0.000	-9e+099	0.000
W2306	100		0.000	-9e+099	0.000
W2505	2	Natural	0.000	-9e+099	0.000
W2505	5		0.000	-9e+099	0.000
W2505	10		0.000	-9e+099	0.000
W2505	100		1.027	-9e+099	0.000
W2615	2	Natural	0.000	-9e+099	0.000
W2615	5		0.000	-9e+099	0.000
W2615	10		0.000	-9e+099	0.000
W2615	100		68.988	-9e+099	0.000
W2617	2	Natural	0.000	-9e+099	0.000
W2617	5		0.000	-9e+099	0.000
W2617	10		0.000	-9e+099	0.000
W2617	100		5.122	-9e+099	0.000
W2705	2	Natural	0.000	-9e+099	0.000
W2705	5		0.000	-9e+099	0.000
W2705	10		0.000	-9e+099	0.000
W2705	100		5.860	-9e+099	0.000

Appendix H – XPSWMM Input/ Output – Future Conditions

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ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
0004	100	1	0004	7190.720	7198.270	546186.978	300775.346	0.000	0.000
0005	100	1	0005	7187.790	7192.950	545822.106	300779.607	0.000	0.000
0006	100	1	0006	7175.970	7181.180	544374.092	300786.409	0.000	0.000
0007	100	1	0007	7249.000	7252.000	543827.562	304985.939	0.000	0.000
0010	100	1	0010	7146.110	7152.920	541703.236	301901.472	0.000	0.000
0017	100	1	0017	7230.470	7233.460	548793.525	300776.879	0.000	0.000
2007	100	1	2007	7130.910	7145.028	538220.731	302871.047	0.000	0.000
2009	100	1	2009	7135.150	7143.573	538417.040	301709.140	0.000	0.000
2019	100	1	2019	7135.570	7141.174	538979.775	300594.717	0.000	0.000
2021	100	1	2021	7134.120	7142.736	538979.730	301243.849	0.000	0.000
2022	100	1	2022	7133.020	7139.591	538405.766	301328.742	0.000	0.000
2030	100	1	2030	7137.000	7142.122	539640.745	300542.725	0.000	0.000
2054	100	1	2054	7139.900	7150.039	540096.607	301556.564	0.000	0.000
2059	100	1	2059	7142.490	7149.073	540843.120	301473.116	0.000	0.000
2093	100	1	2093	7182.210	7186.842	541725.925	304496.790	0.000	0.000
2105	100	1	2105	7164.770	7170.760	541725.529	303869.909	0.000	0.000
2115	100	1	2115	7157.160	7162.485	541718.169	303335.690	0.000	0.000
2116	100	1	2116	7156.140	7161.768	541719.190	303279.585	0.000	0.000
2121	100	1	2121	7159.799	7162.799	542081.992	303298.339	0.000	0.000
2122	100	1	2122	7161.090	7165.850	542162.282	303363.965	0.000	0.000
2166	100	1	2166	7147.840	7154.097	541713.280	302205.545	0.000	0.000
2178	100	1	2178	7143.730	7150.808	541536.559	301324.189	0.000	0.000
2199	100	1	2199	7143.170	7148.687	541326.336	299013.777	0.000	0.000
2206	100	1	2206	7148.610	7157.359	542042.093	298952.321	0.000	0.000
2211	100	1	2211	7154.940	7160.037	541984.051	298249.668	0.000	0.000
2226	100	1	2226	7173.680	7179.648	543060.454	298167.942	0.000	0.000
2229	100	1	2229	7176.550	7180.072	543154.406	298523.197	0.000	0.000
2235	100	1	2235	7178.780	7183.012	543494.955	298480.860	0.000	0.000
2279	100	1	2279	7142.500	7148.462	541383.691	299680.656	0.000	0.000
2282	100	1	2282	7141.570	7148.080	541425.334	300014.008	0.000	0.000
2297	100	1	2297	7140.630	7148.983	541426.625	300370.932	0.000	0.000
2319	100	1	2319	7143.160	7150.355	541493.796	300960.950	0.000	0.000
2327	100	1	2327	7167.530	7173.789	543399.378	300800.856	0.000	0.000
2335	100	1	2335	7171.210	7175.000	543747.505	300788.750	0.000	0.000

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
0004	100	1	0.000	0.000	Allowed	☐
0005	100	1	0.000	0.000	Allowed	☐
0006	100	1	0.000	0.000	Allowed	☐
0007	100	1	0.000	0.000	Allowed	☐
0010	100	1	0.000	0.000	Allowed	☐
0017	100	1	0.000	0.000	Allowed	☐
2007	100	1	0.000	0.000	Allowed	☐
2009	100	1	0.000	0.000	Allowed	☐
2019	100	1	0.000	0.000	Allowed	☐
2021	100	1	0.000	0.000	Allowed	☐
2022	100	1	0.000	0.000	Allowed	☐
2030	100	1	0.000	0.000	Allowed	☐
2054	100	1	0.000	0.000	Allowed	☐
2059	100	1	0.000	0.000	Allowed	☐
2093	100	1	0.000	0.000	Allowed	☐
2105	100	1	0.000	0.000	Allowed	☐
2115	100	1	0.000	0.000	Allowed	☐
2116	100	1	0.000	0.000	Allowed	☐
2121	100	1	0.000	0.000	Allowed	☐
2122	100	1	0.000	0.000	Allowed	☒
2166	100	1	0.000	0.000	Allowed	☐
2178	100	1	0.000	0.000	Allowed	☐
2199	100	1	0.000	0.000	Allowed	☐
2206	100	1	0.000	0.000	Allowed	☐
2211	100	1	0.000	0.000	Allowed	☐
2226	100	1	0.000	0.000	Allowed	☐
2229	100	1	0.000	0.000	Allowed	☐
2235	100	1	0.000	0.000	Allowed	☐
2279	100	1	0.000	0.000	Allowed	☐
2282	100	1	0.000	0.000	Allowed	☐
2297	100	1	0.000	0.000	Allowed	☐
2319	100	1	0.000	0.000	Allowed	☐
2327	100	1	0.000	0.000	Allowed	☐
2335	100	1	0.000	0.000	Allowed	☐

ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
2359	100	1	2359	7191.050	7198.620	546225.385	300777.564	0.000	0.000
2363	100	1	2363	7200.920	7204.340	546925.840	300833.088	0.000	0.000
2364	100	1	2364	7200.270	7204.242	546922.889	300779.036	0.000	0.000
2365	100	1	2365	7202.690	7205.344	547199.257	300781.782	0.000	0.000
2407	100	1	2407	7192.860	7197.280	546219.230	300107.917	0.000	0.000
2412	100	1	2412	7191.900	7195.232	546150.124	300118.278	0.000	0.000
2435	100	1	2435	7200.150	7208.500	546239.729	301973.462	0.000	0.000
2490	100	1	2490	7201.050	7206.480	546923.210	300875.848	0.000	0.000
2634	100	1	2634	7232.560	7241.430	548929.471	300680.548	0.000	0.000
2639	100	1	2639	7230.990	7234.679	548792.472	300745.960	0.000	0.000
2643	100	1	2643	7236.930	7240.373	548825.430	300348.497	0.000	0.000
2650	100	1	2650	7271.300	7275.595	548788.081	299251.595	0.000	0.000
2673	100	1	2673	7133.210	7136.710	537118.424	298930.782	0.000	0.000
2690	100	1	2690	7138.350	7147.700	539080.421	298865.279	0.000	0.000
2695	100	1	2695	7140.040	7144.210	539125.314	299116.373	0.000	0.000
2714	100	1	2714	7140.510	7146.370	540202.102	299180.353	0.000	0.000
CL01	100	1	CL01	7191.050	7194.050	541989.629	304963.307	40.000	4710.502
CL02	100	1	CL02	7190.460	7195.000	541853.363	304979.649	52.000	4683.548
CL03	100	1	CL03	7157.325	7162.485	541570.427	303498.690	47.000	5598.002
CL04	100	1	CL04	7156.305	7161.768	541538.902	303318.259	58.000	4736.463
CL05	100	1	CL05	7148.005	7154.097	541956.463	302198.247	52.000	9160.185
CL06	100	1	CL06	7142.655	7149.073	540956.792	301569.584	67.000	6309.050
CL07	100	1	CL07	7145.830	7149.000	540813.203	301610.254	62.000	6459.803
CL08	100	1	CL08	7135.150	7143.573	538582.882	301821.785	70.000	7453.850
CL09	100	1	CL09	7130.910	7145.028	538307.702	302871.329	92.000	2715.746
CM01	100	1	CM01	7249.165	7252.165	543818.634	305151.328	45.000	13626.560
CM02	100	1	CM02	7161.255	7164.850	542176.503	303522.115	40.000	17819.625
CU01	100	1	CU01	7285.000	7288.000	549355.919	303806.472	43.000	10317.763
LL01	100	1	LL01	7155.105	7160.037	541883.945	298148.456	73.000	5503.573
LL02	100	1	LL02	7145.050	7149.189	541303.629	298673.936	73.000	3580.810
LL03	100	1	LL03	7143.335	7148.687	541347.309	298995.022	61.000	4254.267
LL04	100	1	LL04	7141.735	7148.080	541468.358	300041.519	64.000	4281.098
LL05	100	1	LL05	7140.900	7146.640	540813.736	298993.356	71.000	2311.969
LL06	100	1	LL06	7140.840	7146.370	540186.027	299309.056	75.000	4427.280

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
2359	100	1	0.000	0.000	Allowed	☐
2363	100	1	0.000	0.000	Allowed	☐
2364	100	1	0.000	0.000	Allowed	☐
2365	100	1	0.000	0.000	Allowed	☐
2407	100	1	0.000	0.000	Allowed	☒
2412	100	1	0.000	0.000	Allowed	☐
2435	100	1	0.000	0.000	Allowed	☐
2490	100	1	0.000	0.000	Allowed	☒
2634	100	1	0.000	0.000	Allowed	☒
2639	100	1	0.000	0.000	Allowed	☐
2643	100	1	0.000	0.000	Allowed	☐
2650	100	1	0.000	0.000	Allowed	☐
2673	100	1	0.000	0.000	Allowed	☐
2690	100	1	0.000	0.000	Allowed	☐
2695	100	1	0.000	0.000	Allowed	☐
2714	100	1	0.000	0.000	Allowed	☐
CL01	100	1	63.170	0.033	Allowed	☐
CL02	100	1	69.970	0.025	Allowed	☐
CL03	100	1	65.430	0.028	Allowed	☐
CL04	100	1	53.060	0.033	Allowed	☐
CL05	100	1	86.530	0.034	Allowed	☐
CL06	100	1	70.240	0.005	Allowed	☐
CL07	100	1	44.610	0.020	Allowed	☐
CL08	100	1	41.220	0.021	Allowed	☐
CL09	100	1	26.300	0.053	Allowed	☐
CM01	100	1	87.800	0.011	Allowed	☐
CM02	100	1	123.310	0.019	Allowed	☐
CU01	100	1	266.790	0.054	Allowed	☐
LL01	100	1	79.570	0.027	Allowed	☐
LL02	100	1	79.570	0.019	Allowed	☐
LL03	100	1	27.120	0.029	Allowed	☐
LL04	100	1	52.400	0.026	Allowed	☐
LL05	100	1	16.650	0.008	Allowed	☐
LL06	100	1	27.300	0.006	Allowed	☐

ExistingNodeData

Name	Storm	Subcatchment	Node Name	Invert Elevation ft	Ground Elevation (Spill Crest)	Node X	Node Y	Impervious Percentage %	Width ft
LL07	100	1	LL07	7151.540	7159.440	540123.911	297440.063	75.000	8142.862
LL08	100	1	LL08	7147.440	7154.940	538983.800	297524.918	87.000	3346.457
LL09	100	1	LL09	7138.680	7147.700	538962.497	298964.871	91.000	5975.939
LL10	100	1	LL10	7140.430	7146.000	540893.556	299548.472	61.000	2875.600
LM01	100	1	LM01	7180.980	7186.520	543513.714	298569.428	75.000	2637.362
LM02	100	1	LM02	7180.950	7185.690	543523.134	298374.003	75.000	8579.165
OutFall	100	1	OutFall	7129.578	7144.863	537658.180	304601.349	0.000	0.000
RL01	100	1	RL01	7140.795	7148.983	541523.670	300236.959	66.000	4830.136
RL02	100	1	RL02	7137.165	7142.122	539627.941	300387.257	71.000	5800.339
RL03	100	1	RL03	7133.020	7139.591	538456.088	301215.976	93.000	3805.253
RM01	100	1	RM01	7190.720	7198.270	546214.719	300745.532	47.000	6278.563
RM02	100	1	RM02	7192.860	7196.280	546350.768	300142.048	40.000	6433.843
RM03	100	1	RM03	7201.850	7209.890	546950.869	300906.078	42.000	6509.392
RM04	100	1	RM04	7202.030	7205.030	546781.886	301146.171	37.000	6600.216
RM05	100	1	RM05	7193.860	7197.810	546201.103	299652.095	63.000	10425.899
RM06	100	1	RM06	7176.500	7182.570	544423.602	300730.006	74.000	7033.576
RM07	100	1	RM07	7188.510	7194.000	545864.291	300909.797	38.000	7457.943
RM08	100	1	RM08	7203.190	7213.020	546120.911	302112.547	40.000	4774.371
RM09	100	1	RM09	7176.135	7181.180	544406.034	300872.603	45.000	4523.379
RM10	100	1	RM10	7292.000	7293.000	546696.988	303221.742	40.000	11814.423
RM11	100	1	RM11	7171.540	7175.000	543750.661	301076.767	56.000	3926.521
RU01	100	1	RU01	7307.200	7308.200	551624.561	299921.715	40.000	7933.821
RU02	100	1	RU02	7274.595	7275.595	548963.882	299362.475	40.000	11383.696
RU03	100	1	RU03	7272.810	7275.060	548785.483	299235.044	41.000	6867.514
RU04	100	1	RU04	7232.560	7240.430	549074.696	300662.333	40.000	8835.960
RU05	100	1	RU05	7233.110	7241.420	548949.252	300894.972	39.000	4510.611
RU06	100	1	RU06	7309.500	7310.000	551834.694	299356.787	45.000	10700.590

ExistingNodeData

Name	Storm	Subcatchment	Area ac	Slope	Ponding Type	Storage Node Data Flag
LL07	100	1	69.660	0.015	Allowed	☐
LL08	100	1	49.740	0.004	Allowed	☐
LL09	100	1	64.260	0.004	Allowed	☐
LL10	100	1	24.900	0.007	Allowed	☒
LM01	100	1	21.960	0.025	Allowed	☒
LM02	100	1	43.780	0.016	Allowed	☒
OutFall	100	1	0.000	0.000	Allowed	☐
RL01	100	1	40.800	0.010	Allowed	☐
RL02	100	1	80.640	0.003	Allowed	☐
RL03	100	1	45.550	0.003	Allowed	☐
RM01	100	1	19.540	0.013	Allowed	☐
RM02	100	1	71.380	0.012	Allowed	☐
RM03	100	1	47.930	0.041	Allowed	☐
RM04	100	1	32.220	0.033	Allowed	☐
RM05	100	1	38.970	0.021	Allowed	☐
RM06	100	1	71.600	0.019	Allowed	☒
RM07	100	1	43.810	0.035	Allowed	☒
RM08	100	1	52.790	0.034	Allowed	☒
RM09	100	1	40.380	0.014	Allowed	☐
RM10	100	1	60.990	0.011	Allowed	☐
RM11	100	1	55.160	0.044	Allowed	☐
RU01	100	1	87.360	0.026	Allowed	☐
RU02	100	1	46.390	0.009	Allowed	☐
RU03	100	1	34.110	0.011	Allowed	☐
RU04	100	1	56.400	0.030	Allowed	☐
RU05	100	1	23.660	0.039	Allowed	☒
RU06	100	1	109.050	0.024	Allowed	☐

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
0004	2	0004	0.000	0.000	7198.084
0004	5	0004	0.000	0.000	7198.195
0004	10	0004	0.000	0.000	7198.221
0004	100	0004	0.000	20222.360	7198.676
0005	2	0005	0.000	0.000	7192.826
0005	5	0005	0.000	0.000	7192.930
0005	10	0005	0.000	1175.700	7192.954
0005	100	0005	0.000	42901.100	7193.461
0006	2	0006	0.000	0.000	7178.512
0006	5	0006	0.000	0.000	7179.230
0006	10	0006	0.000	0.000	7179.772
0006	100	0006	0.000	12276.310	7181.713
0007	2	0007	0.000	0.000	7249.575
0007	5	0007	0.000	0.000	7249.678
0007	10	0007	0.000	0.000	7249.719
0007	100	0007	0.000	0.000	7250.037
0010	2	0010	0.000	5437.640	7153.083
0010	5	0010	0.000	15940.210	7153.375
0010	10	0010	0.000	18546.050	7153.457
0010	100	0010	0.000	57887.890	7154.447
0017	2	0017	0.000	0.000	7233.265
0017	5	0017	0.000	0.000	7233.321
0017	10	0017	0.000	0.000	7233.340
0017	100	0017	0.000	46020.160	7233.828
2007	2	2007	0.000	0.000	7135.186
2007	5	2007	0.000	0.000	7135.798
2007	10	2007	0.000	0.000	7136.161
2007	100	2007	0.000	0.000	7137.120
2009	2	2009	0.000	0.000	7140.322
2009	5	2009	0.000	0.000	7142.336
2009	10	2009	0.000	0.000	7143.465
2009	100	2009	0.000	19139.190	7144.743
2019	2	2019	0.000	63035.550	7142.661
2019	5	2019	0.000	75786.860	7143.123
2019	10	2019	0.000	82684.880	7143.274
2019	100	2019	0.000	249411.300	7144.362
2021	2	2021	0.000	0.000	7142.686
2021	5	2021	0.000	22325.600	7143.187
2021	10	2021	0.000	29961.880	7143.360
2021	100	2021	0.000	105743.630	7144.601
2022	2	2022	0.000	0.000	7138.441
2022	5	2022	0.000	3430.520	7140.046
2022	10	2022	0.000	6950.260	7140.279
2022	100	2022	0.000	145867.230	7142.798
2030	2	2030	0.000	115490.150	7142.802
2030	5	2030	0.000	222525.310	7143.369
2030	10	2030	0.000	256434.890	7143.579
2030	100	2030	0.000	604258.880	7145.021
2054	2	2054	0.000	0.000	7145.109
2054	5	2054	0.000	0.000	7147.431
2054	10	2054	0.000	0.000	7146.021

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2054	100	2054	0.000	0.000	7148.014
2059	2	2059	0.000	3361.470	7149.123
2059	5	2059	0.000	42331.800	7149.567
2059	10	2059	0.000	58944.670	7149.688
2059	100	2059	0.000	154974.790	7150.715
2093	2	2093	0.000	0.000	7184.801
2093	5	2093	0.000	0.000	7185.198
2093	10	2093	0.000	0.000	7185.359
2093	100	2093	0.000	0.000	7186.083
2105	2	2105	0.000	0.000	7168.168
2105	5	2105	0.000	0.000	7168.290
2105	10	2105	0.000	0.000	7168.323
2105	100	2105	0.000	0.000	7168.487
2115	2	2115	0.000	0.000	7162.445
2115	5	2115	0.000	1914.220	7162.578
2115	10	2115	0.000	2784.140	7162.622
2115	100	2115	0.000	9800.520	7162.958
2116	2	2116	0.000	10972.470	7161.932
2116	5	2116	0.000	27594.360	7162.096
2116	10	2116	0.000	31345.010	7162.150
2116	100	2116	0.000	93642.800	7162.881
2121	2	2121	0.000	0.000	7162.368
2121	5	2121	0.000	0.000	7162.625
2121	10	2121	0.000	0.000	7162.706
2121	100	2121	0.000	22660.100	7163.801
2122	2	2122	0.000	0.000	7165.051
2122	5	2122	0.000	0.000	7165.432
2122	10	2122	0.000	0.000	7165.556
2122	100	2122	0.000	0.000	7167.403
2166	2	2166	0.000	12332.830	7154.370
2166	5	2166	0.000	22214.050	7154.635
2166	10	2166	0.000	24755.040	7154.715
2166	100	2166	0.000	66529.410	7155.757
2178	2	2178	0.000	5924.380	7150.967
2178	5	2178	0.000	19170.140	7151.320
2178	10	2178	0.000	21382.860	7151.419
2178	100	2178	0.000	73017.890	7152.535
2199	2	2199	0.000	29081.590	7149.194
2199	5	2199	0.000	51665.180	7149.530
2199	10	2199	0.000	60106.220	7149.656
2199	100	2199	0.000	114842.650	7150.391
2206	2	2206	0.000	0.000	7157.156
2206	5	2206	0.000	1341.120	7157.410
2206	10	2206	0.000	2455.010	7157.462
2206	100	2206	0.000	7322.560	7157.677
2211	2	2211	0.000	0.000	7160.016
2211	5	2211	0.000	4291.730	7160.140
2211	10	2211	0.000	6596.900	7160.203
2211	100	2211	0.000	17596.000	7160.472
2226	2	2226	0.000	0.000	7174.898
2226	5	2226	0.000	0.000	7174.952

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2226	10	2226	0.000	0.000	7174.971
2226	100	2226	0.000	1707.460	7179.693
2229	2	2229	0.000	0.000	7178.141
2229	5	2229	0.000	0.000	7178.223
2229	10	2229	0.000	0.000	7178.257
2229	100	2229	0.000	10471.700	7180.473
2235	2	2235	0.000	0.000	7180.956
2235	5	2235	0.000	0.000	7181.464
2235	10	2235	0.000	0.000	7181.608
2235	100	2235	0.000	4260.690	7183.173
2279	2	2279	0.000	5403.710	7148.686
2279	5	2279	0.000	13933.250	7149.006
2279	10	2279	0.000	16762.960	7149.120
2279	100	2279	0.000	34481.060	7149.792
2282	2	2282	0.000	0.000	7147.957
2282	5	2282	0.000	17412.130	7148.384
2282	10	2282	0.000	23729.580	7148.495
2282	100	2282	0.000	62694.220	7149.142
2297	2	2297	0.000	1034.070	7148.996
2297	5	2297	0.000	7009.170	7149.097
2297	10	2297	0.000	9867.160	7149.140
2297	100	2297	0.000	49567.780	7149.850
2319	2	2319	0.000	3106.570	7150.433
2319	5	2319	0.000	9952.700	7150.504
2319	10	2319	0.000	12368.460	7150.538
2319	100	2319	0.000	75519.460	7151.376
2327	2	2327	0.000	0.000	7171.038
2327	5	2327	0.000	0.000	7173.633
2327	10	2327	0.000	0.000	7173.720
2327	100	2327	0.000	26459.060	7174.297
2335	2	2335	0.000	0.000	7174.670
2335	5	2335	0.000	4455.300	7175.180
2335	10	2335	0.000	5500.670	7175.223
2335	100	2335	0.000	33169.150	7175.915
2359	2	2359	0.000	0.000	7198.402
2359	5	2359	0.000	0.000	7198.488
2359	10	2359	0.000	0.000	7198.516
2359	100	2359	0.000	6798.160	7199.200
2363	2	2363	0.000	0.000	7204.013
2363	5	2363	0.000	0.000	7204.103
2363	10	2363	0.000	0.000	7204.131
2363	100	2363	0.000	6974.730	7205.075
2364	2	2364	0.000	0.000	7204.013
2364	5	2364	0.000	0.000	7204.103
2364	10	2364	0.000	0.000	7204.131
2364	100	2364	0.000	22407.770	7204.696
2365	2	2365	0.000	0.000	7205.254
2365	5	2365	0.000	0.000	7205.330
2365	10	2365	0.000	883.750	7205.350
2365	100	2365	0.000	34706.420	7205.997
2407	2	2407	0.000	0.000	7194.747

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
2407	5	2407	0.000	0.000	7195.236
2407	10	2407	0.000	0.000	7195.437
2407	100	2407	0.000	0.000	7196.880
2412	2	2412	0.000	0.000	7194.747
2412	5	2412	0.000	35.000	7195.236
2412	10	2412	0.000	1418.570	7195.437
2412	100	2412	0.000	51566.620	7196.880
2435	2	2435	0.000	0.000	7208.291
2435	5	2435	0.000	0.000	7208.416
2435	10	2435	0.000	0.000	7208.443
2435	100	2435	0.000	10249.470	7208.635
2490	2	2490	0.000	0.000	7202.739
2490	5	2490	0.000	0.000	7203.321
2490	10	2490	0.000	0.000	7203.582
2490	100	2490	0.000	0.000	7205.633
2634	2	2634	0.000	0.000	7236.677
2634	5	2634	0.000	0.000	7238.106
2634	10	2634	0.000	0.000	7238.768
2634	100	2634	0.000	0.000	7241.837
2639	2	2639	0.000	0.000	7234.395
2639	5	2639	0.000	0.000	7234.457
2639	10	2639	0.000	0.000	7234.477
2639	100	2639	0.000	7354.610	7234.958
2643	2	2643	0.000	0.000	7238.554
2643	5	2643	0.000	0.000	7239.292
2643	10	2643	0.000	0.000	7239.489
2643	100	2643	0.000	316442.710	7241.750
2650	2	2650	0.000	0.000	7275.513
2650	5	2650	0.000	10875.050	7275.667
2650	10	2650	0.000	14690.010	7275.697
2650	100	2650	0.000	37204.910	7275.989
2673	2	2673	0.000	0.000	7133.477
2673	5	2673	0.000	0.000	7133.499
2673	10	2673	0.000	0.000	7133.832
2673	100	2673	0.000	63280.480	7137.016
2690	2	2690	56.311	0.000	7144.911
2690	5	2690	0.000	0.000	7146.745
2690	10	2690	0.000	358.310	7147.698
2690	100	2690	0.000	53566.710	7148.386
2695	2	2695	0.000	24724.750	7144.915
2695	5	2695	0.000	102186.530	7146.502
2695	10	2695	0.000	140107.010	7146.889
2695	100	2695	0.000	290503.750	7147.907
2714	2	2714	46.974	0.000	7146.237
2714	5	2714	0.000	7034.740	7146.555
2714	10	2714	0.000	10974.400	7146.626
2714	100	2714	0.000	90435.220	7147.904
CL01	2	CL01	42.205	0.000	7192.141
CL01	5	CL01	64.979	0.000	7192.439
CL01	10	CL01	80.206	0.000	7192.546
CL01	100	CL01	158.314	0.000	7193.232

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
CL02	2	CL02	55.682	0.000	7193.239
CL02	5	CL02	87.598	0.000	7193.668
CL02	10	CL02	108.988	0.000	7193.865
CL02	100	CL02	215.184	0.000	7194.655
CL03	2	CL03	50.641	0.000	7162.453
CL03	5	CL03	78.254	616.840	7162.583
CL03	10	CL03	96.723	890.700	7162.626
CL03	100	CL03	185.863	3491.590	7162.954
CL04	2	CL04	50.029	1150.580	7161.931
CL04	5	CL04	77.561	2745.460	7162.095
CL04	10	CL04	95.983	3175.930	7162.148
CL04	100	CL04	183.963	11424.640	7162.881
CL05	2	CL05	76.073	2021.440	7154.370
CL05	5	CL05	116.747	4585.570	7154.632
CL05	10	CL05	143.934	5435.480	7154.714
CL05	100	CL05	272.720	23237.890	7155.756
CL06	2	CL06	56.156	527.580	7149.129
CL06	5	CL06	92.866	3758.390	7149.564
CL06	10	CL06	117.812	5096.340	7149.684
CL06	100	CL06	227.940	22875.350	7150.715
CL07	2	CL07	46.051	808.550	7149.122
CL07	5	CL07	70.959	4355.660	7149.566
CL07	10	CL07	87.614	5714.660	7149.685
CL07	100	CL07	165.489	24364.970	7150.716
CL08	2	CL08	48.768	0.000	7140.337
CL08	5	CL08	74.849	0.000	7142.360
CL08	10	CL08	92.282	0.000	7143.484
CL08	100	CL08	182.593	11635.360	7144.745
CL09	2	CL09	38.824	0.000	7135.957
CL09	5	CL09	60.386	0.000	7138.071
CL09	10	CL09	74.818	0.000	7139.651
CL09	100	CL09	142.252	3113.200	7145.481
CM01	2	CM01	66.520	0.000	7250.698
CM01	5	CM01	102.200	0.000	7250.993
CM01	10	CM01	126.051	0.000	7251.147
CM01	100	CM01	233.537	0.000	7251.703
CM02	2	CM02	85.586	1215.770	7165.051
CM02	5	CM02	130.412	4200.250	7165.432
CM02	10	CM02	160.343	5436.070	7165.557
CM02	100	CM02	319.062	61240.530	7167.403
CU01	2	CU01	176.601	0.000	7287.660
CU01	5	CU01	277.442	17720.350	7288.250
CU01	10	CU01	345.011	28815.650	7288.404
CU01	100	CU01	691.090	129018.540	7289.615
LL01	2	LL01	82.963	989.850	7160.170
LL01	5	LL01	132.546	2086.400	7160.306
LL01	10	LL01	165.870	2824.900	7160.388
LL01	100	LL01	320.393	6659.190	7160.738
LL02	2	LL02	65.973	3859.340	7149.373
LL02	5	LL02	109.999	7716.040	7149.626
LL02	10	LL02	140.023	10694.190	7149.747

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
LL02	100	LL02	273.604	23992.950	7150.444
LL03	2	LL03	28.403	3712.130	7149.195
LL03	5	LL03	43.407	7271.200	7149.530
LL03	10	LL03	53.431	8931.420	7149.656
LL03	100	LL03	101.145	23815.090	7150.391
LL04	2	LL04	51.453	209.300	7148.103
LL04	5	LL04	80.896	2426.980	7148.382
LL04	10	LL04	100.628	3479.490	7148.492
LL04	100	LL04	190.205	10858.170	7149.141
LL05	2	LL05	17.438	0.000	7145.908
LL05	5	LL05	27.664	0.000	7146.452
LL05	10	LL05	34.527	0.000	7146.538
LL05	100	LL05	65.760	668.460	7146.692
LL06	2	LL06	29.854	0.000	7146.236
LL06	5	LL06	47.483	1246.180	7146.557
LL06	10	LL06	59.320	1809.970	7146.639
LL06	100	LL06	110.571	19912.210	7147.906
LL07	2	LL07	78.773	0.000	7159.429
LL07	5	LL07	124.351	9772.070	7159.541
LL07	10	LL07	154.913	13183.510	7159.578
LL07	100	LL07	299.661	33105.200	7159.820
LL08	2	LL08	39.086	0.000	7149.279
LL08	5	LL08	63.069	0.000	7150.526
LL08	10	LL08	81.728	0.000	7154.554
LL08	100	LL08	169.703	6388.350	7155.101
LL09	2	LL09	58.405	0.000	7144.950
LL09	5	LL09	98.370	0.000	7146.737
LL09	10	LL09	126.328	272.030	7147.720
LL09	100	LL09	254.713	9824.810	7148.587
LL10	2	LL10	21.803	0.000	7142.546
LL10	5	LL10	34.796	0.000	7143.197
LL10	10	LL10	43.526	0.000	7143.432
LL10	100	LL10	89.832	0.000	7145.594
LM01	2	LM01	26.333	0.000	7182.848
LM01	5	LM01	40.994	0.000	7183.574
LM01	10	LM01	50.807	0.000	7183.806
LM01	100	LM01	104.487	0.000	7185.693
LM02	2	LM02	54.674	0.000	7183.567
LM02	5	LM02	84.245	0.000	7184.393
LM02	10	LM02	104.018	0.000	7184.712
LM02	100	LM02	215.622	0.000	7185.368
OutFall	2	OutFall	0.000	0.000	7133.500
OutFall	5	OutFall	0.000	0.000	7133.925
OutFall	10	OutFall	0.000	0.000	7134.115
OutFall	100	OutFall	0.000	0.000	7135.763
RL01	2	RL01	39.980	89.240	7148.997
RL01	5	RL01	63.333	676.550	7149.097
RL01	10	RL01	79.002	959.740	7149.140
RL01	100	RL01	146.951	7573.540	7149.850
RL02	2	RL02	54.310	5166.700	7142.802
RL02	5	RL02	89.295	12906.930	7143.370

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
RL02	10	RL02	115.244	17055.520	7143.579
RL02	100	RL02	235.859	94475.270	7145.022
RL03	2	RL03	38.355	0.000	7138.442
RL03	5	RL03	61.943	3076.460	7140.047
RL03	10	RL03	80.254	6488.080	7140.280
RL03	100	RL03	168.323	137848.140	7142.787
RM01	2	RM01	16.335	0.000	7198.141
RM01	5	RM01	24.703	0.000	7198.231
RM01	10	RM01	30.282	0.140	7198.260
RM01	100	RM01	58.055	3533.040	7198.676
RM02	2	RM02	45.442	0.000	7194.747
RM02	5	RM02	70.822	0.000	7195.236
RM02	10	RM02	87.812	0.000	7195.437
RM02	100	RM02	169.948	4518.480	7196.880
RM03	2	RM03	35.531	0.000	7203.368
RM03	5	RM03	53.866	0.000	7203.665
RM03	10	RM03	66.098	0.000	7203.834
RM03	100	RM03	147.479	0.000	7205.632
RM04	2	RM04	21.371	0.000	7203.219
RM04	5	RM04	32.229	0.000	7203.474
RM04	10	RM04	39.465	0.000	7203.613
RM04	100	RM04	93.702	5323.200	7205.632
RM05	2	RM05	43.191	0.000	7197.081
RM05	5	RM05	65.546	0.000	7197.616
RM05	10	RM05	80.462	0.000	7197.696
RM05	100	RM05	180.835	685.800	7197.891
RM06	2	RM06	79.063	0.000	7179.520
RM06	5	RM06	125.103	0.000	7180.234
RM06	10	RM06	155.988	0.000	7180.556
RM06	100	RM06	298.930	0.000	7182.111
RM07	2	RM07	29.687	0.000	7190.294
RM07	5	RM07	44.856	0.000	7190.794
RM07	10	RM07	54.968	0.000	7191.011
RM07	100	RM07	121.075	0.000	7193.048
RM08	2	RM08	36.088	0.000	7205.971
RM08	5	RM08	55.222	0.000	7206.659
RM08	10	RM08	68.007	0.000	7207.001
RM08	100	RM08	140.576	0.000	7209.160
RM09	2	RM09	29.777	0.000	7179.063
RM09	5	RM09	46.071	0.000	7179.520
RM09	10	RM09	56.970	0.000	7179.778
RM09	100	RM09	107.216	4001.800	7181.714
RM10	2	RM10	42.394	0.000	7292.850
RM10	5	RM10	64.570	0.000	7292.917
RM10	10	RM10	79.377	0.000	7292.935
RM10	100	RM10	149.502	11456.830	7293.075
RM11	2	RM11	49.830	0.000	7174.681
RM11	5	RM11	77.402	1146.090	7175.188
RM11	10	RM11	95.853	1439.320	7175.236
RM11	100	RM11	183.359	8374.400	7175.915
RU01	2	RU01	58.914	0.000	7308.141

NodeResults

Name	Storm	Node Name	Max Flow cfs	Volume of Ponded Flow Stored ft^3	Max Water Elevation ft
RU01	5	RU01	90.481	5023.960	7308.236
RU01	10	RU01	111.582	9389.460	7308.260
RU01	100	RU01	248.501	51206.200	7308.484
RU02	2	RU02	32.539	1041.150	7275.732
RU02	5	RU02	49.429	4719.070	7276.144
RU02	10	RU02	60.701	3809.650	7275.988
RU02	100	RU02	130.247	6174.530	7276.042
RU03	2	RU03	24.327	3461.300	7275.513
RU03	5	RU03	37.042	4757.000	7275.665
RU03	10	RU03	45.531	5315.350	7275.696
RU03	100	RU03	94.201	8990.200	7275.991
RU04	2	RU04	39.888	0.000	7236.678
RU04	5	RU04	60.439	0.000	7238.106
RU04	10	RU04	74.147	0.000	7238.768
RU04	100	RU04	190.004	50506.470	7241.793
RU05	2	RU05	16.524	0.000	7236.596
RU05	5	RU05	24.930	0.000	7237.500
RU05	10	RU05	30.532	0.000	7237.941
RU05	100	RU05	75.797	0.000	7241.204
RU06	2	RU06	81.941	2611.950	7310.007
RU06	5	RU06	126.165	14153.640	7310.084
RU06	10	RU06	155.736	17816.340	7310.108
RU06	100	RU06	302.148	46774.590	7310.298

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
DummyOut	100	DummyOut	2673	7133.210	OutFall	7129.580	100.000	0.000	0.000
L0001	100	L0001	CL09	7130.910	2007	7130.910	33.000	0.000	0.000
L1000	100	L1000	2009	7135.150	2007	7130.910	1206.000	0.000	0.000
L1010	100	L1010	2059	7142.490	2054	7139.900	750.000	0.000	0.000
L1200	100	L1200	CL01	7191.050	2116	7158.768	2014.000	2014.000	2014.000
L1310	100	L1310	0007	7249.000	2122	7161.590	3155.000	3155.000	3155.000
L1311	100	L1311	CM01	7249.165	0007	7249.000	33.000	33.000	33.000
L1315	100	L1315	CU01	7285.000	0007	7249.000	5816.000	5816.000	5816.000
L2022	100	L2022	2059	7148.573	2030	7141.622	2161.000	2161.000	2161.000
L2201	100	L2201	2282	7141.570	LL10	7141.950	300.000	0.000	0.000
L2203	100	L2203	2714	7140.510	LL10	7140.430	217.000	0.000	0.000
L2310	100	L2310	RM10	7292.500	2435	7208.000	2856.000	2856.000	2856.000
L2510	100	L2510	RM04	7202.030	2490	7201.280	143.000	143.000	143.000
L2636	100	L2636	RU02	7275.095	2650	7275.095	33.000	33.000	33.000
L2640	100	L2640	RU01	7307.700	2650	7275.095	3920.000	3920.000	3920.000
L2650	100	L2650	RU06	7309.500	2650	7275.095	2993.000	2993.000	2993.000
L2700	100	L2700	2412	7191.900	0004	7190.720	662.000	0.000	0.000
L2802	100	L2802	LL09	7138.680	2690	7138.350	33.000	0.000	0.000
L2807	100	L2807	LL06	7140.840	2714	7140.510	33.000	0.000	0.000
P0000	100	L0000	2007	7130.910	OutFall	7129.578	450.000	0.000	0.000
P1001	100	L1001	CL08	7135.315	2009	7135.150	33.000	0.000	0.000
P1005	100	L1005	2054	7139.900	2009	7135.150	1686.000	0.000	0.000
P1015	100	L1015	2178	7143.730	2059	7142.490	710.000	0.000	0.000
P1020	100	L1020	0010	7146.110	2178	7143.730	563.000	0.000	0.000
P1030	100	L1030	2166	7147.840	0010	7146.110	304.000	0.000	0.000
P1035	100	L1035	2116	7156.140	2166	7147.840	1079.000	0.000	0.000
P1036	100	L1036	CL04	7156.305	2116	7156.140	33.000	0.000	0.000
P1081	100	L1031	CL05	7148.005	2166	7147.840	33.000	0.000	0.000
P1100	100	L1100	2115	7157.160	2116	7156.140	49.000	0.000	0.000
P1101	100	L1101	CL03	7157.325	2115	7157.160	33.000	0.000	0.000
P1105	100	L1105	2105	7164.770	2115	7157.160	534.000	0.000	0.000
P1110	100	L1110	2093	7182.210	2105	7164.770	627.000	0.000	0.000
P1115	100	L1115	CL02	7190.460	2093	7182.210	499.000	0.000	0.000
P1300	100	L1300	2121	7160.100	2116	7156.140	363.000	0.000	0.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
DummyOut	100	3.000	Trapezoidal		3.630	0.013	3.000	3.000	3.630
L0001	100	2.000	Circular		0.000	0.013	0.000	0.000	0.000
L1000	100	5.000	Circular		0.352	0.013	0.000	0.000	0.352
L1010	100	4.500	Circular		0.350	0.013	0.000	0.000	0.350
L1200	100	3.000	Natural	UrbanTypCh	1.600	0.044	3.000	3.000	1.600
L1310	100	0.500	Natural	UrbanTypStr	2.771	0.020	0.000	0.000	2.771
L1311	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
L1315	100	3.000	Natural	UrbanTypCh	0.620	0.044	3.000	3.000	0.620
L2022	100	0.500	Natural	UrbanTypStr	0.322	0.020	0.000	0.000	0.322
L2201	100	3.000	Special		-0.127	0.013	0.000	0.000	-0.127
L2203	100	2.500	Circular		0.037	0.013	0.000	0.000	0.037
L2310	100	0.500	Natural	UrbanTypStr	3.060	0.020	0.000	0.000	3.060
L2510	100	3.000	Natural	BasinConve	0.524	0.013	0.000	0.000	0.524
L2636	100	0.500	Natural	UrbanTypStr	0.000	0.020	0.000	0.000	0.000
L2640	100	0.500	Natural	UrbanTypStr	0.845	0.020	0.000	0.000	0.845
L2650	100	0.500	Natural	UrbanTypStr	1.150	0.020	0.000	0.000	1.150
L2700	100	1.500	Circular		0.180	0.013	0.000	0.000	0.180
L2802	100	5.000	Circular		1.000	0.014	0.000	0.000	1.000
L2807	100	5.000	Circular		1.000	0.013	0.000	0.000	1.000
P0000	100	6.000	Circular		0.296	0.013	0.000	0.000	0.296
P1001	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P1005	100	5.000	Circular		0.280	0.013	0.000	0.000	0.280
P1015	100	4.500	Circular		0.170	0.013	0.000	0.000	0.170
P1020	100	4.000	Circular		0.423	0.013	0.000	0.000	0.423
P1030	100	3.000	Circular		0.570	0.013	0.000	0.000	0.570
P1035	100	2.500	Circular		0.770	0.013	0.000	0.000	0.770
P1036	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P1081	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P1100	100	2.500	Circular		2.080	0.013	0.000	0.000	2.080
P1101	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P1105	100	2.000	Circular		1.430	0.013	0.000	0.000	1.430
P1110	100	1.500	Circular		2.780	0.013	0.000	0.000	2.780
P1115	100	1.500	Circular		1.650	0.013	0.000	0.000	1.650
P1300	100	1.500	Circular		1.090	0.013	0.000	0.000	1.090

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
DummyOut	100	Free	
L0001	100	Free	
L1000	100	Downhill Onl	
L1010	100	Downhill Onl	
L1200	100	Downhill Onl	
L1310	100	Downhill Onl	
L1311	100	Downhill Onl	
L1315	100	Downhill Onl	
L2022	100	Free	
L2201	100	Free	
L2203	100	Free	
L2310	100	Downhill Onl	
L2510	100	Downhill Onl	
L2636	100	Downhill Onl	
L2640	100	Downhill Onl	
L2650	100	Free	
L2700	100	Downhill Onl	
L2802	100	Free	
L2807	100	Free	
P0000	100	Downhill Onl	0.000
P1001	100	Downhill Onl	0.000
P1005	100	Downhill Onl	0.000
P1015	100	Downhill Onl	0.000
P1020	100	Downhill Onl	0.000
P1030	100	Downhill Onl	0.000
P1035	100	Downhill Onl	0.000
P1036	100	Downhill Onl	0.000
P1081	100	Downhill Onl	0.000
P1100	100	Downhill Onl	0.000
P1101	100	Downhill Onl	0.000
P1105	100	Downhill Onl	0.000
P1110	100	Downhill Onl	0.000
P1115	100	Downhill Onl	0.000
P1300	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
P1305	100	L1305	2122	7161.090	2121	7160.100	104.000	0.000	0.000
P1306	100	L1306	CM02	7161.255	2122	7161.090	33.000	0.000	0.000
P1911	100	L1911	CL07	7145.830	2059	7145.550	56.000	0.000	0.000
P1912	100	L1912	CL06	7142.655	2059	7142.490	33.000	0.000	0.000
P2000	100	L2000	2022	7133.020	OutFall	7129.581	1976.000	0.000	0.000
P2001	100	L2001	RL03	7133.185	2022	7133.020	33.000	0.000	0.000
P2005	100	L2005	2021	7134.120	2022	7133.020	570.000	0.000	0.000
P2010	100	L2010	2019	7135.570	2021	7134.190	643.000	0.000	0.000
P2020	100	L2020	2030	7137.000	2019	7135.570	665.000	0.000	0.000
P2021	100	L2021	RL02	7137.165	2030	7137.000	33.000	0.000	0.000
P2100	100	L2100	2297	7140.630	2030	7137.000	1798.000	0.000	0.000
P2101	100	L2101	RL01	7140.795	2297	7140.630	33.000	0.000	0.000
P2105	100	L2105	2319	7143.160	2297	7140.630	601.000	0.000	0.000
P2110	100	L2110	2327	7167.530	2319	7143.160	1912.000	0.000	0.000
P2115	100	L2115	2335	7171.210	2327	7167.530	348.000	0.000	0.000
P2116	100	L2116	RM11	7171.540	2335	7171.210	33.000	0.000	0.000
P2120	100	L2120	0006	7175.970	2335	7171.210	627.000	0.000	0.000
P2121	100	L2121	RM06	7176.500	0006	7175.970	74.000	0.000	0.000
P2122	100	L2122	RM09	7176.135	0006	7175.970	33.000	0.000	0.000
P2125	100	L2125	0005	7187.790	0006	7175.970	1447.000	0.000	0.000
P2126	100	L2126	RM07	7188.510	0005	7187.790	103.000	0.000	0.000
P2130	100	L2130	0004	7190.720	0005	7187.790	358.000	0.000	0.000
P2131	100	L2131	RM01	7190.885	0004	7190.720	33.000	0.000	0.000
P2200	100	L2200	2282	7141.570	2030	7137.000	2171.000	0.000	0.000
P2202	100	L2202	LL04	7141.735	2282	7141.570	33.000	0.000	0.000
P2204	100	L2204	LL05	7140.900	LL10	7140.430	118.000	0.000	0.000
P2205	100	L2205	2279	7142.500	2282	7141.570	338.000	0.000	0.000
P2210	100	L2210	2199	7143.170	2279	7142.660	669.000	0.000	0.000
P2211	100	L2211	LL03	7143.335	2199	7143.170	33.000	0.000	0.000
P2215	100	L2215	LL02	7145.050	2199	7143.170	341.000	0.000	0.000
P2220	100	L2220	2206	7148.610	2199	7143.170	718.000	0.000	0.000
P2225	100	L2225	2211	7154.940	2206	7148.710	695.000	0.000	0.000
P2226	100	L2226	LL01	7155.105	2211	7154.940	33.000	0.000	0.000
P2230	100	L2230	2226	7173.680	2211	7154.940	1080.000	0.000	0.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
P1305	100	1.500	Circular		0.950	0.013	0.000	0.000	0.950
P1306	100	1.250	Circular		0.500	0.013	0.000	0.000	0.500
P1911	100	2.000	Circular		0.500	0.013	0.000	0.000	0.500
P1912	100	2.000	Circular		0.500	0.013	0.000	0.000	0.500
P2000	100	4.000	Circular		0.174	0.013	0.000	0.000	0.174
P2001	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2005	100	4.000	Circular		0.190	0.013	0.000	0.000	0.190
P2010	100	4.000	Circular		0.215	0.013	0.000	0.000	0.215
P2020	100	4.000	Circular		0.220	0.013	0.000	0.000	0.220
P2021	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2100	100	4.000	Circular		0.200	0.013	0.000	0.000	0.200
P2101	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2105	100	4.000	Circular		0.420	0.013	0.000	0.000	0.420
P2110	100	3.500	Circular		1.270	0.013	0.000	0.000	1.270
P2115	100	3.500	Circular		1.057	0.013	0.000	0.000	1.057
P2116	100	1.000	Circular		1.000	0.013	0.000	0.000	1.000
P2120	100	3.500	Circular		0.759	0.013	0.000	0.000	0.759
P2121	100	2.000	Circular		0.720	0.013	0.000	0.000	0.720
P2122	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2125	100	2.000	Circular		0.820	0.013	0.000	0.000	0.820
P2126	100	2.000	Circular		0.700	0.013	0.000	0.000	0.700
P2130	100	2.000	Circular		0.820	0.013	0.000	0.000	0.820
P2131	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2200	100	4.000	Circular		0.210	0.013	0.000	0.000	0.210
P2202	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2204	100	1.500	Circular		0.398	0.013	0.000	0.000	0.398
P2205	100	4.000	Circular		0.275	0.013	0.000	0.000	0.275
P2210	100	4.000	Circular		0.076	0.013	0.000	0.000	0.076
P2211	100	3.000	Circular		0.500	0.013	0.000	0.000	0.500
P2215	100	2.500	Circular		0.550	0.013	0.000	0.000	0.550
P2220	100	3.000	Circular		0.760	0.013	0.000	0.000	0.760
P2225	100	2.500	Circular		0.900	0.013	0.000	0.000	0.900
P2226	100	1.500	Circular		0.500	0.013	0.000	0.000	0.500
P2230	100	2.000	Circular		1.740	0.013	0.000	0.000	1.740

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
P1305	100	Downhill Onl	0.000
P1306	100	Downhill Onl	0.000
P1911	100	Downhill Onl	0.000
P1912	100	Downhill Onl	0.000
P2000	100	Downhill Onl	0.000
P2001	100	Downhill Onl	0.000
P2005	100	Downhill Onl	0.000
P2010	100	Downhill Onl	0.000
P2020	100	Downhill Onl	0.000
P2021	100	Downhill Onl	0.000
P2100	100	Downhill Onl	0.000
P2101	100	Downhill Onl	0.000
P2105	100	Downhill Onl	0.000
P2110	100	Downhill Onl	0.000
P2115	100	Downhill Onl	0.000
P2116	100	Downhill Onl	0.000
P2120	100	Downhill Onl	0.000
P2121	100	Downhill Onl	0.000
P2122	100	Downhill Onl	0.000
P2125	100	Downhill Onl	0.000
P2126	100	Downhill Onl	0.000
P2130	100	Downhill Onl	0.000
P2131	100	Downhill Onl	0.000
P2200	100	Downhill Onl	0.000
P2202	100	Downhill Onl	0.000
P2204	100	Free	0.000
P2205	100	Downhill Onl	0.000
P2210	100	Downhill Onl	0.000
P2211	100	Downhill Onl	0.000
P2215	100	Downhill Onl	0.000
P2220	100	Downhill Onl	0.000
P2225	100	Downhill Onl	0.000
P2226	100	Downhill Onl	0.000
P2230	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
P2235	100	L2235	2229	7176.550	2226	7173.680	344.000	0.000	0.000
P2240	100	L2240	2235	7178.780	2229	7176.550	408.000	0.000	0.000
P2245	100	L2245	LM02	7180.950	2235	7178.780	112.000	0.000	0.000
P2250	100	L2250	LM01	7180.980	2235	7178.780	90.000	0.000	0.000
P2305	100	L2305	2435	7200.150	0004	7190.720	1211.000	0.000	0.000
P2306	100	L2306	RM08	7203.190	2435	7200.150	167.000	0.000	0.000
P2400	100	L2400	2359	7191.050	0004	7190.720	46.000	0.000	0.000
P2405	100	L2405	2364	7200.270	2359	7191.050	698.000	0.000	0.000
P2500	100	L2500	2363	7200.920	2364	7200.270	52.000	0.000	0.000
P2505	100	L2505	2490	7201.050	2363	7200.920	45.000	0.000	0.000
P2506	100	L2506	RM03	7201.850	2490	7201.480	74.000	0.000	0.000
P2600	100	L2600	2365	7202.690	2364	7200.270	276.000	0.000	0.000
P2605	100	L2605	0017	7230.470	2365	7202.690	1594.000	0.000	0.000
P2610	100	L2610	2639	7230.990	0017	7230.470	33.000	0.000	0.000
P2615	100	L2615	2634	7232.560	2639	7230.990	162.000	0.000	0.000
P2616	100	L2616	RU04	7232.725	2634	7232.560	33.000	0.000	0.000
P2617	100	L2617	RU05	7233.110	2634	7232.560	205.000	0.000	0.000
P2620	100	L2620	2643	7236.930	2634	7233.830	156.000	0.000	0.000
P2630	100	L2630	2650	7271.300	2643	7236.930	1087.000	0.000	0.000
P2631	100	L2631	RU03	7272.810	2650	7271.300	33.000	0.000	0.000
P2705	100	L2705	2407	7192.860	2412	7191.900	71.000	0.000	0.000
P2706	100	L2706	RM02	7193.025	2407	7192.860	33.000	0.000	0.000
P2710	100	L2710	RM05	7193.860	2407	7193.120	54.000	0.000	0.000
P2800	100	L2800	2690	7138.350	2673	7133.210	2240.000	0.000	0.000
P2801	100	L2801	LL08	7147.440	2690	7138.350	1358.000	0.000	0.000
P2804	100	L2804	2695	7140.040	2690	7138.350	340.000	0.000	0.000
P2805	100	L2805	2714	7140.510	2695	7140.040	1075.000	0.000	0.000
P2806	100	L2806	LL07	7151.540	2714	7140.550	1725.000	0.000	0.000
S0000	100	L0000	2007	7142.028	OutFall	7141.863	33.000	33.000	33.000
S1001	100	L1001	CL08	7140.573	2009	7140.408	33.000	33.000	33.000
S1005	100	L1005	2054	7149.539	2009	7143.073	1686.000	1686.000	1686.000
S1015	100	L1015	2178	7150.308	2059	7148.573	710.000	710.000	710.000
S1020	100	L1020	0010	7152.420	2178	7150.308	563.000	563.000	563.000
S1030	100	L1030	2166	7153.597	0010	7152.420	304.000	304.000	304.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
P2235	100	2.000	Circular		0.830	0.013	0.000	0.000	0.830
P2240	100	2.000	Circular		0.547	0.013	0.000	0.000	0.547
P2245	100	1.250	Circular		1.940	0.013	0.000	0.000	1.940
P2250	100	1.250	Circular		2.440	0.013	0.000	0.000	2.440
P2305	100	1.500	Circular		0.779	0.011	0.000	0.000	0.779
P2306	100	1.500	Circular		1.820	0.011	0.000	0.000	1.820
P2400	100	2.000	Circular		0.720	0.013	0.000	0.000	0.720
P2405	100	2.000	Circular		1.320	0.013	0.000	0.000	1.320
P2500	100	1.500	Circular		1.250	0.013	0.000	0.000	1.250
P2505	100	1.000	Circular		0.290	0.011	0.000	0.000	0.290
P2506	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2600	100	2.000	Circular		0.880	0.013	0.000	0.000	0.880
P2605	100	1.500	Circular		1.740	0.013	0.000	0.000	1.740
P2610	100	1.500	Circular		1.730	0.013	0.000	0.000	1.730
P2615	100	2.000	Circular		0.969	0.013	0.000	0.000	0.969
P2616	100	4.000	Circular		0.500	0.013	0.000	0.000	0.500
P2617	100	2.500	Circular		0.250	0.011	0.000	0.000	0.250
P2620	100	2.000	Circular		1.990	0.013	0.000	0.000	1.990
P2630	100	2.000	Circular		3.160	0.013	0.000	0.000	3.160
P2631	100	1.500	Circular		4.576	0.013	0.000	0.000	4.576
P2705	100	1.250	Circular		1.350	0.013	0.000	0.000	1.350
P2706	100	2.000	Circular		0.500	0.011	0.000	0.000	0.500
P2710	100	2.000	Circular		1.370	0.013	0.000	0.000	1.370
P2800	100	3.500	Circular		0.273	0.013	0.000	0.000	0.273
P2801	100	3.500	Circular		0.669	0.013	0.000	0.000	0.669
P2804	100	2.000	Circular		0.497	0.013	0.000	0.000	0.497
P2805	100	2.000	Circular		0.033	0.013	0.000	0.000	0.033
P2806	100	2.000	Circular		0.637	0.013	0.000	0.000	0.637
S0000	100	3.000	Natural	BasinConve	0.500	0.044	0.000	0.000	0.500
S1001	100	3.000	Natural	BasinConve	0.500	0.020	3.000	3.000	0.500
S1005	100	0.500	Natural	UrbanTypStr	0.384	0.020	0.000	0.000	0.384
S1015	100	0.500	Natural	UrbanTypStr	0.244	0.020	0.000	0.000	0.244
S1020	100	0.500	Natural	UrbanTypStr	0.375	0.020	0.000	0.000	0.375
S1030	100	0.500	Natural	UrbanTypStr	0.387	0.020	0.000	0.000	0.387

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
P2235	100	Downhill Onl	0.000
P2240	100	Downhill Onl	0.000
P2245	100	Downhill Onl	0.000
P2250	100	Downhill Onl	0.000
P2305	100	Downhill Onl	0.000
P2306	100	Downhill Onl	0.000
P2400	100	Downhill Onl	0.000
P2405	100	Downhill Onl	0.000
P2500	100	Downhill Onl	0.000
P2505	100	Downhill Onl	0.000
P2506	100	Downhill Onl	0.000
P2600	100	Downhill Onl	0.000
P2605	100	Downhill Onl	0.000
P2610	100	Downhill Onl	0.000
P2615	100	Downhill Onl	0.000
P2616	100	Downhill Onl	0.000
P2617	100	Downhill Onl	0.000
P2620	100	Downhill Onl	0.000
P2630	100	Downhill Onl	0.000
P2631	100	Downhill Onl	0.000
P2705	100	Downhill Onl	0.000
P2706	100	Downhill Onl	0.000
P2710	100	Downhill Onl	0.000
P2800	100	Free	0.000
P2801	100	Free	0.000
P2804	100	Free	0.000
P2805	100	Free	0.000
P2806	100	Free	0.000
S0000	100	Free	0.000
S1001	100	Downhill Onl	0.000
S1005	100	Downhill Onl	0.000
S1015	100	Downhill Onl	0.000
S1020	100	Downhill Onl	0.000
S1030	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
S1035	100	L1035	2116	7161.268	2166	7153.597	1079.000	1079.000	1079.000
S1036	100	L1036	CL04	7161.268	2116	7161.103	33.000	33.000	33.000
S1081	100	L1031	CL05	7153.597	2166	7153.432	33.000	33.000	33.000
S1100	100	L1100	2115	7161.985	2116	7161.268	49.000	49.000	49.000
S1101	100	L1101	CL03	7161.985	2115	7161.820	33.000	33.000	33.000
S1105	100	L1105	2105	7167.760	2115	7161.985	534.000	534.000	534.000
S1110	100	L1110	2093	7183.842	2105	7167.760	627.000	627.000	627.000
S1115	100	L1115	CL02	7192.000	2093	7183.842	499.000	499.000	499.000
S1300	100	L1300	2121	7161.799	2116	7161.268	363.000	363.000	363.000
S1305	100	L1305	2122	7164.850	2121	7161.799	104.000	104.000	104.000
S1306	100	L1306	CM02	7161.850	2122	7161.685	33.000	33.000	33.000
S1911	100	L1911	CL07	7148.500	2059	7148.335	33.000	33.000	33.000
S1912	100	L1912	CL06	7148.573	2059	7148.408	33.000	33.000	33.000
S2000	100	L2000	2022	7136.591	OutFall	7136.426	33.000	33.000	33.000
S2001	100	L2001	RL03	7136.591	2022	7136.426	33.000	33.000	33.000
S2005	100	L2005	2021	7142.236	2022	7139.091	570.000	570.000	570.000
S2010	100	L2010	2019	7140.674	2021	7137.459	643.000	643.000	643.000
S2020	100	L2020	2030	7141.622	2019	7140.674	665.000	665.000	665.000
S2021	100	L2021	RL02	7139.122	2030	7138.957	33.000	33.000	33.000
S2100	100	L2100	2297	7148.483	2030	7141.622	1798.000	1798.000	1798.000
S2101	100	L2101	RL01	7145.983	2297	7145.818	33.000	33.000	33.000
S2105	100	L2105	2319	7149.855	2297	7148.483	601.000	601.000	601.000
S2110	100	L2110	2327	7173.289	2319	7149.855	1912.000	1912.000	1912.000
S2115	100	L2115	2335	7174.500	2327	7173.289	348.000	348.000	348.000
S2116	100	L2116	RM11	7172.000	2335	7171.835	33.000	33.000	33.000
S2120	100	L2120	0006	7180.680	2335	7174.500	627.000	627.000	627.000
S2121	100	L2121	RM06	7181.570	0006	7178.180	74.000	74.000	74.000
S2122	100	L2122	RM09	7178.180	0006	7178.015	33.000	33.000	33.000
S2125	100	L2125	0005	7192.450	0006	7180.680	1447.000	1447.000	1447.000
S2126	100	L2126	RM07	7193.000	0005	7189.950	103.000	103.000	103.000
S2130	100	L2130	0004	7197.770	0005	7192.450	358.000	358.000	358.000
S2131	100	L2131	RM01	7197.770	0004	7197.605	33.000	33.000	33.000
S2200	100	L2200	2282	7147.580	2030	7141.622	2171.000	2171.000	2171.000
S2202	100	L2202	LL04	7147.580	2282	7147.415	33.000	33.000	33.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S1035	100	0.500	Natural	UrbanTypStr	0.711	0.020	0.000	0.000	0.711
S1036	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1081	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1100	100	0.500	Natural	UrbanTypStr	1.463	0.020	0.000	0.000	1.463
S1101	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1105	100	0.500	Natural	UrbanTypStr	1.550	0.020	0.000	0.000	1.550
S1110	100	3.000	Natural	UrbanTypCh	2.565	0.044	3.000	3.000	2.565
S1115	100	3.000	Natural	UrbanTypCh	1.635	0.044	3.000	3.000	1.635
S1300	100	0.500	Natural	UrbanTypStr	0.284	0.020	0.000	0.000	0.284
S1305	100	1.000	Natural	PondOverflo	2.934	0.044	3.000	3.000	2.934
S1306	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S1911	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S1912	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2000	100	3.000	Natural	BasinConve	0.500	0.044	0.000	0.000	0.500
S2001	100	3.000	Natural	BasinConve	0.500	0.020	3.000	3.000	0.500
S2005	100	0.500	Natural	UrbanTypStr	0.552	0.020	0.000	0.000	0.552
S2010	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2020	100	0.500	Natural	UrbanTypStr	0.143	0.020	0.000	0.000	0.143
S2021	100	3.000	Natural	BasinConve	0.500	0.020	0.000	0.000	0.500
S2100	100	0.500	Natural	UrbanTypStr	0.382	0.020	0.000	0.000	0.382
S2101	100	3.000	Natural	BasinConve	0.500	0.020	0.000	0.000	0.500
S2105	100	0.500	Natural	UrbanTypStr	0.228	0.020	0.000	0.000	0.228
S2110	100	0.500	Natural	UrbanTypStr	1.226	0.020	0.000	0.000	1.226
S2115	100	0.500	Natural	UrbanTypStr	0.348	0.020	0.000	0.000	0.348
S2116	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S2120	100	0.500	Natural	UrbanTypStr	0.986	0.020	0.000	0.000	0.986
S2121	100	1.000	Natural	PondOverflo	4.581	0.044	3.000	3.000	4.581
S2122	100	3.000	Natural	UrbanTypCh	0.500	0.044	3.000	3.000	0.500
S2125	100	0.500	Natural	UrbanTypStr	0.813	0.020	0.000	0.000	0.813
S2126	100	1.000	Natural	PondOverflo	1.990	0.044	3.000	3.000	1.990
S2130	100	0.500	Natural	UrbanTypStr	1.486	0.020	0.000	0.000	1.486
S2131	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2200	100	0.500	Natural	UrbanTypStr	0.274	0.020	0.000	0.000	0.274
S2202	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S1035	100	Downhill Onl	0.000
S1036	100	Downhill Onl	0.000
S1081	100	Downhill Onl	0.000
S1100	100	Downhill Onl	0.000
S1101	100	Downhill Onl	0.000
S1105	100	Downhill Onl	0.000
S1110	100	Downhill Onl	0.000
S1115	100	Downhill Onl	0.000
S1300	100	Downhill Onl	0.000
S1305	100	Downhill Onl	20.000
S1306	100	Downhill Onl	0.000
S1911	100	Downhill Onl	0.000
S1912	100	Downhill Onl	0.000
S2000	100	Free	0.000
S2001	100	Downhill Onl	0.000
S2005	100	Downhill Onl	0.000
S2010	100	Free	0.000
S2020	100	Downhill Onl	0.000
S2021	100	Downhill Onl	0.000
S2100	100	Downhill Onl	0.000
S2101	100	Downhill Onl	0.000
S2105	100	Downhill Onl	0.000
S2110	100	Downhill Onl	0.000
S2115	100	Downhill Onl	0.000
S2116	100	Downhill Onl	0.000
S2120	100	Downhill Onl	0.000
S2121	100	Downhill Onl	20.000
S2122	100	Downhill Onl	0.000
S2125	100	Downhill Onl	0.000
S2126	100	Downhill Onl	20.000
S2130	100	Downhill Onl	0.000
S2131	100	Downhill Onl	0.000
S2200	100	Downhill Onl	0.000
S2202	100	Downhill Onl	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
S2204	100	L2204	LL05	7146.140	LL10	7145.500	118.000	0.000	0.000
S2205	100	L2205	2279	7147.962	2282	7147.580	338.000	338.000	338.000
S2206	100	L2206	LL10	7145.000	2030	7137.000	1200.000	0.000	0.000
S2210	100	L2210	2199	7148.187	2279	7147.962	669.000	669.000	669.000
S2211	100	L2211	LL03	7148.187	2199	7148.022	33.000	33.000	33.000
S2215	100	L2215	LL02	7148.689	2199	7148.187	341.000	341.000	341.000
S2220	100	L2220	2206	7156.859	2199	7148.187	718.000	718.000	718.000
S2225	100	L2225	2211	7159.372	2206	7156.859	695.000	695.000	695.000
S2226	100	L2226	LL01	7159.537	2211	7159.372	33.000	33.000	33.000
S2230	100	L2230	2226	7179.148	2211	7159.537	1080.000	1080.000	1080.000
S2235	100	L2235	2229	7179.572	2226	7179.148	344.000	344.000	344.000
S2240	100	L2240	2235	7182.512	2229	7179.572	408.000	408.000	408.000
S2245	100	L2245	LM02	7184.690	2235	7180.012	112.000	112.000	112.000
S2250	100	L2250	LM01	7185.520	2235	7180.012	90.000	90.000	90.000
S2305	100	L2305	2435	7208.000	0004	7197.770	1211.000	1211.000	1211.000
S2306	100	L2306	RM08	7212.020	2435	7207.500	167.000	167.000	167.000
S2400	100	L2400	2359	7198.120	0004	7197.770	46.000	46.000	46.000
S2405	100	L2405	2364	7203.742	2359	7198.120	698.000	698.000	698.000
S2500	100	L2500	2363	7203.340	2364	7203.742	52.000	52.000	52.000
S2505	100	L2505	2490	7205.480	2363	7203.340	45.000	45.000	45.000
S2506	100	L2506	RM03	7202.850	2490	7202.480	74.000	74.000	74.000
S2600	100	L2600	2365	7204.844	2364	7203.742	276.000	276.000	276.000
S2605	100	L2605	0017	7232.960	2365	7204.844	1594.000	1594.000	1594.000
S2610	100	L2610	2639	7234.179	0017	7232.960	33.000	33.000	33.000
S2615	100	L2615	2634	7240.430	2639	7231.679	162.000	162.000	162.000
S2616	100	L2616	RU04	7237.430	2634	7236.430	33.000	33.000	33.000
S2617	100	L2617	RU05	7240.420	2634	7237.255	33.000	33.000	33.000
S2620	100	L2620	2643	7237.373	2634	7232.560	156.000	0.000	0.000
S2630	100	L2630	2650	7275.095	2643	7239.873	1087.000	1087.000	1087.000
S2631	100	L2631	RU03	7274.560	2650	7274.395	33.000	33.000	33.000
S2705	100	L2705	2407	7196.280	2412	7192.232	71.000	71.000	71.000
S2706	100	L2706	RM02	7193.280	2407	7193.115	33.000	33.000	33.000
S2710	100	L2710	RM05	7197.310	2407	7195.780	54.000	0.000	0.000
S2800	100	L2800	2690	7147.200	2673	7136.210	2240.000	2240.000	2240.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S2204	100	0.500	Natural	UrbanTypStr	0.000	0.020	0.000	0.000	0.000
S2205	100	0.500	Natural	UrbanTypStr	0.113	0.020	0.000	0.000	0.113
S2206	100	1.000	Natural	PondOverflo	0.667	0.044	0.000	0.000	0.667
S2210	100	0.500	Natural	UrbanTypStr	0.034	0.020	0.000	0.000	0.034
S2211	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2215	100	0.500	Natural	UrbanTypStr	0.147	0.020	0.000	0.000	0.147
S2220	100	0.500	Natural	UrbanTypStr	1.208	0.020	0.000	0.000	1.208
S2225	100	0.500	Natural	UrbanTypStr	0.362	0.020	0.000	0.000	0.362
S2226	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2230	100	0.500	Natural	UrbanTypStr	1.816	0.020	0.000	0.000	1.816
S2235	100	0.500	Natural	UrbanTypStr	0.123	0.020	0.000	0.000	0.123
S2240	100	0.500	Natural	UrbanTypStr	0.721	0.020	0.000	0.000	0.721
S2245	100	1.000	Natural	PondOverflo	4.177	0.044	3.000	3.000	4.177
S2250	100	1.000	Natural	PondOverflo	6.120	0.044	3.000	3.000	6.120
S2305	100	0.500	Natural	UrbanTypStr	0.845	0.020	0.000	0.000	0.845
S2306	100	1.000	Natural	PondOverflo	2.707	0.044	3.000	3.000	2.707
S2400	100	0.500	Natural	UrbanTypStr	0.761	0.020	0.000	0.000	0.761
S2405	100	0.500	Natural	UrbanTypStr	0.805	0.020	0.000	0.000	0.805
S2500	100	0.500	Natural	UrbanTypStr	0.188	0.020	0.000	0.000	0.188
S2505	100	1.000	Natural	PondOverflo	4.756	0.044	3.000	3.000	4.756
S2506	100	3.000	Natural	BasinConve	0.500	0.044	3.000	3.000	0.500
S2600	100	0.500	Natural	UrbanTypStr	0.399	0.020	0.000	0.000	0.399
S2605	100	0.500	Natural	UrbanTypStr	1.889	0.020	0.000	0.000	1.889
S2610	100	0.500	Natural	UrbanTypStr	3.694	0.020	0.000	0.000	3.694
S2615	100	1.000	Natural	PondOverflo	5.402	0.044	3.000	3.000	5.402
S2616	100	3.000	Natural	BasinConve	3.030	0.044	3.000	3.000	3.030
S2617	100	1.000	Natural	PondOverflo	9.591	0.044	3.000	3.000	9.591
S2620	100	3.000	Natural	UrbanTypCh	3.085	0.044	0.000	0.000	3.085
S2630	100	0.500	Natural	UrbanTypStr	3.240	0.020	0.000	0.000	3.240
S2631	100	0.500	Natural	UrbanTypStr	0.500	0.020	0.000	0.000	0.500
S2705	100	1.000	Natural	PondOverflo	5.701	0.044	3.000	3.000	5.701
S2706	100	3.000	Natural	BasinConve	0.500	0.044	3.000	3.000	0.500
S2710	100	0.500	Natural	UrbanTypStr	2.833	0.020	0.000	0.000	2.833
S2800	100	0.500	Natural	BasinConve	0.512	0.044	0.000	0.000	0.512

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S2204	100	Free	0.000
S2205	100	Downhill Onl	0.000
S2206	100	Free	300.000
S2210	100	Downhill Onl	0.000
S2211	100	Downhill Onl	0.000
S2215	100	Downhill Onl	0.000
S2220	100	Downhill Onl	0.000
S2225	100	Downhill Onl	0.000
S2226	100	Downhill Onl	0.000
S2230	100	Downhill Onl	0.000
S2235	100	Downhill Onl	0.000
S2240	100	Downhill Onl	0.000
S2245	100	Downhill Onl	20.000
S2250	100	Downhill Onl	20.000
S2305	100	Downhill Onl	0.000
S2306	100	Downhill Onl	20.000
S2400	100	Downhill Onl	0.000
S2405	100	Downhill Onl	0.000
S2500	100	Downhill Onl	0.000
S2505	100	Downhill Onl	20.000
S2506	100	Downhill Onl	0.000
S2600	100	Downhill Onl	0.000
S2605	100	Downhill Onl	0.000
S2610	100	Downhill Onl	0.000
S2615	100	Downhill Onl	20.000
S2616	100	Downhill Onl	0.000
S2617	100	Downhill Onl	20.000
S2620	100	Downhill Onl	0.000
S2630	100	Downhill Onl	0.000
S2631	100	Downhill Onl	0.000
S2705	100	Downhill Onl	20.000
S2706	100	Downhill Onl	0.000
S2710	100	Free	0.000
S2800	100	Free	0.000

ExistingLinkData

Name	Storm	Link Name	Upstream Node Name	Upstream Invert Elevation ft	Downstream Node Name	Downstream Invert Elevation ft	Length ft	Left Channel Length ft	Right Channel Length ft
S2801	100	L2801	LL08	7154.440	2690	7147.200	1358.000	1345.000	1345.000
S2804	100	L2804	2695	7143.710	2690	7143.540	340.000	0.000	0.000
S2805	100	L2805	2714	7145.870	2695	7143.710	1075.000	1385.000	1385.000
S2806	100	L2806	LL07	7158.940	2714	7145.870	1725.000	1680.000	1680.000
W1305	100	L1305	2122	7164.850	2121	7161.799	104.000	104.000	104.000
W2121	100	L2121	RM06	7181.570	0006	7178.180	74.000	74.000	74.000
W2126	100	L2126	RM07	7193.000	0005	7189.950	103.000	103.000	103.000
W2206	100	L2206	LL10	7145.000	2030	7137.000	1200.000	0.000	0.000
W2245	100	L2245	LM02	7184.690	2235	7180.012	112.000	112.000	112.000
W2250	100	L2250	LM01	7185.520	2235	7180.012	90.000	90.000	90.000
W2306	100	L2306	RM08	7212.020	2435	7207.500	167.000	167.000	167.000
W2505	100	L2505	2490	7205.480	2363	7203.340	45.000	45.000	45.000
W2615	100	L2615	2634	7240.430	2639	7231.679	162.000	162.000	162.000
W2617	100	L2617	RU05	7240.420	2634	7237.255	33.000	33.000	33.000
W2705	100	L2705	2407	7196.280	2412	7192.232	71.000	71.000	71.000

ExistingLinkData

Name	Storm	Diameter (Height) ft	Shape	Natural Section Shape GLDB	Conduit Slope	Roughness	Left-hand Side Slope ft	Right-hand Side Slope	Conduit Slope
S2801	100	0.500	Natural	UrbanTypStr	0.533	0.020	0.000	0.000	0.533
S2804	100	0.500	Natural	UrbanTypStr	0.050	0.020	0.000	0.000	0.050
S2805	100	0.500	Natural	UrbanTypStr	0.201	0.020	0.000	0.000	0.201
S2806	100	0.500	Natural	UrbanTypStr	0.758	0.020	0.000	0.000	0.758
W1305	100	1.000	Natural	PondOverflo	2.934	0.044	3.000	3.000	2.934
W2121	100	1.000	Natural	PondOverflo	4.581	0.044	3.000	3.000	4.581
W2126	100	1.000	Natural	PondOverflo	1.990	0.044	3.000	3.000	1.990
W2206	100	1.000	Natural	PondOverflo	0.667	0.044	0.000	0.000	0.667
W2245	100	1.000	Natural	PondOverflo	4.177	0.044	3.000	3.000	4.177
W2250	100	1.000	Natural	PondOverflo	6.120	0.044	3.000	3.000	6.120
W2306	100	1.000	Natural	PondOverflo	2.707	0.044	3.000	3.000	2.707
W2505	100	1.000	Natural	PondOverflo	4.756	0.044	3.000	3.000	4.756
W2615	100	1.000	Natural	PondOverflo	5.402	0.044	3.000	3.000	5.402
W2617	100	1.000	Natural	PondOverflo	9.591	0.044	3.000	3.000	9.591
W2705	100	1.000	Natural	PondOverflo	5.701	0.044	3.000	3.000	5.701

ExistingLinkData

Name	Storm	Flow Direction Option	Weir Length ft
S2801	100	Free	0.000
S2804	100	Free	0.000
S2805	100	Free	0.000
S2806	100	Free	0.000
W1305	100	Downhill Onl	20.000
W2121	100	Downhill Onl	20.000
W2126	100	Downhill Onl	20.000
W2206	100	Free	300.000
W2245	100	Downhill Onl	20.000
W2250	100	Downhill Onl	20.000
W2306	100	Downhill Onl	20.000
W2505	100	Downhill Onl	20.000
W2615	100	Downhill Onl	20.000
W2617	100	Downhill Onl	20.000
W2705	100	Downhill Onl	20.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
DummyOut	2	Trapezoidal	48.681	3.921	3.840
DummyOut	5	Trapezoidal	52.973	4.345	3.950
DummyOut	10	Trapezoidal	-114.029	4.546	4.820
DummyOut	100	Trapezoidal	-806.936	6.183	9.980
L0001	2	Circular	38.719	5.042	12.210
L0001	5	Circular	60.270	7.161	18.890
L0001	10	Circular	74.715	8.741	23.310
L0001	100	Circular	117.582	14.571	36.080
L1000	2	Circular	173.081	5.173	9.180
L1000	5	Circular	194.914	7.412	9.910
L1000	10	Circular	203.314	8.352	10.300
L1000	100	Circular	220.339	9.594	11.140
L1010	2	Circular	155.071	6.634	9.740
L1010	5	Circular	155.644	7.569	9.780
L1010	10	Circular	155.377	8.898	9.780
L1010	100	Circular	154.643	8.368	9.710
L1200	2	Natural	32.141	3.164	2.600
L1200	5	Natural	51.690	3.328	3.070
L1200	10	Natural	59.998	3.382	3.270
L1200	100	Natural	130.979	4.114	4.290
L1310	2	Natural	118.966	3.461	5.020
L1310	5	Natural	215.300	3.842	6.060
L1310	10	Natural	259.593	3.966	6.530
L1310	100	Natural	701.449	5.813	8.910
L1311	2	Natural	66.368	1.533	4.890
L1311	5	Natural	102.015	1.828	5.770
L1311	10	Natural	125.945	1.982	6.300
L1311	100	Natural	233.146	2.537	7.900
L1315	2	Natural	87.192	2.660	2.770
L1315	5	Natural	163.840	3.251	3.420
L1315	10	Natural	198.062	3.407	3.670
L1315	100	Natural	534.938	4.616	5.290
L2022	2	Natural	33.859	1.180	1.780
L2022	5	Natural	215.473	1.747	4.200
L2022	10	Natural	284.630	1.957	4.680
L2022	100	Natural	1121.575	3.399	7.740
L2201	2	Special	39.531	6.007	9.880
L2201	5	Special	41.363	6.434	10.280
L2201	10	Special	41.829	6.545	10.380
L2201	100	Special	43.855	7.193	10.800
L2203	2	Circular	49.830	5.727	10.590
L2203	5	Circular	53.907	6.046	11.260
L2203	10	Circular	55.828	6.116	11.570
L2203	100	Circular	61.849	7.394	12.700
L2310	2	Natural	24.117	0.350	3.940
L2310	5	Natural	38.460	0.417	4.430
L2310	10	Natural	43.309	0.443	4.560
L2310	100	Natural	123.134	0.635	6.690
L2510	2	Natural	21.136	1.459	2.180
L2510	5	Natural	32.105	2.041	2.490
L2510	10	Natural	39.200	2.302	2.660

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
L2510	100	Natural	88.960	4.353	3.340
L2636	2	Natural	30.672	0.639	1.460
L2636	5	Natural	36.674	1.052	1.440
L2636	10	Natural	88.081	0.948	2.610
L2636	100	Natural	120.861	0.983	2.790
L2640	2	Natural	22.643	0.441	2.350
L2640	5	Natural	48.623	0.572	3.180
L2640	10	Natural	58.589	0.602	3.410
L2640	100	Natural	192.209	1.002	5.560
L2650	2	Natural	44.332	0.512	3.420
L2650	5	Natural	84.528	0.648	4.420
L2650	10	Natural	99.647	0.694	4.720
L2650	100	Natural	245.596	1.036	6.730
L2700	2	Circular	6.025	7.364	3.460
L2700	5	Circular	6.386	7.475	3.650
L2700	10	Circular	6.524	7.501	3.710
L2700	100	Circular	8.220	7.956	4.580
L2802	2	Circular	58.312	6.563	6.270
L2802	5	Circular	98.273	8.396	7.220
L2802	10	Circular	126.201	9.349	6.530
L2802	100	Circular	231.508	10.037	11.730
L2807	2	Circular	29.786	5.727	3.780
L2807	5	Circular	44.719	6.046	4.060
L2807	10	Circular	56.030	6.116	4.070
L2807	100	Circular	98.151	7.394	4.940
P0000	2	Circular	205.949	4.285	9.700
P0000	5		251.965	4.923	10.360
P0000	10		274.660	5.291	10.730
P0000	100		322.724	6.211	11.400
P1001	2	Circular	48.477	5.173	6.300
P1001	5		68.666	7.412	7.570
P1001	10		81.951	8.352	7.240
P1001	100		74.802	9.594	7.480
P1005	2	Circular	153.900	5.210	8.150
P1005	5		153.562	7.569	8.150
P1005	10		154.083	8.898	8.150
P1005	100		153.902	9.594	8.190
P1015	2	Circular	101.572	7.237	6.360
P1015	5		124.777	7.590	7.790
P1015	10		125.893	7.690	7.860
P1015	100		129.228	8.805	8.060
P1020	2	Circular	93.644	7.237	7.750
P1020	5		111.996	7.590	8.880
P1020	10		113.040	7.690	8.960
P1020	100		104.204	8.805	7.970
P1030	2	Circular	81.705	6.973	11.480
P1030	5		82.263	7.266	11.550
P1030	10		82.268	7.348	11.530
P1030	100		81.990	8.337	11.490
P1035	2	Circular	42.372	6.530	8.640
P1035	5		42.757	6.796	8.710

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P1035	10		42.764	6.876	8.720
P1035	100		42.767	7.917	8.720
P1036	2	Circular	25.578	5.792	14.270
P1036	5		26.483	5.956	14.780
P1036	10		24.638	6.010	13.750
P1036	100		24.029	6.742	13.400
P1081	2	Circular	28.761	6.530	16.000
P1081	5		28.758	6.796	16.010
P1081	10		28.705	6.876	15.970
P1081	100		29.717	7.917	16.540
P1100	2	Circular	60.773	5.792	12.310
P1100	5		63.944	5.956	12.950
P1100	10		65.755	6.010	13.320
P1100	100		63.184	6.742	12.800
P1101	2	Circular	44.156	5.286	4.710
P1101	5		54.890	5.418	4.940
P1101	10		61.219	5.462	4.860
P1101	100		52.909	5.802	5.210
P1105	2	Circular	23.584	5.286	7.660
P1105	5		23.588	5.418	7.730
P1105	10		23.591	5.462	7.760
P1105	100		23.468	5.802	7.790
P1110	2	Circular	18.586	3.399	10.920
P1110	5		18.603	3.521	11.030
P1110	10		18.562	3.554	11.110
P1110	100		18.546	3.873	11.010
P1115	2	Circular	14.230	2.780	8.460
P1115	5		14.417	3.213	8.330
P1115	10		14.479	3.412	8.440
P1115	100		14.297	4.199	8.580
P1300	2	Circular	12.123	5.792	6.950
P1300	5		12.126	5.956	6.950
P1300	10		12.127	6.010	6.950
P1300	100		12.128	6.742	6.950
P1305	2	Circular	17.014	3.961	9.540
P1305	5		17.427	4.342	9.750
P1305	10		17.568	4.466	9.830
P1305	100		19.889	6.313	11.040
P1306	2	Circular	13.271	3.961	10.800
P1306	5		14.424	4.342	11.680
P1306	10		14.984	4.466	12.090
P1306	100		14.363	6.313	11.560
P1911	2	Circular	34.112	3.574	10.850
P1911	5		34.962	4.017	11.110
P1911	10		35.134	4.138	11.160
P1911	100		34.875	5.166	11.090
P1912	2	Circular	41.869	6.634	13.160
P1912	5		43.908	7.077	13.810
P1912	10		44.413	7.198	13.970
P1912	100		43.395	8.226	13.660
P2000	2	Circular	77.708	5.423	6.310

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2000	5		85.683	7.026	6.830
P2000	10		86.771	7.261	6.900
P2000	100		88.063	9.778	7.020
P2001	2	Circular	35.280	5.423	6.920
P2001	5		48.440	7.026	7.370
P2001	10		62.382	7.261	7.330
P2001	100		80.503	9.778	7.080
P2005	2	Circular	124.718	8.568	9.860
P2005	5		125.139	9.069	9.890
P2005	10		125.278	9.241	9.900
P2005	100		126.497	10.481	10.000
P2010	2	Circular	82.603	8.498	6.520
P2010	5		82.808	8.999	6.530
P2010	10		82.571	9.171	6.400
P2010	100		82.404	10.411	6.530
P2020	2	Circular	90.451	7.092	6.950
P2020	5		92.124	7.555	7.140
P2020	10		93.614	7.705	7.240
P2020	100		91.373	8.793	7.050
P2021	2	Circular	35.723	5.802	6.060
P2021	5		47.785	6.369	7.370
P2021	10		47.710	6.579	6.540
P2021	100		42.920	8.021	6.750
P2100	2	Circular	88.733	8.366	7.010
P2100	5		89.705	8.467	7.070
P2100	10		89.666	8.510	7.080
P2100	100		89.589	9.220	7.070
P2101	2	Circular	33.713	8.366	5.100
P2101	5		41.803	8.467	5.890
P2101	10		41.624	8.510	5.740
P2101	100		38.052	9.220	6.030
P2105	2	Circular	73.852	8.366	7.260
P2105	5		78.612	8.467	7.350
P2105	10		77.795	8.510	7.280
P2105	100		79.039	9.220	7.400
P2110	2	Circular	107.507	7.273	12.850
P2110	5		111.313	7.344	12.980
P2110	10		111.509	7.378	12.890
P2110	100		111.798	8.216	12.860
P2115	2	Circular	114.219	3.509	12.360
P2115	5		115.724	6.104	12.270
P2115	10		115.573	6.191	12.400
P2115	100		115.083	6.768	12.400
P2116	2	Circular	3.758	3.460	5.280
P2116	5		3.578	3.971	5.340
P2116	10		3.695	4.013	5.400
P2116	100		4.106	4.705	5.770
P2120	2	Circular	70.696	3.460	10.140
P2120	5		86.263	3.971	10.400
P2120	10		90.294	4.013	10.440
P2120	100		98.988	5.743	10.510

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2121	2	Circular	28.610	3.020	9.040
P2121	5		31.373	3.734	9.940
P2121	10		32.648	4.056	10.330
P2121	100		33.853	5.743	10.700
P2122	2	Circular	14.831	2.929	8.350
P2122	5		15.223	3.386	8.570
P2122	10		15.395	3.802	8.670
P2122	100		15.125	5.743	8.510
P2125	2	Circular	23.458	5.036	7.500
P2125	5		23.492	5.140	7.500
P2125	10		23.494	5.164	7.500
P2125	100		23.494	5.743	7.500
P2126	2	Circular	8.019	5.036	3.930
P2126	5		7.425	5.140	3.670
P2126	10		7.225	5.164	3.590
P2126	100		7.817	5.671	3.850
P2130	2	Circular	33.577	7.364	10.490
P2130	5		33.773	7.475	10.550
P2130	10		33.862	7.501	10.570
P2130	100		33.832	7.956	10.560
P2131	2	Circular	9.509	7.364	5.280
P2131	5		12.672	7.475	7.140
P2131	10		12.617	7.501	7.050
P2131	100		10.809	7.956	6.050
P2200	2	Circular	74.310	6.387	5.840
P2200	5		77.535	6.814	6.120
P2200	10		77.119	6.925	6.100
P2200	100		75.986	8.021	6.000
P2202	2	Circular	34.202	6.387	19.030
P2202	5		35.855	6.814	19.950
P2202	10		34.911	6.925	19.410
P2202	100		33.913	7.573	18.850
P2204	2	Circular	17.349	5.011	10.260
P2204	5		20.994	5.554	11.960
P2204	10		21.349	5.640	12.150
P2204	100		22.092	5.795	12.510
P2205	2	Circular	88.792	6.387	7.050
P2205	5		85.328	6.814	6.770
P2205	10		84.951	6.925	6.740
P2205	100		78.521	7.573	6.730
P2210	2	Circular	84.900	6.026	6.810
P2210	5		86.329	6.360	6.930
P2210	10		86.119	6.488	6.940
P2210	100		85.934	7.221	6.900
P2211	2	Circular	23.414	6.025	3.950
P2211	5		26.924	6.360	4.010
P2211	10		26.396	6.488	4.130
P2211	100		24.816	7.221	4.930
P2215	2	Circular	29.634	6.025	6.020
P2215	5		32.298	6.360	6.560
P2215	10		29.942	6.488	6.080

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2215	100		30.673	7.221	6.230
P2220	2	Circular	71.380	8.546	9.990
P2220	5		72.050	8.801	10.080
P2220	10		72.210	8.853	10.100
P2220	100		71.989	9.067	10.070
P2225	2	Circular	45.940	8.446	9.340
P2225	5		46.066	8.701	9.370
P2225	10		45.568	8.753	9.230
P2225	100		45.735	8.967	9.330
P2226	2	Circular	32.074	5.076	17.900
P2226	5		32.964	5.202	18.350
P2226	10		31.883	5.284	17.770
P2226	100		31.928	5.640	17.800
P2230	2	Circular	19.255	5.076	9.520
P2230	5		20.379	5.200	9.680
P2230	10		20.974	5.263	9.900
P2230	100		30.727	6.013	10.180
P2235	2	Circular	19.247	1.591	7.370
P2235	5		20.372	1.673	7.440
P2235	10		20.772	1.707	7.460
P2235	100		26.059	6.013	8.350
P2240	2	Circular	19.248	2.176	6.140
P2240	5		20.373	2.684	6.540
P2240	10		20.773	2.828	6.660
P2240	100		22.779	4.393	7.180
P2245	2	Circular	10.725	2.617	8.660
P2245	5		11.868	3.443	9.550
P2245	10		12.245	3.762	9.850
P2245	100		11.181	4.418	8.990
P2250	2	Circular	9.438	2.176	7.670
P2250	5		10.193	2.684	8.250
P2250	10		10.335	2.828	8.370
P2250	100		11.439	4.713	9.200
P2305	2	Circular	11.875	8.141	6.880
P2305	5		12.183	8.266	6.810
P2305	10		12.198	8.293	6.830
P2305	100		12.315	8.485	6.900
P2306	2	Circular	10.470	8.141	9.120
P2306	5		11.323	8.266	9.470
P2306	10		11.620	8.293	9.480
P2306	100		11.390	8.485	9.370
P2400	2	Circular	24.381	7.364	7.650
P2400	5		25.529	7.475	8.010
P2400	10		25.853	7.501	8.100
P2400	100		24.858	8.152	7.760
P2405	2	Circular	22.859	7.352	7.900
P2405	5		22.901	7.438	7.700
P2405	10		22.902	7.466	7.630
P2405	100		22.258	8.152	7.220
P2500	2	Circular	5.534	3.743	6.510
P2500	5		7.054	3.833	6.980

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2500	10		7.641	3.861	7.150
P2500	100		12.170	4.426	7.600
P2505	2	Circular	5.526	3.093	7.150
P2505	5		7.046	3.183	9.000
P2505	10		7.634	3.211	9.710
P2505	100		9.346	4.583	11.740
P2506	2	Circular	31.001	1.518	7.090
P2506	5		42.851	1.841	7.730
P2506	10		49.979	2.102	8.040
P2506	100		83.812	4.153	8.950
P2600	2	Circular	21.274	3.743	7.050
P2600	5		19.067	3.833	7.020
P2600	10		18.657	3.861	7.090
P2600	100		17.523	4.426	7.080
P2605	2	Circular	14.636	2.795	8.900
P2605	5		14.728	2.851	8.920
P2605	10		14.594	2.870	8.920
P2605	100		14.528	3.359	8.850
P2610	2	Circular	19.822	3.405	11.130
P2610	5		20.128	3.467	11.300
P2610	10		20.219	3.487	11.350
P2610	100		21.295	3.968	11.940
P2615	2	Circular	27.005	4.118	8.540
P2615	5		34.270	5.546	10.790
P2615	10		37.214	6.208	11.700
P2615	100		47.453	9.277	14.790
P2616	2	Circular	39.678	4.118	6.170
P2616	5		60.198	5.546	7.690
P2616	10		73.959	6.208	8.680
P2616	100		189.683	9.277	14.450
P2617	2	Circular	8.202	4.118	3.080
P2617	5		12.230	5.546	3.250
P2617	10		14.592	6.208	3.220
P2617	100		15.208	9.277	3.370
P2620	2	Circular	31.003	2.848	11.530
P2620	5		34.238	4.276	11.490
P2620	10		35.266	4.938	11.410
P2620	100		35.509	8.007	11.460
P2630	2	Circular	42.027	4.213	13.780
P2630	5		42.238	4.367	14.080
P2630	10		42.211	4.397	14.580
P2630	100		42.236	4.831	14.560
P2631	2	Circular	13.886	4.213	10.120
P2631	5		15.553	4.367	10.540
P2631	10		13.243	4.397	10.340
P2631	100		13.306	4.693	10.330
P2705	2	Circular	5.999	2.847	4.990
P2705	5		6.363	3.336	5.160
P2705	10		6.501	3.537	5.270
P2705	100		7.414	4.980	5.980
P2706	2	Circular	21.999	1.887	10.090

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
P2706	5		30.238	2.376	11.670
P2706	10		35.782	2.577	12.620
P2706	100		41.557	4.020	12.800
P2710	2	Circular	43.132	3.220	13.680
P2710	5		48.818	3.756	15.460
P2710	10		49.607	3.836	15.710
P2710	100		51.457	4.032	16.280
P2800	2	Circular	48.681	6.563	5.570
P2800	5		52.605	8.396	6.000
P2800	10		54.557	9.349	6.210
P2800	100		70.253	10.037	7.520
P2801	2	Circular	38.412	6.563	6.900
P2801	5		61.535	8.396	7.310
P2801	10		82.501	9.349	8.520
P2801	100		81.247	10.037	8.390
P2804	2	Circular	16.309	6.563	5.160
P2804	5		21.096	8.396	6.680
P2804	10		21.620	9.348	6.820
P2804	100		19.701	10.037	6.240
P2805	2	Circular	13.454	5.727	4.230
P2805	5		13.731	6.462	4.400
P2805	10		14.115	6.852	4.450
P2805	100		13.837	7.867	4.350
P2806	2	Circular	22.577	7.889	7.080
P2806	5		22.449	8.001	7.000
P2806	10		22.493	8.038	7.040
P2806	100		22.606	8.281	7.100
S0000	2	Natural	0.000	-8.362	0.000
S0000	5		0.000	-7.938	0.000
S0000	10		0.000	-7.737	0.000
S0000	100		0.000	-6.100	0.000
S1001	2	Natural	0.000	-0.085	0.000
S1001	5		22.168	2.154	1.180
S1001	10		46.364	3.094	1.410
S1001	100		118.725	4.336	1.590
S1005	2	Natural	0.000	-2.750	0.000
S1005	5		0.000	-0.511	0.000
S1005	10		0.000	0.429	0.000
S1005	100		0.000	1.671	0.000
S1015	2	Natural	48.736	0.659	2.070
S1015	5		195.953	1.063	3.840
S1015	10		245.999	1.201	4.190
S1015	100		990.463	2.693	6.820
S1020	2	Natural	71.767	0.663	2.940
S1020	5		214.640	1.115	4.500
S1020	10		262.860	1.244	4.850
S1020	100		1006.424	2.720	7.620
S1030	2	Natural	121.510	0.834	3.650
S1030	5		261.135	1.240	4.820
S1030	10		308.420	1.360	5.100
S1030	100		1046.819	2.786	7.400

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S1035	2	Natural	101.354	0.773	3.990
S1035	5		198.525	1.050	5.140
S1035	10		235.598	1.140	5.480
S1035	100		950.037	2.383	9.340
S1036	2	Natural	38.781	0.829	2.450
S1036	5		69.359	0.993	2.940
S1036	10		85.397	1.047	3.200
S1036	100		173.120	1.779	2.980
S1081	2	Natural	66.648	0.938	3.090
S1081	5		101.573	1.204	3.460
S1081	10		126.542	1.284	3.680
S1081	100		246.174	2.325	3.510
S1100	2	Natural	35.795	0.664	3.020
S1100	5		93.273	0.828	4.490
S1100	10		118.395	0.882	4.910
S1100	100		301.502	1.614	6.630
S1101	2	Natural	9.304	0.626	0.870
S1101	5		36.703	0.758	1.820
S1101	10		48.726	0.802	2.120
S1101	100		139.634	1.142	3.180
S1105	2	Natural	22.066	0.461	2.580
S1105	5		52.757	0.593	3.490
S1105	10		68.329	0.637	3.870
S1105	100		167.296	0.977	5.420
S1110	2	Natural	29.594	0.959	3.970
S1110	5		59.551	1.356	4.890
S1110	10		75.310	1.517	5.230
S1110	100		173.755	2.241	6.620
S1115	2	Natural	36.297	1.240	3.460
S1115	5		67.334	1.673	4.140
S1115	10		85.418	1.872	4.430
S1115	100		184.940	2.659	5.490
S1300	2	Natural	22.692	0.664	1.340
S1300	5		82.895	0.828	2.310
S1300	10		109.649	0.907	2.610
S1300	100		637.623	2.065	5.090
S1305	2	Natural	3.608	-9e+099	0.000
S1305	5		23.481	-9e+099	0.000
S1305	10		32.365	-9e+099	0.000
S1305	100		95.861	-9e+099	0.000
S1306	2	Natural	72.460	3.366	3.930
S1306	5		117.413	3.747	4.540
S1306	10		146.390	3.871	4.840
S1306	100		287.130	5.718	5.430
S1911	2	Natural	27.088	0.789	2.190
S1911	5		58.372	1.232	2.770
S1911	10		74.093	1.353	3.110
S1911	100		130.786	2.381	2.980
S1912	2	Natural	33.490	0.716	2.350
S1912	5		74.465	1.159	3.170
S1912	10		96.533	1.280	3.460

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S1912	100		193.118	2.308	3.730
S2000	2	Natural	75.125	1.852	3.970
S2000	5		302.780	3.455	5.440
S2000	10		431.436	3.690	6.140
S2000	100		1464.162	6.207	8.140
S2001	2	Natural	6.722	2.017	0.650
S2001	5		20.223	3.620	1.210
S2001	10		49.821	3.855	1.430
S2001	100		120.598	6.372	2.590
S2005	2	Natural	18.076	0.452	1.830
S2005	5		262.465	1.243	5.430
S2005	10		383.835	1.538	6.180
S2005	100		1503.928	3.707	9.480
S2010	2	Natural	170.672	5.229	2.590
S2010	5		377.999	5.730	3.360
S2010	10		494.411	5.902	3.590
S2010	100		1598.603	7.142	5.790
S2020	2	Natural	155.971	1.988	2.940
S2020	5		354.969	2.451	3.950
S2020	10		461.433	2.601	4.220
S2020	100		1576.111	3.689	6.800
S2021	2	Natural	33.590	3.845	0.800
S2021	5		56.182	4.412	1.350
S2021	10		70.906	4.622	1.720
S2021	100		141.455	6.064	1.990
S2100	2	Natural	26.900	1.180	1.710
S2100	5		56.641	1.747	2.130
S2100	10		71.881	1.957	2.330
S2100	100		490.416	3.399	5.340
S2101	2	Natural	16.674	3.178	0.450
S2101	5		36.984	3.279	0.920
S2101	10		46.865	3.322	1.150
S2101	100		101.276	4.032	1.820
S2105	2	Natural	32.901	0.578	1.820
S2105	5		50.136	0.649	2.150
S2105	10		60.623	0.683	2.340
S2105	100		465.580	1.717	5.150
S2110	2	Natural	0.000	0.578	0.000
S2110	5		14.911	0.649	2.000
S2110	10		27.051	0.683	2.530
S2110	100		435.937	1.521	8.040
S2115	2	Natural	0.960	0.170	0.700
S2115	5		75.280	0.681	2.920
S2115	10		91.991	0.734	3.200
S2115	100		480.433	1.748	5.750
S2116	2	Natural	47.585	2.835	1.750
S2116	5		68.018	3.346	1.970
S2116	10		86.427	3.388	2.010
S2116	100		173.860	4.080	2.720
S2120	2	Natural	0.000	0.170	0.000
S2120	5		0.000	0.681	0.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2120	10		0.000	0.723	0.000
S2120	100		414.729	1.415	7.510
S2121	2	Natural	0.000	-9e+099	0.000
S2121	5		0.000	-9e+099	0.000
S2121	10		0.000	-9e+099	0.000
S2121	100		23.544	-9e+099	0.000
S2122	2	Natural	15.233	0.884	2.350
S2122	5		34.268	1.341	2.930
S2122	10		45.908	1.757	3.180
S2122	100		101.862	3.698	3.090
S2125	2	Natural	14.328	0.376	2.060
S2125	5		29.103	0.480	2.550
S2125	10		35.160	0.504	2.780
S2125	100		384.632	1.412	7.190
S2126	2	Natural	0.000	-9e+099	0.000
S2126	5		0.000	-9e+099	0.000
S2126	10		0.000	-9e+099	0.000
S2126	100		0.539	-9e+099	0.000
S2130	2	Natural	12.797	0.376	2.580
S2130	5		28.681	0.480	3.180
S2130	10		34.047	0.504	3.340
S2130	100		386.415	1.214	8.560
S2131	2	Natural	10.215	0.479	1.460
S2131	5		18.698	0.590	1.730
S2131	10		24.067	0.616	1.950
S2131	100		50.144	1.071	2.430
S2200	2	Natural	8.968	1.180	0.790
S2200	5		113.427	1.747	2.850
S2200	10		161.312	1.957	3.310
S2200	100		552.201	3.399	5.330
S2202	2	Natural	32.665	0.542	2.340
S2202	5		67.441	0.969	3.100
S2202	10		87.044	1.080	3.350
S2202	100		165.854	1.728	3.870
S2204	2	Natural	0.000	-2.954	0.000
S2204	5		6.660	0.314	1.420
S2204	10		12.985	0.400	1.700
S2204	100		40.015	0.555	2.550
S2205	2	Natural	48.284	0.724	1.730
S2205	5		143.712	1.044	2.760
S2205	10		186.075	1.158	3.070
S2205	100		497.816	1.831	4.460
S2206	2	Natural	0.000	-9e+099	0.000
S2206	5		0.000	-9e+099	0.000
S2206	10		0.000	-9e+099	0.000
S2206	100		-551.323	-9e+099	0.000
S2210	2	Natural	82.377	1.008	1.710
S2210	5		172.734	1.343	2.360
S2210	10		213.841	1.471	2.590
S2210	100		519.562	2.204	3.790
S2211	2	Natural	12.602	1.173	0.790

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2211	5		20.216	1.508	1.080
S2211	10		26.181	1.636	1.390
S2211	100		66.214	2.369	1.150
S2215	2	Natural	47.625	1.008	1.850
S2215	5		88.519	1.343	2.300
S2215	10		117.547	1.471	2.610
S2215	100		228.767	2.204	2.610
S2220	2	Natural	9.972	1.008	1.160
S2220	5		65.724	1.343	3.180
S2220	10		94.490	1.471	3.810
S2220	100		250.331	2.204	5.480
S2225	2	Natural	61.112	0.644	2.670
S2225	5		114.600	0.813	3.520
S2225	10		143.757	0.910	3.840
S2225	100		293.404	1.327	5.030
S2226	2	Natural	70.661	0.654	3.170
S2226	5		121.678	0.838	3.690
S2226	10		153.650	0.941	3.920
S2226	100		297.455	1.345	4.550
S2230	2	Natural	0.000	0.479	0.000
S2230	5		0.000	0.603	0.000
S2230	10		0.000	0.666	0.000
S2230	100		77.272	0.935	4.350
S2235	2	Natural	0.000	-4.250	0.000
S2235	5		0.000	-4.196	0.000
S2235	10		0.000	-4.177	0.000
S2235	100		99.408	0.901	2.410
S2240	2	Natural	0.000	-1.431	0.000
S2240	5		0.000	-1.349	0.000
S2240	10		0.000	-1.315	0.000
S2240	100		100.498	0.901	3.910
S2245	2	Natural	0.000	-9e+099	0.000
S2245	5		0.000	-9e+099	0.000
S2245	10		0.036	-9e+099	0.000
S2245	100		30.286	-9e+099	0.000
S2250	2	Natural	0.000	-9e+099	0.000
S2250	5		0.000	-9e+099	0.000
S2250	10		0.000	-9e+099	0.000
S2250	100		2.719	-9e+099	0.000
S2305	2	Natural	7.925	0.314	1.840
S2305	5		20.476	0.425	2.360
S2305	10		24.256	0.451	2.460
S2305	100		100.175	0.906	4.300
S2306	2	Natural	0.000	-9e+099	0.000
S2306	5		0.000	-9e+099	0.000
S2306	10		0.000	-9e+099	0.000
S2306	100		0.000	-9e+099	0.000
S2400	2	Natural	6.883	0.314	1.730
S2400	5		13.809	0.425	2.050
S2400	10		16.680	0.451	2.150
S2400	100		317.508	1.305	5.540

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2405	2	Natural	6.386	0.282	1.720
S2405	5		13.729	0.368	2.090
S2405	10		16.705	0.396	2.200
S2405	100		324.618	1.297	6.630
S2500	2	Natural	-1.665	0.673	0.000
S2500	5		-2.378	0.763	0.000
S2500	10		-2.569	0.791	0.000
S2500	100		-11.948	1.356	0.000
S2505	2	Natural	0.000	-9e+099	0.000
S2505	5		0.000	-9e+099	0.000
S2505	10		0.000	-9e+099	0.000
S2505	100		2.145	-9e+099	0.000
S2506	2	Natural	4.306	0.518	1.340
S2506	5		10.760	0.841	1.860
S2506	10		15.907	1.102	2.130
S2506	100		58.377	3.153	3.260
S2600	2	Natural	11.618	0.410	1.440
S2600	5		19.058	0.486	1.680
S2600	10		22.079	0.506	1.780
S2600	100		330.518	1.415	5.250
S2605	2	Natural	12.988	0.410	2.620
S2605	5		20.255	0.486	2.880
S2605	10		23.183	0.506	2.990
S2605	100		355.749	1.153	8.480
S2610	2	Natural	7.430	0.305	2.900
S2610	5		14.630	0.361	3.540
S2610	10		17.562	0.380	3.730
S2610	100		372.615	0.959	10.760
S2615	2	Natural	0.000	-9e+099	0.000
S2615	5		0.000	-9e+099	0.000
S2615	10		0.000	-9e+099	0.000
S2615	100		71.163	-9e+099	0.000
S2616	2	Natural	0.000	0.248	0.000
S2616	5		1.034	1.676	0.170
S2616	10		4.636	2.338	0.390
S2616	100		117.770	5.407	3.510
S2617	2	Natural	0.000	-9e+099	0.000
S2617	5		0.000	-9e+099	0.000
S2617	10		0.000	-9e+099	0.000
S2617	100		6.358	-9e+099	0.000
S2620	2	Natural	52.028	4.118	3.890
S2620	5		138.635	5.546	5.490
S2620	10		170.206	6.208	5.900
S2620	100		958.129	9.277	9.150
S2630	2	Natural	40.618	0.418	4.650
S2630	5		130.589	0.628	7.180
S2630	10		160.821	0.682	7.800
S2630	100		567.268	1.888	12.850
S2631	2	Natural	23.921	1.118	0.580
S2631	5		32.204	1.272	0.870
S2631	10		41.157	1.302	1.150

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
S2631	100		87.150	1.598	1.120
S2705	2	Natural	0.000	-9e+099	0.000
S2705	5		0.000	-9e+099	0.000
S2705	10		0.000	-9e+099	0.000
S2705	100		5.768	-9e+099	0.000
S2706	2	Natural	23.245	1.632	2.680
S2706	5		40.303	2.121	3.180
S2706	10		51.592	2.322	3.530
S2706	100		129.628	3.765	4.660
S2710	2	Natural	0.000	-1.033	0.000
S2710	5		16.454	0.306	3.520
S2710	10		30.659	0.386	4.110
S2710	100		125.997	1.100	6.690
S2800	2	Natural	0.000	-2.733	0.000
S2800	5		0.000	-2.710	0.000
S2800	10		3.056	0.499	1.010
S2800	100		225.267	3.005	5.560
S2801	2	Natural	0.000	-2.287	0.000
S2801	5		0.000	-0.454	0.000
S2801	10		0.424	0.499	0.680
S2801	100		86.705	1.187	3.130
S2804	2	Natural	-22.452	1.373	0.750
S2804	5		32.869	3.206	1.040
S2804	10		37.478	4.158	1.080
S2804	100		45.046	4.847	1.010
S2805	2	Natural	7.129	1.205	0.890
S2805	5		59.717	2.792	2.040
S2805	10		81.121	3.182	2.300
S2805	100		240.580	4.197	3.280
S2806	2	Natural	29.151	0.489	2.480
S2806	5		73.773	0.686	3.610
S2806	10		91.445	0.756	3.900
S2806	100		241.916	2.034	5.630
W1305	2	Natural	3.608	-9e+099	0.000
W1305	5		23.481	-9e+099	0.000
W1305	10		32.365	-9e+099	0.000
W1305	100		95.861	-9e+099	0.000
W2121	2	Natural	0.000	-9e+099	0.000
W2121	5		0.000	-9e+099	0.000
W2121	10		0.000	-9e+099	0.000
W2121	100		23.544	-9e+099	0.000
W2126	2	Natural	0.000	-9e+099	0.000
W2126	5		0.000	-9e+099	0.000
W2126	10		0.000	-9e+099	0.000
W2126	100		0.539	-9e+099	0.000
W2206	2	Natural	0.000	-9e+099	0.000
W2206	5		0.000	-9e+099	0.000
W2206	10		0.000	-9e+099	0.000
W2206	100		-551.323	-9e+099	0.000
W2245	2	Natural	0.000	-9e+099	0.000
W2245	5		0.000	-9e+099	0.000

LinkResults

Name	Storm	Shape	Max Flow cfs	Max Depth ft	Max Velocity ft/s
W2245	10		0.036	-9e+099	0.000
W2245	100		30.286	-9e+099	0.000
W2250	2	Natural	0.000	-9e+099	0.000
W2250	5		0.000	-9e+099	0.000
W2250	10		0.000	-9e+099	0.000
W2250	100		2.719	-9e+099	0.000
W2306	2	Natural	0.000	-9e+099	0.000
W2306	5		0.000	-9e+099	0.000
W2306	10		0.000	-9e+099	0.000
W2306	100		0.000	-9e+099	0.000
W2505	2	Natural	0.000	-9e+099	0.000
W2505	5		0.000	-9e+099	0.000
W2505	10		0.000	-9e+099	0.000
W2505	100		2.145	-9e+099	0.000
W2615	2	Natural	0.000	-9e+099	0.000
W2615	5		0.000	-9e+099	0.000
W2615	10		0.000	-9e+099	0.000
W2615	100		71.163	-9e+099	0.000
W2617	2	Natural	0.000	-9e+099	0.000
W2617	5		0.000	-9e+099	0.000
W2617	10		0.000	-9e+099	0.000
W2617	100		6.358	-9e+099	0.000
W2705	2	Natural	0.000	-9e+099	0.000
W2705	5		0.000	-9e+099	0.000
W2705	10		0.000	-9e+099	0.000
W2705	100		5.768	-9e+099	0.000

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Appendix I – Rainfall Data

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Station	**485415**	Station	**485435**	Station	**485417**
Distance	**29226 ft**	Distance	**11536 ft**	Distance	**18337 ft**
2.67		**1.92**		**2.53**	
2.51	**25-yr**	*1.89*	**25-yr**	*2.45*	**10-yr**
2.4		**1.87**		**2.26**	
2.27		**1.78**		*1.83*	**5-yr**
2.01	**10-yr**	*1.74*	**10-yr**	**1.55**	
1.87		**1.74**		**1.48**	
1.61		**1.73**		**1.23**	
1.54		**1.72**		**1.22**	
1.44	**5-yr**	**1.68**		**1.14**	
1.29		*1.49*	**5-yr**	*1.12*	**2-yr**
1.26		**1.44**		**1.09**	
1.2		**1.39**		**0.97**	
1.16		**1.37**		**0.91**	
1.15		**1.29**		**0.71**	
1.12		**1.28**		**0.61**	
1.04		**1.23**		**0.49**	
1.04		**1.16**			
1.02		**1.12**			
0.98		**1.1**			
0.96		**1.09**			
0.95	**2-yr**	**1.04**			
0.94		**1.02**			
0.92		*1.01*	**2-yr**		
0.91		**0.99**			
0.91		**0.96**			
0.88		**0.96**			
0.86		**0.94**			
0.85		**0.94**			
0.83		**0.92**			
0.82		**0.89**			
0.77		**0.86**			
0.75		**0.83**			
0.74		**0.79**			
0.72		**0.73**			
0.72		**0.72**			
0.68		**0.68**			
0.66		**0.66**			
0.63		**0.61**			
0.52		**0.55**			
0.52		**0.52**			
0.48		**0.5**			
		0.49			
		0.26			

Note: Italicized text denotes interpolated number.

Appendix J – Conceptual Solution Scoring Matrix

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Conceptual Solution Scoring Matrix

Issue	Solution	Costs	Costs	Costs	Maintenance	Maintenance	Maintenance	Proven/ Acceptance	Proven/ Acceptance	Proven/ Acceptance	Hydrologic Impact		Hydrologic Impact		Hydrologic Impact		Score	Score	Score	Total Score
											Frequent Event	Major Event	Frequent Event	Major Event	Frequent Event	Major Event				
Downstream capacity/ backwater effect	Floodplain management/ waterproofing (non-structural BMP)	+	+	+	+	0	0	-	+	+	0	+	+	+	0	0	1	4	2	7
	Additional trunklines/ spread	-	0	-	0	0	0	0	+	+	+	+	+	+	0	0	1	3	0	4
	Upsize current trunkline	-	-	--	0	0	0	+	+	0	+	+	+	-	0	0	2	0	-2	0
	Detention (regional/ full-spectrum)	-	-	-	-	0	-	+	+	+	0	0	+	0	+	+	-1	1	1	1
	Downstream capacity improvement (outfall channel)	0	-	-	0	0	0	0	0	0	0	0	+	-	0	0	0	-1	-1	-2
	Mechanical (pumping)	--	0	--	-	0	-	-	0	0	0	-	0	0	0	0	-5	0	-3	-8
Increased discharge due to development	Local detention required	0	-	0	0	-	-	+	+	+	+	+	+	0	+	0	3	0	1	4
	Upsize pipes	-	-	-	0	0	0	+	0	0	0	0	+	0	0	0	0	0	-1	-1
	Low Impact Development (LID) (non-structural)	+	0	+	-	-	-	0	0	+	+	0	+	-	+	-	1	-1	2	2
	Diversion	-	-	0	-	0	0	-	+	-	0	+	+	+	0	0	-2	2	-1	-1
Upstream capacity during large events	Modifying existing detention	+	+	0	0	0	-	+	+	+	0	+	+	0	+	+	3	3	2	8
	Additional detention	-	-	-	-	-	-	+	+	+	0	+	+	0	+	+	0	0	1	1
	Upsize pipes	-	-	--	0	0	0	+	0	0	0	+	+	0	0	0	1	0	-2	-1
	Low Impact Development (LID) (non-structural)	+	0	0	-	-	-	0	0	+	+	0	+	-	+	-	1	-1	0	0

Note: (-) = less effective, (0) = average (+) = more effective, effectiveness is relative to all BMP's

Higher Score in last two columns is more effective than lower score

Appendix K – Conceptual Outfall at Harney Street

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