



May 18, 2018
AVO 31091

Mr. Chris Agnew, P.E.
City Project Manager
City of Grand Prairie
206 W. Church St.
P.O. Box 534045
Grand Prairie, TX 75053

Re: Cannon Branch Study – Avenue B to Hardy Road, W.O. #615.76

Mr. Agnew:

This technical memorandum describes the hydrologic and hydraulic modeling approach used to evaluate a conceptual alternative for Cannon Branch flood mitigation between Avenue B and Hardy Road. The goal of the analysis is to achieve 100-year level of service at Marshall Drive through the development of a suitable detention pond to be located upstream of Avenue D.

The methodology, results, and conclusion of the hydrologic analysis are detailed in the following sections.

Methodology

The task items in the detailed scope of work were carried out as follows.

Task A. Hydrologic Study – 2D Modeling

Halff converted the existing 2012 RPS Espey 2D model to Innovyze ICM and checked for consistency to confirm the results. The 2D model flows (overland and subsurface) at the headwaters of sub-basin A1 were used to develop 24-hour hydrographs for the 10-year and 100-year storm events (see hydrograph tables and plots - Appendix A). These hydrographs were incorporated as source hydrographs into the HEC-HMS hydrologic model. For the flume design located between the residential properties at the headwaters of Cannon Branch to be performed by the City, 2D overland flow hydrographs (10-year, 100-year) were developed and provided to the City.

Task B. Hydrologic Analysis – HEC-HMS

Hydrologic modeling of the study area was performed using the United States Army Corps of Engineers Hydrologic Modeling System (HEC-HMS), version 4.2. The existing sub-basin delineations developed by RPS Espey as part of the Cottonwood and Lakeview Watershed Internal Storm Drain Master Plan Study dated August 2012 and sub-basins A1, A2, A3, A4, A5, A6 were provided by the City. These sub-basins were reviewed and revised as needed, utilizing 2016 City of Grand Prairie Light Detection and Ranging (LiDAR) elevation data. The existing drainage area map used for sub-basin delineation is provided in Appendix B (Exhibit 1).



Hydrologic parameters, including sub-basin shape and area, curve number, rainfall depth, and lag time, were calculated for each sub-basin under existing conditions. A summary of these parameters is provided in Table 1.

Table 1. HEC-HMS Sub-Basin Parameters

Sub-basin	Area (mi ²)	CN	% Impervious	Lag Time (min)
A1	0.0247	80	50%	18
A2	0.0084	80	50%	3
A3	0.0414	80	50%	5
A4	0.0222	80	50%	15
A5	0.0513	80	50%	16
A6	0.0583	80	50%	9

The frequency storm method was used to simulate the 10-year and 100-yr rainfall events. Rainfall depths for each storm were obtained from Table 4.4 of the City of Grand Prairie Drainage Design Manual (DDM), last revised in January of 2017 and developed using the balanced rainfall distribution approach of Section 4.4 of the DDM.

The precipitation loss method utilized in the model was the Soil Conservation Service (SCS) Curve Number Method. Weighted Curve Numbers (CN) were computed based on hydrologic soil group (HSG) classification, using open land in good condition as the land use type for all sub-basin areas. HSG classifications were obtained from the Natural Resources Conservation Service’s Web Soil Survey dataset. The HSG classification map used to develop the weighted curve number method is provided in Appendix B (Exhibit 2).

Weighted percent impervious values were evaluated for each sub-basin using the City’s current future land use GIS file. Given that the Single-Family Residential land use classification applies to nearly 97% of the study area, 50% impervious was used for all sub-basin runoff calculations. The land use map used to evaluate percent impervious is provided in Appendix B (Exhibit 3).

Time of concentration (Tc) was calculated for each sub-basin using the method outlined in the United States Department of Agriculture’s Technical Release 55. The delineated hydraulically longest flowpaths are shown in Appendix B (Exhibit 4). Lag time values were calculated by taking 60% of the computed Tc for each sub-basin and were used as inputs for the SCS Unit Hydrograph method in the HEC-HMS model. Tc calculations are shown in Appendix C.

A source hydrograph was included to represent the 2D model results for the 10-year and 100-year storm events at the headwaters of the HEC-HMS model. The 2D model results were developed through the City of Grand Prairie 2D analysis by RPS Espey in 2012. The 2D model that was built in Innovyze Infoworks SD software was imported for this analysis into the Innovyze Infoworks ICM software. The 2D model overland and subsurface flows for drainage subarea “2DModel” at the upstream point of sub-basin A1 were used to develop 24-hour hydrographs for the 10-year and 100-year storm events. These hydrographs were incorporated as HEC-DSS files into the HEC-



HMS hydrologic model (see hydrograph tables and plots - Appendix A). See Appendix B (Exhibit 5A) for the existing conditions hydrologic workmap.

A conceptual detention pond alternative was developed upstream of Avenue D. The goal of the detention analysis was to attenuate peak flow during the 100-year storm event and to prevent overtopping of the road at Marshall Drive, which is located downstream of Avenue D. To develop this alternative, the area upstream of Avenue D available for detention was identified and a proposed detention pond boundary and grading plan was developed using 4:1 side slopes. Using the proposed grading plan and the 2016 LiDAR contours, the detention pond was modeled in a geographic information system (GIS) and stage-storage relationships were established (Table 2). The stage-discharge relationships were developed using the Culvert Master software to evaluate and optimize outlet structure shape, dimensions, and elevations. The proposed outlet structure replaces the existing 48” culvert at Avenue D with 3 - 4’x3’ culverts. The maximum 100-year water surface of the detention pond was set at 482’. The detention pond was modeled in HEC-HMS as an in-line reservoir placed directly upstream of the sub-basin A1 outfall (J-A1). The detention pond rating curves were optimized for peak flow attenuation to reduce overtopping at Marshall Drive and to maintain the water surface elevation upstream of Avenue D at or below 482’. As part of the analysis, road improvements along Avenue D were proposed to increase the minimum road centerline to 482.5’, and the Oncor powerline easement was assumed to be unavailable for detention storage. See Appendix B (Exhibit 5B) for the proposed conditions hydrologic workmap.

Table 2. Stage-Storage-Discharge Relationship

Stage (ft)	Storage (ac-ft)	Discharge (cfs)
473	0	0.00
474	0.004	9.00
475	0.042	25.00
476	0.153	70.00
477	0.354	137.00
478	2.993	217.00
479	4.575	289.00
480	6.435	352.00
481	8.584	405.00
482	10.869	451.00
483	13.269	784.68
484	15.762	995.81

The conceptual detention alternative is estimated to cost \$858,000. See Appendix D for a detailed estimate of probable cost.



Task C. Hydraulic Review/Analysis

The hydrologic parameters for all sub-basins were used to compute ultimate peak discharges for the 10-year and 100-year design storms at each sub-basin drainage point. These peak discharges were provided to the City for HEC-RAS modeling.

The final HEC-RAS model from the City was used to refine and evaluate the conceptual detention alternative for improvement to overtopping at Marshal Drive.

Results

The peak discharge and runoff volume computed for each sub-basin in HEC-HMS is shown below in Table 3 and Table 4. The proposed condition results reflect the addition of the proposed detention pond. The addition of the proposed detention pond reduced modeled peak flows and runoff volumes for the 10-year and 100-year storm events.

For the conceptual detention alternative, the overall 100-year floodplain map is shown in Appendix B as Exhibit 6 and the study area 100-year floodplain map is shown as Exhibit 7.

Table 3. Computed Peak Discharge (cfs)

Sub-basin Drainage Point	Existing 10% Annual Chance (10-Yr)	Proposed 10% Annual Chance (10-Yr)	Difference (10-Yr)	Existing 1% Annual Chance (100-Yr)	Proposed 1% Annual Chance (100-Yr)	Difference (100-Yr)
A1	315	288	27	580	457	123
A2	328	292	36	585	459	126
A3	424	339	85	622	483	139
A4	475	387	88	638	549	89
A5	581	503	78	790	725	65
A6	640	567	73	922	848	74

Table 4. Computed Runoff Volume (ac-ft)

Sub-basin	Existing 10% Annual Chance (10-Yr)	Proposed 10% Annual Chance (10-Yr)	Difference (10-Yr)	Existing 1% Annual Chance (100-Yr)	Proposed 1% Annual Chance (100-Yr)	Difference (100-Yr)
A1	83	83	0	140	140	0
A2	85	85	0	144	144	0
A3	97	97	0	162	162	0
A4	103	103	0	172	172	0
A5	117	117	0	194	194	0
A6	134	134	0	220	220	0



The proposed peak flows were modeled in the Grand Prairie HEC-RAS model to evaluate the impact of detention upstream of Avenue D on road overtopping at Marshall Drive. The proposed detention pond reduces the maximum water surface elevations at the roadway crossings shown in Table 5 below.

Table 5. Roadway Crossing Maximum Water Surface Elevations

Roadway Crossing	Water Surface Elevation (10-Yr)	Water Surface Elevation (100-Yr)
Marshall Drive	-0.41 feet	-0.32 feet
Avenue F	-0.59 feet	-0.32 feet
Hardy Road	-1.36 feet	-0.32 feet

The proposed detention pond does not sufficiently reduce the maximum water surface elevation (10-year or 100-year) to achieve either 10-year or 100-year level of service at Marshall Drive. The level of protection provided by the detention alternative at Marshall Drive is therefore less than the 10-year event. Multiple pond sizes and outlet designs were tested, and a low-level berm was modeled along the channel to optimize in-line detention design along the stream. With this configuration, the pond overbanks do not store water while the rising limb of the hydrograph passes through the channel, therefore storage potential is maximized during the hydrograph peak. Avenue D was also incorporated into the outlet design for the pond, per the City's request. The proposed detention pond option does manage to remove one residence from the 10-year floodplain (1741 Hardy, between HEC-RAS model cross sections 1586 and 1463).



The properties that the City would need to purchase for construction of the proposed pond is provided in Table 6 and in Appendix B as Exhibit 8.

Table 6. Parcels to Purchase – Detention Pond

Address and Street	Area (sq-ft)
1805 Avenue D	9,957
1809 Avenue D	9,768
1813 Avenue D	9,186
1825 Avenue D	9,413
1830 Avenue C	6,697
1834 Avenue C	6,888
1838 Avenue C	7,197
1833 Avenue C	7,265
1837 Avenue C	7,604

Based on the level of lot inundation for the 100-year floodplain, the properties that the City may wish to consider for potential purchase to remove future development from the 100-year floodplain is provided in Table 7 and in Appendix B as Exhibit 9.

Table 7. Potential Properties to Purchase – 100-year Floodplain

Address and Street	Area (sq-ft)
1802 Avenue D	10,841
1806 Avenue D	9,841
1809 Avenue D	9,768
1813 Avenue D	9,186
1825 Avenue D	9,413
1830 Avenue C	6,697
1834 Avenue C	6,888
1833 Avenue C	7,265
1837 Avenue C	7,604
1841 Avenue C	8,808

A detailed comparison of existing versus proposed water surface elevations at all model cross sections is reported in Table 8.

Table 8. Computed Water Surface Elevations (ft)

Cross Section	Existing 10% Annual Chance (10-Yr)	Proposed 10% Annual Chance (10-Yr)	Difference (10-Yr)	Existing 1% Annual Chance (100-Yr)	Proposed 1% Annual Chance (100-Yr)	Difference (100-Yr)
3105	480.90	-----	-----	481.99	-----	-----
3052	480.75	-----	-----	481.74	-----	-----
2973	480.50	-----	-----	481.30	-----	-----
2844	480.13	-----	-----	480.74	-----	-----
2737	480.04	-----	-----	480.56	-----	-----
2688	480.00	-----	-----	480.49	-----	-----
2669	479.92	-----	-----	480.37	-----	-----
2645 Avenue D						
2619	475.95	475.79	-0.16	477.21	476.67	-0.54
2597	475.86	475.48	-0.38	476.56	476.19	-0.37
2521	475.74	475.33	-0.41	476.32	476.00	-0.32
2410	475.68	475.25	-0.43	476.23	475.91	-0.32
2373	475.63	475.22	-0.41	476.20	475.89	-0.31
2358	475.64	475.23	-0.41	476.22	475.90	-0.32
2335 Marshall Drive						
1981	471.53	470.90	-0.63	472.57	472.25	-0.32
1948	471.47	470.91	-0.56	472.52	472.20	-0.32
1817	471.28	470.70	-0.58	472.40	472.08	-0.32
1801	471.29	470.70	-0.59	472.40	472.08	-0.32
1777 Avenue F						
1752	469.31	467.91	-1.40	472.33	472.00	-0.33
1722	469.30	468.02	-1.28	472.33	472.00	-0.33
1586	469.25	467.93	-1.32	472.31	471.98	-0.33
1463	469.21	467.86	-1.35	472.28	471.96	-0.32
1423	469.17	467.81	-1.36	472.28	471.96	-0.32
1372 Hardy Road						
1342	463.14	462.95	-0.19	463.83	463.68	-0.15
1305	463.23	463.01	-0.22	463.80	463.65	-0.15
749	460.64	460.43	-0.21	461.24	461.09	-0.15
326	460.19	459.98	-0.21	460.80	460.65	-0.15

Conclusion

The Cannon Branch hydrologic and hydraulic analyses were developed to evaluate the impact of an upstream detention pond alternative on road overtopping at Marshall Drive. The current level of protection at Marshall Drive is less than the 10-year rain event. Although the proposed detention pond does reduce peak flow and water surface elevation at Marshall Drive and other road crossings, the Grand Prairie hydraulic model indicates that the existing 72” pipe at Marshall conveys 200 to 250 cfs before being overtopped. With the proposed detention that was optimized



per the available land area, local topography, and buildings and roadways in the area, the proposed peak discharge at Marshall is 455 cfs for the 100-year event. The proposed 10-year event (290 cfs) also overtops Marshall Drive.

Based on this analysis, detention by itself is not enough to achieve the target level of service at Marshall. Additional improvements would be required, such as a parallel relief pipe at Marshall and perhaps other downstream improvements to alleviate tailwater restrictions at Hardy and/or Avenue F. Halff Associates does not recommend pursuing the detention alternative unless it is combined with additional downstream improvements to achieve the desired level of service at Marshall Drive and/or other downstream roadway crossings.

Based on the level of lot inundation for the 100-year floodplain, ten properties were identified that the City may wish to consider for potential purchase to remove future development from the 100-year floodplain.

If you have any questions or comments, please let us know.

Sincerely,

HALFF ASSOCIATES, INC.
Firm No. 0312

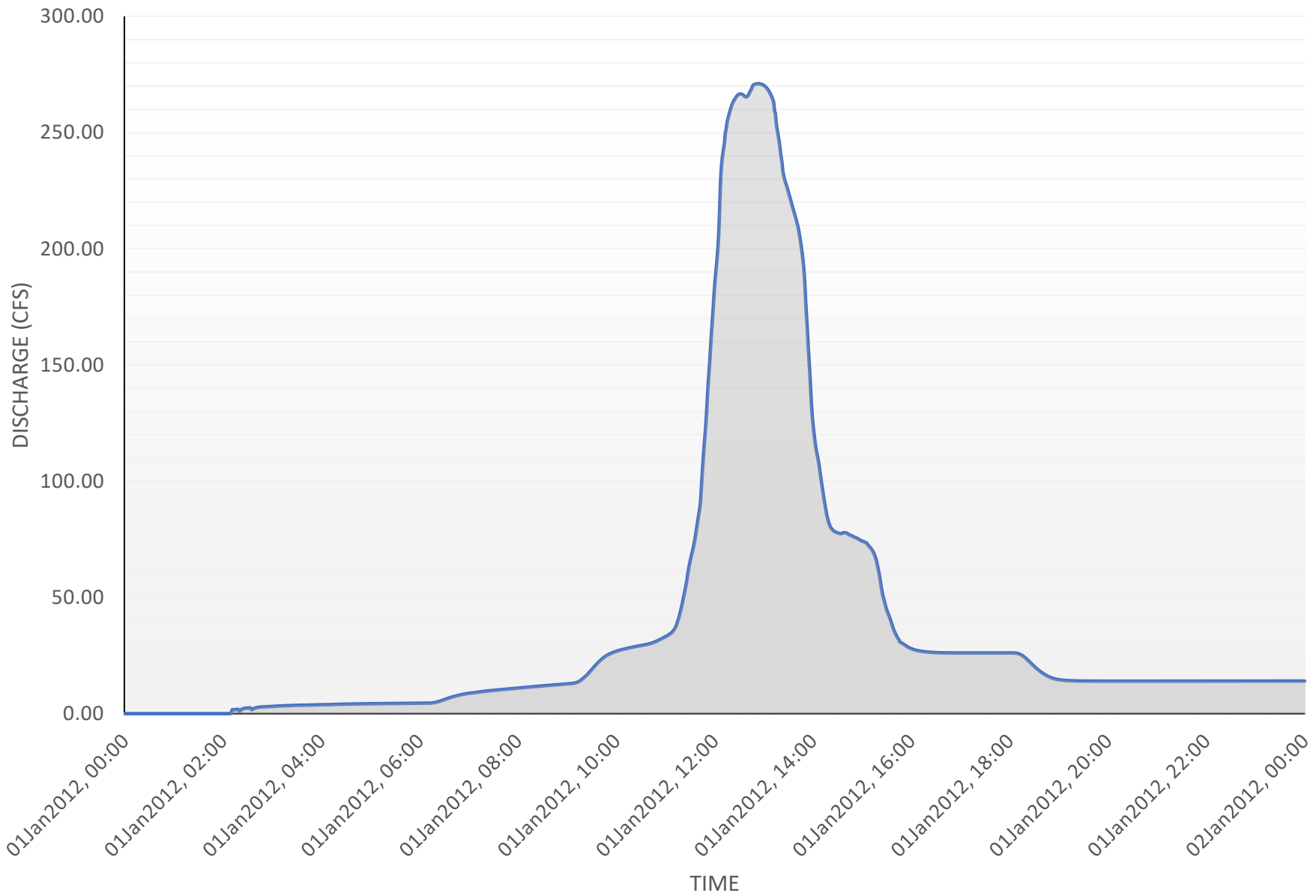
Matt Stahl, P.E., CFM
Civil Engineer

Scott Rushing, P.E., CFM
Water Resources Team Leader

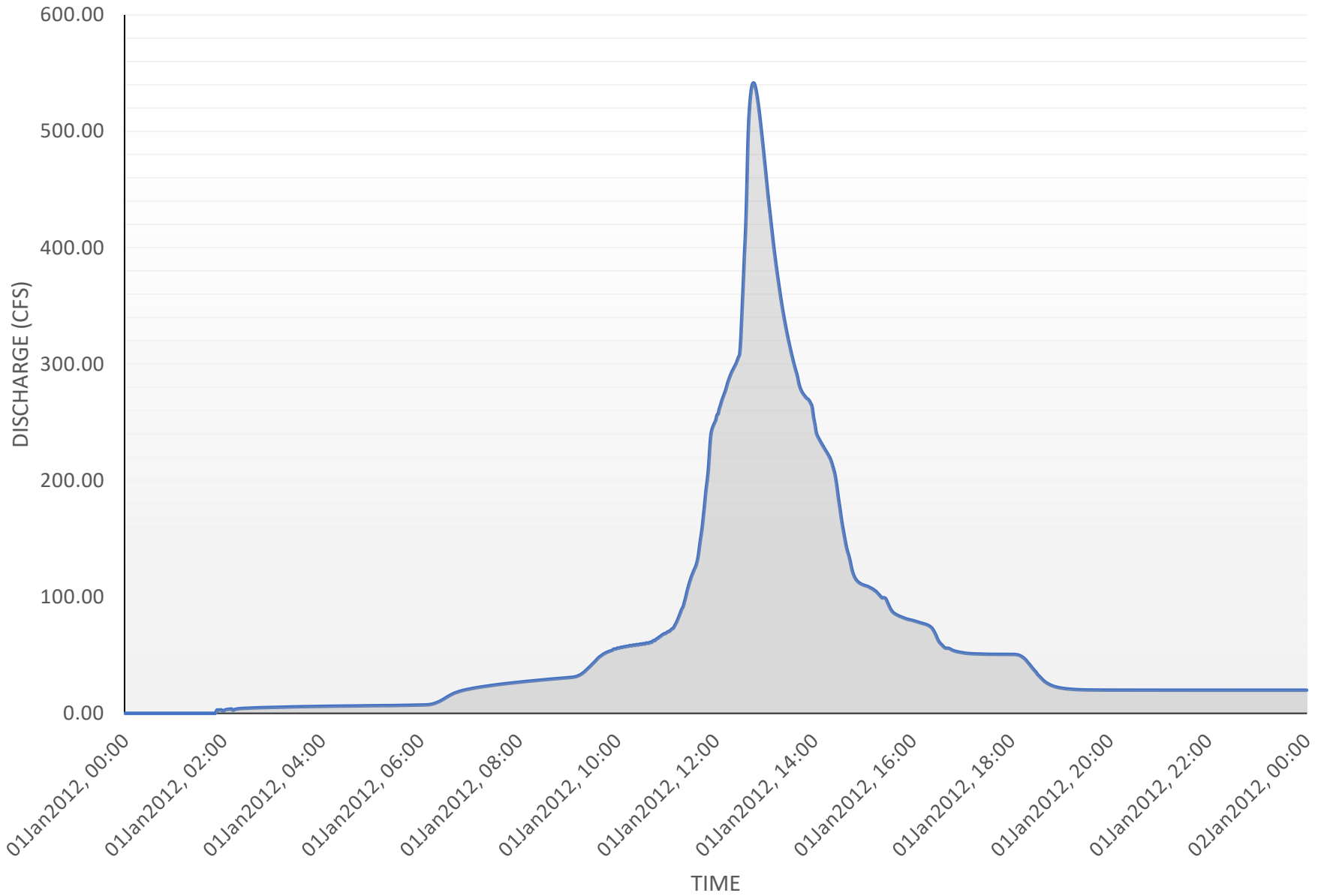

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APPENDIX A

2D Model 24HR Hydrograph - 10YR Discharge (cfs)



2D Model 24HR Hydrograph - 100YR Discharge (cfs)



2D Model 24HR Hydrograph - Discharge Tables

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 00:00	0.00
01Jan2012, 00:01	0.00
01Jan2012, 00:02	0.00
01Jan2012, 00:03	0.00
01Jan2012, 00:04	0.00
01Jan2012, 00:05	0.00
01Jan2012, 00:06	0.00
01Jan2012, 00:07	0.00
01Jan2012, 00:08	0.00
01Jan2012, 00:09	0.00
01Jan2012, 00:10	0.00
01Jan2012, 00:11	0.00
01Jan2012, 00:12	0.00
01Jan2012, 00:13	0.00
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01Jan2012, 00:27	0.00
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01Jan2012, 00:29	0.00
01Jan2012, 00:30	0.00
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Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
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01Jan2012, 02:22	1.63
01Jan2012, 02:23	1.88
01Jan2012, 02:24	2.05
01Jan2012, 02:25	2.17
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01Jan2012, 02:27	2.30
01Jan2012, 02:28	2.34
01Jan2012, 02:29	2.37
01Jan2012, 02:30	2.39
01Jan2012, 02:31	2.43
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01Jan2012, 02:34	2.09
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01Jan2012, 01:51	0.96
01Jan2012, 01:52	2.76
01Jan2012, 01:53	2.86
01Jan2012, 01:54	2.60
01Jan2012, 01:55	2.88
01Jan2012, 01:56	2.92
01Jan2012, 01:57	3.00
01Jan2012, 01:58	2.72
01Jan2012, 01:59	1.79
01Jan2012, 02:00	1.98
01Jan2012, 02:01	2.45
01Jan2012, 02:02	2.83
01Jan2012, 02:03	3.10
01Jan2012, 02:04	3.26
01Jan2012, 02:05	3.36
01Jan2012, 02:06	3.46
01Jan2012, 02:07	3.53
01Jan2012, 02:08	3.61
01Jan2012, 02:09	3.69
01Jan2012, 02:10	3.70
01Jan2012, 02:11	2.84
01Jan2012, 02:12	2.63
01Jan2012, 02:13	3.01
01Jan2012, 02:14	3.30
01Jan2012, 02:15	3.50
01Jan2012, 02:16	3.66
01Jan2012, 02:17	3.79
01Jan2012, 02:18	3.88
01Jan2012, 02:19	3.96
01Jan2012, 02:20	4.02
01Jan2012, 02:21	4.08
01Jan2012, 02:22	4.13
01Jan2012, 02:23	4.17
01Jan2012, 02:24	4.21
01Jan2012, 02:25	4.25
01Jan2012, 02:26	4.29
01Jan2012, 02:27	4.31
01Jan2012, 02:28	4.34
01Jan2012, 02:29	4.36
01Jan2012, 02:30	4.39
01Jan2012, 02:31	4.42
01Jan2012, 02:32	4.46
01Jan2012, 02:33	4.49
01Jan2012, 02:34	4.52
01Jan2012, 02:35	4.56
01Jan2012, 02:36	4.59

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 02:37	2.05
01Jan2012, 02:38	2.22
01Jan2012, 02:39	2.38
01Jan2012, 02:40	2.50
01Jan2012, 02:41	2.59
01Jan2012, 02:42	2.66
01Jan2012, 02:43	2.72
01Jan2012, 02:44	2.77
01Jan2012, 02:45	2.81
01Jan2012, 02:46	2.84
01Jan2012, 02:47	2.86
01Jan2012, 02:48	2.89
01Jan2012, 02:49	2.91
01Jan2012, 02:50	2.93
01Jan2012, 02:51	2.95
01Jan2012, 02:52	2.97
01Jan2012, 02:53	2.99
01Jan2012, 02:54	3.00
01Jan2012, 02:55	3.02
01Jan2012, 02:56	3.04
01Jan2012, 02:57	3.05
01Jan2012, 02:58	3.07
01Jan2012, 02:59	3.09
01Jan2012, 03:00	3.11
01Jan2012, 03:01	3.13
01Jan2012, 03:02	3.16
01Jan2012, 03:03	3.18
01Jan2012, 03:04	3.20
01Jan2012, 03:05	3.22
01Jan2012, 03:06	3.24
01Jan2012, 03:07	3.26
01Jan2012, 03:08	3.27
01Jan2012, 03:09	3.29
01Jan2012, 03:10	3.31
01Jan2012, 03:11	3.33
01Jan2012, 03:12	3.34
01Jan2012, 03:13	3.36
01Jan2012, 03:14	3.37
01Jan2012, 03:15	3.39
01Jan2012, 03:16	3.40
01Jan2012, 03:17	3.42
01Jan2012, 03:18	3.43
01Jan2012, 03:19	3.44
01Jan2012, 03:20	3.46
01Jan2012, 03:21	3.47
01Jan2012, 03:22	3.48
01Jan2012, 03:23	3.50
01Jan2012, 03:24	3.51
01Jan2012, 03:25	3.52
01Jan2012, 03:26	3.53
01Jan2012, 03:27	3.54
01Jan2012, 03:28	3.55
01Jan2012, 03:29	3.56

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 02:37	4.62
01Jan2012, 02:38	4.65
01Jan2012, 02:39	4.68
01Jan2012, 02:40	4.70
01Jan2012, 02:41	4.73
01Jan2012, 02:42	4.76
01Jan2012, 02:43	4.78
01Jan2012, 02:44	4.80
01Jan2012, 02:45	4.83
01Jan2012, 02:46	4.85
01Jan2012, 02:47	4.87
01Jan2012, 02:48	4.89
01Jan2012, 02:49	4.91
01Jan2012, 02:50	4.92
01Jan2012, 02:51	4.94
01Jan2012, 02:52	4.96
01Jan2012, 02:53	4.98
01Jan2012, 02:54	4.99
01Jan2012, 02:55	5.01
01Jan2012, 02:56	5.02
01Jan2012, 02:57	5.04
01Jan2012, 02:58	5.06
01Jan2012, 02:59	5.07
01Jan2012, 03:00	5.09
01Jan2012, 03:01	5.10
01Jan2012, 03:02	5.12
01Jan2012, 03:03	5.13
01Jan2012, 03:04	5.15
01Jan2012, 03:05	5.17
01Jan2012, 03:06	5.18
01Jan2012, 03:07	5.20
01Jan2012, 03:08	5.22
01Jan2012, 03:09	5.24
01Jan2012, 03:10	5.25
01Jan2012, 03:11	5.27
01Jan2012, 03:12	5.29
01Jan2012, 03:13	5.31
01Jan2012, 03:14	5.33
01Jan2012, 03:15	5.35
01Jan2012, 03:16	5.37
01Jan2012, 03:17	5.39
01Jan2012, 03:18	5.41
01Jan2012, 03:19	5.43
01Jan2012, 03:20	5.45
01Jan2012, 03:21	5.47
01Jan2012, 03:22	5.48
01Jan2012, 03:23	5.50
01Jan2012, 03:24	5.52
01Jan2012, 03:25	5.54
01Jan2012, 03:26	5.56
01Jan2012, 03:27	5.58
01Jan2012, 03:28	5.59
01Jan2012, 03:29	5.61

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 03:30	3.58
01Jan2012, 03:31	3.59
01Jan2012, 03:32	3.60
01Jan2012, 03:33	3.61
01Jan2012, 03:34	3.62
01Jan2012, 03:35	3.63
01Jan2012, 03:36	3.64
01Jan2012, 03:37	3.64
01Jan2012, 03:38	3.65
01Jan2012, 03:39	3.65
01Jan2012, 03:40	3.65
01Jan2012, 03:41	3.65
01Jan2012, 03:42	3.66
01Jan2012, 03:43	3.67
01Jan2012, 03:44	3.67
01Jan2012, 03:45	3.68
01Jan2012, 03:46	3.69
01Jan2012, 03:47	3.71
01Jan2012, 03:48	3.72
01Jan2012, 03:49	3.73
01Jan2012, 03:50	3.74
01Jan2012, 03:51	3.75
01Jan2012, 03:52	3.76
01Jan2012, 03:53	3.77
01Jan2012, 03:54	3.78
01Jan2012, 03:55	3.78
01Jan2012, 03:56	3.79
01Jan2012, 03:57	3.80
01Jan2012, 03:58	3.81
01Jan2012, 03:59	3.81
01Jan2012, 04:00	3.82
01Jan2012, 04:01	3.83
01Jan2012, 04:02	3.84
01Jan2012, 04:03	3.84
01Jan2012, 04:04	3.85
01Jan2012, 04:05	3.86
01Jan2012, 04:06	3.86
01Jan2012, 04:07	3.87
01Jan2012, 04:08	3.88
01Jan2012, 04:09	3.88
01Jan2012, 04:10	3.89
01Jan2012, 04:11	3.90
01Jan2012, 04:12	3.91
01Jan2012, 04:13	3.92
01Jan2012, 04:14	3.93
01Jan2012, 04:15	3.94
01Jan2012, 04:16	3.95
01Jan2012, 04:17	3.96
01Jan2012, 04:18	3.97
01Jan2012, 04:19	3.98
01Jan2012, 04:20	3.99
01Jan2012, 04:21	4.00
01Jan2012, 04:22	4.02

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 03:30	5.62
01Jan2012, 03:31	5.64
01Jan2012, 03:32	5.65
01Jan2012, 03:33	5.67
01Jan2012, 03:34	5.68
01Jan2012, 03:35	5.69
01Jan2012, 03:36	5.70
01Jan2012, 03:37	5.72
01Jan2012, 03:38	5.73
01Jan2012, 03:39	5.74
01Jan2012, 03:40	5.75
01Jan2012, 03:41	5.76
01Jan2012, 03:42	5.77
01Jan2012, 03:43	5.78
01Jan2012, 03:44	5.79
01Jan2012, 03:45	5.81
01Jan2012, 03:46	5.82
01Jan2012, 03:47	5.83
01Jan2012, 03:48	5.84
01Jan2012, 03:49	5.85
01Jan2012, 03:50	5.87
01Jan2012, 03:51	5.88
01Jan2012, 03:52	5.89
01Jan2012, 03:53	5.91
01Jan2012, 03:54	5.92
01Jan2012, 03:55	5.93
01Jan2012, 03:56	5.94
01Jan2012, 03:57	5.95
01Jan2012, 03:58	5.97
01Jan2012, 03:59	5.98
01Jan2012, 04:00	5.99
01Jan2012, 04:01	6.00
01Jan2012, 04:02	6.01
01Jan2012, 04:03	6.02
01Jan2012, 04:04	6.03
01Jan2012, 04:05	6.04
01Jan2012, 04:06	6.05
01Jan2012, 04:07	6.06
01Jan2012, 04:08	6.07
01Jan2012, 04:09	6.08
01Jan2012, 04:10	6.09
01Jan2012, 04:11	6.10
01Jan2012, 04:12	6.11
01Jan2012, 04:13	6.12
01Jan2012, 04:14	6.13
01Jan2012, 04:15	6.14
01Jan2012, 04:16	6.15
01Jan2012, 04:17	6.16
01Jan2012, 04:18	6.16
01Jan2012, 04:19	6.17
01Jan2012, 04:20	6.18
01Jan2012, 04:21	6.19
01Jan2012, 04:22	6.19

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 04:23	4.03
01Jan2012, 04:24	4.04
01Jan2012, 04:25	4.05
01Jan2012, 04:26	4.06
01Jan2012, 04:27	4.06
01Jan2012, 04:28	4.07
01Jan2012, 04:29	4.08
01Jan2012, 04:30	4.09
01Jan2012, 04:31	4.10
01Jan2012, 04:32	4.11
01Jan2012, 04:33	4.11
01Jan2012, 04:34	4.12
01Jan2012, 04:35	4.13
01Jan2012, 04:36	4.13
01Jan2012, 04:37	4.14
01Jan2012, 04:38	4.15
01Jan2012, 04:39	4.15
01Jan2012, 04:40	4.16
01Jan2012, 04:41	4.16
01Jan2012, 04:42	4.17
01Jan2012, 04:43	4.17
01Jan2012, 04:44	4.18
01Jan2012, 04:45	4.18
01Jan2012, 04:46	4.19
01Jan2012, 04:47	4.19
01Jan2012, 04:48	4.20
01Jan2012, 04:49	4.20
01Jan2012, 04:50	4.21
01Jan2012, 04:51	4.21
01Jan2012, 04:52	4.22
01Jan2012, 04:53	4.22
01Jan2012, 04:54	4.23
01Jan2012, 04:55	4.23
01Jan2012, 04:56	4.24
01Jan2012, 04:57	4.24
01Jan2012, 04:58	4.25
01Jan2012, 04:59	4.25
01Jan2012, 05:00	4.26
01Jan2012, 05:01	4.26
01Jan2012, 05:02	4.27
01Jan2012, 05:03	4.27
01Jan2012, 05:04	4.28
01Jan2012, 05:05	4.28
01Jan2012, 05:06	4.28
01Jan2012, 05:07	4.29
01Jan2012, 05:08	4.29
01Jan2012, 05:09	4.30
01Jan2012, 05:10	4.30
01Jan2012, 05:11	4.30
01Jan2012, 05:12	4.31
01Jan2012, 05:13	4.31
01Jan2012, 05:14	4.32
01Jan2012, 05:15	4.32

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 04:23	6.20
01Jan2012, 04:24	6.21
01Jan2012, 04:25	6.22
01Jan2012, 04:26	6.23
01Jan2012, 04:27	6.23
01Jan2012, 04:28	6.24
01Jan2012, 04:29	6.25
01Jan2012, 04:30	6.26
01Jan2012, 04:31	6.26
01Jan2012, 04:32	6.27
01Jan2012, 04:33	6.28
01Jan2012, 04:34	6.28
01Jan2012, 04:35	6.29
01Jan2012, 04:36	6.30
01Jan2012, 04:37	6.31
01Jan2012, 04:38	6.31
01Jan2012, 04:39	6.32
01Jan2012, 04:40	6.33
01Jan2012, 04:41	6.34
01Jan2012, 04:42	6.34
01Jan2012, 04:43	6.35
01Jan2012, 04:44	6.36
01Jan2012, 04:45	6.37
01Jan2012, 04:46	6.38
01Jan2012, 04:47	6.39
01Jan2012, 04:48	6.40
01Jan2012, 04:49	6.42
01Jan2012, 04:50	6.43
01Jan2012, 04:51	6.44
01Jan2012, 04:52	6.45
01Jan2012, 04:53	6.46
01Jan2012, 04:54	6.47
01Jan2012, 04:55	6.48
01Jan2012, 04:56	6.49
01Jan2012, 04:57	6.50
01Jan2012, 04:58	6.51
01Jan2012, 04:59	6.51
01Jan2012, 05:00	6.52
01Jan2012, 05:01	6.53
01Jan2012, 05:02	6.54
01Jan2012, 05:03	6.54
01Jan2012, 05:04	6.55
01Jan2012, 05:05	6.56
01Jan2012, 05:06	6.56
01Jan2012, 05:07	6.57
01Jan2012, 05:08	6.58
01Jan2012, 05:09	6.58
01Jan2012, 05:10	6.59
01Jan2012, 05:11	6.60
01Jan2012, 05:12	6.60
01Jan2012, 05:13	6.61
01Jan2012, 05:14	6.61
01Jan2012, 05:15	6.62

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 05:16	4.32
01Jan2012, 05:17	4.33
01Jan2012, 05:18	4.33
01Jan2012, 05:19	4.33
01Jan2012, 05:20	4.34
01Jan2012, 05:21	4.34
01Jan2012, 05:22	4.34
01Jan2012, 05:23	4.35
01Jan2012, 05:24	4.35
01Jan2012, 05:25	4.35
01Jan2012, 05:26	4.36
01Jan2012, 05:27	4.36
01Jan2012, 05:28	4.36
01Jan2012, 05:29	4.36
01Jan2012, 05:30	4.37
01Jan2012, 05:31	4.37
01Jan2012, 05:32	4.37
01Jan2012, 05:33	4.38
01Jan2012, 05:34	4.38
01Jan2012, 05:35	4.38
01Jan2012, 05:36	4.39
01Jan2012, 05:37	4.39
01Jan2012, 05:38	4.40
01Jan2012, 05:39	4.40
01Jan2012, 05:40	4.40
01Jan2012, 05:41	4.41
01Jan2012, 05:42	4.41
01Jan2012, 05:43	4.42
01Jan2012, 05:44	4.42
01Jan2012, 05:45	4.43
01Jan2012, 05:46	4.43
01Jan2012, 05:47	4.43
01Jan2012, 05:48	4.44
01Jan2012, 05:49	4.44
01Jan2012, 05:50	4.45
01Jan2012, 05:51	4.45
01Jan2012, 05:52	4.45
01Jan2012, 05:53	4.46
01Jan2012, 05:54	4.46
01Jan2012, 05:55	4.46
01Jan2012, 05:56	4.47
01Jan2012, 05:57	4.47
01Jan2012, 05:58	4.48
01Jan2012, 05:59	4.49
01Jan2012, 06:00	4.49
01Jan2012, 06:01	4.50
01Jan2012, 06:02	4.50
01Jan2012, 06:03	4.51
01Jan2012, 06:04	4.51
01Jan2012, 06:05	4.51
01Jan2012, 06:06	4.52
01Jan2012, 06:07	4.52
01Jan2012, 06:08	4.51

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 05:16	6.62
01Jan2012, 05:17	6.63
01Jan2012, 05:18	6.63
01Jan2012, 05:19	6.64
01Jan2012, 05:20	6.64
01Jan2012, 05:21	6.65
01Jan2012, 05:22	6.65
01Jan2012, 05:23	6.65
01Jan2012, 05:24	6.66
01Jan2012, 05:25	6.66
01Jan2012, 05:26	6.67
01Jan2012, 05:27	6.67
01Jan2012, 05:28	6.68
01Jan2012, 05:29	6.69
01Jan2012, 05:30	6.71
01Jan2012, 05:31	6.72
01Jan2012, 05:32	6.74
01Jan2012, 05:33	6.76
01Jan2012, 05:34	6.78
01Jan2012, 05:35	6.79
01Jan2012, 05:36	6.81
01Jan2012, 05:37	6.82
01Jan2012, 05:38	6.83
01Jan2012, 05:39	6.84
01Jan2012, 05:40	6.86
01Jan2012, 05:41	6.87
01Jan2012, 05:42	6.88
01Jan2012, 05:43	6.89
01Jan2012, 05:44	6.90
01Jan2012, 05:45	6.91
01Jan2012, 05:46	6.92
01Jan2012, 05:47	6.93
01Jan2012, 05:48	6.95
01Jan2012, 05:49	6.96
01Jan2012, 05:50	6.97
01Jan2012, 05:51	6.98
01Jan2012, 05:52	7.00
01Jan2012, 05:53	7.01
01Jan2012, 05:54	7.03
01Jan2012, 05:55	7.04
01Jan2012, 05:56	7.06
01Jan2012, 05:57	7.07
01Jan2012, 05:58	7.09
01Jan2012, 05:59	7.10
01Jan2012, 06:00	7.12
01Jan2012, 06:01	7.14
01Jan2012, 06:02	7.15
01Jan2012, 06:03	7.17
01Jan2012, 06:04	7.19
01Jan2012, 06:05	7.21
01Jan2012, 06:06	7.23
01Jan2012, 06:07	7.26
01Jan2012, 06:08	7.30

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 06:09	4.51
01Jan2012, 06:10	4.51
01Jan2012, 06:11	4.52
01Jan2012, 06:12	4.53
01Jan2012, 06:13	4.55
01Jan2012, 06:14	4.58
01Jan2012, 06:15	4.61
01Jan2012, 06:16	4.65
01Jan2012, 06:17	4.70
01Jan2012, 06:18	4.77
01Jan2012, 06:19	4.83
01Jan2012, 06:20	4.91
01Jan2012, 06:21	5.00
01Jan2012, 06:22	5.09
01Jan2012, 06:23	5.19
01Jan2012, 06:24	5.30
01Jan2012, 06:25	5.41
01Jan2012, 06:26	5.53
01Jan2012, 06:27	5.64
01Jan2012, 06:28	5.77
01Jan2012, 06:29	5.89
01Jan2012, 06:30	6.02
01Jan2012, 06:31	6.14
01Jan2012, 06:32	6.27
01Jan2012, 06:33	6.40
01Jan2012, 06:34	6.52
01Jan2012, 06:35	6.65
01Jan2012, 06:36	6.77
01Jan2012, 06:37	6.89
01Jan2012, 06:38	7.00
01Jan2012, 06:39	7.11
01Jan2012, 06:40	7.21
01Jan2012, 06:41	7.31
01Jan2012, 06:42	7.40
01Jan2012, 06:43	7.49
01Jan2012, 06:44	7.58
01Jan2012, 06:45	7.66
01Jan2012, 06:46	7.75
01Jan2012, 06:47	7.83
01Jan2012, 06:48	7.92
01Jan2012, 06:49	8.00
01Jan2012, 06:50	8.09
01Jan2012, 06:51	8.17
01Jan2012, 06:52	8.25
01Jan2012, 06:53	8.33
01Jan2012, 06:54	8.40
01Jan2012, 06:55	8.46
01Jan2012, 06:56	8.52
01Jan2012, 06:57	8.58
01Jan2012, 06:58	8.64
01Jan2012, 06:59	8.69
01Jan2012, 07:00	8.74
01Jan2012, 07:01	8.79

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 06:09	7.35
01Jan2012, 06:10	7.41
01Jan2012, 06:11	7.49
01Jan2012, 06:12	7.59
01Jan2012, 06:13	7.71
01Jan2012, 06:14	7.86
01Jan2012, 06:15	8.03
01Jan2012, 06:16	8.23
01Jan2012, 06:17	8.45
01Jan2012, 06:18	8.69
01Jan2012, 06:19	8.95
01Jan2012, 06:20	9.23
01Jan2012, 06:21	9.52
01Jan2012, 06:22	9.83
01Jan2012, 06:23	10.14
01Jan2012, 06:24	10.48
01Jan2012, 06:25	10.84
01Jan2012, 06:26	11.21
01Jan2012, 06:27	11.61
01Jan2012, 06:28	12.02
01Jan2012, 06:29	12.45
01Jan2012, 06:30	12.89
01Jan2012, 06:31	13.33
01Jan2012, 06:32	13.77
01Jan2012, 06:33	14.20
01Jan2012, 06:34	14.62
01Jan2012, 06:35	15.03
01Jan2012, 06:36	15.42
01Jan2012, 06:37	15.79
01Jan2012, 06:38	16.16
01Jan2012, 06:39	16.51
01Jan2012, 06:40	16.85
01Jan2012, 06:41	17.17
01Jan2012, 06:42	17.48
01Jan2012, 06:43	17.70
01Jan2012, 06:44	17.95
01Jan2012, 06:45	18.19
01Jan2012, 06:46	18.45
01Jan2012, 06:47	18.68
01Jan2012, 06:48	18.91
01Jan2012, 06:49	19.13
01Jan2012, 06:50	19.32
01Jan2012, 06:51	19.50
01Jan2012, 06:52	19.68
01Jan2012, 06:53	19.87
01Jan2012, 06:54	20.04
01Jan2012, 06:55	20.18
01Jan2012, 06:56	20.33
01Jan2012, 06:57	20.48
01Jan2012, 06:58	20.62
01Jan2012, 06:59	20.77
01Jan2012, 07:00	20.91
01Jan2012, 07:01	21.04

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 07:02	8.84
01Jan2012, 07:03	8.88
01Jan2012, 07:04	8.92
01Jan2012, 07:05	8.95
01Jan2012, 07:06	8.99
01Jan2012, 07:07	9.03
01Jan2012, 07:08	9.08
01Jan2012, 07:09	9.13
01Jan2012, 07:10	9.18
01Jan2012, 07:11	9.23
01Jan2012, 07:12	9.28
01Jan2012, 07:13	9.33
01Jan2012, 07:14	9.38
01Jan2012, 07:15	9.42
01Jan2012, 07:16	9.47
01Jan2012, 07:17	9.51
01Jan2012, 07:18	9.55
01Jan2012, 07:19	9.59
01Jan2012, 07:20	9.63
01Jan2012, 07:21	9.67
01Jan2012, 07:22	9.71
01Jan2012, 07:23	9.75
01Jan2012, 07:24	9.79
01Jan2012, 07:25	9.83
01Jan2012, 07:26	9.87
01Jan2012, 07:27	9.90
01Jan2012, 07:28	9.94
01Jan2012, 07:29	9.98
01Jan2012, 07:30	10.01
01Jan2012, 07:31	10.04
01Jan2012, 07:32	10.08
01Jan2012, 07:33	10.11
01Jan2012, 07:34	10.14
01Jan2012, 07:35	10.18
01Jan2012, 07:36	10.21
01Jan2012, 07:37	10.24
01Jan2012, 07:38	10.27
01Jan2012, 07:39	10.31
01Jan2012, 07:40	10.34
01Jan2012, 07:41	10.37
01Jan2012, 07:42	10.40
01Jan2012, 07:43	10.44
01Jan2012, 07:44	10.47
01Jan2012, 07:45	10.50
01Jan2012, 07:46	10.53
01Jan2012, 07:47	10.57
01Jan2012, 07:48	10.60
01Jan2012, 07:49	10.63
01Jan2012, 07:50	10.67
01Jan2012, 07:51	10.70
01Jan2012, 07:52	10.73
01Jan2012, 07:53	10.76
01Jan2012, 07:54	10.79

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 07:02	21.18
01Jan2012, 07:03	21.32
01Jan2012, 07:04	21.45
01Jan2012, 07:05	21.58
01Jan2012, 07:06	21.71
01Jan2012, 07:07	21.83
01Jan2012, 07:08	21.95
01Jan2012, 07:09	22.07
01Jan2012, 07:10	22.19
01Jan2012, 07:11	22.30
01Jan2012, 07:12	22.42
01Jan2012, 07:13	22.53
01Jan2012, 07:14	22.64
01Jan2012, 07:15	22.74
01Jan2012, 07:16	22.85
01Jan2012, 07:17	22.95
01Jan2012, 07:18	23.05
01Jan2012, 07:19	23.16
01Jan2012, 07:20	23.26
01Jan2012, 07:21	23.36
01Jan2012, 07:22	23.46
01Jan2012, 07:23	23.57
01Jan2012, 07:24	23.67
01Jan2012, 07:25	23.77
01Jan2012, 07:26	23.87
01Jan2012, 07:27	23.97
01Jan2012, 07:28	24.07
01Jan2012, 07:29	24.17
01Jan2012, 07:30	24.27
01Jan2012, 07:31	24.36
01Jan2012, 07:32	24.46
01Jan2012, 07:33	24.55
01Jan2012, 07:34	24.64
01Jan2012, 07:35	24.73
01Jan2012, 07:36	24.82
01Jan2012, 07:37	24.90
01Jan2012, 07:38	24.99
01Jan2012, 07:39	25.07
01Jan2012, 07:40	25.15
01Jan2012, 07:41	25.23
01Jan2012, 07:42	25.31
01Jan2012, 07:43	25.39
01Jan2012, 07:44	25.47
01Jan2012, 07:45	25.55
01Jan2012, 07:46	25.63
01Jan2012, 07:47	25.71
01Jan2012, 07:48	25.79
01Jan2012, 07:49	25.87
01Jan2012, 07:50	25.95
01Jan2012, 07:51	26.03
01Jan2012, 07:52	26.11
01Jan2012, 07:53	26.18
01Jan2012, 07:54	26.26

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 07:55	10.82
01Jan2012, 07:56	10.86
01Jan2012, 07:57	10.89
01Jan2012, 07:58	10.92
01Jan2012, 07:59	10.95
01Jan2012, 08:00	10.98
01Jan2012, 08:01	11.01
01Jan2012, 08:02	11.05
01Jan2012, 08:03	11.08
01Jan2012, 08:04	11.11
01Jan2012, 08:05	11.15
01Jan2012, 08:06	11.18
01Jan2012, 08:07	11.21
01Jan2012, 08:08	11.25
01Jan2012, 08:09	11.28
01Jan2012, 08:10	11.32
01Jan2012, 08:11	11.35
01Jan2012, 08:12	11.38
01Jan2012, 08:13	11.42
01Jan2012, 08:14	11.45
01Jan2012, 08:15	11.48
01Jan2012, 08:16	11.51
01Jan2012, 08:17	11.55
01Jan2012, 08:18	11.58
01Jan2012, 08:19	11.61
01Jan2012, 08:20	11.64
01Jan2012, 08:21	11.67
01Jan2012, 08:22	11.70
01Jan2012, 08:23	11.73
01Jan2012, 08:24	11.75
01Jan2012, 08:25	11.78
01Jan2012, 08:26	11.81
01Jan2012, 08:27	11.85
01Jan2012, 08:28	11.88
01Jan2012, 08:29	11.91
01Jan2012, 08:30	11.94
01Jan2012, 08:31	11.97
01Jan2012, 08:32	12.00
01Jan2012, 08:33	12.03
01Jan2012, 08:34	12.06
01Jan2012, 08:35	12.09
01Jan2012, 08:36	12.11
01Jan2012, 08:37	12.14
01Jan2012, 08:38	12.16
01Jan2012, 08:39	12.19
01Jan2012, 08:40	12.22
01Jan2012, 08:41	12.25
01Jan2012, 08:42	12.29
01Jan2012, 08:43	12.32
01Jan2012, 08:44	12.35
01Jan2012, 08:45	12.38
01Jan2012, 08:46	12.40
01Jan2012, 08:47	12.41

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 07:55	26.34
01Jan2012, 07:56	26.41
01Jan2012, 07:57	26.49
01Jan2012, 07:58	26.56
01Jan2012, 07:59	26.64
01Jan2012, 08:00	26.71
01Jan2012, 08:01	26.78
01Jan2012, 08:02	26.86
01Jan2012, 08:03	26.93
01Jan2012, 08:04	27.01
01Jan2012, 08:05	27.08
01Jan2012, 08:06	27.16
01Jan2012, 08:07	27.23
01Jan2012, 08:08	27.30
01Jan2012, 08:09	27.38
01Jan2012, 08:10	27.45
01Jan2012, 08:11	27.52
01Jan2012, 08:12	27.58
01Jan2012, 08:13	27.65
01Jan2012, 08:14	27.72
01Jan2012, 08:15	27.79
01Jan2012, 08:16	27.86
01Jan2012, 08:17	27.92
01Jan2012, 08:18	27.99
01Jan2012, 08:19	28.05
01Jan2012, 08:20	28.12
01Jan2012, 08:21	28.19
01Jan2012, 08:22	28.25
01Jan2012, 08:23	28.32
01Jan2012, 08:24	28.39
01Jan2012, 08:25	28.46
01Jan2012, 08:26	28.53
01Jan2012, 08:27	28.60
01Jan2012, 08:28	28.66
01Jan2012, 08:29	28.72
01Jan2012, 08:30	28.78
01Jan2012, 08:31	28.84
01Jan2012, 08:32	28.91
01Jan2012, 08:33	28.97
01Jan2012, 08:34	29.04
01Jan2012, 08:35	29.10
01Jan2012, 08:36	29.17
01Jan2012, 08:37	29.23
01Jan2012, 08:38	29.30
01Jan2012, 08:39	29.36
01Jan2012, 08:40	29.42
01Jan2012, 08:41	29.49
01Jan2012, 08:42	29.55
01Jan2012, 08:43	29.61
01Jan2012, 08:44	29.67
01Jan2012, 08:45	29.73
01Jan2012, 08:46	29.79
01Jan2012, 08:47	29.85

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 08:48	12.43
01Jan2012, 08:49	12.46
01Jan2012, 08:50	12.49
01Jan2012, 08:51	12.52
01Jan2012, 08:52	12.55
01Jan2012, 08:53	12.58
01Jan2012, 08:54	12.62
01Jan2012, 08:55	12.65
01Jan2012, 08:56	12.68
01Jan2012, 08:57	12.71
01Jan2012, 08:58	12.74
01Jan2012, 08:59	12.77
01Jan2012, 09:00	12.79
01Jan2012, 09:01	12.82
01Jan2012, 09:02	12.85
01Jan2012, 09:03	12.88
01Jan2012, 09:04	12.90
01Jan2012, 09:05	12.94
01Jan2012, 09:06	12.97
01Jan2012, 09:07	13.02
01Jan2012, 09:08	13.08
01Jan2012, 09:09	13.15
01Jan2012, 09:10	13.23
01Jan2012, 09:11	13.34
01Jan2012, 09:12	13.46
01Jan2012, 09:13	13.61
01Jan2012, 09:14	13.78
01Jan2012, 09:15	13.97
01Jan2012, 09:16	14.20
01Jan2012, 09:17	14.44
01Jan2012, 09:18	14.72
01Jan2012, 09:19	15.02
01Jan2012, 09:20	15.33
01Jan2012, 09:21	15.67
01Jan2012, 09:22	15.96
01Jan2012, 09:23	16.28
01Jan2012, 09:24	16.62
01Jan2012, 09:25	16.99
01Jan2012, 09:26	17.39
01Jan2012, 09:27	17.79
01Jan2012, 09:28	18.19
01Jan2012, 09:29	18.58
01Jan2012, 09:30	18.98
01Jan2012, 09:31	19.39
01Jan2012, 09:32	19.79
01Jan2012, 09:33	20.19
01Jan2012, 09:34	20.58
01Jan2012, 09:35	20.97
01Jan2012, 09:36	21.35
01Jan2012, 09:37	21.71
01Jan2012, 09:38	22.07
01Jan2012, 09:39	22.42
01Jan2012, 09:40	22.76

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 08:48	29.91
01Jan2012, 08:49	29.96
01Jan2012, 08:50	30.02
01Jan2012, 08:51	30.08
01Jan2012, 08:52	30.14
01Jan2012, 08:53	30.20
01Jan2012, 08:54	30.26
01Jan2012, 08:55	30.32
01Jan2012, 08:56	30.38
01Jan2012, 08:57	30.44
01Jan2012, 08:58	30.50
01Jan2012, 08:59	30.56
01Jan2012, 09:00	30.62
01Jan2012, 09:01	30.69
01Jan2012, 09:02	30.75
01Jan2012, 09:03	30.81
01Jan2012, 09:04	30.88
01Jan2012, 09:05	30.96
01Jan2012, 09:06	31.05
01Jan2012, 09:07	31.16
01Jan2012, 09:08	31.29
01Jan2012, 09:09	31.45
01Jan2012, 09:10	31.64
01Jan2012, 09:11	31.87
01Jan2012, 09:12	32.13
01Jan2012, 09:13	32.44
01Jan2012, 09:14	32.79
01Jan2012, 09:15	33.18
01Jan2012, 09:16	33.61
01Jan2012, 09:17	34.08
01Jan2012, 09:18	34.53
01Jan2012, 09:19	35.09
01Jan2012, 09:20	35.65
01Jan2012, 09:21	36.40
01Jan2012, 09:22	37.04
01Jan2012, 09:23	37.69
01Jan2012, 09:24	38.40
01Jan2012, 09:25	39.05
01Jan2012, 09:26	39.70
01Jan2012, 09:27	40.39
01Jan2012, 09:28	41.10
01Jan2012, 09:29	41.81
01Jan2012, 09:30	42.52
01Jan2012, 09:31	43.22
01Jan2012, 09:32	43.91
01Jan2012, 09:33	44.60
01Jan2012, 09:34	45.37
01Jan2012, 09:35	46.19
01Jan2012, 09:36	46.95
01Jan2012, 09:37	47.66
01Jan2012, 09:38	48.28
01Jan2012, 09:39	48.78
01Jan2012, 09:40	49.31

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 09:41	23.09
01Jan2012, 09:42	23.40
01Jan2012, 09:43	23.70
01Jan2012, 09:44	23.98
01Jan2012, 09:45	24.25
01Jan2012, 09:46	24.50
01Jan2012, 09:47	24.74
01Jan2012, 09:48	24.97
01Jan2012, 09:49	25.18
01Jan2012, 09:50	25.37
01Jan2012, 09:51	25.55
01Jan2012, 09:52	25.72
01Jan2012, 09:53	25.88
01Jan2012, 09:54	26.04
01Jan2012, 09:55	26.18
01Jan2012, 09:56	26.32
01Jan2012, 09:57	26.45
01Jan2012, 09:58	26.58
01Jan2012, 09:59	26.70
01Jan2012, 10:00	26.82
01Jan2012, 10:01	26.94
01Jan2012, 10:02	27.05
01Jan2012, 10:03	27.17
01Jan2012, 10:04	27.27
01Jan2012, 10:05	27.37
01Jan2012, 10:06	27.47
01Jan2012, 10:07	27.56
01Jan2012, 10:08	27.65
01Jan2012, 10:09	27.74
01Jan2012, 10:10	27.82
01Jan2012, 10:11	27.90
01Jan2012, 10:12	27.99
01Jan2012, 10:13	28.07
01Jan2012, 10:14	28.15
01Jan2012, 10:15	28.23
01Jan2012, 10:16	28.31
01Jan2012, 10:17	28.39
01Jan2012, 10:18	28.46
01Jan2012, 10:19	28.54
01Jan2012, 10:20	28.61
01Jan2012, 10:21	28.68
01Jan2012, 10:22	28.76
01Jan2012, 10:23	28.83
01Jan2012, 10:24	28.90
01Jan2012, 10:25	28.96
01Jan2012, 10:26	29.03
01Jan2012, 10:27	29.10
01Jan2012, 10:28	29.17
01Jan2012, 10:29	29.23
01Jan2012, 10:30	29.29
01Jan2012, 10:31	29.36
01Jan2012, 10:32	29.42
01Jan2012, 10:33	29.48

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 09:41	49.79
01Jan2012, 09:42	50.30
01Jan2012, 09:43	50.78
01Jan2012, 09:44	51.21
01Jan2012, 09:45	51.60
01Jan2012, 09:46	51.95
01Jan2012, 09:47	52.28
01Jan2012, 09:48	52.59
01Jan2012, 09:49	52.89
01Jan2012, 09:50	53.17
01Jan2012, 09:51	53.43
01Jan2012, 09:52	53.68
01Jan2012, 09:53	53.91
01Jan2012, 09:54	54.16
01Jan2012, 09:55	54.80
01Jan2012, 09:56	55.25
01Jan2012, 09:57	55.26
01Jan2012, 09:58	55.20
01Jan2012, 09:59	55.44
01Jan2012, 10:00	56.01
01Jan2012, 10:01	56.08
01Jan2012, 10:02	55.97
01Jan2012, 10:03	56.17
01Jan2012, 10:04	56.66
01Jan2012, 10:05	56.66
01Jan2012, 10:06	56.53
01Jan2012, 10:07	56.87
01Jan2012, 10:08	57.21
01Jan2012, 10:09	57.11
01Jan2012, 10:10	57.05
01Jan2012, 10:11	57.55
01Jan2012, 10:12	57.65
01Jan2012, 10:13	57.48
01Jan2012, 10:14	57.69
01Jan2012, 10:15	58.24
01Jan2012, 10:16	58.19
01Jan2012, 10:17	57.93
01Jan2012, 10:18	57.97
01Jan2012, 10:19	58.56
01Jan2012, 10:20	58.64
01Jan2012, 10:21	58.40
01Jan2012, 10:22	58.36
01Jan2012, 10:23	58.94
01Jan2012, 10:24	59.09
01Jan2012, 10:25	58.84
01Jan2012, 10:26	58.74
01Jan2012, 10:27	59.31
01Jan2012, 10:28	59.49
01Jan2012, 10:29	59.23
01Jan2012, 10:30	59.15
01Jan2012, 10:31	59.73
01Jan2012, 10:32	59.88
01Jan2012, 10:33	59.61

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 10:34	29.55
01Jan2012, 10:35	29.61
01Jan2012, 10:36	29.68
01Jan2012, 10:37	29.76
01Jan2012, 10:38	29.84
01Jan2012, 10:39	29.93
01Jan2012, 10:40	30.02
01Jan2012, 10:41	30.12
01Jan2012, 10:42	30.23
01Jan2012, 10:43	30.34
01Jan2012, 10:44	30.46
01Jan2012, 10:45	30.59
01Jan2012, 10:46	30.73
01Jan2012, 10:47	30.87
01Jan2012, 10:48	31.02
01Jan2012, 10:49	31.18
01Jan2012, 10:50	31.34
01Jan2012, 10:51	31.50
01Jan2012, 10:52	31.67
01Jan2012, 10:53	31.85
01Jan2012, 10:54	32.01
01Jan2012, 10:55	32.19
01Jan2012, 10:56	32.37
01Jan2012, 10:57	32.58
01Jan2012, 10:58	32.75
01Jan2012, 10:59	32.95
01Jan2012, 11:00	33.12
01Jan2012, 11:01	33.30
01Jan2012, 11:02	33.48
01Jan2012, 11:03	33.69
01Jan2012, 11:04	34.01
01Jan2012, 11:05	34.18
01Jan2012, 11:06	34.39
01Jan2012, 11:07	34.66
01Jan2012, 11:08	35.01
01Jan2012, 11:09	35.47
01Jan2012, 11:10	35.89
01Jan2012, 11:11	36.42
01Jan2012, 11:12	37.05
01Jan2012, 11:13	37.83
01Jan2012, 11:14	38.78
01Jan2012, 11:15	39.88
01Jan2012, 11:16	41.04
01Jan2012, 11:17	42.32
01Jan2012, 11:18	43.68
01Jan2012, 11:19	45.11
01Jan2012, 11:20	46.57
01Jan2012, 11:21	48.27
01Jan2012, 11:22	50.06
01Jan2012, 11:23	51.81
01Jan2012, 11:24	53.53
01Jan2012, 11:25	55.26
01Jan2012, 11:26	57.25

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 10:34	59.59
01Jan2012, 10:35	60.21
01Jan2012, 10:36	60.49
01Jan2012, 10:37	60.24
01Jan2012, 10:38	60.05
01Jan2012, 10:39	60.59
01Jan2012, 10:40	61.08
01Jan2012, 10:41	60.97
01Jan2012, 10:42	60.99
01Jan2012, 10:43	61.77
01Jan2012, 10:44	62.48
01Jan2012, 10:45	62.47
01Jan2012, 10:46	62.45
01Jan2012, 10:47	63.23
01Jan2012, 10:48	64.06
01Jan2012, 10:49	64.30
01Jan2012, 10:50	64.58
01Jan2012, 10:51	65.53
01Jan2012, 10:52	65.85
01Jan2012, 10:53	66.14
01Jan2012, 10:54	67.06
01Jan2012, 10:55	67.47
01Jan2012, 10:56	67.74
01Jan2012, 10:57	68.42
01Jan2012, 10:58	68.46
01Jan2012, 10:59	68.68
01Jan2012, 11:00	69.23
01Jan2012, 11:01	69.75
01Jan2012, 11:02	70.16
01Jan2012, 11:03	70.15
01Jan2012, 11:04	70.74
01Jan2012, 11:05	71.37
01Jan2012, 11:06	72.12
01Jan2012, 11:07	72.60
01Jan2012, 11:08	72.87
01Jan2012, 11:09	73.92
01Jan2012, 11:10	75.30
01Jan2012, 11:11	76.59
01Jan2012, 11:12	77.98
01Jan2012, 11:13	79.50
01Jan2012, 11:14	81.14
01Jan2012, 11:15	82.92
01Jan2012, 11:16	84.75
01Jan2012, 11:17	86.63
01Jan2012, 11:18	88.45
01Jan2012, 11:19	90.02
01Jan2012, 11:20	91.24
01Jan2012, 11:21	93.33
01Jan2012, 11:22	96.13
01Jan2012, 11:23	98.54
01Jan2012, 11:24	101.62
01Jan2012, 11:25	104.66
01Jan2012, 11:26	107.33

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 11:27	59.69
01Jan2012, 11:28	61.88
01Jan2012, 11:29	63.80
01Jan2012, 11:30	65.47
01Jan2012, 11:31	67.05
01Jan2012, 11:32	68.57
01Jan2012, 11:33	70.06
01Jan2012, 11:34	71.63
01Jan2012, 11:35	73.36
01Jan2012, 11:36	75.29
01Jan2012, 11:37	77.46
01Jan2012, 11:38	79.76
01Jan2012, 11:39	82.16
01Jan2012, 11:40	84.46
01Jan2012, 11:41	86.66
01Jan2012, 11:42	88.83
01Jan2012, 11:43	92.74
01Jan2012, 11:44	98.49
01Jan2012, 11:45	104.24
01Jan2012, 11:46	109.64
01Jan2012, 11:47	114.40
01Jan2012, 11:48	118.92
01Jan2012, 11:49	123.53
01Jan2012, 11:50	128.84
01Jan2012, 11:51	135.43
01Jan2012, 11:52	141.65
01Jan2012, 11:53	146.69
01Jan2012, 11:54	151.65
01Jan2012, 11:55	157.59
01Jan2012, 11:56	163.20
01Jan2012, 11:57	168.21
01Jan2012, 11:58	173.48
01Jan2012, 11:59	179.03
01Jan2012, 12:00	184.12
01Jan2012, 12:01	188.44
01Jan2012, 12:02	192.11
01Jan2012, 12:03	196.23
01Jan2012, 12:04	200.97
01Jan2012, 12:05	207.11
01Jan2012, 12:06	216.48
01Jan2012, 12:07	227.18
01Jan2012, 12:08	234.01
01Jan2012, 12:09	238.11
01Jan2012, 12:10	240.94
01Jan2012, 12:11	243.36
01Jan2012, 12:12	245.69
01Jan2012, 12:13	249.78
01Jan2012, 12:14	251.25
01Jan2012, 12:15	254.14
01Jan2012, 12:16	255.69
01Jan2012, 12:17	257.07
01Jan2012, 12:18	258.39
01Jan2012, 12:19	259.69

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 11:27	109.85
01Jan2012, 11:28	112.28
01Jan2012, 11:29	114.59
01Jan2012, 11:30	116.68
01Jan2012, 11:31	118.63
01Jan2012, 11:32	120.39
01Jan2012, 11:33	122.11
01Jan2012, 11:34	123.83
01Jan2012, 11:35	125.21
01Jan2012, 11:36	127.16
01Jan2012, 11:37	129.52
01Jan2012, 11:38	132.55
01Jan2012, 11:39	136.75
01Jan2012, 11:40	142.19
01Jan2012, 11:41	147.52
01Jan2012, 11:42	152.33
01Jan2012, 11:43	157.02
01Jan2012, 11:44	162.99
01Jan2012, 11:45	169.86
01Jan2012, 11:46	176.29
01Jan2012, 11:47	183.66
01Jan2012, 11:48	190.97
01Jan2012, 11:49	196.64
01Jan2012, 11:50	202.46
01Jan2012, 11:51	209.82
01Jan2012, 11:52	220.00
01Jan2012, 11:53	230.81
01Jan2012, 11:54	238.79
01Jan2012, 11:55	242.80
01Jan2012, 11:56	245.20
01Jan2012, 11:57	247.04
01Jan2012, 11:58	248.65
01Jan2012, 11:59	250.19
01Jan2012, 12:00	251.70
01Jan2012, 12:01	254.90
01Jan2012, 12:02	256.81
01Jan2012, 12:03	257.18
01Jan2012, 12:04	260.80
01Jan2012, 12:05	263.06
01Jan2012, 12:06	265.33
01Jan2012, 12:07	267.81
01Jan2012, 12:08	269.84
01Jan2012, 12:09	271.75
01Jan2012, 12:10	273.73
01Jan2012, 12:11	275.64
01Jan2012, 12:12	277.60
01Jan2012, 12:13	279.95
01Jan2012, 12:14	282.64
01Jan2012, 12:15	284.94
01Jan2012, 12:16	286.97
01Jan2012, 12:17	288.86
01Jan2012, 12:18	290.65
01Jan2012, 12:19	292.35

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 12:20	260.80
01Jan2012, 12:21	261.81
01Jan2012, 12:22	262.71
01Jan2012, 12:23	263.45
01Jan2012, 12:24	264.04
01Jan2012, 12:25	264.60
01Jan2012, 12:26	265.21
01Jan2012, 12:27	265.68
01Jan2012, 12:28	266.03
01Jan2012, 12:29	266.32
01Jan2012, 12:30	266.50
01Jan2012, 12:31	266.58
01Jan2012, 12:32	266.59
01Jan2012, 12:33	266.50
01Jan2012, 12:34	266.34
01Jan2012, 12:35	266.10
01Jan2012, 12:36	265.69
01Jan2012, 12:37	265.50
01Jan2012, 12:38	265.35
01Jan2012, 12:39	265.38
01Jan2012, 12:40	265.64
01Jan2012, 12:41	266.05
01Jan2012, 12:42	266.69
01Jan2012, 12:43	267.53
01Jan2012, 12:44	268.12
01Jan2012, 12:45	268.77
01Jan2012, 12:46	269.75
01Jan2012, 12:47	270.45
01Jan2012, 12:48	270.64
01Jan2012, 12:49	270.76
01Jan2012, 12:50	270.87
01Jan2012, 12:51	270.94
01Jan2012, 12:52	270.97
01Jan2012, 12:53	271.10
01Jan2012, 12:54	271.06
01Jan2012, 12:55	270.91
01Jan2012, 12:56	270.87
01Jan2012, 12:57	270.73
01Jan2012, 12:58	270.65
01Jan2012, 12:59	270.49
01Jan2012, 13:00	270.27
01Jan2012, 13:01	269.99
01Jan2012, 13:02	269.67
01Jan2012, 13:03	269.31
01Jan2012, 13:04	268.89
01Jan2012, 13:05	268.41
01Jan2012, 13:06	267.88
01Jan2012, 13:07	267.27
01Jan2012, 13:08	266.60
01Jan2012, 13:09	265.83
01Jan2012, 13:10	264.97
01Jan2012, 13:11	264.06
01Jan2012, 13:12	262.89

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 12:20	293.96
01Jan2012, 12:21	295.26
01Jan2012, 12:22	296.68
01Jan2012, 12:23	298.05
01Jan2012, 12:24	299.38
01Jan2012, 12:25	300.92
01Jan2012, 12:26	302.75
01Jan2012, 12:27	304.59
01Jan2012, 12:28	306.39
01Jan2012, 12:29	308.07
01Jan2012, 12:30	315.67
01Jan2012, 12:31	328.89
01Jan2012, 12:32	345.17
01Jan2012, 12:33	361.05
01Jan2012, 12:34	377.73
01Jan2012, 12:35	394.63
01Jan2012, 12:36	409.31
01Jan2012, 12:37	428.39
01Jan2012, 12:38	455.03
01Jan2012, 12:39	485.58
01Jan2012, 12:40	505.79
01Jan2012, 12:41	518.13
01Jan2012, 12:42	527.66
01Jan2012, 12:43	534.19
01Jan2012, 12:44	538.56
01Jan2012, 12:45	540.91
01Jan2012, 12:46	541.58
01Jan2012, 12:47	540.76
01Jan2012, 12:48	538.72
01Jan2012, 12:49	535.66
01Jan2012, 12:50	531.78
01Jan2012, 12:51	527.19
01Jan2012, 12:52	522.04
01Jan2012, 12:53	516.44
01Jan2012, 12:54	510.46
01Jan2012, 12:55	504.16
01Jan2012, 12:56	497.72
01Jan2012, 12:57	491.14
01Jan2012, 12:58	484.38
01Jan2012, 12:59	477.51
01Jan2012, 13:00	470.63
01Jan2012, 13:01	463.75
01Jan2012, 13:02	456.41
01Jan2012, 13:03	449.44
01Jan2012, 13:04	442.68
01Jan2012, 13:05	436.01
01Jan2012, 13:06	430.01
01Jan2012, 13:07	423.69
01Jan2012, 13:08	417.18
01Jan2012, 13:09	411.07
01Jan2012, 13:10	404.64
01Jan2012, 13:11	398.86
01Jan2012, 13:12	393.07

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 13:13	259.27
01Jan2012, 13:14	258.19
01Jan2012, 13:15	254.30
01Jan2012, 13:16	251.75
01Jan2012, 13:17	249.67
01Jan2012, 13:18	247.54
01Jan2012, 13:19	245.23
01Jan2012, 13:20	242.34
01Jan2012, 13:21	239.60
01Jan2012, 13:22	237.33
01Jan2012, 13:23	233.85
01Jan2012, 13:24	231.81
01Jan2012, 13:25	230.23
01Jan2012, 13:26	228.99
01Jan2012, 13:27	227.90
01Jan2012, 13:28	226.80
01Jan2012, 13:29	225.54
01Jan2012, 13:30	224.28
01Jan2012, 13:31	223.03
01Jan2012, 13:32	221.77
01Jan2012, 13:33	220.52
01Jan2012, 13:34	219.20
01Jan2012, 13:35	217.91
01Jan2012, 13:36	216.68
01Jan2012, 13:37	215.50
01Jan2012, 13:38	214.32
01Jan2012, 13:39	213.04
01Jan2012, 13:40	211.71
01Jan2012, 13:41	210.32
01Jan2012, 13:42	208.78
01Jan2012, 13:43	206.91
01Jan2012, 13:44	204.74
01Jan2012, 13:45	202.47
01Jan2012, 13:46	199.95
01Jan2012, 13:47	197.17
01Jan2012, 13:48	194.08
01Jan2012, 13:49	190.26
01Jan2012, 13:50	184.74
01Jan2012, 13:51	177.55
01Jan2012, 13:52	171.44
01Jan2012, 13:53	165.45
01Jan2012, 13:54	158.82
01Jan2012, 13:55	152.83
01Jan2012, 13:56	147.02
01Jan2012, 13:57	140.17
01Jan2012, 13:58	133.49
01Jan2012, 13:59	128.32
01Jan2012, 14:00	124.38
01Jan2012, 14:01	121.12
01Jan2012, 14:02	118.07
01Jan2012, 14:03	115.30
01Jan2012, 14:04	113.17
01Jan2012, 14:05	111.44

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 13:13	387.66
01Jan2012, 13:14	382.30
01Jan2012, 13:15	377.22
01Jan2012, 13:16	372.22
01Jan2012, 13:17	367.32
01Jan2012, 13:18	362.51
01Jan2012, 13:19	357.81
01Jan2012, 13:20	353.25
01Jan2012, 13:21	348.84
01Jan2012, 13:22	344.66
01Jan2012, 13:23	340.67
01Jan2012, 13:24	336.75
01Jan2012, 13:25	332.98
01Jan2012, 13:26	329.33
01Jan2012, 13:27	325.77
01Jan2012, 13:28	322.36
01Jan2012, 13:29	319.08
01Jan2012, 13:30	315.93
01Jan2012, 13:31	312.76
01Jan2012, 13:32	309.67
01Jan2012, 13:33	306.69
01Jan2012, 13:34	303.75
01Jan2012, 13:35	300.92
01Jan2012, 13:36	298.23
01Jan2012, 13:37	295.70
01Jan2012, 13:38	293.21
01Jan2012, 13:39	290.76
01Jan2012, 13:40	287.55
01Jan2012, 13:41	284.00
01Jan2012, 13:42	281.33
01Jan2012, 13:43	279.23
01Jan2012, 13:44	277.56
01Jan2012, 13:45	276.14
01Jan2012, 13:46	274.94
01Jan2012, 13:47	273.89
01Jan2012, 13:48	272.96
01Jan2012, 13:49	272.11
01Jan2012, 13:50	271.26
01Jan2012, 13:51	270.41
01Jan2012, 13:52	270.06
01Jan2012, 13:53	269.39
01Jan2012, 13:54	268.42
01Jan2012, 13:55	267.16
01Jan2012, 13:56	265.76
01Jan2012, 13:57	264.30
01Jan2012, 13:58	260.43
01Jan2012, 13:59	254.84
01Jan2012, 14:00	251.16
01Jan2012, 14:01	247.47
01Jan2012, 14:02	242.64
01Jan2012, 14:03	239.77
01Jan2012, 14:04	238.10
01Jan2012, 14:05	236.80

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 14:06	109.75
01Jan2012, 14:07	107.75
01Jan2012, 14:08	105.39
01Jan2012, 14:09	102.64
01Jan2012, 14:10	100.19
01Jan2012, 14:11	97.82
01Jan2012, 14:12	95.50
01Jan2012, 14:13	93.17
01Jan2012, 14:14	91.04
01Jan2012, 14:15	89.01
01Jan2012, 14:16	86.86
01Jan2012, 14:17	85.12
01Jan2012, 14:18	83.65
01Jan2012, 14:19	82.39
01Jan2012, 14:20	81.32
01Jan2012, 14:21	80.50
01Jan2012, 14:22	79.87
01Jan2012, 14:23	79.39
01Jan2012, 14:24	79.00
01Jan2012, 14:25	78.69
01Jan2012, 14:26	78.43
01Jan2012, 14:27	78.22
01Jan2012, 14:28	78.04
01Jan2012, 14:29	77.89
01Jan2012, 14:30	77.76
01Jan2012, 14:31	77.64
01Jan2012, 14:32	77.54
01Jan2012, 14:33	77.46
01Jan2012, 14:34	77.42
01Jan2012, 14:35	77.54
01Jan2012, 14:36	77.72
01Jan2012, 14:37	77.75
01Jan2012, 14:38	77.78
01Jan2012, 14:39	77.79
01Jan2012, 14:40	77.77
01Jan2012, 14:41	77.65
01Jan2012, 14:42	77.47
01Jan2012, 14:43	77.22
01Jan2012, 14:44	76.97
01Jan2012, 14:45	76.79
01Jan2012, 14:46	76.67
01Jan2012, 14:47	76.56
01Jan2012, 14:48	76.39
01Jan2012, 14:49	76.19
01Jan2012, 14:50	76.00
01Jan2012, 14:51	75.85
01Jan2012, 14:52	75.71
01Jan2012, 14:53	75.58
01Jan2012, 14:54	75.38
01Jan2012, 14:55	75.19
01Jan2012, 14:56	75.00
01Jan2012, 14:57	74.71
01Jan2012, 14:58	74.54

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 14:06	235.49
01Jan2012, 14:07	234.17
01Jan2012, 14:08	232.89
01Jan2012, 14:09	231.65
01Jan2012, 14:10	230.43
01Jan2012, 14:11	229.24
01Jan2012, 14:12	228.00
01Jan2012, 14:13	226.77
01Jan2012, 14:14	225.62
01Jan2012, 14:15	224.53
01Jan2012, 14:16	223.37
01Jan2012, 14:17	222.13
01Jan2012, 14:18	220.84
01Jan2012, 14:19	219.48
01Jan2012, 14:20	217.90
01Jan2012, 14:21	215.93
01Jan2012, 14:22	213.60
01Jan2012, 14:23	211.18
01Jan2012, 14:24	208.68
01Jan2012, 14:25	205.92
01Jan2012, 14:26	202.11
01Jan2012, 14:27	197.83
01Jan2012, 14:28	192.64
01Jan2012, 14:29	187.16
01Jan2012, 14:30	182.12
01Jan2012, 14:31	177.36
01Jan2012, 14:32	172.44
01Jan2012, 14:33	167.36
01Jan2012, 14:34	162.77
01Jan2012, 14:35	158.78
01Jan2012, 14:36	154.93
01Jan2012, 14:37	150.98
01Jan2012, 14:38	147.07
01Jan2012, 14:39	143.44
01Jan2012, 14:40	140.46
01Jan2012, 14:41	137.96
01Jan2012, 14:42	135.67
01Jan2012, 14:43	133.09
01Jan2012, 14:44	129.96
01Jan2012, 14:45	126.36
01Jan2012, 14:46	123.28
01Jan2012, 14:47	120.78
01Jan2012, 14:48	118.79
01Jan2012, 14:49	117.21
01Jan2012, 14:50	115.88
01Jan2012, 14:51	114.82
01Jan2012, 14:52	113.95
01Jan2012, 14:53	113.18
01Jan2012, 14:54	112.53
01Jan2012, 14:55	112.00
01Jan2012, 14:56	111.52
01Jan2012, 14:57	111.13
01Jan2012, 14:58	110.79

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 14:59	74.36
01Jan2012, 15:00	74.18
01Jan2012, 15:01	74.12
01Jan2012, 15:02	73.95
01Jan2012, 15:03	73.75
01Jan2012, 15:04	73.67
01Jan2012, 15:05	73.47
01Jan2012, 15:06	73.07
01Jan2012, 15:07	72.59
01Jan2012, 15:08	72.13
01Jan2012, 15:09	71.72
01Jan2012, 15:10	71.34
01Jan2012, 15:11	70.92
01Jan2012, 15:12	70.42
01Jan2012, 15:13	69.83
01Jan2012, 15:14	69.13
01Jan2012, 15:15	68.32
01Jan2012, 15:16	67.37
01Jan2012, 15:17	66.22
01Jan2012, 15:18	64.76
01Jan2012, 15:19	63.11
01Jan2012, 15:20	61.36
01Jan2012, 15:21	59.53
01Jan2012, 15:22	57.39
01Jan2012, 15:23	55.14
01Jan2012, 15:24	53.02
01Jan2012, 15:25	51.18
01Jan2012, 15:26	49.72
01Jan2012, 15:27	48.42
01Jan2012, 15:28	47.04
01Jan2012, 15:29	45.73
01Jan2012, 15:30	44.57
01Jan2012, 15:31	43.59
01Jan2012, 15:32	42.70
01Jan2012, 15:33	41.82
01Jan2012, 15:34	40.85
01Jan2012, 15:35	39.79
01Jan2012, 15:36	38.66
01Jan2012, 15:37	37.55
01Jan2012, 15:38	36.53
01Jan2012, 15:39	35.62
01Jan2012, 15:40	34.80
01Jan2012, 15:41	34.04
01Jan2012, 15:42	33.35
01Jan2012, 15:43	32.72
01Jan2012, 15:44	32.17
01Jan2012, 15:45	31.68
01Jan2012, 15:46	30.77
01Jan2012, 15:47	30.66
01Jan2012, 15:48	30.42
01Jan2012, 15:49	30.22
01Jan2012, 15:50	30.00
01Jan2012, 15:51	29.76

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 14:59	110.46
01Jan2012, 15:00	110.21
01Jan2012, 15:01	109.94
01Jan2012, 15:02	109.71
01Jan2012, 15:03	109.49
01Jan2012, 15:04	109.28
01Jan2012, 15:05	109.03
01Jan2012, 15:06	108.71
01Jan2012, 15:07	108.37
01Jan2012, 15:08	107.98
01Jan2012, 15:09	107.50
01Jan2012, 15:10	107.33
01Jan2012, 15:11	106.71
01Jan2012, 15:12	106.46
01Jan2012, 15:13	105.87
01Jan2012, 15:14	105.20
01Jan2012, 15:15	104.94
01Jan2012, 15:16	104.13
01Jan2012, 15:17	103.37
01Jan2012, 15:18	102.63
01Jan2012, 15:19	101.86
01Jan2012, 15:20	101.09
01Jan2012, 15:21	100.32
01Jan2012, 15:22	99.54
01Jan2012, 15:23	99.01
01Jan2012, 15:24	99.20
01Jan2012, 15:25	99.24
01Jan2012, 15:26	99.03
01Jan2012, 15:27	98.52
01Jan2012, 15:28	97.31
01Jan2012, 15:29	95.65
01Jan2012, 15:30	94.07
01Jan2012, 15:31	92.56
01Jan2012, 15:32	91.03
01Jan2012, 15:33	89.64
01Jan2012, 15:34	88.48
01Jan2012, 15:35	87.51
01Jan2012, 15:36	86.74
01Jan2012, 15:37	86.12
01Jan2012, 15:38	85.61
01Jan2012, 15:39	85.17
01Jan2012, 15:40	84.77
01Jan2012, 15:41	84.40
01Jan2012, 15:42	84.04
01Jan2012, 15:43	83.70
01Jan2012, 15:44	83.38
01Jan2012, 15:45	83.07
01Jan2012, 15:46	82.77
01Jan2012, 15:47	82.49
01Jan2012, 15:48	82.24
01Jan2012, 15:49	81.99
01Jan2012, 15:50	81.71
01Jan2012, 15:51	81.43

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 15:52	29.51
01Jan2012, 15:53	29.27
01Jan2012, 15:54	29.04
01Jan2012, 15:55	28.83
01Jan2012, 15:56	28.62
01Jan2012, 15:57	28.43
01Jan2012, 15:58	28.25
01Jan2012, 15:59	28.09
01Jan2012, 16:00	27.94
01Jan2012, 16:01	27.81
01Jan2012, 16:02	27.68
01Jan2012, 16:03	27.56
01Jan2012, 16:04	27.45
01Jan2012, 16:05	27.35
01Jan2012, 16:06	27.26
01Jan2012, 16:07	27.18
01Jan2012, 16:08	27.10
01Jan2012, 16:09	27.03
01Jan2012, 16:10	26.96
01Jan2012, 16:11	26.90
01Jan2012, 16:12	26.84
01Jan2012, 16:13	26.79
01Jan2012, 16:14	26.74
01Jan2012, 16:15	26.69
01Jan2012, 16:16	26.65
01Jan2012, 16:17	26.61
01Jan2012, 16:18	26.57
01Jan2012, 16:19	26.53
01Jan2012, 16:20	26.50
01Jan2012, 16:21	26.47
01Jan2012, 16:22	26.44
01Jan2012, 16:23	26.42
01Jan2012, 16:24	26.39
01Jan2012, 16:25	26.36
01Jan2012, 16:26	26.34
01Jan2012, 16:27	26.31
01Jan2012, 16:28	26.29
01Jan2012, 16:29	26.26
01Jan2012, 16:30	26.25
01Jan2012, 16:31	26.23
01Jan2012, 16:32	26.22
01Jan2012, 16:33	26.21
01Jan2012, 16:34	26.20
01Jan2012, 16:35	26.19
01Jan2012, 16:36	26.19
01Jan2012, 16:37	26.18
01Jan2012, 16:38	26.17
01Jan2012, 16:39	26.17
01Jan2012, 16:40	26.16
01Jan2012, 16:41	26.16
01Jan2012, 16:42	26.15
01Jan2012, 16:43	26.15
01Jan2012, 16:44	26.14

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 15:52	81.17
01Jan2012, 15:53	80.95
01Jan2012, 15:54	80.75
01Jan2012, 15:55	80.57
01Jan2012, 15:56	80.40
01Jan2012, 15:57	80.24
01Jan2012, 15:58	80.08
01Jan2012, 15:59	79.93
01Jan2012, 16:00	79.75
01Jan2012, 16:01	79.53
01Jan2012, 16:02	79.31
01Jan2012, 16:03	79.10
01Jan2012, 16:04	78.91
01Jan2012, 16:05	78.71
01Jan2012, 16:06	78.50
01Jan2012, 16:07	78.26
01Jan2012, 16:08	78.03
01Jan2012, 16:09	77.80
01Jan2012, 16:10	77.60
01Jan2012, 16:11	77.40
01Jan2012, 16:12	77.21
01Jan2012, 16:13	77.01
01Jan2012, 16:14	76.81
01Jan2012, 16:15	76.60
01Jan2012, 16:16	76.37
01Jan2012, 16:17	76.11
01Jan2012, 16:18	75.83
01Jan2012, 16:19	75.48
01Jan2012, 16:20	75.09
01Jan2012, 16:21	74.63
01Jan2012, 16:22	74.10
01Jan2012, 16:23	73.46
01Jan2012, 16:24	72.62
01Jan2012, 16:25	71.55
01Jan2012, 16:26	70.29
01Jan2012, 16:27	68.99
01Jan2012, 16:28	67.56
01Jan2012, 16:29	65.84
01Jan2012, 16:30	64.18
01Jan2012, 16:31	62.73
01Jan2012, 16:32	61.53
01Jan2012, 16:33	60.57
01Jan2012, 16:34	59.79
01Jan2012, 16:35	59.10
01Jan2012, 16:36	58.38
01Jan2012, 16:37	57.63
01Jan2012, 16:38	56.93
01Jan2012, 16:39	56.35
01Jan2012, 16:40	55.97
01Jan2012, 16:41	55.87
01Jan2012, 16:42	55.91
01Jan2012, 16:43	55.89
01Jan2012, 16:44	55.74

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 16:45	26.14
01Jan2012, 16:46	26.13
01Jan2012, 16:47	26.13
01Jan2012, 16:48	26.13
01Jan2012, 16:49	26.12
01Jan2012, 16:50	26.12
01Jan2012, 16:51	26.12
01Jan2012, 16:52	26.11
01Jan2012, 16:53	26.11
01Jan2012, 16:54	26.11
01Jan2012, 16:55	26.11
01Jan2012, 16:56	26.11
01Jan2012, 16:57	26.10
01Jan2012, 16:58	26.10
01Jan2012, 16:59	26.10
01Jan2012, 17:00	26.10
01Jan2012, 17:01	26.10
01Jan2012, 17:02	26.10
01Jan2012, 17:03	26.10
01Jan2012, 17:04	26.10
01Jan2012, 17:05	26.10
01Jan2012, 17:06	26.09
01Jan2012, 17:07	26.09
01Jan2012, 17:08	26.09
01Jan2012, 17:09	26.09
01Jan2012, 17:10	26.09
01Jan2012, 17:11	26.09
01Jan2012, 17:12	26.09
01Jan2012, 17:13	26.09
01Jan2012, 17:14	26.09
01Jan2012, 17:15	26.09
01Jan2012, 17:16	26.09
01Jan2012, 17:17	26.09
01Jan2012, 17:18	26.09
01Jan2012, 17:19	26.09
01Jan2012, 17:20	26.09
01Jan2012, 17:21	26.09
01Jan2012, 17:22	26.09
01Jan2012, 17:23	26.09
01Jan2012, 17:24	26.09
01Jan2012, 17:25	26.09
01Jan2012, 17:26	26.09
01Jan2012, 17:27	26.09
01Jan2012, 17:28	26.09
01Jan2012, 17:29	26.09
01Jan2012, 17:30	26.09
01Jan2012, 17:31	26.09
01Jan2012, 17:32	26.09
01Jan2012, 17:33	26.09
01Jan2012, 17:34	26.09
01Jan2012, 17:35	26.09
01Jan2012, 17:36	26.10
01Jan2012, 17:37	26.10

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 16:45	55.44
01Jan2012, 16:46	55.07
01Jan2012, 16:47	54.69
01Jan2012, 16:48	54.33
01Jan2012, 16:49	54.02
01Jan2012, 16:50	53.75
01Jan2012, 16:51	53.53
01Jan2012, 16:52	53.32
01Jan2012, 16:53	53.14
01Jan2012, 16:54	52.97
01Jan2012, 16:55	52.81
01Jan2012, 16:56	52.66
01Jan2012, 16:57	52.52
01Jan2012, 16:58	52.40
01Jan2012, 16:59	52.28
01Jan2012, 17:00	52.16
01Jan2012, 17:01	52.04
01Jan2012, 17:02	51.92
01Jan2012, 17:03	51.79
01Jan2012, 17:04	51.67
01Jan2012, 17:05	51.57
01Jan2012, 17:06	51.49
01Jan2012, 17:07	51.42
01Jan2012, 17:08	51.37
01Jan2012, 17:09	51.32
01Jan2012, 17:10	51.27
01Jan2012, 17:11	51.23
01Jan2012, 17:12	51.20
01Jan2012, 17:13	51.16
01Jan2012, 17:14	51.13
01Jan2012, 17:15	51.10
01Jan2012, 17:16	51.07
01Jan2012, 17:17	51.05
01Jan2012, 17:18	51.02
01Jan2012, 17:19	51.00
01Jan2012, 17:20	50.98
01Jan2012, 17:21	50.96
01Jan2012, 17:22	50.94
01Jan2012, 17:23	50.91
01Jan2012, 17:24	50.88
01Jan2012, 17:25	50.84
01Jan2012, 17:26	50.82
01Jan2012, 17:27	50.80
01Jan2012, 17:28	50.78
01Jan2012, 17:29	50.77
01Jan2012, 17:30	50.76
01Jan2012, 17:31	50.74
01Jan2012, 17:32	50.71
01Jan2012, 17:33	50.70
01Jan2012, 17:34	50.69
01Jan2012, 17:35	50.69
01Jan2012, 17:36	50.69
01Jan2012, 17:37	50.69

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 17:38	26.10
01Jan2012, 17:39	26.10
01Jan2012, 17:40	26.10
01Jan2012, 17:41	26.10
01Jan2012, 17:42	26.10
01Jan2012, 17:43	26.10
01Jan2012, 17:44	26.10
01Jan2012, 17:45	26.10
01Jan2012, 17:46	26.10
01Jan2012, 17:47	26.10
01Jan2012, 17:48	26.10
01Jan2012, 17:49	26.10
01Jan2012, 17:50	26.10
01Jan2012, 17:51	26.10
01Jan2012, 17:52	26.10
01Jan2012, 17:53	26.10
01Jan2012, 17:54	26.11
01Jan2012, 17:55	26.11
01Jan2012, 17:56	26.11
01Jan2012, 17:57	26.11
01Jan2012, 17:58	26.11
01Jan2012, 17:59	26.11
01Jan2012, 18:00	26.11
01Jan2012, 18:01	26.11
01Jan2012, 18:02	26.11
01Jan2012, 18:03	26.11
01Jan2012, 18:04	26.11
01Jan2012, 18:05	26.09
01Jan2012, 18:06	26.08
01Jan2012, 18:07	26.04
01Jan2012, 18:08	26.00
01Jan2012, 18:09	25.93
01Jan2012, 18:10	25.85
01Jan2012, 18:11	25.74
01Jan2012, 18:12	25.61
01Jan2012, 18:13	25.46
01Jan2012, 18:14	25.28
01Jan2012, 18:15	25.07
01Jan2012, 18:16	24.84
01Jan2012, 18:17	24.59
01Jan2012, 18:18	24.31
01Jan2012, 18:19	24.02
01Jan2012, 18:20	23.72
01Jan2012, 18:21	23.39
01Jan2012, 18:22	23.06
01Jan2012, 18:23	22.72
01Jan2012, 18:24	22.37
01Jan2012, 18:25	22.02
01Jan2012, 18:26	21.67
01Jan2012, 18:27	21.32
01Jan2012, 18:28	20.98
01Jan2012, 18:29	20.64
01Jan2012, 18:30	20.31

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 17:38	50.68
01Jan2012, 17:39	50.67
01Jan2012, 17:40	50.66
01Jan2012, 17:41	50.66
01Jan2012, 17:42	50.65
01Jan2012, 17:43	50.65
01Jan2012, 17:44	50.65
01Jan2012, 17:45	50.65
01Jan2012, 17:46	50.64
01Jan2012, 17:47	50.63
01Jan2012, 17:48	50.63
01Jan2012, 17:49	50.63
01Jan2012, 17:50	50.63
01Jan2012, 17:51	50.63
01Jan2012, 17:52	50.63
01Jan2012, 17:53	50.62
01Jan2012, 17:54	50.61
01Jan2012, 17:55	50.61
01Jan2012, 17:56	50.61
01Jan2012, 17:57	50.61
01Jan2012, 17:58	50.61
01Jan2012, 17:59	50.60
01Jan2012, 18:00	50.60
01Jan2012, 18:01	50.60
01Jan2012, 18:02	50.59
01Jan2012, 18:03	50.59
01Jan2012, 18:04	50.57
01Jan2012, 18:05	50.53
01Jan2012, 18:06	50.46
01Jan2012, 18:07	50.36
01Jan2012, 18:08	50.21
01Jan2012, 18:09	50.02
01Jan2012, 18:10	49.77
01Jan2012, 18:11	49.47
01Jan2012, 18:12	49.10
01Jan2012, 18:13	48.66
01Jan2012, 18:14	48.15
01Jan2012, 18:15	47.63
01Jan2012, 18:16	47.01
01Jan2012, 18:17	46.34
01Jan2012, 18:18	45.61
01Jan2012, 18:19	44.79
01Jan2012, 18:20	43.92
01Jan2012, 18:21	43.07
01Jan2012, 18:22	42.26
01Jan2012, 18:23	41.40
01Jan2012, 18:24	40.48
01Jan2012, 18:25	39.57
01Jan2012, 18:26	38.72
01Jan2012, 18:27	37.89
01Jan2012, 18:28	37.07
01Jan2012, 18:29	36.27
01Jan2012, 18:30	35.47

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 18:31	19.99
01Jan2012, 18:32	19.68
01Jan2012, 18:33	19.37
01Jan2012, 18:34	19.08
01Jan2012, 18:35	18.79
01Jan2012, 18:36	18.51
01Jan2012, 18:37	18.25
01Jan2012, 18:38	17.98
01Jan2012, 18:39	17.73
01Jan2012, 18:40	17.48
01Jan2012, 18:41	17.24
01Jan2012, 18:42	17.01
01Jan2012, 18:43	16.79
01Jan2012, 18:44	16.58
01Jan2012, 18:45	16.38
01Jan2012, 18:46	16.19
01Jan2012, 18:47	16.02
01Jan2012, 18:48	15.85
01Jan2012, 18:49	15.70
01Jan2012, 18:50	15.55
01Jan2012, 18:51	15.41
01Jan2012, 18:52	15.29
01Jan2012, 18:53	15.17
01Jan2012, 18:54	15.06
01Jan2012, 18:55	14.96
01Jan2012, 18:56	14.88
01Jan2012, 18:57	14.80
01Jan2012, 18:58	14.73
01Jan2012, 18:59	14.67
01Jan2012, 19:00	14.61
01Jan2012, 19:01	14.56
01Jan2012, 19:02	14.51
01Jan2012, 19:03	14.47
01Jan2012, 19:04	14.43
01Jan2012, 19:05	14.39
01Jan2012, 19:06	14.36
01Jan2012, 19:07	14.33
01Jan2012, 19:08	14.30
01Jan2012, 19:09	14.27
01Jan2012, 19:10	14.25
01Jan2012, 19:11	14.23
01Jan2012, 19:12	14.21
01Jan2012, 19:13	14.19
01Jan2012, 19:14	14.17
01Jan2012, 19:15	14.16
01Jan2012, 19:16	14.14
01Jan2012, 19:17	14.13
01Jan2012, 19:18	14.12
01Jan2012, 19:19	14.11
01Jan2012, 19:20	14.10
01Jan2012, 19:21	14.09
01Jan2012, 19:22	14.08
01Jan2012, 19:23	14.07

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 18:31	34.64
01Jan2012, 18:32	33.35
01Jan2012, 18:33	32.73
01Jan2012, 18:34	31.99
01Jan2012, 18:35	31.31
01Jan2012, 18:36	30.58
01Jan2012, 18:37	29.84
01Jan2012, 18:38	29.11
01Jan2012, 18:39	28.42
01Jan2012, 18:40	27.78
01Jan2012, 18:41	27.20
01Jan2012, 18:42	26.67
01Jan2012, 18:43	26.19
01Jan2012, 18:44	25.75
01Jan2012, 18:45	25.34
01Jan2012, 18:46	24.95
01Jan2012, 18:47	24.60
01Jan2012, 18:48	24.26
01Jan2012, 18:49	23.96
01Jan2012, 18:50	23.67
01Jan2012, 18:51	23.41
01Jan2012, 18:52	23.17
01Jan2012, 18:53	22.95
01Jan2012, 18:54	22.74
01Jan2012, 18:55	22.55
01Jan2012, 18:56	22.37
01Jan2012, 18:57	22.21
01Jan2012, 18:58	22.06
01Jan2012, 18:59	21.92
01Jan2012, 19:00	21.79
01Jan2012, 19:01	21.67
01Jan2012, 19:02	21.56
01Jan2012, 19:03	21.45
01Jan2012, 19:04	21.35
01Jan2012, 19:05	21.26
01Jan2012, 19:06	21.18
01Jan2012, 19:07	21.10
01Jan2012, 19:08	21.02
01Jan2012, 19:09	20.95
01Jan2012, 19:10	20.88
01Jan2012, 19:11	20.81
01Jan2012, 19:12	20.75
01Jan2012, 19:13	20.69
01Jan2012, 19:14	20.64
01Jan2012, 19:15	20.59
01Jan2012, 19:16	20.54
01Jan2012, 19:17	20.50
01Jan2012, 19:18	20.45
01Jan2012, 19:19	20.42
01Jan2012, 19:20	20.38
01Jan2012, 19:21	20.34
01Jan2012, 19:22	20.31
01Jan2012, 19:23	20.28

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 19:24	14.06
01Jan2012, 19:25	14.05
01Jan2012, 19:26	14.05
01Jan2012, 19:27	14.04
01Jan2012, 19:28	14.04
01Jan2012, 19:29	14.03
01Jan2012, 19:30	14.03
01Jan2012, 19:31	14.02
01Jan2012, 19:32	14.02
01Jan2012, 19:33	14.02
01Jan2012, 19:34	14.01
01Jan2012, 19:35	14.01
01Jan2012, 19:36	14.01
01Jan2012, 19:37	14.00
01Jan2012, 19:38	14.00
01Jan2012, 19:39	14.00
01Jan2012, 19:40	14.00
01Jan2012, 19:41	13.99
01Jan2012, 19:42	13.99
01Jan2012, 19:43	13.99
01Jan2012, 19:44	13.99
01Jan2012, 19:45	13.99
01Jan2012, 19:46	13.99
01Jan2012, 19:47	13.99
01Jan2012, 19:48	13.99
01Jan2012, 19:49	13.98
01Jan2012, 19:50	13.98
01Jan2012, 19:51	13.98
01Jan2012, 19:52	13.98
01Jan2012, 19:53	13.98
01Jan2012, 19:54	13.98
01Jan2012, 19:55	13.98
01Jan2012, 19:56	13.98
01Jan2012, 19:57	13.98
01Jan2012, 19:58	13.98
01Jan2012, 19:59	13.98
01Jan2012, 20:00	13.98
01Jan2012, 20:01	13.98
01Jan2012, 20:02	13.98
01Jan2012, 20:03	13.98
01Jan2012, 20:04	13.98
01Jan2012, 20:05	13.98
01Jan2012, 20:06	13.98
01Jan2012, 20:07	13.98
01Jan2012, 20:08	13.98
01Jan2012, 20:09	13.98
01Jan2012, 20:10	13.98
01Jan2012, 20:11	13.98
01Jan2012, 20:12	13.98
01Jan2012, 20:13	13.98
01Jan2012, 20:14	13.98
01Jan2012, 20:15	13.98
01Jan2012, 20:16	13.98

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 19:24	20.26
01Jan2012, 19:25	20.23
01Jan2012, 19:26	20.21
01Jan2012, 19:27	20.19
01Jan2012, 19:28	20.17
01Jan2012, 19:29	20.15
01Jan2012, 19:30	20.13
01Jan2012, 19:31	20.12
01Jan2012, 19:32	20.10
01Jan2012, 19:33	20.09
01Jan2012, 19:34	20.08
01Jan2012, 19:35	20.06
01Jan2012, 19:36	20.05
01Jan2012, 19:37	20.04
01Jan2012, 19:38	20.03
01Jan2012, 19:39	20.03
01Jan2012, 19:40	20.02
01Jan2012, 19:41	20.01
01Jan2012, 19:42	20.00
01Jan2012, 19:43	20.00
01Jan2012, 19:44	19.99
01Jan2012, 19:45	19.99
01Jan2012, 19:46	19.98
01Jan2012, 19:47	19.98
01Jan2012, 19:48	19.97
01Jan2012, 19:49	19.97
01Jan2012, 19:50	19.97
01Jan2012, 19:51	19.96
01Jan2012, 19:52	19.96
01Jan2012, 19:53	19.96
01Jan2012, 19:54	19.95
01Jan2012, 19:55	19.95
01Jan2012, 19:56	19.95
01Jan2012, 19:57	19.94
01Jan2012, 19:58	19.94
01Jan2012, 19:59	19.94
01Jan2012, 20:00	19.94
01Jan2012, 20:01	19.94
01Jan2012, 20:02	19.93
01Jan2012, 20:03	19.93
01Jan2012, 20:04	19.93
01Jan2012, 20:05	19.93
01Jan2012, 20:06	19.93
01Jan2012, 20:07	19.92
01Jan2012, 20:08	19.92
01Jan2012, 20:09	19.92
01Jan2012, 20:10	19.92
01Jan2012, 20:11	19.92
01Jan2012, 20:12	19.92
01Jan2012, 20:13	19.92
01Jan2012, 20:14	19.92
01Jan2012, 20:15	19.91
01Jan2012, 20:16	19.91

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 20:17	13.98
01Jan2012, 20:18	13.98
01Jan2012, 20:19	13.98
01Jan2012, 20:20	13.98
01Jan2012, 20:21	13.98
01Jan2012, 20:22	13.98
01Jan2012, 20:23	13.98
01Jan2012, 20:24	13.98
01Jan2012, 20:25	13.98
01Jan2012, 20:26	13.98
01Jan2012, 20:27	13.98
01Jan2012, 20:28	13.98
01Jan2012, 20:29	13.98
01Jan2012, 20:30	13.98
01Jan2012, 20:31	13.98
01Jan2012, 20:32	13.98
01Jan2012, 20:33	13.98
01Jan2012, 20:34	13.98
01Jan2012, 20:35	13.98
01Jan2012, 20:36	13.98
01Jan2012, 20:37	13.98
01Jan2012, 20:38	13.98
01Jan2012, 20:39	13.98
01Jan2012, 20:40	13.98
01Jan2012, 20:41	13.98
01Jan2012, 20:42	13.98
01Jan2012, 20:43	13.98
01Jan2012, 20:44	13.98
01Jan2012, 20:45	13.98
01Jan2012, 20:46	13.98
01Jan2012, 20:47	13.98
01Jan2012, 20:48	13.98
01Jan2012, 20:49	13.98
01Jan2012, 20:50	13.98
01Jan2012, 20:51	13.98
01Jan2012, 20:52	13.98
01Jan2012, 20:53	13.98
01Jan2012, 20:54	13.98
01Jan2012, 20:55	13.98
01Jan2012, 20:56	13.98
01Jan2012, 20:57	13.98
01Jan2012, 20:58	13.98
01Jan2012, 20:59	13.98
01Jan2012, 21:00	13.98
01Jan2012, 21:01	13.98
01Jan2012, 21:02	13.98
01Jan2012, 21:03	13.98
01Jan2012, 21:04	13.98
01Jan2012, 21:05	13.98
01Jan2012, 21:06	13.98
01Jan2012, 21:07	13.98
01Jan2012, 21:08	13.98
01Jan2012, 21:09	13.98

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 20:17	19.91
01Jan2012, 20:18	19.91
01Jan2012, 20:19	19.91
01Jan2012, 20:20	19.91
01Jan2012, 20:21	19.91
01Jan2012, 20:22	19.91
01Jan2012, 20:23	19.91
01Jan2012, 20:24	19.91
01Jan2012, 20:25	19.91
01Jan2012, 20:26	19.90
01Jan2012, 20:27	19.90
01Jan2012, 20:28	19.90
01Jan2012, 20:29	19.90
01Jan2012, 20:30	19.90
01Jan2012, 20:31	19.90
01Jan2012, 20:32	19.90
01Jan2012, 20:33	19.90
01Jan2012, 20:34	19.90
01Jan2012, 20:35	19.90
01Jan2012, 20:36	19.90
01Jan2012, 20:37	19.90
01Jan2012, 20:38	19.90
01Jan2012, 20:39	19.90
01Jan2012, 20:40	19.89
01Jan2012, 20:41	19.89
01Jan2012, 20:42	19.89
01Jan2012, 20:43	19.89
01Jan2012, 20:44	19.89
01Jan2012, 20:45	19.89
01Jan2012, 20:46	19.89
01Jan2012, 20:47	19.89
01Jan2012, 20:48	19.89
01Jan2012, 20:49	19.89
01Jan2012, 20:50	19.89
01Jan2012, 20:51	19.89
01Jan2012, 20:52	19.89
01Jan2012, 20:53	19.89
01Jan2012, 20:54	19.89
01Jan2012, 20:55	19.89
01Jan2012, 20:56	19.89
01Jan2012, 20:57	19.89
01Jan2012, 20:58	19.89
01Jan2012, 20:59	19.89
01Jan2012, 21:00	19.89
01Jan2012, 21:01	19.89
01Jan2012, 21:02	19.88
01Jan2012, 21:03	19.88
01Jan2012, 21:04	19.88
01Jan2012, 21:05	19.88
01Jan2012, 21:06	19.88
01Jan2012, 21:07	19.88
01Jan2012, 21:08	19.88
01Jan2012, 21:09	19.88

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 21:10	13.99
01Jan2012, 21:11	13.99
01Jan2012, 21:12	13.99
01Jan2012, 21:13	13.99
01Jan2012, 21:14	13.99
01Jan2012, 21:15	13.99
01Jan2012, 21:16	13.99
01Jan2012, 21:17	13.99
01Jan2012, 21:18	13.99
01Jan2012, 21:19	13.99
01Jan2012, 21:20	13.99
01Jan2012, 21:21	13.99
01Jan2012, 21:22	13.99
01Jan2012, 21:23	13.99
01Jan2012, 21:24	13.99
01Jan2012, 21:25	13.99
01Jan2012, 21:26	13.99
01Jan2012, 21:27	13.99
01Jan2012, 21:28	13.99
01Jan2012, 21:29	13.99
01Jan2012, 21:30	13.99
01Jan2012, 21:31	13.99
01Jan2012, 21:32	13.99
01Jan2012, 21:33	13.99
01Jan2012, 21:34	13.99
01Jan2012, 21:35	13.99
01Jan2012, 21:36	13.99
01Jan2012, 21:37	13.99
01Jan2012, 21:38	13.99
01Jan2012, 21:39	13.99
01Jan2012, 21:40	13.99
01Jan2012, 21:41	13.99
01Jan2012, 21:42	13.99
01Jan2012, 21:43	13.99
01Jan2012, 21:44	13.99
01Jan2012, 21:45	13.99
01Jan2012, 21:46	13.99
01Jan2012, 21:47	13.99
01Jan2012, 21:48	13.99
01Jan2012, 21:49	13.99
01Jan2012, 21:50	13.99
01Jan2012, 21:51	13.99
01Jan2012, 21:52	13.99
01Jan2012, 21:53	13.99
01Jan2012, 21:54	13.99
01Jan2012, 21:55	13.99
01Jan2012, 21:56	13.99
01Jan2012, 21:57	13.99
01Jan2012, 21:58	14.00
01Jan2012, 21:59	14.00
01Jan2012, 22:00	14.00
01Jan2012, 22:01	14.00
01Jan2012, 22:02	14.00

Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 21:10	19.88
01Jan2012, 21:11	19.88
01Jan2012, 21:12	19.88
01Jan2012, 21:13	19.88
01Jan2012, 21:14	19.88
01Jan2012, 21:15	19.88
01Jan2012, 21:16	19.88
01Jan2012, 21:17	19.88
01Jan2012, 21:18	19.88
01Jan2012, 21:19	19.88
01Jan2012, 21:20	19.88
01Jan2012, 21:21	19.88
01Jan2012, 21:22	19.88
01Jan2012, 21:23	19.88
01Jan2012, 21:24	19.88
01Jan2012, 21:25	19.88
01Jan2012, 21:26	19.88
01Jan2012, 21:27	19.88
01Jan2012, 21:28	19.88
01Jan2012, 21:29	19.88
01Jan2012, 21:30	19.88
01Jan2012, 21:31	19.88
01Jan2012, 21:32	19.88
01Jan2012, 21:33	19.88
01Jan2012, 21:34	19.88
01Jan2012, 21:35	19.88
01Jan2012, 21:36	19.88
01Jan2012, 21:37	19.87
01Jan2012, 21:38	19.87
01Jan2012, 21:39	19.87
01Jan2012, 21:40	19.87
01Jan2012, 21:41	19.87
01Jan2012, 21:42	19.87
01Jan2012, 21:43	19.87
01Jan2012, 21:44	19.87
01Jan2012, 21:45	19.87
01Jan2012, 21:46	19.87
01Jan2012, 21:47	19.87
01Jan2012, 21:48	19.87
01Jan2012, 21:49	19.87
01Jan2012, 21:50	19.87
01Jan2012, 21:51	19.87
01Jan2012, 21:52	19.87
01Jan2012, 21:53	19.87
01Jan2012, 21:54	19.87
01Jan2012, 21:55	19.87
01Jan2012, 21:56	19.87
01Jan2012, 21:57	19.87
01Jan2012, 21:58	19.87
01Jan2012, 21:59	19.87
01Jan2012, 22:00	19.87
01Jan2012, 22:01	19.87
01Jan2012, 22:02	19.87

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 22:03	14.00
01Jan2012, 22:04	14.00
01Jan2012, 22:05	14.00
01Jan2012, 22:06	14.00
01Jan2012, 22:07	14.00
01Jan2012, 22:08	14.00
01Jan2012, 22:09	14.00
01Jan2012, 22:10	14.00
01Jan2012, 22:11	14.00
01Jan2012, 22:12	14.00
01Jan2012, 22:13	14.00
01Jan2012, 22:14	14.00
01Jan2012, 22:15	14.00
01Jan2012, 22:16	14.00
01Jan2012, 22:17	14.00
01Jan2012, 22:18	14.00
01Jan2012, 22:19	14.00
01Jan2012, 22:20	14.00
01Jan2012, 22:21	14.00
01Jan2012, 22:22	14.00
01Jan2012, 22:23	14.00
01Jan2012, 22:24	14.00
01Jan2012, 22:25	14.00
01Jan2012, 22:26	14.00
01Jan2012, 22:27	14.00
01Jan2012, 22:28	14.00
01Jan2012, 22:29	14.00
01Jan2012, 22:30	14.00
01Jan2012, 22:31	14.00
01Jan2012, 22:32	14.00
01Jan2012, 22:33	14.00
01Jan2012, 22:34	14.00
01Jan2012, 22:35	14.00
01Jan2012, 22:36	14.00
01Jan2012, 22:37	14.00
01Jan2012, 22:38	14.00
01Jan2012, 22:39	14.01
01Jan2012, 22:40	14.01
01Jan2012, 22:41	14.01
01Jan2012, 22:42	14.01
01Jan2012, 22:43	14.01
01Jan2012, 22:44	14.01
01Jan2012, 22:45	14.01
01Jan2012, 22:46	14.01
01Jan2012, 22:47	14.01
01Jan2012, 22:48	14.01
01Jan2012, 22:49	14.01
01Jan2012, 22:50	14.01
01Jan2012, 22:51	14.01
01Jan2012, 22:52	14.01
01Jan2012, 22:53	14.01
01Jan2012, 22:54	14.01
01Jan2012, 22:55	14.01

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 22:03	19.87
01Jan2012, 22:04	19.87
01Jan2012, 22:05	19.87
01Jan2012, 22:06	19.87
01Jan2012, 22:07	19.87
01Jan2012, 22:08	19.87
01Jan2012, 22:09	19.87
01Jan2012, 22:10	19.87
01Jan2012, 22:11	19.87
01Jan2012, 22:12	19.87
01Jan2012, 22:13	19.87
01Jan2012, 22:14	19.87
01Jan2012, 22:15	19.87
01Jan2012, 22:16	19.87
01Jan2012, 22:17	19.87
01Jan2012, 22:18	19.87
01Jan2012, 22:19	19.87
01Jan2012, 22:20	19.87
01Jan2012, 22:21	19.87
01Jan2012, 22:22	19.87
01Jan2012, 22:23	19.87
01Jan2012, 22:24	19.87
01Jan2012, 22:25	19.87
01Jan2012, 22:26	19.87
01Jan2012, 22:27	19.87
01Jan2012, 22:28	19.87
01Jan2012, 22:29	19.87
01Jan2012, 22:30	19.87
01Jan2012, 22:31	19.87
01Jan2012, 22:32	19.87
01Jan2012, 22:33	19.87
01Jan2012, 22:34	19.87
01Jan2012, 22:35	19.87
01Jan2012, 22:36	19.87
01Jan2012, 22:37	19.87
01Jan2012, 22:38	19.87
01Jan2012, 22:39	19.87
01Jan2012, 22:40	19.87
01Jan2012, 22:41	19.87
01Jan2012, 22:42	19.87
01Jan2012, 22:43	19.87
01Jan2012, 22:44	19.87
01Jan2012, 22:45	19.87
01Jan2012, 22:46	19.87
01Jan2012, 22:47	19.87
01Jan2012, 22:48	19.86
01Jan2012, 22:49	19.86
01Jan2012, 22:50	19.86
01Jan2012, 22:51	19.86
01Jan2012, 22:52	19.86
01Jan2012, 22:53	19.86
01Jan2012, 22:54	19.86
01Jan2012, 22:55	19.86

Time (ddMMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 22:56	14.01
01Jan2012, 22:57	14.01
01Jan2012, 22:58	14.01
01Jan2012, 22:59	14.01
01Jan2012, 23:00	14.01
01Jan2012, 23:01	14.01
01Jan2012, 23:02	14.01
01Jan2012, 23:03	14.01
01Jan2012, 23:04	14.01
01Jan2012, 23:05	14.01
01Jan2012, 23:06	14.01
01Jan2012, 23:07	14.01
01Jan2012, 23:08	14.01
01Jan2012, 23:09	14.01
01Jan2012, 23:10	14.01
01Jan2012, 23:11	14.01
01Jan2012, 23:12	14.01
01Jan2012, 23:13	14.01
01Jan2012, 23:14	14.01
01Jan2012, 23:15	14.01
01Jan2012, 23:16	14.01
01Jan2012, 23:17	14.01
01Jan2012, 23:18	14.01
01Jan2012, 23:19	14.01
01Jan2012, 23:20	14.01
01Jan2012, 23:21	14.01
01Jan2012, 23:22	14.01
01Jan2012, 23:23	14.02
01Jan2012, 23:24	14.02
01Jan2012, 23:25	14.02
01Jan2012, 23:26	14.02
01Jan2012, 23:27	14.02
01Jan2012, 23:28	14.02
01Jan2012, 23:29	14.02
01Jan2012, 23:30	14.02
01Jan2012, 23:31	14.02
01Jan2012, 23:32	14.02
01Jan2012, 23:33	14.02
01Jan2012, 23:34	14.02
01Jan2012, 23:35	14.02
01Jan2012, 23:36	14.02
01Jan2012, 23:37	14.02
01Jan2012, 23:38	14.02
01Jan2012, 23:39	14.02
01Jan2012, 23:40	14.02
01Jan2012, 23:41	14.02
01Jan2012, 23:42	14.02
01Jan2012, 23:43	14.02
01Jan2012, 23:44	14.02
01Jan2012, 23:45	14.02
01Jan2012, 23:46	14.02
01Jan2012, 23:47	14.02
01Jan2012, 23:48	14.02

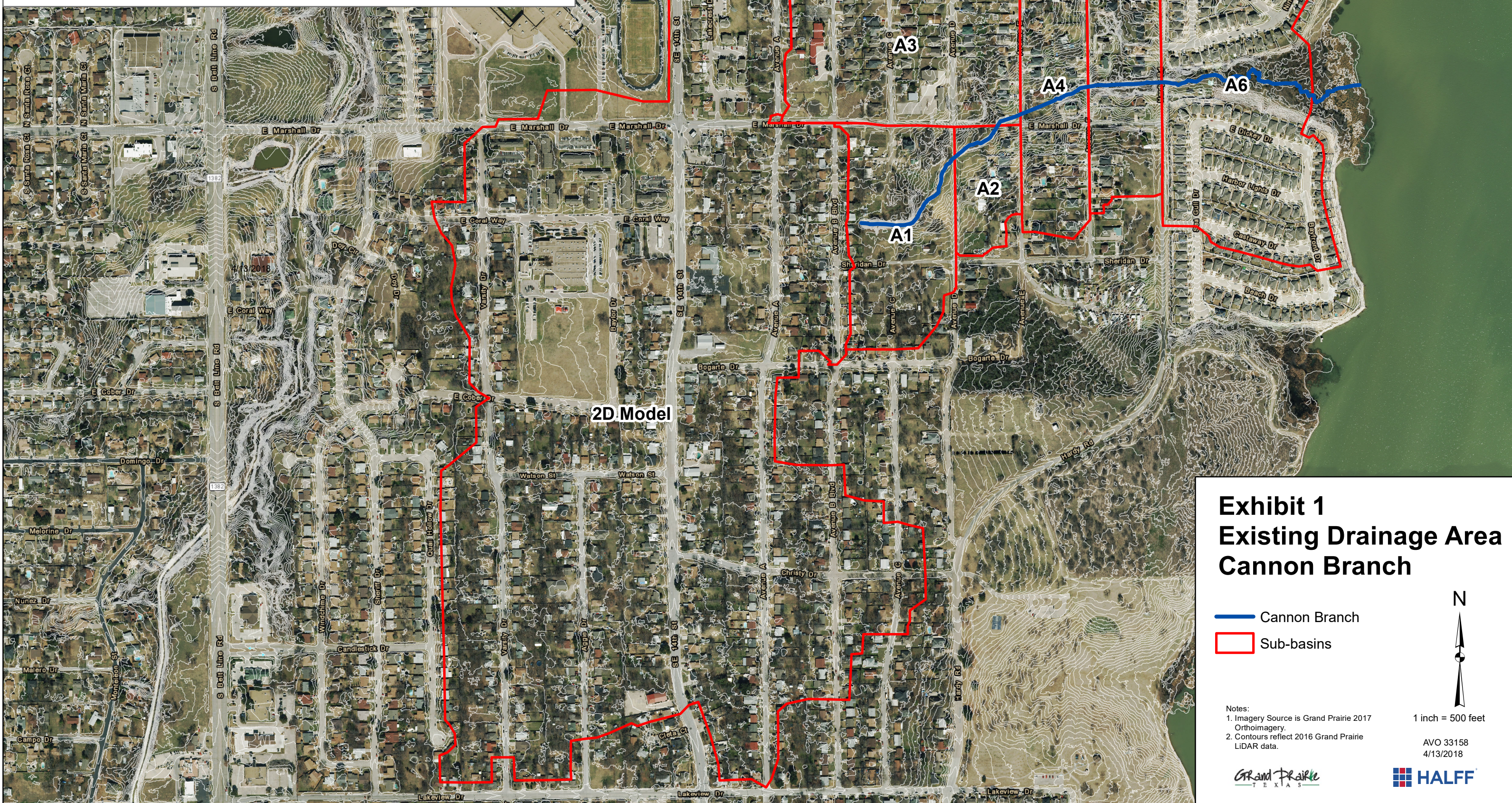
Time (ddMMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 22:56	19.86
01Jan2012, 22:57	19.86
01Jan2012, 22:58	19.86
01Jan2012, 22:59	19.86
01Jan2012, 23:00	19.86
01Jan2012, 23:01	19.86
01Jan2012, 23:02	19.86
01Jan2012, 23:03	19.86
01Jan2012, 23:04	19.86
01Jan2012, 23:05	19.86
01Jan2012, 23:06	19.86
01Jan2012, 23:07	19.86
01Jan2012, 23:08	19.86
01Jan2012, 23:09	19.86
01Jan2012, 23:10	19.86
01Jan2012, 23:11	19.86
01Jan2012, 23:12	19.86
01Jan2012, 23:13	19.86
01Jan2012, 23:14	19.86
01Jan2012, 23:15	19.86
01Jan2012, 23:16	19.86
01Jan2012, 23:17	19.86
01Jan2012, 23:18	19.86
01Jan2012, 23:19	19.86
01Jan2012, 23:20	19.86
01Jan2012, 23:21	19.86
01Jan2012, 23:22	19.86
01Jan2012, 23:23	19.86
01Jan2012, 23:24	19.86
01Jan2012, 23:25	19.86
01Jan2012, 23:26	19.86
01Jan2012, 23:27	19.86
01Jan2012, 23:28	19.86
01Jan2012, 23:29	19.86
01Jan2012, 23:30	19.86
01Jan2012, 23:31	19.86
01Jan2012, 23:32	19.86
01Jan2012, 23:33	19.86
01Jan2012, 23:34	19.86
01Jan2012, 23:35	19.86
01Jan2012, 23:36	19.86
01Jan2012, 23:37	19.86
01Jan2012, 23:38	19.86
01Jan2012, 23:39	19.86
01Jan2012, 23:40	19.86
01Jan2012, 23:41	19.86
01Jan2012, 23:42	19.86
01Jan2012, 23:43	19.86
01Jan2012, 23:44	19.86
01Jan2012, 23:45	19.86
01Jan2012, 23:46	19.86
01Jan2012, 23:47	19.86
01Jan2012, 23:48	19.86

Time (ddMMYYYY, HH:mm)	10YR Discharge (CFS)
01Jan2012, 23:49	14.02
01Jan2012, 23:50	14.02
01Jan2012, 23:51	14.02
01Jan2012, 23:52	14.02
01Jan2012, 23:53	14.02
01Jan2012, 23:54	14.02
01Jan2012, 23:55	14.02
01Jan2012, 23:56	14.02
01Jan2012, 23:57	14.02
01Jan2012, 23:58	14.02
01Jan2012, 23:59	14.02
02Jan2012, 00:00	14.02

Time (ddMMYYYY, HH:mm)	100YR Discharge (CFS)
01Jan2012, 23:49	19.86
01Jan2012, 23:50	19.86
01Jan2012, 23:51	19.86
01Jan2012, 23:52	19.86
01Jan2012, 23:53	19.86
01Jan2012, 23:54	19.86
01Jan2012, 23:55	19.87
01Jan2012, 23:56	19.87
01Jan2012, 23:57	19.87
01Jan2012, 23:58	19.87
01Jan2012, 23:59	19.87
02Jan2012, 00:00	19.87

APPENDIX B

Sub-basin	Area (mi ²)	CN	Impervious (%)	Lag Time (min)
A1	0.0247	80	50	18
A2	0.0097	80	50	3
A3	0.0414	80	50	5
A4	0.0222	80	50	15
A5	0.0513	80	50	16
A6	0.0583	80	50	9



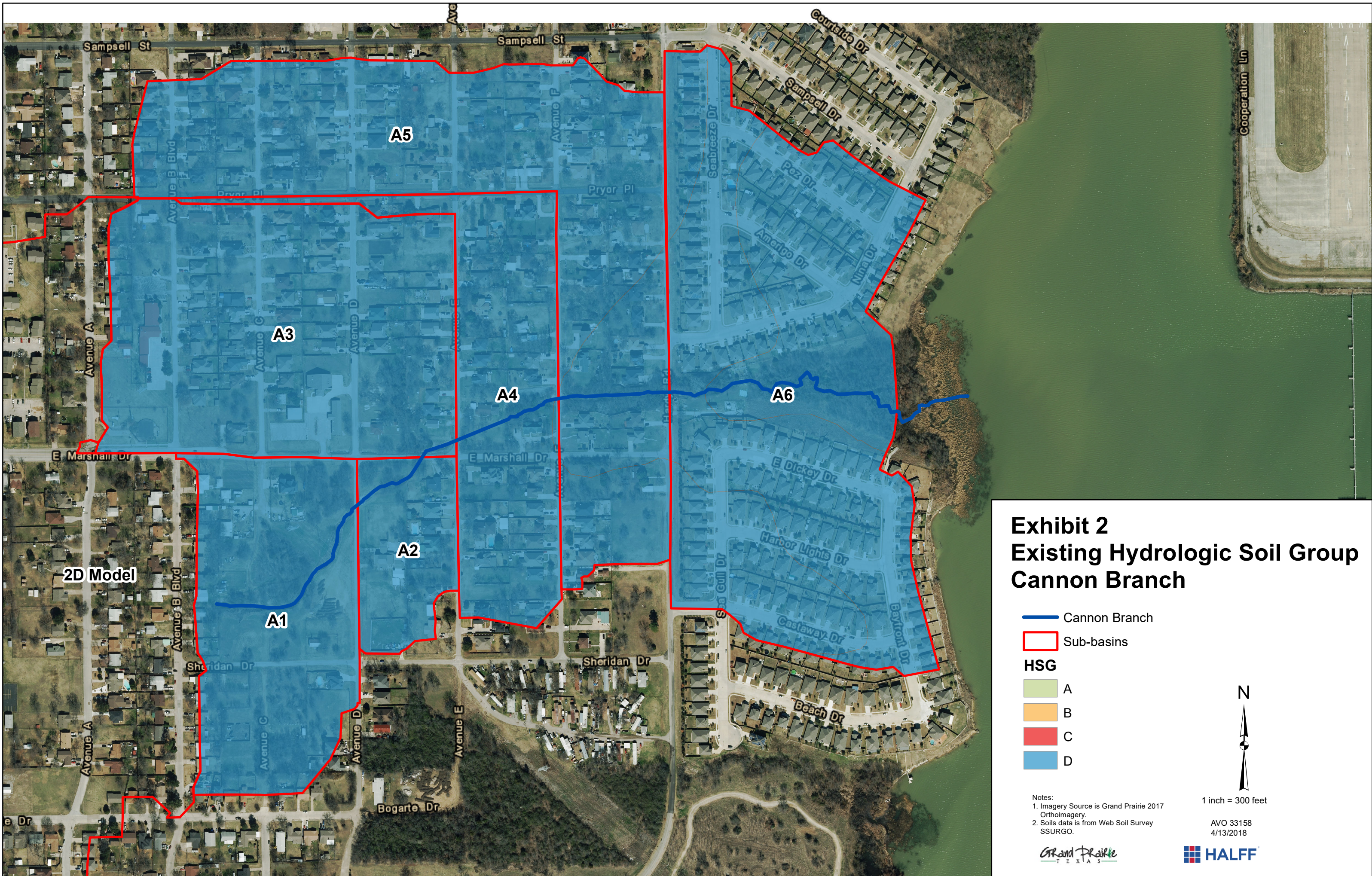






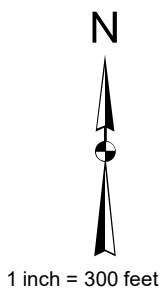


Exhibit 2 Existing Hydrologic Soil Group Cannon Branch

-  Cannon Branch
-  Sub-basins
- HSG**
-  A
-  B
-  C
-  D

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Soils data is from Web Soil Survey SSURGO.



1 inch = 300 feet

AVO 33158
4/13/2018



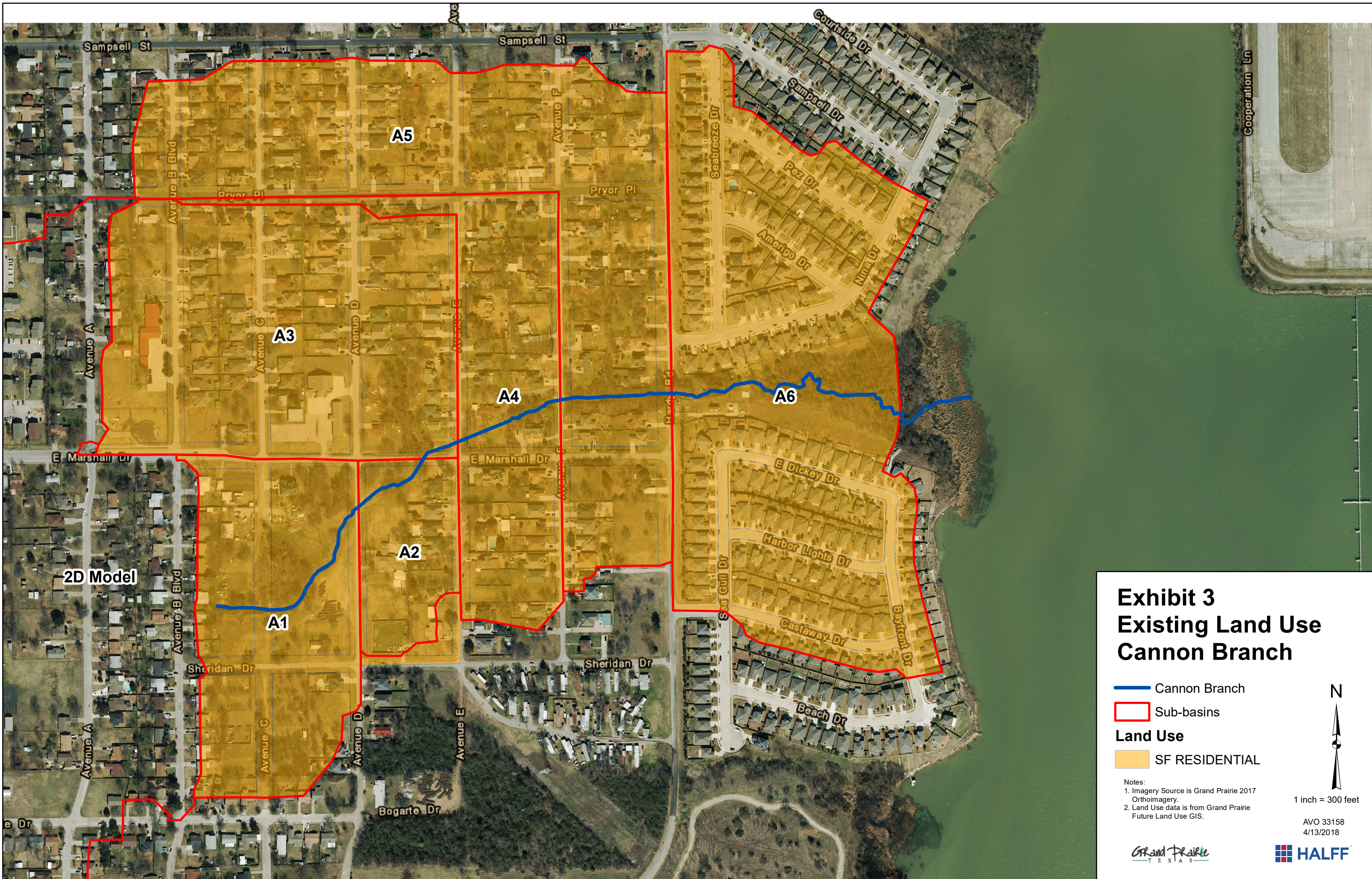
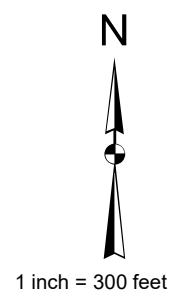


Exhibit 3 Existing Land Use Cannon Branch

- Cannon Branch
- Sub-basins
- Land Use**
- SF RESIDENTIAL

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Land Use data is from Grand Prairie Future Land Use GIS.



AVO 33158
4/13/2018



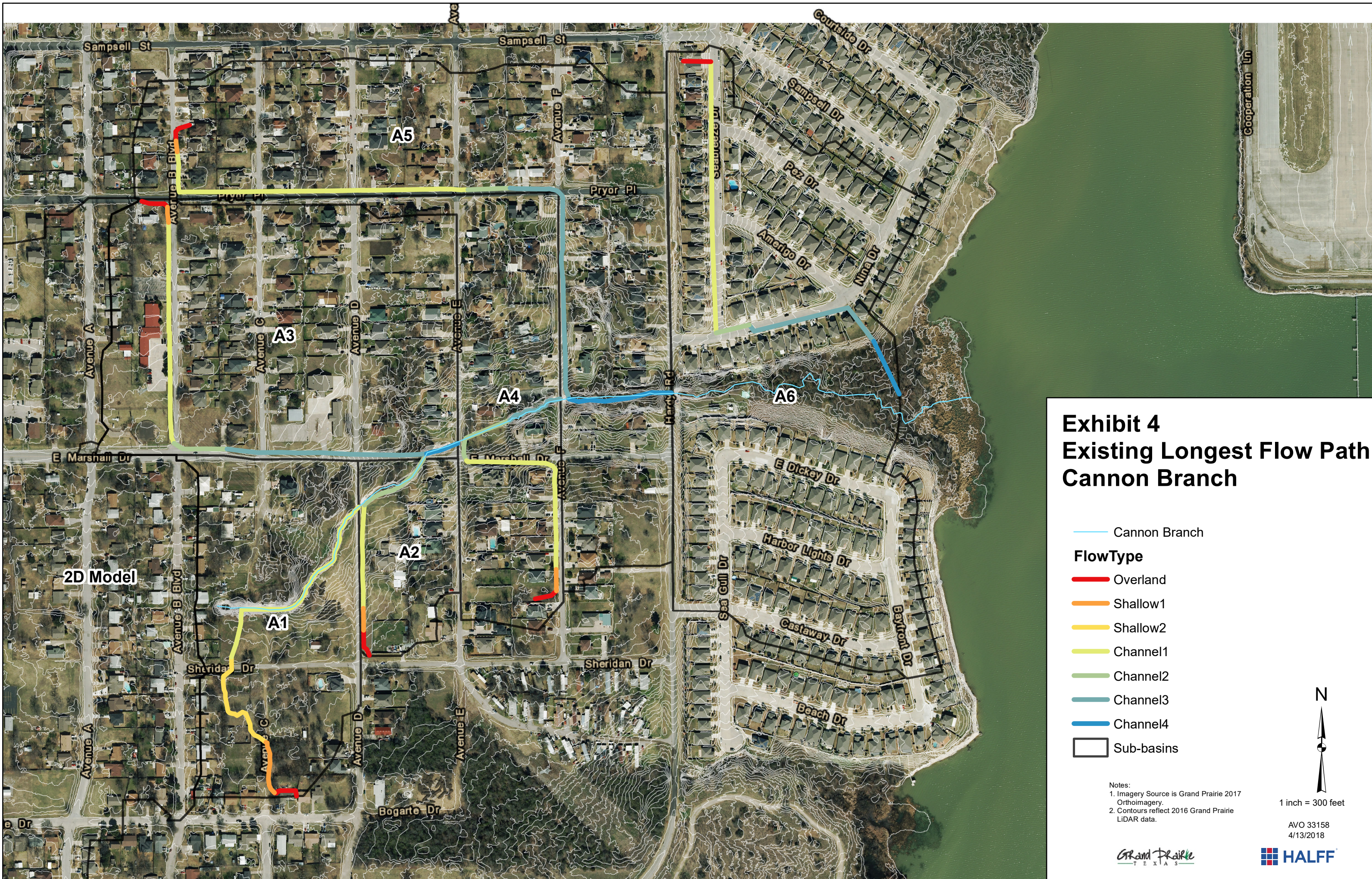


Exhibit 4 Existing Longest Flow Path Cannon Branch

— Cannon Branch



FlowType

- Overland
- Shallow1
- Shallow2
- Channel1
- Channel2
- Channel3
- Channel4
- Sub-basins

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Contours reflect 2016 Grand Prairie LiDAR data.

1 inch = 300 feet

AVO 33158
4/13/2018



Routing Reach Cross Sections - Existing						
Routing Reach Name	Length	Average Velocity	Steps	Rounded Steps	US XS	DS XS
R-A1	674	2.39	4.70	5.0	3362	2688
R-A2	315	4.04	1.30	2.0	2688	2373
R-A4	556	2.79	3.33	4.0	2373	1817
R-A5	354	2.92	2.02	3.0	1817	1463
R-A6	1137	2.33	8.13	9.0	1463	326

Flow Breaks - Existing			
XS	HMS Element	Q10yr (cfs)	Q100yr (cfs)
3362	2D hydrograph	270	540
2844	J-A1	315	580
2373	J-A3	425	620
1948	J-A4	475	640
1586	J-A5	580	790
749	J-A6	640	920

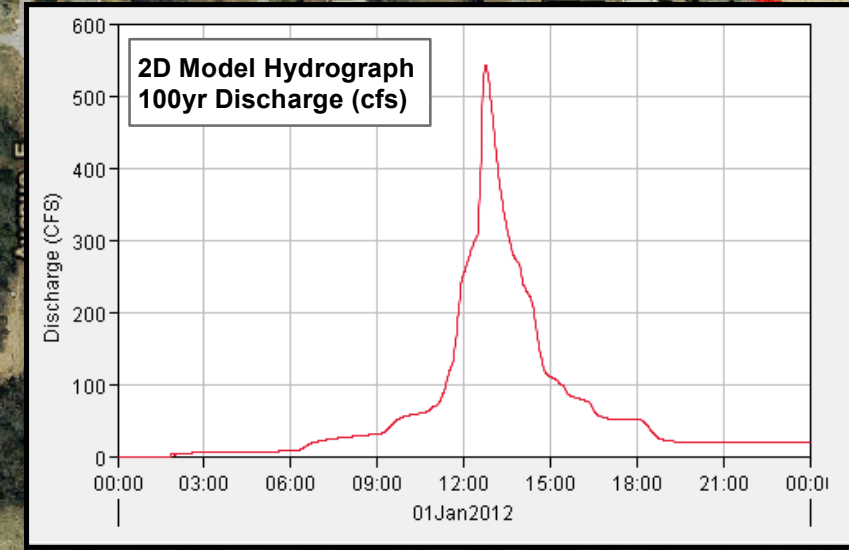
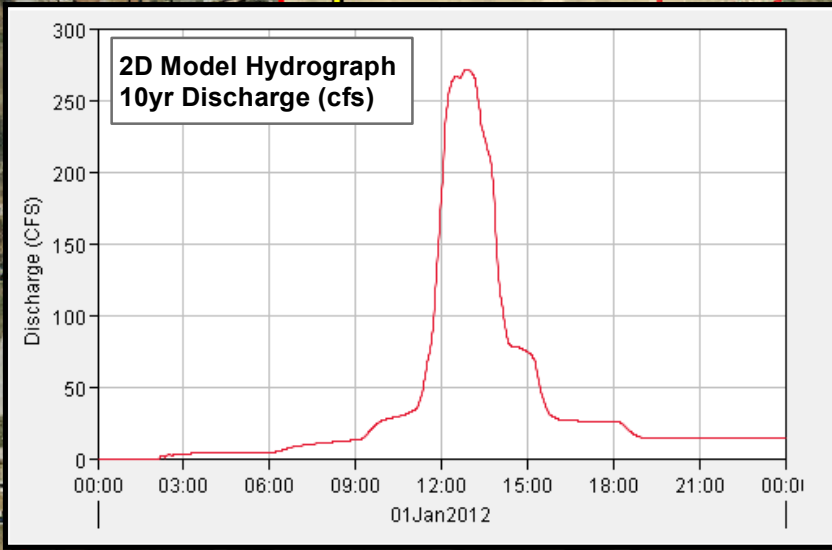


Exhibit 5A Existing Hydrologic Workmap Cannon Branch

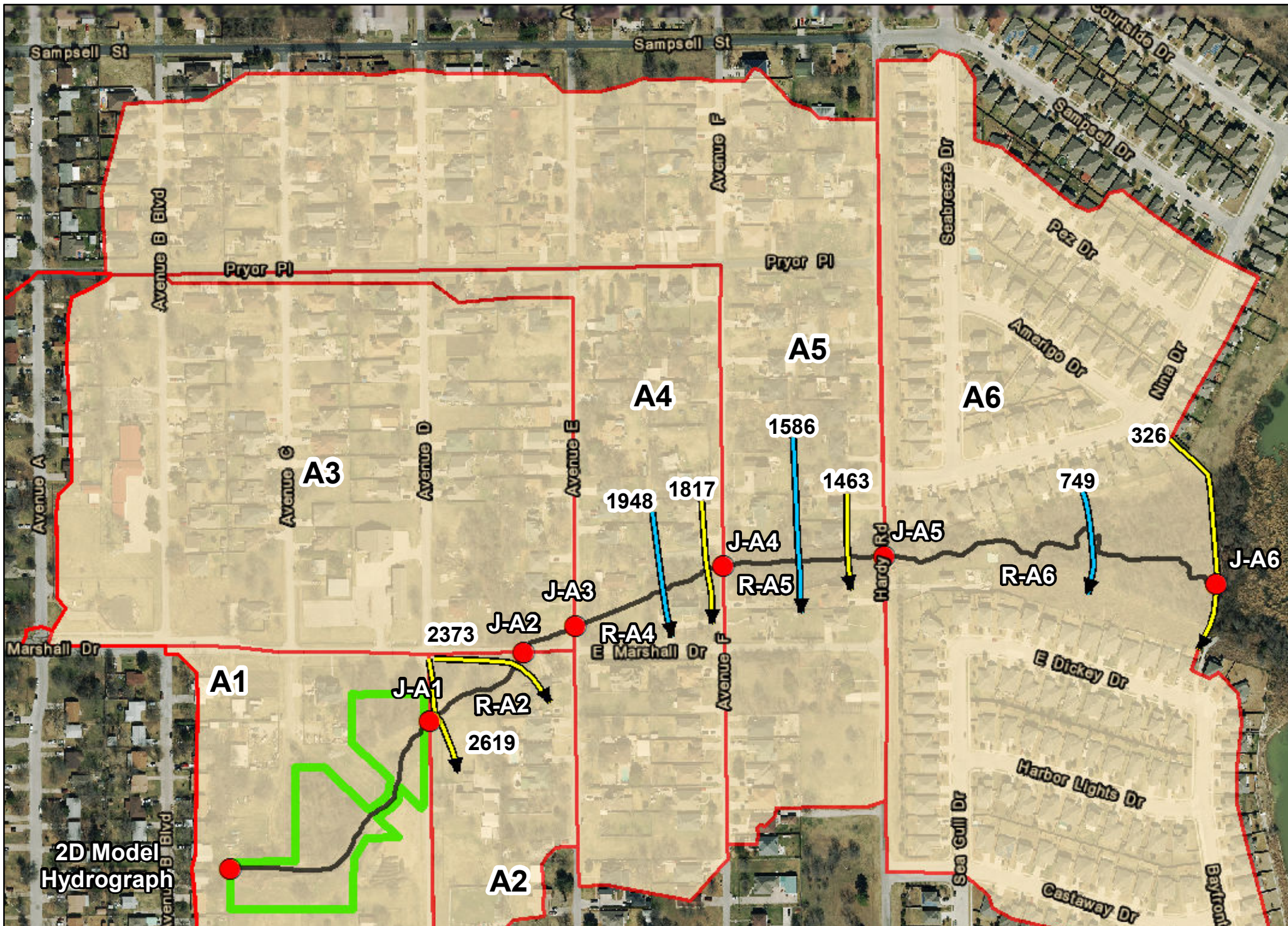
- HMS Junctions
- ➔ Routing Reach Cross Sections
- ➔ Flow Break Cross Sections
- Routing Reaches
- HMS Sub-basins

N

1 inch = 300 feet

Notes:
1. Imagery Source is Grand Prairie 2017 Orthoimagery.

AVO 33158
5/18/2018



Routing Reach Cross Sections - Proposed						
Routing Reach Name	Length	Average Velocity	Steps	Rounded Steps	US XS	DS XS
R-A2	315	4.04	1.30	2.0	2619	2373
R-A4	556	2.79	3.33	4.0	2373	1817
R-A5	354	2.92	2.02	3.0	1817	1463
R-A6	1137	2.33	8.13	9.0	1463	326

Flow Breaks - Proposed			
XS	HMS Element	Q10yr (cfs)	Q100yr (cfs)
2619	J-A1	290	455
2373	J-A3	340	485
1948	J-A4	385	550
1586	J-A5	505	725
749	J-A6	565	850

2D Model Hydrograph

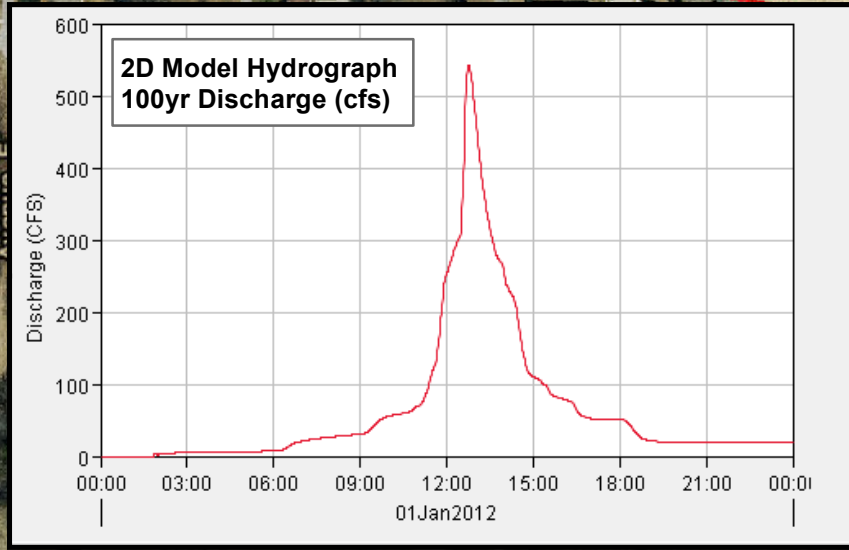
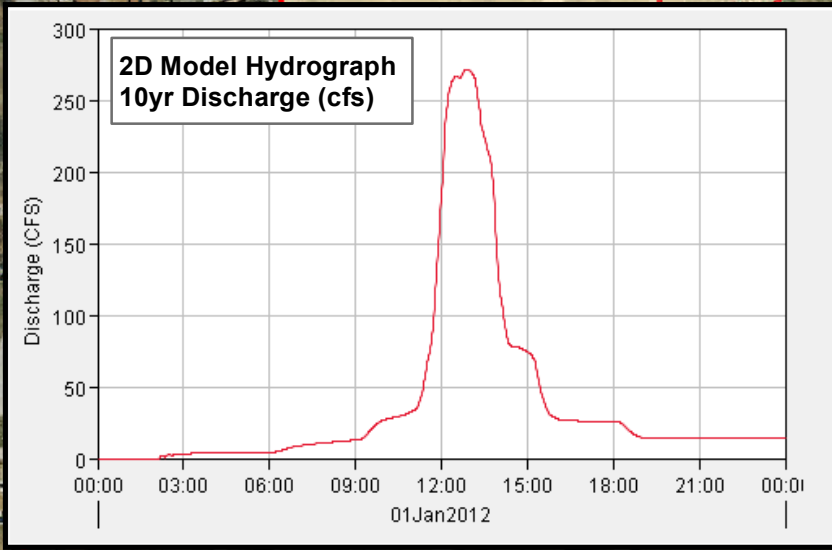
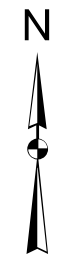
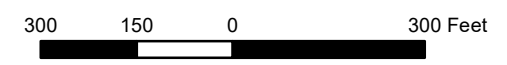


Exhibit 5B Proposed Hydrologic Workmap Cannon Branch

- HMS Junctions
- Routing Reach Cross Sections
- Flow Break Cross Sections
- Routing Reaches
- Detention Pond Boundary
- HMS Sub-basins



1 inch = 300 feet



Notes:
1. Imagery Source is Grand Prairie 2017 Orthoimagery.

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River Sta	EX 100yr WSEL (ft)	PR 100yr WSEL (ft)	Delta (ft)
3105	481.99		
3052	481.74		
2973	481.30		
2844	480.74		
2737	480.56		
2688	480.49		
2669	480.37		
2645 Avenue D			
2619	477.21	476.67	-0.54
2597	476.56	476.19	-0.37
2521	476.32	476.00	-0.32
2410	476.23	475.91	-0.32
2373	476.20	475.89	-0.31
2358	476.22	475.90	-0.32
2335 Marshall Drive			
1981	472.57	472.25	-0.32
1948	472.52	472.20	-0.32
1817	472.40	472.08	-0.32
1801	472.40	472.08	-0.32
1777 Avenue F			
1752	472.33	472.00	-0.33
1722	472.33	472.00	-0.33
1586	472.31	471.98	-0.33
1463	472.28	471.96	-0.32
1423	472.28	471.96	-0.32
1372 Hardy Road			
1342	463.83	463.68	-0.15
1305	463.80	463.65	-0.15
749	461.24	461.09	-0.15
326	460.80	460.65	-0.15

Cannon Branch 10yr Discharges (cfs)				
Flow Break River Sta	EX	PR	Delta	
3362	270	-	-	
2844	315	-	-	
2619	315	290	25	
2373	425	340	85	
1948	475	385	90	
1586	580	505	75	
749	640	565	75	

Cannon Branch 100yr Discharges (cfs)				
Flow Break River Sta	EX	PR	Delta	
3362	540	-	-	
2844	580	-	-	
2619	580	455	125	
2373	620	485	135	
1948	640	550	90	
1586	790	725	65	
749	920	850	70	

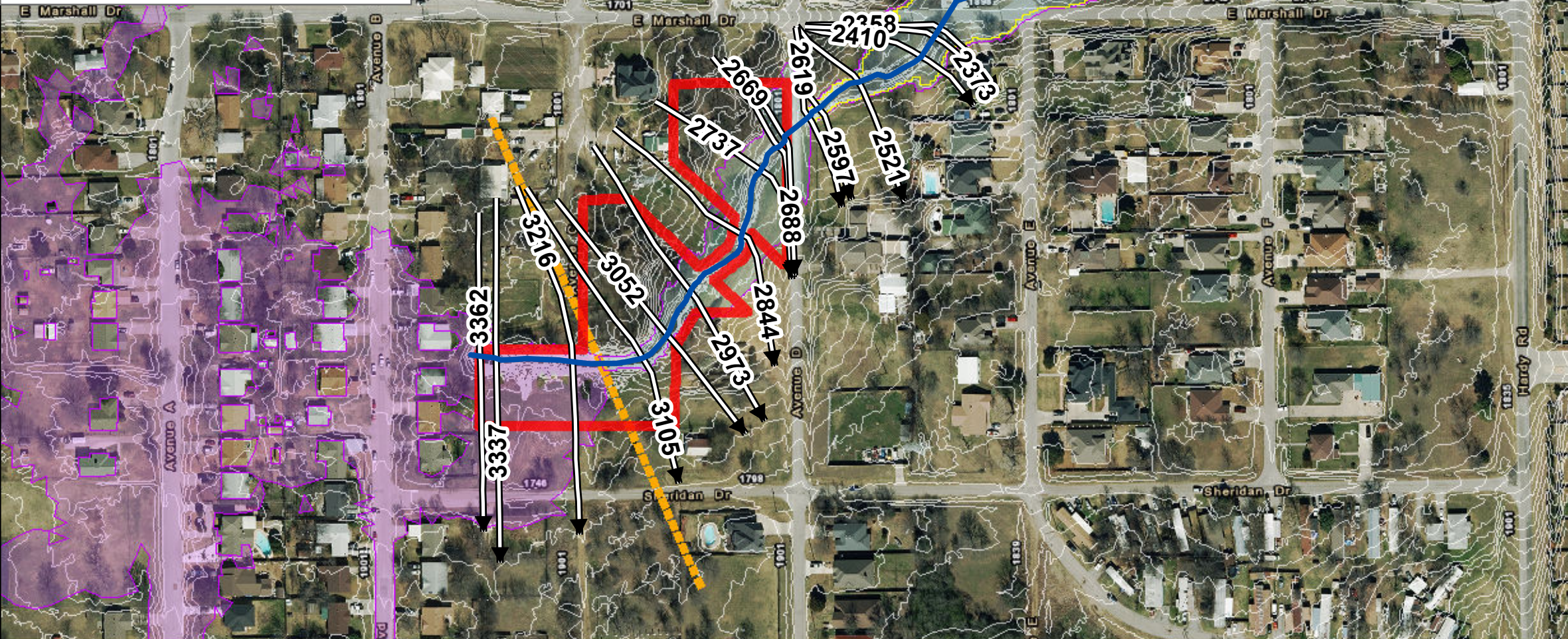
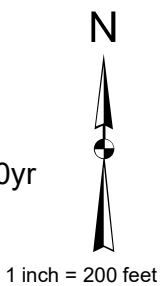


Exhibit 6 Overall Floodplain Workmap Cannon Branch

- Cannon Branch
- ⇨ Cross Sections
- Proposed Detention Pond Boundary
- Proposed Floodplain 100yr
- Existing Floodplain 100yr
- Results Boundary - 1D-2D
- 2D Model Existing Ponding 100yr

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Contours reflect 2016 Grand Prairie LiDAR data.



1 inch = 200 feet

AVO: 33158
5/18/2018



River Sta	EX 100yr WSEL (ft)	PR 100yr WSEL (ft)	Delta (ft)
3105	481.99		
3052	481.74		
2973	481.30		
2844	480.74		
2737	480.56		
2688	480.49		
2669	480.37		
2645	Avenue D		
2619	477.21	476.67	-0.54
2597	476.56	476.19	-0.37
2521	476.32	476.00	-0.32
2410	476.23	475.91	-0.32
2373	476.20	475.89	-0.31
2358	476.22	475.90	-0.32
2335	Marshall Drive		
1981	472.57	472.25	-0.32
1948	472.52	472.20	-0.32
1817	472.40	472.08	-0.32
1801	472.40	472.08	-0.32
1777	Avenue F		
1752	472.33	472.00	-0.33
1722	472.33	472.00	-0.33
1586	472.31	471.98	-0.33
1463	472.28	471.96	-0.32
1423	472.28	471.96	-0.32
1372	Hardy Road		
1342	463.83	463.68	-0.15
1305	463.80	463.65	-0.15
749	461.24	461.09	-0.15
326	460.80	460.65	-0.15

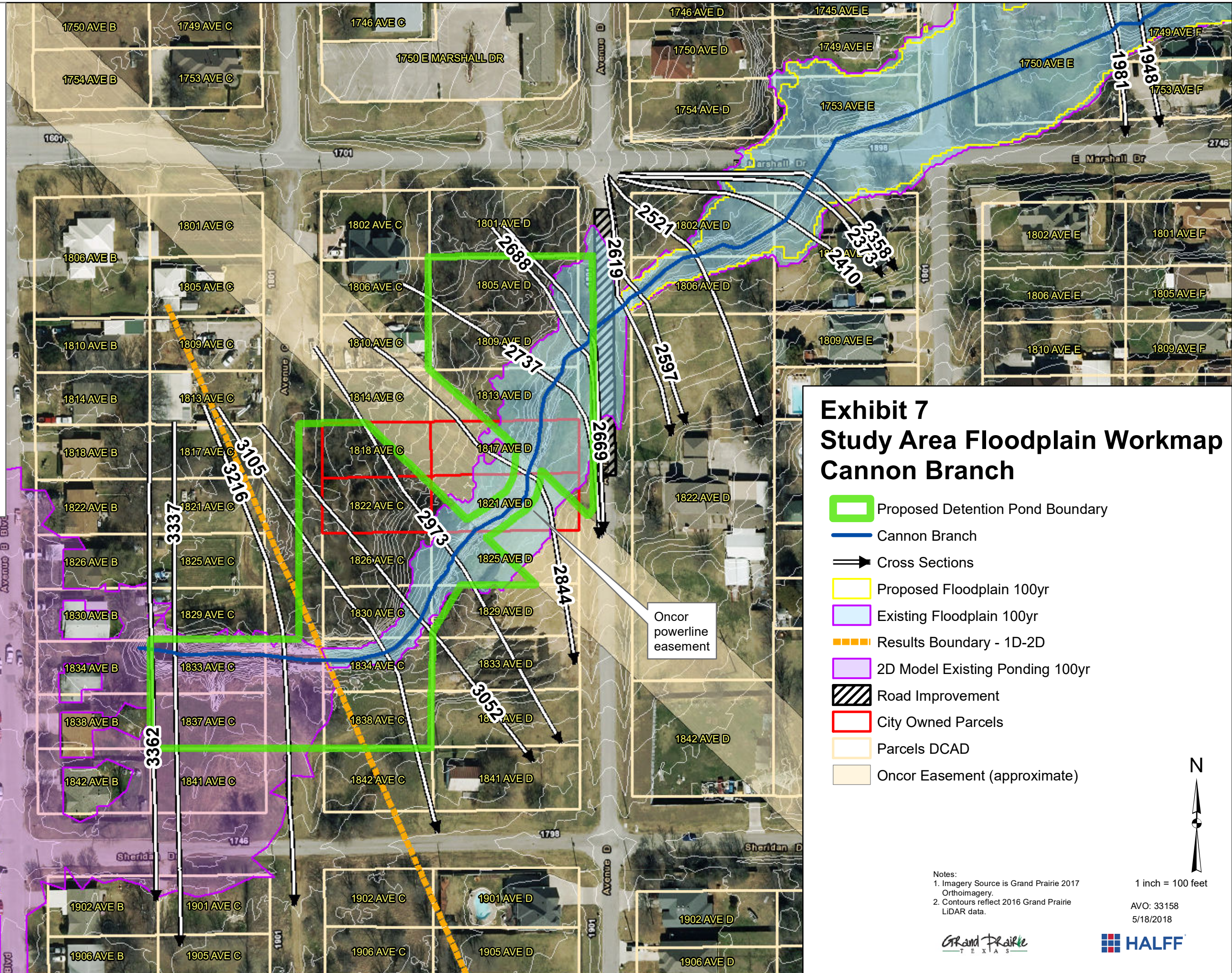


Exhibit 7 Study Area Floodplain Workmap Cannon Branch

- Proposed Detention Pond Boundary
- Cannon Branch
- Cross Sections
- Proposed Floodplain 100yr
- Existing Floodplain 100yr
- Results Boundary - 1D-2D
- 2D Model Existing Ponding 100yr
- Road Improvement
- City Owned Parcels
- Parcels DCAD
- Oncor Easement (approximate)

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Contours reflect 2016 Grand Prairie LiDAR data.

1 inch = 100 feet
 AVO: 33158
 5/18/2018



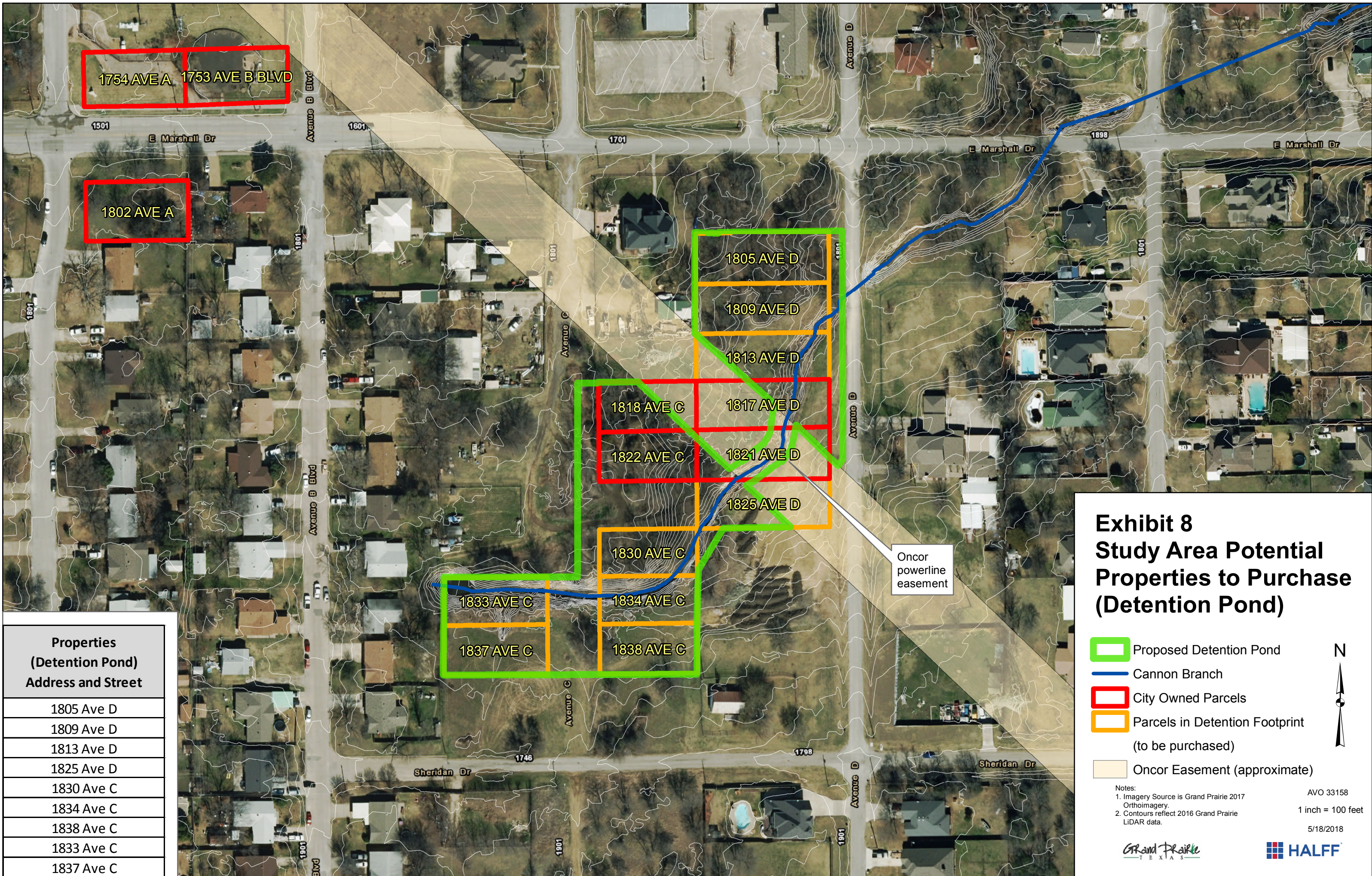


Exhibit 8 Study Area Potential Properties to Purchase (Detention Pond)

- Proposed Detention Pond
- Cannon Branch
- City Owned Parcels
- Parcels in Detention Footprint
(to be purchased)
- Oncor Easement (approximate)



Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Contours reflect 2016 Grand Prairie LIDAR data.

AVO 33158
 1 inch = 100 feet
 5/18/2018



Properties (Detention Pond) Address and Street
1805 Ave D
1809 Ave D
1813 Ave D
1825 Ave D
1830 Ave C
1834 Ave C
1838 Ave C
1833 Ave C
1837 Ave C

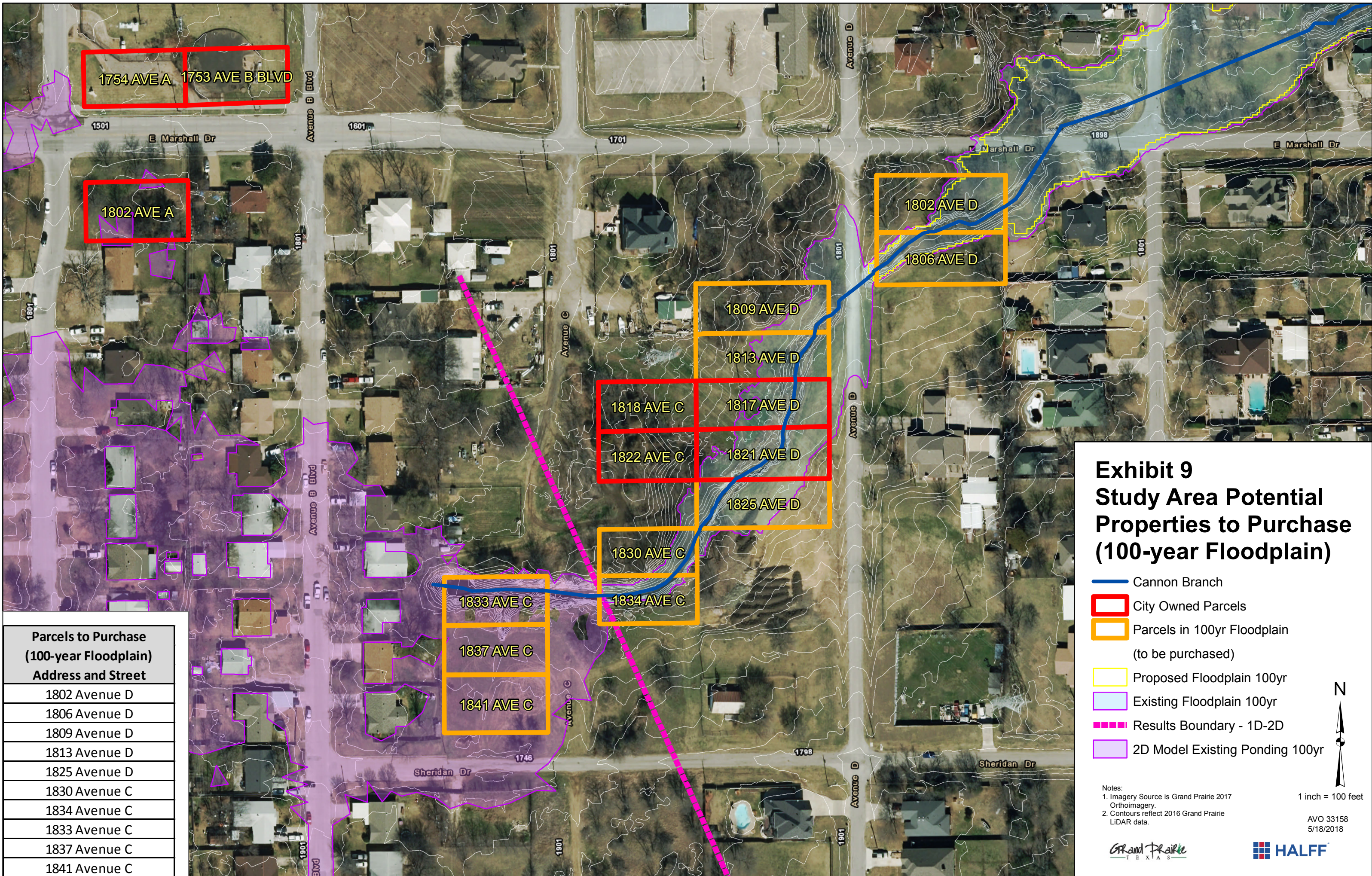









Exhibit 9 Study Area Potential Properties to Purchase (100-year Floodplain)

-  Cannon Branch
-  City Owned Parcels
-  Parcels in 100yr Floodplain
(to be purchased)
-  Proposed Floodplain 100yr
-  Existing Floodplain 100yr
-  Results Boundary - 1D-2D
-  2D Model Existing Ponding 100yr

Notes:
 1. Imagery Source is Grand Prairie 2017 Orthoimagery.
 2. Contours reflect 2016 Grand Prairie LiDAR data.

1 inch = 100 feet
 AVO 33158
 5/18/2018



Parcels to Purchase (100-year Floodplain) Address and Street
1802 Avenue D
1806 Avenue D
1809 Avenue D
1813 Avenue D
1825 Avenue D
1830 Avenue C
1834 Avenue C
1833 Avenue C
1837 Avenue C
1841 Avenue C

APPENDIX C

HMS Program Basin Name	Longest Flowpath (ft) (1)	Overland Flow								Shallow Concentrated Flow							Channel Flow						Final Tc (min) (18)	Tlag (min) (19)	Time Step (min) (20)	
		Length (ft) (2)	Elev Upper (ft)	Elev Lower (ft)	Land Use/Surface Description (4)	n-Value (3)	Slope (%) (5)	Rainfall (in) (6)	TcO (sec) (7)	Length (ft) (8)	Elev Upper (ft)	Elev Lower (ft)	Slope (%) (9)	V1 (ft/s) (10)	Assumption for V1 (Paved/Unpaved) (11)	TcS (sec) (12)	Length (ft) (13)	Elev Upper (ft)	Elev Lower (ft)	Slope (%) (14)	Conveyance Type (15)	V2 (ft/s) (16)				TcC (sec) (17)
A1		101	494.96	494.55	Unpaved	0.150	0.41	4.10	990	195	494.55	493.93	0.32	0.91	Unpaved	215	827	478.87	473.09	0.70	Open channel	4.00	207			
										424	493.93	478.87	3.55	3.04	Unpaved	139										
									To Total						Ts Total							Tc Total	207	26	16	4
A2		98	494.08	491.00	Unpaved	0.150	3.14	4.10	427	81	491.00	487.80	3.97	3.22	Unpaved	25	374	487.80	477.32	2.80	Open channel	4.00	94			
																281	477.32	468.54	3.12	Open channel	4.00	70				
									To Total						Ts Total	25						Tc Total	164	10	6	2
A3		99	505.67	504.27	Unpaved	0.150	1.41	4.10	594	56	504.27	503.48	1.41	1.92	Unpaved	29	803	503.48	496.73	0.84	Open channel	4.00	201			
																199	496.73	495.49	0.62	Open channel	4.00	50				
																724	495.49	467.45	3.88	Open channel	4.00	181				
									To Total						Ts Total	29	121	467.45	466.67	0.65	Open channel	4.00	30			
																					Tc Total	461	18	11	3	
A4		85	496.14	495.44	Unpaved	0.150	0.83	4.10	649	78	495.44	495.13	0.40	1.02	Unpaved	77	695	495.13	474.82	2.92	Open channel	4.00	174			
																256	474.82	466.59	3.21	Open channel	4.00	64				
									To Total						Ts Total	77	210	466.59	462.93	1.74	Open channel	4.00	52			
																					Tc Total	290	17	10	3	
A5		89	505.36	504.96	Unpaved	0.150	0.45	4.10	863	41	504.96	504.67	0.71	1.36	Unpaved	30	1193	504.67	493.41	0.94	Open channel	4.00	298			
																153	493.41	488.90	2.95	Open channel	4.00	38				
																939	488.90	462.22	2.84	Open channel	4.00	235				
									To Total						Ts Total	30	375	462.22	458.80	0.91	Open channel	4.00	94			
																					Tc Total	665	26	16	5	
A6		100	493.55	489.64	Unpaved	0.150	3.91	4.10	397							983	489.64	473.37	1.65	Open channel	4.00	246				
																124	473.37	468.96	3.56	Open channel	4.00	31				
																533	468.96	462.33	1.24	Open channel	4.00	133				
									To Total						Ts Total	0	213	462.33	457.64	2.21	Open channel	4.00	53			
																					Tc Total	463	14	9	2	

Notes:

- (1) Flowpaths hand-delineated. Source Data.gdb/CanonBranch_LongestFlow_r1
- (2) Overland flow was considered to occur at short distances with a maximum of 100 feet
- (3) n-Value was based on the land use. (See table to right)
- (4) Land use was determined from City of Grand Prairie Future Land Use GIS.
- (5) Overland flow slope = (US elevation - DS elevation) / overland flow length
- (6) 2-YR 1 day Rainfall - Grand Prairie Drainage Criteria Manual - Table 3.0A
- (7) Overland Flow Time of Concentration (hr) = (0.007*(nL)^0.8)/((P2)^0.5*s^0.4)
- (8) Length of Shallow Concentrated Flow
- (9) Ground Slope over Shallow Concentrated Flow Path
- (10) Channel Velocity: Paved Areas = 20.3282 * SQRT (Slope / 100)
- (11) From orthos
- (12) Channel Flow Tc (Shallow Concentrated) = L1 / V1
- (13) Main channel length
- (14) Channel Slope
- (15) Conveyance Type was determined from orthos (See table to right)
- (16) Channel Velocity (assumed 6 fps open channel, 4 fps storm drain)
- (17) Channel Time of Concentration (Channel Length/Channel Velocity)
- (18) Final Tc = Overland Flow (TcO)+Shallow Concentrated Flow+Channel Flow
- (19) Lag Time (Tlag) = 0.6 * Final Tc (Soil Conservation Service)
- (20) Time Step = Lag Time (Tlag)*0.29

n-Values (Table 3-1 TR-55)

Surface Description	n-Value
Smooth Surface (concrete, asphalt, bare earth)	0.011
Fallow (no residue)	0.05
Cultivated Soils	
	0.06
	0.17
Grass	
	0.15
	0.24
	0.41
Range (natural)	0.13
Woods	
	0.40
	0.80

APPENDIX D



CONCEPTUAL ESTIMATE OF PROBABLE COST
City of Grand Prairie - Cannon Branch at Avenue D
Proposed Channel Improvements, Detention Pond, & Property Buyouts
Between East Marshall Drive and Sheridan Drive

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Mobilization / Site Prep (5% of construction subtotal)	LS	1	\$ 21,800.00	\$ 21,800
2	SWPPP	LS	1	\$ 5,000.00	\$ 5,000
3	Traffic Control	LS	1	\$ 5,000.00	\$ 5,000
Avenue D					
4	Demolition - Headwall	EA	2	\$ 2,022.00	\$ 4,040
5	Install Concrete Box Culvert 3 - 4' X 3'	LF	180	\$ 300.00	\$ 54,000
6	Headwall	EA	2	\$ 15,000.00	\$ 30,000
7	24" Stone Rip-Rap	CY	40	\$ 150.00	\$ 6,000
8	Asphalt Pavement - Remove and Replace	SY	980	\$ 81.00	\$ 79,400
9	8" Flex Base	CY	327	\$ 60.00	\$ 19,600
Detention Improvements					
10	Channel Excavation	CY	13,000	\$ 12.50	\$ 162,500
11	Fine Grading/Sod	SY	12,660	\$ 5.00	\$ 63,300
12	Outlet Structure - v-notch 90 degree	LS	1	\$ 22,000.00	\$ 22,000
Buyout for Detention Improvements					
13	Land Acquisition of 9 parcels + 15% Market Adjustment/Purchase Price ²	SF	73,975	\$ 0.50	\$ 148,500
				Construction Subtotal	\$ 472,640
				Contingency (25%)	\$ 118,160
				Construction Total	\$ 590,800
				Engineering and Materials Testing (20%)¹	\$ 119,000
				PROJECT TOTAL	\$ 858,000
Quantities are based on a preliminary planning level design and are subject to future changes. This document is an estimate only and is not to be used for construction, bidding, or permit purposes. Prices shown in this estimate reflect 2018 CWDMP updated prices.					
Materials Testing includes effort to acquire detailed system surveys, develop detailed detention pond grading and outlet structure design, detailed cost estimate, and prepare construction plans and bid documents.					
1) 20% Engineering and					
2) Buyout properties (see Table 4. Parcels to Purchase - Detention Pond) values based on Dallas County Appraisal District Market Values on 04/13/18.					