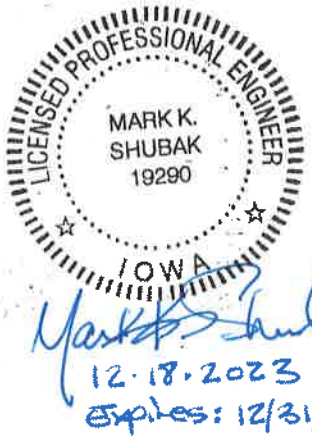
Technical Memorandum for

RDG Planning & Design, Inc.

Chaplin Schmitt Island Floodplain Study



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INTRODUCTION

Recent elevated Mississippi River levels in spring 2023 have highlighted the fact that portions of Chaplin Schmitt Island are prone to periodic and prolonged flooding. For this reason, as development planning efforts continue to advance at the island, it will be important to evaluate and understand the impact potential Mississippi River flood risks will have on the feasibility of various improvement projects being considered. This includes confirming compliance with applicable federal, state, and local floodplain and floodway regulations that will govern whether potential improvements at the island are feasible from a regulatory, engineering, and cost perspective.

EXISTING FLOODPLAIN MAPPING REVIEW

Figures 1 and 2 depict the regulatory Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Chaplin Schmitt Island (map number 19061C0244F, August 19, 2013). FEMA produces FIRMs that show areas that are at risk to flooding, also known as floodplains or Special Flood Hazard Areas (SFHA). Figure 1 and 2 show flood zones, floodplain boundaries, floodways, and base flood elevations of the Mississippi River.

Communities use the maps to set minimum building and land development requirements for projects in flood prone areas. Given that potential future development improvement projects at the island will need to comply with local, state, and federal floodplain management regulations, it is important to gain an understanding of the various flood zones that are present at the island.

A. SFHA

SFHAs are defined as areas that are subject to inundation by the 1 percent annual chance flood or 100-year flood event. Review of the floodplain mapping at the island indicates presence of SFHAs that covers much of Miller Riverview Park, including the Vietnam Memorial, Riverview Park Drive, the campground, and the playground and picnic area at the northern tip of the island. SFHAs also cover northwestern portions of the island including the Dubuque Water Sports Club and Heron Pond. SFHAs also are shown to cover the western portion of the west parking lot of the casino and covers the eastern portion of the east parking lot of the casino. None of the existing casino buildings are currently located within a mapped SFHA. However, SFHAs do appear to encroach onto some of the existing kennel structures and the northwest wing of the Hilton Garden Inn building. Also covering the majority of the Hilton Garden Inn building and all of the existing kennel buildings is 0.2 percent or 500-year floodplain. On the south one-half of the island, mapped SFHAs cover much of the existing marina, including Catfish Charlie's restaurant, the marine maintenance building, the marina parking lots, the campground, and most of Marina Drive. The existing Mystique Community Ice Center, while not located within a SFHA, is mapped within the 0.2 percent or 500-year floodplain.

B. Floodway

The floodway is defined as the channel of a waterway plus any adjacent floodplain areas that must be kept free of encroachment so that the 1 percent annual chance flood (100-year flood event) can be carried without substantial increases in flood heights. Figure 1, which is the FEMA regulatory map panel, shows the Mississippi River floodway with a diagonal cross hatching pattern. Figure 2 similarly shows the

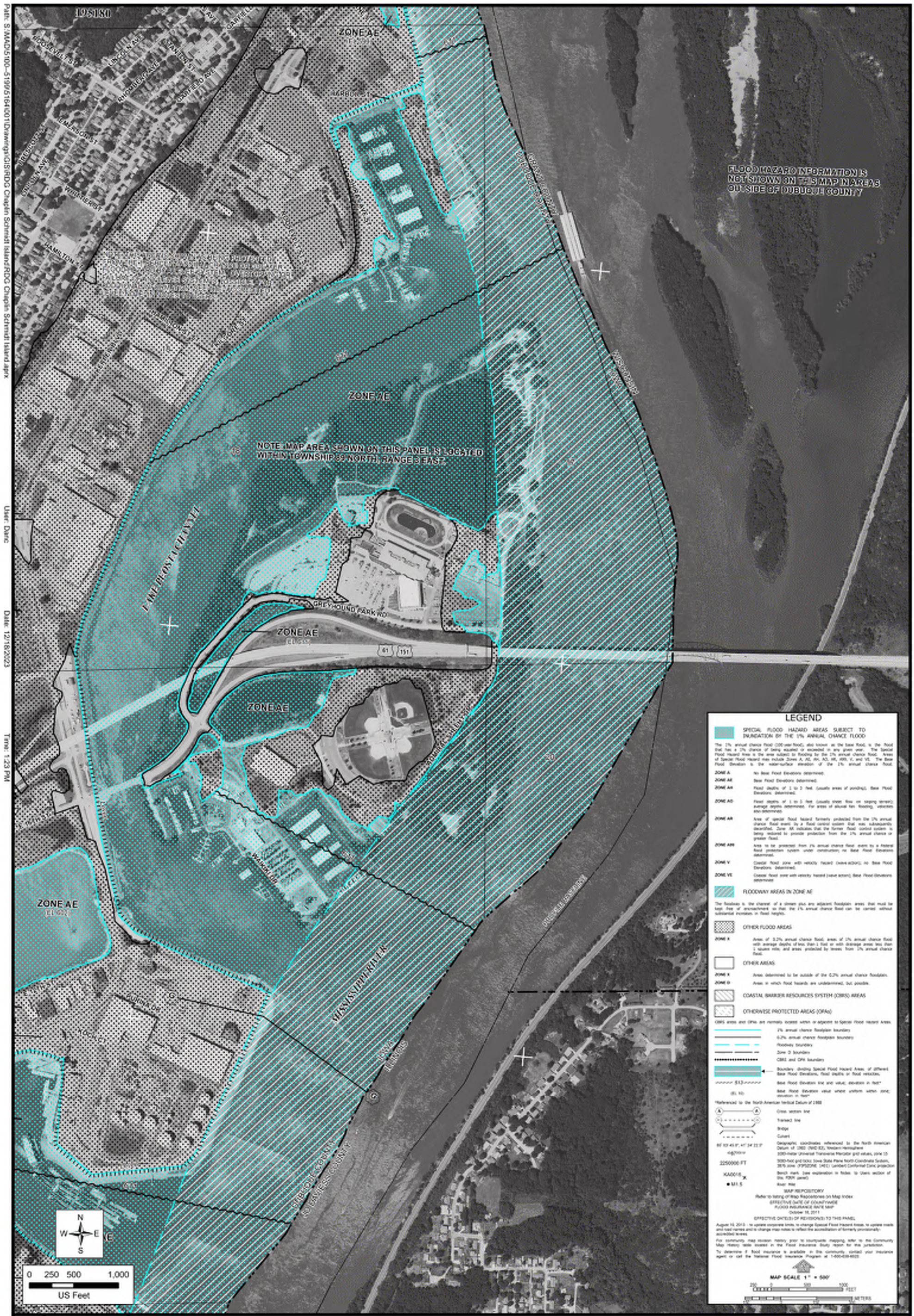

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FIGURE 1
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FEMA FLOODPLAIN MAPPING (FIRM PANEL)

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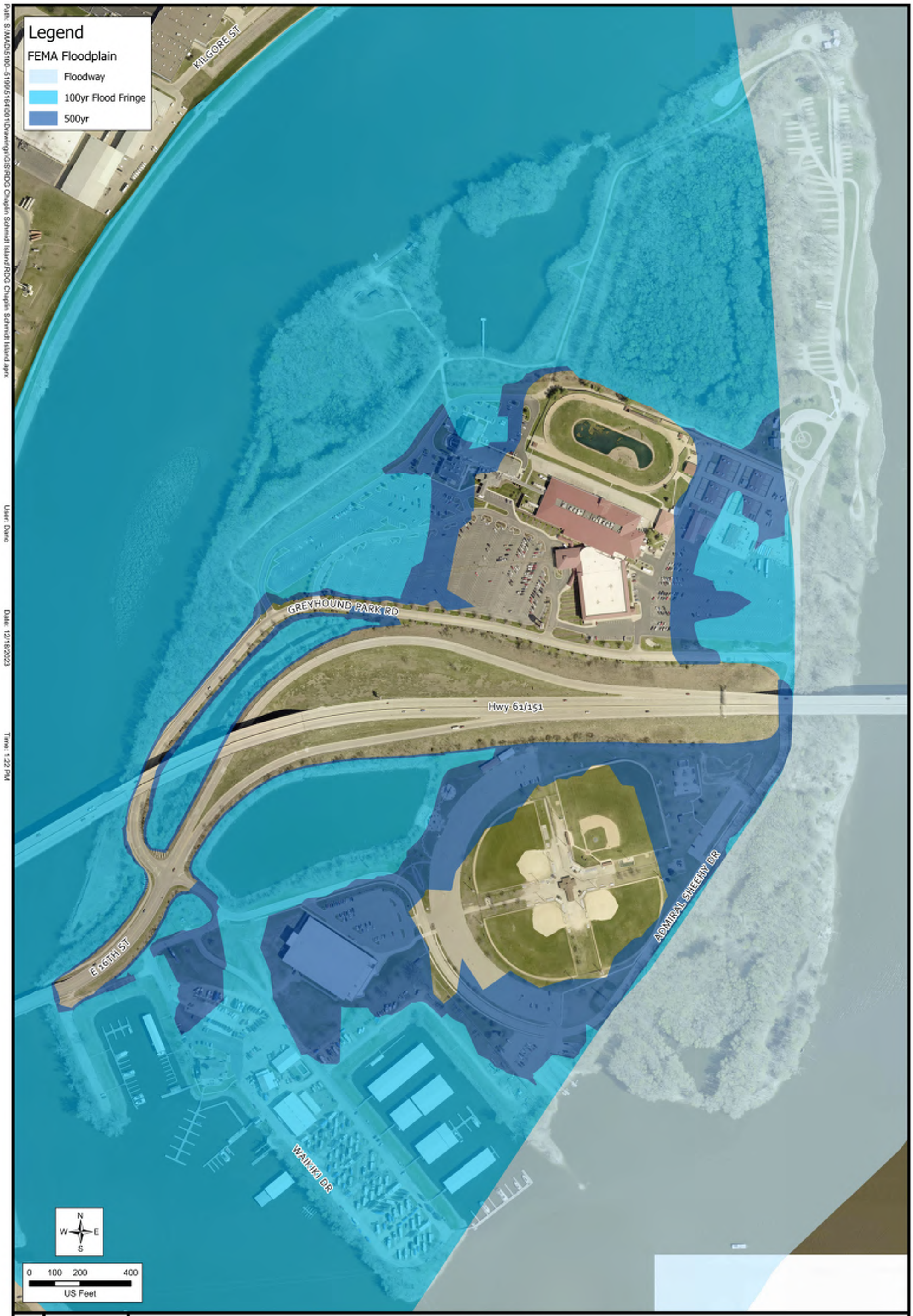

FEMA FLOODPLAIN MAPPING

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FIGURE 2
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Mississippi River floodway with a light blue color shading. Both maps indicate that the floodway occupies portions of the easterly edge of the island. The floodway on the east end of the island varies in width from approximately 470 feet at the north end of the island, approximately 250 feet at the United States Highway (USH) 61/151 bridge, and up to 700 feet wide near the south end of the island.

C. Base Flood Elevations (BFEs) and Flood Depths

The BFE at a particular location is defined as the elevation of surface water resulting from a flood event that has a 1 percent chance of equaling or exceeding that level in any given year (commonly referred to as the 100-year BFE). The BFEs for the Mississippi River at the island are both depicted on the FIRM floodplain map and also are provided on flood profile exhibits within the City of Dubuque's (City's) FEMA Flood Insurance Study (FIS) report. Review of these data sources indicates that the 100-year event BFE at the island is 611.0 (North American Vertical Datum of 1988). Figure 3 depicts the estimated depths of flooding for a 100-year flood event (BFE=611.0). Note that the basis of the ground surface topographic data is available high-resolution light detection and ranging (Lidar) that was obtained and published by the United States Geological Survey (USGS) in 2019.

Review of Figure 3 indicates that the easterly area of the island that is mapped floodway generally has 100-year flood depths that are greater than 10 feet. Areas of the island that are not in mapped floodway that also have flood depths greater than 10 feet include the majority of Miller Riverview Park, the Dubuque Water Sports Club (including Heron Pond), and the 8-acre pond located immediately north of the Mystique Community Ice Center site. Areas on the island that have shallower flood depths (i.e. between 0 and 4 feet) include westerly portions of the casino parking lot, easterly portions of the east casino parking lot, an area near the southeast corner of the kennel buildings, portions of Admiral Sheehy Drive located immediately north of the ice center, and portions of the south marina area including surrounding parking lots and driveways.

TOPOGRAPHIC SURVEY DATA COLLECTION

In order to validate the accuracy and reliability of the USGS 2019 Lidar topographic data, we conducted field topographic surveys (379 field survey points) at several key locations at the island as follows:

- Northeast area designated as regulatory floodway in the location of the proposed observation tower.
- East parking lot designated as a SFHA floodplain in the vicinity of the Backwater Stage area.
- West parking lot and entrance drive area designated as a SFHA floodplain.
- South marina area designated as a SFHA floodplain.

Figure 4 depicts USGS 2019 Lidar ground surface topographic mapping in a color relief format. Figure 5 includes this same Lidar topographic data overlayed with the individual field surface topographic survey data points from the various areas of the island listed above. Within Appendix A, there is a tabular summary of the 379 field survey points that provides a comparison of the surveyed elevation versus the estimated Lidar elevation at the same location. Note that Lidar data is a based on a grid size of 1 square meter.

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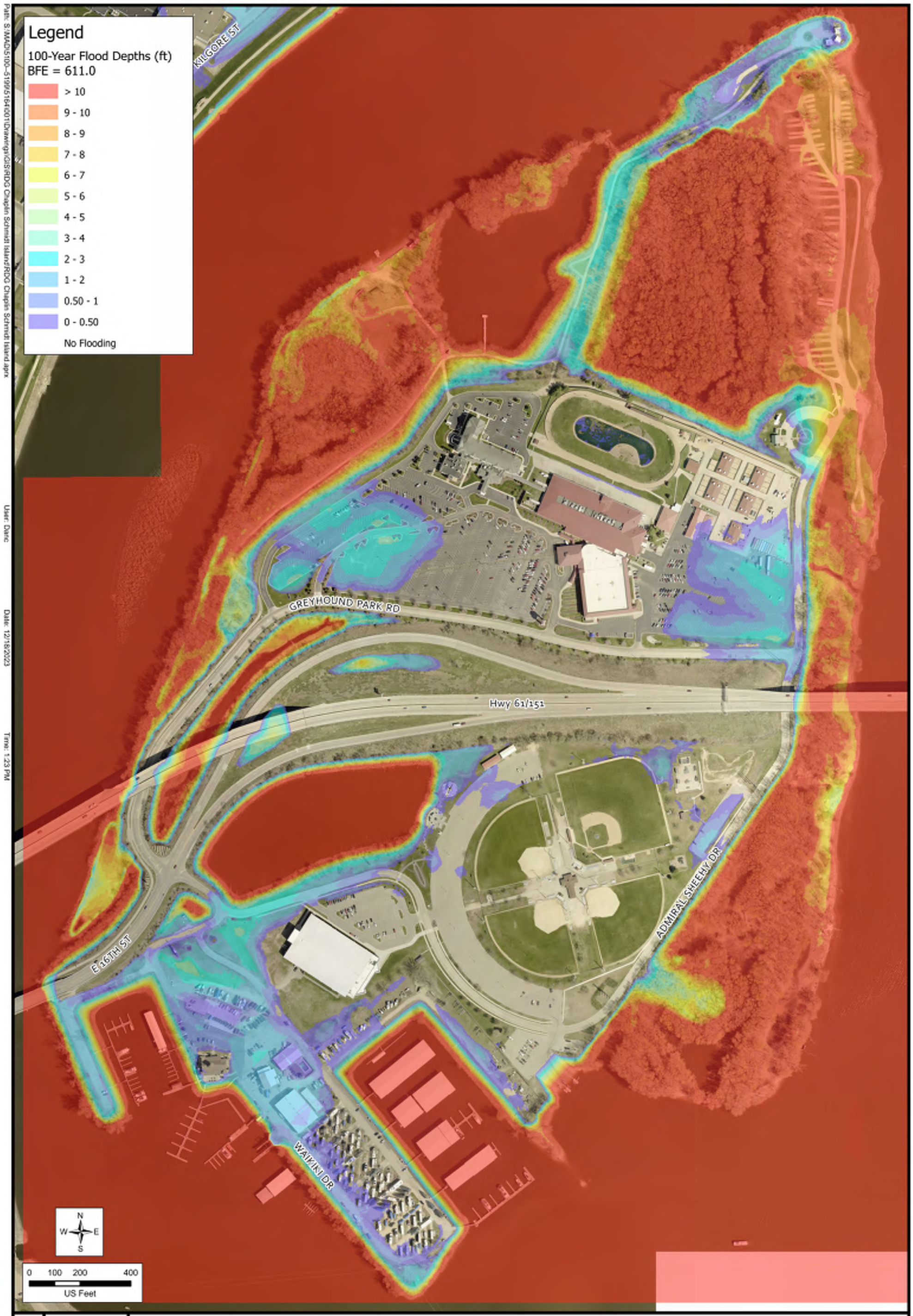

100-YEAR EVENT FLOODING DEPTH

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FIGURE 3
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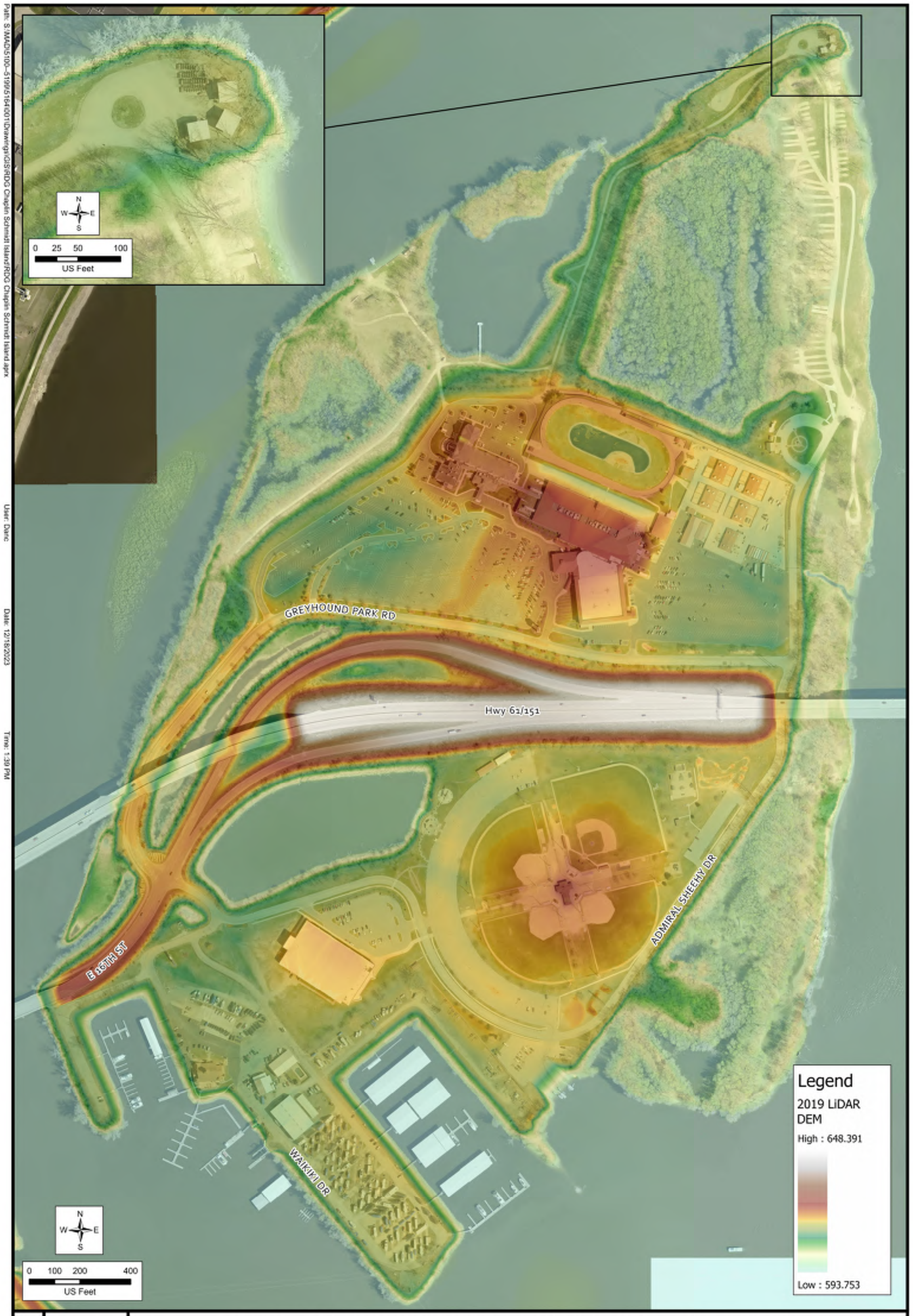

LIDAR TOPOGRAPHIC DATA VERSUS FIELD SURVEYED TOPOGRAPHIC DATA

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FIGURE 5
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Comparison of the survey data versus the Lidar data indicates that the elevation differential between the field surveyed shots and the Lidar data falls mainly between plus or minus 0.25 feet (refer to the histogram that is included as an inset exhibit on Figure 5). 92 percent of the field survey shots fall between approximately 0.25 feet of the Lidar elevation.

Review of the data indicates that the elevation differential does not appear to be skewed either up or down, which seems to indicate that there is not a transformational vertical datum issue. Note that the only area where there appears to be elevation differentials that are more significant (greater than 1.5 feet) are shots that were taken along the northeast shoreline of the island near the proposed observation tower. There appears to be a logical explanation for this, given that when the Lidar data was collected, it is likely that the Mississippi River levels may have been elevated and therefore, the true ground surface elevation was not represented accurately. Based on the results of the comparison of the field surveyed surface topographic data and the USGS 2019 Lidar topographic data, the Lidar topography appears to be reasonably accurate and is suitable for use for planning level engineering analyses, including the floodplain development assessment described later in this technical memorandum.

FLOODPLAIN AND FLOODWAY REGULATION REVIEW

The City floodplain management regulations are stated within Title 16 Unified Development Code, Chapter 6 Overlay Districts, Section 16-6-4: Flood Hazard Overlay District. The provisions outlined in Section 16-6-4 applies to all lands within the jurisdiction of the City shown on the Official Floodplain Zoning Map as being within the boundaries of the Floodway (FW), Floodway Fringe (Flood Fringe) (FF), and General Floodplain (Overlay) (FP) Districts. Each of these floodplain districts is described in further detail below:

A. FW

Those areas identified as floodway on the Official Floodplain Zoning Map. These areas are depicted as Zone AE floodplain with diagonal hatched areas on Figure 1 and light blue shaded areas on Figure 2.

If placement of any structures or fill within these areas is considered, engineering analyses will need to be conducted to reflect the effects of this development on Mississippi River flood levels and show that no increase in 100-year base flood elevation results. The following section provides the results of potential development scenarios that could occur within regulatory floodway at the island and the resultant impacts to Mississippi River 100-year base flood elevations.

B. FF

Those areas identified as Zone AE on the Official Floodplain Zoning Map but excluding those areas identified as floodway. These areas are depicted as Zone AE floodplain with no diagonal hatched area on Figure 1 and as indigo shaded blue areas on Figure 2.

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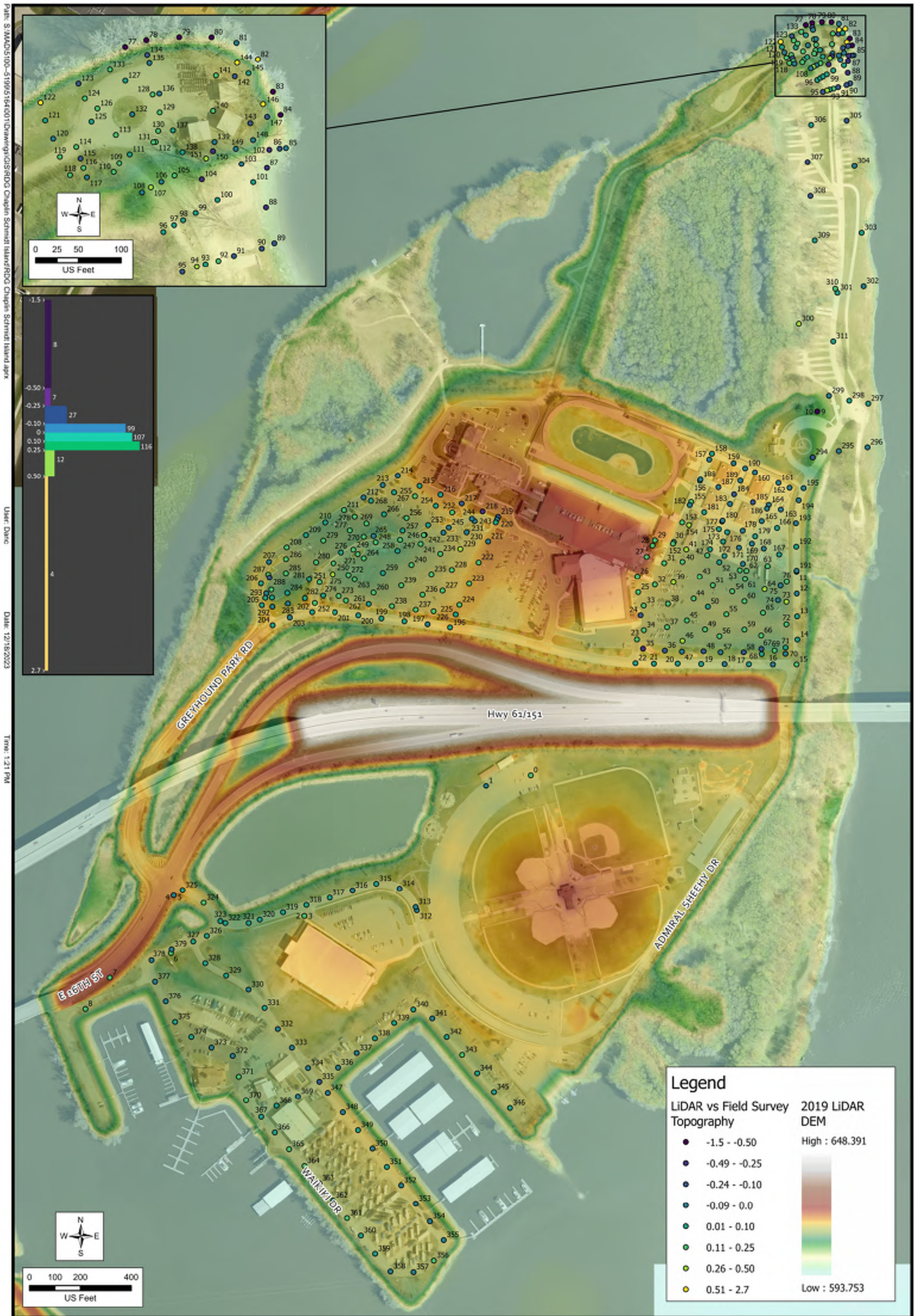

LIDAR TOPOGRAPHIC DATA VERSUS FIELD SURVEYED TOPOGRAPHIC DATA

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FIGURE 5
5164.001

C. FP

Those areas shown as being within the approximate 100-year flood boundary or Zone A on the official floodplain zoning map. Note that there are no General Floodplain Overlay Districts within the limits of Chaplin Schmitt Island.

Regardless, any proposed buildings (residential or non-residential) within a SFHA (both floodway and flood fringe areas), must be elevated to be equal to or greater than the flood protection elevation. The flood protection elevation is defined as the regional 100-year storm base flood elevation plus 1 foot of freeboard. Therefore, the flood protection elevation at the island is equivalent to elevation 612.0.

FLOODPLAIN DEVELOPMENT ASSESSMENT

A. FEMA Effective Hydraulic Model

In order to perform the floodplain development assessments for various potential improvement projects at the island, Strand Associates, Inc.® (Strand) requested and obtained the regulatory FEMA hydraulic floodplain model for the Mississippi River from the FEMA Engineering Library. This HEC-RAS hydraulic model simulates the flood water surface elevations of the Mississippi River during a 100-year return interval flood event. Review of this hydraulic model indicated that three Mississippi River stream cross sections pass through portions of the island. A comparison of the topographic data from the hydraulic model cross sections indicated that generally speaking, the ground surface data represented in the model was reasonably close to ground surface data obtained from the USGS 2019 Lidar data. However, given there are areas where there appeared to be some discrepancies, the three river cross sections were adjusted to reflect the Lidar ground surface data on the island. Following making these model cross section adjustments, additional intermediate river cross sections were created in the hydraulic model at an approximate interval just under 200 feet. It is important to note that the Mississippi River hydraulic model only represents flood flows passing through the regulatory floodway as being effective flood conveyance. Flows passing through areas of the island that are outside the floodway boundary (flood fringe areas) are not represented as effective flood conveyance. Graphic exhibits are included within Appendix B which depict the Mississippi River hydraulic model cross section locations. Subsequent graphic exhibits in Appendix B are also provided which represent each of the development scenarios (Scenarios 1 through 3) that are discussed in the following.

B. Floodway Encroachment Analysis

Given that Strand is currently at a concept level planning stage, the goal of this initial floodway encroachment analysis is to determine what level and extent of development within the regulatory floodway is feasible. The scenarios that have been evaluated should not be considered actual development proposals, but rather a process of establishing what can and cannot be done in the floodway from a development and regulatory approval perspective.

1. Scenario 1–Fill Entire Floodway Along the East Side of the Island

It should be understood that this potential development scenario is a highly conservative "worst-case scenario" where fill would theoretically be placed within all areas of the island that are

mapped as regulatory floodway. Note that the current projects being considered in the master plan (boardwalk trails and the observation tower near the north tip of the island) would certainly involve significantly less potential for obstruction of Mississippi River flood flows. However, if the outcome of this worst-case scenario indicates no increases in 100-year Mississippi River base flood elevation, it is reasonable to assume that any development project that is contemplated within the mapped floodway on the island would be permissible from a floodway regulation compliance standpoint.

The results of the Scenario 1 development scenario did indicate some minor base flood elevation increases (approximately 0.04 feet) throughout the stretch of the Mississippi River along the island and points immediately upstream. While these increases seem negligible, the federal, state and local floodway development rules clearly state that no increases in 100-year base flood elevation are to be allowed.

2. Scenario 2–Fill Entire Floodway Upstream of USH 61/151

A second floodplain development scenario that was evaluated with the Mississippi River floodplain hydraulic model included theoretically placing fill within all areas of the island that are mapped as regulatory floodway, but only those locations on the island located north of the USH 61/151 bridge. This scenario would essentially keep the regulatory floodway areas that are located to the south of the US 61/151 bridge undisturbed. The results of this hydraulic modeling evaluation indicated that increases in Mississippi River 100-year flood stage would only increase by approximately 0.005 feet. Given that conservative assumptions are still being made for placement of fill that would entirely occupy the floodway north of the US 61/151, it is reasonable to assume that the projects currently being considered in this part of the island would have little to no impact on Mississippi River flood stage.

3. Scenario 3–Fill Entire Floodway Upstream of USH 61/151 and Perform Minor Regrading South of USH 61/151 to Offset Minor River Flood Elevation Increases

The third floodplain development scenario that was evaluated is identical to Scenario 2. However, in an effort to offset the minor Mississippi River flood stage increases that resulted from Scenario 2, some regrading of floodway areas on the island located south of the US 61/151 bridge are reflected in the hydraulic model. This potential regrading seeks to lower ground surface elevations in this area to near elevation 596. The Scenario 3 hydraulic modeling results indicate that no increases in Mississippi River flood stage would occur.

C. Other Floodplain Development Considerations

The previous section focuses primarily on development scenarios involving potential improvement projects within mapped regulatory floodway areas on the island. Given that construction within floodway zones is highly restrictive from a regulatory standpoint, it is an important step to determine what can and cannot feasibly be done in these areas. The results of the floodway encroachment analyses summarized in the previous section demonstrate that locating potential projects in the mapped floodway at the island appears to be feasible. However, development projects on other portions of the island also needs to be evaluated.

As stated in the regulatory review section on Page 3, proposed buildings must be elevated to be equal to or greater than the flood protection elevation, which is equivalent to the regional 100-year base flood elevation plus 1 foot of freeboard (elevation 612.0). This is the minimum flood protection elevation standard that must be met. However, given that storm and flood events are growing in severity and frequency due to the effects of climate change and other threats, following a flood protection elevation standard that improves resilience of future buildings and projects on the island should be considered.

The Federal Flood Risk Management Standard establishes a flood standard that helps achieve the goal of increasing the resiliency of future projects against flooding. Currently, the Federal Flood Risk Management Standard applies only to federally funded actions involving new construction, substantial improvement or repairs to substantial flood damage. It also applies to hazard mitigation projects involving structure elevation, dry floodproofing, and mitigation reconstruction. If federal funding is sought for future development and improvement projects on the island, applying the Federal Flood Risk Management Standard should be considered. If the Freeboard Value Approach (FVA) is applied, it would involve adding 2 feet to the base flood elevation for non-critical actions and adding an additional 3 feet to base flood elevation for critical actions. An alternative to the FVA is increasing the flood protection elevation to the 500-year base flood elevation, which in this case would increase the flood protection elevation by approximately 1.5 feet.

Increasing the flood protection elevations for new buildings will result in greater cost to account for placement of additional fill to elevate structures beyond the minimum flood protection elevation standard. The increase in resiliency and mitigation of potential future flood risks will need to be balanced with the estimated increases in construction costs to comply with the more stringent flood protection standards.

APPENDIX A
TABULAR COMPARISON OF LIDAR AND FIELD SURVEYED TOPOGRAPHY

Comparison of Field Survey Topographic Data and Lidar Topographic Data

Chaplin Schmitt Island Floodplain Study

Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
0	3663733.326	5690773.44	612.77	612.60	0.17
1	3663691.423	5690597.741	610.55	610.58	-0.02
2	3663179.242	5689881.324	611.38	611.16	0.21
3	3663179.136	5689881.352	611.34	611.17	0.16
4	3663260.599	5689367.679	615.87	615.99	-0.13
5	3663260.613	5689367.706	615.92	615.99	-0.07
6	3663034.053	5689356.865	610.82	610.70	0.11
7	3662937.16	5689116.791	620.62	620.39	0.23
8	3662812.443	5689020.737	611.05	610.89	0.16
9	3665163.346	5691900.98	605.54	606.65	-1.12
10	3665163.325	5691900.958	605.59	606.65	-1.06
11	3664533.531	5691819.827	610.24	610.24	0.00
12	3664446.311	5691820.781	610.99	611.01	-0.01
13	3664356.889	5691821.923	611.72	611.66	0.06
14	3664265.784	5691823.006	611.11	611.10	0.01
15	3664168.327	5691819.887	610.48	610.36	0.12
16	3664168.448	5691727.125	609.45	609.46	-0.01
17	3664169.172	5691632.732	610.25	610.24	0.01
18	3664169.836	5691537.159	610.51	610.54	-0.02
19	3664170.141	5691445.136	611.23	611.21	0.03
20	3664171.731	5691350.893	611.74	611.68	0.06
21	3664171.393	5691257.677	613.15	613.06	0.09
22	3664173.297	5691185.025	613.40	613.34	0.06
23	3664266.424	5691190.923	612.74	612.52	0.21
24	3664361.128	5691205.112	612.62	612.79	-0.17
25	3664452.118	5691195.677	613.54	613.29	0.25
26	3664514.055	5691192.733	614.85	614.66	0.19
27	3664591.175	5691228.909	618.96	618.79	0.17
28	3664635.833	5691252.167	618.04	617.87	0.17
29	3664656.673	5691261.49	615.48	615.29	0.19
30	3664650.31	5691335.998	612.20	612.16	0.05
31	3664567.204	5691298.056	612.83	612.71	0.12
32	3664481.951	5691261.551	612.92	612.77	0.15
33	3664399.113	5691217.505	612.55	612.39	0.16
34	3664302.781	5691218.174	612.05	611.90	0.14
35	3664229.987	5691214.868	612.81	613.08	-0.27
36	3664222.553	5691300.654	611.75	611.88	-0.13
37	3664314.559	5691309.283	611.10	610.87	0.22
38	3664406.168	5691312.895	611.73	611.53	0.21
39	3664491.578	5691334.505	611.89	611.59	0.29
40	3664572	5691369.87	611.49	611.26	0.22
41	3664620.715	5691384.832	611.53	611.18	0.35
42	3664597.528	5691469.05	610.11	609.93	0.19
43	3664513.585	5691439.079	610.47	610.24	0.23
44	3664426.782	5691413.996	611.09	610.93	0.17
45	3664340.854	5691387.192	610.42	610.18	0.24
46	3664260.855	5691369.895	609.93	609.54	0.39
47	3664218.485	5691367.522	611.32	611.36	-0.04
48	3664219.944	5691454.695	610.12	610.24	-0.11
49	3664305.557	5691460.24	610.25	610.14	0.11
50	3664395.066	5691471.528	611.25	611.17	0.08
51	3664478.914	5691491.023	610.10	609.96	0.13
52	3664570.416	5691516.478	609.79	609.71	0.07
53	3664538.94	5691597.088	609.24	609.06	0.18
54	3664455.28	5691567.076	610.09	609.93	0.16
55	3664365.203	5691544.205	611.07	610.91	0.16

Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
56	3664279.029	5691516.926	610.19	610.06	0.13
57	3664216.093	5691521.367	609.88	609.97	-0.09
58	3664215.926	5691612.332	609.64	609.76	-0.12
59	3664304.902	5691615.147	610.30	610.12	0.18
60	3664416.571	5691615.208	610.12	609.95	0.17
61	3664504.554	5691617.539	609.03	608.82	0.21
62	3664536.573	5691623.261	609.28	609.13	0.14
63	3664555.08	5691706.207	609.43	609.31	0.12
64	3664463.818	5691694.424	608.88	608.53	0.35
65	3664370.901	5691688.034	609.61	609.44	0.17
66	3664281.494	5691680.921	609.75	609.57	0.18
67	3664229.2	5691681.614	608.27	608.51	-0.24
68	3664209.031	5691682.879	609.96	609.92	0.04
69	3664222.935	5691733.415	607.69	607.53	0.17
70	3664210.173	5691776.338	610.78	610.85	-0.06
71	3664234.557	5691776.751	609.17	609.13	0.04
72	3664325.634	5691779.886	610.35	610.18	0.17
73	3664414.231	5691780.149	609.74	609.48	0.25
74	3664420.78	5691747.1	608.01	608.10	-0.09
75	3664478.193	5691756.946	608.09	608.14	-0.05
76	3664493.54	5691781.262	609.09	608.84	0.24
77	3666683.028	5691856.133	597.48	598.77	-1.29
78	3666691.056	5691880.934	598.03	598.71	-0.68
79	3666694.441	5691919.405	597.71	599.03	-1.32
80	3666694.332	5691957.265	597.52	598.11	-0.59
81	3666687.779	5691986.342	597.36	597.44	-0.08
82	3666668.413	5692011.434	597.21	594.49	2.73
83	3666630.465	5692029.095	597.32	598.33	-1.02
84	3666603.469	5692038.021	597.66	599.14	-1.48
85	3666564.634	5692044.365	597.53	597.57	-0.04
86	3666564.012	5692036.912	597.67	597.90	-0.23
87	3666541.263	5692022.074	597.27	597.62	-0.35
88	3666495	5692020.98	597.27	597.63	-0.36
89	3666453.088	5692030.722	597.40	597.62	-0.22
90	3666446.816	5692016.023	600.84	600.96	-0.12
91	3666438.151	5691983.451	601.28	601.38	-0.10
92	3666432.234	5691965.311	601.48	601.32	0.15
93	3666428.3	5691950.209	601.56	601.48	0.08
94	3666425.644	5691940.04	601.76	601.46	0.30
95	3666419.554	5691923.081	601.36	601.46	-0.10
96	3666466.162	5691900.817	601.98	601.88	0.10
97	3666474.244	5691913.439	601.94	601.89	0.05
98	3666480.012	5691923.957	601.78	601.75	0.03
99	3666488.486	5691938.582	602.05	601.95	0.09
100	3666503.673	5691964.153	601.22	601.20	0.02
101	3666524.499	5692006.023	599.87	599.77	0.10
102	3666562.569	5692024.828	598.96	599.36	-0.40
103	3666545.75	5691992.232	601.07	601.08	-0.01
104	3666527.853	5691945.826	602.51	602.96	-0.45
105	3666532.162	5691913.883	605.10	604.96	0.14
106	3666524.868	5691898.492	604.43	604.45	-0.03
107	3666518.407	5691886.269	605.01	604.69	0.31
108	3666512.462	5691875.922	605.19	605.19	-0.01
109	3666546.806	5691849.306	609.19	608.98	0.21
110	3666536.439	5691842.755	608.86	608.72	0.14
111	3666557.293	5691861.445	609.01	608.96	0.04
112	3666571.88	5691891.863	609.52	609.33	0.19
113	3666580.031	5691845.288	609.69	609.52	0.17

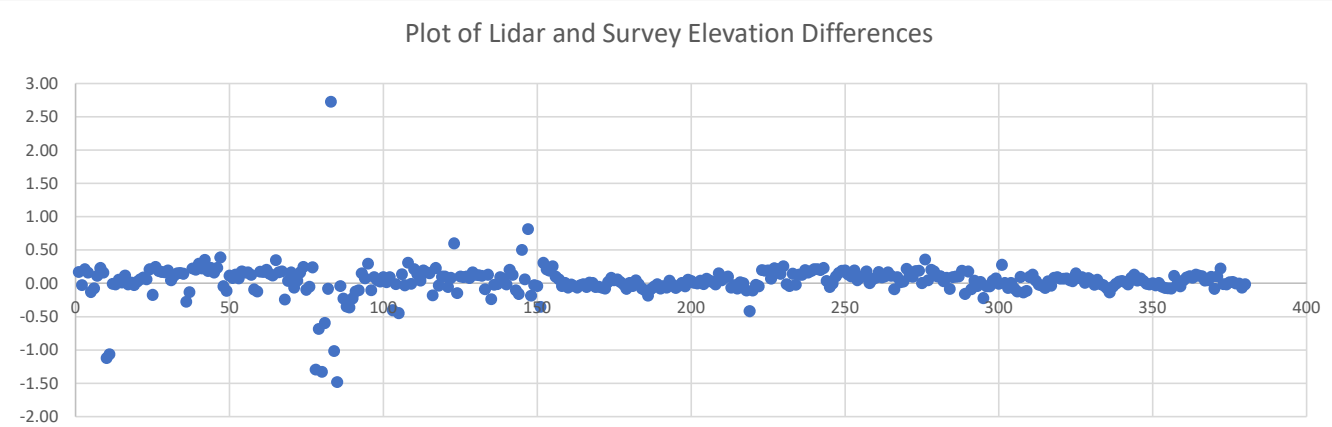
Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
114	3666566.073	5691798.953	610.13	609.97	0.15
115	3666552.508	5691803.955	609.95	610.12	-0.18
116	3666541.057	5691807.432	610.22	609.99	0.23
117	3666530.013	5691811.418	609.71	609.74	-0.03
118	3666532.644	5691791.634	610.32	610.22	0.10
119	3666554.495	5691779.783	610.34	610.24	0.11
120	3666575.689	5691771.946	609.28	609.34	-0.05
121	3666596.951	5691762.624	610.16	610.07	0.08
122	3666617.727	5691757.183	609.87	609.27	0.60
123	3666639.964	5691801.57	609.04	609.19	-0.15
124	3666622.635	5691809.02	609.97	609.86	0.11
125	3666595.612	5691816.74	610.00	609.90	0.09
126	3666610.883	5691823.649	609.97	609.86	0.10
127	3666643.485	5691856.316	609.88	609.80	0.08
128	3666627.263	5691888.285	610.25	610.08	0.17
129	3666606.339	5691896.588	610.17	610.04	0.13
130	3666584.663	5691894.816	609.90	609.77	0.13
131	3666571.607	5691889.202	609.44	609.33	0.11
132	3666604.142	5691864.515	609.91	610.00	-0.09
133	3666656.316	5691838.429	609.18	609.04	0.13
134	3666673.775	5691881.996	608.93	609.16	-0.23
135	3666664.076	5691884.508	609.75	609.77	-0.02
136	3666628.289	5691896.089	610.09	610.10	-0.01
137	3666585.311	5691912.035	609.83	609.73	0.10
138	3666559.826	5691923.177	608.71	608.64	0.07
139	3666571.755	5691960.754	610.26	610.28	-0.02
140	3666608.205	5691959.054	610.63	610.43	0.21
141	3666649.545	5691962.491	611.15	611.02	0.13
142	3666648.475	5691984.464	611.14	611.24	-0.10
143	3666593.772	5692002.645	610.81	610.97	-0.16
144	3666664.472	5691987.174	610.41	609.91	0.51
145	3666652.233	5692000.491	610.25	610.19	0.06
146	3666615.997	5692017.54	609.96	609.14	0.81
147	3666601.134	5692022.256	609.08	609.26	-0.18
148	3666574.075	5692005.917	609.60	609.62	-0.02
149	3666563.751	5691985.662	609.12	609.16	-0.04
150	3666561.092	5691958.952	609.01	609.36	-0.35
151	3666552.473	5691950.932	609.91	609.60	0.31
152	3664643.545	5691332.489	612.33	612.11	0.21
153	3664726.914	5691368.469	612.29	612.09	0.19
154	3664716.391	5691395.52	611.84	611.58	0.26
155	3664807.642	5691403.968	611.76	611.66	0.10
156	3664890.6	5691440.267	611.55	611.48	0.06
157	3664974.813	5691477.041	612.79	612.83	-0.04
158	3664997.789	5691487.471	613.14	613.13	0.01
159	3664960.367	5691572.677	613.37	613.44	-0.06
160	3664924.073	5691656.297	613.18	613.20	-0.02
161	3664882.47	5691748.82	612.96	613.00	-0.04
162	3664862.876	5691792.329	612.97	613.03	-0.06
163	3664777.311	5691758.066	611.59	611.62	-0.03
164	3664795.832	5691710.741	611.96	611.97	-0.01
165	3664732.153	5691682.834	611.10	611.15	-0.05
166	3664704.974	5691743.407	610.77	610.76	0.01
167	3664600.659	5691751.442	608.86	608.85	0.01
168	3664624.029	5691691.195	609.93	609.98	-0.05
169	3664643.345	5691644.573	610.14	610.19	-0.05
170	3664564.101	5691609.22	609.68	609.74	-0.07
171	3664627.697	5691593.728	611.02	611.09	-0.08

Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
172	3664595.613	5691536.586	610.53	610.50	0.02
173	3664651.719	5691531.407	610.86	610.78	0.08
174	3664621.308	5691480.107	611.13	611.08	0.05
175	3664700.268	5691514.688	612.32	612.26	0.06
176	3664688.527	5691547.175	611.19	611.16	0.02
177	3664730.457	5691527.051	612.66	612.67	-0.01
178	3664694.117	5691608.15	611.49	611.57	-0.08
179	3664672.35	5691657.291	610.45	610.44	0.01
180	3664733.938	5691529.241	612.61	612.65	-0.04
181	3664766.764	5691456.921	612.50	612.46	0.05
182	3664795.007	5691398.462	611.38	611.39	-0.01
183	3664799.504	5691558.091	611.94	612.01	-0.08
184	3664837.101	5691574.554	611.68	611.78	-0.10
185	3664806.114	5691648.58	612.72	612.90	-0.18
186	3664781.062	5691703.766	611.68	611.76	-0.08
187	3664865.428	5691512.961	613.07	613.12	-0.05
188	3664895.696	5691442.565	611.54	611.55	-0.01
189	3664891.402	5691598.892	612.35	612.43	-0.08
190	3664939.592	5691617.913	612.68	612.72	-0.04
191	3664537.28	5691820.099	610.15	610.21	-0.06
192	3664631.481	5691818.795	610.73	610.69	0.04
193	3664723.523	5691817.553	611.56	611.58	-0.02
194	3664813.559	5691828.458	611.66	611.73	-0.07
195	3664861.159	5691847.737	610.94	610.98	-0.03
196	3664313.457	5690455.952	614.23	614.22	0.01
197	3664325.664	5690367.747	613.46	613.50	-0.04
198	3664337.313	5690276.643	612.60	612.54	0.06
199	3664348.645	5690186.28	611.82	611.78	0.04
200	3664360.86	5690095.362	612.11	612.10	0.01
201	3664372.787	5690002.935	612.78	612.78	0.00
202	3664373.387	5689912.397	613.19	613.15	0.04
203	3664352.39	5689824.071	612.37	612.38	-0.01
204	3664321.886	5689756.932	613.96	613.89	0.07
205	3664400.938	5689714.385	613.20	613.16	0.04
206	3664486.36	5689710.868	612.26	612.24	0.02
207	3664571.774	5689742.509	611.42	611.44	-0.01
208	3664628.752	5689811.943	610.35	610.19	0.15
209	3664677.146	5689887.6	609.16	609.11	0.05
210	3664726.464	5689963.652	608.13	608.04	0.09
211	3664775.401	5690039.202	609.06	608.96	0.10
212	3664824.918	5690116.068	610.47	610.53	-0.06
213	3664873.491	5690191.415	611.64	611.67	-0.03
214	3664911.199	5690250.663	612.76	612.84	-0.08
215	3664870.211	5690336.201	614.48	614.46	0.02
216	3664835.935	5690418.716	615.53	615.52	0.00
217	3664800.926	5690501.749	614.51	614.61	-0.10
218	3664769.451	5690584.263	615.32	615.74	-0.42
219	3664748.807	5690645.089	615.72	615.83	-0.11
220	3664738.184	5690640.372	614.11	614.13	-0.02
221	3664651.889	5690605.724	614.94	614.99	-0.04
222	3664569.397	5690568.417	614.84	614.64	0.20
223	3664485.698	5690531.301	614.34	614.14	0.19
224	3664402.235	5690492.982	614.28	614.09	0.20
225	3664364.154	5690478.235	614.41	614.34	0.07
226	3664376.844	5690391.494	613.59	613.36	0.23
227	3664458.054	5690426.687	612.66	612.44	0.22
228	3664540.172	5690462.874	612.67	612.53	0.14
229	3664622.313	5690496.472	612.60	612.34	0.26

Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
230	3664688.042	5690521.105	612.19	612.20	-0.01
231	3664732.016	5690552.418	612.09	612.13	-0.04
232	3664766.034	5690464.623	613.91	613.76	0.15
233	3664686.568	5690429.924	611.68	611.70	-0.02
234	3664603.489	5690417.87	611.05	610.92	0.13
235	3664522.678	5690382.839	611.35	611.22	0.13
236	3664442.073	5690347.895	612.37	612.17	0.20
237	3664382.9	5690321.333	612.91	612.74	0.16
238	3664396.665	5690227.433	611.86	611.67	0.19
239	3664478.651	5690264.355	610.62	610.41	0.21
240	3664559.763	5690304.282	610.10	609.88	0.22
241	3664642.293	5690340.311	609.33	609.13	0.20
242	3664678.019	5690356.059	610.15	609.92	0.23
243	3664726.841	5690635.575	614.23	614.19	0.04
244	3664741.285	5690541.865	612.05	612.10	-0.05
245	3664706.754	5690450.99	612.42	612.42	0.00
246	3664677.231	5690352.642	609.94	609.84	0.10
247	3664658.501	5690259.637	608.86	608.71	0.16
248	3664648.965	5690163.662	608.54	608.35	0.19
249	3664619.812	5690075.894	609.16	608.97	0.19
250	3664566.369	5689996.751	609.81	609.67	0.14
251	3664491.663	5689941.144	610.78	610.67	0.11
252	3664409.335	5689922.697	613.20	613.01	0.19
253	3664716.396	5690369.921	611.23	611.18	0.05
254	3664791.952	5690400.205	613.68	613.59	0.09
255	3664829.589	5690318.248	612.71	612.59	0.11
256	3664744.084	5690285.092	610.84	610.65	0.18
257	3664694.764	5690269.779	609.29	609.29	0.00
258	3664614.902	5690249.507	608.09	608.03	0.06
259	3664528.255	5690192.129	608.98	608.90	0.09
260	3664450.258	5690155.204	609.96	609.79	0.17
261	3664405.405	5690136.222	611.92	611.83	0.09
262	3664419.004	5690046.708	611.68	611.57	0.11
263	3664503.208	5690080.908	608.70	608.54	0.17
264	3664586.213	5690117.063	608.84	608.72	0.11
265	3664673.292	5690155.465	607.73	607.81	-0.09
266	3664758.872	5690196.623	609.83	609.73	0.09
267	3664844.603	5690236.07	612.13	612.11	0.02
268	3664811.56	5690145.187	611.07	611.04	0.03
269	3664722.615	5690127.315	609.29	609.07	0.22
270	3664670.371	5690116.832	608.30	608.18	0.12
271	3664602.376	5690093.134	609.32	609.22	0.10
272	3664519.94	5690056.443	608.70	608.52	0.19
273	3664436.825	5690018.164	610.41	610.22	0.19
274	3664438.791	5689955.617	611.02	611.02	0.01
275	3664522.516	5689994.091	609.88	609.52	0.36
276	3664608.719	5690027.042	609.16	609.11	0.05
277	3664695.412	5690061.876	609.28	609.08	0.21
278	3664749.183	5690081.074	609.74	609.56	0.18
279	3664655.545	5689956.144	609.21	609.10	0.11
280	3664570.087	5689927.724	610.14	610.03	0.11
281	3664503.903	5689900.351	609.10	609.07	0.03
282	3664428.358	5689883.871	612.34	612.26	0.09
283	3664407.177	5689816.837	610.80	610.88	-0.08
284	3664448.757	5689814.556	607.94	607.84	0.10
285	3664526.998	5689809.054	609.50	609.40	0.10
286	3664582.552	5689809.299	610.96	610.85	0.10
287	3664521.567	5689739.486	612.16	611.97	0.19

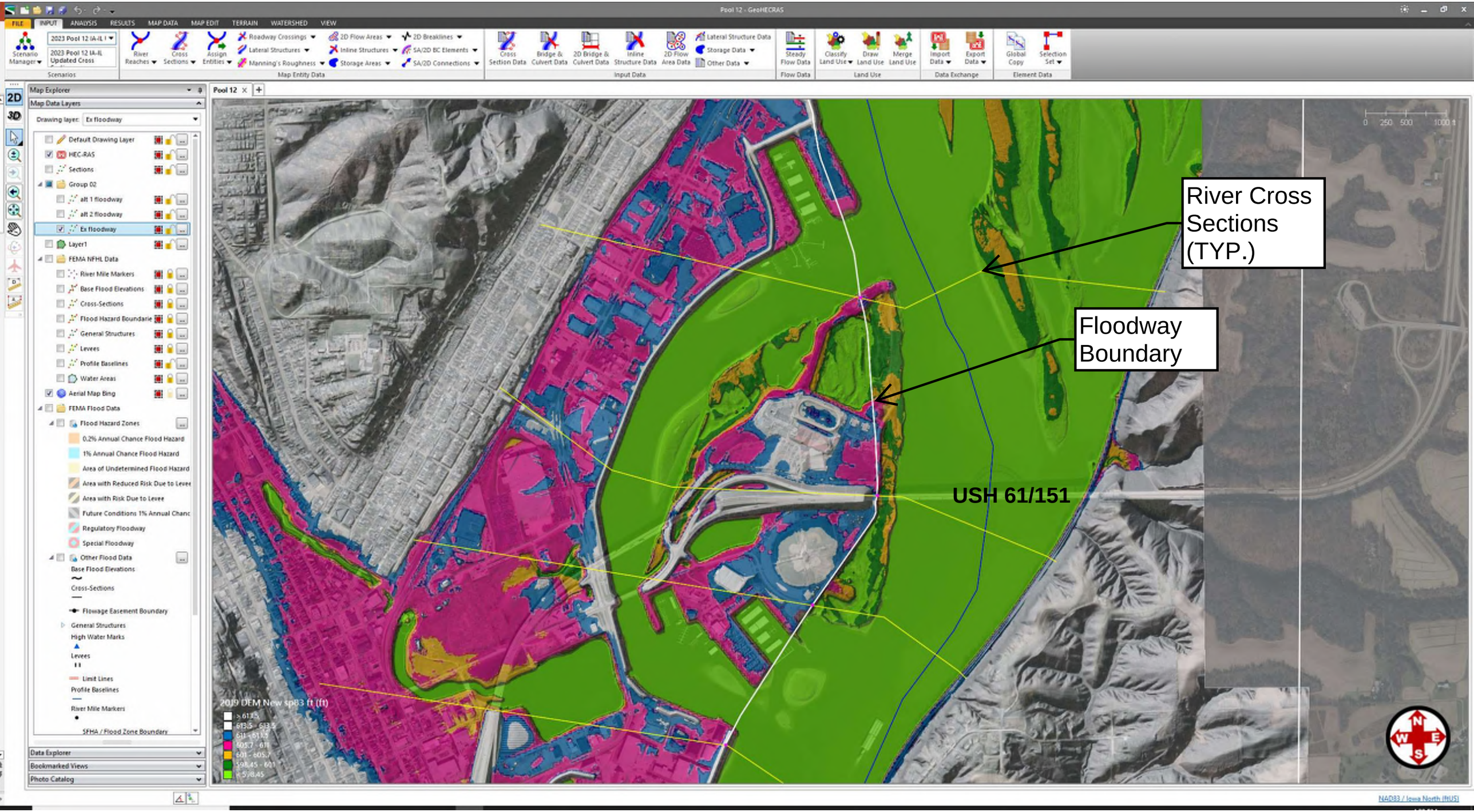
Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
288	3664509.603	5689744.073	610.00	610.16	-0.16
289	3664462.065	5689751.742	609.16	608.98	0.18
290	3664447.47	5689731.9	609.29	609.38	-0.09
291	3664430.479	5689754.236	609.01	608.97	0.04
292	3664394.823	5689755.946	613.30	613.34	-0.04
293	3664429.493	5689727.809	613.16	613.13	0.02
294	3664983.44	5691883.329	605.25	605.47	-0.22
295	3665008.336	5691985.819	602.07	602.11	-0.04
296	3665022.946	5692098.665	599.90	599.94	-0.04
297	3665194.323	5692101.413	600.87	600.82	0.04
298	3665205.794	5692026.817	601.29	601.21	0.08
299	3665225.038	5691947.309	601.96	601.96	-0.01
300	3665508.256	5691828.941	599.60	599.32	0.28
301	3665629.348	5691980.102	599.09	599.08	0.01
302	3665654.681	5692083.27	600.16	600.23	-0.07
303	3665865.856	5692075.484	600.13	600.13	0.01
304	3666128.421	5692047.417	601.56	601.64	-0.08
305	3666306.773	5692016.725	601.58	601.70	-0.12
306	3666290.119	5691877.175	601.25	601.16	0.10
307	3666143.494	5691863.082	600.81	600.95	-0.14
308	3666010.36	5691874.439	599.91	600.03	-0.11
309	3665836.074	5691891.305	600.58	600.48	0.10
310	3665645.216	5691972.195	599.62	599.49	0.13
311	3665439.53	5691964.064	601.40	601.36	0.04
312	3663201.483	5690325.441	612.09	612.10	-0.02
313	3663214.209	5690320.936	611.96	611.99	-0.03
314	3663286.745	5690257.466	611.24	611.31	-0.07
315	3663306.23	5690166.118	611.14	611.11	0.03
316	3663279.739	5690072.721	610.36	610.39	-0.03
317	3663251.251	5689981.472	609.96	609.87	0.09
318	3663222.579	5689889.568	609.74	609.65	0.09
319	3663193.815	5689797.681	608.88	608.81	0.07
320	3663164.898	5689705.879	608.41	608.34	0.07
321	3663151.368	5689662.616	608.39	608.32	0.07
322	3663151.211	5689570.818	609.04	608.99	0.05
323	3663158.859	5689551.231	608.98	608.94	0.04
324	3663231.254	5689485.627	611.46	611.32	0.15
325	3663281.001	5689402.508	614.55	614.47	0.08
326	3663100.77	5689497.941	610.69	610.60	0.09
327	3663078.773	5689444.567	611.03	611.02	0.01
328	3662993.733	5689492.03	609.69	609.61	0.08
329	3662945.288	5689574.066	609.61	609.56	0.05
330	3662890.407	5689662.021	609.66	609.67	-0.02
331	3662816.608	5689725.21	610.47	610.42	0.05
332	3662733.901	5689777.223	610.95	610.96	-0.01
333	3662660.829	5689832.721	610.20	610.23	-0.03
334	3662580.914	5689896.032	610.34	610.41	-0.07
335	3662526.842	5689940.404	610.81	610.94	-0.13
336	3662582.557	5690015.917	610.54	610.59	-0.05
337	3662639.961	5690089.156	610.57	610.57	0.00
338	3662697.226	5690160.677	610.83	610.80	0.03
339	3662757.736	5690236.519	611.70	611.66	0.04
340	3662810.314	5690311.809	612.03	612.01	0.02
341	3662775.454	5690386.152	611.06	611.07	-0.02
342	3662702.708	5690443.139	610.50	610.41	0.09
343	3662632.619	5690503.606	610.67	610.53	0.13
344	3662560.316	5690562.968	610.35	610.31	0.04
345	3662486.584	5690628.76	610.71	610.63	0.08

Survey Point ID	Y	X	Surveyed Elevation (FT - NAVD 88)	LiDAR Elevation (FT - NAVD 88)	Elevation Difference (FT)
346	3662423.068	5690691.782	611.02	610.98	0.04
347	3662483.118	5689973.655	611.71	611.72	-0.01
348	3662406.409	5690034.695	612.49	612.51	-0.02
349	3662336.262	5690094.477	612.79	612.79	0.00
350	3662264.369	5690151.14	612.69	612.71	-0.03
351	3662192.498	5690207.595	612.44	612.44	0.00
352	3662120.278	5690264.146	612.24	612.29	-0.05
353	3662048.381	5690321.435	611.58	611.65	-0.07
354	3661978.696	5690376.862	611.63	611.70	-0.07
355	3661904.844	5690431.299	611.24	611.31	-0.08
356	3661824.164	5690392.198	611.12	611.01	0.11
357	3661778.959	5690312.503	610.67	610.68	-0.01
358	3661781.817	5690221.928	610.32	610.36	-0.04
359	3661851.188	5690161.524	610.47	610.43	0.05
360	3661922.527	5690105.615	610.59	610.50	0.09
361	3661991.231	5690051.09	610.47	610.36	0.11
362	3662061.596	5689994.768	610.41	610.32	0.09
363	3662129.183	5689940.222	610.44	610.31	0.13
364	3662196.349	5689882.153	610.17	610.06	0.12
365	3662261.815	5689821.435	610.30	610.19	0.11
366	3662327.209	5689765.481	609.84	609.80	0.04
367	3662388.912	5689711.869	609.42	609.37	0.05
368	3662432.302	5689772.088	609.49	609.39	0.10
369	3662468.855	5689856.273	609.34	609.42	-0.08
370	3662453.829	5689652.527	609.48	609.37	0.11
371	3662546.544	5689623.525	609.67	609.45	0.22
372	3662628.595	5689599.612	609.60	609.61	-0.01
373	3662661.061	5689516.353	610.11	610.12	-0.01
374	3662702.889	5689437.1	610.06	610.04	0.02
375	3662761.707	5689373.269	610.19	610.17	0.02
376	3662842.653	5689336.59	609.86	609.86	0.00
377	3662921.458	5689294.362	609.55	609.55	0.00
378	3663005.693	5689280.729	610.95	611.01	-0.07
379	3663048.068	5689359.792	610.97	610.98	-0.01

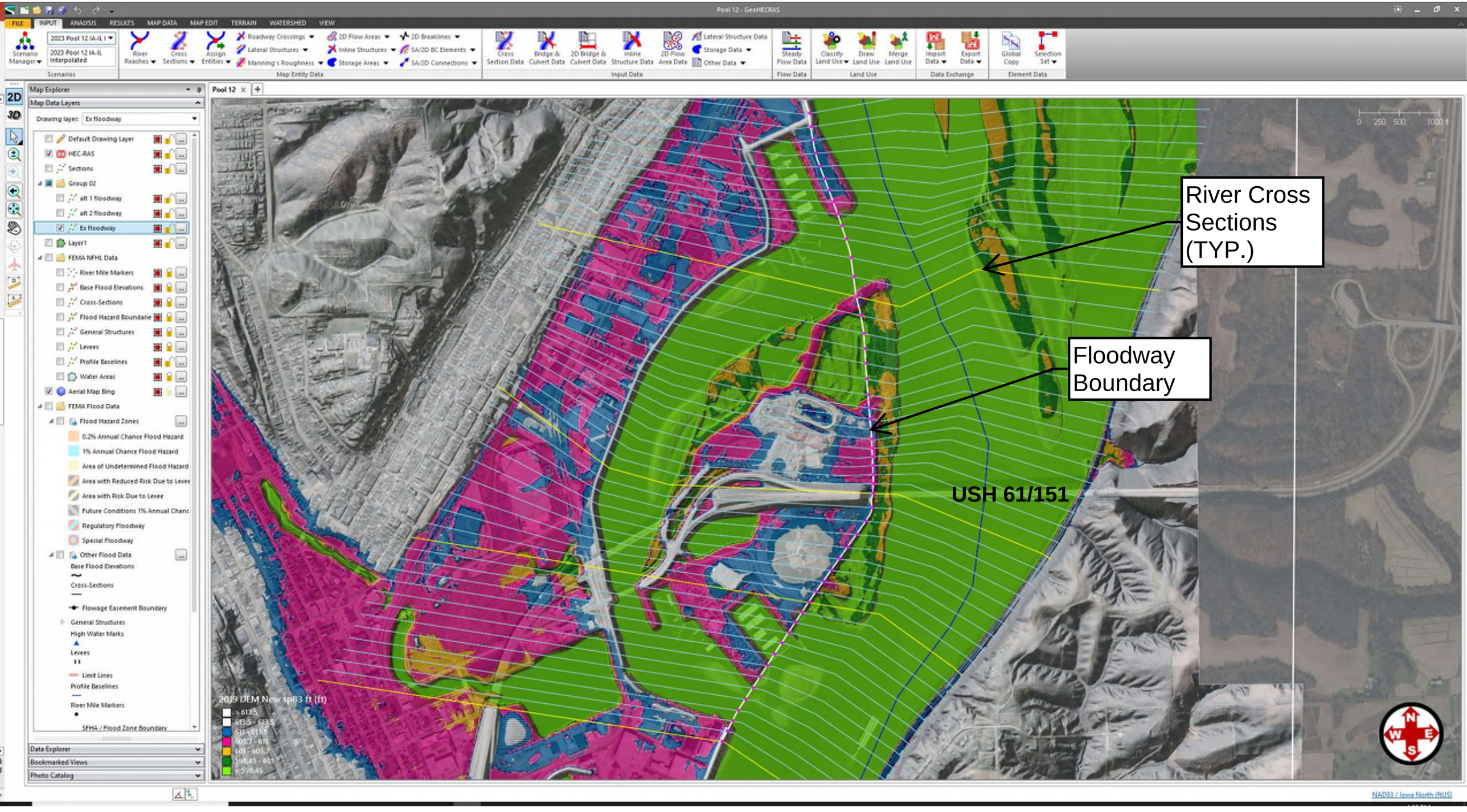


APPENDIX B
GRAPHIC EXHIBITS OF FLOODPLAIN DEVELOPMENT ASSESSMENTS

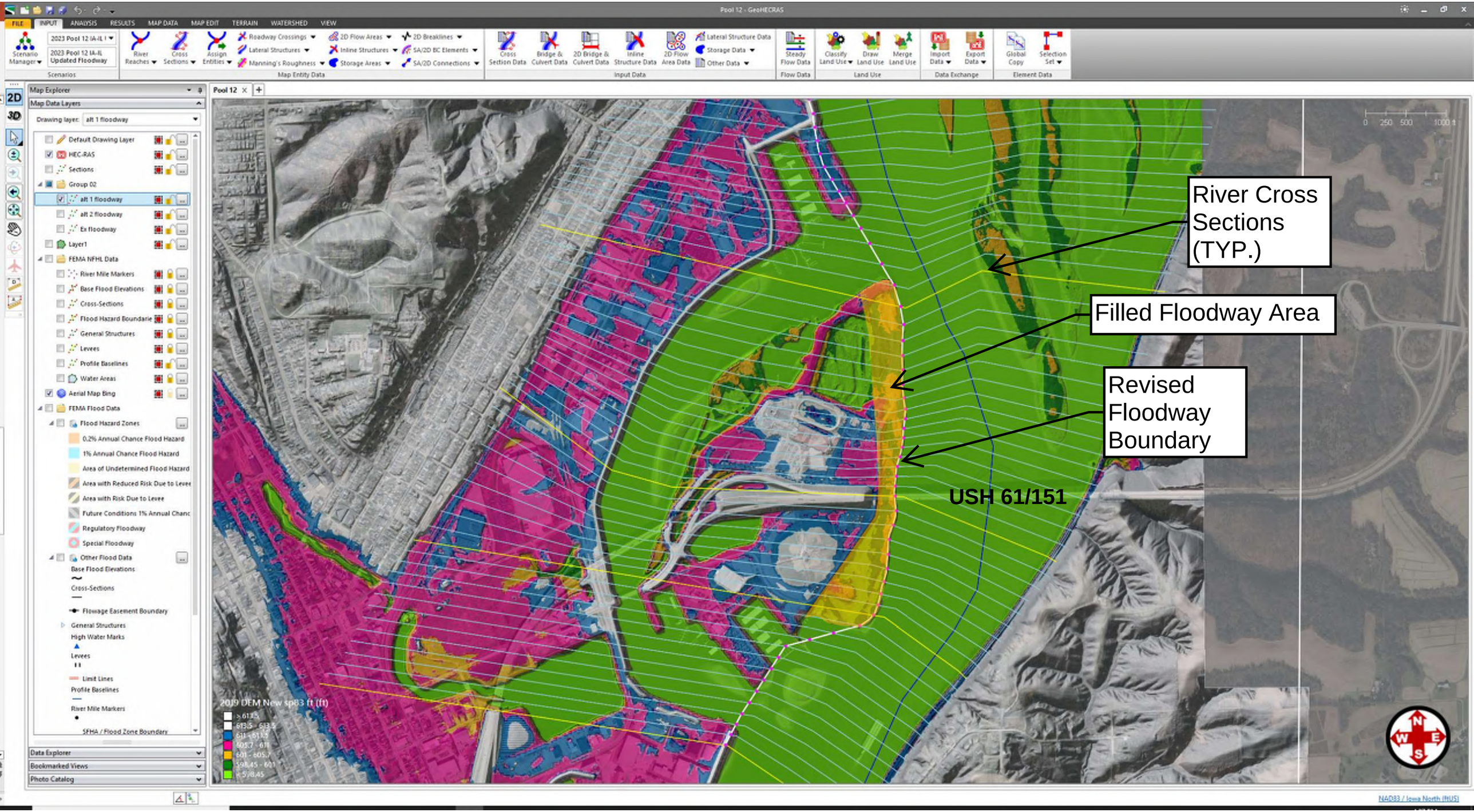
Existing Conditions - Mississippi River Floodplain Model Cross Sections



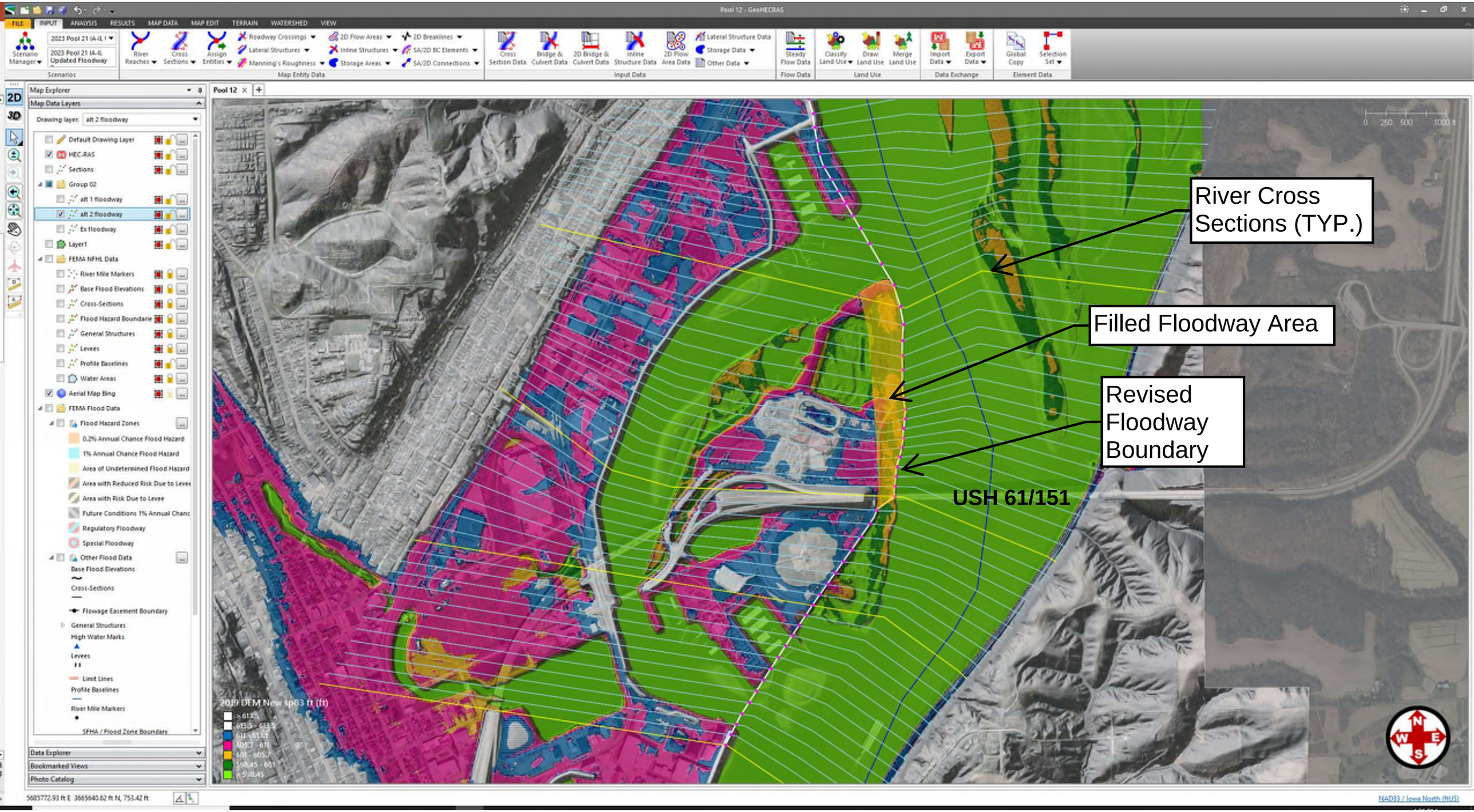
Existing Conditions - Mississippi River Floodplain Model Cross Sections, w/ Added Intermediate Cross Sections



Development Scenario 1 - Fill Entire Floodway Along the East Side of the Island



Development Scenario 2 - Fill Entire Floodway Upstream of USH 61/151



Development Scenario 3 - Fill Entire Floodway Upstream of USH 61/151 and Perform Minor Regrading South of USH 61/151 to Offset Minor River Flood Elevation Increases