

Appendix H

Location Hydraulic Report



LOCATION HYDRAULIC REPORT

PROJECT DEVELOPMENT & ENVIRONMENTAL (PD&E) STUDY

For the design of

CITY OF PLANTATION MIDTOWN BRIDGE

400 NW 73RD AVENUE
PLANTATION, FLORIDA 33317



Plantation
the grass is greener®

Broward County, Florida

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March 2022

TABLE OF CONTENTS

	Page
1. INTRODUCTION	2
2. FLOOD PLAIN ANALYSIS	2
3. RISK EVALUATION.....	4
4. CONCLUSION	5

APPENDICES

- Appendix-A: DBHYDRO DATA ANALYSIS (HEADWATER G 54)
- Appendix-B: FEMA FLOOD MAP
- Appendix-C: SFWMD PERMIT APPLICATION CHECKLIST

1.0 INTRODUCTION

Location hydraulics studies required by 23 Code of Federal Regulations (CFR) Part 650A must be prepared during the Project Development and Environment (PD&E) Study commensurate with the level of encroachment to allow consistent evaluation and identification of impacts. The results of location hydraulic studies should be documented in the Location Hydraulics Report (LHR).

This project includes the construction of a new 130' to 150' bridge over the South Florida Water Management District (SFWMD) New River Canal between SR 84 and SW 17th Street in the City of Plantation, Broward County, Florida. The bridge will provide new capacity directly connecting the Midtown District with right-in/right-out access to SR 84 connecting. This new capacity is also projected to provide significant congestion relief to the University Drive and Pine Island Road corridors in the vicinity of I-595.

2.0 FLOOD PLAIN ANALYSIS

This Location Hydraulic Report has been prepared to determine if any floodplains will be significantly affected due to the recommended improvements. A floodplain or flood plain is an area of land adjacent to a river/canal which stretches from the banks of its channel to the base of the enclosing valley walls, and which experiences flooding during periods of high discharge. The level of floodplain analysis is dependent upon the flood risk associated with each type of encroachment. The encroachment types are listed below:

- 1. No Involvement** - No involvement means that there are no floodplains in the vicinity of the project alternatives.
- 2. No Encroachment** - No encroachment means that there are floodplains in the vicinity of the project alternatives, but there is no floodplain encroachment.
- 3. Minimal Encroachments** - Minimal encroachments on a floodplain occur when there is floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Normally, these minimal efforts to address the impacts will consist of applying FDOT's drainage design standards and following the WMD's procedures to achieve results that will not increase or significantly change the flood elevations and/or limits.
- 4. Significant Encroachments** - A highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction or flood related activities:
 - a. A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or which provides a community's only evacuation route
 - b. A significant risk including the potential for property loss and hazard to life.
 - c. A significant adverse impact on natural and beneficial floodplain values.

When the project causes significant encroachment on a floodplain a risk analysis is required to establish a level of risk allowable for a project area and to design the alternative to that level.

The following items have been addressed to document that the floodplain encroachments will be minimal.

1. History of Flooding: The project area is on and around the vicinity of an artificial control canal. The control structure is located around 1.5 miles downstream of the project location. The name of the control structure is G-54. The headwater elevation has been analyzed from 1969 to the present year, the max elevation found is 5.825 ft NAVD 88 (See Appendix-A). The top of the bank elevation is around 8.25 ft NAVD 88. So, it could be concluded that there is no historical flooding condition found in the project area.
2. Longitudinal or Transverse Encroachments: Longitudinal encroachment refers to the placement of fill in the floodplain, such as for building a road parallel to the edge of a river. Transverse encroachment, meaning that the encroachment is perpendicular to the flow of the stream. The project is making transverse encroachment. The project area is located in Flood Zone AE. Flood Zone AE has an elevation of 6 feet in this area (See Appendix-B). The low member elevation of the bridge is 8.9 feet NGVD 88 (10.5 feet NGVD 29) (See Appendix-C). So, the bridge will be above the Flood Zone which will not make any effect on canal flow.
3. Avoidance Alternatives: In this case where no prudent and feasible avoidance alternatives exist. So, it is not necessary to find the practicability of avoidance alternatives and/or measures to minimize impacts.
4. Emergency Services and Evacuations: North new river canal, SW 17th street and S.R. 84 have no history of stormwater overtopping. Therefore, no emergency services or evacuation opportunities will be adversely affected.
5. Base Flood Impacts: The project's drainage design will be consistent with local, Federal Emergency Management Agency (FEMA), FDOT, and South Florida Water Management District's (SFWMD) design guidelines. Moreover, the new river canal is an artificial control canal, and one of the functions of this canal is to control the drainage of the surrounding area of the canal. Therefore, no significant changes in base flood elevations or limits will occur.
6. Regulatory Floodway: A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation

more than a designated height. Based on SFWMD district, the upstream elevation could increment/head loss should be less or equal to 0.1 feet (See Appendix-C). For quantified the increment of the water surface elevation/head loss, see Required Bridge Hydraulic Report, where it is shown the head loss is less than 0.1'. Therefore, no negative impact will occur in the Regulatory Floodway.

7. Natural and Beneficial Floodplain Values: Natural floodplains provide flood risk reduction benefits by slowing runoff and storing flood water. They also provide other benefits of considerable economic, social, and environmental value that are often overlooked when local land-use decisions are made. Floodplains frequently contain wetlands and other important ecological areas which directly affect the quality of the local environment. Some of the benefits of floodplains to a functioning natural system include:

Fish and wildlife habitat protection

Natural flood and erosion control

Surface water quality maintenance

Groundwater recharge

Biological productivity

Higher quality recreational opportunities.

The project does not impact or create floodplains, therefore, no natural and beneficial floodplain values will be significantly affected.

8. Floodplain Consistency and Development: Part of the project area is consistent with the City of Plantation Stormwater Master Plan. This project will not encourage floodplain development due to local (FEMA) floodplain and SFWMD regulations.
9. Floodplain/FIRM: The FEMA FIRM panel (12011C0535H effective 08/18/2014) showing the project corridor is shown in Appendix B.
10. Risk Assessment: Floodplain encroachments are not significantly increased by this project's build alternative, as discussed further within this report.

3.0 RISK EVALUATION

To quantify the risk on project alternatives that encroach floodplains, we use risk assessment or risk analysis depending on the significance of floodplain encroachment. Risk assessment is performed for minimal encroachments while risk analysis is performed for significant encroachments that are anticipated to increase or substantially change floodplain elevations and/or limits.

Risk assessment is a subjective analysis of the risks resulting from various design alternatives, without detailed quantification of flood risks and losses. It may consist of developing the construction costs for each alternative, and subjectively comparing the risks associated with each alternative. A risk assessment is more appropriate for small structures, or for structures whose size is not influenced by hydraulic constraints. Since the project is a small bridge structure so a risk assessment has been used in this project.

Risk assessment is completed every three steps. It helps communities answer the following questions:

- What threats and hazards can affect our community?
- If they occurred, what impacts would those threats and hazards have on our community?
- Based on those impacts, what capabilities should our community have?

Since the project is not adding any extra flood plain impact and there is a lot of similar bridge already existing over the same canal, there are no additional threats and hazards that will be added by building the project.

4.0 CONCLUSION

The discussion in this report indicates that there is a minimal encroachment in the flood plain and no additional risk will be added due to the building alternative. There will be no change in the flood elevation or flood map for this project.

APPENDICES

- APPENDIX-A: DBHYDRO DATA ANALYSIS (HEADWATER G 54)
- APPENDIX-B: FEMA FLOOD MAP
- APPENDIX-C: SFWMD PERMIT APPLICATION CHECKLIST

APPENDIX-A

DBHYDRO DATA ANALYSIS (HEADWATER G 54)

DBKEY STATION TYPE UNITS FQ STAT STRATA OPNUM RCDR AGENCY START END CNTY LAT LONG SEC TWP RNG ALTERNATE ID
 00454 G54_H GAGHT feet DA MEAN 0 ???? USGS 1969 1992 BRO 260541 801349 14 50 41 02285000 N/A

Period of Record Statistical Summary by Year For DBKEY 00454
 For Period 19691001 to 19920414

DBKEY Station	Data Type	Year	Sample Size	Minimum	Mean	Maximum	Median	Std. Dev.
00454 G54_H	GAGHT	1969	92	2.38	3.653	5.16	3.76	0.5
00454 G54_H	GAGHT	1970	365	1.44	3.685	5.21	3.78	0.83
00454 G54_H	GAGHT	1971	365	1.96	4.205	5.54	4.22	0.73
00454 G54_H	GAGHT	1972	366	1.63	4.47	5.74	4.61	0.74
00454 G54_H	GAGHT	1973	365	2.31	3.946	5.52	3.92	0.61
00454 G54_H	GAGHT	1974	365	2.58	4.004	5.66	3.95	0.45
00454 G54_H	GAGHT	1975	365	2.41	3.75	5	3.76	0.46
00454 G54_H	GAGHT	1976	366	1.83	3.578	4.9	3.61	0.5
00454 G54_H	GAGHT	1977	365	0.95	3.333	4.51	3.51	0.84
00454 G54_H	GAGHT	1978	365	0.65	3.691	4.8	3.84	0.69
00454 G54_H	GAGHT	1979	365	1.7	3.464	4.51	3.64	0.54
00454 G54_H	GAGHT	1980	366	1.68	3.446	4.63	3.64	0.58
00454 G54_H	GAGHT	1981	365	2.75	4.057	5.69	4.01	0.55
00454 G54_H	GAGHT	1982	365	0.81	3.443	4.75	3.66	0.87
00454 G54_H	GAGHT	1983	365	1.13	2.946	4.26	3.07	0.84
00454 G54_H	GAGHT	1984	366	2.5	3.649	4.7	3.665	0.31
00454 G54_H	GAGHT	1985	365	2.61	3.63	4.69	3.61	0.27
00454 G54_H	GAGHT	1986	365	0.88	3.133	4.17	3.37	0.65
00454 G54_H	GAGHT	1987	365	1.14	3.453	4.47	3.55	0.49
00454 G54_H	GAGHT	1988	366	1.23	3.363	4.14	3.54	0.52
00454 G54_H	GAGHT	1989	365	2.82	3.519	4.66	3.48	0.25
00454 G54_H	GAGHT	1990	339	3.05	3.693	4.97	3.64	0.3
00454 G54_H	GAGHT	1991	354	3.07	3.692	4.85	3.68	0.27
00454 G54_H	GAGHT	1992	105	3.36	3.612	3.87	3.61	0.11

Max Elevation	5.74
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DBKEY STATION TYPE UNITS FQ STAT STRATA OPNUM RCDR AGENCY START END CNTY LAT LONG SEC TWP RNG ALTERNATE ID
 15966 G54 H STG ft NGVD29 DA MEAN 0 TELE WMD 1992 2022 BRO 260541 801349 14 50 41 G54-H

Period of Record Statistical Summary by Year For DBKEY 15966
 For Period 19921210 to 20220302

DBKEY Station	Data Type	Year	Sample Size	Minimum	Mean	Maximum	Median	Std. Dev.
-----	-----	---	-----	-----	-----	-----	-----	-----
15966 G54_H	STG	1992	21	4.115	4.33	4.489	4.327	0.09
15966 G54_H	STG	1993	365	3.577	4.238	4.84	4.253	0.18
15966 G54_H	STG	1994	365	3.303	4.111	5.248	4.206	0.29
15966 G54_H	STG	1995	365	2.619	3.824	4.624	3.85	0.35
15966 G54_H	STG	1996	366	2.762	3.971	4.46	4.079	0.36
15966 G54_H	STG	1997	365	2.847	4.015	4.883	4.052	0.3
15966 G54_H	STG	1998	365	2.351	3.888	4.692	3.882	0.34
15966 G54_H	STG	1999	365	2.015	3.704	4.97	3.756	0.48
15966 G54_H	STG	2000	366	2.77	3.915	4.44	4.063	0.38
15966 G54_H	STG	2001	365	2.009	3.847	5.027	4.022	0.57
15966 G54_H	STG	2002	365	1.455	3.815	4.43	3.949	0.49
15966 G54_H	STG	2003	365	1.973	3.576	4.416	3.441	0.49
15966 G54_H	STG	2004	366	2.405	3.811	4.654	3.921	0.45
15966 G54_H	STG	2005	365	2.26	3.535	4.475	3.614	0.65
15966 G54_H	STG	2006	365	2.524	4.18	4.747	4.18	0.25
15966 G54_H	STG	2007	365	3.157	4.046	4.653	4.136	0.31
15966 G54_H	STG	2008	366	2.865	3.95	4.899	4.104	0.52
15966 G54_H	STG	2009	365	3.157	3.925	4.875	3.952	0.4
15966 G54_H	STG	2010	365	2.985	4.098	4.9	4.168	0.34
15966 G54_H	STG	2011	365	2.846	3.9	4.901	3.946	0.41
15966 G54_H	STG	2012	366	3.023	4.011	4.953	4.062	0.41
15966 G54_H	STG	2013	365	3.125	4.153	4.971	4.275	0.49
15966 G54_H	STG	2014	365	3.164	4.098	4.967	4.154	0.46
15966 G54_H	STG	2015	365	3.205	4.085	4.918	4.058	0.42
15966 G54_H	STG	2016	366	3.125	3.907	5.051	3.92	0.41
15966 G54_H	STG	2017	365	2.43	3.822	4.961	3.822	0.47
15966 G54_H	STG	2018	364	3.053	3.966	4.885	3.954	0.41
15966 G54_H	STG	2019	365	2.629	4.338	4.934	4.391	0.46
15966 G54_H	STG	2020	366	3.149	3.849	5.825	3.795	0.51
15966 G54_H	STG	2021	364	3.141	4.247	4.951	4.298	0.39
15966 G54_H	STG	2022	54	4.203	4.623	4.947	4.686	0.18

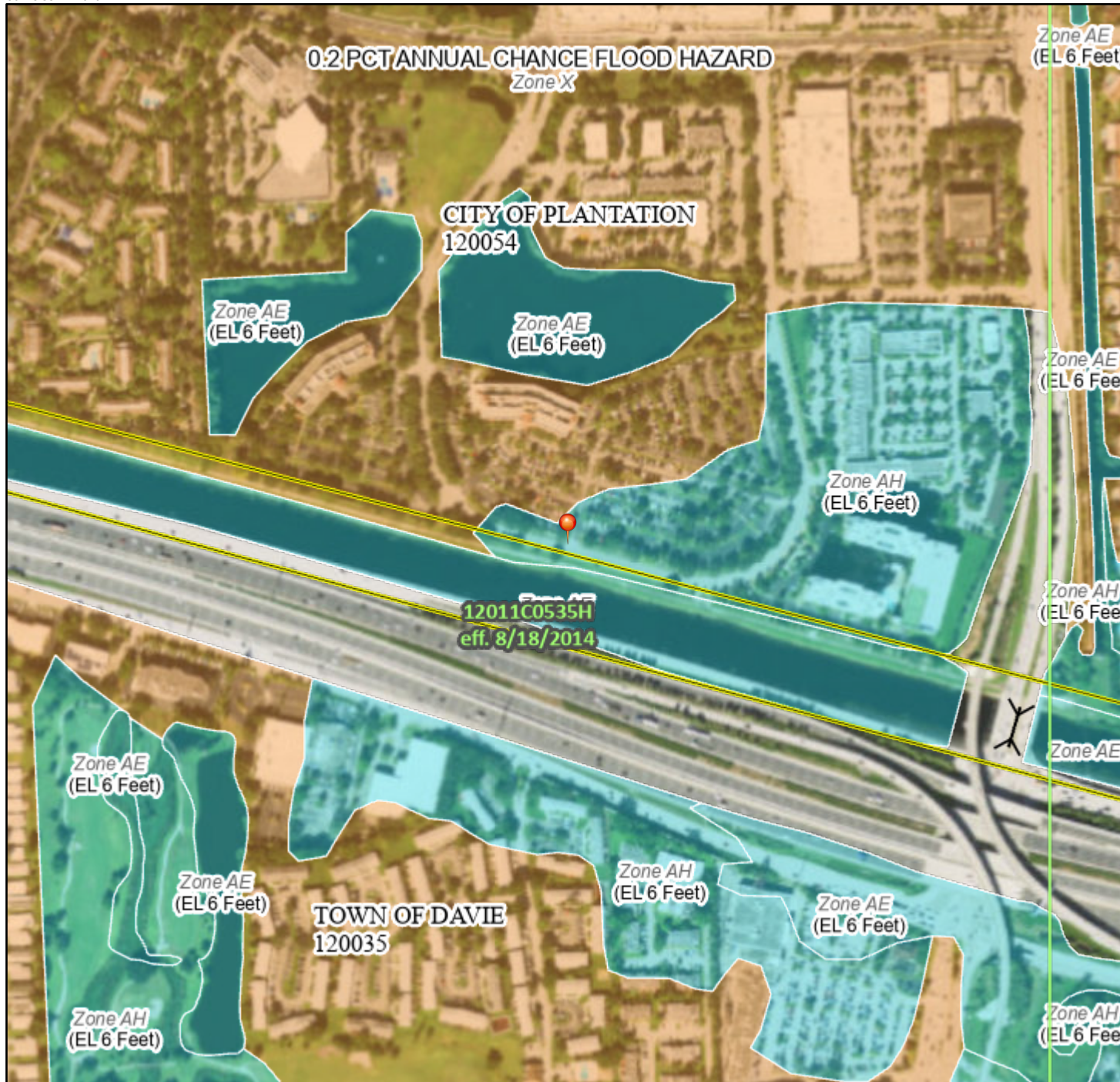
Max elevation 5.825

APPENDIX-B
FEMA FLOOD MAP

National Flood Hazard Layer FIRMMette



80°15'35"W 26°6'21"N



Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation 17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **2/28/2022 at 10:43 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX-C

SFWMD PERMIT APPLICATION CHECKLIST



SOUTH FLORIDA WATER MANAGEMENT DISTRICT RIGHT OF WAY SECTION

CHECKLIST FOR ROW PERMIT APPLICATIONS FOR BRIDGES CROSSING DISTRICT CANALS

The following checklist is for applicants seeking a Right of Way Occupancy Permit (ROW Permit) from the District for bridge work proposed in the right of way, including new bridges, bridge replacements, and bridge widenings. In addition, this checklist applies to most general bridge types (e.g., vehicular bridges, pedestrian bridges, golf cart bridges, etc.). Applicants are advised to review the District's Criteria Manual for further information and details (which can be accessed at www.sfwmd.gov/rowpermits).

LOCATION INFORMATION (To be Completed by Staff - Attach Location Map/Aerial)

Canal: G-15

General Location: East of Pine Island Road

PRE-DESIGN WORK FOR BRIDGES

• CANAL DESIGN CROSS-SECTION

The District's canal design cross-section must be maintained throughout the work area for the bridge project.

- The canal design cross-section at the proposed location is as follows (to be provided by District staff):
 - Canal Bottom Width: 80 feet
 - Canal Bottom Elevation (NGVD29): (-)6.4 feet
 - Side Slopes: 1V:2H
 - Top of Bank (if applicable): N/A

Required Documentation from Applicant

- For bridges crossing the canal perpendicular to the canal centerline, the applicant is required to submit a minimum of five cross-sectional surveys of the canal which must be signed and sealed by the surveyor who performed them.
 - The five surveys include one at the centerline, one at each bridge face, and one 25 feet from each bridge face.
 - The surveys must be taken perpendicular to the centerline of the channel and with soundings taken at 10-foot intervals. Surveys must be tied to the right of way lines and include the canal prism (from top of bank to top of bank).

- Additional survey documentation may be required if: 1) the proposed bridge is not perpendicular to the centerline of the canal (e.g., bridges that cross the canal at an angle or on a curve); 2) grading is required within staging areas to support District emergency operations at each bridge quadrant; and/or 3) grading is required because changes to proposed grade will adversely impact existing District access over its right of way (e.g., the proposed bridge and approach ramps are higher than existing grade). In such cases, applicants should consult with District staff to determine the number and location of required cross-sectional surveys and/or surveys.
- Cross-sections depicting the required canal design cross-section superimposed over each of the required cross-sectional surveys.
- If the existing cross-sectional survey area is less than the required design cross-section, the plans must depict areas to be dredged to achieve the required design cross-section. The square footage of area to dredged should be noted on each cross-section. If the existing cross-sectional survey area is greater than the required design cross-section, no dredging will be required.
- Following completion of the dredging, applicant will be required to submit new “as-built” cross-sectional surveys reflecting that the required canal design cross-section has been achieved. No driving of piles or installation of horizontal bridge components will be allowed until the “as-built” surveys have been reviewed and approved by the District.

BRIDGE DESIGN REQUIREMENTS

The following considerations must be addressed when designing a bridge over a District canal. Please be advised that additional considerations may need to be addressed depending on the specific location, existing conditions, and the District’s existing and future needs.

Required Documentation from Applicant

Bridge plans submitted with an application must address the following bridge design requirements.

- **GENERALLY**

Bridge plans must be designed and certified by a professional engineer licensed in the State of Florida and limited to only include those plan sheets and details that relate to work proposed in the right of way. The District’s right of way lines must be depicted and highlighted in color. Applicants who submit full construction plans that include substantive work and details outside of the right of way should anticipated that the first Request for Additional Information will require that the plans to culled to comply with this requirement before any technical review of the plans can begin.

- **LOW MEMBER ELEVATION**

Bridges must comply with the required low member elevation as measured from either the Design Water Surface Elevation (DWSE) or Optimum Water Control Elevation (OWCE), whichever produces the higher elevation. The minimum low member elevation depends on

specific canal and location. To determine the required low member elevation, applicants should refer to the Horizontal and Vertical Clearance Requirements on pages 69-79 of the Criteria Manual.

- The DWSE and OWCE at the proposed location is as follows (to be provided by District staff):
 - DWSE: 5.6 feet NGVD29
 - OWCE: 4.5 feet NGVD29

 - Required Low Member Elevation: 10.5 feet NGVD29

DESIGNING FOR FUTURE WIDENINGS AND MODIFICATIONS. Bridges that are designated as arterial roadways or that may otherwise be widened in the future depending on demand and future development patterns must be designed to ensure that future lanes comply with the minimum low member elevation. This is particularly important for bridges with a sloped bank/curve or that slope from the centerline to the bridge faces. Failure to design for future widenings and modifications will not be recognized as grounds for a hardship to support a future waiver from District requirements.

- **SPANS**

Bridges must have an odd number of spans (*a span is the open space between piles and/or the abutment/bank*). The minimum width of the center span and approach spans depend on specific canal and location. To determine the required span spacing, applicants should refer to the Horizontal and Vertical Clearance Requirements on pages 69-79 of the Criteria Manual.

- **PILE ALIGNMENT**

The arrangement of proposed piles and bents must be parallel to the centerline of the canal. In addition, proposed pile arrangement and bents must align with existing pile-supported facilities within 250 feet upstream or downstream of the proposed bridge. Plans must depict the existing pile locations (based upon a certified survey that must be submitted by the applicant) to confirm alignment.

- **BANK STABILIZATION**

Bank stabilization is required under the bridge and within a minimum of 25 feet up and downstream of the proposed bridge. The area necessary to accommodate proposed bank stabilization may not encroach into the required canal design cross-sectional area. Rip rap is typically acceptable for banks proposed with a maximum slope of 2H:1V. For steeper slopes, articulating block mat or other hardened material acceptable to the District will be required. All work must comply with District specifications.

- **DISTRICT ACCESS**

No bridge work may adversely impact District access or future planned District access. With few exceptions, applicants will be required to provide the following for any bridge work to be authorized. For specific details and further information, applicants should refer to the District Access Requirements on pages 65-68 of the Criteria Manual.

Plans to ensure continued District access must depict (when required by the District):

- Dropped curbs and/or guardrail openings from the bridge approaches to provide vehicular access to the right of way;
- Installation of District gates at applicant's expense at each access location;
- Guardrail fencing to restrict public access to the right of way;
- Paving entries from the bridge approach/street with sufficient distance for a District vehicle to park and to swing the gate open;
- Reinforced concrete sidewalks designed to support the weight of District vehicles and equipment;
- Drivable median openings;
- Berm ramps;
- Boat ramps (typically in the Big Cypress Basin); and
- Staging areas measuring 100 feet from each bridge face and encompassing the full width of the right of way at each bridge quadrant which are designed and compacted to support the weight of District equipment up to 90,000 pounds.

AutoTURN exhibits for all points of access and staging areas will be required to demonstrate that proposed access drives, dropped curbs, gate locations, vehicular turning areas (where the right of way is a dead end) are sufficient for large District vehicles with trailers.

Where an applicant's proposal will adversely impact existing or future planned District access to or along its right of way, applicant will be solely responsible for acquiring additional property needed to address District access concerns. The acquisition of land and the recording of an easement in favor of the District (using District forms) are required prior to permit issuance. District staff will coordinate the review and approval of proposed land conveyances with the District's Real Estate Division.

- **EXISTING FACILITIES/UTILITIES**

Applicants must identify existing facilities and utilities that will be impacted and require relocation or modification to accommodate the proposed bridge project. In particular, no

permit will be issued for a bridge within 100 feet of an existing aerial utility crossing or pile-supported utility crossing unless those existing facilities are proposed to be removed or relocated by directional bore under the canal. No permit for a bridge will be issued without contemporaneous issuance of the ROW Permit for the necessary utility modifications.

It is applicant's sole responsibility to contact the affected parties and to direct them to apply for Right of Way Occupancy Permit to modify existing improvements or remove them from the right of way. Applicants must identify affected facilities and utilities on the bridge plans and provide evidence of communications with those parties prior to permit issuance. Applicants should anticipate that work on the bridge project may not commence without issuance of permits from the District authorizing the modification and/or removal of such affected facilities and utilities.

- **REQUIRED BRIDGE HYDRAULIC REPORT**

Applicants are required to submit a bridge hydraulic study which set forth the impacts of the proposed work. The report must confirm that the work will not result in head loss greater than 0.1 feet throughout the proposed bridge structure and canal cross-section.

OTHER CONSIDERATIONS

Applicants proposing bridges within the right of way must also consider the following with respect to bridge design and District requirements:

- **FINANCIAL ASSURANCE**

Any applicant that is not a city, county, state or other governmental entity shall be required to post a cash bond with the District equal to the cost of demolishing the facility (e.g., demolition, disposal, administrative costs, restoration of the right of way to its original condition) prior to the issuance of a ROW Permit. Applicant must provide a detailed cost estimate which the District reserves the right to accept or deny. The cash bond will be retained by the District for the life of the structure and only released upon removal of the bridge and restoration of the District's right of way.

- **MEANS AND METHODS OF CONSTRUCTION**

Applicants are advised that if they are unable to explain the specific means and methods of construction during the application process (e.g., submit a required barge management plan, provide details regarding access to the site and/or material staging, etc.), then the ROW Permit will issue subject to the contractor obtaining its own separate ROW Permit for temporary access, staging, and barge use. The contractor will be required to comply with all terms and conditions of the ROW Permit, including, but not limited to, compliance with a barge management plan and requirements for insurance and financial assurance for the benefit of the District. Contractors must always also maintain District access through the right of way during construction, if required by the District, and provide for boater and recreational safety. Installation must be designed so that the bridge can be constructed

without the use of dams (including cofferdams), fills, or other constrictions or impediments to canal flow.

(NOTE: The District will incorporate as a condition of permit issuance an attachment that should be included in bid documents and distributed to contractors seeking to build applicant's proposed bridge. This document will identify the typical issues that chosen contractors must address to secure a temporary access permit to enter upon the right of way for purposes of constructing the bridge.)

- **SECURITY AND FENCING**

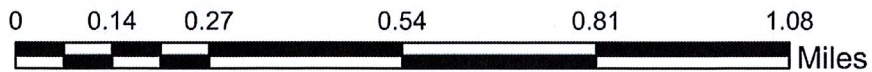
Applicants must design bridge projects to ensure that areas under bridges are not used as temporary housing and/or camps, where required by the District. Security fencing or other means will be required by the District.

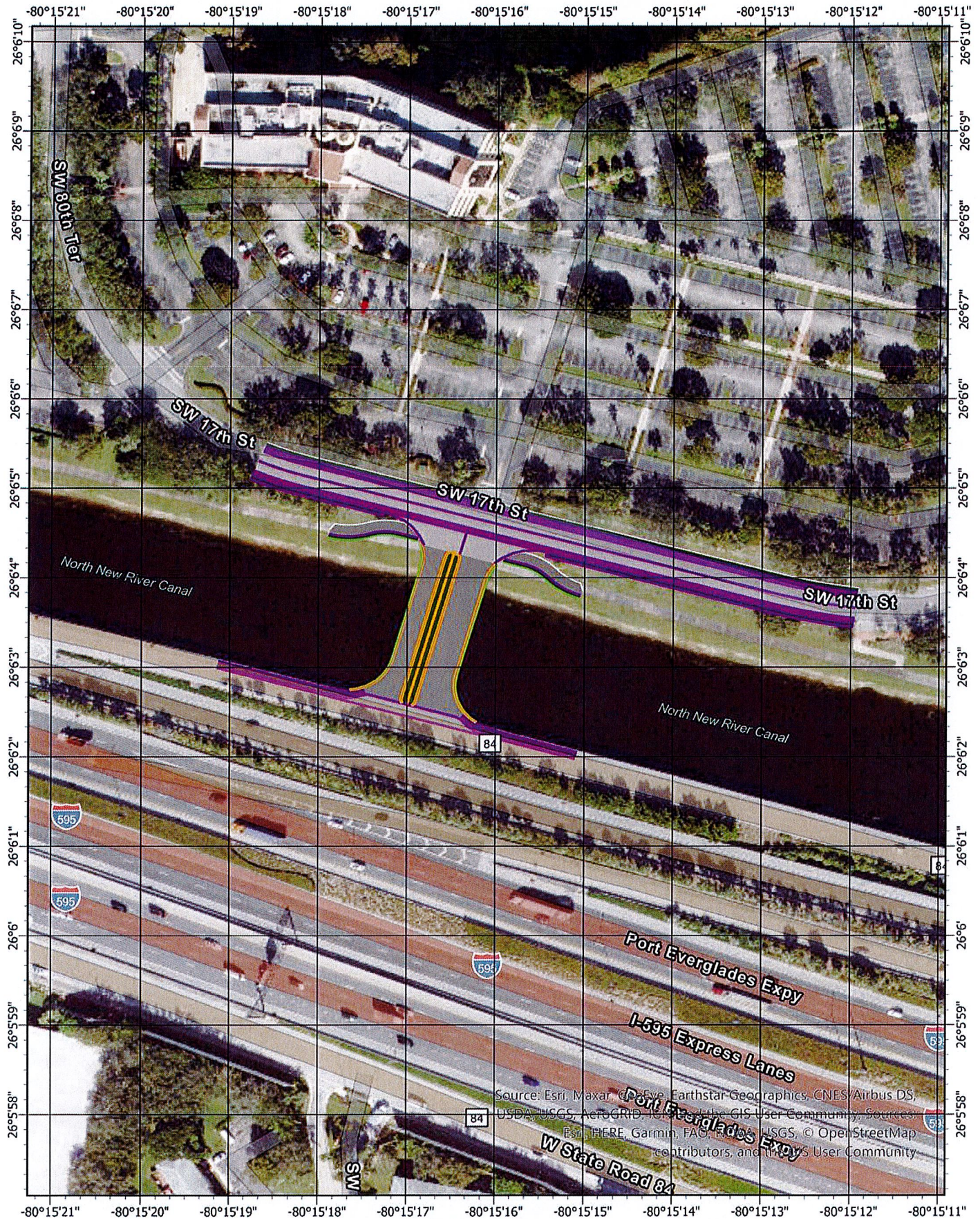
- **RECREATIONAL/BOATER SAFETY**

Bridges must be designed to ensure recreational and boater safety during and after construction. Navigational lights, signs, and other means should be considered and may be required as a condition of the ROW Permit.



Source: Esri, DeLorme, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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