

OPERATION PLAN FOR EMERGENCY PUMPS IN THE CITY OF BONITA SPRINGS

Prepared for:

City of Bonita Springs

Prepared by:

***South Florida Water Management District
May 4, 2022***



STRUCTURE REFERENCE

Structure ID	Structure Type [High x Wide]	Function	Design Capacity (cfs)	Design Headwater and Tailwater [feet NAVD (feet NGVD)]	Emergency Back-up Power	Operation Type	Vertical Datum Offset (ft)	Page Containing Description	Notes
COCO1	Two 6.5-foot x 10-foot gated spillway with fixed crest weir	Flood Protection; salinity control	1380	HW = 5.91 (7.15) TW = 5.26 (6.5)	Onsite backup generator	Local & Remote	1.24	5	
COCO2	Two 6.5-foot x 10-foot gated spillway with fixed crest weir	Flood Protection; salinity control	606	HW = 7.1 (8.34) TW = 6.8 (8.04)	Onsite backup generator	Local & Remote	1.24	5	
COCO3	Two 6.5-foot x 10-foot gated spillway with fixed crest weir	Flood Protection; salinity control	591	HW = 10.97 (12.23) TW = 10.75 (12.01)	Onsite backup generator	Local & Remote	1.26	5	
KEHL1	100-foot-wide fixed crest weir and three 8-foot x 9-foot gated spillway	Flood Protection	N/A				1.21	6	
CBS-P1	Two 12 cfs (5,400 gpm) -Mobile Pumps	Flood Protection	12	N/A	N/A	Local		6	
CBS-P2	One 41 cfs (18,500 gpm)-Mobile Pump	Flood Protection	41	N/A	N/A	Local		6	

CBS = City of Bonita Springs
 cfs = cubic feet per second
 gpm = gallon per minute
 HW = headwater
 N/A = Not Applicable
 NAVD = North American Vertical Datum of 1988
 NGVD = National Geodetic Vertical Datum of 1929
 TW = tailwater



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1. BACKGROUND

In February 2022, the South Florida Water Management District (SFWMD or District) and the City of Bonita Springs entered in a cooperative agreement (**Appendix 1**) to develop short-term and long-term efforts for flood mitigation, watershed flow and intergovernmental coordination in south Lee county. One of the short-term collaborations identified in the cooperative agreement is the development of operational guidelines for the timing of emergency conveyances and the use of emergency operational schedule while meeting the water management needs of the region. This operation plan (Plan) is prepared by the SFWMD to fulfill condition 7 of the cooperative agreement.

2. OBJECTIVE

The objective of the Plan is to develop guidelines which will assist the City of Bonita Springs to determine when to deploy mobile pumps to move water from Logan Boulevard Canal into the natural area adjacent to the canal southernmost extent commonly referred to as Conservation Area FKA Woodlands Slough, during a declared state of emergency in Lee county issued by the SFWMD as identified in this Plan without affecting flood control capability in the Cocohatchee system. The mobile pumps owned and operated by the City of Bonita Springs will be operated based on stages within the Coco Canal system, Kehl Canal, Logan Boulevard Canal, and the conservation area FKA Woodlands Slough. Stages in the Coco and Kehl canals are monitored in real time via telemetry at several locations by the SFWMD, and that in the conservation area FKA Woodlands Slough will be collected at a new site that will be maintained by the United States Geological Survey (USGS). A District approved and monitored Stage recorder should be installed by the City of Bonita Springs at the pump intake point in Logan Boulevard Canal to monitor stage during pump operations. Existing and proposed stage monitoring stations are listed in **Table 1** and are shown in **Figure 1**. Additional information on stage monitoring sites is compiled in **Appendix 2**.

Table 1 Stage Monitoring Sites

System Component	Stage Monitoring Station	Description
Cocohatchee Canal	COCO1 T	Structure COCO1
	COCO2 H	Structure COCO2
	COCO3 H	Structure COCO3
Kehl Canal	KEHL_T	Structure KEHL1
Imperial River	IMP.RIV.BSP*	Imperial River near Bonita Springs
Estero Bay	SOCREW1	Southern CREW Marsh#1
Estero Bay	SOCREW2	Southern CREW Marsh#2
Logan Boulevard Canal	NA**	Pump intake point
Woodlands Slough	SOCREW06	Woodlands Slough

*Imperial River near Bonita Springs

**NA: Not Available



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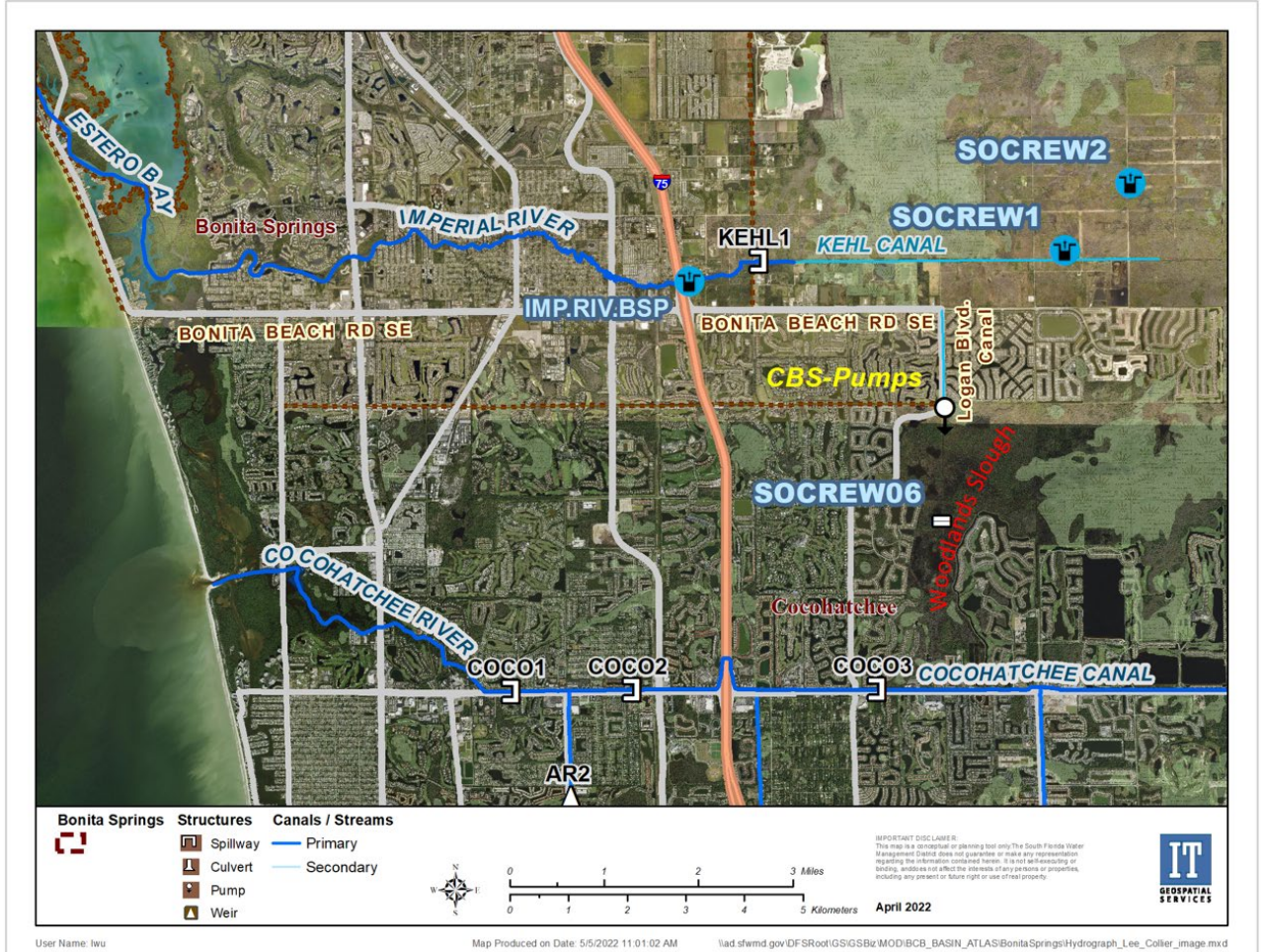


Figure 1: Cocohatchee and Kehl System



3. SYSTEM COMPONENTS

3.1 Cocohatchee Canal Structures

The Cocohatchee watershed covers an area of 27.5 square miles and is located in the northwest quadrant of Collier County. The drainage patterns in the Cocohatchee watershed are generally directed to the south and southwest, ultimately entering the Cocohatchee Canal which runs along the north right of way of Immokalee Road. The Cocohatchee Canal consists of two branches, east and west, generally descriptive of the typical flow directions in the canal alignment. The Cocohatchee Canal-East Branch forms part of the Golden Gate system and includes that portion of the canal lying east of the COCO4 (aka Twin Eagles) structure. The Cocohatchee Canal-West Branch flows generally westward and includes the remainder of the canal from Twin Eagles to the main outfall COCO1, all within the Cocohatchee watershed coverage area. The water control structures along the Cocohatchee Canal-West branch relevant for the emergency operations of City of Bonita Springs mobile pumps are described below.

3.1.1 COCO1

COCO1 is a two-bay gated structure, with single stem vertical-lift steel roller gates and a fixed-crest overflow weir. This structure is located approximately 325 feet downstream of the Palm River Boulevard Bridge which is at the intersection of Immokalee Road and Palm River Boulevard in North Naples. COCO1 drains the final 1.3-mile reach of the Cocohatchee Canal, as well as the northern 2.7 miles of the Airport Road Canal. It is the outfall structure of the Cocohatchee Canal system and is primarily designed to prevent saltwater intrusion. It also controls upstream water levels to optimize groundwater recharge in the surficial aquifer.

The operating ranges for COCO1 is 2.8 to 5.5 feet NAVD88 (4.0 to 6.7 feet NGVD29) during wet period and 4.0 to 5.5 feet NAVD88 (5.2 to 6.7 feet NGVD29) during dry period.

3.1.2 COCO2

COCO2 is a two-bay gated structure, with single stem vertical-lift steel roller gates and a fixed-crest overflow weir. This structure is located approximately 300 feet upstream of Lakeland Avenue on the north side of Immokalee Road in north Naples. COCO2 drains a 3.1-mile reach of the Cocohatchee Canal, and it lies between the upstream COCO3 and downstream COCO1 structures. Operation of this structure is designed to attenuate flows, keep upstream canal stage within prescribed range, and to ensure that water levels necessary for groundwater recharge are maintained in the surficial aquifer.

The operating ranges for COCO2 is 6.8 to 9.0 feet NAVD88 (8.0 to 10.2 feet NGVD29) during wet period and 7.5 to 10.2 feet NAVD88 (8.7 to 10.2 feet NGVD29) during dry period.

3.1.3 COCO3

COCO3 is a two-bay gated structure, with single stem vertical-lift steel roller gates and a fixed-crest overflow weir. This structure is located on the north side of Immokalee Road, approximately 1.5 miles east of I-75 in north Naples. The COCO3 structure lies upstream of COCO2, and it drains the upper reach of



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the Cocohatchee Canal, a segment of approximately 4.7 miles. Operation of this structure is designed to attenuate flows, keep upstream canal stage within prescribed range, and to ensure that water levels necessary for groundwater recharge are maintained in the surficial aquifer.

The operating ranges for COCO3 is 8.7 to 10.2 feet NAVD88 (10.0 to 11.5 feet NGVD29) during wet period and 9.5 to 10.5 feet NAVD88 (10.8 to 11.8 feet NGVD29) during dry period.

3.2 Kehl Canal Structure

The Kehl Canal is an east-west drainage way that conveys most of the stormwater run-off north of Bonita Beach Road and east of Bonita Grande Drive to the Imperial River. The Kehl Canal weir and gated structure (KEHL1) were constructed to augment stormwater run-off storage in the dry season, improve water quality and enhance the groundwater recharge of the area.

3.2.1 KEHL1

KEHL1 structure is a combined structure, consisting of an uncontrolled fixed crest weir, and three bay vertical lift sluice gates. The weir consists of a 100-foot-wide sharp crested weir with the weir crest at elevation 8.8 feet NAVD88 (10 feet NGVD29), and three (3) 8 feet x 9 feet operable gates with sill elevations at 1.8 feet NAVD88 (3.0 feet NGVD29). This structure is located approximately 200 feet east of Bonita Grande Drive. KEHL1 controls flow from Kehl Canal to the Imperial River. The structure is owned and operated by Lee County. Stages at upstream and downstream of the structure are monitored by the SFWMD.

KEHL1 gates may remain closed from October through March (Dry Season) and may be opened from April through September (Wet Season). The gates are operated with the following operating guidelines.

Table 2. Guidelines for Gate Opening

Upstream Elevation (feet NGVD29)	Maximum Single Gate Opening (feet)
7.0	0.0
8.0	1.6
9.0	2.2
10.0	2.5
11.0 and above	2.6

3.3 City of Bonita Springs Pumps

City of Bonita Springs Mobile Pumps that will be deployed to move water from Logan Boulevard Canal to the conservation area FKA Woodlands Slough consist of two (2) 12 cfs (5,400 gpm) and one (1) 41 cfs (18,500 gpm) pumps with a combined total capacity of 65 cfs. The specifications of the mobile pumps are compiled in **Appendix 3**.



3.4 Conservation Area FKA Woodlands Slough

The conservation area is located east of Logan Boulevard and between the Lee and Collier County line in the north and Immokalee Road in the south. The conservation area receives water from the headwaters of the Big Cypress Basin (BCB) system near Lake Trafford, through Corkscrew Sanctuary, and finally Bird Rookery. The conservation area is also utilized by several adjacent developments to discharge stormwater. During a declared state of emergency for Lee County by the SFWMD, the Woodlands Slough will receive discharges from the Logan Boulevard Canal via the City of Bonita Springs mobile pumps.

4. OPERATING PLAN FOR BONITA SPRINGS EMERGENCY PUMPS

In the event of a declared state of emergency for Lee County by the SFWMD, the emergency pumps shall be operated as follows.

Pump On:

The emergency pumps will be turned on during a declared state of emergency by the SFWMD when all of the following conditions are met:

- 1) When instantaneous stage in Cocohatchee Canal measured at gage COCO3_H is less than 10.24 feet NAVD88 (11.5 feet NGVD29) and receding.
- 2) When instantaneous stage in Cocohatchee Canal measured at gage COCO2_H is less than 9.0 feet NAVD88 (10.2 feet NGVD29) and receding.
- 3) When average daily stage for the previous day in Cocohatchee Canal measured at gage COCO1_T is less than 3.26 feet NAVD88 (4.5 feet NGVD29).
- 4) When instantaneous stage in the conservation area FKA Woodlands Slough measured at gage SOCREW06 is less than 13.5 feet NAVD88 (14.75 feet NGVD29).
- 5) When instantaneous stage in the Imperial River near Bonita Springs measured at USGS gage (USGS Site ID 02291500) is greater than 12.0 feet Gage Height* and rising.
- 6) When instantaneous stage in Logan Boulevard Canal measured at the location of the emergency pumps intake point is greater than 14.3** feet NAVD88 (15.54 feet NGVD29).

* The vertical datum at this gage is not known.

** This will be updated after information on the exact location of the emergency pumps received from the City of Bonita Springs.

Pump Off:

The emergency pumps will be turned off if either of the following condition is met:

- 1) When instantaneous stage in Cocohatchee Canal measured at gage COCO3_H is greater than 10.24 feet NAVD88 (11.5 feet NGVD29) and rising.



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- 2) When instantaneous stage in Cocohatchee Canal measured at gage COCO2_H is greater than 9.0 feet NAVD88 (10.2 feet NGVD29) and rising.
- 3) When average daily stage for the previous day in Cocohatchee Canal measured at gage COCO1_T is greater than 3.26 feet NAVD88 (4.5 feet NGVD29).
- 4) When instantaneous stage in the conservation area FKA Woodlands Slough measured at gage SOCREW06 is greater than 13.5 feet NAVD88 (14.75 feet NGVD29).
- 5) When instantaneous stage in the Imperial River near Bonita Springs measured at USGS gage (USGS Site ID 02291500) is less than 11.0 feet Gage Height* and receding.
- 6) When instantaneous stage in Logan Boulevard Canal measured at the location of the emergency pumps intake point is less than 10.0 feet NAVD88 (11.24 feet NGVD29).
- 7) When the SFWMD Water Managers issue pump off order based on their assessment of the watershed conditions and weather forecasts.
- 8) When the declared state of emergency for Lee County issued by the SFWMD expired.

* The vertical datum at this gage is not known.

The elevations included in pump ON, and OFF criteria may be updated based on field observations collected during emergency operations.

5. COMMUNICATION PROTOCOL

The City of Bonita Springs shall be the entity responsible for the operation and maintenance of the emergency pumps.

During a declared state of emergency for Lee County by the SFWMD, the City of Bonita Springs will communicate with the SFWMD Water Managers the Condition(s) specified in this operation plan that are present which allow turning the emergency pumps on, the anticipated number of pumps and capacities, the expected start date and time of operations, and the approximate duration of operations. The SFWMD Water Managers (following internal coordination with BCB water Managers and basin engineer) will notify the City of Bonita Springs approving or denying the request. The SFWMD Water Managers reserve the right to deny the request based on their assessment of the watershed conditions, even if the conditions for turning the pumps on are met. SFWMD Water Managers consult with the BCB Water Managers and look at the condition of the entire system and may have specific information that forces them to deny the request. The City of Bonita Springs could commence operation of the emergency pumps after receiving approval from the SFWMD Water Managers.

During pump operations, the City of Bonita Springs will report daily to the SFWMD Water Managers on the operations of the emergency pumps (the number of pumps operated and duration of pumping), and assessment of the Condition(s) specified in this operation plan for turning the pumps on.

All coordination of operations and reporting will be via email correspondence, the following email addresses will serve as the official notification point:

- SFWMD - watermanagers@sfwmd.gov; occ@sfwmd.gov



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- City of Bonita Springs - watermanager@cityofbonitasprings.org

In case of phone communications, the following phone numbers may be used:

- SFWMD Water Managers: 561-686-8800
- City of Bonita Springs: 239-949-6262

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**APPENDIX 1 – COOPERATIVE AGREEMENT BETWEEN THE SOUTH FLORIDA
WATER MANAGEMENT DISTRICT AND CITY OF BONITA SPRINGS**

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**COOPERATIVE AGREEMENT
BETWEEN THE
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
and
CITY OF BONITA SPRINGS**

THIS COOPERATIVE AGREEMENT BETWEEN THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT and CITY OF BONITA SPRINGS ("AGREEMENT"), is made and entered into this 4th day of FEBRUARY, 2022, by and between the South Florida Water Management District, an independent special district of the State of Florida, (the "DISTRICT") and the City of Bonita Springs, a municipality of the State of Florida (the "CITY"). Collectively, the DISTRICT and CITY are referred to as the Parties (the "PARTIES").

RECITALS:

WHEREAS, the DISTRICT is an independent taxing authority, created by the Florida Legislature and given those powers and responsibilities enumerated in Chapter 373, Florida Statutes; and

WHEREAS, the CITY is a municipality within Lee County, Florida; and

WHEREAS, it is the desire and the intent of the PARTIES to coordinate in the development of regional solutions that will serve to further mitigate flooding in south Lee County.

NOW, THEREFORE, in consideration of the benefits flowing from each to the other, the adequacy and sufficiency of which is acknowledged by the PARTIES, the PARTIES agree as follows:

1. The Recitals as set forth above are incorporated in the terms of this AGREEMENT as if set out herein at length.
2. The purpose of this AGREEMENT is to provide a mechanism for the PARTIES to further develop short-term and long-term efforts for flood mitigation, watershed flow and intergovernmental coordination in south Lee County. Accordingly, unless extended or earlier terminated, this AGREEMENT will commence on the 4th day of FEBRUARY, 2022 and continue for a period of ten (10) years to the 4th day of FEBRUARY, 2032, and may be renewed upon mutual agreement of the PARTIES.
3. The Project Managers for the PARTIES are as follows:

SFWMD # 4600004534
BSC-22-01-006



DISTRICT	CITY
Name:	Name:
Address: 3301 Gun Club Road West Palm Beach, Florida 33406	Address:
Telephone: 561-682-	Telephone:

The PARTIES will direct all matters arising in connection with the performance of this AGREEMENT to the attention of the Project Managers for attempted resolution or action. The Project Managers will be responsible for overall coordination and oversight relating to the performance of this AGREEMENT.

- All notices to the DISTRICT under this AGREEMENT must also be in writing and sent by certified mail to:

South Florida Water Management District
 Attn: Procurement Division
 P. O. Box 24680
 West Palm Beach, FL 33416-4680

All notices to the CITY under this AGREEMENT must also be in writing and sent by certified mail to:

The PARTIES will also provide a copy of all notices to the PARTIES' Project Managers. All notices required by this AGREEMENT will be considered delivered upon receipt. Should any party change its address or designated Project Managers, immediate written notice of the new address and/or Project Manager must be sent to the other Parties in accordance with provisions of this section.

- It is the intent of the DISTRICT to use its best efforts to provide technical expertise and support short-term proposals and long-term planning for south Lee County while meeting the water management needs of the region as a whole. In further support, the DISTRICT will assist in the development of a South Lee County Flood Forecast Model.

- It is the intent of the PARTIES that the DISTRICT will coordinate a quarterly meeting between the PARTIES with an emphasis on south Lee County watersheds. The



quarterly meeting shall specifically include DISTRICT-designated staff with responsibilities related to the Big Cypress Basin. A primary purpose of the quarterly meeting is for the PARTIES to establish a collaborative list of short-term and long-term efforts benefiting south Lee County watersheds that will be pursued expeditiously. In addition to the quarterly meeting, it is the expectation that the PARTIES, and the Big Cypress Basin via the DISTRICT, will cooperate to coordinate projects and activities on an ongoing basis.

7. It is the intent of the PARTIES to collaborate on the development of operational guidelines for the timing of emergency conveyances and the use of emergency pumps. The DISTRICT will establish and provide to the PARTIES an Emergency Operational Schedule within ninety days of execution of this AGREEMENT. Additionally, the DISTRICT will aid in site preparation for the use of emergency pumps. The PARTIES acknowledge that the timing of emergency conveyances and the use of emergency pumps are subordinate to regional water management needs and subject to all relevant legal requirements. The PARTIES will coordinate their available resources and cooperate to address elevated water events in south Lee County.

8. The PARTIES will cooperate to accomplish projects that are developed as part of this AGREEMENT. Further, the PARTIES acknowledge that an immediate short-term focus for the pursuit of funds includes the following:

- A. Inclusion of a land acquisition program to address flooded areas in Bonita Springs in the PARTIES' respective resiliency plan submittals for State funding.
- B. DISTRICT support on modelling, engineering, and planning for the development of a permittable water management project for the CREW/Flint Pen/Larry Kiker Preserve that addresses flood protection and hydrologic restoration.

9. Notwithstanding any provisions of this AGREEMENT to the contrary, the PARTIES will not be held liable if failure or delay in the performance of this AGREEMENT arises from fires, floods, strikes, embargoes, acts of the public enemy, unusually severe weather, outbreak of war, restraint of Government, riots, civil commotion, *force majeure*, act of God, or for any other cause of the same character which is unavoidable through the exercise of due care and beyond the control of the PARTIES.

10. The failure of any PARTY to obtain sufficient funding to cover its respective obligations pursuant to the terms of this AGREEMENT will be a cause for any of the PARTIES to terminate this AGREEMENT for convenience in accordance with provisions of Paragraph 4. Otherwise, this AGREEMENT may be terminated by a PARTY for convenience by providing the other PARTIES a minimum of six (6) months advance written notice. In such events, the PARTIES will be relieved of any and all future obligations under this AGREEMENT as of the effective date of termination. Termination of the AGREEMENT is the sole and exclusive remedy.

11. The PARTIES hereto acknowledge that they are self-insured public entities.



12. To the extent permitted by Florida law, the DISTRICT will assume any and all risks of personal injury, bodily injury and property damage attributable to the negligent acts or omissions of the DISTRICT and the officers, employees, servants and agents thereof.

13. To the extent permitted by Florida law, the CITY will assume any and all risks of personal injury, bodily injury and property damage attributable to the negligent acts or omissions of the CITY and the officers, employees, servants and agents thereof.

14. The PARTIES further agree that nothing contained herein will be construed or interpreted as (1) denying to a party any remedy or defense available to such party under the laws of the State of Florida; (2) the consent of the State of Florida or its agents and agencies to be sued; or (3) a waiver of sovereign immunity of the State of Florida as provided in §768.28, Florida Statutes.

15. This AGREEMENT may be amended only with the written approval of the PARTIES.

16. The PARTIES will allow public access to all documents and materials in accordance with the provisions of Chapter 119, Florida Statutes.

17. The laws of the state of Florida will govern all aspects of this AGREEMENT. In the event it is necessary for a party to initiate legal action regarding this AGREEMENT, venue will be in the Twentieth Judicial Circuit for claims under State law, and the Middle District of Florida for any claims that are justiciable in Federal court.

18. By execution of this AGREEMENT, the PARTIES are not assuming any liabilities or duties whatsoever, of the other PARTIES, which may presently exist or have previously accrued to any third party.

19. This AGREEMENT states the entire understanding between the PARTIES and supersedes any written or oral representations, statements, negotiations or agreements to the contrary. The PARTIES recognize that any representations, statements or **negotiations made by staff of the PARTIES are not legally sufficient to bind the PARTIES** in a contractual relationship unless they have been reduced to writing, approved and signed by authorized representatives of the PARTIES.

20. This AGREEMENT is solely for the benefit of the PARTIES herein. No person or entity other than the PARTIES will have any rights or privileges under this AGREEMENT in any capacity whatsoever, either as a third-party beneficiary or otherwise.

21. This AGREEMENT will be binding upon the PARTIES, their assigns, and successors in interest.



IN WITNESS WHEREOF, the PARTIES hereto set their hands and seals on the day, month and year first above written.

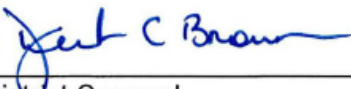
**SOUTH FLORIDA WATER
MANAGEMENT DISTRICT BY ITS
GOVERNING BOARD**

BY: 
Drew Bartlett, Executive Director

**CITY OF BONITA SPRINGS, FLORIDA
BY ITS CITY COMMISSION**

BY: 

APPROVED AS TO FORM FOR THE
RELIANCE OF THE DISTRICT:


District Counsel

APPROVED AS TO FORM FOR THE
RELIANCE OF CITY OF BONITA
SPRINGS ONLY:


Office of the CITY OF BONITA SPRINGS
Attorney

ATTEST: CITY OF BONITA SPRINGS

By: 
City Clerk



APPENDIX 2 – STAGE MONITORING STATIONS AND DATA ACQUISITION

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Table 3. Details of Stage Monitoring Stations

System Component	Stage Monitoring Station	Data Type	Data Source	Link to Data	DBKEY/USGS Site ID	Description
Cocohatchee Canal	COCO1_T	Surface water	SFWMD	Realtime/Instantaneous Daily Average	IX014 16227	Structure COCO1
	COCO2_H	Surface water	SFWMD	Realtime/Instantaneous	IX015	Structure COCO2
	COCO3_H	Surface water	SFWMD	Realtime/Instantaneous	PT614	Structure COCO3
Kehl Canal	KEHL T	Surface water	SFWMD	Realtime/Instantaneous	P4551	Structure KEHL1
Imperial River	IMP.RIV.BSP*	Surface water	USGS	Realtime/Instantaneous	02291500	Imperial River near Bonita Springs
Estero Bay	SOCREW1	Ground water	SFWMD	Realtime/Instantaneous	92333	Southern CREW Marsh#1
Estero Bay	SOCREW2	Ground water	SFWMD	Realtime/Instantaneous	92335	Southern CREW Marsh#2
Logan Boulevard Canal	NA**	Surface water				Pump intake point
Woodlands Slough	SOCREW06	Groundwater	USGS	Realtime/Instantaneous	261759081421901	Woodlands Slough

Data Acquisition

Timeseries data at stations with data source identified as SFWMD in **Table 3** can be extracted by clicking at their respective links. The links are good as of April 15, 2022. Timeseries data at those stations for different period can also be accessed from the SFWMD DBHYDRO database via the DBHYDRO Browser using the DBKEYs listed in **Table 3**.

The DBHYDRO Browser is located at the following link: https://my.sfwmd.gov/dbhydroplsql/show_dbkey_info.main_menu

The DBHYDRO user's guide is located at the following link:

https://www.sfwmd.gov/sites/default/files/dbhydro_browser_user_documentation.pdf

Timeseries data at the USGS station SOCREW06 (USGS ID 261759081421901) can be extracted by clicking at its link from **Table 3**. A guide on how to extract data from USGS Water Data for the Nation site is located at the following link: <https://waterdata.usgs.gov/blog/how-to-use-nextgen-pages>.

*Imperial River near Bonita Springs

**NA: Not Available



APPENDIX 3 – SPECIFICATIONS OF CITY OF BONITA SPRINGS MOBILE PUMPS

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10" Axial Flow Pump-head

- 5,400 gpm @ 5' TDH
- 10" vertical discharge, 150# flange
- Cast bronze propeller, mounted in discharge side of pump head
- Vane-type hydraulic motor requiring 44 gpm @2,250 psi, mounted in suction side of pump head
- Hydraulic oil lubricated bearing carrier
- Stainless steel pump shaft
- Viton o'rings
- 75-series quick disconnects
- 50' of 1" (pressure) hydraulic hose with quick disconnects
- 50' of 1 ¼" (return) hydraulic hose with quick disconnects

20" Axial Flow Pump-head

- 18,500 gpm @ 5' TDH
- 20" vertical discharge, 150# flange
- Cast bronze impeller, mounted in discharge side of pump head
- Vane-type hydraulic motor requiring 96 gpm @2,500 psi, mounted in suction side of pump head
- Hydraulic oil lubricated bearing carrier
- Stainless steel pump shaft
- Viton o'rings
- 75-series quick disconnects
- 50' of 1 1/2" (pressure) hydraulic hose with quick disconnects
- 50' of 1 1/2" (return) hydraulic hose with quick disconnects

Note: The pump curve provided by the City for the 12 cfs (5,400 gpm) pumps indicates the discharge pipe size as 12"; however, pump specifications received earlier shows 10". The City needs to clarify this difference.



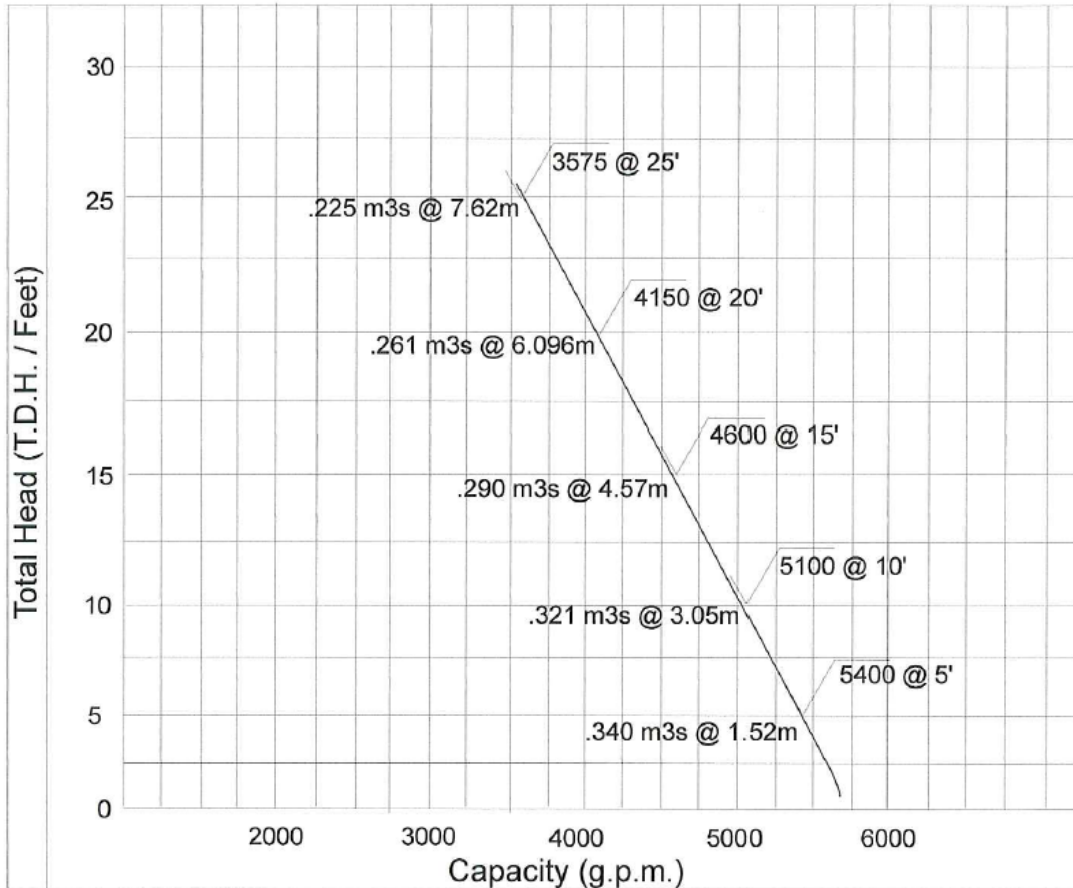
12" AXIAL FLOW PUMP MODEL-12 x 1.3 x 400

D & D AXIAL FLOW PUMP



Propeller Dia.	Style	No. Vanes	Solids Dia.	Discharge	Weight
10.062"	open	3	0	12.00"	725 Lbs.

Hydraulic Motor	Model	Displacement	G.P.M. Required	P.S.I.	b.h.p./ rpm
Vicker's	25M65-dd	4.19 cu/in Rev	44	2000	61 1800



NOTE--pumps can be chosen per specific g.p.m at any head--need not perform the entire curve. Please consult factory for special requests.

TEST CONDITIONS

Water-----fresh
S. G.-----1.00
Temp-----70* F
Altitude-----Sea Level

10/2012



*Tests were conducted according to Hydraulic Institute ANSI / HI-1.6

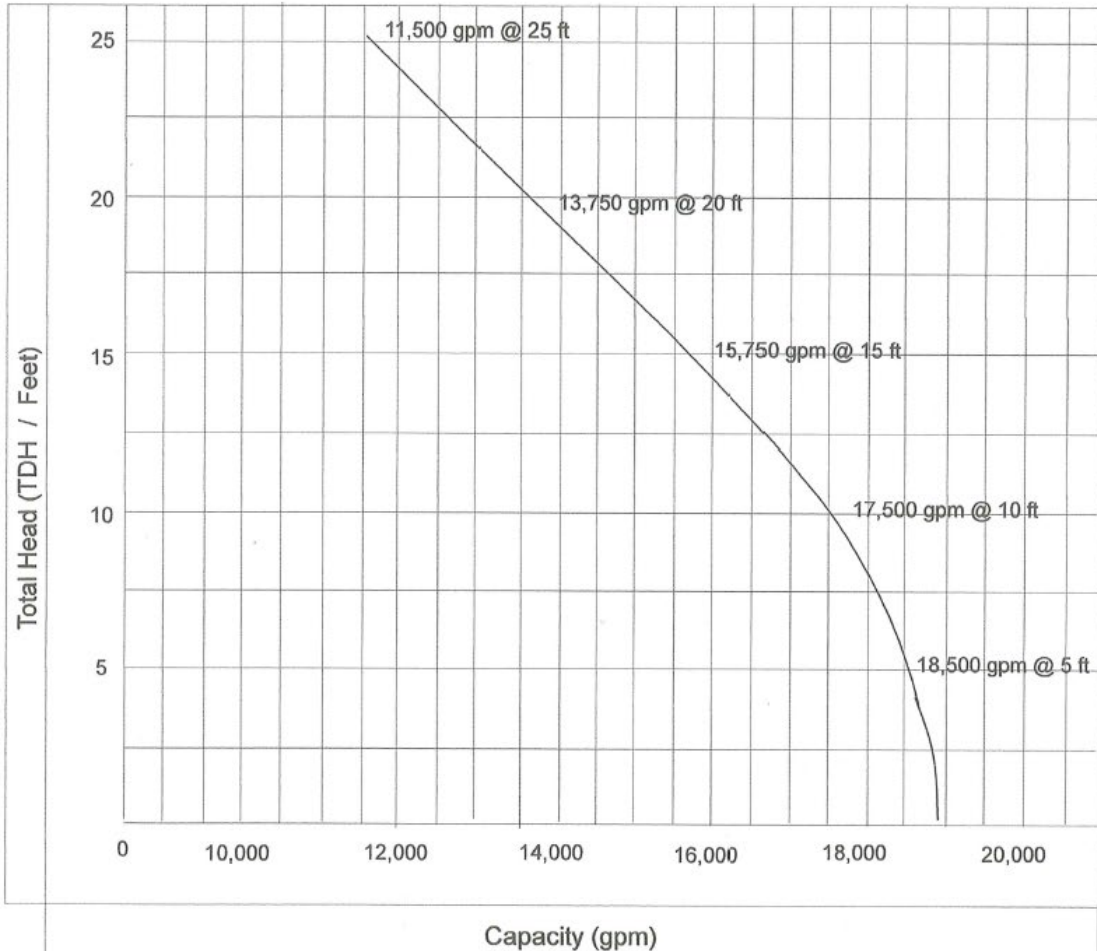


20" AXIAL FLOW PUMPHEAD

D & D AXIAL FLOW PUMP

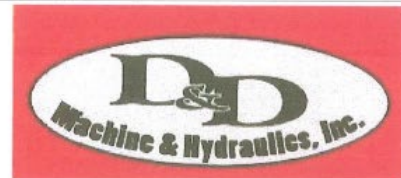


20AX		Solids Dia.	Discharge	Weight
		2"	20.00"	1,360 lbs
gpm req'd	psi	Line Set		Power Unit Series 800
96	2,500	1 1/2" press	1 1/2" return	225 hp



TEST CONDITIONS

Water-----fresh
 S. G.-----1.00
 Temp-----70* F
 Altitude-----Sea Level



*Tests were conducted according to Hydraulic Institute ANSI / HI-1.6

09/08/16