JEA BOARD OF DIRECTORS MEETING MINUTES
June 22, 2021

The JEA Board met in regular session at 9:00 am on Tuesday, June 22, 2021, on the 19th Floor, 21 W. Church Street, Jacksonville, Florida. The public was invited to attend this meeting in-person at the physical location and virtually via WebEx. Attendees were required to wear masks and CDC guidelines and social distancing were required at the meeting location.

WELCOME

Meeting Called to Order – Board Chair John Baker, whom attended the meeting virtually, called the meeting to order at 9:00 am. Board members in attendance were Bobby Stein, Marty Lanahan, Dr. Leon Haley, and Joseph DiSalvo. Also in attendance virtually was Dr. Zachary Faison. Board member Tom VanOsdol was not in attendance for the meeting. A quorum of the Board was physically present for the meeting.

Others in attendance in-person were Jay Stowe, Managing Director/CEO, Laura Dutton, Chief Strategy Officer, David Emanuel, Chief Human Resources Officer, Sheila Pressley, Chief Customer Officer and DeLisa Johnigarn, Executive Assistant. Jody Brooks, Chief Administrative Officer, attended the meeting virtually.

Time of Reflection – A moment of reflection was observed by all.

Introductions – Chair Baker recognizing there were no introductions to be made proceeded with the business of the meeting.

Adoption of the Agenda – On ***motion*** by Marty Lanahan and seconded by Bobby Stein, the agenda was approved.

Safety Briefing and Moment – Tom Wiertsema, Director, Customer Field & Meter Services, presented the Safety Briefing and a Safety Moment on Hurricane Preparedness and Disaster Supply Kit Checklists

COMMENTS / PRESENTATIONS

Council Liaison's Comments – Council Member Randy DeFoor thanked the Board for allowing her to be the Council Liaison and stated CM Boylan will take over July 1st. CM DeFoor acknowledged Council Members Newby and Freeman as the newly elected Council President and Vice President, respectively. In closing, CM DeFoor stated she would always be available for support.

Comments from the Public

N/A

Managing Director / CEO Report – Jay Stowe, Managing Director/CEO, opened the report by stating that it has been a privilege to watch employees live out JEA's mission. Mr. Stowe then reviewed the core values and strategic focus areas providing details on how JEA employees adhere to them. Mr. Stowe's highlights included an emphasis on building the strength of the current employees; Paul McElroy's recognition at the APPA conference; an update on the Board's diversity resolution; the announcement of Ted Phillips and Regina Ross as the Chief Financial Officer and Chief Legal Officer,

respectively; JEA employees' volunteer activities in the community; COVID safety measures and the "work from wherever you're best" policy; new corporate headquarters update; progress with SJWRMD; a recognition for CM DeFoor for her time as the Council Liaison and welcoming CM Boylan as the incumbent; and septic tank phase out. Mr. Stowe closed his report by acknowledging Lineman Bill Ziegenfelder, with Clay Electric, that passed away during a storm event. There were no questions.

CONSENT AGENDA

The Consent Agenda consists of agenda items that require Board approval but are routine in nature or have been discussed in previous public meetings of the Board.

On ***motion*** by Marty Lanahan and seconded by Dr. Leon Haley, all Consent Agenda items were approved.

Board Meeting Minutes – May 25, 2021 - Approved
FY2022 Budget *(Resolution 2021-13)* – Approved

FOR BOARD CONSIDERATION

Monthly Performance Update – James Kipp, Sr Director, Generation, began the presentation with an overview of the JEA Performance Scorecard data through May 31, 2021. Focusing on the three strategic focus areas, Mr. Kipp highlighted the results for safety, sales and expenses in both the electric and water/wastewater systems, fuel expenses, and reliability. Mr. Kipp recognized the maintenance team at Northside Generating Station then concluded the presentation with an update on the Pay for Performance metric.

BUSINESS EXCELLENCE

Rates and Fees Update – Juli Crawford, Director, Financial Planning & Analysis, referencing materials in the board meeting packet, provided an update on the FY2022 proposed rates and fees adjustments. Ms. Crawford presented a four part presentation which highlighted water & sewer rate adjustments, electric rate adjustments, timeline of events, next steps for Staff and a request for feedback and direction from the Board of Directors. Ms. Crawford concluded the presentation with a recommendation for the Board to take action and call a public rate hearing in August 2021 ***(Resolution 2021-15)***. A brief discussion amongst the Board ensued and positive feedback was provided.

On ***motion*** by Marty Lanahan and seconded by Dr. Leon Haley Resolution 2021-15 was approved.

Plant Vogtle Units 3 & 4 External Technical Consultant Report – Joe Orfano, Interim VP Financial Services opened the presentation introducing Bill Kemp, Director, Roland Berger LP, whom provided the results of their outside assessment of Plant Voglte Units 3 & 4. Mr. Kemp, referencing materials in the board meeting packet, presented an overview of the key performance indicators, details of the analysis conducted by Roland Berger and Modus, and outlined the recommended next steps for consideration.

Policy Reviews

Delegation of Authority – Jody Brooks, Chief Administration Officer, referencing materials in the board meeting packet, provided a high level overview of the recommended revisions to the Delegation of Authority policy. In her presentation, Ms. Brooks highlighted changes to the policy

that relate to the governing body which is the board. Ms. Brooks concluded the presentation by requesting the Board take action to approve the revised policy. ***(Resolution 2021-14)***.

On ***motion*** by Bobby Stein and seconded by Marty Lanahan Resolution 2021-14 was approved.

OTHER BUSINESS AND CLOSING CONSIDERATION

Old and Other New Business / Open Discussion – N/A

Chair's Report – None

Announcements – Next Board Meeting July 27, 2021 at Westside Service Center

Adjournment – With no further business coming before the Board, Chair Baker declared the meeting adjourned at 10:25 AM.

APPROVED BY:

_____
Marty Lanahan, Secretary

Date: _____

Board Meeting Recorded by:

_____
Madricka Jones
Executive Assistant to CEO

Safety Moment and Briefing

Sharon Van Den Heuvel
Director, ERP Systems

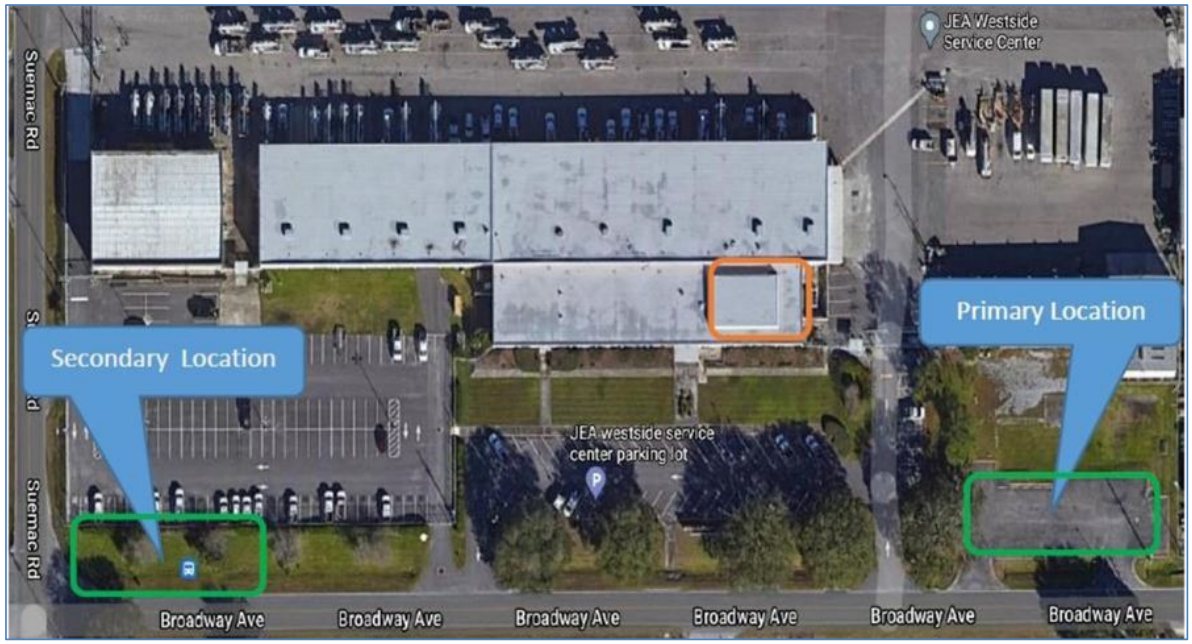
July 2021

Develop an Unbeatable Team

Safety Briefing

Westside Service Center

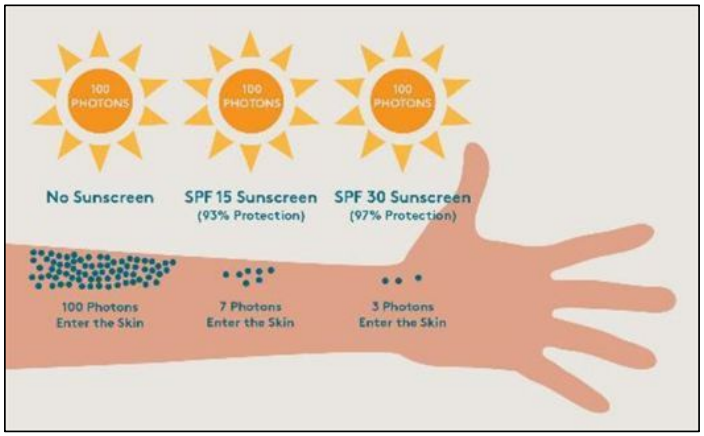
- In the event of an emergency, call 9-911 and alert others
- Emergency Evacuation Route
- Assembly Location: Eastside Parking Lot
- Safety Partner (person to your right)
- Medical Conditions / CPR
- Hazard & Situational Awareness
- Cell Phone Etiquette



Safety Moment

Summer Sun Awareness

- While some exposure to sunlight can be enjoyable, too much can be dangerous. Too much sun light can lead to sunburn, eye damage, and skin cancer.
- More than 3.5 million new cases of skin cancer are diagnosed annually.
- Seek shade between 10:00 am - 4:00 pm and use a broad spectrum sunscreen with a sun protection factor (SPF) of at least 30.
- No sunscreen is waterproof; they all eventually wash off. Sunscreens labeled water resistant are tested to be effective for up to 40 minutes of swimming, while very water resistant sunscreens stay effective for up to 80 minutes in the water.
- Clothing, sunglasses and hats are among the simplest and most effective ways to guard your skin and eyes from the sun's harmful rays.



Current Refunding Bond Offering Results

Joe Orfano
VP, Financial Services and Treasurer

July 27, 2021

Current Refunding Bond Offering Results

JEA Staff launched and priced current refunding bond offerings for the Electric and Water and Sewer Systems during the week of July 12th

The refunding transactions will generate approximately $3.7 million in average annual debt service savings over the next 20 years

Bond refunding delegation resolutions from this Board allow Staff the flexibility to launch transactions based on prevailing market conditions

($ in millions)	ELECTRIC	WATER	J
Refunding Par Amount	$44	$122	**$166**
Net PV Savings	$15 25.6%	$46 30.4%	**$61**

The historically low interest rate environment led to superior Net Present Value savings

BOARD RESOLUTION: 2021-16
July 27, 2021

SETTLEMENT OF ADMINISTRATIVE CHALLENGE AND APPROVAL OF COST PARTICIPATION AGREEMENT

WHEREAS, JEA filed an administrative challenge against the St. Johns River Water Management District (District) regarding the proportionate costs to JEA for the District's Black Creek Water Resource Development Project (Project); and

WHEREAS, JEA, along with the Clay County Utility Authority , Gainesville Regional Utilities , and St. John's County have negotiated participation agreements with the District that provides these utilities the ability to meet the Project requirements in an equitable manner that addresses these utilities impacts to the associated lakes – Lake Brooklyn and Lake Geneva (Lakes); and

WHEREAS, JEA's Consumptive Use Permit (CUP) allocation for drinking water, Lakes offset requested to address JEA's associated Lakes impact, and corresponding cost of participation is shown in the following table:

	CUP (mgd)	Offset (ft)	Total Cost
JEA	142	0.68	$7,373,307

THEREFORE BE IT RESOLVED by the JEA Board of Directors that:

The Board approves the attached Participation Agreement between JEA and St. Johns River Water Management District for participation in the District's Black Creek Water Resource Development Project and delegates to the CEO/Managing Director to execute the Participation Agreement and to take all other necessary actions to dismiss the administrative petition concerning this matter.

Dated this 27th day of July 2021.

JEA Board Chair

JEA Board Secretary

Form Approved by

Office of General Counsel

VOTE	
In Favor	
Opposed	
Abstained	

COST PARTICIPATION AGREEMENT NO. 3
FOR CONSTRUCTION AND OPERATION AND
MAINTENANCE OF THE BLACK CREEK
WATER RESOURCE DEVELOPMENT PROJECT

THIS AGREEMENT is entered into as of this ___ day of July 2021 (Effective Date) by and between JEA, whose address is 21 West Church Street, Jacksonville, Florida 32202, and the St. Johns River Water Management District, a special taxing district created by Chapter 373, Florida Statutes, (the District), whose address is 4049 Reid Street, Palatka, Florida 32177-2529.

RECITALS:

A. The District is charged with the responsibility to prevent harm to the water resources of the District and to administer and enforce Chapter 373, Florida Statutes (F.S.), and the rules promulgated thereunder.

B. The District administers the consumptive use permitting program in part II of Chapter 373, F.S., and has implemented that program, in part, through chapter 40C-2, Florida Administrative Code (F.A.C.), including the Applicant's Handbook: Consumptive Uses of Water (August 29, 2018) (A.H.) incorporated by reference in rule 40C-2.101(1)(a), F.A.C.

C. The District is authorized and directed to develop and implement minimum flows and minimum water levels in sections 373.042 and 373.0421, F.S., and has implemented this program in part through chapter 40C-8, F.A.C.

D. The District has issued JEA the following consumptive use permits (CUPs), collectively referred to as the JEA CUPs:

1. JEA CUP number 88271-21 on February 4, 2021, which expires on May 10, 2031 (CUP 88271).

2. JEA CUP number 147105-2 on December 22, 2017, which expires on August 17, 2036 (CUP 147105).

E. Condition number 10 of CUP 88271 and condition number 10 of CUP 147105 provides as follows:

> The permittee's consumptive use of water as authorized by this permit shall not reduce a flow or level below any minimum flow or level established by the District or the Department of Environmental Protection pursuant to Section 373.042 and 373.0421, F.S. If the permittee's use of water causes or contributes to such a reduction, then the District shall revoke the permit, in whole or in part, unless the permittee implements all provisions applicable to the permittee's use in a District approved recovery or prevention strategy.

F. Condition number 40 of CUP 88271 provides as follows:

> The permittee shall participate in developing and implementing any MFL prevention/recovery strategy approved by the Governing Board for the Keystone Heights area lakes with established MFLs (i.e., Cowpen Lake and Lakes Geneva and Brooklyn), unless a prevention or recovery strategy is no longer required under section 373.0421 of the Florida Statutes. The permittee's participation in developing and implementing an MFL prevention/recovery strategy approved by the Governing Board shall be limited to offsetting or mitigating the impact of the permittee's groundwater allocation and shall not extend to offsetting or mitigating the impact of other water uses or changes and structural alterations to the watershed, surface water, and aquifers and the effects that such changes or alterations have had or will have, and the constraints that such changes or alteration have placed or will place, on the hydrology of the affected watershed. If approved by the Governing Board as part of the regional water supply plan or plan amendment, such a prevention/recovery strategy may include without limitation any of the following actions or combinations of them:
>
> > a) Identifying and developing additional water supplies and other actions, consistent with the authority granted under chapter 373;
> >
> > b) Promulgation of a rule or orders setting forth phasing or a time table, which will allow for the provision of sufficient water supplies for all existing and projected reasonable-beneficial uses, including development of additional water supplies and implementation of conservation and other efficiency measures concurrent with, to the extent practical, and to offset, reductions in permitted withdrawals, consistent with the provisions of chapter 373;
> >
> > c) Actions taken by the District or water users, which cause Cowpen Lake or Lakes Geneva or Brooklyn to meet their minimum levels established in rule chapter 40C-8;
> >
> > d) Elimination or reduction of permitted water uses; or

e) A lake impact avoidance/mitigation plan approved by the District, which by surface water augmentation, groundwater recharge, alternative water supply sources or other means offsets or mitigates the impact of the permittee's groundwater allocation on Cowpen Lake or Lakes Geneva or Brooklyn.

The District shall revoke the permit in whole or in part, if the permittee fails to implement its portion of any Board-approved prevention/recovery strategy for Cowpen Lake or Lakes Geneva or Brooklyn in accordance with the schedule included in the strategy, as required by this condition.

G. On April 14, 2021, at the District's request, a notice of proposed rule was published in the Florida Administrative Register. This notice of proposed rule would establish the following new MFLs for Lakes Brooklyn and Geneva:

System Name	County	Minimum Level	Level (ft NAVD)
Brooklyn	Clay	P25	111.5
		P50	106.2
		P75	98.6
Geneva	Bradford,	P25	101.7
	Clay	P50	98.3
		P75	89.3

The minimum P25, P50, and P75 levels for Lake Brooklyn are based on the MFLs condition lake level time series (7/17/1957 – 12/31/2018), effective {*effective date*}, which is incorporated by reference and available at {insert URL} and upon request from the St. Johns River Water Management District, 4049 Reid Street, Palatka, FL 32177-2529.

MFL status of Lake Brooklyn will be assessed by comparing the minimum P25, P50, and P75 to the current P25, P50, and P75, respectively. The current P25, P50, and P75 for Lake Brooklyn are calculated by updating the current pumping condition lake level time series (7/17/1957 – 12/31/2018) with post-2018 observed data at SJRWMD gage 3360373. The current-pumping condition lake level time series is incorporated by reference and available at {insert URL} and upon request from the St. Johns River Water Management District, 4049 Reid Street, Palatka, FL 32177-2529.

> The minimum P25, P50, and P75 levels for Lake Geneva are based on the MFLs condition lake level time series (7/1/1957 – 12/31/2018), effective {*effective date*}, which is incorporated by reference and available at {insert URL} and upon request from the St. Johns River Water Management District, 4049 Reid Street, Palatka, FL 32177-2529.
>
> MFL status of Lake Geneva will be assessed by comparing the minimum P25, P50, and P75 to the current P25, P50, and P75, respectively. The current P25, P50, and P75 for Lake Geneva are calculated by updating the current pumping condition lake level time series (7/1/1957 – 12/31/2018) with post-2018 observed data at SJRWMD gage 11590497. The current-pumping condition lake level time series is incorporated by reference and available at {insert URL} and upon request from the St. Johns River Water Management District, 4049 Reid Street, Palatka, FL 32177-2529.

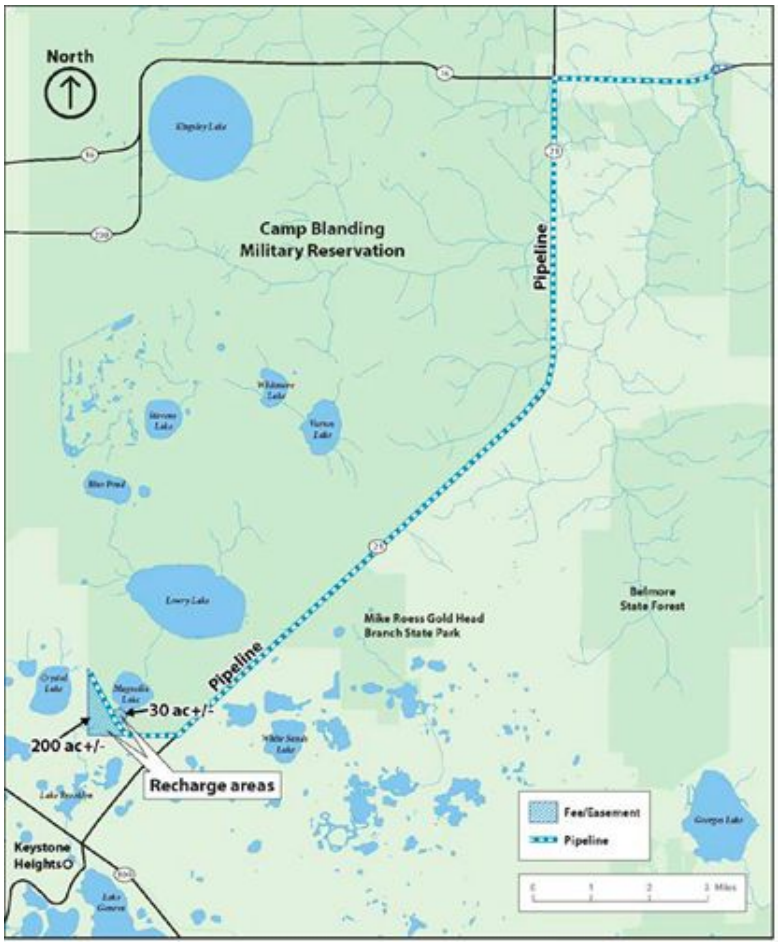
H. At its May 11, 2021, Governing Board meeting, the District's Governing Board voted to adopt the proposed MFLs rule referenced in paragraph G above.

I. By an Order dated May 11, 2021, the District determined that Lakes Brooklyn and Geneva were not meeting (i.e., were below) these new MFLs. That same Order additionally determined that Lakes Brooklyn and Geneva were in recovery and approved a recovery strategy (B&G Recovery Strategy). This recovery strategy estimated a P50 deficit for Lakes Brooklyn and Geneva of 3.9 feet and 1.5 feet, respectively by the year 2045. The B&G Recovery Strategy provides that "[u]pon determination that groundwater withdrawals authorized by individual consumptive use permits held by a permittee will cause or contribute, individually or cumulatively, to a violation of the MFLs for Lakes Brooklyn or Geneva, the District will notify them pursuant to the standard limiting conditions …of their responsibility to address their proportional share of the required recovery of the MFLs." A copy of B&G Recovery Strategy is attached as "Attachment 1."

J. The District will construct, operate and maintain the Black Creek Water Resource Development Project (Black Creek WRD). The Black Creek WRD is described in the B & G Recovery Strategy. The Black Creek WRD is also described in the North Florida Regional Water

Supply Plan (NFRWSP). Among other things, the Black Creek WRD involves the construction of an intake facility at Black Creek, a 17-mile transfer pipeline, and a treatment and distribution system at Alligator Creek, which flows into Lake Brooklyn.

K. The Black Creek WRD is illustrated by the following graphic:



L. The Black Creek WRD will directly augment Lakes Brooklyn and Geneva and also recharge the Floridan Aquifer in the vicinity of Lakes Brooklyn and Geneva sufficiently to enable these lakes to meet the MFLs described in section G above until at least the year 2045.

M. In the B&G Recovery Strategy, the District allows entities holding CUPs whose authorized water withdrawals contribute to the deficit for the Lakes Brooklyn and Geneva MFLs to participate financially in the construction and operation of the Black Creek WRD as a means of

addressing their proportional share of the required recovery of the MFLs for Lakes Brooklyn and Geneva and to ensure their future water use complies with the Lakes Brooklyn and Geneva MFL criteria by not causing a violation of the Lakes Brooklyn and Geneva MFLs. As used in this Agreement, the phrase "impacts to the Lakes Brooklyn Geneva MFLs" means JEA's proportionate share of the required recovery of the MFLs for Lakes Brooklyn and Geneva and compliance with the Lakes Brooklyn and Geneva MFL criteria to ensure no violations of the Lakes Brooklyn and Geneva MFLs, all as specified in the B&G Recovery Strategy.

N. Subject to the terms of this Agreement, JEA has elected to participate financially in the construction, operation, and maintenance of the Black Creek WRD to address JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the extent described herein.

O. Subject to the terms of this Agreement, the District has elected to allow JEA to participate financially in the construction, operation, and maintenance of the Black Creek WRD to address JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the extent described herein.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual benefits to be derived here from, the District and JEA agree as provided herein.

Incorporation of Recitals

1. The recitals set forth above are incorporated herein by reference and made a part hereof as fully as if set forth herein verbatim.

JEA's Purchase of Offsets and Payment for Black Creek WRD

2. The Black Creek WRD has an estimated construction project cost of between $63.8 and $82.9 million. As used herein, "construction cost" means actual costs of constructing project facilities, including construction management. The term "construction cost" does not include land acquisition, engineering design, permitting, and solicitation costs. The Black Creek WRD is

projected to raise the P50 elevation of Lake Brooklyn by 9.9 feet. Therefore, the initial estimated construction cost per each 0.1-foot rise in the elevation of Lake Brooklyn's water level (hereafter referred to as "lift" or "offset") achieved by the Black Creek WRD would be approximately $644,444 to $837,778, but in no case shall the total cost per 0.1 foot of lift used to determine JEA's construction cost participation payment exceed $837,778.00. This lift is also sufficient to raise the P50 elevation in Lake Geneva by 4.9 feet.

3. The Black Creek WRD has an estimated initial annual total operation and maintenance cost of $1,230,000. The 20-year net present value of this annual operation and maintenance cost was calculated to be $24,406,674 using an annual inflation rate of 1.4% and a discount factor of 1.34%. The resulting JEA payment for each 0.1 foot of lake level lift for Black Creek WRD operation and maintenance is $246,532.00.

4. JEA has elected to purchase 0.68 feet of lift. That purchase consists of 0.32 feet of lift for JEA's proportionate share of the impact from its 2014 – 2018 average water use towards the 1.6 feet of existing needed recovery in Lake Brooklyn and the 0.3 feet of existing needed recovery in Lake Geneva, and also 0.36 feet of lift so as to offset the impact from JEA's water use over and above its 2014-2018 average use towards the 3.9 feet of future recovery in Lake Brooklyn and 1.5 feet of future recovery in Lake Geneva. The determination of the amount of lift needed to offset the impact from JEA's water use is based upon the allocation of 142.26 MGD specified in condition 18 of CUP 88271, the allocation of 51.84 million gallons per year specified in CUP 147105, and the model simulation run by the District on June 17, 2021, and provided to JEA on June 22, 2021.

5. Based on the 0.68 feet of lift that JEA is purchasing, the total maximum construction cost JEA will pay based on the 0.1-foot lake level increase construction cost estimate of $837,778 is $5,696,890. This maximum construction cost payment may be lower based on the

payment methodology in paragraph 6 below.

6. Not later than November 1, 2021, JEA will pay, deposit and deliver, in escrow, to the Florida Department of Financial Services (DFS) as Escrow Agent under the terms of an Escrow Agreement to be entered into among JEA, the District, and DFS (Escrow Agreement) cash or cash equivalent in the principal sum of $2,848,445 representing one-half of JEA's total proportional share of the Black Creek WRD construction cost for the amount of lift JEA is purchasing. After JEA pays the Escrow Agent this amount, the District will determine the final award for the construction bid for the Black Creek WRD, and based on that bid award, within 30 days thereafter, the District will notify JEA of the final construction cost per 0.1 feet of lift and notify JEA of the dollar amount of the remaining portion of the Black Creek WRD construction cost JEA must pay the Escrow Agent (determined by final construction cost per 0.1 feet of lift multiplied by feet of lift the JEA is purchasing). However, regardless of the final construct cost per 0.1 of lift, JEA's remaining construction cost payments under this Agreement shall not exceed $2,848,445. After the District notifies JEA of the final construction cost per 0.1 foot of lift multiplied by the feet of lift JEA is purchasing, and accounting for JEA initial construction cost payment specified above, then not later than November 1, 2022, JEA will pay, deposit, and deliver, in escrow, to the Escrow Agent, the remaining amount of JEA construction cost payment. These construction cost payments are valid for the term of this Agreement and any extensions of this Agreement.

7. As another component of JEA's lift purchase, JEA will pay for JEA's share of the Black Creek WRD operation and maintenance costs as a lump sum payment, representing the net present value of 20 years of annual operation and maintenance costs using an annual inflation rate of 1.4% and a discount factor of 1.34%. Based on the 0.68 feet of lift that JEA is purchasing, and the net present value operation and maintenance cost of $246,532.00 per 0.1 feet of lift, JEA will pay an amount of $1,676,417. JEA will pay this amount in two payments. Therefore, in addition

to the construction cost payments specified above, by November 1, 2021, JEA will pay to the Escrow Agent the amount of $838,208. By November 1, 2022, JEA will pay to the Escrow Agent the amount of $838,209. This operation and maintenance payment amount is valid only for the term of this Agreement. If JEA wishes to extend the term of this Agreement, additional sums based on actual costs to operate and maintain the Black Creek WRD must be provided.

Access of Funds Via Escrow Agent

8. After JEA transfers the above referenced amounts to the Escrow Agent, the District shall access funds from the Escrow Agent pursuant to the terms of the Escrow Agreement to construct, operate and maintain the Black Creek WRD. When requesting disbursements, the District shall use the prescribed forms of DFS and will provide a cover letter to DFS with a copy to CUA stating the following:

> In accordance with Cost Participation Agreement Number [__], I request disbursement of funds in the amount of _____ DOLLARS ($_____) and certify that an equal amount has been expended by the District for construction or operation and maintenance of the Black Creek Project.

District Design, Permitting and Operation of Black Creek WRD

9. The District will undertake all reasonable efforts to design, permit, construct, operate, and maintain the Black Creek WRD up to its 10 MGD capacity, and in a manner which maximizes the flowrate discharged and aquifer recharge to raise the lake levels of Lakes Brooklyn and Geneva to the levels required to achieve compliance with the applicable minimum levels contained in Chapter 40C-8, F.A.C.

10. The District will use funds disbursed by the Escrow Agent under this Agreement for the sole purpose of payment for the construction or operation and maintenance of the Black Creek WRD.

11. In exchange for JEA financial participation in the Black Creek WRD provided in

this Agreement, the District assumes all liability and responsibility, through the operation of the Black Creek WRD, of ensuring that sufficient lake augmentation or other water conveyance occurs to enable Lakes Brooklyn and Geneva to meet the applicable minimum levels set forth in Chapter 40C-8, F.A.C., and to address JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the quantity of lift JEA has purchased. The District's liability and responsibility includes addressing and resolving any shortfalls in Black Creek WRD function or design, including shortfalls in effective lake augmentation, aquifer recharge and shortfalls or other impediments that may result in lake levels not increasing to the projected levels including, but not limited to, sinkhole formation, water quality issues, regulatory issues, third party lawsuits, and project cost overruns.

12. Any failure to design, permit, construct, operate or maintain the Black Creek WRD in a timely or sufficient manner, and any consequences resulting from the same, shall be the District's sole responsibility.

13. While the Black Creek WRD may provide regional recharge benefits beyond eliminating the recovery deficit of the Lakes Brooklyn and Geneva MFLs, the District will prioritize the design, permitting, construction, operation and maintenance of the Black Creek WRD to eliminate the recovery deficit of the Lakes Brooklyn and Geneva MFLs and to address JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the quantity of lift JEA has purchased before any regional recharge or other non-MFL benefits.

No Ownership of Control by JEA of Black Creek WRD

14. JEA will have no ownership in or operational control over the Black Creek WRD, including no ownership or control over any real estate interest needed to support the Black Creek WRD. JEA shall have no obligation to design, permit, construct, operate or maintain any portion of the Black Creek WRD. Nothing in this Agreement shall be construed to create a joint venture, partnership, or any other co-ownership arrangement between the District and JEA. JEA has no

10

obligation to any contractors, materialmen, suppliers, or any other entities performing work on the Black Creek WRD. All contracts or agreements for work on the Black Creek WRD shall be solely between the contractor and the District.

15. Each party is responsible for all personal injury and property damage attributable to the negligent acts or omissions of that party, its officers, employees and agents. District accepts all risks arising from construction or operation of the Black Creek WRD. Nothing contained herein shall be construed or interpreted as denying to any party any remedy or defense available under the laws of the state of Florida, nor as a waiver of sovereign immunity of the state of Florida, or of any political subdivision of the state of Florida, beyond the waiver provided for in §768.28, Fla. Stat., as amended. The District shall acquire and maintain throughout the term of this Agreement such liability, workers' compensation, and automobile insurance as required by its current rules and regulations.

District Representations Regarding JEA's Financial Participation in the Black Creek WRD

16. The District represents and warrants to JEA that the quantity of lift, lake augmentation, aquifer recharge or other benefit from the Black Creek WRD accrued to JEA by virtue of JEA's financial participation in the Black Creek WRD is in excess of any water resource development or general public benefit of that project such as, but not limited to, one or more of the following:

a. quantities reserved or otherwise designated for the benefit of the water resource or for water resource development;

b. quantities needed to offset of deficits associated with existing exempt and sub-threshold consumptive uses;

c. quantities needed to offset deficits associated with anticipated future exempt and sub-threshold consumptive uses;

d. quantities needed to offset deficits associated with permitted consumptive uses located in other water management districts or consumptive uses located outside the State of Florida; and

e. quantities accrued to other participants by virtue of their financial participation in the Black Creek WRD.

17. The District has full authority and ability to enter into this Agreement. The provisions of this Agreement do not conflict with any District regulatory program.

18. The District understands and recognizes that JEA's intends to rely on the District's implementation and operation of the Black Creek WRD as the sole means for JEA to demonstrate compliance with the Lake Brooklyn and Lake Geneva MFLs and to address JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the quantity of lift JEA has purchased to enable JEA to provide water for public supply purposes pursuant to the terms of JEA's CUPs.

Compliance with Consumptive Use Permit and Brooklyn and Geneva MFLs and Recovery Strategy

19. If JEA applies to renew or modify JEA's CUPs, the District shall accept this Agreement, for its duration, to demonstrate compliance with the requirements of Rule 40-2.301(2)(h), F.A.C. and sections 2.3(h) and 3.8 of the A.H. relative to the Lake Brooklyn and Lake Geneva MFLs and JEA's proposed groundwater withdrawals up to the amount of lift purchased by JEA to offset its impacts to the Lakes Brooklyn and Geneva MFLs. JEA and the District will use the North Florida Southeast Georgia Regional Groundwater Flow Model version 1.1 (NFSEG) in combination with the KHTM local scale model version 2.0 to determine the deficit in Lake Brooklyn MFL caused by JEA's proposed groundwater withdrawals to be compared to the amount of lift JEA has purchased under this Agreement. Upon mutual agreement of the parties, alternative groundwater flow models or future updates to the NFSEG Model version 1.1 or KHTM local scale model version 2.0 may be utilized for the determination of deficits and lift.

20. This section shall remain valid regardless of the design, permitting, construction or

operational status of the Black Creek WRD.

21. From the Effective Date through the duration of this Agreement, JEA will bear no responsibility for taking actions to offset lake stage deficits of either Lake Brooklyn or Lake Geneva resulting from JEA's groundwater withdrawals up to the amounts of lift specified in this Agreement.

22. If JEA timely makes the payments provided herein, JEA shall, for the duration of this Agreement, be deemed to have fully complied with the requirements of the conditions of the JEA CUPs identified in Recitals E and F and with the requirements of Rule 40C-2.301(2)(h), F.A.C., and Sections 2.3(h) and 3.8 of the Consumptive Uses of Water Applicants Handbook (A.H.), and any statutory provisions, regarding minimum levels for Lakes Brooklyn and Geneva, and recovery for the same, up to the amounts of lift specified in this Agreement, regardless of any or all of the following:

(i) the status of the District's construction, implementation, or operation of the Black Creek WRD;

(ii) any changes occurring to the construction or operation of the Black Creek WRD;

(iii) the cost of constructing the Black Creek WRD increasing beyond the amounts used in this Agreement;

(iv) any changes to permitted consumptive uses located in other water management districts or consumptive uses located outside of the State of Florida;

(v) the effectiveness or lack thereof of the Black Creek WRD in increasing lake levels of Lakes Brooklyn and Geneva; and

(vi) subsequently approved changes or revisions to the B &G Recovery

Strategy.

23. JEA shall be deemed to have addressed JEA's impacts to the Lakes Brooklyn and Geneva MFLs to the quantity of lift JEA purchased, and deemed in compliance with the aforementioned permits, rule, B & G Recovery Strategy, and any statutory obligation related to the Lakes Brooklyn and Geneva MFLs, without regard to the District's construction, operation or maintenance of the Black Creek WRD.

24. Within 90 days of executing this Agreement, the District will amend the B & G Recovery Strategy to include the following language: "Entities who have executed agreements to participate in the Black Creek WRD project have addressed their proportional share of impacts to the MFLs and are in compliance with the B&G Recovery Strategy up to the amount of lift purchased by that Entity." In the interim, this Agreement shall be deemed by the District to satisfy the B & G Recovery Strategy. The District's failure to amend the B&G Recovery Strategy to include this language within the specified timeframe shall not affect the determination that by entering into this Agreement JEA has addressed its impacts to the Lakes Brooklyn and Geneva MFLs referenced in section G above and is in compliance with the B&G Recovery Strategy up to the amount lift purchased by JEA.

25. JEA may submit and the District will accept this Agreement as "good cause" justifying JEA to apply to renew the JEA CUPs more than one year before the CUP expiration date as required by rule 40C-2.361(1), F.A.C.

26. If JEA fails to make any of the payments of its proportionate share of the Black Creek WRD construction costs or operation and maintenance costs specified herein, the District may enforce the terms of this Agreement and JEA shall not be entitled to use this Agreement to demonstrate compliance with the requirements of Rule 40C-2.301(2)(h), F.A.C. and sections 2.3(h) and 3.8 of the A.H. relative to the Lake Brooklyn and Lake Geneva MFLs.

Use of JEA's Lift Purchased from Black Creek WRD

for Other MFLs and Environmental Resources

27. The benefits from the Black Creek WRD associated with JEA's payments herein will also be considered an offset or benefit toward addressing impacts or deficits of other water bodies with established minimum flows or levels or with other environmental resource impacts attributable to the JEA CUPs authorized withdrawals to the extent operation of the Black Creek WRD creates such benefits. To the extent permitted by the Florida Department of Environmental Protection's rules, the District shall consider such offset or benefit toward addressing impacts or deficits to the re-evaluated minimum flow or level and recovery or prevention strategy for the Lower Santa Fe and Ichetucknee Rivers and associated priority springs. When the District issues a notice of proposed rule development to establish a new or re-evaluated minimum water flow or water level for waterbodies other than Lakes Brooklyn and Geneva or new minimum levels for groundwater, the District will evaluate the extent to which the operation of the Black Creek WRD provides benefits to, or offsets impacts from groundwater withdrawals to such other minimum water levels or water flows or environmental resource impacts and inform JEA of same.

Option for Additional Participation

28. For the duration of this Agreement, JEA has the option to pay the District for the right to use additional Black Creek WRD benefits to offset future impacts to the Lakes Brooklyn and Geneva MFLs and other impacts or deficits of other water bodies with established minimum flows or levels or with other environmental resource impacts resulting additional quantities of groundwater JEA would seek authorization to withdraw under the JEA CUPs, including any modifications of the JEA CUPs, at the same cost per foot of recovery used to calculate JEA's original participation costs described herein (i.e., construction, operation and maintenance costs). This option remains so long as the Lakes Brooklyn and Geneva water level augmentation

capabilities of the Black Creek WRD have not been otherwise been assigned. If JEA desires to execute this option, JEA shall notify the District of the same along with an offer of the additional payment for the right to use the requested additional benefits. Upon receiving the JEA's notice, the District shall determine whether adequate benefits from the Black Creek WRD remain available for JEA's use and whether JEA has correctly calculated the amount of the additional payment required for such use. If the District determines that additional benefits are available for JEA's use and determines the correct payment amount for such additional benefits, JEA and the District will amend this Agreement to reflect the payment and use of such additional benefits.

Miscellaneous

29. All notices or other communications which may be required under the terms of this Agreement shall be in writing and shall be deemed to have been duly given if sent by overnight courier (e.g., Federal Express), or if mailed by United States certified mail, return receipt requested, postage prepaid, addressed to the respective party at the addresses set forth below:

If to JEA:	JEA 21 West Church Street Jacksonville, FL 32202 Attn: VP of Environmental Services
With copy to:	JEA 21 West Church Street Jacksonville, FL 32202 Attn: Chief Administrative Officer
If to District:	St. Johns River Water Management District 4049 Reid Street Palatka, FL 32177-2529 Attn: Office of General Counsel

30. JEA will take no action opposing (or encourage any other person or entity to oppose) the District's application to any government body or special district for authorization to

16

construct, operate, and maintain the Black Creek WRD.

31. This Agreement shall be governed by, and construed and enforced in accordance with, the laws of the State of Florida.

32. This Agreement constitutes the entire understanding and agreement between the parties hereto with respect to the subject matter hereof. This Agreement may not be modified or amended except by the written agreement of the parties to be bound thereby.

33. In the event of any legal or administrative proceedings arising from or related to this Agreement, including appeals, each party shall bear its own attorney's fees.

34. Two (2) originals of this Agreement shall be executed, with each party provided one (1) fully executed original.

35. The parties intend this Agreement to be an interlocal agreement pursuant to section 163.01, FS., and JEA shall record this Agreement at JEA expense with the Clerk for the Circuit Court in and for Duval, Nassau and St. Johns Counties, Florida.

36. The fact that one of the parties may be deemed to have drafted or structured any provision hereof shall not be considered in construing the particular provision either in favor of or against such party.

37. If any provision of this Agreement is held to be illegal, invalid, or unenforceable under present or future laws, such provision shall be fully severable, the same as if the invalid or unenforceable provision had never been a part of the Agreement; and the remaining provisions of the Agreement shall remain in full force and effect and shall not be affected by the illegal, invalid, or unenforceable provision or by its severance from this Agreement.

38. The terms of this Agreement shall inure to the benefit or obligation of the successors and assigns of the parties. In addition, for the duration of this Agreement, if JEA determines that it no longer requires all or a portion of the amount of lift JEA purchased under this

17

Agreement, JEA may tender all or a portion of that amount of lift to the District. If the District agrees to accept the amount of lift JEA is tendering, JEA and the District shall enter into an amendment of this Agreement specifying the terms for JEA return of that amount of lift to the District. In general, as of the Effective Date, the parties envision that an amendment to this Agreement allowing JEA to return to the District all or a portion of the amount of lift purchased will require the District to pay to JEA an amount of money representing the cost of such lift under the lift payment formulas specified herein. The parties also envision that the District may also sell to a third party some or all of the amount of lift JEA is returning to the District. JEA may not directly sell or resell to a third party all or a portion of the amount of lift JEA has purchased under this Agreement. This Agreement does not create any obligation for the District to purchase any part of the lift tendered by JEA nor create any expectation in JEA that the District would agree to such purchase.

39. The parties acknowledge that a portion of JEA's utility service area is in St. Johns County as described in the interlocal agreement between St. Johns County and JEA dated July 20, 1999, as subsequently amended. In the event that JEA's utility service area is modified to include additional utility service area within St. Johns County, nothing in this Agreement shall prevent JEA from receiving credit for the amount of lift purchased by St. Johns County proportionate to such extended utility service area. Such credit shall not be considered a sale to a third party for the purposes of this Agreement.

40. The District shall provide no input nor attempt to influence in any way the source or method JEA employs to recover costs associated with JEA's participation in this Agreement or the Black Creek WRD. This prohibition shall not apply if JEA requests the District input. In such case, the District's input shall be limited to the extent of JEA's request.

41. This Agreement shall remain in effect through December 31, 2045.

42. JEA's participation in this Agreement shall not be construed in any way to prejudice JEA's future ability to rely on other projects or action of the District or other entities for additional benefits or offsets to the Lakes Brooklyn and Geneva MFLs, other established minimum water levels or water flows and associate prevention or recovery strategies, and other water resource impacts.

43. This Agreement may be enforced through specific performance. This Agreement may also be used in any legal or administrative proceeding involving JEA and the Lakes Brooklyn and Geneva MFLs.

44. Any party to this Agreement may publish notice of the Agreement. If this Agreement is challenged or opposed by a third party, the District and JEA will jointly defend against such challenge, including any subsequent appeals.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed on the dates set forth below.

[SIGNATURES ON FOLLOWING PAGES]

JEA

BY: _____
Jay Stowe, Managing Director and CEO

Date of Execution: _____

Approved as to form and content:

By: _____

Name: _____
Assistant County Attorney
Office of General Counsel

20

ST. JOHNS RIVER WATER
MANAGEMENT DISTRICT

By: _____
Douglas Burnett, Chairman

Attest: _____
FOR Susan Dolan, Secretary Asst. Sec.

(SEAL)

Approved as to Legal Form and Content:

_____
Mary Ellen Winkler, General Counsel

Filed on this _____ day of _____, 2021.

_____
District Clerk

ATTACHMENT 1

RECOVERY STRATEGY FOR IMPLEMENTATION OF LAKES BROOKLYN AND GENEVA MINIMUM LEVELS

Recovery Strategy for the Implementation of Lakes Brooklyn and Geneva Minimum Levels

July 13, 2021

St. Johns River Water Management District
Division of Water Supply Planning and Assessment
Bureau of Water Supply Planning

Introduction

As a part of fulfilling its mission and statutory responsibilities, the St. Johns River Water Management District (District) establishes minimum flows and levels (MFLs) for priority water bodies within its boundaries. MFLs establish a minimum hydrologic regime and define the limits at which further consumptive use withdrawals would be significantly harmful to the water resources or ecology of an area. MFLs are one of many effective tools used by the District to assist in making sound water management decisions and preventing significant adverse impacts due to water withdrawals.

Lakes Brooklyn and Geneva are sandhill lakes located in Clay and Bradford counties, Florida (see Figure 1) and adjacent to the city of Keystone Heights, Florida. Lakes Brooklyn and Geneva are part of a chain of lakes and wet prairies in the Upper Etonia Creek Basin. Minimum levels for Lakes Brooklyn and Geneva were originally adopted in January 1996. The District completed a reevaluation of minimum levels for Lakes Brooklyn and Geneva in 2020. The reevaluated minimum levels recommended for Lakes Brooklyn and Geneva are based on implementation of updated methods and more appropriate environmental criteria. The updated methods include results from a new regional steady state groundwater model and a local scale transient model used to quantify the effects of local and regional groundwater withdrawals, and the analysis of an additional 20 years of hydrologic data. The status assessment for Lakes Brooklyn and Geneva indicate that they are currently not meeting their proposed MFLs based upon current (average of 2014–2018) groundwater withdrawals with a P50 lake deficit of 1.6 feet for Lake Brooklyn and 0.3 feet for Lake Geneva. Therefore, Lakes Brooklyn and Geneva are in recovery, and a recovery strategy is required (subsection 373.0421(2), *Florida Statutes* (F.S.)). Additionally, the estimated pumping conditions at 2045 were assessed and when added to the current deficit resulted in an estimated total deficit for Lakes Brooklyn and Geneva at the P50 of 3.9 feet and 1.5 feet, respectively.

Consistent with the provisions for establishing and implementing MFLs provided for in section 373.0421, F.S., the Recovery Strategy (Strategy) for the Implementation of Lakes Brooklyn and Geneva MFLs identifies a suite of projects and measures that, when implemented, recovers the MFLs for Lakes Brooklyn and Geneva and prevents the MFLs from being violated in the future due to consumptive uses of water, while also providing sufficient water supplies for all existing and projected reasonable beneficial uses.

To meet the requirements for the Strategy according to subsection 373.0421(2), F.S., this Strategy contains the following information:

- A listing of specific projects and measures identified for implementation of the plan
- A regulatory component to achieve the MFLs
- A timetable for implementation

On January 17, 2017, the St. Johns River Water Management District and the Suwannee River Water Management District Governing Boards approved the 2015–2035 North Florida Regional Water Supply Plan [NFRWSP] (SJRWMD and SRWMD, 2017) which identified that groundwater withdrawals beyond 2010 were not sustainable without creating adverse environmental impacts.

The MFLs for Lakes Brooklyn and Geneva support the conclusions of the NFRWSP. Like the NFRWSP, this Strategy focuses on water conservation, water supply development and water resource development (WRD) projects. A regulatory component is also included that utilizes existing rules to provide a structure for consumptive use permittees to address individual and cumulative impacts to Lakes Brooklyn and Geneva. The combination of projects and regulatory measures provide assurance that the MFLs for Lakes Brooklyn and Geneva will be achieved while meeting future demands.

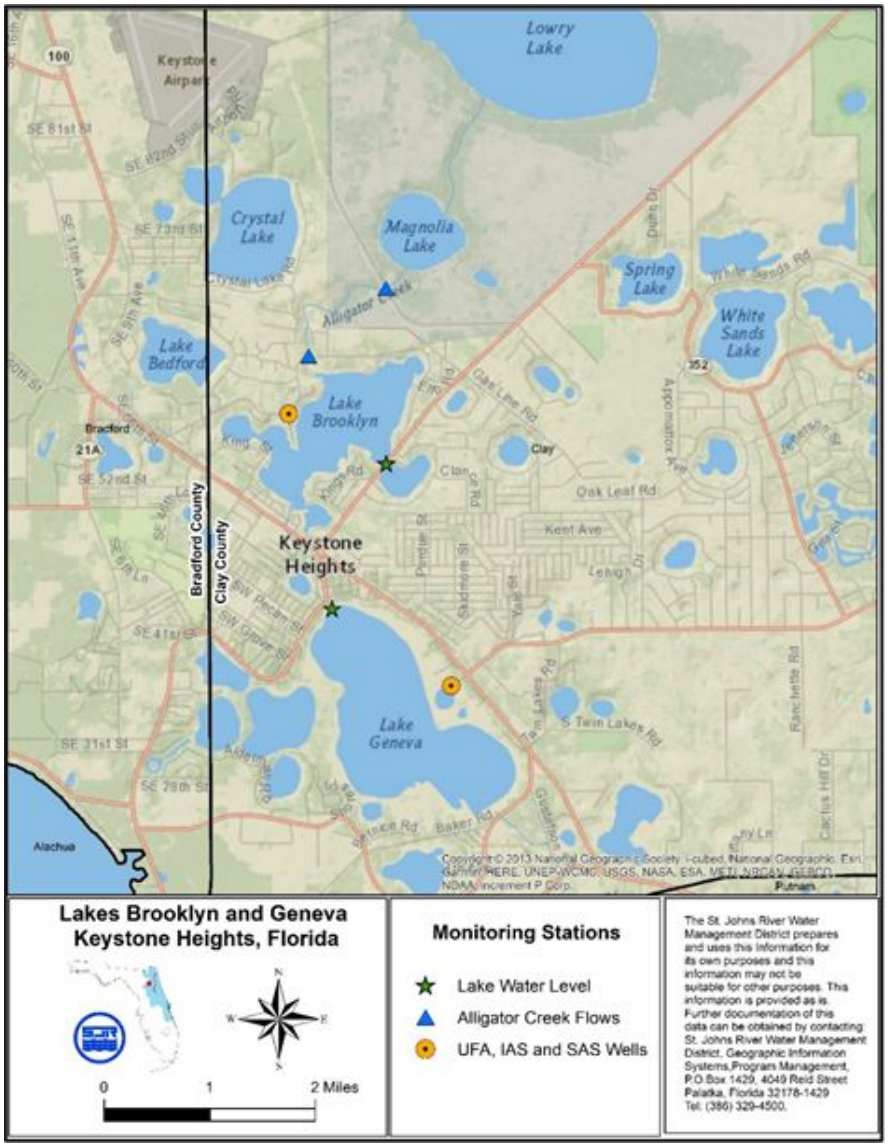


Figure 1. Location of Lakes Brooklyn and Geneva and associated monitoring stations

Stakeholder outreach

The District has been coordinating with stakeholders within the region since 2012 regarding potential projects to benefit Lakes Brooklyn and Geneva. Stakeholder outreach activities specifically related to the updated MFLs and the Strategy began in April 2018 with briefings to members of the Save Our Lakes Organization (SOLO), the North Florida Utility Coordination Group (NFUCG), and the Florida Pulp and Paper Association. On October 26, 2020, all District consumptive use permittees within the NFRWSP area (see Figure 2) were advised by letter of the draft MFLs for Lakes Brooklyn and Geneva and encouraged to participate in the development of the Recovery Strategy. A draft Recovery Strategy for the Implementation of Lakes Brooklyn and Geneva Minimum Levels was posted for public viewing on the District website on December 3, 2020, and a public workshop was held on December 10, 2020, in Palatka, Florida.

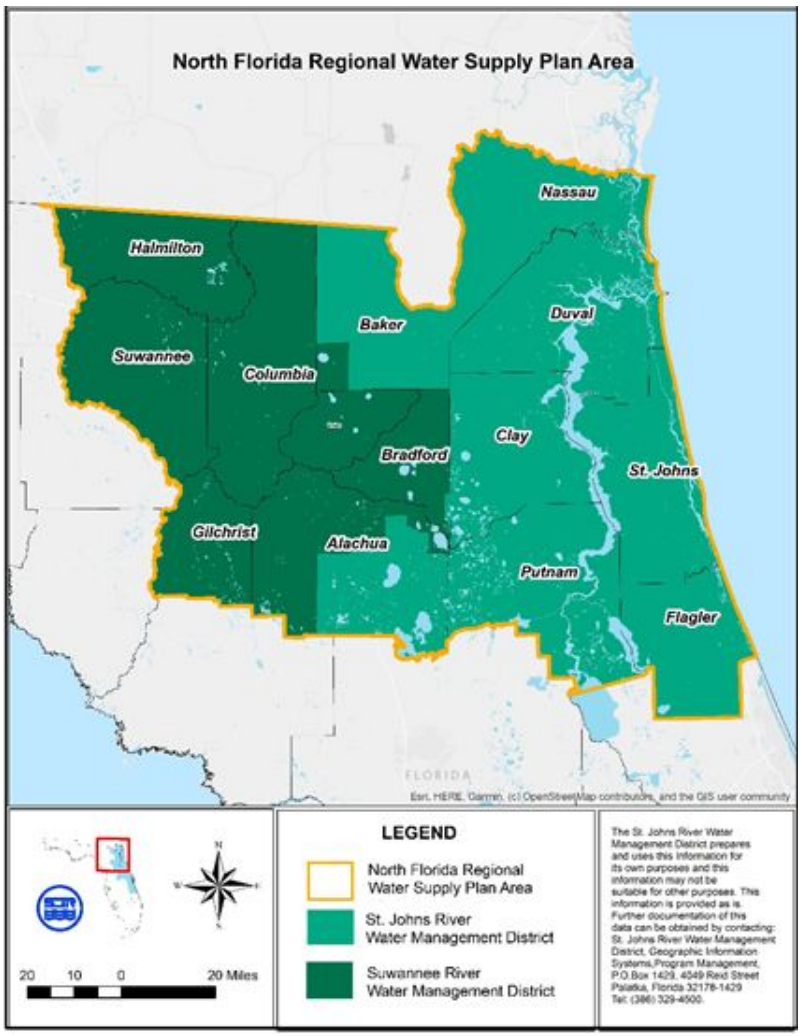


Figure 2. Map of the North Florida Regional Water Supply Plan area.

Lakes Brooklyn and Geneva MFLs and Status Assessment

The District completed a reevaluation of the minimum levels for Lakes Brooklyn and Geneva in 2020. After peer review and staff evaluation of relevant criteria, 10 environmental metrics were chosen for evaluation and assessment at Lakes Brooklyn and Geneva. Of these 10 metrics, the open-water area criterion was determined to be the most sensitive for both Lakes Brooklyn and Geneva. (Sutherland, et. al., 2020).

Three minimum levels (see Table 1) were recommended for Lakes Brooklyn and Geneva. These three levels were calculated from the MFLs condition exceedance curve for each lake. Adopting these three minimum levels will ensure the protection of the minimum hydrologic regime at low, average and high levels for Lakes Brooklyn and Geneva.

Table 1. Recommended minimum levels for Lakes Brooklyn and Geneva, Clay and Bradford counties, Florida (from Sutherland et al, 2020).

System	Percentile	Recommended minimum lake level (ft; NAVD88)
Lake Brooklyn	25	111.5
	50	106.2
	75	98.6
Lake Geneva	25	101.7
	50	98.3
	75	89.3

The recommended minimum levels for Lakes Brooklyn and Geneva will protect relevant water resource values from significant harm due to water withdrawals. The recommended MFLs are preliminary and will not become effective until after adoption.

As part of the reevaluation, an assessment was conducted to compare the proposed minimum levels (minimum MFLs hydrologic regime) to existing and projected hydrologic regimes to determine the current and future status of the MFLs. The status assessment utilized the North Florida Southeast-Georgia Regional Groundwater Flow Model version 1.1 (NFSEG) and the Keystone Heights Transient Groundwater Flow Model v2.0 (KHTM) to determine the current status associated with the MFLs for these two lakes.

Proposed MFLs and current-pumping conditions were compared to determine lake freeboards/deficits for the final suite of environmental criteria. The current-pumping condition represents the average 2014–2018 pumping condition and is based on the best available data as of July 2020. The status assessment for Lakes Brooklyn and Geneva indicate that they are currently not meeting their proposed MFLs. A comparison of the MFLs and current-pumping conditions for Lakes Brooklyn and Geneva yields a lake level deficit of 1.6 feet and 0.3 feet, respectively.

Therefore, Lakes Brooklyn and Geneva are in recovery, and a recovery strategy is required. The 2035 water use estimations were extrapolated out to 2045 resulting in an 8% increase over expected 2035 withdrawals. This 8% increase was applied to the results of the 2035 status assessment for Lakes Brooklyn and Geneva levels producing an estimated 2045 deficit for Lakes Brooklyn and Geneva of 3.9 feet and 1.5 feet, respectively.

Consistent with the provisions for establishing and implementing MFLs provided for in section 373.0421, F.S., the recovery strategy for Lakes Brooklyn and Geneva MFLs identifies a suite of projects and measures that, when implemented, will recover these lakes from impacts due to withdrawals. Since the MFLs status of Lakes Brooklyn and Geneva are in recovery, a portion of the current groundwater pumping and all future groundwater demands that have a potential impact will need to be met through increased water conservation, alternative water supplies, or impact offsets (e.g., recharge).

Influence by use type

Identifying the water uses that have the largest potential impact on the water resource of concern is an important first step in the development of a recovery strategy. This assessment guides the development of strategies, including projects, that result in the greatest benefit to the constrained water resource. The NFSEG model was used to determine the impact by use type for Lake Brooklyn, because it has the greater recovery deficit. Public supply water use represents 44.3% of the change in the potentiometric surface of the Upper Floridan aquifer (UFA) at Lake Brooklyn from current pumping within the District (see Figure 3). The second largest user group is domestic self-supply at 27.0%.

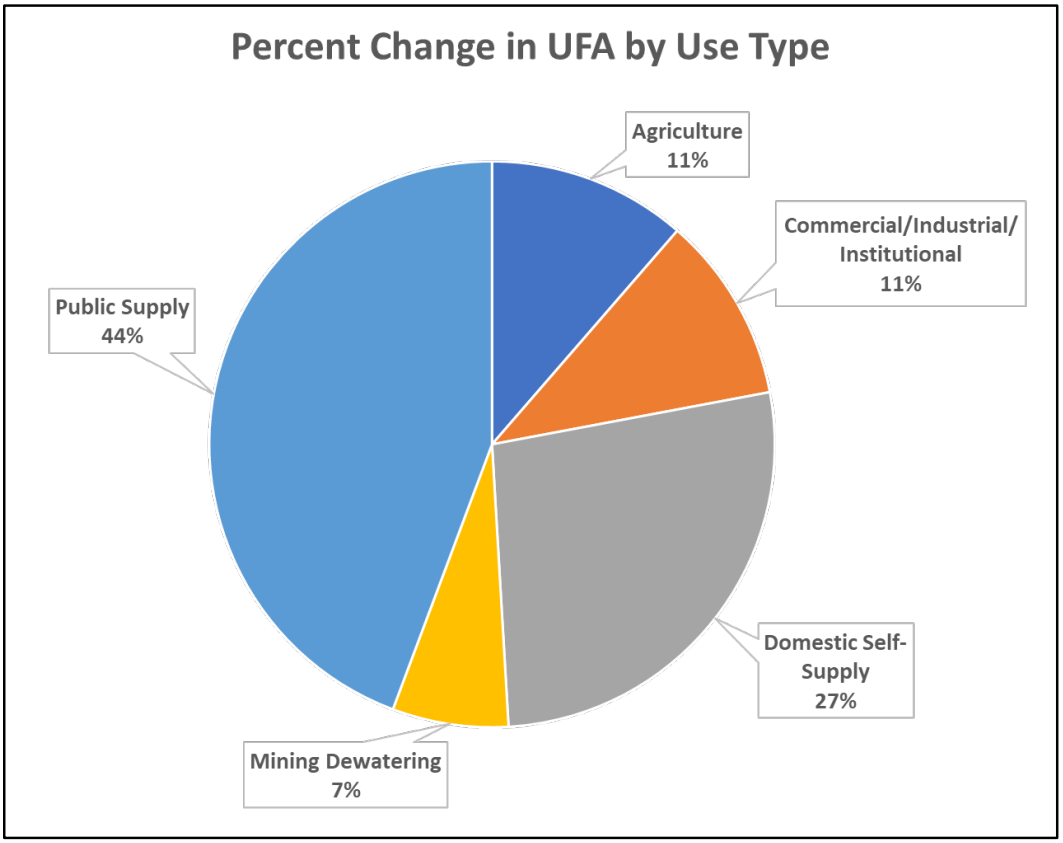


Figure 3[1]. Percent change in Upper Floridan Aquifer levels at Lake Brooklyn by category from withdrawals in the District.

Domestic Self-Supply near Keystone Heights

Impacts from domestic self-supply withdrawals within 10 miles of Lake Brooklyn in the District were investigated. The results of this investigation indicate that current pumping from domestic self-supply withdrawals near Keystone Heights represent nearly 50% of the total DSS change in the

[1] The combined change to UFA at Lake Brooklyn from current pumping for the landscape/recreation/aesthetic, power generation, and other small categories make up less than 1.0% of the remaining change and thus are not shown in Figure 2, but are considered in this Strategy.

UFA levels at Lake Brooklyn from withdrawals in the District. This investigation highlights how, cumulatively, nearby small withdrawals can significantly influence the UFA levels at Lake Brooklyn.

The impact from domestic self-supply withdrawals could be mitigated by development of a source of supply other than the UFA or by relocating the UFA withdrawals farther from the lakes. For example, the development of a public water supply system would allow for the centralization of the UFA withdrawal to a location farther away from the lakes and thus provide a benefit to the UFA at Lake Brooklyn. Optimization of the UFA withdrawal location and the individuals served could be further explored to address the impact from domestic self-supply withdrawals near Lake Brooklyn.

Projects and Measures that Achieve the Strategy Objective

Achieving and ensuring the maintenance of the MFLs for Lakes Brooklyn and Geneva will require the implementation of projects and measures in addition to the careful management of local and regional groundwater withdrawals. Projects and measures include enhanced conservation, aquifer recharge, development of alternative water supplies, and expansion of reclaimed water systems. The benefits predicted from the suite of proposed projects and measures, together with the regulatory component, provide assurance that the MFLs for Lakes Brooklyn and Geneva will be achieved through 2045.

Numerous projects and measures within the District from the NFRWSP were completed between 2014 and 2020. Examples of these projects include water conservation measures utilizing technological improvements such as soil moisture monitoring and advanced metering, implementation of best management practices, and reuse system expansion through increased treatment, distribution and storage systems. Appendix A provides further information on projects from the NFRWSP that have been completed. The primary benefit from these completed projects is reducing future demand from the Floridan aquifer.

Additional water conservation measures, water resource development projects, and water supply projects will be necessary to meet future water use demands while ensuring that the MFLs for Lakes Brooklyn and Geneva will be met. Potential stakeholder projects and measures from the NFRWSP along with their estimated benefits are listed in Appendix B.

Actual projects and measures implemented to achieve the goals of the Strategy objective may differ from those described in this document. Moreover, projects and measures identified in the Strategy do not become permit conditions by virtue of their inclusion in an approved Strategy. The projects described in this Strategy or alternative projects that the District concurs will provide an equivalent benefit, may be developed and incorporated as consumptive use permit (CUP) conditions through standard permitting procedures and future Strategy revisions, as appropriate.

Water conservation

Water conservation is an important component of any prevention or recovery strategy as it directly affects projected water demand and, therefore, the magnitude of resource impacts. Best

management practices such as improved irrigation scheduling, conversion to more efficient irrigation systems, and moisture sensor-controlled automation can reduce the amount of water applied to crops and landscape. A large portion of these savings occurs through passive water conservation. Passive water conservation occurs when showerheads, appliances, urinals, and faucet aerators are replaced with more efficient fixtures or systems in homes, commercial establishments, institutions, or any facility with household type use.

Potential water conservation quantities were estimated based on the methodologies employed for the NFRWSP. The conservation savings potential within the District was estimated to be 23 million gallons per day (mgd) through both passive water conservation strategies and active water conservation programs funded by local governments or public water supply utilities.

Reclaimed water potential

The reclaimed water projects summarized in Appendixes A and B provide details on the actual projects completed or planned to be constructed to expand the use of reclaimed water as identified in the NFRWSP. Implementation of reclaimed water provides an offset to withdrawals from traditional water sources and reduces potential impacts. Much of this reclaimed water will provide a source of irrigation water for recreational, residential, and commercial users.

Black Creek WRD project

The 10 mgd Black Creek WRD project, identified in the NFRWSP, is currently in the design and permitting phase. The Black Creek WRD development project will provide regional recharge to the Floridan aquifer. In addition to these regional benefits, when fully implemented, this project has the potential to increase median lake levels in Lakes Brooklyn and Geneva by up to 9.9 ft and 4.9 ft, respectively. The estimated construction and 20-year operation and maintenance cost for the project is $81.4 million. The St. Johns River and Keystone Heights Lake Region Projects legislative appropriations provided nearly $43.4 million to the Black Creek WRD Project, and the District is also contributing $5 million toward the project. Once the necessary permits have been issued and sufficient funding has been secured, construction could be completed within 3 years.

The project will provide sufficient benefits to Lakes Brooklyn and Geneva to offset the impacts from current and future water uses that are not subject to individual permitting requirements such as domestic self-supply and other water uses that are below consumptive use permitting thresholds. It is anticipated that additional benefits could be available to offset a portion of existing impacts from individual consumptive use permittees. Permittees would also have the opportunity to partner with the District on the project to ensure the project could be constructed and operated in a manner such that sufficient benefits would be available to fully offset their current and future impacts to Lakes Brooklyn and Geneva. Entities who have executed agreements to participate in the Black Creek WRD project have addressed their proportional share of impacts to the MFLs and are in compliance with the Recovery Strategy up to the amount of lift purchased by that entity.

Regulatory Component

A regulatory component to the recovery strategy is necessary to not only ensure that existing and future groundwater use is consistent with the recovery and maintenance of the MFLs for Lakes Brooklyn and Geneva, but also to outline the necessary actions by permittees to address their proportional share of the required recovery of the minimum levels for Lakes Brooklyn and Geneva.

Current permitting rules

Presently, the District possesses a comprehensive system of rules, which regulate consumptive uses of water. These permit criteria are listed in Chapter 40C-2, Florida Administrative Code (F.A.C.), and are expanded upon in the District's *Applicant's Handbook: Consumptive Uses of Water* (A.H). Several existing permit requirements will continue to provide assurance that existing and new permitted consumptive uses are consistent with the Strategy objective:

- Permitting criterion requiring that reasonable-beneficial uses *must not cause harm to the water resources of the area*. See Rule 40C-2.301(2)(g), F.A.C. According to the definition of an MFL, withdrawals that result in MFLs not being achieved are considered significantly harmful to that water body.
- Permitting criterion requiring that reasonable-beneficial uses *must be in accordance with any minimum flow or minimum level and implementation strategy*. See Rule 40C-2.301(2)(h), F.A.C.
- Permitting criterion requiring that reasonable-beneficial uses *must be in such quantity as is necessary for economic and efficient use*. See Rule 40C-2.301(2)(a), F.A.C. To meet the requirements of this criterion, water use must be consistent with the demonstrated water demand for a particular water use.
- A standard limiting condition is placed on consumptive use permits requiring that the permittee's consumptive use of water as authorized by the permit shall not reduce a flow or level below any minimum flow or level established by the District or the Department of Environmental Protection pursuant to sections 373.042 and 373.0421, F.S. The condition further requires that if the permittee's use of water causes or contributes to such a reduction, then the District shall revoke the permit, in whole or in part, unless the permittee implements all provisions applicable to the permittee's use in a District-approved recovery or prevention strategy. See Rule 40C-2.381(2)(a)10., F.A.C.
- Another standard limiting condition requires that the permittee's consumptive use of water as authorized by this permit shall not significantly and adversely impact wetlands, lakes, rivers, or springs. If significant adverse impacts occur, the District shall revoke the permit, in whole or in part, to curtail or abate the adverse impacts, unless the impacts associated with the permittee's consumptive use of water are mitigated by the permittee pursuant to a District-approved plan. See Rule 40C-2.381(2)(a)9., F.A.C.

Existing Permitted Uses

Nothing in this strategy shall be construed to automatically modify any consumptive use permits to reduce previously authorized allocations. Upon determination that groundwater withdrawals authorized by individual consumptive use permits held by a permittee will cause or contribute,

individually or cumulatively, to a violation of the MFLs for Lakes Brooklyn or Geneva, the District will notify them pursuant to the standard limiting conditions above of their responsibility to address their proportional share of the required recovery of the MFLs. Any modifications to existing consumptive use permits would be in accordance with chapter 373, Florida Statutes, and District rules.

Applications for New Quantities and Renewals

Requests for withdrawals of new quantities of water or renewals of existing allocations that are projected to impact the MFLs for Lakes Brooklyn or Geneva would need to meet the conditions for issuance described above, including a demonstration that the proposed use will not cause or contribute, individually or cumulatively, to violations of the Minimum Levels for Lakes Brooklyn or Geneva.

Timeline

The following timeline highlights the milestones toward achieving the recovery of the MFLs within 20 years.

- **Ongoing efforts**
  - Continue implementation of projects from the NFRWSP (Appendix B).
  - Incentivize water conservation and water supply projects through the District's cost-share programs.
  - Utilize existing Consumptive Use Permitting rules to require applicants to demonstrate their proposed use of water will not cause or contribute, individually or cumulatively to harm to the water resources of the area or to a violation of the Minimum Levels for Lakes Brooklyn and Geneva.
- **2021-2025**
  - Approval of MFL for Lakes Brooklyn and Geneva and associated Recovery Strategy by the District Governing Board.
  - Initiation of construction of Black Creek WRD project.
  - District's Consumptive use permittees whose groundwater withdrawals cause or contribute, individually or cumulatively, to the reduction of the water levels in Lakes Brooklyn or Geneva below their minimum levels will be notified that they must address their proportional share of required recovery of the minimum levels for Lakes Brooklyn and Geneva in accordance with this strategy.
  - Complete construction and begin operation of the Black Creek WRD project.
- **2025-2040**
  - Continue to work with the District's consumptive use permittees to implement their selected methods for addressing their proportional share of the required recovery of the minimum levels for Lakes Brooklyn and Geneva.
  - Continued operation of the Black Creek WRD project.

Funding

Black Creek WRD Project

The St. Johns River and Keystone Heights Lake Region Projects legislative appropriations provided nearly $43.4 million to the Black Creek WRD Project. The District is also contributing $5 million toward the project. The Black Creek WRD Project is an example of a regional project whereby entities could partner with the District by contributing to construction and operation and maintenance costs to offset their impacts.

Districtwide/REDI Cost-Share programs

The District primarily provides funding assistance through the Districtwide Cost-Share program, which is administered annually and supports projects that benefit one or more of the District's four core missions: water supply (alternative water supply, non-traditional sources, and water conservation), water quality, natural systems restoration (including projects that provide a significant percent recovery for an MFL waterbody whose status is in prevention or recovery), and flood protection.

This funding assistance is exclusively available for construction-related costs with the District's percent match typically at 33% or up to 50% for conservation projects. The District's scoring criteria is geared such that projects that benefit an MFL water body that is determined to be in prevention or recovery receive the highest score in the core mission benefit ranking criterion, thereby giving weight to projects with demonstrated benefits that are listed within a prevention or recovery strategy. For the current fiscal year (FY), there is approximately $20 million in the district-wide/REDI cost-share programs.

Agricultural Cost-Share program

The District's Agricultural Cost-share Program provides funding assistance districtwide to agricultural operations for the implementation of projects that conserve water and/or result in nutrient loading reductions. This cost-share program provides up to 75%, not to exceed $250,000 per project, for engineering, design, and construction costs of an approved project. The grower is expected to cover operation and maintenance costs; however, future requests for long-term maintenance items (such as drip tape) may be considered for funding. For FY 2019/20, the District funded about $1.9 million and for the current fiscal year is expecting to fund $1.1 million.

Tri-County Agricultural Area (TCAA) Water Management Partnership

Multiple agencies are contributing funding, education, and technical assistance for growers in the TCAA of Flagler, Putnam, and St. Johns counties to implement projects that contribute to improving the health of the St. Johns River and implementation of effective water conservation measures. These projects are anticipated to contribute to the improved health of the river through on-farm and regional water management projects and practices that reduce the movement of nutrients to the river, improve irrigation efficiencies, which will result in more efficient farm management practices, while maintaining the long-term viability of agriculture in the TCAA. Funds allocated to this program vary year-to-year based upon funding availability from the Florida

Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, and the District. For the FY 2019/20, there was about $1.9 million funded for the TCAA Water management Partnership. Funding in the current fiscal year is expected be similar.

Other funding sources

There are several grant programs being administered by the Florida Department of Environmental Protection at: *https://protectingfloridatogether.gov/state-action/grants-submissions*, which would provide funding for projects to assist in the recovery of these lakes. Specifically, in FY 2020, the Rivers and Springs Grants had $25 million available for projects and the Alternative Water Supply Grants had $40 million available.

References

SJRWMD and SRWMD. 2017. *North Florida Regional Water Supply Plan (2015–2035).* St. Johns River Water Management District and Suwannee River Water Management District. Palatka, FL.

Sutherland, A.B., F. Gordu, and S. Jennewein. 2020. *Minimum Levels Revaluation for Lakes Brooklyn and Geneva; Clay and Bradford Counties, Florida (Draft)*. St. Johns River Water Management District. Palatka, FL.

Appendices

Appendix A: NFRWSP projects completed from 2014-2020

Appendix B: NFRWSP projects planned to be completed by 2030

Appendix A

NFRWSP projects completed from 2014–2020 (updated October 2020)

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2014	Duval	Queens Harbor Reclaimed Water Main Expansion	JEA and Queens Harbor Golf and Country Club	Reuse - Pipeline	Reclaimed Water	0.30	0.5
2015	Clay	AMI	CCUA	Conservation	Floridan	0.08	0.0
2015	Duval	Atlantic Beach Selva Marina Reclaimed Water System Expansion	City of Atlantic Beach	Reuse - Supply	Reclaimed Water	0.50	1.1
2015	Duval	Gate Pkwy - Shiloh Mill Blvd to Town Ctr Pkwy - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.01	0.3
2015	Flagler	Palm Coast Royal Palms Parkway Reclaimed Water Line	City of Palm Coast	Reuse - Pipeline	Reclaimed Water	0.05	0.3
2015	Flagler	Palm Coast Utilization of Concentrate as Raw Water Supply	City of Palm Coast	AWS	Concentrate	0.75	1.2
2015	St. Johns	Nocatee Coastal Oaks Phase 4	JEA	Reuse - Supply	Reclaimed Water	2.00	1.1
2015	St. Johns	AMR - Ponte Vedra System	SJCUD	Conservation	N/A	0.39	4.3
2015	St. Johns	Outdoor BMP Retrofit	SJCUD	Conservation	N/A	0.00	0.1
2015	St. Johns	Soil Moisture Sensor Pilot Project	SJCUD	Conservation	N/A	0.04	0.3
2016	Clay	Reclaimed Water SCADA System	CCUA	Reuse	Reclaimed Water	4.51	0.7
2016	Duval	Arlington East Water Reclamation Facility - Onsite Reuse Pump Upgrade	JEA	Reuse - Pipeline and Pumping	Reclaimed Water	0.60	0.6
2016	Duval	District II - Broward River Crossing Replacement	JEA	Reuse - Pipeline	Reclaimed Water	0.08	4.8
2016	Duval	Intermediate Well Conversion	San Jose Country Club	AWS	Intermediate aquifer	0.27	0.0

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2016	Flagler	State Street Irrigation System Expansion	City of Bunnell	Reuse - Pipeline	Reclaimed Water	0.10	0.1
2016	Flagler	Palm Coast Matanzas Woods Reclaimed Pipeline	City of Palm Coast	Reuse - Pipeline	Reclaimed Water	2.00	2.5
2016	St. Johns	Nocatee Area - Artisan Lakes - N10 - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.2
2016	St. Johns	Nocatee Area - Riverwood POD 17 - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.2
2016	St. Johns	Nocatee Area - Twenty Mile Village - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.3
2016	St. Johns	Nocatee Storage and Repump Facility Tank Expansion	JEA	Reuse - Storage	Reclaimed Water	0.00	0.3
2016	St. Johns	AI WWTP Reuse Storage Tank and Booster Pump Station	SJCUD	Reuse - Storage and Pumping	Reclaimed Water	2.00	1.5
2016	St. Johns	International Golf Parkway - Reclaimed Water System Expansion	SJCUD	Reuse - Pipeline	Reclaimed Water	0.42	2.4
2016	St. Johns	NW WWTF Reclaimed Water System Expansions/Improvements	SJCUD	Reuse - Pipeline, Storage, Pumping	Reclaimed Water	3.00	2.6
2016	St. Johns	SR 16 Corridor Reclaimed Water System Expansions/Improvements	SJCUD	Reuse - Pipeline, Storage, Pumping	Reclaimed Water	1.00	3.1

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2016	St. Johns	AI WWTP Reuse Storage Tank and Booster Pump Station	SJCUD/ SJRWMD	Reuse - Storage and Pumping	Reclaimed Water	2.00	1.5
2016	St. Johns	International Golf Parkway - Reclaimed Water System Expansion	SJCUD/ SJRWMD	Reuse - Pipeline	Reclaimed Water	0.42	2.4
2017	Duval	Bartram Park WTP - RW - Storage Expansion	JEA	Reuse - Storage	Reclaimed Water	0.05	2.2
2017	Flagler	Palm Coast Grand Landing Reclaimed Water Transmission Main	City of Palm Coast	Reuse - Pipeline	Reclaimed Water	0.56	0.7
2017	Flagler	Palm Coast RCW Irrigation Along US-1 & Palm Coast Park	City of Palm Coast	Reuse - Pipeline	Reclaimed Water	1.00	1.5
2017	St. Johns	Bartram Park Reclaimed Water Storage Tank Expansion	JEA	Reuse - Storage	Reclaimed Water	0.53	2.1
2017	St. Johns	Nocatee Area - Crosswater Pkwy - Coastal Oaks to South Village - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.04	0.4
2017	St. Johns	Nocatee Area - Twenty Mile Village Ph 4A - 4B - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.3
2017	St. Johns	Nocatee Booster Station	JEA	Reuse - Pumping	Reclaimed Water	1.20	1.4
2017	St. Johns	Nocatee North Storage and Repump Facility - New 3.5 MG Reclaimed Water Storage Tank	JEA	Reuse - Storage	Reclaimed Water	0.07	2.5
2017	St. Johns	City of St. Augustine Beach Reclaimed Water System Expansion	SJCUD	Reuse - Pipeline	Reclaimed Water	0.02	0.6

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2017	St. Johns	NW Automated Metering Infrastructure System Expansion	SJCUD	Conservation	N/A	0.14	0.1
2017	St. Johns	Web Based Customer Portal	SJCUD	Conservation	N/A	0.37	0.0
2018	Clay	Old Jenning Road Reclaimed Storage Tank	CCUA	Reuse - Storage	Reclaimed Water	1.70	1.3
2018	Clay	Tynes Blvd. Reclaimed Water Main Extension	CCUA	Reuse - Pipeline	Reclaimed Water	1.92	0.3
2018	Duval	Jacksonville Beach Water & Sewer Mains Extension	City of Jacksonville Beach	Reuse - Supply	Reclaimed Water	0.00	0.4
2018	Duval	9B Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	13.00	0.5
2018	Duval	Monument Rd - Cancun Dr to Hidden Hills Ln - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.36	0.6
2018	Duval	RG Skinner Area - 9B to Parcels 10A - 11 - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.12	1.1
2018	Duval	RG Skinner Area - 9B to T-Line - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.12	1.2
2018	St. Johns	Rivertown - Parcel 13 - Southern POD - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.1
2018	St. Johns	St Johns Pkwy - Racetrack Rd to Espada Ln - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.01	0.6

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2019	Duval	Baymeadows Rd - Point Meadows Rd to Old Still PUD - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.01	1.0
2019	Duval	JP - FDOT - SR 9A (I-295) - Managed Lanes - JTB - 9B Extension - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	0.3
2019	Duval	Mandarin Water Reclamation Facility - Equalization Storage Tank and Transfer Pump Station	JEA	Reuse - Storage and Pumping	Reclaimed Water	0.03	2.6
2019	Duval	Mandarin Water Reclamation Facility - High Level UV Upgrade	JEA	Reuse - Supply	Reclaimed Water	3.05	4.2
2019	Duval	RG Skinner - North Rd - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.47	3.0
2019	Nassau	Nassau RW Main - Radio Av to Harts Rd - Trans - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.04	2.3
2019	Nassau	William Burgess Rd - SR200 to Harts Rd - Trans - New - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.46	2.5
2019	St. Johns	Bannon Lakes 2 MG Reclaimed Water Storage and Booster Pump Station	SJCUD	Reuse - Storage and Pumping	Reclaimed Water	0.42	3.2
2020	Clay	Stormwater Harvest Pilot Project	CCUA	Reuse - Pipeline	Stormwater	0.40	1.2

Completion Date	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2020	Clay	Tynes Reclaimed Storage Tank and Pumping Facility	CCUA	Reuse - Storage	Reclaimed Water	1.10	4.0
2020	Duval	WTP SCADA System Upgrade	City of Atlantic Beach	Conservation	N/A	0.48	0.2
2020	Duval	Gate Pkwy - Glen Kernan to T-Line - Trans - New - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.18	8.5
2020	Duval	Tredinick Pkwy - Millcoe Rd to Mill Creek Rd - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.04	1.6
2020	St. Johns	CR210 - Old Dixie Hwy to Twin Creeks - Trans - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	2.3
2020	St. Johns	Oak Bridge Golf Course Reuse Modification	SJCUD	Reuse - Storage and Pumping, and Pipeline	Reclaimed Water	0.50	1.9

Appendix B

NFRWSP projects planned to be completed by 2030 (updated October 2020)

Timeframe for Completion	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2021	St. Johns	Twin Creeks Reclaimed Water Storage Tank and Booster Pump Station	JEA	Reuse - Storage and Pumping	Reclaimed Water	2.00	3.5
2022	Alachua	Low-Income Water Efficient Toilet Exchange Program	GRU	Conservation	N/A	0.00	0.1
2022	Clay	Potable Reuse Pilot Project	CCUA	Supply/Storage	Reclaimed Water	0.03	4.0
2022	Clay	Ridaught Reclaimed Water Ground Storage Tank	CCUA	Reuse - Storage	Reclaimed Water	1.10	1.3
2022	Clay	Saratoga Springs Reclaimed Water Storage and Pumping Facility	CCUA	Reuse - Storage	Reclaimed Water	1.10	4.3
2022	Clay	Saratoga Springs Reclaimed Water Transmission/Distribution Main Extensions	CCUA	Reuse - Pipeline	Reclaimed Water	1.91	1.2
2022	Duval/St. Johns	US 1 - Greenland WRF to CR 210 - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	7.8
2022	Nassau	Nassau Area - Radio Av - Reclaimed Water Storage Tank and Booster Pump Station	JEA	Reuse - Storage and Pumping	Reclaimed Water	1.44	3.3
2022	St. Johns	CR210 - South Hampton to Ashford Mills - Trans - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.02	0.6
2023	St. Johns	CR210 - Longleaf Pine Pkwy to Ashford Mills Rd - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.16	5.0

Timeframe for Completion	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2024	Clay	Peter's Creek AWT Plant Expansion and Reclaimed Water Facility (f.k.a. Green Cove Regional Reclaimed WTP)	CCUA	Reuse - Supply	Reclaimed Water	1.50	22.0
2024	St. Johns	Nocatee South Reclaimed Water Storage Tank and Booster Pump Station	JEA	Reuse - Storage and Pumping	Reclaimed Water	2.00	3.5
2024	St. Johns	SR 16 Corridor Reuse Transmission Main Expansion	SJCUD	Reuse - Storage and Pumping, and Pipeline	Reclaimed Water	1.00	3.7
2025	Duval	Davis - Gate Pkwy to RG Skinner - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.12	5.0
2025	Duval	Greenland Reclaimed Water Repump Facility - Storage Tank and Booster Pump Station	JEA	Reuse - Storage and Pumping	Reclaimed Water	4.00	5.0
2025	Duval	T-Line - Greenland Substation to GEC - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.12	3.1
2025	Nassau	Nassau Regional WWTF Reclaimed Water Storage Tank, UV Disinfection and Pumps	JEA	Reuse - Storage, Pumping and Supply	Reclaimed Water	2.16	6.1
2025	St. Johns	NW Wellfield VFD addition	SJCUD	Conservation	Floridan	1.55	1.0
2025	St. Johns	NW WRF Expansion (3 MGD to 6 MGD)	SJCUD	Reuse - treatment, Storage, and Pumping	Reclaimed Water	3.00	40.0
2025	St. Johns	Promote Cost-Effective Conservation Programs	SJCUD	Conservation	N/A	1.14	3.8

Timeframe for Completion	County	Project Name	Implementing Entity	Project Type	Water Source	Project Capacity (mgd)	Total Capital ($M)
2026	Duval	Arlington East WRF - Reclaimed Water Filtration Expansion - Increase Capacity from 8.0 to 10.0 MGD	JEA	Reuse - Supply	Reclaimed Water	2.00	2.8
2026	Duval	Monument Rd - Arlington East WRF to St Johns Bluff Rd - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	3.3
2026	Duval	Ridenour WTP - Reclaimed Water Storage and Repump	JEA	Reuse - Storage and Pumping	Reclaimed Water	3.00	3.7
2026	St. Johns	CR210 - Twin Creeks to Russell Sampson Rd - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	3.0
2027	St. Johns	RiverTown WTP - Reclaimed Water - New Storage and Pumping System	JEA	Reuse - Storage and Pumping	Reclaimed Water	2.00	4.0
2027	St. Johns	Veterans Pkwy - Longleaf Pine Pkwy to CR210 - Reclaimed Water System Expansion	JEA	Reuse - Pipeline	Reclaimed Water	0.06	8.8
2027	St. Johns	Develop supplemental reclaimed water source from stormwater harvesting (Potential I-95 Corridor)	SJCUD	Reuse - Supply	Stormwater	2.00	14.5
2027	St. Johns	SR 207 WRF Expansion	SJCUD	Reuse - Storage and Pumping, and Pipeline	Reclaimed Water	2.25	40.0
2030	Alachua	Brytan subdivision Reclaimed Water system expansion	GRU	Reuse - Pipeline	Reclaimed Water	0.07	1.1
2030	Clay	FCOB Stormwater Ponds	CCUA	Reuse - Pipeline	Stormwater	2.50	27.0

Board of Directors Annual Calendar Fiscal Year 2021

Action Item | * Requires Approval | Board Committee Action

Q1 | October - December

October

- CEO Search Committee: CEO Interviews

November 17, 2020

- JD Power Customer Satisfaction Report
- Five-Year Financial Assumptions & Plan
- Integrated Water Resource Plan (IWRP)
- Surface Water Discharge
- JEA | St. Johns County Agreement
- HQ2 Hardened Facility Real Estate Acquisition
- Jacksonville Small & Emerging Business (JSEB) Quarterly Report
- Workforce Strategy
- Policy Reviews
  - Governance: Board Policy Manual *

December 15, 2020

- Customer Engagement & Educational Campaign
- Board Committee Reports
  - Finance & Audit
- Policy Reviews
  - Electric Compliance Policy *
  - JEA Charter
  - Finance & Audit: Enterprise Risk Management & Compliance, JEA Code of Conduct / Code of Ethics, and Identity Theft Protection Program (FACTA) Annual Risk Assessment

Q2 | January - March

January 28, 2021

- Reappointment of Geraldine Lockett to Civil Service Board
- St. Johns Power Park System Employee's Retirement Plan – Amendment 3
- Real Estate: Property Purchases
- Corporate Headquarters Review & Update
- Jacksonville Small & Emerging Business (JSEB) Quarterly Report

February 25, 2021

- Customer Experience Team Initiatives
- Rating Agency Presentation
- WateReuse Bill (Surface Water Discharge)

March 23, 2021

- Integrated Water Resource Plan (IWRP)
- Environmental Awareness: Water Conservation Month
- FY20 Annual Disclosure Reports
- Extreme Weather Response
- Board Committee Reports
  - Nominating: Approve Board Officers
- Policy Reviews
  - Energy Market Risk Management Policy *

Q3 | April - June

April 27, 2021

- FY20 Annual Disclosure Reports
- Residential Customer Satisfaction Survey Results
- Procurement Code Policy

May 25, 2021

- FY22 Draft Budget Summary

June 22, 2021

- FY22 Budget *
- Call for Rate Hearing
- Policy Reviews
  - Delegation of Authority *

Q4 | July - September

July 27, 2021

- FY22 Board Calendar
- Strategic Board Retreat

August 24, 2021

- Unbeatable Team
  - Pay for Performance Plan *
- Customer Loyalty
  - Final FY21 JDP Customer Satisfaction Results
- Business Excellence
  - Rate Hearing
- Policy Reviews
  - Finance & Audit: Internal Audit Charter
  - Board Education & Development Policy *
  - Board Policy Manual *
  - Investment Policy
  - Debt Management Policy
  - Travel Policy & Procedures

Board of Directors Annual Calendar Fiscal Year 2022

Action Item | * Requires Approval | Board Committee Action

Q1 | October - December

October 26, 2021

- Unbeatable Team
  - Pay for Performance: FY21 Results *
- Customer Loyalty
  - Brand Management
  - Small Business Collaborative
  - Surface Water Discharge Elimination Plan
- Business Excellence
  - Resilient / Reliable Infrastructure Update

November 16, 2021

- Unbeatable Team
  - Strong Labor Relations Update
- Customer Loyalty
  - Environmental Stewardship Update
  - JEA Brand Management Update
- Business Excellence
  - Technology & Cybersecurity Update
- Policy Reviews
  - Governance: Board Policy Manual *
  - Electric Compliance Policy *
  - JEA Charter

Q2 | January - March

January 11, 2022

- Unbeatable Team
  - Employee Engagement Update
- Customer Loyalty
  - JD Powers Wave 1 Residential update
- Business Excellence
  - Real Estate Portfolio Update
- Policy Reviews
  - Finance & Audit: Enterprise Risk Management & Compliance, JEA Code of Conduct / Code of Ethics, and Identity Theft Protection Program (FACTA) Annual Risk Assessment

February 22, 2022

- Unbeatable Team
  - Diversity, Equity & Inclusion Update
- Customer Loyalty
  - Economic Development Update
  - Water Conservation Resolution *
- Business Excellence
  - Integrated Resource Plan Update
  - New Business Opportunities Update
- Board Committee Reports
  - Nominating: Approve Board Officers *
- Policy Reviews
  - Energy Market Risk Management Policy *

Q3 | April - June

April 5, 2022

- Unbeatable Team
  - Long-term Workforce Planning Update
  - Employee Development Update
- Customer Loyalty
  - JD Powers Wave 2 Residential update
  - Community Engagement
- Business Excellence
  - FY23 Draft Budget Summary
- Policy Reviews
  - Finance & Audit: Internal Audit Charter
  - Board Education & Development Policy *
  - Travel Policy & Procedures

May 24, 2022

- Unbeatable Team
  - JEA Headquarters Update
- Customer Loyalty
  - Stakeholder Relations Update
  - Customer Experience – Tech Solutions
- Business Excellence
  - FY23 Budget *
  - Call for Rate Hearing
- Policy Reviews
  - Delegation of Authority *
  - Investment Policy *
  - Debt Management Policy *

Q4 | July - September

August 9-10, 2022

- Strategic Board Retreat

September 20, 2022

- Unbeatable Team
  - FY23 Pay for Performance Plan *
- Customer Loyalty
  - Final FY22 JDP Customer Satisfaction Results
- Business Excellence
  - Resilient / Reliable Infrastructure Update
  - Rate Hearing

INTER-OFFICE MEMORANDUM
July 14, 2021

SUBJECT:	**CORPORATE HEADQUARTERS UPDATE**
FROM:	Jay Stowe, Managing Director/CEO
TO:	JEA Board of Directors

BACKGROUND:
JEA has been planning for a new corporate headquarters (HQ) for several years to address business continuity risks while meeting our headquarters needs in a cost-effective manner. The Board approved a lease with Ryan Companies US, Inc. (Ryan) at its June 25, 2019 meeting and the lease was executed on July 9, 2019 after approval of the site purchase and sale agreement between Ryan and the City of Jacksonville. Reviews by the JEA Board and its Corporate Headquarters Committee in May 2020 resulted in approved changes to the scope of the HQ project including reducing two floors from the main building and the parking garage. A lease amendment reflecting the scope changes was executed on June 23, 2020. JEA executed lease amendment 3 on February 26, 2021 setting the guaranteed maximum price (GMP) for construction scope with Ryan Companies in line with the target budget established in the June 2020 lease amendment. The changes to the building size and scope support the recent decision to migrate to a flexible hybrid work model post Covid-19 restrictions.

DISCUSSION:
Significant progress continues on the office building construction. Exterior wall sheathing at east and north elevations has commenced. Curtain wall window assembly continues for south and west elevations. The precast concrete garage is being constructed in sections from south to north and is nearing 60 percent complete. Detailed coordination continues on construction elements, utilities and design clarifications. RS&H is preparing schematic design for the interiors with a variety of workspaces to support the flexible work model. Ryan has allowed for weekly tours of the project for JEA employees.

View looking east

July 9th update

Ver 2.2 02/01/2014

FINANCIAL IMPACT:
The reassessment for downtown locations discussed in January 2021 may allow for better use of space in the long term and the possibility of short term financial savings.

RECOMMENDATION:
This is provided as information only.

Jay Stowe, Managing Director/CEO

JCS/LMD/NKV

July 2021

CORPORATE COMMUNICATIONS & COMMUNITY OUTREACH

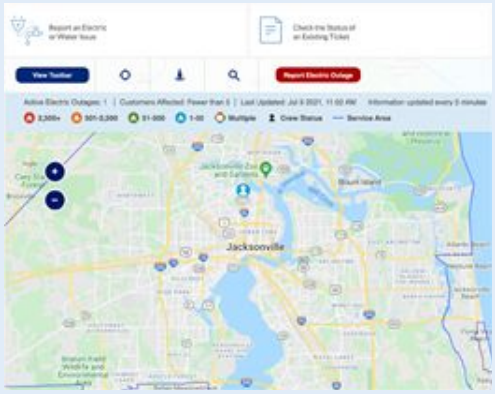
The Customer & Community Engagement Team develops engaging communications across a range of channels to educate our customers and community on JEA services and programs in order to help them save money and time, and provide peace of mind.

ADVERTISING & SOCIAL MEDIA CAMPAIGNS • CUSTOMER COMMUNICATIONS • DIGITAL COMMUNICATIONS • VIDEOGRAPHY • COMMUNITY OUTREACH

PREPARING CUSTOMERS FOR ELSA

JEA's main priority is keeping our customers safe and informed, especially during storm season. In the days leading up to and during Tropical Storm Elsa, we ramped up customer communication on all media channels.

- Extensive media coverage with interviews by the media team and CEO
- Social media posts encouraging customers to update contact information, sign up for alerts, report downed power lines and provide updates on restoration
- Daily "Storm News" customer emails providing real-time information on JEA's preparations and activities, as well as storm tips and promotion of alerts and jea.com outage map
- Multimedia messaging to reinforce JEA storm readiness and encourage customers to engage with us online and update their contact information



SOCIAL MEDIA/BRAND SENTIMENT

JEA saw an **increase of 124 percent in positive mentions** over the previous month. One driver for these positive mentions was JEA's participation in the APPA's Virtual Rodeo Challenge, a series featuring public power utilities throughout the U.S. that shared videos of their line workers challenging other utilities to participate in the 2022 APPA Rodeo in Austin. You can view JEA's tweet here.

MONTHLY BILL INSERT AND EMAIL BLAST

Educated customers on ways to save money on their utility bill during the hottest days of the year.

We shared that a number of factors may come into play that cause an upward swing in utility charges, particularly in the summer months and that simple changes in customer's habits and consumption can make a big difference. We also encouraged customers to take advantage of home energy efficiency assessments.

VIDEO SPOTLIGHT

CLICK HERE TO WATCH

This customer education video was created to show the array of water tests performed every year at JEA's Springfield Lab to ensure the safety of our drinking water. This video takes viewers on a tour of the lab, and is intended to increase visitors to the facility.

MEDIA HIGHLIGHTS

Click on the links to read JEA's notable media stories for the month, including coverage related to Elsa.

Total local and national TV, online and print publicity value *July 1-8*: $616,510

- JEA JUMPING INTO ACTION
- JEA & OTHER UTILITIES PREPARED TO RESTORE POWER IN THE EVENT OF ELSA-RELATED OUTAGES
- JEA AIMS TO HEAD OFF STORM DAMAGE BY TRIMMING TREES
- HOW JEA PREPARES YEAR-ROUND FOR HURRICANE SEASON
- JEA PRODUCTION CREWS, PROFESSIONAL CONTRACTORS TREE TRIMMING DURING HURRICANE SEASON IN JACKSONVILLE
- "IT SOUNDED VERY PROFESSIONAL": HOW TO AVOID THE LATEST JEA IMPOSTOR SCAM
- NEW APPROACH TO JACKSONVILLE SEPTIC TANK PHASE OUTS COULD GET MORE NEIGHBORHOODS DONE SOONER
- NEW SEWER TECHNOLOGY COULD SAVE CITY $250M IN SEPTIC TANK PHASE OUT

MONTHLY PAID MEDIA IMPRESSIONS

MEDIA	IMPRESSIONS
Television/Cable	637,000
Radio	702,000
Out-of-Home	3,916,274
Online Display/Video	1,430,289
Paid Social	782,063
Online Paid Social	110,291
Print	3,000
TOTAL	7,580,917

INTRODUCING JEA's SMALL BUSINESS HUB

After focus group piloting and feedback sessions with many of our small business customers, JEA's digital team launched this site page dedicated to our 20,000+ small business customers who are looking to save time, money and grow their business.

Visit JEA's Small Business Hub at:

jea.com/smallbusinesshub

COMMUNITY OUTREACH

107 Activities | **412 Hours**

During COVID, JEA kept up Volunteer and Ambassador activities virtually. We have now resumed in-person events and we are excited to be able to fully support our partner non-profits again.

SEVERAL AMBASSADOR/VOLUNTEER ACTIVITIES CONDUCTED IN JUNE:

Communities in Schools of Jacksonville — Virtual volunteer reading program
Hope at Hand — Newspaper and magazine images
Eden Gardens — Greenhouse planting, harvesting, and mulching
Feeding Northeast Florida Food Bank — Sorting and packaging food
City of Jacksonville — July 5th beaches cleanup
Duval County Public Schools — Book giveaway for Public Power Month
Free Flow — Toiletry collection drive for the homeless
Community Health Charities — 5k Charity walk, scavenger hunt & recipe book

AMBASSADOR OF THE MONTH

Randy Hilton
Senior Operations Analyst in the Supply Chain Department

"Showing care and concern for others is important to me, so being an ambassador aligns me with these things, and gives me the opportunity to serve the greater community good."

VOLUNTEER OF THE MONTH

Jorge Colgan
Utilities Pipe-fitter Crew Leader

"I enjoy helping the community that I work and grew up in. It's gratifying, especially when someone recognizes what you're doing and shows their appreciation with a gesture as simple as a 'thank you' or a thumbs up."


JEA®
Monthly Financial Statements
June 2021

Monthly Financial Statements

June 2021

Index

JEA

Statements of Net Position
(in thousands)

	June 2021 (unaudited)	September 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 375,140	$ 387,148
Investments	4,142	3,107
Customer accounts receivable, net of allowance ($3,731 and $3,864, respectively)	207,577	219,814
Inventories:		
Materials and supplies	59,514	61,663
Fuel	30,105	37,822
Other current assets	12,378	16,364
Total current assets	688,856	725,918
Noncurrent assets:		
Restricted assets:		
Cash and cash equivalents	195,529	253,984
Investments	338,417	311,130
Accounts and interest receivable	28	1,071
Total restricted assets	533,974	566,185
Costs to be recovered from future revenues	829,178	852,314
Hedging derivative instruments	56,997	11,944
Other assets	28,884	20,277
Total noncurrent assets	1,449,033	1,450,720
Capital assets:		
Land and easements	213,486	216,918
Plant in service	12,401,575	12,124,453
Less accumulated depreciation	(7,434,288)	(7,161,707)
Plant in service, net	5,180,773	5,179,664
Construction work in progress	270,816	331,511
Net capital assets	5,451,589	5,511,175
Total assets	7,589,478	7,687,813
Deferred outflows of resources		
Accumulated decrease in fair value of hedging derivatives	138,393	179,286
Unrealized pension contributions and losses	143,881	143,881
Unamortized deferred losses on refundings	94,176	100,314
Unrealized asset retirement obligations	34,728	35,241
Unrealized OPEB contributions and losses	9,406	9,406
Total deferred outflows of resources	420,584	468,128
Total assets and deferred outflows of resources	$ 8,010,062	$ 8,155,941

JEA

Statements of Net Position
(in thousands)

	June 2021 (unaudited)	September 2020
Liabilities		
Current liabilities:		
Customer deposits and prepayments	$ 78,252	$ 71,304
Accounts and accrued expenses payable	49,154	66,622
Billings on behalf of state and local governments	24,787	26,005
Compensation and benefits payable	10,772	14,599
City of Jacksonville payable	10,230	10,255
Asset retirement obligations	2,725	4,136
Total current liabilities	175,920	192,921
Current liabilities payable from restricted assets:		
Debt due within one year	91,535	102,700
Interest payable	28,219	52,856
Construction contracts and accounts payable	18,941	46,977
Renewal and replacement reserve	33,384	37,910
Total current liabilities payable from restricted assets	172,079	240,443
Noncurrent liabilities:		
Net pension liability	641,086	641,086
Asset retirement obligations	32,003	31,105
Compensation and benefits payable	32,845	31,342
Net OPEB liability	10,091	10,091
Other liabilities	18,399	20,556
Total noncurrent liabilities	734,424	734,180
Long-term debt:		
Debt payable, less current portion	2,953,665	3,154,590
Unamortized premium, net	157,658	174,205
Fair value of debt management strategy instruments	138,389	177,288
Total long-term debt	3,249,712	3,506,083
Total liabilities	4,332,135	4,673,627
Deferred inflows of resources		
Revenues to be used for future costs	193,451	206,782
Unrealized pension gains	24,304	24,304
Unrealized OPEB gains	15,294	15,294
Accumulated increase in fair value of hedging derivatives	56,997	11,944
Total deferred inflows of resources	290,046	258,324
Net position		
Net investment in capital assets	2,701,124	2,532,627
Restricted for:		
Capital projects	239,194	204,855
Debt service	67,582	101,558
Other purposes	45,395	48,617
Unrestricted	334,586	336,333
Total net position	3,387,881	3,223,990
Total liabilities, deferred inflows of resources, and net position	$ 8,010,062	$ 8,155,941

JEA
Statements of Revenues, Expenses, and Changes in Net Position
(in thousands - unaudited)

	Month June		Year-to-Date June	
	2021	2020	2021	2020
Operating revenues				
Electric - base	$ 75,011	$ 75,284	$ 606,580	$ 618,643
Electric - fuel and purchased power	36,201	30,211	278,080	233,621
Water and sewer	37,968	37,370	335,192	353,829
District energy system	679	621	5,362	5,661
Other operating revenues	2,704	1,672	27,765	25,791
Total operating revenues	152,563	145,158	1,252,979	1,237,545
Operating expenses				
Operations and maintenance:				
Maintenance and other operating expenses	30,179	35,078	272,146	304,195
Fuel	30,565	26,296	247,135	202,393
Purchased power	10,202	7,219	72,822	60,420
Depreciation	32,744	30,010	293,500	272,769
State utility and franchise taxes	6,323	6,041	50,930	49,049
Recognition of deferred costs and revenues, net	2,227	2,146	20,253	22,046
Total operating expenses	112,240	106,790	956,786	910,872
Operating income	40,323	38,368	296,193	326,673
Nonoperating revenues (expenses)				
Interest on debt	(10,655)	(11,674)	(92,228)	(107,422)
Investment income	36	2,030	2,009	13,159
Allowance for funds used during construction	865	1,592	6,228	15,652
Other nonoperating income, net	(1,453)	580	3,112	5,486
Earnings from The Energy Authority	1,400	553	10,454	1,878
Other interest, net	(4)	(5)	4	716
Total nonoperating expenses, net	(9,811)	(6,924)	(70,421)	(70,531)
Income before contributions	30,512	31,444	225,772	256,142
Contributions (to) from				
General Fund, City of Jacksonville, Florida	(10,001)	(9,903)	(90,009)	(89,119)
Developers and other	9,812	12,654	68,232	78,923
Reduction of plant cost through contributions	(6,663)	(10,264)	(40,104)	(55,205)
Total contributions, net	(6,852)	(7,513)	(61,881)	(65,401)
Change in net position	23,660	23,931	163,891	190,741
Net position, beginning of period	3,364,221	3,119,543	3,223,990	2,952,733
Net position, end of period	$ 3,387,881	$ 3,143,474	$ 3,387,881	$ 3,143,474

JEA **Page 5**

Statement of Cash Flows
(in thousands - unaudited)

	Year-to-Date June	
Operating activities	**2021**	**2020**
Receipts from customers	$ 1,230,545	$ 1,177,452
Payments to suppliers	(472,799)	(445,846)
Payments for salaries and benefits	(183,699)	(206,362)
Other operating activities	28,966	27,094
Net cash provided by operating activities	603,013	552,338
Noncapital and related financing activities		
Contribution to General Fund, City of Jacksonville, Florida	(89,910)	(89,020)
Net cash used in noncapital and related financing activities	(89,910)	(89,020)
Capital and related financing activities		
Defeasance of debt	(104,390)	(93,495)
Acquisition and construction of capital assets	(253,300)	(307,495)
Repayment of debt principal	(102,700)	(192,555)
Interest paid on debt	(124,524)	(142,262)
Capital contributions	28,128	23,718
Revolving credit agreement repayments	(5,000)	-
Other capital financing activities	3,611	(5,122)
Net cash used in capital and related financing activities	(558,175)	(717,211)
Investing activities		
Purchase of investments	(215,057)	(210,420)
Proceeds from sale and maturity of investments	183,927	198,169
Investment income	4,389	9,703
Distributions from The Energy Authority	1,350	895
Net cash used in investing activities	(25,391)	(1,653)
Net change in cash and cash equivalents	(70,463)	(255,546)
Cash and cash equivalents at beginning of year	641,132	680,222
Cash and cash equivalents at end of period	$ 570,669	$ 424,676
Reconciliation of operating income to net cash provided by operating activities		
Operating income	$ 296,193	$ 326,673
Adjustments:		
Depreciation and amortization	294,338	273,647
Recognition of deferred costs and revenues, net	20,253	22,046
Other nonoperating income, net	69	349
Changes in noncash assets and noncash liabilities:		
Accounts receivable	12,236	9,330
Inventories	9,868	(11,427)
Other assets	4,329	872
Accounts and accrued expenses payable	(18,057)	(21,921)
Current liabilities payable from restricted assets	(5,364)	(5,326)
Other noncurrent liabilities and deferred inflows	(10,852)	(41,905)
Net cash provided by operating activities	$ 603,013	$ 552,338
Noncash activity		
Contribution of capital assets from developers	$ 40,104	$ 55,205
Unrealized investment fair market value changes, net	$ (2,809)	$ 3,209

JEA
Combining Statement of Net Position
(in thousands - unaudited) June 2021

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Assets							
Current assets:							
Cash and cash equivalents	$ 248,776	$ 51,316	$ -	$ 300,092	74,088	$ 960	$ 375,140
Investments	-	4,142	-	4,142	-	-	4,142
Customer accounts receivable, net of allowance ($3,731)	152,323	-	-	152,323	54,682	572	207,577
Inventories:							
Materials and supplies	2,366	-	-	2,366	57,148	-	59,514
Fuel	30,105	-	-	30,105	-	-	30,105
Other current assets	12,611	2,437	(6,666)	8,382	3,996	-	12,378
Total current assets	446,181	57,895	(6,666)	497,410	189,914	1,532	688,856
Noncurrent assets:							
Restricted assets:							
Cash and cash equivalents	13,474	78,745	-	92,219	100,137	3,173	195,529
Investments	231,701	9,689	-	241,390	97,027	-	338,417
Accounts and interest receivable	-	21	-	21	7	-	28
Total restricted assets	245,175	88,455	-	333,630	197,171	3,173	533,974
Costs to be recovered from future revenues	342,587	223,659	-	566,246	262,902	30	829,178
Hedging derivative instruments	56,997	-	-	56,997	-	-	56,997
Other assets	27,878	4,915	(4,765)	28,028	846	10	28,884
Total noncurrent assets	672,637	317,029	(4,765)	984,901	460,919	3,213	1,449,033
Capital assets:							
Land and easements	124,801	6,660	-	131,461	78,974	3,051	213,486
Plant in service	5,999,523	1,316,043	-	7,315,566	5,025,259	60,750	12,401,575
Less accumulated depreciation	(3,590,880)	(1,313,686)	-	(4,904,566)	(2,498,546)	(31,176)	(7,434,288)
Plant in service, net	2,533,444	9,017	-	2,542,461	2,605,687	32,625	5,180,773
Construction work in progress	92,217	-	-	92,217	178,164	435	270,816
Net capital assets	2,625,661	9,017	-	2,634,678	2,783,851	33,060	5,451,589
Total assets	3,744,479	383,941	(11,431)	4,116,989	3,434,684	37,805	7,589,478
Deferred outflows of resources							
Accumulated decrease in fair value of hedging derivatives	109,487	-	-	109,487	28,906	-	138,393
Unrealized pension contributions and losses	74,505	17,601	-	92,106	51,775	-	143,881
Unamortized deferred losses on refundings	52,412	3,149	-	55,561	38,455	160	94,176
Unrealized asset retirement obligations	34,132	596	-	34,728	-	-	34,728
Unrealized OPEB contributions and losses	5,549	-	-	5,549	3,857	-	9,406
Total deferred outflows of resources	276,085	21,346	-	297,431	122,993	160	420,584
Total assets and deferred outflows of resources	$ 4,020,564	$ 405,287	$ (11,431)	$ 4,414,420	$ 3,557,677	$ 37,965	$ 8,010,062

JEA
Combining Statement of Net Position
(in thousands - unaudited) June 2021

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Liabilities							
Current liabilities:							
Customer deposits and prepayments	$ 60,791	$ -	$ -	$ 60,791	$ 17,461	$ -	$ 78,252
Accounts and accrued expenses payable	42,893	2,719	(2,439)	43,173	5,963	18	49,154
Billings on behalf of state and local governments	20,682	-	-	20,682	4,105	-	24,787
Compensation and benefits payable	7,640	-	-	7,640	3,101	31	10,772
City of Jacksonville payable	7,998	-	-	7,998	2,232	-	10,230
Asset retirement obligations	2,129	596	-	2,725	-	-	2,725
Total current liabilities	142,133	3,315	(2,439)	143,009	32,862	49	175,920
Current liabilities payable from restricted assets:							
Debt due within one year	66,220	14,175	-	80,395	9,370	1,770	91,535
Interest payable	13,544	2,474	-	16,018	11,887	314	28,219
Construction contracts and accounts payable	4,016	4,738	(4,227)	4,527	14,407	7	18,941
Renewal and replacement reserve	-	33,384	-	33,384	-	-	33,384
Total current liabilities payable from restricted assets	83,780	54,771	(4,227)	134,324	35,664	2,091	172,079
Noncurrent liabilities:							
Net pension liability	373,642	7,794	-	381,436	259,650	-	641,086
Asset retirement obligations	32,003	-	-	32,003	-	-	32,003
Compensation and benefits payable	23,514	-	-	23,514	9,259	72	32,845
Net OPEB liability	5,954	-	-	5,954	4,137	-	10,091
Other liabilities	18,399	4,765	(4,765)	18,399	-	-	18,399
Total noncurrent liabilities	453,512	12,559	(4,765)	461,306	273,046	72	734,424
Long-term debt:							
Debt payable, less current portion	1,459,240	237,590	-	1,696,830	1,227,195	29,640	2,953,665
Unamortized premium (discount), net	86,832	444	-	87,276	70,403	(21)	157,658
Fair value of debt management strategy instruments	109,483	-	-	109,483	28,906	-	138,389
Total long-term debt	1,655,555	238,034	-	1,893,589	1,326,504	29,619	3,249,712
Total liabilities	2,334,980	308,679	(11,431)	2,632,228	1,668,076	31,831	4,332,135
Deferred inflows of resources							
Revenues to be used for future costs	155,976	5,821	-	161,797	31,654	-	193,451
Unrealized pension gains	11,988	3,986	-	15,974	8,330	-	24,304
Unrealized OPEB gains	9,023	-	-	9,023	6,271	-	15,294
Accumulated increase in fair value of hedging derivatives	56,997	-	-	56,997	-	-	56,997
Total deferred inflows of resources	233,984	9,807	-	243,791	46,255	-	290,046
Net position			-				
Net investment in (divestment of) capital assets	1,110,731	(11,035)	-	1,099,696	1,599,574	1,854	2,701,124
Restricted for:							
Capital projects	123,434	-	-	123,434	114,228	1,532	239,194
Debt service	48,378	10,998	-	59,376	6,879	1,327	67,582
Other purposes	3,975	31,512	4,227	39,714	5,681	-	45,395
Unrestricted	165,082	55,326	(4,227)	216,181	116,984	1,421	334,586
Total net position	1,451,600	86,801	-	1,538,401	1,843,346	6,134	3,387,881
Total liabilities, deferred inflows of resources, and net position	$ 4,020,564	$ 405,287	$ (11,431)	$ 4,414,420	$ 3,557,677	$ 37,965	$ 8,010,062

JEA
Combining Statement of Net Position
(in thousands) September 2020

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Assets							
Current assets:							
Cash and cash equivalents	$ 266,683	$ 51,814	$ -	$ 318,497	$ 67,036	$ 1,615	$ 387,148
Investments	-	3,107	-	3,107	-	-	3,107
Customer accounts receivable, net of allowance ($3,864)	165,515	-	-	165,515	54,176	123	219,814
Inventories:							
Materials and supplies	2,378	-	-	2,378	59,285	-	61,663
Fuel	37,822	-	-	37,822	-	-	37,822
Other current assets	14,981	5,361	(9,519)	10,823	5,541	-	16,364
Total current assets	487,379	60,282	(9,519)	538,142	186,038	1,738	725,918
Noncurrent assets:							
Restricted assets:							
Cash and cash equivalents	89,193	89,318	-	178,511	71,232	4,241	253,984
Investments	202,036	10,227	-	212,263	98,867	-	311,130
Accounts and interest receivable	1,053	11	-	1,064	7	-	1,071
Total restricted assets	292,282	99,556	-	391,838	170,106	4,241	566,185
Costs to be recovered from future revenues	348,740	234,170	-	582,910	269,374	30	852,314
Hedging derivative instruments	11,944	-	-	11,944	-	-	11,944
Other assets	18,705	4,500	(4,500)	18,705	1,569	3	20,277
Total noncurrent assets	671,671	338,226	(4,500)	1,005,397	441,049	4,274	1,450,720
Capital assets:							
Land and easements	123,748	6,660	-	130,408	83,459	3,051	216,918
Plant in service	5,835,887	1,316,043	-	7,151,930	4,912,993	59,530	12,124,453
Less accumulated depreciation	(3,439,442)	(1,313,379)	-	(4,752,821)	(2,379,631)	(29,255)	(7,161,707)
Plant in service, net	2,520,193	9,324	-	2,529,517	2,616,821	33,326	5,179,664
Construction work in progress	154,702	-	-	154,702	175,783	1,026	331,511
Net capital assets	2,674,895	9,324	-	2,684,219	2,792,604	34,352	5,511,175
Total assets	3,833,945	407,832	(14,019)	4,227,758	3,419,691	40,364	7,687,813
Deferred outflows of resources							
Accumulated decrease in fair value of hedging derivatives	141,605	-	-	141,605	37,681	-	179,286
Unrealized pension contributions and losses	74,505	17,601	-	92,106	51,775	-	143,881
Unamortized deferred losses on refundings	56,693	3,300	-	59,993	40,152	169	100,314
Unrealized asset retirement obligations	32,368	2,873	-	35,241	-	-	35,241
Unrealized OPEB contributions and losses	5,549	-	-	5,549	3,857	-	9,406
Total deferred outflows of resources	310,720	23,774	-	334,494	133,465	169	468,128
Total assets and deferred outflows of resources	$ 4,144,665	$ 431,606	$ (14,019)	$ 4,562,252	$ 3,553,156	$ 40,533	$ 8,155,941

JEA **Page 9**
Combining Statement of Net Position
(in thousands) September 2020

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Liabilities							
Current liabilities:							
Customer deposits and prepayments	$ 53,779	$ -	$ -	$ 53,779	$ 17,525	$ -	$ 71,304
Accounts and accrued expenses payable	57,341	5,658	(5,376)	57,623	8,855	144	66,622
Billings on behalf of state and local governments	22,171	-	-	22,171	3,834	-	26,005
Compensation and benefits payable	10,301	-	-	10,301	4,262	36	14,599
City of Jacksonville payable	8,159	-	-	8,159	2,096	-	10,255
Asset retirement obligations	1,263	2,873	-	4,136	-	-	4,136
Total current liabilities	153,014	8,531	(5,376)	156,169	36,572	180	192,921
Current liabilities payable from restricted assets:							
Debt due within one year	67,765	13,340	-	81,105	19,870	1,725	102,700
Interest payable	24,871	5,222	-	30,093	22,115	648	52,856
Construction contracts and accounts payable	15,109	5,575	(4,143)	16,541	30,389	47	46,977
Renewal and replacement reserve	-	37,910	-	37,910	-	-	37,910
Total current liabilities payable from restricted assets	107,745	62,047	(4,143)	165,649	72,374	2,420	240,443
Noncurrent liabilities:							
Net pension liability	373,642	7,794	-	381,436	259,650	-	641,086
Asset retirement obligations	31,105	-	-	31,105	-	-	31,105
Compensation and benefits payable	22,271	-	-	22,271	9,002	69	31,342
Net OPEB liability	5,954	-	-	5,954	4,137	-	10,091
Other liabilities	20,556	4,500	(4,500)	20,556	-	-	20,556
Total noncurrent liabilities	453,528	12,294	(4,500)	461,322	272,789	69	734,180
Long-term debt:							
Debt payable, less current portion	1,629,850	251,765	-	1,881,615	1,241,565	31,410	3,154,590
Unamortized premium (discount), net	95,677	783	-	96,460	77,769	(24)	174,205
Fair value of debt management strategy instruments	139,607	-	-	139,607	37,681	-	177,288
Total long-term debt	1,865,134	252,548	-	2,117,682	1,357,015	31,386	3,506,083
Total liabilities	2,579,421	335,420	(14,019)	2,900,822	1,738,750	34,055	4,673,627
Deferred inflows of resources							
Revenues to be used for future costs	177,589	5,821	-	183,410	23,372	-	206,782
Unrealized pension gains	11,988	3,986	-	15,974	8,330	-	24,304
Unrealized OPEB gains	9,023	-	-	9,023	6,271	-	15,294
Accumulated increase in fair value of hedging derivatives	11,944	-	-	11,944	-	-	11,944
Total deferred inflows of resources	210,544	9,807	-	220,351	37,973	-	258,324
Net position							
Net investment in (divestment of) capital assets	977,434	(14,114)	-	963,320	1,567,914	1,393	2,532,627
Restricted for:							
Capital projects	139,308	-	-	139,308	63,679	1,868	204,855
Debt service	66,487	13,706	-	80,193	19,640	1,725	101,558
Other purposes	5,772	32,163	4,143	42,078	6,539	-	48,617
Unrestricted	165,699	54,624	(4,143)	216,180	118,661	1,492	336,333
Total net position	1,354,700	86,379	-	1,441,079	1,776,433	6,478	3,223,990
Total liabilities, deferred inflows of resources, and net position	$ 4,144,665	$ 431,606	$ (14,019)	$ 4,562,252	$ 3,553,156	$ 40,533	$ 8,155,941

JEA **Page 10**

Combining Statement of Revenues, Expenses, and Changes in Net Position
(in thousands - unaudited) for the month ended June 2021

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating revenues								
Electric - base	$ 75,756	$ -	$ -	$ 75,756	$ -	$ -	$ (745)	$ 75,011
Electric - fuel and purchased power	36,886	2,219	(2,219)	36,886	-	-	(685)	36,201
Water and sewer	-	-	-	-	37,977	-	(9)	37,968
District energy system	-	-	-	-	-	711	(32)	679
Other operating revenues	1,671	6	-	1,677	1,208	4	(185)	2,704
Total operating revenues	114,313	2,225	(2,219)	114,319	39,185	715	(1,656)	152,563
Operating expenses								
Operations and maintenance:								
Maintenance and other operating expenses	18,488	(655)	-	17,833	13,612	390	(1,656)	30,179
Fuel	30,565	-	-	30,565	-	-	-	30,565
Purchased power	12,421	-	(2,219)	10,202	-	-	-	10,202
Depreciation	18,324	34	-	18,358	14,172	214	-	32,744
State utility and franchise taxes	5,302	-	-	5,302	1,021	-	-	6,323
Recognition of deferred costs and revenues, net	561	1,156	-	1,717	510	-	-	2,227
Total operating expenses	85,661	535	(2,219)	83,977	29,315	604	(1,656)	112,240
Operating income	28,652	1,690	-	30,342	9,870	111	-	40,323
Nonoperating revenues (expenses)								
Interest on debt	(5,807)	(815)	-	(6,622)	(3,926)	(107)	-	(10,655)
Investment income	(59)	4	-	(55)	91	-	-	36
Allowance for funds used during construction	302	-	-	302	562	1	-	865
Other nonoperating income, net	343	24	-	367	(1,820)	-	-	(1,453)
Earnings from The Energy Authority	1,400	-	-	1,400	-	-	-	1,400
Other interest, net	(3)	-	-	(3)	(1)	-	-	(4)
Total nonoperating expenses, net	(3,824)	(787)	-	(4,611)	(5,094)	(106)	-	(9,811)
Income before contributions	24,828	903	-	25,731	4,776	5	-	30,512
Contributions (to) from								
General Fund, City of Jacksonville, Florida	(7,801)	-	-	(7,801)	(2,200)	-	-	(10,001)
Developers and other	353	-	-	353	9,459	-	-	9,812
Reduction of plant cost through contributions	(353)	-	-	(353)	(6,310)	-	-	(6,663)
Total contributions, net	(7,801)	-	-	(7,801)	949	-	-	(6,852)
Change in net position	17,027	903	-	17,930	5,725	5	-	23,660
Net position, beginning of period	1,434,573	85,898	-	1,520,471	1,837,621	6,129	-	3,364,221
Net position, end of period	$ 1,451,600	$ 86,801	$ -	$ 1,538,401	$ 1,843,346	$ 6,134	$ -	$ 3,387,881

JEA **Page 11**

Combining Statement of Revenues, Expenses, and Changes in Net Position
(in thousands - unaudited) for the month ended June 2020

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating revenues								
Electric - base	$ 76,171	$ -	$ -	$ 76,171	$ -	$ -	$ (887)	$ 75,284
Electric - fuel and purchased power	30,664	2,029	(2,029)	30,664	-	-	(453)	30,211
Water and sewer	-	-	-	-	37,389	-	(19)	37,370
District energy system	-	-	-	-	-	654	(33)	621
Other operating revenues	1,552	(446)	-	1,106	755	-	(189)	1,672
Total operating revenues	108,387	1,583	(2,029)	107,941	38,144	654	(1,581)	145,158
Operating expenses								
Operations and maintenance:								
Maintenance and other operating expenses	18,690	3,952	-	22,642	13,628	389	(1,581)	35,078
Fuel	26,296	-	-	26,296	-	-	-	26,296
Purchased power	9,248	-	(2,029)	7,219	-	-	-	7,219
Depreciation	16,958	34	-	16,992	12,812	206	-	30,010
State utility and franchise taxes	5,074	-	-	5,074	967	-	-	6,041
Recognition of deferred costs and revenues, net	612	1,104	-	1,716	430	-	-	2,146
Total operating expenses	76,878	5,090	(2,029)	79,939	27,837	595	(1,581)	106,790
Operating income	31,509	(3,507)	-	28,002	10,307	59	-	38,368
Nonoperating revenues (expenses)								
Interest on debt	(6,530)	(844)	-	(7,374)	(4,191)	(109)	-	(11,674)
Investment income	704	202	-	906	1,122	2	-	2,030
Allowance for funds used during construction	595	-	-	595	988	9	-	1,592
Other nonoperating income, net	348	27	-	375	205	-	-	580
Earnings from The Energy Authority	553	-	-	553	-	-	-	553
Other interest, net	(4)	-	-	(4)	(1)	-	-	(5)
Total nonoperating expenses, net	(4,334)	(615)	-	(4,949)	(1,877)	(98)	-	(6,924)
Income before contributions	27,175	(4,122)	-	23,053	8,430	(39)	-	31,444
Contributions (to) from								
General Fund, City of Jacksonville, Florida	(7,823)	-	-	(7,823)	(2,080)	-	-	(9,903)
Developers and other	147	-	-	147	12,507	-	-	12,654
Reduction of plant cost through contributions	(147)	-	-	(147)	(10,117)	-	-	(10,264)
Total contributions, net	(7,823)	-	-	(7,823)	310	-	-	(7,513)
Change in net position	19,352	(4,122)	-	15,230	8,740	(39)	-	23,931
Net position, beginning of period	1,267,525	93,096	-	1,360,621	1,752,723	6,199	-	3,119,543
Net position, end of period	$ 1,286,877	$ 88,974	$ -	$ 1,375,851	$ 1,761,463	$ 6,160	$ -	$ 3,143,474

JEA

Combining Statement of Revenues, Expenses, and Changes in Net Position
(in thousands - unaudited) for the nine months ended June 2021

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating revenues								
Electric - base	$ 612,828	$ -	$ -	$ 612,828	$ -	$ -	$ (6,248)	$ 606,580
Electric - fuel and purchased power	283,767	19,974	(19,974)	283,767	-	-	(5,687)	278,080
Water and sewer	-	-	-	-	335,393	-	(201)	335,192
District energy system	-	-	-	-	-	5,598	(236)	5,362
Other operating revenues	19,135	111	-	19,246	10,175	5	(1,661)	27,765
Total operating revenues	915,730	20,085	(19,974)	915,841	345,568	5,603	(14,033)	1,252,979
Operating expenses								
Operations and maintenance:								
Maintenance and other operating expenses	163,392	1,931	-	165,323	117,774	3,082	(14,033)	272,146
Fuel	247,135	-	-	247,135	-	-	-	247,135
Purchased power	92,796	-	(19,974)	72,822	-	-	-	72,822
Depreciation	162,616	307	-	162,923	128,656	1,921	-	293,500
State utility and franchise taxes	42,825	-	-	42,825	8,105	-	-	50,930
Recognition of deferred costs and revenues, net	5,811	10,408	-	16,219	4,034	-	-	20,253
Total operating expenses	714,575	12,646	(19,974)	707,247	258,569	5,003	(14,033)	956,786
Operating income	201,155	7,439	-	208,594	86,999	600	-	296,193
Nonoperating revenues (expenses)								
Interest on debt	(50,690)	(7,336)	-	(58,026)	(33,248)	(954)	-	(92,228)
Investment income	1,005	101	-	1,106	901	2	-	2,009
Allowance for funds used during construction	2,159	-	-	2,159	4,061	8	-	6,228
Other nonoperating income, net	3,040	218	-	3,258	(146)	-	-	3,112
Earnings from The Energy Authority	10,454	-	-	10,454	-	-	-	10,454
Other interest, net	(16)	-	-	(16)	20	-	-	4
Total nonoperating expenses, net	(34,048)	(7,017)	-	(41,065)	(28,412)	(944)	-	(70,421)
Income before contributions	167,107	422	-	167,529	58,587	(344)	-	225,772
Contributions (to) from								
General Fund, City of Jacksonville, Florida	(70,207)	-	-	(70,207)	(19,802)	-	-	(90,009)
Developers and other	1,923	-	-	1,923	66,309	-	-	68,232
Reduction of plant cost through contributions	(1,923)	-	-	(1,923)	(38,181)	-	-	(40,104)
Total contributions, net	(70,207)	-	-	(70,207)	8,326	-	-	(61,881)
Change in net position	96,900	422	-	97,322	66,913	(344)	-	163,891
Net position, beginning of year	1,354,700	86,379	-	1,441,079	1,776,433	6,478	-	3,223,990
Net position, end of period	$ 1,451,600	$ 86,801	$ -	$ 1,538,401	$ 1,843,346	$ 6,134	$ -	$ 3,387,881

JEA **Page 13**

Combining Statement of Revenues, Expenses, and Changes in Net Position
(in thousands - unaudited) for the nine months ended June 2020

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating revenues								
Electric - base	$ 625,084	$ -	$ -	$ 625,084	$ -	$ -	$ (6,441)	$ 618,643
Electric - fuel and purchased power	238,827	18,586	(18,587)	238,826	-	-	(5,205)	233,621
Water and sewer	-	-	-	-	353,996	-	(167)	353,829
District energy system	-	-	-	-	-	5,907	(246)	5,661
Other operating revenues	17,282	(282)	-	17,000	10,904	-	(2,113)	25,791
Total operating revenues	881,193	18,304	(18,587)	880,910	364,900	5,907	(14,172)	1,237,545
Operating expenses								
Operations and maintenance:								
Maintenance and other operating expenses	181,019	11,877	-	192,896	122,329	3,142	(14,172)	304,195
Fuel	202,393	-	-	202,393	-	-	-	202,393
Purchased power	79,007	-	(18,587)	60,420	-	-	-	60,420
Depreciation	151,686	307	-	151,993	118,925	1,851	-	272,769
State utility and franchise taxes	40,890	-	-	40,890	8,159	-	-	49,049
Recognition of deferred costs and revenues, net	7,412	9,459	-	16,871	5,175	-	-	22,046
Total operating expenses	662,407	21,643	(18,587)	665,463	254,588	4,993	(14,172)	910,872
Operating income	218,786	(3,339)	-	215,447	110,312	914	-	326,673
Nonoperating revenues (expenses)								
Interest on debt	(59,360)	(7,600)	-	(66,960)	(39,478)	(984)	-	(107,422)
Investment income	7,441	1,745	-	9,186	3,918	55	-	13,159
Allowance for funds used during construction	5,931	-	-	5,931	9,679	42	-	15,652
Other nonoperating income, net	3,144	238	-	3,382	2,104	-	-	5,486
Earnings from The Energy Authority	1,878	-	-	1,878	-	-	-	1,878
Other interest, net	359	-	-	359	357	-	-	716
Total nonoperating expenses, net	(40,607)	(5,617)	-	(46,224)	(23,420)	(887)	-	(70,531)
Income before contributions	178,179	(8,956)	-	169,223	86,892	27	-	256,142
Contributions (to) from								
General Fund, City of Jacksonville, Florida	(70,404)	-	-	(70,404)	(18,715)	-	-	(89,119)
Developers and other	1,096	-	-	1,096	77,827	-	-	78,923
Reduction of plant cost through contributions	(1,096)	-	-	(1,096)	(54,109)	-	-	(55,205)
Total contributions, net	(70,404)	-	-	(70,404)	5,003	-	-	(65,401)
Change in net position	107,775	(8,956)	-	98,819	91,895	27	-	190,741
Net position, beginning of year	1,179,102	97,930	-	1,277,032	1,669,568	6,133	-	2,952,733
Net position, end of period	$ 1,286,877	$ 88,974	$ -	$ 1,375,851	$ 1,761,463	$ 6,160	$ -	$ 3,143,474

JEA **Page 14**

Combining Statement of Cash Flows
(in thousands - unaudited) for the nine months ended June 2021

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating activities								
Receipts from customers	$ 894,640	$ 19,974	$ (19,972)	$ 894,642	$ 343,126	$ 5,149	$ (12,372)	$ 1,230,545
Payments to suppliers	(423,094)	(7,451)	19,972	(410,573)	(73,571)	(2,688)	14,033	(472,799)
Payments for salaries and benefits	(130,205)	-	-	(130,205)	(52,964)	(530)	-	(183,699)
Other operating activities	19,129	19	-	19,148	11,474	5	(1,661)	28,966
Net cash provided by operating activities	360,470	12,542	-	373,012	228,065	1,936	-	603,013
Noncapital and related financing activities								
Contribution to General Fund, City of Jacksonville, Florida	(70,229)	-	-	(70,229)	(19,681)	-	-	(89,910)
Net cash used in noncapital and related financing activities	(70,229)	-	-	(70,229)	(19,681)	-	-	(89,910)
Capital and related financing activities								
Defeasance of debt	(104,390)	-	-	(104,390)	-	-	-	(104,390)
Acquisition and construction of capital assets	(122,983)	-	-	(122,983)	(129,656)	(661)	-	(253,300)
Repayment of debt principal	(67,765)	(13,340)	-	(81,105)	(19,870)	(1,725)	-	(102,700)
Interest paid on debt	(64,047)	(10,169)	-	(74,216)	(49,033)	(1,275)	-	(124,524)
Capital contributions	-	-	-	-	28,128	-	-	28,128
Revolving credit agreement repayments	-	-	-	-	(5,000)	-	-	(5,000)
Other capital financing activities	2,709	304	-	3,013	598	-	-	3,611
Net cash used in capital and related financing activities	(356,476)	(23,205)	-	(379,681)	(174,833)	(3,661)	-	(558,175)
Investing activities								
Purchase of investments	(173,643)	(27,485)	-	(201,128)	(13,929)	-	-	(215,057)
Proceeds from sale and maturity of investments	142,182	26,968	-	169,150	14,777	-	-	183,927
Investment income	2,720	109	-	2,829	1,558	2	-	4,389
Distributions from The Energy Authority	1,350	-	-	1,350	-	-	-	1,350
Net cash provided by (used in) investing activities	(27,391)	(408)	-	(27,799)	2,406	2	-	(25,391)
Net change in cash and cash equivalents	(93,626)	(11,071)	-	(104,697)	35,957	(1,723)	-	(70,463)
Cash and cash equivalents at beginning of year	355,876	141,132	-	497,008	138,268	5,856	-	641,132
Cash and cash equivalents at end of period	$ 262,250	$ 130,061	$ -	$ 392,311	$ 174,225	$ 4,133	$ -	$ 570,669
Reconciliation of operating income to net cash provided by operating activities								
Operating income	$ 201,155	$ 7,439	$ -	$ 208,594	$ 86,999	$ 600	$ -	$ 296,193
Adjustments:								
Depreciation and amortization	162,616	307	-	162,923	129,494	1,921	-	294,338
Recognition of deferred costs and revenues, net	5,811	10,408	-	16,219	4,034	-	-	20,253
Other nonoperating income, net	41	-	-	41	28	-	-	69
Changes in noncash assets and noncash liabilities:								
Accounts receivable	13,192	-	-	13,192	(507)	(449)	-	12,236
Inventories	7,730	-	-	7,730	2,138	-	-	9,868
Other assets	761	2,425	-	3,186	1,150	(7)	-	4,329
Accounts and accrued expenses payable	(11,177)	(2,939)	-	(14,116)	(3,810)	(131)	-	(18,057)
Current liabilities payable from restricted assets	-	(5,364)	-	(5,364)	-	-	-	(5,364)
Other noncurrent liabilities and deferred inflows	(19,659)	266	-	(19,393)	8,539	2	-	(10,852)
Net cash provided by operating activities	$ 360,470	$ 12,542	$ -	$ 373,012	$ 228,065	$ 1,936	$ -	$ 603,013
Noncash activity								
Contribution of capital assets from developers	$ 1,923	$ -	$ -	$ 1,923	$ 38,181	$ -	$ -	$ 40,104
Unrealized investment fair market value changes, net	$ (1,796)	$ (20)	$ -	$ (1,816)	$ (993)	$ -	$ -	$ (2,809)

JEA **Page 15**

Combining Statement of Cash Flows
(in thousands - unaudited) for the nine months ended June 2020

	Electric System and Bulk Power Supply System	SJRPP System	Elimination of Intercompany transactions	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Eliminations	Total JEA
Operating activities								
Receipts from customers	$ 840,843	$ 18,586	$ (19,448)	$ 839,981	$ 343,772	$ 5,758	$ (12,059)	$ 1,177,452
Payments to suppliers	(387,783)	(7,210)	19,448	(375,545)	(81,767)	(2,706)	14,172	(445,846)
Payments for salaries and benefits	(139,269)	(10,307)	-	(149,576)	(56,222)	(564)	-	(206,362)
Other operating activities	18,561	(188)	-	18,373	10,834	-	(2,113)	27,094
Net cash provided by operating activities	332,352	881	-	333,233	216,617	2,488	-	552,338
Noncapital and related financing activities								
Contribution to General Fund, City of Jacksonville, Florida	(70,327)	-	-	(70,327)	(18,693)	-	-	(89,020)
Net cash used in noncapital and related financing activities	(70,327)	-	-	(70,327)	(18,693)	-	-	(89,020)
Capital and related financing activities								
Defeasance of debt	(48,070)	-	-	(48,070)	(45,425)	-	-	(93,495)
Acquisition and construction of capital assets	(155,799)	-	-	(155,799)	(149,126)	(2,570)	-	(307,495)
Repayment of debt principal	(122,380)	(13,780)	-	(136,160)	(54,705)	(1,690)	-	(192,555)
Interest paid on debt	(75,060)	(10,786)	-	(85,846)	(55,103)	(1,313)	-	(142,262)
Capital contributions	-	-	-	-	23,718	-	-	23,718
Other capital financing activities	(4,095)	159	-	(3,936)	(1,186)	-	-	(5,122)
Net cash used in capital and related financing activities	(405,404)	(24,407)	-	(429,811)	(281,827)	(5,573)	-	(717,211)
Investing activities								
Purchase of investments	(163,969)	(23,820)	-	(187,789)	(22,631)	-	-	(210,420)
Proceeds from sale and maturity of investments	122,862	23,768	-	146,630	51,539	-	-	198,169
Investment income	5,589	1,733	-	7,322	2,326	55	-	9,703
Distributions from The Energy Authority	895	-	-	895	-	-	-	895
Net cash provided by (used in) investing activities	(34,623)	1,681	-	(32,942)	31,234	55	-	(1,653)
Net change in cash and cash equivalents	(178,002)	(21,845)	-	(199,847)	(52,669)	(3,030)	-	(255,546)
Cash and cash equivalents at beginning of year	356,655	161,592	-	518,247	153,732	8,243	-	680,222
Cash and cash equivalents at end of period	$ 178,653	$ 139,747	$ -	$ 318,400	$ 101,063	$ 5,213	$ -	$ 424,676
Reconciliation of operating income to net cash provided by operating activities								
Operating income	$ 218,786	$ (3,339)	$ -	$ 215,447	$ 110,312	$ 914	$ -	$ 326,673
Adjustments:								
Depreciation and amortization	151,686	307	-	151,993	119,803	1,851	-	273,647
Recognition of deferred costs and revenues, net	7,412	9,459	-	16,871	5,175	-	-	22,046
Other nonoperating income (loss), net	87	-	-	87	262	-	-	349
Changes in noncash assets and noncash liabilities:								
Accounts receivable	11,679	-	-	11,679	(2,200)	(149)	-	9,330
Inventories	(8,933)	106	-	(8,827)	(2,600)	-	-	(11,427)
Other assets	1,207	55	-	1,262	(382)	(8)	-	872
Accounts and accrued expenses payable	(17,611)	1,342	-	(16,269)	(5,493)	(159)	-	(21,921)
Current liabilities payable from restricted assets	-	(5,326)	-	(5,326)	-	-	-	(5,326)
Other noncurrent liabilities and deferred inflows	(31,961)	(1,723)	-	(33,684)	(8,260)	39	-	(41,905)
Net cash provided by operating activities	$ 332,352	$ 881	$ -	$ 333,233	$ 216,617	$ 2,488	$ -	$ 552,338
Noncash activity								
Contribution of capital assets from developers	$ 1,096	$ -	$ -	$ 1,096	$ 54,109	$ -	$ -	$ 55,205
Unrealized investment fair market value changes, net	$ 1,831	$ -	$ -	$ 1,831	$ 1,378	$ -	$ -	$ 3,209

JEA **Page 16**

Debt Service Coverage
June 2021
(unaudited)

	Month June		Year-to-Date June	
	2021	**2020**	**2021**	**2020**
Electric System				
Senior debt service coverage, (annual minimum 1.20x)	13.11 x	12.61 x	11.23 x	9.81 x
Senior and subordinated debt service coverage, (annual minimum 1.15x)	5.76 x	5.49 x	4.92 x	4.44 x
Bulk Power Supply System				
Debt service coverage, (annual minimum 1.15x)	1.22 x	1.60 x	1.27 x	2.11 x
St. Johns River Power Park, Second Resolution				
Debt service coverage, (annual minimum 1.15x)	1.25 x	0.91 x	1.15 x	1.14 x
Water and Sewer System				
Senior debt service coverage, (annual minimum 1.25x)	7.16 x	5.34 x	7.11 x	5.78 x
Senior and subordinated debt service coverage excluding capacity fees [(1)]	5.56 x	4.36 x	5.52 x	4.66 x
Senior and subordinated debt service coverage including capacity fees [(1)]	6.27 x	4.80 x	6.22 x	5.13 x
District Energy System				
Debt service coverage, (annual minimum 1.15x)	1.27 x	1.06 x	1.11 x	1.25 x

[(1)] Annual minimum coverage is either 1.00x aggregate debt service and aggregate subordinated debt service (excluding capacity charges) or the sum of 1.00x aggregate debt service and 1.20x aggregate subordinated debt service (including capacity charges).

JEA **Page 17**
Electric System
Operating Statistics
June 2021 and 2020 (unaudited)

	Month			Year-to-Date		
	2021	**2020**	**Variance**	**2021**	**2020**	**Variance**
Electric revenues sales (000s omitted):						
Residential	$ 58,848	$ 59,638	-1.32%	$ 451,993	$ 421,219	7.31%
Commercial	33,332	31,351	6.32%	270,709	263,705	2.66%
Industrial	16,215	16,320	-0.64%	139,381	136,365	2.21%
Public street lighting	1,171	1,142	2.54%	10,327	9,994	3.33%
Electric revenues - territorial	109,566	108,451	1.03%	872,410	831,283	4.95%
Sales for resale - off system	26	235	-88.94%	2,068	1,405	47.19%
Electric revenues	109,592	108,686	0.83%	874,478	832,688	5.02%
Rate stabilization & recovery	3,050	(767)	-497.65%	23,694	32,864	-27.90%
Allowance for doubtful accounts	-	(1,084)	-100.00%	(1,577)	(1,641)	-3.90%
Net electric revenues	112,642	106,835	5.44%	896,595	863,911	3.78%
MWh sales						
Residential	520,193	533,636	-2.52%	3,942,915	3,770,482	4.57%
Commercial	347,827	338,308	2.81%	2,763,591	2,772,123	-0.31%
Industrial	230,145	240,187	-4.18%	1,923,706	1,963,351	-2.02%
Public street lighting	4,881	4,933	-1.05%	41,637	41,844	-0.49%
Total MWh sales - territorial	1,103,046	1,117,064	-1.25%	8,671,849	8,547,800	1.45%
Sales for resale - off system	600	566	6.01%	22,273	16,423	35.62%
Total MWh sales	1,103,646	1,117,630	-1.25%	8,694,122	8,564,223	1.52%
Average number of accounts						
Residential	438,367	429,711	2.01%	435,181	426,181	2.11%
Commercial	54,383	53,697	1.28%	54,077	53,474	1.13%
Industrial	195	196	-0.51%	196	195	0.51%
Public street lighting	3,989	3,925	1.63%	3,973	3,921	1.33%
Total average accounts	496,934	487,529	1.93%	493,427	483,771	2.00%
Residential averages						
Revenue per account - $	134.24	138.79	-3.27%	1,038.63	988.36	5.09%
kWh per account	1,187	1,242	-4.44%	9,060	8,847	2.41%
Revenue per kWh - ¢	11.31	11.18	1.23%	11.46	11.17	2.61%
Degree days						
Heating degree days	-	-	-	1,208	822	386
Cooling degree days	433	440	(7)	1,371	1,689	(318)
Total degree days	433	440	(7)	2,579	2,511	68
Degree days - 30 year average	459			2,593		

JEA
Water and Sewer System
Operating Statistics
June 2021 and 2020 (unaudited)

	Month								
	Water			Sewer			Reuse		
	2021	2020	Variance	2021	2020	Variance	2021	2020	Variance
Revenues (000s omitted):									
Residential	$ 8,817	$ 8,591	2.63%	$ 12,753	$ 12,673	0.63%	$ 1,417	$ 1,186	19.48%
Commercial and industrial	3,609	3,729	-3.22%	8,107	8,492	-4.53%	587	570	2.98%
Irrigation	3,540	3,152	12.31%	N/A	N/A	N/A	19	10	90.00%
Gross revenues	15,966	15,472	3.19%	20,860	21,165	-1.44%	2,023	1,766	14.55%
Rate stabilization	(357)	(237)	50.63%	(466)	(323)	44.27%	(46)	(27)	70.37%
Allowance for doubtful accounts	(1)	(171)	-99.42%	(2)	(236)	-99.15%	-	(20)	-100.00%
Net revenues	$ 15,608	$ 15,064	3.61%	$ 20,392	$ 20,606	-1.04%	$ 1,977	$ 1,719	15.01%
Kgal sales (000s omitted)									
Residential	1,630,311	1,562,912	4.31%	1,422,388	1,357,656	4.77%	232,520	191,850	21.20%
Commercial and industrial	994,529	1,029,900	-3.43%	825,652	888,847	-7.11%	125,790	122,446	2.73%
Irrigation	633,955	542,537	16.85%	N/A	N/A	N/A	77,611	40,680	90.78%
Total kgals sales	3,258,795	3,135,349	3.94%	2,248,040	2,246,503	0.07%	435,921	354,976	22.80%
Average number of accounts:									
Residential	310,625	301,725	2.95%	276,954	268,224	3.25%	19,518	16,931	15.28%
Commercial and industrial	26,654	26,248	1.55%	18,942	18,681	1.40%	753	672	12.05%
Irrigation	38,098	37,692	1.08%	N/A	N/A	N/A	42	38	10.53%
Total average accounts	375,377	365,665	2.66%	295,896	286,905	3.13%	20,313	17,641	15.15%
Residential averages:									
Revenue per account - $	28.38	28.47	-0.32%	46.05	47.25	-2.54%	72.60	70.05	3.64%
Kgals per account	5.25	5.18	1.35%	5.14	5.06	1.58%	11.91	11.33	5.12%
Revenue per kgals - $	5.41	5.50	-1.64%	8.97	9.33	-3.86%	6.09	6.18	-1.46%

	Year-to-Date								
	Water			Sewer			Reuse		
	2021	2020	Variance	2021	2020	Variance	2021	2020	Variance
Revenues (000s omitted):									
Residential	$ 74,863	$ 74,755	0.14%	$ 114,018	$ 113,434	0.51%	$ 10,824	$ 10,521	2.88%
Commercial and industrial	35,005	34,918	0.25%	81,806	81,448	0.44%	4,024	4,662	-13.69%
Irrigation	23,562	26,132	-9.83%	N/A	N/A	N/A	215	153	40.52%
Gross revenues	133,430	135,805	-1.75%	195,824	194,882	0.48%	15,063	15,336	-1.78%
Rate stabilization	(3,221)	3,386	-195.13%	(4,698)	5,036	-193.29%	(363)	350	-203.71%
Allowance for doubtful accounts	(244)	(317)	-23.03%	(372)	(446)	-16.59%	(26)	(36)	-27.78%
Net revenues	$ 129,965	$ 138,874	-6.42%	$ 190,754	$ 199,472	-4.37%	$ 14,674	$ 15,650	-6.24%
Kgal sales (000s omitted)									
Residential	13,763,234	14,031,081	-1.91%	12,038,132	12,212,059	-1.42%	1,689,827	1,740,321	-2.90%
Commercial and industrial	9,936,778	9,953,450	-0.17%	8,726,972	8,704,331	0.26%	839,051	996,233	-15.78%
Irrigation	3,759,790	4,400,190	-14.55%	N/A	N/A	N/A	736,843	468,126	57.40%
Total kgals sales	27,459,802	28,384,721	-3.26%	20,765,104	20,916,390	-0.72%	3,265,721	3,204,680	1.90%
Average number of accounts:									
Residential	307,375	298,808	2.87%	273,807	265,425	3.16%	18,591	16,025	16.01%
Commercial and industrial	26,461	26,158	1.16%	18,808	18,625	0.98%	722	639	12.99%
Irrigation	37,855	37,452	1.08%	N/A	N/A	N/A	40	37	8.11%
Total average accounts	371,691	362,418	2.56%	292,615	284,050	3.02%	19,353	16,701	15.88%
Residential averages:									
Revenue per account - $	243.56	250.18	-2.65%	416.42	427.37	-2.56%	582.22	656.54	-11.32%
Kgals per account	44.78	46.96	-4.64%	43.97	46.01	-4.43%	90.89	108.60	-16.31%
Revenue per kgals - $	5.44	5.33	2.06%	9.47	9.29	1.94%	6.41	6.05	5.95%

	Month				Year-to-Date			
Rain statistics	2021	2020	Variance	30 Year Avg	2021	2020	Variance	30 Year Avg
Rainfall	9.71	9.86	(0.15)	7.60	34.94	35.44	(0.50)	32.94
Rain Days	18	11	7	14	92	72	20	73

Appendix

JEA **Page 19**
Schedule of Cash and Investments
(in thousands - unaudited) June 2021

	Electric System and Bulk Power Supply	SJRPP System	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Unrestricted cash and investments						
Operations	$ 50,213	$ 34,216	$ 84,429	$ 25,615	$ 960	$ 111,004
Rate stabilization:						
Fuel	69,555	-	69,555	-	-	69,555
Environmental	20,115	-	20,115	31,655	-	51,770
Purchased Power	16,728	-	16,728	-	-	16,728
DSM/Conservation	6,822	-	6,822	-	-	6,822
Total rate stabilization funds	113,220	-	113,220	31,655	-	144,875
Customer deposits	44,930	-	44,930	16,818	-	61,748
General reserve	-	21,242	21,242	-	-	21,242
Self insurance reserve funds:						
Self funded health plan	13,845	-	13,845	-	-	13,845
Property insurance reserve	10,000	-	10,000	-	-	10,000
Total self insurance reserve funds	23,845	-	23,845	-	-	23,845
Environmental liability reserve	16,568	-	16,568	-	-	16,568
Total unrestricted cash and investments	$ 248,776	$ 55,458	$ 304,234	$ 74,088	$ 960	$ 379,282
Restricted assets						
Renewal and replacement funds	$ 123,298	$ 33,384	$ 156,682	$ 93,900	$ 1,532	$ 252,114
Debt service reserve account	55,844	10,066	65,910	58,664	-	124,574
Debt service funds	61,922	13,472	75,394	18,598	1,641	95,633
Construction funds	68	-	68	20,321	-	20,389
Environmental funds	68	-	68	783	-	851
Subtotal	241,200	56,922	298,122	192,266	3,173	493,561
Unrealized holding gain (loss) on investments	3,975	84	4,059	4,898	-	8,957
Other funds	-	31,428	31,428	-	-	31,428
Total restricted cash and investments	$ 245,175	$ 88,434	$ 333,609	$ 197,164	$ 3,173	$ 533,946
Total cash and investments	$ 493,951	$ 143,892	$ 637,843	$ 271,252	$ 4,133	$ 913,228

JEA
Schedule of Cash and Investments
(in thousands) September 2020

	Electric System and Bulk Power Supply	SJRPP System	Total Electric Enterprise Fund	Water and Sewer Enterprise Fund	District Energy System Fund	Total JEA
Unrestricted cash and investments						
Operations	$ 48,670	$ 34,212	$ 82,882	$ 26,738	$ 1,615	$ 111,235
Rate stabilization:						
Fuel	73,347	-	73,347	-	-	73,347
Environmental	21,818	-	21,818	23,372	-	45,190
Purchased Power	36,326	-	36,326	-	-	36,326
DSM/Conservation	5,423	-	5,423	-	-	5,423
Total rate stabilization funds	136,914	-	136,914	23,372	-	160,286
Customer deposits	43,641	-	43,641	16,926	-	60,567
General reserve	-	20,709	20,709	-	-	20,709
Self insurance reserve funds:						
Self funded health plan	10,890	-	10,890	-	-	10,890
Property insurance reserve	10,000	-	10,000	-	-	10,000
Total self insurance reserve funds	20,890	-	20,890	-	-	20,890
Environmental liability reserve	16,568	-	16,568	-	-	16,568
Total unrestricted cash and investments	$ 266,683	$ 54,921	$ 321,604	$ 67,036	$ 1,615	$ 390,255
Restricted assets						
Renewal and replacement funds	$ 137,643	$ 37,910	$ 175,553	$ 38,131	$ 1,868	$ 215,552
Debt service reserve account	55,844	10,544	66,388	58,228	-	124,616
Debt service funds	91,358	18,928	110,286	41,660	2,373	154,319
Construction funds	311	-	311	25,541	-	25,852
Environmental funds	301	-	301	649	-	950
Subtotal	285,457	67,382	352,839	164,209	4,241	521,289
Unrealized holding gain (loss) on investments	5,772	101	5,873	5,890	-	11,763
Other funds	-	32,062	32,062	-	-	32,062
Total restricted cash and investments	$ 291,229	$ 99,545	$ 390,774	$ 170,099	$ 4,241	$ 565,114
Total cash and investments	$ 557,912	$ 154,466	$ 712,378	$ 237,135	$ 5,856	$ 955,369

JEA **Page 20**

INVESTMENT PORTFOLIO REPORT
June 2021
(unaudited)

INVESTMENT	BOOK VALUE	YIELD	% OF TOTAL
Federal Home Loan Bank	$ 75,249,692	2.08%	8.31%
Municipal Bonds	116,016,261	3.32%	12.80%
Commercial Paper	142,323,111	0.18%	15.71%
U.S. Treasury Money Market Funds (1)	207,493,072	0.02%	22.90%
Agency Money Market Funds (2)	93,575,000	0.03%	10.33%
PALM Money Market Fund	40,500,000	0.05%	4.47%
Florida Prime Fund	114,563,000	0.09%	12.64%
Wells Fargo Bank Accounts (3)			
Electric, Scherer	58,039,137	0.16%	6.41%
SJRPP	23,127,359	0.16%	2.55%
Water & Sewer, DES	35,147,569	0.16%	3.88%
Total Portfolio	$ 906,034,201	0.69%	100.00%

Weighted Avg. Annual Yield for June 2021, Excluding Bank & Money Market Funds: 1.72%

Weighted Avg. Annual Yield for June 2021, Including Bank & Money Market Funds: 0.69%

Some investments listed above may be classified as Cash Equivalents on the Statements of Net Position in accordance with generally accepted accounting principles.

(1) Treasury Funds: Fidelity, Goldman Sachs, State Street
(2) Government Funds: State Street, Wells Fargo
(3) Month-end bank balances

JEA **Page 21**
Schedule of Outstanding Indebtedness
June 2021

	Interest Rates	Principal Payment Dates	Par Amount Principal Outstanding	Current Portion of Long-Term Debt
Electric Enterprise				
Electric System				
Fixed Rate Senior	3.000-6.056%	2021-2044	459,695,000	15,705,000
Fixed Rate Subordinated	3.375-6.406%	2021-2039	478,255,000	31,870,000
Variable Rate Senior	0.035-0.531%	2021-2040	448,430,000	8,595,000
Variable Rate Subordinated	0.017-0.096%	2021-2038	57,195,000	2,970,000
Total Electric System	2.735% (wtd avg)	2021-2044	1,443,575,000	59,140,000
Bulk Power Supply System				
Fixed Rate Senior	2.250-5.920%	2021-2038	81,885,000	7,080,000
St. Johns River Power Park				
Fixed Rate Senior	2.250-5.450%	2021-2039	251,765,000	14,175,000
Total Electric Enterprise	2.950% (wtd avg)	2021-2044	1,777,225,000	80,395,000
Water and Sewer System				
Fixed Rate Senior	3.000-6.310%	2021-2044	899,860,000	2,060,000
Fixed Rate Subordinated	2.750-5.000%	2023-2040	88,845,000	-
Variable Rate Senior	0.033-1.981%	2021-2042	147,025,000	4,860,000
Variable Rate Subordinated	0.012-0.046%	2021-2038	100,835,000	2,450,000
Total Water and Sewer System	3.234% (wtd avg)	2021-2044	1,236,565,000	9,370,000
District Energy System				
Fixed Rate Senior	2.694 - 4.538%	2021-2034	31,410,000	1,770,000
Total JEA	3.079% (wtd avg)	2021-2044	3,045,200,000	91,535,000

JEA
Debt Ratio
June 2021

	Current YTD
Electric Enterprise	55.9%
Water and Sewer System	40.6%

JEA **Page 22**

Interest Rate Swap Position Report
June 2021
(unaudited)

JEA Debt Management Swaps Variable to Fixed

ID	Dealer	Effective Date	Termination Date	Allocation	Fixed Rate	Floating Rate (1)	Spread	Rate Cap	Index
Electric System									
1	Goldman Sachs	9/18/2003	9/16/2033	$ 84,800,000	3.717	0.063	3.654	n/a	68% 1 mth Libor
3	Morgan Stanley	1/27/2005	10/1/2039	82,575,000	4.351	0.031	4.319	n/a	SIFMA
4	JPMorgan	1/27/2005	10/1/2035	81,575,000	3.661	0.063	3.598	n/a	68% 1 mth Libor
6	JPMorgan	1/27/2005	10/1/2037	39,175,000	3.716	0.063	3.653	n/a	68% 1 mth Libor
8	Morgan Stanley	1/31/2007	10/1/2031	62,980,000	3.907	0.031	3.876	n/a	SIFMA
10	Goldman Sachs	1/31/2008	10/1/2036	51,680,000	3.836	0.031	3.805	n/a	SIFMA
			Total	402,785,000					
Water/Sewer System									
7	Morgan Stanley	10/31/2006	10/1/2022	9,915,000	4.075	2.395	1.680	n/a	CPI
9	Merrill Lynch	3/8/2007	10/1/2041	85,290,000	3.895	0.031	3.864	n/a	SIFMA
			Total	95,205,000					
			Grand Total	$ 497,990,000	Wtd Avg Spread		3.796		

Note: (1) The "Floating Rate" column is the average of the floating rate for each instrument for this month.

JEA
Electric System
Production Statistics
June 2021 and 2020 (unaudited)

	Month			Year-to-Date		
	2021	**2020**	**Variance**	**2021**	**2020**	**Variance**
Generated power:						
Steam:						
Fuel oil						
Fuel expense	$ (16,137)	$ 200,132	-108.06%	$ 2,197,864	$ 265,308	728.42%
Barrels #6 oil consumed	(149)	1,846	-108.07%	20,262	2,447	728.03%
$/ per barrel consumed	$ 108.30	$ 108.41	-0.10%	$ 108.47	$ 108.42	0.05%
kWh oil generated (1)	(3,056)	1,060,132	-100.29%	10,376,120	1,201,578	763.54%
Cost per MWh - oil	$ 5,280.43	$ 188.78	2697.13%	$ 211.82	$ 220.80	-4.07%
Natural gas units #1-3						
Gas expense - variable	$ 5,792,694	$ 3,407,007	70.02%	$ 43,163,638	$ 33,200,691	30.01%
MMBTU's consumed	1,808,219	1,976,273	-8.50%	15,414,802	16,124,845	-4.40%
$/ per MMBTU consumed	$ 3.20	$ 1.72	85.82%	$ 2.80	$ 2.06	36.00%
kWh - gas generated (1)	159,478,751	179,111,606	-10.96%	1,389,113,773	1,482,730,504	-6.31%
Cost per MWh - gas	$ 36.32	$ 19.02	90.95%	$ 31.07	$ 22.39	38.77%
Cost per MWh - gas & oil - steam	$ 36.22	$ 20.02	80.92%	$ 32.41	$ 22.55	43.72%
Coal						
Coal expense	$ 2,210,632	$ 2,307,003	-4.18%	$ 14,167,347	$ 12,393,328	14.31%
kWh generated	65,853,351	101,809,942	-35.32%	513,777,278	501,818,832	2.38%
Cost per MWh - coal	$ 33.57	$ 22.66	48.14%	$ 27.57	$ 24.70	11.65%
Pet coke and limestone						
Expense	$ 4,041,304	$ 4,404,121	-8.24%	$ 29,017,911	$ 25,736,946	12.75%
kWh generated	82,241,077	185,449,922	-55.65%	729,820,717	1,051,365,824	-30.58%
Cost per MWh - pet coke and limestone	$ 49.14	$ 23.75	106.92%	$ 39.76	$ 24.48	62.42%
Cost per MWh - coal & petcoke - steam	$ 42.22	$ 23.36	80.70%	$ 34.73	$ 24.55	41.45%
Combustion turbine:						
Fuel oil						
Fuel expense	$ 48,304	$ 136,324	-64.57%	$ 1,550,649	$ 1,396,731	11.02%
Barrels #2 oil consumed	139	1,136	-87.76%	12,495	11,091	12.66%
$/ per barrel consumed	$ 347.51	$ 120.00	189.58%	$ 124.10	$ 125.93	-1.45%
kWh - oil generated	92,021	461,302	-80.05%	5,026,432	4,171,893	20.48%
Cost per MWh - oil	$ 524.92	$ 295.52	77.63%	$ 308.50	$ 334.80	-7.85%
Natural gas (includes landfill)						
Gas expense Kennedy & landfill - variable	$ 583,779	$ 170,079	243.24%	$ 5,212,575	$ 1,658,555	214.28%
MMBTU's consumed	182,381	99,230	83.80%	1,835,142	736,666	149.11%
$/ per MMBTU consumed	$ 3.20	$ 1.71	86.75%	$ 2.84	$ 2.25	26.16%
kWh - gas generated (1)	16,161,260	8,559,677	88.81%	162,421,699	61,780,941	162.90%
Cost per MWh - gas	$ 36.12	$ 19.87	81.79%	$ 32.09	$ 26.85	19.55%
Gas expense BB simple - variable	$ 370,737	$ 303,223	22.27%	$ 4,099,849	$ 2,111,144	94.20%
MMBTU's consumed	$ 122,302	223,384	-45.25%	1,517,114	1,206,659	25.73%
$/ per MMBTU consumed	$ 3.03	$ 1.36	123.32%	$ 2.70	$ 1.75	54.46%
kWh - gas generated (1)	11,247,000	21,097,004	-46.69%	142,372,849	121,247,091	17.42%
Cost per MWh - gas simple	$ 32.96	$ 14.37	129.34%	$ 28.80	$ 17.41	65.38%
Gas expense BB combined - variable	$ 9,298,371	$ 4,698,300	97.91%	$ 69,490,187	$ 50,669,400	37.14%
MMBTU's consumed	2,901,526	2,737,256	6.00%	23,937,259	24,281,542	-1.42%
$/ per MMBTU consumed	$ 3.20	$ 1.72	86.70%	$ 2.90	$ 2.09	39.12%
kWh - gas generated (1)	420,902,611	405,446,608	3.81%	3,540,005,710	3,622,583,624	-2.28%
Cost per MWh - gas combined	$ 22.09	$ 11.59	90.64%	$ 19.63	$ 13.99	40.34%
Gas expense GEC simple - variable	$ 2,268,688	$ 1,115,323	103.41%	$ 14,774,803	$ 7,219,134	104.66%
MMBTU's consumed	646,158	507,592	27.30%	4,332,742	3,203,881	35.23%
$/ per MMBTU consumed	$ 3.51	$ 2.20	59.79%	$ 3.41	$ 2.25	51.34%
kWh - gas generated	58,449,578	46,746,034	25.04%	395,632,201	291,829,580	35.57%
Cost per MWh - gas simple	$ 38.81	$ 23.86	62.68%	$ 37.34	$ 24.74	50.96%
Cost per MWh - gas & oil ct	$ 24.80	$ 13.32	86.22%	$ 22.41	$ 15.37	45.75%
Natural gas expense - fixed	$ 3,283,746	$ 3,622,782	-9.36%	$ 29,071,432	$ 29,035,482	0.12%
Total generated power:						
Fuels expense	$ 27,882,118	$ 20,364,294	36.92%	$ 212,746,255	$ 163,686,719	29.97%
kWh generated	814,422,593	949,742,227	-14.25%	6,888,546,779	7,138,729,867	-3.50%
Cost per MWh	$ 34.24	$ 21.44	59.67%	$ 30.88	$ 22.93	34.69%

(1) Allocation of kWh generated is based upon a ratio of gas MBTU's (adjusted to oil equivalent - 95.5%) and oil MBTU's.

JEA **Page 24**
Electric System
Production Statistics (Continued)
June 2021 and 2020 (unaudited)

	Month			Year-to-Date		
	2021	**2020**	**Variance**	**2021**	**2020**	**Variance**
Production Statistics (Continued)						
Cost of fuels						
Natural gas	$ 21,598,015	$ 13,316,714	62.19%	$ 165,812,484	$ 123,894,406	33.83%
Petcoke	4,041,304	4,404,121	-8.24%	29,017,911	25,736,946	12.75%
Coal	2,210,632	2,307,003	-4.18%	14,167,347	12,393,328	14.31%
Fuel oil #2	48,304	136,324	-64.57%	1,550,649	1,396,731	11.02%
Fuel oil #6	(16,137)	200,132	-108.06%	2,197,864	265,308	728.42%
Total	$ 27,882,118	$ 20,364,294	36.92%	$ 212,746,255	$ 163,686,719	29.97%
Purchased power:						
Plant Scherer						
Purchases	$ 5,008,660	$ 3,670,965	36.44%	$ 39,571,135	$ 33,225,025	19.10%
kWh purchased	124,866,000	63,627,000	96.25%	850,375,000	462,082,000	84.03%
Cost per MWh	$ 40.11	$ 57.70	-30.48%	$ 46.53	$ 71.90	-35.28%
TEA & other						
Purchases	$ 10,202,563	$ 7,219,474	41.32%	$ 72,822,683	$ 60,420,259	20.53%
kWh purchased	210,239,575	151,709,023	38.58%	1,237,002,971	1,263,112,963	-2.07%
Cost per MWh	$ 48.53	$ 47.59	1.98%	$ 58.87	$ 47.83	23.07%
SJRPP						
Purchases	$ 2,218,938	$ 2,028,676	9.38%	$ 19,973,842	$ 18,586,973	7.46%
Total purchased power:						
Purchases	$ 17,430,161	$ 12,919,115	34.92%	$ 132,367,660	$ 112,232,257	17.94%
kWh purchased	335,105,575	215,336,023	55.62%	2,087,377,971	1,725,194,963	20.99%
Cost per MWh	$ 52.01	$ 60.00	-13.30%	$ 63.41	$ 65.05	-2.52%
Subtotal - generated and purchased power:	$ 45,312,279	$ 33,283,409	36.14%	$ 345,113,915	$ 275,918,976	25.08%
Fuel interchange sales	(26,109)	(235,016)	-88.89%	(920,116)	(1,299,405)	-29.19%
Earnings of The Energy Authority	(1,399,834)	(553,499)	152.91%	(10,454,241)	(1,878,406)	456.55%
EPA Allowance Purchases	-	-		-	(17,000)	-100.00%
Realized and Unrealized (Gains) Losses	(2,286,405)	2,462,330	-192.86%	(5,493,105)	12,713,310	-143.21%
Fuel procurement and handling	815,870	1,005,648	-18.87%	9,633,008	9,911,959	-2.81%
Byproduct reuse	479,721	362,992	32.16%	5,659,667	2,861,940	97.76%
Total generated and net purchased power:						
Cost, net	42,895,522	36,325,864	18.09%	343,539,128	298,211,374	15.20%
kWh generated and purchased	1,149,528,168	1,165,078,250	-1.33%	8,975,924,750	8,863,924,830	1.26%
Cost per MWh	$ 37.32	$ 31.18	19.68%	$ 38.27	$ 33.64	13.76%
Reconciliation:						
Generated and purchased power per above	$ 42,895,522	$ 37.32		$ 343,539,128	$ 38.27	
SJRPP operating expenses:						
SJRPP debt service	$ (1,971,226)	(1.71)		(17,744,437)	(1.98)	
SJRPP R & R	$ (247,712)	(0.22)		(2,229,405)	(0.25)	
Scherer operating expenses:						
Scherer power production	$ (502,698)	(0.44)		(6,494,030)	(0.72)	
Scherer R & R	$ (171,990)	(0.15)		(1,984,772)	(0.22)	
Scherer transmission	$ (546,937)	(0.48)		(5,446,643)	(0.61)	
Scherer taxes	$ (113,773)	(0.10)		(1,056,649)	(0.12)	
Florida and other capacity	$ (347,904)	(0.30)		(5,998,507)	(0.67)	
MEAG	$ (2,133,193)	(1.86)		(19,738,202)	(2.20)	
Rounding	$ -	-		-	-	
Energy expense per budget page	$ 36,860,089	$ 32.07		$ 282,846,483	$ 31.51	

JEA **Page 25**

Electric System		**Month**			**Prior Year Month**	
Budget vs. Actual	**ANNUAL BUDGET**	**BUDGET**	**ACTUAL**	**Variance**	**ACTUAL**	**Variance**
June 2021 and 2020 (unaudited)	**2020-21**	**2020-21**	**2020-21**	**%**	**2019-20**	**%**
Fuel Related Revenues & Expenses						
Fuel Rate Revenues	$ 410,912,775	$ 38,768,245	$ 35,582,374	-8.22%	$ 32,976,078	7.90%
Fuel Expense and Purchased Power:						
Fuel Expense - Electric System	307,626,283	28,165,858	26,891,304		24,195,264	
Other Purchased Power	66,547,723	6,890,547	9,968,785		6,233,857	
Subtotal Energy Expense	374,174,006	35,056,405	36,860,089	-5.15%	30,429,121	-21.13%
Transfer to (from) Rate Stabilization, Net	35,506,030	3,609,112	(1,277,715)		2,196,227	
Fuel Related Uncollectibles	1,232,739	102,728	-		350,730	
Total	410,912,775	38,768,245	35,582,374	8.22%	32,976,078	-7.90%
Fuel Balance	-	-	-		-	
Nonfuel Related Revenues						
Base Rate Revenues	793,579,500	74,871,570	67,934,511		69,646,746	
Conservation Charge Revenue	768,600	72,515	89,459		86,936	
Environmental Charge Revenue	7,814,100	737,234	675,860		684,755	
Investment Income	7,962,574	663,548	274,751		448,793	
Natural Gas Revenue Pass Through	967,784	80,649	74,293		51,276	
Other Revenues	131,989,836	2,095,101	1,956,668		1,840,524	
Total	943,082,394	78,520,617	71,005,542	-9.57%	72,759,030	-2.41%
Nonfuel Related Expenses						
Non-Fuel O&M	239,699,869	17,252,887	15,883,149		15,770,482	
DSM / Conservation O&M	6,422,909	542,110	299,935		304,243	
Environmental O&M	1,891,598	156,047	95,990		132,912	
Rate Stabilization - DSM	750,691	62,558	336,013		320,678	
Rate Stabilization - Environmental	(9,423,646)	(785,304)	(44,906)		(132,863)	
Natural Gas Expense Pass Through	915,183	75,361	81,963		59,403	
Debt Principal - Electric System	59,140,000	4,928,333	4,928,333		5,065,833	
Debt Interest - Electric System	72,033,417	6,002,785	5,969,331		6,497,046	
Early Debt Retirement	106,848,624	-	-		-	
R&R - Electric System	64,012,472	5,334,373	5,211,688		5,468,637	
Operating Capital Outlay	217,292,441	25,000,000	25,000,000		24,000,000	
Operating Capital Outlay - Environmental	9,640,680	-	624,776		684,706	
City Contribution Expense	93,609,555	7,800,796	7,800,796		7,822,581	
Taxes & Uncollectibles	2,606,030	217,169	17,600		758,154	
Emergency Reserve	5,000,000	-	-		-	
Nonfuel Purchased Power:						
* SJRPP D/S Principal	14,175,000	1,181,250	1,181,250		1,111,667	
* SJRPP D/S Interest	9,893,940	824,495	800,443		843,913	
** Other Non-Fuel Purchased Power	48,573,631	4,047,803	2,826,264		3,165,463	
Total Nonfuel Expenses	943,082,394	72,640,663	71,012,625	2.24%	71,872,855	1.20%
Non-Fuel Balance	-	5,879,954	(7,083)		886,175	
Total Balance	-	5,879,954	(7,083)		886,175	
Total Revenues	**1,353,995,169**	**117,288,862**	**106,587,916**	-9.12%	**105,735,108**	0.81%
Total Expenses	**1,353,995,169**	**111,408,908**	**106,594,999**	4.32%	**104,848,933**	-1.67%
KWH Sold - Territorial	**12,810,000,000**	**1,208,581,000**	**1,103,046,062**	-8.73%	**1,117,063,491**	-1.25%
KWH Sold - Off System	**-**	**-**	**600,000**		**566,000**	
	12,810,000,000	**1,208,581,000**	**1,103,646,062**	-8.68%	**1,117,629,491**	-1.25%

* Gross debt service

** Includes transmission capacity, SJRPP and Scherer R & R, O & M and Investment Income.

JEA **Page 26**

Electric System

Budget vs. Actual		Year-to-Date			Prior Year-to-Date	
June 2021 and 2020 (unaudited)	**ANNUAL BUDGET 2020-21**	**BUDGET 2020-21**	**ACTUAL 2020-21**	**Variance %**	**ACTUAL 2019-20**	**Variance %**
Fuel Related Revenues & Expenses						
Fuel Rate Revenues	$ 410,912,775	$ 289,895,253	$ 279,587,164	-3.56%	$ 252,106,581	10.90%
Fuel Expense and Purchased Power:						
Fuel Expense - Electric System	307,626,283	217,668,951	222,545,825		189,156,927	
Other Purchased Power	66,547,723	45,870,362	60,300,658		48,369,886	
Subtotal Energy Expense	374,174,006	263,539,313	282,846,483	-7.33%	237,526,813	-19.08%
Transfer to (from) Rate Stabilization, Net	35,506,030	25,431,387	(3,792,235)		14,046,671	
Fuel Related Uncollectibles	1,232,739	924,553	532,916		533,097	
Total	410,912,775	289,895,253	279,587,164	3.56%	252,106,581	-10.90%
Fuel Balance	-	-	-		-	
Nonfuel Related Revenues						
Base Rate Revenues	793,579,500	559,863,180	545,544,546		532,961,921	
Conservation Charge Revenue	768,600	542,240	444,131		350,729	
Environmental Charge Revenue	7,814,100	5,512,777	5,321,580		5,238,495	
Investment Income	7,962,574	5,971,931	2,802,029		5,610,511	
Natural Gas Revenue Pass Through	967,784	725,838	604,164		494,797	
Other Revenues	131,989,836	18,855,909	126,283,849		42,760,016	
Total	943,082,394	591,471,875	681,000,299	15.14%	587,416,469	15.93%
Nonfuel Related Expenses						
Non-Fuel O&M	239,699,869	181,389,925	141,984,657		150,509,230	
DSM / Conservation O&M	6,422,909	4,855,227	3,352,954		4,021,830	
Environmental O&M	1,891,598	1,423,458	637,164		755,715	
Rate Stabilization - DSM	750,691	563,019	1,398,894		592,150	
Rate Stabilization - Environmental	(9,423,646)	(7,067,734)	(1,702,732)		(3,584,548)	
Natural Gas Expense Pass Through	915,183	689,118	743,464		565,914	
Debt Principal - Electric System	59,140,000	44,355,000	44,355,000		45,592,500	
Debt Interest - Electric System	72,033,417	54,025,062	50,095,806		54,956,251	
Early Debt Retirement	106,848,624	106,848,624	106,848,624		55,154,065	
Rate Stabilization - Debt Management	-	-	-		(29,884,152)	
R&R - Electric System	64,012,472	48,009,354	46,905,188		49,217,738	
Operating Capital Outlay	217,292,441	159,000,000	159,000,000		122,000,000	
Operating Capital Outlay - Environmental	9,640,680	-	6,387,147		8,067,327	
City Contribution Expense	93,609,555	70,207,166	70,207,166		70,403,226	
Taxes & Uncollectibles	2,606,030	1,954,523	1,211,130		1,313,722	
Emergency Reserve	5,000,000	-	-		-	
* SJRPP D/S Principal	14,175,000	10,631,250	10,631,250		10,005,000	
* SJRPP D/S Interest	9,893,940	7,420,455	7,202,173		7,595,216	
** Other Non-Fuel Purchased Power	48,573,631	36,430,223	30,779,061		38,834,561	
Total Nonfuel Expenses	943,082,394	720,734,670	680,036,946	5.65%	586,115,745	-16.02%
Non-Fuel Balance	-	(129,262,795)	963,353		1,300,724	
Total Balance	-	(129,262,795)	963,353		1,300,724	
Total Revenues	**1,353,995,169**	**881,367,128**	**960,587,463**	8.99%	**839,523,050**	14.42%
Total Expenses	**1,353,995,169**	**1,010,629,923**	**959,624,110**	5.05%	**838,222,326**	-14.48%
KWH Sold - Territorial	**12,810,000,000**	**9,037,340,000**	**8,671,847,675**	-4.04%	**8,547,799,767**	1.45%
KWH Sold - Off System	**-**	**-**	**22,273,000**		**16,423,000**	
	12,810,000,000	**9,037,340,000**	**8,694,120,675**	-3.80%	**8,564,222,767**	1.52%

* Gross debt service

** Includes transmission capacity, SJRPP and Scherer R & R, O & M and Investment Income.

JEA

Water and Sewer System

Budget vs. Actual **June 2021 and 2020 (unaudited)**	**ANNUAL BUDGET** **2020-21**	**Month** **BUDGET** **2020-21**	**ACTUAL** **2020-21**	**Variance** **%**	**Prior Year Month** **ACTUAL** **2019-20**	**Variance** **%**
REVENUES						
Water & Sewer Revenues	$ 465,323,338	$ 38,603,187	$ 37,827,933		$ 37,435,019	
Capacity & Extension Fees	29,388,151	3,124,857	3,149,403		2,389,317	
Capital Contributions	-	-	-		-	
Investment Income	2,975,171	247,931	201,836		231,541	
Other Income	14,600,000	622,061	(617,701)		919,752	
Total	512,286,660	42,598,036	40,561,471	-4.78%	40,975,629	-1.01%
EXPENSES						
O & M Expenses	177,824,583	13,940,536	13,279,372		13,092,242	
Debt Principal - Water & Sewer	9,370,000	780,833	780,834		1,655,833	
Debt Interest - Water & Sewer	56,066,531	4,672,211	4,544,683		4,637,460	
Rate Stabilization - Environmental	-	-	869,633		587,025	
R&R - Water & Sewer	26,606,100	2,217,175	2,217,175		2,094,913	
Operating Capital Outlay	166,506,917	13,212,602	13,212,602		13,712,602	
Operating Capital Outlay - Capacity/Extension	29,388,151	2,449,013	3,149,403		2,389,317	
Operating Capital Outlay - Contributions	-	-	-		-	
Operating Capital Outlay - Environmental	16,783,512	1,398,626	509,483		429,179	
City Contribution Expense	26,402,695	2,200,225	2,200,225		2,079,420	
Uncollectibles & Fees	1,395,970	116,331	2,247		426,875	
Interlocal Agreements	942,201	-	-		-	
Emergency Reserve	1,000,000	-	-		-	
Total Expenses	512,286,660	40,987,552	40,765,657	0.54%	41,104,866	0.83%
Total Balance	$ -	$ 1,610,484	$ (204,186)		$ (129,237)	
Sales kgals						
Water	40,425,000	3,423,366	3,258,795	-4.81%	3,135,349	3.94%
Sewer	34,650,000	2,921,020	2,683,961	-8.12%	2,601,479	3.17%
Total	75,075,000	6,344,386	5,942,756	-6.33%	5,736,828	3.59%

Budget vs. Actual **June 2021 and 2020 (unaudited)**	**ANNUAL BUDGET** **2020-21**	**Year-To-Date** **BUDGET** **2020-21**	**ACTUAL** **2020-21**	**Variance** **%**	**Prior Year to Date** **ACTUAL** **2019-20**	**Variance** **%**
REVENUES						
Water & Sewer Revenues	$ 465,323,338	$ 344,254,636	$ 336,212,111		$ 337,863,412	
Capacity & Extension Fees	29,388,151	21,089,604	27,966,988		23,658,050	
Capital Contributions	-	-	161,057		60,000	
Investment Income	2,975,171	2,231,378	1,891,132		2,537,534	
Other Income	14,600,000	12,553,727	9,719,869		44,386,378	
Total	512,286,660	380,129,345	375,951,157	-1.10%	408,505,374	-7.97%
EXPENSES						
O & M Expenses	177,824,583	133,240,082	114,615,543		118,489,591	
Debt Principal - Water & Sewer	9,370,000	7,027,500	7,027,503		14,902,501	
Debt Interest - Water & Sewer	56,066,531	42,049,898	38,804,652		40,899,877	
Early Debt Retirement	-	-	-		48,195,881	
Rate Stabilization - Debt Management	-	-	-		(14,209,250)	
Rate Stabilization - Environmental	-	-	8,282,162		5,436,978	
R&R - Water & Sewer	26,606,100	19,954,575	19,954,575		18,854,213	
Operating Capital Outlay	166,506,917	132,313,418	132,313,414		125,013,414	
Operating Capital Outlay - Capacity/Extension	29,388,151	22,041,113	27,966,988		23,658,050	
Operating Capital Outlay - Contributions	-	-	161,057		60,000	
Operating Capital Outlay - Environmental	16,783,512	12,587,634	4,033,803		5,174,663	
City Contribution Expense	26,402,695	19,802,021	19,802,021		18,714,782	
Uncollectibles & Fees	1,395,970	1,046,977	641,693		799,552	
Interlocal Agreements	942,201	942,201	942,201		536,771	
Emergency Reserve	1,000,000	-	-		-	
Total Expenses	512,286,660	391,005,419	374,545,612	4.21%	406,527,023	7.87%
Total Balance	$ -	$ (10,876,074)	$ 1,405,545		$ 1,978,351	
Sales kgals						
Water	40,425,000	29,841,147	27,459,802	-7.98%	28,384,721	-3.26%
Sewer	34,650,000	25,493,399	24,030,825	-5.74%	24,121,070	-0.37%
Total	75,075,000	55,334,545	51,490,627	-6.95%	52,505,791	-1.93%

JEA

District Energy System

Budget vs. Actual **June 2021 and 2020 (unaudited)**	**ANNUAL BUDGET** **2020-21**	**Month** **BUDGET** **2020-21**	**ACTUAL** **2020-21**	**Variance** **%**	**Prior Year Month** **ACTUAL** **2019-20**	**Variance** **%**
REVENUES						
Revenues	$ 9,328,327	$ 808,272	$ 714,848		$ 654,187	
Investment Income	-	-	120		1,834	
Total	9,328,327	808,272	714,968	-11.54%	656,021	8.99%
EXPENSES						
O & M Expenses	5,193,927	415,295	386,206		386,461	
Debt Principal - Water & Sewer	1,770,000	147,500	147,500		143,750	
Debt Interest - Water & Sewer	1,253,891	104,491	104,491		107,963	
R&R - Water & Sewer	437,313	36,443	36,079		49,100	
Operating Capital Outlay	673,196	-	-		-	
Total Expenses	9,328,327	703,729	674,276	4.19%	687,274	1.89%
Total Balance	$ -	$ 104,543	$ 40,692		$ (31,253)	

Budget vs. Actual **June 2021 and 2020 (unaudited)**	**ANNUAL BUDGET** **2020-21**	**Year-To-Date** **BUDGET** **2020-21**	**ACTUAL** **2020-21**	**Variance** **%**	**Prior-Year-to-Date** **ACTUAL** **2019-20**	**Variance** **%**
REVENUES						
Revenues	$ 9,328,327	$ 6,497,286	$ 5,602,761		$ 5,907,199	
Investment Income	-	-	1,857		55,015	
Total	9,328,327	6,497,286	5,604,618	-13.74%	5,962,214	-6.00%
EXPENSES						
O & M Expenses	5,193,927	3,840,148	3,080,537		3,123,214	
Debt Principal - Water & Sewer	1,770,000	1,327,500	1,327,500		1,293,750	
Debt Interest - Water & Sewer	1,253,891	940,419	940,419		971,663	
R&R - Water & Sewer	437,313	327,985	324,712		441,900	
Operating Capital Outlay	673,196	-	-		-	
Total Expenses	9,328,327	6,436,052	5,673,168	11.85%	5,830,527	2.70%
Total Balance	$ -	$ 61,234	$ (68,550)		$ 131,687	

Jacksonville Small and Emerging Business (JSEB) Quarterly Report

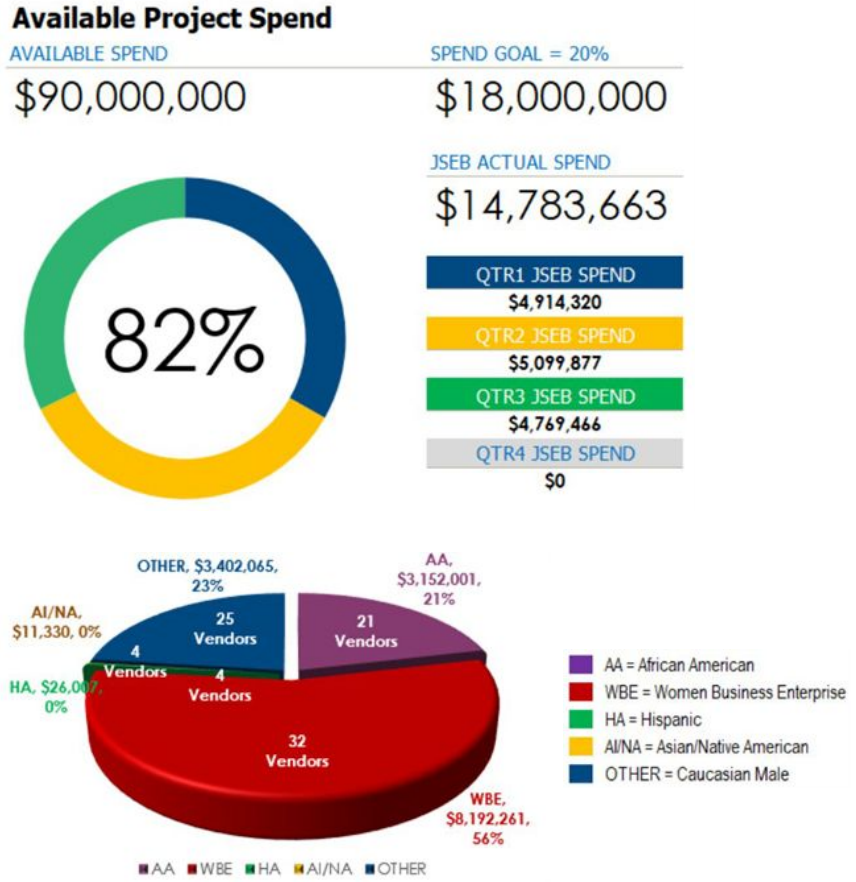
Rita Scott
Manager Jacksonville Small Emerging Business Program & Procurement Performance

July 27, 2021

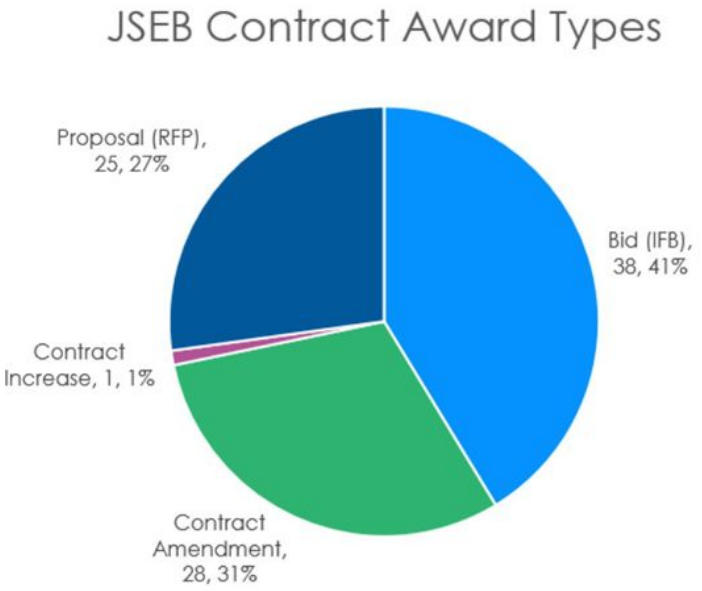
Jacksonville Small and Emerging Business (JSEB) Scorecard

FY21 Q3 Results

- Available Spend is $90M.
- JSEB Goal is $18M.
- As of Q3, we have achieved $14.7M in actual spend, representing 82% of the Goal.
- Prime JSEB Vendors account for 47% of the actual spend.
- There is a diverse mix of JSEB Vendors that account for the actual spend.



Jacksonville Small and Emerging Business (JSEB) Scorecard



Q3 Contracts Awarded to JSEB Vendors

- 92 Contracts have been awarded to JSEB Vendors.
- Contracts awarded are valued at $15.9M.
- The bulk of the contracts awarded are projects within the Facilities and Water Waste Water groups.
- Contract awards typically range from 1 to 5 years.

7/20/2021

Electric FY22-FY26

Electric Project Title	FY22 Proposed ('000)	FY23 Proposed ('000)	FY24 Proposed ('000)	FY25 Proposed ('000)	FY26 Proposed ('000)	FY22-FY26 Total ('000)
GENERATION						
Kennedy Generating - CT7 - Rotor Replacement	9,445	3,429	0	0	0	12,874
Northside Generating - Generation Support Capital Improvements	4,000	4,000	4,000	4,000	4,000	20,000
Northside Generating - N03 Turbine & Generator Inspection	3,090	0	0	0	0	3,090
Northside Generating - Energy Project Management Capital Improvement Projects	3,000	6,000	6,000	6,000	6,000	27,000
Northside Generating - CT3 Major Inspection	2,790	0	0	0	0	2,790
Brandy Branch Generating - General Capital Improvements	2,000	2,000	2,000	2,000	2,000	10,000
Kennedy Generating - MarkVIe and EX2100e Upgrade	1,693	441	0	0	0	2,134
Northside Generating - N03 Turbine Valve Inspection	1,246	0	0	0	0	1,246
Northside Generating - N01 Impulse Cleaning System Installation	1,100	0	0	0	0	1,100
Brandy Branch Generating and Kennedy Generating - Fire Protection Updates	966	0	0	0	0	966
Northside Generating - N03 Turbine Inspection	850	0	0	0	0	850
Northside Generating - N03 Condenser Tube Replacement	842	0	0	0	0	842
Brandy Branch Generating - B50 Turbine Parts Warehouse	839	0	0	0	0	839
Northside Generating - N03 Air Preheater Overhaul	742	0	0	0	0	742
Northside Substation Improvements - Phase 2	700	0	0	0	0	700
Northside Generating - N01-N02 Fan Silencer replacement	670	0	0	0	0	670
Northside Generating - N03 Secondary Superheater Tube Replacement	618	0	0	0	0	618
Northside Generating - N02 Boiler Elevator Overhaul	528	0	0	0	0	528
Northside Generating - N01, N02 Expansion Joint Fab & Install	502	0	0	0	0	502
Northside Generating - N33, N34, N35, N36 Control System Upgrade	398	392	455	0	0	1,245
Northside Generating - N00 Fire Main Valve Replacement	280	0	0	0	0	280
Brandy Branch Generating - CT2 - Hot Gas Path Inspection #6	250	5,745	0	0	0	5,995
Brandy Branch Generating - CT3 - Hot Gas Path Inspection #6	250	5,745	0	0	0	5,995
Kennedy Generating - CT7 - Hot Gas Path Inspection #3	250	5,318	0	0	0	5,568
Northside Generating - N33 Electrical Equipment Upgrades	234	0	0	0	0	234
Northside Generating - N02 A Cyclone Crossover EJ Repair	213	0	0	0	0	213
Northside Generating - N03 Breaker Upgrade	194	0	0	0	0	194
Brandy Branch Generating - B52, B53 Transition Duct Liner	175	1,234	0	0	0	1,409
Northside Generating - N01 N02 UPS Replacement	158	0	0	0	0	158
Northside Generating - N34 Electrical Equipment Upgrades	80	239	0	0	0	320
Brandy Branch Generating - CT1 - Rotor Replacement	0	3,600	14,202	0	0	17,802
Northside Generating - CT4 Major Inspection	0	2,800	0	0	0	2,800
Northside Generating - N01 Boiler Elevator Overhaul	0	528	0	0	0	528
Brandy Branch Generating - B52, B53 Catalyst Replacement	0	500	439	0	0	939
Brandy Branch Generating - CT1 - Hot Gas Path Inspection #3	0	250	6,550	0	0	6,800
Greenland Energy – 1X1 Combined Cycle Addition	0	0	4,981	10,000	150,000	164,981
Northside Generating - Byproduct Storage Area II	0	0	1,800	11,855	5,626	19,281
Northside Generating - Intake and Discharge Flume Concrete Repair	0	0	1,678	0	0	1,678
Brandy Branch Generating - CT2 - Hot Gas Path Inspection #7	0	0	300	6,156	0	6,456
Brandy Branch Generating - CT3 - Hot Gas Path Inspection #7	0	0	300	6,156	0	6,456
Northside Generating - CT5 Major Inspection	0	0	0	2,800	0	2,800
Compression Upgrade to Greenland Pipeline – New Generating Capacity at Greenland Energy	0	0	0	1,000	6,000	7,000
Northside Generating - N35 Electrical Equipment Upgrades	0	0	0	333	0	333
Northside Generating - N36 Electrical Equipment Upgrades	0	0	0	0	271	271
Kennedy Generating - CT8 - Hot Gas Path Inspection #2	0	0	0	0	250	250

7/20/2021

Electric FY22-FY26

Electric Project Title	FY22 Proposed ('000)	FY23 Proposed ('000)	FY24 Proposed ('000)	FY25 Proposed ('000)	FY26 Proposed ('000)	FY22-FY26 Total ('000)
Budget Reserve	**1,905**	**0**	**0**	**0**	**0**	**1,905**
GENERATION SUBTOTAL	**40,010**	**42,222**	**42,704**	**50,300**	**174,147**	**349,383**
TRANSMISSION AND DISTRIBUTION						
Electric Distribution Maintenance Capital Upgrades	12,500	12,500	13,100	13,100	13,100	64,300
Customer Order Management - New Electric Service Additions	11,500	12,000	12,500	13,000	13,500	62,500
69kv - 663 line rebuild	9,931	8	0	0	0	9,939
Customer Order Management - Development Driven Projects	9,250	9,750	10,250	10,750	11,250	51,250
SAIDI Improvement Plan	5,842	0	0	0	0	5,842
Real Estate - Greenland to Mayo Substation - Transmission Corridor Purchase	4,410	0	0	0	0	4,410
Pole Replacement Program	4,200	4,200	4,400	4,400	4,400	21,600
Eagle LNG 138-13.8 kV Substation	3,000	6,867	1,000	0	0	10,867
General Underground Network and Commercial Repair & Replace	3,000	3,000	3,100	3,100	3,100	15,300
CEMI-5 Electric Distribution Betterment	3,000	3,000	3,000	3,000	3,000	15,000
Mayo 230-138-26kV Substation	2,816	6,803	2,612	0	0	12,232
Substation Repair & Replace Projects - Transformer Replacements	2,610	2,690	1,550	1,400	1,400	9,650
Joint Participation Electric Relocation Projects	2,000	2,000	2,000	2,000	2,000	10,000
Underground Network Improvement Plan	1,988	1,988	1,988	1,988	0	7,952
Park and King 4kV Substation Rebuild	1,866	250	0	0	0	2,116
Electric Meters - Growth	1,760	1,760	1,760	1,760	1,760	8,800
853 Pole Replacement	1,686	0	0	0	0	1,686
Electric Distribution System Improvements	1,664	1,690	1,720	1,750	1,780	8,604
230kV Circuit 915 Partial Rebuild	1,611	0	0	0	0	1,611
Real Estate - North Jacksonville Transmission Corridor Acquisition	1,600	3,625	0	0	0	5,225
230kV Breaker Replacement	1,600	938	0	0	0	2,538
26kV Feeder Circuit Breaker Replacement	1,536	1,393	1,607	1,536	1,536	7,608
Circuit 649 UG 69kV Reconductor Project	1,294	0	0	0	0	1,294
St Johns 4kV Substation Rebuild	1,000	1,500	500	0	0	3,000
Distribution System - Pole Removal	1,000	1,000	1,000	1,000	1,000	5,000
Brandy Branch Solar Feeders 356, 357	906	0	0	0	0	906
Forest Sub 217 Feeder - Electric Distribution	893	0	0	0	0	893
Underground Cable Replacement Program - Existing Developments	750	500	500	500	500	2,750
Transmission and Substation Class Circuit Breaker Replacement Program	750	948	1,132	750	750	4,330
General Distribution Improvements	750	750	750	750	750	3,750
Electric Meters - Replacement	740	740	740	740	740	3,700
Cecil Commerce Center North Solar T2 Addition - Substation Project	709	0	0	0	0	709
General Substation Improvements	700	700	700	700	700	3,500
Transmission Line Relay Replacement Project	689	899	899	865	300	3,651
Transmission Insulator Replacement	650	500	500	500	500	2,650
Transmission Outdoor Potential Device Replacement	610	607	665	539	637	3,058
230 KV_ 138KV_69 kV Pole Refurbishment	600	300	300	300	300	1,800
Normandy Substation Protection Improvement	576	0	0	0	0	576
4kV Rehab – Distribution Projects	500	500	500	500	500	2,500
Beeghly 393 Overhead Feeder Extension–Arnold Rd	500	0	0	0	0	500
Hamilton 312 Reconductor	421	169	0	0	0	590
Real Estate - Imeson Substation - Property Acquisition	415	10	0	0	0	425
Georgia Street Pipe Type Cable Pump Plant Replacement	400	1,400	0	0	0	1,800

7/20/2021

Electric FY22-FY26

Electric Project Title	FY22 Proposed ('000)	FY23 Proposed ('000)	FY24 Proposed ('000)	FY25 Proposed ('000)	FY26 Proposed ('000)	FY22-FY26 Total ('000)
Cecil Commerce Center North Solar Feeders 371, 372	400	0	0	0	0	400
230kV Breaker Replacement - Protection & Controls	370	225	0	0	0	594
Bartram 298: Feeder Extension in Transmission ROW from Sub to Bartram Park Bv	312	0	0	0	0	312
Greenland Energy to Mayo 230kV Circuit 950 Addition	300	6,500	8,500	900	0	16,200
Kennedy Substation Control Cable and Protection System Replacement	300	2,193	0	0	0	2,493
General Transmission Improvements	300	300	300	300	300	1,500
Real Estate - Study and Investigate - Durbin 230-26KV Substation Property	292	0	0	0	0	292
Park and King 4kV Substation Rebuild - Protection & Controls	247	0	0	0	0	247
Energy Management System - Base Upgrade Project	240	200	130	200	130	900
Automatic Recloser Deployment	235	235	235	235	235	1,175
URD-2026 Reliability Improvement	225	645	0	0	0	870
Park and King 4kV Distribution Feeder Getaway Rebuild	224	0	0	0	0	224
Capital Tools and Equipment - Underground Network and Service Centers	220	220	231	231	231	1,133
McDuff Substation 4kV Circuits 4, 6, and 9 Relocation	200	80	0	0	0	280
Ribault 138-26 kV T2 and Circuit Breaker 452 Addition	188	2,495	27	0	0	2,710
Steelbald Solar Center - Protection & Controls	187	0	0	0	0	187
Cecil Commerce Center North Solar - Protection & Controls	185	0	0	0	0	185
Circuit 650 UG 69kV Reconductor Project	180	1,540	0	0	0	1,720
Eagle LNG 138-13.8 kV Substation - Protection & Controls	157	700	200	0	0	1,057
Imeson 26kV Circuit 493 New Feeder Addition	150	1,100	0	0	0	1,250
Mayo 230-138-26kV Substation - Protection & Controls	150	1,000	280	0	0	1,430
Ribault 138-26 kV T2 and Circuit 452 Addition - Protection & Controls	150	475	105	0	0	730
General Protection System Improvements Transmission	150	150	150	150	150	750
Greenland Energy to Bartram 230 kV Circuit 909 Addition	150	0	0	0	0	150
Southside GIS 69kV Controller Replacement	138	0	0	0	0	138
Circuit 830 Static Wire Replacement	120	493	0	0	0	613
Circuit 825 Static Wire Replacement	120	395	0	0	0	515
Transmission Capacitor Bank Controls Replacement	120	197	0	0	0	317
Westlake Solar Center - Protection & Controls	120	0	0	0	0	120
Eagle LNG 138kV Circuit 847 Interconnect	118	250	100	0	0	468
Distribution Breaker Telemetry Enhancements	110	160	160	110	0	540
Imeson 26kv Circuit 493 Substation Breaker and Cap Bank Addition	101	655	0	0	0	756
Greenland Energy 230kV Bay & Breaker Addition for Circuit 950	100	300	700	100	0	1,200
St Johns 4kV Substation Rebuild - Protection & Controls	100	200	100	0	0	400
OM - General Transmission Improvements	100	100	100	100	100	500
Ritter Park Circuit 428 Extension	90	1,120	0	0	0	1,210
Ribault 26 kV Circuit 452 Addition	90	470	190	0	0	750
Capital Tools and Equipment - T&S Maintenance	80	80	80	80	80	400
Mayo Substation - 138kV Transmission Interconnects	75	586	0	0	0	661
Mayo Substation Distribution Feeders	72	1,128	100	0	0	1,300
Transmission Circuit 692 Underground Cable Replacement- Part B - Protection & Controls	70	0	0	0	0	70
Circuit 645 UG 69kV Cable Replacement Project- PART B	60	182	0	0	0	242
Circuit 645 UG 69kV Cable Replacement Project- PART A	60	165	0	0	0	225
Overhead-Underground Conversion in Neighborhoods	60	60	60	60	60	300
Energy Management System - RTU Upgrade Project	60	50	50	50	50	260
Electric Customer Service Response Tools and Equipment	55	55	55	55	55	275
St Johns 4kV Distribution Feeder Getaway Rebuild	50	100	50	0	0	200

7/20/2021

Electric FY22-FY26

Electric Project Title	FY22 Proposed ('000)	FY23 Proposed ('000)	FY24 Proposed ('000)	FY25 Proposed ('000)	FY26 Proposed ('000)	FY22-FY26 Total ('000)
Circuit 684S Pipe-Type Cable Replacement	40	35	825	0	0	900
69kv - 663 line rebuild - Protection & Controls	25	0	0	0	0	25
College St Substation 13kV Protection and Arc Flash Upgrade	20	410	0	0	0	430
West Jax Substation Protection Improvement	20	280	0	0	0	300
Greenland Energy 230kV Bay & Breaker Addition for Circuit 950 - Protection & Controls	10	180	300	10	0	500
Imeson 26kv Circuit 493 Substation Breaker and Cap Bank Addition - Protection & Controls	4	81	0	0	0	85
Substation Repair & Replace Projects	0	3,000	3,000	3,000	3,000	12,000
Transmission Repair & Replace Projects	0	2,500	2,500	2,500	2,500	10,000
Energy Management System - Outage Management System Integration	0	1,300	200	0	0	1,500
SOCC - Console Upgrade	0	240	0	0	0	240
SouthWest Substation-Transmission	0	0	5,000	5,000	5,000	15,000
SouthWest Substation - Substation	0	0	2,000	7,000	5,000	14,000
SJRPP 230 - 26kV Substation	0	0	1,500	3,500	0	5,000
New Nocatee T-2 TX	0	0	1,500	1,000	0	2,500
69kv - 665 line rebuild	0	0	1,000	2,000	3,000	6,000
SJRPP Substation Distribution Feeders	0	0	600	1,400	0	2,000
SouthWest Substation - Distribution	0	0	300	400	300	1,000
Pecan Park Area Transmission	0	0	0	5,000	5,000	10,000
Pecan Park Area Substation	0	0	0	1,000	6,000	7,000
Pecan Park Area Distribution	0	0	0	500	2,000	2,500
West Jax T3 200 MVA Autotransformer Addition	0	0	0	0	2,000	2,000
Budget Reserve	**7,579**	**0**	**0**	**0**	**0**	**7,579**
TRANSMISSION AND DISTRIBUTION SUBTOTAL	**119,503**	**117,813**	**99,401**	**99,809**	**98,694**	**535,220**
ELECTRIC OTHER						
Facilities - JEA Headquarters	20,131	1,177	0	0	0	21,308
Technology Services Projects	13,956	18,525	16,800	16,175	13,825	79,281
Capital Administrative Overhead	10,500	10,500	10,500	10,500	10,500	52,500
Facilities - Emergency Ops Center Hardened Facility	10,000	8,000	0	0	0	18,000
Fleet - Replacement	8,250	8,390	8,063	8,090	8,485	41,278
Facilities - Commonwealth - Admin Upgrades	4,500	144	0	0	0	4,644
Facilities - Southside Renovations - Phase 2	2,961	0	0	0	0	2,961
Facilities - Industrial Training Center	1,876	0	0	0	0	1,876
Facilities - Brandy Branch Operations and DC Power Systems Generator Backup Units	850	0	0	0	0	850
Facilities - Westside Building 5 Glove Lab Upgrades	753	0	0	0	0	753
Security Improvements	650	650	650	650	650	3,250
Fleet - Expansion	634	600	600	600	500	2,934
Facilities - PV Array Upgrades	631	0	0	0	0	631
Facilities - Roof Replacements	450	450	450	450	450	2,250
Facilities - Heating, Ventilation, and Air	430	430	430	430	430	2,150
Laboratory Equipment Upgrades	349	75	75	75	75	649
Security - Video Server Upgrade	275	0	0	0	0	275
Security - Fencing	260	260	260	260	260	1,300
Security - Commonwealth Security Enhancements	256	0	0	0	0	256
Facilities - Paving and Site Improvements	250	250	250	250	250	1,250
Facilities - Kennedy Generating - Pump Shop Demolition	250	0	0	0	0	250

7/20/2021

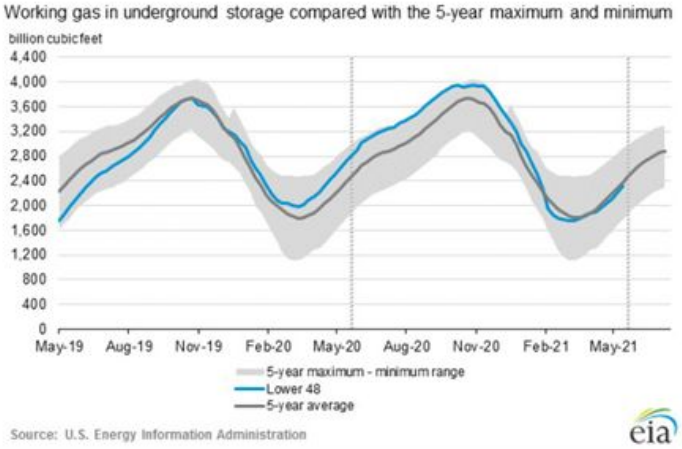
Electric FY22-FY26

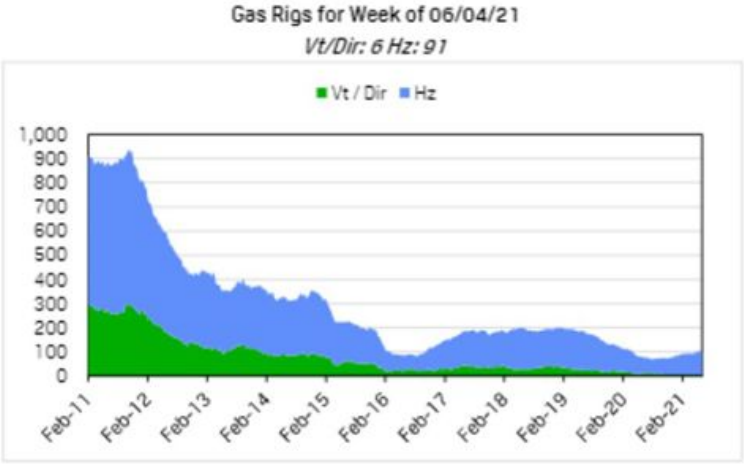
Electric Project Title	FY22 Proposed ('000)	FY23 Proposed ('000)	FY24 Proposed ('000)	FY25 Proposed ('000)	FY26 Proposed ('000)	FY22-FY26 Total ('000)
Security - Normandy Substation Fence Replacement	225	0	0	0	0	225
Facilities - Building Upgrades	200	200	200	200	200	1,000
Facilities - Generators	200	150	250	1	1	602
Facilities - Southside Asphalt Pavement Upgrade	200	0	0	0	0	200
Facilities - Plumbing Upgrades	100	100	100	100	100	500
Facilities - Electrical and Lighting	100	100	100	100	100	500
Utility Locate Group - Capital Equipment	50	50	50	50	50	250
Security - Fire System Sprinklers	20	20	20	20	20	100
Facilities - Elevators	1	1	1	1	1	5
Budget Reserve	**1,982**	**0**	**0**	**0**	**0**	**1,982**
ELECTRIC OTHER SUBTOTAL	**81,289**	**50,072**	**38,799**	**37,952**	**35,897**	**244,009**
ELECTRIC GRAND TOTAL	**240,802**	**210,107**	**180,904**	**188,061**	**308,738**	**1,128,612**

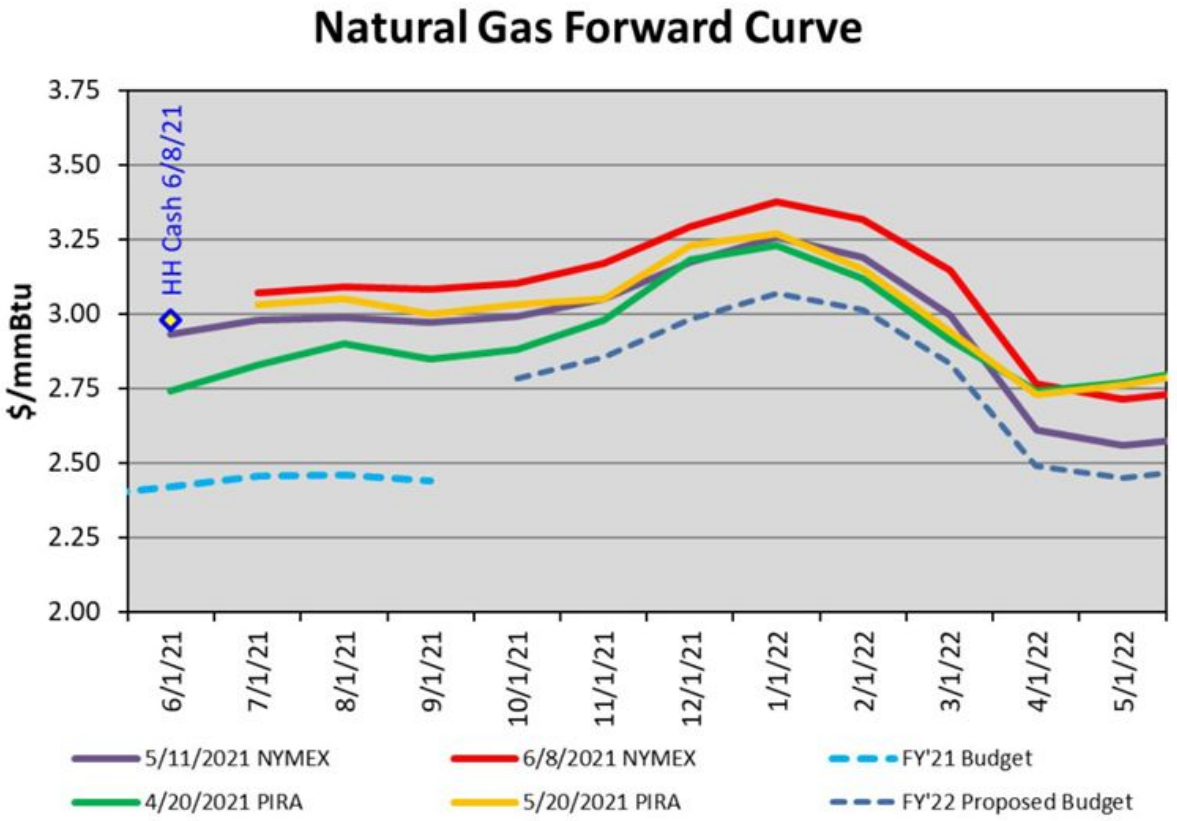
Fuel and Purchased Power Committee

June 8, 2021

Natural Gas Market Prices







2

* Commodity prices without transportation costs

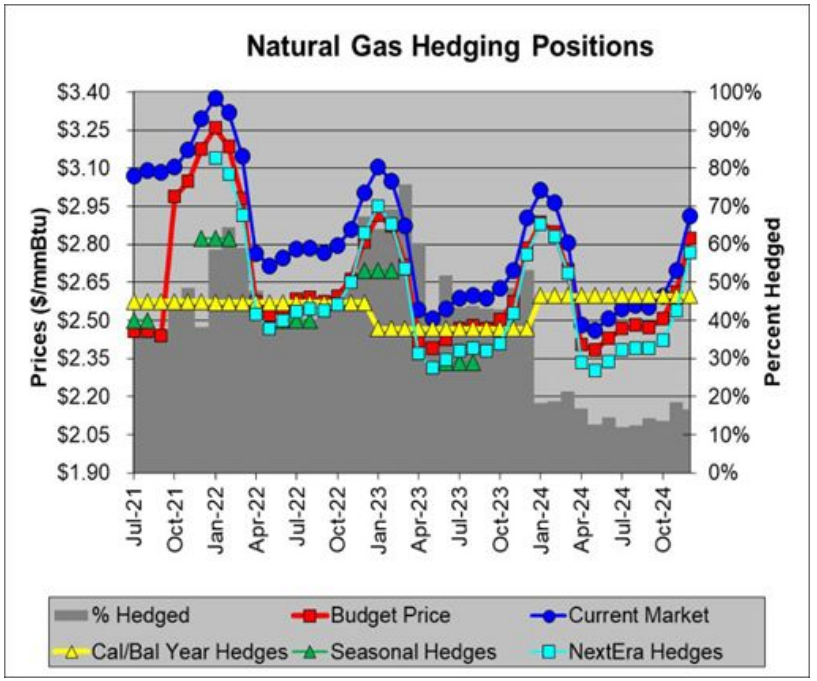
Natural Gas Hedging Summary

Wells Fargo and RBC Natural Gas Financial Swaps

Year	VOLUME (mmBtu) Annual 20K	Annual 20K	Annual 20K	Dec, Jan, Feb Winter 10K	Jun, Jul, Aug Summer 10K	Natural Gas Price for Fuel Rate Breakeven @ $30.50/MWh
2021	$2.596 8/23/2018 RBC	$2.554 8/30/2018 RBC	$2.573 9/7/2018 RBC	$2.800 8/23/2018 WFB	$2.498 8/24/2018 WFB	$2.53
2022	$2.640 6/19/2019 RBC	$2.602 7/23/2019 RBC	$2.471 8/20/2019 WFB	$2.823 7/9/2019 WFB	$2.498 7/26/2019 WFB	$3.07
2023	$2.420 4/9/2020 WFB	$2.396 6/18/2020 WFB	$2.583 5/19/2021 WFB	$2.695 5/27/2020 RBC	$2.335 4/24/2020 RBC	$3.29
2024	$2.597 5/19/2021 RBC	$2.570 Current Target	$2.530 Current Target	$2.890 Current Target	$2.510 Current Target	$3.40

	Active Hedges
	Completed/Expired
	Waiting for Target

All quantities in mmBtu, prices in $/mmBtu

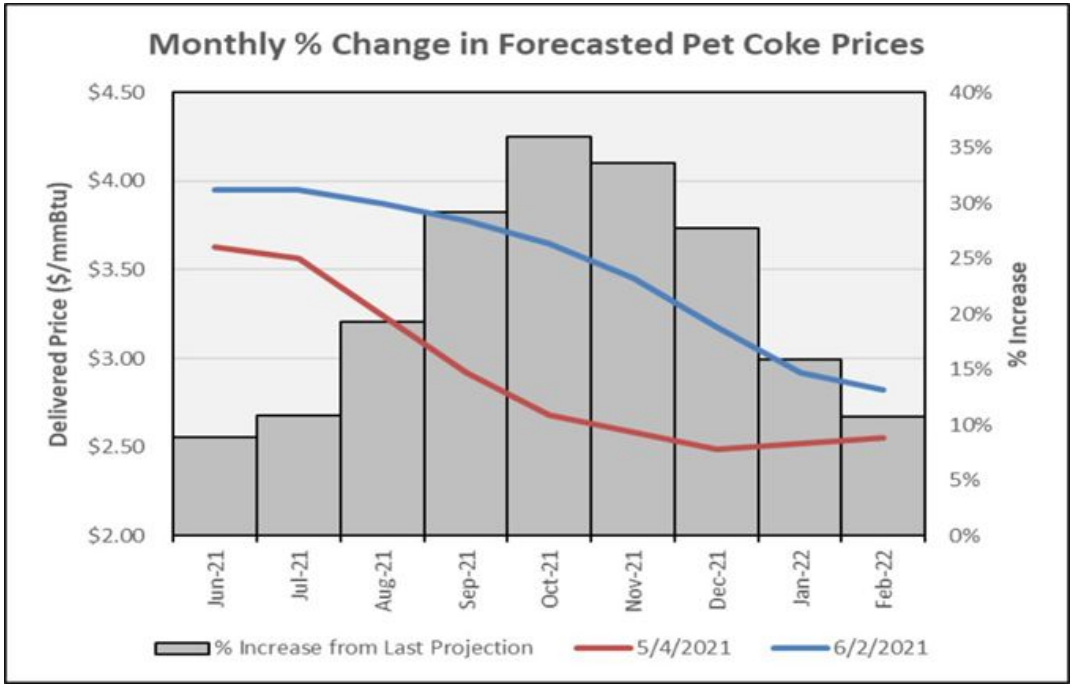


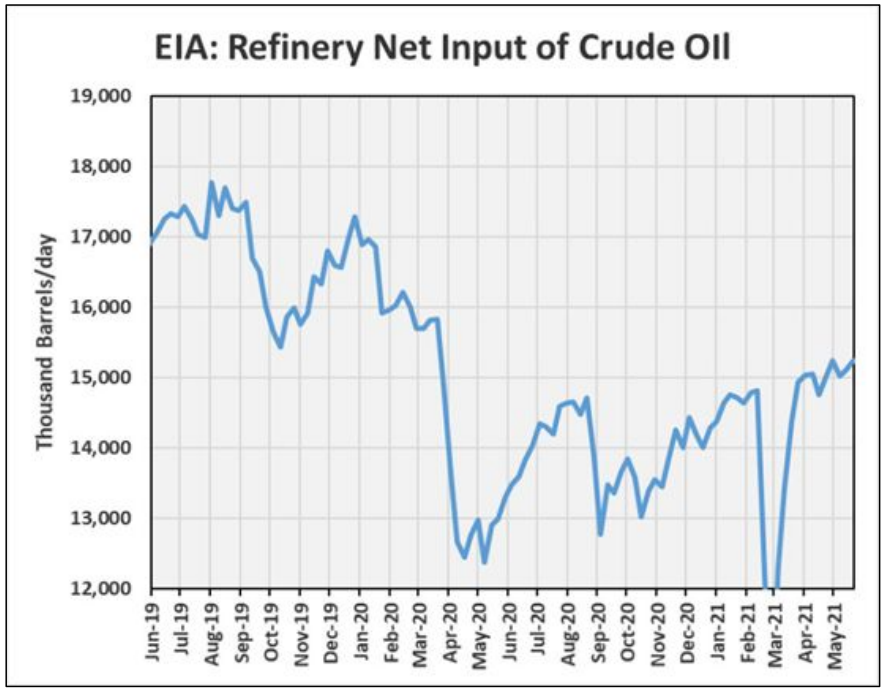
NextEra Natural Gas Financial Swaps

Calendar Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	NextEra Total
Average Price	$2.69	$2.53	$2.52	$2.53	$2.52	$2.54	$2.57	$2.61	$2.66	$2.70	**M2M Cost/(Credit)**
Volume (mmBtu)	8,577,500	8,577,500	8,601,000	8,577,500	8,577,500	8,577,500	8,601,000	8,577,500	8,577,500	8,577,500	**$ (10,543,604)**

Projected Petroleum Coke Market

- Pet Coke publication showing another significant increase in prices (36% price increase in October)
- Supply remaining very tight due to continued impacts from COVID-19 on economic activity
- Demand has been resilient and a strong coal market is providing support





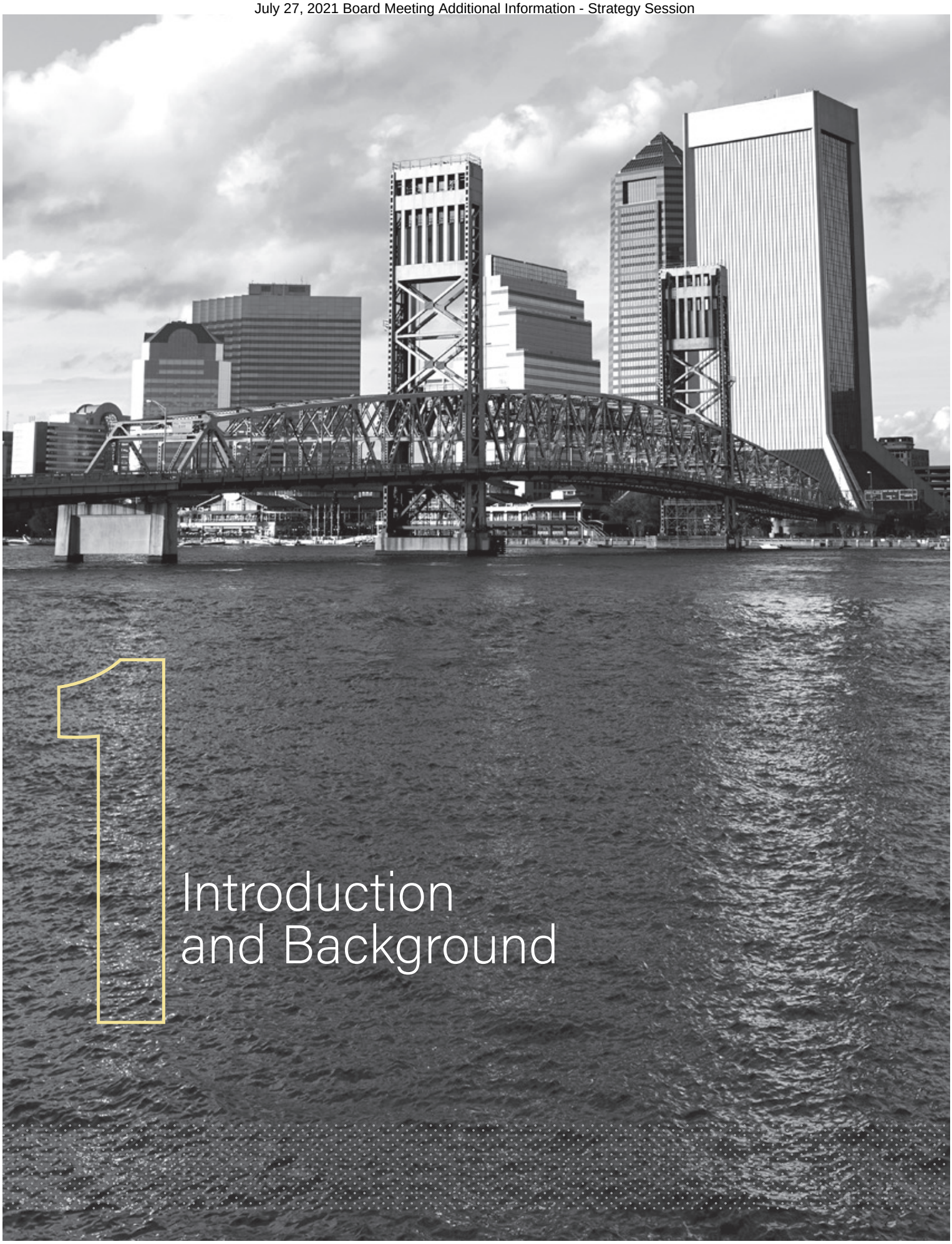
EXECUTIVE SUMMARY

JEA's Integrated Water Resources Plan (IWRP) and Demand Side Management (DSM) Strategy

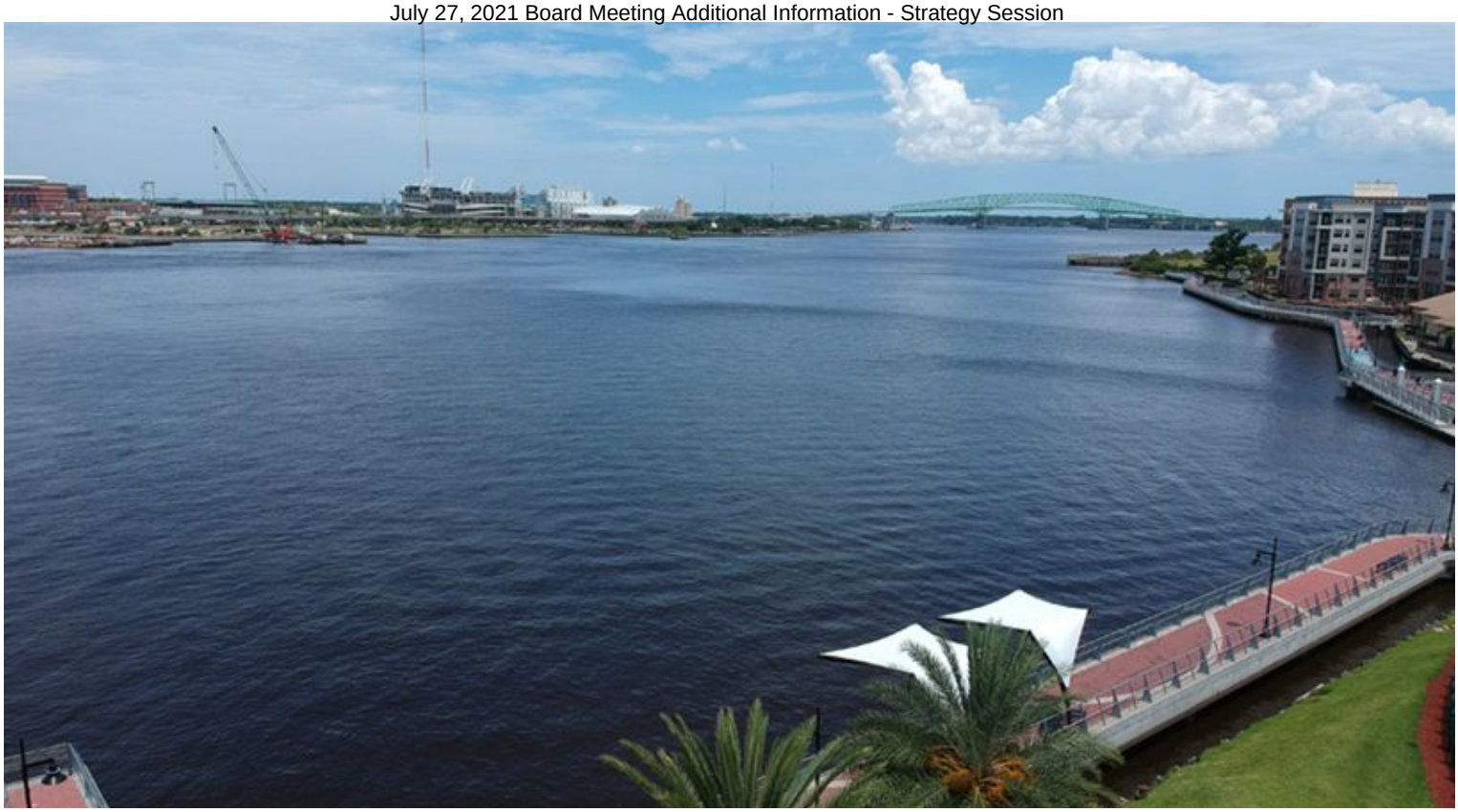
March 2021

FINAL

JEA®
Building Community®



1 Introduction and Background



INTRODUCTION AND BACKGROUND

JEA is the eighth largest community owned utility in the United States, and by customers served, is the largest community owned electric and water utility in Florida. JEA's goal is to provide reliable services at the best value for 478,720 electric, 367,145 water, 288,275 sewer and 18,015 reclaimed water customers in northeast Florida.

Population of Greater Jacksonville Area is **1.5M** based on 2017 estimate by the U.S. Census

4th largest GDP in Florida and **2nd highest** wage growth in Florida

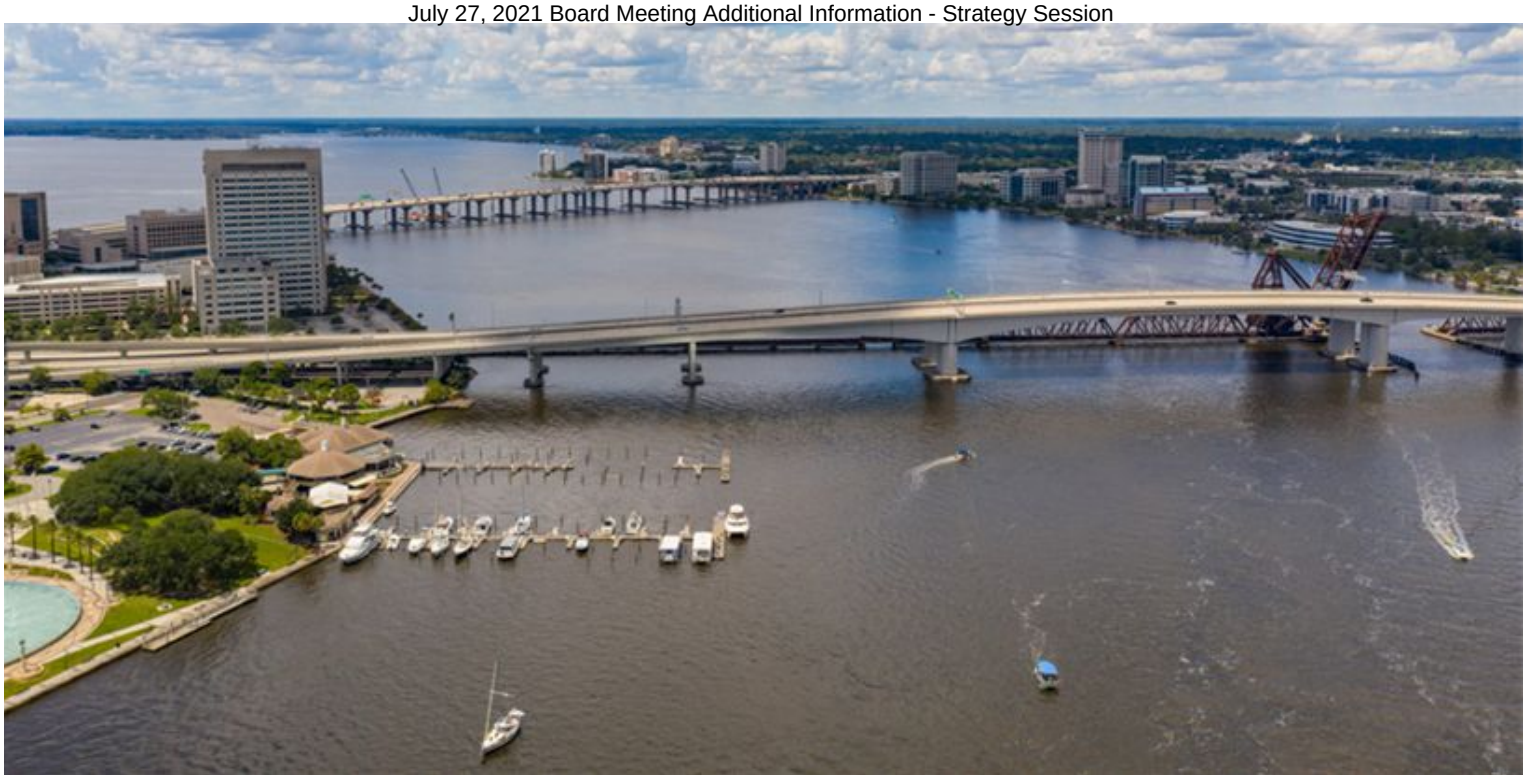
JEA's Service Area covers **900 square miles** including all of Duval County and parts of Clay, St. Johns and Nassau counties

134 Floridan Aquifer wells, **38 WTPs** and over **4,449 miles** of water lines

3,900 miles of sewer collection lines and **11 WRFs**

Production capacity up to **40 mgd** of reclaimed water with a current average demand of about **19 mgd**

300 miles of reclaimed water transmission lines



Drivers for Change

JEA and our community has been blessed with access to the one of the most productive groundwater aquifers in the United States, the **Floridan Aquifer**. This high-producing, high-quality aquifer has served as the region's sole source of water supply going back as far as the 1800s and has allowed JEA to reliably serve its customers with some of the lowest cost water in Florida. Given the robust and vibrant growing economy of the region, it is critically important for JEA to continuously plan for the future. Already a Florida leader in the use of reclaimed water to help conserve groundwater supplies, **it will be necessary for JEA to further diversify its water supply portfolio—developing alternative water supplies for continued sustainability of groundwater and assurance of reliability for decades to come.**

One of the reasons for northeast Florida's rapid growth rate is the local quality of life, including access to numerous water resources from the St. Johns River, beautiful beaches, and bountiful creeks, streams, springs and lakes. JEA has a responsibility, as does the community at large, to protect these water resources.

One factor driving JEA toward a diversified water supply portfolio is the need to renew the existing 20-year consumptive use permit (CUP) with the St. Johns River Water Management District (SJRWMD). For the renewal in 2031, SJRWMD will examine how JEA meets its customer water supply needs, while protecting the environment and making continued strides in conservation and expansion of reclaimed water for non-potable water demand. The future allocation of additional groundwater may be limited and is likely going to be tied to continued advancements by JEA in beneficial reuse of reclaimed water. This includes the potential for potable reuse, either Direct Potable Reuse (DPR) or Indirect Potable Reuse (IPR) via aquifer recharge.

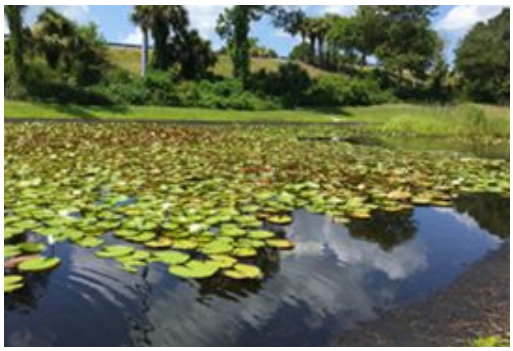
Preservation of water quality is always at the forefront of JEA's long term water sustainability plan. To help ensure water quality on the South Grid, aquifer recharge will be considered to help maintain low chlorides in the existing JEA wellfield.

Another consideration is that SJRWMD and the Florida Department of Environmental Protection (FDEP) are responsible for implementing regional Minimum Flows and Minimum Water Levels (MFLs) to balance meeting public water supply needs while maintaining the healthy natural systems essential to our region's economy and quality of life. There are several on-going MFLs moving toward implementation that could have an impact on regional public water supplies. These MFLs include two in the Sandhill Lakes Region (Lake Brooklyn and Lake Geneva) in Keystone Heights and the Lower Santa Fe and Ichetucknee River MFLs in the Suwannee River Water Management District.

Another potential consideration is a Florida legislative initiative that could come into law as early as 2021 that requires utilities in Florida to eliminate treated wastewater effluent discharge to surface water over a potential 5-year implementation period. While ambitious, this proposed legislation supports the implementation of potable reuse as part of its water supply portfolio which aligns with JEA's goals and objectives.

JEA's Integrated Water Resources Plan

As an industry leader, JEA has long embraced the concept of One Water and the principles of Integrated Water Resources Management. Knowing that water is an interconnected system and that resources are maximized by implementing multipurpose projects, JEA initiated this Integrated Water Resources Plan (IWRP) in 2019 and coupled that with the development of a comprehensive Water Demand-Side Management (DSM) Strategy for water conservation.






Mission Statement

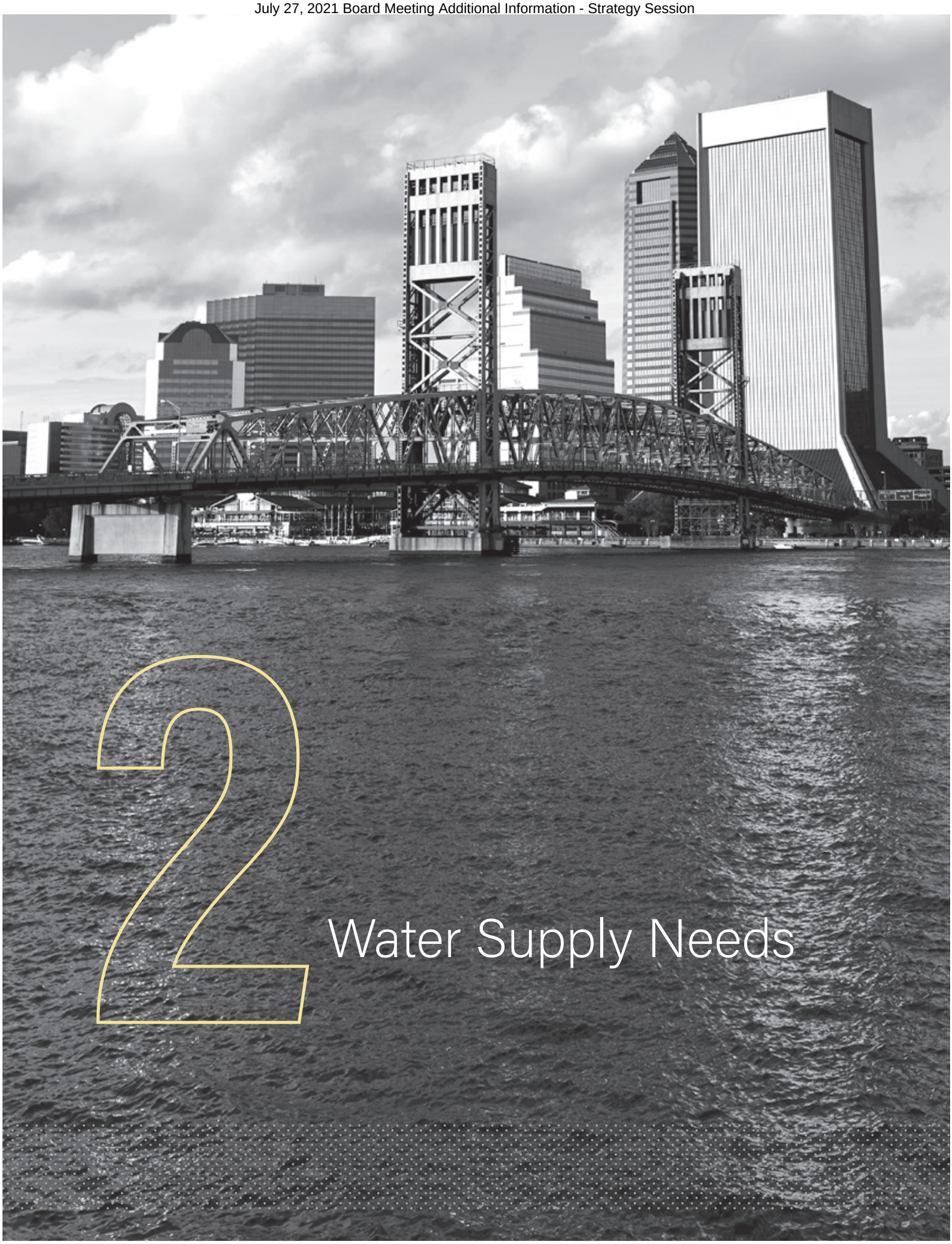
JEA will prepare an Integrated Water Resource Plan and Water Demand-Side Management Strategy that results in:

- Water supply certainty in meeting current and future water demands;
- Maximum use of reclaimed water;
- Well-targeted and cost-effective water conservation programs;
- Enhanced resiliency, accounting for future uncertainties; and
- Recommendations for specific projects and programs that are aligned with JEA's Strategic Areas of Focus (earn customer loyalty, deliver business excellence, and develop an unbeatable team).

One of the key first steps in developing an IWRP, is to develop the planning objectives that can be used as criteria to evaluate future water supply and conservation alternatives. While maximizing each of these objectives is difficult, the goal of the IWRP is balancing them to provide the best overall strategy for the future.

Planning Objectives

Water Supply Certainty	Cost-Effectiveness	Environmental Stewardship	Community Acceptance/ Implementation Ease	Operational Flexibility
Ability to meet seasonal water demands during average and dry weather conditions	Accounts for both near-term change in customer water rates and long-term levelized unit cost of water supply	Reduced treated wastewater discharge to St. Johns River and increased groundwater sustainability	Addresses community concerns and ease of implementation of projects	Ability to move water supplies from part of the water service area to another to maximize reliability



2 Water Supply Needs

WATER SUPPLY NEEDS

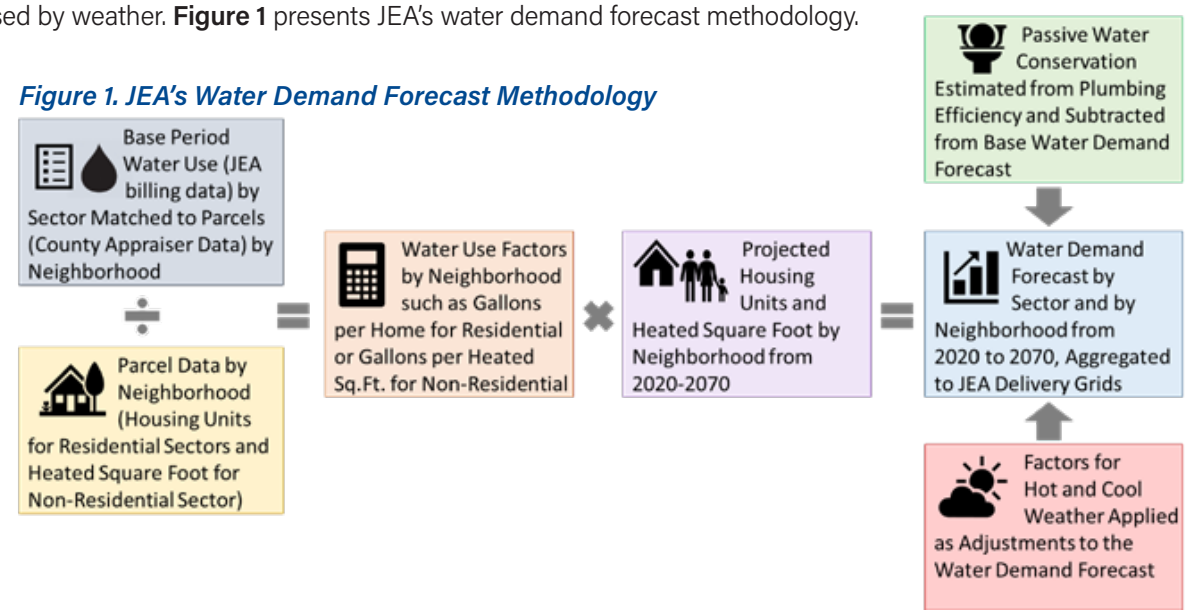
To properly plan for the future use of JEA's water resources, it is critical to understand how and where water is currently used, as well as to estimate how much water will be needed in the future. Under the IWRP, total water demands were forecasted through 2070 and compared to the existing supplies and operational constraints to determine future water supply needs.

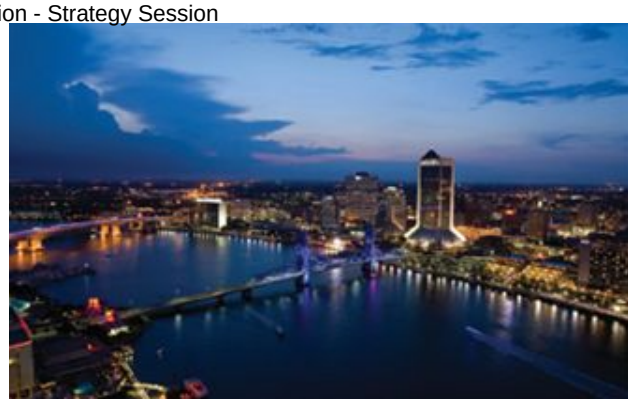
Water Demand Forecast

For the IWRP and Water DSM Strategy, JEA developed its first-ever neighborhood-level water demand forecast. By analyzing water use and future growth at the neighborhood level, more accurate forecasts at the water delivery grid and sub-grid can be achieved. In addition, neighborhood-level water demand analysis allows for more optimal targeting of DSM programs. For example, by knowing the age of homes, a DSM program that replaces older, non-conserving toilets with high-efficiency toilets would be targeted to those neighborhoods that are older than 1994 (the date when federal plumbing codes required 1.6 gallon-flush toilets).

The neighborhood-level demand forecast started with matching customer-level billing data, parcel data from county assessor databases, and neighborhood demographics to estimate water use by customer type by neighborhood. Some neighborhoods have higher per unit water use than others due to larger residential lot sizes, affluence, and other factors. Forecasts by neighborhood also distinguished areas close to being built-out from areas that have significant potential for new development. In addition, passive water conservation (the water savings that will occur from efficiency gains from adherence to plumbing codes for new development) was estimated. Finally, historical water use data was analyzed to estimate the annual and seasonal variations in demand caused by weather. **Figure 1** presents JEA's water demand forecast methodology.

Figure 1. JEA's Water Demand Forecast Methodology



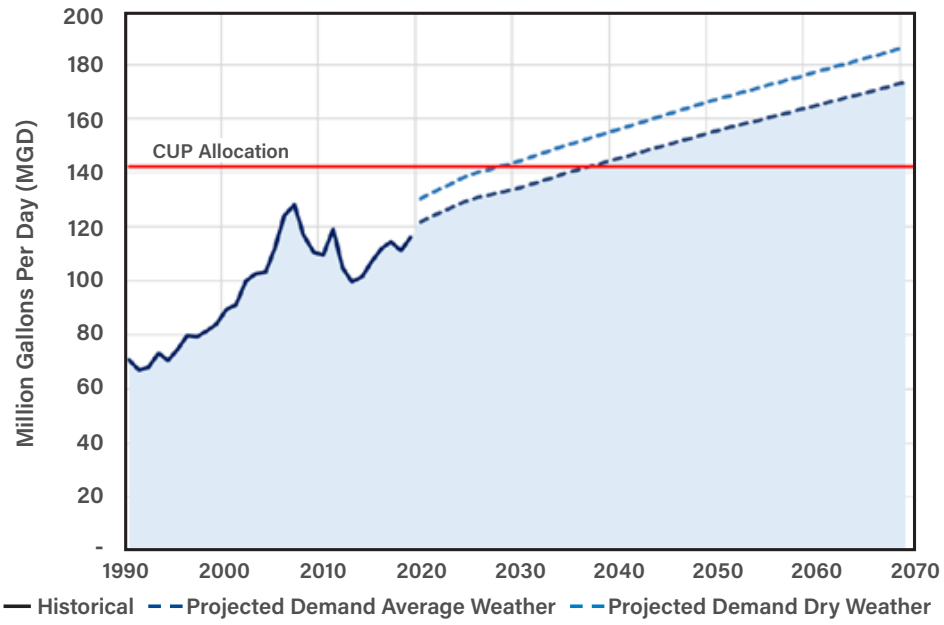



The total water demand forecast is presented in **Table 1** for the annual average demand under both average and dry weather conditions. Various reclaimed water growth projections were studied under the IWRP. Also listed in Table 1 is the reclaimed water forecast for the IWRP recommended strategy of continued expansion of the South Grid reclaimed water system as well as expansion of reclaimed water provision in the Nassau East Grid. These reclaimed water demands do not include on-site uses at the WRFs. When the reclaimed water demand is subtracted from the total water demand, it provides the future potable demand. The potable water demand forecast is shown in **Figure 2**, and compared to the current 2021 CUP allocation of 142 MGD. The potable water demand forecast is projected to surpass the available CUP allocation in 2028 under dry weather conditions.

Table 1. JEA Water Demand Forecast (MGD)

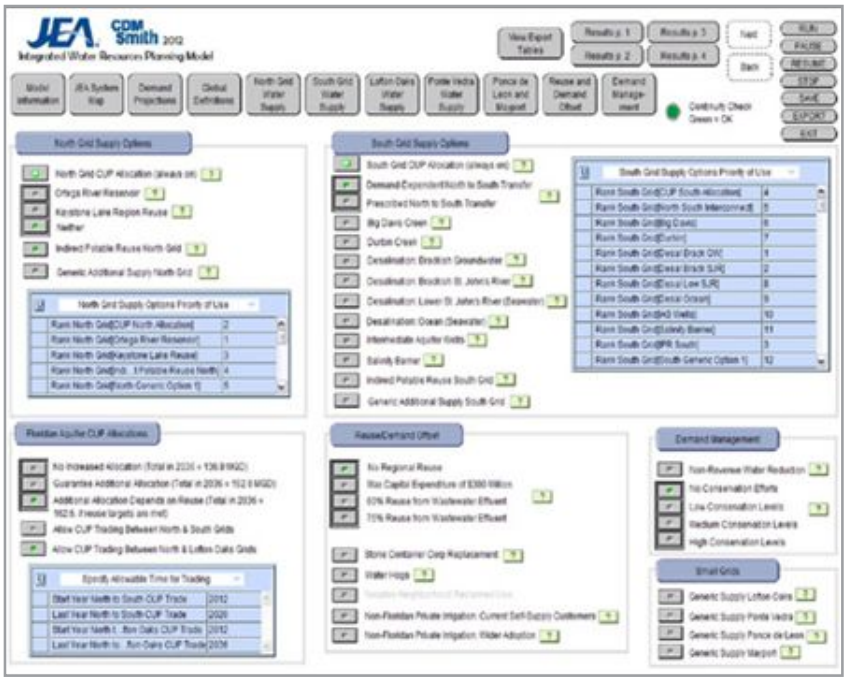
Year	Total Demand		Projected Reclaimed	Potable Demand	
	Average Weather	Dry Weather		Average Weather	Dry Weather
2020	132.4	140.8	10.5	121.9	130.4
2025	144.3	153.4	14.3	129.9	139.1
2030	156.2	165.9	22.0	134.2	144.0
2035	164.9	175.2	25.1	139.8	150.1
2040	172.5	183.2	27.7	144.8	155.5
2050	186.8	198.4	31.9	155.0	166.6
2060	199.1	211.4	35.0	164.1	176.4
2070	210.1	223.1	36.7	173.4	186.4

Figure 2. JEA'S Potable Water Demand Forecast and CUP



System Constraints

To evaluate water supply needs by JEA's grid and sub-grid delivery areas, an integrated systems model was developed using the commercial simulation software STELLA (Systems Thinking Experimental Learning Laboratory with Animation).



The systems model tracks water demands and water supplies at the sub-grid level, estimating potential supply gaps at a monthly basis. For JEA's groundwater supply, the system model reflects JEA's CUP for each water treatment plant, which is aggregated to a specific sub-grid. The systems model also incorporates major water, sewer and reclaimed system capacities, including permitted treatment capacities and major conveyance pipeline capacities. Transfer of raw water between the North Grid and South Grid via two existing St. Johns River crossings, considering both the raw water available to be transferred as well as the hydraulic capacity of the pipelines, is simulated as part of meeting water demands. New supply alternatives can also be evaluated in terms of timing of supply benefits, unit costs, and water quality.





Gap Analysis by Sub-Grid

Future water demands were compared against the current water supplies by sub-grid, including new supply projects that JEA has already initiated. In doing so, the future total water supply need (or gap) is identified both in temporal and spatial form.

Outdoor water demands vary seasonally throughout the year due to more water being needed for irrigation during the hotter summer months. To account for this variation, monthly peaking factors, developed from historical water use data, were utilized to convert annual demand values into a seasonal pattern. It is the supply gaps identified during these peak summer months which were utilized in planning for new alternative water supply. The dry weather maximum monthly water demand is about 12% higher than the dry weather annual average. The total dry weather max month supply gap is expected to be 14 MGD by 2030 and nearing 60 MGD by 2070 (see **Table 2**). The identified supply gaps do not include any assumed conservation efforts or further expansion of the reclaimed water service area.

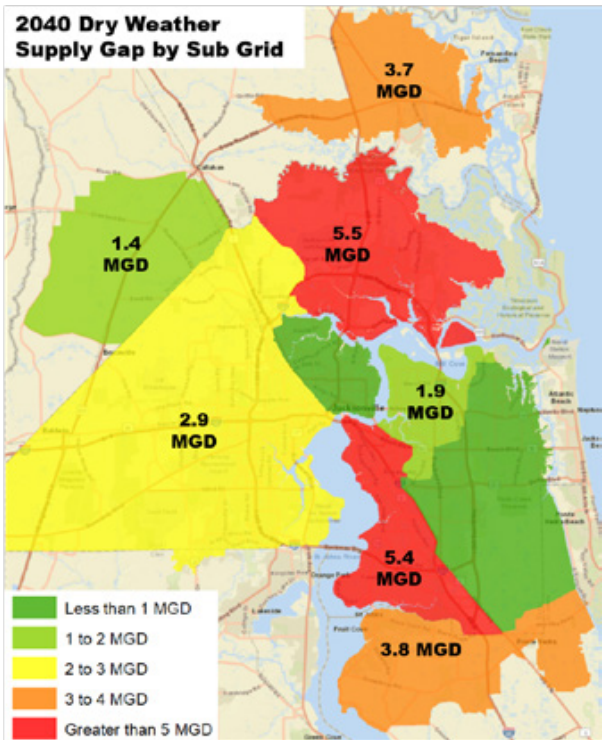
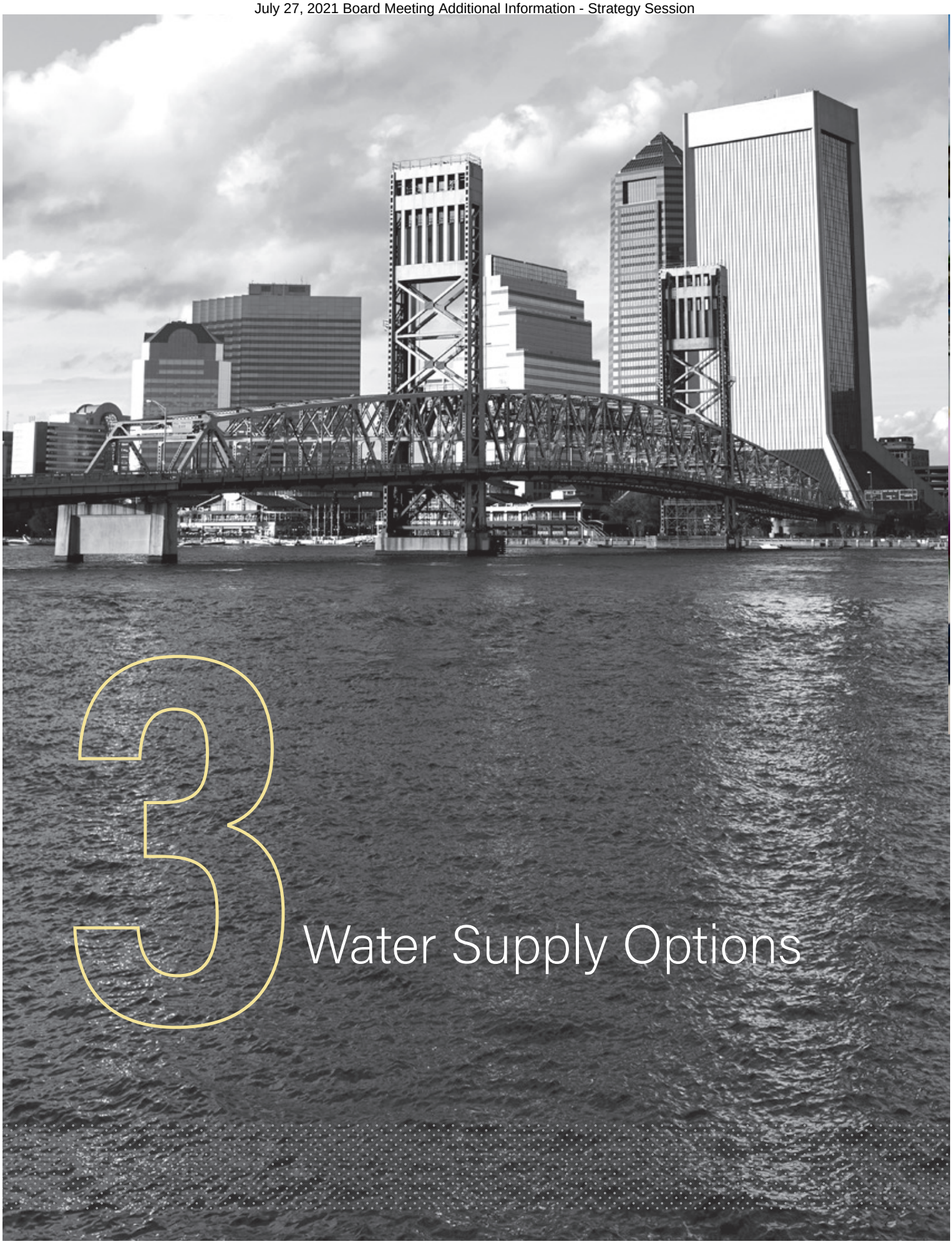


Table 2. Total Water Supply Needs by Major Grid

Water Grid	Dry Weather Max Monthly Deficit (MGD)				
	2030	2040	2050	2060	2070
South Grid	8	11	13	15	16
North Grid	2	8	17	26	34
Nassau	4	5	6	7	8
Overall Total	**14**	**24**	**36**	**48**	**58**



3 Water Supply Options

WATER SUPPLY OPTIONS

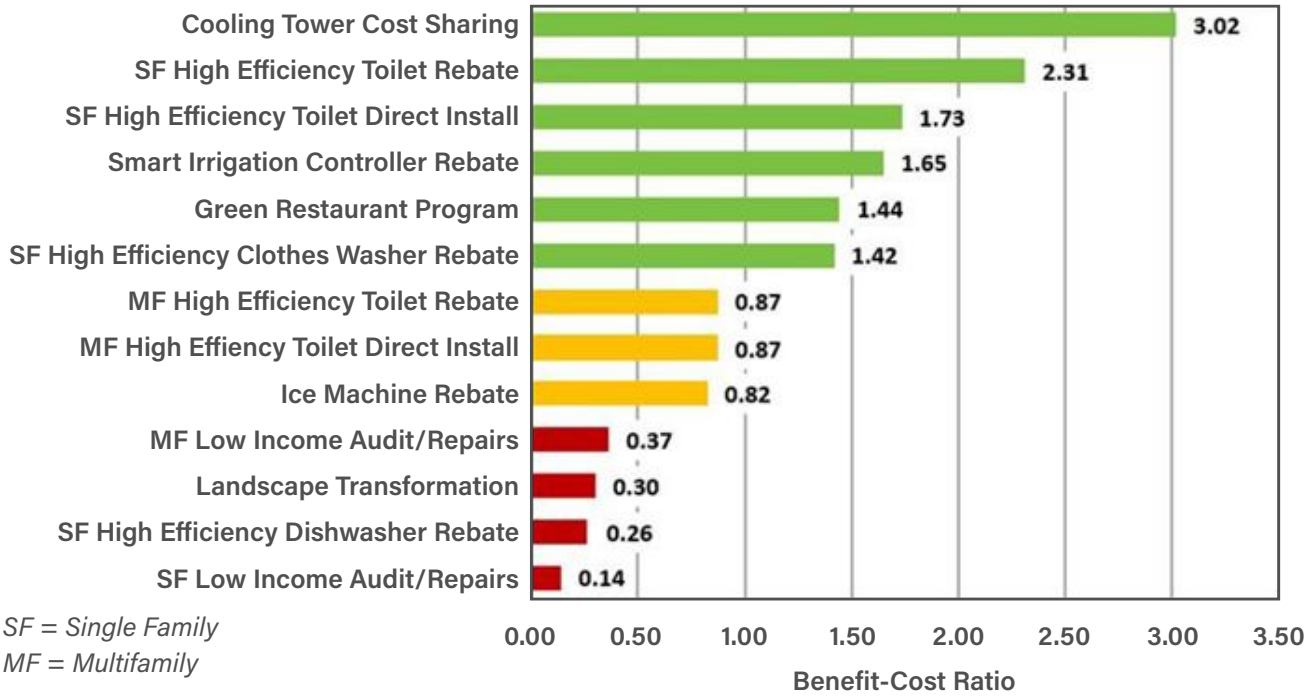
The IWRP's main goal is to develop a long-range strategy that provides water supply certainty far into the future and considers continued investments in conservation, expansion of reclaimed water to meet outdoor demands and bringing online alternative water supplies (AWS) in a cost-effective way.

Water Conservation

As part of the IWRP, a Water DSM Strategy was developed by analyzing a universe of feasible DSM measures. These DSM measures were evaluated using a sophisticated water conservation model that estimated water use and potential efficiency gains by sector and major end uses of water (e.g., toilet flushing, showers, clothes washing, dishwashing, landscape irrigation, cooling towers, etc.).

Each DSM measure was targeted to appropriate water customer types by neighborhood. Assumed levels of customer participation were made over an initial 5-year implementation period. Costs for the DSM measures were based on rebate programs from around the United States. Benefits were based on reduced O&M costs for water and sewer, as well as deferred costs for new water supply projects. **Figure 3** presents the benefit-cost ratio of the evaluated DSM measures.

Figure 3. Ranking of DSM Measures by Benefit-Cost Ratio



SF = Single Family
MF = Multifamily

The final DSM Strategy selected for implementation included 5 indoor measures and 2 outdoor measures. Expected implementation cost for JEA will total $34 million, with an economic return of $49 million when accounting for reduced O&M costs and deferments of new alternative supply costs. In total, the program will achieve a peak savings of up to 4.5 MGD and an overall benefit-cost ratio of 1.45 (i.e., every $1 spent saves JEA and customers $1.45). An additional benefit of DSM is enhanced customer experience, as participants in the program will enjoy reduced water bills (and in some cases reduced energy bills). For the IWRP, an expanded DSM Strategy was assumed with 9 measures being implemented over a longer period providing an extended savings of 6.5 MGD at a total cost of $130 million.

Recommended Water DSM Strategy

Single-Family High Efficiency Toilet Direct Installation

Multifamily High Efficiency Toilet Direct Installation

Single-Family High Efficiency Clothes Washer Rebate

Green Restaurant Program

Ice Machine Program

Cooling Tower Cost Sharing

Smart Irrigation Controller Rebate

Peak Water Savings = 4.5 MGD	Implementation Cost = $34 Million	Benefit = $49 Million	Net Benefit = $15 Million

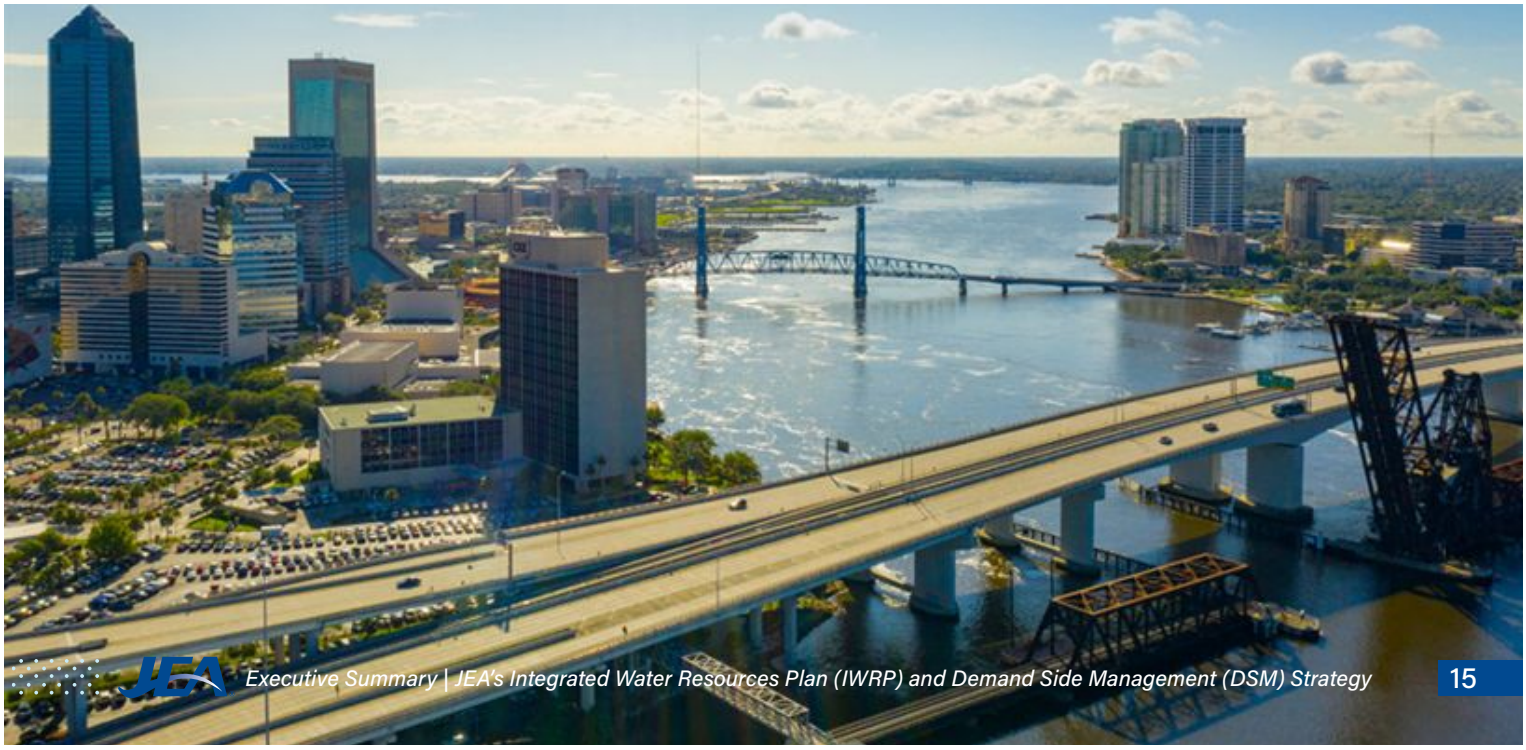
Given that the IWRP looks far beyond 5-years out, a key assumption in evaluating AWS, is how, and to what level, can conservation gains continue to be made. Focused conservation programs, when implemented successfully, are more cost effective than AWS, because conservation reduces the amount of new supplies brought online while also reducing water reclamation costs with almost no infrastructure investment. That said, there are technical limitations to how much conservation can be achieved and many of the measures include trying to change a customer's awareness and behaviors associated with their water use practices. Because of these added complexities, it is important to be practical on what can be achieved via conservation. The success of the DSM program should be monitored as it is being implemented because of implications related to timing and quantity of AWS needs.

Alternative Water Supplies

Given JEA's long history of evaluating and planning for alternative water supplies, this effort gained significantly from that past work and allowed the team to add additional details including some of the following:

- Water supply options were evaluated, and cost estimated down to the sub-grid level, including conveyance and hydraulic analysis
- Given the potential for leveraging membrane technologies associated with AWS, several variants for concentrate disposal were evaluated and cost ranges developed
- Significant effort was devoted to evaluating the potential need to eliminate surface water discharges of treated wastewater effluent, recognizing the existing legislation that is being considered in early 2021
- Reclaimed water was considered over a broad range, including adding membrane treatment for potable reuse (purified water) and the possibility of retrofitting already built out neighborhoods with reclaimed water to meet outdoor irrigation demands

Future Alternative Water Supplies will likely make use of membrane reverse osmosis (RO) technologies that produce highly purified water but also require management of a brine concentrate. Concentrate management can range in costs from $1 per 1,000 gallons of water produced (deep well injection) to upwards of $2 per 1,000 gallons of water produced (zero liquid discharge).






Over all of the sub-grids evaluated for new supplies, more than 30 new supply options were conceptualized, including increments as small as 2 mgd and as large as 30 mgd with a cost range from $1.3 to $7.2 per 1,000 gallons (kgal) of water. The ranges of water supply and unit costs within each category reflects different project sizes and project locations, as well as level of treatment for desalination options.

Water Conservation

Supply: 5 to 7 MGD
Unit Cost: $1.3 to $2.4/kgal

Traditional Reclaimed

Supply: 2 to 16 MGD
Unit Cost: $3.0 to $5.3/kgal

Stormwater Augmentation

Supply: up to 5 MGD
Unit Cost: $3.0/kgal

Potable Reuse

Supply: 5 to 32 MGD
Unit Cost: $2.9 to $6.1/kgal

Brackish GW Desalination

Supply: 2 to 24 MGD
Unit Cost: $2.6 to $5.3/kgal

Surface Water Desalination

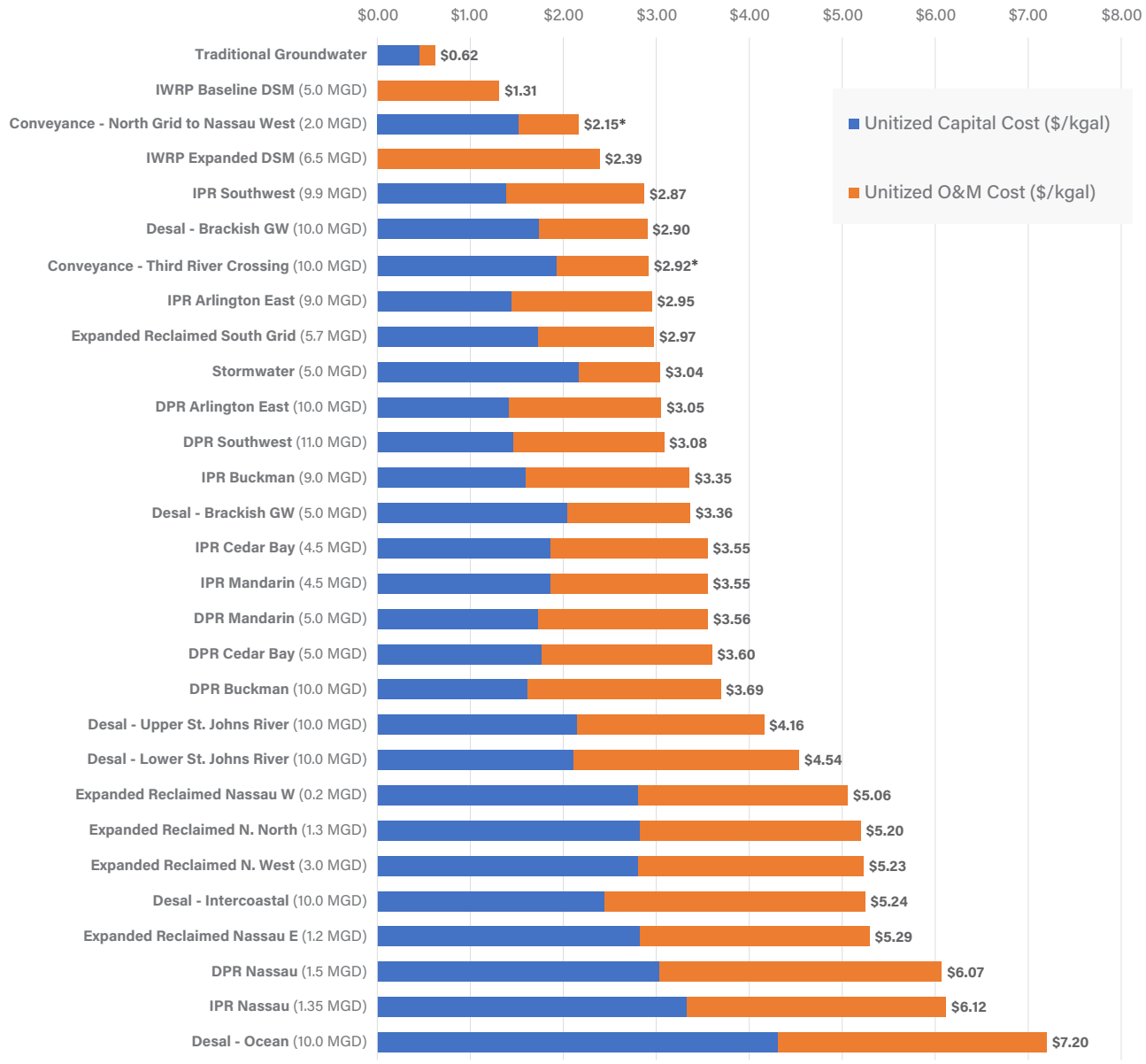
Supply: 4 to 30 MGD
Unit Cost: $4.2 to $7.2/kgal

The total unitized cost of water is the sum of unitized capital costs and operating costs. Unitized capital costs were developed assuming financing over 30 years at a discount rate of 2.5%. Depending on the supply alternative, unitized operating and maintenance costs (O&M) typically included variable costs such as electricity, chemicals and residual disposal as well as fixed costs such as labor, water quality analyses, and equipment repair and maintenance. The costs for water conservation are a net unit cost which includes the cost of the program and operational cost savings from conserving water.

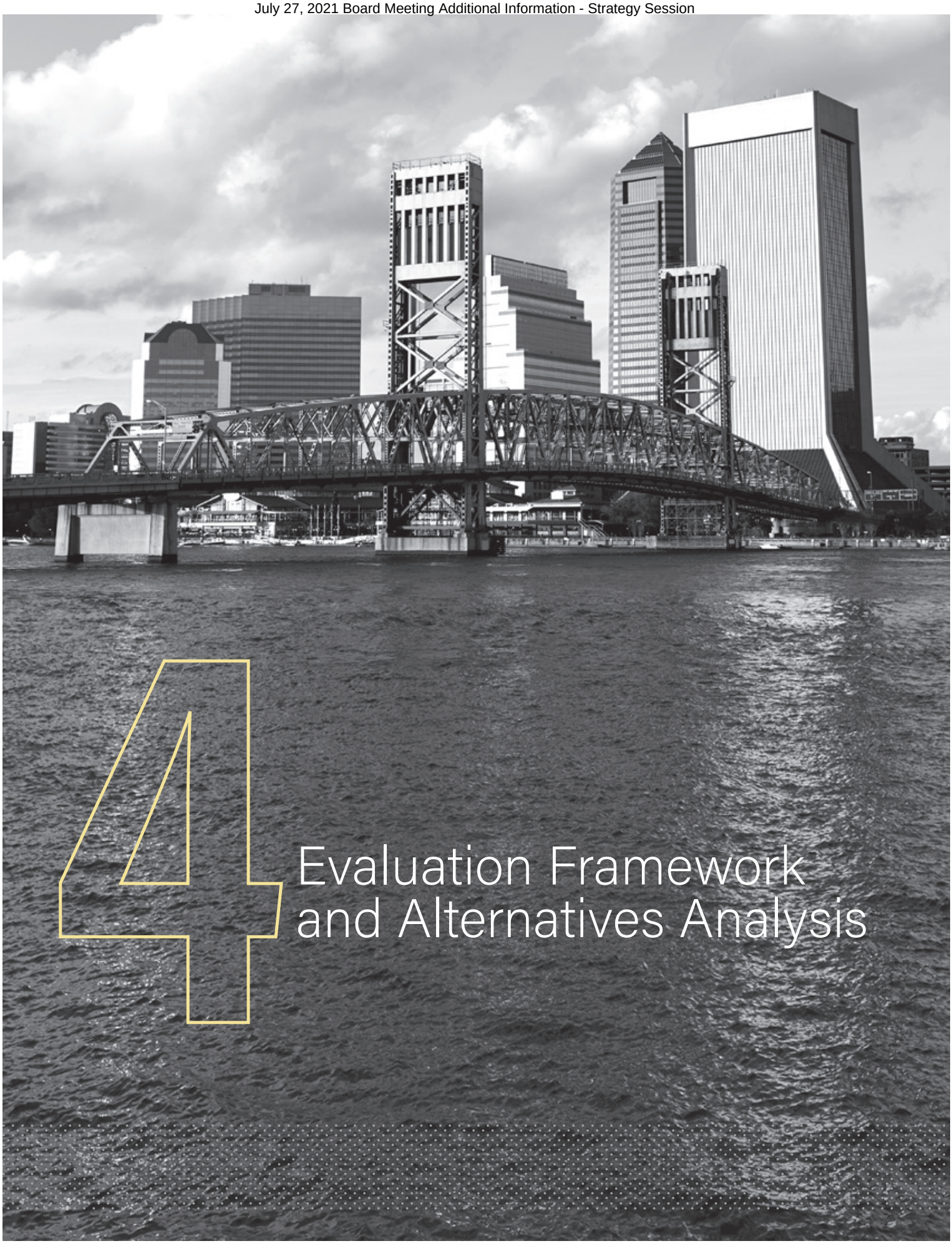



Figure 4 below shows the annualized cost for each supply option in units of dollars per 1,000 gallons of water supplied and includes a breakdown between the required capital investment and the unitized O&M costs. The costs include water supply production and major transmission only. They do not include distribution system upgrades and administrative costs. The supply provided by each option is also listed. In many cases, larger or smaller capacities could be designed but the size listed corresponds to the provided cost. No single project will meet all the identified supply needs so a combination of projects is required.

Figure 4. Annualized Cost of Water Supply Options ($/kgal)



**Conveyance options such as the Third River Crossing do not ultimately provide new supply and would need to be in addition to a new supply option in order to meet long term supply needs.*

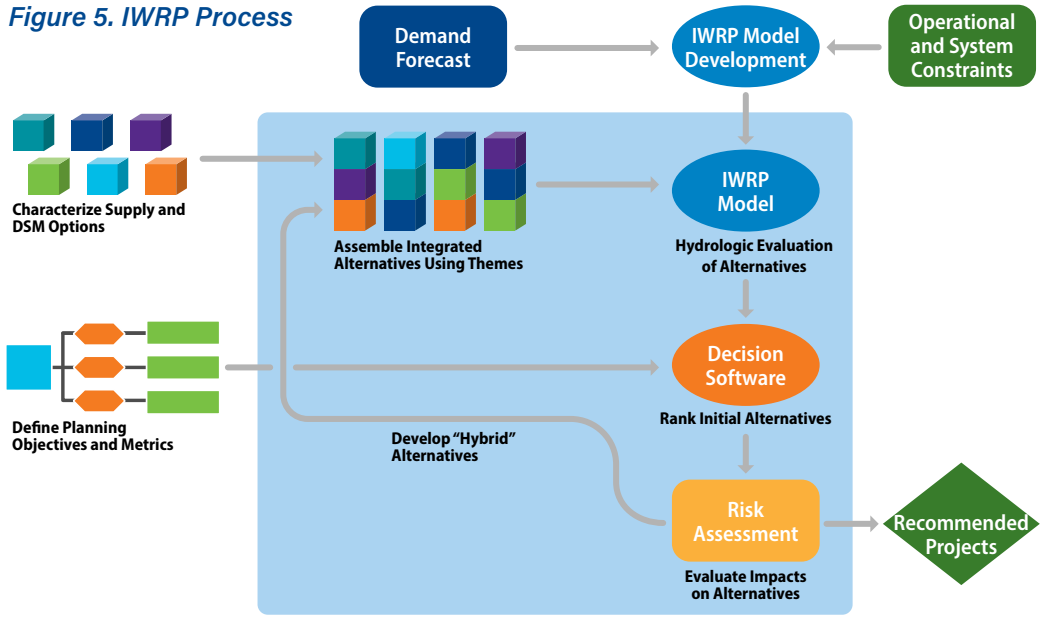


4 Evaluation Framework and Alternatives Analysis

EVALUATION FRAMEWORK AND ALTERNATIVES ANALYSIS

Having a pre-established and agreed-upon evaluation framework is essential to ensure that the IWRP's recommendations are objective, transparent and defensible. **Figure 5** outlines the evaluation framework that JEA implemented for analyzing and developing the IWRP's baseline, hybrid and preferred alternatives.

Figure 5. IWRP Process








The IWRP evaluation framework is intentionally designed to be an iterative process that first starts with themed baseline alternatives that are singularly focused. This allows for understanding tradeoffs as hybrid alternatives, or alternatives that mix and match higher performing components of the baseline themed alternatives, are developed and analyzed for uncertainty or risk. It is through these iterations that the preferred alternative is developed. The baseline alternatives that were developed for JEA's IWRP are outlined in **Table 3** below:

Table 3. Baseline Alternatives

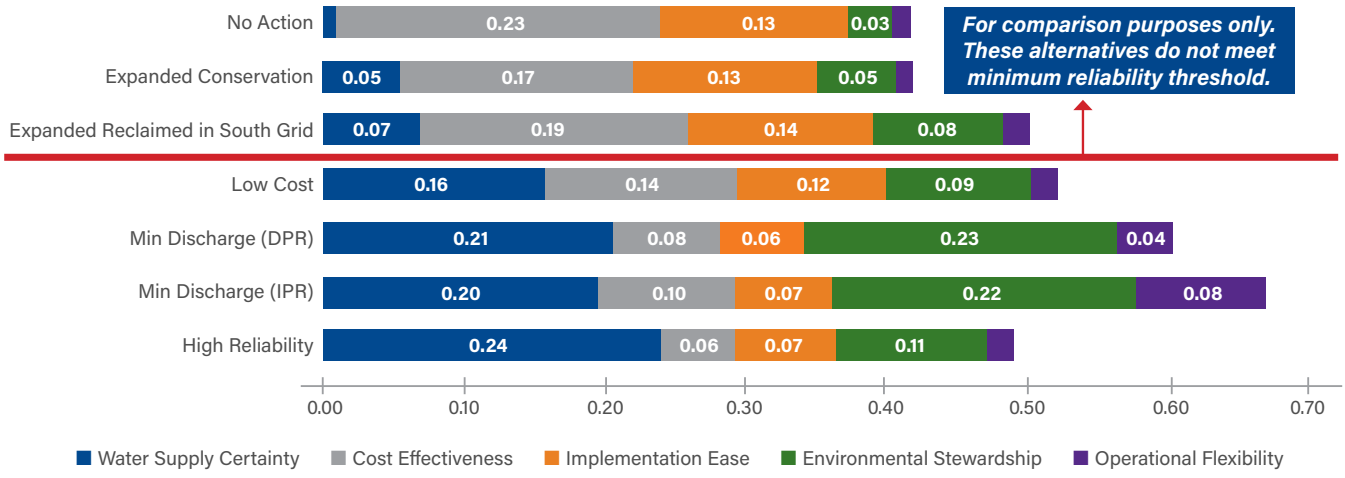
Alternative Name	Definition
No Action (Does not Meet Reliability Threshold)	Current groundwater and existing reclaimed plus committed reclaimed water in the South Grid, with no additional (future) water supply or water conservation.
Expanded Water Conservation (Does not Meet Reliability Threshold)	Expanded levels of water conservation, beyond the 5-Year DSM Program, coupled with existing reclaimed plus committed reclaimed water in the South Grid.
Expanded Reclaimed System in South Grid (Does not Meet Reliability Threshold)	Committed and new expansions of reclaimed water in the South Grid, coupled with baseline levels of water conservation.
Low Cost	Committed and new expanded reclaimed water in South Grid, brackish groundwater desalination, new intra-grid conveyance, and expanded levels of water conservation.
Minimize Treated Wastewater Discharge to St. Johns River (DPR Focus)	Committed and new expanded reclaimed water in the South Grid, direct potable reuse projects, new intra-grid conveyance, and baseline levels of water conservation.
Minimize Treated Wastewater Discharge to St. Johns River (IPR Focus)	Committed and new expanded reclaimed water in the South Grid, indirect potable reuse, new intra-grid conveyance, and baseline levels of water conservation.
High Reliability (Desalination Focus)	Committed and new expanded reclaimed water in the South Grid, brackish desalination, including river/intracoastal desalination, new intra-grid conveyance and baseline levels of water conservation.




The baseline alternatives were ranked against the five IWRP objectives using a decision software, where the longer the color bar the better the performance for a specific objective (**Figure 6**). The total length of all bar segments indicate the overall ranking score for the alternative. The Minimize Discharge with IPR focus had the best overall ranking score. Some items to note from the results include the following:

- The No Action, the Expanded Conservation and the Expanded Reclaimed baseline alternatives did not meet the minimum reliability threshold, which was set to ensure that there would not be any water supply gaps under average weather for the 2040 max month demands.
- The Lowest Cost alternative scored best for cost effectiveness but fell short on providing environmental benefits.
- The Minimize Discharge alternatives, with an emphasis on potable reuse, scored the best overall for the baseline alternatives, scoring well in most categories.
- The High Reliability baseline alternative scored well in water supply certainty but did not score well for cost effectiveness or operational flexibility.

Figure 6. Evaluation of Baseline Alternatives






Prior to developing and analyzing the hybrid alternatives, JEA conducted a risk analysis of the baseline alternatives that met the minimum reliability threshold. This allows for a better understanding of their ability to perform given possible future uncertainties.

Elements of Risk Exposure for Baseline Alternatives

Groundwater Withdrawal Limitations
Difficulty in withdrawing anticipated groundwater for brackish desalination and indirect potable reuse credit—with a 50% IPR recovery ratio and 50% reduction in groundwater produced from brackish desalination outside of the South Grid.

Zero Liquid Discharge
Increased capital and O&M costs associated with zero liquid discharge concentrate disposal for IPR, DPR, and desal options (brackish GW and surface).

Membrane Treatment Technology
Decreased capital and O&M costs associated with future technology gains in membrane treatment—assuming a 30% decrease in capital cost and 10% decrease in O&M cost.

Stranded Cost
Stranded capital costs associated with greater levels of water conservation that occur after new water supply projects are implemented.

The risk analysis results are summarized in **Table 4**. The table provides a performance assessment of the baseline alternatives in terms of their ranking and exposure to risk from the sensitivity analysis. **Green** indicates relatively greater benefits/lower risk, while **red** indicates relatively lower benefits/higher risk, and **yellow** is somewhere in-between. Depending on the situation, having a high sensitivity can be either a benefit (reduced costs) or a risk (reduced groundwater recovery).

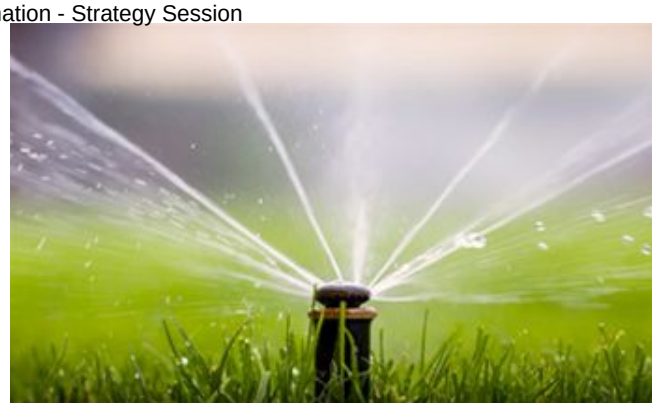
Table 4. Risk Exposure Heat Map

Alternative	Rank Score	Groundwater Recovery	Zero Liquid Concentrate Cost Risk	Membrane Technology Cost Savings	Stranded Investment Risk
Low Cost	0.52	High	Low	Med	High
Minimize Discharge (DRP)	0.55	Low	Med	High	Med
Minimize Discharge (IPR)	0.61	High	Med	High	Med
High Reliability	0.47	Med	High	High	HIgh

The following conclusion arise from the risk exposure heat table:

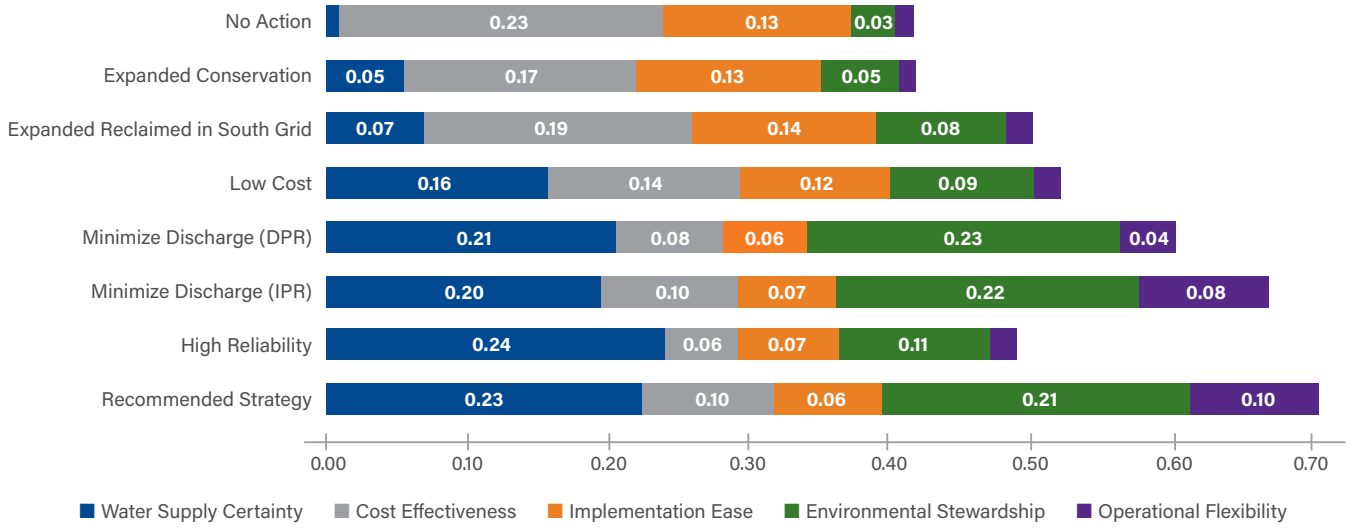
- The High Reliability and Low Cost alternatives have lower rank scores and higher potential risk exposure to uncertainties.
- While the Minimize Treated Wastewater Discharge (IPR Focus) alternative has the best rank score, it has a slightly higher risk exposure compared to the Minimize Discharge (DPR Focus) alternative.

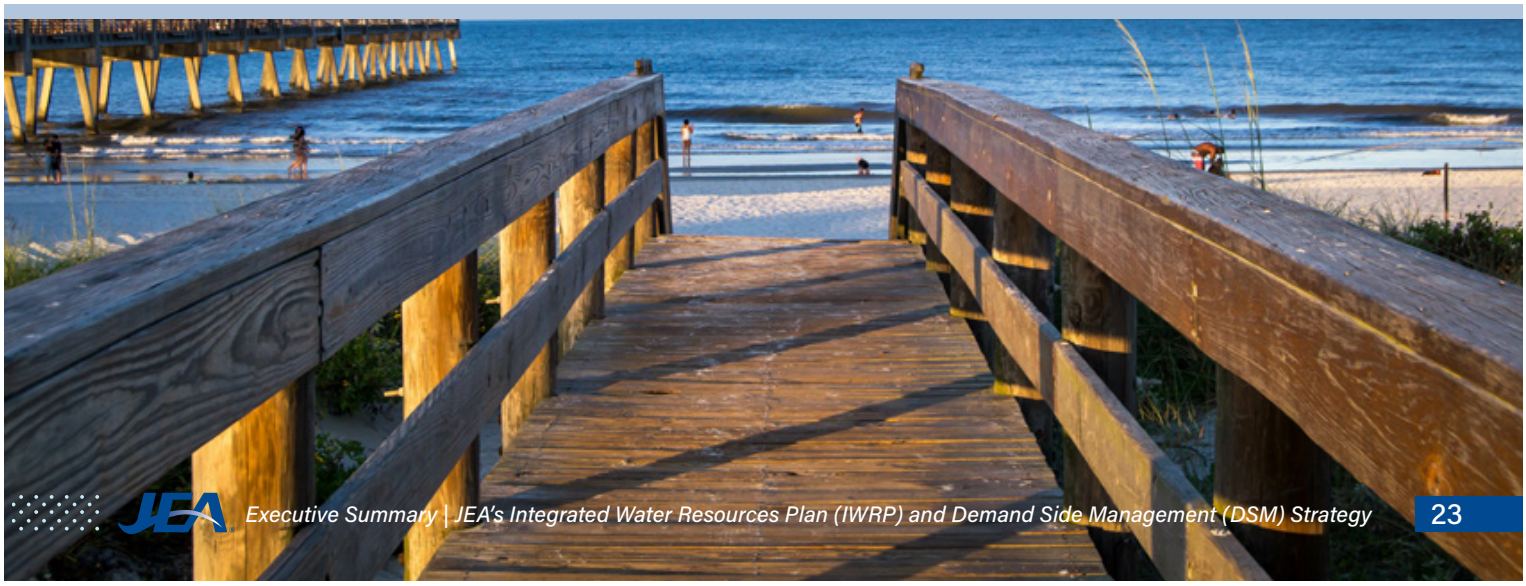


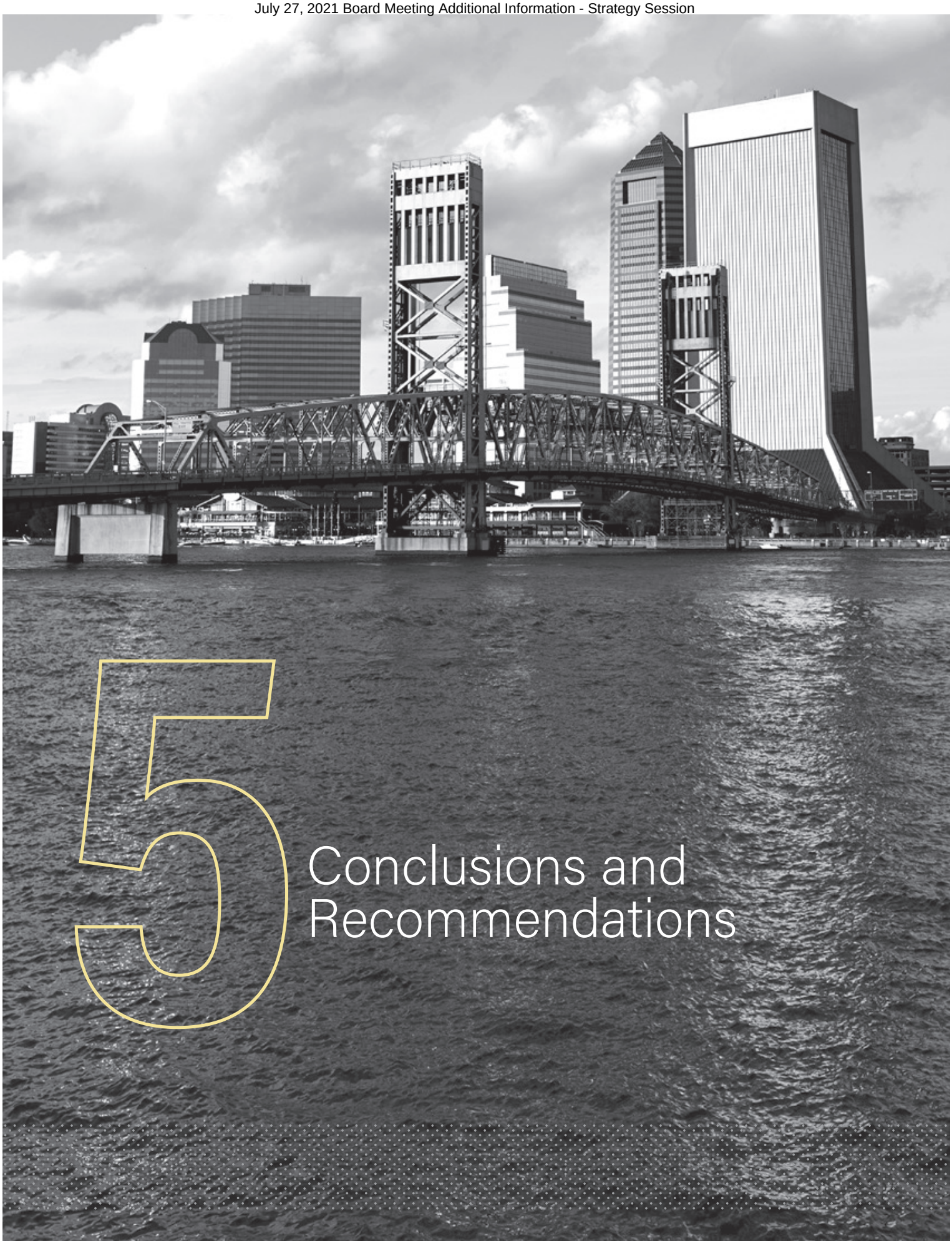



The risk exposure analysis, along with other insights, were used to evaluate several hybrid alternatives. A final recommended strategy was developed that included a mix of expanded reclaimed and conservation, along with potable reuse and brackish desalination. **Figure 7** presents the ranking of the baseline alternatives and final recommended strategy. As seen, the recommended strategy performs best overall.

Figure 7. Ranking of Baseline Alternatives and Recommended Strategy





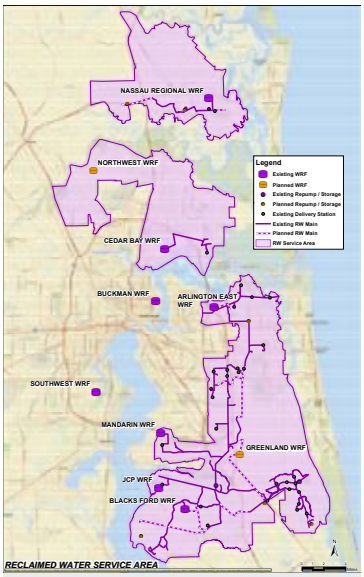


5 Conclusions and Recommendations

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The following conclusions can be made based on the evaluations within the IWRP:



JEA reuse service area.

1. Single-family residential water customers account for most of JEA's water demands, at about 62 percent of current total demand.
2. Landscape irrigation can represent 20 to 92 percent of total single-family residential water demand, averaging 57 percent for single-family homes in the service area. The range is noticeably large due to the fact that it is greatly dependent on the residential lot size and affluence of the neighborhoods.
3. If all of JEA's water customers were at their maximum-level of water efficiency for indoor and outdoor water uses, the theoretical water conservation savings by 2040 would be about 20 mgd—but this would be extremely costly, difficult to achieve, and would require significant regional municipal policy changes as well as customer behavior changes.
4. Based on JEA's Water DSM Strategy report, more achievable water conservation savings that provide a net benefit to JEA and its water customers range from 4 to 5 mgd by 2040. Implementation of the DSM program will be evaluated every 12-24 months and the results of that evaluation will be used to guide future longterm continued investments in conservation.
5. Traditional reclaimed water supply used to meet non-potable water demands can be beneficial in service areas where JEA has already made substantial investments in water reclamation treatment and reclaimed conveyance.
6. Implementation of targeted water conservation and traditional reclaimed will allow JEA to free up existing groundwater allocations under the CUP to serve additional customers, but there will be additional needs for alternative water supplies between 2025 and 2030 in order to meet seasonal water demands under dry weather conditions.
7. Potable reuse, either indirect or direct, offers multiple benefits such as providing alternative water supplies and reducing the treated wastewater discharge to the St. Johns River.
8. In some JEA service areas, brackish groundwater desalination is more cost-effective and easier to implement than potable reuse due to location and limited availability of potable reuse supply.
9. Water conveyance and river crossings to transfer available water supply from one area to another area with supply needs can be beneficial as long as future water demands in the area where supply is being transferred from do not increase significantly and cause stranded investments.

Recommendations

The recommendations for JEA's IWRP are made for near-term, mid-term, and long-term. The IWRP will be continuously monitored, with mid-term and long-term recommendations being potentially revisited should future conditions change. As of now, the following recommendations are being made:

Short-Term Recommendations (2020-2030)

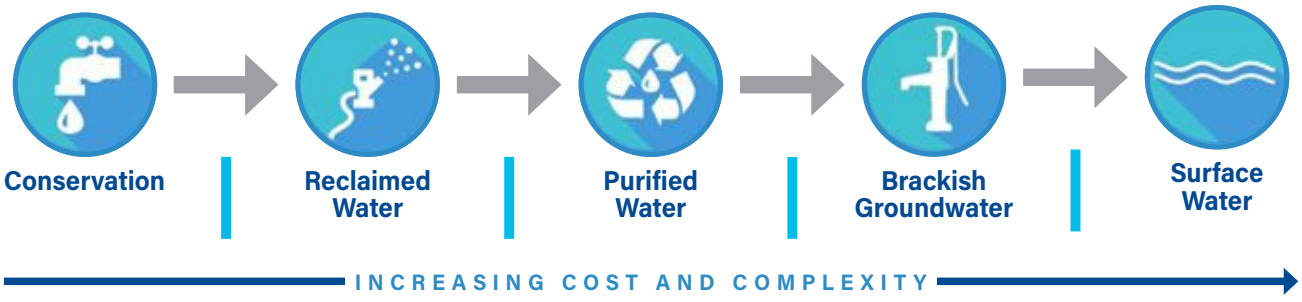
- Complete implementation of the Southside Integrated Piping System (SIPS) program to transfer more available water from the North Grid to the South Grid
- Continued implementation of the DSM Program based on continued evaluation of cost effectiveness and meeting conservation goal targets
- Work with developers to continue expanding traditional reclaimed water in the South Grid—providing an additional 3.0 mgd of non-potable water for the St. Johns County sub-grid
- Conduct public outreach, permitting, design and construction for an indirect potable reuse facility located in the South Grid, utilizing supply from the Arlington East Water Reclamation Facility (WRF)—providing an additional 2.7 mgd of alternative water supply for the South Grid
- Complete design and construction of water reclamation treatment and conveyance for expanded reclaimed water—providing an additional 1.0 mgd of non-potable water in the Nassau East area
- Conduct permitting, design and construction for a 3.0 mgd brackish groundwater desalination facility in the Nassau East Grid - the first phase of operations will provide 2.0 mgd of supply
- Conduct design and construction of a new water conveyance pipeline to transfer groundwater from the North Grid to the west Nassau West area
- Conduct permitting, design and construction for a 4.0 mgd indirect potable reuse facility at Cedar Bay WRF - the first phase of operations will provide 1.8 mgd of supply for the North sub-grid of the North Grid

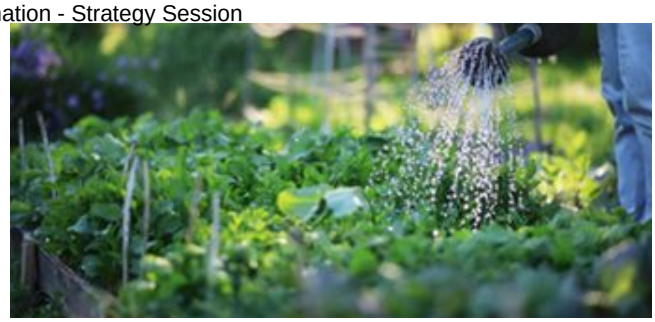
JEA is evaluating the potential to implement new cost effective treatment technologies such as reverse osmosis (RO) membranes as it looks to diversity the future water supply portfolio, to include brackish groundwater desalination and potable reuse.




Mid-Term Recommendations (2030-2040)

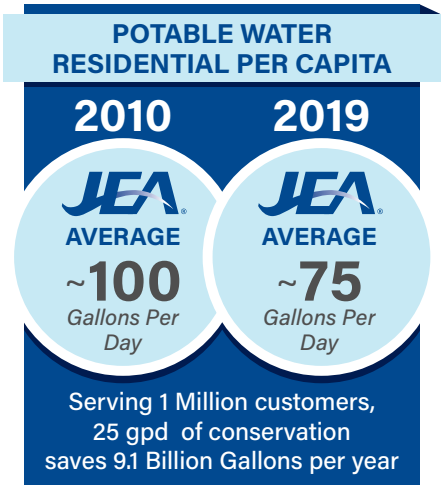
- Continued implementation of the DSM Program based on continued evaluation of cost effectiveness and meeting conservation targets
- Expand the operations for the second phase of indirect potable reuse at Cedar Bay WRF—providing an additional 1.8 mgd of alternative water supply for the North sub-grid of the North Grid
- Expand operations for the second phase of brackish groundwater desalination—providing an additional 1.0 mgd of alternative water supply for the Nassau East Grid
- Conduct permitting, design and construction of the first phase of indirect potable reuse at Southwest WRF—providing an additional 2.7 mgd of alternative water supply for the West sub-grid of the North Grid
- Conduct permitting, design and construction of the first phase of brackish groundwater desalination—providing an additional 2.0 mgd of alternative water supply for the North sub-grid of the North Grid





Long-Term Recommendations (Beyond 2040)

- Continued implementation of the DSM Program based on continued evaluation of cost effectiveness and meeting conservation targets
- Conduct public outreach, permitting, design and construction of direct potable reuse at Buckman WRF—providing an additional 8.0 mgd of alternative water supply for the South Grid and 12 mgd of alternative water supply for the West sub-grid of the North Grid
- Conduct permitting, design and construction of the second phase of indirect potable reuse at Southwest WRF—providing an additional 5.4 mgd of alternative water supply for the West sub-grid of the North Grid
- Conduct permitting, design and construction of the third phase of brackish groundwater desalination—providing an additional 1.0 mgd of alternative water supply for the Nassau East Grid
- Conduct permitting, design and construction of the second phase of brackish groundwater desalination—providing an additional 7.0 mgd of alternative water supply for the North sub-grid of the North Grid



Capital Improvement Program

Based on the IWRP recommendations, a detailed capital improvement program (CIP) was developed for the next 10 and 20 years, with long-term projects being identified beyond 2040. **Figure 8** presents the CIP schedule for new water supply projects. Implementation of a conservation strategy and already planned continued expansion of the reclaimed water system in the South Grid and Nassau East Grid are also critical elements of meeting the supply gaps outlined in **Table 5**. In the near term, JEA has operational flexibility within the CUP to distribute groundwater pumping between grids. This flexibility provides the ability to maximize the timing of projects.

Table 5. Meeting Near-Term Supply Gap (MGD)

Identified Supply Gap		2030	2040	2070
		14	24	58
Supply Options	Conservation	6.5	6.5	6.5
	Expanded Reclaimed	3.3	4.4	6.3
	New Supply	6.5	14.0	47.4
	Total Additional Supply	**16.3**	**24.9**	**60.2**

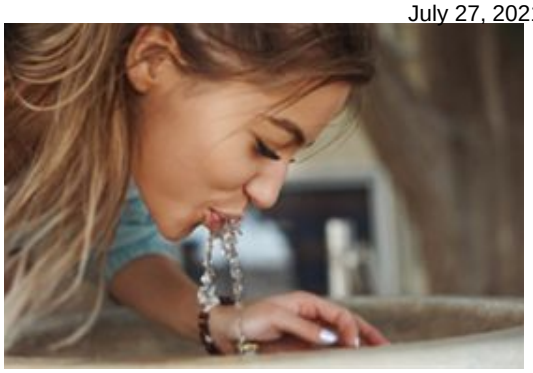
Figure 8. Recommended JEA IWRP CIP Schedule

CIP Phase	Project	Grid	Capacity Size (MGD)	Water* Supply (MGD)	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2039	2040 and Beyond
10 Year	Purified Water South Grid (1.0 MGD Demo)	S Arlington	0.0	--					
	Aquifer Recharge South Grid	S Arlington	3.0	2.7					
	Brackish GW Desalination – Nassau	Nassau East	3.0	2.0/3.0					
	Aquifer Recharge at Cedar Bay WRF	N North	4.0	1.8/3.6					
	New Conveyance – Nassau West	Nassau West	2.0	1.0†					
20 Year	Aquifer Recharge at Southwest WRF	N West	3.0	2.7					
	Brackish GW Desalination – North	N North	2.0	2.0					
Long-Term	Purified Water for Direct Use at Buckman WRF	S Grid (8) / N West (12)	20.0	20.0					*Timing TBD*
	Aquifer Recharge at Southwest WRF – Expansion	N West	6.0	5.4					*Timing TBD*
	Brackish GW Desalination – Nassau East – Expansion	Nassau East	1.0	1.0					*Timing TBD*
	Brackish GW Desalination – North – Expansion	N North	7.0	7.0					*Timing TBD*

WRF – Water Reclamation Facility ■ Design & Permit ■ Construction ■ Demonstration & Training ■ Operational

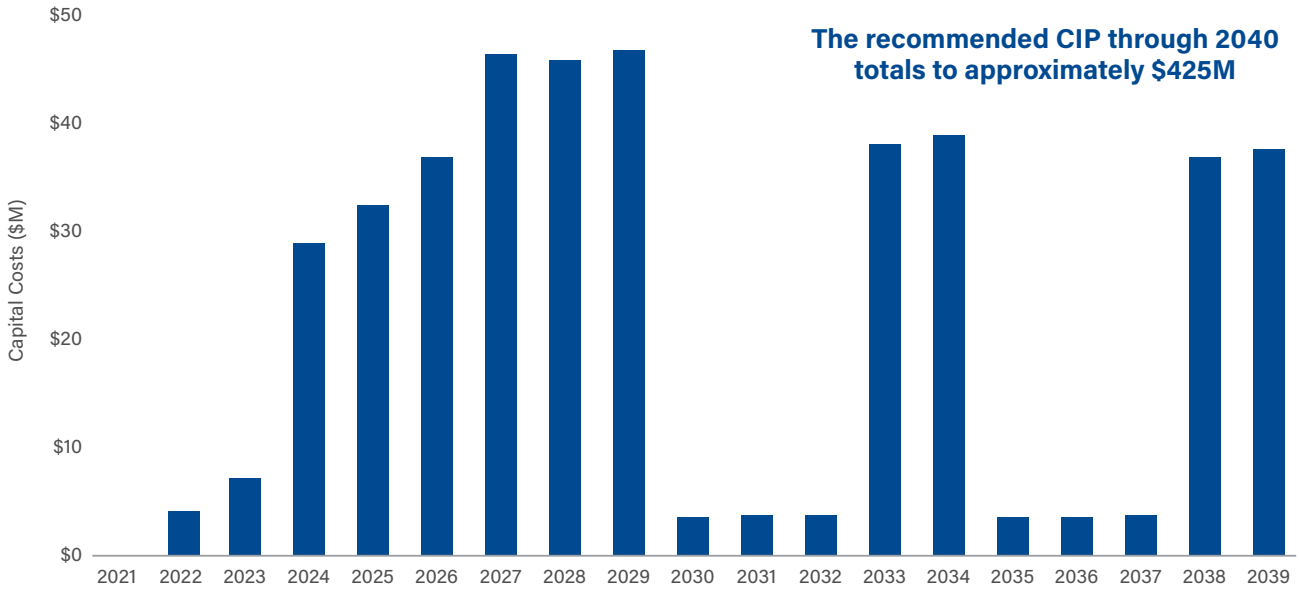
**The supply available for withdrawal from aquifer recharge projects is assumed as 90 percent of the water stored.*

†New conveyance helps to meet localized supply gaps but does not represent a new source of supply.



The capital costs for new alternative water supply projects within the CIP through 2040 are shown in **Figure 9**. These costs include engineering, design, permitting, JEA indirect costs and a two percent escalation factor. Projects were grouped within five-year increments but could be further staggered to distribute financing requirements.

Figure 9. Capital Costs for JEA's CIP Through 2040.



DSM Strategy

Water conservation is an important component for JEA's IWRP, as it provides multiple benefits such as extending existing groundwater and reclaimed water supplies, reducing JEA's current operating costs for water and sewer, reducing/deferring future capital investments, and providing increased customer satisfaction by increasing water use efficiency and reducing water bills. Successful implementation of water conservation programs in JEA's service area requires a DSM Strategy.

In order to advance the DSM Strategy, existing and new water customers were characterized by neighborhood in terms of irrigable lot size, age of home, and income to develop a highly-targeted program that maximizes water conservation savings in a cost-effective manner. A five-year initial DSM Strategy was developed to first implement those water conservation measures with the highest net benefit to determine which ones have the greatest customer acceptance. Implementation of the initial DSM strategy is expected to conserve about 4 MGD of sustained water savings over the next 10 or so years, with a total cost of just under $40 million. **Table 6** presents the cost details for this strategy.

Based on the useful life of these DSM measures and the reduced costs for JEA's operations and deferred capital investments, the anticipated net benefit of this initial strategy is approximately $15 million.

Table 6. JEA Water DSM Strategy Costs

DSM Strategy Cost Categories	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Incentive and Administration Costs ($ millions)						
SF High Efficiency Toilet Direct Install	$0.96	$0.96	$0.96	$0.96	$0.96	$4.80
MF High Efficiency Toilet Direct Install	$1.73	$1.73	$1.73	$1.73	$1.73	$8.64
SF High Efficiency Clothes Washer Rebate	$3.52	$3.52	$3.52	$3.52	$3.52	$17.61
Green Restaurant Program	$0.05	$0.05	$0.05	$0.05	$0.05	$0.25
Ice Machine Rebate	$0.01	$0.01	$0.01	$0.01	$0.01	$0.05
Cooling Tower Cost Sharing	$048	$0.48	$048	$0.48	$0.48	$2.40
Smart Irrigation Controller Rebate	$0.58	$0.58	$0.58	$0.58	$0.58	$2.90
Sub-total	**$7.33**	**$7.33**	**$7.33**	**$7.33**	**$7.33**	**$36.65**
Programmatic Costs ($ millions)						
Marketing/Public Education	$0.40	$0.40	$0.40	$0.40	$0.40	$2.00
Program Evaluation	$0.08	$0.08	$0.08	$0.08	$0.38	$0.70
Sub-total	$0.48	$0.48	$0.48	$0.48	$0.78	$2.70
TOTAL COSTS	**$7.81**	**$7.81**	**$7.81**	**$7.81**	**$8.11**	**$39.35**

Because it is important that JEA continue implementation of water conservation measures beyond the initial five-year DSM Strategy, increased customer participation was projected over a 10-year expanded program implementation for the IWRP. Based on this expanded program, longer-term water savings were estimated to be between 6.5 and 7 MGD, with a cost of implementation being approximately $130 million, or $13 million per year.


Prepared by
CDM Smith®
For
JEA®
Building Community®

JEA®

Volume I: Resilience Plan

FOR WATER, WASTEWATER, CHILLED WATER, AND RECLAIMED WATER SYSTEMS

FINAL • TASK ORDER No.3 • SYSTEM RESILIENCY PROGRAM

DECEMBER 2020

Jacobs

JEA Resiliency Program

Project No:	705890CH
Document Title:	Task Order No. 3: System Resilience Plan
Document No.:	PPS0507201802JAX
Revision:	1
Document Status:	Final
Date:	December 2020
Client Name:	JEA
Client No:	174097
Jacobs PM:	Cory Hooper (Task Lead: Laurens Van der Tak)

Jacobs Engineering Group Inc.
200 W. Forsyth Street, Suite 1520
Jacksonville, Florida 32202
United States
T +1. 904.636.5432
F +1.904.636.5433
www.jacobs.com

This plan was produced as the final deliverable of the JEA Resiliency Program focused on evaluating flood risk and developing adaptation strategies to mitigate the identified flood risk for JEA's water, wastewater, chilled water, and reclaimed water systems.

This study included a regional analysis of the entire 900-square-mile JEA service area for the purposes of identifying facility vulnerability to future flood events and is not intended to be a site-level analysis for design purposes. However, the results are helpful in prioritizing improvement projects for critical and vulnerable facilities.

Contents

Appendixes

Tables

Figures

Acronyms and Abbreviations

AACEI	Association for the Advancement of Cost Engineering International
B/C	benefit/cost ratio
BFE	base flood elevation (defined by FEMA as flood elevation associated with the 1% annual chance flood)
CIP	capital improvement plan
CWP	chilled water plant
eAM	enterprise asset management
FBC	Florida Building Code
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps (these delineate special hazard flood zones and state base flood elevations)
GCM	general circulation model
GHG	greenhouse gas
I&C	instrumentation and controls
LOS	level of service
LS	lift station
MHHW	mean higher high water
mph	miles per hour
NAVD88	North American Vertical Datum of 1988
NCA	National Climate Assessment
NHC	National Hurricane Center
NOAA	National Oceanic and Atmospheric Administration
NPV	net present value
O&M	operations and maintenance
PM	project manager
RCP	representative concentration pathway
ROI	return on investment
SLR	sea level rise
SSO	sanitary sewer overflow
TM	technical memorandum
TO	task order

U.S.	United States
USACE	U.S. Army Corps of Engineers
WRF	water reclamation facility
WTP	water treatment plant
WWTP	wastewater treatment plant

Definitions

100-year Flood: This flood event is used as the basis for the Federal Emergency Management Agency's base flood elevation and is generally used to describe a storm with a 100-year return frequency; however, it is more accurately represented as an area having a 1-percent chance of flooding in any given year.

500-year Flood: This flood event exceeds the 100-year event and is generally used to describe a storm with a 500-year return frequency; however, it is more accurately represented as an area having a 0.2-percent chance of flooding in any given year.

Adaptive Capacity: Ability of an asset to relatively easily, or at low cost, adjust to or be modified to accommodate changing conditions to minimize related impacts.

Assets: Individual system components at a facility, such as a motor, pump, electrical panel, transformer, or building.

Benefit/Cost Ratio: Total discounted benefits divided by total discounted costs for a quick determination on economic efficiency.

Booster Lift Station: A wastewater pump station strategically located to decrease pressures at upstream pump stations for long-distance force mains.

Calibrated Flow Model: Tool used to assess capacity and flow in distribution or collection system piping.

Criticality: An asset's importance to maintain primary system function in terms of the system's operational capacity to avoid a loss of service. Critical buildings served by an asset or facility also contribute to its criticality, such as hospitals, or evacuation shelters.

Consequence: Impacts to services, including interruptions in service delivery based on failure of assets or facilities to perform intended function.

Benefit/Cost Analysis: Total discounted benefits divided by total discounted costs for a quick determination on economic efficiency.

Design Flood Elevation: This is a term used by the American Society of Civil Engineers and Federal Emergency Management Agency (FEMA) to describe locally adopted base flood elevations that exceed the FEMA base flood elevation. This term is not used in this guide to avoid confusion with modeled flood elevation and minimum design elevation.

Dry Floodproofing: A form of asset hardening that prevents exposure to flood inundation through the use of flood barriers, sealed building envelopes, and water-tight cabinets or enclosures. This strategy is applied to assets or facilities up to the minimum design elevation when not elevated.

Elevating: A flood mitigation strategy to elevate sensitive equipment and buildings above the anticipated flood elevation to the recommended minimum design elevation to avoid possible impacts from flood inundation.

Exposure (Flood): The proximity of a given asset or facility to the extents of a specific flood event.

Facility: A single site location containing multiple infrastructure assets supporting a single facility type.

Facility Criticality: The degree to which JEA facilities serve critical and priority customers, maintain high flows, and are depended upon by other JEA systems to meet the intended level of service.

Facility Type: Category of facilities in JEA's water, wastewater, chilled, and reclaimed water systems, such as lift station, repump station, booster station, etc.

Flood Barriers: Devices that provide a physical, water-tight barrier used to hold back flood water and protect entire facilities, buildings, or other assets. These can be operable or fixed.

Flood Exposure: The proximity of a given asset or facility to the extents of a specific flood event.

Floodproofing: A flood mitigation strategy to protect sensitive assets against damage resulting from flood inundation, including the use of both wet and dry floodproofing.

Flood Risk: Measure of impact of flooding on a facility, calculated based on a facility's likelihood and criticality score.

Flood Sensitivity: The degree to which an asset or facility may be impacted or damaged by temporary flood inundation, resulting from asset composition and materials.

Freeboard: The distance (in feet) above a stated flood level that an asset is elevated to provide additional level or protection.

Hardening: A flood mitigation strategy that includes wet and dry floodproofing intended to protect sensitive assets from flood damage when elevating cannot be used.

High Emission Scenario: A global climate projection for greenhouse gas emissions, referred to by many scientists as a high probability future scenario, corresponding to a continued increase in concentrations of greenhouse gases and atmospheric warming that will result in increased water temperatures and elevated sea levels.

Likelihood: Probability of an identified threat impacting JEA assets.

Minimum Design Elevation: Comprised of the *anticipated future flood elevation + freeboard*, this is the minimum elevation established to protect a facility or asset from flood damage through either elevating or hardening strategies.

Mitigation: The act of reducing high-risk situations.

Net Present Value: Present value benefits minus present value costs.

Planning Horizons: The 2040, 2070, and 2100 scenarios for which the future conditions flood models could be run to evaluate flood risk at JEA facilities.

Potable Water Booster Station: Pump station strategically located to increase pressure in the potable water distribution system.

Potable Water Repump Station: A pump station strategically located in the potable water distribution system containing water storage to inject into the system to maintain system pressure and flow.

Prioritization: Identification of facilities based on their highest priority to maintain system operation and service reliability, considering multiple performance metrics including regulatory compliance, health and safety, and flood risk.

Reclaimed Booster Station: Pump station strategically located to increase pressure in the reclaimed water distribution system.

Redundancy: Having a secondary or backup system in place to prevent single point of failure of a given system to improve system reliability.

Relative Sea Level Change: Changes in the ocean's surface elevation relative to local factors such as subsidence, upstream flood control, erosion, regional ocean currents, variations in land height, and whether the land is still rebounding from the compressive weight of Ice Age glaciers.

Resilience: The capacity of individuals, communities, or systems to survive, recover, adapt, and thrive in the face of chronic stresses and acute shocks.

Return on Investment: $ Net Return/$ Cost = Net Present Value/$ Cost, based on the dollars netted for each dollar invested.

Return Period: A recurrence interval between specific severe weather events, such as flooding, often stated in terms of 2-, 5-, 10-, 25-, 50-, 100-, and 500-year intervals; typically used to determine flood probability and design criteria.

Sensitivity (Flood): The degree to which an asset or facility may be impacted or damaged by temporary flood inundation, resulting from asset composition and materials.

Service Life: The life of a system based on its type: 25 years for mechanical and electrical systems and 50 or more years for structures/buildings.

Vacuum Station: Small pump station, typically located on private property, that is used when a gravity system is not practical.

Vulnerability: A state of exposure and sensitivity to identified hazards, which can be partially mitigated through adaptive capacity and redundancy. Represented by the following equation: (Exposure + Sensitivity) / (Adaptive Capacity + Redundancy).

Wet Floodproofing: A form of asset hardening that uses non-sensitive materials to prevent damage to an asset or facility. This strategy is applied to assets or facilities up to the minimum design elevation when assets cannot be elevated or where dry floodproofing is cost prohibitive.

Executive Summary

ES.1 Introduction

Located in Jacksonville, Florida, JEA is the seventh largest community-owned electric utility company in the United States and the largest in Florida. On the water and wastewater side of the utility, JEA owns and operates more than 1,400 wastewater lift stations, 11 water reclamation facilities, 134 wells, 37 water treatment plants, and 4 chilled water plants, which collectively serve nearly 420,000 customer accounts and over 1.5 million people across a 900-square-mile service area spanning four counties.

Severe weather impacts and storms since 2016 have caused electrical power disruptions and equipment failures resulting in service interruptions and sewer overflows. These events prompted JEA to develop this comprehensive and forward-looking infrastructure to reduce system risk and increase reliability and resilience against severe weather events.

ES.2 Background

In the summer of 2018, Jacobs began developing the Resilience Plan Framework for JEA's water, wastewater, chilled water, and reclaimed water systems, which guided the activities under the JEA Resiliency Program, encompassing multiple activities, including the following:

- System Resilience Plan (Task Order [TO] No. 3): Comprehensive assessment of flood vulnerability and risk associated with current and future flood scenarios and the development of adaptation strategies to mitigate the flood risk.
- Electrical, Instrumentation and Controls (I&C) System Assessment (TO 4): Review of electrical and I&C equipment to identify assets that may pose a risk to the reliability of the water, wastewater, and chilled water systems.
- Water Reclamation Facility and Conveyance System Hydraulic Capacity Assessment (TO 5): Hydraulic modeling of wastewater collection system/water reclamation facility (WRF) capacity to convey peak flows and meet the intended level of service today and in the future, under various flood conditions.

In addition to the activities above, which were the primary focus of the Flood Risk Assessment, focused condition assessments or project reviews were also performed at various JEA facilities. These assessments also contributed to the broader JEA facility assessment performed under TO 3 and included the tasks at the following facilities:

- TO 10 Cedar Bay Wastewater Treatment Plant (WWTP) electrical
- TO 12 Buckman WRF Outfall
- TO 15 Monterey WRF
- TO 16 Arlington East WRF effluent pump station
- TO 3 Flood exposure reviews and resilience guidance for ongoing capital projects including:
  - Talleyrand Lift Station Rehabilitation
  - 118th Street Lift Station Rehabilitation
  - Wilson Street Lift Station Rehabilitation
  - Buckman WRF Site Expansion

Within this Resiliency Program, each of the above activities were coordinated to identify system weaknesses that could result in service interruptions or system failures. JEA recognized the importance of this comprehensive system assessment approach to ensure continued service reliability and to protect the health and safety of its customers.

ES.3 Purpose

This Resilience Plan serves as an action-oriented guide to position JEA for long-term reliability and resilience for potable water, wastewater, chilled water, and reclaimed water systems through identification of flood risk, development and prioritization of mitigation strategies, and the incorporation of design standards for future capital projects.

The vulnerabilities identified during the system assessments are combined to collectively inform capital investment priorities to maintain safe and reliable services and avoid future system interruptions or sanitary sewer overflows during severe weather, flood events, and other common system hazards. The analysis of flood risk is aimed to evaluate asset level vulnerabilities to multiple flood mechanisms including rainfall, extreme tides, storm surge, and sea level rise. This analysis focuses on current and future risk over the service life of assets.

Through a variety of adaptation strategies, capital projects are recommended to mitigate the identified flood risk using cost-effective strategies focused on the right investment at the right time. The vulnerabilities and mitigation strategies are evaluated at the asset level, which is then summarized at the facility level to guide the prioritization of capital investment through rehabilitation projects. The term “assets” is used to represent individual electrical/mechanical components such as motors, electrical panels, and transformers, as opposed to “facilities,” which represent all JEA infrastructure assets at one location.

Although this plan is focused on enhancing the reliability and resilience of infrastructure equipment, a review of water supply, staffing, vendor reliability, and other aspects of JEA system operations should also be considered to identify any potential threats and ensure operational continuity.

ES.4 Methodology

A total of 1,664 JEA facilities were initially reviewed and screened based on highest vulnerability and criticality. Of the 1,664 JEA facilities, 176 were identified as having high criticality and/or high flood exposure. Flood modeling was conducted under a range of future climate scenarios representing projections of future changes in rainfall and sea level rise to 2040 and 2070 (Section 3). An example of the flood modelling results for downtown Jacksonville is shown on Figure ES-1.

A vulnerability assessment was conducted for these facilities, which included an in-depth analysis of individual assets at each facility that might result in failure of the overall facility’s ability to provide service to JEA customers and protect JEA staff. The vulnerability assessment reviewed each asset’s function, systems, and site characteristics to identify facility vulnerability (Section 5). Facilities were scored based on flood exposure, sensitivity, adaptive capacity, and redundancy, using the equation:

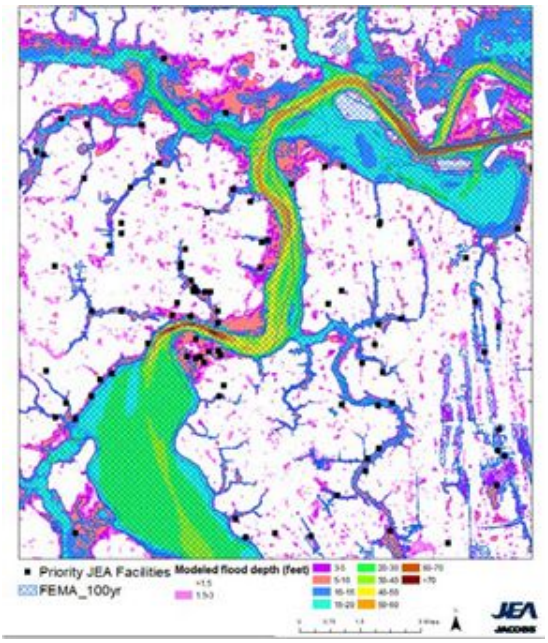


Figure ES-1. Sample Flood Map, 100-year Storm in 2070

$$\frac{\text{Vulnerability = (Exposure + Sensitivity)}}{\text{(Adaptive Capacity + Redundancy)}}$$

Exposure (Flood): *The proximity of a given asset (or facility) to the extents of a flood.*

Sensitivity (Flood): *The degree to which an asset may be impacted/damaged by flooding.*

Adaptive Capacity: *Ability of an asset to accommodate changing conditions.*

Redundancy: *Having a backup system to prevent single point of failure.*

This analysis, along with additional input from JEA, ultimately reduced the previously identified 176 facilities down to 150 priority facilities, which were then included in a risk analysis. The risk analysis was quantified as the product of consequences times the probability of flooding, where the consequences were monetized using both the direct JEA facility impacts based on asset replacement cost and indirect impacts to JEA customers served by each facility (Sections 8.1 and 8.2, respectively). This assessment was used to identify a subset comprised of 40 facilities with the highest risk across all facility types for which site-specific adaptation strategies and cost estimates were developed. This subset of 40 critical and vulnerable facilities served as representative samples of each facility type for use in developing and applying cost curves across all 150 vulnerable JEA facilities (Section 6.2). Table ES-1 provides a summary of the number of JEA facilities evaluated as part of TO 3.

Table ES-1. Number of Facilities Evaluated by Activity

Facility Description	No. of Facilities	Assessment Stage
Total JEA Facilities	**1,664**	Data collection from asset management system
Initial Facility Screening	**176**	Facility screening
Visited Facilities	**205**	Asset-level data collection from fieldwork
Vulnerable Facilities	**150**	Vulnerability assessment
Facilities Selected for Site-Specific Adaptation Strategy Development	**40**	Risk analysis and strategy development

Results of the risk analysis were combined with the vulnerability assessment results to provide a risk and vulnerability profile for each asset or asset group, which was then used to inform mitigation strategies based on immediate opportunities, mid-range actions, and long-term design changes. The number of vulnerable facilities by facility type are shown on Figure ES-2.

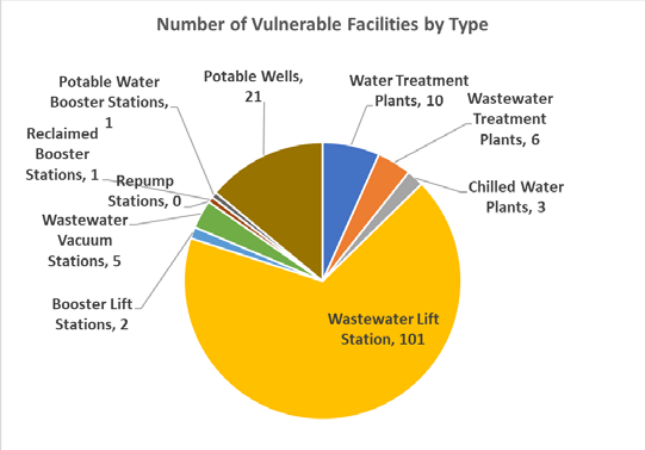


Figure ES-2. Number of Vulnerable Facilities by Type

The Jacobs team then developed applicable strategies that provide varying levels of protection to JEA's assets based on asset criticality and anticipated service life. These strategies were developed using the team's operational knowledge of JEA's water, wastewater, reclaimed water, and chilled water systems and supporting communications, electric supply, and instrumentation and controls (I&C) systems to ensure the strategies are practicable and cost effective to enhance each asset type. The adaptation strategies developed fall into three categories:

1) Elevation
2) Hardening
3) Flood walls/barriers

Example adaptation strategies are illustrated on Figure ES-3.

Cost estimates for each strategy and asset type were then developed. The recommended flood mitigation strategies are categorized as asset-based and facility-based. The hybrid category is comprised of a combination of the elevate and harden categories, using the most cost-effective strategy between them to form a complete solution to protect the vulnerable assets at each facility.

Figure ES-3. Adaptation Strategies

ES.5 Results

The following results provide a clear understanding of facility priorities related to flood risk to inform capital expenditure sequencing and phasing. The ultimate decision on capital project sequencing should also consider available funding, new development capacity needs, health and safety of customers, and other JEA priorities to ensure appropriate alignment with JEA's broader mission while continuing to reduce flood risk and enhance service reliability against the evolving flood threat.

The results of the facility vulnerability and risk analysis allow for facilities to be prioritized based on one of three perspectives:

- Risk (damage avoided)
- Return on investment (ROI) ($ net present valuate of benefits, i.e. risk minus cost, per $ invested in resilience)
- Capital Improvement Plan (CIP) prioritization metric, which includes three different metrics, including risk and ROI

The results based on each of these three perspectives are summarized below.

ES.5.1 Risk-Based Results

The combined risk quantified in dollars includes the monetized risk of both physical damage to JEA assets and business economic losses resulting from a loss of services, which is sometimes referred to as direct and indirect risk. The combined risk was quantified for Flood Scenario 2 (100-year event in 2040), Flood Scenario 4 (100-year event in 2070), and Flood Scenario 7 (500-year event in 2070). Figure ES-4 shows each of the 150 facilities in declining order of the monetized risk, based on the physical damage (direct) risk to JEA assets avoided at those facilities and indirect business impacts avoided if Scenario 4 level of flood control is provided (100-year storm flood depth projected in 2070).

In addition, as depicted on Figure ES-4, each JEA facility was assigned a "level of service risk score" from 5 to 1 based on the range in which the monetized risk avoided fell (combined physical damage and indirect business losses), as follows:

- 5 = High Risk: greater than $1 million damage and business loss avoided
- 4 = Intermediate-High Risk: $500,000 to $1 million damage and business loss avoided
- 3 = Intermediate Risk: $250,000 to $500,000 damage and business loss avoided
- 2 = Intermediate-Low Risk: $100,000 to $250,000 damage and business loss avoided
- 1 = Low Risk: $0 to $100,000 damage and business loss avoided
- 0 = No damage and business losses

Figure ES-4 shows the monetized risk avoided for each facility in declining order (blue dots on left axis) and their corresponding score (stair step values from 5 to 0 on right axis), based on the combined risk of physical damage and business losses for Flood Scenario 4. Table ES-2 summarizes the facilities with the highest monetized risk avoided (combined direct damages and business losses avoided) for Flood Scenario 4, including all facilities with a score of 5 or 4.

The risk scores for all vulnerable facilities are shown in the map on Figure ES-5. The percentage breakdown of monetized risk avoided by facility type is shown on Figure ES-6. Section 6 provides a full list of facility risk ranking.

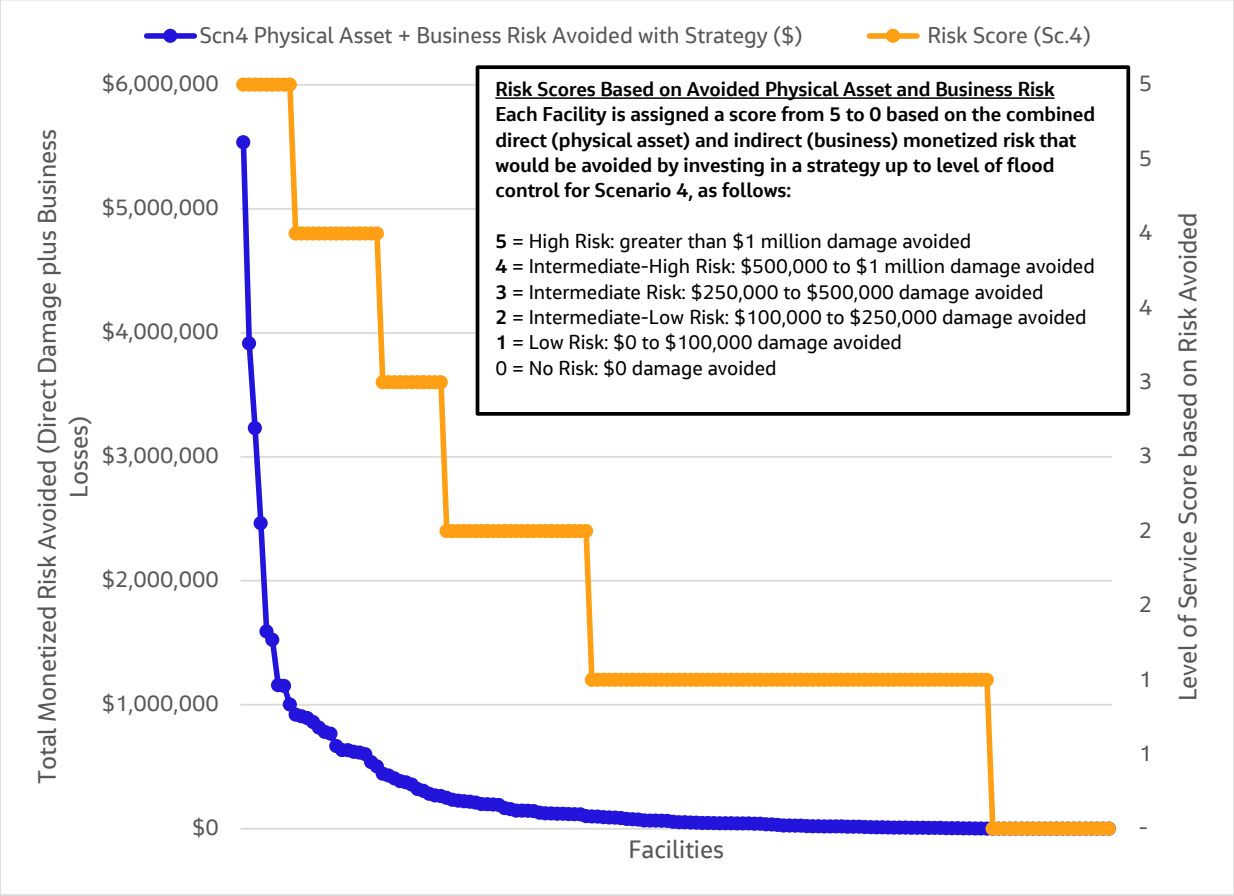


Figure ES-4. Cumulative Risk Scores Based on Avoided Direct and Secondary Impacts and Risk Score used in CIP Prioritization based on Flood Scenario 4 (100-year event in 2070).

Table ES-2. JEA Facilities with Highest Benefit for Scenario 4: Monetized Risks Avoided of Physical Damage plus Business Losses

Facility Name*	Facility Type**	Monetized Risks Avoided for Scenario 4 (Physical Damage plus Business Losses)**	Risk Score for Scenario 4*
2045 UTAH AV	Lift Station	$5,535,284	5
MAIN ST WTP	WTP	$3,913,204	5
1202 BUNKER HILL BV	Vacuum Station	$3,230,755	5
HENDRICKS WTP	WTP	$2,463,923	5
1636 TALLEYRAND AV	Lift Station	$1,590,552	5
7200 AC SKINNER PY	Lift Station	$1,523,045	5
1023 LAURA ST N	Lift Station	$1,157,178	5
PONCE DE LEON WWTP	WWTP	$1,151,313	5
MONTEREY (All)	WWTP	$1,001,315	5
SOUTHWEST (All)	WWTP	$919,151	4
MAYPORT WTP	WTP	$905,884	4
210 HOLLYBROOK AV	Lift Station	$891,832	4
BUCKMAN (All)	WWTP	$859,308	4
130 METZ ST	Vacuum Station	$814,795	4
5301 EVERGREEN AV	Lift Station	$780,483	4
7834 HOLIDAY RD S	Lift Station	$765,625	4
JULINGTON CREEK PLANTATION	WWTP	$666,190	4
MAIN STREET WELL 10	Well	$633,488	4
ST JOHNS FOREST WTP 1	WTP	$632,784	4
544 BOWLAN ST	Lift Station	$619,165	4
2732 SCOTT MILL LA	Vacuum Station	$612,903	4
8617 WESTERN WY	Booster Lift Station	$599,732	4
MAIN STREET WELL 1	Well	$536,674	4
11305 HARTS RD	Lift Station	$501,602	4

* Only facilities with risk score of 5 or 4 are listed, that is facilities with combined risk greater than $1M and greater than $500,000, respectively, for Flood Scenario 4 (100-year event in 2070).

** Monetized risk avoided of business losses for WWTPs and CWPs was not calculated, per JEA direction; values in this table for WWTPs represent only direct physical damage.

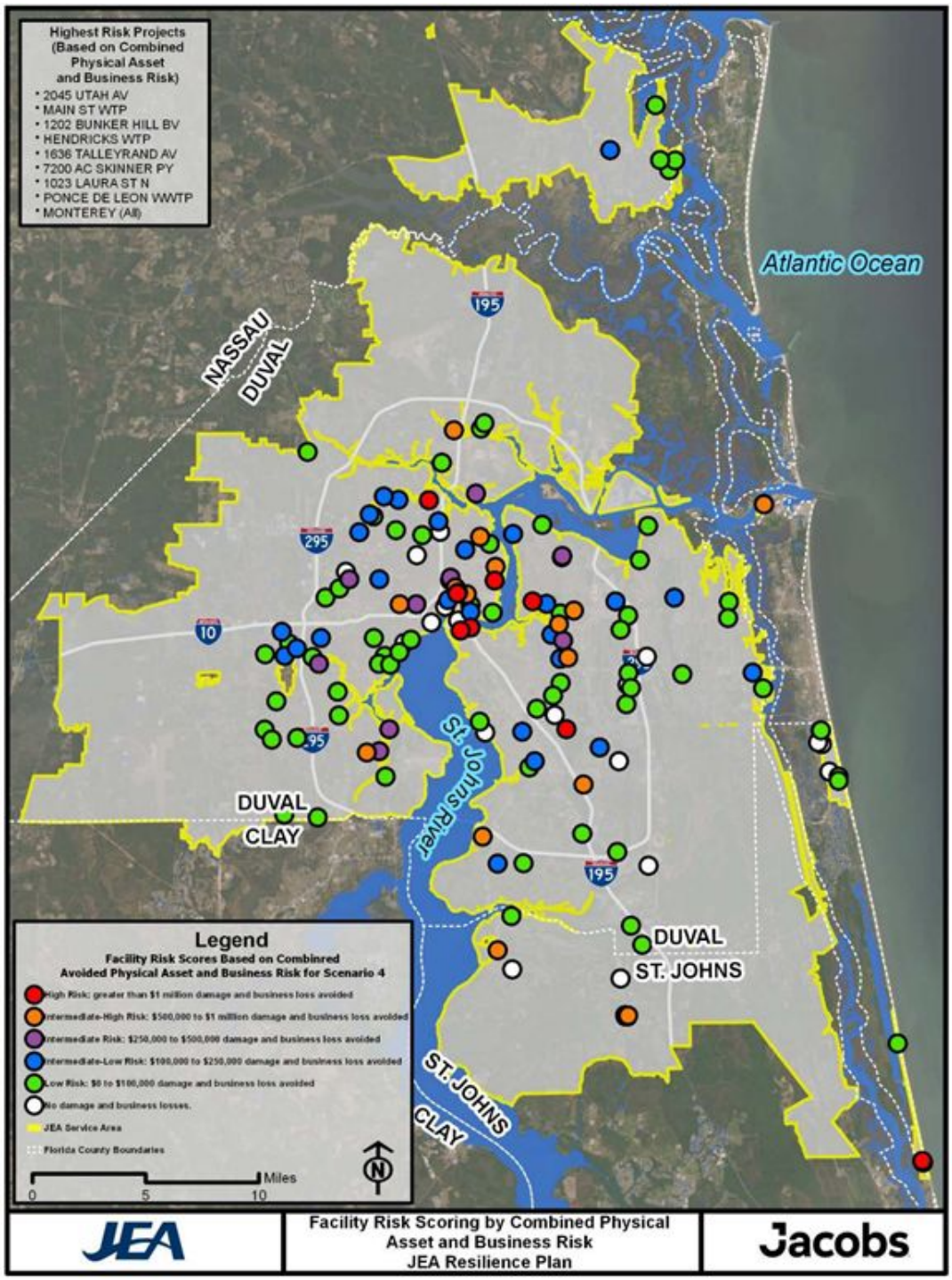


Figure ES-5. Map of Facility Ranking Based on Combined Risk (Physical Asset + Business Impacts) for Flood Scenario 4 (100-year storm in 2070).

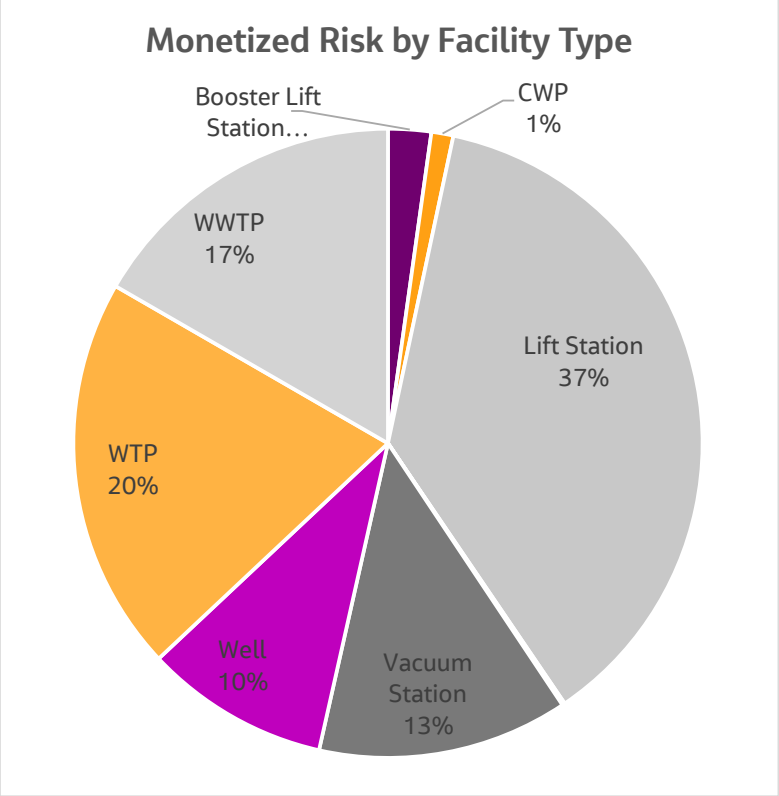


Figure ES-6. Monetized Risk Summarized by Facility Type

ES.5.2 ROI-Based Results

The ROI is used to measure the cost-effectiveness of capital investment in specific facilities to reduce flood risk and is defined as the Net Present Value (NPV) of benefits per dollar invested, that is the net combined benefits minus resilience strategy costs, divided by the strategy costs. Similar to risk ranking, the facilities were categorized into five groups with scores from 5 down to 1 based on their ROI ratio as shown on Figure 8-7 in Section 8. The five groups are based on following categories:

- **5 = Top 10% of facilities with ROI>0**, which equates to ROI greater than $18 NPV per $ of strategy cost for Scenario 4
- **4 = Facilities between top 10% and 25% with ROI>0**, which equates to ROI between from $18 and $7.5 NPV per $ of strategy cost for Scenario 4
- **3 = Facilities between top 25% and 50% with ROI>0**, which equates to ROI between from $7.5 and $3.1 NPV per $ of strategy cost for Scenario 4
- **1 = Facilities between top 50% and 100% with ROI>0**, which equates to ROI between from $3.1 and $0 NPV per $ of strategy cost for Scenario 4
- **0 = Facilities with ROI less than $0** NPV per $ strategy cost for Scenario 4

These five groups are shown in the map on Figure ES-7. Table ES-3 summarizes the facilities with the ROI for Flood Scenario 4, including all facilities with an ROI score of 5 or 4.

Table ES-3. JEA Facilities with Highest ROI for Scenario 4, Based on Risks Avoided of Physical Damage plus Business Losses

Facility *	Facility Type	Return on Investment SCN4 Hybrid ($)	ROI (Cost Effectiveness) Score SCN4 *
2045 UTAH AV	Lift Station	100.68	5
Arlington Well 5	Well	11.37	5
MAIN STREET WELL 1	Well	82.26	5
RIDENOUR WELL 7	Well	56.55	5
1636 TALLEYRAND AV	Lift Station	52.57	5
SOUTHWEST WWTP	WWTP	35.70	5
Brierwood Well 5	Well	35.03	5
3300 SAN PABLO RD S	Lift Station	28.90	5
1706 BOULEVARD AV	Lift Station	26.57	5
1023 LAURA ST N	Lift Station	26.07	5
1202 BUNKER HILL BV	Vacuum Station	23.89	5
210 HOLLYBROOK AV	Lift Station	23.03	5
7834 HOLIDAY RD S	Lift Station	18.58	5
MAIN STREET WELL 3	Well	17.16	4
6927 HANSON DR S	Lift Station	15.57	4
4140 KINGSBURY ST	Lift Station	13.79	4
ST JOHNS FOREST WTP 1	WTP	13.21	4
MAYPORT WTP	WTP	13.13	4
MAIN STREET WELL 10	Well	12.03	4
5301 EVERGREEN AV	Lift Station	10.97	4
ST. JOHNS FOREST WELL 3	Well	10.93	4
MAIN ST WTP	WTP	10.66	4
2251 MCCOY CREEK BV	Lift Station	10.42	4
8617 WESTERN WY	Booster Lift Station	10.12	4
130 METZ ST	Vacuum Station	8.83	4
HENDRICKS WTP	WTP	8.53	4
2732 SCOTT MILL LA	Vacuum Station	8.53	4
PONCE DE LEON WWTP	WWTP	8.07	4
DEERWOOD 3 WTP	WTP	7.89	4

* Only facilities with an ROI score of 5 or 4 are listed; that is, facilities in the top 25% of ROI for Flood Scenario 4 (100-year event in 2070).

Table ES-4 depicts the facilities with a high ROI ranking for each flood scenario evaluated as part of the economic assessment, which shows that providing higher levels of flood control does not necessarily translate into higher ROI.

Figure ES-8 illustrates the ROI for Scenario 4 for the top-ranked facilities compared to strategy costs, when business loss NPV is also considered. The full list of facilities and ROI rankings can be found in Section 8 and in Appendix G.

Table ES-4. Top 20 Facilities in Rank Order by ROI and by Flood Scenario

Scenario 2 ROI Ranking	Scenario 4 ROI Ranking	Scenario 7 ROI Ranking
ARLINGTON WELL 5	2045 UTAH AV	ARLINGTON WELL 5
MAIN STREET WELL 1	ARLINGTON WELL 5	2045 UTAH AV
2045 UTAH AV	MAIN STREET WELL 1	RIDENOUR WELL 7
RIDENOUR WELL 7	RIDENOUR WELL 7	MAIN STREET WELL 1
1636 TALLEYRAND AV	1636 TALLEYRAND AV	MAIN STREET WELL 12
BRIERWOOD WELL 5	SOUTHWEST WWTP	6630 BROADWAY AV
SOUTHWEST WWTP	BRIERWOOD WELL 5	1636 TALLEYRAND AV
1706 BOULEVARD AV	3300 SAN PABLO RD S	BRIERWOOD WELL 5
1202 BUNKER HILL BV	1706 BOULEVARD AV	1023 LAURA ST N
1023 LAURA ST N	1023 LAURA ST N	210 HOLLYBROOK AV
MAIN STREET WELL 3	1202 BUNKER HILL BV	7834 HOLIDAY RD S
210 HOLLYBROOK AV	210 HOLLYBROOK AV	GREENLAND WELL 2
MAYPORT WTP	7834 HOLIDAY RD S	1202 BUNKER HILL BV
6927 HANSON DR S	MAIN STREET WELLFIELDWELL 3	MAIN STREET WELL 3
4140 KINGSBURY ST	6927 HANSON DR S	6927 HANSON DR S
ST JOHNS FOREST WTP 1	4140 KINGSBURY ST	834 BAY ST E
PONCE DE LEON WWTP	ST JOHNS FOREST WTP 1	1706 BOULEVARD AV
7834 HOLIDAY RD S	MAYPORT WTP	3300 SAN PABLO RD S
MAIN STREET WELL 10	MAIN STREET WELLFIELDWELL 10	ST JOHNS FOREST WTP 1
ST. JOHNS FOREST WELL 3	5301 EVERGREEN AV	ST. JOHNS FOREST WELL 3

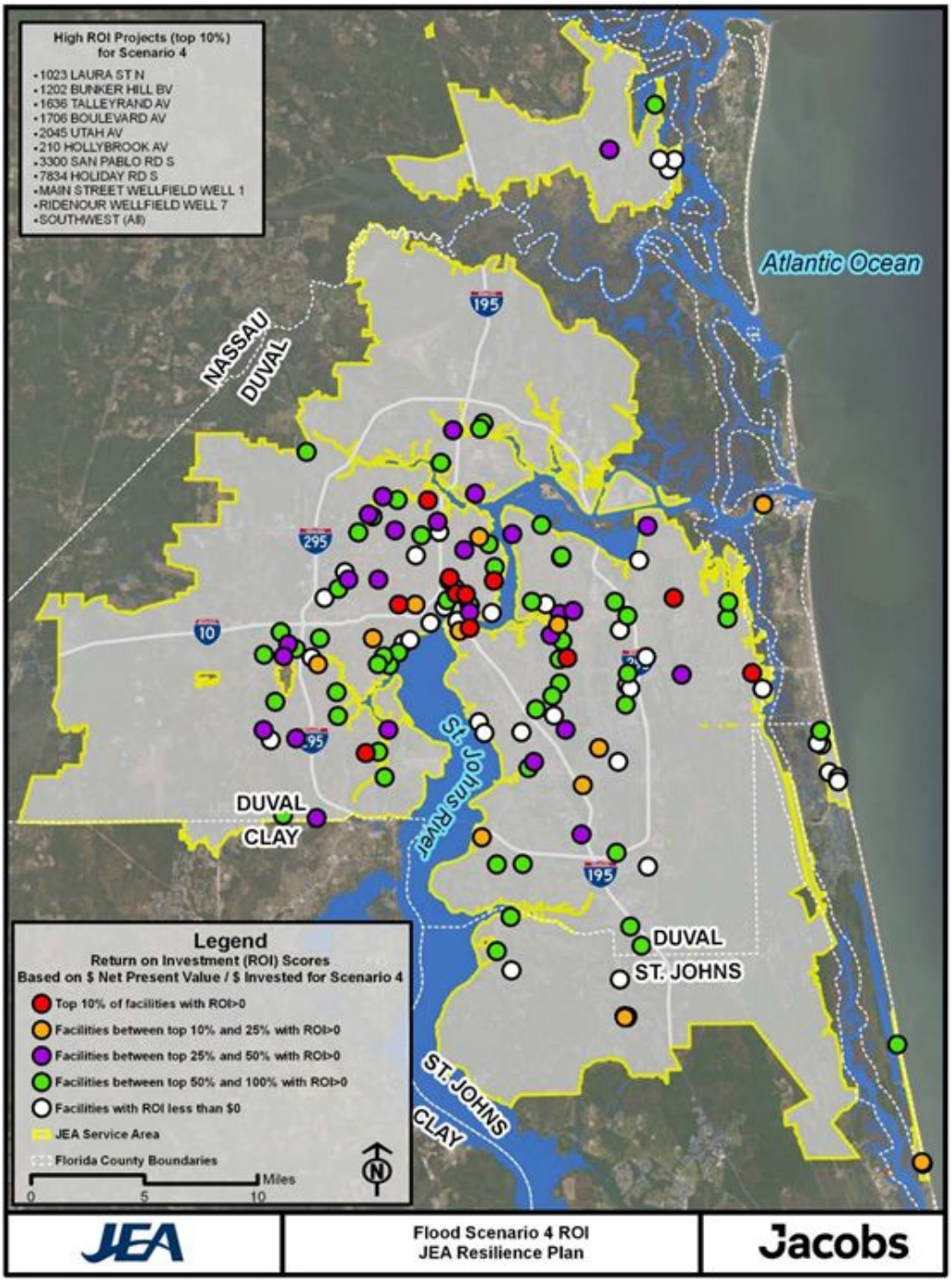


Figure ES-7. Map of Facility Ranking Based on Return on Investment for Scenario 4 (100-year storm in 2070).

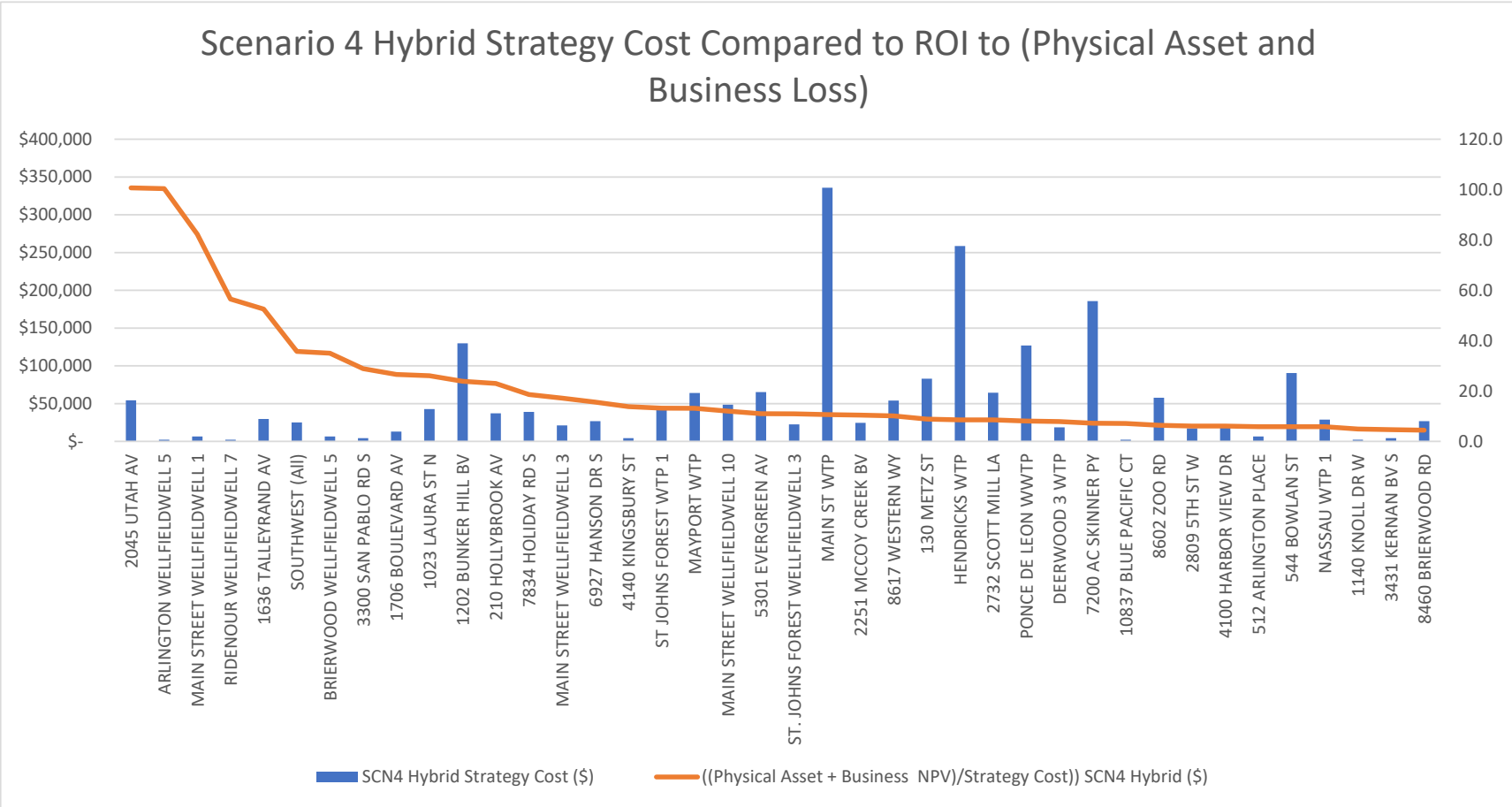


Figure ES-8. Scenario 4 Hybrid Strategy Cost and ROI (Physical Assets and Business Losses) by Facility

ES.5.3 Capital Improvement Project Prioritization

The capital improvement projects resulting from TOs 3, 4, 5, 10, 12, 15, and 16 were combined to address the broader system vulnerabilities and needs to enhance reliability. These projects encompass the bulk of the facility assessments conducted as part of the JEA Resiliency Program, including flood risk, electrical, I&C, hydraulic capacity of wastewater collection system, and conditions assessments of specific critical facilities. More information on the full list of projects, including prioritization scores, can be found in Section 10 of this plan.

A numerical score was assigned to each project, by facility, based on the following approved JEA prioritization criteria and corresponding evaluation methodology:

- Capacity/System Growth
- Level of Service Improvement
- Redundancy/Operational Flexibility
- Environmental Impact
- Cost Effectiveness

The facilities were then grouped into high, medium-high, medium, medium-low and low ranking based on their numerical score. The project ranking, by facility, resulted in the following facilities with the highest ranking, in order of priority, as shown in Table ES-5. Figure ES-9 tallies how many facilities are in each ranking category by facility type. Figure ES-10 is a map of all facilities that received CIP ranking, including those identified during TO 3, TO 4, TO 5, or other JEA Resiliency Program TOs.

Table ES-5. Facility Capital Improvement Project Prioritization

Ranking	Facility Name	Priority
1	Arlington East WRF	High
2	Buckman WRF	High
3	210 Hollybrook Avenue	High
4	Monterey WRF	Medium-High
5	Southwest WRF	Medium-High
6	2045 Utah Avenue	Medium-High
7	Buckman WRF Outfall	Medium-High
8	River Oaks Potable Repump Station	Medium-High
9	Main Street WTP	Medium-High
10	Hendricks WTP	Medium-High
11	1023 Laura Street North	Medium-High
12	12733 Abess Boulevard	Medium-High
13	9898 Gate Parkway N	Medium-High
14	Mayport WTP	Medium
15	Arlington Potable Booster Pump Station	Medium
16	8617 Western Way	Medium
17	7834 Holiday Road South	Medium-High
18	Ponce de Leon WWTP	Medium
19	St. John's Forest WTP 1	Medium
20	7200 AC Skinner PY	Medium

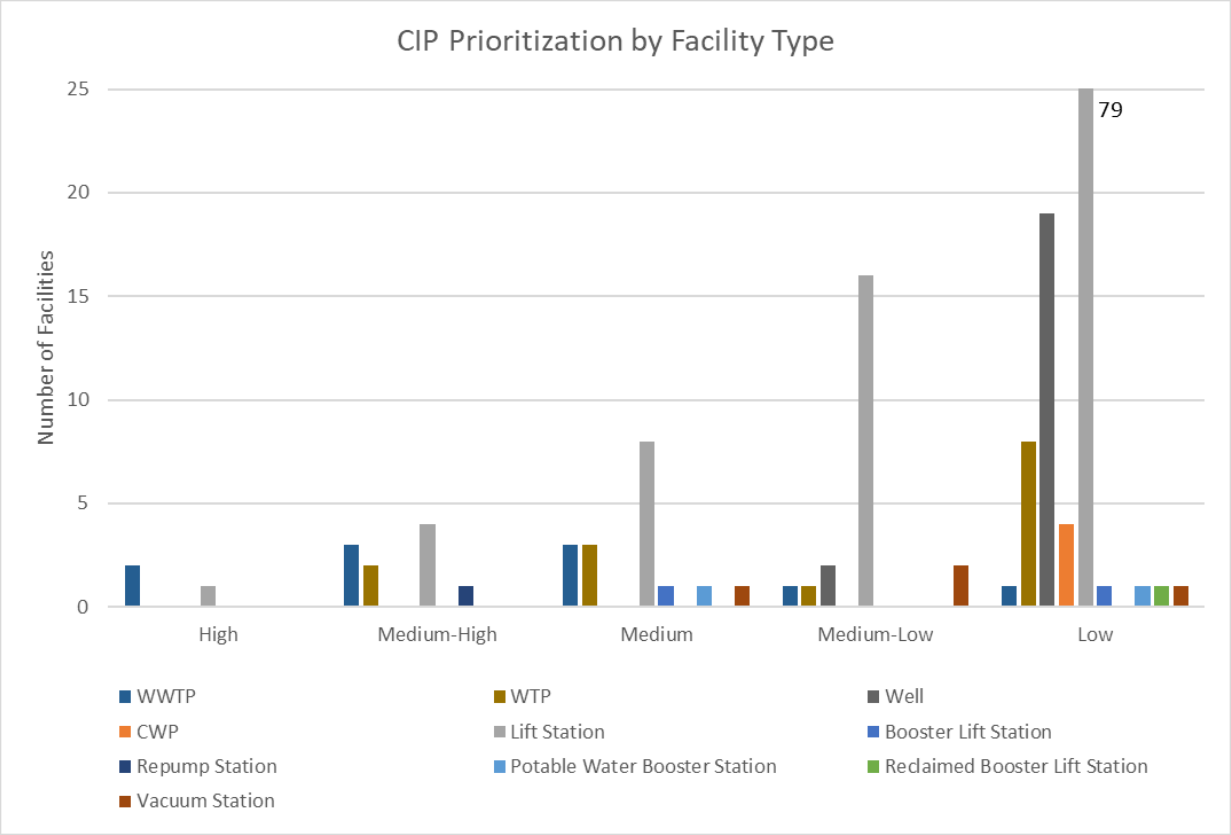


Figure ES-9. Chart of CIP Scores and Ranking (H, M, L) for all 170 projects, including projects indentified in all Resliency TOs

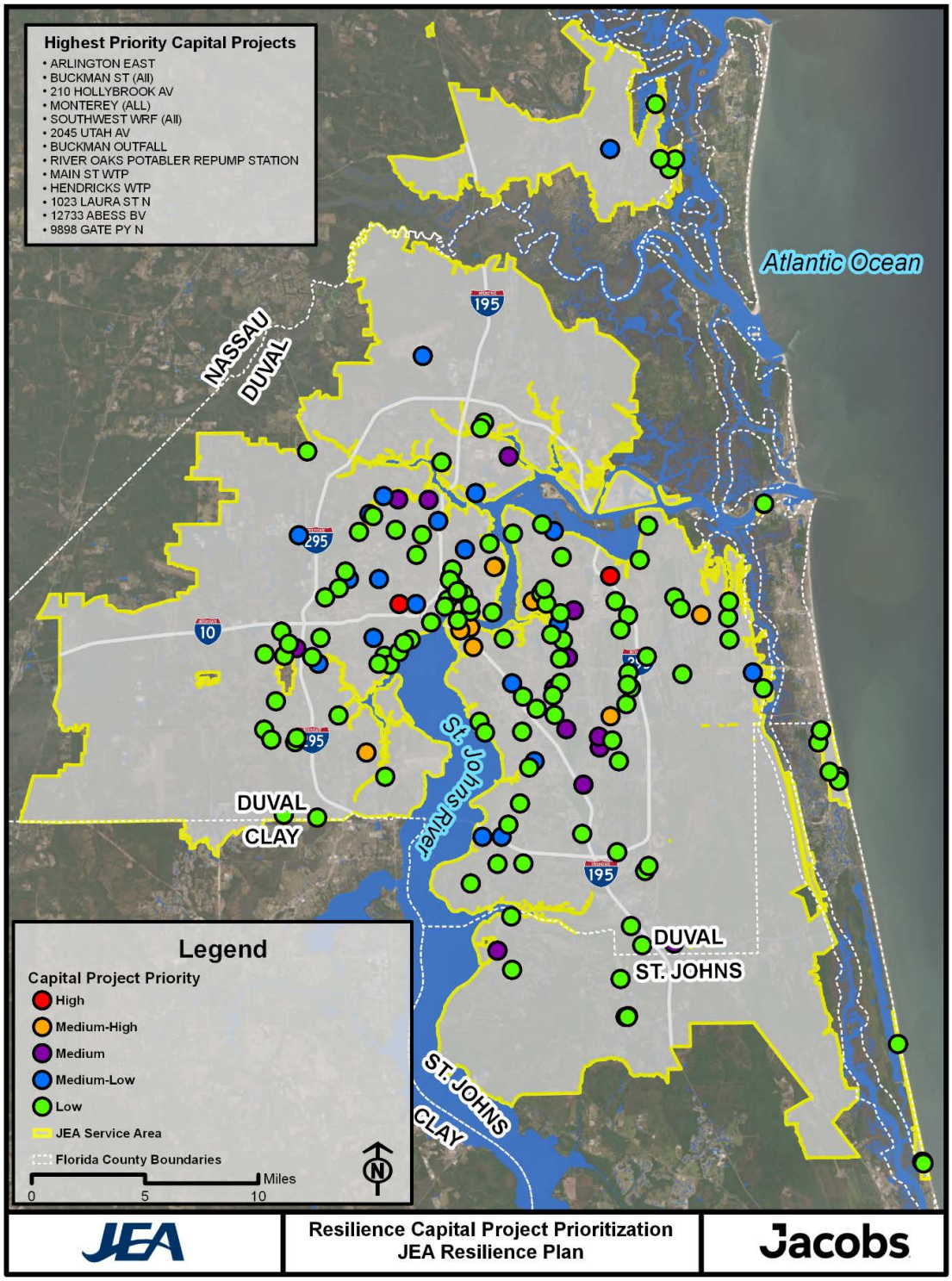


Figure ES-10. Map of Overall CIP Prioritization Results

ES.6 Recommendations and Next Steps

The following actions are recommended for implementation to reduce flood risk, improve system reliability, and enhance resilience of JEA's systems. These recommendations include both physical improvements to facilities and recommendations to standards to ensure all future capital projects are designed and constructed to meet the same level of service.

ES.6.1 Design Standards and Guidelines

Concurrent with the asset vulnerability and risk assessment and mitigation strategy development, JEA's design standards and design details were reviewed to identify opportunities for enhancement to system reliability, severe weather risk reduction, and future-looking design approaches. Recommendations were made to the existing standards, including non-corrosive material selection, electric power and communications redundancy, general equipment hardening, and the application of freeboard, in addition to adopting some standards as JEA-wide policy rather than including duplicate standards in multiple documents (Section 9).

In addition, a new Flood Risk Reduction Implementation Guide was developed for consistent application across all of JEA's projects. This single source of all information related to flood risk mitigation can be referenced across JEA's other design documents.

The planning process produced several recommendations, including new flood mitigation guidance to enhance JEA's existing design standards for adoption by JEA and for application on new project designs, including for ongoing CIP and operations and maintenance projects.

ES.6.2 Prioritized Capital Improvements for Flood Risk Mitigation

Additionally, this plan identifies capital project phasing focused on avoiding sanitary sewer overflows (SSOs) and service disruptions, with the following project phasing based on the prioritized CIP list presented in Section 10, and summarized as:

- Immediate projects (eight ongoing projects, estimated at $500,000 to $700,000)
  - Defined as improvements to ongoing or planned projects.
- Near-term (16 projects/facilities, estimated at $1.5 million to $2.5 million)
  - Defined as Projects/Facilities designated as High and Med-High priority per prioritized CIP list.
  - Critical facilities at risk of flooding today (within the current 100-year and 500-year flood zones)
- Mid-term (49 projects/facilities, estimated at $2.0 million to $4.0 million)
  - Defined as Projects/Facilities designated as Medium and Med-Low priority per prioritized CIP list.
- Long term (109 projects/facilities, estimated at $1.5 million to $3.0 million)
  - Defined as Projects/Facilities designated as Low priority per prioritized CIP list.
  - General enhancements to system reliability and redundancy for lower criticality facilities with lower vulnerabilities.

The costs range presented here represents the difference between building to Flood Scenario 2 versus Flood Scenario 7. While these costs do not include equipment replacement or specialty repairs, they summarize the probable construction cost additions to facility rehabilitation projects to incorporate flood risk reduction, hardening, and system redundancy to improve overall reliability and resilience.

ES.6.3 Next Steps

The following actions, some of which may be part of ongoing initiatives at JEA, are recommended:

- Incorporate recommendations to design standards into current and new JEA design standards, details, and guidance documents, including the JEA Project Management Handbook.
- Adopt new standards as a unified policy applicable to all JEA capital projects and related operations.
- Review all ongoing and planned capital projects for opportunities to influence new facility siting and enhance designs to incorporate flood risk reduction.
- Evaluate recommended capital projects against ongoing and planned projects for improved alignment and to shift high-priority projects forward.
- Evaluate recommended capital projects against capital budget to inform project sequencing and timing.
- Evaluate water supply reliability and future resilience against severe weather influence, including drought conditions or water quality impacts (part of ongoing IWRP that was due in fall 2020).
- Provide staff training around new standards, policies, and the operationalization of resilience to promote its integration across all JEA activities.
- Review vendor contracts and supply chain redundancies to ensure backup systems are in place for emergency response.
- Review and update response plan agreements with neighboring utilities with respect to sharing resources and staff, when needed.

Moving forward, stakeholder engagement and staff capacity-building will be critical to the success of this program and approach. Finally, resilience planning is an ongoing process, requiring continuous evaluation and improvements, and should be updated regularly as new weather data and climate projections become available. Jacobs recommends periodic reviews and updates to the data inputs and subsequent realignment of projects as required.

1. Resilience Plan Framework

1.1 Plan Goals and Objectives

The goal of this Resilience Plan is to provide a comprehensive flood vulnerability and risk assessment of JEA facilities and assets based on severe weather today and future climate projections, including rainfall, sea level rise (SLR) and storm surge, as well as potential costs and suggested measures to reduce risk and enhance system reliability.

This Resilience Plan provides an understanding of current and future severe weather-related flood risks to JEA's water, wastewater, chilled water, and reclaimed water systems, which are expected to be exacerbated by SLR, increased precipitation, and increasing storm severity. This Resilience Plan outlines system vulnerabilities to these threats and presents appropriate mitigation actions to protect existing infrastructure, including mitigation measures to reduce risk today and adaptative strategies to prepare for future uncertainty. This plan will also guide the development of enhanced design criteria and forward-looking standards for current and future projects to prepare JEA today for a more resilient tomorrow.

As a valued asset and vital community partner, JEA strives to maintain its position as an industry leader through its excellent customer service and through the quality and reliability of its water, wastewater, and energy services. This reliability of high-quality services attracts private sector investment in the market, promoting both regional growth and competitiveness for Jacksonville and northeast Florida.

1.2 Plan Participants

During the Resiliency Program, the Jacobs team worked closely with JEA leadership, grid managers, facility managers, department heads and other key staff, with close coordination through over 10 facilitated workshops and over 25 submittals of technical memoranda (TMs), maps, datasets, and other related information to support the continued knowledge sharing and advancing awareness of incorporating resilience into ongoing and planned JEA capital projects. JEA has provided review comments and guidance at each step of the process leading up to this plan and the recommendations presented herein.

During the data collection phase, the emergency response leaders for each of the four counties across the service area. Duval, St. Johns, Clay, and Nassau Counties were contacted to obtain a list of critical facilities in support of the JEA facility prioritization. They each expressed interest to learn of the findings and outcome of this study as they relate to protecting the critical infrastructure of the four counties.

The JEA program leadership has presented information regarding the flood risk modeling results, and plans to mitigate the risk, to the City of Jacksonville Adaptation Action Area Working Group on multiple occasions as a means of sharing knowledge with the region to promote collaboration and advance the region's efforts to build a resilient community.

2. Background and Project Understanding

JEA is the seventh largest community-owned electric utility company in the United States and the largest in Florida. JEA owns and operates over 1,400 wastewater lift stations, 11 water reclamation facilities (WRFs), 134 wells, 37 water treatment plants (WTPs), and four chilled water plants (CWPs), which serve nearly 420,000 customer accounts serving over 1.5 million people across a 900-square-mile service area spanning four counties and six regional service grids (Figure 2-1).

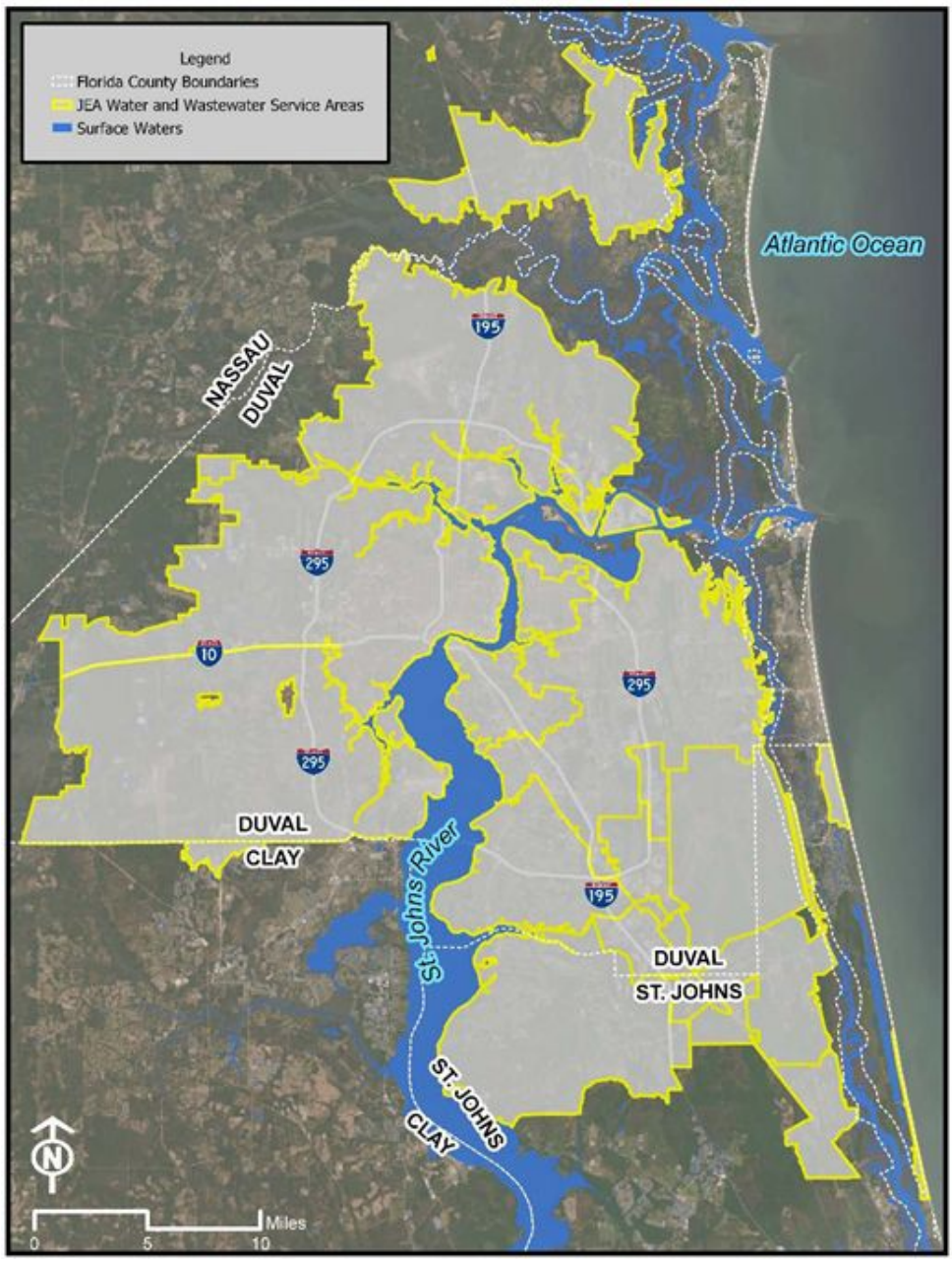


Figure 2-1. JEA Service Area Map Across the Four-County Region

Management of the expansive water, wastewater, chilled water, and reclaimed water system network across a large service area has been an ongoing challenge that approximately 500 operators and maintenance staff. The size of the JEA service area and the coastal nature of these systems coupled with more frequent and severe weather events in recent years, has required an increasing amount of resources to maintain a safe and reliable water system and prevent wastewater collection overflows. The extent and complexity of potential inland and coastal flood exposure across the JEA service area adds to this challenge and is depicted on Figure 2-2.

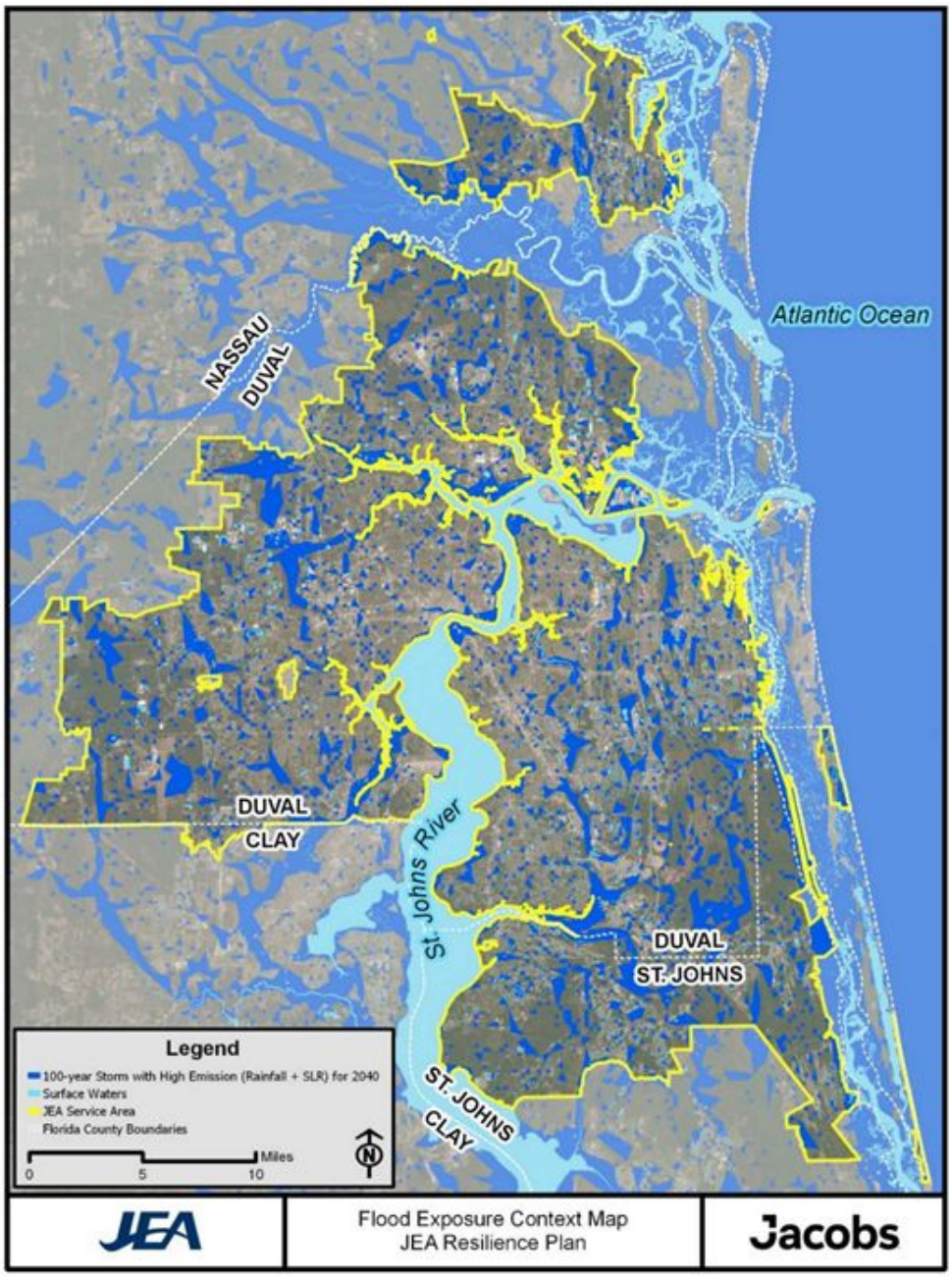


Figure 2-2. Future Potential Flood Exposure Context Map (Scenario 2, 100-year event in 2040) for JEA Service Area

2.1 Historical Severe Weather Events

The Jacksonville area has experienced numerous extreme weather-related events in recent years that have resulted in damage to JEA equipment and/or caused service interruptions or sanitary sewer overflows (SSOs). These events have elevated the need for action, garnering support for significant investment by JEA, including a series of projects to harden equipment and communications and improve system redundancy and reliability. Some of these severe weather events are described in the following sections.

2.1.1 Hurricane Matthew, October 2016

Hurricane Matthew was the first major hurricane to adversely affect Jacksonville in over a century. The hurricane passed Jacksonville approximately 50 miles to the east (offshore) as a Category 3 storm with winds of 60 miles per hour (mph) and isolated rainfall totals exceeding 10 inches in less than 72 hours. The National Hurricane Center (NHC) reported storm surge of 5 to 7 feet above ground level along the coasts of St. Johns and Duval counties (Figure 2-3). The St. Johns River observed water levels of 4 to 6 feet above normal, with flood inundation of 2 to 4 feet above ground level along the river banks.

Overall storm surge and rainfall induced flooding impacted nearly 500 homes and interrupted power for over 250,000 customers and led to power failures at 785 JEA facilities, leading to SSOs at 54 of these facilities.

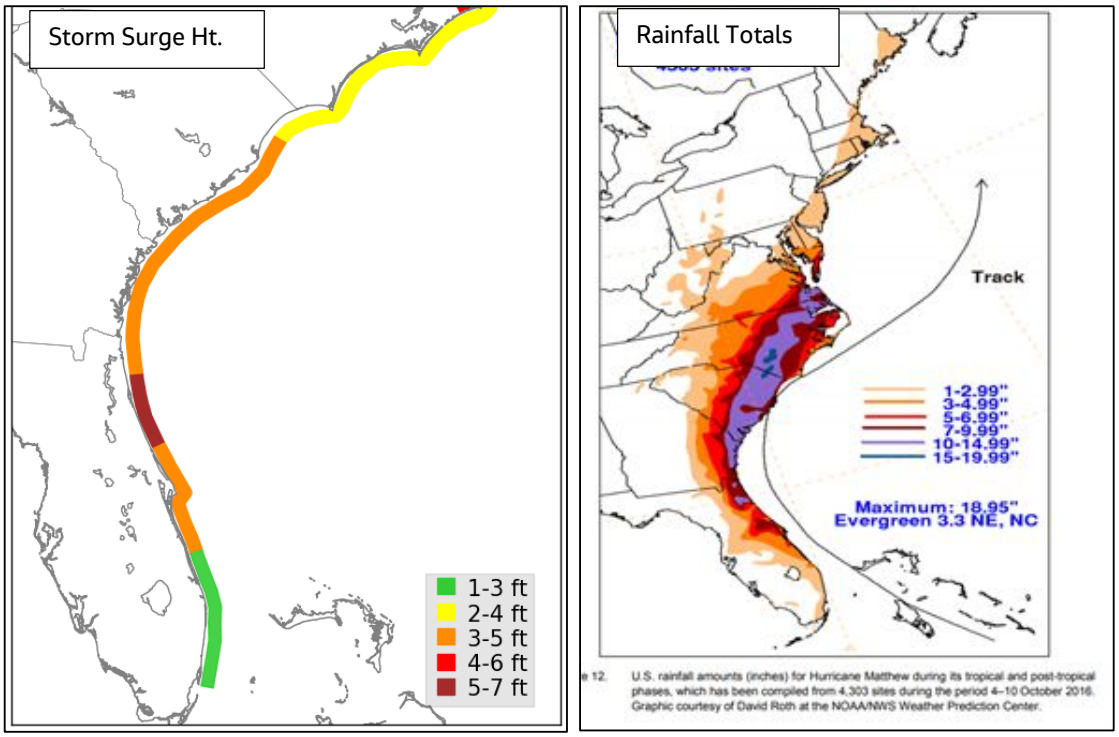


Figure 2-3. Observed Surge and Rainfall Totals from Hurricane Matthew (Source: NHC)

2.1.2 Nor'easter Storm, July 2017

This unusual, off-season cold front brought heavy winds and rain to the Jacksonville area. During the event, the slow-moving weather system dropped over 4 inches of rainfall in less than 1 hour in parts of JEA's service area, resulting in flooding of numerous JEA facilities and disruption of services. While this event was not considered

devastating and did not cause the same level of damage seen during a hurricane, for example, it demonstrated the vulnerability of JEA's system to flooding caused by intense rain events.

2.1.3 Hurricane Irma, September 2017

During the week of September 10, 2017, Hurricane Irma made landfall in southwest Florida as a Category 4 storm with sustained winds over 130 mph. As Hurricane Irma moved north through the interior of western Florida, it continued weakening and was a Category 1 storm as it crossed north Florida and entered Georgia. This weakening reduced the impacts observed in north Florida but still resulted in major impacts to JEA's systems. According to the NHC, Hurricane Irma is responsible for one of the worst flooding events in the City of Jacksonville's more than 225-year history, with hundreds of people needing to be rescued.

The storm created a storm surge along the St. Johns River that peaked at an elevation of approximately 5 feet mean higher high water (MHHW) (6.1 feet North American Vertical Datum of 1988 [NAVD88]), flooding 33 of JEA's facilities and causing power failures at 730 facilities (Figure 2-4). There was a total of 59 SSO incidents, with approximately 2.3 million gallons discharged at about 55 stations due to high-rising floodwater, and lack of backup power. In comparison, post-Matthew saw 10 million gallons of raw and partially treater wastewater discharge into river, streams, and neighborhoods at 70 sites. This nearly 70 percent reduction in discharge is attributed to JEA the doubling of total generators and backup generators. Before Matthew, 23 percent of JEA's stations had backup power; this rose to 35 percent by the time of Irma. The Hendricks wellfield also saw a loss of power, which nearly resulted in a boil-water notice. Unsafe weather conditions and lack of accessibility greatly contributed to the number of overflows due to delayed response times in addition to the direct equipment impacts.

The events resulting from Hurricanes Matthew and Irma led to the State Governor's 90-Day Emergency Rule: *Public Notice of Pollution*. This statute requires an operator of an installation at which a reportable pollution release occurred to provide a report to the Florida Department of Environmental Protection (FDEP) within 24 hours after its discovery.

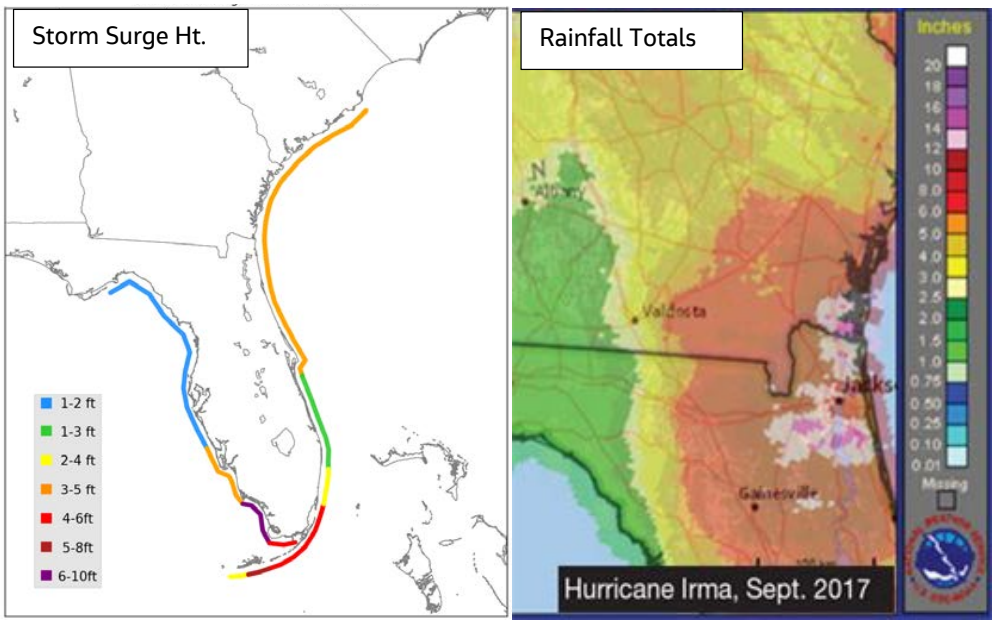


Figure 2-4. Observed Surge and Rainfall Totals from Hurricane Irma (Source: NHC)

2.1.4 Hurricane Dorian, September 2019

Hurricane Dorian was a Category 5 hurricane when it reached Great Abaco and Grand Bahama islands on September 3, 2019, with a forecasted path taking it directly toward Jacksonville, Florida. JEA asked Jacobs to provide estimates of potential flood levels to inform storm preparations. While not being able to know the full extent of possible flooding due to the uncertainty of hurricane track forecasts, Jacobs provided guidance consisting of probable flood impacts from surge and rainfall if the storm followed the forecasted path.

Fortunately, the storm turned north and stayed 90 miles offshore in the Atlantic Ocean and continued weakening to a Category 2 hurricane, sparing Jacksonville from major damage like previous hurricanes. The storm produced tropical storm force winds and isolated areas of 5 inches of rainfall locally (Figure 2-5). Some coastal areas were wave-battered and flooded, but most of Jacksonville only experienced weak winds and short-lived power outages to 32,000 JEA customers that were quickly restored by nightfall.

JEA's water, wastewater, and chilled water systems did not encounter any service interruptions, demonstrating how the system redundancy and hardening activities, in conjunction with JEA's emergency management protocols, were working to maintain safe and reliable service.

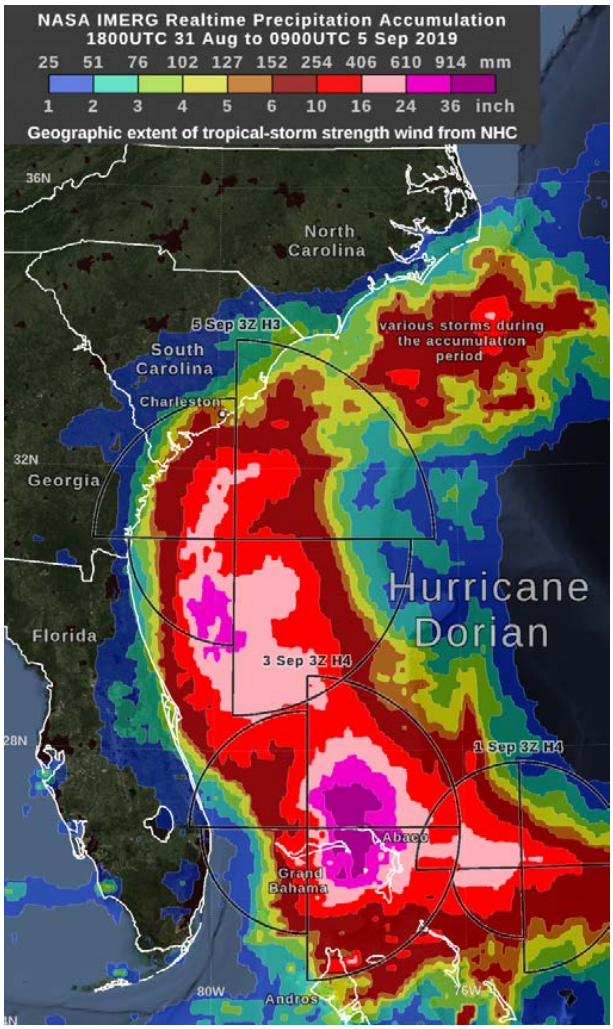


Figure 2-5. Observed Rainfall Totals from 2019 Hurricane Dorian (Source: NASA)

2.2 JEA Directives and Commitments

JEA has continued to be committed to continuing to provide reliable utility services to customers across its service area while protecting public health and the environment. However, storm impacts from the recent storm events brought to light some vulnerabilities of JEA's facilities and systems. These events triggered loss of power, resulting in a temporary reduction of water system pressure, and/or wastewater collection system SSOs. As a result, JEA has committed to investing in developing and implementing a Resilience Plan, including system upgrades, equipment hardening, elevating, and electrical power redundancy to reduce these risks and maintain system reliability. JEA's strives towards its goal of eliminating SSOs for the wastewater system in order to uphold the protection of public health and the environment.

2.3 Previous and Ongoing Resilience Efforts

JEA has undertaken numerous initiatives to avoid adverse impacts to its various utility systems resulting from extreme weather events including upgrades to communications and monitoring systems; application of redundant electrical power systems, including backup generators and pony pumps at nearly 300 lift stations with remote start and automatic transfer switches; and elevating sensitive equipment above flood stages to avoid service interruptions and maintain operation continuity.

JEA strives for zero wastewater overflows by eliminating single points of failure, specifying resilience requirements and developing adaptation strategies for prevention of system interruptions and failures.

JEA has also initiated the creation of the Resilience Plan, led by Jacobs, to perform a comprehensive analysis of flood risk and to develop mitigation measures and adaptation strategies to further enhance JEA system resilience.

To support the implementation of this initiative, JEA has allocated a significant investment in direct resilience-related activities in the five-year capital plan. This plan prioritizes the most at-risk facilities as a crucial way to combat the devasting impacts from severe weather events. With 11 WTPs/WRFs and 1,400 wastewater pumping stations, this plan includes an extensive and in-depth assessment of the height of critical assets in relation to projected flood heights. In determining the benefits of resilience measures and the level of acceptable costs, JEA considered not only the value of wastewater assets but also the population served and critical facilities in the service areas.

3. Climate Projections and Flood Scenarios

An evaluation of flood exposure and risk was performed for JEA's facilities. This exposure review considered multiple flood mechanisms, including tidal flooding, rainfall-induced flooding, and storm surge flooding, and included scenarios featuring future rain events and elevated sea levels. More information on climate projections and flood scenarios can be found in Appendix A, *Activity 3: Sea Level Rise, Precipitation Projections, and Climate Scenarios Technical Memorandum* and in Appendix B, *Activity 3: Activity 3: Flood Modeling Surge and Inland Flood Modeling Technical Memorandum*.

3.1 Climate Projections

Projections of future sea levels and rainfall were developed for inclusion in the flood scenarios based on the most recent peer-reviewed climate science, as further described in the following sections. More information on climate projections can be found in Appendix A.

3.1.1 Projected Sea Levels

Future conditions of relative SLR for the Jacksonville area were based on the published 2017 projections from the National Oceanographic and Atmospheric Administration (NOAA) using the Mayport, Jacksonville tide gauge. These projections consist of seven different climate scenarios, representing various global greenhouse gas emission projections, ranging from low to extreme (Figure 3-1). Three of these climate scenarios were chosen for use in developing the flood scenarios for JEA, including the Intermediate, Intermediate-High, and High SLR curves. They were chosen for their high probability of occurrence, recognizing that the extreme and lower curves contain a higher amount of uncertainty, especially for the longer planning horizons.

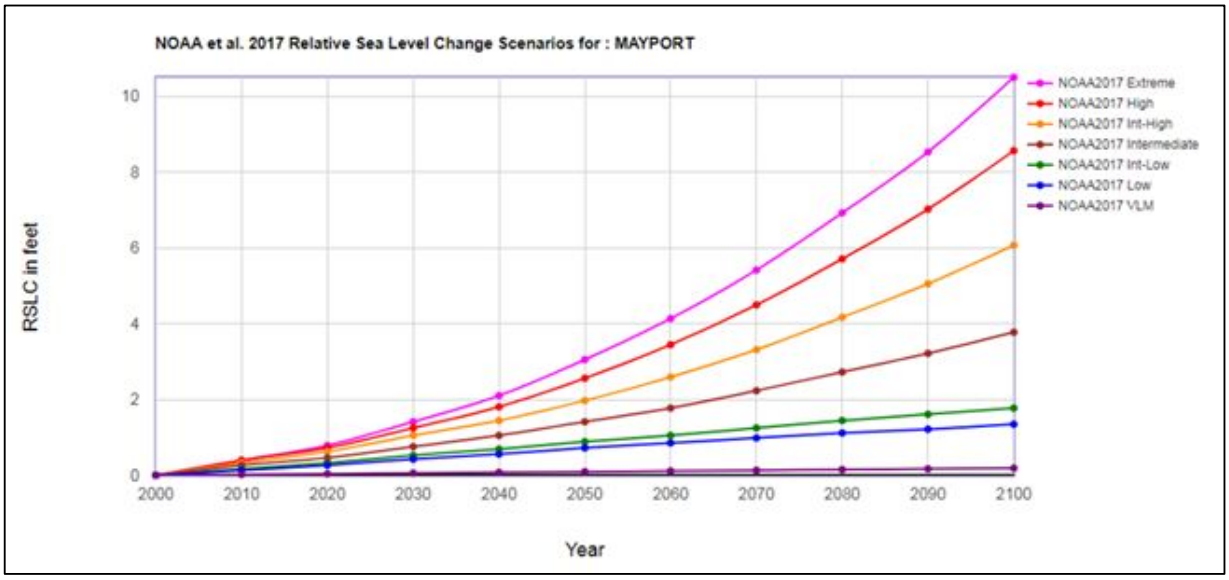


Figure 3-1. Relative Sea Level Rise Projections for Mayport Tide Gauge (NOAA, 2017)

Existing and future mean higher high water (MHHW) elevations from the Mayport, Jacksonville for the 2040, 2070, and 2100 timeframes are listed in Table 3-1. Projected increases in MHHW elevations were included in each climate scenario, which are greatest for the NOAA High climate scenario.

Table 3-1. Existing and Future Mean Higher High-Water Elevations at Mayport, Jacksonville, Florida

Year	Intermediate (feet, NAVD88)	Intermediate-High (feet, NAVD88)	NOAA High (feet, NAVD88)
2000	1.96	1.96	1.96
2040	3.01	3.40	3.76
2070	4.19	5.27	6.45
2100	5.73	8.03	10.52

3.1.2 Projected Rainfall

Projected changes in 24-hour precipitation were derived using results from 30 general circulation models (GCMs) with daily time steps for the years 2040, 2070, and 2100 using medium and high greenhouse gas (GHG) emission scenarios, referred to as representative concentration pathways (RCPs) 6.0 (medium emissions) and 8.5 (high emissions). Projected changes in precipitation depths are shown in Figure 3-2 for the 24-hour duration and multiple return periods.

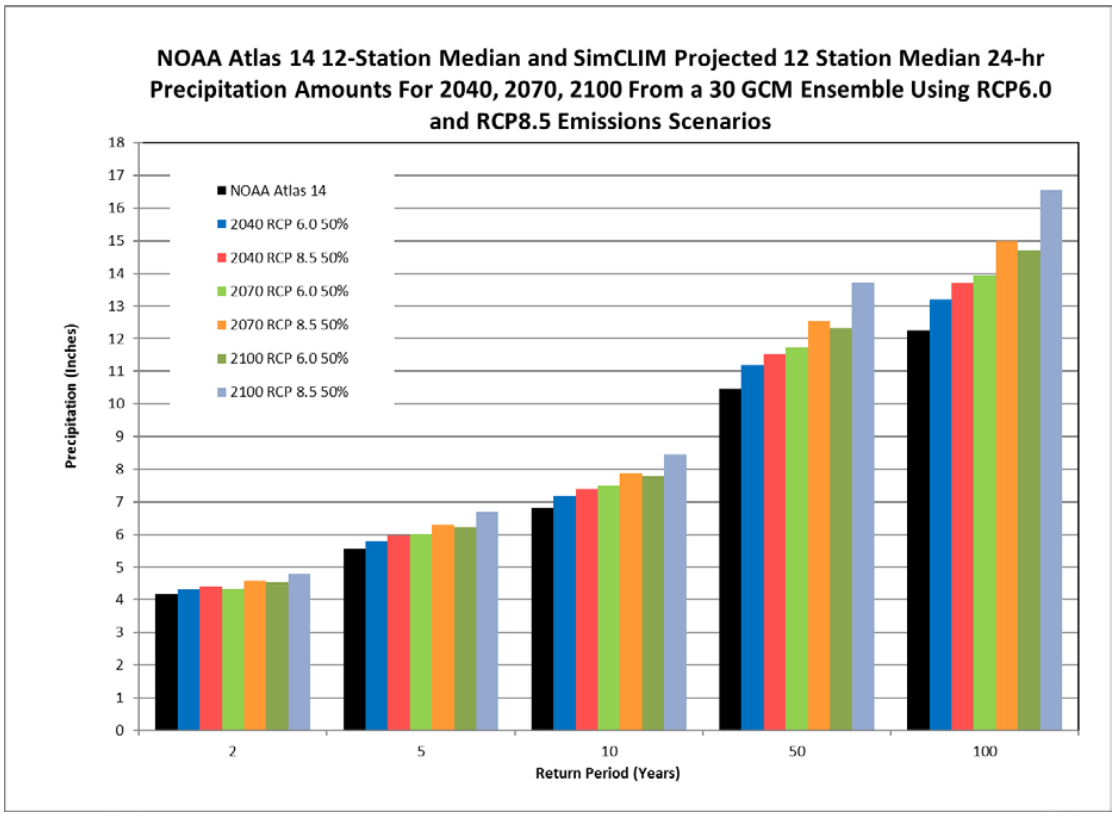


Figure 3-2. Projected 24-hour Rainfall for Select Return Periods, Future Years, and Greenhouse Gas Emissions

3.2 Flood Scenario Development

Previous severe weather impacts have prompted JEA to assess flood risk from both current and future conditions related to climate-induced flood hazards, which include SLR, increased rainfall intensity and frequency, and storm surge. Projections of these future flood hazards helps to ensure the proper level of flood protection across JEA's service area over the service life of assets.

A total of 11 flood scenarios were analyzed: three current conditions and eight projected future climate scenarios. The three current condition scenarios reflect different storm magnitude, as given by the storm probability, 4-, 1-, and 0.2-percent annual probability of occurrence, which correspond to recurrence intervals of 25-year, 100-year, and 500-year, respectively.

To assess future risk to JEA assets, eight climate scenarios were selected with JEA that bracket the range of potential climate projections (RCP6.0 and RCP8.5), storm probability or frequency (25-, 100-, and 500-year storms), and planning horizon. Planning horizon timeframes of 2040, 2070, and 2100 were chosen that best align with expected asset service life. The service life of mechanical and electrical systems is assumed to be 20 years, with structures assumed to have a service life of 50 years. The 2100 planning horizon is meant primarily to provide a bookend for the most critical facilities that are not likely to move in the next 80 years and is also a convenient long-term planning horizon because most climate projection data are available through 2100.

More information on flood scenarios can be found in Appendix A, *Activity 3: Sea Level Rise, Precipitation Projections, and Climate Scenarios Technical Memorandum*.

Figure 3-3 shows the eight future climate scenarios that were used to analyze flood risk and the associated values for each climate variable.

Scenario Description		Scenarios (R/S = Rain/Surge, with SLR; R = Rain only, with SLR)							
		1	2	3	4	5	6	7	8
Rainfall	SLR Projections	Rainfall and/or SLR, with Storm Surge (R/S = Rain/Surge, with SLR; R = Rain only, without storm surge or SLR)							
RCP6.0 50% non-exceedance	NOAA 2017: Intermediate	R/S		R/S		R/S			
RCP8.5 50% non-exceedance	NOAA 2017: High		R/S		R/S		R/S	R/S	R/Astronomical Tide
Target Year									
2040		✓	✓			✓			
2070				✓	✓		✓	✓	✓
Return Period of Surge Event (year)									
25-year (current rain: 8.8")						✓	✓		
100-year (current rain: 12.3")		✓	✓	✓	✓				✓
500-year (current rain: 16.6")								✓	
Scenario Summary									
Rainfall 24-hour Total (inches)		13.21	13.69	13.94	14.99	9.34	10.36	21.54	14.99
MHHW (2000: 1.96 feet NAVD88)		3.01	3.76	4.19	6.45	3.01	6.45	6.45	N/A
SLR (feet)		1.05	1.8	2.23	4.49	1.05	4.49	4.49	4.49

Figure 3-3. Table of Modeled Flood Scenarios

3.3 Flood Modeling

The coastal surge and inland flood modeling analysis has assessed JEA facility flood risk from current and future climate scenarios using a calibrated flow model developed during this study. The model represents the coastal area along the shoreline and the St. Johns River across the four-county JEA service area. The MIKE 21 Flow

Flexible Mesh (FM) module flood modeling software was applied for this analysis because it incorporates the coastal storm surge, sea level rise, and rainfall-driven flood processes to be simulated simultaneously, thus allowing the complex flood processes in the St. Johns River estuary to be evaluated. The model was calibrated based on measured U.S. Geological Survey (USGS) water level data from Hurricane Matthew and validated using data from Hurricane Irma.

The potential flood extents are generated by the change in future rainfall and SLR, which were evaluated using the eight climate scenarios described in the previous section. The resulting flood extents and depths were evaluated at prioritized JEA facilities to support the detailed vulnerability assessment (Figures 3-4 and 3-5). The surge and inland flood model domain incorporates the entire JEA service area, including the adjacent catchment area of the St. Johns River and a portion of the Atlantic Ocean abutting the shoreline. Figures 3-6, 3-7, and 3-8 show examples of the flood extent from the modeled future 100-year and 500-year storm events compared to the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) special hazard flood areas (SHFA) for a portion of the St. Johns River basin centered on the JEA service area and model domain.

More information on flood modeling can be found in Appendix B, *Activity 3: Flood Modeling Surge and Inland Flood Modeling Technical Memorandum*.

To further validate the flood model, a review of the technical paper describing the U.S. Army Corps of Engineers (USACE) St. Johns River Channel Dredging Project was performed to identify possible changes to flood water levels associated with a deeper channel. This review determined that dredging the St. Johns River will not have an appreciable impact on water levels in the river associated with storm surge events. More information on the St. Johns River dredging analysis can be found in the *St. Johns River Dredging Impact Assessment Technical Memorandum* in Appendix B.

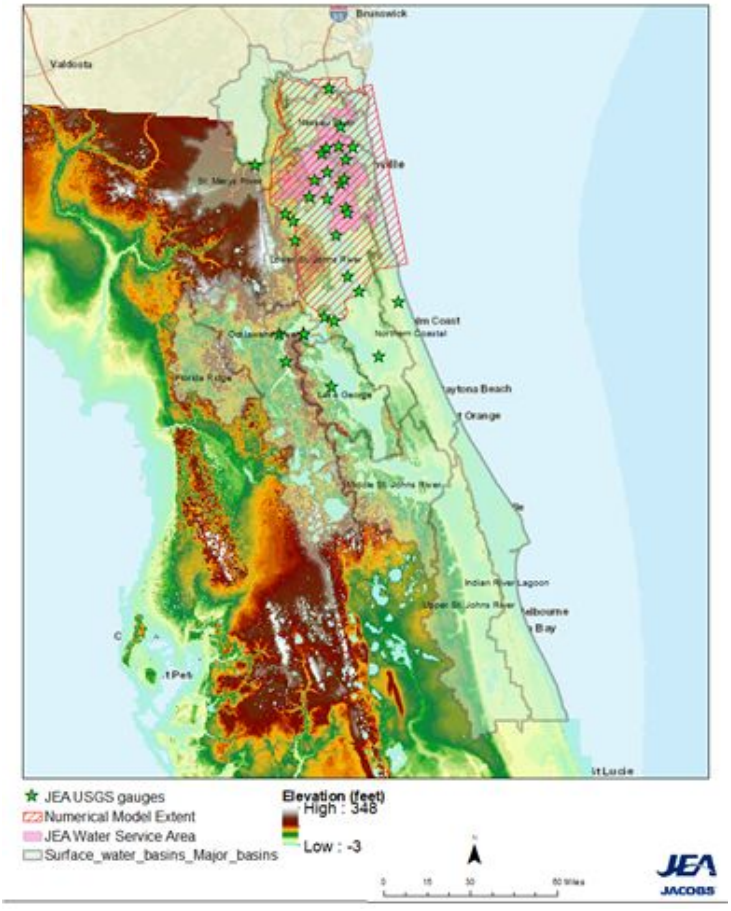


Figure 3-4. Flood Model Grid Extents

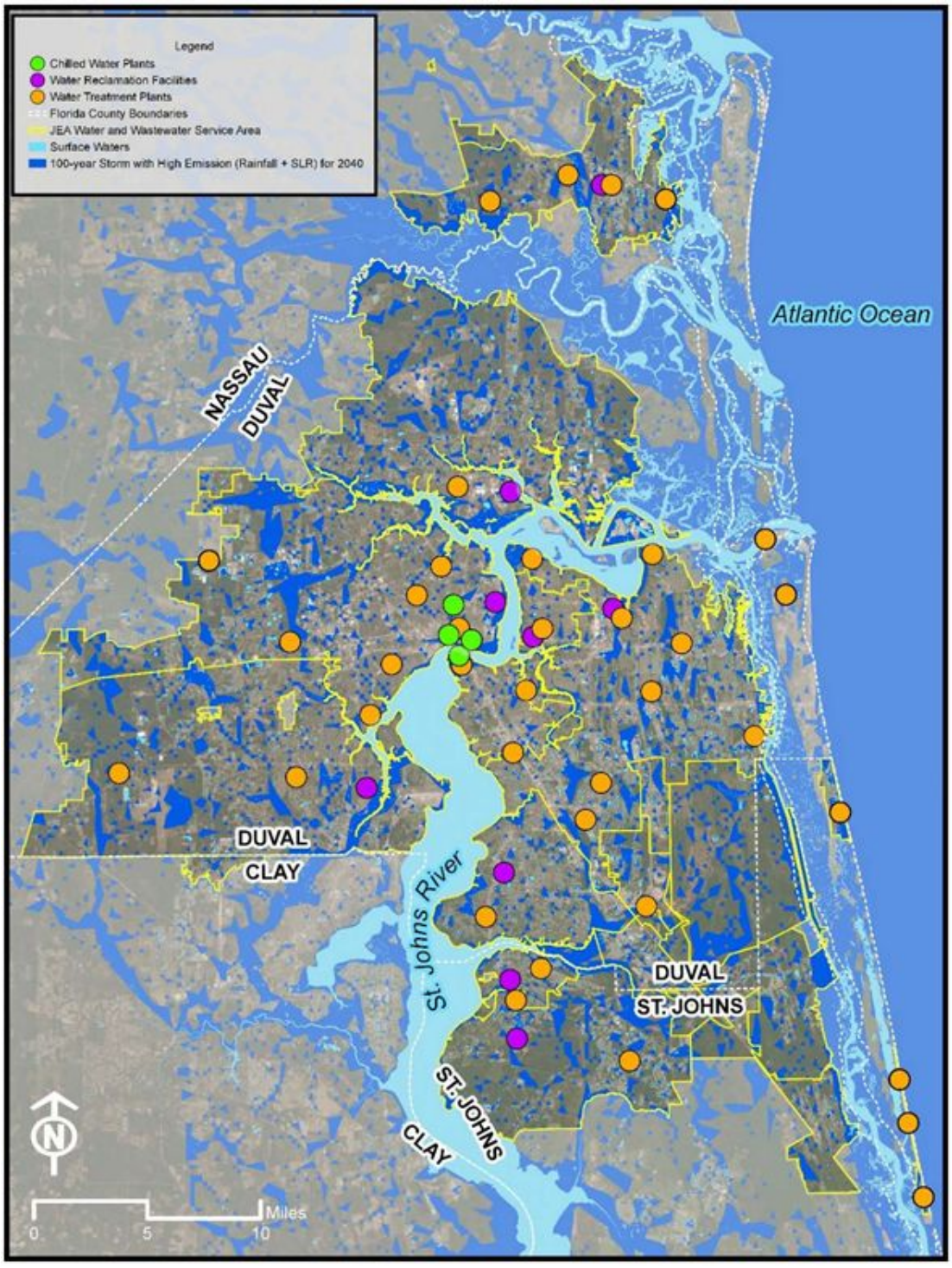


Figure 3-5. JEA Water, Wastewater, and Chilled Water Plants – Map of Flood Extents across JEA Service Area for Flood Scenario 2: 100-year Storm in 2040 with High Projection for Rainfall (RCP8.5) and SLR (NOAA High)

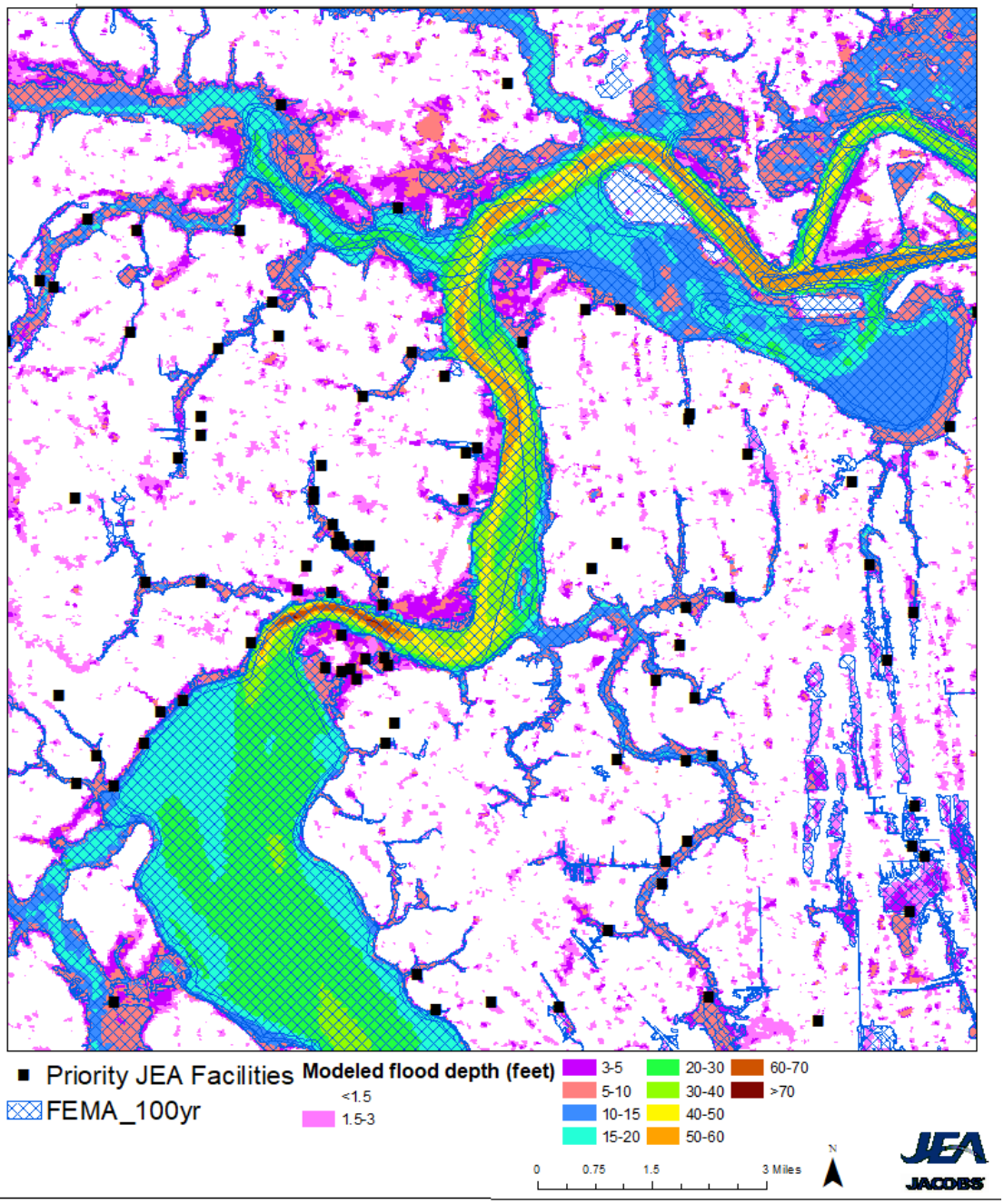


Figure 3-6. Flood Depths and Extents for Flood Scenario 2: 100-year Storm in 2040 with High Projection for Rainfall (RCP8.5) and SLR (NOAA High)

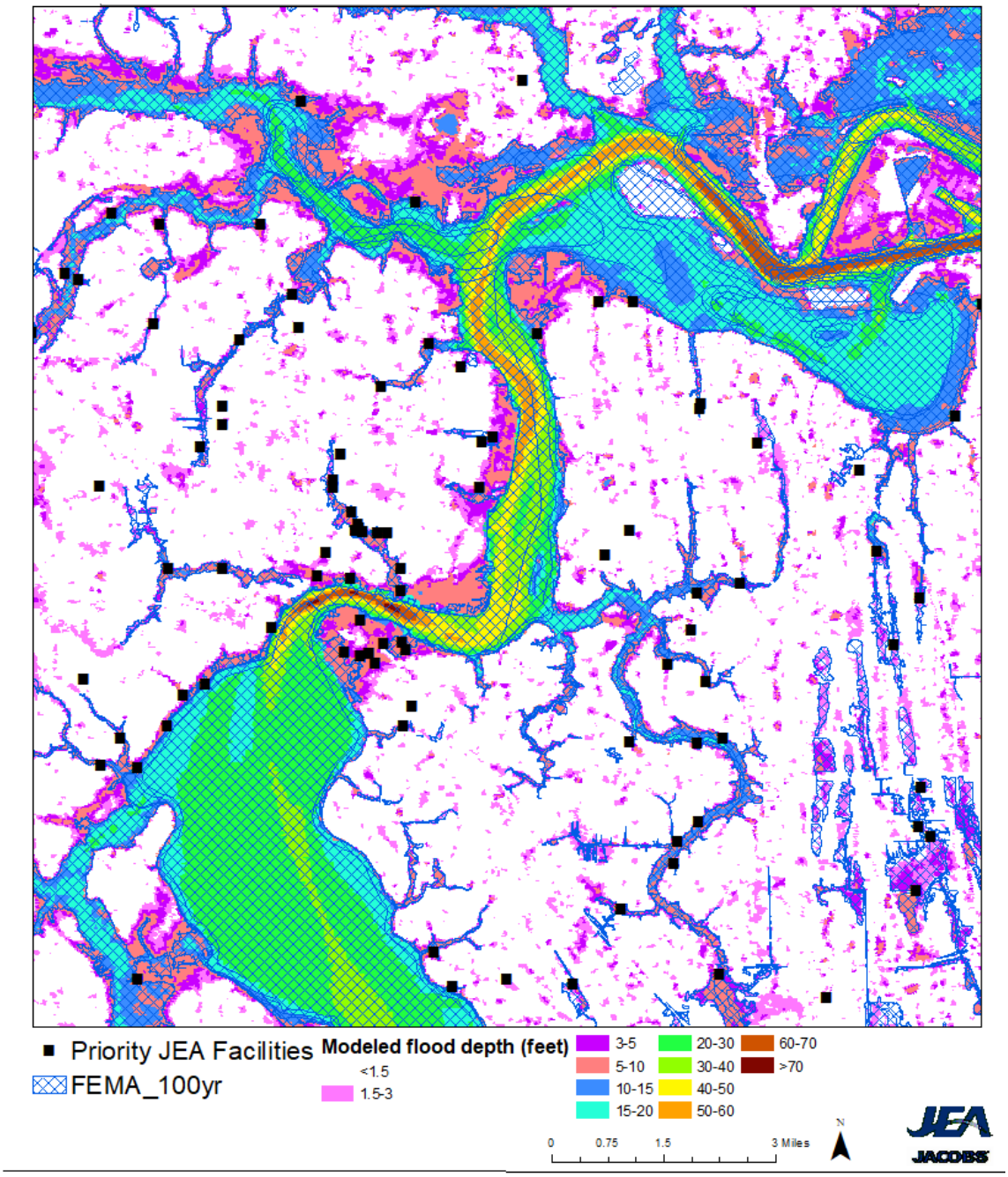


Figure 3-7. Flood Depths and Extents for Flood Scenario 4: 100-year Storm in 2070 with High Projection for Rainfall (RCP8.5) and SLR (NOAA High)

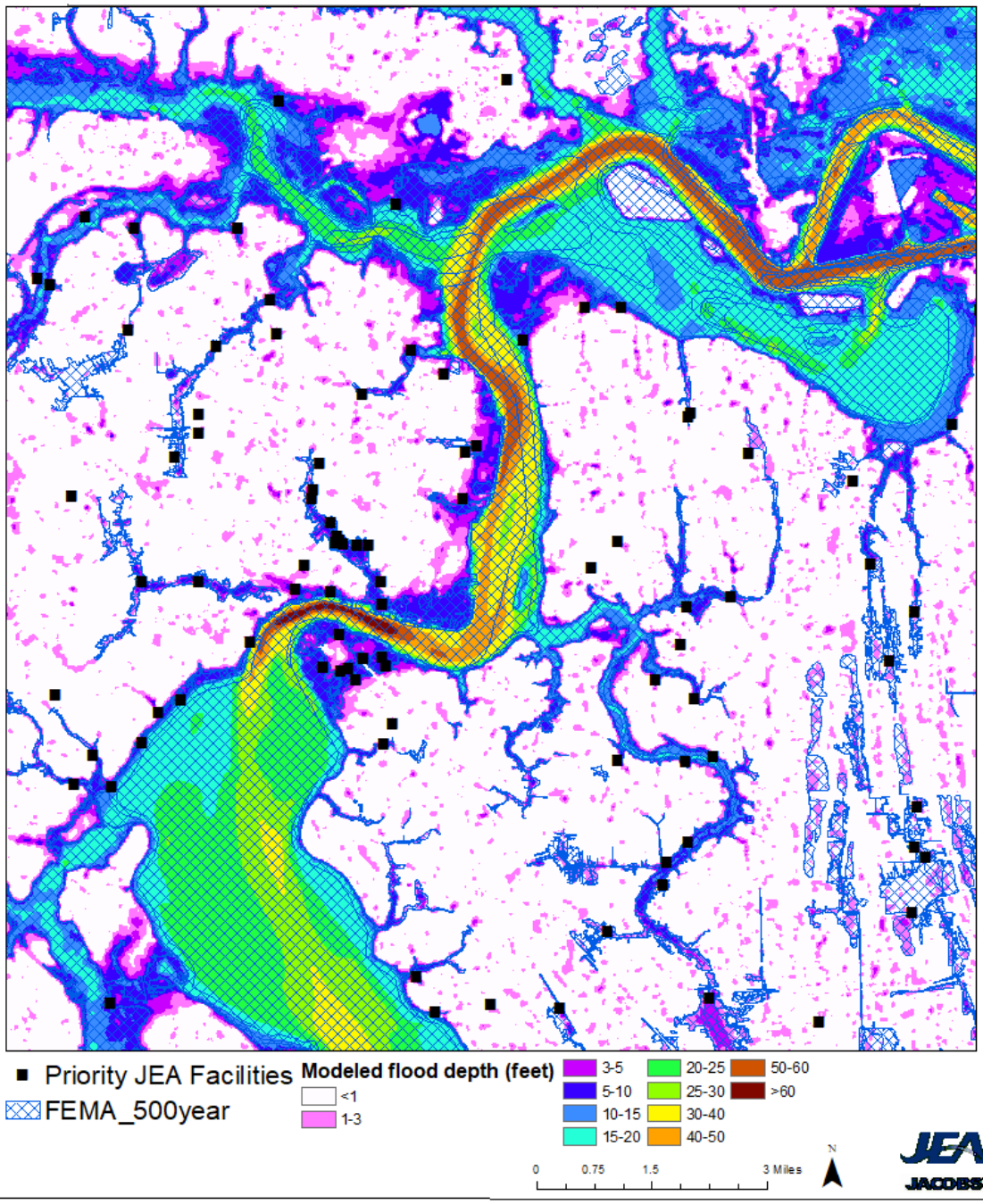


Figure 3-8. Flood Depths and Extents for Flood Scenario 7: 500-year Storm in 2070 with High Projection for Rainfall (RCP8.5) and SLR (NOAA High)

4. Facility Prioritization/Screening

Prior to performing the vulnerability and risk assessments, an initial facility prioritization/screening was performed of the 1,664 JEA facilities to identify those facilities with the highest vulnerability and criticality for inclusion in field assessments and further analysis. Recognizing the large number of facilities managed by JEA, there was a need to focus the flood risk analysis on those facilities with the highest priority and need. The prioritization/screening activity involved the first two steps in a multi-step process to identify those facilities to be included in the vulnerability assessment. Figure 4-1 depicts this multi-step process to narrow down to the highest priority JEA facilities. Further details of the entire process can be found in Appendix C, *Activity 4, Facility Criticality and Prioritization for Site Visits Technical Memorandum*.

Figure 4-1. Facility Vulnerability and Prioritization/Screening Process

Table 4-1 provides a summary of the JEA facilities evaluated during each step of the process, showing how the total number of facilities was reduced to the top high-priority facilities through screening, exposure analysis, vulnerability assessment, and risk analysis.

Table 4-1. Number of Facilities Evaluated by Activity

Facility Description	No. of Facilities	Assessment Stage
Total JEA Facilities	**1,664**	Data collection from asset management system
Visited Facilities	**205**	Asset level data collection from field work
Prioritized Facilities	**176**	Facility screening
Vulnerable Facilities	**150**	Vulnerability assessment
High Priority Facilities	**40**	Risk analysis

4.1 Facility Criticality and Current Flood Exposure Review

The criticality assessment and initial review of current flood exposure was performed for 1,664 JEA facilities, resulting in facilities that were included in the vulnerability assessment. The criteria used in this analysis are listed in Table 4-2.

Table 4-2. Evaluation Criteria

	Facility Criticality	Current Flood Exposure
Criteria	Critical and priority facilities served	Current flood exposure
	Enterprise asset management (eAM) system (Tier 1)	JEA staff survey
		Previous flood impacts
		eAM System (Tier 2)
		eAM System (Tier 3)

Each of these criteria was translated into a normalized numerical value to quantify the flood risk associated with severe weather impacts for each facility, providing the basis for facility priority.

4.1.1 Facility Criticality

A review of critical facilities served by each of JEA's water, wastewater, and chilled water systems was performed to support the identification of critical JEA facilities. Critical facilities served include hospitals, emergency operations centers, airports, first responders, evacuation shelters, and other critical public service buildings and facilities across the four-county JEA service area.

4.1.2 Facility Flood Exposure

The initial flood exposure review was performed based on the FEMA 100-year and 500-year flood zones and documented previous flooding events at the facilities. This initial review was only a cursory review, based on readily available information, to identify those facilities at the highest risk of flooding today This initial assessment identified 176 facilities with high criticality and/or high flood exposure.

4.2 Field Data Collection

The field data collection effort included Jacobs staff visiting and collecting asset-level information for 205 JEA facilities, which included the 176 prioritized facilities as part of the Flood Vulnerability Assessment task (TO 3), additional facilities identified as part of the Electrical and I&C Assessment (TO 4), and the Water Reclamation System Hydraulic Assessment (TO 5), along with additional facilities recommended by JEA. The facilities visited included:

- 117 lift stations (LS)
- 38 wells
- 10 WRFs
- 19 WTPs
- 4 CWPs
- 5 booster lift stations
- 5 vacuum stations
- 3 repump stations
- 1 reclaimed booster station
- 3 potable water booster stations

  Total: 205 facilities

These site visits served to document asset information, including size, age, and condition; capture photos of each asset; and to measure the lowest elevation of each asset from the ground or slab to the bottom of the asset and identify the flood pathways for each asset at each facility (Figure 4-2). This information was compiled into an asset management database to be used in the subsequent exposure, sensitivity, adaptive capacity, and redundancy assessments.

Figure 4-2. Field Data Collection Team Photo and Tablet Data Entry Form

5. Vulnerability Assessment

A vulnerability assessment was performed for the assets at each of the 176 priority facilities. Understanding the flood risk at each site/facility, as well as the associated susceptibility for damage of the facility's assets, is essential to conducting a comprehensive vulnerability assessment. An in-depth analysis of each asset's functions, systems, and site characteristics was analyzed to detect and characterize a facility's vulnerability and can be found in Appendix D, *Activity 4, Facility Vulnerability Assessment Technical Memorandum*. A facility vulnerability score was then calculated for each asset using the following equation:

Vulnerability = (Exposure + Sensitivity) / (Adaptive Capacity + Redundancy)

Exposure (Flood): *The proximity of a given asset (or facility) to the extents of a flood.*

Sensitivity (Flood): *The degree to which an asset may be impacted/damaged by flooding.*

Adaptive Capacity: *Ability of an asset to accommodate changing conditions.*

Redundancy: *Having a backup system to prevent single point of failure.*

This assessment helped reduce the previously identified 176 facilities to 150 vulnerable facilities. The vulnerability assessment results and scores for each asset were summed and used to rank the facilities. This assessment helped to categorize and prioritize various facilities/assets for more detailed development of cost of impacts and adaptation strategy development in the next phase of the project. Table 5-1 shows the breakdown of vulnerability scores for the 150 facilities by facility type.

Table 5-1. Facility Flood Vulnerability Scores

Facility Type	Number of Facilities Broken Down by Vulnerability Scores for Flooding				# of Vulnerable Facilities
	Highest Vulnerability (Score greater than or equal 3)	Medium Vulnerability (Score from 1.5 to 3)	Low Vulnerability (Score less than 1.5)	Not Vulnerable (Score of 0)	
Water Treatment Plants	4	1	2	3	10
Wastewater Treatment Plants	1	3	2	0	6
Chilled Water Plants	0	3	0	0	3
Wastewater Lift Station	24	59	15	3	101
Booster Lift Stations	1	1	0	0	2
Wastewater Vacuum Stations	2	1	2	0	5
Repump Stations	0	0	0	0	0
Reclaimed Booster Stations	0	1	0	0	1
Potable Water Booster Stations	0	1	0	0	1
Potable Wells	7	8	5	1	21
Total	39	78	26	7	150

Vulnerability Assessment Results:

- Of the 1,664 JEA facilities, 205 were selected for site visits.
- Of those 205 facilities, 176 facilities were selected as priority.
- Of those 176 facilities, 150 were found to have an elevated vulnerability.
- These 150 facilities with an elevated vulnerability were advanced into the risk assessment phase.

Note: The initial assessment grouped WTPs with wells that supply them. However, based on direction from JEA, these WTP/well groups were split into separate facilities if the well heads were located separately from the WTPs. This resulted in a total of 150 facilities advancing to the risk assessment phase.

Table 5-2 lists the 30 facilities with the highest vulnerability score. The full list of facilities is provided in database provided with Section 12. The full list of facilities with vulnerability scores is provided in Appendix D.

Table 5-2. Facilities with the Highest Flood Vulnerability

Name	Type	Vulnerability Score
MAYPORT WELLFIELD WELL NO. 2	Well	5.0
MAIN STREET WELLFIELD WELL NO. 10	Well	4.9
HENDRICKS WTP	WTP	4.4
6947 NORWOOD AVENUE	LS	4.3
1202 BUNKER HILL BOULEVARD	Vacuum Station	4.3
5104 118TH STREET	LS	4.2
MAIN STREET WTP	WTP	4.1
MAYPORT WTP	WTP	4.1
5730 KINLOCK DRIVE SOUTH	LS	3.9
1023 LAURA STREET NORTH	LS	3.8
MAIN STREET WELLFIELD WELL NO. 6A	Well	3.8
PONCE DE LEON	WWTP	3.7
2251 MCCOY CREEK BOULEVARD	LS	3.6
8460 BRIERWOOD ROAD	LS	3.6
94 32ND STREET EAST	LS	3.4
420 TRESCA ROAD	LS	3.4
8617 WESTERN WAY	Booster Station	3.4
3254 TOWNSEND BOULEVARD	LS	3.4
487 GROVE PARK BOULEVARD	LS	3.4
8602 ZOO ROAD	LS	3.4
MAIN STREET WELLFIELD WELL NO. 1	Well	3.4
130 METZ STREET	Vacuum Station	3.4
ST. JOHNS FOREST WELLFIELD WELL NO. 1	Well	3.4
7834 HOLIDAY ROAD SOUTH	LS	3.3
6267 WHISPERING OAKS DRIVE NORTH	LS	3.3
MAIN STREET WELLFIELD WELL NO. 6	Well	3.3
MAIN STREET WELLFIELD WELL NO. 3	Well	3.3

Table 5-2. Facilities with the Highest Flood Vulnerability

Name	Type	Vulnerability Score
7211 RHODE ISLAND DRIVE EAST	LS	3.3
6801 RHONE DRIVE	LS	3.3
4881 TIMUQUANA ROAD	LS	3.2
5233 5TH STREET WEST	LS	3.2
ST. JOHNS FOREST WELLFIELD WELL NO. 3	Well	3.1
BRIERWOOD WTP	WTP	3.1
74 BAISDEN ROAD	LS	3.1
11247 BEACON DRIVE	LS	3.1
DEERWOOD III WTP	WTP	3.1

6. Risk Analysis

6.1 Methodology

A risk analysis was performed on the previously selected 150 vulnerable facilities to quantify risk in terms of dollars based on direct damages resulting to JEA's assets for each flood scenario. This assessment was used to identify a representative set of 40 facilities, including those with the highest risk of direct asset damages, that includes representatives from all types of facilities. This list of critical and vulnerable facilities served as representative sample of facilities of each type for use in developing cost curves and extrapolation across all vulnerable facilities within the JEA enterprise.

Adaptation strategies were developed, and strategy costs were compared with cumulative risk avoided to generate facility recommendations. Using the asset elevation data, the benefit of providing flood protection at each facility was calculated as the cumulative risk avoided, which was determined based on each asset's replacement cost times the probability of flooding for each year. This annualized risk is then summed for all years over the asset service life to determine the cumulative risk avoided, which assumes the probability of flooding changes over time based on flood modeling climate scenario results from previous tasks.

Recommended adaptation strategies were identified for three different flood control levels, 100-year in 2040 and 2070 and 500-year in 2070 (Scenarios 2, 4, and 7, respectively); for each flood control level, flood mitigation strategies were selected when costs were less than the cumulative risk avoided for a particular group of assets. This calculation of risk was done separately for direct damages to JEA assets and for indirect economic impacts to JEA customers. See Appendix E, *Activity 5, Facility Risk Assessment Technical Memorandum* for facility-specific analyses and cumulative risk calculations based on direct asset impacts.

6.2 Risk Assessment Results

The results of this risk analysis are summarized by facility type in Figure 6-1. The combined risk of all lift stations with a level of service (LOS) of 1 have the highest monetized risk, followed by WTP facilities and WRFs. The asset LOS was determined for various asset categories depending on their associated facilities. The definitions of the LOS scoring are detailed as follows:

- WWTP Facilities/Pump Station (PS) Facilities LOS
  - The safety and protection of site personnel is of foremost importance. The following priorities for flood protections of wastewater treatment process assets are used and shown in order of importance:
    1) Maintenance of hydraulic capacity
    2) Primary treatment liquid processes and disinfection
    3) Secondary treatment liquid processes
    4) Solids treatment processes
    5) No impact on WWTP/PS process
  - Each WWTP/PS asset was given a functionality score of 1 to 5 based on the above descriptions.
- WTP Facilities LOS
  - The following priorities for flood protections of water treatment process assets are used and shown in order of importance:
    6) Ability to store water and meet demands of the grid (water supply and water distribution)
    7) Maintain water quality/disinfection
    8) No impact on WTP process
  - Each WTP asset will receive a functionality score of 1 to 3 based on the above descriptions.

- Reclaimed Water Facilities LOS:
  - Ground storage and repump criteria are similar to those of WTPs (score of 1 or 3).
  - Production criteria are similar to those of WWTPs (score of 1 to 5).
- CWP Facilities LOS
  - The following priorities for flood protections of CWP assets are used and shown in order of importance:
    1) Impacts ability to produce chilled water
    2) No impact on chilled water process
  - Each CWP asset will receive a functionality score of 1 to 2 based on the above descriptions.

The risk assessment results were used to prioritize the facilities with highest damage assessment costs. The facilities are listed in priority order of decreasing risk, both at a facility level by type of facility and at an asset level at each facility.

The facilities and assets that are generally above the flood scenarios' flood elevations have less risk of damages compared to the facilities and assets that are below the flood elevations. Based on the damage costs, the facilities that are in the top five of highest damages within each facility type are listed in Table 6-1. A full list is provided in Appendix E.

Table 6-1. Prioritization Based on Monetized Risk of Direct Damages – Up to Top Five of Each Facility Type

Facility	Total Assets Count	No. of Assets Impacted	Asset Replacement Cost ($)	Monetized Risk ($)
8617 WESTERN WY	25	21	$3,534,600	$864,800
2740 CR 210	24	8	$1,680,700	$29,000
CWP				
HOGANS CREEK CHILLED PLANT	58	4	$6,995,100	$258,400
DOWNTOWN CWP	48	4	$4,688,000	$197,400
SAN MARCO CWP	14	0	$2,291,300	$ -
Lift Station				
210 HOLLYBROOK AV	22	22	$4,537,100	$1,122,900
544 BOWLAN ST	20	20	$3,510,100	$940,200
7834 HOLIDAY RD S	23	23	$4,998,600	$737,800
834 BAY ST E	18	18	$5,944,200	$669,000
5301 EVERGREEN AV	25	20	$9,069,500	$654,400
Potable Water Booster Station				
1920 BISHOP ESTATES RD	8	1	$2,081,600	$34,900
Reclaim Booster Station				
US-1 RECLAIM PRESSURE BOOSTER STATION	16	1	$1,104,800	$21,800

Table 6-1. Prioritization Based on Monetized Risk of Direct Damages – Up to Top Five of Each Facility Type

Facility	Total Assets Count	No. of Assets Impacted	Asset Replacement Cost ($)	Monetized Risk ($)
Vacuum Station				
1202 BUNKER HILL BV	54	41	$6,316,300	$3,229,400
130 METZ ST	42	19	$5,511,000	$1,169,600
2732 SCOTT MILL LA	38	18	$3,140,100	$583,400
253 STATE RD A1A N	29	15	$1,206,300	$202,000
1108 BARNWELL RD	15	6	$948,300	$16,300
Well				
MAIN STREET WELLFIELDWELL 10	6	6	$1,445,600	$796,300
MAIN STREET WELLFIELDWELL 3	6	2	$1,576,000	$642,900
MAIN STREET WELLFIELDWELL 1	6	4	$1,445,600	$594,200
ST. JOHNS FOREST WELLFIELDWELL 3	12	7	$1,342,600	$397,800
BRIERWOOD WELLFIELDWELL 5	7	5	$1,381,900	$354,500
WTP				
MAIN ST WTP	141	140	$14,296,400	$3,984,900
HENDRICKS WTP	44	41	$7,033,900	$1,917,100
MAYPORT WTP	29	21	$2,773,100	$889,500
ST JOHNS FOREST WTP 1	37	10	$5,539,800	$699,100
NASSAU WTP 1	38	11	$4,227,700	$262,300
WWTP				
MONTEREY WRF 1	23	11	$5,316,900	$1,308,900
PONCE DE LEON WWTP	30	17	$4,286,200	$1,151,300
SOUTHWEST	56	39	$10,077,600	$805,400
JULINGTON CREEK PLANTATION	90	37	$12,035,800	$783,000
SOUTHWEST WRF 3	50	3	$7,552,800	$585,700

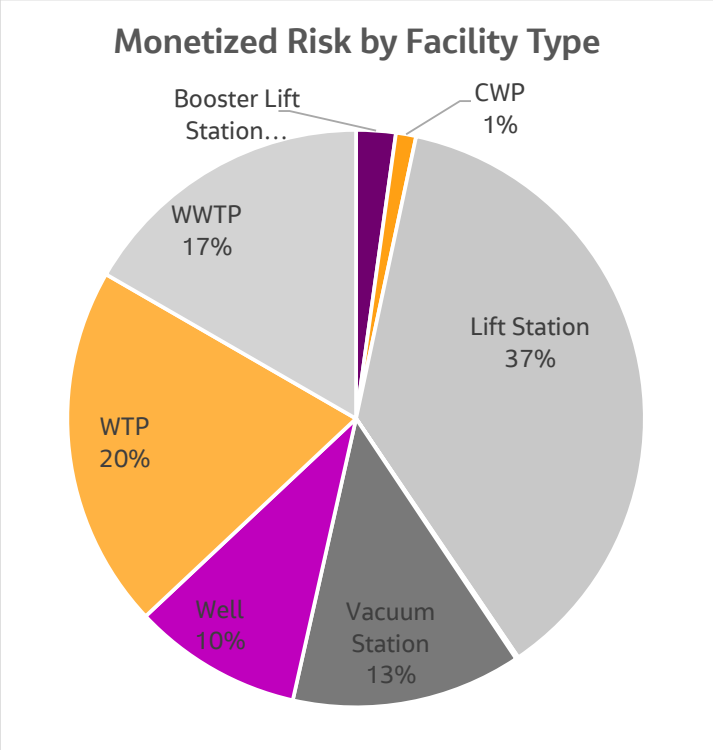


Figure 6-1. Monetized Risk Summarized by Facility Type

7. Adaptation Strategies

7.1 Strategy Development

The purpose of this section is to describe the methodology and assumptions used to develop and apply the most cost-effective adaptation strategies to mitigate flood risk for each asset at each facility. These strategies have been developed using our team's operational knowledge of JEA water utility systems and supporting communications, electric supply, and I&C to ensure the strategies are practicable and implementable for each asset type. A full analysis on the development and application of each strategy can be found in Appendix F, *Activity 6, Mitigation and Adaptation Strategy Development Technical Memorandum.*

Adaptation strategies fall into three distinct categories: 1) elevate assets, 2) harden assets, and 3) facility flood walls/barriers. Where the elevate and harden strategies do not work for some asset types, they were combined to form a new category called "Hybrid," which selected the most cost-effective and applicable strategy between the elevate and harden categories to form a complete solution to protect all vulnerable assets at each facility. Examples of these strategies are presented on Figure 7-1.

- **Elevate Flood Strategy**: elevating assets or facilities depending upon cost effectiveness comparison
- **Hardening Strategy**: watertight sealing of windows, vents, and other penetrations using operable barriers
- **Flood Barrier Strategy**: permanent and temporary flood barrier solutions placed around building entrances or gaps in flood walls
- **Hybrid Strategy**: comprised of a collection of the most cost-effective (elevate or harden) strategy from each category to protect a given asset or facility

The determination of applicable flood mitigation strategies for each asset type was based on the assets identified at the 40 high-risk facilities. These 40 facilities include the largest and most critical facilities, with the highest flood risk, with the intent to support development of regression curves by facility type and extrapolation of strategy costs to the remaining vulnerable facilities across the JEA enterprise.

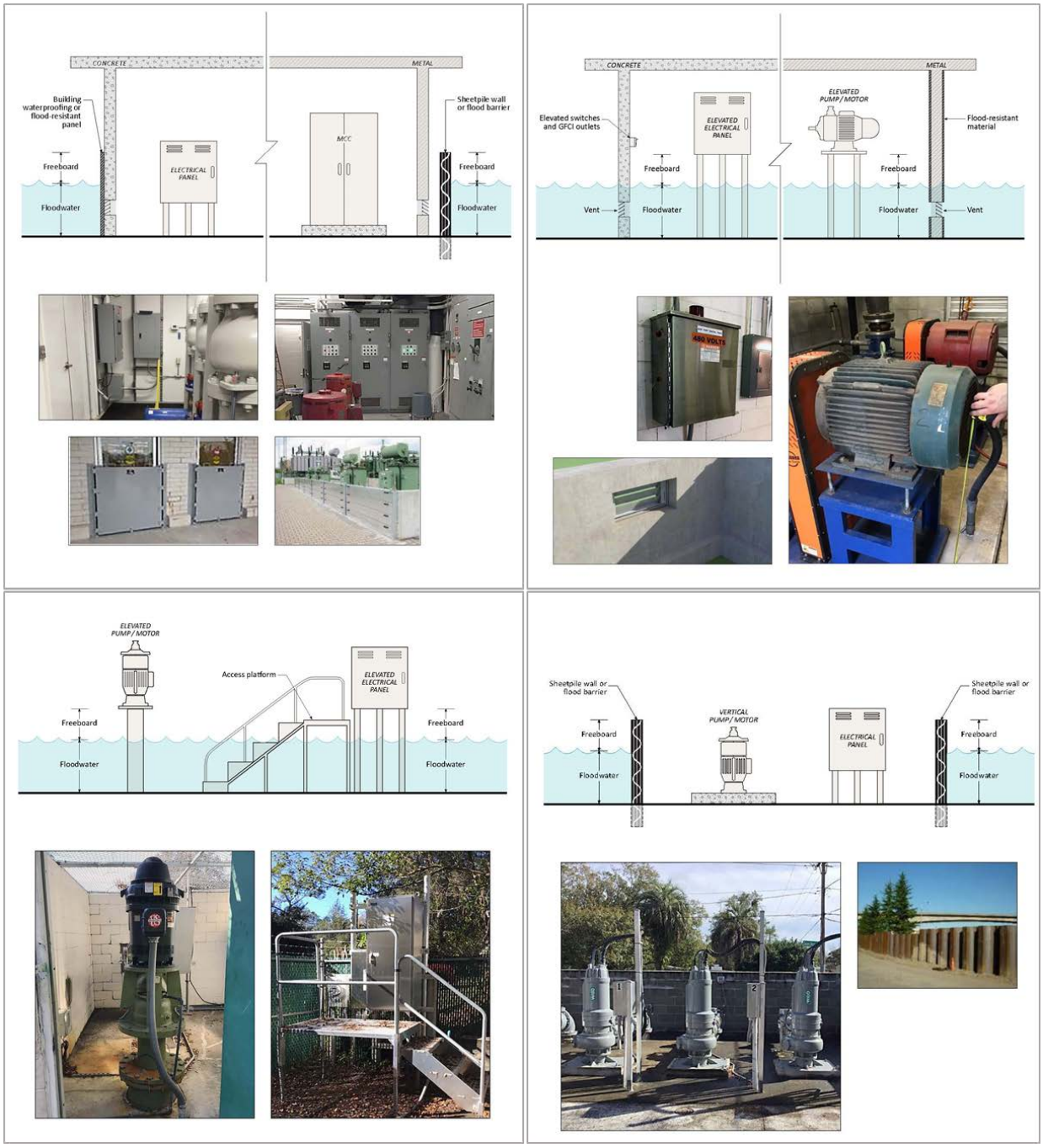


Figure 7-1. Adaptation Strategy Examples

7.2 Strategy Cost Estimates

Flood mitigation strategy costs were developed for each strategy and for each asset type. These estimated construction costs for the recommended strategies represent installed costs, including anticipated soft costs such as design and permitting.

7.2.1 Replacement Costs

Replacement costs were developed for 230 asset categories using over 500 unique asset costs. Jacobs' Timberline cost estimating tool and historical project costs obtained from JEA were used to estimate equipment replacement costs, which were used to support the strategy costs and the benefit/cost analysis. Costs for assets that had accurate capacities/parameters available in the field data collection database were extracted directly from the Timberline software program. Costs were often developed for a range of asset capacities/sizes for ease of application across the asset groups within an asset type. For assets without documented capacities/sizes, reasonable assumptions for capacity ranges were made based on asset functionality.

The project cost estimates are based on 2019 dollars. Table 7-1 provides a summary of replacement costs. This table provides summary of the 150 facilities that were evaluated for monetized risk.

Table 7-1. Replacement Costs Summarized by Facility Type for the 150 Facilities

Facility Type	No. of Assets Impacted	Total Replacement Cost
Booster Lift Station	29	$2,827,800
CWP	8	$2,451,900
Lift Station	884	$58,470,700
Potable Water Booster Station	1	$1,187,700
Reclaim Booster Station	1	$147,300
Vacuum Station	99	$8,748,800
Well	58	$12,701,600
WTP	261	$28,356,500
WWTP	200	$25,893,100
Total	**1541**	**$140,785,400**

7.2.2 Soft Costs

The soft costs are calculated individually for each line item including tax, mobilization, overhead and profit, and engineering costs, among others, and applied sequentially to the direct construction cost subtotal. Table 7-2 presents the soft costs applied to the cost subtotal (materials only) cost to calculate the total strategy cost for the exposed assets, for each of the strategies, and for each flood scenario (2, 4, and 7). The soft cost percentages were agreed to by JEA at a workshop dated on May 23, 2019.

Table 7-2. Soft Costs Including Permitting, Labor, and Materials

Item	Percentage
Material Sales and Use Tax	7%
General Conditions	10%
Mobilization and Demobilization	5%
Overhead and Profit	15%
Bonds and Insurance	2%
Contingency	25%
Engineering	10%

7.2.3 Strategy Costs

A Class 5 estimate was prepared for these strategies in accordance with the Association for the Advancement of Cost Engineering International (AACEI) classification system. Based on AACEI guidelines, these estimates are considered to have a level of accuracy between −50 to +100 percent.

The cost estimate for strategies recommended for the 40 facilities was used to develop a regression model for strategy costs by type of facility and level of flood control to extrapolate to the remaining priority facilities identified during the Vulnerability and Risk Assessment.

The calculated hybrid strategy cost for each facility is the function of five main parameters:

4) Flood depth
5) Total number of exposed assets
6) Total number of large exposed assets
7) Total number of penetrations in exposed buildings
8) Total number of assets inside buildings

Costs for the selected (40) facilities are summarized on Figure 7-2 and further described in Section 8 as part of the benefit/cost analysis.

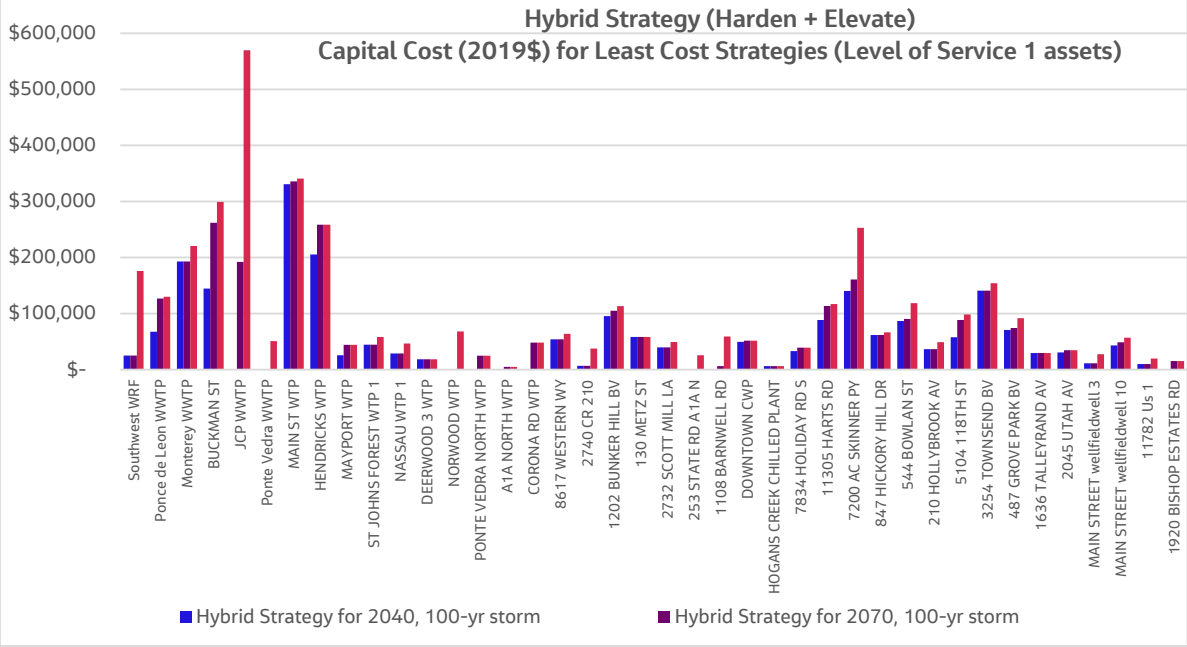


Figure 7-2. Hybrid Strategy (Harden or Elevate) Strategy Costs by Facility (LOS 1 Assets)

7.2.4 Strategy Cost by Flood Scenario

Capital costs for the flood protection strategies for the 40 facilities evaluated range from less than $10,000 up to $8 million per facility (2019 dollars), not including asset replacement costs. These costs were extrapolated to the 150 facilities evaluated during the risk assessment activity. The three planning scenarios evaluated are summarized for the selected 150 facilities as follows:

- **Flood Scenario 2:** Projected 100-year storm in 2040 with 12.3 inches of rainfall, 1.8 feet of SLR, and storm surge with high GHG emissions. Cost range per facility (2019 dollars):
  - Hybrid strategy: $5,000 to $330,000 (protecting up to 149 assets at one facility)
  - Barrier Wall: $630,000 to $7,000,000
- **Flood Scenario 4:** Projected 100-year storm in 2070 with 12.3 inches of rainfall, 4.5 feet of SLR, and storm surge with high GHG emissions. Cost range per facility (2019 dollars):
  - Hybrid: $5,000 to $630,000 (protecting up to 151 assets at one facility)
  - Barrier Wall: $640,000 to $7,300,000
- **Flood Scenario 7:** Projected 500-year storm in 2070, with 16.6 inches of rainfall, 4.5 feet of SLR, and storm surge with high GHG emissions. Cost range per facility (2019 dollars):
  - Hybrid: $5,000 to $670,000 (protecting up to 151 assets at one facility)
  - Barrier Wall: $660,000 to $8,000,000

Figure 7-3 compares the cumulative cost of strategies for 150 facilities by flood scenario, demonstrating the cost effectiveness of the hybrid strategy versus the perimeter wall strategy.

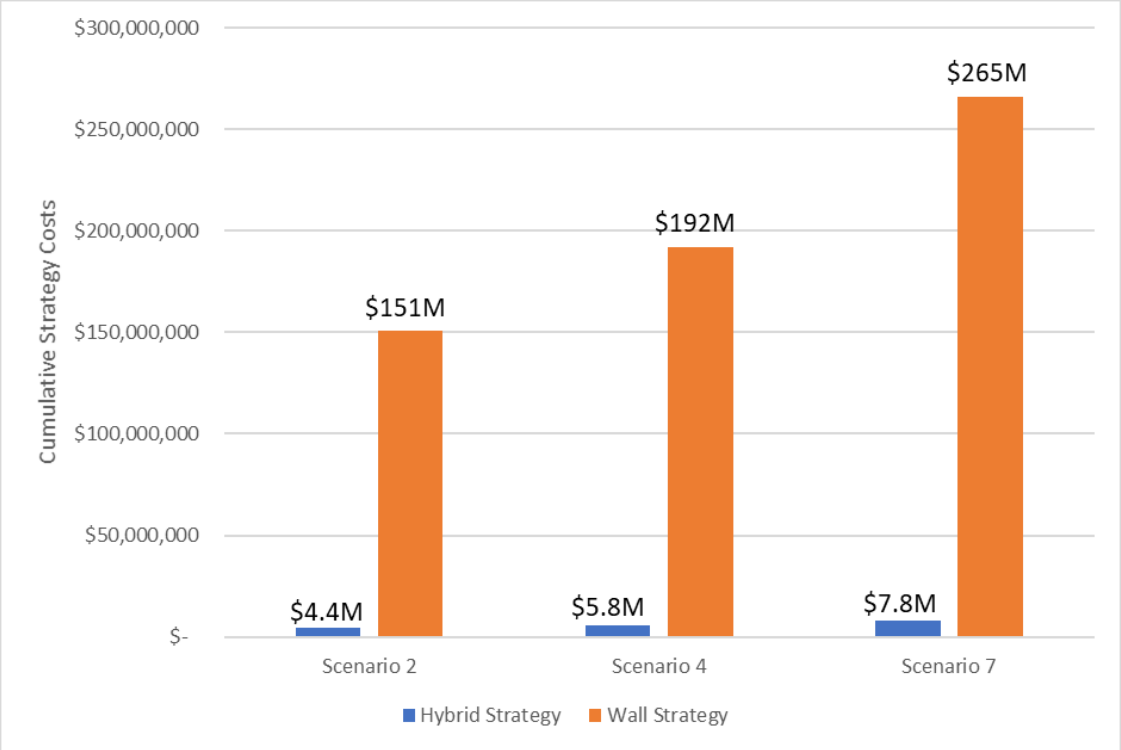


Figure 7-3. Cumulative Strategy Cost for 150 Facilities by Strategy Category and Flood Scenario

8. Economic Impact Assessment and Benefit/Cost Analysis

The primary benefits anticipated from incorporating flood mitigation measures for JEA facilities stem from avoiding damages from flooding. This includes both the direct physical damages to JEA facilities, and the indirect damages associated with business interruptions resulting from loss in water service, loss in wastewater service, or sewer overflows. These two types of damages would be avoided by protecting JEA facilities from flooding.

To identify potential flood impacts to assets at selected JEA facilities, three flood model scenarios were used, as listed below, in conjunction with two primary flood protection strategies developed by the Jacobs team, including the hybrid strategy and the perimeter wall strategy.

- Scenario 2: 2040, 100-year storm with storm surge and SLR
- Scenario 4: 2070, 100-year storm with storm surge and SLR
- Scenario 7: 2070, 500-year storm with storm surge and SLR

More information can be found in Appendix G, *Activity 7, Economic Impact and Benefit/Cost Analysis Technical Memorandum*.

8.1 Benefits from Reducing Impacts to JEA's Physical Assets

As summarized in Section 6, benefits were first determined for reduction in flood risk to JEA's physical assets through the implementation of flood mitigation measures as described in Section 7. The Jacobs team applied the flood mitigation alternatives developed in Section 7, using the modeled flood elevations for the selected facilities. In this step, the benefits from reducing risk of business losses are omitted so that the direct impact to JEA's bottom line from risk of damages to JEA's physical assets can be shown. The benefits from reducing risk to JEA's physical assets are calculated for each asset at each facility per climate scenario, as quantified in Section 6, *Risk Analysis*. These benefits are rolled up to the facility level so that the benefits and costs of maintaining service at the facility level could be evaluated in the benefit cost analysis.

8.2 Benefits from Reducing Impacts to JEA's Business Customers

Benefits associated with reducing interruption in services for JEA business customers as a result of a JEA system failure also support the benefit cost analysis for resilience investment.

The economic impact analysis determines the contribution to the economy of the businesses supported by water distribution or wastewater collection services within the JEA service areas of the priority facilities identified in the vulnerability analysis and subsequently in the risk analysis. The results show the value per day (i.e., net output) of the business activity in the JEA service areas for each of these facilities. The primary data used for estimating the value of economic activity within the JEA service areas of facilities at risk are embedded in the Impact Analysis for Planning (IMPLAN) model. The IMPLAN data build upon the three principal government sources of industry, wage, price, and other economic data compiled by the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS) and the U.S. Census. IMPLAN uses these data and other economic sources to estimate any missing pieces and to transform the data into a consistent format. These data are found in Appendix G, *Activity 7, Economic Impact and Benefit Cost Analysis Technical Memorandum*.

This value per day is multiplied by the duration of the outage (i.e., number of days) to estimate the losses in economic net output from facility failures. The value of preventing the risk of such losses in economic activity due to the loss of water or wastewater service or to SSOs is an economic benefit of resilience measures that protect against flood elevations that force a shutdown of JEA's facilities. Such benefits are separate from and additive to the direct physical damages to JEA facilities.

The combined benefits were then calculated as the sum of monetized risks avoided of damages to physical assets and business losses. These can then be sorted to provide a ranking based on the combined benefits, as shown in Figure 8-1. In addition, for input to the capital prioritization, the benefits based on combined risk were categorized into a simple 5 to 1 score, as follows and depicted in Figure 8-1:

- **5** = High Risk: greater than $1 million damage and business loss avoided
- **4** = Intermediate-High Risk: $500,000 to $1 million damage and business loss avoided
- **3** = Intermediate Risk: $250,000 to $500,000 damage and business loss avoided
- **2** = Intermediate-Low Risk: $100,000 to $250,000 damage and business loss avoided
- **1** = Low Risk: $0 to $100,000 damage and business loss avoided
- 0 = No damage and business losses

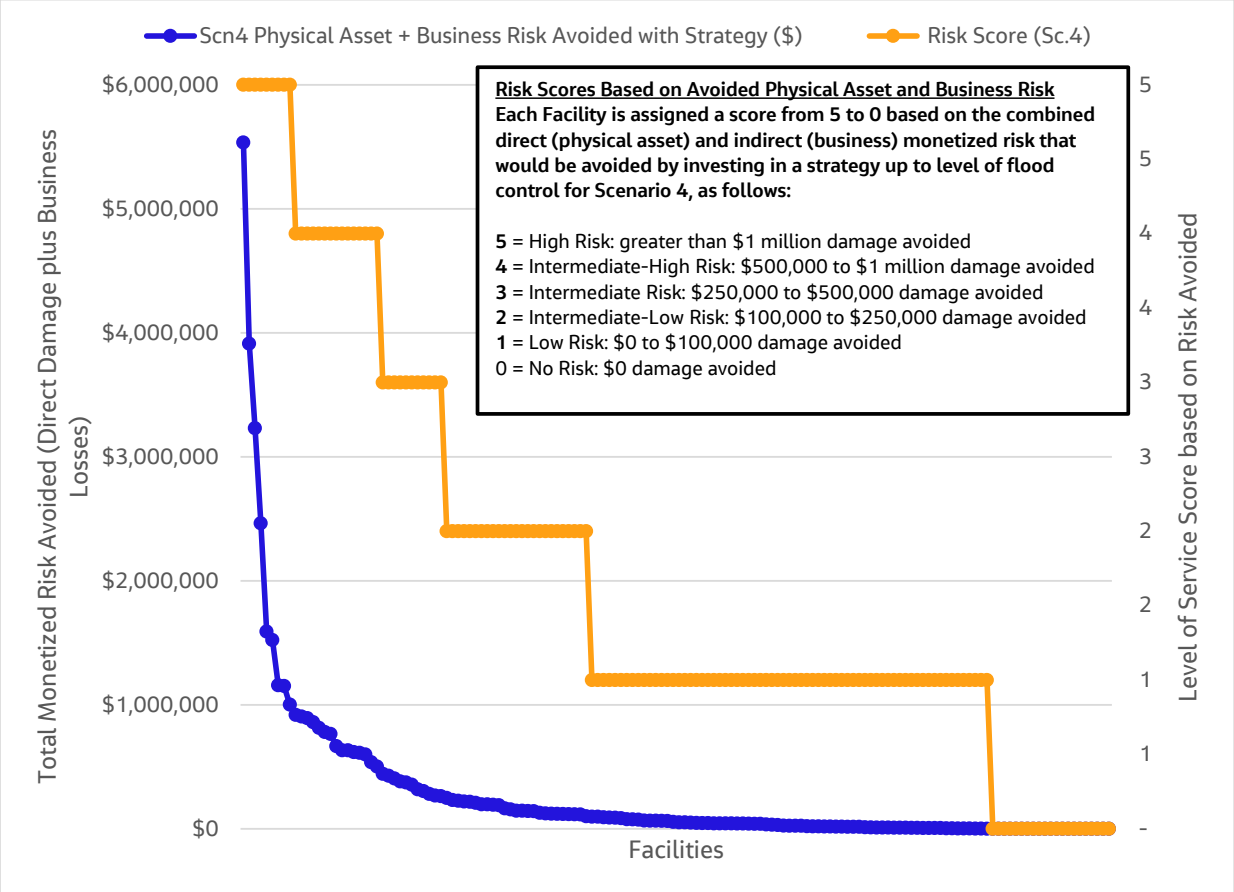


Figure 8-1. Cumulative Risk Scores Based on Avoided Direct and Secondary Impacts and Risk Score used in CIP Prioritization based on Flood Scenario 4 (100-year event in 2070).

8.3 Benefit/Cost Analysis

The benefit/cost analysis provides the magnitude of the total damages avoided (both physical damages and business losses) and cost effectiveness of investments in strategies to improve resilience. It analyzes the benefits versus costs of JEA making investments to mitigate flood impacts to their facilities and to their customers.

Prior to presenting the results, it is helpful to define the terms used in benefit-cost analysis for evaluating projects based on economic efficiency. These terms and their interpretation are as follows:

- **Benefit/Cost (B/C) Ratio** = Total discounted benefits divided by total discounted costs for a quick determination on economic efficiency.
  - When B/C > 1, the benefits exceed the costs and the project is justified.
  - The larger the B/C ratio, the greater the confidence that the investment is worthwhile.
- **Net Present Value (NPV)** = Present Value Benefits minus Present Value Costs
  - When NPV > 0 project is justified.
  - The larger the NPV the greater the confidence that the investment is worthwhile.
  - When choosing among alternatives, the economic goal is to maximize NPV.
- **$ Return on Investment (ROI)** = NPV/$ Cost, based on the dollars netted for each dollar invested
  - Useful metric for ranking projects to achieve the goal of maximizing NPV.
  - Selecting projects according to their $ Net Return/$ Cost rank, gives the most cost-effective portfolio of investments for improving resilience.

For each of these metrics, two sets of benefit-cost results are calculated where the first reflects only the benefits of avoided risk of damages to JEA assets and the second includes the first set plus the avoided risk of loss of business. The detailed results for all 150 facilities are displayed in the Appendix G, *Activity 7, Economic Impact and Cost Benefit Analysis Technical Memorandum*.

Table 8-1 summarizes the results for the combined monetized risk avoided (direct physical damages and indirect business losses) for the top 25 facilities in order of ROI of the resilience strategy. The facility column identifies the facility. The ROI for Maximum Strategy column provides the measure of cost-effectiveness. The selected strategy for each facility is identified in the Max Return Scenario column, and it corresponds to the Hybrid Strategy for the scenario (i.e., 2, 4, or 7) that produced the highest ROI. Scenario 7 is most often, but not always, the highest ROI scenario. Thus, it is more cost-effective to select the scenario on a facility-by-facility basis rather than apply a single level of protection to all facilities.

The Maximum Strategy Cost column provides the strategy cost and the NPV Maximum Strategy column shows the NPV. For the facilities in this list, the NPV far exceeds the strategy costs, resulting in the large ROI reported in the ROI for Maximum Strategy column. For example, for each dollar in strategy cost for improving Arlington Well No. 5, the investment returns a benefit of $136.7.

Although all the facilities in Table 8-1 pass the benefit/cost test, JEA may have a limited budget for investing in resilience. The Cumulative Cost Maximum Strategy column provides the cumulative cost from investing in multiple resilience projects. Funding all 25 strategies would cost $0.73 million and would generate a net return of $24.46 million. Table 8-2 shows the facilities with “High” ROI ranking by flood scenario and thus shows the facilities that would be selected if JEA commits to one of the single flood protection scenarios for all facilities, rather than the recommended maximum ROI scenario.

Table 8-1. Facilities Ranked by ROI Based on Combined Risk Avoided of Damages to Physical Assets and Business Losses

Facility Name	Max ROI	Max ROI Scenario	Strategy Cost	Max Scenario NPV	Cumulative Cost	Cumulative NPV
ARLINGTON WELL 5	136.7	SCN7	$2,149	$293,800	$2,149	$293,800
2045 UTAH AV	135.3	SCN7	$54,438	$7,364,212	$56,587	$7,658,012
RIDENOUR WELL 7	99.5	SCN7	$2,149	$213,831	$58,735	$7,871,843
MAIN STREET WELL 1	95.3	SCN2	$4,297	$409,388	$63,032	$8,281,231
MAIN STREET WELL 12	66.9	SCN7	$2,149	$143,814	$65,181	$8,425,045
6630 BROADWAY AV	62.1	SCN7	$6,446	$400,314	$71,626	$8,825,359
1636 TALLEYRAND AV	52.6	SCN7	$29,694	$1,560,859	$101,320	$10,386,218
BRIERWOOD WELL 5	48.1	SCN7	$6,446	$310,256	$107,766	$10,696,474
SOUTHWEST WRF	35.7	SCN4	$25,042	$894,109	$132,808	$11,590,583
1023 LAURA ST N	30.8	SCN7	$42,743	$1,318,519	$175,550	$12,909,101
3300 SAN PABLO RD S	28.9	SCN4	$4,297	$124,191	$179,847	$13,033,292
210 HOLLYBROOK AV	28.5	SCN7	$49,489	$1,409,670	$229,336	$14,442,963
7834 HOLIDAY RD S	28.2	SCN7	$39,096	$1,101,371	$268,433	$15,544,334
GREENLAND WELL 2	26.7	SCN7	$2,149	$57,361	$270,581	$15,601,695
1706 BOULEVARD AV	26.6	SCN4	$12,891	$342,466	$283,473	$15,944,161
1202 BUNKER HILL BV	25.9	SCN2	$120,209	$3,110,546	$403,682	$19,054,707
MAIN STREET WELL 3	24.8	SCN2	$11,135	$276,336	$414,817	$19,331,043
6927 HANSON DR S	20.0	SCN7	$26,743	$535,064	$441,560	$19,866,107
834 BAY ST E	18.71	SCN 7	$85,485	$1,599,267	$527,045	$21,465,374
MAYPORT WTP	16.4	SCN2	$45,530	$747,549	$572,575	$22,212,923
ST JOHNS FOREST WTP 1	16.0	SCN7	$58,150	$931,491	$630,725	$23,144,414
ST. JOHNS FOREST WELL 3	15.1	SCN7	$22,446	$338,384	$653,170	$23,482,798
4140 KINGSBURY ST	13.8	SCN4	$4,297	$59,246	$657,467	$23,542,044
2251 MCCOY CREEK BV	13.7	SCN7	$24,594	$336,572	$682,061	$23,878,616
MAIN STREET WELL 10	12.0	SCN4	$48,618	$584,870	$730,679	$24,463,486

Table 8-2. Top 20 Facilities in Rank Order by ROI and by Flood Scenario

Scenario 2 ROI Ranking	Scenario 4 ROI Ranking	Scenario 7 ROI Ranking
ARLINGTON WELL 5	2045 UTAH AV	ARLINGTON WELL 5
MAIN STREET WELL 1	ARLINGTON WELL 5	2045 UTAH AV
2045 UTAH AV	MAIN STREET WELL 1	RIDENOUR WELL 7
RIDENOUR WELL 7	RIDENOUR WELL 7	MAIN STREET WELL 1
1636 TALLEYRAND AV	1636 TALLEYRAND AV	MAIN STREET WELL 12
BRIERWOOD WELL 5	SOUTHWEST WWTP	6630 BROADWAY AV
SOUTHWEST WWTP	BRIERWOOD WELL 5	1636 TALLEYRAND AV
1706 BOULEVARD AV	3300 SAN PABLO RD S	BRIERWOOD WELL 5
1202 BUNKER HILL BV	1706 BOULEVARD AV	1023 LAURA ST N
1023 LAURA ST N	1023 LAURA ST N	210 HOLLYBROOK AV
MAIN STREET WELL 3	1202 BUNKER HILL BV	7834 HOLIDAY RD S
210 HOLLYBROOK AV	210 HOLLYBROOK AV	GREENLAND WELL 2
MAYPORT WTP	7834 HOLIDAY RD S	1202 BUNKER HILL BV
6927 HANSON DR S	MAIN STREET WELL 3	MAIN STREET WELL 3
4140 KINGSBURY ST	6927 HANSON DR S	6927 HANSON DR S
ST JOHNS FOREST WTP 1	4140 KINGSBURY ST	834 BAY ST E
PONCE DE LEON WWTP	ST JOHNS FOREST WTP 1	1706 BOULEVARD AV
7834 HOLIDAY RD S	MAYPORT WTP	3300 SAN PABLO RD S
MAIN STREET WELL 10	MAIN STREET WELL 10	ST JOHNS FOREST WTP 1
ST. JOHNS FOREST WELLFIELDWELL 3	5301 EVERGREEN AV	ST. JOHNS FOREST WELL 3

The results from comparing the combined cumulative cost against the ROI for each flood scenario (2, 4, or 7) for the top ranked facilities from Table 8-2 are shown on Figure 8-2. In general, the ROI increases with higher levels of flood control , as illustrated in Figure 8-1. Scenario 2 is usually the lowest ROI, followed by Scenario 4 then Scenario 7. However, this is not always the case. For example, for Main Street Well Nos. 1 and 3, Scenario 2 has the highest ROI. In addition, some facilities, such as the Main Street Well No. 12, Scenario 7 is not only the preferred level of protection, but it is also the only level of protection that is needed as no impacts to large assets were detected at lower flood elevations.

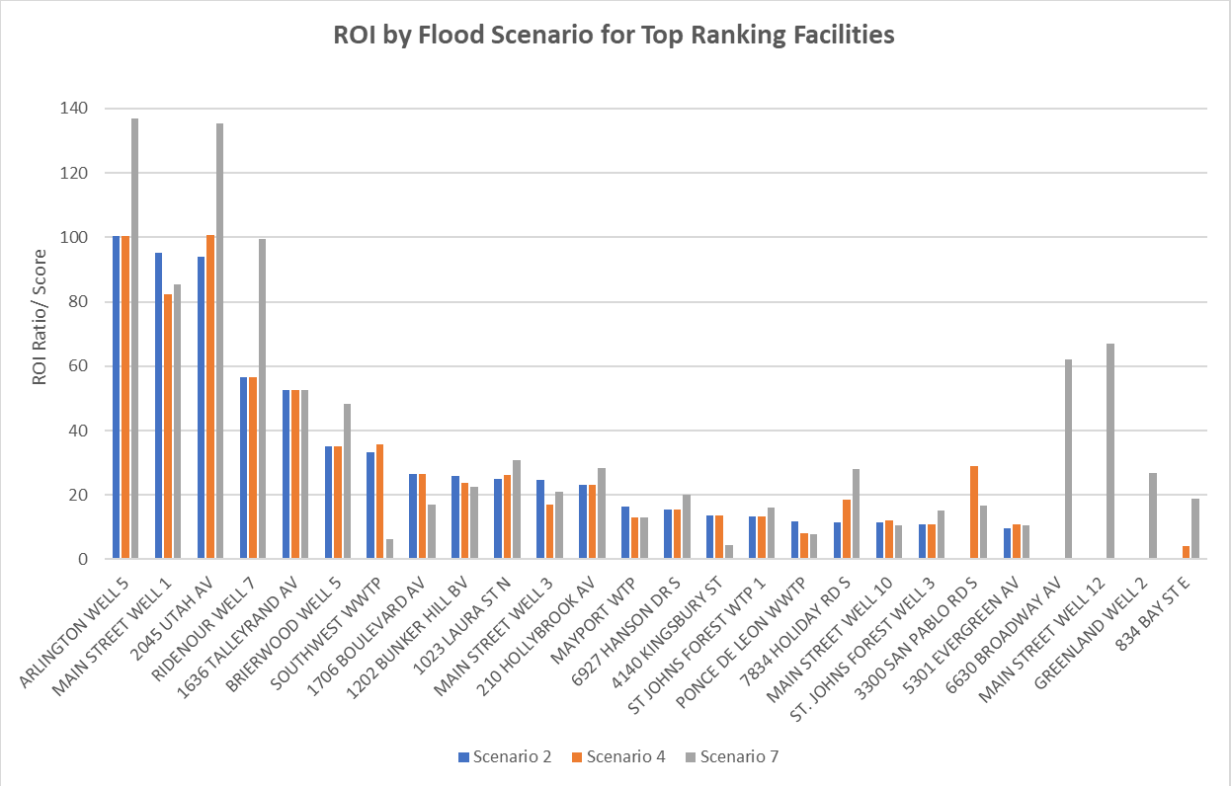


Figure 8-2. Comparison of ROI across Scenarios 2, 4, and 7 for the facilities with the highest ROI (Combined Physical Asset and Business Loss ROI)

From Table 8-1 the ROI starts high and declines steeply before flattening out while remaining in the double-digits for this short list. Figure 8-3 compares the cumulative NPV to the cumulative strategy cost for the top-ranking facilities based on ROI for the Maximum Scenario. This figure shows cumulative NPV increasing and then flattening out, but never decreasing over this range. It also shows the wide divergence between cumulative NPV and cumulative strategy cost such that it is easy to recommend these facilities for improvement, and even the relatively expensive strategy costs among these top-ranking facilities contribute positively to cumulative NPV and are well worth considering if JEA has the funds to invest in improving resilience.

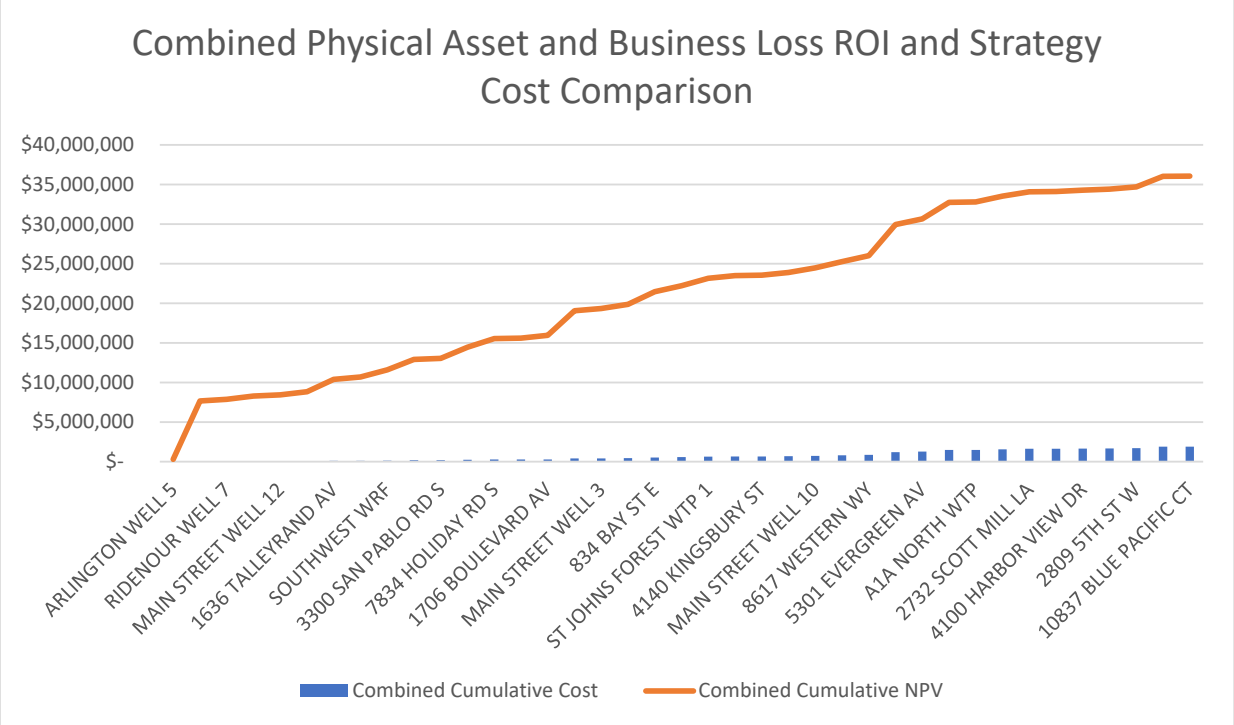


Figure 8-3. Combined Physical Asset and Business Loss Cumulative NPV and Cumulative Strategy Cost Comparison for Flood Scenario with Maximum ROI

Figure 8-4 is identical to Figure 8-3 except that it includes only the avoided risks to JEA's physical assets in the benefit calculations.

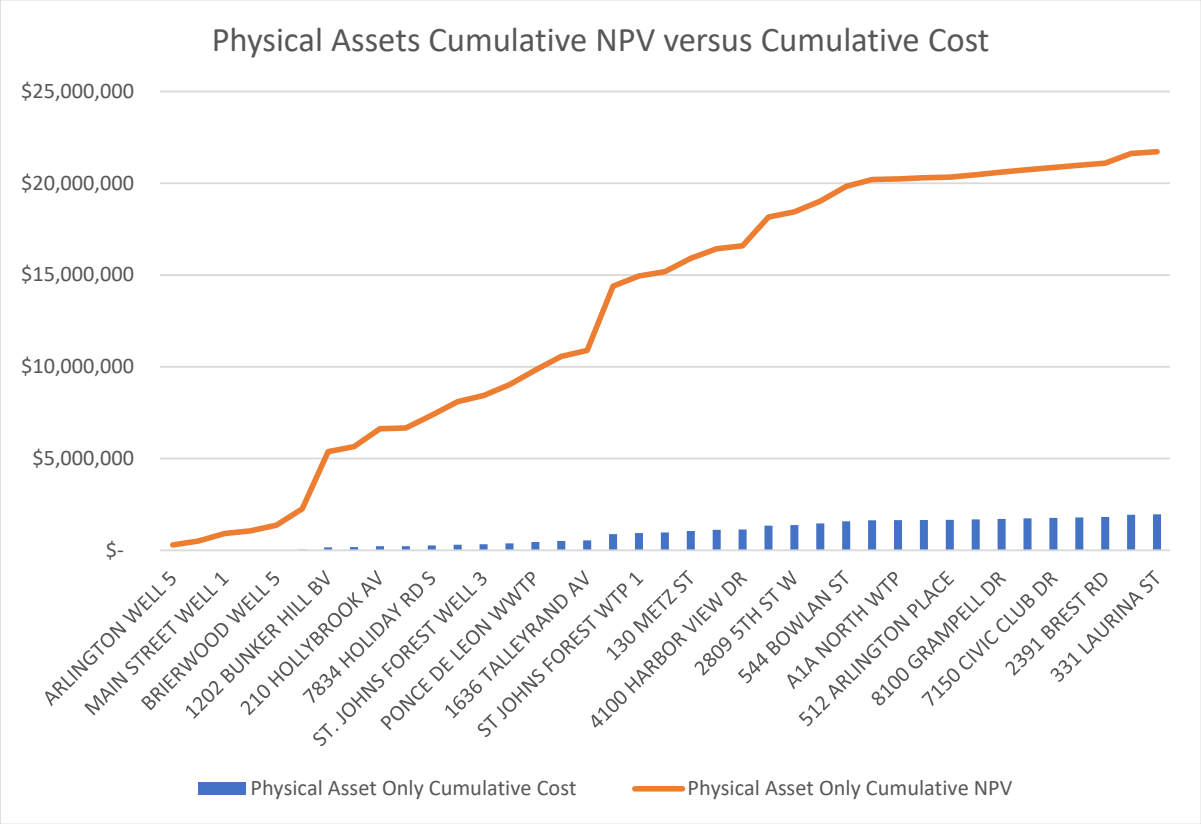


Figure 8-4. Physical Assets Cumulative NPV and Cumulative Strategy Cost Comparison for Flood Scenario with Maximum ROI

Figure 8-5 shows the Cumulative Strategy Cost for the facilities in order of maximum ROI for the combined physical asset and business loss. This graph is especially useful for illustrating how many facilities can be improved with a given investment if the dollars are allocated in terms of ROI. For example, if JEA has $1.9 million to invest, they can improve the facilities shown in Figure 8-5.

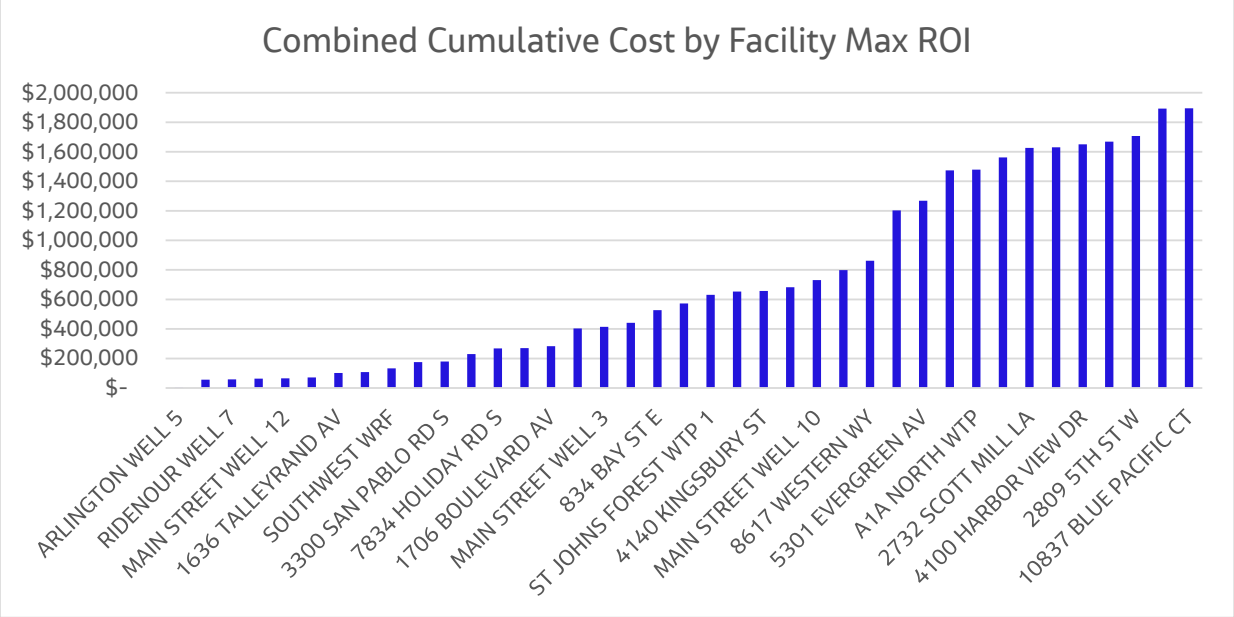


Figure 8-5. Cumulative Costs for Facilities Ranked by Maximum Return on Investment (Combined Benefits of Avoided Physical Assets and Business Losses)

To support the CIP prioritization discussed in Section 9, facilities were categorized into five categories based on ROI from their combined benefits, as shown on Figure 8-6. The five groups are based on following categories:

- **5 = Top 10% of facilities with ROI>0**, which equates to ROI greater than $18 NPV per $ of strategy cost for Scenario 4
- **4 = Facilities between top 10% and 25% with ROI>0**, which equates to ROI between from $18 and $7.5 NPV per $ of strategy cost for Scenario 4
- **3 = Facilities between top 25% and 50% with ROI>0**, which equates to ROI between from $7.5 and $3.1 NPV per $ of strategy cost for Scenario 4
- **1 = Facilities between top 50% and 100% with ROI>0**, which equates to ROI between from $3.1 and $0 NPV per $ of strategy cost for Scenario 4
- **0 = Facilities with ROI less than $0** NPV per $ strategy cost for Scenario 4

These five groups are shown in the map on Figure ES-7.

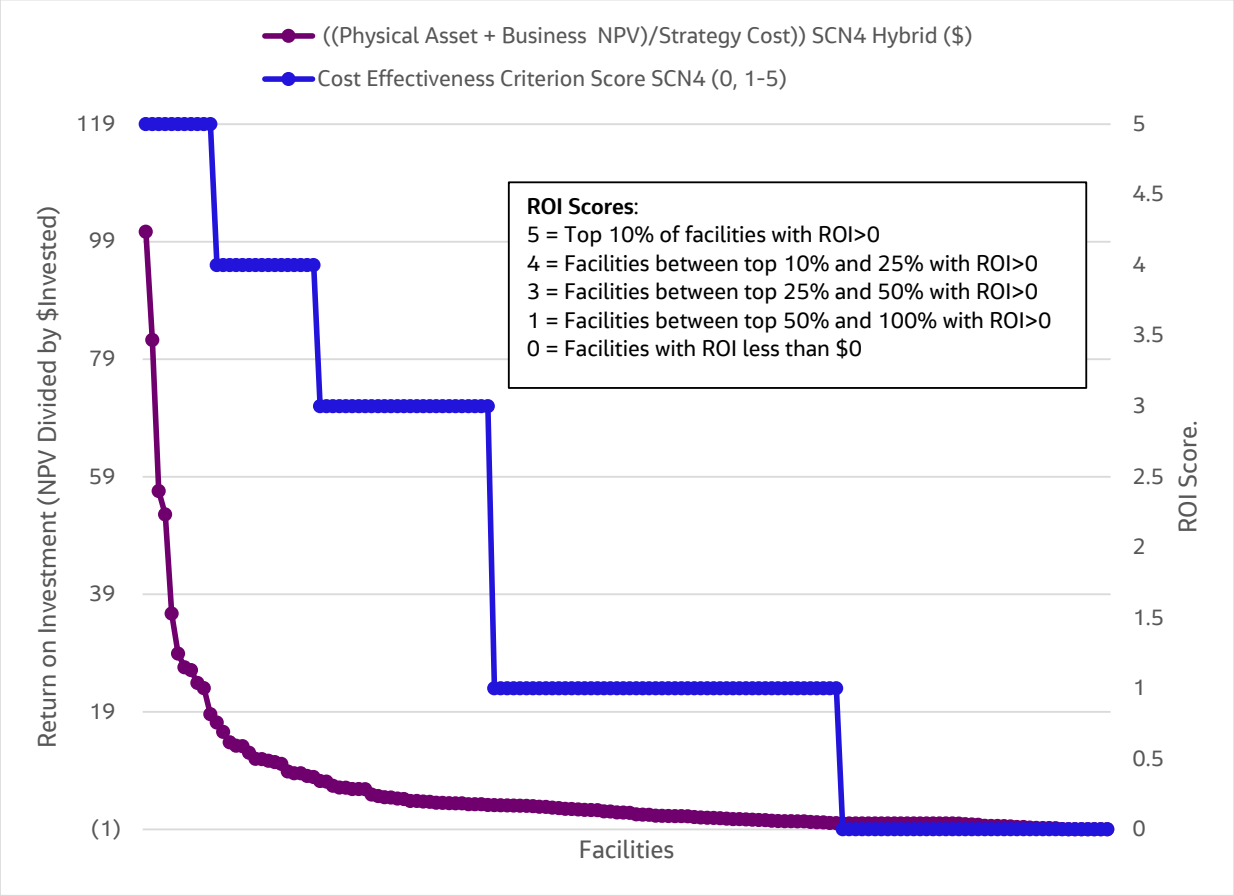


Figure 8-6. Chart Showing Combined Physical Asset and Business Loss ROI and ROI Rank (5,4,3,1,0) used in CIP Prioritization Based on Scenario 4

Several general conclusions can be drawn from the benefit-cost analysis results as follows; refer to Appendix G, *Activity 7, Economic Impact and Benefit Cost Analysis Technical Memorandum* for data tables supporting these conclusions:

- Some facilities should be omitted from investments in measures to improve resilience because they have a B/C ratio less than one and generate a negative return.
- The barrier wall is too expensive and does not generate benefits that justify the costs.
- ROI defined as $NPV/ $Strategy Cost is the best way to rank projects to achieve the greatest amount of protection at least cost.
- Using the combination of business losses and physical assets changes the priority rankings in some cases and should be the basis for setting priorities.
- The hybrid strategy designed for the 500-year flood in 2070 (Scenario 7) is generally, but not always, the best investment, indicating that the decision on level of protection should be made on a facility-by-facility basis
- JEA may not have the funds available to immediately invest in all the facilities that pass the benefit-cost test. To assist in setting priorities, Attachments 18 and 19 from the Activity 7 TM, in Appendix E, shows

which level of protection is most cost-effective for each facility and ranks the facilities by cost-effectiveness from highest ROI to lowest ROI. The top 25 facilities from this list are shown in Table 8-2.

- Some facilities may be at risk sooner rather than later. To further refine priorities the list of such facilities can be cross-referenced against the priority ranking in Table 6-1 and Appendix E, *Activity 5, Facility Risk Assessment Technical Memorandum*.

There are a few caveats in applying these results to investment decisions.

- It might be beneficial to separately rank each type of facility for a fairer comparison.
  - The benefits of the chilled water facilities and the WWTPs are underestimated because, at JEA's request, they do not include any of the avoided risk of business losses.
  - The benefits of the WTP improvements are underestimated because the business losses were limited to a shutdown of 1 day.
- JEA costs of operating and maintaining the improvement measures were not included, thus costs are underestimated.
- Other benefits that were not included in the Benefit/Cost Assessment (BCA) such as JEA emergency response costs, avoided risk of loss of service to residential customers, and avoided costs to JEA to restart facilities after shutdown have the effect of underestimating benefits.

9. Design and Construction Standards

The existing design and construction standards for JEA were reviewed to identify and address any potential resilience-related gaps, conflicts, or opportunities for alignment with JEA's advancing position on flood risk reduction, system reliability, and operational continuity to the increasing flood threat posed by severe weather and climate change. In addition to reviewing the existing standards to enhance water, wastewater, chilled water, and reclaimed water system resilience, new resilience standards and implementation guidance were developed and are recommended for consideration by JEA. Appendix H contains the *Industry Best Practices/Benchmark Assessment Technical Memorandum* submitted to JEA.

The standards reviewed included:

- Water and Wastewater Standards Manual (January 2020)
- Water Treatment Plant Standards Manual (January 2020; Draft)
- Wastewater Manhole Standards (January 2018)
- Rules and Regulations for Water, Sewer, and Reclaimed Water Services (November 2017)
- Detail Sheet – JEA Pump Station Site-Specific Sheets Master (January 2020)
- Detail Sheet – JEA Pump Station Standard Sheets Master (January 2020)
- Detail Sheet – JEA Wastewater Details (January 2020)
- Detail Sheet – JEA Water and Reclaimed Details (January 2020)

The recommendations discussed are intended to inform modifications to the existing design standards or development and adoption of new design standards by JEA and to guide their application for planning and design of facility upgrades, rehabilitations, and new capital projects to reduce flood risk and build resilience across the JEA water utility enterprise. Additional information, including a full list of recommended revisions to existing standards, can be found in Appendix I, *Activity 9, Design and Construction Standards Review Technical Memorandum*.

9.1 Existing Standards Review

The review of the existing JEA potable water, wastewater, chilled water, and reclaimed water system standards was performed to identify opportunities for enhancement of the standards to mitigate the potential adverse effects resulting from flood and other severe weather events causing service interruptions because of equipment damage and disruptions to system operations. This review of JEA standards includes those standards, details, and guiding documents provided by JEA and those obtained from the JEA website.

The following strategies are our general recommendation to reduce flood risk and increase system reliability against current and future severe weather events:

- Backflow preventers, where applicable for older buildings built prior to plumbing code requirement of building FF 18" above manhole rim, to prevent backup of wastewater into applicable buildings,
- Dual/redundant electrical power supply and communications for all critical electrical and I&C panels,
- Avoid use of ductile iron pipe; replace with polyvinyl chloride (PVC) for buried pipe and stainless steel for above ground,
- Elevate or floodproof flood sensitive equipment and buildings above the minimum design elevation recommended in the *Flood Risk Reduction Implementation Guide* to address projected future climate change conditions as mapped out in Activity 3,
- Seal electrical and control boxes using water-tight connections or submersible equipment.

9.2 New Resilience Standards

New design standards recommendations presented to JEA for consideration are intended to reduce flood risk and increase reliability of JEA water, wastewater, reclaimed water, and chilled water systems. They are intended to inform the development of new design standards that will apply to both existing facilities and new capital projects.

These new design standards include Electrical and I&C, Wastewater Conveyance System Improvements, Flood Risk Reduction Standards, Flood Risk Reduction Implementation Guide, and Mitigating Other Natural Hazards.

- The electrical and I&C system recommendations include application of a single, centralized backup generator power station to serve an entire facility and closed-loop transition from primary power to backup power.
- The wastewater conveyance system improvements consist of recommendations, including calibration of the WRF hydraulic models for both dry- and wet-weather flow and provisions for installation of influent flowmeters for new and rehabilitated WRFs.
- The flood risk reduction standards, further described in the *Flood Risk Reduction Implementation Guide*, provide guidance related to the minimum design elevations and associated standards for reducing flood risk and incorporating resilience into the design of both rehabilitation and new construction projects across JEA's water utilities
- Mitigation of other natural threats was also recognized as a critical component of reducing risk and improving reliability of the various water systems, resulting in actions to mitigate high wind and flying debris, lightning, extreme heat, wildfire and building fire, and drought.

The previous considerations and recommendations are provided for awareness, as local and state regulations have historically driven the design criteria used by JEA designs. However, the new standards and recommendations within this document exceed local and state requirements, in some cases, to position JEA's facilities for future severe weather conditions anticipated over the service life of the assets.

Monitoring of these local and state regulations is recommended as there are changes underway that are expected to become policy in the next couple of years.

9.3 Facility Lookup Tool

Once a facility is selected for upgrades or enhancements as part of the rehabilitation and replacement (R&R), operations and maintenance (O&M), or capital programs, the first step is to collect all relevant data required to determine what assets require intervention. Jacobs has developed a new Facility Lookup Tool that will allow JEA's asset management team to quickly provide additional, necessary data, such as the lowest asset elevation or flood pathway, to JEA Project Managers (PMs) to prepare a project description that mitigates a broader range of facility vulnerabilities and provides guidance on minimum design criteria and overall resilience. Refer to Appendix M, *Facility Lookup Tool and User Guide*.

This tool has been set up using a Microsoft Excel database to allow an easy link to JEA's eAM system and for quick filtering of facilities for use by JEA during this early phase of facility review. The draft Facility Lookup Tool has been provided to JEA, for review.

Key Findings and Considerations:

- In some cases, the new standards and recommendations within this document exceed local and state requirements.
- The City of Jacksonville has begun a stormwater masterplan update intended to reflect the elevated boundary conditions resulting from SLR and the rainfall projections prepared as part of JEA's Resiliency Program.
- The Florida Building Code (FBC) adopted the 2015 International Building Code with amendments. After Hurricane Michael in 2018, the FBC wind map is being revisited for possible revision. By moving to a more robust design standard now, JEA can be ahead of the curve and prepare for the anticipated, more aggressive standards.
- Create a dedicated web page that lists all standards documents on one page with adoption dates and that maintains previous versions, grouped based on the intended user or function of the document, with a short preamble that describes the intent of each document group. This "one-stop shop" site will help ensure that developers and designers are always using the latest versions of these documents.
- Reinforce the need to provide external-facing education and awareness through workshops, fact sheets, and easy to follow "how-to" guides that describe the new process of identifying and mitigating flood and other risks for each project.
- JEA should review all guidance documents, processes, and policies to ensure alignment with the new standards and the broader changes to the process of incorporating resilience into all JEA capital projects.
- Continue coordination with the City of Jacksonville regarding stormwater management policies and flood risk reduction projects.
- Enhance hurricane design criteria mimicking the Miami-Dade County design wind speed.
- Consolidation of JEA standards for ease of use and to prevent duplication of information.
- Discuss possible update to JEA PM Handbook, staff training, and development of JEA policy with appropriate JEA committee or board to communicate leadership position on planning and designing for climate change to ensure consistent application across the enterprise.
- Engage stakeholders on JEA's position to enhance design standards to inform standards updates to improve contractor and external awareness of the intent behind the new more robust standards and approved adoption and compliance.

10. Capital Project Prioritization

Jacobs assisted JEA with determining prioritization criteria for their capital projects as part of the Water and Wastewater Capital Program. A workshop was held to determine the prioritization criteria that were most important to JEA and align with JEA's corporate values. These prioritization criteria were modified and applied to the improvement projects from each TO that were combined with the resilience projects to address the broader needs and vulnerabilities for each facility. A score was assigned to each combined resilience capital project for these five prioritization criteria:

- Capacity/System Growth
- Level of Service Improvement
- Redundancy/Operational Flexibility
- Environmental Impact
- Cost Effectiveness

Full criteria descriptions and prioritization weightings can be found in Appendix J, *Activity 10, Capital Project Prioritization Technical Memorandum*.

10.1 Project Prioritization and Phasing

To prioritize capital improvement projects identified, information was compiled from TOs 3, 4, 5, 10, 12, 15, and 16 of the Resiliency Program. A total of 240 JEA facilities were evaluated.

Figure 10-1 shows the number of facilities containing recommended improvements, recognizing that there is some overlap between the TOs. The facilities with recommendations were moved forward to be prioritized as projects. In some cases, projects at a single facility were kept separate, such as with the Buckman WRF, which has two projects since the outfall rehabilitation project requires a specialty contractor and would not fit well with the other recommendations at the Buckman WRF.

Once the potential projects were determined, the analysis reviewed whether JEA has an existing project that will address the recommendations made in the resilience TOs. If the existing project will address the resilience recommendations, the resilience project was excluded from the prioritization. Following the analysis, a total of 170 projects were moved into the prioritization.

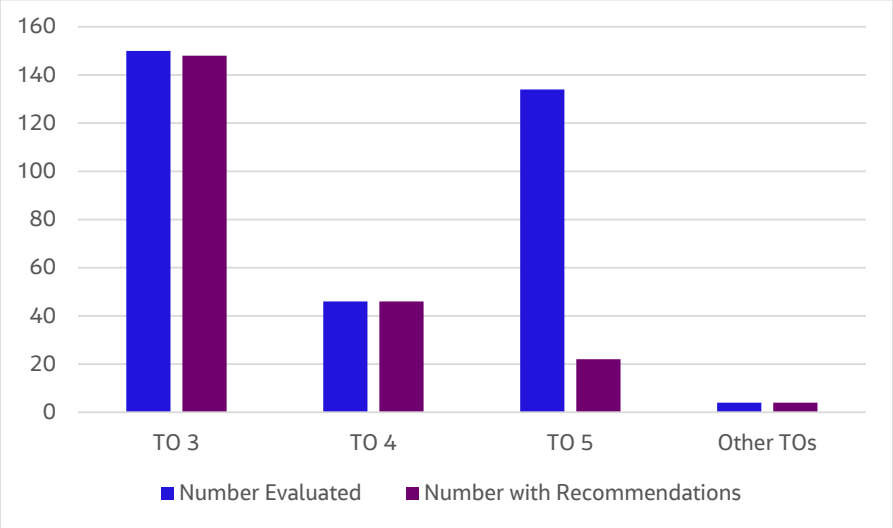


Figure 10-1. Number of Facilities Evaluated and with Recommendations in Each Task Order

Prioritization scores for each of the five prioritization criteria were determined for each project selected under the Resiliency Program. The Capacity/System Growth criterion is used to indicate that a specific project will increase the capacity of the wastewater collection or treatment system since TO 5 was the only Resiliency Program TO that focused on capacity and was only focused on the wastewater system. The Level of Service Improvement criterion was scored based upon the magnitude of a reduced risk of flooding and applied to projects from TO 3, TO 4, or TO 5. The Redundancy/Operational Flexibility criterion was scored based upon the reduction in O&M costs resulting from the project. The Environmental Impact criterion was scored based on a project mitigating historical SSOs, including those experienced during Hurricanes Matthew and Irma. The Cost Effectiveness criterion was scored based on capacity improvements identified, generator/motor control center (MCC) replacement improvements identified, and results of the benefit-cost analysis for TO 3 recommendations.

Once each project had a score for each of the five criteria, a spreadsheet was used to calculate the scores and prioritize the 170 projects. The spreadsheet tool was used to perform a sensitivity analysis to evaluate the impact on the rankings of projects based on the following potential weightings:

1) Equal weighting
2) Cost Effectiveness and Redundancy/Operational Flexibility focus
   a) Cost Effectiveness and Redundancy/Operational Flexibility are weighted at 100 percent
   b) Other criteria are weighted at 33 percent
3) Level of Service focus
   a) Level of Service is weighted at 100 percent
   b) Other criteria are weighted at 25 percent
4) The final weighting based on the average of these three was:
   a) Capacity/System Growth: 16 percent
   b) Level of Service Improvement: 23 percent
   c) Redundancy/Operational Flexibility: 23 percent
   d) Environmental Impact: 16 percent
   e) Cost Effectiveness: 23 percent

While there is some difference observed within the rankings, the average ranking, equal weighting, and the average of all weightings produced similar results. Therefore, the prioritized list is based on the equal weighting that was originally presented by JEA.

10.2 Priority Capital Project List Descriptions

Table 10-1 shows the projects that were ranked in the top 20 based on the equal weighting criteria. The priority assigned to each project in Table 10-1 and Appendix J, *Activity 10, Capital Project Prioritization Technical Memorandum* was determined based on the JEA scoring presented in Appendix J. Refer to Appendix K for the Electrical and I&C Systems Assessment and Appendix L for the Wastewater Systems Hydraulic Capacity Assessment.

Table 10-1. Prioritized List of Resiliency Projects

Ranking	Facility Name	Priority	Project Type
1	Arlington East WRF	High	Electrical and I&C upgrades (TO 4); Capacity upgrades (TO 5); Effluent PS rehabilitation/upgrades (TO 16)
2	Buckman WRF	High	Flood resilience upgrades (TO 3); Electrical and I&C upgrades (TO 4); Capacity upgrades (TO 5)
3	210 Hollybrook Avenue	High	Flood resilience upgrades (TO 3); Capacity upgrades (TO 5)
4	Monterey WRF	Medium-High	Flood resilience upgrades (TO 3); Electrical and I&C upgrades (TO 4); Electrical switchgear replacement/ generator addition, influent backup pump, and containment pond (TO 15)
5	Southwest WRF	Medium-High	Flood resilience upgrades (TO 3); Electrical and I&C upgrades (TO 4); Capacity upgrades (TO 5)
6	2045 Utah Avenue	Medium-High	Flood resilience upgrades (TO 3)
7	Buckman WRF Outfall	Medium-High	Rehabilitation of outfall pipe (TO 12)
8	River Oaks Potable Repump Station	Medium-High	Electrical and I&C upgrades (TO 4)
9	Main Street WTP	Medium-High	Flood resilience upgrades (TO 3); Electrical and I&C upgrades (TO 4)
10	Hendricks WTP	Medium-High	Flood resilience upgrades (TO 3); Electrical and I&C upgrades (TO 4)
11	1023 Laura Street North	Medium-High	Flood resilience upgrades (TO 3)
12	12733 Abess Boulevard	Medium-High	Electrical and I&C upgrades (TO 4)
13	9898 Gate Parkway N	Medium-High	Capacity Upgrades (TO 5)
14	Mayport WTP	Medium	Flood resilience upgrades (TO 3)
15	Arlington Potable Booster Pump Station	Medium	Electrical and I&C upgrades (TO 4)
16	8617 Western Way	Medium	Flood resilience upgrades (TO 3)
17	7834 Holiday Road South	Medium-High	Flood resilience upgrades (TO 3); Capacity upgrades (TO 5)
18	Ponce de Leon WWTP	Medium	Flood resilience upgrades (TO 3)
19	St. John's Forest WTP 1	Medium	Flood resilience upgrades (TO 3)
20	7200 AC Skinner Parkway	Medium	Flood resilience upgrades (TO 3)

11. Final Recommendations and Implementation Road Map

Proactively investing in forward-looking, enhanced design standards and capital improvement projects that provide risk reduction and resilience across JEA's infrastructure today will ensure the continuity of these critical services against severe weather events today and over the service life of the assets. Implementing resilience strategies to improve energy and communications reliability, facility hardening, redundancy and adaptive capacity into services and operations, will benefit JEA through improved service and financial performance and improved brand confidence by community leaders and customers.

This section includes the final recommendations resulting from the activities performed within the JEA Resiliency Program, which put JEA on a path to continual improvement in system reliability and performance.

11.1 Final Recommendations

11.1.1 Design Criteria and Standards

With the ongoing and planned capital improvement projects, it is critical that JEA adopts new design standards that reflect the current and anticipated flood risk and seek to minimize potential impacts to JEA's systems over their service life. By doing so, the new policies and standards will leverage all capital expenditures across JEA to consistently promote continual improvement in service reliability and operational continuity.

These new and/or enhanced design standards should include Electrical and I&C, Wastewater Conveyance System Improvements, Flood Risk Reduction Standards, Flood Risk Reduction Implementation Guide, and Mitigating Other Natural Hazards.

- The Electrical and I&C System recommendations include application of a single, centralized backup generator power station to serve an entire facility and closed-loop transition from primary power to backup power.
- The wastewater conveyance system improvements consist of recommendations including calibration of the WRF hydraulic models for both dry- and wet-weather flow and provisions for installation of influent flowmeters for new and rehabilitated WRFs.
- The flood risk reduction standards, further described in the *Flood Risk Reduction Implementation Guide*, provide guidance related to the minimum design elevations and associated standards for reducing flood risk and incorporating resilience into the design of both rehabilitation and new construction projects across JEA's water, wastewater, reclaimed water, and chilled water systems.
- Mitigation of other natural threats was also recognized as a critical component of reducing risk and improving reliability of the various water systems, resulting in actions to mitigate high wind and flying debris, lightning, extreme heat, wildfire and building fire, and drought.

The previous considerations and recommendations are provided for awareness, as local and state regulations have historically driven the design criteria used by JEA designs. However, the new standards and recommendations within this document exceed local and state requirements, in some cases, to position JEA's facilities for future severe weather conditions anticipated over the service life of the assets.

11.1.2 Capital Projects

The implementation of these capital projects may require phasing to align with available budgets and management resources with a focus on the most critical systems and those facilities with the highest vulnerabilities to support continued reliable service delivery and avoidance of SSOs.

The following is a list of recommended capital projects prioritized based on the select performance metrics and organized by overall importance for near term implementation and mid-term planning.

- Immediate projects (8 ongoing projects, estimated at a combined cost of $500,000 to $700,000)
  - Defined as improvements to ongoing or planned projects
- Near-term (13 projects/facilities, estimated at a combined cost of $1.5 million to $2.5 million)
  - Defined as Projects/Facilities designated as High and Med-High priority per prioritized CIP list
  - Critical facilities at risk of flooding today (within the current 100- and 500-year flood zones) or identified as having an immediate need for capital investment to maintain operation.
- Mid-term (49 projects/facilities, estimated at a combined cost of $2.0 million to $4.0 million)
  - Defined as Projects/Facilities designated as Medium and Med-Low priority per prioritized CIP list
- Long-term (109 projects/facilities, estimated at a combined cost of $1.5 million to $3.0 million)
  - Defined as Projects/Facilities designated as Low priority per prioritized CIP list
  - General enhancements to system reliability and redundancy for lower criticality facilities with lower vulnerabilities

The costs ranges presented herein represent the difference between building to Flood Scenario 2 versus Flood Scenario 7. While these costs do not include equipment replacement or specialty repairs, they summarize the probable construction cost additions to facility rehabilitation projects to incorporate flood risk reduction, hardening, and system redundancy to improve overall reliability and flood resilience.

While this list provides a general order of project priority for implementation, additional considerations are warranted that may affect the order of implementation as discussed in Section 11.1.3, Project Timing and Sequencing. Table 11-1 lists the top priority facilities/capital projects recommended.

Table 11-1. High-Priority Capital Projects

Facility Name	Priority	Project Type
Arlington East WRF	High	Electrical, I&C, capacity, and effluent pump station
Buckman WRF	High	Flood risk reduction, Electrical, I&C, and capacity
210 Hollybrook Avenue	High	Flood risk reduction and capacity
Monterey WRF	Medium-High	Flood risk reduction, electrical, I&C, influent pumping, and containment pond
Southwest WRF	Medium-High	Flood risk reduction, electrical, I&C, and capacity
2045 Utah Avenue LS	Medium-High	Flood risk reduction
Buckman WRF Outfall	Medium-High	Outfall rehabilitation
River Oaks Potable Repump Station	Medium-High	Electrical and I&C upgrades
Main Street WTP	Medium-High	Flood risk reduction, electrical, and I&C upgrades
Hendricks WTP	Medium-High	Flood risk reduction, electrical, and I&C upgrades
1023 Laura Street North LS	Medium-High	Flood risk reduction
12733 Abess Boulevard	Medium-High	Electrical and I&C upgrades
9898 Gate Parkway North	Medium-High	Capacity upgrades

11.1.3 Project Timing and Sequencing

A review of project timing and sequencing is outside the scope of this project but is recommended along with a review of ongoing O&M and CIP projects and an analysis of alternative funding and financing mechanisms to support the development of an updated capital plan to implement the recommended capital projects.

The recommended capital projects include improvements to multiple systems combined into a single project to capture cost savings and other synergies between the improvements; however, where applicable, some improvements may be able to be deferred to focus available budget on the most critical aspects of each facility. This requires a design-level evaluation of each recommended project to further prioritize these improvements for the most critical and vulnerable equipment at a given facility.

Coordination between the recommended projects and the ongoing and planned capital projects is critical to ensure the best use of available funding to meet near term needs and maintain operations of critical infrastructure. This also ensures that there is no duplication of efforts and that projects that impact other facilities and assets are identified early to promote overall system performance and avoid unintended consequences.

Other considerations for sizing and sequencing recommended capital projects may include:

- Projects focused on improving existing capacity
- Seasonal demands/flows
- Projects in support of new developments to meet planned demands
- Available budgets and financing capacity
- Project sizing for procurement, management, and resource allocation
- Project sizing for emergency ingress/egress

11.2 Funding and Financing Alternatives

Various funding and financing mechanisms are available to support the implementation of these capital projects, including utility rate review, state and federal grants (including CDBG Rebuild Florida Mitigation Grant and FEMA Mitigation Funding under the new BRIC program), low-interest state revolving funds and federal stimulus program funding. Evaluation of these alternative funding sources is outside of the scope of this project but would be a good next step in developing the phasing and timing of the project implementation.

11.3 Industry Best Practices and Benchmark Assessment

As part of the JEA Resiliency Program, Jacobs researched ongoing resilience best practices for 13 utilities across the United States to establish an industry-based performance benchmark and influence the program for JEA's benefit based on lessons learned from other utilities. This section provides a brief summary of the findings from that effort.

In collaboration with JEA, several climate resilience related categories were selected for the literature search and for the benchmarking with peer utilities. The working group selected 13 utilities to be queried about climate resilience activities. However, when contacted by Jacobs to complete a questionnaire, many of them declined to respond. Nevertheless, Jacobs was able to gather information on their resilience measures and suggested metrics for the purposes of establishing a performance benchmark.

Many of the 13 utilities researched are using climate models to forecast precipitation and SLR to determine flood elevations. Some have also developed, or are developing, decision-making frameworks and tools to address the uncertainties of future extreme weather events, along with planning the timing and extent of investments for implementing resilience measures. These measures are being used by each of the utilities to mitigate potential impacts of extreme weather events related to their ability to provide reliable utility services.

Identifying and understanding how fellow members of the water and wastewater utility sector are addressing severe weather and climate-related risks provides valuable guidance in planning JEA's mitigation strategies and operational tactics for protecting its infrastructure, employees, and customers. These suggested metrics, seen in Table 11-2, allow JEA to engage in adopting climate models or decision-making frameworks for evaluating progress to become more resilient to the impacts of extreme weather events.

Table 11-2. Suggested Metrics to Measure Progress Toward Risk Reduction and Resilience

Metric	Reported As	Frequency	Calculation
Number of SSOs	Number per 100 miles of pipe	Monthly	(Total number of SSOs during the month) x 100 Total number of miles of gravity sewers and force mains
Quantity of SSOs	Gallons per 100 miles of pipe	Monthly	(Total gallons of SSOs during the month) x 100 Total number of miles of gravity sewers and force mains
SSOs at Wastewater Pump Stations Due to Power Loss	Percentage	Monthly	(Total gallons of SSOs during the month) Total number wastewater pump stations
Onsite Generators with Auto-transfer or Pony Pumps at Pump Stations	Percentage	Annually	Number of pump stations having onsite generators with automatic transfer or pony pumps Total number of pump stations
Pump Station Lightning Protection	Percentage	Annually	Number of pump stations having lightning protection compliant with NFPA standards Total number of pump stations
Inflow and Infiltration by WWTP Sewershed	Percentage	Annually	Refer to U.S. Environmental Protection Agency (EPA)'s *Quick Guide for Estimating Infiltration and Inflow* or other acceptable methodology
Flooding Potential at 100-year Flood (Buildings)	Percentage	Annually	Number of buildings with first floor elevation and/or penetrations below 100-year floodplain Total number of buildings
Flooding Potential at 500-year Flood (Buildings)	Percentage	Annually	Number of buildings with first floor elevation and/or penetrations below 500-year floodplain Total number of buildings
Flooding Potential at 100-year Flood (Equipment)	Percentage	Annually	Number of locations with non-submersible equipment vulnerable to 100-year flood Total number of locations with mechanical, electrical, and/or IT equipment
Flooding Potential at 500-year Flood (Equipment)	Percentage	Annually	Number of locations with non-submersible equipment vulnerable to 500-year flood Total number of locations with mechanical, electrical, and/or IT equipment
Access to Critical Facilities at 100-year Flood	Percentage	Annually	Number of critical facilities that would be inaccessible at a 100-year flood Total number of critical facilities
Access to Critical Facilities at 500-year Flood	Percentage	Annually	Number of critical facilities that would be inaccessible at a 500-year flood Total number of critical facilities
Access to Hydrants at 100-year Flood	Percentage	Annually	Number of hydrants that would be inaccessible at a 100-year flood Total number of hydrants
Access to Hydrants at 500-year Flood	Percentage	Annually	Number of hydrants that would be inaccessible at a 500-year flood Total number of hydrants
Boil Water Advisories Not Associated with Main Breaks	Number	Annually	Number of boil water advisories issued due to low pressure or no water not associated with main breaks
Customers Affected by Boil Water Advisories Not Associated with Main Breaks	Affected customers per 10,000 accounts	Annually	(Number of customer accounts affected by boil water advisories due to low pressure or no water not associated with main breaks) x 10,000 Total number of customer accounts

Table 11-2. Suggested Metrics to Measure Progress Toward Risk Reduction and Resilience

Metric	Reported As	Frequency	Calculation
Change in Wellfield Chloride Levels	Percentage increase in chlorides in each wellfield	Monthly	(Concentration of chlorides in current month) – (Concentration of chlorides in previous month) / Concentration of chlorides in previous month
Change in Wellfield Total Dissolved Solids (TDS) Levels	Percentage increase in TDS in each wellfield	Monthly	(Concentration of TDS in current year) – (Concentration of chlorides in previous year) / Concentration of TDS in previous year

11.4 Stakeholder Engagement

The addition of new resilience standards will be disruptive to the local development community and JEA contractors, requiring education and awareness communications to promote compliance and a smooth transition. As part of the Resiliency Program, the Jacobs team reviewed multiple ongoing JEA projects and provided guidance related to reducing flood risk and building system resilience. These guidance memorandums were received by JEA PMs with mixed reviews, and many questions arose since they exceeded the current regulatory requirements and JEA policies. This same response is anticipated by contractors outside of the JEA organization, reinforcing the need to provide external-facing education and awareness.

This education and awareness would be provided through workshops, fact sheets, and easy to follow "how-to" guides that describe the new process of identifying and mitigating flood and other risks for each project. This stakeholder engagement will prove invaluable to JEA by helping to mitigate potential project cost increases and delays and by streamlining the design and approval process for projects.

For internal stakeholders, including JEA PMs, operators, and grid and plant managers, a position statement and fact sheet is highly recommended that states JEA leadership's position on resilience and how it should be embraced and incorporated into all aspects of JEA operations, including planning, design, construction, operations, and maintenance of JEA assets and facilities. This important educational campaign will ensure that all projects are performed consistently to capture the most value for JEA while positioning JEA's systems for continued reliability in the face of an uncertain climate and severe weather future.

Like most organizations, JEA staff may rely on additional guidance documents and procedures to support JEA PMs in developing and delivering projects. It is recommended that all guidance documents, processes, and policies be reviewed by JEA to ensure alignment with the new standards and the broader changes to the process of incorporating resilience into all JEA capital projects.

11.5 Plan Maintenance and Update Frequency

Under the Global Change Research Act of 1990, the U.S. National Climate Assessment (NCA) is commissioned by U.S. Congress to consider future SLR trends and synthesize current scientific literature on global SLR into a report published every 4 years. The NCA is a multi-agency effort, led by NOAA, providing SLR scenarios that can be used for assessing potential impacts. Global SLR scenarios are influenced by two main factors, which include thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets (https://oceanservice.noaa.gov/facts/sealevel.html).

As climate and severe weather conditions continue to evolve, updates to this JEA Resilience Plan and the corresponding flood elevations will be required. It is recommended that this plan be updated no less than every 4 to 5 years to coincide with the release of new climate scenarios and SLR projections as published by NOAA and the NCA. Updated rainfall and tidal data should also be used in concert with the updated projections. The plan

update should also reflect changes in other data inputs from local sources, including new policies and regulations, design guidance, or direction from the JEA board. They should also consider impacts on current recommendations, minimum design standards, and JEA priorities for capital investment.

Data inputs that may drive the update frequency of this Implementation Guide, include:

- New SLR projections by USACE, NOAA, NCA, Intergovernmental Panel on Climate Change (IPCC), and other scientific organizations
  - Typically updated every 4 to 5 years; may include locally adopted projections
- New ground surface elevation data from updated surface digital elevation model (DEM)
  - Light detection and ranging (LiDAR) surface mapping is typically performed every 5 years to reflect changes in land form from development expansion
- Updated water levels used as boundary conditions from tide gauges along the St. Johns River
- Updated rainfall data, based on latest NOAA Atlas 14 local rain gauge data
- Updated rainfall projections
- Updated stormwater or flood modeling results by City of Jacksonville or St. Johns River Water Management District (SJRWMD)
- Updated USACE St. Johns River dredging project information, including river depths and water level modeling
- Updated FEMA flood mapping information, with upcoming release of Risk Map 2.0
- Updated NHC sea, lake, and overland surge from hurricane, maximum of maximums (SLOSH MOM) surge modeling
- Storm events (rainfall and surge) that cause damage to JEA facilities or other property in the service area

12. Complete Evaluated Facility List

The following is a full list of JEA facilities evaluated as part of this study, with performance metrics used to prioritize projects/facilities. An excel spreadsheet containing this information has also been submitted to JEA.

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium /Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
10182 BRADLEY RD	30.31246828	-81.53566278	Lift Station	Low	107	$ 18,200	5	1	Yes	Yes	$ 16,000	-0.61	141	$ 16,000	-0.61	136	$ 20,300	-0.21	124
1023 LAURA ST N	30.335154	-81.65669196	Lift Station	Medium-High	12	$ 91,800	9	5	Yes	Yes	$ 42,700	24.97	10	$ 42,700	26.07	10	$ 42,700	30.85	9
10410 LAWSON RD	30.32167257	-81.53001536	Lift Station	Low	77	$ 30,800	5	2	Yes	Yes	$ 29,900	2.00	71	$ 29,900	2.01	75	$ 34,100	2.89	80
10468 INDIAN WALK RD	30.18690205	-81.61782146	Lift Station	Low	137				No	No									
10477 BRADLEY RD	30.3130441	-81.52702718	Lift Station	#N/A					No	No									
1060 ELLIS RD N	30.33791606	-81.74375416	Lift Station	Low	78	$ 50,300	5	1	Yes	Yes	$ 2,100	1.84	75	$ 2,100	1.84	77	$ 6,400	6.68	36
10656 KENNEDY LN	30.1617561	-81.62568904	Lift Station	Low	92	$ 83,200	14	2	Yes	Yes	$ 52,300	1.23	84	$ 52,300	1.24	85	$ 56,600	1.80	93
10797 FT CAROLINE RD	30.35719271	-81.52168191	Lift Station	Low	141	$ 200	2	1	No	No	$ -	0.00	104	$ 18,100	-0.80	141	$ 20,300	-0.82	137
1108 BARNWELL RD	30.649516	-81.51146365	Vacuum Station	Low	125	$ 16,300	6	1	Yes	Yes	$ -	0.00	104	$ 6,200	0.37	102	$ 59,000	-0.72	135
10837 BLUE PACIFIC CT	30.18127939	-81.56311475	Lift Station	Low	79	$ 19,500	10	1	Yes	Yes	$ 2,100	6.90	29	$ 2,100	7.12	31	$ 10,700	2.26	87
11035 CREEKWOOD DR	30.16973692	-81.53723569	Lift Station	Low	109	$ 16,600	5	1	Yes	Yes	$ 10,700	1.23	85	$ 10,700	1.23	86	$ 12,900	2.01	89
11082 BECKLEY PL	30.27708014	-81.53027205	Lift Station	Low	156	$ 2,300	2	1	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 2,100	-0.61	133
11220 ALUMNI WY	30.27512086	-81.52776818	Lift Station	Low	142	$ 7,000	3	1	Yes	Yes	$ 4,300	-0.45	138	$ 4,300	-0.45	133	$ 6,400	0.12	121
11247 BEACON DR	30.37899291	-81.51559964	Lift Station	Low	80	$ 45,700	4	1	No	Yes	$ 10,700	2.27	66	$ 10,700	3.25	55	$ 10,700	3.25	72
11260 BEACH BV	30.28473131	-81.52974324	Lift Station	Low	110	$ 111,400	7	1	Yes	Yes	$ 16,000	1.07	86	$ 16,000	1.07	88	$ 45,900	1.03	102
11305 HARTS RD	30.43986965	-81.65969695	Lift Station	#N/A	#N/A	$ 490,500	18	4	Yes	Yes	$ 101,000	2.12	68	$ 113,600	3.41	51	$ 117,000	3.29	69
1140 KNOLL DR W	30.30213871	-81.7804539	Lift Station	Low	81	$ 18,500	4	1	Yes	Yes	$ 2,100	4.89	36	$ 2,100	4.89	38	$ 8,600	1.54	94
1202 BUNKER HILL BV	30.39498388	-81.67791969	Vacuum Station	Medium	26	$ 3,229,400	41	5	Yes	Yes	$ 120,200	25.88	9	$ 129,800	23.89	11	$ 137,900	22.43	13
130 METZ ST	30.31569875	-81.58134452	Vacuum Station	Medium-Low	46	$ 1,169,600	19	4	No	No	$ 82,900	8.12	26	$ 82,900	8.83	25	$ 82,900	8.83	28
11452 RENNE DR W	30.44452759	-81.63722623	Lift Station	Low	108	$ 75,100	7	1	No	No	$ 18,100	1.75	76	$ 18,100	1.85	76	$ 20,300	2.93	79
11604 ST JOSEPH RD	30.16217252	-81.6064413	Lift Station	Low	111	$ 41,700	5	1	Yes	Yes	$ 10,700	2.67	62	$ 10,700	2.67	66	$ 10,700	3.59	66
12733 ABESS BV	30.32194624	-81.47625341	Lift Station	Low	74				No	No									
13383 TROPIC EGRET DR	30.30642366	-81.45527191	Lift Station	Low	98				No	No									
14041 BARTRAM PARK BV	30.12251765	-81.5268842	Lift Station	Low	102	$ 42,600	11	1	No	No	$ 26,700	0.26	97	$ 26,700	0.57	98	$ 42,700	0.26	119
14600 CEDAR ISLAND DR	30.27505624	-81.42999594	Lift Station	Low	126	$ 68,800	16	2	Yes	Yes	$ 4,300	-0.79	142	$ 53,500	-0.23	130	$ 57,800	1.29	99
14802 BARTRAM PARK BV	30.11012666	-81.51866767	Lift Station	Low	103	$ 31,500	10	1	No	No	$ 12,900	0.24	98	$ 12,900	0.24	106	$ 28,900	-0.05	122
1509 EL PRADO RD	30.293447	-81.58019998	Lift Station	Low	67	$ 104,500	16	3	Yes	Yes	$ 22,400	5.16	33	$ 69,500	1.25	84	$ 69,500	2.65	84

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium/Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
1520 HAMMOND BV	30.2952336	-81.79840747	Lift Station	Low	127	$ 28,000	5	1	Yes	Yes	$ 10,700	0.45	94	$ 10,700	0.45	100	$ 10,700	1.37	98
1530 BROWARD RD	30.41892074	-81.6687035	Lift Station	Low	128	$ 31,800	6	1	Yes	Yes	$ 12,900	0.26	96	$ 12,900	0.94	91	$ 12,900	1.46	96
1636 TALLEYRAND AV	30.34351553	-81.62875199	Lift Station	#N/A	#N/A	$ 347,800	7	5	No	No	$ 29,700	52.57	5	$ 29,700	52.57	5	$ 29,700	52.57	7
1646 45TH ST W	30.37255124	-81.6826702	Lift Station	Low	129	$ 32,000	5	1	Yes	Yes	$ 8,600	1.03	88	$ 10,700	0.67	96	$ 10,700	1.85	92
1705 HODGES BV	30.32012553	-81.45621586	Lift Station	Low	82	$ 45,700	4	1	Yes	Yes	$ 2,100	3.42	45	$ 4,300	3.09	58	$ 16,000	1.46	97
1920 BISHOP ESTATES RD	30.12809902	-81.61511737	Potable Water Booster Station	Low	112	$ 34,900	1	1	No	No	$ -	0.00	104	$ 15,300	1.27	83	$ 21,500	0.62	111
1706 BOULEVARD AV	30.34520432	-81.66165131	Lift Station	Medium	27	$ 71,900	7	3	No	Yes	$ 12,900	26.53	8	$ 12,900	26.57	9	$ 26,700	17.09	17
1818 WILLOWBRANCH TERRACE	30.30310931	-81.69557989	Lift Station	Low	157	$ -	0	0	No	Yes	$ -	0.00	104	$ 2,100	-1.00	144	$ 24,600	-1.00	141
1888 POWELL PL	30.30533994	-81.69067903	Lift Station	Low	143	$ 16,000	5	1	Yes	Yes	$ 8,600	-0.23	134	$ 10,700	-0.04	127	$ 10,700	0.64	109
1894 CHALLEN AV	30.2972495	-81.69920625	Lift Station	Low	130	$ 22,500	6	1	Yes	Yes	$ 12,900	0.00	103	$ 12,900	0.40	101	$ 12,900	0.75	107
1990 GREENWOOD ST	30.28909979	-81.70575037	Lift Station	Low	113	$ 87,300	7	1	Yes	Yes	$ 26,700	-0.26	136	$ 26,700	0.63	97	$ 26,700	2.27	86
2004 LA VACA RD	30.25285532	-81.63929214	Lift Station	Low	144	$ 17,400	5	1	Yes	Yes	$ 2,100	1.61	78	$ 10,700	-0.19	129	$ 10,700	0.62	110
2010 LEWIS INDUSTRIAL DR	30.3487671	-81.73889476	Lift Station	Low	158	$ 6,700	2	1	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 4,300	8.52	30
2045 UTAH AV	30.31332441	-81.64646248	Lift Station	Medium-High	7	$ 422,900	28	5	Yes	Yes	$ 50,500	93.81	3	$ 54,400	100.68	1	$ 54,400	135.28	2
2084 ST JOHNS PY	30.08844387	-81.53456356	Lift Station	Low	159	$ 45,700	9	1	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 24,600	0.43	114
253 STATE RD A1A N	30.2395852	-81.3864102	Vacuum Station	#N/A	#N/A	$ 202,000	15	2	No	No	$ -	0.00	104	$ -	0.00	111	$ 25,700	4.96	50
2732 SCOTT MILL LA	30.17925891	-81.63680827	Vacuum Station	Medium-Low	47	$ 583,400	18	4	Yes	Yes	$ 64,300	4.11	40	$ 64,300	8.53	27	$ 86,400	6.10	41
2740 CR 210	30.06410491	-81.52911369	Booster Lift Station	Low	94	$ 29,000	8	1	Yes	Yes	$ 6,700	-0.81	143	$ 6,700	-0.81	142	$ 37,600	-0.41	128
210 HOLLYBROOK AV	30.32792384	-81.6989816	Lift Station	Medium-High	6	$ 1,122,900	22	5	Yes	Yes	$ 37,100	23.02	12	$ 37,100	23.03	12	$ 49,500	28.48	10
2111 COLE FLYER RD	30.48766873	-81.67869739	Lift Station	Medium-Low	52				No	No									
2251 MCCOY CREEK BV	30.32794703	-81.68668728	Lift Station	Medium-Low	39	$ 70,400	6	3	Yes	Yes	$ 24,600	10.39	21	$ 24,600	10.42	23	$ 24,600	13.69	21
2304 MCMILLAN ST	30.3515873	-81.69167534	Lift Station	#N/A					No	No									
2391 BREST RD	30.27813938	-81.57989498	Lift Station	Low	114	$ 141,800	6	2	Yes	Yes	$ 26,700	1.87	73	$ 26,700	2.45	69	$ 26,700	4.37	56
2415 D ST	30.37564824	-81.70203576	Lift Station	Low	93	$ 14,000	3	1	No	No	$ 4,300	3.48	44	$ 4,300	3.48	49	$ 6,400	3.25	71
2520 ORANGE PICKER RD	30.14917723	-81.64515127	Lift Station	Low	99				No	No									
2588 Lofberg Dr	30.27443929	-81.58449672	Lift Station	#N/A					Yes	Yes									
2809 5TH ST W	30.34405462	-81.71438598	Lift Station	Medium-Low	53	$ 402,000	13	3	No	No	$ 17,200	6.09	30	$ 17,200	6.09	33	$ 37,500	7.48	34
3231 HERMITAGE RD E	30.35883748	-81.57933464	Lift Station	Low	115	$ 52,000	5	1	Yes	Yes	$ 34,100	0.14	100	$ 34,100	0.16	108	$ 34,100	0.44	113
3254 TOWNSEND BV	30.35966453	-81.57899058	Lift Station	#N/A	#N/A	$ 340,000	9	3	Yes	Yes	$ 140,900	0.87	90	$ 140,900	0.87	92	$ 154,200	1.12	100

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium /Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
3300 SAN PABLO RD S	30.285206	-81.43792181	Lift Station	Medium-Low	40	$ 19,000	4	2	Yes	Yes	$ -	0.00	104	$ 4,300	28.90	8	$ 8,600	16.76	18
331 LAURINA ST	30.30899325	-81.58679059	Lift Station	Low	68	$ 117,700	6	2	Yes	Yes	$ 22,400	2.30	64	$ 24,600	3.80	45	$ 24,600	3.80	61
3431 KERNAN BV S	30.28400394	-81.48981632	Lift Station	Low	83	$ 15,000	7	1	Yes	Yes	$ 4,300	4.62	38	$ 4,300	4.65	39	$ 6,400	5.83	45
3650 SALISBURY RD	30.26128424	-81.597367	Lift Station	Low	84	$ 54,800	9	3	Yes	Yes	$ 29,900	1.51	80	$ 29,900	1.52	79	$ 44,900	6.10	40
3806 HERSCHEL ST	30.2948653	-81.70977225	Lift Station	Low	85	$ 157,100	14	2	No	Yes	$ 32,000	2.05	70	$ 32,000	2.05	74	$ 34,100	3.01	76
4100 HARBOR VIEW DR	30.39725061	-81.7112421	Lift Station	Medium-Low	54	$ 182,900	4	2	Yes	Yes	$ 20,300	4.62	37	$ 20,300	6.08	34	$ 20,300	8.11	31
4110 ATLANTIC BV	30.30630907	-81.62160704	Lift Station	Low	100				No	No									
4140 KINGSBURY ST	30.30635394	-81.71799441	Lift Station	Medium-Low	55	$ 22,100	3	1	No	No	$ 4,300	13.76	15	$ 4,300	13.79	16	$ 16,000	4.56	53
4147 FERBER RD	30.37497723	-81.58549313	Lift Station	Medium-Low	36				No	No									
420 TRESCA RD	30.33075589	-81.53957174	Lift Station	Low	104	$ 253,400	11	3	Yes	Yes	$ 58,700	2.30	65	$ 58,700	2.30	71	$ 58,700	3.27	70
4211 WOODMERE ST	30.28958106	-81.7140444	Lift Station	Low	116	$ 47,800	7	1	No	No	$ 15,000	3.15	49	$ 31,000	1.01	89	$ 31,000	1.01	103
4511 SPRING PARK RD	30.27726049	-81.61566387	Lift Station	Medium-Low	44				No	No									
4516 MORRISON ST	30.36713046	-81.63277263	Lift Station	Low	117	$ 33,800	7	1	No	No	$ 32,000	0.08	101	$ 38,400	0.18	107	$ 40,600	0.12	120
4522 TOWN CENTER PY	30.26457963	-81.53096788	Lift Station	Low	86	$ 135,800	10	2	Yes	Yes	$ 38,400	0.73	92	$ 38,400	0.73	94	$ 40,600	1.90	91
4526 DETAILLIE DR	30.38422616	-81.71884583	Lift Station	Low	118	$ 54,400	9	1	Yes	Yes	$ 19,300	2.05	69	$ 19,300	2.36	70	$ 19,300	3.22	73
4807 DUCHENEAU DR	30.25647352	-81.74337115	Lift Station	Low	119	$ 44,600	5	1	Yes	Yes	$ 10,700	2.99	56	$ 10,700	3.01	61	$ 10,700	3.91	59
487 GROVE PARK BV	30.30539811	-81.57821656	Lift Station	Low	61	$ 410,000	10	3	No	No	$ 70,800	3.24	48	$ 74,300	3.10	57	$ 91,800	3.63	65
4881 TIMUQUANA RD	30.24785487	-81.7060429	Lift Station	#N/A	#N/A	$ 346,900	18	3	No	No	$ 74,700	2.36	63	$ 87,600	3.27	53	$ 94,100	2.97	77
4959 ORTEGA HILLS DR	30.21739307	-81.70875211	Lift Station	Low	131	$ 54,200	9	1	Yes	Yes	$ 17,200	1.90	72	$ 33,200	0.95	90	$ 33,200	0.95	104
5104 118TH ST	30.23351092	-81.71352854	Lift Station	#N/A	#N/A	$ 428,200	33	4	Yes	Yes	$ 57,900	3.12	51	$ 88,600	2.60	67	$ 110,900	4.36	57
512 ARLINGTON PLACE	30.32283546	-81.57995955	Lift Station	Low	87	$ 45,200	3	1	Yes	Yes	$ 6,400	5.08	35	$ 6,400	5.85	35	$ 6,400	6.01	43
5219 GOLF COURSE DR	30.37346858	-81.61559064	Lift Station	Low	69	$ 151,200	7	2	Yes	Yes	$ 24,600	2.22	67	$ 26,700	3.51	48	$ 26,700	4.66	51
5233 5TH ST W	30.34385114	-81.73655112	Lift Station	Medium-Low	48	$ 412,500	15	4	No	No	$ 84,300	3.81	41	$ 84,300	3.81	44	$ 90,700	4.98	48
5301 EVERGREEN AV	30.3717262	-81.63999262	Lift Station	Medium	20	$ 654,400	20	5	Yes	Yes	$ 45,900	9.56	24	$ 65,200	10.97	20	$ 123,900	10.45	25
536 LE MASTER DR	30.22176567	-81.38097954	Lift Station	Low	160	$ -	0	0	Yes	Yes	$ -	0.00	104	$ 8,600	-1.00	144	$ 42,700	-1.00	141
544 BOWLAN ST	30.32465669	-81.57019703	Lift Station	Medium	28	$ 940,200	20	4	Yes	Yes	$ 86,700	5.15	34	$ 90,500	5.84	36	$ 118,600	6.87	35
5490 SHINDLER DR	30.24690188	-81.79825296	Lift Station	Low	62	$ 173,800	6	2	Yes	Yes	$ 18,100	4.39	39	$ 18,100	4.39	41	$ 24,600	5.39	46
5642 J RAY CIRCLE S	30.26924045	-81.60761571	Lift Station	Low	124				No	No									
5730 KINLOCK DR S	30.37409809	-81.72933235	Lift Station	Low	70	$ 112,700	9	2	Yes	Yes	$ 31,000	1.84	74	$ 31,000	2.25	73	$ 31,000	2.88	81
581 QUEENS HARBOR BV N	30.33059633	-81.45547992	Lift Station	Low	132	$ 31,400	8	1	Yes	Yes	$ 8,600	0.91	89	$ 28,900	0.04	110	$ 42,700	-0.25	125
604 WATER ST	30.32648993	-81.66537901	Lift Station	Low	88	$ -	0	0	No	Yes	$ 41,600	-1.00	148	$ 45,900	-1.00	144	$ 75,700	-1.00	141

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium/Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
6217 WILSON BLVD	30.27172632	-81.74452039	Lift Station	#N/A	#N/A	$ 235,800	18	2	No	Yes	$ 22,400	1.29	83	$ 22,400	1.47	80	$ 81,200	1.93	90
6267 WHISPERING OAKS DR N (6268)	30.37965615	-81.59402175	Lift Station	Low	120	$ 49,300	6	1	Yes	Yes	$ 36,300	0.18	99	$ 36,300	0.36	103	$ 36,300	0.36	116
6350 GINNIE SPRINGS RD	30.1112989	-81.49509821	Lift Station	Medium	22				No	No									
6630 BROADWAY AV	30.33195787	-81.75408303	Lift Station	Low	145	$ 23,000	4	3	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 6,400	62.11	6
6705 CHERBORG AV N	30.30597033	-81.75714167	Lift Station	Low	95	$ 247,300	10	3	Yes	Yes	$ 68,300	1.64	77	$ 68,300	1.78	78	$ 68,300	2.97	78
6801 RHONE DR	30.39504707	-81.70052319	Lift Station	Low	59	$ 202,900	15	2	No	Yes	$ 65,200	1.52	79	$ 67,300	2.27	72	$ 67,300	2.27	85
6868 BELFORT OAKS PL	30.25743247	-81.58407525	Lift Station	Low	161	$ 96,200	6	2	No	No	$ -	0.00	104	$ -	0.00	111	$ 48,000	4.13	58
6927 HANSON DR S	30.28933172	-81.75849962	Lift Station	Medium-Low	41	$ 271,700	7	4	Yes	Yes	$ 26,700	15.43	14	$ 26,700	15.57	15	$ 26,700	20.01	15
6947 NORWOOD AV	30.38129875	-81.6706763	Lift Station	Medium-Low	49	$ 205,500	13	2	Yes	Yes	$ 51,300	2.71	61	$ 51,300	3.40	52	$ 51,300	3.40	68
7017 7019 SAN FERNANDO PL	30.24610998	-81.63531664	Lift Station	Low	162	$ 11,300	2	1	Yes	Yes	$ 2,100	-1.00	148	$ 2,100	-1.00	144	$ 18,100	-0.38	127
7039 ALACHUA AV	30.29379588	-81.7631025	Lift Station	Low	146	$ 27,200	1	1	No	No	$ 43,700	-0.53	140	$ 43,700	-0.53	135	$ 43,700	-0.42	129
7133 SOUTHSIDE BV	30.24384447	-81.55138906	Lift Station	Medium	32				No	No									
7150 CIVIC CLUB DR	30.4255379	-81.7680489	Lift Station	Low	121	$ 148,900	6	2	No	Yes	$ 20,300	2.95	58	$ 22,400	2.97	62	$ 24,600	5.03	47
718 STANDISH PL	30.31630785	-81.67554102	Lift Station	Low	163	$ -	0	0	No	No	$ -	0.00	104	$ 48,000	-1.00	144	$ 48,000	-1.00	141
7200 AC SKINNER PY	30.24842694	-81.57522365	Lift Station	Medium	21	$ 545,100	36	5	Yes	Yes	$ 185,600	7.18	28	$ 185,600	7.20	30	$ 290,200	6.16	39
8617 WESTERN WY	30.21280685	-81.56251917	Booster Lift Station	Medium	15	$ 864,800	21	4	No	No	$ 53,900	10.12	23	$ 53,900	10.12	24	$ 63,800	11.70	23
7211 RHODE ISLAND DR E	30.38553758	-81.72179898	Lift Station	Medium-Low	56	$ 209,500	10	2	Yes	Yes	$ 44,900	3.67	43	$ 44,900	3.67	47	$ 44,900	3.67	64
7263 SECRET WOOD TL	30.27012004	-81.58534423	Lift Station	Low	133	$ 27,500	4	1	Yes	Yes	$ 8,600	1.06	87	$ 8,600	1.22	87	$ 8,600	2.17	88
74 BAISDEN RD	30.44117493	-81.6396836	Lift Station	Low	122	$ 72,900	8	1	Yes	Yes	$ 38,400	0.70	93	$ 40,600	0.80	93	$ 40,600	1.10	101
7615 PRITCHARD RD	30.3722026	-81.77662824	Lift Station	Medium-Low	37				No	No									
7702 LENOX AV	30.29914489	-81.77494882	Lift Station	Low	60	$ 220,000	13	2	Yes	Yes	$ 47,000	1.46	81	$ 47,000	1.46	81	$ 51,300	2.79	83
7834 HOLIDAY RD S	30.29441244	-81.57429491	Lift Station	Medium-High	5	$ 737,800	23	5	No	Yes	$ 32,900	11.65	18	$ 39,100	18.58	13	$ 39,100	28.17	11
A1A NORTH WTP	30.04750487	-81.32991411	WTP	Low	75	$ 41,900	13	1	No	Yes	$ 4,900	-0.26	135	$ 4,900	0.55	99	$ 4,900	9.42	27
ARLINGTON WELLFIELD WELL 5	30.3287997	-81.5906318	Well	Medium-Low	42	$ 329,500	1	3	No	No	$ 2,100	100.37	1	$ 2,100	100.37	2	$ 2,100	136.74	1
BRIERWOOD WELLFIELD WELL 5	30.246667	-81.608056	Well	Medium-Low	43	$ 354,500	5	3	Yes	Yes	$ 6,400	35.03	6	$ 6,400	35.03	7	$ 6,400	48.13	8
ARLINGTON EAST WRF	30.246667	-81.608056	WWTP	High	1				No	No									
CORONA RD WTP	30.21854174	-81.37416328	WTP	Low	139	$ 8,900	3	1	No	No	$ -	0.00	104	$ 48,300	-0.79	140	$ 48,300	-0.79	136
CORONA ROAD WELLFIELD WELL 1	30.215876	-81.374036	Well	Low	152	$ 7,800	3	1	No	No	$ -	0.00	104	$ -	0.00	111	$ 18,100	-0.57	131
DEERWOOD 3 WTP	30.23671303	-81.5506533	WTP	Medium	25	$ 198,400	5	2	No	No	$ 18,600	7.89	27	$ 18,600	7.89	29	$ 18,600	7.89	32
DOWNTOWN CWP	30.33086062	-81.66348192	CWP	Low	58	$ 197,400	4	2	No	No	$ 49,500	1.30	82	$ 51,700	2.82	64	$ 51,700	2.82	82

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium /Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
FAIRFAX WELLFIELD WELL 4	30.359656	-81.686612	Well	Low	165	$ -	0	0	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 13,900	-1.00	141
GREENLAND WELLFIELD WELL 2	30.16109	-81.5142193	Well	Low	166	$ 77,400	1	1	No	No	$ -	0.00	104	$ -	0.00	111	$ 2,100	26.70	12
HENDRICKS WTP	30.31129395	-81.65387071	WTP	Medium-High	11	$ 1,917,100	41	5	Yes	No	$ 205,400	10.21	22	$ 258,600	8.53	26	$ 258,600	8.53	29
HOGANS CREEK CHILLED PLANT	30.32783494	-81.64662869	CWP	Low	106	$ 258,400	4	1	No	No	$ 18,600	0.34	95	$ 18,600	0.34	105	$ 18,600	0.34	117
BUCKMAN WRF	30.35233059	-81.62831566	WWTP	High	2	$ 1,055,500	57	4	No	No	$ 144,500	3.36	46	$ 633,200	0.36	104	$ 670,300	0.39	115
MAIN ST WTP	30.33567493	-81.6559307	WTP	Medium-High	10	$ 3,984,900	140	5	Yes	Yes	$ 330,700	8.14	25	$ 335,700	10.66	22	$ 340,800	11.51	24
MAIN STREET WELLFIELD WELL 1	30.3347629	-81.649594	Well	Medium-High	13	$ 594,200	4	4	Yes	Yes	$ 4,300	95.27	2	$ 6,400	82.26	3	$ 6,400	85.27	4
MAIN STREET WELLFIELD WELL 10	30.3389194	-81.6576889	Well	Medium	16	$ 796,300	6	4	Yes	Yes	$ 43,000	11.49	19	$ 48,600	12.03	19	$ 69,300	10.44	26
MAIN STREET WELLFIELD WELL 12	30.3364621	-81.656325	Well	Low	167	$ 180,700	1	2	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 2,100	66.94	5
MAIN STREET WELLFIELD WELL 3	30.3347629	-81.6518672	Well	Medium	23	$ 642,900	2	4	Yes	Yes	$ 11,100	24.82	11	$ 21,100	17.16	14	$ 27,500	21.08	14
MAIN STREET WELLFIELD WELL 6	30.3435907	-81.6617766	Well	#N/A	#N/A	$ 82,600	7	1	Yes	Yes	$ 18,100	0.78	91	$ 22,400	1.31	82	$ 26,700	1.52	95
MAIN STREET WELLFIELD WELL 6A	30.3361056	-81.6559629	Well	Medium-Low	51	$ 77,500	5	1	No	No	$ 10,700	3.00	55	$ 10,700	3.43	50	$ 10,700	6.01	42
MAYPORT WELLFIELD WELL 1	30.393333	-81.43	Well	Low	153	$ 11,600	4	1	Yes	Yes	$ 2,100	-0.83	144	$ 20,300	-0.43	132	$ 24,600	-0.53	130
MAYPORT WELLFIELD WELL 2	30.393611	-81.43	Well	#N/A	#N/A	$ 3,100	4	1	No	No	$ 6,400	-0.86	145	$ 10,700	-0.71	138	$ 10,700	-0.71	134
MAYPORT WTP	30.39331335	-81.43012156	WTP	Medium	14	$ 889,500	21	4	No	Yes	$ 45,500	16.42	13	$ 64,100	13.13	18	$ 64,100	13.13	22
BUCKMAN OUTFALL	30.39331335	-81.43012156	WWTP	Medium-High	8				No	No									
NASSAU WTP 1	30.62033045	-81.54495732	WTP	Medium-Low	35	$ 262,300	11	3	No	No	$ 28,900	5.81	31	$ 28,900	5.81	37	$ 46,600	5.87	44
NORWOOD WTP	30.37478646	-81.66934766	WTP	#N/A	#N/A	$ 167,100	10	2	No	No	$ -	0.00	104	$ -	0.00	111	$ 68,000	0.84	105
OAKRIDGE WELLFIELD WELL 2	30.2952728	-81.5161779	Well	Low	168	$ 200	1	1	No	No	$ -	0.00	104	$ -	0.00	111	$ 2,100	-0.99	140
PONCE DE LEON WELLFIELD WELL 1	29.97105357	-81.31088551	Well	Low	169	$ -	0	0	No	No	$ 13,900	-1.00	148	$ 13,900	-1.00	144	$ 13,900	-1.00	141
CEDAR BAY WRF	30.39331335	-81.43012156	WWTP	Medium	33				No	No									
PONTE VEDRA NORTH WELLFIELD WELL 1	30.248223	-81.387363	Well	Low	170	$ -	0	0	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 16,000	-1.00	141
PONTE VEDRA NORTH WTP	30.24838077	-81.38727922	WTP	Low	91	$ 42,400	7	1	Yes	Yes	$ -	0.00	104	$ 24,700	0.71	95	$ 24,700	0.71	108
JULINGTON CREEK PLANTATION WRF	30.10615216	-81.62534052	WWTP	Medium	24	$ 783,000	37	4	No	No	$ -	0.00	104	$ 192,300	2.46	68	$ 587,200	0.33	118
RIDENOUR WELLFIELD WELL 7	30.333282	-81.49606	Well	Medium	29	$ 249,200	1	2	No	No	$ 2,100	56.55	4	$ 2,100	56.55	4	$ 2,100	99.52	3
SAN MARCO CWP	30.31773265	-81.65573487	CWP	Low	138	$ -	0	0	No	yes	$ -	0.00	104	$ 16,000	-1.00	144	$ 16,000	-1.00	141
SOUTHWEST WELLFIELD WELL 2	30.241853	-81.77431	Well	Low	64	$ 23,400	1	1	No	No	$ 2,100	3.72	42	$ 2,100	3.72	46	$ 2,100	3.72	63
MANDARIN WRF	30.39331335	-81.43012156	WWTP	Medium-Low	34				No	No									
ST JOHNS FOREST WTP 1	30.06455901	-81.52871037	WTP	Medium	19	$ 699,100	10	4	Yes	Yes	$ 44,500	13.21	16	$ 44,500	13.21	17	$ 58,100	16.02	19
ST. JOHNS FOREST WELLFIELD WELL 1	30.0650766	-81.5307954	Well	Low	155	$ 1,000	5	1	Yes	Yes	$ 20,300	-0.98	146	$ 20,300	-0.98	143	$ 24,600	-0.97	139

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium/Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
ST. JOHNS FOREST WELLFIELD WELL 3	30.0642645	-81.5306177	Well	Medium	30	$ 397,800	7	3	Yes	Yes	$ 22,400	10.93	20	$ 22,400	10.93	21	$ 22,400	15.08	20
ST. JOHNS NORTH WELLFIELD WELL 2	30.093889	-81.614444	Well	Low	171	$ -	0	0	No	No	$ -	0.00	104	$ -	0.00	111	$ 13,900	-1.00	141
US-1 RECLAIM PRESSURE BOOSTER STATION	30.39331335	-81.43012156	Reclaimed Booster Lift Station	Low	140	$ 21,800	1	1	Yes	Yes	$ 9,900	-0.14	133	$ 9,900	-0.14	128	$ 19,800	-0.57	132
MONTEREY WRF	30.33023507	-81.60077523	WWTP	Medium-High	3	$ 1,633,900	22	5	No	No	$ 254,700	2.93	59	$ 254,700	2.93	63	$ 282,400	3.15	75
7863 LITTLE FOX LN	30.22802306	-81.53652564	Lift Station	Low	164	$ -	0	0	Yes	Yes	$ -	0.00	104	$ -	0.00	111	$ 2,100	-1.00	141
8100 GRAMPELL DR	30.29428791	-81.78394434	Lift Station	Low	71	$ 190,800	8	2	Yes	Yes	$ 28,900	3.14	50	$ 28,900	3.14	56	$ 28,900	4.97	49
NASSAU REGIONAL WRF	30.62204777	-81.55284157	WWTP	#N/A					No	No									
PONCE DE LEON WRF	29.97213179	-81.31165915	WWTP	Medium	18	$ 1,151,300	17	5	No	Yes	$ 67,700	11.83	17	$ 126,900	8.07	28	$ 130,000	7.86	33
RIVER OAKS POTABLE REPUMP STATION	30.39331335	-81.43012156	Repump Station	Medium-High	9				No	No									
ARLINGTON BOOSTER PUMP STATION	30.3352	-81.59433	Potable Water Booster Station	Medium	17				No	No									
DEERWOOD III WELLFIELD WELL 3	30.39331335	-81.43012156	Well	Low	101				Yes	Yes									
8104 ARGYLE FOREST BV	30.19257452	-81.78331907	Lift Station	Low	134	$ 42,400	8	1	No	No	$ 2,100	0.07	102	$ 2,100	0.07	109	$ 15,000	0.57	112
834 BAY ST E	30.32344774	-81.6464876	Lift Station	Low	89	$ 669,000	18	5	Yes	Yes	$ -	0.00	104	$ 27,900	4.21	42	$ 85,500	18.71	16
PONTE VEDRA WRF	30.24058509	-81.38936537	WWTP	Low	66	$ 118,600	5	1	No	No	$ -	0.00	104	$ -	0.00	111	$ 50,800	0.76	106
8431 SPRINGTREE RD	30.26517541	-81.78986541	Lift Station	Low	76	$ 132,500	7	2	Yes	Yes	$ 22,400	2.80	60	$ 22,400	2.80	65	$ 26,700	3.46	67
8460 BRIERWOOD RD	30.22768525	-81.59861754	Lift Station	Medium-Low	45	$ 93,700	7	2	Yes	Yes	$ 26,700	3.02	54	$ 26,700	4.44	40	$ 26,700	4.44	55
GREENLAND WTP	30.39331335	-81.43012156	WTP	Low	73				No	No									
847 HICKORY HILL DR	30.30989621	-81.78600644	Lift Station	Low	72	$ 338,900	9	3	Yes	Yes	$ 61,800	3.02	53	$ 61,800	3.03	60	$ 66,600	3.75	62
ARLINGTON WELLFIELD WELL 4	30.39331335	-81.43012156	Well	Low	154				No	No									
ARLINGTON WTP	30.39331335	-81.43012156	WTP	Low	96				No	No									
SOUTHWEST WRF	30.23280041	-81.72268044	WWTP	Medium-High	4	$ 1,990,400	62	5	No	No	$ 25,000	33.35	7	$ 25,000	35.70	6	$ 250,300	6.28	38
RIDENOUR WTP	30.39331335	-81.43012156	WTP	Low	105				No	No									
SOUTHWEST WTP	30.39331335	-81.43012156	WTP	Low	97				No	No									
SPRINGFIELD CWP	30.39331335	-81.43012156	CWP	Low	136				No	No									
8560 FURY DR	30.2407167	-81.79295294	Lift Station	Low	147	$ 221,500	19	2	No	No	$ 29,900	-0.47	139	$ 29,900	-0.47	134	$ 38,700	3.17	74
8602 ZOO RD	30.39935761	-81.64306085	Lift Station	Medium-Low	50	$ 222,900	16	3	Yes	Yes	$ 57,800	5.43	32	$ 57,800	6.41	32	$ 57,800	6.41	37
8622 BEECHFERN LN	30.19076052	-81.75876317	Lift Station	Low	90	$ 72,700	7	1	Yes	Yes	$ 15,000	3.08	52	$ 15,000	4.15	43	$ 15,000	4.53	54
8671 OSPREY LN	30.22382364	-81.6025096	Lift Station	Low	123	$ 21,500	5	1	Yes	Yes	$ 8,600	2.95	57	$ 10,700	3.05	59	$ 10,700	3.89	60

Table 12-1. Full List of Evaluated Facilities with Prioritization Rankings

Facility Name	latitude	longitude	Facility Type	CIP Score (High/Medium /Low)	Final CIP Ranking	Monetized Risk (direct impacts)	# of Assets at Risk*	Scenario 4 Risk Ranking (including business losses)	Facility within current 100-yr flood zone** (as of 2020)	Facility within the current 500-year flood zone (as of 2020)	Scenario 2 results			Scenario 4 results			Scenario 7 results		
											Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank	Hybrid Strategy Cost	ROI***	ROI Rank
94 32ND ST E	30.36332576	-81.6508389	Lift Station	Medium-Low	57	$ 81,500	10	2	No	No	$ 33,200	3.24	47	$ 33,200	3.26	54	$ 33,200	4.61	52
95135 BRADY POINT RD	30.60785209	-81.50101683	Lift Station	Low	148	$ 11,300	6	1	Yes	Yes	$ 2,100	-0.29	137	$ 12,900	-0.41	131	$ 12,900	-0.12	123
96135 MARSH LAKES	30.61390309	-81.49673649	Lift Station	Low	149	$ 8,800	6	1	Yes	Yes	$ 2,100	-1.00	147	$ 10,700	-0.62	137	$ 12,900	-0.31	126
96515 OTTER RUN	30.61400814	-81.5079067	Lift Station	Low	150	$ 1,500	4	1	No	Yes	$ -	0.00	104	$ 4,300	-0.78	139	$ 12,900	-0.89	138
PONCE DE LEON WTP	30.39331335	-81.43012156	WTP	Low	135				No	Yes									
9733 BAYOU BLUFF DR	30.39331335	-81.43012156	Lift Station	Low	65				No	No									
9898 GATE PY N	30.39331335	-81.43012156	Lift Station	Medium-Low	38				No	No									

* Asset is considered at risk if the asset elevation is below the flood elevation of any of the current or future condition scenarios.

** Facility is considered within 100-yr storm extent if at least one asset at risk is below 100-yr flood elevation.

*** It should be noted that the ROIs for the WWTPs and CWPs do not include business losses.

JEA®

Jacobs

CONTACT US

Mike Dykes, PE
Principal-in-Charge

Phone: +1 904.224.3170
Email: Mike.Dykes@jacobs.com

Jason M. Bird, CFM
FL Resilience Practice Lead

Phone: +1 970.214.1495
Email: Jason.Bird@jacobs.com

200 W. Forsyth Street, Suite 1520
Jacksonville, Florida 32202-4346

www.jacobs.com

PP5042120842TPA

JEA Diversity, Equity, & Inclusion

WHY IT'S IMPORTANT

Companies that have more diverse management teams have 19% Higher Revenue

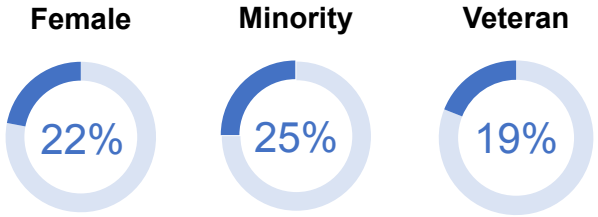
Diverse teams Outperform Individual Decision-Makers up to 87% of the time when it comes to making business decisions

Florida Population demographics shifting significantly - Florida will be majority-minority by 2028

Racially and ethnically diverse companies Outperform Industry Norms by 35%

67% of Job Seekers said a diverse workforce is important when considering job offers

WHERE WE ARE NOW



Total JEA Population 1,924 as of June 2021

	Male	Female	Female %	White	Minority	Minority %
Craft/Skilled	1045	186	15%	958	273	22%
Indivd. Contr.	272	156	36%	279	149	35%
Manager	143	56	28%	150	49	25%
Director	32	16	33%	44	4	8%
Executive	8	3	27%	7	4	36%
Board	6	1	14%	5	2	29%
Total	**1506**	**418**	**22%**	**1443**	**481**	**25%**

Excludes CEO, JEA Temporaries and External Contractors

WHAT WE'RE DOING

Evaluate our past successes, know our current state and move beyond metrics

Engage our internal stakeholders in discussions regarding current state, current challenges, and desired future state

Research Best Practices from our business & utility peers in Jacksonville and throughout the U.S.

Build a strategy that makes our employees and the people of Jacksonville proud

FOR POSITIVE CHANGE

Improve how we attract talent, engage our employees and develop the workforce of the future

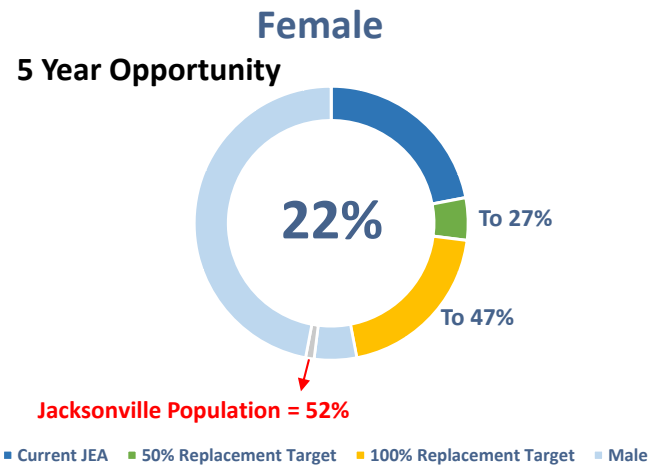
Improve how we communicate and interact with our Community

Form a coalition of employees and community partners building on these relationships to learn from and begin to influence our practices and work at JEA and the community we serve

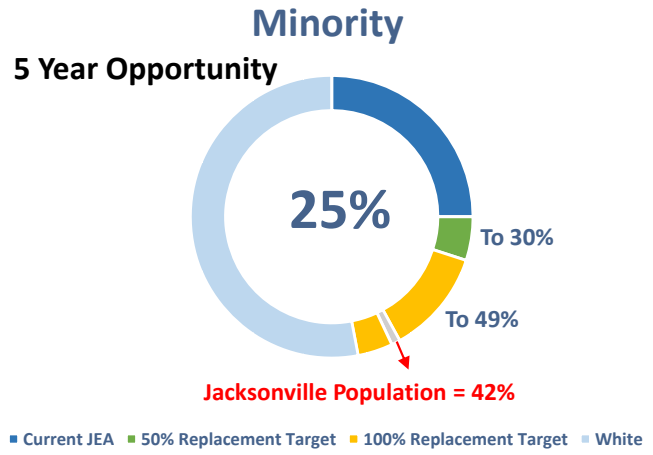
…because we believe the numbers should be a reflection of the values we embody

JEA Gender & Race

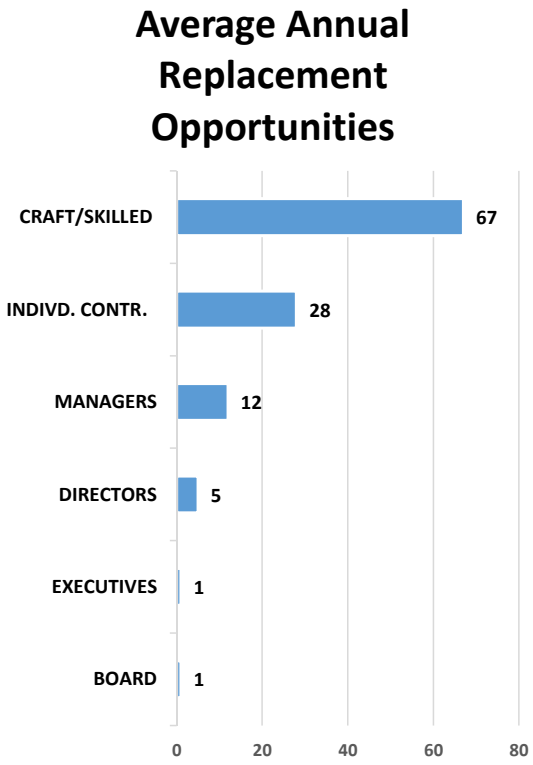
	Male	Female	Female (%)
Craft/Skilled	1045	186	15%
Indivd. Contr.	272	156	36%
Manager	143	56	28%
Director	32	16	33%
Executive	8	3	27%
Board	6	1	14%
Total	1506	418	22%



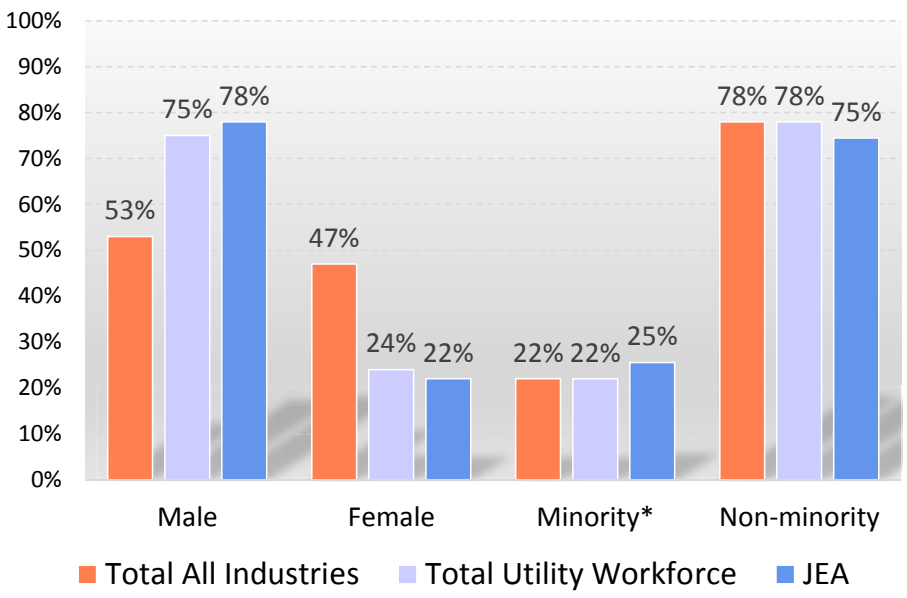
	White	Minority	Minority (%)
Craft/Skilled	958	273	22%
Indivd. Contr.	279	149	35%
Manager	150	49	25%
Director	44	4	8%
Executive	7	4	36%
Board	5	2	29%
Total	1443	481	25%



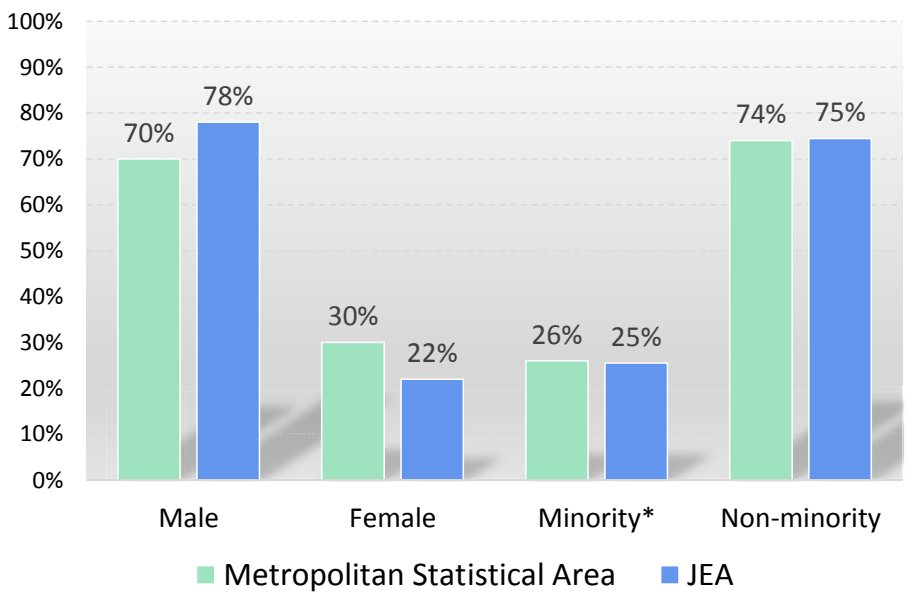
Average Annual Replacement Opportunities = 114



Industry



Community



JULY 2021

JEA Diversity Benchmarking

JEA Active Employees – June 30, 2021

** American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, and Two or More Races.*

Real Estate Portfolio