Memo

To: Clay Pearson, City Manager

From: Cara Davis, Sr. Project Manager – Engineering

CC: Trent Epperson, Assistant City Manager
Robert D Upton, P.E., Director of Engineering
Skipper Jones, Assistant Director of Capital Pr
Clarence Wittwer, Director of Public Works

Date: May 2, 2019

Re: John Hargrove Environmental Center (JHEC) Wastewater Treatment Plant Expansion

5/2/2019
To: Mayor and City Council members
Good run-through of the JHEC wastewater treatment plant capcity assumptions and various components what's sized now and for future capacity. Clay

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Purpose

This memo provides additional information on the proposed 2 million gallon per day (MGD) expansion of the John Hargrove Water Reclamation Facility (JHWRF) in response to a Council question received during the discussion of the award of the design contract to Ardurra Group on March 4, 2019.

Background

The JHEC Water Reclamation Facility (JHWRF) Preliminary Engineering Report (PER) submitted in January 2017 recommended a 5 million gallon per day (MGD) expansion to a total of 9 MGD (4 MGD existing plus 5 MGD expansion) for the "Intermediate" (10 year) design based on the additional flows anticipated from growth and the inclusion of MUDs 2, 3 and 6. If annexation of all outlying areas located in the Extraterritorial Jurisdiction (ETJ) were to occur, the "Ultimate" service area build-out expansion flows were projected to reach 11 MGD. The PER work was completed before Senate Bill 6 passed in 2017 limiting the City's ability to annex unincorporated.

Subsequently, a Technical Memorandum Amendment, finalized in September 2018, revised the expansion recommendations for the 10 year planning period, City Limit build-out, and Ultimate build-out capacities. **The revised recommendations serve as the current basis of design expand the plant by only 2 MGD to a total capacity of 6 MGD for the "Intermediate" (10 year) design and 8 MGD for the City Limit build-out service area.** Due to Senate Bill 6 limiting the City's ability to annex unincorporated areas, the required design capacity for the 10-year planning period as well as the Ultimate 11 MGD plant capacity is greatly reduced due to the current unlikelihood of future annexations. Therefore, the 6 MGD capacity will be adequate to meet current growth requirements for the 10 year planning period and 8 MGD capacity for the City Limit build-out capacity requirements, assuming no annexation of large areas currently outside of the existing city limits. If annexation laws changed and the entire ETJ were eventually annexed, the plant can be expanded again to accommodate the "Ultimate" service area.

Outlined below is a discussion of the preparations made in the current design phase to accommodate possible future expansion that might be required by changes to the current annexation laws or will allow for limited voluntary annexation requests in these areas to accommodate additional flows.

Planning for Future Expansion

The current planned expansion will provide additional pumping capacity in the influent lift station, additional treatment capacity in the plant, additional tertiary filter capacity and additional UV disinfection for 6 MGD. Plant piping in this expansion would be extended to the final expansion location for 8MGD. The expansion to 6MGD requires new blowers, expansion of the blower building, additional electrical supply and control, additional sludge handling capabilities as well as expansion of the buildings and structures housing these operations.

The Preliminary Engineering Report, as amended, anticipated expanding the existing 4 MGD sequencing batch reactor (SBR) treatment by adding two SBR basins and associated piping and equipment. Because this intermediate 2 MGD expansion would require a moderate increase of pumping capacity in the influent lift station, the project will replace the two existing pumps (Pump No. 6 and 7) at Lift Station No. 2 with new higher duty pumps and install an identical spare in slot No. 8. For the City Limit build-out (8 MGD) one additional (identical) pump will be required in slot No. 9 along with a new 30" diameter force main to the headworks. Headworks screening capacity and flow splitter operations, as well as odor control, will require the reconstruction and relocation for these processes. For that reason, the new headworks screening and flow splitter would be sized and configured to provide for the 8 MGD City Limit build-out service area capacity avoiding the need to modify later. Additional blowers will be required for the intermediate expansion requiring the blower building to be increased. Air piping, electrical capacity and blower building space will be configured for additional blowers to accommodate the future installation of additional blowers to meet the City Limit build-out service area capacity. The tertiary filter basin structure will be upgraded to provide the City Limit build-out service area capacity with the addition of a new cloth filter without additional structural concrete work in the future. In all cases these processes are planned to allow for an expansion to the 8 MGD City Limit capacity requirements to avoid the expense of a full plant expansion in the future. This same philosophy has been applied to the planned aerated sludge holding tanks, the non-potable water system and relocation of the Centerpoint Energy electrical service for the site.

While the solids handling facility will be upsized to manage the City Limit build-out service area requirements, only the belt press capacity necessary for the Interim expansion will be installed at this time. Likewise, while the generator size will be increased to provide backup power for the Interim expansion any future expansion would need to review the benefit of retaining a ten-plus year old generator versus replacing it with a slightly upsized generator or run multiple generators in parallel. The following table outlines the major components of the facility and how they are affected by the Intermediate 10-year and the City Limit build-out Service Area build-out scenarios.

John Hargrove Environment Complex (JHEC)
Water Reclamation Facility (WRF) Expansion Project
Process Unit Capacities

Process Unit or Item	Capacity
Site Work/Yard Piping	Varies[1]
Influent Lift Stations	10-year[2]
Headworks	City Limit Build-out
Odor Control	City Limit Build-out
SBR Influent Splitter Box	City Limit Build-out
Sequencing Batch Reactors and Blowers	10-year[3]
Cloth Disk Filters	10-year[4]
UV Disinfection System	10-year[5]
Aerated Sludge Holding Tanks	City Limit Build-out
Solids Handling Facility	City Limit Build-out
NPW System	City Limit Build-out
CenterPoint Energy Service	City Limit Build-out
Emergency Generators	10-year

[1]Piping sized for City Limit build-out Capacity where appropriate or required with fittings for future connections.
[2]Installation of additional pumps required for expansion to City Limit Build-out.
[3]Two additional SBRs to be constructed for City Limit Build-out.
[4]Structure sized for City Limit Build-out with filter equipment installed for 10-year Capacity.
[5]Exising UV System sized for 10-year Capacity. One new UV disinfection channel and equipment required for City Limit Build-out.

In this manner the planned 2MGD expansion accommodates both the (10-year) requirements and the current City Limits flows within the JHWRF service area. This 2 MGD expansion is being planned to mitigate and reduce the costs of a possible future expansion to add another 2 MGD for the full City Limit build-out of 8 MGD.

JOHN HARGROVE WATER RECLAMATION FACILITY

Legend/Notes

WTP Wastewater Treatment Plant

1:7,715

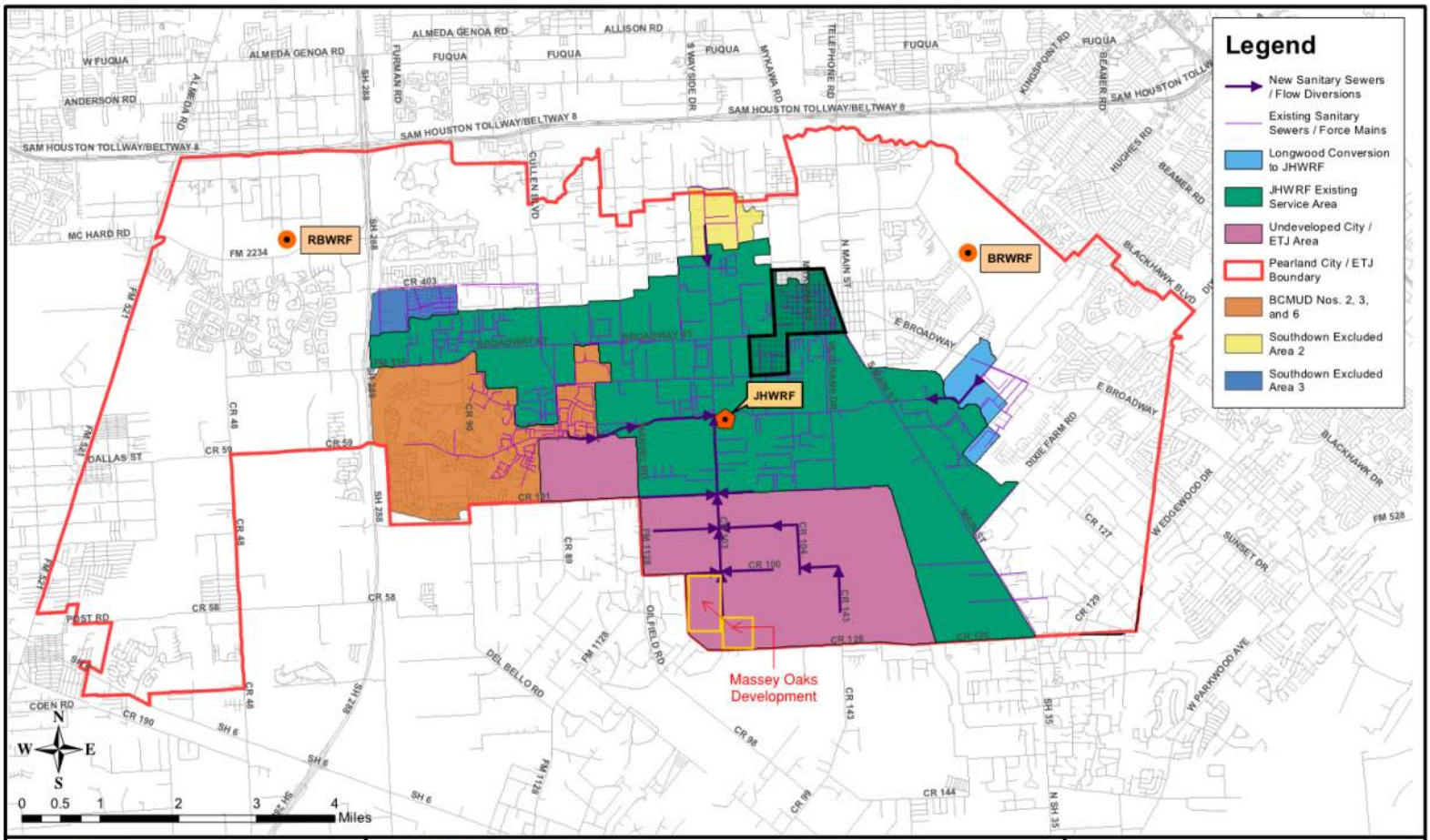
1 inch = 640 feet

NORTH

This product is for informational purposes only and may not be prepared or be suitable for legal, engineering, or surveying purposes.

MAP PREPARED: JANUARY 24, 2018

Service Area Map



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CITY OF PEARLAND, TEXAS
JOHN HARGROVE WATER RECLAMATION FACILITY EXPANSION
PRELIMINARY ENGINEERING REPORT

FIGURE 2-9
JHWRF PLANNED FLOW DIVERSION