



Abridged Application

Due February 5, 2016 by 5:00pm

SWIFT@twdb.texas.gov

COURTESY COPY FOR REVIEW: ORIGINALLY SUBMITTED VIA ONLINE LOAN APPLICATION SYSTEM

By submitting this abridged application, you understand and confirm that the information provided is true and correct to the best of your knowledge and further understand that the failure to submit a complete abridged application by the stated deadlines, or to respond in a timely manner to additional requests for information, may result in the withdrawal of the abridged application without review.

GENERAL INFORMATION

Name of Entity	County	Regional Water Planning Area
North Harris County RWA *ORIGINALLY SUBMITTED VIA OLA*	Harris	H

Entity Contact Information

Contact Person	Name	Mark Evans		
	Title	Planning and Governmental Affairs Coordinator		
Mailing Address	3648 Cypress Creek Parkway			
	77068-0000			
Phone Number	(281) 440-3924	Fax Number	(281) 440-4104	
Email Address	mevans@nhcrwa.com			

PROJECT DESCRIPTION

Name of Project <i>(As it appears in the 2016 regional water plan)</i>	NHCRA Internal 2020 Distribution System			
Where can the project be found in the most recent Regional Water Plan?	Project described on page:	See Attachment	Capital costs listed on page:	See Attachment

Please attach a list of all water systems served by the proposed project.

Phase(s) Applied For	<input checked="" type="checkbox"/> Planning	<input checked="" type="checkbox"/> Acquisition	<input checked="" type="checkbox"/> Design	<input checked="" type="checkbox"/> Construction
Population Served When Fully Operational	938,598			

Description of Proposed Project

The North Harris County Regional Water Authority (NHCRA) has entered into contractual agreements with the City of Houston to purchase treated surface water from the City's Northeast Water Purification Plant (NEWPP) for use in complying with the Harris-Galveston Subsidence District (HGSD) regulatory conversion requirements as detailed in the NHCRA's Updated Groundwater Reduction Plan (GRP). The NEWPP is located adjacent to the western shoreline of Lake Houston near the Sam Houston Toll Road (Beltway 8). In addition to the expansion of the NEWPP, a shared transmission pipeline approximately 24.3 miles in length will be built from the NEWPP to a proposed NHCRA SH 249 Regional Pump Station (SH 249 RPS) located west of SH 249 to provide treated surface water for various type water districts and cities (collectively called MUDs) to facilitate compliance with the HGSD regulatory conversion requirements. From the SH249 RPS, treated surface water will be distributed to MUDs via the NHCRA's distribution system to serve MUDs located primarily in the west and northwest portions of the NHCRA. This application is to request funding for the initial 2025 phase of the SH 249 RPS.

The initial phase of NHCRA 2025 Distribution System was approved for funding by the TWDB during the first round of SWIFT applications in an amount of \$44,125,000. That application and subsequent loan commitment (Loan No. 51004) by the TWDB did



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not include project costs associated with the SH 249 RPS as described above. Therefore, this application seeks funding for the SH 249 RPS Project as part of the Initial Phase of the Authority 2025 Distribution System.

See Attachment B for further information and background for the NHCRWA and Exhibit 2 - Existing and Proposed Phased Water Distribution System Map.

Emergency <i>(select all that apply)</i>	<input type="checkbox"/> Applicant/entity's water supply will last less than 180 days. <input type="checkbox"/> Water supply need occurs earlier than anticipated in the State Water Plan. <input type="checkbox"/> Applicant has received or applied for Federal emergency funding. <input checked="" type="checkbox"/> None of the above.
--	--

Agricultural Efficiency Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Efficiency improvement achieved by implementing the project <i>(Please provide an attachment showing the basis for your calculation.)</i> <table style="width: 100%;"> <tr> <td><input type="checkbox"/> <1%</td> <td><input type="checkbox"/> 10%-13.9%</td> </tr> <tr> <td><input type="checkbox"/> 1%-1.9%</td> <td><input type="checkbox"/> 14%-17.9%</td> </tr> <tr> <td><input type="checkbox"/> 2%-5.9%</td> <td><input type="checkbox"/> ≥18%</td> </tr> <tr> <td><input type="checkbox"/> 6%-9.9%</td> <td></td> </tr> </table>	<input type="checkbox"/> <1%	<input type="checkbox"/> 10%-13.9%	<input type="checkbox"/> 1%-1.9%	<input type="checkbox"/> 14%-17.9%	<input type="checkbox"/> 2%-5.9%	<input type="checkbox"/> ≥18%	<input type="checkbox"/> 6%-9.9%	
<input type="checkbox"/> <1%	<input type="checkbox"/> 10%-13.9%									
<input type="checkbox"/> 1%-1.9%	<input type="checkbox"/> 14%-17.9%									
<input type="checkbox"/> 2%-5.9%	<input type="checkbox"/> ≥18%									
<input type="checkbox"/> 6%-9.9%										

Household Cost Factor

(Household Cost Factor for SWIFT prioritization is calculated by dividing the service area's average residential water bill by its annual median household income. For regional projects, these should represent the combined service areas of all participating entities.)

Estimated average annual residential water bill:	\$488	Annual Median Household Income:	\$77,750
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The proposed project addresses:	<input type="checkbox"/> Conservation <input type="checkbox"/> Water Loss <input checked="" type="checkbox"/> N/A	Annual Volume of Water Produced/Conserved by the Project <i>(in acre-feet per year)</i>	143,360
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Readiness to Proceed <i>(select all that apply)</i>	<input checked="" type="checkbox"/> Preliminary planning or design work (30% of total project) has been completed or is not required. <input checked="" type="checkbox"/> Applicant is prepared to begin implementation or construction within 18 months of application deadline. <input checked="" type="checkbox"/> Applicant has acquired all water rights associated with the proposed project, or none will be required.
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ESTIMATED COSTS

Estimated Project Costs	Low-interest Loan	\$ 107,820,000
	Deferred Loan	\$
	Board Participation	\$
	Local Contribution	\$ 29,626,500
	Other: Prior SWIFT	\$ 44,125,000
	Total Estimated Project Costs	\$ 181,571,500

Anticipated Commitments <i>Attach proposed schedule for multi-year commitments</i>	<input type="checkbox"/> One-Time Commitment <input checked="" type="checkbox"/> Multi-Year Commitments
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Project Information Form #277809

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 - Document - Additional_Attachments
 - Document - Additional_Attachments
 - Document - Additional_Attachments

1. General Information

Project Information

Funding Type: SWIFT

2. Contact Information

Entity Contact Information	Engineering Firm Contact Information
Name of Entity: North Harris Co Regional WA:3167	Name of New Entity: no value entered by user
County: Harris	Prefix: Mr.
Prefix: Mr.	First Name: Mark
First Name: Michael V.	Last Name: Evans
Last Name: Reedy	Addr 1: 3648 Cypress Creek Parkway, Suite 110
Addr 1: 10497 Town and Country Way Ste 600	Addr 2: no value entered by user
Addr 2: no value entered by user	City: Houston
City: Houston	State: TX
State: TX	Zip: 77068-0000
Zip: 77024-0000	Phone: (281) 440-3924
Phone: (713) 600-6828	Fax: (281) 440-4104
Fax: (713) 600-6801	Suffix: no value entered by user
Suffix: P.E.	OrgName: no value entered by user
OrgName: no value entered by user	DeptName: no value entered by user
DeptName: no value entered by user	Title: Planning and Governmental Affairs Direct
Title: Vice President	Email: mevans@nhcrwa.com
Email: mvr@freese.com	
Firm Name: Freese and Nichols, Inc.	Make Changes: Y
Make Changes: Y	No Entity TxWISE Id

3. Service Area

Population Served: 938598

4. Project Description

Project Name: NHCRWA Distribution Expansion

Where can Project be found in the most recent Regional Water Plan?

Project listed on page: : See Attachment A

Capital costs on page: : See Attachment A

Region: H - REGION H

Phase(s) Applied For

Planning: Y

Acquisition: Y

Design: Y

Construction: Y

Emergency

Applicant/entity's water supply will last less than 180 days.: N

Water Supply need occurs earlier than anticipated in the State Water Plan: N

Applicant has received or applied for Federal emergency funding.: N

None of the above.: Y

Agricultural Efficiency Project?: N

Estimated average annual residential water bill: \$488.00

Annual Median Household Income: \$77750.00

Project expected to produce water: Y

Project expected to conserve water: N

Annual Volume of Water Produced or Conserved: 143360.00

Project Long Desc: The North Harris County Regional Water Authority (NHCRWA) has entered into contractual agreements with the City of Houston to purchase treated surface water from the City's Northeast Water Purification Plant (NEWPP) for use in complying with the Harris-Galveston Subsidence District (HGSD) regulatory conversion requirements as detailed in the NHCRWA's Updated Groundwater Reduction Plan (GRP). The NEWPP is located adjacent to the western shoreline of Lake Houston near the Sam Houston Toll Road (Beltway 8). In addition to the expansion of the NEWPP, a shared transmission pipeline approximately 24.3 miles in length will be built from the NEWPP to a proposed NHCRWA SH 249 Regional Pump Station (SH 249 RPS) located west of SH 249 to provide treated surface water for various type water districts and cities (collectively called MUDs) to facilitate compliance with the HGSD regulatory conversion

requirements. From the SH249 RPS, treated surface water will be distributed to MUDs via the NHCRWA's distribution system to serve MUDs located primarily in the west and northwest portions of the NHCRWA. This application is to request funding for the initial 2025 phase of the SH 249 RPS.

The initial phase of NHCRWA 2025 Distribution System was approved for funding by the TWDB during the first round of SWIFT applications in an amount of \$44,125,000. That application and subsequent loan commitment (Loan No. 51004) by the TWDB did not include project costs associated with the SH 249 RPS as described above. Therefore, this application seeks funding for the SH 249 RPS Project as part of the Initial Phase of the Authority 2025 Distribution System.

See Attachment B for further information and background for the NHCRWA and Exhibit 2 - Existing and Proposed Phased Water Distribution System Map.

ATTACHMENT C
REGIONAL PROJECT WORKSHEET

Texas Water Development Board
State Water Implementation Fund for Texas (SWIFT)

Abridged Application Regional Project Worksheet

Applicant: North Harris County Regional Water Authority (NHCRA)

Project Name: NHCRA Transmission 2020 (Initial Phase of NHCRA 2025 Transmission System)

Instructions: List all entities (aside from the applicant) that will be served by the proposed project. Use the “Rural” column to indicate the entities serving populations of 10,000 or fewer.

Press “Tab” to add new rows as needed.

Entity Name	Rural
1. Bammel UD	Yes
2. Bilma PUD	Yes
3. Bridgestone MUD	No
4. Charterwood MUD	Yes
5. City of Jersey Village	Yes
6. City of Tomball	No
7. City of Waller	Yes
8. CNP UD	Yes
9. Cy-Champ PUD	Yes
10. Cypress Creek UD	Yes
11. Cypress Forest PUD	Yes
12. Cypress Hill MUD 1	Yes
13. Cypress-Klein UD	Yes
14. Cypresswood UD	Yes
15. Dowdell PUD	Yes
16. Emerald Forest UD	Yes
17. Encanto Real UD	Yes
18. Faulkey Gully MUD	Yes
19. Fountainhead MUD	Yes
20. Grant Road PUD	Yes
21. Harris County FWSD 52	Yes
22. Harris County FWSD 61	No
23. Harris County ID 18	Yes
24. Harris County MUD 001	Yes
25. Harris County MUD 016	Yes
26. Harris County MUD 018	Yes
27. Harris County MUD 024	Yes
28. Harris County MUD 025	Yes
29. Harris County MUD 026	No
30. Harris County MUD 043	Yes

Texas Water Development Board

State Water Implementation Fund for Texas (SWIFT)

Abridged Application Regional Project Worksheet

31.	Harris County MUD 044	Yes
32.	Harris County MUD 048	Yes
33.	Harris County MUD 069	Yes
34.	Harris County MUD 082	No
35.	Harris County MUD 086	Yes
36.	Harris County MUD 104	Yes
37.	Harris County MUD 109	Yes
38.	Harris County MUD 118	Yes
39.	Harris County MUD 168	No
40.	Harris County MUD 170	Yes
41.	Harris County MUD 180	Yes
42.	Harris County MUD 191	Yes
43.	Harris County MUD 202	Yes
44.	Harris County MUD 211	Yes
45.	Harris County MUD 220	Yes
46.	Harris County MUD 222	Yes
47.	Harris County MUD 230	Yes
48.	Harris County MUD 231	Yes
49.	Harris County MUD 233	Yes
50.	Harris County MUD 248	Yes
51.	Harris County MUD 249	Yes
52.	Harris County MUD 273	Yes
53.	Harris County MUD 275	Yes
54.	Harris County MUD 280	Yes
55.	Harris County MUD 281	Yes
56.	Harris County MUD 282	Yes
57.	Harris County MUD 286	Yes
58.	Harris County MUD 316	Yes
59.	Harris County MUD 322	Yes
60.	Harris County MUD 354	Yes
61.	Harris County MUD 358	Yes
62.	Harris County MUD 360	Yes
63.	Harris County MUD 364	Yes
64.	Harris County MUD 365	Yes
65.	Harris County MUD 367	Yes
66.	Harris County MUD 368	No
67.	Harris County MUD 383	Yes
68.	Harris County MUD 387	Yes
69.	Harris County MUD 389	Yes
70.	Harris County MUD 391	Yes
71.	Harris County MUD 396	Yes

Texas Water Development Board

State Water Implementation Fund for Texas (SWIFT)

Abridged Application Regional Project Worksheet

72.	Harris County MUD 397	Yes
73.	Harris County MUD 401	Yes
74.	Harris County MUD 416	Yes
75.	Harris County MUD 454	Yes
76.	Harris County MUD 468	Yes
77.	Harris County MUD 480	Yes
78.	Harris County WCID 091	Yes
79.	Harris County WCID 092	Yes
80.	Harris County WCID 099	Yes
81.	Harris County WCID 109	Yes
82.	Harris County WCID 110	Yes
83.	Harris County WCID 113	Yes
84.	Harris County WCID 114	Yes
85.	Harris County WCID 116	Yes
86.	Harris County WCID 119	Yes
87.	Harris County WCID 132	Yes
88.	Harris County WCID 136	Yes
89.	Harris County WCID 155 (Partial)	Yes
90.	Harris Montgomery County MUD 386	No
91.	Heatherloch MUD	Yes
92.	Hunter's Glen MUD	Yes
93.	Inverness Forest ID	Yes
94.	Klein PUD	Yes
95.	Kleinwood MUD	Yes
96.	Lake Forest UD	Yes
97.	Louetta North PUD	Yes
98.	Louetta Rd. UD	Yes
99.	Malcomson Road UD	Yes
100.	Meadowhill Regional MUD	Yes
101.	Memorial Hills UD	Yes
102.	Mills Road MUD	Yes
103.	North Park PUD	Yes
104.	Northampton MUD	Yes
105.	Northgate Crossing MUD 1	Yes
106.	Northgate Crossing MUD 2	Yes
107.	Northwest Freeway MUD	Yes
108.	Northwest Harris County MUD 05	No
109.	Northwest Harris County MUD 06	Yes
110.	Northwest Harris County MUD 09	Yes
111.	Northwest Harris County MUD 10	Yes
112.	Northwest Harris County MUD 15	Yes

Texas Water Development Board

State Water Implementation Fund for Texas (SWIFT)

Abridged Application Regional Project Worksheet

113.	Northwest Harris County MUD 19	Yes
114.	Northwest Harris County MUD 20	Yes
115.	Northwest Harris County MUD 21	Yes
116.	Northwest Harris County MUD 22	Yes
117.	Northwest Harris County MUD 23	Yes
118.	Northwest Harris County MUD 24	Yes
119.	Northwest Harris County MUD 28	Yes
120.	Northwest Harris County MUD 29	Yes
121.	Northwest Harris County MUD 30	Yes
122.	Northwest Harris County MUD 32	Yes
123.	Northwest Harris County MUD 36	Yes
124.	Northwest Park MUD	Yes
125.	Oakmont PUD	Yes
126.	Ponderosa Forest UD	Yes
127.	Post Wood MUD	Yes
128.	Prestonwood Forest UD	Yes
129.	Reid Road MUD 1	Yes
130.	Reid Road MUD 2	Yes
131.	Richey Road MUD	Yes
132.	Shasla PUD	Yes
133.	Spring Creek Forest PUD	Yes
134.	Spring West MUD	Yes
135.	Tattor Road MUD	Yes
136.	Terranova West MUD	Yes
137.	Timber Lane UD	No
138.	Timberlake ID	Yes
139.	West Harris County MUD 01	Yes
140.	West Harris County MUD 09	Yes
141.	West Harris County MUD 10	Yes
142.	West Harris County MUD 11	Yes
143.	West Harris County MUD 15	Yes
144.	West Harris County MUD 21	Yes
145.	Westador MUD	Yes
146.	White Oak Bend MUD	Yes
147.	Woodcreek MUD	Yes

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5. Readiness to Proceed to Construction

Preliminary planning or design work (30% of total project) has been completed or is not required.:
Y

Applicant is prepared to begin implementation or construction within 18 months of application
deadline.: Y

Applicant has acquired all water rights associated with the proposed project, or none will be
required.: Y

6. Estimated Costs

TWDB Requested Amount

Low-Interest Loan Amount: \$107820000.00

Deferred Loan Amount: no value entered by user

Board Participation Amount: no value entered by user

Local Contribution Amount: \$29626500.00

Other Amount: \$44125000.00

Other Desc: Prior SWIFT Commitment

Total Estimated Project Costs: \$181571500.00

ATTACHMENT D
PROJECT FUNDING DETAILS

PROJECT BUDGET - Entity Name NHCRA (SH 249 Regional Pump Station)					
Uses	TWDB 2016 Funds	TWDB 2017 Funds	Total TWDB Cost	Other Funds	Total Cost
Construction					
Construction	\$299,000	\$75,653,800	\$75,952,800	\$0	\$75,952,800
Subtotal Construction	\$299,000	\$75,653,800	\$75,952,800	\$0	\$75,952,800
Basic Engineering Fees					
Planning +	\$455,200	\$0	\$455,200	\$0	\$455,200
Design	\$5,009,200	\$0	\$5,009,200	\$0	\$5,009,200
Construction Engineering	\$0	\$0	\$0	\$0	\$0
Basic Engineering Other **	\$0	\$0	\$0	\$0	\$0
Subtotal Basic Engineering Fees	\$5,464,400	\$0	\$5,464,400	\$0	\$5,464,400
Special Services					
Application	\$50,000	\$0	\$50,000	\$0	\$50,000
Environmental	\$0	\$0	\$0	\$0	\$0
Water Conservation Plan	\$0	\$0	\$0	\$0	\$0
I/I Studies/Sewer Evaluation	\$0	\$0	\$0	\$0	\$0
Surveying	\$0	\$0	\$0	\$0	\$0
Geotechnical	\$0	\$0	\$0	\$0	\$0
Testing	\$0	\$1,472,600	\$1,472,600	\$0	\$1,472,600
Permits	\$0	\$0	\$0	\$0	\$0
Inspection	\$41,500	\$3,681,500	\$3,723,000	\$0	\$3,723,000
O&M Manual	\$0	\$0	\$0	\$0	\$0
Project Management (by engineer)	\$1,111,200	\$0	\$1,111,200	\$0	\$1,111,200
Pilot Testing	\$0	\$0	\$0	\$0	\$0
Water Distribution Modeling	\$0	\$0	\$0	\$0	\$0
Special Services Other **	\$0	\$0	\$0	\$0	\$0
Subtotal Special Services	\$1,202,700	\$5,154,100	\$6,356,800	\$0	\$6,356,800
Other					
Administration	\$0	\$0	\$0	\$0	\$0
Land/Easements Acquisition	\$5,358,000	\$0	\$5,358,000	\$0	\$5,358,000
Water Rights Purchase (If Applicable)	\$0	\$0	\$0	\$0	\$0
Capacity Buy-In (If Applicable)	\$0	\$0	\$0	\$0	\$0
Project Legal Expenses	\$0	\$0	\$0	\$0	\$0
Other **	\$0	\$0	\$0	\$0	\$0
Subtotal Other Services	\$5,358,000	\$0	\$5,358,000	\$0	\$5,358,000
Fiscal Services					
Financial Advisor	\$27,860	\$187,783	\$215,643	\$0	\$215,643
Bond Counsel	\$41,790	\$281,674	\$323,464	\$0	\$323,464
Issuance Cost	\$27,860	\$187,783	\$215,643	\$0	\$215,643
Bond Insurance/Surety	\$0	\$0	\$0	\$0	\$0
Fiscal/Legal	\$41,790	\$280,230	\$322,020	\$0	\$322,020
Capitalized Interest	\$557,200	\$3,755,658	\$4,312,858	\$0	\$4,312,858
Bond Reserve Fund	\$696,500	\$4,694,572	\$5,391,072	\$0	\$5,391,072
Loan Origination Fee	\$0	\$0	\$0	\$0	\$0
Other **	\$0	\$0	\$0	\$0	\$0
Subtotal Fiscal Services	\$1,393,000	\$9,387,700	\$10,780,700	\$0	\$10,780,700
Contingency					
Contingency	\$ 212,900	\$3,694,400	\$3,907,300	\$0	\$3,907,300
Subtotal Contingency	\$212,900	\$3,694,400	\$3,907,300	\$0	\$3,907,300
TOTAL COSTS	\$13,930,000	\$93,890,000	\$107,820,000	\$0	\$107,820,000



Jimmie Schindewolf, P.E.
General Manager

February 4, 2016

BOARD OF DIRECTORS
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Mr. Tom Entsminger
State Programs Coordinator
Texas Water Development Board
P. O. Box 13231
Austin, Texas 78711-3231

Re: North Harris County Regional Water Authority State Water Implementation Fund for Texas ("SWIFT") 2016 Abridged Application

Dear Mr. Entsminger:

Transmitted herewith please find the NHCRWA's 2016 Abridged Application for SWIFT funding for the NHCRWA Internal 2020 Distribution project, as named in the 2012 State Water Plan (also referred to as "Initial Phase of NHCRWA 2025 Distribution System"). This application is requesting funding for the initial 2025 phase of the SH 249 Regional Pump Station component of the NHCRWA 2025 Distribution System.

Should you have any questions or need any additional information please contact me by telephone at 281-440-3924 or by email at meevans@nhcrwa.com.

Sincerely,

A handwritten signature in blue ink that reads "Mark Evans".

Mark Evans
Planning and Governmental Affairs Director

ME/cp

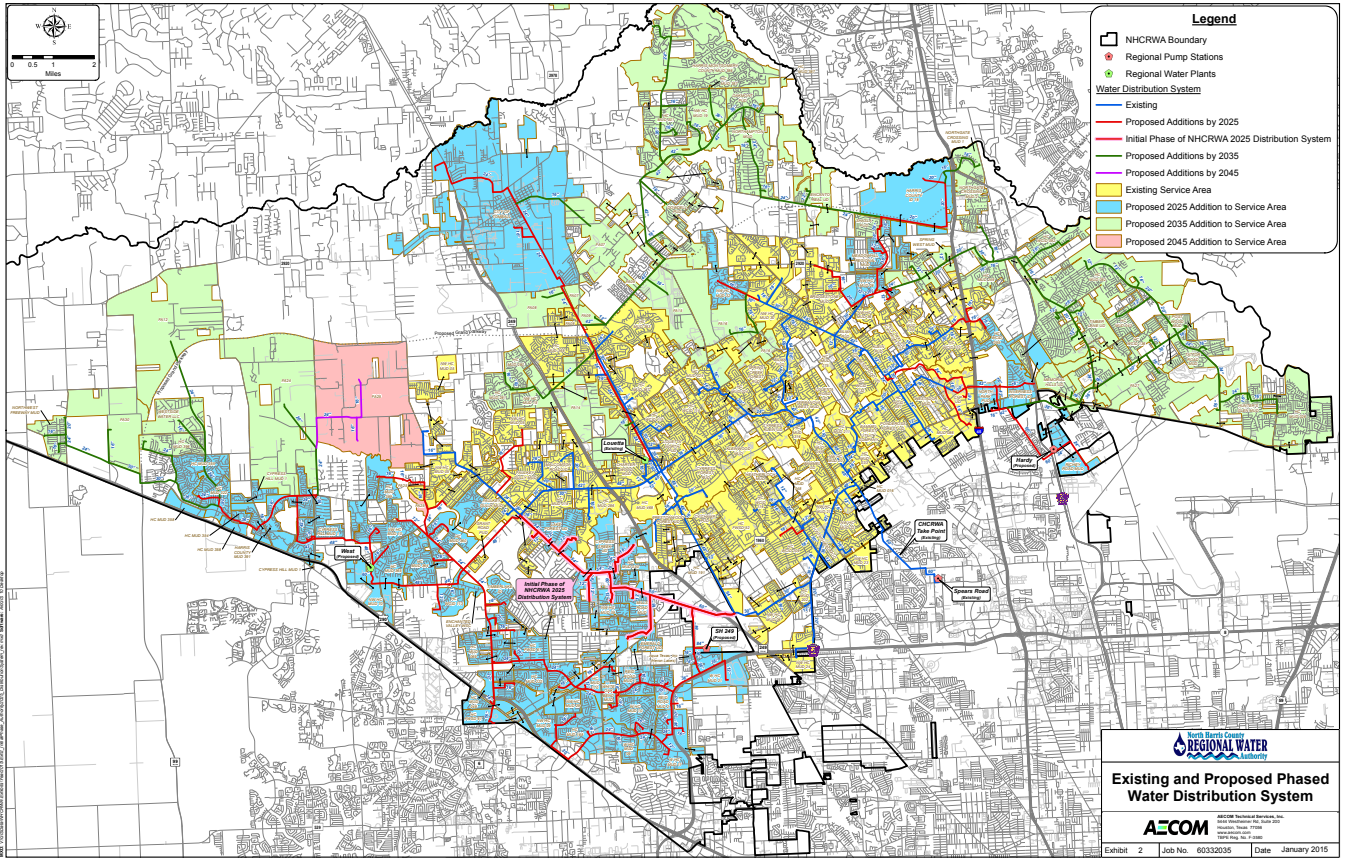
Attachment

cc: Michael V. Reedy, P.E., Freese and Nichols
John Howell, The GMS Group, L. L. C.
Tom Rolen, P.E., AECOM Technical Services, Inc.
Michael G. Baugher, P.E., AECOM Technical Services, Inc.
Robin S. Bobbitt, Radcliffe Bobbitt Adams Polley PLLC
Jon D. Polley, Radcliffe Bobbitt Adams Polley PLLC
Jimmie Schindewolf, P.E., NHCRWA General Manager
Cyndi Plunkert, NHCRWA Financial Assistant

ATTACHMENT B

**ADDITIONAL INFORMATION AND BACKGROUND ON NHCRWA AND
EXHIBIT 2 – EXISTING AND PROPOSED PHASED WATER DISTRIBUTION SYSTEM MAP**

The North Harris County Regional Water Authority (NHCRA) is a special purpose political subdivision of the State of Texas created in 1999. The NHCRA has jurisdiction over an approximately 338 square mile area, largely comprised of County-Other as defined by the Texas Water Development Board (TWDB), located in northwest Harris County. The NHCRA has the statutory power to conserve, preserve, protect, recharge, and prevent waste of groundwater including, but not limited to, the power to acquire or develop surface water supplies; to acquire, construct, operate, and maintain a water treatment or supply system; to store, transport, treat, and sell water to others; to allocate water among participants in its Groundwater Reduction Plan (GRP); to coordinate water services; and to exercise the power of eminent domain. Based on the Region H Regional Water Plan, the NHCRA area is expected to experience significant growth throughout the planning cycle, from approximately 750,000 people in 2020 to approximately 940,000 by 2070. This growth in population will result in significant increased water demands. The NHCRA was created to develop and implement the strategies for complying with the Harris-Galveston Subsidence District's Regulatory Plan. The NHCRA's GRP establishes the framework and plans for the implementation of projects to optimize groundwater and surface water supplies and ensuring a sustainable water supply for the population served by the NHCRA.



Legend


- NHCROWA Boundary
- Regional Pump Stations
- Regional Water Plants

Water Distribution System

- Existing
- Proposed Additions by 2025
- Initial Phase of NHCROWA 2025 Distribution System
- Proposed Additions by 2035
- Proposed Additions by 2045

Service Area

- Existing Service Area
- Proposed 2025 Addition to Service Area
- Proposed 2035 Addition to Service Area
- Proposed 2045 Addition to Service Area


Existing and Proposed Phased Water Distribution System




Exhibit 2 Job No. 60332035 Date January 2015

Map created by AECOM on 01/15/2015. All rights reserved.

ATTACHMENT A

**SECTION 1. APPLICANT INFORMATION
REFERENCES TO 2016 REGION H REGIONAL WATER PLAN**

SECTION 1. APPLICANT INFORMATION

The applicant project can be found in the 2016 Region H Regional Water Plan in the following:

Chapter 5 – Water Management Strategies

Table 5-4 WMS and Key Project Relationships – page 5-18

Table 5-5 Key Project Overview – page 5-20

Appendix 5-A – Water Management Strategy Tables

Table 5-A3 Scoring for Key Projects – page 5-A-9

Table 5-A4 Water Management Strategy and Project Relationships - pages 5-A-26 and 5-A-27

Table 5-A10 Project Costs Summary - page 5-A-115

Table 5-A11 Project Cost Summary (Unit Cost) - Page 5-A-134

Appendix 5-B – Project Technical Memoranda

North Harris County Regional Water Authority Distribution Expansion – pages 5-B-CONV-008-1 through 5-B-CONV-008-6.

Appendix 5-DB – DB17 Reports

Recommended Projects Associated with Water Management Strategies – page 17 of 23

Capital costs associated with the applicant project can be found in the 2016 Region H Water Plan in the following:

Chapter 5 – Water Management Strategies

Table 5-5 Key Project Overview – page 5-20

Appendix 5-A – Water Management Strategy Tables

Table 5-A10 Project Costs Summary - page 5-A-115

Appendix 5-B – Project Technical Memoranda

North Harris County Regional Water Authority Distribution Expansion – pages 5-B-CONV-008-1 and 5-B-CONV-008-3.

Appendix 5-DB – DB17 Reports

Recommended Projects Associated with Water Management Strategies – page 17 of 23

Water Management Strategy*	WMS Project Name
New / Expanded Contract With BRA	Allens Creek Reservoir
	BRA System Operation Permit (Region G Project)
New / Expanded Contract With BWA	BWA Treatment Plant Expansion
New / Expanded Contract With BWA - Brackish Groundwater	BWA Brackish Groundwater
New / Expanded Contract With CLCND	CLCND West Chambers System
New / Expanded Contract With COH	City of Houston GRP
	City of Houston Treatment Expansion
	COH Northeast Water Purification Plant Expansion
	Luce Bayou Interbasin Transfer
	San Jacinto Basin Regional Return Flows
	TRA to COH Transfer
New / Expanded Contract With GCWA	GCWA Reclaimed Water from COH
New / Expanded Contract With LNVA	WUG Infrastructure Expansion (WUG-level projects)
New / Expanded Contract With SJRA	Lake Livingston to SJRA Transfer
	San Jacinto Basin Regional Return Flows
	SJRA GRP
NFBWA Grand Lakes Reuse	Grand Lakes Reclaimed Water System
NFBWA GRP	City of Houston Reuse
	COH Northeast Water Purification Plant Expansion
	Luce Bayou Interbasin Transfer
	NFBWA GRP
	NFBWA Phase 2 Distribution Segments
	San Jacinto Basin Regional Return Flows
	TRA to COH Transfer
	WHCRWA/NFBWA Transmission Line
NHCRWA GRP	City of Houston Reuse
	COH Northeast Water Purification Plant Expansion
	COH, NHCRWA, and CHCRWA Shared Transmission
	Luce Bayou Interbasin Transfer
	NHCRWA Distribution Expansion
	NHCRWA GRP
	NHCRWA Transmission Line
	San Jacinto Basin Regional Return Flows
TRA to COH Transfer	
Old Galveston Road Transmission Improvements	Old Galveston Road Transmission Improvements
Panorama Village And Shenandoah Joint GRP	Panorama Village and Shenandoah Joint GRP
Pearland SWTP	Allens Creek Reservoir
	GCWA Reclaimed Water from COH
	Pearland Surface Water Treatment Plant
Porter SUD Joint GRP	City of Conroe Reuse
	Porter SUD Joint GRP

Project	Potential Volume ¹ (ac-ft)	Capital Cost (\$)	Unit Cost (\$/ac-ft)		Start Decade
			Start Decade	2070	
Contractual Transfer					
TRA to COH Transfer	150,000	\$0	\$5	\$5	2020
Conveyance					
CHCRWA Transmission and Distribution Expansion	4,682	\$23,207,659	\$409	\$44	2020
COH, NHRWA, and CHCRWA Shared Transmission	148,042	\$150,325,381	\$83	\$9	2020
East Texas Transfer	250,000	\$388,064,210	\$145	\$15	2040
Lake Livingston to SJRA Transfer	50,000	\$166,710,892	\$311	\$32	2050
Luce Bayou Interbasin Transfer	450,000	\$360,004,806	\$143	\$23	2020
NFBWA Phase 2 Distribution Segments	62,496	\$65,450,062	\$95	\$7	2020
NHRWA Distribution Expansion	143,360	\$922,549,086	\$307	\$50	2020
NHRWA Transmission Line	143,360	\$155,993,406	\$86	\$6	2020
Old Galveston Road Transmission Improvements	24,300	\$99,886,253	\$322	\$25	2020
WHCRWA Distribution Expansion	91,896	\$293,290,000	\$299	\$32	2020
WHCRWA/NFBWA Transmission Line	154,392	\$642,986,052	\$340	\$34	2020
Groundwater Development					
Brackish Groundwater Development ³	Varies	Varies by project	\$278-1,557	Varies	2020
BWA Brackish Groundwater	3,136	\$34,016,950	\$600	\$346	2020
Conroe Brackish Groundwater Desalination	5,600	\$40,691,342	\$857	\$323	2020
Expanded Use of Groundwater ³	30,000+	Varies by WUG	Varies by WUG	Varies by WUG	2020
Groveton Groundwater Expansion	161	\$2,195,000	\$1,277	\$136	2020
SJRA Catahoula Aquifer Supplies	7,840	\$10,980,367	\$213	\$96	2020
Groundwater Reduction Plans					
CHCRWA GRP ⁴	4,682	\$0	\$0	\$0	2020
City of Houston GRP ⁴	130,544	\$0	\$0	\$0	2020
City of Missouri City GRP	12,656	\$50,959,636	\$329	\$33	2020
City of Richmond GRP	1,465	\$32,167,109	\$1,761	\$146	2020
City of Rosenberg GRP	826	\$12,469,012	\$1,242	\$131	2020
City of Sugar Land GRP	20,160	\$148,650,964	\$900	\$283	2020
Fort Bend County MUD 25 GRP	744	\$2,148,043	\$282	\$40	2030
Fort Bend County WC&ID No. 2 GRP	6,720	\$36,668,844	\$800	\$343	2020
NFBWA GRP ⁴	62,496	\$0	\$0	\$0	2020
NHRWA GRP ⁴	143,360	\$0	\$0	\$0	2020
Panorama Village and Shenandoah Joint GRP	472	\$1,619,114	\$399	\$112	2040
Porter SUD Joint GRP	2,240	\$22,061,536	\$1,250	\$426	2020
River Plantation and East Plantation Joint GRP ⁵	92	\$0	\$0	\$0	2030
SJRA GRP	100,000	\$834,931,018	\$245	\$81	2020
WHCRWA GRP ⁴	91,896	\$0	\$0	\$0	2020

Table 5-A3 – Scoring for Key Projects

WMS Project		Cost	Location	Water Quality	Environmental Land & Habitat	Impacts on Environmental Flows	Local Preference	Institutional Constraints / Risk of Implementability	Development Timeline	Sponsorship	Vulnerability	Impacts on Other WMS
Conservation												
CNSV-001	Industrial Conservation	5	5	3	5	3	4	5	5	3	5	3
CNSV-002	Irrigation Conservation	5	5	3	4	3	3	5	5	3	5	3
CNSV-003	Municipal Conservation	4	5	3	5	3	4	5	5	3	5	2
Contractual Transfer												
CNTR-001	TRA to COH Transfer	5	2	3	5	2	3	3	5	5	4	4
Conveyance												
CONV-001	CHCRWA Transmission and Distribution Expansion	4	4	3	3	3	4	3	4	5	5	3
CONV-002	COH, NHCRWA, and CHCRWA Shared Transmission	5	4	3	3	3	4	3	4	5	5	3
CONV-003	East Texas Transfer	5	1	3	2	2	3	1	3	3	2	4
CONV-004	GCWA Treated Water from LNVA	1	1	3	2	3	2	2	4	2	2	3
CONV-005	Lake Livingston to SJRA Transfer	4	2	3	2	2	4	2	4	4	4	4
CONV-006	Luce Bayou Interbasin Transfer	5	2	3	3	2	4	5	5	5	4	5
CONV-007	NFBWA Phase 2 Distribution Segments	5	4	3	3	3	4	3	4	5	5	3
CONV-008	NHCRWA Distribution Expansion	3	4	3	3	3	4	3	4	5	5	3
CONV-009	NHCRWA Transmission Line	5	4	3	3	3	4	3	4	5	5	3
CONV-010	Old Galveston Road Transmission Improvements	4	5	3	5	3	5	3	5	5	5	5
CONV-011	WHCRWA Distribution Expansion	4	4	3	3	3	4	3	4	5	5	3
CONV-012	WHCRWA/NFBWA Transmission Line	5	4	3	3	3	4	3	4	5	5	3
Groundwater Development												
GWDV-001	Aquifer Storage and Recovery	3	5	3	4	4	4	3	5	3	3	5
GWDV-002	Brackish Groundwater Development	3	5	3	4	4	3	3	5	3	4	4
GWDV-003	BWA Brackish Groundwater	3	3	3	3	4	4	4	5	5	4	5
GWDV-004	Conroe Brackish Groundwater Desalination	2	5	3	4	4	4	3	5	4	4	4
GWDV-005	Expanded Use of Groundwater	1	5	3	4	4	4	3	5	3	5	3
GWDV-006	Forestar Houston County Project	3	2	3	2	4	3	2	5	2	3	3

Project	Project Type	Associated WMS
NEW / EXPANDED CONTRACT WITH GCWA - MINING, BRAZORIA COUNTY (SIB)	WUG	NEW / EXPANDED CONTRACT WITH GCWA
NEW / EXPANDED CONTRACT WITH GCWA - MINING, GALVESTON COUNTY (SIB)	WUG	NEW / EXPANDED CONTRACT WITH GCWA
NEW / EXPANDED CONTRACT WITH GCWA - MISSOURI CITY	WUG	NEW / EXPANDED CONTRACT WITH GCWA
NEW / EXPANDED CONTRACT WITH GCWA - SANTA FE	WUG	NEW / EXPANDED CONTRACT WITH GCWA
NEW / EXPANDED CONTRACT WITH GCWA - SIENNA PLANTATION	WUG	NEW / EXPANDED CONTRACT WITH GCWA
NEW / EXPANDED CONTRACT WITH LNVA - COUNTY-OTHER, GALVESTON COUNTY (NT)	WUG	NEW / EXPANDED CONTRACT WITH LNVA
NEW / EXPANDED CONTRACT WITH LNVA - IRRIGATION, CHAMBERS COUNTY	WUG	TRANSFER TO REGION H (SAM RAYBURN)
NEW / EXPANDED CONTRACT WITH LNVA - IRRIGATION, LIBERTY COUNTY	WUG	TRANSFER TO REGION H (SAM RAYBURN)
NEW / EXPANDED CONTRACT WITH LNVA - MINING, GALVESTON COUNTY (NT)	WUG	NEW / EXPANDED CONTRACT WITH LNVA
NEW / EXPANDED CONTRACT WITH SJRA - BENDERS LANDING WATER SYSTEM	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - COUNTY-OTHER, MONTGOMERY COUNTY (SI)	WUG	NEW / EXPANDED CONTRACT WITH SJRA
		SIRA CATAHOULA AQUIFER SUPPLIES
NEW / EXPANDED CONTRACT WITH SJRA - EAST PLANTATION UD	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - INDIGO LAKE WATER SYSTEM	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - MANUFACTURING, MONTGOMERY COUNTY (SI)	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - MONTGOMERY	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - MONTGOMERY COUNTY MUD #18	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - PANORAMA VILLAGE	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - RIVER PLANTATION MUD	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - SHENANDOAH	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - STAGECOACH	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - STANLEY LAKE MUD	WUG	NEW / EXPANDED CONTRACT WITH SJRA
NEW / EXPANDED CONTRACT WITH SJRA - STEAM ELECTRIC POWER, MONTGOMERY COUNTY (SI)	WUG	SIRA CATAHOULA AQUIFER SUPPLIES
NEW / EXPANDED CONTRACT WITH SUGAR LAND - FORT BEND MUD 25	WUG	FORT BEND MUD 25 GRP
NFBWA GROUNDWATER REDUCTION PLAN	WMS	NFBWA GRP
NFBWA PHASE 2 DISTRIBUTION SEGMENTS	WMS	NFBWA GRP
NHCRWA DISTRIBUTION EXPANSION - 2025 PHASE	WMS	NHCRWA GRP

Project	Project Type	Associated WMS
NHRWA DISTRIBUTION EXPANSION - 2035 PHASE	WMS	NHRWA GRP
NHRWA DISTRIBUTION EXPANSION - 2045 PHASE	WMS	NHRWA GRP
NHRWA GROUNDWATER REDUCTION PLAN	WMS	NHRWA GRP
NHRWA TRANSMISSION LINES	WMS	NHRWA GRP
OLD GALVESTON ROAD TRANSMISSION IMPROVEMENTS	WMS	OLD GALVESTON ROAD TRANSMISSION IMPROVEMENTS
PANORAMA AND SHENANDOAH GRP INFRASTRUCTURE	WMS	PANORAMA AND SHENANDOAH JOINT GRP
PEARLAND REUSE INFRASTRUCTURE	WMS	CITY OF PEARLAND REUSE
PEARLAND SURFACE WATER TREATMENT PLANT DEVELOPMENT	WMS	PEARLAND SWTP
PORTER SUD GRP INFRASTRUCTURE	WMS	PORTER SUD JOINT GRP
REGIONAL RETURN FLOWS DEVELOPMENT		CHCRWA GRP
		CITY OF HOUSTON GRP
		NEW / EXPANDED CONTRACT WITH COH
		NEW / EXPANDED CONTRACT WITH SJRA
		NFBWA GRP
		NHRWA GRP
		SJRA REUSE SUPPLIES FOR MANUFACTURING
RICHMOND GRP INFRASTRUCTURE	WMS	WHCRWA GRP
RIVER PLANTATION REUSE EXPANSION	WMS	RICHMOND GRP
ROSENBERG GRP INFRASTRUCTURE	WMS	RIVER PLANTATION AND EAST PLANTATION JOINT GRP
SJRA CATAHOULA AQUIFER SUPPLIES	WMS	ROSENBERG GRP
SJRA CONROE REUSE PROJECT	WMS	SJRA CATAHOULA AQUIFER SUPPLIES
SJRA GROUNDWATER REDUCTION PLAN - 2025 PHASE		SJRA REUSE SUPPLIES FOR MANUFACTURING
		NEW / EXPANDED CONTRACT WITH SJRA
SJRA GROUNDWATER REDUCTION PLAN - 2035 PHASE		SJRA GRP
		NEW / EXPANDED CONTRACT WITH SJRA
		SJRA GRP

Project Name	Proj. Level	Sponsor	Capital Cost (\$)	Annual Cost (\$/year)						
				2020	2030	2040	2050	2060	2070	
NEW / EXPANDED CONTRACT WITH SIRA - STAGECOACH	WUG	SAN JACINTO RIVER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NEW / EXPANDED CONTRACT WITH SIRA - STANLEY LAKE MUD	WUG	SAN JACINTO RIVER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NEW / EXPANDED CONTRACT WITH SIRA - STEAM ELECTRIC POWER, MONTGOMERY COUNTY (SJ)	WUG	STEAM ELECTRIC POWER, MONTGOMERY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NEW / EXPANDED CONTRACT WITH SUGAR LAND - FORT BEND MUD 25	WUG	FORT BEND COUNTY MUD #25	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NFBWA GROUNDWATER REDUCTION PLAN	WMIS	NORTH FORT BEND WATER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NFBWA PHASE 2 DISTRIBUTION SEGMENTS	WMIS	NORTH FORT BEND WATER AUTHORITY	\$65,450,062	\$5,934,717	\$5,934,717	\$457,900	\$457,900	\$457,900	\$457,900	\$457,900
NHCRWA DISTRIBUTION EXPANSION - 2025 PHASE	WMIS	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$537,692,455	\$43,957,902	\$43,957,902	\$4,393,550	\$4,393,550	\$4,393,550	\$4,393,550	\$4,393,550
NHCRWA DISTRIBUTION EXPANSION - 2035 PHASE	WMIS	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$373,353,219	\$-	\$30,244,283	\$30,244,283	\$2,772,300	\$2,772,300	\$2,772,300	\$2,772,300
NHCRWA DISTRIBUTION EXPANSION - 2045 PHASE	WMIS	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$11,503,412	\$-	\$-	\$905,141	\$905,141	\$58,700	\$58,700	\$58,700
NHCRWA GROUNDWATER REDUCTION PLAN	WMIS	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
NHCRWA TRANSMISSION LINES	WMIS	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$155,993,406	\$12,358,768	\$12,358,768	\$880,500	\$880,500	\$880,500	\$880,500	\$880,500
OLD GALVESTON ROAD TRANSMISSION IMPROVEMENTS	WMIS	HOUSTON	\$99,886,253	\$8,963,415	\$8,963,415	\$605,000	\$605,000	\$605,000	\$605,000	\$605,000
PANORAMA AND SHENANDOAH GRP INFRASTRUCTURE	WMIS	PANORAMA VILLAGE	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
PEARLAND REUSE INFRASTRUCTURE	WMIS	SHENANDOAH	\$1,619,114	\$-	\$-	\$188,486	\$188,486	\$53,000	\$53,000	\$53,000
PEARLAND SURFACE WATER TREATMENT PLANT DEVELOPMENT	WMIS	PEARLAND	\$5,895,808	\$154,751	\$596,982	\$468,137	\$103,625	\$103,625	\$103,625	\$103,625
PORTER SUD GRP INFRASTRUCTURE	WMIS	PEARLAND	\$112,947,347	\$9,402,243	\$14,604,574	\$8,500,389	\$5,153,215	\$5,153,215	\$5,153,215	\$5,153,215
REGIONAL RETURN FLOWS DEVELOPMENT	WMIS	PORTER SUD	\$22,061,536	\$2,800,465	\$2,800,465	\$954,371	\$954,371	\$954,371	\$954,371	\$954,371
		HOUSTON	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
		NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
		SAN JACINTO RIVER AUTHORITY	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
RICHMOND GRP INFRASTRUCTURE	WMIS	RICHMOND	\$32,167,109	\$2,580,112	\$2,580,112	\$213,200	\$213,200	\$213,200	\$213,200	\$213,200

Project Name	Proj. Level	Unit Cost (\$/ac-ft)					
		2020	2030	2040	2050	2070	
LNVA IRRIGATION SYSTEM EXPANSION	WMS	\$0	\$0	\$435	\$435	\$360	\$360
LUCE BAYOU TRANSFER	WMS	\$143	\$143	\$23	\$23	\$23	\$23
MISSOURI CITY GRP INFRASTRUCTURE	WMS	\$329	\$329	\$33	\$33	\$33	\$33
MONTGOMERY COUNTY MUDDS #8 AND #9 REUSE	WMS	\$1,360	\$1,360	\$595	\$595	\$595	\$595
NFBWA GROUNDWATER REDUCTION PLAN	WMS	\$0	\$0	\$0	\$0	\$0	\$0
NFBWA PHASE 2 DISTRIBUTION SEGMENTS	WMS	\$95	\$95	\$7	\$7	\$7	\$7
NHCRWA DISTRIBUTION EXPANSION - 2025 PHASE	WMS	\$307	\$307	\$31	\$31	\$31	\$31
NHCRWA DISTRIBUTION EXPANSION - 2035 PHASE	WMS	\$0	\$211	\$211	\$19	\$19	\$19
NHCRWA DISTRIBUTION EXPANSION - 2045 PHASE	WMS	\$0	\$0	\$6	\$6	\$1	\$1
NHCRWA GROUNDWATER REDUCTION PLAN	WMS	\$0	\$0	\$0	\$0	\$0	\$0
NHCRWA TRANSMISSION LINES	WMS	\$86	\$86	\$6	\$6	\$6	\$6
OLD GALVESTON ROAD TRANSMISSION IMPROVEMENTS	WMS	\$369	\$369	\$25	\$25	\$25	\$25
PANORAMA AND SHENANDOAH GRP INFRASTRUCTURE	WMS	\$0	\$0	\$399	\$399	\$112	\$112
PEARLAND REUSE INFRASTRUCTURE	WMS	\$493	\$517	\$406	\$90	\$90	\$90
PEARLAND SURFACE WATER TREATMENT PLANT DEVELOPMENT	WMS	\$839	\$652	\$379	\$230	\$230	\$230
PORTER SUD GRP INFRASTRUCTURE	WMS	\$1,250	\$1,250	\$426	\$426	\$426	\$426
REGIONAL RETURN FLOWS DEVELOPMENT	WMS	\$0	\$0	\$0	\$0	\$0	\$0
RICHMOND GRP INFRASTRUCTURE	WMS	\$1,761	\$1,761	\$146	\$146	\$146	\$146
RIVER PLANTATION REUSE EXPANSION	WMS	\$0	\$0	\$0	\$0	\$0	\$0
ROSENBERG GRP INFRASTRUCTURE	WMS	\$1,242	\$1,242	\$131	\$131	\$131	\$131
SIRA CATAHOULA AQUIFER SUPPLIES	WMS	\$213	\$213	\$96	\$96	\$96	\$96
SIRA CONROE REUSE PROJECT	WMS	\$0	\$0	\$0	\$0	\$0	\$0
SIRA GROUNDWATER REDUCTION PLAN - 2025 PHASE	WMS	\$245	\$245	\$28	\$28	\$28	\$28
SIRA GROUNDWATER REDUCTION PLAN - 2035 PHASE	WMS	\$0	\$971	\$971	\$113	\$113	\$113
SIRA GROUNDWATER REDUCTION PLAN - 2045 PHASE	WMS	\$0	\$0	\$594	\$594	\$69	\$69
SIRA GROUNDWATER REDUCTION PLAN - 2055 PHASE	WMS	\$0	\$0	\$0	\$971	\$971	\$113
SUGAR LAND GRP	WMS	\$0	\$0	\$0	\$0	\$0	\$0

REGION H PROJECT ANALYSIS TECHNICAL MEMORANDUM

Project Name:	North Harris County Regional Water Authority Distribution Expansion
Project ID:	CONV-008
Project Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	143,360 ac-ft/yr (128 mgd)
Implementation Decade:	2020 (2025)
Development Timeline:	<10 years (per phase)
Project Capital Cost:	\$922,549,086 (Sept. 2013)
Unit Water Cost (Rounded):	\$518 per ac-ft (during loan period) \$50 per ac-ft (after loan period)

PROJECT DESCRIPTION

The Harris-Galveston Subsidence District (HGSD) and Fort Bend Subsidence District (FBSD) have established requirements for entities within their boundaries to limit groundwater pumpage to a specified percentage of total water use to address the issue of land surface subsidence caused by prolonged heavy pumping from the Gulf Coast Aquifer; as demands are expected to grow with time, the allowable percentage from groundwater is scheduled to decrease. In order to meet these requirements, the North Harris County Regional Water Authority (NHCRWA) has contracted with the City of Houston (COH) to receive treated surface water. The Authority has already developed transmission and distribution infrastructure to its initial obligations for reducing groundwater demand and are receiving water from COH. In order to utilize sufficient supplies to meet future surface water conversion obligations, NHCRWA is developing a phased expansion of the distribution infrastructure network through which it supplies its member districts, allowing for greater overall volume conveyed and conversion of additional districts to surface water.

PROJECT ANALYSES

The project analyses for the NHCRWA Distribution Expansion include evaluations of the potential supply to be created, environmental factors involved in the project, permitting and development considerations, and an analysis of project cost.

Supply Development

The Authority has already developed transmission and distribution infrastructure to its initial obligations for reducing groundwater demand and is receiving water from COH, which is reflected in the Regional Plan as an existing supply. In order to meet future water demands and regulatory conversion obligations, the Authority has continued development and implementation of its Groundwater Reduction Plan (GRP) program, increasing its supply reservation and planning for large

scale transmission to its service area. In order to utilize this expanded supply in order to meet future required phases of conversion, NHCRWA will engage in a phased expansion of the distribution infrastructure network through which it supplies its member districts, allowing for greater overall volume conveyed and conversion of additional districts to surface water. The year 2025 expansion will include development an expanded distribution pipeline network and two new pump station facilities, one near the Hardy Toll Road and Richey Road, and the other west of SH 249 near the Heron Lakes subdivision. The existing Louetta Regional Water Plant will be expanded, and two groundwater wells will be added to the system. The year 2025 expansion will bring the total number of districts in the NHCRWA surface water service area to 105. A subsequent 2035 expansion of the distribution pipeline system will allow surface water to be conveyed to an additional 36 districts. Other infrastructure measures implemented in this phase will include three additional wells, a new West Regional Water Plant, and enhancements to the Spears Road Pump Station, Louetta Regional Water Plant, and SH 249 Regional Pump Station. The 2045 conversion phase will involve limited expansion of infrastructure and add an additional seven districts receiving surface water.

Environmental Considerations

Infrastructure development may result in some construction disturbance which could require mitigation. The most significant impact associated with the GRP is the source supply, which requires the interbasin transfer of surface water supplies.

Permitting and Development

NHCRWA is subject to contractual requirements established by COH as well as any relevant permitting required by the State of Texas and HGSD. Development of expanded distribution infrastructure will cause some degree of surface disturbance, which may require permitting and mitigation. Infrastructure development is also likely to require acquisition of additional easements or property.

Cost Analysis

Planning-level capital cost estimates for the NHCRWA Distribution Expansion project were included in the NHCRWA GRP. The primary capital components of the project were pump station and pipeline development, with additional cost for contingency, engineering, legal costs, land acquisition, and environmental studies and mitigation. Capital costs were scaled to a September 2013 equivalent cost using the Construction Cost Index in accordance with TWDB guidance. Other cost components not included in the GRP, such as interest during construction, annualized debt service, and annualized operations and maintenance costs, were assumed using standard Regional Planning costing assumptions. The costs presented in this memorandum do not include the purchase cost of water. Estimated costs are presented in *Table 1*.

Table 1 – NHCRA Distribution Expansion Project Costs

OPINION OF PROBABLE CONSTRUCTION COST					January 24, 2015
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	\$494,200,000	\$494,200,000
2	ENGINEERING, FINANCIAL, AND LEGAL SERVICES AND CONTINGENCIES	1	LS	\$254,690,000	\$254,690,000
3	LAND AND EASEMENTS	1	LS	\$77,160,000	\$77,160,000
4	ENVIRONMENTAL - STUDIES AND MITIGATION	1	LS	\$790,000	\$790,000
5	INTEREST DURING CONSTRUCTION	1	LS	\$95,709,086	\$95,709,086
PROJECT COST					\$922,549,086

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		2020	2030	2040	2050	2060	2070
1	DEBT SERVICE	\$39,564,352	\$67,036,335	\$28,318,425	\$846,441	\$0	\$0
2	OPERATION AND MAINTENANCE (O&M)	\$4,393,550	\$7,165,850	\$7,224,550	\$7,224,550	\$7,224,550	\$7,224,550
3	PUMPING ENERGY COSTS	\$0	\$0	\$0	\$0	\$0	\$0
4	PURCHASE COST OF WATER	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL ANNUAL COST		\$43,957,902	\$74,202,185	\$35,542,975	\$8,070,991	\$7,224,550	\$7,224,550

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		2020	2030	2040	2050	2060	2070
1	ANNUAL COST	\$43,957,902	\$74,202,185	\$35,542,974	\$8,070,991	\$7,224,550	\$7,224,550
2	YIELD	143,360	143,360	143,360	143,360	143,360	143,360
3	UNIT COST	\$307	\$518	\$248	\$56	\$50	\$50
TOTAL UNIT COST		\$205					

PROJECT EVALUATION

Based on the analysis provided above, the NHCRA Distribution Expansion project was evaluated across eleven different criteria for the purpose of quick comparison against alternative projects that may be incorporated into the Regional Water Plan. The results of this evaluation can be seen in the table below.

CRITERIA	RATING	EXPLANATION
Cost	3	The project unit cost is slightly over \$500/ac-ft during debt service but declines sharply after debt service completion.
Location	4	Reflects distribution infrastructure from major transmission pipelines to demand centers.
Water Quality	3	No known water quality issues.
Environmental Land and Habitat	3	Environmental impacts can be mitigated. Limited concerns.
Environmental Flows	3	Project does not directly impact flows. Source projects will result in decreased instream flows downstream of diversion location in source basin.

CRITERIA	RATING	EXPLANATION
Local Preference	4	Local support. Limited opposition.
Institutional Constraints	3	Permits expected with minimal problems. Property available.
Development Timeline	4	Project to be developed within 10 years.
Sponsorship	5	Sponsors identified and project is in development.
Vulnerability	5	Minimal risk from natural and man-made disasters.
Impacts on Other Projects	3	No known significant impacts to other projects.

The NHCRWA Distribution Expansion includes up to 155 miles of pipelines. The majority of this impact will be in urbanized areas with limited impacts to habitat. The NHCRWA Distribution Expansion will not directly impact environmental flows and is not anticipated to impact agricultural land or production.

WATER USER GROUP APPLICATION

The NHCRWA Distribution Expansion project was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the project as well as other factors that may relate to the auditability of the project to the WUGs served.

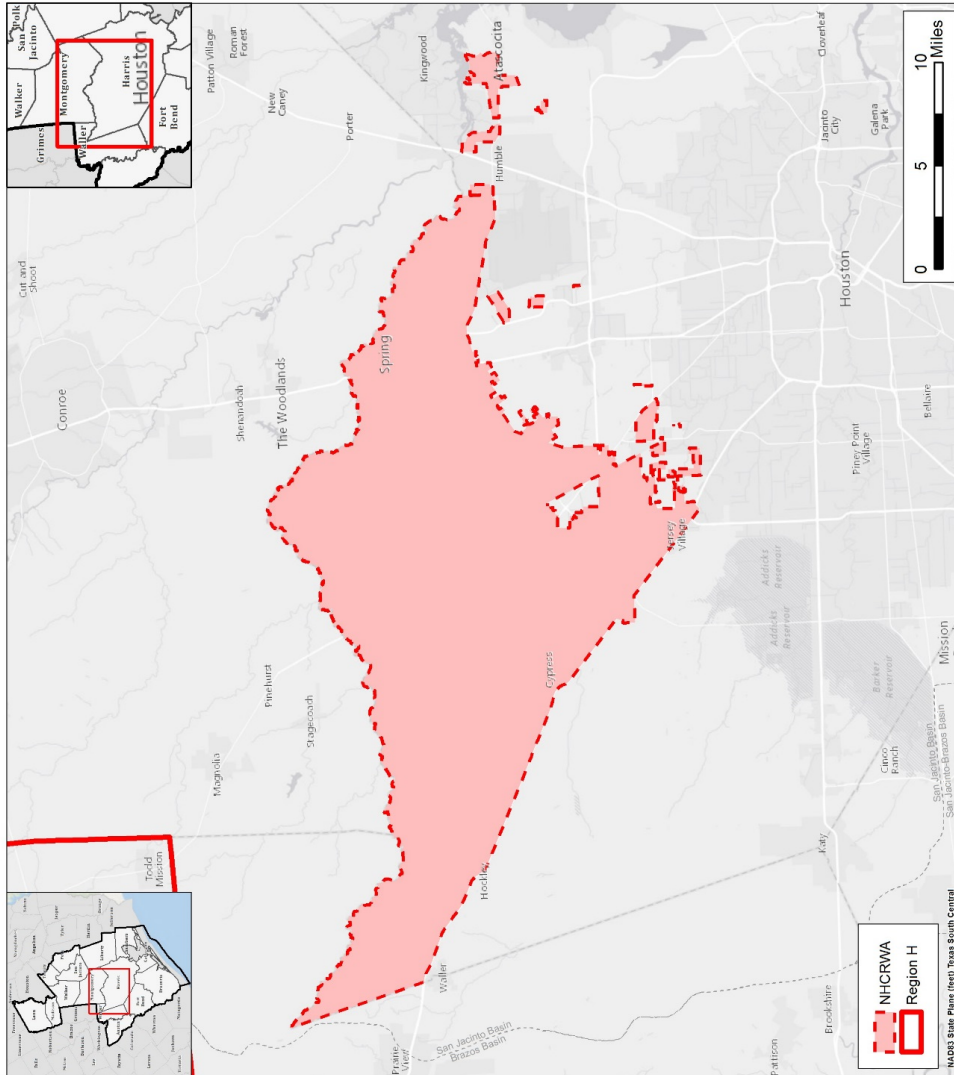
CRITERIA	WUG SUITABILITY
Proximity	Distribution infrastructure from major transmission pipelines to demand centers.
Size	Conveyance is sized to convey the requisite amount of source water.
Water Quality	Conveys treated water of quality appropriate for municipal use.
Unit Cost	Reflects a portion of the overall cost to implement NHCRWA's surface water conversion.
Other Factors	Reduces dependence on Gulf Coast Aquifer groundwater.

REFERENCES

AECOM. *2014 North Harris County Regional Water Authority Groundwater Reduction Plan*, prepared for NHCRWA, June 2014.

Harris-Galveston Subsidence District. *Harris-Galveston Subsidence District 2013 District Regulatory Plan*, May 2013..

LOCATION MAP



**NHCRA Distribution Expansion
Location Map**



Texas

Recommended Projects Associated with Water Management Strategies

Sponsor Name	Is Sponsor a WWP?	Project Name	Project Description	Capital Cost	Online Decade
NORTH GREEN MUD	N	WUG INFRASTRUCTURE EXPANSION (GROUNDWATER) - NORTH GREEN MUD	MULTIPLE WELLS/WELL FIELD	\$1,567,843	2030
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	COH NORTHEAST WATER PURIFICATION PLANT EXPANSION	WATER TREATMENT PLANT EXPANSION	\$462,850,625	2021
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	COH, NHCRA, AND CHCRA SHARED TRANSMISSION	CONVEYANCE/TRANSMISSION PIPELINE	\$107,089,958	2025
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	MUNICIPAL CONSERVATION, NHCRA	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$59,468,460	2020
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	MUNICIPAL IRRIGATION REUSE DEVELOPMENT, NHCRA	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT	\$6,067,108	2030
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	NHCRA DISTRIBUTION EXPANSION - 2025 PHASE	CONVEYANCE/TRANSMISSION PIPELINE	\$537,692,455	2025
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	NHCRA DISTRIBUTION EXPANSION - 2035 PHASE	CONVEYANCE/TRANSMISSION PIPELINE	\$373,353,219	2035
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	NHCRA DISTRIBUTION EXPANSION - 2045 PHASE	CONVEYANCE/TRANSMISSION PIPELINE	\$11,503,412	2045
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	NHCRA TRANSMISSION LINES	CONVEYANCE/TRANSMISSION PIPELINE	\$155,993,406	2025
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	WATER LOSS REDUCTION, NHCRA	WATER LOSS CONTROL	\$132,740,570	2020
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	WUG INFRASTRUCTURE EXPANSION - NHCRA DISTRICTS 2025	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION	\$106,821,318	2025
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Y	WUG INFRASTRUCTURE EXPANSION - NHCRA DISTRICTS 2035	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION	\$83,858,688	2035
NORTHWEST PARK MUD	N	MUNICIPAL CONSERVATION, NORTHWEST PARK MUD	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$1,455,250	2020
NORTHWEST PARK MUD	N	WUG INFRASTRUCTURE EXPANSION (GROUNDWATER) - NORTHWEST PARK MUD	MULTIPLE WELLS/WELL FIELD	\$5,130,247	2030
OAK RIDGE NORTH	N	MUNICIPAL CONSERVATION, OAK RIDGE NORTH	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$208,910	2020
OAKWOOD	N	MUNICIPAL CONSERVATION, OAKWOOD	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$5,890	2040
OLD RIVER-WINFREE	N	WATER LOSS REDUCTION, OLD RIVER-WINFREE	WATER LOSS CONTROL	\$361,100	2020
OLD RIVER-WINFREE	N	WUG INFRASTRUCTURE EXPANSION (GROUNDWATER) - OLD RIVER-WINFREE - PHASE 1	SINGLE WELL	\$1,080,966	2020
OLD RIVER-WINFREE	N	WUG INFRASTRUCTURE EXPANSION (GROUNDWATER) - OLD RIVER-WINFREE - PHASE 2	SINGLE WELL	\$1,080,966	2070
ONALASKA	N	WATER LOSS REDUCTION, ONALASKA	WATER LOSS CONTROL	\$1,511,450	2020
OYSTER CREEK	N	MUNICIPAL CONSERVATION, OYSTER CREEK	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$129,490	2020
OYSTER CREEK	N	WATER LOSS REDUCTION, OYSTER CREEK	WATER LOSS CONTROL	\$283,260	2020
OYSTER CREEK	N	WUG INFRASTRUCTURE EXPANSION - OYSTER CREEK	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION	\$1,832,010	2020
PANORAMA VILLAGE	N	MUNICIPAL CONSERVATION, PANORAMA VILLAGE	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$227,300	2020
PANORAMA VILLAGE	N	WUG INFRASTRUCTURE EXPANSION - PANORAMA VILLAGE	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT; PUMP STATION	\$6,493,814	2025
PARKWAY UD	N	MUNICIPAL CONSERVATION, PARKWAY UD	MUNICIPAL CONSERVATION CAPITAL COST (DOES NOT INCLUDE METER REPLACEMENT OR WATER LOSS)	\$224,720	2020



Abridged Application

Due February 5, 2016 by 5:00pm

SWIFT@twdb.texas.gov

RECEIVED

By submitting this abridged application, you understand and confirm that the information provided is true and correct to the best of your knowledge and further understand that the failure to submit a complete abridged application by the stated deadlines, or to respond in a timely manner to additional requests for information, may result in the withdrawal of the abridged application without review.

GENERAL INFORMATION

Name of Entity	County	Regional Water Planning Area
North Harris County RWA *ORIGINALLY SUBMITTED VIA OLA*	Harris	H

Entity Contact Information

Contact Person	Name	Mark Evans		
	Title	Planning and Governmental Affairs Director		
Mailing Address	3648 Cypress Creek Parkway			
	77068-0000			
Phone Number	(281) 440-3924	Fax Number	(281) 440-4104	
Email Address	mevans@nhcrwa.com			

PROJECT DESCRIPTION

Name of Project <i>(As it appears in the 2016 regional water plan)</i>	NHCRWA Internal 2020 Distribution System		
Where can the project be found in the most recent Regional Water Plan?	Project described on page:	Capital costs listed on page:	

Please attach a list of all water systems served by the proposed project.

Phase(s) Applied For	<input checked="" type="checkbox"/> Planning	<input checked="" type="checkbox"/> Acquisition	<input checked="" type="checkbox"/> Design	<input checked="" type="checkbox"/> Construction
Population Served When Fully Operational	843,645			

Description of Proposed Project

The North Harris County Regional Water Authority (NHCRWA) has entered into contractual agreements with the City of Houston to purchase treated surface water from the City's Northeast Water Purification Plant (NEWPP) for use in complying with the Harris-Galveston Subsidence District (HGSD) regulatory conversion requirements as detailed in the NHCRWA's Updated Groundwater Reduction Plan (GRP). The NEWPP is located adjacent to the western shoreline of Lake Houston near the Sam Houston Toll Road (Beltway 8). In addition to the expansion of the NEWPP, a shared transmission pipeline approximately 24.3 miles in length will be built from the NEWPP to a proposed NHCRWA SH 249 Regional Pump Station (SH 249 RPS) located west of SH 249 to provide treated surface water for various type water districts and cities (collectively called MUDs) to facilitate compliance with the HGSD regulatory conversion requirements. From the SH249 RPS, treated surface water will be distributed to MUDs via the NHCRWA's distribution system to serve MUDs located primarily in the west and northwest portions of the NHCRWA. This application is to request funding for the initial 2025 phase of the SH 249 RPS.

The initial phase of NHCRWA 2025 Distribution System was approved for funding by the TWDB during the first round of SWIFT applications in an amount of \$44,125,000. That application and subsequent loan commitment (Loan No. 51004) by the TWDB did not include project costs associated with the SH 249 RPS as described above. Therefore, this application seeks funding for the SH



Abridged Application

Due February 5, 2016 by 5:00pm

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249 RPS Project as part of the Initial Phase of the Authority 2025 Distribution System.
See Attachment B for further information and background for the NHCRWA and Exhibit 2 - Existing and Proposed Phased Water Distribution System

Emergency <i>(select all that apply)</i>	<input type="checkbox"/> Applicant/entity's water supply will last less than 180 days. <input type="checkbox"/> Water supply need occurs earlier than anticipated in the State Water Plan. <input type="checkbox"/> Applicant has received or applied for Federal emergency funding. <input checked="" type="checkbox"/> None of the above.
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Agricultural Efficiency Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Efficiency improvement achieved by implementing the project <i>(Please provide an attachment showing the basis for your calculation.)</i>
		<input type="checkbox"/> <1% <input type="checkbox"/> 10%-13.9% <input type="checkbox"/> 1%-1.9% <input type="checkbox"/> 14%-17.9% <input type="checkbox"/> 2%-5.9% <input type="checkbox"/> ≥18% <input type="checkbox"/> 6%-9.9%

Household Cost Factor
(Household Cost Factor for SWIFT prioritization is calculated by dividing the service area's average residential water bill by its annual median household income. For regional projects, these should represent the combined service areas of all participating entities.)

Estimated average annual residential water bill:	\$488	Annual Median Household Income:	\$77,750
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The proposed project addresses:	<input type="checkbox"/> Conservation <input type="checkbox"/> Water Loss <input checked="" type="checkbox"/> N/A	Annual Volume of Water Produced/Conserved by the Project <i>(in acre-feet per year)</i>	126,585
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Readiness to Proceed <i>(select all that apply)</i>	<input checked="" type="checkbox"/> Preliminary planning or design work (30% of total project) has been completed or is not required. <input checked="" type="checkbox"/> Applicant is prepared to begin implementation or construction within 18 months of application deadline. <input checked="" type="checkbox"/> Applicant has acquired all water rights associated with the proposed project, or none will be required.
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ESTIMATED COSTS		
Estimated Project Costs	Low-interest Loan	\$ 107,820,000
	Deferred Loan	\$
	Board Participation	\$
	Local Contribution	\$ 29,626,500
	Other: Prior SWIFT	\$ 44,125,000
	Total Estimated Project Costs	\$ 181,571,500

Anticipated Commitments <i>Attach proposed schedule for multi-year commitments</i>	<input type="checkbox"/> One-Time Commitment <input checked="" type="checkbox"/> Multi-Year Commitments
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