INITIALLY PREPARED PLAN

CHAPTER 5.4: EVALUATION OF ALTERNATIVE WMS

Rio Grande Regional Water Plan

B&V PROJECT NO. 192863

PREPARED FOR

Rio Grande Regional Water Planning Group

3 MARCH 2020

BLACK & VEATCH

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5.4.1.1 Brownsville

Brownsville-Matamoros Weir and Reservoir

Project Source

This strategy was submitted by the City of Brownsville to the RWPG during the 2016 regional water planning process.

Description

This strategy is for the construction of a weir and on-channel reservoir to capture and store excess river flow for an additional water supply in the lower Rio Grande Valley. The weir and reservoir would be located about 4 miles southeast of Brownsville.

Available Supply

BPUB currently has authorization to divert up to 40,000 acft/yr of "excess flows" from the Rio Grande under TCEQ Permit No. 1838. Excess flows are defined as all US waters passing the Brownsville gauging station above 25 cfs. Excess US river flows will be impounded in the Brownsville Reservoir under BPUB's TCEQ water rights Permit No. 5259. According to hydrologic studies performed for the project sponsors, the proposed project would allow the diversion of the full 40,000 acft/yr authorized under the existing permit approximately 70 percent of the time.

Environmental Issues

Environmental issues include impacts on water quality (i.e., increased salinity) within and downstream of the reservoir, impacts to aquatic and riparian habitat as a result of changes in downstream flow and salinity patterns, potential impacts to habitat from reservoir construction and inundation, potential adverse impacts to the Audubon Society's Sabal Palm Sanctuary, and increased risk of flooding. The project sponsors have indicated their intent to operate the proposed project to mitigate these concerns; resource advocates remain concerned about these issues.

TCEQ issued a water right permit for the Brownsville Weir and Reservoir Project in 2000. This permit authorizes the construction of the Brownsville Weir on the Rio Grande and impoundment of 6,000 acft of Rio Grande water in the Brownsville Reservoir. Special conditions included in this permit require the BPUB to (1) pass a minimum flow of 25 cfs when water is being impounded, (2) pass sufficient water through the reservoir to satisfy demands of downstream water rights holders as directed by the Rio Grande Watermaster, (3) monitor salinity in the Rio Grande downstream of the weir near the riverine/estuarine interface (23.6 river miles upstream from the mouth of the river) and only impound water in the reservoir when the measured salinity is less than an established low salinity condition, and (4) consult with the TCEQ, TPWD, USFWS, and other appropriate agencies to develop and implement an acceptable mitigation plan for the overall Brownsville Weir and Reservoir Project.

The mitigation plan for the project will be developed and finalized through the Section 404/10 process under the authority of the Galveston District of the Corps of Engineers. Environmental issues that have

been raised must be satisfactorily addressed through the Section 404/10 federal permitting process and through the IBWC project approval process in order for the project to be authorized. The IBWC will be the lead agency for all discussions and dealings with Mexico that depend on the Section 404/10 permit.

Engineering and Costing

Costs for this strategy from the UCM include an on-channel reservoir and land acquisition. It is assumed that the construction period for this strategy is 1 year. Table 5.4-1 outlines the estimated project requirements and costs.

Table 5.4-1 Brownsville-Matamoros Weir and Reservoir

COST ESTIMATE SUMMARY BROWNSVILLE-MATAMOROS WEIR AND RESERVOIR	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Off-Channel Storage/Ring Dike (conservation pool 6000 acft, 300 acres)	$15,589,000
TOTAL COST OF FACILITIES	**$15,589,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$5,456,000
Environmental and Archaeology Studies and Mitigation	$1,054,000
Land Acquisition and Surveying (300 acres)	$1,069,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$638,000
TOTAL COST OF PROJECT	**$23,806,000**
ANNUAL COST	
Reservoir Debt Service (3.5%, 40 years)	$1,115,000
O&M	
Dam and Reservoir (1.5% of cost of facilities)	$234,000
Pumping Energy Costs (1608390 kWh at 0.08 $/kWh)	$129,000
TOTAL ANNUAL COST	$1,478,000
Available Project Yield (acft/yr)	**19,176**
Annual Cost of Water ($ per acft)	**$77.08**
Annual Cost of Water After Debt Service ($ per acft)	**$18.93**
Annual Cost of Water ($ per 1,000 gallons)	**$0.24**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$0.06**

The project is on hold pending approval from Mexico.

Seawater Desalination Demonstration and Implementation

Project Source

This strategy was submitted by the City of Brownsville to the RWPG during the 2016 regional water planning process.

Description

This strategy is for the construction of a 2.5 mgd seawater desalination facility on the south shore of the Brownsville Ship Channel. In anticipation of a future expansion to a 25 mgd facility, this strategy includes some full-scale components like the intake system, concentrate disposal system, and land acquisition.

Available Supply

This strategy would start with a desalination demonstration in 2020, supplying 2.5 mgd of drinking water. It is assumed that the full-scale, 25 mgd desalination facility will be constructed by 2060 when Brownsville's drinking water demand exceeds its current water treatment capacity.

Engineering and Costing

This strategy includes two separate costs. One cost is for the initial 2.5 mgd demonstration, including an intake structure, piping, land acquisition, and treatment. The second cost includes the facility expansion to 25 mgd, including expanded intake structure and pipeline.

This strategy proposes construction and implementation of alternative energy generation facilities, including wind generation and landfill gas reclamation. These alternatives could not be incorporated into the UCM and are not included in the costs presented.

Table 5.4-2 and Table 5.4-3 outline the estimated costs and project requirements for the seawater desalination demonstration and implementation, respectively.

Table 5.4-2 BPUB Seawater Desalination Demonstration Project Requirements and Costs

COST ESTIMATE SUMMARY BROWNSVILLE PUBLIC UTILITIES BOARD - SEAWATER DESALINATION DEMONSTRATION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station (5.3 mgd)	$4,248,000
Transmission Pipeline (18 in dia., 0.06 mile)	$33,000
Two WTPs (2.5 mgd and 2.5 mgd)	$49,205,000
TOTAL COST OF FACILITIES	**$53,486,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$18,718,000
Environmental and Archaeology Studies and Mitigation	$26,000
Land Acquisition and Surveying (8 acres)	$30,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$1,988,000
TOTAL COST OF PROJECT	**$74,248,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$5,224,000
O&M	
Intakes and Pump Stations (2.5% of cost of facilities)	$106,000
WTP	$6,555,000
Pumping Energy Costs (576,024 kWh at 0.08 $/kWh)	$46,000
TOTAL O&M	$6,707,000
TOTAL ANNUAL COST	**$11,931,000**
Available Project Yield (acft/yr)	**2,800**
Annual Cost of Water ($ per acft)	**$4,261**
Annual Cost of Water After Debt Service ($ per acft)	**$2,395**
Annual Cost of Water ($ per 1,000 gallons)	**$13.07**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$7.35**

Table 5.4-3 BPUB Seawater Desalination Implementation Project Requirements and Costs

COST ESTIMATE SUMMARY BROWNSVILLE PUBLIC UTILITIES BOARD - SEAWATER DESALINATION IMPLEMENTATION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station (52.6 mgd)	$17,877,000
Transmission Pipeline (60 in dia., 0.07 mile)	$123,000
Two WTP (22.5 mgd and 22.5 mgd)	$320,569,000
TOTAL COST OF FACILITIES	**$338,569,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$118,493,000
Environmental and Archaeology Studies and Mitigation	$1,000
Land Acquisition and Surveying (28 acres)	$2,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$12,570,000
TOTAL COST OF PROJECT	**$469,635,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$33,044,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$1,000
Intakes and Pump Stations (2.5% of cost of facilities)	$447,000
WTP	$41,391,000
Pumping Energy Costs (5,691,079 kWh at 0.08 $/kWh)	$455,000
TOTAL O&M	$42,294,000
TOTAL ANNUAL COST	**$75,338,000**
Available Project Yield (acft/yr)	**28,000**
Annual Cost of Water ($ per acft)	**$2,690**
Annual Cost of Water After Debt Service ($ per acft)	**$1,510**
Annual Cost of Water ($ per 1,000 gallons)	**$8.26**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$4.63**

Implementation Issues

Financing a full-scale seawater desalination facility is a major implementation issue. The BPUB is researching potential federal, state, and local funding sources to help finance this strategy.

5.4.1.2 County-Other, Cameron

County-Other, Cameron – Expanded Groundwater Supply

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is to provide additional supply to Cameron County-Other with the installation of fresh groundwater wells.

Available Yield

Because of MAG limitations, Cameron County has no MAG availability for new projects this planning cycle. The available supply for this project is assumed to be 3,000 acft/yr beginning in 2020.

Engineering and Costing

The UCM was utilized to develop estimated costs for this strategy based on assumptions about the individual wells. The wells were costed with a capacity of 50 gpm. Well piping and land acquisition were also included in the cost estimate.

The estimated costs and project requirements for this strategy are presented in Table 5.4-4.

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater wells and piping may also include a TCEQ well drilling permit, purchase of land, and a TXDOT right-of-way permit.

Table 5.4-4 Cameron County-Other Groundwater Wells Cost and Yield Projections

COST ESTIMATE SUMMARY COUNTY-OTHER, CAMERON - EXPANDED GROUNDWATER	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$4,507,000
TOTAL COST OF FACILITIES	**$4,507,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$1,577,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$168,000
TOTAL COST OF PROJECT	**$6,252,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$440,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$45,000
TOTAL ANNUAL COST	$485,000
Available Project Yield (acft/yr)	**3,000**
Annual Cost of Water ($ per acft)	**$161.67**
Annual Cost of Water After Debt Service ($ per acft)	**$15.00**
Annual Cost of Water ($ per 1,000 gallons)	**$0.50**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$0.05**

North Cameron Regional WTP Well Field Expansion

Project Source

This strategy was submitted by East Rio Hondo Water Supply Corporation (ERHWSC) to the RWPG on behalf of ERHWSC and NAWSC.

Description

This strategy is for the addition of a groundwater well to increase the brackish water supply to the existing North Cameron Regional RO WTP. The WTP could be located between the cities of Santa Rosa and Combes, increasing supplies to both the NAWSC and ERHWSC systems. ERHWSC's share of the supply would be delivered by the Bean Road Transmission Line.

Available Supply

The North Cameron WSC desalination plant currently treats 1.15 mgd of brackish water supplied by one groundwater well. The WTP has the capacity to treat 2.30 mgd raw water, and this strategy would supply the additional 1.15 mgd of brackish water needed to bring the plant to full capacity. No additional treatment is necessary. ERHWSC would receive 400 acft/yr from the expansion.

Engineering and Costing

Capital costs from the UCM for this strategy include groundwater well pumping, well field piping, land acquisition, and permitting. O&M costs were estimated for the well and operating the desalination facility at capacity. It is assumed that the construction period would be no longer than 1 year. Table 5.4-5 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit.

Table 5.4-5 ERHWSC and NAWSC North Regional WTP Well Field Expansion

COST ESTIMATE SUMMARY ERHWSC AND NAWSC - NORTH CAMERON REGIONAL WSC WELL FIELD EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$1,354,000
Integration	$351,000
TOTAL COST OF FACILITIES	**$1,705,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$597,000
Environmental and Archaeology Studies and Mitigation	$26,000
Land Acquisition and Surveying (6 acres)	$18,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$65,000
TOTAL COST OF PROJECT	**$2,411,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$170,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$17,000
WTP	$1,263,000
Pumping Energy Costs (351,942 kWh at 0.08 $/kWh)	$28,000
TOTAL O&M	$1,308,000
TOTAL ANNUAL COST	**$1,478,000**
Available Project Yield (acft/yr)	**1,200**
Annual Cost of Water ($ per acft)	**$1,232**
Annual Cost of Water After Debt Service ($ per acft)	**$1,090**
Annual Cost of Water ($ per 1,000 gallons)	**$3.78**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$3.34**

Surface Water Treatment Plant Phase II with Inter-Basin Transfer of Surface Water

Project Source

This strategy was submitted by ERHWSC to the RWPG concurrently with the recommended Phase I portion of the project during the 2016 regional water planning process.

Description

Phase II includes a pump station and WTP expansion, with inter-basin transfer of surface water.

Available Supply

The pump station and treatment plant expansions would be designed for an additional 2.2 mgd capacity. The plant will treat approximately 4,000 acft/yr from the Phase I portion, an additional 2,500 acft/yr of water rights, and an estimated 1,700 acft of additional water rights available through conversion of irrigation water rights.

Engineering and Costing

As detailed above, costs for this strategy from the UCM include expanding the pump station and WTP, with inter-basin transfer of surface water. It is assumed that the construction period for this strategy is 6 months. Because of the needs of ERHWSC, only Phase I is recommended, and Phase II has remained an alternative this planning cycle. Table 5.4-6 outlines the requirements and cost for this strategy.

Implementation Issues

The availability of surface water rights required to supply the treatment plant expansion is a potential implementation issue.

Table 5.4-6 ERHWSC Surface Water Treatment Plant Phase II Expansion with Inter-Basin Transfer Cost Estimate Summary

COST ESTIMATE SUMMARY	
ERHWSC - SURFACE WATER TREATMENT PLANT PHASE II EXPANSION AND INTER-BASIN TRANSFER	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station (2.3 mgd)	$3,360,000
WTP Upgrade	$8,582,000
TOTAL COST OF FACILITIES	**$11,942,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$4,180,000
Environmental and Archaeology Studies and Mitigation	$129,000
Land Acquisition and Surveying (67 acres)	$4,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$448,000
TOTAL COST OF PROJECT	**$16,703,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,175,000
O&M	
Intakes and Pump Stations (2.5% of cost of facilities)	$84,000
WTP	$763,000
Pumping Energy Costs (241,279 kWh at 0.08 $/kWh)	$35,000
TOTAL O&M	$882,000
Purchase of Water (1,700 acft/yr at 2,040 $/acft)	$3,468,000
TOTAL ANNUAL COST	**$5,525,000**
Available Project Yield (acft/yr)	**2,500**
Annual Cost of Water ($ per acft)	**$2,210.00**
Annual Cost of Water After Debt Service ($ per acft)	**$1,740.00**
Annual Cost of Water ($ per 1,000 gallons)	**$6.78**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$5.34**

5.4.1.3 La Feria

Brackish Groundwater Well and Desalination

Project Source

This strategy was submitted by the City of La Feria to the RWPG.

Description

This strategy is to provide additional drinking water supply to the City of La Feria WTP with the installation of a groundwater well and high pressure RO system. Water produced from the RO system will then go to the city's WTP for conventional treatment. A location adjacent to the WTP is proposed for the well to limit the well field piping that is needed. The city has already drilled a pilot well and confirmed that water supply is available at approximately 500 feet below ground surface.

Available Supply

On the basis of the pilot well information, the city believes the groundwater well can pump 1.25 mgd to produce 1.0 mgd of water from the RO unit.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is 1 year.

Table 5.4-7 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit.

Table 5.4-7 La Feria Brackish Well with RO Unit Project Requirements and Costs

COST ESTIMATE SUMMARY	
LA FERIA - NEW BRACKISH GROUNDWATER WELL AND DESALINATION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$701,000
WTP (1 mgd)	$4,640,000
TOTAL COST OF FACILITIES	**$5,341,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$1,869,000
Environmental and Archaeology Studies and Mitigation	$2,000
Land Acquisition and Surveying (1 acre)	$2,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$199,000
TOTAL COST OF PROJECT	**$7,413,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$522,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$7,000
WTP	$464,000
TOTAL ANNUAL COST	$993,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$886.61**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$420.54**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$2.72**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$1.29**

Non-Potable Wastewater Effluent Reuse

Project Source

This strategy was submitted by the City of La Feria to the RWPG and has been adapted from the 2016 RWP.

Description

The City of La Feria currently uses wastewater effluent to fill three small lakes in the city's Nature Park. This direct non-potable reuse strategy involves adding tertiary treatment to the WWTP and using additional effluent to irrigate the native vegetation at the park.

Available Supply

The WWTP has a rated capacity of 1.25 mgd and a 2013 daily average of 0.38 mgd. A portion of the WWTP effluent is already conveyed to Nature Park, so according to current flows, an additional 0.155 mgd could be available.

Although a certain amount of water is available to use for irrigation, because the plants at Nature Park are native vegetation, no additional irrigation should be required for them. Therefore, this management strategy is not recommended and is listed as an alternative because it does not necessarily displace any the demand shown for La Feria.

Engineering and Costing

To establish this management strategy, tertiary treatment would be added to the WWTP and additional pumping and piping would be needed to convey the reclaimed water to the park. Stainless steel disk, cloth media filters would be installed to further treat the wastewater effluent. A ground storage tank would also be included to provide 1 day's worth of storage. It is assumed that the construction period would be 1.5 years.

Table 5.4-8 outlines the project requirements and cost estimate developed using UCM. Treatment Level 2 was used on the UCM spreadsheet to estimate the costs for addition of the cloth media filters.

Implementation Issues

TCEQ approval for a reclaimed water system is needed. Construction of the new pipeline may also include any of the following permits: USACE Section 404 permit; TPWD sand, shell, gravel, and marl permit; TPDES Storm Water Pollution Prevention Plan; and TXDOT right-of-way permit. Environmental impacts typical of direct potable reuse are discussed in Section 5.2.

Table 5.4-8 La Feria Non-Potable Reuse Project Requirements and Costs

COST ESTIMATE SUMMARY	
CITY OF LA FERIA - NON-POTABLE WASTEWATER EFFLUENT REUSE	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station	$1,636,000
Transmission Pipeline (6 in dia., 0.5 mile)	$92,000
Storage Tanks (other than at booster pump stations)	$945,000
WTP (0.2 mgd)	$1,694,000
TOTAL COST OF FACILITIES	**$4,367,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$1,524,000
Environmental and Archaeology Studies and Mitigation	$13,000
Land Acquisition and Surveying (13 acres)	$23,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$164,000
TOTAL COST OF PROJECT	**$6,091,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$429,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$10,000
Intakes and Pump Stations (2.5% of cost of facilities)	$41,000
WTP	$169,000
Pumping Energy Costs (17800 kWh at 0.08 $/kWh)	$1,000
TOTAL ANNUAL COST	$650,000
Available Project Yield (acft/yr)	**174**
Annual Cost of Water ($ per acft), based on PF=1	**$3,735.63**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$1,270.11**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$11.46**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$3.90**

5.4.1.4 North Alamo Water Supply Corporation

1 Million Gallon Water Tower – Edinburg/Pharr

Project Source

This strategy was submitted by NAWSC to the RWPG during the 2016 regional water planning process.

Description

This strategy is to provide additional water storage and increase water pressure in the Edinburg and Pharr areas. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would provide 1 million gallons of storage; however, it would not provide any additional supply.

Engineering and Costing

Table 5.4-9 outlines the estimated project requirements and cost estimate.

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin.

Table 5.4-9 NAWSC - 1 Million Gallon Water Tower for Edinburg/Pharr Cost Estimate Summary

COST ESTIMATE SUMMARY	
NAWSC - 1 Million Gallon Water Tower - Edinburg/Pharr	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Storage Tanks (other than at booster pump stations)	$2,826,000
TOTAL COST OF FACILITIES	**$2,826,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$989,000
Environmental and Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (2 acres)	$7,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$106,000
TOTAL COST OF PROJECT	**$3,935,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$277,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$28,000
TOTAL ANNUAL COST	**$305,000**
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$272**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$25**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.84**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.08**

1 Million Gallon Water Tower – Mid Valley

Project Source

This strategy was submitted by NAWSC to the RWPG during the 2016 regional water planning process.

Description

This strategy is to provide additional water storage and increase water pressure in the Mid Valley area. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would provide 1 million gallons of storage; however, it would not provide any additional supply.

Engineering and Costing

Table 5.4-10 outlines the estimated project requirements and cost estimate.

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin.

Table 5.4-10 NAWSC 1 Million Gallon Water Tower for Mid Valley Cost Estimate Summary

COST ESTIMATE SUMMARY	
NAWSC - 1 MILLION GALLON WATER TOWER - MID VALLEY	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Storage Tanks (other than at booster pump stations)	$2,826,000
TOTAL COST OF FACILITIES	**$2,826,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$989,000
Environmental and Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (2 acres)	$7,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$106,000
TOTAL COST OF PROJECT	**$3,935,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$277,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$28,000
TOTAL ANNUAL COST	**$305,000**
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$272**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$25**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.84**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.08**

Plant No. 5 – 16 Inch Waterline Expansion

Project Source

This strategy was submitted by the NAWSC to the RWPG during the 2016 regional water planning process.

Description

This strategy is for a 16 inch waterline expansion from WTP No. 5 to provide additional water to the cities of Weslaco, Donna, and Alamo as well as other surrounding areas. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would not provide any additional supply; therefore, it is not recommended.

Engineering and Costing

Costs for this strategy from the UCM include a pump station and pipeline. It is assumed that the construction period for this strategy is 1 year. Table 5.4-11 outlines the estimated project requirements and cost estimate from the UCM. The location and length of the pipeline was assumed from the submitted description of the project.

Implementation Issues

No major implementation issues are anticipated for this strategy. The waterline would be installed within existing easements and right-of-ways. As with any project, necessary state and federal permits must be obtained before construction can begin.

Table 5.4-11 NAWSC Plant No. 5 - 16 Inch Waterline Expansion

COST ESTIMATE SUMMARY	
NAWSC - PLANT NO. 5 - 16 INCH WATERLINE EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station (4.2 mgd)	$5,938,000
Transmission Pipeline (16 in dia., 4.2 miles)	$2,622,000
TOTAL COST OF FACILITIES	**$8,560,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$2,865,000
Environmental and Archaeology Studies and Mitigation	$104,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$318,000
TOTAL COST OF PROJECT	**$11,847,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$834,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$26,000
Intakes and Pump Stations (2.5% of cost of facilities)	$148,000
Pumping Energy Costs (1,146,254 kWh at 0.08 $/kWh)	$92,000
TOTAL O&M	$266,000
TOTAL ANNUAL COST	**$1,100,000**
Available Project Yield (acft/yr)	**4,480**
Annual Cost of Water ($ per acft), based on PF=1	**$246**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$59**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.75**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.18**

WTP No. 5 Expansion

Project Source

This strategy was submitted by NAWSC to the RWPG during the 2016 regional water planning process.

Description

This strategy is for the expansion of WTP No. 5. The expansion would serve residents within the Weslaco, Donna, Alamo, and surrounding areas. It would also provide the NAWSC the ability to utilize other water districts as a source of push water for delivery of water in times of drought. Acquisition of water rights through urbanization is required for this strategy.

Available Supply

The expansion of WTP No. 5 would provide NAWSC with capacity to treat an additional 4 mgd of drinking water. In the first decade, only 1,120 acft/yr of converted water rights are assumed to be available, which limits the new supply in the first decade. In 2030, it is assumed the remaining water rights are available for the plant to supply the full treatment capacity of 4,480 acft/yr. However, because of supplies from other sources and strategies, this strategy is now an alternative for this planning cycle.

Engineering and Costing

Costs for this strategy from the UCM include WTP expansion and purchase of water rights, which are separated into the initial decade and following decades as water rights become available through urbanization. It is assumed that the construction period for this strategy is 1 year.

A unit capital cost of $3,000 per acft has been estimated as the market value for water rights. However, under Subchapter O of Chapter 49 Texas Water Code, a municipal supplier can buy water rights to the net irrigable acres in a subdivision at 68 percent of the market value. It is assumed that water rights will be urbanized within NAWSC's jurisdiction, and this reduced rate would apply. Therefore, a unit capital cost of $2,040 per acft is used to estimate the capital costs. Table 5.4-12 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

The project would be constructed within existing easements and right-of-ways; however, as with any project, necessary state and federal permits must be obtained before construction can begin.

Table 5.4-12 NAWSC WTP No. 5 Expansion

COST ESTIMATE SUMMARY	
NAWSC - WTP NO. 5 EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
WTP (4 mgd)	$12,109,000
TOTAL COST OF FACILITIES	**$12,109,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$4,238,000
Environmental and Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (2 acres)	$7,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$450,000
TOTAL COST OF PROJECT	**$16,811,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,183,000
O&M	
WTP	$972,000
Purchase of Water (4,480 acft/yr at 2,040 $/acft)	$9,139,000
TOTAL O&M	$972,000
TOTAL ANNUAL COST	**$11,294,000**
Available Project Yield (acft/yr)	**4,480**
Annual Cost of Water ($ per acft)	**$2,521**
Annual Cost of Water After Debt Service ($ per acft)	**$2,257**
Annual Cost of Water ($ per 1,000 gallons)	**$7.74**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$6.93**

5.4.1.5 Primera

Primera Brackish Groundwater Desalination

Project Source

This strategy was submitted by the City of Primera to the RWPG.

Description

This strategy is for the construction of a new RO WTP with ground storage and a groundwater well. The City of Primera is currently supplied with drinking water from the North Cameron Regional Water Project WTP and the City of Harlingen. This strategy would allow the City of Primera to have its own drinking water source.

Available Supply

Because of MAG limitations, Cameron County has no MAG availability for new projects this planning cycle. This strategy would yield the City of Primera with 1,120 acft/yr of drinking water.

Engineering and Costing

Costs for this strategy from the UCM include well field pumping, well field piping, water treatment, and land acquisition. More information on the proposed location of the plant and existing distribution system is needed to include costs for pipelines. Membrane treatment efficiency is assumed to be 80 percent, so the wells and well field piping are designed to 1,400 acft/yr. It is assumed that the construction period would be 1.5 years.

Table 5.4-13 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

A pilot well and water quality study will be needed.

Table 5.4-13 Primera Brackish Groundwater Desalination Project Requirements and Costs

COST ESTIMATE SUMMARY	
CITY OF PRIMERA - NEW BRACKISH GROUNDWATER AND DESALINATION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$754,000
Storage Tanks (other than at booster pump stations)	$772,000
Two WTPs (1 mgd and 1 mgd)	$9,280,000
TOTAL COST OF FACILITIES	**$10,806,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$3,782,000
Environmental and Archaeology Studies and Mitigation	$10,000
Land Acquisition and Surveying (3 acres)	$11,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$402,000
TOTAL COST OF PROJECT	**$15,011,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,056,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$15,000
WTP	$928,000
TOTAL ANNUAL COST	$1,999,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$1,784.82**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$841.96**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$5.48**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$2.58**

5.4.1.6 Rio Hondo

Groundwater Well

Project Source

This strategy was submitted by Rio Hondo to the RWPG.

Description

This strategy is for the construction of a new groundwater well field and raw water collection lines to supplement the city's water supply.

Available Supply.

Because of MAG limitations, Cameron County has no MAG availability for new projects this planning cycle. This project includes the development of 750 acft/yr of fresh groundwater.

Engineering and Costing

Costs for this strategy from the UCM include groundwater wells, well field piping, and land acquisition. It is assumed that the construction period for this strategy is 1 year.

Table 5.4-14 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

Impacts typical of groundwater projects are discussed in Section 5.2.

Table 5.4-14 Rio Hondo Groundwater Supply Project Requirements and Costs

COST ESTIMATE SUMMARY	
RIO HONDO - GROUNDWATER SUPPLY	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$3,546,000
TOTAL COST OF FACILITIES	**$3,546,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$1,241,000
Environmental and Archaeology Studies and Mitigation	$138,000
Land Acquisition and Surveying (26 acres)	$97,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$139,000
TOTAL COST OF PROJECT	**$5,161,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$363,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$35,000
Pumping Energy Costs (83233 kWh at 0.08 $/kWh)	$7,000
TOTAL ANNUAL COST	$405,000
Available Project Yield (acft/yr)	**750**
Annual Cost of Water ($ per acft), based on PF=1	**$540.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$56.00**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$1.66**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.17**

5.4.1.7 San Benito

Groundwater Supply

Project Source

This strategy was submitted by the City of San Benito to the RWPG.

Description

This strategy is for the construction of two groundwater wells and raw water collection lines to supplement the city's water supply. The brackish groundwater will be mixed with the current surface water source at 10 percent to 15 percent the average daily demand. The city plans to construct the wells in phases, with the first well installed within 5 years at the WTP No. 2 site. It is anticipated that a pilot well and water quality study will be needed to implement this strategy.

Available Supply

Because of MAG limitations, Cameron County has no MAG availability for new projects this planning cycle. For planning purposes, it is assumed that each groundwater well will supply about 500 gpm, a total of 1 mgd for both wells.

Engineering and Costing

Costs for this strategy from the UCM include groundwater wells, well field piping, and pipeline right-of-way. It is assumed that the construction period for this strategy is 1 year.

Table 5.4-15 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

Impacts typical of distribution and transmission projects are discussed in Section 5.2.

Table 5.4-15 San Benito Groundwater Supply Project Requirements and Costs

COST ESTIMATE SUMMARY	
SAN BENITO - GROUNDWATER SUPPLY	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$1,553,000
TOTAL COST OF FACILITIES	**$1,553,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$544,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$58,000
TOTAL COST OF PROJECT	**$2,155,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$152,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$16,000
TOTAL ANNUAL COST	$168,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$150.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$14.29**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.46**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.04**

Potable Reuse of Treated Effluent from City's Wastewater Treatment Plant

Project Source

This strategy was submitted by the City of San Benito to the RWPG.

Description

A modular WTP would be built to provide additional treatment for the treated wastewater effluent to bring it to potable water standards. The direct potable reuse water would then serve potable water needs for the north portion of the City of San Benito.

Available Supply

The City of San Benito WWTP currently discharges 2.3 mgd of effluent into a minor stream. Initially, 1 mgd would be produced from the modular treatment plant. As the WWTP effluent increases, the modular plant would be expanded, and eventually, a total of 3 mgd would be produced, equating to an ultimate build-out capacity of 3,360 acft/yr.

Engineering and Costing

This project consists of a new modular WTP, pump station, pipeline, and storage tank to bring the reuse water into the city's distribution system. It is assumed that the construction period would be 2 years per phase. Because the first phases would be constructed in 2020 and the second phase would not be implemented until 2070, it was costed for the pump station and pipeline to be replaced during construction of Phase II.

Table 5.4-16 and Table 5.4-17 outline the project requirements and cost estimate for both phases developed using the UCM spreadsheet.

Implementation Issues

TCEQ approval for a reclaimed water system is needed. Construction of the new pipelines may also include any of the following permits: USACE Section 404 permit; TPWD sand, shell, gravel, and marl permit; TPDES Storm Water Pollution Prevention Plan; and TXDOT right-of-way permit. Environmental impacts typical of potable reuse are discussed in Section 5.2.

Table 5.4-16 San Benito Potable Reuse Phase I Project Requirements and Costs

COST ESTIMATE SUMMARY	
CITY OF SAN BENITO - REUSE OF TREATED EFFLUENT FROM CITY'S WWTP (PHASE I)	
Item	**Estimated Costs for Facilities**
Primary Pump Station	$3,887,000
Transmission Pipeline (8 in dia., 3 miles)	$1,166,000
Storage Tanks (other than at booster pump stations)	$1,297,000
WTP (1 mgd)	$6,231,000
TOTAL COST OF FACILITIES	**$12,581,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$4,345,000
Environmental and Archaeology Studies and Mitigation	$75,000
Land Acquisition and Surveying (44 acres)	$137,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$472,000
TOTAL COST OF PROJECT	**$17,610,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,239,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$25,000
Intakes and Pump Stations (2.5% of cost of facilities)	$97,000
WTP	$623,000
Pumping Energy Costs (412768 kWh at 0.08 $/kWh)	$33,000
TOTAL ANNUAL COST	$2,017,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$1,800.89**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$694.64**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$5.53**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$2.13**

Table 5.4-17 San Benito Potable Reuse Phase II Project Requirements and Costs

COST ESTIMATE SUMMARY	
CITY OF SAN BENITO - REUSE OF TREATED EFFLUENT FROM CITY'S WWTP (PHASE II)	
Item	**Estimated Costs for Facilities**
Primary Pump Station	$3,887,000
Transmission Pipeline (10 in dia., 3 miles)	$1,166,000
Storage Tanks (other than at booster pump stations)	$1,297,000
WTP (2 mgd)	$10,253,000
TOTAL COST OF FACILITIES	**$16,603,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$5,753,000
Environmental and Archaeology Studies and Mitigation	$75,000
Land Acquisition and Surveying (44 acres)	$137,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$621,000
TOTAL COST OF PROJECT	**$23,189,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,632,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$25,000
Intakes and Pump Stations (2.5% of cost of facilities)	$97,000
WTP	$884,000
Pumping Energy Costs (412768 kWh at 0.08 $/kWh)	$33,000
TOTAL ANNUAL COST	$2,671,000
Available Project Yield (acft/yr)	**3,360**
Annual Cost of Water ($ per acft), based on PF=1	**$794.94**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$309.23**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$2.44**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.95**

Non-Potable Reuse of Treated Effluent from City's Wastewater Treatment Plant

Project Source

This strategy was submitted by the City of San Benito to the RWPG.

Description

This direct non-potable reuse strategy involves diverting a portion of WWTP effluent to a canal for irrigation use.

Available Supply

The City of San Benito WWTP currently discharges 2.3 mgd of effluent into a minor stream that feeds the Arroyo Colorado. Of this, 1,120 acft/yr would be diverted and used to supplement the irrigation canal.

Engineering and Costing

This project would require modifications to the WWTP's effluent pump station and a new pipeline. It is assumed that the construction period would be 1 year. Table 5.4-18 outlines the project requirements and cost estimated with the UCM.

Implementation Issues

TCEQ approval for a reclaimed water system is needed. Construction of the new pipeline may also include any of the following permits: USACE Section 404 permit; TPWD sand, shell, gravel, and marl permit; TPDES Storm Water Pollution Prevention Plan; and TXDOT right-of-way permit.

Use of any ID canals to convey recycled water (specifically Cameron County ID No. 2 listed here), would require a permit from the ID. Environmental impacts typical of non-potable reuse are discussed in Section 5.2.

Map

A map depicting the approximate alignment of the reuse pipeline is shown on Figure 5.4-1.

Table 5.4-18 San Benito Non-Potable Reuse Project Requirements and Costs

COST ESTIMATE SUMMARY	
CITY OF SAN BENITO - REUSE OF TREATED EFFLUENT FROM CITY'S WWTP	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station	$930,000
Transmission Pipeline (8 in dia., 2 miles)	$657,000
TOTAL COST OF FACILITIES	**$1,587,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$523,000
Environmental and Archaeology Studies and Mitigation	$55,000
Land Acquisition and Surveying (32 acres)	$101,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$63,000
TOTAL COST OF PROJECT	**$2,329,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$164,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$7,000
Intakes and Pump Stations (2.5% of cost of facilities)	$23,000
Pumping Energy Costs (336558 kWh at 0.08 $/kWh)	$27,000
TOTAL ANNUAL COST	$221,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$197.32**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$50.89**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.61**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.16**

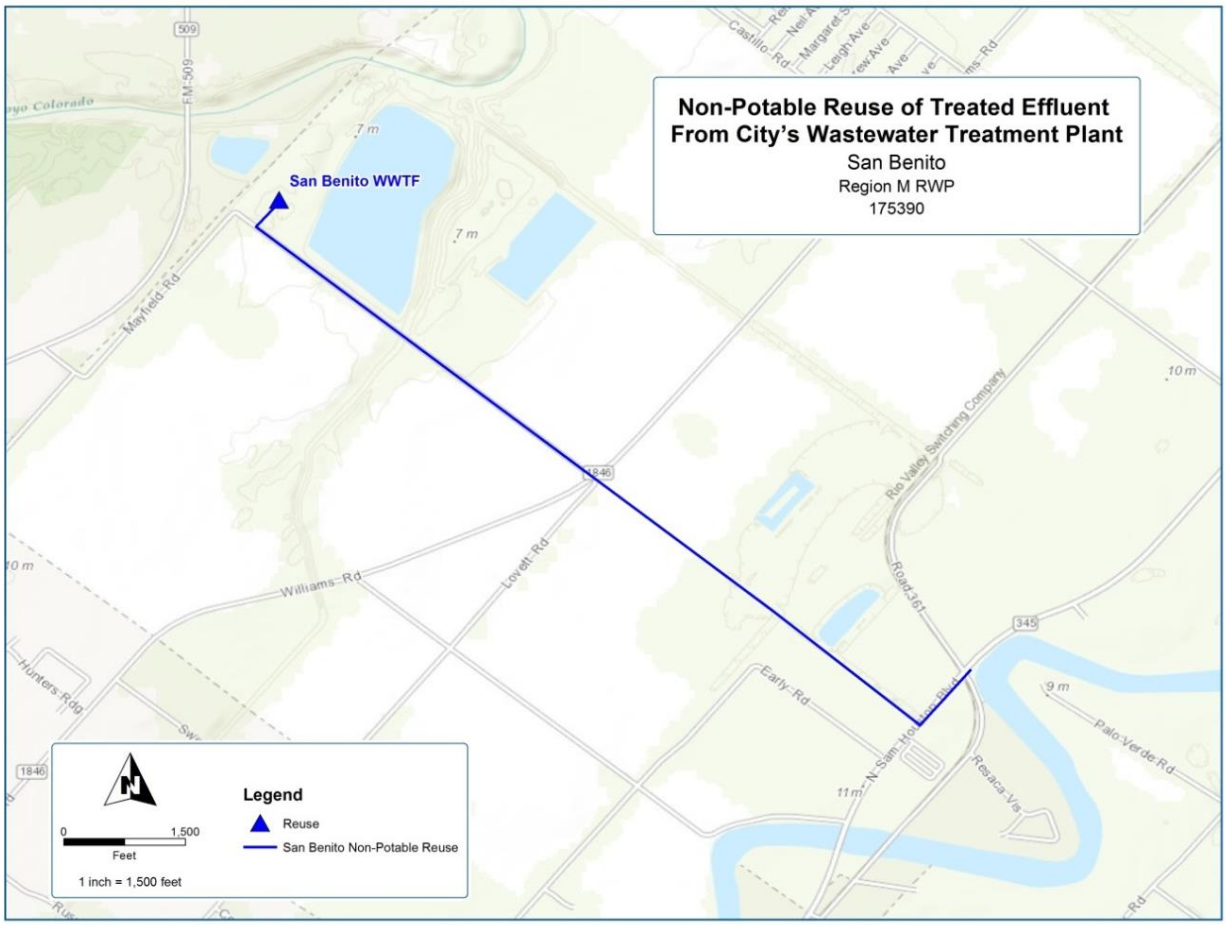

Figure 5.4-1 San Benito Non-Potable Reuse Pipeline Location

5.4.1.8 Valley Municipal Utility District No. 2

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new RO WTP to treat the brackish water to potable drinking water standards.

Available Supply

According to the preliminary needs estimates for Valley MUD No. 2, the new brackish groundwater plant is sized for 100 acft/yr.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80 percent, so the wells and well field piping are designed to 125 acft/yr. It is assumed that the construction period for this strategy is 1.5 years, beginning in 2060.

Implementation Issues

No major implementation issues are expected for this strategy. TCEQ approval for additional concentrate disposal will be needed. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts typical of BGD plants are discussed in Section 5.2.

Table 5.4-19 outlines the estimated costs and project requirements used to develop the cost estimate.

Implementation Issues

No major implementation issues are expected for this strategy. TCEQ approval for additional concentrate disposal will be needed. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts typical of BGD plants are discussed in Section 5.2.

Table 5.4-19 Valley MUD No. 2 New BGD Plant Project Requirements and Costs

COST ESTIMATE SUMMARY	
VALLEY MUD NO. 2 - NEW BRACKISH GROUNDWATER TREATMENT PLANT	
Item	Estimated Costs for Facilities
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$333,000
Two WTPs (0.1 mgd and 0.1 mgd)	$2,652,000
TOTAL COST OF FACILITIES	**$2,985,000**

COST ESTIMATE SUMMARY	
VALLEY MUD NO. 2 - NEW BRACKISH GROUNDWATER TREATMENT PLANT	
Item	**Estimated Costs for Facilities**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$1,045,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$111,000
TOTAL COST OF PROJECT	**$4,141,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$291,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$3,000
WTP	$265,000
TOTAL ANNUAL COST	$559,000
Available Project Yield (acft/yr)	**100**
Annual Cost of Water ($ per acft), based on PF=1	**$5,590.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$2,680.00**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$17.15**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$8.22**

5.4.2 Hidalgo County

5.4.2.1 Water User Group and Water User Group/Wholesale Water Provider

Agua Special Utility District - New Brackish Groundwater Treatment Plant

Project Source

This strategy was identified by the RWPG during the 2016 regional water planning process.

Description

This strategy is to drill a new brackish groundwater well in the Gulf Coast Aquifer located within the Rio Grande River Basin and construct a new RO WTP to treat the brackish water to potable drinking water standards. According to the data gathered in the BRACS Report, the well depth was approximated at 800 ft. below ground surface.

Available Supply

On the basis of the preliminary needs estimates for the Agua SUD, the new brackish groundwater plant is sized to treat 1,680 acft/yr to produce 1,344 acft/yr of new supply.

Environmental Issues

This project would require the disposal of 336 acft/yr. Environmental impacts typical of BGD plants are discussed in Section 5.2.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is 1.5 years. Table 5.4-20 outlines the estimated project requirements and cost estimates.

Implementation Issues

No major implementation issues are expected for this strategy. TCEQ approval for additional concentrate disposal will be needed. Construction of the new groundwater well and piping may also include a TXDOT right-of-way permit.

Table 5.4-20 Agua SUD Brackish Groundwater Desalination Cost Estimate Summary

COST ESTIMATE SUMMARY	
AGUA SUD - BRACKISH GROUNDWATER DESALINATION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$2,119,000
Two WTPs (1.5 mgd and 1.5 mgd)	$13,698,000
TOTAL COST OF FACILITIES	**$15,817,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$5,536,000
Environmental and Archaeology Studies and Mitigation	$52,000
Land Acquisition and Surveying (12 acres)	$37,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$590,000
TOTAL COST OF PROJECT	**$22,032,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,550,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$21,000
WTP	$1,945,000
Pumping Energy Costs (344,558 kWh at 0.08 $/kWh)	$28,000
TOTAL O&M	$1,994,000
TOTAL ANNUAL COST	**$3,544,000**
Available Project Yield (acft/yr)	**1,344**
Annual Cost of Water ($ per acft), based on PF=1	**$2,637**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$1,484**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$8.09**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$4.55**

Non-Potable Reuse

Project Source

This strategy was submitted by the Agua SUD to the RWPG.

Description

The Agua SUD owns one WWTP (West Agua WWTP) and is planning to build a second plant (East Agua WWTP). The West Agua WWTP is located in Sullivan City, Texas, and the East Agua WWTP is located near Palmview, Texas. This direct non-potable reuse strategy is to provide Type II reclaimed water currently produced at the WWTP to individual customers with a need for reuse water.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5 percent of Agua SUD's 2020 WUG demand could be met by non-potable reuse. Therefore, this strategy was sized to produce 280 acft/yr.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP and storage. The submitted strategy discussed having customers receive the reclaimed water at the WWTP; therefore, no pumping or piping costs were included. This strategy could be implemented at either of Agua SUD's WWTPs. Table 5.4-21 outlines the project requirements and cost estimate developed in the UCM.

Implementation Issues

TCEQ approval for a reclaimed water system is needed. Construction of the new pipeline may also include any of the following permits: USACE Section 404 permit; TPWD sand, shell, gravel, and marl permit; TPDES Storm Water Pollution Prevention Plan; and TXDOT right-of-way permit. Environmental impacts typical of non-potable reuse projects are discussed in Section 5.2.

Table 5.4-21 Agua SUD Non-Potable Reuse Project Requirements and Costs

COST ESTIMATE SUMMARY	
AGUA SUD - NON-POTABLE WASTEWATER EFFLUENT REUSE	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Primary Pump Station	$3,878,000
Transmission Pipeline (10 in dia., 11 miles)	$3,988,000
Storage Tanks (other than at booster pump stations)	$772,000
Advanced Water Treatment Facility (1 mgd)	$9,918,000
TOTAL COST OF FACILITIES	**$18,556,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$6,295,000
Environmental and Archaeology Studies and Mitigation	$299,000
Land Acquisition and Surveying (141 acres)	$530,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$707,000
TOTAL COST OF PROJECT	**$26,387,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,857,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$48,000
Intakes and Pump Stations (2.5% of cost of facilities)	$97,000
Advanced Water Treatment Facility	$1,186,000
Pumping Energy Costs (402620 kWh at 0.08 $/kWh)	$32,000
TOTAL ANNUAL COST	$3,220,000
Available Project Yield (acft/yr)	**1,120**
Annual Cost of Water ($ per acft), based on PF=1	**$2,875.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$1,216.96**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$8.82**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$3.73**

5.4.2.2 Elsa

WTP Expansion and Interconnect to Engelman ID

Project Source

This strategy was submitted by the City of Elsa to the RWPG during the 2016 regional water planning process.

Description

This strategy is for an interconnect between the City of Elsa and Engleman ID. Hidalgo County ID No. 9 is currently the sole source for Elsa raw water. This strategy would provide the City of Elsa with a reliable second source of raw water in case of drought or when a supply is down for an extended period of time for system repairs. It also includes an expansion of Elsa's WTP.

Available Supply

This strategy would supply the City of Elsa's WTP with 2,240 acft/yr in 2020.

Engineering and Costing

Costs for this strategy from the UCM include WTP expansion, pipeline, and pipeline right-of-way. It is assumed that the construction period for this strategy is 1 year. Table 5.4-22 outlines the project requirements and cost estimate developed using the UCM.

Implementation Issues

Typical environmental impacts are discussed in Section 5.2. No implementation issues have been identified at this time.

Table 5.4-22 Elsa WTP Expansion and Interconnect to Engelman ID

COST ESTIMATE SUMMARY	
ELSA - WTP EXPANSION AND INTERCONNECT TO ENGLEMAN ID	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Transmission Pipeline (12 in dia., 2.4 miles)	$1,016,000
WTP (2 mgd)	$8,190,000
TOTAL COST OF FACILITIES	**$9,206,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$3,171,000
Environmental and Archaeology Studies and Mitigation	$63,000
Land Acquisition and Surveying (35 acres)	$109,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$346,000
TOTAL COST OF PROJECT	**$12,895,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$907,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$10,000
WTP	$739,000
Pumping Energy Costs (397,443 kWh at 0.08 $/kWh)	$32,000
TOTAL O&M	$781,000
TOTAL ANNUAL COST	**$1,688,000**
Available Project Yield (acft/yr)	**2,240**
Annual Cost of Water ($ per acft)	**$754**
Annual Cost of Water After Debt Service ($ per acft)	**$347**
Annual Cost of Water ($ per 1,000 gallons)	**$2.31**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$1.07**

5.4.2.3 McAllen

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is to provide additional supply to McAllen with the installation of additional fresh groundwater wells.

Available Supply

The proposed groundwater wells would provide 500 acft/yr in Phase I and a total of 1,500 acft/yr once Phase II is implemented.

Engineering and Costing

It is assumed that the construction period for this strategy is 1.5 years. Table 5.4-23 and Table 5.4-24 outline the estimated project requirements and cost estimates for each phase developed in the UCM.

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land, and a TXDOT right-of-way permit. Environmental impacts typical of groundwater supply projects are discussed in Section 5.2.

Table 5.4-23 Expand Existing Groundwater Supply Phase I Costs and Project Requirements

COST ESTIMATE SUMMARY	
MCALLEN - EXPAND EXISTING GROUNDWATER SUPPLY (PHASE I)	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$674,000
WTP (0.5 mgd)	$52,000
TOTAL COST OF FACILITIES	**$726,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$254,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$27,000
TOTAL COST OF PROJECT	**$1,007,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$71,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$7,000
WTP	$31,000
TOTAL ANNUAL COST	$109,000
Available Project Yield (acft/yr)	**500**
Annual Cost of Water ($ per acft), based on PF=1	**$218.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$76.00**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.67**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.23**

Table 5.4-24 Expand Existing Groundwater Supply Phase II Costs and Project Requirements

COST ESTIMATE SUMMARY	
MCALLEN - EXPAND EXISTING GROUNDWATER SUPPLY (PHASE II)	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$697,000
WTP (0.9 mgd)	$82,000
TOTAL COST OF FACILITIES	**$779,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$272,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$29,000
TOTAL COST OF PROJECT	**$1,080,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$76,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$7,000
WTP	$49,000
TOTAL ANNUAL COST	$132,000
Available Project Yield (acft/yr)	**1500**
Annual Cost of Water ($ per acft), based on PF=1	**$88.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$37.33**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.27**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.11**

5.4.2.4 Mercedes

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is to provide additional supply to Mercedes with an additional groundwater well.

Available Supply

The proposed groundwater well would provide 560 acft/yr.

Engineering and Costing

Costs for this strategy from the UCM assumed that the construction period is 1 year. Table 5.4-25 outlines the estimated project requirements and costs.

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land, and a TXDOT right-of-way permit. Environmental impacts typical of groundwater supply expansion projects are discussed in Section 5.2.

Table 5.4-25 Mercedes Expand Existing Groundwater Supply

COST ESTIMATE SUMMARY	
MERCEDES - EXPAND EXISTING GROUNDWATER SUPPLY	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$718,000
WTP (0.5 mgd)	$52,000
TOTAL COST OF FACILITIES	**$770,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$270,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$29,000
TOTAL COST OF PROJECT	**$1,069,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$75,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$7,000
WTP	$31,000
TOTAL ANNUAL COST	$113,000
Available Project Yield (acft/yr)	**560**
Annual Cost of Water ($ per acft), based on PF=1	**$201.79**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$67.86**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.62**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.21**

5.4.2.5 Military Highway Water Supply Corporation

Expand Existing Groundwater Supply in Hidalgo County

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is to provide additional supply to Military Highway WSC in Hidalgo County with the installation of additional fresh groundwater wells.

Available Supply

The proposed groundwater wells would provide 250 acft/yr in 2020 during Phase I and a total of 625 acft/yr once Phase II is implemented in 2050.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water disinfection. It is assumed that the construction period for this strategy is 1 year per phase. Table 5.4-26 and Table 5.4-27 outline the estimated costs and project requirements for each phase.

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land, and a TXDOT right-of-way permit. Environmental impacts typical of groundwater expansion projects are discussed in Section 5.2.

Table 5.4-26 Military Highway WSC Expand Existing Groundwater Supply Phase I Project Requirements and Costs

COST ESTIMATE SUMMARY	
MILITARY HIGHWAY WSC - EXPAND EXISTING GROUNDWATER SUPPLY (PHASE I)	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$480,000
WTP (0.2 mgd)	$30,000
TOTAL COST OF FACILITIES	**$510,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$179,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$19,000
TOTAL COST OF PROJECT	**$708,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$50,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$5,000
WTP	$18,000
TOTAL ANNUAL COST	$73,000
Available Project Yield (acft/yr)	**250**
Annual Cost of Water ($ per acft), based on PF=1	**$292.00**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$92.00**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.90**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.28**

Table 5.4-27 Military Highway WSC Expand Existing Groundwater Supply Phase II Project Requirements and Costs

COST ESTIMATE SUMMARY	
MILITARY HIGHWAY WSC - EXPAND EXISTING GROUNDWATER SUPPLY (PHASE II)	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$581,000
WTP (0.3 mgd)	$38,000
TOTAL COST OF FACILITIES	**$619,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$217,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$23,000
TOTAL COST OF PROJECT	**$859,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$60,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$6,000
WTP	$23,000
TOTAL ANNUAL COST	$89,000
Available Project Yield (acft/yr)	**625**
Annual Cost of Water ($ per acft), based on PF=1	**$142.40**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$46.40**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.44**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.14**

5.4.2.6 Weslaco

Emergency Transfers of Surface Water or Interconnects Between Systems

Project Source

This strategy was submitted by the City of Weslaco to the RWPG during the 2016 regional water planning process.

Description

This strategy is to provide relief and possibly treatment assistance to water infrastructure by interconnecting with an adjacent system in the northwest portion of the city. The City of Weslaco has an adjacent system with three entities: the City of Mercedes, NAWSC, and Military Highway WSC. This strategy would physically connect the City of Weslaco and NAWSC systems.

Because this strategy would only transfer water to Weslaco in emergencies, it cannot be considered as providing a reliable supply and, therefore, is not recommended.

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new RO WTP to treat the brackish water to potable drinking water standards.

Available Supply

On the basis of the preliminary needs estimates for Weslaco, the new brackish groundwater plant is sized for 1,630 acft/yr.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is 1.5 years. Table 5.4-28 outlines the estimated project requirements and cost estimate.

Implementation Issues

No major implementation issues are expected for this strategy. TCEQ approval for additional concentrate disposal will be needed. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts typical of BGD plants are discussed in Section 5.2.

Table 5.4-28 New Brackish Groundwater Treatment Plant Project Requirements and Costs

COST ESTIMATE SUMMARY	
WESLACO - NEW BRACKISH GROUNDWATER TREATMENT PLANT	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$1,364,000
Two WTPs (1.5 mgd and 1.5 mgd)	$11,490,000
TOTAL COST OF FACILITIES	**$12,854,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$4,499,000
Environmental and Archaeology Studies and Mitigation	$5,000
Land Acquisition and Surveying (2 acres)	$6,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$478,000
TOTAL COST OF PROJECT	**$17,842,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,255,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$14,000
WTP	$1,067,000
TOTAL ANNUAL COST	$2,336,000
Available Project Yield (acft/yr)	**1,630**
Annual Cost of Water ($ per acft)	**$1,433.13**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$663.19**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$4.40**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$2.03**

5.4.3 Jim Hogg County

5.4.3.1 Irrigation, Jim Hogg

Additional Groundwater Wells

Project Source

This strategy was recommended in the 2016 RWP and has been updated by the RWPG.

Description

This strategy is to provide additional supply to Jim Hogg Irrigation with the installation of fresh groundwater wells.

Available Yield

The available supply is 300 acft/yr beginning in 2020.

Engineering and Costing

The UCM was utilized to develop estimated costs for this strategy using assumptions about the individual wells. The wells were costed with a capacity of 50 gpm. Well piping and land acquisition were also included in the cost estimate.

The estimated costs and project requirements for this strategy are presented in Table 5.4-29.

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land, and a TXDOT right-of-way permit.

Table 5.4-29 Jim Hogg Irrigation Groundwater Wells Cost and Yield Projections

COST ESTIMATE SUMMARY	
IRRIGATION, JIM HOGG - ADDITIONAL GROUNDWATER WELLS	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$1,569,000
TOTAL COST OF FACILITIES	**$1,569,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$549,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$59,000
TOTAL COST OF PROJECT	**$2,177,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$153,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$16,000
TOTAL ANNUAL COST	$169,000
Available Project Yield (acft/yr)	**300**
Annual Cost of Water ($ per acft), based on PF=1	**$563.33**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$53.33**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$1.73**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.16**

5.4.4 Maverick County

5.4.4.1 Eagle Pass

Eagle Pass ASR Project

Project Source

This strategy was submitted by Eagle Pass to the RWPG.

Description

This strategy is for using ASR for Eagle Pass.

Available Supply

The supply for this WMS will come from Eagle Pass's current supplies. When the entity has a surplus of water supplies, the excess water will be injected into the aquifer for storage. When Eagle Pass is experiencing water shortage or drought conditions, water can be recovered from the aquifer and delivered throughout its system. For the purposes of this plan, it is assumed the ASR project will have a capacity of 3,360 acft/yr.

Engineering and Costing

Costs for this strategy from the UCM include a new WTP, land acquisition, and a new well field with dual purpose well pumps for both injecting surplus water and recovering the stored water, and well field piping. It is assumed that the construction period for this strategy is 1.5 years. Table 5.4-30 outlines the estimated project requirements and cost estimate.

Implementation Issues

Additional studies will need to be conducted for the feasibility of the project. Appropriate TCEQ permitting is required. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts typical of ASR plants are discussed in Section 5.2.

Table 5.4-30 Eagle Pass ASR Project Requirements and Costs

COST ESTIMATE SUMMARY	
EAGLE PASS - ASR	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
Well Fields (wells, pumps, and piping)	$9,495,000
WTP (3 mgd)	$10,490,176,000
TOTAL COST OF FACILITIES	**$10,499,671,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$3,674,885,000
Environmental and Archaeology Studies and Mitigation	$5,844,000
Land Acquisition and Surveying (1,696 acres)	$6,403,000
Interest During Construction (3% for 1 year with a 0.5% return on investment)	$390,138,000
TOTAL COST OF PROJECT	**$14,576,941,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$1,025,649,000
O&M	
Pipeline, Wells, and Storage Tanks (1% of cost of facilities)	$95,000
WTP	$734,312,000
Pumping Energy Costs (304,678 kWh at 0.08 $/kWh)	$24,000
TOTAL ANNUAL COST	$1,760,080,000
Available Project Yield (acft/yr)	**3,360**
Annual Cost of Water ($ per acft), based on PF=1	**$523,833.33**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$218,580.65**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$1,607.34**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$670.70**

5.4.5 Starr County

No alternative WMSs have been identified for Starr County.

5.4.6 Webb County

5.4.6.1 Water User Group and Water User Group/Wholesale Water Provider

Laredo - El Pico Water Treatment Plant – 1st Expansion

Project Source

This strategy was submitted by the City of Laredo to the RWPG during the 2016 regional water planning process.

Description

This strategy is for the expansion of the El Pico WTP from 20 mgd to 45 mgd. This expansion would occur in 2020.

Available Supply

Expanding the plant would supply an additional 25 mgd of drinking water.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition. It is assumed that the construction period for this strategy is 1.5 years. Table 5.4-31 outlines the estimated costs and project requirements used to develop the cost estimate.

Implementation Issues

Necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts typical of WTP expansions are discussed in Section 5.2.

Table 5.4-31 Laredo El Pico WTP 1st Expansion Cost Estimate Summary

COST ESTIMATE SUMMARY	
LAREDO - EL PICO WTP 1ST EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
WTP (25 mgd)	$47,231,000
TOTAL COST OF FACILITIES	**$47,231,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$16,531,000
Interest During Construction (3% for 1.5 years with a 0.5% return on investment)	$2,631,000
TOTAL COST OF PROJECT	**$66,393,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$4,671,000
O&M	
WTP	$3,306,000
TOTAL ANNUAL COST	**$7,977,000**
Available Project Yield (acft/yr)	**28,000**
Annual Cost of Water ($ per acft), based on PF=1	**$285**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$118**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.87**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.36**

El Pico Water Treatment Plant - 2nd Expansion

Description

This strategy is to expand the El Pico WTP from 45 mgd to 70 mgd. This expansion would occur in 2030.

Available Supply

Expanding the plant would supply an additional 25 mgd of drinking water.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition. It is assumed that the construction period for this strategy is 1.5 years Table 5.4-32 outlines the estimated costs.

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts typical of WTP expansions are discussed in Section 5.2.

Table 5.4-32 Laredo El Pico WTP 2nd Expansion Cost Estimate Summary

COST ESTIMATE SUMMARY	
LAREDO - EL PICO WTP 2ND EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
WTP (25 mgd)	$47,231,000
TOTAL COST OF FACILITIES	**$47,231,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$16,531,000
Interest During Construction (3% for 1.5 years with a 0.5% return on investment)	$2,631,000
TOTAL COST OF PROJECT	**$66,393,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$4,671,000
O&M	
WTP	$3,306,000
TOTAL ANNUAL COST	**$7,977,000**
Available Project Yield (acft/yr)	**28,000**
Annual Cost of Water ($ per acft), based on PF=1	**$285**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$118**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.87**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.36**

El Pico Water Treatment Plant – 3rd Expansion

Description

This strategy is to expand the El Pico WTP from 70 mgd to 100 mgd. This expansion would occur in 2040.

Available Supply

Expanding the plant would supply an additional 30 mgd of drinking water.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition, assuming 1.5 years for construction. Table 5.4-33 outlines the estimated costs and project requirements..

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts typical of WTP expansions are discussed in Section 5.2.

Table 5.4-33 Laredo El Pico WTP 3rd Expansion

COST ESTIMATE SUMMARY	
LAREDO - EL PICO WTP 3RD EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
WTP (30 mgd)	$55,020,000
TOTAL COST OF FACILITIES	**$55,020,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$19,257,000
Interest During Construction (3% for 1.5 years with a 0.5% return on investment)	$3,064,000
TOTAL COST OF PROJECT	**$77,341,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$5,442,000
O&M	
WTP	$3,851,000
TOTAL ANNUAL COST	**$9,293,000**
Available Project Yield (acft/yr)	**33,600**
Annual Cost of Water ($ per acft), based on PF=1	**$277**
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	**$115**
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	**$0.85**
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	**$0.35**

El Pico Water Treatment Plant- 4th Expansion

Description

This strategy is to expand the El Pico WTP from 100 mgd to 165 mgd in 2050.

Available Supply

Expanding the plant would supply an additional 65 mgd of drinking water.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition, and 1.5 years assumed for construction. Table 5.4-34 details the costs and requirements for this strategy.

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts typical of WTP expansions are discussed in Section 5.2.

Table 5.4-34 Laredo El Pico WTP 4th Expansion

COST ESTIMATE SUMMARY	
LAREDO - EL PICO WTP 4TH EXPANSION	
Item	**Estimated Costs for Facilities**
CAPITAL COST	
WTP (65 mgd)	$116,670,000
TOTAL COST OF FACILITIES	**$116,670,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes and 35% for all other facilities)	$40,835,000
Interest During Construction (3% for 1.5 years with a 0.5% return on investment)	$6,498,000
TOTAL COST OF PROJECT	**$164,003,000**
ANNUAL COST	
Debt Service (3.5%, 20 years)	$11,539,000
O&M	
WTP	$8,167,000
TOTAL ANNUAL COST	**$19,706,000**
Available Project Yield (acft/yr)	**72,800**
Annual Cost of Water ($ per acft)	**$271**
Annual Cost of Water After Debt Service ($ per acft)	**$112**
Annual Cost of Water ($ per 1,000 gallons)	**$0.83**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$0.34**

5.4.7 Willacy County

No alternative WMSs have been identified for Willacy County.

5.4.8 Zapata County

No alternative WMSs have been identified for Zapata County.