

**Alliance Regional Water Authority
Technical Committee**

SPECIAL MEETING



ALLIANCE WATER

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.

Kyle - Public Works Building
520 E. RR 150, Kyle, TX 78640

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

This Notice is posted pursuant to the Texas Open Meetings Act (Texas Government Code Chapter 551). The Technical Committee of the Board of Directors of the Alliance Regional Water Authority (the Authority) will hold a meeting at 3:00 PM, Tuesday, November 12th, 2019, at Kyle Public Works Building, 520 E. RR 150, Kyle, Texas. Additional information can be obtained by calling Graham Moore at (512) 294-3214.

Because this meeting is open to the public, members of the Authority Board of Directors who are not members of the Technical Committee may attend this meeting. If any such Board member attends this meeting such that a quorum of the Authority Board is present, this serves as notice of that potential quorum. The meeting will continue as a meeting of the Authority Technical Committee, and not a meeting of the Authority Board. A Board member who is not a Technical Committee member will have no right to vote on any matter before the Committee.

A. CALL TO ORDER

B. ROLL CALL

C. PUBLIC COMMENT PERIOD (Note: Each person wishing to speak must submit a completed Public Comment Form to the Executive Director or his/her designee before the public comment period begins.)

D. CONSENT AGENDA

D.1 Consider approval of minutes of the Regular Technical Committee Meeting held September 11, 2019. ~ *Graham Moore, P.E., Executive Director*

E. PRESENTATIONS TO THE COMMITTEE

E.1 None.

F. ITEMS FOR COMMITTEE ACTION OR DISCUSSION/DIRECTION

F.1 Discussion and possible action authorizing the Executive Director to complete all necessary paperwork to join the WateReuse Association for FY 2019-2020. ~ *Graham Moore, P.E., Executive Director*

F.2 Update and possible direction to Staff regarding the Authority's Phase 1A projects. ~ *Jason Biemer, Project Coordinator*

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- F.3 Update and possible direction to Staff regarding the Authority's Phase 1B program. ~ *Ryan Sowa, P.E., Kimley-Horn & Associates*
 - F.4 Discussion and possible recommendation to the Board to approve a work order with Freese & Nichols, Inc. for Design and Procurement Services for the Authority's Phase 1B Segment D Pipeline project. ~ *Ryan Sowa, P.E., Kimley-Horn & Associates*
 - F.5 Update, discussion and possible recommendation to the Board regarding Cost Saving Measures for the Authority's Phase 1B Program. ~ *Graham Moore, P.E., Executive Director*
 - F.6 Discussion and possible direction to Staff regarding the Authority's draft Staffing Plan. ~ *Graham Moore, P.E., Executive Director*
 - F.7 Update on status of groundwater management in project target area, and Gonzales County Underground Water Conservation District, Plum Creek Conservation District, Groundwater Management Area 13, Region L Planning Group, Guadalupe-Blanco River Authority, Hays County and CAPCOG activities. ~ *Graham Moore, P.E., Executive Director*
- G. EXECUTIVE DIRECTOR REPORT ~ *Graham Moore, P.E., Executive Director*
- H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS– no action to be taken.
- I. EXECUTIVE SESSION
- I.1 *Executive Session pursuant to the Government Code, Section 551.071 (Consultation with Attorney) and/or Section 551.072 and 551.073 (Real Property Deliberations) regarding:*
 - A. *Water supply partnership options*
 - B. *Groundwater leases*
 - C. *Acquisition of real property for water supply project purposes*
 - I.2 Action from Executive Session on the following matters:
 - A. *Water supply partnership options*
 - B. *Groundwater leases*
 - C. *Acquisition of real property for water supply project purposes*

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J. ADJOURNMENT

NOTE: *The Technical Committee may meet in Executive Session to consider any item listed on this agenda if a matter is raised that is appropriate for Executive Session discussion. An announcement will be made of the basis for the Executive Session discussion. The Technical Committee may also publicly discuss any item listed on the agenda for Executive Session.*

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A. CALL TO ORDER

No Backup Information for this Item.

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B. ROLL CALL

NAME PRESENT

Kenneth Williams

James Earp

Tom Taggart

Humberto Ramos

Steve Parker

Mike Taylor

NON-VOTING MEMBERS PRESENT

Mayor George Haehn

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C. PUBLIC COMMENT PERIOD

Each person wishing to speak must submit a completed Public Comment Form to the Executive Director or his/her designee before the public comment period begins.

Comments are limited to 3-minutes per agenda item and three minutes total for all non-agenda topics. If using a translator, comments are limited to six minutes per agenda item and six minutes total for non-agenda topics.

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D. CONSENT AGENDA

Item D.1 is presented as part of the consent agenda.

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D.1 Consider approval of minutes of the Regular Technical Committee Meeting held September 11, 2019. ~ *Graham Moore, P.E., Executive Director*

Attachment(s)

- 2019 09 11 Technical Committee Meeting Minutes

Technical Committee decision needed:

- Approval of minutes.



ALLIANCE WATER

Alliance Regional Water Authority

TECHNICAL COMMITTEE MEETING

MINUTES

Wednesday, September 11, 2019

The following represents the actions taken by the Technical Committee of the Alliance Regional Water Authority (Alliance Water) in the order they occurred during the meeting. The Technical Committee convened in a meeting on Wednesday, September 11, 2019 at the Kyle Public Works Facility, 520 E. RR 150, Kyle, Texas.

A. CALL TO ORDER.

The Alliance Water Technical Committee Meeting was called to order at 3:00 p.m. by Mr. Taggart.

B. ROLL CALL.

- **Present:** Taggart, Ramos, Parker and Taylor with Williams joining in Item E.1.
- **Absent:** Earp and Haehn.

C. PUBLIC COMMENTS

- **None.**

D. CONSENT AGENDA

D.1 Consider approval of minutes of the Regular Executive Committee Meeting held August 14, 2019.

- **Motion to adopt the consent agenda as presented was made by Mr. Taylor, seconded by Mr. Ramos and approved on a 4-0 vote.**

E. PRESENTATIONS TO THE COMMITTEE

E.1 Presentation on Preliminary Results and Recommendations of the Phase 1B System Hydraulics and Master Plan.

- **Mr. Taggart asked about how the change in NBU's use to a lower rate would affect the system hydraulics and what is the sensitivity of the hydraulics to the pipe c-factor?**
- **Mr. Scott Cole: The envelope of flows includes low flows for NBU, so overall hydraulics are not impacted. The system is not very sensitive to the c-factor of pipelines – it would not change any pipe sizes.**
- **Mr. Ramos suggested that in the Pipe Diameter Recommendations that a notation be added to differentiate those pipelines that will not be paid by Alliance Water.**
- **Mr. Taggart if there were any initial concerns/thoughts of controlling the transients in the system.**
- **Mr. Scott Cole noted that the floating elevated storage is expected to be very helpful in resolving these potential issues.**
- **Mr. Pat Allen inquired if there is any concern about designing down to a 5-psi minimum.**
- **Mr. Scott Cole & Mr. David Bennett responded that if the TCEQ were to change their criteria at a later date, then at a worst case the Authority could implement some operational changes to meet any new criteria.**
- **No Action.**

F. ITEMS FOR COMMITTEE ACTION OR DISCUSSION/DIRECTION

- F.1 Update and possible direction to Staff regarding the Authority's Phase 1A projects.
- **Mr. Biemer provided an update on the projects.**
 - **No Action.**
- F.2 Discussion and possible action to recommend approval by the Authority Board of a work authorization with Lockwood, Andrews & Newnam, Inc. for construction administration of the Phase 1B Segment B Pipeline project.
- **Mr. Moore discussed the need for the work authorization.**
 - **Motion to recommend to the Board approval of a Work Authorization with LAN was made by Mr. Williams, seconded by Mr. Taylor and approved on a 5-0 vote.**
- F.3 Update and possible direction to Staff regarding the Authority's Phase 1B program.
- **Mr. Ryan Sowa with Kimley-Horn went through the presentation in the packet summarizing Kimley-Horn's recent activities and on the possible savings that could result from various changes to the Phase 1B Program.**
 - **No Action.**

Items F.4 through F.8 were acted upon by a single action.

- F.4 Discussion and possible action to recommend approval by the Authority Board of an extension of the existing general counsel services agreement with Mark B. Taylor through November 30, 2019.
- F.5 Discussion and possible action to recommend approval by the Authority Board of a work order with RW Harden & Associates for general hydrogeological services through September 30, 2020.
- F.6 Discussion and possible action to recommend approval by the Authority Board of a contract for groundwater permitting special counsel services agreement with Patricia Ehrlinger Carls through September 30, 2020.
- F.7 Discussion and possible action to recommend approval by the Authority Board of an agreement for governmental affairs with Texas Solutions Group through September 30, 2020.
- F.8 Discussion and possible action to recommend approval by the Authority Board of an agreement for public relations services with Dandy Planning, inc. dba Gap Strategies through September 30, 2020.
 - **Motion to recommend to the Board approval of the agreements for Items F.4 through F.8 and for the items to be placed on the consent agenda was made by Mr. Ramos, seconded by Mr. Taylor and approved on a 5-0 vote.**
- F.9 Update on status of groundwater management in project target area, and Gonzales County Underground Water Conservation District, Plum Creek Conservation District, Groundwater Management Area 13, Region L Planning Group, Guadalupe-Blanco River Authority, Hays County and CAPCOG activities.
 - **Mr. Moore provided an update on the various topics.**
 - **Update, no action.**

G. EXECUTIVE DIRECTOR REPORT

- **Update, no action.**

H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS

- **None.**

I. EXECUTIVE SESSION

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 - A. *Water supply partnership options*
 - B. *Groundwater leases*
 - C. *Acquisition of real property for water supply project purposes*
 - **None.**

- I.2 Action from Executive Session on the following matters:
 - A. Water supply partnership options
 - B. Groundwater leases
 - C. Acquisition of real property for water supply project purposes
 - **No Action.**

J. ADJOURNMENT

- **Meeting was adjourned at 4:06 p.m. by Mr. Taggart.**

APPROVED: _____, 2019

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

- F.1** Discussion and possible action authorizing the Executive Director to complete all necessary paperwork to join the WateReuse Association for FY 2019-2020. ~
Graham Moore, P.E., Executive Director
-

Background/Information

Alliance Water has been a member of WateReuse for two years and now is the time to consider renewal. The Authority is expected to ultimately pursue a direct potable reuse project as evidenced by the water management strategy that will be included in the 2021 Region L Plan.

The annual fees for belonging to WateReuse have increased slightly from past years are now up to \$3,600. The fees are calculated based on the assumed number of people served by the entity.

The Executive Director is authorized to approve expenditures up to \$3,000 whereas the Technical Committee is authorized to approve expenditures up to \$50,000. The \$3,600 renewal fee is within the budgeted amount for "Dues" for the current fiscal year.

Attachment(s)

- WateReuse Letter dated October 17, 2019

Technical Committee Decisions Needed:

- Authorize the Executive Director to complete all necessary paperwork to join the WateReuse Association for FY 2019-2020.



WATERREUSE

1199 North Fairfax St, Suite 900 • Alexandria, VA 22314

President

Paul Jones, II

Eastern Municipal Water
District, CA

Vice President

Gilbert Trejo

El Paso Water Utilities, TX

Treasurer

Diane Taniguchi-Dennis

Clean Water Services, OR

Secretary

Craig Lichty

Black & Veatch, CA

Past President

Guy Carpenter

Carollo Engineers, AZ

October 17, 2019

Mr. Graham Moore

Executive Director

Alliance Regional Water Authority

630 E. Hopkins

San Marcos, TX 78666

Dear Graham:

On behalf of our Board of Directors, thank you for your support and membership to the WaterReuse Association. Your annual membership renewal invoice is enclosed.

This year, the Board of Directors worked closely with staff to develop a three- year strategic plan focused on maintaining the Association as the leading trade organization for policy and technical resources related to water reuse. Our goal is to ensure that as current and prospective members increasingly integrate water reuse approaches across their water management programs, the Association can provide them with superior advocacy services, communication products, and professional development programs.

For its 2020 workplan, the national office staff will focus on:

- Strengthening content available to members through programming such as webinars, Symposium technical sessions, and written materials;
- Advocating on behalf of members for key federal funding programs and implementation of a national water reuse action plan;
- Developing communications tools to support public outreach and educational awareness by our members; and,
- Ensuring our Annual Symposium and section conferences successfully meet member expectations.

In 2020, WaterReuse Texas (WRTX) will increase the amount of educational content available for water utilities and the general public on the Texas pages of the WaterReuse website. WRTX is also co-sponsoring the creation of a nationally published "Kids in Discovery" booklet series on the topic of water reuse and recycling. The booklet is being produced by the Project WET Foundation with the cooperation of WRA and the material, which includes a lesson plan for parents and teachers, will be geared toward children in grades three through five.

To achieve these goals, the Board recognized that additional resources for staff and administrative capacity are needed, and approved a dues increase. Your investment enables the Association to rebuild some of the capacity lost as the national office transitioned away from its affiliation with the former Water Environment & Reuse Foundation (currently, the Water Research Foundation). Your investment will also

ensure that we continue to attract new members in regions where a range of drivers make water reuse attractive.

This is an exciting time for the WateReuse Association and our mission of engaging members in a national movement for safe and sustainable water supplies through water recycling:

- Our Annual WateReuse Symposium drew over 1000 participants to San Diego for four days of technical sessions, policy discussions, exhibits and facility tours showcasing progress on water reuse;
- Our Federal agency partners are launching a national water reuse initiative to take specific actions to facilitate adoption of water recycling by the Federal Government, communities, and business;
- Our advocacy on Capitol Hill is producing bipartisan Congressional support for key federal funding programs to increase investment in water reuse projects;
- Our collaboration with the National Blue Ribbon Commission for Onsite Non-potable Water Systems is raising the profile and importance of decentralized water recycling; and,
- Our communication program is producing new tools to help our members undertake education and outreach efforts with customers, businesses and the public health community.

Your investment in the Association's work enables our entire Association to fulfill its mission of promoting adoption of water recycling and advocating for supportive policies and funding.

Water reuse has the potential to remake how America uses water – and its national significance grows daily. We appreciate your investment in WateReuse so that we can continue to invest in your priorities.

If you have any questions, please feel free to contact Patricia Sinicropi, Executive Director, at (571) 445-5502 or psinicropi@watereuse.org, or Erin DiMenna, Director of Membership, at (571) 445-5505 or edimenna@watereuse.org. All of us at the WateReuse Association thank you for your past loyalty and involvement, your continued support, and we look forward to serving you in 2020.

Sincerely,



Paul Jones, II
WateReuse Association President
Eastern Municipal Water District, CA

INVOICE

Alliance Regional Water Authority
 630 E. Hopkins
 San Marcos, TX 78666

Invoice Date:
 September 30, 2019

Invoice Number:
 D34933

Reference:
 Online Contribution: WateReuse
 Association Renewal: Water Utilities

WateReuse
 1199 North Fairfax Street, Suite 900
 Alexandria, 22314
 United States
 703.548.0880
 membership@watereuse.org

Description	Quantity	Unit Price	Amount USD
Population - 100,000 - 124,999	1	\$ 3,600.00	\$ 3,600.00
Please indicate your location - Texas	1	\$ 0.00	\$ 0.00
		Sub Total	\$ 3,600.00
TOTAL USD			\$ 3,600.00

DUE DATE: December 31, 2019

For questions, please contact Erin DiMenna at 571-445-5505 or edimenna@watereuse.org.

WateReuse estimates that 20% of your annual dues will be used to support the Association's direct lobbying effort. Pursuant to the 1993 Federal Tax Act, that portion of your annual WateReuse dues will therefore be considered non-deductible for income tax purposes. The WateReuse Association Taxpayer Identification Number is 68-0235568.

Thank you for your support of the WateReuse Association! The WateReuse Association is a trade organization whose primary purpose is to support the common interests of the water reuse industry. We're honored to serve you.

PAYMENT ADVICE

To:
 WateReuse
 1199 North Fairfax Street, Suite 900
 Alexandria, 22314
 United States
 703.548.0880
 membership@watereuse.org

Member: Alliance Regional Water Authority
Invoice Number: D34933

Amount Due: \$ 3,600.00
Due Date: December 31, 2019

Pay by Check (Payable to WateReuse Association)

WateReuse Association
 1199 North Fairfax Street, Suite 900
 Alexandria, VA 22314

Pay by Electronic Funds Transfer

Beneficiary Bank: United Fairfax
 8270 Greensboro Drive
 McLean, VA 22102
Beneficiary Name: WateReuse Association
Routing/Transit #: 056004445
Beneficiary Acct #: 0091900076

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.

520 E. RR 150, Kyle, TX 78640

- F.2** Update and possible direction to Staff regarding the Authority's Phase 1A projects.
~ *Jason Biemer, Project Coordinator*
-

Background/Information

Below are brief updates on the Phase 1A projects.

Segment B Pipeline:

- The TWDB noted some language changes they want made to the Performance and Payment bonds. These are being revised and re-issued by the Contractor so that a Notice-to-Proceed may be issued for the project.
- Contractor and staff reviewed creek crossing and pathway the work will follow on Wednesday 11/6/2019 to check for any critical concerns. None noted.
- Site prep could be started before the end of the calendar year.

Pump Station:

- Pump station construction proceeding. See attached slides.

Attachment(s)

- Phase 1A Pump Station Progress Presentation

Technical Committee Decisions Needed:

- None.



Phase 1A Booster Pump Station

- Status Update
- November 13, 2019

General Updates



Road work on site beginning.



Generator installation underway.



Building structures up – internal painting completed.



Electrical conduit and chemical feed system install effort underway.



SCADA Programming Training in November

Facility Structures

- Internal paint completed.
- Installation of conduit's in motor control room completed.
- HVAC system installation completed.
- Chemical feed system installation underway. Anticipate completion of this week.



Facility Road

- Gates and fencing to begin soon.
- Road work nearing completion.



SPECIAL MEETING
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COMMITTEE MEMBER PACKETS
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520 E. RR 150, Kyle, TX 78640

- F.3** Update and possible direction to Staff regarding the Authority's Phase 1B program.
~ *Ryan Sowa, P.E., Kimley-Horn & Associates*
-

Background/Information

Ryan Sowa with Kimley-Horn will update the Committee on their recent activities associated with the Phase 1B program.

Attachment(s)

- Phase 1B Program Update – November 12, 2019
- Kimley-Horn Monthly Summary of Activities for October 2019

Technical Committee Decisions Needed:

- None.



Phase 1B Program Update

Technical Committee Meeting
November 12, 2019

Kimley»Horn

Agenda

Ongoing Progress

Pipeline Segment D – Final Design/Procurement Contract



Kimley»Horn

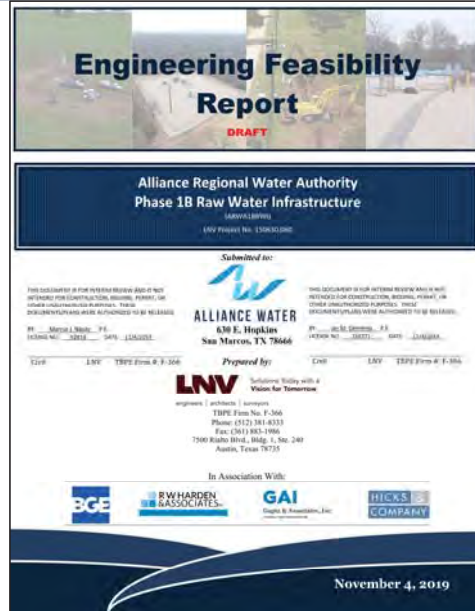
Ongoing Progress

Consultant Contracting Update

- Pipeline Segment D
 - Final Design Phase Contract (November)
- Water Treatment Plant
 - Final Design Phase Contract (December)
- Well Drilling
 - Construction Phase Contract (December)

Design Milestone Reviews

- Water Treatment Plant
 - Draft Engineering Feasibility Report (November)
- Booster Pump Station & Delivery Points
 - Draft Engineering Feasibility Report (November)
- Raw Water Infrastructure
 - Final Engineering Feasibility Report (December)



Kimley»Horn

Ongoing Progress

Environmental Study Status

Project	Desktop Analysis	Field Work	Agency Coordination	TWDB Approval	Comments
Wellfield / Raw Water Infrastructure	C	C	C	U	Field work only within WTP property
Water Treatment Plant	C	C	C	U	
Pipeline Segment A	C	C	NS	NS	Field work completed week of 11/11
Pipeline Segment B	C	U	NS	NS	Dependent on rights-of-entry
Pipeline Segment C	C	U	NS	NS	Dependent on rights-of-entry
Pipeline Segment D	C	U	NS	NS	Dependent on rights-of-entry
Pipeline Segment E	C	U	NS	NS	Dependent on rights-of-entry
Booster Pump Station	C	C	C	C	

NS = Not Started, U = Underway, C = Completed



Kimley»Horn

Pipeline Route Analyses & Rights of Entry

Pipeline Segment	Number of Right-of-Entry Requests	Right-of-Entry Received or Access Granted (No. of Parcels)	Right-of-Entry Received or Access Granted (%)	Alignment Confirmed (%)
A	44	44	100%	77%
B	55	52	95%	69%
D	83	78	94%	65%
C	87	64	74%	0%
E	32	23	72%	6%
Wellfield	15	9	60%	0%
Total	316	270		



Kimley»Horn

Pipeline Easement Acquisition Status

Pipeline Segment	Number of Parcels	Appraisals Prepared	Final Offer Letter Delivered	Easement Signed/Closed
A	44	31	2	2
B	55	1	1	1
D	83	0	0	0
C	87	0	0	0
E	32	0	0	0
Wellfield	15	0	0	0
Total	316	32	3	3



Kimley»Horn



Questions?



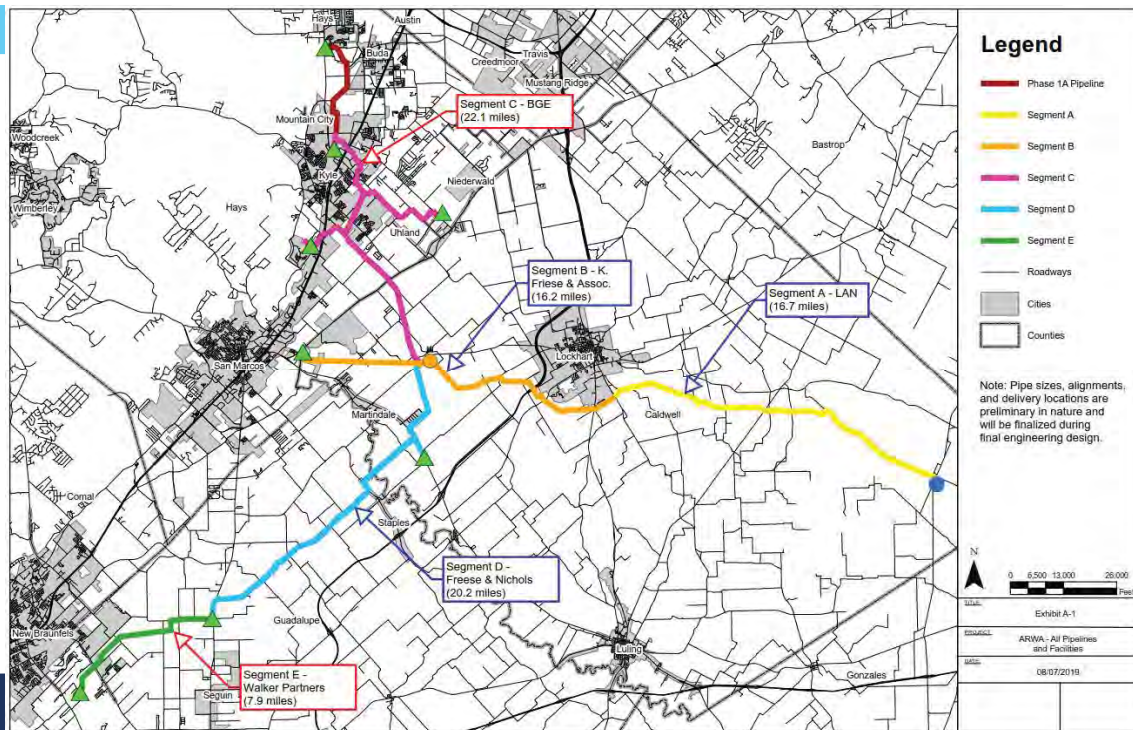
Kimley»Horn



Consulting Services



Kimley»Horn



Phase 1B Transmission Pipeline Design Services

Final Design Phase Pipeline Proposal status update

- Segment A and B approved at the August meeting
- Segment D on the November agenda

Scope through final design phase, to include:

- 60%, 90%, and 100% Design
- Procurement
- Geotechnical, SUE, and Survey Services
- Does not include Construction Phase Services

Phase 1B Transmission Pipeline Design Services

Supplemental Services:

- Additional Survey, SUE, and Geotechnical Services
- General Engineering Design
- Eminent Domain Support (Up to 10% of Parcels Assumed)
- Additional Meetings



Kimley»Horn

Phase 1B Transmission Pipeline Design Services

Segment	Selected Consultant	Basic Services	Supplemental Services	Total Proposal
A	LAN, Inc.	\$ 1,903,077.00	\$ 232,949.00	\$ 2,136,026.00
B	K Friese + Assoc.	\$ 1,830,994.00	\$ 421,051.00	\$ 2,252,045.00
D	Freese & Nichols	\$ 1,999,464.00	\$ 251,427.00	\$ 2,250,891.00



Kimley»Horn

Phase 1B Transmission Pipeline Design Services

Segment	Anticipated Construction Cost (Draft Engineering Feasibility Report)	Anticipated Engineering Basic Services Fee through Construction (7%-8%)*		Preliminary + Final Design Engineering Services (Basic Services)*	Preliminary + Final Design Engineering Fee as a % of Total Construction Cost
A	\$ 44,000,000.00	\$ 3,080,000.00	\$ 3,520,000.00	\$ 1,997,649.00	4.5%
B	\$ 43,400,000.00	\$ 3,038,000.00	\$ 3,472,000.00	\$ 1,795,055.00	4.1%
D	\$ 50,200,000.00	\$ 3,514,000.00	\$ 4,016,000.00	\$ 2,039,279.00	4.1%

*Does not include survey, geotechnical, environmental, subsurface utility engineering (potholing)



Kimley»Horn

Questions?



Kimley»Horn

November 8, 2019

Project Monthly Summary

October 2019 Tasks Performed:

- Task 1 – Program Management Plan (PMP)
 - Finalized additional updates to the Real Estate Acquisition and Management Plan based on feedback from ARWA.

- Task 2 – Stakeholder Coordination
 - Coordination and/or meetings with entities including: Caldwell County, Guadalupe County, Bluebonnet Electric Coop, TCEQ, and TWDB.
 - Prepared for and attended meeting with the TCEQ.
 - Continued weekly task coordination with Alliance Water.
 - Prepared for Project Advisory Committee Meeting Update.
 - Prepared and presented Technical Committee Meeting Update.
 - Prepared and presented Board Meeting Update.
 - Prepared for and held Monthly Status Meeting with Alliance Water.

- Task 3 – Budgeting
 - Continued cost analyses for evaluating potential reductions in overall Program costs.
 - Prepared a summary of cost analyses and developed presentation for the Program Cost Workshop.
 - Attended and presented at the Program Cost Workshop.
 - Continued updates to Budget Workbook to include monthly tracking of actual costs for ARWA review.

- Task 4 – Schedule
 - Coordinated with Program team to integrate each project schedule into overall Program schedule.
 - Prepared monthly schedule update.

- Task 6 – Data Management
 - Ongoing maintenance of Microsoft SharePoint Online program.
 - Continued updating of web-based GIS for right-of-entry process.

- Task 7 – Environmental Management
 - Prepared for and attended Environmental Amendment Discussion with Environmental Consultant.
 - Performed coordination between Program Environmental Consultant and Land Acquisition Consultant to clarify environmental field work to be done on properties as part of right-of-entry process.

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Monthly progress meeting and ongoing coordination with Program Environmental Consultant.
- Continued coordination between Program Environmental Consultant and Design Engineers.
- Reviewed Program Environmental invoices, schedule, and risk log.

- Task 8 – Land Acquisition Management
 - Attended Temporary Injunction Hearings for multiple parcels where the Program is seeking a ROE.
 - Coordinated the appraisal process for Segment A and Segment B parcels.
 - Coordinated with Program Survey Consultant, Program Environmental Consultant, and Land Acquisition team to address questions that arise as part of the field work coordination process.
 - Performed weekly QC of parcel files in SharePoint, provided comments to Land Acquisition team.
 - Weekly coordination meeting with land agents to discuss status of rights-of-entry and to provide Program clarification on any questions/requests that have come from landowners.
 - Reviewed Program Land Acquisition team, Program Legal, and Program Survey invoices.
 - Continued field work coordination to notify landowners of upcoming field work by consultants.

- Task 9 – Texas Water Development Board Management
 - Assisted with TWDB budget revisions for loan submittal.
 - Continue coordination with TWDB Staff to track all EFRs and environmental reports currently under review.

- Task 10 – Design Standards
 - Continued coordination with ARWA to finalize Front End Contract Documents.
 - Continued addressing comments from GBRA, ARWA, and design consultants regarding the Pipeline Construction Standards.
 - Prepared for and attended Construction Standards Follow-Up Discussion.
 - Continued coordinating with ARWA for the continued development of standards for fiber and SCADA.
 - Began development of Cathodic Protection Program Standards.

- Task 11 – Engineering Design Management
 - Pipelines:
 - Segment A
 - Coordinated with design consultant to finalize EFR.
 - Continued coordination with design consultant for beginning final design.

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Segment B
 - Coordinated with design consultant to finalize EFR.
 - Continued coordination with design consultant for beginning final design.
 - Segment C
 - Continued coordination with design consultant regarding ongoing field work as part of right-of-entry process and EFR development.
 - Segment D
 - Coordinated with design consultant to finalize EFR.
 - Continued coordination with design consultant regarding ongoing field work as part of right-of-entry.
 - Coordinated with design consultant to prepare the scope and fee for final design and procurement phase.
 - Segment E
 - Continued coordination with design consultant regarding upcoming field work as part of right-of-entry process and EFR development.
- Wellfield:
 - Continued coordination regarding front end documents for the bidding of Wells 6-9.
- Raw Water Infrastructure:
 - Reviewed and commented on 30% Design Report.
 - Continued coordination with design consultant for 30% design development.
- Water Treatment Plant:
 - Reviewed and commented on 30% Design Report.
 - Continued coordination with design consultant for 30% design development.
- Booster Pump Station:
 - Reviewed and commented on 30% Design Report to be submitted by the design consultant.
- Inline Elevated Storage Tanks:
 - Coordinated with design consultant concerning for 30% design development and potential site selection.
- Administrative & Operations Facility
 - Continued coordination with the design consultant to finalize scope and fee.
- Other:
 - Monthly progress meetings with all design consultants (pipelines, water treatment plant, raw water infrastructure, wellfield, booster pump station).
 - Review invoices, schedules, and risk logs for consultants

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Task 13 - Electrical Power Planning
 - Coordinated with ARWA concerning emergency power needs and service options for the water treatment plant and wellfield.
 - Coordinated with GVEC regarding electric service to the WTP and wellfield.

- Task 14 - Permit Coordination/Tracking
 - Continued Permit coordination with Pipeline consultants
 - Continued coordination with Caldwell County concerning variance request for the Site Development Permit
 - Continued General Coordination with TxDOT
 - Prepared for and attended coordination meeting with TxDOT (Caldwell County District)
 - Continued General Coordination with GVEC and BBEC
 - Prepared for and attended coordination meeting with BBEC
 - On-going Permit Tracking Log Updates

November 2019 Projection:

- Task 1 - Program Management Plan (PMP)
 - Finalize additional updates to the PMP given the updated Real Estate Acquisition and Management Plan.

- Task 2 - Stakeholder Coordination
 - Coordination and/or meetings with entities including: Caldwell County, Guadalupe County, GVEC, Bluebonnet Electric Coop, TCEQ, and TWDB.
 - Continue weekly task coordination with Alliance Water.
 - Prepare and present Project Advisory Committee Meeting Update.
 - Prepare and present Technical Committee Meeting Update.
 - Prepare and present Board Meeting Update.
 - Prepare for and held Monthly Status Meeting with Alliance Water.

- Task 3 - Budgeting
 - Continue cost analyses for evaluating potential reductions in overall Program costs.
 - Finalize updates to Budget Workbook to include monthly tracking of actual costs for ARWA review.

- Task 4 - Schedule
 - Coordinate with Program team to integrate each project schedule into overall Program schedule.

- Task 6 - Data Management
 - Ongoing maintenance of Microsoft SharePoint Online program.
 - Continued updating of web-based GIS for right-of-entry process and alignment changes.

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Task 7 – Environmental Management
 - Perform coordination between Program Environmental Consultant and Land Acquisition Consultant to clarify environmental field work to be done on properties as part of right-of-entry process.
 - Monthly progress meeting and ongoing coordination with Program Environmental Consultant.
 - Continue coordination between Program Environmental Consultant and Design Engineers.
 - Review Program Environmental invoices, schedule, and risk log.

- Task 8 – Land Acquisition Management
 - Coordinate the appraisal process for Segment A and Segment B parcels.
 - Coordinate with Program Survey Consultant, Program Environmental Consultant, and Land Acquisition team to address questions that arise as part of the field work coordination process.
 - Perform weekly QC of parcel files in SharePoint, provide comments to Land Acquisition team.
 - Weekly coordination meeting with land agents to discuss status of rights-of-entry and to provide Program clarification on any questions/requests that have come from landowners.
 - Review Program Land Acquisition team, Program Legal, and Program Survey invoices.
 - Continue field work coordination to notify landowners of upcoming field work by consultants.

- Task 9 – Texas Water Development Board Management
 - Continue coordination with TWDB Staff to track all EFRs and environmental reports currently under review.

- Task 10 – Design Standards
 - Finalize Front End Contract Documents based on comments from ARWA.
 - Continue addressing comments from GBRA, ARWA, and design consultants for the Pipeline Construction Standards.
 - Prepare and send out the Pipeline Construction Standards for Manufacturer review.
 - Continue coordinating with ARWA for the continued development of standards for fiber and SCADA.
 - Continue development of Cathodic Protection Program Standards.

- Task 11 – Engineering Design Management
 - Pipelines:
 - Segment A
 - Continue coordination with design consultant to finalize EFR given alignment revisions.

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Continue coordination with design consultant for final design.
 - Segment B
 - Continue coordination with design consultant to finalize EFR.
 - Continue coordination with design consultant regarding for final design.
 - Segment C
 - Continue coordination with design consultant regarding ongoing field work and pipeline alignment considerations as part of right-of-entry process and EFR development.
 - Segment D
 - Continue coordination with design consultant to prepare the scope and fee for final design and procurement phase.
 - Continue coordination with design consultant regarding ongoing field work and pipeline alignment considerations as part of right-of-entry process and EFR development.
 - Segment E
 - Continue coordination with design consultant regarding ongoing field work as part of right-of-entry process and EFR development.
- Wellfield:
 - Continue coordination regarding bidding of Wells 6-9.
- Raw Water Infrastructure:
 - Review and comment on 30% Design Report.
 - Continue coordination with design consultant for 30% design development.
- Water Treatment Plant:
 - Review and comment on 30% Design Report.
 - Continue coordination with design consultant for 30% design development.
- Booster Pump Station:
 - Review of 30% Design Report to be submitted by the design consultant.
- Inline Elevated Storage Tanks:
 - Provide input on potential EST sites.
 - Coordination with design consultant for 30% design development.
- Administrative/Operations Building:
 - Coordination with design consultant for 30% design development.
- Other:
 - Monthly progress meetings with all design consultants (pipelines, water treatment plant, raw water infrastructure, wellfield).
 - Review invoices, schedules, and risk logs for consultants
- Task 13 – Electrical Power Planning
 - Coordination with ARWA concerning emergency power needs and service options for the water treatment plant and wellfield.

Alliance Water – Phase 1B Infrastructure – Owner’s Representative

- Coordination with GVEC regarding electric service to the WTP and wellfield.
- Task 14 – Permit Coordination/Tracking
 - Continue Permit coordination with Pipeline consultants
 - Continue Coordination with Caldwell County for variance request for the Site Development Permit.
 - Continue coordination with Guadalupe County regarding Program’s impact to property owners.
 - General Coordination with TxDOT
 - General Coordination with GVEC and BBEC
 - Prepare for and attend coordination meeting with GVEC.
 - Permit Tracking Log Updates
- Task 17 – Other Services
 - Finalize and submit the City of San Marcos Watershed Protection Plan for the Booster Pump Station Plat.

Scope Elements Added/Removed:

None at this time.

Outstanding Issues/Concerns:

None at this time.

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

- F.4** Discussion and possible recommendation to the Board to approve a work order with Freese & Nichols, Inc. for Design and Procurement Services for the Authority's Phase 1B Segment D Pipeline project. ~ *Ryan Sowa, P.E., Kimley-Horn & Associates*
-

Background/Information

Freese & Nichols, Inc. (FNI) was selected by the RFQ review committee for the design of one of the five pipeline segments. They are in the process of completing the preliminary engineering for the Segment D Pipeline project. The total fee for preliminary design including supplemental services was a maximum of \$668,906.

The Executive Director and the Owner's Representative negotiated the scope and fee for the final engineering design and procurement of the Phase 1B Segment D pipeline project with FNI. The effort includes coordination with environmental and land acquisition consultants, permitting agencies and public/private utilities. Final design also includes the design survey (combination of aerial and on-the-ground), geotechnical investigation and preparation of final plans and specifications including cathodic protection. The work order also includes support for the procurement of a contractor for the work. The work order does not include construction phase services – a future work authorization is anticipated for these efforts.

Below are some of the key facts regarding the Phase 1B Segment D final design proposal:

Firm: Freese & Nichols, Inc.

Fee: \$2,250,891

Work Order Type: Lump Sum

Anticipated Duration: 18 months

Project Manager: Anne Hoskins, P.E.

Key Subconsultants: Brierley Associates (Tunneling/Trenchless Design), Arias (Geotechnical), Bain Medina Bain (Surveying) & The Rios Group (SUE)

Staff is requesting that the Technical Committee recommend approval of a work order with a fee for the basic services of \$1,999,464 and a fee for supplemental effort in an amount not-to-exceed \$251,427 for a total fee of \$2,250,891. The Executive Director will be given the discretion to authorize the supplemental effort if needed.

Attachment(s)

- Proposal for Final Engineering Design for Phase 1B Segment D Pipeline dated November 7, 2019

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

Technical Committee Decision Needed:

- Possible recommendation to the Board to approve a work order with Freese & Nichols, Inc. for Design and Procurement Services for the Authority's Phase 1B Segment D Pipeline project.

November 7, 2019

Alisa Gruber, P.E.
Program Manager - ARWA
CP&Y
12500 San Pedro, Ste. 450
San Antonio, TX 78216

Re: Alliance Regional Water Authority - Phase 1B, Segment D, Final Design Scope and Fee Proposal

Dear Ms. Gruber:

Freese and Nichols is pleased to submit our Scope of Work (SOW) for the above referenced project. Based on the SOW, FNI and subconsultants have developed a fee schedule. Attached are the following documents for your review:

- Attachment A - Scope of Work
- Attachment B - Proposed Level of Effort Spreadsheet
- Attachment C - Subconsultant Proposals (Brierley)
- Attachment D - Subconsultant Proposals (Arias)
- Attachment E - Subconsultant Proposals (Bain Medina Bain, including Rios Group)

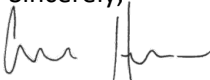
The proposed fee is as follows:

Base Scope	Fee
Basic Engineering Services	\$1,441,565
Special Engineering Services	-
Survey, Geotech, SUE Services	\$557,899
Total Base Scope	\$1,999,464
Supplemental Services	Fee
Basic Engineering Services	\$158,237
Special Engineering Services	-
Survey, Geotech, SUE Services	\$93,190
Total Supplemental Scope	\$251,427
Total Fee	\$2,250,891

Please note that the basic engineering services total includes effort for cathodic protection laboratory services (Lab Soil Analysis) and San Marcos River crossing design (Brierley Associates).

After you've had a chance to review, please let us know if you have any questions or would like to discuss. We appreciate this opportunity and look forward to working with ARWA on this important project!

Sincerely,



Anne Hoskins, P.E.
Project Manager

**Alliance Regional Water Authority – Phase 1B
Final Design Pipeline Scope**

1. Project Management
 - 1.1. Prepare Monthly Summary Reports/Invoicing as identified in the ARWA Phase 1B Program Management Plan.
 - 1.2. Develop schedule and provide monthly updates through procurement phase. The schedule will be provided as part of the monthly invoice and project summary report.
 - 1.2.1. Schedule shall be in Microsoft Project format.
 - 1.3. Risk Register development and monthly updates will be provided as part of the monthly invoice and project summary report.
 - 1.3.1. Risk Register shall be in Microsoft Excel format.
 - 1.4. Meetings
 - 1.4.1. Conduct Monthly Progress Meetings with Owner’s Representative (18 meetings).
 - 1.4.2. Conduct half-day coordination workshops (2 workshops).
 - 1.4.3. Prepare and distribute meeting notes.
 - 1.4.4. Quality Control Audit (1 workshop)
2. Review of Final Pipeline Construction Standards
 - 2.1. Review and provide comments on Updates to Pipeline Construction Standards prepared by Owner’s Representative.
 - 2.2. Review and provide comments on Cathodic Protection Standards prepared by Owner’s Representative.
 - 2.3. Meetings.
 - 2.3.1. Attend one half-day workshop to discuss comments on Final Pipeline Construction Standards.
 - 2.4. Deliverables
 - 2.4.1. Comments on Updates to Pipeline Construction Standards in Adobe PDF format.
 - 2.4.2. Comments on Cathodic Protection Standards in Adobe PDF format.
3. Environmental Coordination
 - 3.1. Review Final Environmental Document for Segment D and develop Construction Documents based on findings.
 - 3.2. Incorporate recommendations from Environmental Document into Contract Documents.
 - 3.3. Meetings
 - 3.3.1. Conduct one coordination meeting with Environmental Consultant to discuss the Final Environmental Report and incorporation of recommended items into contract documents for Segment D.
 - 3.3.2. Prepare and distribute meeting notes.
4. Land Acquisition Coordination
 - 4.1. Provide Program with right-of-entry needs for final design phase.
 - 4.2. Easement Development
 - 4.2.1. Review and comment on draft and final easement exhibits to verify that the exhibits reflects the intent of the Design.

- 4.2.2. Update Parcel Data Forms and easement exhibits, including environmental findings.
 - 4.2.2.1. Include easement documents exhibits for each parcel provided by the Program Manager.
- 4.3. Meetings
 - 4.3.1. Coordination with Land Acquisition team to address easement items.
 - 4.3.1.1. Basic questions regarding the easement, such as where the pipeline will be located in the easement, will there be any aboveground appurtenances, etc. (Assume 80% of easements).
 - 4.3.1.2. Issues such as requests for a fence barrier during construction to protect cattle and minor alignment adjustments within a parcel that do not require additional field studies (Assume 20% of easements).
- 5. Entity/Agency Coordination
 - 5.1. Develop and submit the following applicable permits:
 - 5.1.1. Caldwell County Floodplain Permit coordination during design phase (Program Manager to provide direct coordination with Caldwell County)
 - 5.1.1.1. Coordinate with the County during the 60% design. Preparation and submittal of permit during 90% design phase milestone
 - 5.1.1.2. Address comments and resubmit permit during 100% design phase milestone.
 - 5.1.1.3. Conduct coordination meetings with Caldwell County as required.
 - 5.1.2. Caldwell County Road Crossing Permit coordination during design phase (Program Manager to provide direct coordination with Caldwell County)
 - 5.1.2.1. Coordinate with the County during the 60% design. Preparation and submittal of permit during 90% design phase milestone
 - 5.1.2.2. Address comments and resubmit permit during 100% design phase milestone.
 - 5.1.2.3. Conduct coordination meetings with Caldwell County as required.
 - 5.1.3. Caldwell County Site Construction Permit coordination during design phase (Program Manager to provide direct coordination with Caldwell County).
 - 5.1.3.1. Coordinate with the County during the 60% design. Preparation and submittal of permit during 90% design phase milestone.
 - 5.1.3.2. Address Comments and resubmit permit during 100% design phase milestone.
 - 5.1.3.3. Conduct coordination meetings with Caldwell County as required.
 - 5.1.4. Guadalupe County Floodplain Permit coordination during design phase
 - 5.1.4.1. Coordinate with the County during the 60% design. Preparation and submittal of permit during 90% Design Phase milestone
 - 5.1.4.2. Address comments and resubmit permit during 100% Design Phase milestone.
 - 5.1.4.3. Conduct coordination meetings with Guadalupe County as required.
 - 5.1.5. Guadalupe County Road Crossing Permit coordination during design phase
 - 5.1.5.1. Coordinate with the County during the 60% design. Preparation and Submittal of Permit during 90% Design Phase milestone
 - 5.1.5.2. Address comments and resubmit permit during 100% Design Phase milestone.
 - 5.1.5.3. Conduct coordination meetings with Guadalupe County as required.
 - 5.1.6. TxDOT Utility Installation in Right-of-Way for San Antonio and Austin District (Program Manager to provide direct coordination with TxDOT).

- 5.1.6.1. Coordinate with TxDOT during the 60% design. Preparation and submittal of Permit during 90% design phase milestone
 - 5.1.6.2. Address comments and resubmit permit during 100% design phase milestone.
 - 5.1.6.3. The Owner's Representative will assist with submitting and coordinating with TxDOT.
 - 5.1.7. Texas Commission on Environmental Quality (TCEQ) Exceptions and Variance development and coordination. Owner's Representative will compile submittal and coordinate with the TCEQ. Design Consultant shall provide exhibits, calculations, and technical support data for each exception request.
 - 5.1.7.1. Minimum Pressure Variance - TCEQ 290.44 (d)
 - 5.1.7.2. Stream Crossing Exception – TCEQ 290.44 (f) (2)
 - 5.1.7.3. Sampling Frequency Variance - TCEQ 290.44 (f) (3)
 - 5.2. General Land Office (GLO) coordination and preparation of the Miscellaneous Easement Documents.
6. Public and Private Utility Coordination
- 6.1. Provide Quality Service Level A SUE services to identify the location and depth of existing utilities. Provide up to nine (9) Level A locates with accurate horizontal and vertical positions of subsurface utilities. The Level A SUE service will be performed by Bain Medina Bain, Inc. See attached proposal for additional details.
 - 6.2. Provide Quality Service Level B SUE services to identify the horizontal location of existing utilities. Level B SUE service will be performed by Bain Medina Bain for a maximum of 2500-linear feet. See attached proposal for additional details.
 - 6.3. Provide Quality Service Level C and D SUE services to identify the horizontal location of existing utilities. Level C and Level D will be performed by Bain Medina Bain, Inc. during surveying operations. Surveyor will call Digtess, 811 or equivalent to have utilities marked in the field. Other agencies not part of 811 will be notified one time prior to survey.
 - 6.3.1. GIS files, Record Drawings, Utility Block Maps, and other methods not obtained in previous phase will be requested, mapped, and tracked in applicable logs.
 - 6.4. Coordinate with Owner's Representative on available GIS data collected.
 - 6.4.1. Coordinate with entities for additional data needs.
 - 6.5. Design Coordination for the following Easement Agreements:
 - 6.5.1. Bluebonnet Electric Co-operative
 - 6.5.1.1. Review package preparation during 60% design milestone.
 - 6.5.1.2. Submittal of review package during 90% design Phase milestone
 - 6.5.1.3. Address comments and resubmit during 100% design phase milestone.
 - 6.5.1.4. Coordinate with Bluebonnet Electric Co-operative regarding utility pole relocations.
 - 6.5.2. Crystal Clear SUD
 - 6.5.2.1. Review package preparation during 60% design phase milestone.
 - 6.5.2.2. Submittal of review package during 90% design phase milestone.
 - 6.5.2.3. Address comments and resubmit during 100% design phase milestone.
 - 6.5.3. Guadalupe Valley Telephone Co-operative (GVTC)
 - 6.5.3.1. Coordinate with GVTC regarding buried telecommunications relocations.
 - 6.5.4. Enterprise Products

- 6.5.4.1. Prepare encroachment review package during 60% design phase milestone.
- 6.5.4.2. Submittal of encroachment review package during 90% design phase milestone.
- 6.5.4.3. Address comments and resubmit during 100% design phase milestone.
- 6.5.5. Lower Colorado River Authority
 - 6.5.5.1. Prepare Right-of-Way crossing package during 60% design phase milestone.
 - 6.5.5.2. Submittal of Right-of-Way crossing package during 90% design phase milestone
 - 6.5.5.3. Address Comments and resubmit during 100% design phase milestone.
- 6.5.6. Coordination with other impacted utilities (Including but not limited to AT&T, City of Staple, TX, and Maxwell, TX)
- 6.6. Meetings
 - 6.6.1. Conduct maximum six (6) coordination meetings with impacted utilities.
 - 6.6.2. Prepare and distribute meeting notes.
- 7. Design Consultant Coordination
 - 7.1. BPS/Delivery Point Design Consultant
 - 7.1.1. One (1) meeting to coordinate to confirm tie-in locations to two (2) delivery points to Crystal Clear SUD.
 - 7.1.2. One (1) meeting to coordinate to confirm hydraulics, surge, pipe diameter, and pressure class.
 - 7.1.3. One (1) meeting to coordinate to confirm tie-in locations to BPS site.
 - 7.2. Other Transmission Main Design Consultants/WTP Design Consultant
 - 7.2.1. Three (3) meetings to coordinate to confirm tie-in location to Pipeline Segments B, C, and E.
- 8. Design Survey
 - 8.1.1. Horizontal and Vertical Aerial LiDAR survey based on NAD 83 coordinates (State Plane Texas South Central/Feet) will be used to develop 2D planimetric and 3D DTM data to produce a 1-foot contour delineation. Aerial LiDAR will be performed 400 feet wide for Segment D and 200 Feet wide for Segment D-DP1, centered on proposed easements and access routes. Survey will be performed by Bain Medina Bain, Inc. See additional details in their attached proposal.
 - 8.1.1.1. Survey will identify property lines, contours, benchmarks, bores, apparent locations of existing utilities marked on the surface, and appurtenances such as trees, fences, drainage structures, and existing easements.
 - 8.1.1.2. Provide aerial imagery for the project corridor (400 feet wide for Segment D and 200 Feet wide for Segment D-DP1).
 - 8.1.1.3. Perform a tree inventory in accordance with local entities.
 - 8.1.1.3.1. 12-inch diameter and greater or the minimum diameter required by the permitting entity.
 - 8.1.1.3.2. Engage a certified Arborist or Forester to confirm species (one-time confirmation).
 - 8.1.1.4. Verify control points provided by ARWA Owner's Representative.
- 9. Subsurface Investigations

- 9.1. Geotechnical Investigation performed by Arias Geoprosessionals; see additional details in their attached proposal.
 - 9.1.1. Twenty-three (23) borings will be drilled each to maximum depth of 40 feet along the pipeline alignment. These borings will not include rock coring. Two (2) borings will be drilled each 40 feet deep at San Marcos river crossing These borings will include HQ rock coring.
 - 9.1.2. Two (2) borings will be drilled each 80 feet deep at San Marcos river crossing. These borings will include HQ rock coring.
- 9.2. Corrosion Investigation, Data Collection and Design Support
 - 9.2.1. Perform field evaluation of available data provided by the ARWA Program and Design team to analyze soil conditions.
 - 9.2.2. Conduct in-situ soil resistivity tests (Wenner 4-Pin survey in accordance with ASTM G57) at approximately 2,000-foot intervals along the pipeline alignment. Test depths (pin spacing) shall be at 5, 10, 15 and 20- feet (and pipeline invert if depth is greater than 20- feet) at each test location.
 - 9.2.3. Obtain a one-quart soil sample at approximately 4,000-foot intervals along the project alignment. These samples may be available from geotechnical boring samples and should be collected at the approximate pipeline invert depth at each location.
 - 9.2.4. Conduct stray current (DC and AC) interference investigation in the proposed alignment. The purpose of performing this investigation is to identify potential sources of stray current sources that may interact with the proposed pipeline cathodic protection system.
 - 9.2.4.1. Potential DC stray current interference sources;
 - 9.2.4.1.1. Identify foreign pipeline crossings as well as locations with parallel occupancy with the project pipeline (within 1,000-feet). Identify station locations as well as operator contact information (often provided on foreign pipeline test station posts).
 - 9.2.4.1.2. Identify large steel storage tanks which may have operable CP systems as well as gas stations with buried metallic fuel tanks (within 1000-feet of the project pipeline alignment). Identify station locations as well as operator contact information
 - 9.2.4.2. Potential AC stray current interference sources;
 - 9.2.4.2.1. Identify collocated overhead electric transmission corridors locations within 2,000- feet of the project pipeline alignment. Provide the limits of the colocation by stationing. Take photos depicting the electric tower construction and the wire conductor phase arrangement as well as the circuit loading (if available). Provide the identity of the electric facility owner and operator.
 - 9.2.5. Identify possible sources of AC power distribution along the alignment (by stationing) which may be considered as a power source for impressed CP system rectifiers.
 - 9.2.6. Analyze the field collected data and the results of the laboratory tests for each soil sample. The following minimum laboratory tests shall be provided for each soil sample;
 - 9.2.6.1. As received soil resistivity per ASTM G57
 - 9.2.6.2. Saturated soil resistivity per ASTM G57

- 9.2.6.3. Chlorides per SW 9056
- 9.2.6.4. Sulfates per SW 9056
- 9.2.6.5. Alkalinity/Bicarbonate per SM 2320B
- 9.2.6.6. pH per EPA 9045C
- 9.2.6.7. Prepare a comprehensive soil corrosivity technical memorandum. The memorandum will include the collected field data and laboratory soil analysis results and provide conclusions and recommendations for a cathodic monitoring or cathodic protection system based on the soil conditions and stray current interference presence with respect to the proposed pipeline materials. Provide corrosion investigation services to the extent necessary as well as an Opinion of Probable Cost for all scenarios.

10. 60% Design Phase

10.1. Perform up to five site visits for 60% design.

10.2. Construction Drawings

10.2.1. Perform analyses

- 10.2.1.1. Cathodic Protection
- 10.2.1.2. Joint Restraint (for one pipe material with the most conservative scenario)
- 10.2.1.3. Embedment
- 10.2.1.4. Backfill
- 10.2.1.5. Scour
- 10.2.1.6. Buoyancy
- 10.2.1.7. Pipe Deflection
- 10.2.1.8. Combination Air Vacuum and Air Release Valve (size and location)
- 10.2.1.9. Blow-off Valve (size)
- 10.2.1.10. Trenchless Engineering and calculations (including casing and/or liner thickness for various creeks and roadway crossings). Brierley Inc will provide design for the San Marcos River Crossing, see details in attached proposal.

10.2.2. Develop 60% Plan Set (in accordance with the ARWA Phase 1B Program Design Standards). Quantity boxes will be included on all design and plan and profile sheets.

- 10.2.2.1. General Sheets (Cover, Project Layout, General Notes, Quantities, etc.)
- 10.2.2.2. Overall Dimensional Control Plan
- 10.2.2.3. Survey Control sheets
- 10.2.2.4. Contractor access sheets (including permanent access driveways, low water crossings, etc.)
- 10.2.2.5. Plan and Profile sheets Identify scale of P&P sheets: 1"=50' H, 1"=5' V (22"x34" sheet); 1"=100' H, 1"=10'V (11"x17" sheet)
- 10.2.2.6. Erosion Control Sheets
- 10.2.2.7. Cathodic Protection sheets
- 10.2.2.8. Standard Details (Provided by the Owner's Representative)
- 10.2.2.9. Cathodic Protection detail sheets
- 10.2.2.10. Project Specific Details (as developed by the Design Consultant)

10.3. Preparation of Project Manual

10.3.1. Development of Table of Contents

- 10.3.1.1. To include all ARWA Phase 1B Program standard specifications (Provided by the Owner's Representative), project specific specifications (Provided by FNI).
- 10.4. 60% Opinions of Probable Construction Cost Analysis based on recent bid tabs
- 10.5. Perform internal QC and address QC comments
- 10.6. 60% Design Workshop
 - 10.6.1. Conduct 60% Design workshop to review the 60% Design Submittal.
 - 10.6.2. Prepare and distribute meeting notes.
- 10.7. Address comments provided by the Owner and Owner's Representative.
- 10.8. 60% Design Phase Deliverables
 - 10.8.1. 60% Design Deliverables (plans and specifications)
 - 10.8.2. Draft Geotechnical Data and Baseline Reports
 - 10.8.3. Updated list of permits required for the project
 - 10.8.4. Updated Risk Register
 - 10.8.5. SUE Deliverables
 - 10.8.6. Updated Project Schedule
 - 10.8.7. Cathodic Protection Report
 - 10.8.8. 60% Design Letter documenting conformance to applicable AWWA and TCEQ standards conformance to ARWA standards, and documentation of any exceptions to these standards.
 - 10.8.9. 60% Design Review Workshop and meeting notes
 - 10.8.10. 60% Opinion of Probable Construction Cost (OPCC)
- 11. 90% Design Phase
 - 11.1. Perform up to four site visits for 90% design
 - 11.2. 90% Draft letter
 - 11.2.1. Documenting conformance to applicable AWWA and TCEQ standards, conformance to ARWA standards, and documentation of any exceptions to these standards.
 - 11.3. Construction Drawings
 - 11.3.1. Develop 90% Plan Set in accordance with the ARWA Phase 1B Program Design Standards.
 - 11.3.1.1. Further Development of 60% Plan Set sheets
 - 11.3.1.1.1. General Sheets (Cover, Project Layout, General Notes, Quantities, etc.)
 - 11.3.1.1.2. Overall Dimensional Control Plan
 - 11.3.1.1.3. Survey Control Sheets
 - 11.3.1.1.4. Contractor Access Sheets (including permanent access driveways, low water crossings, etc)
 - 11.3.1.1.5. Plan and Profile Sheets (including open cut and trenchless design)
 - 11.3.1.1.6. Erosion Control Sheets
 - 11.3.1.1.7. Cathodic Protection Sheets
 - 11.3.1.1.8. Standard Details (Provided by the Owner's Representative_
 - 11.3.1.1.9. Cathodic Protection detail sheets
 - 11.3.1.1.10. Project Specific Details (as developed by the Design Consultant)
 - 11.3.1.2. Traffic Control Plan
 - 11.3.1.3. Tree Preservation Plan

- 11.4. Draft Project Manual
 - 11.4.1. Update all front-end documents and applicable specifications both provided by the Owner's Representative and specific to the project.
- 11.5. 90% Opinions of Probable Construction Cost
- 11.6. Perform internal QC and address QC comments.
- 11.7. 90% Design Workshop
 - 11.7.1. Conduct 90% Design workshop to review the 90% Design Submittal.
 - 11.7.2. Prepare and distribute meeting minutes.
- 11.8. Address comments provided by Owner and Owner's Representative.
- 11.9. 90% Design Phase Deliverables
 - 11.9.1. 90% Design Deliverables (plans and specifications)
 - 11.9.2. Final Geotechnical Reports
 - 11.9.2.1. Geotechnical Data Report
 - 11.9.2.2. Geotechnical Baseline Report (San Marcos River Crossing)
 - 11.9.3. Updated Risk Register
 - 11.9.4. Updated Project Schedule
 - 11.9.5. 90% Design Letter
 - 11.9.6. 90% Design Review Workshop and meeting notes
 - 11.9.7. 90% Opinion of Probable Construction Cost (OPCC)
 - 11.9.8. QA/QC Documentation
- 12. 100% Design Phase
 - 12.1. Perform site visits as needed for 100% design.
 - 12.2. 100% Design letter
 - 12.2.1. Documenting conformance to applicable AWWA and TCEQ standards, conformance to ARWA standards, and documentation of any exceptions to these standards.
 - 12.3. Construction Drawings
 - 12.3.1. Develop 100% Plan Set in accordance with the ARWA Phase 1B Program Design Standards.
 - 12.3.1.1. Further Development of 90% Plan Set sheets
 - 12.4. Signed and Sealed Final Project Manual
 - 12.4.1. Contract Documents to include language for Request for Competitive Sealed Proposals. (RFCSP)
 - 12.4.2. To include all applicable specifications provided by the Program and specific to the project.
 - 12.5. 100% Opinions of Probable Construction Cost Analysis utilizing recent bid tabs.
 - 12.6. Perform internal QC and address QC comments.
 - 12.7. 100% Design Workshop
 - 12.7.1. Conduct 100% Design workshop to review the 100% Design Submittal.
 - 12.7.2. Prepare and distribute meeting notes.
 - 12.8. Address comments provided by the Owner and Owner's Representative.
 - 12.9. Agency Review of 100% Plan Set
 - 12.9.1. Prepare packet for submission of 100% construction documents (plans and specifications) to the following agencies.

- 12.9.1.1. TWDB
- 12.9.1.2. TCEQ
- 12.9.2. Address comments provided by TWDB and TCEQ.
- 12.10. 100% Design Phase Deliverables
 - 12.10.1. 100% Design Deliverables (plans and specifications)
 - 12.10.2. Final Geotechnical Reports
 - 12.10.2.1. Geotechnical Data Report
 - 12.10.2.2. Geotechnical Baseline Report (San Marcos River Crossing)
 - 12.10.3. Updated Risk Register
 - 12.10.4. Updated Project Schedule
 - 12.10.5. 100% Design Letter
 - 12.10.6. 100% Design Review Workshop and meeting notes
 - 12.10.7. 100% Opinion of Probable Construction Cost (OPCC)
 - 12.10.8. QA/QC Documentation
- 13. Procurement (Request for Competitive Sealed Proposal (RFCSP))
 - 13.1. Submit Final Documents for Advertisement.
 - 13.2. Pre-Proposal Conference
 - 13.3. Prepare Addendum and Clarifications.
 - 13.4. Attend Proposal Opening.
 - 13.5. Review Contractors Proposals.
 - 13.5.1. Perform Contractor References Check.
 - 13.5.2. Confirm Contractor Experience.
 - 13.5.3. Prepare Recommendation for Award.
 - 13.6. Prepare Conformed Contract Documents.
- 14. Supplemental
 - 14.1. Survey
 - 14.1.1. Verify/Reset horizontal and vertical controls points for construction purposes.
 - 14.2. At the direction of ARWA the Consultant may be required to perform up to four (4) additional Geotechnical Boring to a maximum depth of 40 feet and three (3) Piezometers beyond those scoped for the project, and conduct surveying as required to tie-in borings into the design documents.
 - 14.3. General Engineering Design
 - 14.4. Land Acquisition
 - 14.4.1. Eminent domain hearings - 10% of the parcels to require hearings (6 hearings)
 - 14.4.2. Provide support documents and exhibits for Eminent domain hearings (6 hearings).
 - 14.5. Environmental Coordination based on necessary additional environmental investigations
 - 14.6. Attend Public Meetings (2 meetings).
 - 14.7. Attend additional meetings in the vicinity of the project (five meetings.)
 - 14.8. Additional SUE Potholes
 - 14.8.1. At the direction of ARWA, the Consultant may be required to perform up to five (5) additional SUE potholes beyond those scoped for the project.
 - 14.9. General Land Office (GLO) preparation of the Miscellaneous Easement Exhibit.

Assumptions:

1. Final Design Phase is assumed to be maximum 15 months in length.
2. Procurement Phase is assumed to be maximum 3 months in length.
3. Construction Phase services are not included in this scope of work.
4. All meetings to held in the immediate vicinity of the project.
5. Owner's Representative will be the primary contact with TWDB and will facilitate all submittals and coordination. At request of Owner's Rep, design consultant may coordinate directly with TWDB as required to address specific comments.
6. Owner's Representative will conduct Pre-bid meeting, including developing agenda, and FNI will participate at the meeting as requested.
7. Owner's Representative will receive and distribute all Contractor questions during procurement process.
8. The Owner will provide the following information to the Engineer:
 - a. Right-of-Entry to all parcels impacted by the alignment
 - b. Boundary survey to all parcels impacted by the alignment
 - c. Control points set by ARWA near the alignment.

Phase	Task	Tasks	Labor																Subconsultants						Total					
			Anne Hostons	Rosa Valdez	Helen Salazar	David Bennett	Dawn Hatley	Eric Lov	Brent Miller	Ben Talley	Ron Deal	Milton Aconcava	Diana Huffines	Drew Harbin	Rusty Gibson	George Foster	Brian Gittinger	Billy Metzger	Tony Bosacker	Total Hours	Total Labor Effort	Total Expense Effort	Lab Soil Analysis	Brierley		Bain Medina Bain	Rios Group	Arias	Total Sub Effort	Total Effort
			Engineer VI	Engineer IV	Engineer III	Engineer VI	CAD Designer II	CAD Technician II	Group Manager	Construction Representative III	Senior Designer	CAD Designer II	Engineer V	Engineer VI	Lead Technical Professional	Engineer V	Engineer VI	Operations Analyst	Engineer VI											
	9.1.1	Sample borings (23)	2	8	8														18	\$ 2,872	\$ 153					\$67,035	\$ 77,090	\$ 80,116		
	9.1.2	San Marcos River borings (2)	2	8	8														18	\$ 2,872	\$ 153					\$66,559	\$ 76,543	\$ 79,568		
	9.2	Corrosion Investigation, Data Collection and Design Support																	74	\$ -	\$ -		\$5,873				\$ -	\$ -		
	9.2.1	Field evaluation to analyze soil conditions																	20	\$ 11,165	\$ 2,633					\$ -	\$ 6,754	\$ 20,552		
	9.2.2	In-situ soil resistivity & pH testing (~105)																	40	\$ 8,557	\$ 478	\$2,500				\$ -	\$ 2,875	\$ 11,903		
	9.2.3	Conduct stray current (DC) investigation																	20	\$ 5,595	\$ 340					\$ -	\$ -	\$ 5,935		
	9.2.4	Technical Memo	2	8	8														46	\$ 8,056	\$ 391					\$ -	\$ -	\$ 8,447		
	9.2.4.1	Wenner 4-pi testing ASTM G57 every 2,000 feet																	4	\$ 740	\$ 34					\$ -	\$ -	\$ 774		
	9.2.4.2	Obtain soil sample from approximate pipeline depth every 4,000 feet																	4	\$ 740	\$ 34					\$ -	\$ -	\$ 774		
	9.2.4.2.1	Minimum of 1- quart soil sample																	4	\$ 740	\$ 34					\$ -	\$ -	\$ 774		
																			4	\$ -	\$ -					\$ -	\$ -	\$ -		
		Task 10 - 60% Design Phase																	2,101	\$ 323,403	\$ 18,784		\$58,857			\$28,250	\$ 97,873	\$ 440,060		
	10.1	Site visits for 60% design (5)	12	30	30														72	\$ 11,750	\$ 1,192					\$ -	\$ -	\$ 12,942		
	10.2	Construction Drawings																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.2.1	Perform Analyses																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.2.1.1	Cathodic Protection	4	8	12														60	\$ 21,349	\$ 1,054					\$ -	\$ -	\$ 22,403		
	10.2.1.2	Joint Restraint (for one pipe material)	4	8	12														24	\$ 3,877	\$ 204					\$ -	\$ -	\$ 4,081		
	10.2.1.3	Embedment	4	4	4														12	\$ 2,088	\$ 102					\$ -	\$ -	\$ 2,190		
	10.2.1.4	Backfill	4	4	4														12	\$ 2,088	\$ 102					\$ -	\$ -	\$ 2,190		
	10.2.1.5	Scour	4	8	16														149	\$ 26,847	\$ 1,612					\$ -	\$ -	\$ 28,459		
	10.2.1.6	Buoyancy	4	8	8										121				20	\$ 3,307	\$ 170					\$ -	\$ -	\$ 3,477		
	10.2.1.7	Pipe Deflection	4	8	8														20	\$ 3,307	\$ 170					\$ -	\$ -	\$ 3,477		
	10.2.1.8	Combination Air Vacuum and Air Release Valve	4	8	8														20	\$ 3,307	\$ 170					\$ -	\$ -	\$ 3,477		
	10.2.1.9	Blow-Off Valve	4	8	8														20	\$ 3,307	\$ 170					\$ -	\$ -	\$ 3,477		
	10.2.1.10	Trenchless Engineering and calculations	4	6	12														42	\$ 7,900	\$ 357					\$ -	\$ -	\$ 8,257		
	10.2.2	Develop 60% Plan Set																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.2.2.1	General Sheets	2	4	8														34	\$ 4,813	\$ 289					\$ -	\$ -	\$ 5,102		
	10.2.2.2	Overall Dimensional Control Plan	2	4	8														34	\$ 4,813	\$ 289					\$ -	\$ -	\$ 5,102		
	10.2.2.3	Survey Control sheets	2	4	8														34	\$ 4,813	\$ 289					\$ -	\$ -	\$ 5,102		
	10.2.2.4	Contractor Access sheets	2	4	8														34	\$ 4,813	\$ 289					\$ -	\$ -	\$ 5,102		
	10.2.2.5	Plan and Profile sheets	2	60	120														782	\$ 104,955	\$ 6,647					\$ -	\$ -	\$ 111,602		
	10.2.2.6	Erosion Control Sheets	2	12	12														66	\$ 9,271	\$ 561					\$ -	\$ -	\$ 9,832		
	10.2.2.7	Cathodic Protection sheets	2	2	2														6	\$ 1,044	\$ 51					\$ -	\$ -	\$ 1,095		
	10.2.2.8	Standard Details	2	16	16														74	\$ 10,489	\$ 629					\$ -	\$ -	\$ 11,118		
	10.2.2.9	Cathodic Protection Detail sheets	2	2	2														8	\$ 1,044	\$ 51					\$ -	\$ -	\$ 1,095		
	10.2.2.10	Project Specific Details	2	12	18														78	\$ 10,876	\$ 663					\$ -	\$ -	\$ 11,539		
	10.3	Preparation of Project Manual																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.3.1	Development of TOC	2	6	12														20	\$ 3,118	\$ 170					\$ -	\$ -	\$ 3,288		
	10.3.1.1	Include standard and project specific specs	2	6	12														20	\$ 3,118	\$ 170					\$ -	\$ -	\$ 3,288		
	10.4	60% OPCC Analysis	4	6	20														30	\$ 4,692	\$ 255		\$7,130			\$ 8,200	\$ 13,147			
	10.5	Internal QC and address QC comments	8	12	12														102	\$ 20,611	\$ 867					\$ -	\$ -	\$ 21,478		
	10.6	60% Design Workshop																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.6.1	60% design workshop to review 60% submittal	6	6	6														18	\$ 3,132	\$ 153		\$4,137			\$ 4,758	\$ 8,043			
	10.6.2	Prepare and Distribute Meeting Notes																	2	\$ 285	\$ 17					\$ -	\$ -	\$ 302		
	10.7	Address Owner and Owner's Rep Comments	6	12	16														34	\$ 5,531	\$ 289					\$ -	\$ -	\$ 5,820		
	10.8	60% Design Phase Deliverables																		\$ -	\$ -					\$ -	\$ -	\$ -		
	10.8.1	60% Design Deliverables	6	8	12														26	\$ 4,312	\$ 221		\$13,800			\$ 15,870	\$ 20,403			
	10.8.2	Draft Geotechnical Report	4	8	12														36	\$ 6,485	\$ 306		\$33,790			\$ 69,046	\$ 75,837			
	10.8.3	Updated list of permits required for the project	4	8	12														24	\$ 3,877	\$ 204					\$28,250	\$ 69,046			
	10.8.4	Updated Risk Register	4	4	4														12	\$ 2,088	\$ 102					\$ -	\$ -	\$ 4,081		
	10.8.5	SUE Deliverables	2	2	4														8	\$ 1,329	\$ 68					\$ -	\$ -	\$ 1,397		
	10.8.6	Updated Project Schedule	2	2	4														8	\$ 1,329	\$ 68					\$ -	\$ -	\$ 1,397		
	10.8.7	Cathodic Protection Report	2	2	4														8	\$ 1,329	\$ 68					\$ -	\$ -	\$ 1,397		
	10.8.8	60% Design Letter	2	8	12														22	\$ 3,442	\$ 187					\$ -	\$ -	\$ 3,629		
	10.8.9	60% Design Review Workshop Meeting Notes	2	8	12														22	\$ 3,442	\$ 187					\$ -	\$ -	\$ 3,629		
	10.8.10	60% OPCC	2	6	12														46	\$ 9,221	\$ 391					\$ -	\$ -	\$ 9,612		
																				\$ -	\$ -					\$ -	\$ -	\$ -		
		Task 11 - 90% Design Phase																	1,984	\$ 300,243	\$ 18,243		\$25,112			\$20,000	\$ 51,879	\$ 370,364		
	11.1	Site visits for 90% design (4)	12	24	24														60	\$ 9,922	\$ 1,090					\$ -	\$ -	\$ 11,012		
	11.2	90% Draft Letter																		\$ -	\$ -					\$ -	\$ -	\$ -		
	11.2.1	Document Conformance to AWWA, TCE																												

Phase	Task	Task Description	Labor																Subconsultants						Total Effort				
			Anne Hostins	Rosa Valdez	Helen Salame	David Bennett	Dawn Hatley	Eric Low	Brent Miller	Ben Talley	Ron Deal	Milton Aronson	Dan Huffines	Drew Harlin	Rusty Gibson	George Foster	Brian Gelfinger	Billy Metzger	Tony Bloscker	Total Hours	Total Labor Effort	Total Expense Effort	Lab Soil Analysis	Brierley		Bain Medina Bain	Rios Group	Arias	Total Sub Effort
			Engineer VI	Engineer IV	Engineer II	Engineer VI	CAD Designer II	CAD Technician II	Group Manager	Construction Representative II	Senior Designer	CAD Designer II	Engineer V	Engineer VII	Lead Technical Professional	Engineer V	Engineer VI	Operations Analyst	Engineer VI										
12.10.2.2	Geotechnical Baseline Report (San Marcos River Crossing)		2	8	12														22	\$ 3,442	\$ 187		\$6,605				\$ 7,596	\$ 11,225	
12.10.3	Updated Risk Register		2	4	6														12	\$ 1,939	\$ 102						\$ -	\$ 2,041	
12.10.4	Updated Project Schedule		2	2	4														8	\$ 1,329	\$ 68						\$ -	\$ 1,397	
12.10.5	100% Design Letter		4	8	12														24	\$ 3,877	\$ 204						\$ -	\$ 4,081	
12.10.6	100% Design Review Workshop and Meeting Notes				6														6	\$ 855	\$ 51						\$ -	\$ 906	
12.10.7	100% OPCC		2	8	24														34	\$ 5,152	\$ 289						\$ -	\$ 5,441	
12.10.8	QA/QC Documentation		2	8	12														22	\$ 3,442	\$ 187						\$ -	\$ 3,629	
																				\$ -	\$ -						\$ -	\$ -	
	Task 13 - Procurement (RFCSF)																		278	\$ 44,374	\$ 2,595						\$ -	\$ 46,969	
13.1	Submit Final Documents for Advertisement		2	8	12														22	\$ 3,380	\$ 187						\$ -	\$ 3,767	
13.2	Pre-Proposal Conference		4	4	4														12	\$ 2,172	\$ 218						\$ -	\$ 2,390	
13.3	Prepare Addendum and Clarifications		8	24	24	20	20												96	\$ 14,801	\$ 816						\$ -	\$ 15,617	
13.4	Attend Proposal Opening		4	4	4														12	\$ 2,172	\$ 218						\$ -	\$ 2,390	
13.5	Review Contractors' Proposals																			\$ -	\$ -						\$ -	\$ -	
13.5.1	Perform Contractor Reference Check		4	4	8														16	\$ 2,765	\$ 136						\$ -	\$ 2,901	
13.5.2	Confirm Contractor Experience		4	4	8														16	\$ 2,765	\$ 136						\$ -	\$ 2,901	
13.5.3	Prepare Recommendation for Award		4	8	12														24	\$ 4,032	\$ 204						\$ -	\$ 4,236	
13.6	Prepare Conformed Contract Documents		4	12	40	12	12												80	\$ 12,088	\$ 680						\$ -	\$ 12,768	
	Subtotal Basic Services		648	1,553	2,149	126	1,342	1,228	126	68	288	76	40	24	26	137	40	9	24	7,904	\$ 1,228,617	\$ 73,181	\$2,500	\$119,037	\$274,415	\$30,870	\$179,844	\$ 697,666	\$ 1,999,464
	Task 14 - Supplemental																		806	\$ 134,136	\$ 6,851						\$ 110,440	\$ 251,427	
14.1	Survey																			\$ -	\$ -						\$ -	\$ -	
14.1.1	Verify/Reset horizontal and vertical control points		2	8	8														18	\$ 2,872	\$ 153						\$ -	\$ 3,025	
14.2	Additional Geotechnical Borings (4) and Piezometers (3)																			\$ -	\$ -		\$5,000	\$8,850		\$45,055	\$ 57,563	\$ 57,563	
14.3	General Engineering Design		12	60	60	24	40	40											236	\$ 36,467	\$ 2,006	\$10,000					\$ 11,500	\$ 49,973	
14.4	Land Acquisition																			\$ -	\$ -						\$ -	\$ -	
14.4.1	Eminent Domain Hearings (6 hearings)		60	60	54	32													206	\$ 37,425	\$ 1,751						\$ -	\$ 39,176	
14.4.2	Provide Support Docs for Hearings (6 hearings)		16	60	60	12	60												208	\$ 33,916	\$ 1,768						\$ -	\$ 35,684	
14.5	Environmental Coordination		4	8	12														24	\$ 3,877	\$ 204						\$ -	\$ 4,081	
14.6	Attend Public Meetings (2)		12	12	12														36	\$ 6,265	\$ 306						\$ -	\$ 6,571	
14.7	Attend Additional Meetings in Vicinity of the Project (5)		20	20	20														60	\$ 10,442	\$ 510						\$ -	\$ 10,952	
14.8	Additional SUE Potholes (5)																			\$ -	\$ -						\$ -	\$ -	
14.8.1	Additional SUE Potholes at the Direction of ARWA		2	8	8														18	\$ 2,872	\$ 153			\$7,000			\$ 8,050	\$ 11,075	
14.9	GLO Exhibit																			\$ -	\$ -		\$20,130				\$ 23,150	\$ 23,150	
	Subtotal Supplemental Services		128	236	234	68	100	40											806	\$ 134,136	\$ 6,851						\$ 110,440	\$ 251,427	
	Total Effort (Basic Service + Supplemental Services)*		776	1,789	2,383	194	1,442	1,268	126	68	288	76	40	24	26	137	40	9	24	8,710	\$ 1,362,753	\$ 80,032	\$ 2,875	\$ 154,143	\$ 348,904	\$ 43,551	\$ 268,634	\$ 808,106	\$ 2,250,891
	*Total Effort for subconsultants include subconsultant markup																												

November 7, 2019
Brierley Project # 618017-001

Attachment C

Mrs. Anne Hoskins, P.E.
Freese and Nichols, Inc.
10431 Morado Circle, Suite 300
Austin, TX 78759

RE: Proposal for Alliance Regional Water Authority Phase 1B Segment D – Final Design_Revision3

Dear Mrs. Hoskins:

Brierley Associates (Brierley) is pleased to submit this proposal to Freese and Nichols, Inc. (FNI) to provide tunneling and trenchless design associated with the Alliance Regional Water Authority (ARWA) Phase 1B Segment D. The proposed Segment D pipeline will begin near the intersection of Church St. and TX-142 located just south of Maxwell, Texas. The 42-inch pipeline will generally head west and southwest to the intersection TX-758 and HWY 123 approximately 2.7 miles north of Geronimo, Texas. We understand that FNI would like Brierley's tunneling design services only for the San Marcos River crossing (red dashed circle below).



Brierley will only be involved on the San Marcos River crossing of the alignment which will be constructed using Horizontal Directional Drilling (HDD) techniques.

The ARWA has elected to utilize a phased approach for the project as outlined in the RFQ and highlighted below:

- a. Feasibility/Preliminary Engineering Phase Services
- b. Design and Permitting Services**
- c. Bidding Services
- d. Construction Phase Services
- e. Warranty Phase Services

This proposal will be structured under **b. Design and Permitting Services** within the RFQ, and it is understood that an additional proposal will be requested for the future phases. The preliminary trenchless components have been identified for the 30 percent Level of Effort along with the preferred pipeline route. This proposal is specifically for the **b. Design and Permitting Services**.

A final design pipeline scope template was provided to Brierley for development of this proposal; we have mirrored our tasks with the scope of services outlined in the scope template. The number in parentheses within the task headings below refers directly to the scope of services within the provided documents.

Brierley's work associated with this phase of the ARWA project will generally be incorporated into the following Tasks:

Design and Permitting Services

- Task 1*** – Project Management
- Task 4*** – Land Acquisition Coordination
- Task 9*** – Subsurface Investigation
- Task 10*** – 60% Design Phase
- Task 11*** – 90% Design Phase
- Task 12*** – 100% Design Phase
- Task 14*** – Supplemental

Task numbers were skipped intentionally to conform to the template format provided and the requested Brierley participation. Brierley understands that the Design and Permitting Services addressed in this proposal will be up to approximately 18 months in duration.

TASK 1 – PROJECT MANAGEMENT (1.0)

1.1 Prepare Monthly Summary Reports/Invoicing - Brierley will prepare monthly Lump Sum invoices, under the assumptions that this phase of the work will be completed in 18 months or less.

1.4.1. Conduct Progress Meetings with Owner's Representative (18 meetings) - Brierley assumes our involvement may include up to four (4) coordination calls, to be distributed throughout this 18-month duration. Brierley assumed that these calls will involve 2 people from Brierley's design team.

TASK 4 – LAND ACQUISITION COORDINATION (4.0)

4.2.1. Review and Comment on Draft and Final Easements – This proposal contemplates the 1 HDD crossing at the San Marcos River to be designed and evaluated. The site will need to be sized appropriately for the type of equipment being considered for the HDD crossing, as this impacts the amount of necessary laydown and construction area needed, especially at the HDD entry side. As part of this task, Brierley envisions a small write up for FNI to include into a Technical Memo discussing temporary construction easements necessary at the San Marcos River crossing, along with a schematic of the easement.

4.2.3. Review and comment on draft and final easement exhibits – As part of this task, Brierley envisions reviewing and commenting on the final easement exhibit for the San Marcos River crossing. Comments will be provided to FNI via email or Bluebeam session.

TASK 9 – SUBSURFACE INVESTIGATIONS (9.0)

9.1.1. Provide Geotechnical Investigation Services – Brierley will evaluate and provide recommendations for the geotechnical investigation at the proposed San Marcos River crossing and provide a Technical Memorandum to FNI. This Technical Memorandum will provide bore locations, depths, standard geotechnical laboratory testing, specialized testing at entry and exit locations as well as along the bore path for the San Marcos River crossing along with packer testing, specialized laboratory tests, etc. Brierley assumes that a Brierley Professional Geologist will have a very limited presence onsite for one site visit while these borings are conducted, to observe ground behavior as it pertains to the HDD crossing at the San Marcos River.

TASK 10 – 60% DESIGN PHASE (10.0)

10.4. 60% Opinions of Probable Construction Costs - Brierley will develop the opinion of probable construction costs (OPCC) for the San Marcos River crossing. The OPCC will be based on the data collected for the geotechnical investigation of the river crossing and on a Class 3 estimate classification system as detailed by the AACE Cost Estimating Classification System.

10.6. 60% Design Workshop - Brierley assumed that this will be an in-person meeting at FNI's office, will involve 2 key team members of Brierley's design team, and will be a 6-hour meeting (9 hours with RT drive time).

10.8.1. 60% Design Deliverables (plans and specifications) - Brierley will provide up to 8 specifications which may be necessary for the HDD construction at the San Marcos River crossing. Brierley will provide approximately 6 drawings to coincide with the specifications that may be necessary for HDD construction.

10.8.2.a 60% Draft Geotechnical Report - Brierley envisions reviewing and commenting on 60% Draft Geotechnical Report at the San Marcos River crossing. Comments will be provided to FNI via email or Bluebeam session.

10.8.2.b 60% Draft Geotechnical Baseline Report - The purpose of a GBR is to present an interpretative summary of the results of the geotechnical investigation completed for the tunnel and shaft components of this project. The interpretative discussion within a GBR represents the geotechnical basis of design. A GBR, in conjunction with the other contract documents, is intended to 1) assist prospective bidders in evaluating requirements for excavating, shoring, dewatering, and tunneling necessary to complete the work; 2) assist the Contractor in planning the work and designing temporary facilities; and 3) assist the Engineer and Construction Manager in reviewing and monitoring the Contractor's submittals and operations.

This GBR will include discussions of constructability issues including the existing soil and groundwater conditions to the most appropriate construction method (i.e. HDD). Additionally, the GBR will include the following scope items:

- **Develop Design HDD Criteria** – a. Confirm pipe diameter and wall thickness; b. Estimate work area for necessary HDD equipment; c. Establish entry and exit angles; d. Establish design radii for horizontal and vertical curves; e. Determine design methodology.
- **Evaluate HDD Site Conditions** – a. Available work areas; b. Available pipe layout area; c. Truck access to work areas; d. Other site constraints.
- **Pipe Buoyancy Analysis, Pipe Pull Load Calculations, Pipe Stress Calculations, and Hydrofracture Analysis** – These calculations and analyses will be based on methodology described in ASTM F1962-11 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of

Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings and will also be performed based on current industry practice and the site-specific geotechnical parameters.

Brierley will prepare one GBR for the San Marcos River crossing. Excluded from this proposal are the site characterization and design services for the open cut portions of the project, tie-in connections, and related facilities.

TASK 11 – 90% DESIGN PHASE (11.0)

11.5. 90% Opinions of Probable Construction Costs - Brierley will progress the OPCC for the San Marcos River crossing to the 90% design level and on a Class 2 estimate classification system as detailed by the AACE Cost Estimating Classification System.

11.7. 90% Design Workshop - Brierley assumed that this will be an in-person meeting at FNI's office, will involve 2 key team members of Brierley's design team, and will be a 6-hour meeting (9 hours with RT drive time).

11.9.1. 90% Design Deliverables (plans and specifications) - Brierley will progress the specifications and drawings for the San Marcos River crossing to the 90% level.

11.9.2.a Final Geotechnical Report - Brierley envisions reviewing and commenting on Final Geotechnical Report at the San Marcos River crossing. Comments will be provided to FNI via email or Bluebeam session.

11.9.2.b 90% Geotechnical Baseline Report – Brierley will advance the GBR to a 90% level.

TASK 12 – 100% DESIGN PHASE (12.0)

12.5. 100% Opinions of Probable Construction Costs - Brierley will progress the OPCC for the San Marcos River crossing to the 100% design level and on a Class 1 estimate classification system as detailed by the AACE Cost Estimating Classification System.

12.10.1. 100% Design Deliverables (plans and specifications) - Brierley will progress the specifications and drawings for the San Marcos River crossing to the 100% level.

12.10.1.a. Final Geotechnical Baseline Report – Brierley will stamp and seal final geotechnical baseline report for the San Marcos River crossing and email to FNI as a PDF.

TASK 14 – SUPPLEMENTAL (14.0)

14.3. Additional Geotechnical Boring and Piezometers – In the event that additional geotechnical borings are needed at the San Marcos crossing, Brierley will make recommendations.

14.4. General Engineering Design – In the event that additional geotechnical borings are needed at the San Marcos River crossing, Brierley will revise and update GBR and OPCC.

COST

Brierley proposes to perform the tasks described herein and summarized on the attached Fee Estimate worksheet to be paid as a Lump Sum.

Note that the hourly rates used are reflective of Brierley's 2019 Standard Fee Schedule. If, for some reason, the design and permitting services is not completed by December 31, 2020, we reserve the right to escalate our fees by 5% per year from the 2019 hourly rates. Brierley expects to be allowed to utilize skilled engineering staff throughout Brierley, as needed to perform and review its work. Our fees for this scope will be invoiced monthly, with estimated percent complete for lump sum items. If additional effort beyond the scope detailed is requested, a negotiated fee and contract amendment will be agreed to prior to commencing work. An e-mail or other written directive will be sent to Brierley prior to proceeding with additional scope.

Please call me at 512-219-1733 if you need anything else to clarify this proposal or if we can be of any other assistance to Freese and Nichols, Inc.

Sincerely,

Brierley Associates Corporation



Kevin Mandeville, P.G.
Associate



Jim Williams, P.E.
Associate

Accepted by:

Anne Hoskins, P.E.
Associate

Attachments: Fee Estimate, 2019 Standard Fee Schedule

2019 LABOR HOURS AND COSTS

Task	Task Description	Principal / Sr. Consultant II	Sr. Assoc./Sr. Consultant I	Associate/Sr. Project Mgr	Sr. Professional II	Sr. Professional I	Professional II	Professional I	Staff Professional II	BIM/VDC Manager	BIM Technician/Drafter		Administrative	Total Hours	Expense Effort	Total Cost
		Rate \$ 250	\$ 235	\$ 205	\$ 190	\$ 170	\$ 155	\$ 145	\$ 135	\$ 145	\$ 120	\$ -	\$ 70		LS	
1	Project Management															\$ -
1.1	Prepare Monthly Summary Reports/Invoicing			36									36	72		\$ 9,900
1.4.1	Conduct Progress Meetings with Owner's Representative (18 meetings)		4	4										8		\$ 1,760
4	Land Acquisition Coordination															\$ -
4.2.1	Review and Comment on Draft and Final Easements	5	8				8			5				26		\$ 5,095
9	Subsurface Investigations															\$ -
9.1.1	Provide Geotechnical Investigation Services		10	15										25	447.6	\$ 5,873
10	60% Design Phase															\$ -
10.4	60% Opinions of Probable Construction Cost	2	18	10									5	35		\$ 7,130
10.6	60% Design Workshop		9	9										18	177	\$ 4,137
10.8.1	60% Design Deliverables (plans and specifications)	8	20	20			10			10				68		\$ 13,800
10.8.2a	Draft Geotechnical Report (Review)		7	7										14		\$ 3,080
10.8.2b	Draft Geotechnical Baseline Report	8	20	20			20			20			10	98		\$ 17,500
	- Develop HDD Design Criteria		8											8		\$ 1,880
	- Evaluate HDD Site Conditions		6	6										12		\$ 2,640
	- Pipe Buoyancy Analysis, Pipe Pull Load Calculations, Pipe Stress Calculations, and Hydrofracture Analysis		30	8										38		\$ 8,690
11	90% Design Phase															\$ -
11.5	90% Opinions of Probable Construction Cost		10	5										15		\$ 3,375
11.7	90% Design Workshop		9	9										18	177	\$ 4,137
11.8.1	90% Design Deliverables (plans and specifications)	4	10				15							29		\$ 5,675
11.9.2a	Final Geotechnical Report (Review)		8	8										16		\$ 3,520
11.9.2b	90% Geotechnical Baseline Report		8	15			20						5	48		\$ 8,405
12	100% Design Phase															\$ -
12.5	100% Opinions of Probable Construction Cost		8	5									5	18		\$ 3,255
12.7	100% Design Workshop													0		\$ -
12.10.1	100% Design Deliverables (plans and specifications)		4	8										12		\$ 2,580
12.10.1.a	Final Geotechnical Baseline Report		8	10			15						5	38		\$ 6,605
14	Supplemental															\$ -
14.3	Additional Geotechnical Boring and Piezometer													0		\$ 5,000
14.4	General Engineering Design															\$ 10,000
Hours		27	205	195	0	0	88	0	0	35	0	0	66	616		
Total		\$ 6,750	\$ 48,175	\$ 39,975	\$ -	\$ -	\$ 13,640	\$ -	\$ -	\$ 5,075	\$ -	\$ -	\$ 4,620		\$ 802	\$ 134,037

Basic Engineering Effort \$ 119,037

Supplemental \$ 15,000

Total Engineering Effort \$ 134,037

BRIERLEY ASSOCIATES CORPORATION
STANDARD FEE SCHEDULE
January 2019

1. Fees for services will be based on the time worked on the project by staff personnel plus reimbursable expenses. The hourly fee for professional services will be charged as follows unless otherwise noted in the proposal:

Principal/Senior Consultant II	\$250
Senior Associate/Senior Consultant I	\$235
Associate/Senior Project Manager	\$205
Senior Professional II	\$190
Senior Professional I	\$170
Professional II	\$155
Professional I	\$145
Staff Professional II	\$135
Staff Professional I	\$120
BIM/VDC Manager	\$145
Senior BIM/VDC Designer	\$120
BIM Technician/Drafter	\$100
CADD	\$100
GIS Analyst	\$100
Administrative	\$70

2. Overtime hours will be charged at straight time rates.
3. The fee for direct non-salary expenses will be billed at our cost plus a fifteen (15) percent handling fee and shall include the following: a) Transportation or subsistence expenses incurred for necessary travel, such as use of personal or company vehicles at IRS allowed mileage rates; use of public carriers, airplanes, rental cars, trucks, boats or other means of transportation; b) Reproduction and printing costs for reports, drawings and other project records; c) Express deliveries such as FedEx.
4. Subcontractors engaged to perform services required by the project will be billed at our cost plus fifteen (15) percent.
5. Communications and computer expenses will be charged at a flat rate of three and one half (3.5) percent of the total gross labor charges to include normal telephone, e-mail, faxes, long distance telephone, mailing of correspondence, in-house computer use and computer aided design and drafting (CADD).
6. Specialized computer usage, separately defined in the proposal for specific client needs, will be charged as identified in the proposal.
7. Payment: Invoices generally are submitted once a month for services performed during the previous month. Payment will be due and payable upon receipt of invoice. Interest may be added to accounts in arrears at the rate of one and one-half (1.50%) percent per month on the outstanding balance. In the event Brierley Associates Corp must engage counsel to enforce overdue payment, Client will reimburse Brierley Associates Corp for all reasonable attorney's fees and court costs.
8. The billing rates given above are subject to change at the beginning of each year, unless noted otherwise in the signed proposal.

Arias' Scope of Work**Field Exploration**

1. Our scope of work will include drilling and sampling of total twenty-seven (27) borings:
 - Twenty-three (23) borings will be drilled each to maximum depth of 40 feet along the pipeline alignment. These borings will not include rock coring.
 - Two (2) borings will be drilled each 40 feet deep at San Marcos river crossing. These borings will include HQ rock coring as suggested by Project Tunnel Engineer.
 - Two (2) borings will be drilled each 80 feet deep at San Marcos river crossing. These borings will include HQ rock coring as suggested by Project Tunnel Engineer.

The final boring locations and depths will be selected by FNI in consultation with Arias and Project Tunnel Engineer.

2. Once the boring locations become finalized, Arias will locate the borings and contact Texas 811 One Call service in order to mark public utilities in the immediate vicinity of the proposed borings. We have assumed that the client will assist with the coordination and planning to avoid potential private utilities that may be located in the project area. Traffic control is not anticipated during drilling; however, may be required. Site Clearing may be required to access some of the boring locations. We have assumed that right-of-entry (ROE) will be provided to us prior to start field exploration.
3. Arias will retain a subcontract driller with an all-terrain-vehicle (ATV) and/or truck mounted rig (as applicable) to perform drilling and sampling for all the borings except 4 tunnel borings at San Marcos river crossing. A truck mounted drill rig will be used for 4 tunnel borings at this location.
4. Arias personnel will direct the sampling efforts and will visually classify recovered samples. Soil interpreted to be clay in the field will be sampled by either pushing a thin-walled tube (ASTM D 1587) or with a split barrel sampler while performing the Standard Penetration Test (SPT) in accordance with ASTM D 1586. Soil interpreted to be sand or gravel in the field will be sampled with a split barrel sampler while performing the SPT. Our scope does not include rock coring in any borings except 4 tunnel borings located at San Marcos river crossing. If rock is encountered within the proposed boring depth in the 4 tunnel borings located at this crossing, HQ core barrel will be used for rock coring. Recovered soil/rock samples will be visually classified in the field.
5. Soil samples will be sealed in zip lock plastic bags. Rock core samples will be sealed in see-through plastic wrap and placed in sturdy cardboard boxes that are labeled by boring number and depth interval.
6. After completion of the 4 tunnel borings at San Marcos river crossing, double packer tests will be performed in accordance with U.S. Bureau of Reclamation procedures for testing and calculations of hydraulic conductivity at 10-foot intervals in the rock from bottom of the bore hole to top of the rock. Packer testing will not be performed if rock is not encountered in the 4 tunnel borings.
7. If groundwater is encountered, the groundwater levels within the open boreholes will be recorded immediately after drilling. The boreholes will be backfilled with drill cuttings after completion of the drilling. For tunnel borings, if groundwater is encountered prior to the start of rock coring, the groundwater levels within the open boreholes will be recorded. After completion of the packer tests noted above, the tunnel borings will be filled by pumping grout into the boreholes from the bottom up. Please note that only 4 tunnel

borings will be filled with pumping grout from bottom to top of the rock, and then will be backfilled with bentonite pellets. As noted, other borings will be backfilled using drill cuttings after completion of borings.

8. Arias will provide to FNI the GPS coordinates at the as-drilled locations of the borings so that FNI can survey the locations and provide Arias with Texas State Plane Coordinates and elevations on the ground surface.

Laboratory Testing

1. Laboratory testing will be performed on recovered samples selected by the geotechnical engineer to aid in soil classification and to measure engineering properties. Laboratory testing is expected to include moisture content, Atterberg limits, fines content, corrosion testing (total 10) and unconfined compressive strength. The actual laboratory program will depend upon the type of soils encountered.
2. For 4 tunnel borings at San Marcos river crossing, laboratory strength testing of rock will include Recovery and RQD, unconfined compression, one (1) point direct shear, corrosivity testing, unconfined compression with determination of stress-strain curves and elastic moduli, Cerchar abrasiveness index, indirect tensile/Brazilian, slake durability, and punch indentation/penetration. We have assumed one (1) specialized tunnel test per tunnel boring.

Geotechnical Data Report

An electronic copy (pdf format) of our Geotechnical Data Report (GDR) will be prepared by a Licensed Texas Professional Engineer that will include:

- *Descriptions of the field exploration and laboratory programs;*
- *Boring location plan that depicts borehole locations;*
- *Boring logs with soil classifications based on the Unified Soil Classification System (ASTM D 2487) with a chart illustrating the soil and rock classification criteria and the terminology and symbols used on the boring logs;*
- *Description of site geology based on location of the site on the Geologic Atlas of Texas;*
- *Generalized site stratigraphy and engineering properties developed from field and laboratory data at the explored locations;*
- *Depth and elevations where groundwater was encountered during drilling and from piezometer readings, and*
- *Tabulation of in situ hydraulic conductivity calculated from the double packer tests.*

Our report will not include providing/conducting local or global stability analyses for retaining walls, shoring systems, or slopes, interpretation of geotechnical data and subsoil behavior, pipe bedding and backfill recommendations, pavement design and geomorphological study. We can provide these services if desired under a separate service scope for an additional fee.

Supplemental Services:

1. As requested, four (4) additional borings will be drilled each to a depth of 40 feet each, which will not include rock coring. Laboratory testing is expected to include moisture content, Atterberg limits, fines content, and unconfined compressive strength. The actual laboratory program will depend upon the type of soils encountered.
2. As requested, a 2-inch diameter PVC standpipe piezometer (i.e. observation well) will be installed at three (3) borings located near existing creeks to evaluate groundwater levels over time. A stick-up cover will be used for the piezometers. A concrete pad that is 4-foot square will be constructed around the steel cover for piezometers. We will take groundwater readings at 4 separate times in each of the piezometers.

FIELD EXPLORATION, LABORATORY TESTING, AND GEOTECHNICAL DATA REPORT									
ARWA Segment D Pipeline									
Arias Geoprosessionals - Job No.: 2018-467- Date: October 16, 2019									
DIRECT COSTS									
Description	Qty.	Unit	Unit Cost	Total					
Field Exploration									
Drill Rig Mobilization - Rock Coring (Personnel & Equipment)	1000	miles	\$ 6.00	\$ 6,000.00					
Site Clearing	6	ea	\$ 1,200.00	\$ 7,200.00					
Traffic Control	6	day	\$ 2,600.00	\$ 15,600.00					
Traffic Control - Off Duty Police Officers	48	hr	\$ 80.00	\$ 3,840.00					
Soil/Rock Drilling (Hollow Stem Auger to seal off groundwater and rock core through) & Sampling: 2 Borings - 80' and 2 Borings-40' (Assume 30 ft soil & 50 ft rock)	120	ft	\$ 25.00	\$ 3,000.00					
HQ Rock Coring & Sampling: 2 Borings - 80' and 2 Borings-40' (Assume 30 ft soil & 50 ft rock)	120	ft	\$ 70.00	\$ 8,400.00					
Soil (auger/air rotary) & Sampling for Open-Trench Portion: 23 Borings at 40-ft (avg)	920	ft	\$ 18.00	\$ 16,560.00					
Drill Rig Mobilization for Open-Trench Borings	13	ea	\$ 385.00	\$ 5,005.00					
Packer Tests: For Shaft Boring - 6 tests at 10-foot intervals in rock	12	ea	\$ 650.00	\$ 7,800.00					
Water Supply Truck - 1 Boring	4	hole	\$ 600.00	\$ 2,400.00					
Disposal of Cuttings -assumed cutting will disposed at site	0	hole	\$ 600.00	\$ -					
Cardboard Core Boxes	20	ea	\$ 35.00	\$ 700.00					
Grouting Materials and Technician Support	120	ft	\$ 18.00	\$ 2,160.00					
Grouting - Drill Rig & Crew	4	hr	\$ 175.00	\$ 700.00					
Per diem for 3-man Crew (State Rate)	10	day	\$ 447.00	\$ 4,470.00					
Standby Time for Drill Rig for weather delays	16	hr	\$ 200.00	\$ 3,200.00					
SUBTOTAL FIELD:				\$ 87,035.00					
Laboratory Tests									
Moisture Content	289	ea	\$ 15.00	\$ 4,335.00					
Atterberg limits test	135	ea	\$ 75.00	\$ 10,125.00					
Minus #200 sieve test	135	ea	\$ 55.00	\$ 7,425.00					
Sieve Analysis - Part I (TEX-110-E)	12	ea	\$ 76.00	\$ 912.00					
Sieve Analysis - Part II (TEX-110-E)	12	ea	\$ 101.00	\$ 1,212.00					
Unconfined Compression test - soil	66	ea	\$ 55.00	\$ 3,630.00					
Unconfined Compression test - rock	12	ea	\$ 70.00	\$ 840.00					
Swell - 1 test/boring	4	ea	\$ 125.00	\$ 500.00					
Direct Shear (interface shear, 1 point - HQ Rock Core) -1 test/boring	4	ea	\$ 520.00	\$ 2,080.00					
Direct Shear (shear through rock, 1 point - HQ Rock Core)	4	ea	\$ 1,050.00	\$ 4,200.00					
Corrosivity Testing: pH, resistivity, sulfates, sulfides, chlorides, redox, and bicarbonate - 10 tests	10	ea	\$ 560.00	\$ 5,600.00					
Unconfined Compression test with stress-strain and elastic moduli - rock -1 test/boring	4	ea	\$ 500.00	\$ 2,000.00					
CERCHAR abrasivity -1 test/boring	4	ea	\$ 185.00	\$ 740.00					
Indirect Tensile / Brazilian- 1 test/boring	4	ea	\$ 135.00	\$ 540.00					
Slake Durability- 1 test/boring	4	ea	\$ 115.00	\$ 460.00					
Punch Indentation/Penetration- 1 test/boring	4	ea	\$ 250.00	\$ 1,000.00					
RQD	24	ea	\$ 40.00	\$ 960.00					
SUBTOTAL LAB:				\$ 46,559.00					
Engineering Report									
Copies (max. 3 copies of report)		ls	1,000.00	\$ -					
SUBTOTAL REPORT:				\$ -					
TOTAL DIRECT COSTS				\$ 133,594.00					
LABOR COSTS									
Description	Principal	Project Manager	Sr. Project Engineer	Project Engineer	Engineer in Training	Professional Geologist	Engineering Technician	Clerical	Total by Task
	\$ 195.00	\$ 175.00	\$ 155.00	\$ 140.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 50.00	
Project Initiation				2	2			2.0	\$ 570.00
Field Coordination				8.0	12.0				\$ 2,260.00
Project Workshops and Taskforce meetings (preparation and attend)			4.0	8.0					\$ 1,740.00
Field Reconnaissance - Locate Borings & Utility Clearance					8.0		12.0		\$ 1,660.00
Water Level Readings in Piezometers (5 readings)							40.0		\$ 3,000.00
Soil/Rock Sampling and Logging					80.0		128.0		\$ 17,200.00
Classify Soil & Rock Samples and Assign Laboratory Testing			8.0	24.0	36.0				\$ 8,020.00
Preparation of Geotechnical Data Report		8.0	16.0	24.0	48.0				\$ 11,800.00
Subtotal Hours	0.0	8.0	28.0	66.0	186.0	0.0	180.0	2.0	\$ -
Subtotal	\$ -	\$ 1,400.00	\$ 4,340.00	\$ 9,240.00	\$ 17,670.00	\$ -	\$ 13,500.00	\$ 100.00	\$ 46,250.00
TOTAL LABOR COSTS									\$ 46,250.00
PROJECT TOTAL									\$ 179,844.00
Summary of Fees									
Direct Costs		\$ 133,594.00							
Labor Costs		\$ 46,250.00							
Total Fee		\$ 179,844.00							

FIELD EXPLORATION, LABORATORY TESTING, AND GEOTECHNICAL DATA REPORT
ARWA Segment D Pipeline - Supplemental Services
Arias Geoprosessionals - Job No.: 2018-467- Date: October 16, 2019

DIRECT COSTS					
Description	Qty.	Unit	Unit Cost		Total
Field Exploration					
Site Clearing	2	ea	\$ 1,200.00		\$ 2,400.00
Traffic Control	2	day	\$ 2,600.00		\$ 5,200.00
Traffic Control - Off Duty Police Officers	32	hr	\$ 80.00		\$ 2,560.00
Soil (auger/air rotary) & Sampling for Open-Trench Portion: 4 Borings at 40-ft (avg)	160	ft	\$ 18.00		\$ 2,880.00
Drill Rig Mobilization for Open-Trench Borings	3	ea	\$ 385.00		\$ 1,155.00
Drill Rig Mobilization for Piezometer Installation	2	ea	\$ 385.00		\$ 770.00
Installation of Piezometers: 3 borings to 40 feet	120	ft	\$ 35.00		\$ 4,200.00
Development of Piezometers - 3 borings to 40 feet	3	ea	\$ 300.00		\$ 900.00
Piezometer Installation Report for TCEQ	3	ea	\$ 100.00		\$ 300.00
Standby Time for Drill Rig for weather delays	4	hr	\$ 200.00		\$ 800.00
SUBTOTAL FIELD:					\$ 21,165.00
Laboratory Tests					
Moisture Content	88	ea	\$ 15.00		\$ 1,320.00
Atterberg limits test	40	ea	\$ 75.00		\$ 3,000.00
Minus #200 sieve test	40	ea	\$ 55.00		\$ 2,200.00
Unconfined Compression test - soil	24	ea	\$ 55.00		\$ 1,320.00
SUBTOTAL LAB:					\$ 7,840.00
Engineering Report					
Copies (max. 3 copies of report)		ls	1,000.00		\$ -
SUBTOTAL REPORT:					\$ -
TOTAL DIRECT COSTS					\$ 29,005.00

LABOR COSTS									
	Principal	Project Manager	Sr. Project Engineer	Project Engineer	Engineer in Training	Professional Geologist	Engineering Technician	Clerical	Total by Task
	\$ 195.00	\$ 175.00	\$ 155.00	\$ 140.00	\$ 95.00	\$ 90.00	\$ 75.00	\$ 50.00	
Description									
Project Initiation				2	2				\$ 470.00
Field Coordination				2.0	6.0				\$ 850.00
Project Workshops and Taskforce meetings (preparation and attend)									\$ -
Field Reconnaissance - Locate Borings & Utility Clearance					6.0		12.0		\$ 1,470.00
Water Level Readings in Piezometers (5 readings)							40.0		\$ 3,000.00
Soil/Rock Sampling and Logging							56.0		\$ 4,200.00
Classify Soil & Rock Samples and Assign Laboratory Testing			2.0	2.0	6.0				\$ 1,160.00
Preparation of Geotechnical Data Report		8.0	8.0	8.0	12.0				\$ 4,900.00
Subtotal Hours	0.0	8.0	10.0	14.0	32.0	0.0	108.0	0.0	\$ -
Subtotal	\$ -	\$ 1,400.00	\$ 1,550.00	\$ 1,960.00	\$ 3,040.00	\$ -	\$ 8,100.00	\$ -	\$ 16,050.00
TOTAL LABOR COSTS									\$ 16,050.00

PROJECT TOTAL **\$ 45,055.00**

Summary of Fees	
Direct Costs	\$ 29,005.00
Labor Costs	\$ 16,050.00
Total Fee	\$ 45,055.00

1. Survey
 - 1.1. Horizontal and Vertical Aerial LiDAR survey based on NAD 83 coordinates (State Plane Texas South Central/Feet) will be used to develop 2D planimetric and 3D DTM data to produce a 1-foot contour delineation. Aerial LiDAR will be performed 400 feet wide for Segment D and 200 Feet wide for Segment D-DP1, centered on proposed easements and access routes.
 - 1.1.1. Survey will identify property lines, contours, benchmarks, bores, apparent locations of existing utilities marked on the surface, and appurtenances such as trees, fences, drainage structures, existing easements, etc....
 - 1.1.2. Assist in GLO Permit for the River Crossing.
 - a) GLO Research.
Acquire Original Survey Field Notes /roll sketches from the GLO Archives on both sides of the river
Prepare a "working sketch" of the research
Acquire Right of Entry for Corners outside of easement.
 - b) Locate & tie existing survey corner(s)
 - c) Prepare Field Notes & Parcel plat for river crossing
 - d) Set reference points for river crossing.
 - 1.2. Provide aerial imagery for the project corridor.
 - 1.3. Perform a tree inventory in accordance with local entities.
 - 1.3.1.1. 12-inch diameter and greater or the minimum diameter required by the permitting entity
 - 1.3.1.2. Engage a certified Arborist or Forester to confirm species (one time confirmation).
 - 1.4. Verify control points provided by ARWA Owner's Representative
 - 1.5. Provide Quality Service Level A SUE services to identify the location and depth of existing utilities. Provide up to eight (8) Level A locates with accurate horizontal and vertical positions of subsurface utilities.
 - 1.6. Provide Quality Service Level C and D SUE services to identify the horizontal location of existing utilities. Level C and Level D will be performed by Bain Medina Bain, Inc. during surveying operations. Freese will assist BMB with copies of utility maps and plans gathered to date. Surveyor will call Digtess, 811 or equivalent to have utilities marked in the field. Other agencies not part of 811 will be notified one time prior to survey.
 - 1.7. Provide Quality Service Level B SUE services to identify the horizontal location of existing utilities. Level B SUE service will be based on per linear foot not to exceed 2500-linear feet. see attached proposal for additional details.
 - 1.8. Coordinate with FNI on available GIS data collected
 - 1.8.1. Coordinate with entities for additional data needs
 - 1.9. Meetings
 - 1.9.1. Conduct coordination meetings with impacted utilities
2. Supplemental Services
 - 2.1. Prepare Exhibits for the GLO Permit for the river crossing
 - 2.1.1. GLO research
 - 2.1.1.1. Acquire Original Survey Field Notes/ Roll Sketches etc from the GLO Archives on Both sides of the River
 - 2.1.1.2. Prepare a ""Working Sketch"" of the research.
 - 2.1.1.3. Acquire Right of Entry for corners outside of Easement."

- 2.1.2. Locate & tie existing Survey corner(s)
- 2.1.3. prepare Field Notes & Parcel Plat for River Crossing
- 2.1.4. Set reference points for River Crossing
- 2.2. Prepare and stake additional parcels & metes and bounds descriptions. This item includes time to compute, submit and revise as per comments.
- 2.3. SUE (5 Pot Holes) @ \$1400
- 2.4. Verify and Reset Horizontal and Vertical Control points

Item No.	FEE ESTIMATE FOR Freese and Nichols ARWA Segment D Survey Services		RPLS	Survey Tech. IV	CADD Tech II	3-Man Survey Crew	Administrative Assistant	Total Task Hours	Cost
			\$150.00	\$115.00	\$105.00	\$205.00	\$85.00		
HOURS									TOTAL
Design Survey Tasks									
	Project management		40				40	40.0	\$9,400.00
	Mobilization		8	6	6			20.0	\$2,520.00
	Locate and verify ARWA project survey control		8.0	40.0	20.0	60.0		128.0	\$20,200.00
	Set secondary control for this project (Estimate 50 points)		4.0	20.0		40.0		64.0	\$11,100.00
	Horizontal control and level loops		16.0	80.0	60.0	144.0		300.0	\$47,420.00
	Aerial LIDAR Control		16.0	60.0	60.0	80.0		216.0	\$32,000.00
	Obtain ROW maps		8.0		24.0			32.0	\$3,720.00
	Provide SUE Levels C and D		8.0	20.0	20.0			48.0	\$5,600.00
	Locate Easement corners (Set by others) locating improvements in easement		12.0	40.0		80.0		132.0	\$22,800.00
	Provide profile data for 4 stream crossings		5.0	21.0	16.0	24.0		66.0	\$9,765.00
	Provide profile data for 1 river crossing		4.0	8.0	8.0	10.0	1.0	31.0	\$4,495.00
	Prepare Drawings showing the topography of the alignment. The Data will be based on Aerial LIDAR and supplemented with <i>on the ground survey</i> for obscure and critical areas. The topography will be gathered to a width of 400ft. (200ft. Along ROW), centered on the easement. The drawing will be prepared in ACAD format. It will show topography, existing utilities, fences, inventory trees (12" dia. and up) above ground features and improvements within the corridor.		24.0	40.0	40.0	80.0	16.0	200.0	\$30,160.00
	Prepare survey control data sheets for inclusion into a construction plan set.		16.0	30.0	60.0			106.0	\$12,150.00
	Attend 2 meetings		16.0					16.0	\$2,400.00
	Quality Control		16.0	12.0				28.0	\$3,780.00
	Quality assurance		16.0	12.0				28.0	\$3,780.00
	Sub Total Hours		217.0	389.0	314.0	518.0	57.0	1455.0	
	Sub Total Cost		\$32,550.00	\$44,735.00	\$32,970.00	\$106,190.00	\$4,845.00		\$221,290.00
Professional Services Expenses									
	SUE work The Rios Group								\$30,870.00
	Dallas Aerial Survey (DAS)								\$45,625.00
	J& L Consulting Certified Arborist								\$7,500.00
	Sub Total Cost								\$83,995.00
Supplemental Services \$4,500 Per Parcel Including Tax									
	Prepare Exhibits for the GLO Permit for the river crossing								
	a) GLO research Acquire Original Survey Field Notes/ Roll Sketches etc from the GLO Archives on Both sides of the River Prepare a "Working Sketch" of the research. Acquire Right of Entry for corners outside of Easement.		16.0	16.0	8.0		6.0	46.0	\$5,590.00
	b) Locate & tie existing Survey corner(s)		10.0	6.0		20.0	6.0	42.0	\$6,800.00
	c) prepare Field Notes & Parcel Plat for River Crossing		12.0	8.0	16.0			36.0	\$4,400.00
	d) Set reference points for River Crossing		4.0	6.0		10.0		20.0	\$3,340.00
	Prepare and stake additional parcels & metes and bounds descriptions. This item includes time to compute, submit and revise as per comments.							0.0	\$0.00
	SUE (5 Pot Holes) @ \$1400							0.0	\$7,000.00
	Verify and Reset Horizontal and Vertical Control points		3.0	16.0		32.0		51.0	\$8,850.00
	Sub Total Hours		45.0	52.0	24.0	62.0	12.0	144.0	
	Sub Total Cost		\$6,750.00	\$5,980.00	\$2,520.00	\$12,710.00	\$1,020.00		\$35,980.00
	Total		\$39,300.00	\$50,715.00	\$35,490.00	\$118,900.00	\$5,865.00	\$144.00	\$341,265.00
	Assumptions: Right of Entry has been acquired along the project length for access and control panels that may fall outside the acquired easements for the 400 ft. corridor mapping effort. Copies of all the easements and descriptions will be provided in digital format. Metadata on the project control will be provided								

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.
 520 E. RR 150, Kyle, TX 78640

F.5 Update, discussion and possible recommendation to the Board regarding Cost Saving Measures for the Authority’s Phase 1B Program. ~ *Graham Moore, P.E., Executive Director*

Background/Information

A Board Workshop meeting was held on October 16th to discuss the eight cost saving measures that were identified for the Phase 1B Program. The eight measures under consideration are provided in Table 1 below. The Board requested the following items be reviewed further:

1. Evaluate Return-on-Investment of a Solar Array at the WTP Property
2. Discuss more fully the implications of deferring the construction of the inline elevated storage tanks
3. Provide information on peaking factors experienced by the customer’s water systems

Items 2 and 3 have been added to the presentation discussing the cost saving measures. The possible area for a solar array has been added, but the analysis for a solar array has not yet been concluded. In addition, Staff has split the peaking factor cost saving measure into two parts – 2A: Pipelines Only and 2B: Facilities. Attached is the updated presentation with these additions.

Projected Advisory Committee (PAC) Recommendations

The PAC met on Friday, November 1st and discussed the various cost saving measures. The PAC’s recommendations are noted in Table 1 below.

Table 1 – Cost Saving Measures		
Item	Description	PAC Recommendation
1	Sell Excess WTP Property	Neutral - Ensure enough property for future needs.
2A	Peaking Factor – Pipelines Only	Need to consider further.
2B	Peaking Factory – Facilities Only	For.
3	Phase 2 Capacity Deferral	Against.
4	Administrative / Operations Facility Deferral	Neutral.
5	Inline Elevated Storage Tank Deferral	Against.
6	Repackaging of Construction Contracts	For – consider expanding repackaging.
7	Isolation Valve Spacing Revision	For.
8	Stream Crossing Variance	For.

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee


COMMITTEE MEMBER PACKETS
Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

Attachment(s)


- Program Cost Summary Presentation – November 12, 2019
- Updated, Detailed Cut Sheet for Each Cost Saving Measure

Technical Committee Decision Needed:

- No Board action will be sought at the meeting. Future action will be requested at the December Technical Committee meeting.



**CRYSTAL CLEAR
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ALLIANCE WATER


ARWA Phase 1B
Program Cost Summary
November 12, 2019

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1

Agenda

- Overall Program Update
- Review Design / Bidding Schedule
- Overall Program Cost verses Available Funding
- Cost Saving Options
- Next Steps

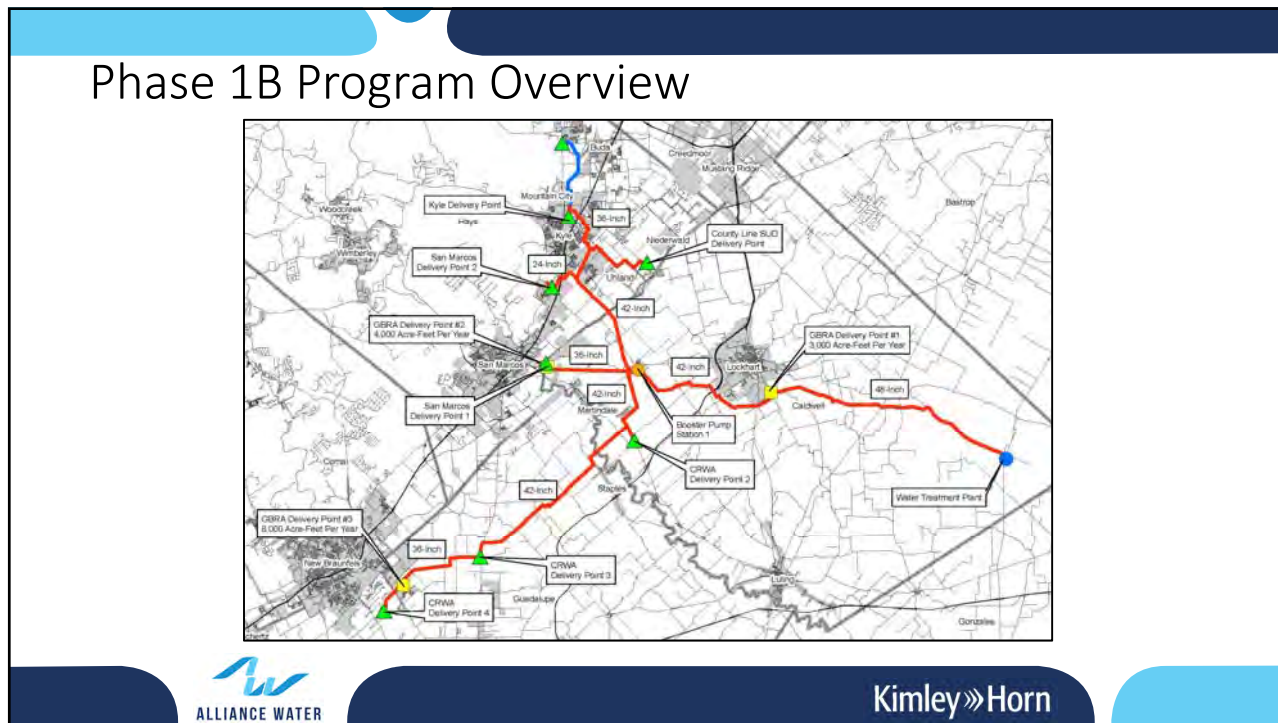


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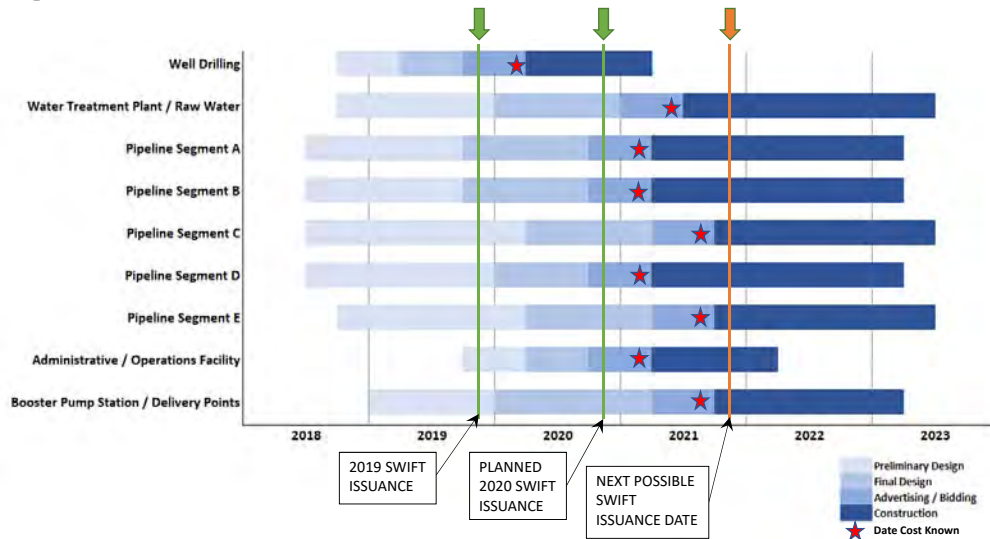


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Program Schedule



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Current Funding Summary

Sponsor	2017 Issuance	2019 Issuance	2020 Issuance	Total
CRWA	\$9,865,000	\$26,530,000	\$29,520,000	\$65,915,000
Kyle	\$8,995,000	\$24,200,000	\$26,925,000	\$60,120,000
San Marcos	\$11,450,000	\$30,800,000	\$34,270,000	\$76,520,000
Buda	\$1,625,000	\$4,370,000	\$4,860,000	\$10,855,000
Total	\$31,935,000	\$85,900,000	\$95,575,000	\$213,410,000

Note: Interest savings have created approximately \$18 million in additional financing capacity for equivalent debt service payments, not including the 2020 issuance.



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PER Costs vs. Available Funding

	Total PER Projected Cost	GBRA Projected Cost of Shared Program	ARWA Projected Cost for Phase 1B
No Contingency	\$345,900,000	\$97,000,000	\$248,900,000
With 30% Contingency	\$437,000,000	\$122,100,000	\$314,800,000
Current Funding			\$213,400,000
"Funding – Projected Cost" (w/o contingency)			(\$35,490,000)
"Funding – Project Costed" (w/ 30% contingency)			(\$101,390,000)

The "Gap"




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Addressing the Gap

Option 1: Additional Funding

Option 2: Cost Reductions

Option 3: Combination of Option 1 & 2



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Additional Funding Options

Option	Pros	Cons
Private Funding	<ul style="list-style-type: none"> • Flexible timing (close anytime) • Funds available immediately at closing 	<ul style="list-style-type: none"> • Higher interest costs • Never used by ARWA
SWIFT Funding	<ul style="list-style-type: none"> • Lowest interest costs • Known process by ARWA 	<ul style="list-style-type: none"> • Limited timing (once/yr) • Funds “released” based on info provided to TWDB • Requires action by February 2020 to add capacity



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Cost Saving Options

- 5 - Require Direction
- 3 - Savings Realized though Design Standards Updates
(No Specific Action Needed)



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Cost Saving Options Summary

Reflects ARWA's share of potential cost savings:

Item	Original Standards	Potential Capital Cost Savings	Potential Capital Cost Savings (30% Construction Contingency)
1	Selling Excess WTP Property	\$2,000,000	\$2,000,000 (No Contingency Added)
2	Peaking Factor Analysis	Up To \$23,000,000	Up To \$30,000,000
3	Phase 2 Capacity Deferral	\$21,000,000	\$27,000,000
4	Administrative / Operations Deferrals	\$3,200,000 - \$4,400,000	\$4,100,000 - \$5,700,000
5	Inline Elevated Storage Tanks Deferral	\$6,600,000	\$8,600,000
6	Repackaging of Contract Analysis	\$1,700,000 - \$7,900,000	\$2,200,000 - \$10,300,000
7	Isolation Valve Spacing Revision	\$2,600,000	\$3,400,000
8	Stream Crossing Variance	\$1,100,000	\$1,400,000

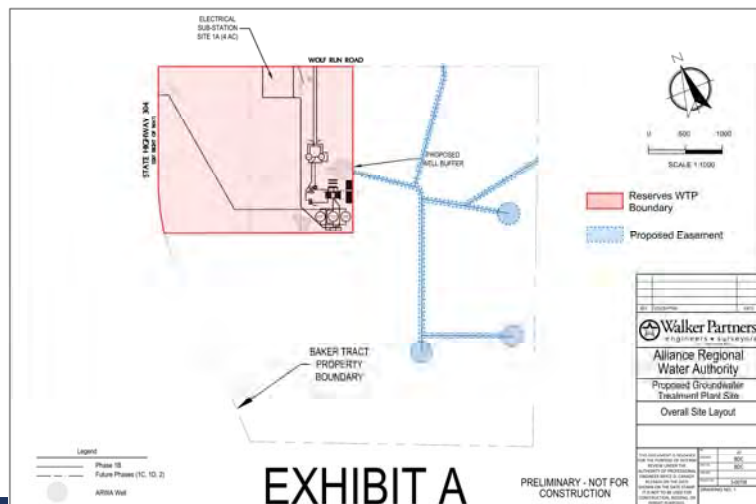


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Item 1 – Selling Excess WTP Property

- Total WTP Property acreage = 560 acres
- Approximately 400 acres of excess property anticipated and available to sell.
- Potential Sales Cost = **\$2,000,000**

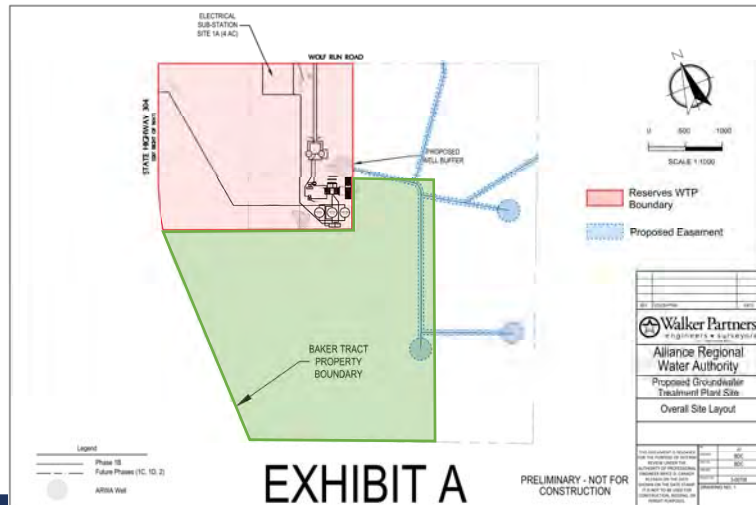


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Item 1 – Selling Excess WTP Property

- Green area is available for solar farm
- Action items:
 - Coordination with GVEC on interconnect
 - Consumption Analysis
 - Production Analysis
 - Site Plan
 - Financial Model



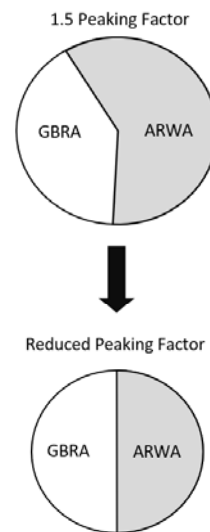
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Item 2 - Peaking Factor Analysis

- Peaking Factor Reduction from 1.5 to 1.0 in tenth increments
- By reducing the peaking factor, the peak flow is reduced which decreases the required pipe diameter and facility sizing

Peaking Factor	Potential Cost Savings			
	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ 1,000,000	\$ 2,000,000	\$ (300,000)	\$ (400,000)
1.3	\$ 8,000,000	\$ 11,000,000	\$ (500,000)	\$ (700,000)
1.2	\$ 10,000,000	\$ 13,000,000	\$ (800,000)	\$ (1,000,000)
1.1	\$ 17,000,000	\$ 22,000,000	\$ (2,300,000)	\$ (3,000,000)
1.0	\$ 23,000,000	\$ 30,000,000	\$ (3,600,000)	\$ (4,700,000)

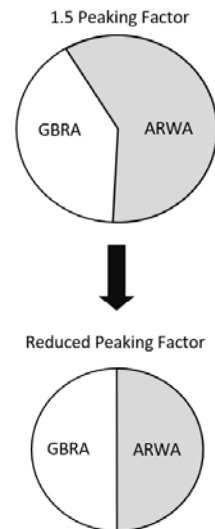


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Item 2a - Peaking Factor Analysis – Pipelines

- Peaking Factor Reduction from 1.5 to 1.0 in tenth increments
- By reducing the peaking factor, the peak flow is reduced which decreases the required pipe diameter sizing



Peaking Factor	Potential Cost Savings			
	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ -	\$ -	\$ -	\$ -
1.3	\$ 5,000,000	\$ 7,000,000	\$ 100,000	\$ 200,000
1.2	\$ 6,000,000	\$ 8,000,000	\$ 100,000	\$ 200,000
1.1	\$ 12,000,000	\$ 15,000,000	\$ (1,100,000)	\$ (1,300,000)
1.0	\$ 16,000,000	\$ 20,000,000	\$ (2,100,000)	\$ (2,700,000)



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Item 2b - Peaking Factor Analysis – Facilities

- Peaking Factor Reduction from 1.5 to 1.0 in tenth increments
- By reducing the peaking factor, the peak flow is reduced which decreases the required facility sizing

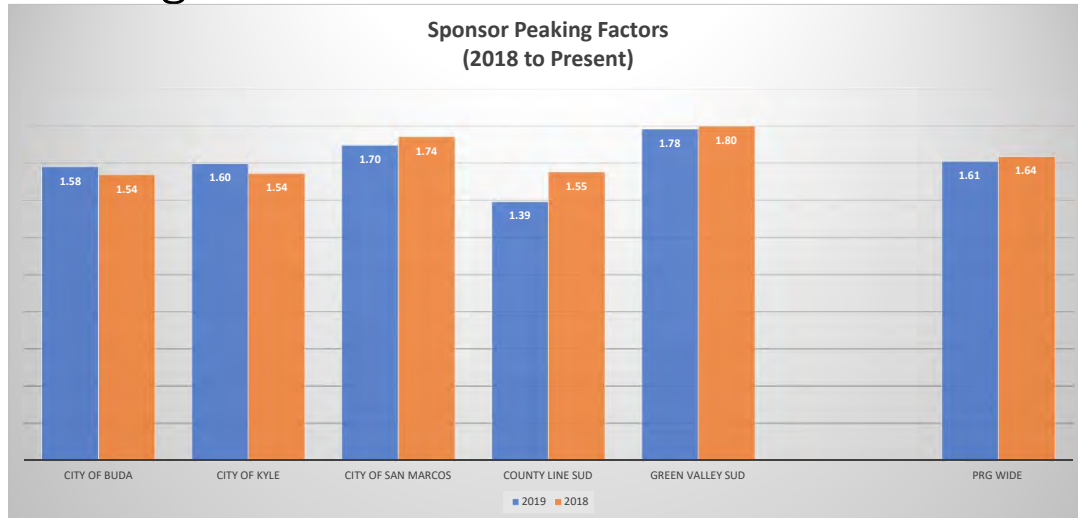
Peaking Factor	Potential Cost Savings			
	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ 1,000,000	\$ 2,000,000	\$ (300,000)	\$ (400,000)
1.3	\$ 3,000,000	\$ 4,000,000	\$ (600,000)	\$ (800,000)
1.2	\$ 4,000,000	\$ 5,000,000	\$ (900,000)	\$ (1,200,000)
1.1	\$ 6,000,000	\$ 7,000,000	\$ (1,200,000)	\$ (1,600,000)
1.0	\$ 7,000,000	\$ 9,000,000	\$ (1,500,000)	\$ (2,000,000)



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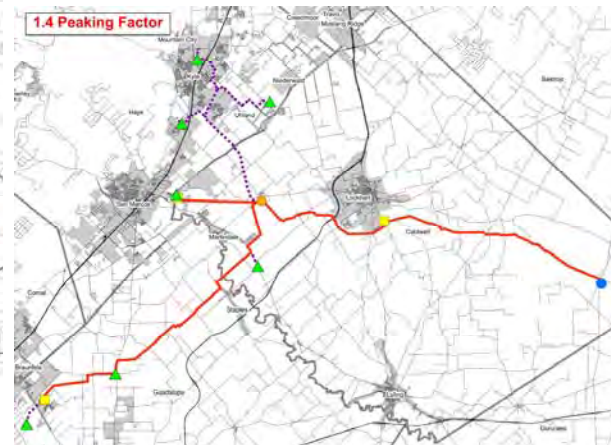
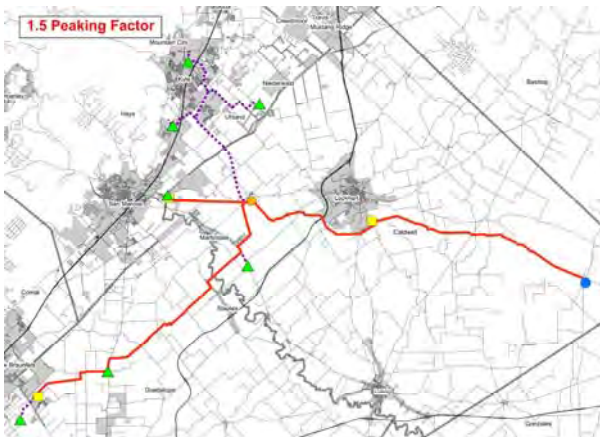
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Peaking Factor Data



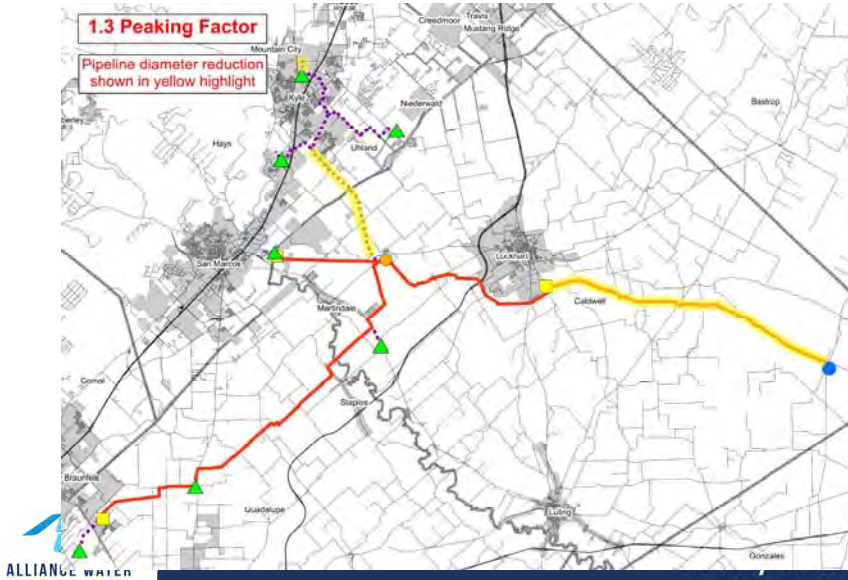
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Item 2 - Peaking Factor Analysis



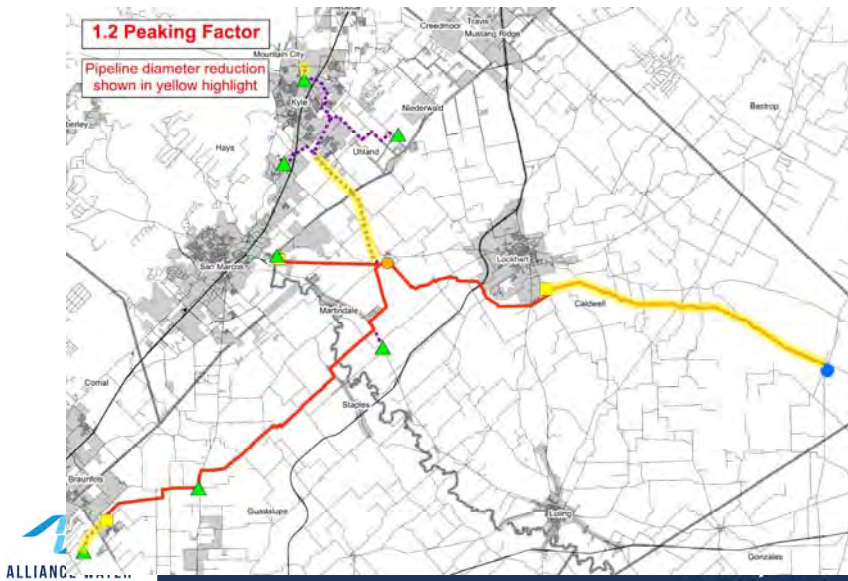
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Item 2 - Peaking Factor Analysis



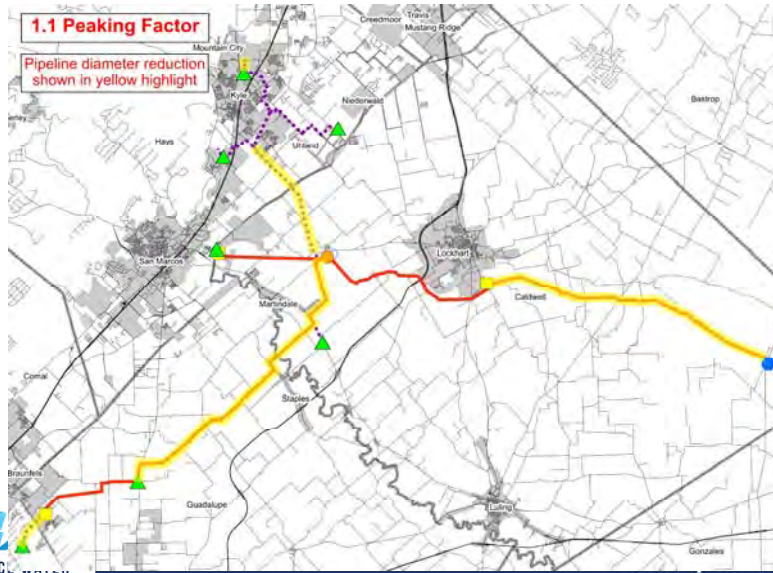
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Item 2 - Peaking Factor Analysis



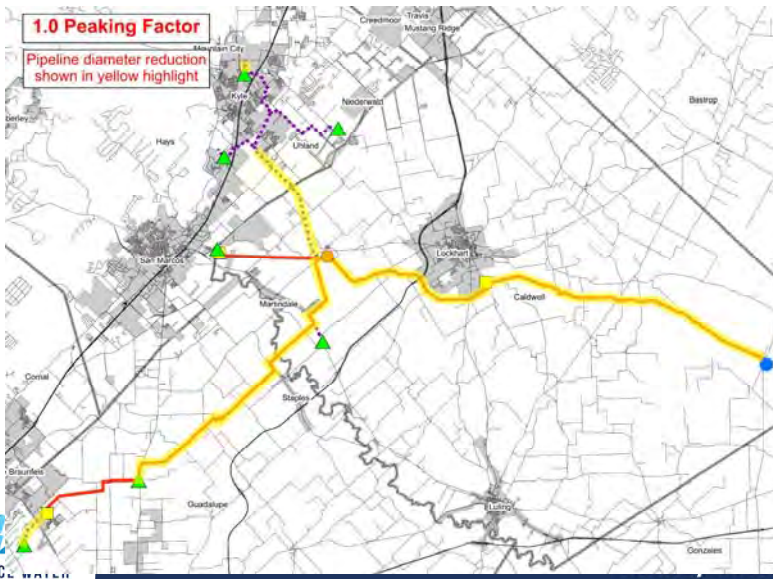
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Item 2 - Peaking Factor Analysis



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Item 2 - Peaking Factor Analysis



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Item 3 - Phase 2 Capacity Deferral

- Existing pipelines from the Booster Pump Station (BPS) are sized to handle Phase 2 capacity
- Potential capital cost savings associated with deferring the Phase 2 capacity until it is needed
- Phase 2 capacity would require an additional parallel pipeline project

Segment	Current	Phase 2 Deferral	
	Phase 1+2 Capacity	Phase 1 Capacity	Phase 2 Capacity
Segment B2	36"	30"	24"
Segment C	16", 24", 30", 36", 42"	12", 30"	12", 16", 20", 30"
Segment D	42"	30"	36"
Segment E1	36"	30"	30"
Segment E2	36"	24"	24"



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Item 3 - Phase 2 Capacity Deferral

Phase 1B ARWA Cost Savings

Option	Excluding Contingency			Including 30% Contingency		
	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings
Total	\$102,000,000	\$81,000,000	\$21,000,000	\$133,000,000	\$106,000,000	\$27,000,000

Future Phase 2 Pipeline Cost (Cost in 2040 \$)

Option	Excluding Contingency	Including 30% Contingency
Total	\$183,800,000	\$230,500,000

Current Phase 1+2 Capacity



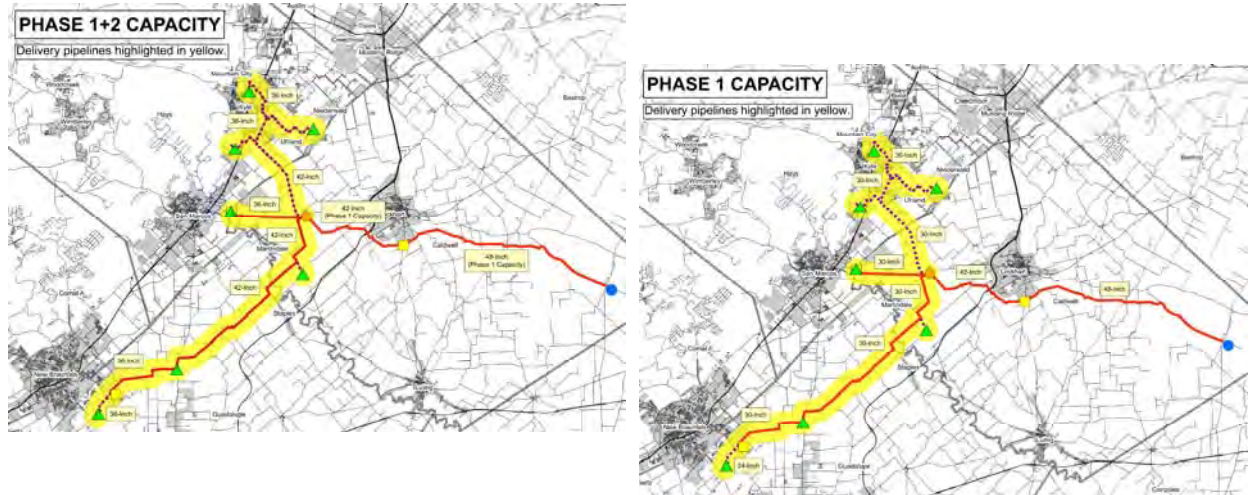
Phase 1 Capacity (with Phase 2 Deferral)



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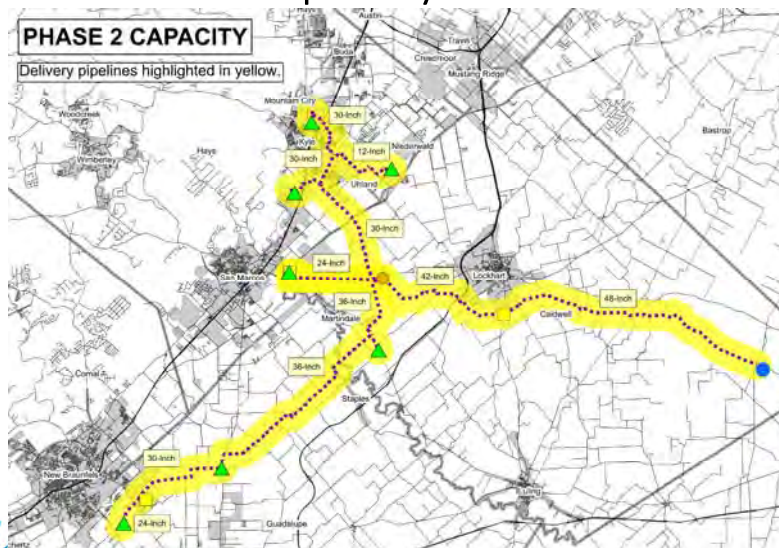
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Item 3 - Phase 2 Capacity Deferral



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Item 3 - Phase 2 Capacity Deferral



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Item 4 - Administrative / Operations Deferrals

Two options to consider

- Defer the entire facility (Administrative and Operations Building), or
- Defer only the Administrative portion of the facility

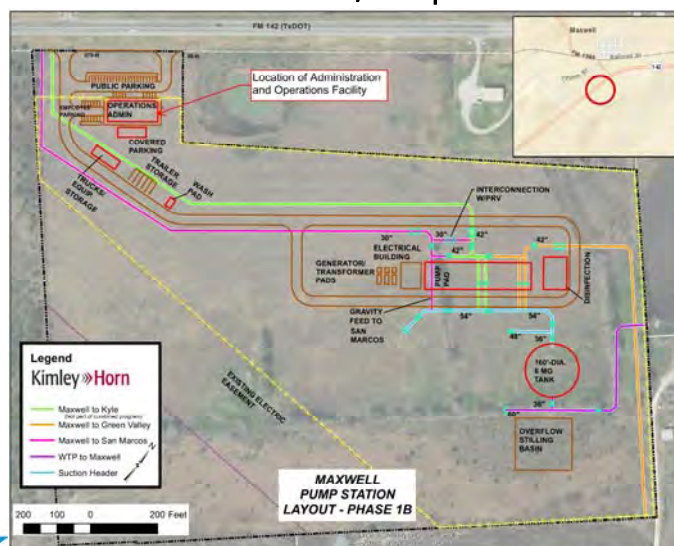
Option	Description	Potential Capital Cost Savings	30% Contingency	Temporary Housing Cost
1	Defer the entire facility	\$4,400,000	\$5,700,000	\$800/month
2	Defer only the Administrative portion of the facility	\$3,200,000	\$4,100,000	\$800/month



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Item 4 - Administrative / Operations Deferrals



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Item 5 - Inline Elevated Storage Tanks Deferral

Benefit of Inline ESTs:

- Consistent Hydraulics
- Reduced Operational Concerns

Potential Deferral of ESTs:

- Additional Operational Considerations (Controls / SCADA)
- Increased Complexity of Start-up Process
- Additional Complexity in selection of booster pumps
- Greater Risk of Surge Events
 - Including fatigue/damage to pipes, valves, and various other infrastructure related items



Projected Construction Cost - **\$6,600,000**

(30% Cont. \$8,600,000)

Project Construction Cost includes additional costs for additional controls and surge mitigations



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Item 6 – Repackaging of Contract Analysis

Two Potential Options:

- **Option 1** is to combine all facility work into one package. This includes the Water Treatment Plant, Booster Pump Station, and Raw Water Infrastructure.
- **Option 2** is to combine all east to west projects. This includes the Water Treatment Plant, Booster Pump Station, Segment A Pipeline, Segment B Pipeline, and the Raw Water Infrastructure.

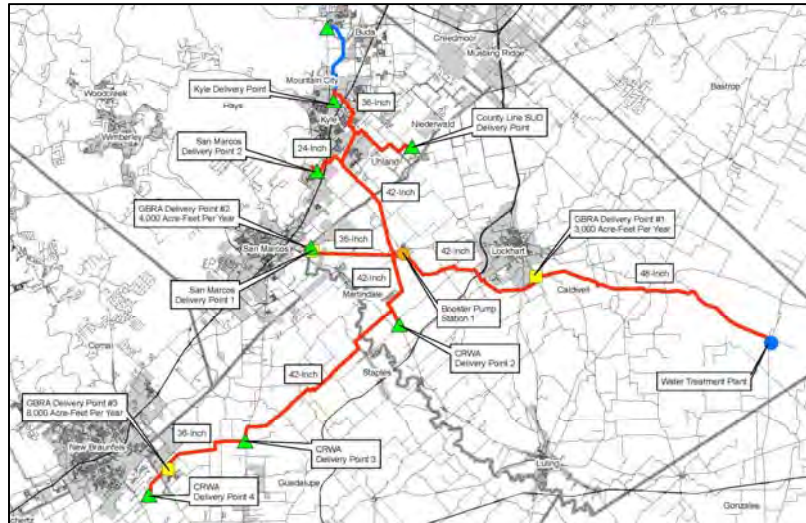
Package Options	Projected Construction Cost	ARWA Share	ARWA Potential Savings	GBRA Share	GBRA Potential Savings
1	Total package \$55,800,000	\$33,300,000	\$1,700,000	\$24,400,000	\$1,100,000
	w/ 30% Contingency \$72,500,000	\$43,300,000	\$2,200,000	\$29,200,000	\$1,500,000
2	Total package \$128,500,000	\$79,200,000	\$7,900,000	\$49,300,000	\$4,900,000
	w/ 30% Contingency \$167,100,000	\$103,000,000	\$10,300,000	\$64,100,000	\$6,400,000



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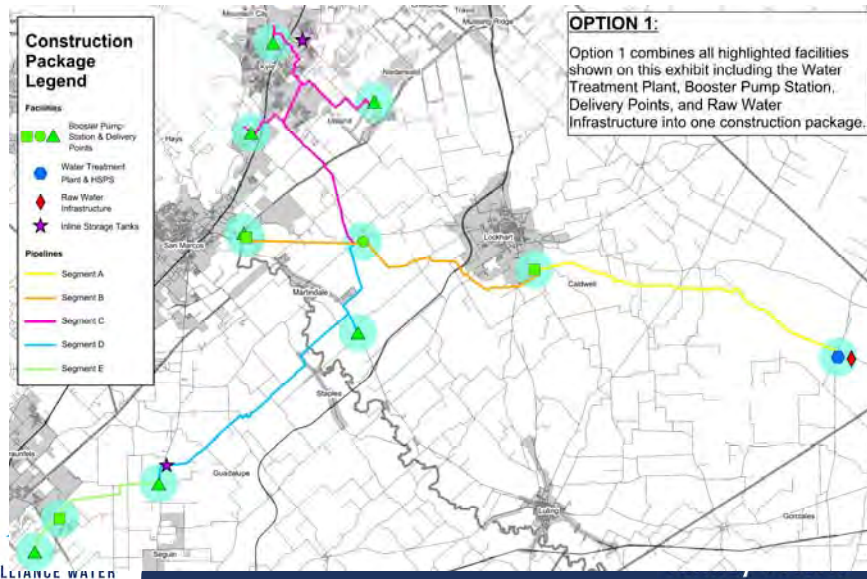
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Phase 1B Program Overview



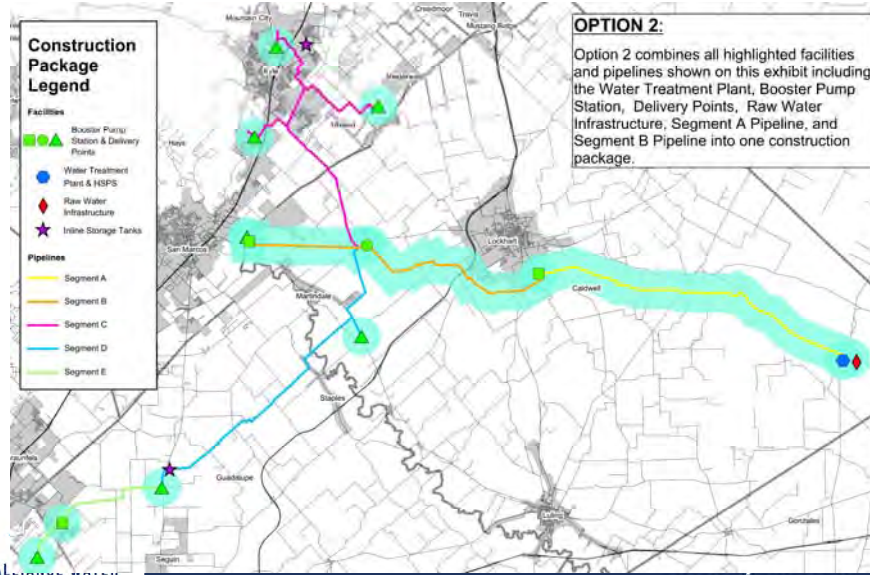
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Item 6 – Repackaging of Contract Analysis



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Item 6 – Repackaging of Contract Analysis



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Item 7 – Isolation Valve Spacing Revision

Original Standards	Revised Standards
Max spacing 5,000 LF	Not to exceed 13,000 LF
Both sides of Highways, rivers, Lakes, Railroads	Balance the distance of the spacing with the accessibility of the valve and the risk associated with significant crossings.

Segment	Potential Cost Savings	ARWA Savings	GBRA Savings
Segment A	\$1,000,000	\$600,000	\$400,000
Segment B	\$1,000,000	\$670,000	\$330,000
Segment C	\$400,000	\$400,000	\$0
Segment D	\$1,000,000	\$750,000	\$250,000
Segment E	\$300,000	\$200,000	\$100,000
Total	\$3,700,000	\$2,600,000	\$1,100,000
Total w/30% Contingency	\$4,800,000	\$3,400,000	\$1,400,000

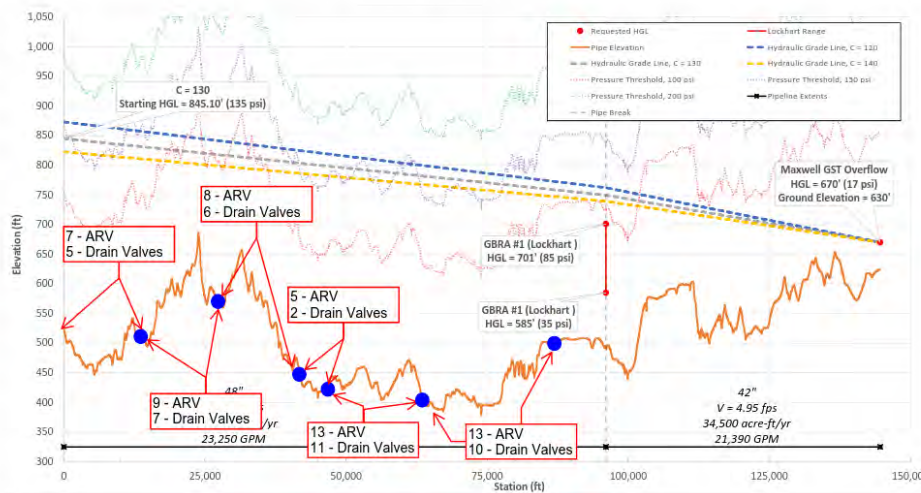
*Based on projected reduction in number of valves for revised spacing requirements



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Item 7 – Isolation Valve Spacing Revision

POSSIBLE SEGMENT A ISOLATION VALVE SPACING



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Item 8 – Stream Crossing Variance

- Stream Crossings Exception – TCEQ 290.44 (f) (2) Variance Request
 - TCEQ – Precautions must be taken when waterlines are laid under any flowing or intermittent stream or semi-permanent body of water. Includes encasement and valves on each side of the crossing. With permission of executive director, watertight pipe encasement may be omitted.
- Variance Request
 - For crossings that are typically dry or show no sign of regular flows, eliminate requirement for trenchless crossing and/or encasement (should scour calculations allow).

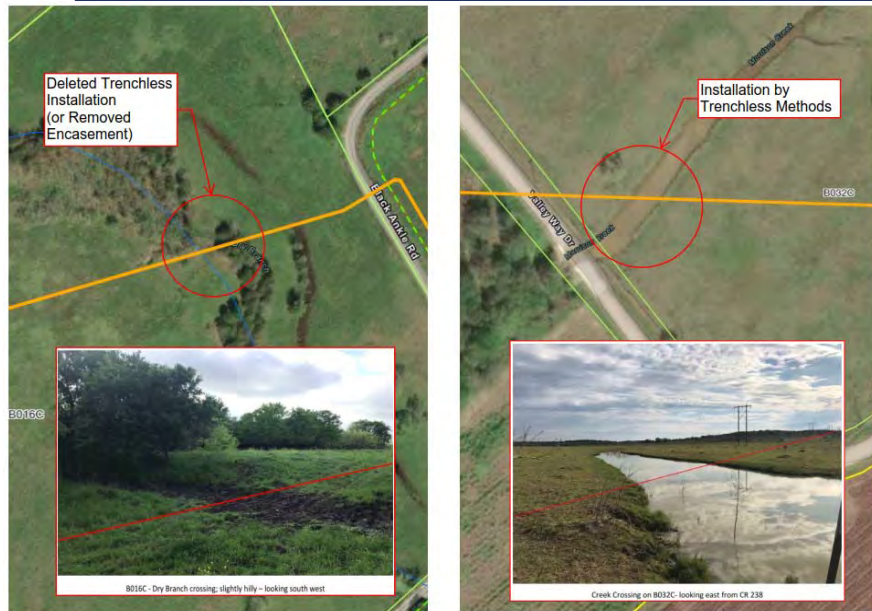
Segment	Potential Cost Savings	ARWA Savings	GBRA Savings
Segment A	\$500,000	\$300,000	\$200,000
Segment B	\$300,000	\$200,000	\$100,000
Segment C	\$100,000	\$100,000	\$0
Segment D	\$500,000	\$375,000	\$125,000
Segment E	\$200,000	\$130,000	\$70,000
Total	\$1,600,000	\$1,100,000	\$500,000
Total w/30% Contingency	\$2,100,000	\$1,400,000	\$700,000

*Based on stream crossings identified in most current studies performed by Pipeline Segment Design Consultants



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Item 8 – Stream Crossing Variance



* Photos and descriptions taken from the "Phase 1B Pipeline Segment B Engineering Feasibility Report" (K. Friese and Associates; August 2019)



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Cost Saving Options Summary

Reflects ARWA's share of potential cost savings:

Item	Original Standards	Potential Capital Cost Savings	Potential Capital Cost Savings (30% Construction Contingency)
1	Selling Excess WTP Property	\$2,000,000	\$2,000,000 (No Contingency Added)
2	Peaking Factor Analysis	Up To \$23,000,000	Up To \$30,000,000
3	Phase 2 Capacity Deferral	\$21,000,000	\$27,000,000
4	Administrative / Operations Deferrals	\$3,200,000 - \$4,400,000	\$4,100,000 - \$5,700,000
5	Inline Elevated Storage Tanks Deferral	\$6,600,000	\$8,600,000
6	Repackaging of Contract Analysis	\$1,700,000 - \$7,900,000	\$2,200,000 - \$10,300,000
7	Isolation Valve Spacing Revision	\$2,600,000	\$3,400,000
8	Stream Crossing Variance	\$1,100,000	\$1,400,000



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Next Steps

- Direction to Pursue Additional TWDB SWIFT Funding Capacity
- Direction on Cost Saving Measures to be Implemented



- Continued Evaluation of Program Costs and Exploration of Cost Saving Measures

1	PHASE 1B PROGRAM COST EVALUATION FACT SHEET	
ITEM UNDER CONSIDERATION:	SELLING EXCESS WATER TREATMENT PLANT PROPERTY	POTENTIAL LAND PRICE: \$2,000,000

Summary

This option consists of selling a portion of the Water Treatment Plant Property. Alliance Regional Water Authority requires approximately 160 acres to construct the Water Treatment Plant, Wells and Raw Water Infrastructure, and leave sufficient space for the anticipated future expansion phases. This allows for the sale of the remaining 400 acres.

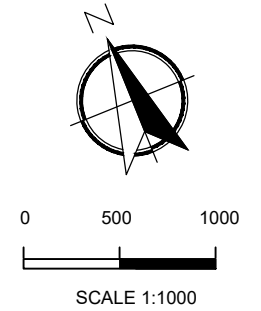
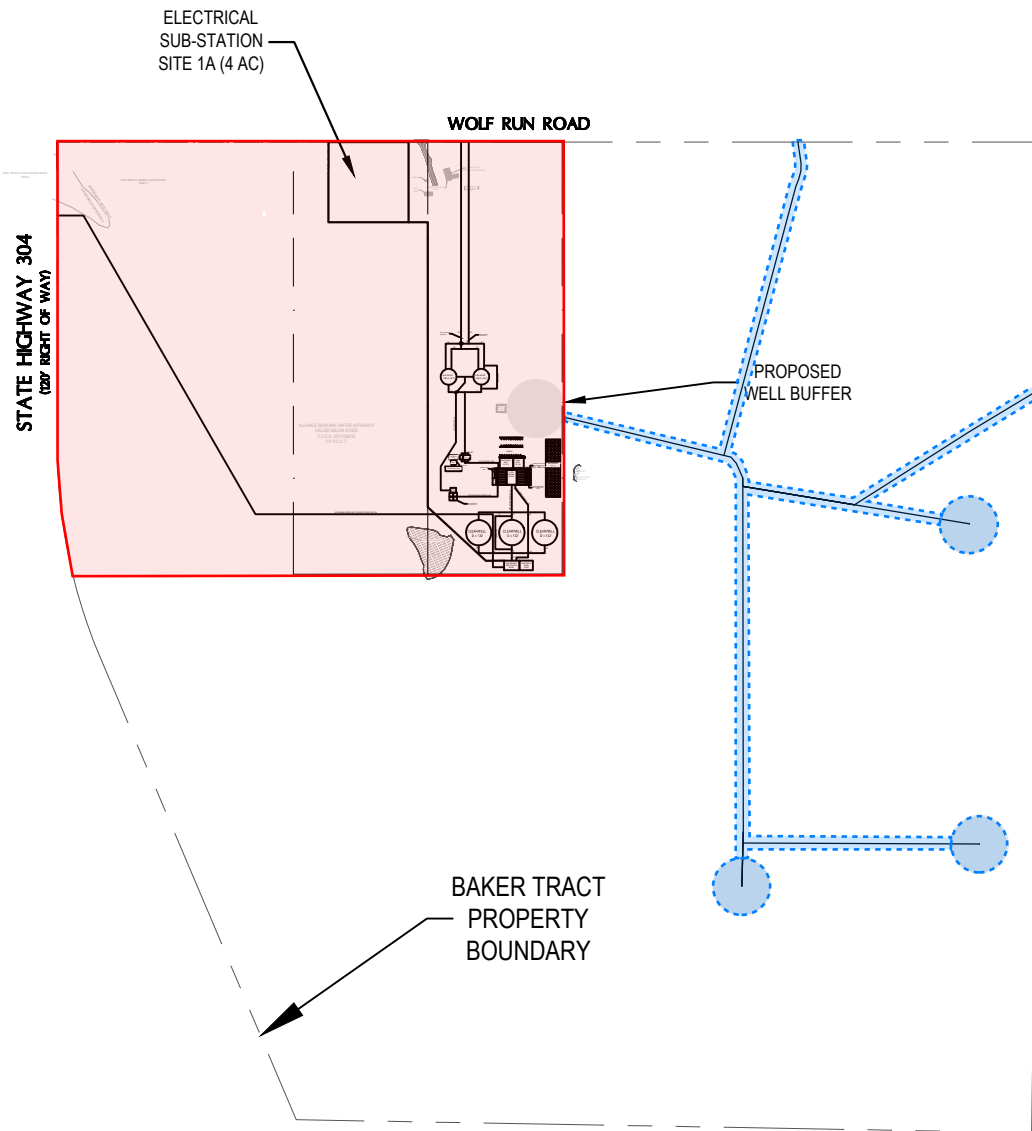
Pros

Able to recoup funds that were spent on land that is not being utilized	Not having enough land for currently unforeseen uses of this property.
---	--

Cons

Cost Evaluation

Initial Land Purchase of 560 Acres	Proportionate Value of 160 Acres	Potential Land Price - Excess 400 Acres to be Sold
\$2,600,000	\$600,000	\$2,000,000



- Reserves WTP Boundary
- Proposed Easement

- Legend**
- Phase 1B
 - Future Phases (1C, 1D, 2)
 - ARWA Well

EXHIBIT A

PRELIMINARY - NOT FOR CONSTRUCTION

REV.	DESCRIPTION	DATE
 Walker Partners engineers ★ surveyors <small>T.S.P.E. Registration No. 4853</small>		
Alliance Regional Water Authority		
Proposed Groundwater Treatment Plant Site		
Overall Site Layout		
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF PROFESSIONAL ENGINEER BRYCE D. CANADY #123424 ON THE DATE SHOWN ON THE DATE STAMP. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES.		
DESIGNED	JJ	
DRAFTED	BDC	
CHECKED	BDC	
PROJECT NO.	3-00708	
DRAWING NO. 1		

2	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: PEAKING FACTOR ANALYSIS	
POTENTIAL COST SAVINGS: UP TO \$23,000,000	
POTENTIAL COST SAVINGS (30% CONTINGENCY): UP TO \$30,000,000	

Summary

The Phase 1B Program infrastructure is proposed to be sized to handle a peaking factor of 1.5 times the anticipated base demand. By reducing the peaking factor, the peak flow is reduced which decreases the required pipe size and required facility sizing and allows for potential cost savings. This analysis identifies the potential cost savings associated with reducing the peaking factor in intervals of 0.1 from 1.5 to 1.0.

Pros

Cons

Reduction in pipe diameters reduces overall construction costs	An overall reduction in capacity allocated to ARWA through Phase 1 could require Phase 2 to be initiated earlier
	Reduces the instantaneous flow that each Sponsor can obtain from their Phase 1B delivery point
	Reduces ARWA's operational flexibility in the transmission system

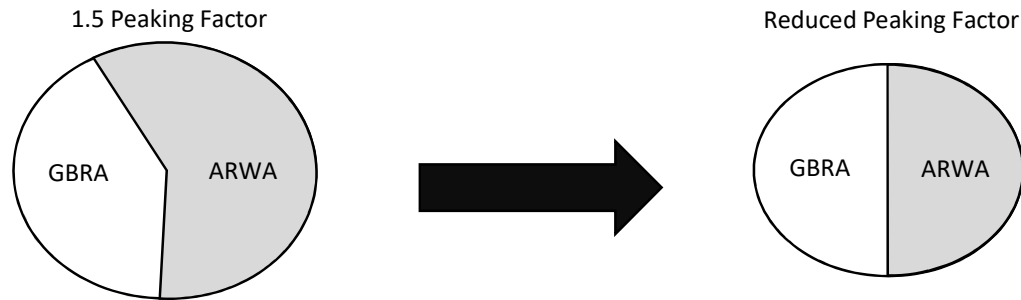
Cost Evaluation

Potential Cost Savings				
Peaking Factor	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ 1,000,000	\$ 2,000,000	\$ (300,000)	\$ (400,000)
1.3	\$ 8,000,000	\$ 11,000,000	\$ (500,000)	\$ (700,000)
1.2	\$ 10,000,000	\$ 13,000,000	\$ (800,000)	\$ (1,000,000)
1.1	\$ 17,000,000	\$ 22,000,000	\$ (2,300,000)	\$ (3,000,000)
1.0	\$ 23,000,000	\$ 30,000,000	\$ (3,600,000)	\$ (4,700,000)

PHASE 1B PROGRAM COST - PEAKING FACTOR

PROJECTED COST SAVINGS PERCENTAGE PER PEAKING FACTOR

Component	ARWA Potential Construction Cost Savings per Peaking Factor (by Component)					
	Peaking Factor					
	1.5	1.4	1.3	1.2	1.1	1.0
Pipeline A	0%	0%	14%	14%	14%	14%
Pipeline B1	0%	0%	0%	0%	0%	26%
Pipeline B2	0%	0%	0%	0%	0%	0%
Pipeline C	0%	0%	4%	4%	5%	5%
Pipeline D1	0%	0%	0%	0%	18%	18%
Pipeline D2	0%	0%	0%	0%	18%	18%
Pipeline E1	0%	0%	0%	0%	0%	0%
Pipeline E2	0%	0%	0%	12%	12%	12%
WTP	0%	5%	11%	16%	22%	27%
BPS	0%	4%	7%	11%	15%	19%



2A	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: PEAKING FACTOR ANALYSIS – PIPELINES ONLY	
POTENTIAL COST SAVINGS: UP TO \$16,000,000	
POTENTIAL COST SAVINGS (30% CONTINGENCY): UP TO \$21,000,000	

Summary

The Phase 1B Program infrastructure is proposed to be sized to handle a peaking factor of 1.5 times the anticipated base demand. By reducing the peaking factor, the peak flow is reduced which decreases the required pipe size allows for potential cost savings. This analysis identifies the potential cost savings associated with reducing the peaking factor in intervals of 0.1 from 1.5 to 1.0.

Cost Evaluation

Potential Cost Savings				
Peaking Factor	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ -	\$ -	\$ -	\$ -
1.3	\$ 5,000,000	\$ 7,000,000	\$ 100,000	\$ 200,000
1.2	\$ 6,000,000	\$ 8,000,000	\$ 100,000	\$ 200,000
1.1	\$ 12,000,000	\$ 15,000,000	\$ (1,100,000)	\$ (1,300,000)
1.0	\$ 16,000,000	\$ 21,000,000	\$ (2,100,000)	\$ (2,700,000)

**PHASE 1B PROGRAM COST - PEAKING FACTOR
PROJECTED CONSTRUCTION COST PER PEAKING FACTOR**

Component	ARWA Portion of Construction Cost (without Contingency)					
	Peaking Factor					
	1.5	1.4	1.3	1.2	1.1	1.0
Pipeline A	\$ 21,900,000	\$ 21,900,000	\$ 18,800,000	\$ 18,800,000	\$ 18,800,000	\$ 18,800,000
Pipeline B1	\$ 16,400,000	\$ 16,400,000	\$ 16,400,000	\$ 16,400,000	\$ 16,400,000	\$ 12,200,000
Pipeline B2	\$ 8,600,000	\$ 8,600,000	\$ 8,600,000	\$ 8,600,000	\$ 8,600,000	\$ 8,600,000
Pipeline C	\$ 47,600,000	\$ 47,600,000	\$ 45,500,000	\$ 45,500,000	\$ 45,400,000	\$ 45,400,000
Pipeline D1	\$ 7,200,000	\$ 7,200,000	\$ 7,200,000	\$ 7,200,000	\$ 5,900,000	\$ 5,900,000
Pipeline D2	\$ 23,000,000	\$ 23,000,000	\$ 23,000,000	\$ 23,000,000	\$ 18,800,000	\$ 18,800,000
Pipeline E1	\$ 8,800,000	\$ 8,800,000	\$ 8,800,000	\$ 8,800,000	\$ 8,800,000	\$ 8,800,000
Pipeline E2	\$ 6,900,000	\$ 6,900,000	\$ 6,900,000	\$ 6,100,000	\$ 6,100,000	\$ 6,100,000
Total	\$ 140,400,000	\$ 140,400,000	\$ 135,200,000	\$ 134,400,000	\$ 128,800,000	\$ 124,600,000

Component	ARWA Portion of Construction Cost (with Contingency)					
	Peaking Factor					
	1.5	1.4	1.3	1.2	1.1	1.0
Pipeline A	\$ 28,500,000	\$ 28,500,000	\$ 24,400,000	\$ 24,400,000	\$ 24,400,000	\$ 24,400,000
Pipeline B1	\$ 21,300,000	\$ 21,300,000	\$ 21,300,000	\$ 21,300,000	\$ 21,300,000	\$ 15,900,000
Pipeline B2	\$ 11,200,000	\$ 11,200,000	\$ 11,200,000	\$ 11,200,000	\$ 11,200,000	\$ 11,200,000
Pipeline C	\$ 61,900,000	\$ 61,900,000	\$ 59,200,000	\$ 59,200,000	\$ 59,100,000	\$ 59,100,000
Pipeline D1	\$ 9,300,000	\$ 9,300,000	\$ 9,300,000	\$ 9,300,000	\$ 7,700,000	\$ 7,700,000
Pipeline D2	\$ 29,900,000	\$ 29,900,000	\$ 29,900,000	\$ 29,900,000	\$ 24,500,000	\$ 24,500,000
Pipeline E1	\$ 11,500,000	\$ 11,500,000	\$ 11,500,000	\$ 11,500,000	\$ 11,500,000	\$ 11,500,000
Pipeline E2	\$ 9,000,000	\$ 9,000,000	\$ 9,000,000	\$ 8,000,000	\$ 8,000,000	\$ 8,000,000
Total	\$ 182,600,000	\$ 182,600,000	\$ 175,800,000	\$ 174,800,000	\$ 167,700,000	\$ 162,300,000

Note: Individual values are rounded and the total sums may not match exactly.

**PHASE 1B PROGRAM COST - PEAKING FACTOR
PROJECTED PIPELINE CONSTRUCTION COST PER PEAKING FACTOR**

Segment	Excluding Contingency											
	1.5		1.4		1.3		1.2		1.1		1.0	
	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost
Pipeline A	\$ 21,900,000	\$ 14,600,000	\$ 21,900,000	\$ 14,600,000	\$ 18,800,000	\$ 14,500,000	\$ 18,800,000	\$ 14,500,000	\$ 18,800,000	\$ 14,500,000	\$ 18,800,000	\$ 14,500,000
Pipeline B1	\$ 16,400,000	\$ 8,700,000	\$ 16,400,000	\$ 8,700,000	\$ 16,400,000	\$ 8,700,000	\$ 16,400,000	\$ 8,700,000	\$ 16,400,000	\$ 8,700,000	\$ 12,200,000	\$ 9,800,000
Pipeline B2	\$ 8,600,000	\$ 3,800,000	\$ 8,600,000	\$ 3,800,000	\$ 8,600,000	\$ 3,800,000	\$ 8,600,000	\$ 3,800,000	\$ 8,600,000	\$ 3,800,000	\$ 8,600,000	\$ 3,800,000
Pipeline C	\$ 47,600,000	\$ -	\$ 47,600,000	\$ -	\$ 45,500,000	\$ -	\$ 45,500,000	\$ -	\$ 45,400,000	\$ -	\$ 45,400,000	\$ -
Pipeline D1	\$ 7,200,000	\$ 2,400,000	\$ 7,200,000	\$ 2,400,000	\$ 7,200,000	\$ 2,400,000	\$ 7,200,000	\$ 2,400,000	\$ 5,900,000	\$ 2,600,000	\$ 5,900,000	\$ 2,600,000
Pipeline D2	\$ 23,000,000	\$ 7,800,000	\$ 23,000,000	\$ 7,800,000	\$ 23,000,000	\$ 7,800,000	\$ 23,000,000	\$ 7,800,000	\$ 18,800,000	\$ 8,700,000	\$ 18,800,000	\$ 8,700,000
Pipeline E1	\$ 8,800,000	\$ 4,700,000	\$ 8,800,000	\$ 4,700,000	\$ 8,800,000	\$ 4,700,000	\$ 8,800,000	\$ 4,700,000	\$ 8,800,000	\$ 4,700,000	\$ 8,800,000	\$ 4,700,000
Pipeline E2	\$ 6,900,000	\$ -	\$ 6,900,000	\$ -	\$ 6,900,000	\$ -	\$ 6,100,000	\$ -	\$ 6,100,000	\$ -	\$ 6,100,000	\$ -
Total	\$ 140,400,000	\$ 42,000,000	\$ 140,400,000	\$ 42,000,000	\$ 135,200,000	\$ 41,900,000	\$ 134,400,000	\$ 41,900,000	\$ 128,800,000	\$ 43,000,000	\$ 124,600,000	\$ 44,100,000

Segment	Excluding Contingency											
	1.5		1.4		1.3		1.2		1.1		1.0	
	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings
Pipeline A	\$ -	\$ -	\$ -	\$ -	\$ 3,100,000	\$ 100,000	\$ 3,100,000	\$ 100,000	\$ 3,100,000	\$ 100,000	\$ 3,100,000	\$ 100,000
Pipeline B1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,200,000	\$ (1,100,000)
Pipeline B2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pipeline C	\$ -	\$ -	\$ -	\$ -	\$ 2,100,000	\$ -	\$ 2,100,000	\$ -	\$ 2,200,000	\$ -	\$ 2,200,000	\$ -
Pipeline D1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,300,000	\$ (200,000)	\$ 1,300,000	\$ (200,000)
Pipeline D2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,200,000	\$ (900,000)	\$ 4,200,000	\$ (900,000)
Pipeline E1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pipeline E2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 800,000	\$ -	\$ 800,000	\$ -	\$ 800,000	\$ -
Total	\$ -	\$ -	\$ -	\$ -	\$ 5,200,000	\$ 100,000	\$ 6,000,000	\$ 100,000	\$ 11,600,000	\$ (1,000,000)	\$ 15,800,000	\$ (2,100,000)

Note: Individual values are rounded and the total sums may not match exactly.

2B	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: PEAKING FACTOR ANALYSIS – FACILITIES ONLY	
POTENTIAL COST SAVINGS: UP TO \$7,000,000	
POTENTIAL COST SAVINGS (30% CONTINGENCY): UP TO \$9,000,000	

Summary

The Phase 1B Program infrastructure is proposed to be sized to handle a peaking factor of 1.5 times the anticipated base demand. By reducing the peaking factor, the peak flow is reduced which decreases the required facility sizing and allows for potential cost savings. This analysis identifies the potential cost savings associated with reducing the peaking factor in intervals of 0.1 from 1.5 to 1.0.

Cost Evaluation

Potential Cost Savings				
Peaking Factor	ARWA		GBRA	
	Without Contingency	With Contingency	Without Contingency	With Contingency
1.5	\$ -	\$ -	\$ -	\$ -
1.4	\$ 1,000,000	\$ 2,000,000	\$ (300,000)	\$ (400,000)
1.3	\$ 3,000,000	\$ 4,000,000	\$ (600,000)	\$ (800,000)
1.2	\$ 4,000,000	\$ 5,000,000	\$ (900,000)	\$ (1,200,000)
1.1	\$ 6,000,000	\$ 7,000,000	\$ (1,200,000)	\$ (1,600,000)
1.0	\$ 7,000,000	\$ 9,000,000	\$ (1,500,000)	\$ (2,000,000)

**PHASE 1B PROGRAM COST - PEAKING FACTOR
PROJECTED FACILITY CONSTRUCTION COST PER PEAKING FACTOR**

Component	ARWA Portion of Construction Cost (without Contingency)					
	Peaking Factor					
	1.5	1.4	1.3	1.2	1.1	1.0
WTP	\$ 18,200,000	\$ 17,200,000	\$ 16,200,000	\$ 15,200,000	\$ 14,200,000	\$ 13,200,000
BPS	\$ 10,700,000	\$ 10,300,000	\$ 9,900,000	\$ 9,500,000	\$ 9,100,000	\$ 8,700,000
Total	\$ 28,900,000	\$ 27,500,000	\$ 26,100,000	\$ 24,700,000	\$ 23,300,000	\$ 21,900,000

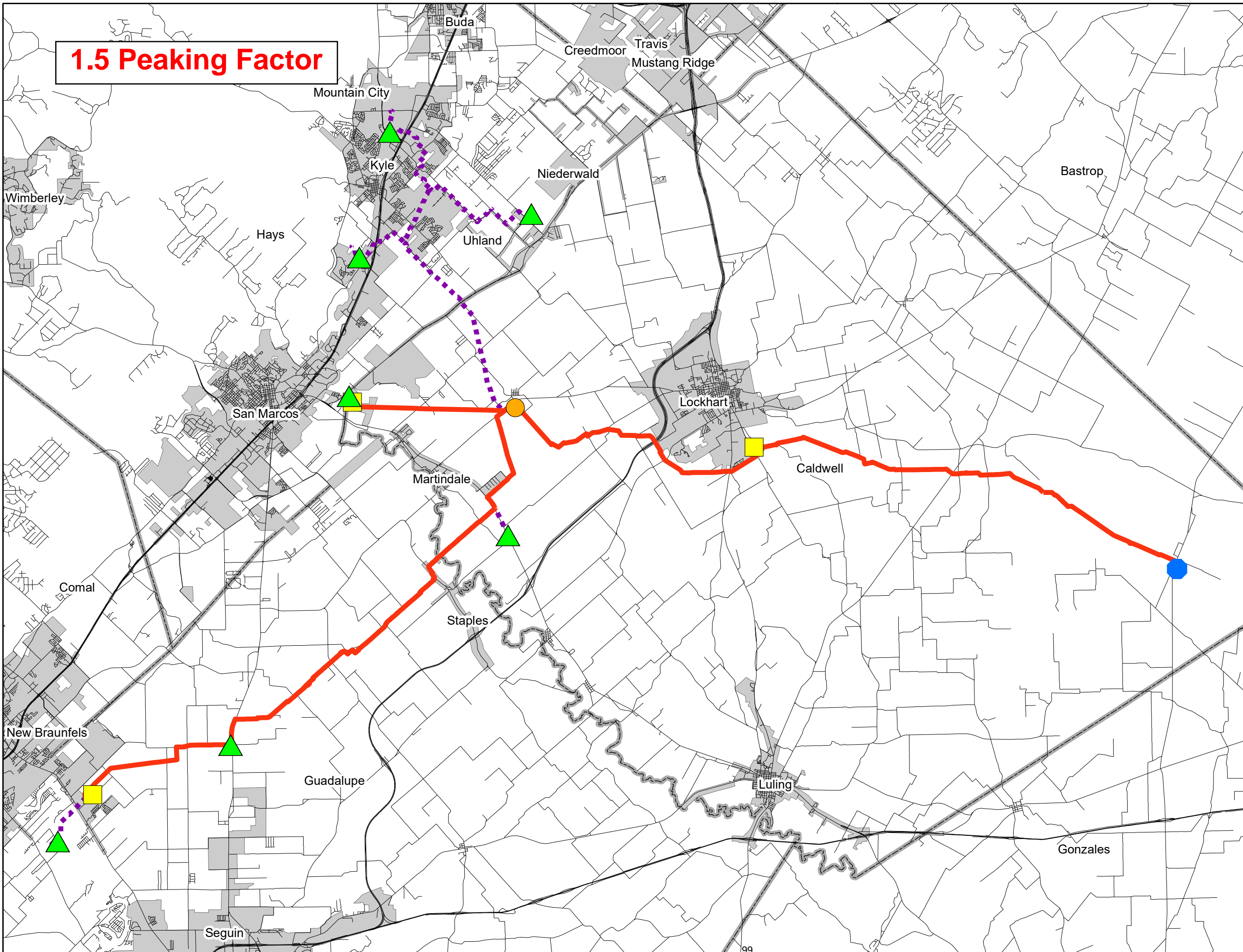
Component	ARWA Portion of Construction Cost (with Contingency)					
	Peaking Factor					
	1.5	1.4	1.3	1.2	1.1	1.0
WTP	\$ 23,700,000	\$ 22,400,000	\$ 21,100,000	\$ 19,800,000	\$ 18,500,000	\$ 17,200,000
BPS	\$ 13,900,000	\$ 13,400,000	\$ 12,900,000	\$ 12,400,000	\$ 11,800,000	\$ 11,300,000
Total	\$ 37,600,000	\$ 35,800,000	\$ 34,000,000	\$ 32,200,000	\$ 30,300,000	\$ 28,500,000

Segment	Excluding Contingency											
	1.5		1.4		1.3		1.2		1.1		1.0	
	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost	ARWA Cost	GBRA Cost
WTP	\$ 18,200,000	\$ 15,800,000	\$ 17,200,000	\$ 16,100,000	\$ 16,200,000	\$ 16,400,000	\$ 15,200,000	\$ 16,700,000	\$ 14,200,000	\$ 17,000,000	\$ 13,200,000	\$ 17,300,000
BPS	\$ 10,700,000	\$ 7,800,000	\$ 10,300,000	\$ 7,800,000	\$ 9,900,000	\$ 7,800,000	\$ 9,500,000	\$ 7,800,000	\$ 9,100,000	\$ 7,800,000	\$ 8,700,000	\$ 7,800,000
Total	\$ 28,900,000	\$ 23,600,000	\$ 27,500,000	\$ 23,900,000	\$ 26,100,000	\$ 24,200,000	\$ 24,700,000	\$ 24,500,000	\$ 23,300,000	\$ 24,800,000	\$ 21,900,000	\$ 25,100,000

Segment	Excluding Contingency											
	1.5		1.4		1.3		1.2		1.1		1.0	
	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings	Potential ARWA Cost Savings	Potential GBRA Cost Savings
WTP	\$ -	\$ -	\$ 1,000,000	\$ (300,000)	\$ 2,000,000	\$ (600,000)	\$ 3,000,000	\$ (900,000)	\$ 4,000,000	\$ (1,200,000)	\$ 5,000,000	\$ (1,500,000)
BPS	\$ -	\$ -	\$ 400,000	\$ -	\$ 800,000	\$ -	\$ 1,200,000	\$ -	\$ 1,600,000	\$ -	\$ 2,000,000	\$ -
Total	\$ -	\$ -	\$ 1,400,000	\$ (300,000)	\$ 2,800,000	\$ (600,000)	\$ 4,200,000	\$ (900,000)	\$ 5,600,000	\$ (1,200,000)	\$ 7,000,000	\$ (1,500,000)





Note: Individual values are rounded and the total sums may not match exactly.

1.5 Peaking Factor



Legend

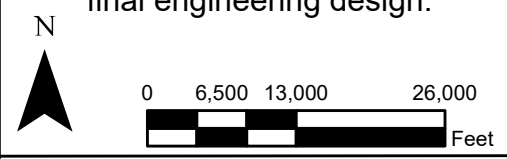
Construction Package

-  Booster Pump Station (ARWA-GBRA)
-  Delivery Point - ARWA
-  Delivery Point - GBRA
-  WTP, Well Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

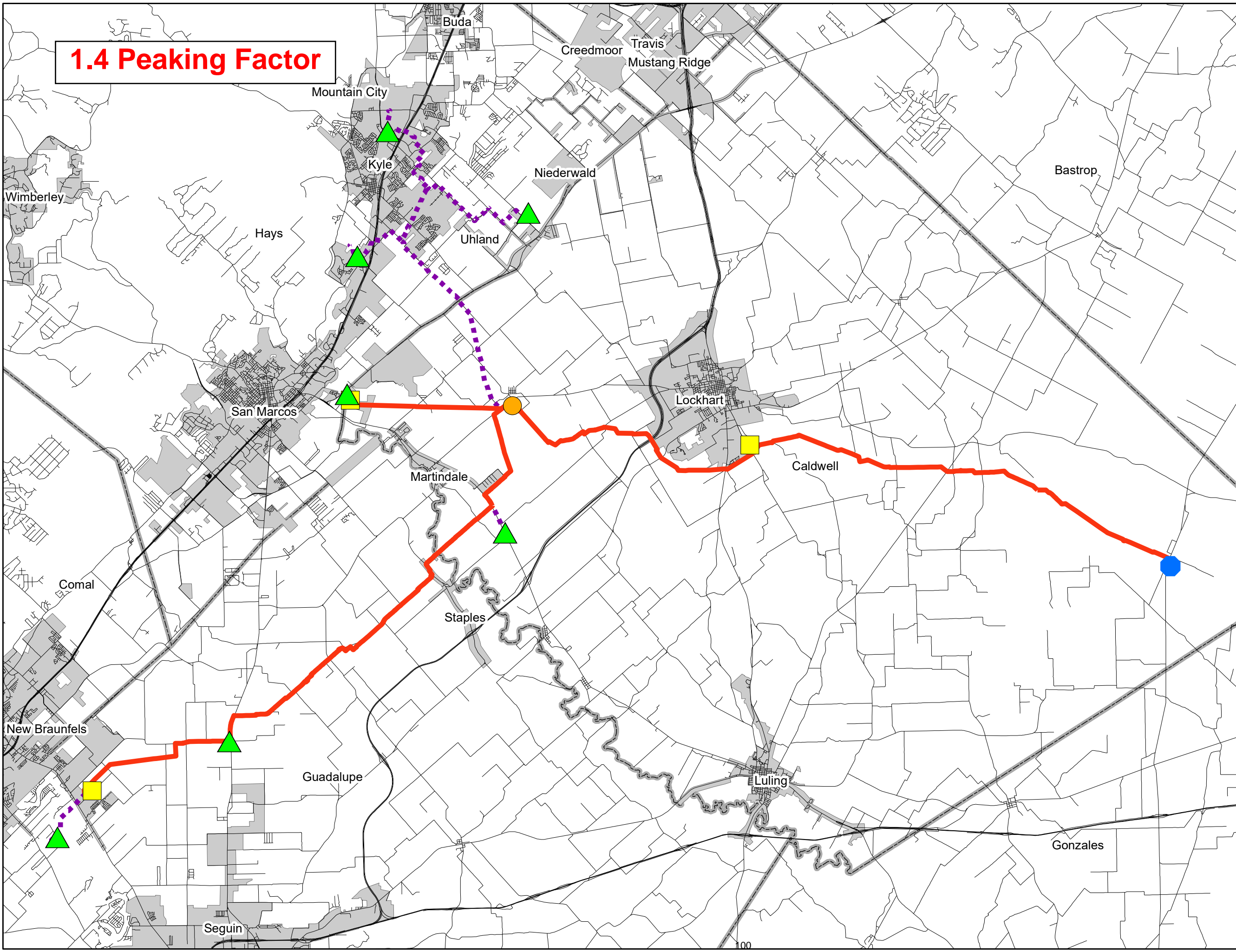
-  ARWA Only
-  ARWA-GBRA

Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Exhibit Alliance Water Phase 1B Program
PROJECT:	ARWA - Phase 1B
DATE:	05/01/2019

1.4 Peaking Factor



Legend

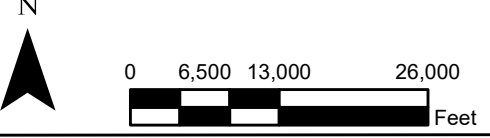
Construction Package

- Booster Pump Station (ARWA-GBRA)
- Delivery Point - ARWA
- Delivery Point - GBRA
- WTP, Well, Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

- ARWA Only
- ARWA-GBRA

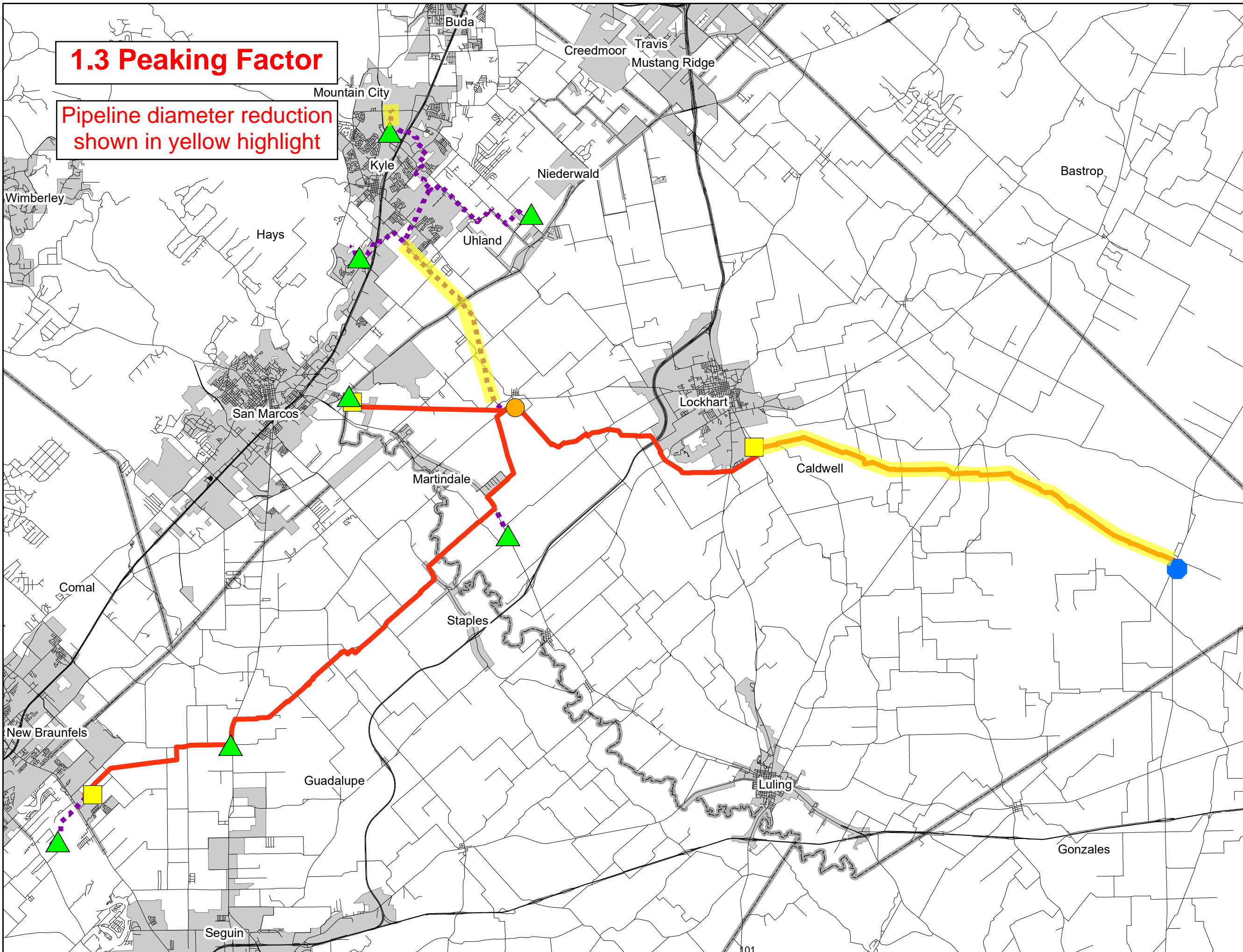
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Exhibit Alliance Water Phase 1B Program
PROJECT:	ARWA - Phase 1B
DATE:	05/01/2019

1.3 Peaking Factor

Pipeline diameter reduction shown in yellow highlight



Legend

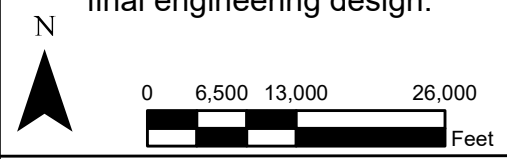
Construction Package

- Booster Pump Station (ARWA-GBRA)
- Delivery Point - ARWA
- Delivery Point - GBRA
- WTP, Well Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

- ARWA Only
- ARWA-GBRA

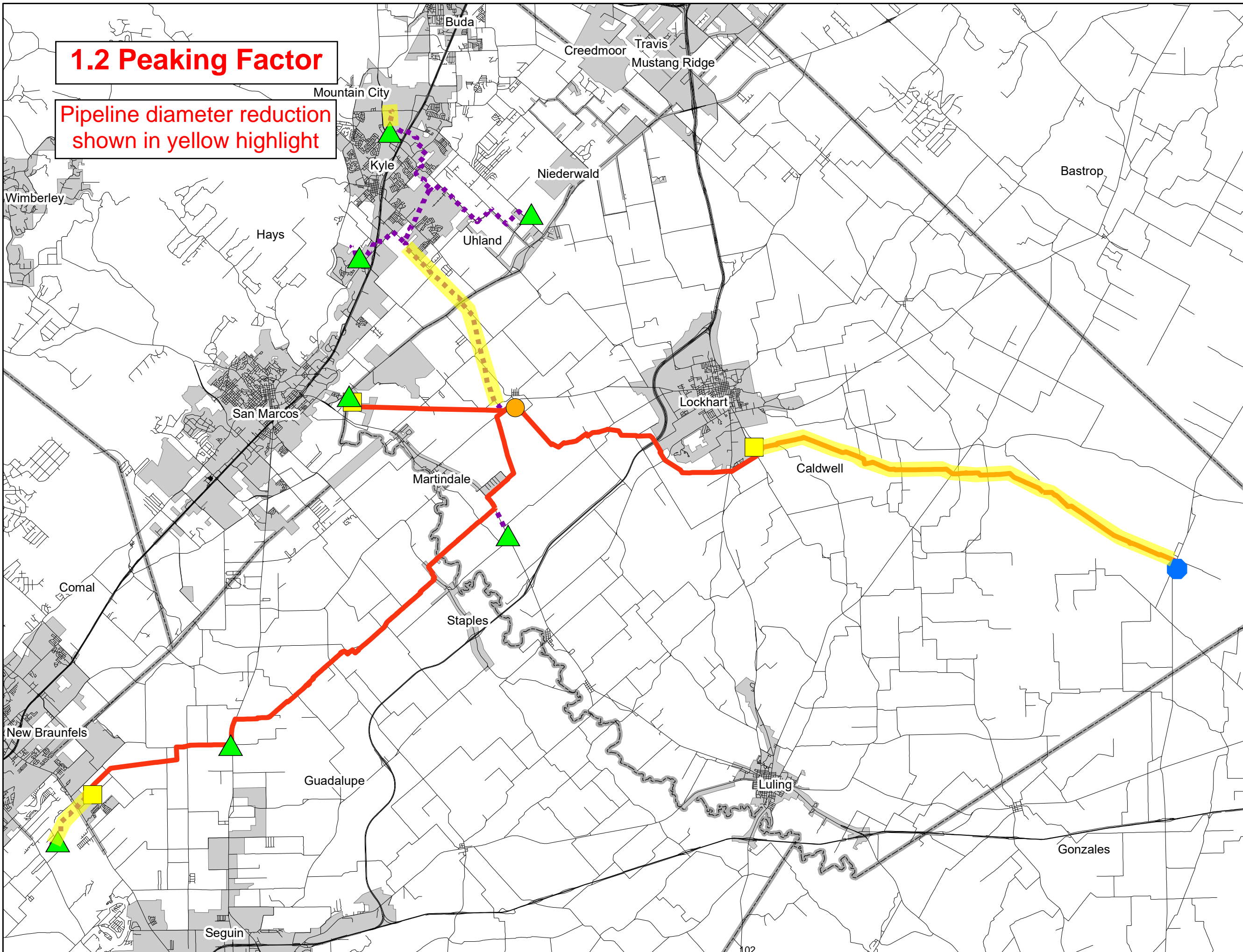
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Exhibit Alliance Water Phase 1B Program
PROJECT:	ARWA - Phase 1B
DATE:	05/01/2019





1.2 Peaking Factor

Pipeline diameter reduction shown in yellow highlight



Legend

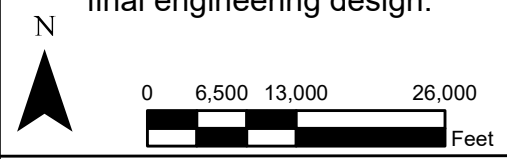
Construction Package

-  Booster Pump Station (ARWA-GBRA)
-  Delivery Point - ARWA
-  Delivery Point - GBRA
-  WTP, Well Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

-  ARWA Only
-  ARWA-GBRA

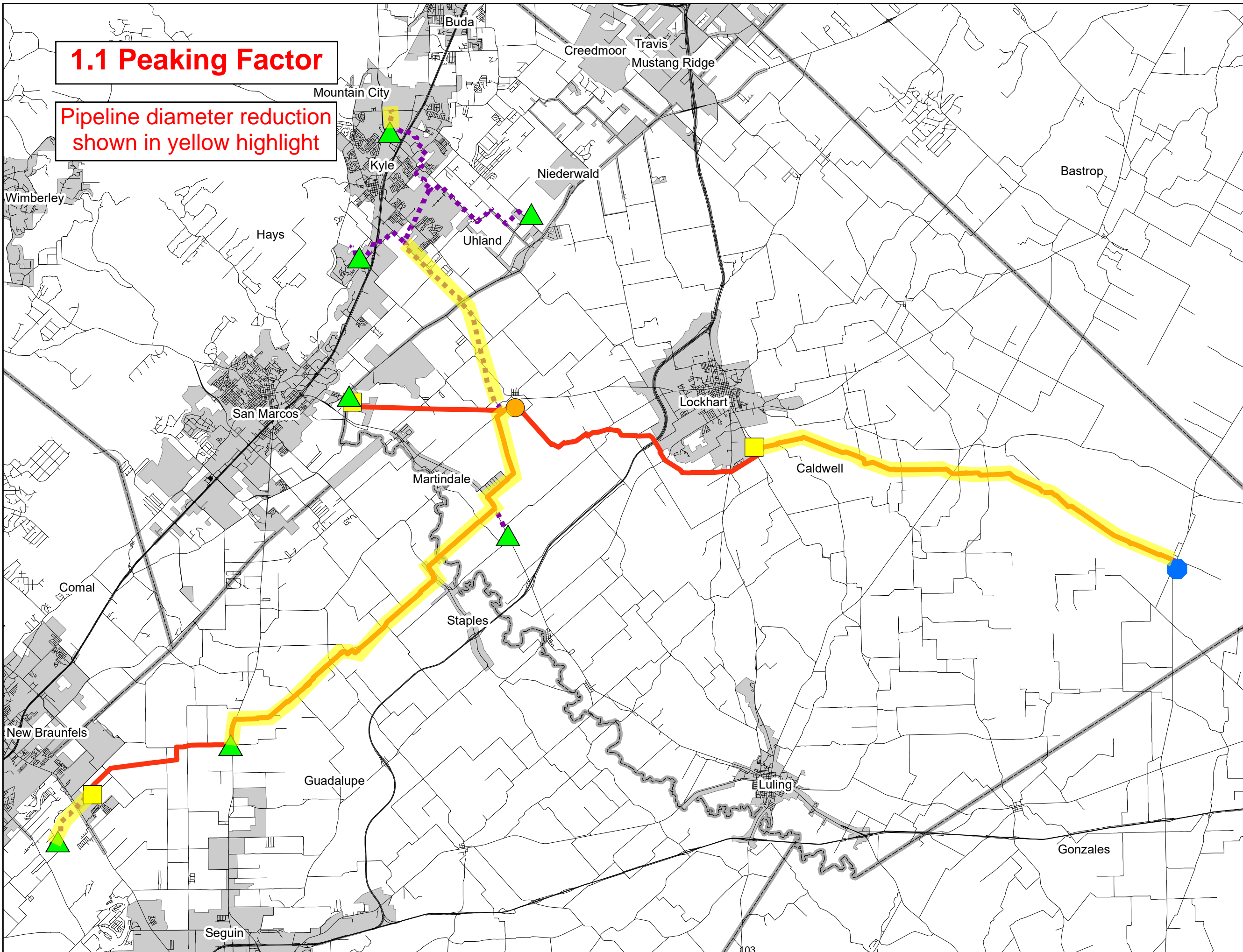
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Exhibit Alliance Water Phase 1B Program
PROJECT:	ARWA - Phase 1B
DATE:	05/01/2019

1.1 Peaking Factor

Pipeline diameter reduction shown in yellow highlight



Legend

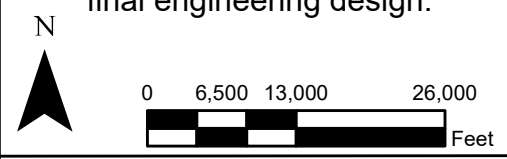
Construction Package

- Booster Pump Station (ARWA-GBRA)
- Delivery Point - ARWA
- Delivery Point - GBRA
- WTP, Well Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

- ARWA Only
- ARWA-GBRA

Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Exhibit Alliance Water Phase 1B Program
PROJECT:	ARWA - Phase 1B
DATE:	05/01/2019

1.0 Peaking Factor

Pipeline diameter reduction shown in yellow highlight

Legend

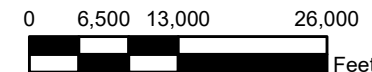
Construction Package

- Booster Pump Station (ARWA-GBRA)
- Delivery Point - ARWA
- Delivery Point - GBRA
- WTP, Well Civil/Elec/Mech, HSPS (ARWA-GBRA)

Phase 1B Pipeline

- ARWA Only
- ARWA-GBRA

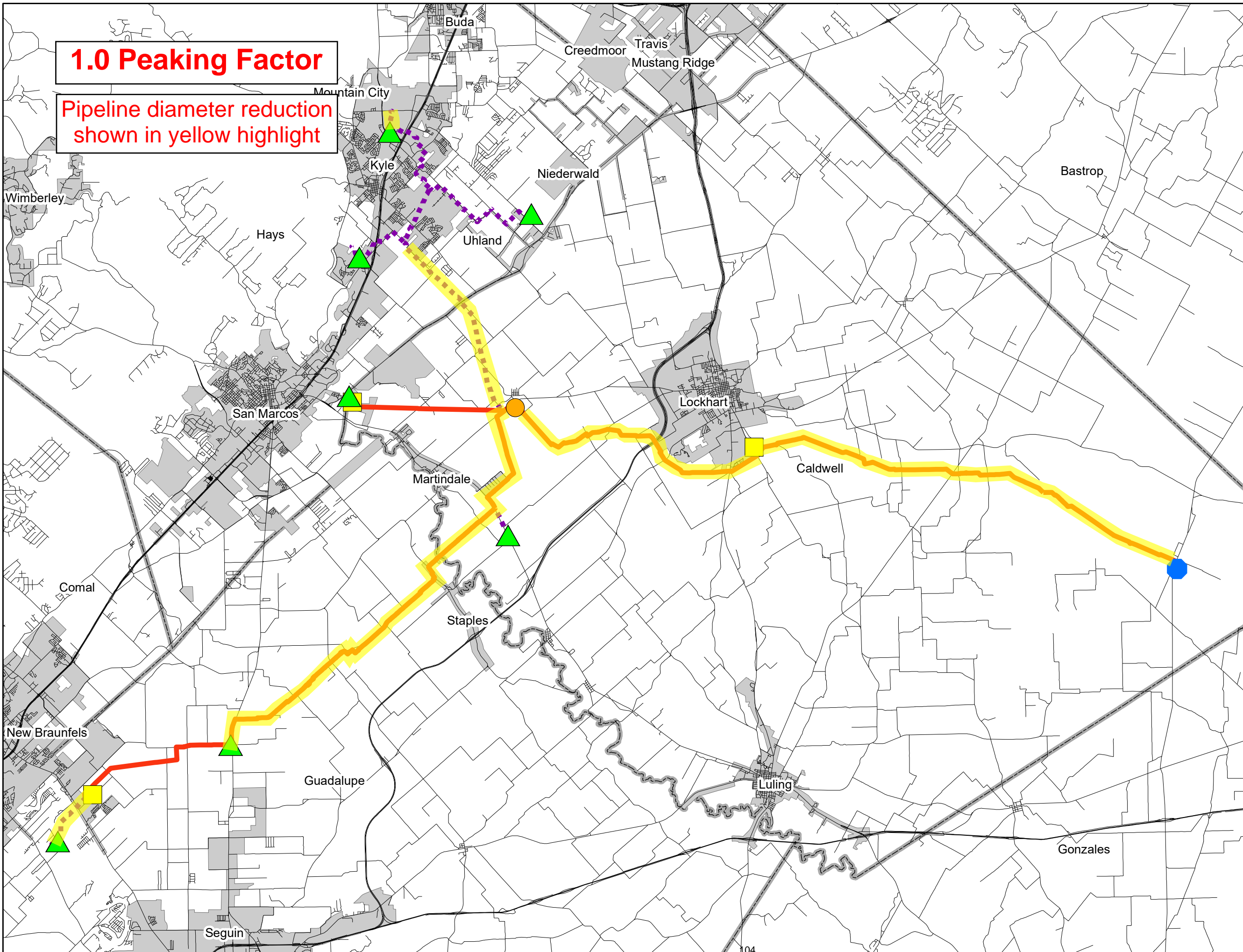
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE: Exhibit Alliance Water Phase 1B Program

PROJECT: ARWA - Phase 1B

DATE: 05/01/2019



3	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: PHASE 2 PIPELINE CAPACITY DEFERRAL	
POTENTIAL COST SAVINGS: \$21,000,000	
POTENTIAL COST SAVINGS (30% CONTINGENCY): \$27,000,000	

Summary

The Phase 1B Program pipelines exiting from the Booster Pump Station (BPS) are currently sized for Phase 2 capacity demands. This cost evaluation identifies the potential cost savings associated with deferring the Phase 2 capacity until it is needed (projected to be in 2040), at which point a separate, additional pipeline project would be required.

Segment	Current	Phase 2 Deferral	
	Phase 1+2 Capacity	Phase 1 Capacity	Phase 2 Capacity
Segment B2	36"	30"	24"
Segment C	16", 24", 30", 36", 42"	12", 30"	12", 16", 20", 30"
Segment D	42"	30"	36"
Segment E1	36"	30"	30"
Segment E2	36"	24"	24"

Pros

Reduction in pipe diameter reduces Phase 1B construction costs

Cons

An additional pipeline project of substantial cost will be required to handle future Phase 2 capacity

Cost Evaluation

Phase 1B ARWA Cost Savings

Option	Excluding Contingency			Including 30% Contingency		
	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings
Total	\$102,000,000	\$81,000,000	\$21,000,000	\$133,000,000	\$106,000,000	\$27,000,000

Phase 1B GBRA Cost Savings

Option	Excluding Contingency			Including 30% Contingency		
	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Potential Cost Savings
Total	\$18,700,000	\$19,900,000	(\$1,200,000)	\$24,500,000	\$25,800,000	(\$1,300,000)

Future Phase 2 Pipeline Cost (Cost in 2040 \$)

Option	Excluding Contingency	Including 30% Contingency
Total	\$183,800,000	\$230,500,000

**PHASE 1B PROGRAM COST - PHASE 2 DEFERRAL
PROJECTED ARWA CONSTRUCTION COSTS PER CAPACITY**

Segment	Excluding Contingency			Including 30% Contingency		
	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Phase 2 Capacity*	Current Phase 1+2 Capacity	Phase 1 Capacity (with Phase 2 Deferral)	Phase 2 Capacity*
Pipeline B2	\$ 8,600,000	\$ 7,700,000	\$ 8,900,000	\$ 11,200,000	\$ 10,100,000	\$ 11,600,000
Pipeline C	\$ 47,600,000	\$ 39,700,000	\$ 39,800,000	\$ 61,900,000	\$ 51,600,000	\$ 51,800,000
Pipeline D1	\$ 7,200,000	\$ 5,000,000	\$ 8,500,000	\$ 9,300,000	\$ 6,500,000	\$ 11,000,000
Pipeline D2	\$ 23,000,000	\$ 16,100,000	\$ 27,400,000	\$ 29,900,000	\$ 21,000,000	\$ 35,700,000
Pipeline E1	\$ 8,800,000	\$ 7,000,000	\$ 12,400,000	\$ 11,500,000	\$ 9,200,000	\$ 16,200,000
Pipeline E2	\$ 6,900,000	\$ 5,600,000	\$ 5,600,000	\$ 9,000,000	\$ 7,300,000	\$ 7,300,000
Total	\$ 102,100,000	\$ 81,100,000	\$ 102,600,000	\$ 132,800,000	\$ 105,700,000	\$ 133,600,000

*Phase 2 to be constructed in 2040, the values shown are in today's dollars for comparison purposes.

Note: Individual values are rounded and the total sums may not match exactly.

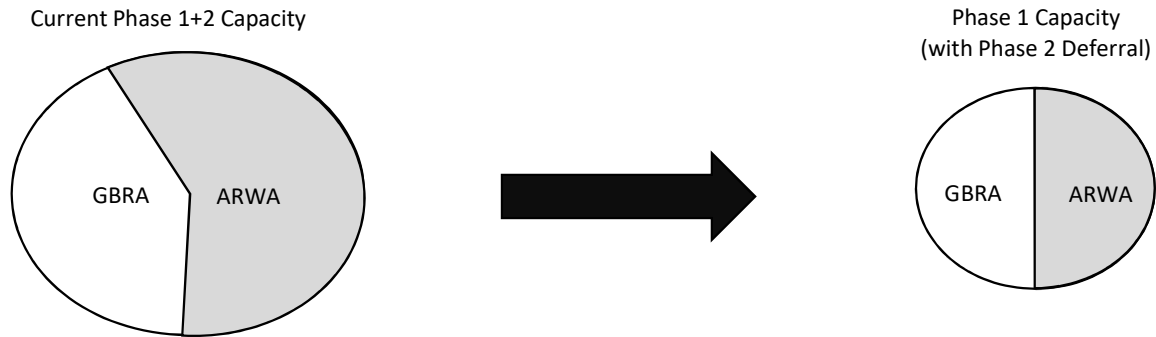
**PHASE 1B PROGRAM COST - PHASE 2 DEFERRAL
PROJECTED ARWA CONSTRUCTION COST SAVINGS**

Option	ARWA Potential Cost Savings			
	Excluding Contingency		Including 30% Contingency	
Phase 1 Capacity (with Phase 2 Deferral)	21%	\$ 21,000,000	20%	\$ 27,100,000

Segment	ARWA Potential Cost Savings			
	Excluding Contingency		Including 30% Contingency	
Pipeline B2	10%	\$ 900,000	10%	\$ 1,100,000
Pipeline C	17%	\$ 7,900,000	17%	\$ 10,300,000
Pipeline D1	31%	\$ 2,200,000	30%	\$ 2,800,000
Pipeline D2	30%	\$ 6,900,000	30%	\$ 8,900,000
Pipeline E1	20%	\$ 1,800,000	20%	\$ 2,300,000
Pipeline E2	19%	\$ 1,300,000	19%	\$ 1,700,000
Total		\$ 21,000,000	Total	\$ 27,100,000

**PHASE 1B PROGRAM COST - PHASE 2 DEFERRAL
PROJECTED ARWA and GBRA CONSTRUCTION COST SAVINGS**

Segment	Capacity	Excluding Contingency			
		ARWA Cost	Potential ARWA Cost Savings	GBRA Cost	Potential GBRA Cost Savings
Pipeline B2	Current Phase 1+2 Capacity	\$ 8,600,000	\$ 900,000	\$ 3,800,000	\$ 1,200,000
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 7,700,000		\$ 2,600,000	
Pipeline C	Current Phase 1+2 Capacity	\$ 47,600,000	\$ 7,900,000	\$ -	\$ -
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 39,700,000		\$ -	
Pipeline D1	Current Phase 1+2 Capacity	\$ 7,200,000	\$ 2,200,000	\$ 2,400,000	\$ (400,000)
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 5,000,000		\$ 2,800,000	
Pipeline D2	Current Phase 1+2 Capacity	\$ 23,000,000	\$ 6,900,000	\$ 7,800,000	\$ (1,300,000)
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 16,100,000		\$ 9,100,000	
Pipeline E1	Current Phase 1+2 Capacity	\$ 8,800,000	\$ 1,800,000	\$ 4,700,000	\$ (700,000)
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 7,000,000		\$ 5,400,000	
Pipeline E2	Current Phase 1+2 Capacity	\$ 6,900,000	\$ 1,300,000	\$ -	\$ -
	Phase 1 Capacity (with Phase 2 Deferral)	\$ 5,600,000		\$ -	
Total			\$ 21,000,000	Total	\$ (1,200,000)



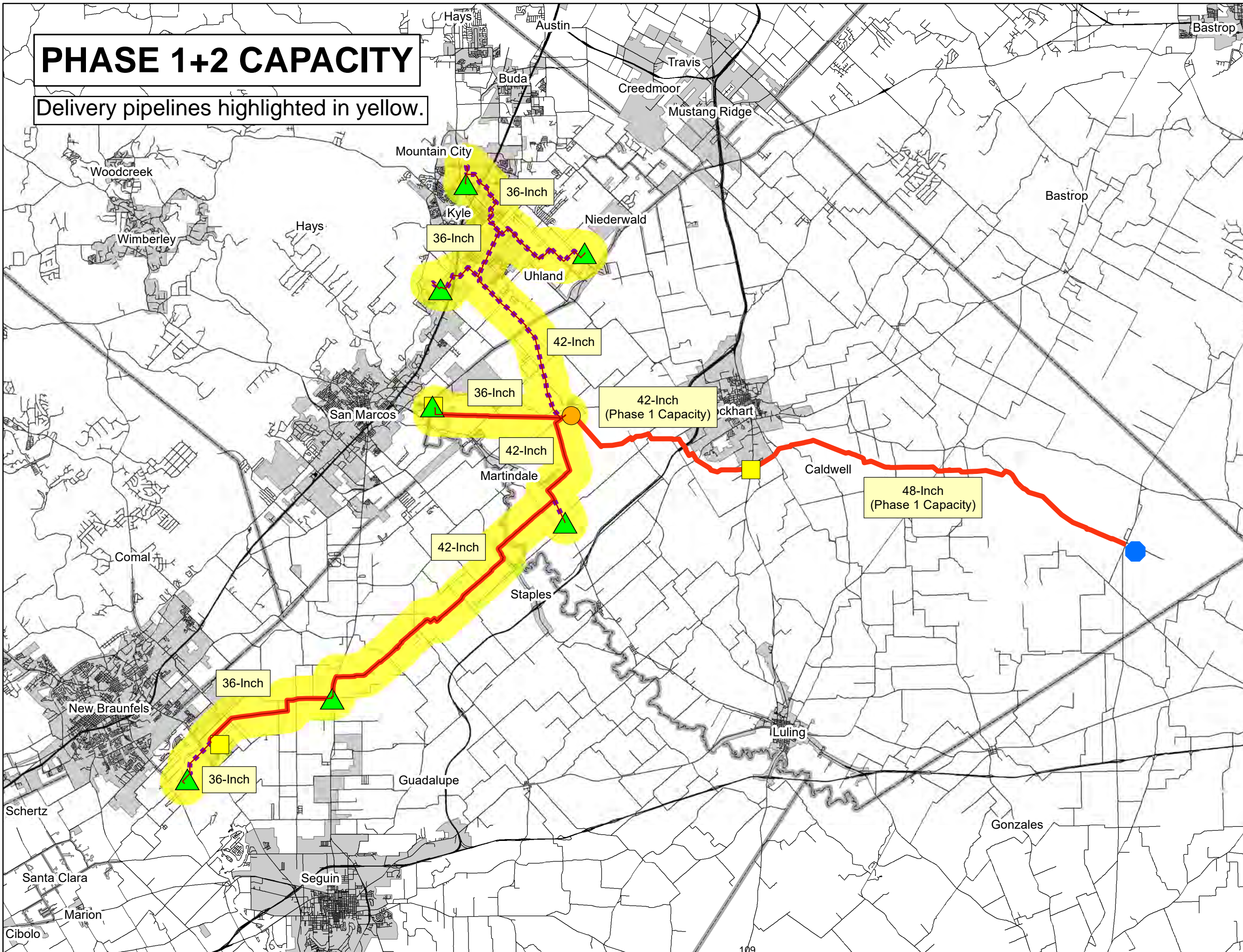
**PHASE 1B PROGRAM COST - PHASE 2 DEFERRAL
PROJECTED OVERALL ARWA CAPITAL COST**

Excluding Contingency			
Capacity	2020	2040	NPV (2020) of 2040 Expenditure
No Deferral (Phase 1+2 Capacity)	\$ 102,100,000	\$ -	\$ 102,100,000
Phase 2 Deferral	\$ 81,100,000	\$ 183,800,000	\$ 204,800,000
Difference	\$ (21,000,000)		\$ 102,700,000

Including 30% Contingency			
Capacity	2020	2040	NPV (2020) of 2040 Expenditure
No Deferral (Phase 1+2 Capacity)	\$ 132,800,000	\$ -	\$ 132,800,000
Phase 2 Deferral	\$ 105,700,000	\$ 230,500,000	\$ 260,800,000
Difference	\$ (27,100,000)		\$ 128,000,000

PHASE 1+2 CAPACITY

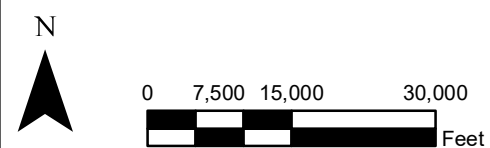
Delivery pipelines highlighted in yellow.



Legend

- Booster Pump Station**
- Delivery Point - Alliance Water**
- Delivery Point - GBRA**
- WTP, Well Civil/Elec/Mech, HSPS**
- Phase 1B Pipeline**
 - ARWA Only
 - ARWA-GBRA

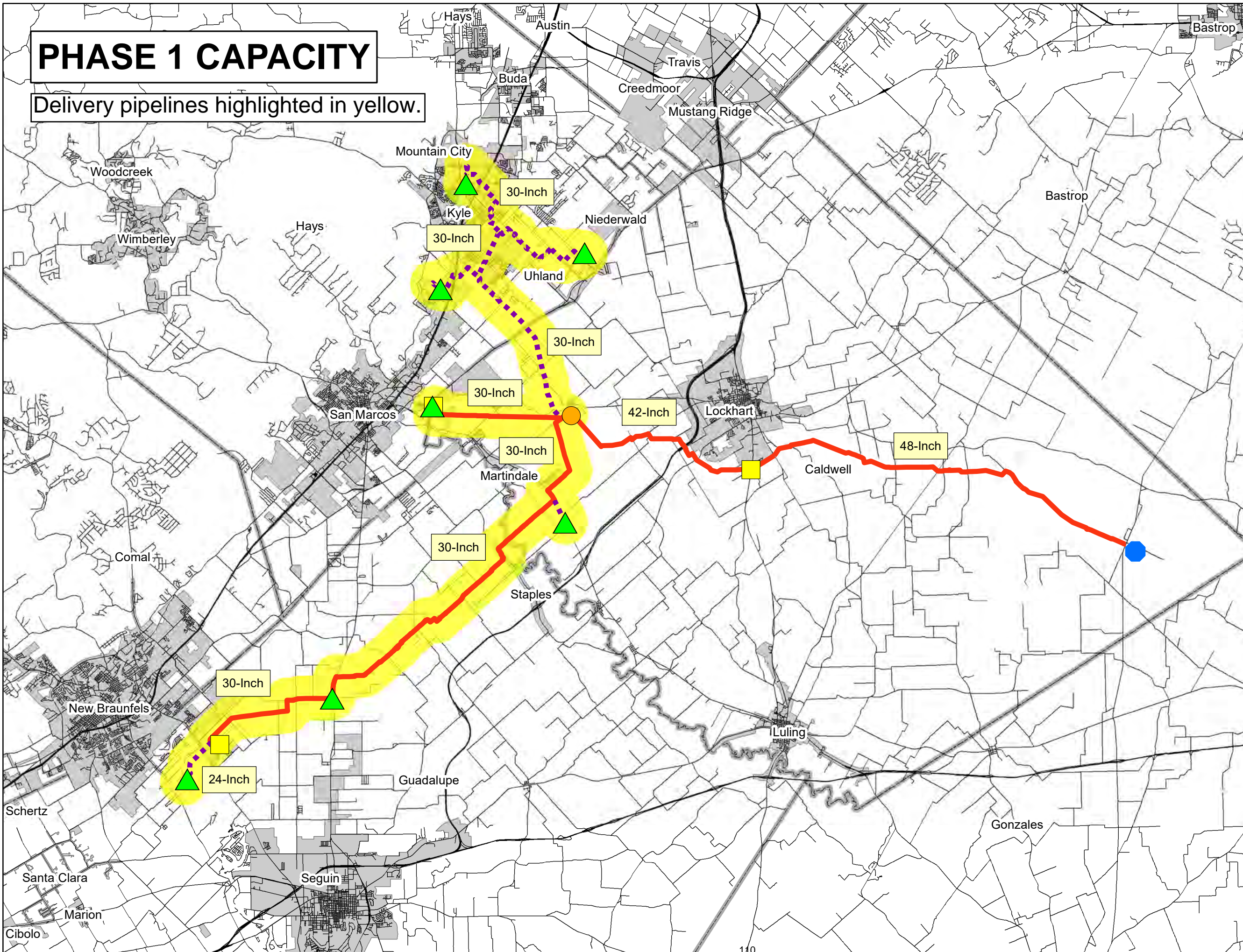
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.









TITLE:	Infrastructure Overview: Phase 1+2 Capacity Exhibit
PROJECT:	Combined Alliance Water and GBRA Program
DATE:	09/05/2019

PHASE 1 CAPACITY

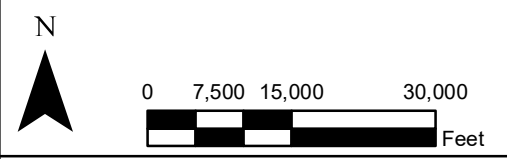
Delivery pipelines highlighted in yellow.



Legend

-  **Booster Pump Station**
-  **Delivery Point - Alliance Water**
-  **Delivery Point - GBRA**
-  **WTP, Well Civil/Elec/Mech, HSPS**
- Phase 1B Pipeline**
 -  ARWA Only
 -  ARWA-GBRA

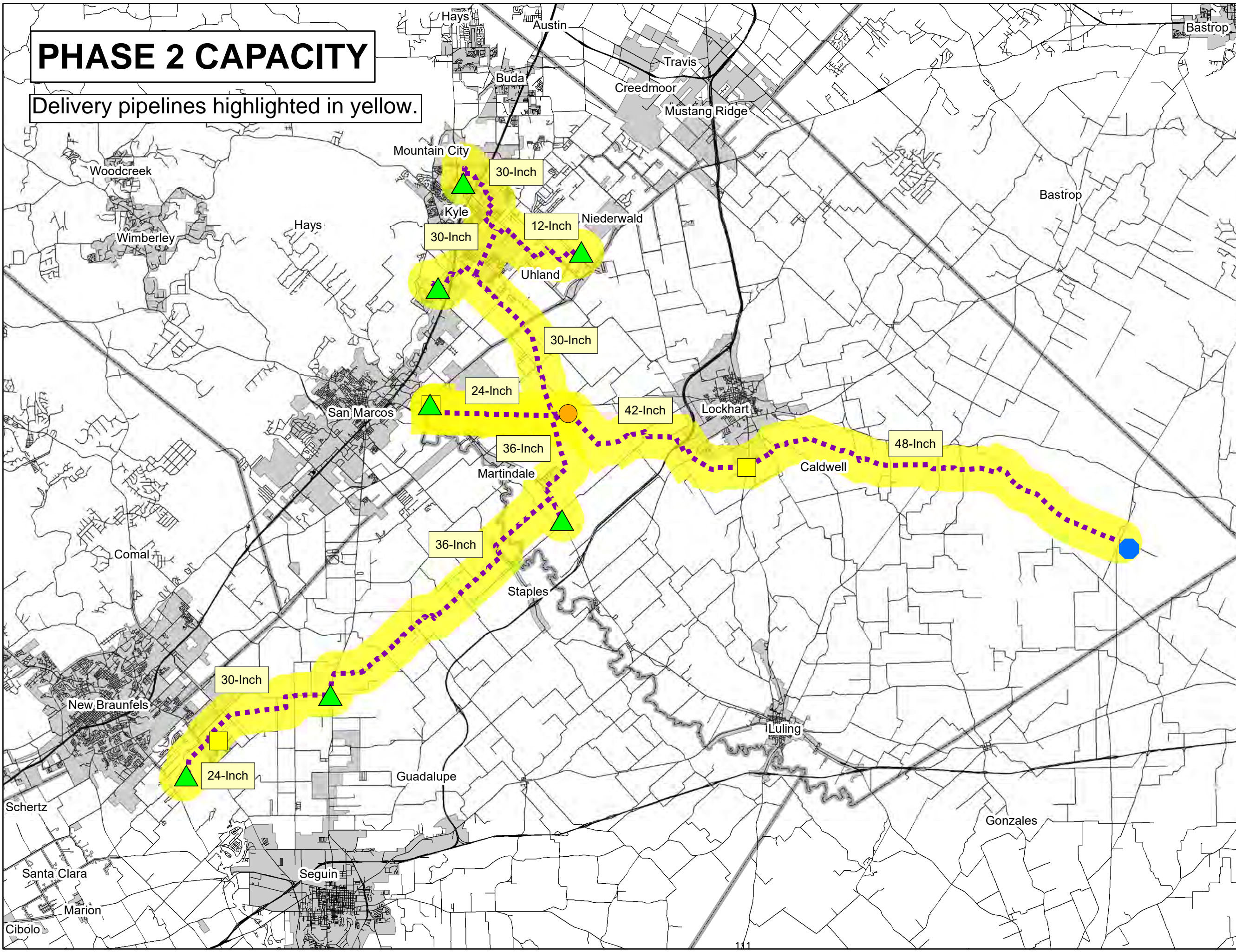
Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.








TITLE:	Infrastructure Overview: Phase 1 Capacity Exhibit
PROJECT:	Combined Alliance Water and GBRA Program
DATE:	09/05/2019

PHASE 2 CAPACITY

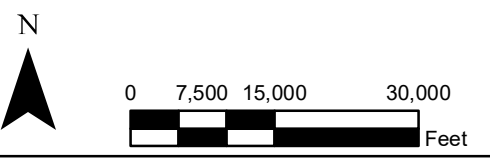
Delivery pipelines highlighted in yellow.



Legend

-  **Booster Pump Station**
-  **Delivery Point - Alliance Water**
-  **Delivery Point - GBRA**
-  **WTP, Well Civil/Elec/Mech, HSPS**
-  **ARWA Only (Future Pipeline)**

Note: Pipe sizes, alignments, and delivery locations are preliminary in nature and will be finalized during final engineering design.



TITLE:	Infrastructure Overview: Phase 2 Capacity Exhibit
PROJECT:	Combined Alliance Water and GBRA Program
DATE:	09/05/2019

4		PHASE 1B PROGRAM COST EVALUATION FACT SHEET	
ITEM UNDER CONSIDERATION:	OPTION 1 - DEFER ADMINISTRATIVE AND OPERATIONS FACILITY	POTENTIAL CAPITAL COST SAVINGS:	\$4,400,000
		POTENTIAL CAPITAL COST SAVINGS (30% CONTINGENCY):	\$5,700,000
ITEM UNDER CONSIDERATION:	OPTION 2 – DEFER ONLY THE ADMINISTRATIVE PORTION OF THE FACILITY	POTENTIAL CAPITAL COST SAVINGS:	\$3,200,000
		PROJECTED CAPITAL COST SAVINGS (30% CONTINGENCY):	\$4,100,000

Summary

This option consists of deferring all or a portion of the proposed Administrative and Operations facilities that are proposed to be installed as part of the Phase 1B Program. These facilities are to be located adjacent to the proposed booster pump station.

Two options are being considered:

1. Defer both the Administrative and Operations facilities;
2. Defer only the Administrative portion of the facility.

Pros

Cons

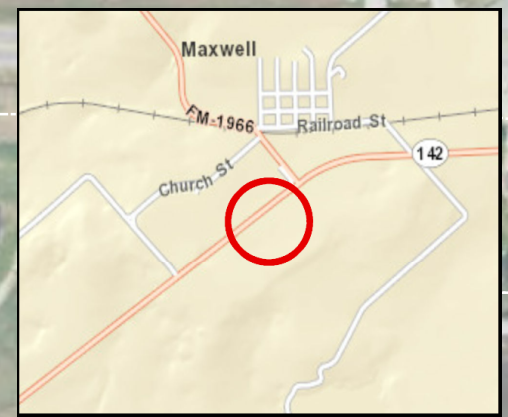
Capital cost savings in not constructing the portions of the facilities	The lack of an Administrative facility will result in a monthly cost for temporary housing for employees.
	Defers capital costs to a future timeframe with potentially increased construction costs.
	The Operations facility is intended to serve as the primary control center for the proposed infrastructure, with a backup control center at the water treatment plant. Defer the Operations portion of the facility (Option 1) and the water treatment plant will be the sole control center in the interim. There will be no redundancy in telemetry control system.

Cost Evaluation

Option	Description	Potential Capital Cost Savings	30% Contingency	Temporary Housing Cost
1	Defer the entire facility	\$4,400,000	\$5,700,000	\$800/month
2	Defer only the Administrative portion of the facility	\$3,200,000	\$4,100,000	\$800/month

Note: No savings to be realized by GBRA with either option.

FM 142 (TxDOT)



Location of Administration and Operations Facility

370-ft
30-ft

PUBLIC PARKING
EMPLOYEE PARKING
OPERATIONS ADMIN

COVERED PARKING
TRAILER STORAGE
WASH PAD

TRUCKS/
EQUIP.
STORAGE

INTERCONNECTION
W/PRV

30" 30" 42" 42"
ELECTRICAL BUILDING
GENERATOR/
TRANSFORMER
PADS
PUMP PAD
DISINFECTION

GRAVITY
FEED TO
SAN
MARCOS

160'-DIA.
6 MG
TANK

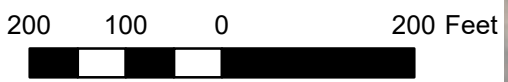
OVERFLOW
STILLING
BASIN

EXISTING ELECTRIC
EASEMENT

Legend
Kimley»Horn

- Maxwell to Kyle
(Not part of combined program)
- Maxwell to Green Valley
- Maxwell to San Marcos
- WTP to Maxwell
- Suction Header

MAXWELL PUMP STATION LAYOUT - PHASE 1B



Source: Esri, DigitalGlobe, GeoEye, AeroGRID, IGN, and the GIS 1st

This map is conceptual in nature. No engineering design or analysis has been performed in the drawing of this exhibit. Property boundaries and easements have not been surveyed. 9/28/2018

5	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: DEFER INLINE ELEVATED STORAGE TANKS	
POTENTIAL COST SAVINGS:	\$6,600,000
POTENTIAL COST SAVINGS (30% CONTINGENCY):	\$8,600,000

Summary

Two Inline Elevated Storage Tanks are proposed to be installed along the transmission delivery pipelines, one on Segment C and the other on Segment D. The benefits of these tanks are that they will provide a consistent delivery pressure range for the proposed booster pumps as well as provide water to delivery points during periods of low demand, resulting in a straightforward system for ARWA to control and fewer surge issues. This option considers the deferral of these tanks, instead relying solely on controls and SCADA to operate the system. This alternative approach will require additional operational controls and SCADA to be installed.

Pros

Cons

Capital cost savings in deferring the tanks	Additional operational considerations (controls / SCADA) and significantly increased complexity in normal system operation to balance pump on/off with valve opening/closing
Reduced water age could potentially result in easier water quality management.	Inline tanks will serve to mitigate surge incidents in the transmission system. Deferring these tanks will create greater risk for impacts from surge events, such as damaged pipe and appurtenances.
	Additional complexity in selection of booster pumps that will operate successfully before and after installation of tanks due to larger range of conditions
	Increased complexity of start-up process
	Defers capital costs to a future timeframe with likely increased construction costs

Breakdown of Cost Evaluation

Item	Description	Quantity	Unit Price	Total Price	ARWA Portion	GBRA Portion
1	Segment D Inline Elevated Storage Tank	1	\$ 4,000,000	\$ 4,000,000	\$ 3,000,000	\$ 1,000,000
2	Additional Controls and SCADA	1	\$ (100,000)	\$ (100,000)	\$ (75,000)	\$ (25,000)
3	Additional Surge Mitigation	1	\$ (150,000)	\$ (150,000)	\$ (112,500)	\$ (37,500)
4	Segment C Inline Elevated Storage Tank	1	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ -
5	Additional Controls and SCADA	1	\$ (100,000)	\$ (100,000)	\$ (100,000)	\$ -
6	Additional Surge Mitigation	1	\$ (150,000)	\$ (150,000)	\$ (150,000)	\$ -
Total				\$ 7,500,000	\$ 6,600,000	\$ 900,000
Total with 30% Contingency				\$ 9,800,000	\$ 8,600,000	\$ 1,200,000

Table Notes:

- Please note the prices listed are rounded.
- The negative unit prices indicate a reduction in potential cost savings to ARWA based on the deferral of the construction of the Inline Elevated Storage Tanks during the Phase 1B Program.
- Deferral of the Inline Elevated Storage Tanks will add additional costs for Controls and SCADA to properly operate the system.
- The table shows both ARWA and GBRA savings. Since Segment C only conveys water for ARWA, ARWA recognizes the full value of deferring the Inline Elevated Storage Tank.

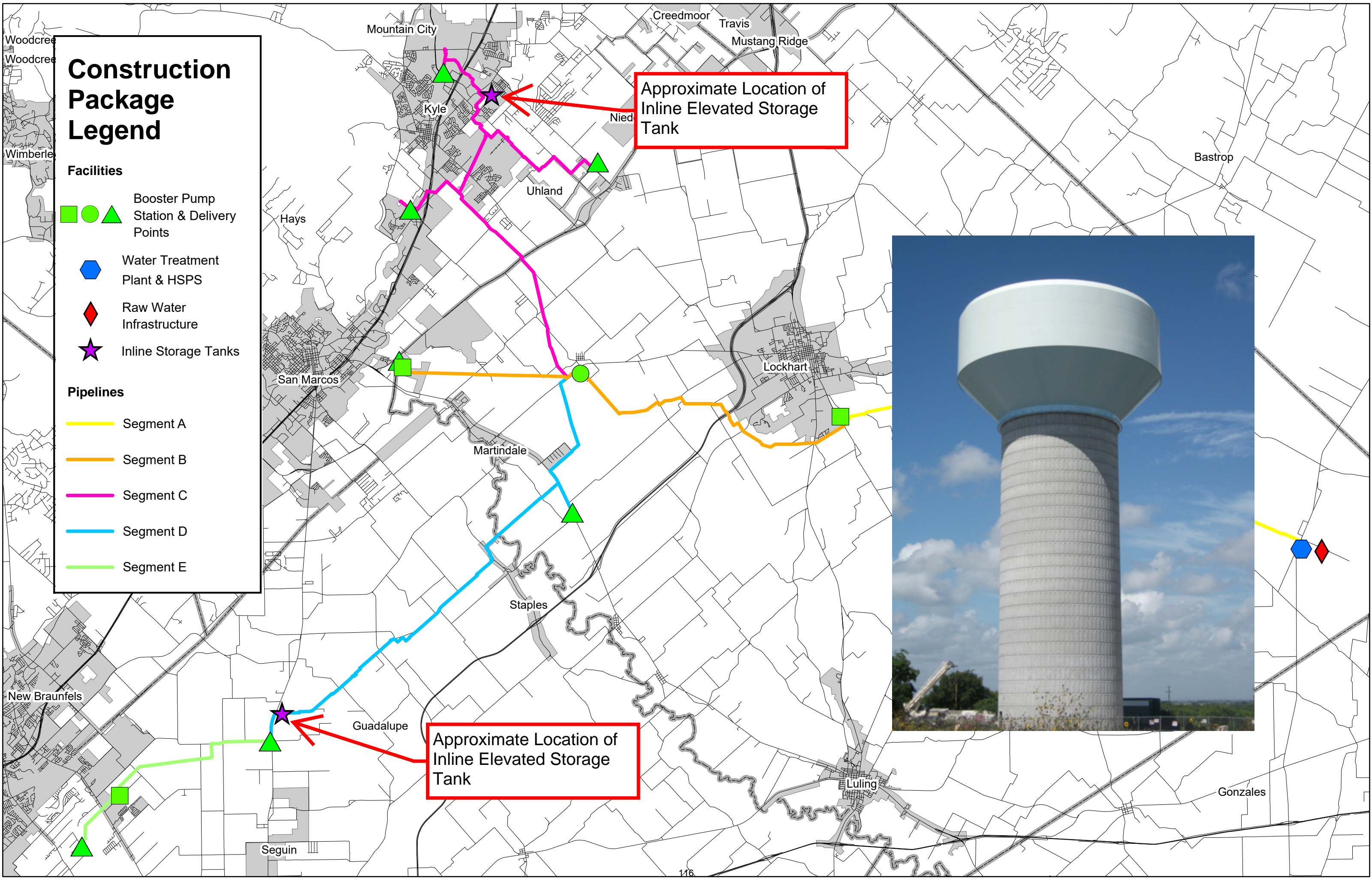
Construction Package Legend

Facilities

- Booster Pump Station & Delivery Points
- Water Treatment Plant & HSPS
- Raw Water Infrastructure
- Inline Storage Tanks

Pipelines

- Segment A
- Segment B
- Segment C
- Segment D
- Segment E



Approximate Location of
Inline Elevated Storage
Tank

Approximate Location of
Inline Elevated Storage
Tank



6		PHASE 1B PROGRAM COST EVALUATION FACT SHEET	
ITEM UNDER CONSIDERATION: PACKAGING OF DESIGN PROJECTS INTO LARGER CONSTRUCTION PACKAGES			
POTENTIAL OPTION 1:	ALL FACILITY PROJECTS	POTENTIAL COST SAVINGS:	\$1,700,000
		POTENTIAL COST SAVINGS (30% CONTINGENCY)	\$2,200,000
POTENTIAL OPTION 2:	EAST/WEST PROJECTS	POTENTIAL COST SAVINGS:	\$7,900,000
		POTENTIAL COST SAVINGS (30% CONTINGENCY)	\$10,300,000

Summary

The Phase 1B Owner’s Representative team has had ongoing coordination with multiple contractors that are interested in pursuing the proposed Phase 1B infrastructure. The idea of combining many of the design projects into larger packages for construction has been explored, to get an idea of what the potential cost savings may be to ARWA. The proposed Phase 1B infrastructure packages will be released as Competitive Sealed Proposals (CSPs), which will allow a mechanism for contractors to bid projects individually but also identify potential cost savings if they are selected for multiple projects simultaneously. There are multiple ways that these projects could be combined into larger packages, but two examples that were explored with contractors include:

- **Option 1** is to combine all facility work into one package. This includes the Water Treatment Plant, Booster Pump Station, and Raw Water Infrastructure.
- **Option 2** is to combine all east to west projects. This includes the Water Treatment Plant, Booster Pump Station, Segment A Pipeline, Segment B Pipeline, and the Raw Water Infrastructure.

Pros

Cons

One contractor responsibility for a larger scope of work	Relying on one contractor to manage and construct 4 large portions of the Phase 1B Program on schedule
Increase in large national construction company interest	Release of projects will need to be timed to allow for contractor feedback on costs and ARWA to evaluate all options to approve the preferred construction package
Larger scale of material to purchase at one time	May reduce pool of likely bidders

Cost Evaluation

Package Options	Projected Construction Cost	ARWA Share	ARWA Potential Savings	GBRA Share	GBRA Potential Savings
1	Total package \$55,800,000	\$33,300,000	\$1,700,000	\$24,400,000	\$1,100,000
	w/ 30% Contingency \$72,500,000	\$43,300,000	\$2,200,000	\$29,200,000	\$1,500,000
2	Total package \$128,500,000	\$79,200,000	\$7,900,000	\$49,300,000	\$4,900,000
	w/ 30% Contingency \$167,100,000	\$103,000,000	\$10,300,000	\$64,100,000	\$6,400,000

PHASE 1B PROGRAM COST - REPACKAGING FACILITIES
PROJECTED CONSTRUCTION COST WITH 30% CONTINGENCY





CONSTRUCTION PACKAGE - OPTION 1	PROJECTED CONSTRUCTION COST	ARWA / GBRA SPLIT	
		ARWA SHARE	GBRA SHARE
WATER TREATMENT PLANT	\$43,600,000	\$23,300,000	\$20,300,000
BOOSTER PUMP STATION	\$24,100,000	\$15,200,000	\$8,900,000
RAW WATER INFRASTRUCTURE	\$4,800,000	\$4,800,000	\$0
PHASE 1B PROGRAM TOTAL	\$72,500,000	\$43,300,000	\$29,200,000
REPACKAGING POTENTIAL SAVINGS (5%)	\$3,600,000	\$2,200,000	\$1,500,000

**REPACKAGING EAST-WEST INFRASTRUCTURE
PROJECTED CONSTRUCTION COST WITH 30% CONTINGENCY**

CONSTRUCTION PACKAGE - OPTION 2	PROJECTED CONSTRUCTION COST	ARWA / GBRA SPLIT	
		ARWA SHARE	GBRA SHARE
WATER TREATMENT PLANT	\$43,600,000	\$23,300,000	\$20,300,000
BOOSTER PUMP STATION	\$24,100,000	\$15,200,000	\$8,900,000
PIPELINE SEGMENT A	\$48,600,000	\$29,200,000	\$19,400,000
PIPELINE SEGMENT B	\$46,000,000	\$30,500,000	\$15,500,000
RAW WATER INFRASTRUCTURE	\$4,800,000	\$4,800,000	\$0
PHASE 1B PROGRAM TOTAL	\$167,100,000	\$103,000,000	\$64,100,000
REPACKAGING POTENTIAL SAVINGS (10%)	\$16,700,000	\$10,300,000	\$6,400,000

Construction Package Legend

Facilities

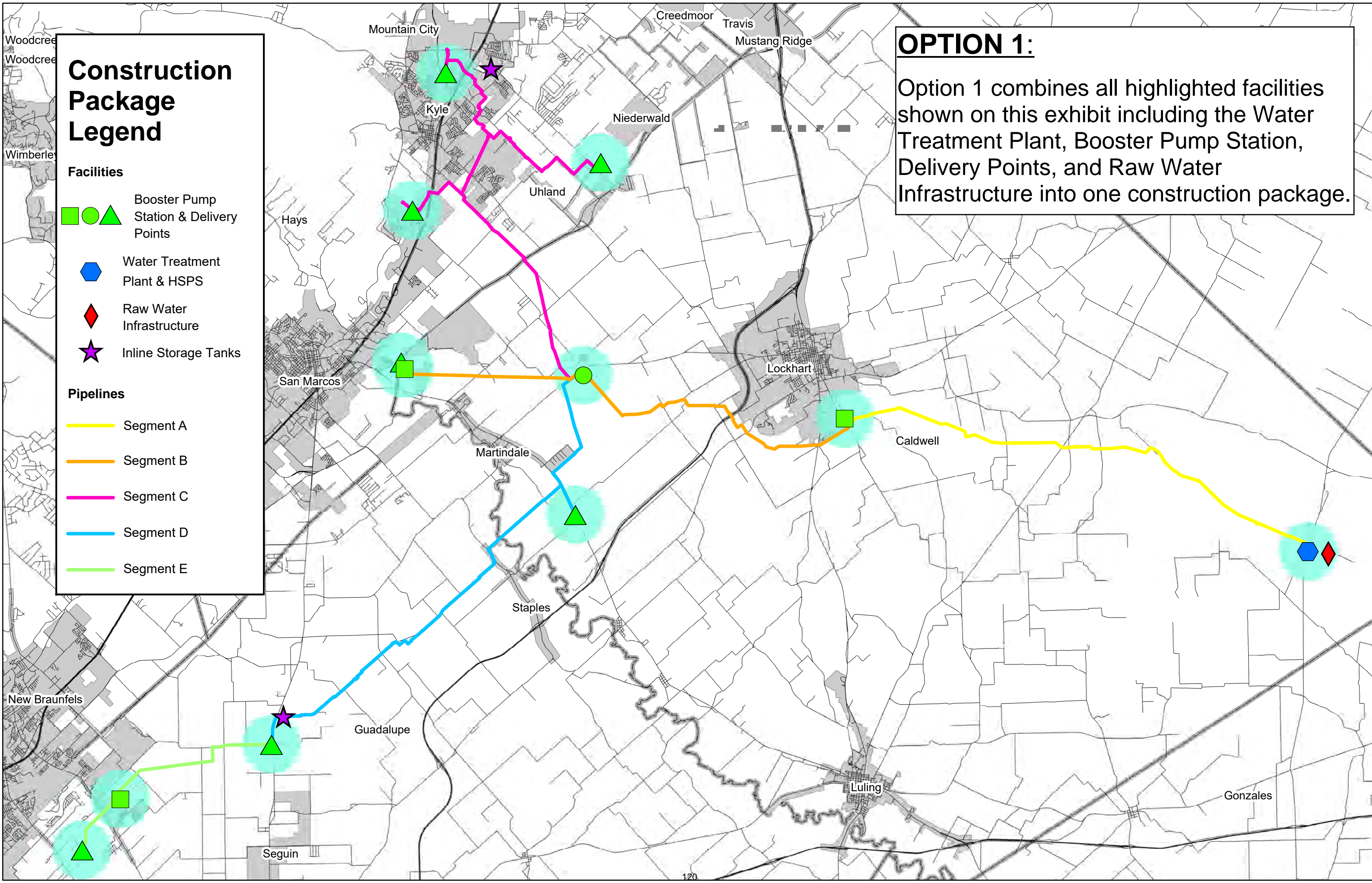
-  Booster Pump Station & Delivery Points
-  Water Treatment Plant & HSPS
-  Raw Water Infrastructure
-  Inline Storage Tanks

Pipelines

-  Segment A
-  Segment B
-  Segment C
-  Segment D
-  Segment E





OPTION 1:

Option 1 combines all highlighted facilities shown on this exhibit including the Water Treatment Plant, Booster Pump Station, Delivery Points, and Raw Water Infrastructure into one construction package.



Construction Package Legend

Facilities

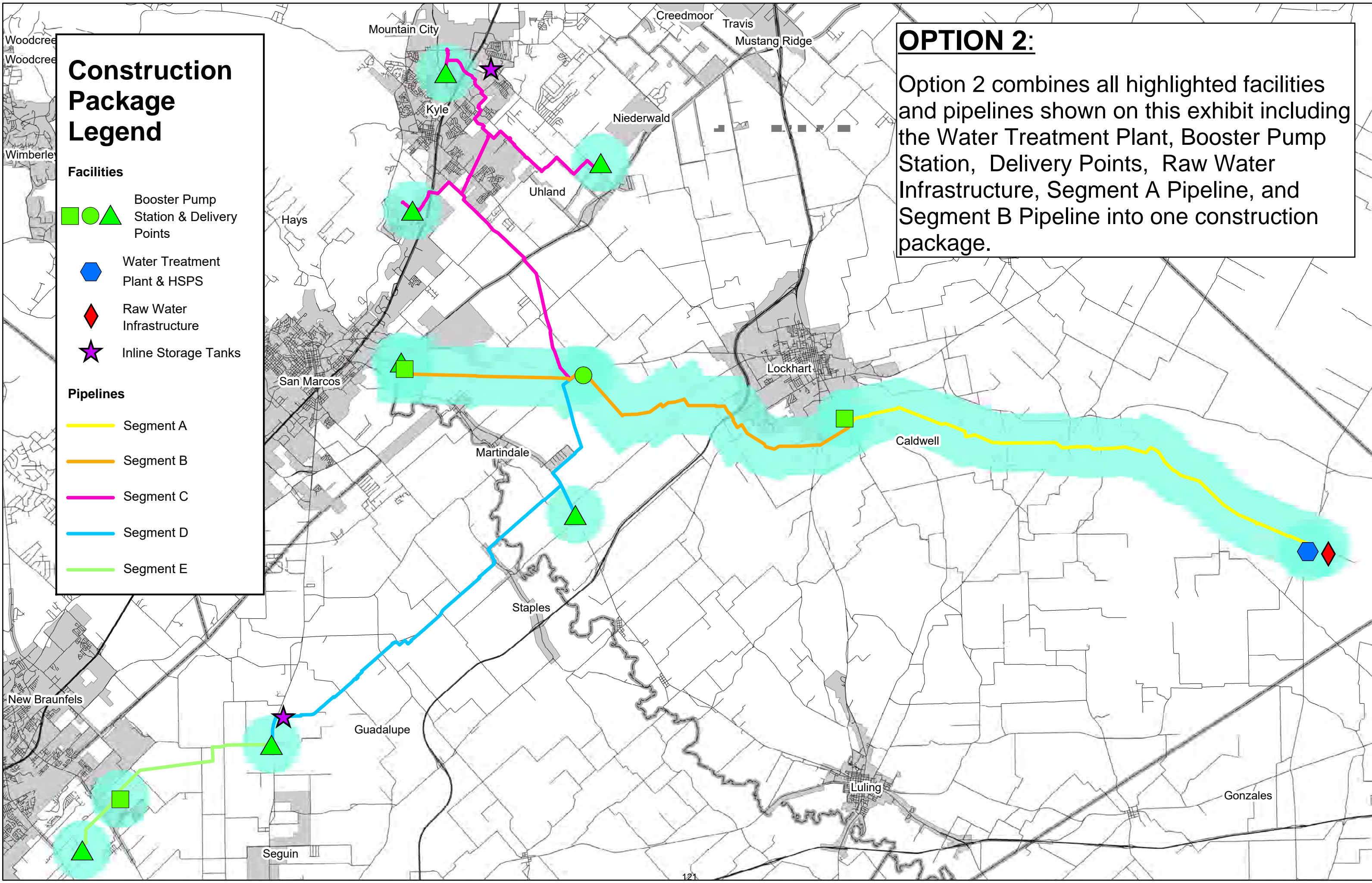
-  Booster Pump Station & Delivery Points
-  Water Treatment Plant & HSPS
-  Raw Water Infrastructure
-  Inline Storage Tanks

Pipelines

-  Segment A
-  Segment B
-  Segment C
-  Segment D
-  Segment E

OPTION 2:

Option 2 combines all highlighted facilities and pipelines shown on this exhibit including the Water Treatment Plant, Booster Pump Station, Delivery Points, Raw Water Infrastructure, Segment A Pipeline, and Segment B Pipeline into one construction package.



7	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION: ISOLATION VALVE SPACING REVISION	
POTENTIAL COST SAVINGS:	\$2,600,000
POTENTIAL COST SAVINGS (30% CONTINGENCY):	\$3,400,000

Summary

This option consists of reducing the total number of isolation valves to be placed along the pipeline segments. The original design standards required a maximum spacing of 5,000 linear feet between isolation valves. The proposed revise standards require isolation valve spacing to not exceed 13,000 linear feet and one isolation valve should be placed at all railroad, major roadway, and major river crossings. The Design Consultants will also consider the accessibility to the isolation valve when determining the specific distances between isolation valves.

Pros

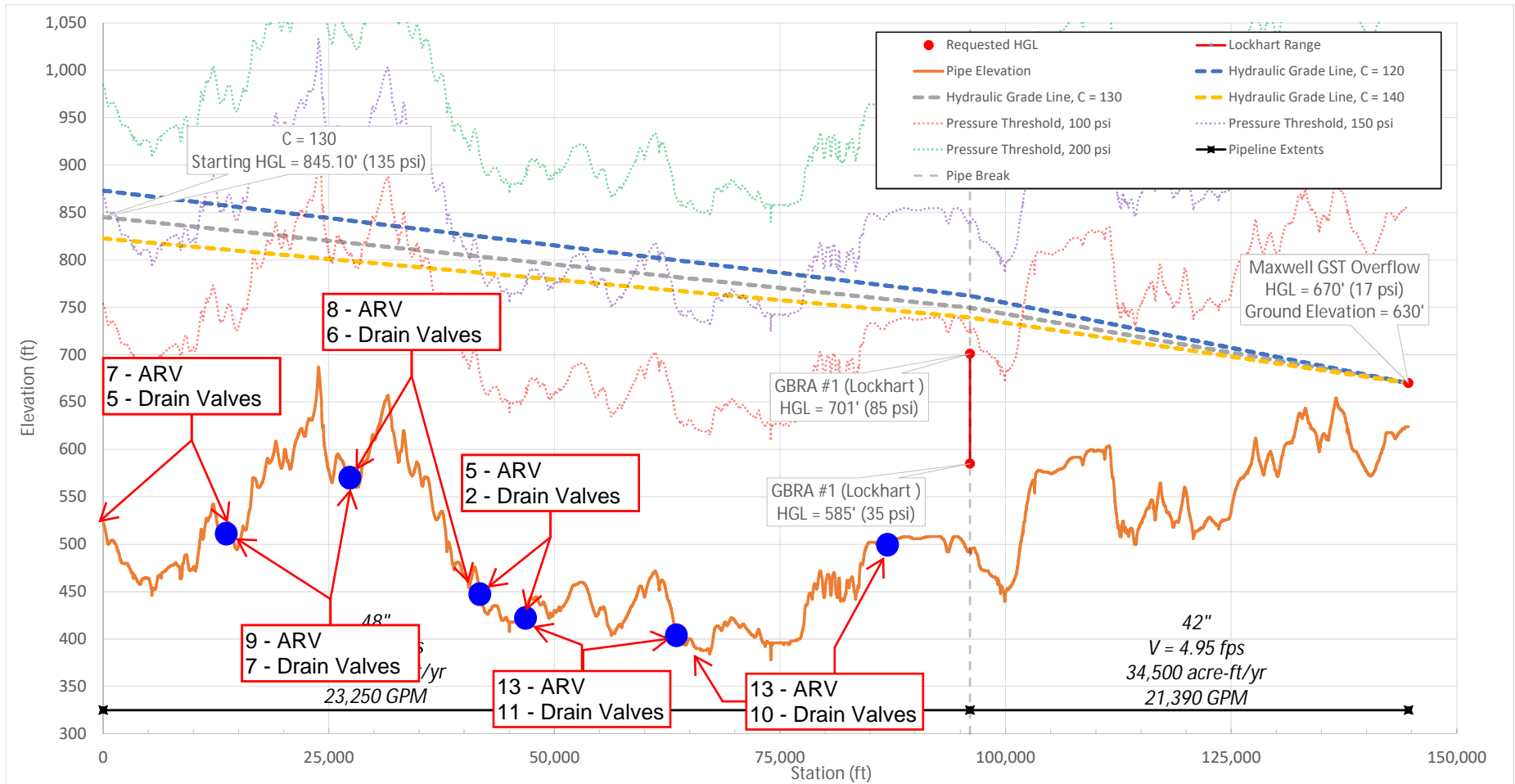
Cons

Lower number of isolation valves to install and maintain	Less isolation valves equals a greater volume of water stored between valves
Strategically placed isolation valves in areas of higher accessibility and eliminating isolation valves that will be difficult to access	Less isolation valves equals a greater time to fill and drain the line

Cost Evaluation

Segment	Technical Memorandum (TM)		Anticipated Revised Number of Valves		Potential Cost Savings	ARWA Savings	GBRA Savings
	Quantity	Total Cost	Quantity	Total Cost			
A	19	\$1,500,000	6	\$500,000	\$1,000,000	\$600,000	\$400,000
B	27	\$1,400,000	6	\$400,000	\$1,000,000	\$670,000	\$330,000
C	25	\$900,000	13	\$500,000	\$400,000	\$400,000	\$0
D	24	\$1,900,000	12	\$900,000	\$1,000,000	\$750,000	\$250,000
E	11	\$700,000	6	\$400,000	\$300,000	\$200,000	\$100,000
Total	106	\$6,400,000	43	\$2,700,000	\$3,700,000	\$2,600,000	\$1,100,000
Total with Contingency (30%)	-	\$8,300,000	-	\$3,500,000	\$4,800,000	\$3,400,000	\$1,400,000

POSSIBLE SEGMENT A ISOLATION VALVE SPACING



**PHASE 1B PROGRAM COST - ISOLATION VALVE SPACING
PROJECTED ARWA CONSTRUCTION COST SAVINGS**

Drain Time Analysis	
Pipe Diameter (ft)	4
Cross-Section Area (ft ²)	12.6
Average Drain Valve Spacing (ft)	1,500.00
Volume of Water Between Drain Valves (gal)	150,000.00
Assumed Rate of Discharge (gpm)	1,000.00
Time to Drain Water Between Drain Valves (hours)	2.5

PHASE 1B PROGRAM COST - ISOLATION VALVE SPACING PROJECTED ARWA CONSTRUCTION COST SAVINGS

Time repair a segment of pipe based on isolation valve spacing		
Isolation Valve Spacing	5,000	13,000
Time to travel and close two isolation valves (hours)	3	4
Time to travel and open drain valves (average spacing 1,500 FT at 45 minutes to access and open drain valves) (hours)	3	7
Time to drain the segment of pipe (average drain valve spacing 1,500 FT at 2.5 hours to drain 1,500 segment) (hours)	3	3
Repair segment of pipe (hours)	72	72
Time to travel and close drain valves (average spacing 1,500 FT at 45 minutes to access and close drain valve) (hours)	3	7
Time to travel and open one isolation valve (nearest to WTP) (hours)	1.5	1.5
Time to flush segment of pipe (average 4 ft/sec) (hours)	0.3	0.9
Time to close isolation valve (nearest to WTP) to disinfect the segment of pipe (hours)	1.5	1.5
Time for disinfection and testing (hours)	24	24
Time to open isolation valve to flush line (nearest to WTP) (hours)	1.5	1.5
Time to flush line (average 4 ft/sec) (hours)	0.3	0.9
Time to travel and open one isolation valve (hours)	1.5	1.5
Total Hours	114.7	124.8
Total Days	4.8	5.2

8	PHASE 1B PROGRAM COST EVALUATION FACT SHEET
ITEM UNDER CONSIDERATION:	STREAM CROSSING EXCEPTION (REDUCE TUNNELING/ENCASEMENT SEGMENTS)
POTENTIAL COST SAVINGS:	\$1,100,000
POTENTIAL COST SAVINGS (30% CONTINGENCY):	\$1,400,000

Summary

This option consists of reviewing the Pipeline Segments Technical Memorandums (TM) and identifying locations where there is a potential to reduce the quantity of installation by trenchless methods (such as boring or tunneling) as well as protective encasement pipe over the water pipeline when crossing smaller streams that are typically dry or shown no sign of regular flows, eliminate requirements for trenchless crossings and/or encasement. This will require an exception from the Texas Commission on Environmental Quality (TCEQ).

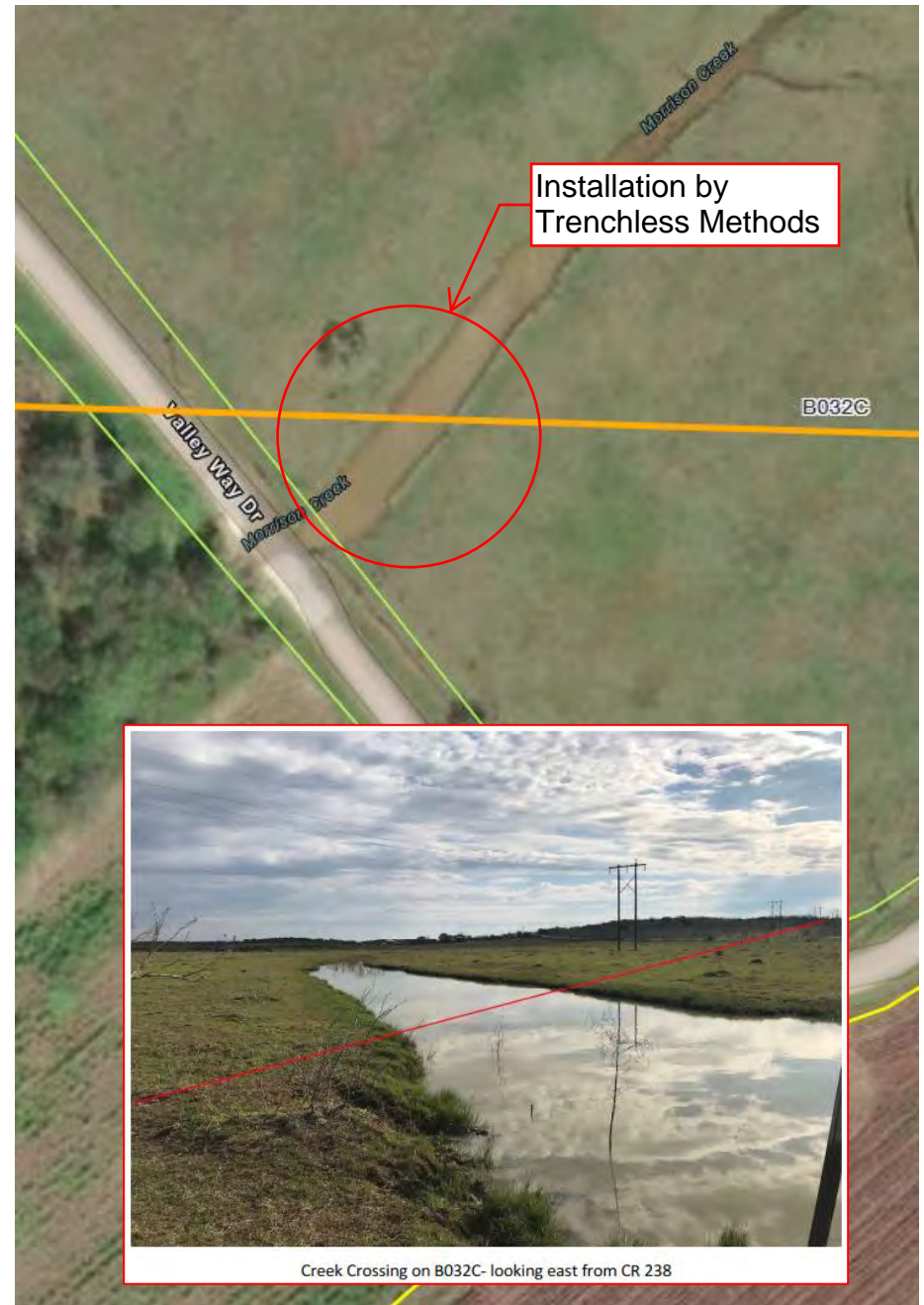
Pros

Cons

<p>Allows for open cut construction methods at dry or no sign of regular flows</p>	<p>Long term, as development occurs in the general vicinity of these streams and there is potential for higher flows during rain events, it is possible that scouring of the water body could occur. Should the stream scour to the elevation of the pipeline, the pipeline could be exposed with no protective casing.</p>
<p>Easier maintenance of the pipe in these locations without encasement over the pipe.</p>	

Cost Evaluation

Segment	Technical Memorandum (TM)	Anticipated Reduced QTY (Trenchless/ Encasement)	Anticipated Revised Cost	Potential Cost Savings	ARWA Savings	GBRA Savings
	Total Cost	Quantity (LF)	Total Cost			
A	\$2,000,000	1,200	\$1,500,000	\$500,000	\$300,000	\$200,000
B	\$2,000,000	700	\$1,700,000	\$300,000	\$200,000	\$100,000
C	\$3,200,000	250	\$3,100,000	\$100,000	\$100,000	\$0
D	\$2,800,000	800	\$2,300,000	\$500,000	\$375,000	\$125,000
E	\$2,500,000	400	\$2,300,000	\$200,000	\$130,000	\$70,000
Total	\$12,500,000	3,350	\$10,900,000	\$1,600,000	\$1,100,000	\$500,000
Total with Contingency (30%)	\$16,300,000	-	\$14,200,000	\$2,100,000	\$1,400,000	\$700,000



* Photos and descriptions taken from the "Phase 1B Pipeline Segment B Engineering Feasibility Report" (K. Friese and Associates; August 2019)

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.

520 E. RR 150, Kyle, TX 78640

- F.6** Discussion and possible direction to Staff regarding the Authority's draft Staffing Plan. ~ *Graham Moore, P.E., Executive Director*
-

Background/Information

Staff has prepared the attached organizational charts in order to anticipate the number and types of staff that will be needed in order to appropriately operate through time. Staff will discuss the organizational charts at the meeting and some of the reasoning / philosophy regarding how they were developed.

The following assumptions were made in preparing the organizational charts:

2029: 24/7 Operations will be necessary.

2022: Operators will be brought on prior to full operations – the goal is for them to help with the inspection/construction management and to learn the overall system.

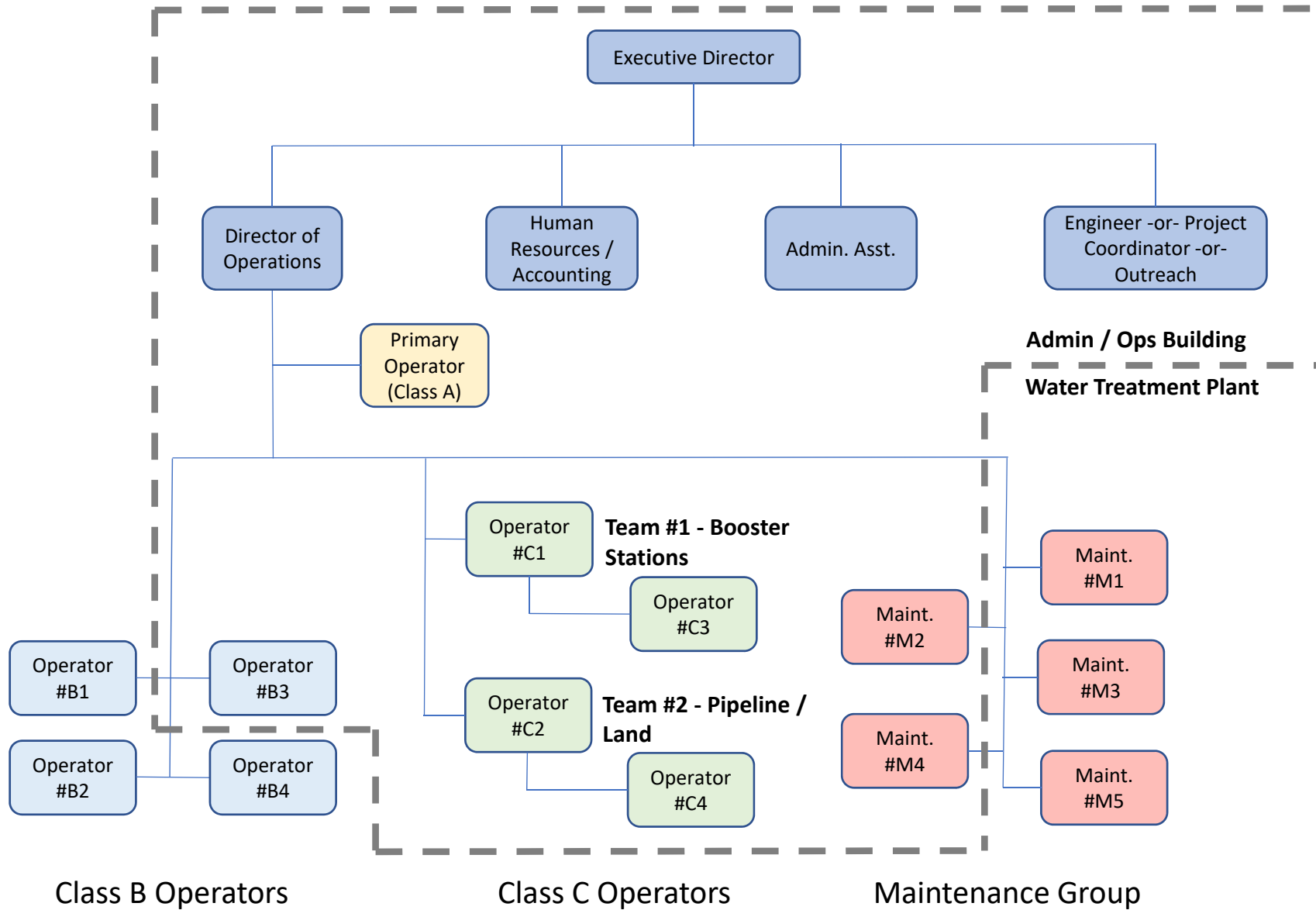
Attachment(s):

- Organizational Chart for four different years: 2029, 2024, 2022 & 2020

Technical Committee Decision Needed:

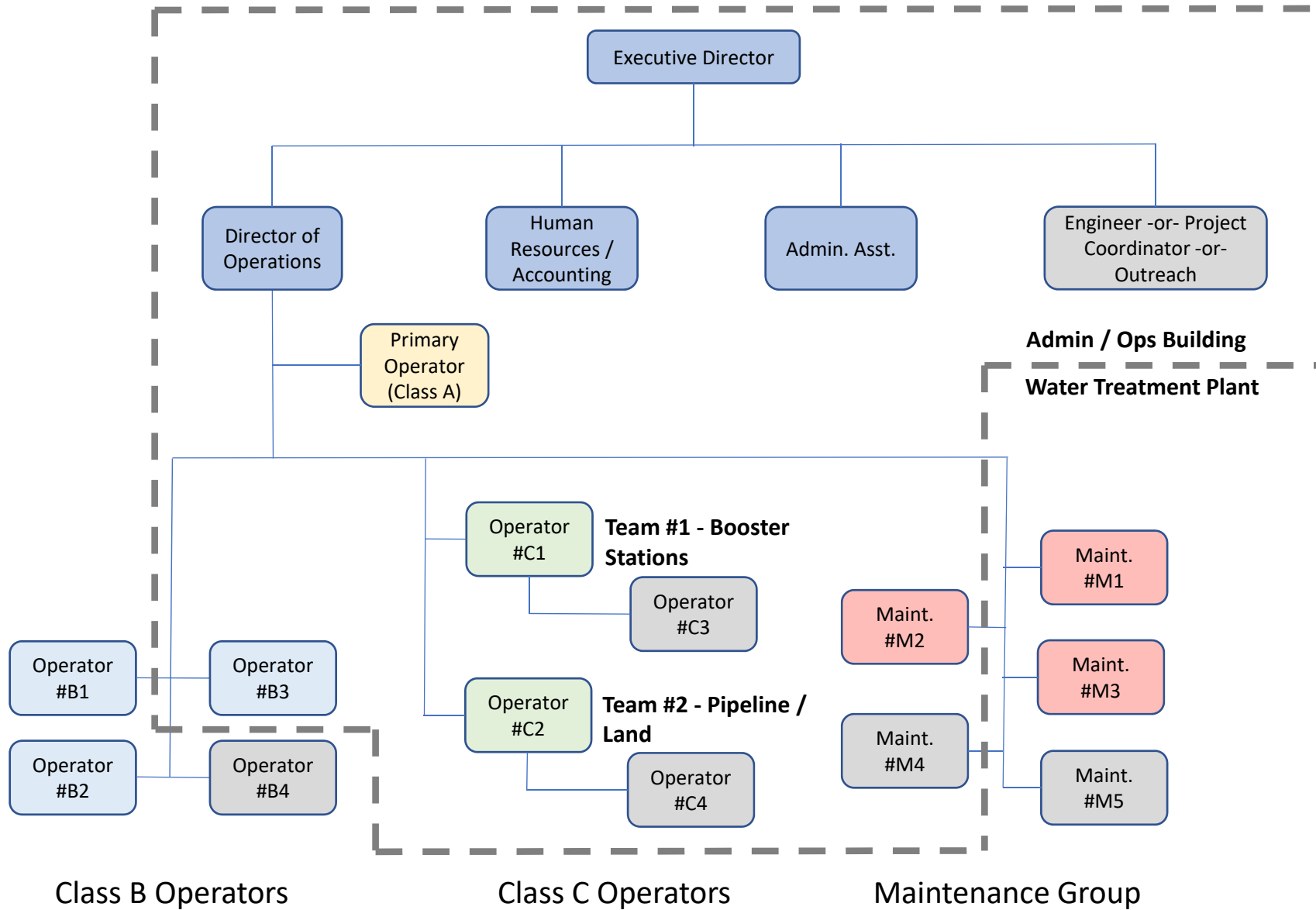
- Possible direction to Staff.

2029 Organizational Chart





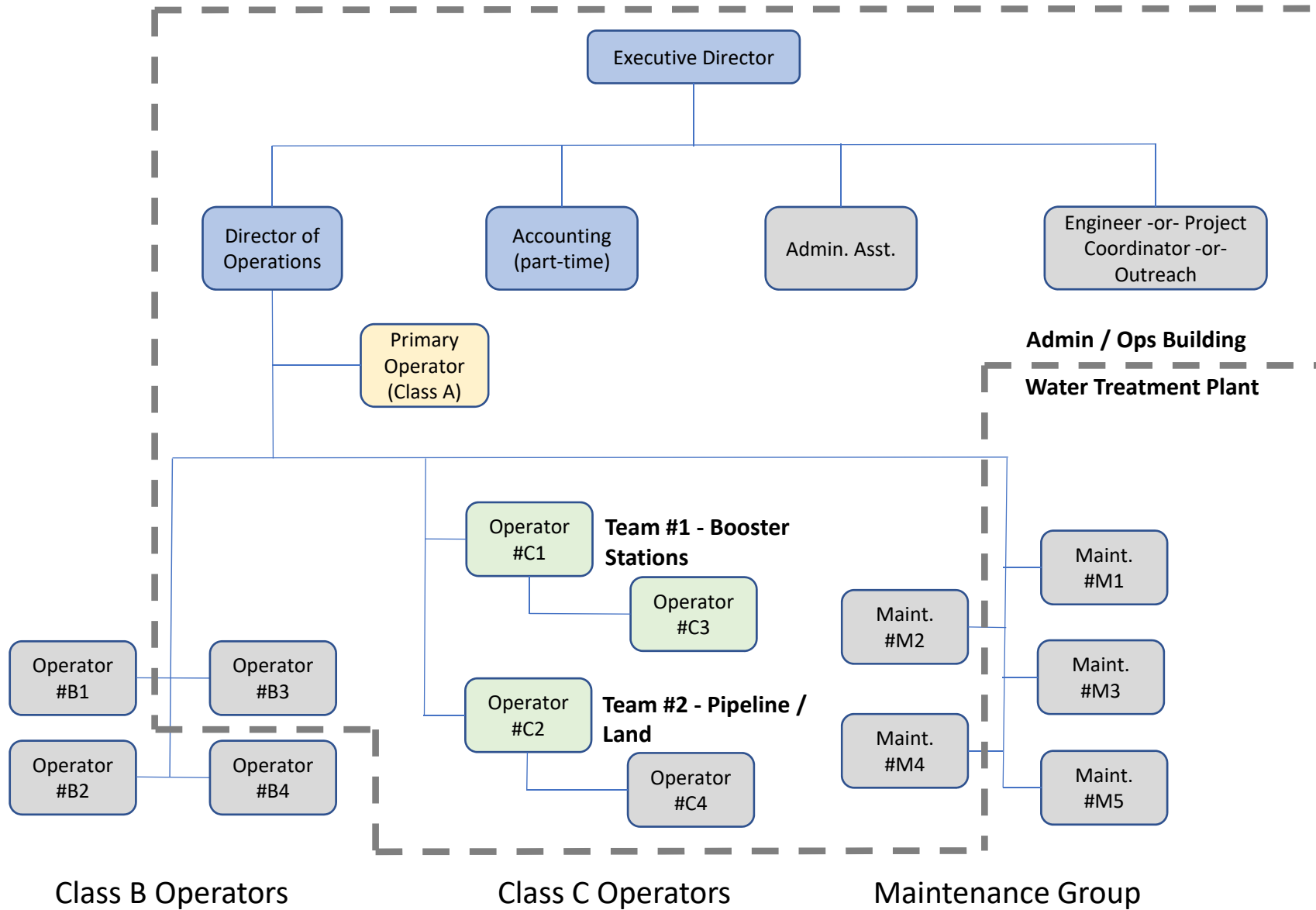
2024 Organizational Chart



Future Position

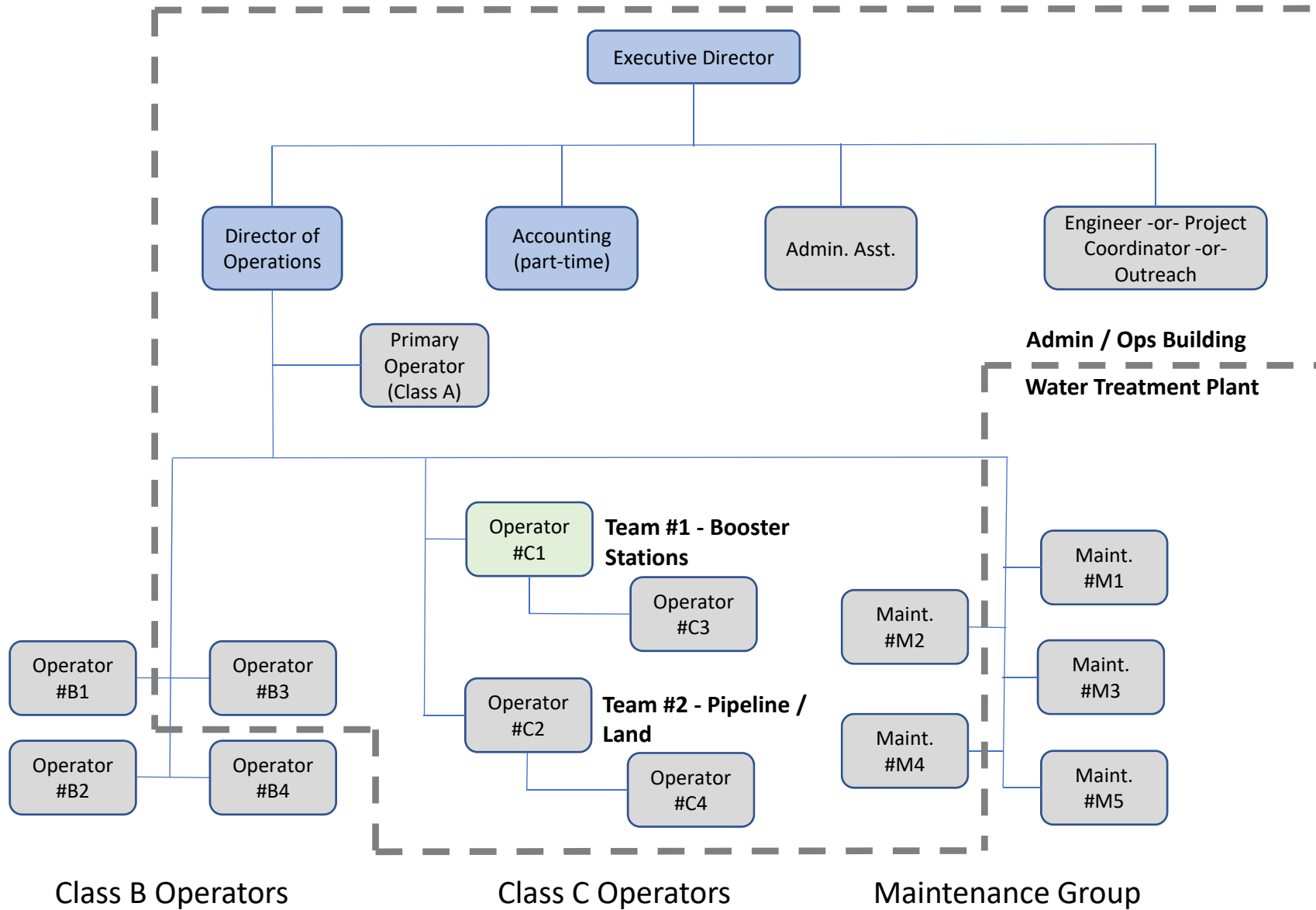


2022 Organizational Chart



Future Position

2020 Organizational Chart



Future Position

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

- F.7** Update on status of groundwater management in project target area, and Gonzales County Underground Water Conservation District, Plum Creek Conservation District, Groundwater Management Area 13, Region L Planning Group, Guadalupe-Blanco River Authority, Hays County and CAPCOG activities.
~ *Graham Moore, P.E., Executive Director*
-

Gonzales County Underground Water Conservation District (GCUWCD)

The GCUWCD is scheduled to meet on November 12th after the Technical Committee meeting.

Plum Creek Conservation District (PCCD)

The PCCD is scheduled to meet on November 19th.

Groundwater Management Area 13

The next GMA-13 meeting is scheduled for November 8th in Pleasanton. A verbal update will be provided at the Technical Committee.

Region L Planning Group

Region L held their latest meeting on November 7th. The Authority's three projects were presented. There was a question about anticipated drawdown information resulting from the Carrizo projects. There was also a question asking clarification on the direct potable reuse project regarding where the concentrate is expected to be disposed.

Guadalupe-Blanco River Authority; Hays County Activities; CAPCOG Activities

No update.

Technical Committee decision needed:

- None.

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
 Tuesday, November 12, 2019 at 3:00 P.M.
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G. EXECUTIVE DIRECTOR REPORT

Board Meeting

- The November Board meeting will be held at the San Marcos Activity Center on Wednesday, November 20th.

Consultant Invoices Paid

- Below are reports on the consultant invoices paid in September and October.

FY 18-19 CONSULTANT INVOICES PAID in SEPTEMBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/Anomalies
Mark B. Taylor	\$130,000.00	\$9,515.00	\$110,555.00	85%	\$19,445.00	
LAN - Kyle/Buda Design	\$45,469.89	\$11,325.83	\$38,049.63	84%	\$7,420.26	
Patricia Ehrlinger Carls	\$50,000.00	\$1,127.00	\$8,603.17	17%	\$41,396.83	
RW Harden	\$60,000.00	\$4,150.26	\$49,160.10	82%	\$10,839.90	
Tx Solutions Group	\$72,000.00	\$6,000.00	\$72,000.00	100%	\$0.00	
Gap Strategies	\$50,000.00	\$0.00	\$24,479.75	49%	\$25,520.25	
BGE - Ph 1A CA	\$181,136.00	\$0.00	\$76,473.54	42%	\$104,662.46	
LAN - ROW Acquisition	\$37,592.23	\$0.00	\$5,482.19	15%	\$32,110.04	
Kent Alan Sick - ROW Legal	\$45,000.00	\$6,193.42	\$6,193.42	14%	\$38,806.58	
LNV - Ph 1A Observations	\$205,185.59	\$21,890.00	\$199,861.25	97%	\$5,324.34	
LNV - GIS Svcs	\$36,046.38	\$75.00	\$5,268.75	15%	\$30,777.63	
Fugro	\$13,880.00	\$0.00	\$0.00	0%	\$13,880.00	
MLA Labs, Inc.	\$21,437.00	\$0.00	\$9,611.00	45%	\$11,826.00	
MWM Design Group	\$5,293.00	\$0.00	\$5,293.00	100%	\$0.00	
Armstrong, Vaughan & Associates, P.C.	\$10,505.00	\$0.00	\$10,505.00	100%	\$0.00	
Total	\$963,545.09	\$60,276.51	\$621,535.80		\$342,009.29	

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
 Tuesday, November 12, 2019 at 3:00 P.M.
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FY 18-19 CONSULTANT INVOICES PAID in OCTOBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/Anomalies
Mark B. Taylor	\$130,000.00	\$7,475.00	\$108,030.00	83%	\$21,970.00	
LAN - Kyle/Buda Design	\$45,469.89	\$11,325.83	\$38,049.63	84%	\$7,420.26	
Patricia Ehrlinger Carls	\$50,000.00	\$637.00	\$9,240.17	18%	\$40,759.83	
RW Harden	\$60,000.00	\$3,130.00	\$52,290.10	87%	\$7,709.90	
Tx Solutions Group	\$72,000.00	\$0.00	\$72,000.00	100%	\$0.00	
Gap Strategies	\$50,000.00	\$9,387.25	\$33,867.00	68%	\$16,133.00	
BGE - Ph 1A CA	\$181,136.00	\$50,723.87	\$127,197.41	70%	\$53,938.59	
LAN - ROW Acquisition	\$37,592.23	\$0.00	\$5,482.19	15%	\$32,110.04	
Kent Alan Sick - ROW Legal	\$45,000.00	\$2,548.36	\$8,741.78	19%	\$36,258.22	
LNV - Ph 1A Observations	\$205,185.59	\$1,317.50	\$201,178.75	98%	\$4,006.84	
LNV - GIS Svcs	\$36,046.38	\$0.00	\$5,268.75	15%	\$30,777.63	
Fugro	\$13,880.00	\$0.00	\$0.00	0%	\$13,880.00	
MLA Labs, Inc.	\$21,437.00	\$0.00	\$10,623.00	50%	\$10,814.00	
MWM Design Group	\$5,293.00	\$0.00	\$5,293.00	100%	\$0.00	
Armstrong, Vaughan & Associates, P.C.	\$10,505.00	\$0.00	\$0.00	0%	\$10,505.00	
J.R. Tolles & Associates, Inc.	\$210,000.00	\$20,015.00	\$10,505.00	5%	\$199,495.00	
Total	\$1,173,545.09	\$106,559.81	\$687,766.78		\$485,778.31	

FY 19-20 CONSULTANT INVOICES PAID in OCTOBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/Anomalies
Mark B. Taylor	\$17,500.00	\$0.00	\$0.00	0%	\$17,500.00	
LAN - Kyle/Buda Design	\$7,420.26	\$981.95	\$981.95	13%	\$6,438.31	
Patricia Ehrlinger Carls	\$25,000.00	\$0.00	\$0.00	0%	\$25,000.00	
RW Harden	\$40,000.00	\$0.00	\$0.00	0%	\$40,000.00	
Tx Solutions Group	\$72,000.00	\$6,000.00	\$6,000.00	8%	\$66,000.00	
BGE - Ph 1A CA	\$53,938.59	\$0.00	\$0.00	0%	\$53,938.59	
LAN - ROW Acquisition	\$32,110.04	\$0.00	\$0.00	0%	\$32,110.04	
Kent Alan Sick - ROW Legal	\$45,000.00	\$0.00	\$0.00	0%	\$45,000.00	
LNV - Ph 1A Observations	\$4,006.84	\$0.00	\$0.00	0%	\$4,006.84	
LNV - GIS Svcs	\$30,777.63	\$0.00	\$0.00	0%	\$30,777.63	
MLA Labs, Inc.	\$10,814.00	\$853.00	\$1,232.00	11%	\$9,582.00	
Armstrong, Vaughan & Associates, P.C.	\$10,715.00	\$0.00	\$0.00	0%	\$10,715.00	
Total	\$349,282.36	\$7,834.95	\$8,213.95		\$341,068.41	

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
 Tuesday, November 12, 2019 at 3:00 P.M.
 520 E. RR 150, Kyle, TX 78640

- Below is the report on the Phase 1B invoices paid in September & October.

PHASE 1B FY 18-19 CONSULTANT INVOICES PAID in SEPTEMBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/ Anomalies
Kimley-Horn Ph 1B Owner's Rep	\$3,868,137.53	\$230,221.83	\$1,983,503.20	51%	\$1,884,634.33	
Blanton - Environmental	\$1,303,453.43	\$0.00	\$740,963.11	57%	\$562,490.32	
LAN - Segment A Prelim	\$520,555.95	\$19,398.45	\$325,276.00	62%	\$195,279.95	
KFA - Segment B Prelim	\$436,442.99	\$44,715.75	\$332,486.45	76%	\$103,956.54	
BGE - Segment C Prelim	\$473,520.88	\$27,323.43	\$251,210.34	53%	\$222,310.54	
FNI - Segment D Prelim	\$498,140.88	\$108,735.23	\$369,191.23	74%	\$128,949.65	
Walker - Segment E Prelim	\$520,579.00	\$49,957.50	\$278,438.42	53%	\$242,140.58	
LAN - ROW Acquisition	\$2,449,771.00	\$26,091.50	\$240,121.86	10%	\$2,209,649.14	
DTR&G	\$999,241.72	\$30,626.00	\$85,740.75	9%	\$913,500.97	
CBRE - Appraisals	\$2,350,000.00	\$3,250.00	\$6,500.00	0%	\$2,343,500.00	
CP&Y - Survey	\$3,375,780.00	\$608,848.65	\$1,149,841.99	34%	\$2,225,938.01	
RW Harden - WDH	\$130,880.00	\$6,000.00	\$107,660.00	82%	\$23,220.00	
LNV - RWI	\$1,526,000.00	\$52,699.00	\$389,926.89	26%	\$1,136,073.11	
Walker Partners - WTP Design	\$1,203,606.00	\$203,312.37	\$691,192.88	57%	\$512,413.12	
LAN - BPS Acquisition	\$22,000.00	\$0.00	\$21,995.60	100%	\$4.40	
FNI - BPS Prelim	\$791,725.00	\$75,300.39	\$281,738.64	36%	\$509,986.36	
Total	\$20,469,834.38	\$1,486,480.10	\$7,255,787.36		\$13,214,047.02	

PHASE 1B FY 18-19 CONSULTANT INVOICES PAID in OCTOBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/ Anomalies
Kimley-Horn Ph 1B Owner's Rep	\$3,868,137.53	\$242,350.22	\$2,495,786.34	65%	\$1,372,351.19	
Blanton - Environmental	\$1,303,453.43	\$0.00	\$740,963.11	57%	\$562,490.32	
LAN - Segment A Prelim	\$520,555.95	\$16,924.15	\$342,200.15	66%	\$178,355.80	
KFA - Segment B Prelim	\$436,442.99	\$25,085.98	\$357,572.43	82%	\$78,870.56	
BGE - Segment C Prelim	\$473,520.88	\$24,717.00	\$275,927.34	58%	\$197,593.54	
FNI - Segment D Prelim	\$498,140.88	\$82,777.89	\$451,969.12	91%	\$46,171.76	
Walker - Segment E Prelim	\$520,579.00	\$7,017.00	\$285,455.42	55%	\$235,123.58	
LAN - ROW Acquisition	\$2,449,771.00	\$43,678.77	\$283,800.63	12%	\$2,165,970.37	
DTR&G	\$999,241.72	\$18,965.66	\$104,706.41	10%	\$894,535.31	
CBRE - Appraisals	\$2,350,000.00	\$52,000.00	\$58,500.00	2%	\$2,291,500.00	
CP&Y - Survey	\$3,375,780.00	\$0.00	\$1,149,841.99	34%	\$2,225,938.01	
RW Harden - WDH	\$130,880.00	\$9,300.00	\$116,960.00	89%	\$13,920.00	
LNV - RWI	\$1,526,000.00	\$41,597.74	\$431,524.63	28%	\$1,094,475.37	
Walker Partners - WTP Design	\$1,203,606.00	\$207,665.66	\$898,858.54	75%	\$304,747.46	
LAN - BPS Acquisition	\$22,000.00	\$0.00	\$21,995.60	100%	\$4.40	
FNI - BPS Prelim	\$791,725.00	\$119,054.68	\$400,793.32	51%	\$390,931.68	
Plummer - Inline Elevated Tank	\$90,847.00	\$1,694.56	\$1,694.56	2%	\$89,152.44	
Total	\$20,560,681.38	\$892,829.31	\$8,418,549.59		\$12,142,131.79	

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
 Tuesday, November 12, 2019 at 3:00 P.M.
 520 E. RR 150, Kyle, TX 78640

Approved Change Orders

- See below for Change Orders approved in September & October 2019.

CHANGE ORDERS APPROVED IN SEPTEMBER 2019				
Consultant	Original Authorization	Change Orders to Date	Change Order Approved this Month	New Total Contract Amount
Walker Partners: 1B Segment E	\$ 408,755.00	\$ 111,824.00	\$ -	\$ 520,579.00
Central Road & Utility - Phase 1A Segment A	\$1,718,117.99	\$ 10,248.29	\$ -	\$ 1,728,366.28
Black Castle - Phase 1A BPS Construction	\$4,999,080.00	\$ 111,827.56	\$ 35,312.14	\$ 5,110,907.56
RW Harden - 1B Well Drilling & Hydrogeology	\$ 114,000.00	\$ 31,380.00	\$ -	\$ 145,380.00
RW Harden - General Hydrogeology	\$ 40,000.00	\$ 20,000.00	\$ -	\$ 60,000.00
Freese & Nichols: 1B BPS & DP Prelim	\$ 771,617.00	\$ 34,863.00	\$ -	\$ 806,480.00
LAN: 1B Segment A	\$ 595,455.00	\$ 60,375.00	\$ -	\$ 655,830.00
K Friese & Assoc.: 1B Segment B	\$ 565,417.00	\$ 58,595.00	\$ 48,595.00	\$ 624,012.00
BGE: 1B Segment C	\$ 614,626.00	\$ 10,290.00	\$ -	\$ 624,916.00
Freese & Nichols: 1B Segment D	\$ 597,714.00	\$ 66,722.00	\$ -	\$ 664,436.00
Walker Partners: 1B WTP	\$ 1,203,606.00	\$ 33,096.00	\$ 18,096.00	\$ 1,236,702.00

CHANGE ORDERS APPROVED IN OCTOBER 2019				
Consultant	Original Authorization	Change Orders to Date	Change Order Approved this Month	New Total Contract Amount
Walker Partners: 1B Segment E	\$ 408,755.00	\$ 111,824.00	\$ -	\$ 520,579.00
Black Castle - Phase 1A BPS Construction	\$4,999,080.00	\$ 111,827.56	\$ -	\$ 5,110,907.56
RW Harden - 1B Well Drilling & Hydrogeology	\$ 114,000.00	\$ 31,380.00	\$ -	\$ 145,380.00
Freese & Nichols: 1B BPS & DP Prelim	\$ 771,617.00	\$ 34,863.00	\$ -	\$ 806,480.00
LAN: 1B Segment A	\$ 595,455.00	\$ 60,375.00	\$ -	\$ 655,830.00
K Friese & Assoc.: 1B Segment B	\$ 565,417.00	\$ 58,595.00	\$ -	\$ 624,012.00
BGE: 1B Segment C	\$ 614,626.00	\$ 10,290.00	\$ -	\$ 624,916.00
Freese & Nichols: 1B Segment D	\$ 597,714.00	\$ 66,722.00	\$ -	\$ 664,436.00
Walker Partners: 1B WTP	\$ 1,203,606.00	\$ 40,406.00	\$ 7,310.00	\$ 1,244,012.00

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

- H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS – no action to be taken.

Background/Information

The Committee Members have an opportunity to make announcements or to request that items be added to future Board or Committee agendas.

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS

Tuesday, November 12, 2019 at 3:00 P.M.

520 E. RR 150, Kyle, TX 78640

- I.1 *Executive Session pursuant to the Government Code, Section 551.071 (Consultation with Attorney) and/or Section 551.072 and 551.073 (Real Property Deliberations) regarding:*
- A. *Water supply partnership options*
 - B. *Groundwater leases*
 - C. *Acquisition of real property for water supply project purposes*
-

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Tuesday, November 12, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

I.2 Action from Executive Session on the following matters:

- A. *Water supply partnership options*
 - B. *Groundwater leases*
 - C. *Acquisition of real property for water supply project purposes*
-

SPECIAL MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Tuesday, November 12, 2019 at 3:00 P.M.
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J. ADJOURNMENT
