Alliance Regional Water Authority
Technical Committee

REGULAR MEETING

ALLIANCE WATER

COMMITTEE MEMBER PACKETS

Wednesday, December 11th, 2019 at 3:00 P.M.

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

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 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, Wednesday, December 11th, 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 November 12, 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 Update and possible direction to Staff regarding the Authority's Phase 1A projects. ~ *Jason Biemer, Project Coordinator*

F.2 Update and possible direction to Staff regarding the Authority's Phase 1B program. ~ *Ryan Sowa, P.E., Kimley-Horn & Associates*

F.3 Discussion and possible recommendation to the Board to amend the Phase 1B Program to incorporate Cost Saving Measures. ~ *Graham Moore, P.E., Executive Director*

F.4 Discussion and possible action to reschedule the date of the January Technical Committee meeting. ~ *Graham Moore, P.E., Executive Director*

F.5 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 - Update on future meeting dates, locations, consultant invoices paid, approved changed orders, status of Authority procurements, Executive Director activities and other operational activities where no action is required. ~ *Graham Moore, P.E., Executive Director*

H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS – Possible acknowledgement by Committee Members of future area events and/or requests for item(s) to be placed on a future agenda where no action is required.

I. EXECUTIVE SESSION

I.1 *Executive Session pursuant to the Government Code, Section 551.071 (Consultation with Attorney) and/or Section 551.072 (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.

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
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D.1 Consider approval of minutes of the Regular Technical Committee Meeting held November 12, 2019. ~ *Graham Moore, P.E., Executive Director*

Attachment(s)

- 2019 11 12 Technical Committee Meeting Minutes

Technical Committee decision needed:

- Approval of minutes.

Alliance Regional Water Authority

TECHNICAL COMMITTEE MEETING

MINUTES

Wednesday, November 12, 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 Tuesday, November 12, 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 3:05 p.m. by Mr. Earp.

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

C. PUBLIC COMMENT PERIOD
- **None.**

D. CONSENT AGENDA

D.1 Consider approval of minutes of the Regular Technical Committee Meeting held September 11, 2019.
- **Motion to adopt the consent agenda as presented was made by Mr. Taylor, seconded by Mr. Taggart and approved on a 5-0 vote.**

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.

- **Motion to authorize the Executive Director to complete all necessary paperwork to join the WateReuse Association for FY 2019-2020 was made by Mr. Taggart, seconded by Mr. Taylor and approved on a 5-0 vote.**

F.2 Update and possible direction to Staff regarding the Authority's Phase 1A projects.

- **Mr. Moore provided an update on the projects.**
- **Mr. Taggart inquired if the Authority's logo will be painted on the tank. Mr. Moore responded that it is not planned as part of this project, but could be added at a later date.**
- **No Action.**

Items F.6 and F.7 were handled out of order.

F.6 Discussion and possible direction to Staff regarding the Authority's draft Staffing Plan.

- **Mr. Moore presented the draft Staffing Plan through 2029.**
- **Mr. Taggart noted that to cover 24-hour operations, another Class B and Class C operator may need to be added along with possibly another Class A operator. He also recommended more back-up for the Administrative Assistant. He also noted that hiring one of the Maintenance positions in 2022 would be wise so that learn the infrastructure as it's being built.**
- **Mr. Earp agreed with many of the suggestions made by Mr. Taggart especially when considering operations will be 24-hours per day.**
- **No Action.**

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.

- **Mr. Moore provided an update on the various topics.**
- **Update, no action.**

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.**

- **Mr. Taylor asked if there is urgency in getting the wells drilled to get the raw water quality data for design purposes. Mr. Sowa confirmed that the data is wanted as soon as possible.**
- **Mr. Taggart noted that this is the first month with the property acquisition process reflecting a signed/closed easement.**
- **No Action.**

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.

- **Motion to recommend to the Board approval of work order with Freese & Nichols, Inc. for Design and Procurement Services for the Authority's Phase 1B Segment D Pipeline project was made by Mr. Earp, seconded by Mr. Ramos and approved on a 6-0 vote.**

F.5 Update, discussion and possible recommendation to the Board regarding Cost Saving Measures for the Authority's Phase 1B Program.

- **Mr. Moore provided a brief update on the cost saving measures under evaluation, including splitting Measure #2 between "pipeline" and the "water treatment plant and booster pump station".**
- **Mr. Moore requested that no action be taken on this item at this time and that it be brought back in December.**
- **Mr. Earp made a comment that he is concerned with the high capital costs and would prefer costs be shifted to operational costs, where feasible.**
- **No Action.**

G. EXECUTIVE DIRECTOR REPORT

- **Update, no action.**

H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS

- **None.**

I. EXECUTIVE SESSION

I.1 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

- **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 4:07 p.m. by Mr. Earp.**

APPROVED: _____, 2019

_____

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F.1 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 A Pipeline:
- None

Segment B Pipeline:
- Bid opened 8/22/2019 (recap).
  - 9/25 ARWA Board approved contingent award of contract to Smith Contracting, per LAN recommendation.
  - Ductile Iron.
  - Contract cost $3.811 million dollars.
- Notice to proceed received 12/5/2019.
- Pre-Construction kickoff meeting likely before Christmas holiday break.

Pump Station:
- Pump station construction proceeding. See attached slides.

Technical Committee Decisions Needed:
- None.

Phase 1A
Booster Pump Station

- **Status Update**
- **December 11, 2019**

General Updates

ROAD WORK ON SITE NEARING COMPLETION

GENERATOR INSTALLATION UNDERWAY.

BUILDING STRUCTURES UP – INTERNAL PAINTING COMPLETED.

ELECTRICAL CONDUIT AND CHEMICAL FEED SYSTEM INSTALL EFFORT UNDERWAY.

SCADA SYSTEMS FACTORY TESTING DECEMBER 9TH THROUGH 11TH.

Facility Structures - *Interior*

- HVAC system installation completed.
- Chemical feed system completing.
- Chemical leak safety system installation completing.
- Ventilation system installation completing.

Facility Structures - *Landscaping*

- Gates and fence installation underway.
- Road work nearing completion.
- Vegetation planting underway.
- Irrigation system installation completing soon.

Phase 1A
Buda Delivery Point

- Canopy completed.
- Underground plumbing completed.
- SCADA and electrical systems next in installation sequence.

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F.2 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.

Included in the discussion is an update on the current schedule and budget projections for the Program and the tracking methods.

Attachment(s)
- Phase 1B Program Update – December 11, 2019
- ARWA Ph 1B Cost Tracking Update – Through September 2019
- Kimley-Horn Monthly Summary of Activities for November 2019

Technical Committee Decisions Needed:
- None.

Phase 1B Program Update

Technical Committee Meeting
December 11, 2019

ALLIANCE WATER

Kimley»Horn

Agenda

Ongoing Progress

Schedule & Budget Update

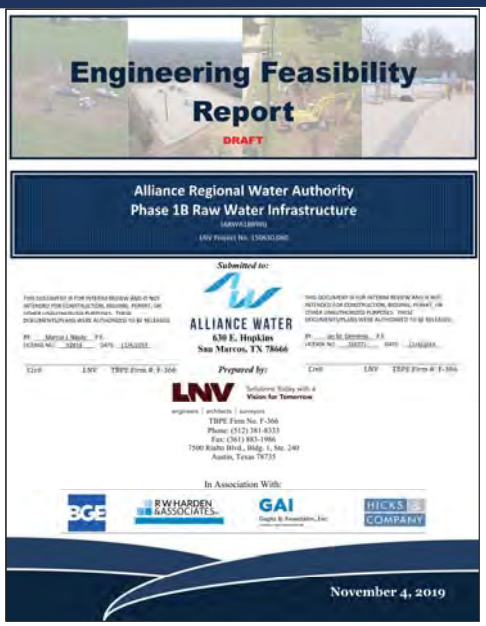
Ongoing Progress

Consultant Contracting Update

- Well Drilling
  - Construction Phase Contract (January)
- Water Treatment Plant
  - Final Design Phase Contract (January)
- Pipeline Segment C
  - Final Design Phase Contract (February)
- Pipeline Segment E
  - Final Design Phase Contract (February)

Design Milestone Reviews

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



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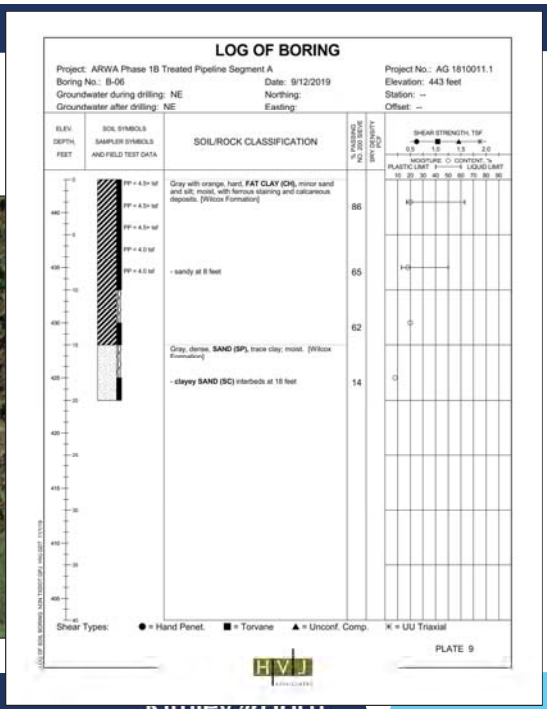
Ongoing Progress

Online GIS Update – Geotechnical Bores



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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 (No. of Parcels)	Alignment Confirmed (%)
A	38	38	100%	38	100%
B	46	46	100%	39	85%
D	68	66	97%	56	82%
C	88	71	81%	0	0%
E	32	24	75%	2	6%
Wellfield	15	8	53%	0	0%
Total	**287**	**253**			

ALLIANCE WATER

Kimley»Horn

Pipeline Easement Acquisition Status

Pipeline Segment	Number of Parcels	Appraisals Prepared	Inital Offer Letter Delivered	Purchase Agreement Signed / Easement Closed
A	38	31	24	5
B	46	6	1	1
D	68	0	0	0
C	88	0	0	0
E	32	0	0	0
Wellfield	15	0	0	0
Total	**287**	**37**	**25**	**6**

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Questions?

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Schedule Update

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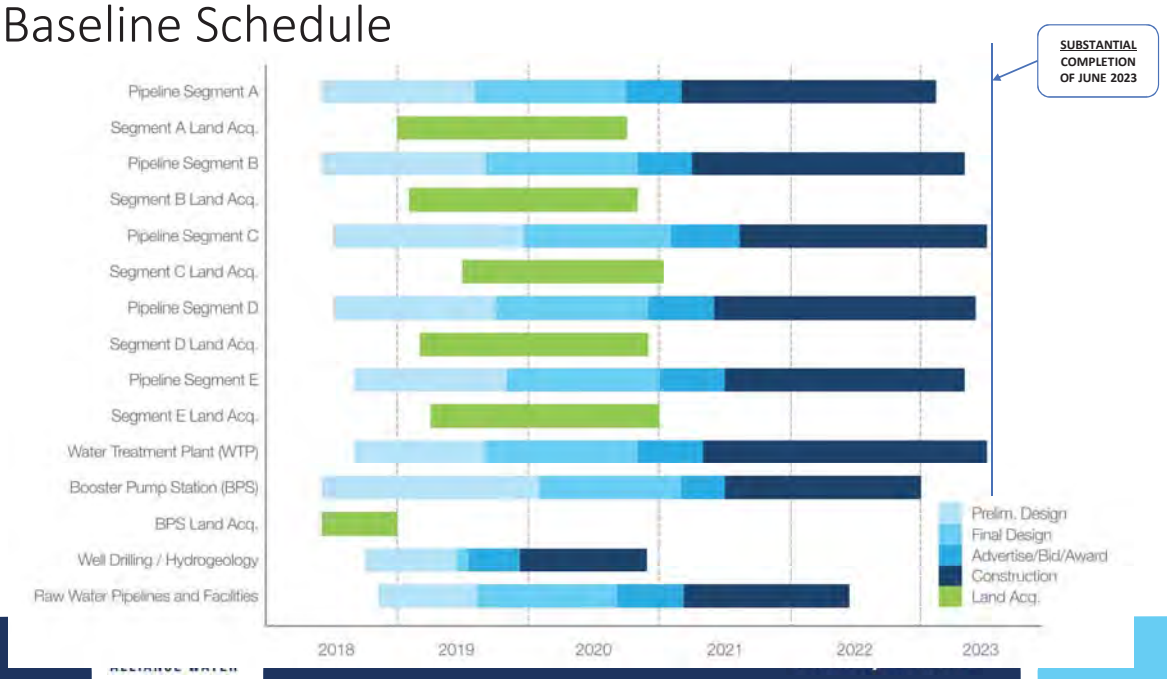
ID	Task Name	Duration	Start	Finish
1037	**Booster PS & Delivery Points**	**221.6 wks**	**Fri 12/21/18**	**Mon 3/20/23**
1038	**Preliminary Analyses**	**67.6 wks**	**Fri 12/21/18**	**Mon 4/6/20**
1039	**Site Layout**	**14 wks**	**Mon 2/11/19**	**Fri 5/17/19**
1040	Base Mapping & Data Gathering	2 wks	Mon 2/11/19	Fri 2/22/19
1041	Preliminary Site Layouts	4 wks	Mon 2/25/19	Fri 3/22/19
1042	Constructability Review	1 wk	Mon 3/25/19	Fri 3/29/19
1043	Cost Estimates	3 wks	Mon 4/1/19	Fri 4/12/19
1044	Site Selection	1 wk	Mon 4/15/19	Fri 4/19/19
1045	ARWA Site Concurrence	4 wks	Mon 4/22/19	Fri 5/17/19
1046	**Preliminary Engineering Feasibility Report**	**50.4 wks**	**Mon 2/11/19**	**Fri 1/24/20**
1047	**Master Plan**	**25.5 wks**	**Mon 2/11/19**	**Wed 8/7/19**
1048	Model Data/Review	7 wks	Mon 2/11/19	Fri 3/29/19
1049	Develop Delivery Criteria	2 wks	Mon 3/25/19	Fri 4/5/19
1050	Hydraulic Modeling / Evaluation	8 wks	Mon 4/8/19	Fri 5/31/19
1051	Final Alignment Data from Pipeline Teams	0 days	Wed 4/17/19	Wed 4/17/19
1052	Submit Draft Master Plan Report	0.2 wks	Fri 6/7/19	Fri 6/7/19
1053	ARWA Review of Draft	4 wks	Mon 6/10/19	Fri 7/5/19
1054	Finalize Master Plan Report	4.5 wks	Mon 7/8/19	Wed 8/7/19
1055	Submit Master Plan Report	0 days	Wed 8/7/19	Wed 8/7/19
1056	Facility Sizing & Phasing Evaluation	18.2 wks	Mon 7/8/19	Fri 11/8/19
1057	Preliminary Field Work	10 wks	Mon 7/8/19	Fri 9/13/19
1058	Draft PS & Delivery Points Schematic Layouts	8 wks	Mon 7/8/19	Fri 8/30/19
1059	Prepare Draft PS & DP Schematic TM	1 wk	Mon 9/2/19	Fri 9/6/19
1060	ARWA Review of Draft TM	1 wk	Mon 9/9/19	Fri 9/13/19
1061	Preliminary Surge Analysis	8.2 wks	Mon 9/16/19	Fri 11/8/19
1062	Finalize Pump Station & Delivery Points TM	4 wks	Mon 9/16/19	Fri 10/11/19
1063	**Engineering Feasibility Report**	**15.4 wks**	**Mon 10/14/19**	**Fri 1/24/20**
1064	Prepare & Submit Draft EFR & 30% Plans	7 wks	Mon 10/14/19	Wed 11/27/19
1065	ARWA Review of Draft EFR	2 wks	Mon 12/2/19	Fri 12/13/19
1066	Finalize EFR & 30% Plans	6 wks	Mon 12/16/19	Fri 1/24/20
1067	Submit Sealed Report & 30% Plans	0 wks	Fri 1/24/20	Fri 1/24/20
1068	**Environmental - Admin/Ops Facility**	**0 wks**	**Fri 5/3/19**	**Fri 5/3/19**
1069	See Admin/Ops Facility	0 wks	Fri 5/3/19	Fri 5/3/19
1070	**Land Acquisition**	**0 wks**	**Fri 12/21/18**	**Fri 12/21/18**
1071	See Admin/Ops Facility	0 wks	Fri 12/21/18	Fri 12/21/18
1072	**Texas Water Development Board**	**58.6 wks**	**Fri 2/22/19**	**Mon 4/6/20**

Baseline Schedule



Schedule Update

Schedule Update

Transmission Pipelines

- Right-of-Entry Process Delay – 6 to 8 months
  - IMPACTS:
    - Environmental Field Work – 6 to 8 months
    - EFR Submittal – 6 to 8 months
    - Land Acquisition – 6 to 8 months
    - Pipeline Final Design – 1 to 3 months
    - Pipeline Construction Completion – 1 to 3 months
  - MITIGATION:
    - Decoupling of EFR Submittal Process from Final Design Process

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Schedule Update

Well Drilling

- Delay – 4 months
  - Pipeline / Access Road Alignment Confirmation and TWDB Environmental Review Process

Water Treatment Plant

- Potential Delay – 2 months
  - Design Process and Program Direction (Minimum Flow Determinations)
  - MITIGATION: Accelerated Final Design Phase

Booster Pump Station

- Potential Delay – 3 months
  - Design Process and Program Direction (Extended Hydraulic Analyses)
  - MITIGATION: Accelerated Final Design Phase

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Budget Update

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Opinions of Cost

Baseline Budget developed within the ARWA1B
Preliminary Engineering Report

PIPELINE SEGMENT A		
CONSTRUCTION	SEGMENT A CONSTRUCTION	$37,400,000
LAND ACQUISITION	EASEMENT PURCHASE	$1,701,000
	LEGAL ($25,000 / Easement for 25% of total easements)	$262,500
	LAND AGENT ($6,000 / Easement)	$252,000
	APPRAISAL TEAM ($4,500 / Easement)	$189,000
	SURVEY ($5,000 / Easement)	$210,000
	TITLE SERVICES ($500 / Easement)	$21,000
SUPPORT SERVICES	ENGINEERING (9%)	$3,366,000
	DESIGN SURVEY (3%)	$1,122,000
	ENVIRONMENTAL (1%)	$374,000
	INSPECTION (4%)	$1,496,000
	CONSTRUCTION MANAGEMENT (1%)	$374,000
	TESTING (1%)	$374,000
CONTINGENCIES	CONSTRUCTION CONTINGENCY (30% OF CONSTRUCTION)	$11,220,000
	EASEMENT CONTINGENCY (30% OF PURCHASE)	$510,300
	SUPPORT SERVICES CONTINGENCY (5% OF CONSTRUCTION)	$1,870,000
	SUBTOTAL (ROUNDED)	**$60,700,000**

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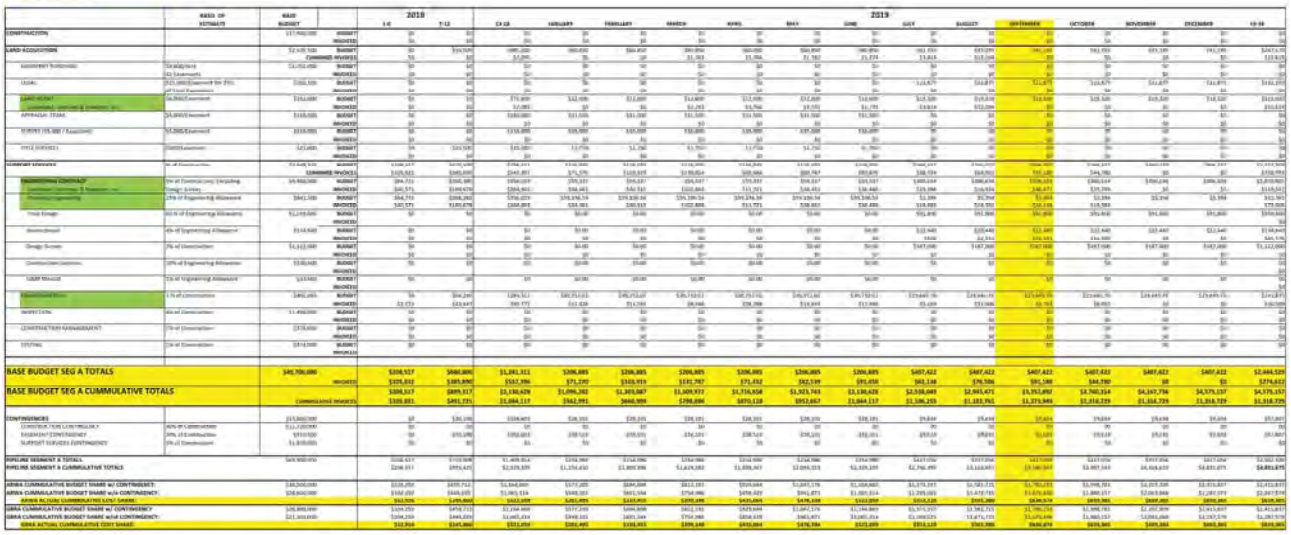
PIPELINE SEGMENT A



ALLIANCE WATER

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Budget Update

Budget Development

- ARWA1B Preliminary Engineering Report
  - Serves as Baseline

Budget Tracking

- Monthly Expenditures
  - Invoices
- Budget Updates
  - Actual Contract Amounts
  - Updated Cost Projections
- TWDB Milestones & Funding Releases

ALLIANCE WATER

Kimley»Horn

ARWA PHASE 1B COST TRACKING -- COMBINED PROGRAM
Through September 2019

PHASE 1B COMBINED PROGRAM SUMMARY	PLANNING BUDGET		2019 June	2019 September	2019 December	TOTAL
WATER TREATMENT PLANT CUMULATIVE TOTAL	$46,700,000	BUDGET	$1,791,000	$3,173,000	$4,194,000	$46,726,000
		ACTUAL	$1,221,000	$2,840,000		
BPS & GBRA METERING STATIONS CUMULATIVE TOTAL	$24,100,000	BUDGET	$1,200,000	$1,911,000	$2,987,000	$24,022,000
		ACTUAL	$493,000	$823,000		
IN-LINE EST (COMBINED PROGRAM) CUMULATIVE TOTAL	$5,290,000	BUDGET	$88,000	$133,000	$179,000	$5,239,000
		ACTUAL	$58,000	$74,000		
PIPELINE SEGMENT A CUMULATIVE TOTALS	$49,700,000	BUDGET	$2,131,000	$3,353,000	$4,575,000	$49,685,000
		ACTUAL	$1,044,000	$1,774,000		
PIPELINE SEGMENT B CUMULATIVE TOTALS	$47,400,000	BUDGET	$1,433,000	$2,007,000	$3,637,000	$47,416,000
		ACTUAL	$856,000	$1,189,000		
PIPELINE SEGMENT D CUMULATIVE TOTALS	$53,300,000	BUDGET	$3,020,000	$3,480,000	$3,915,000	$53,283,000
		ACTUAL	$1,044,000	$1,421,000		
PIPELINE SEGMENT E1 CUMULATIVE TOTALS	$15,500,000	BUDGET	$399,000	$521,000	$620,000	$15,505,000
		ACTUAL	$367,000	$433,000		
PROGRAM CUMULATIVE TOTALS WITHOUT CONTINGENCY	$241,900,000	BUDGET	$9,062,000	$13,906,000	$18,677,000	$241,875,000
		ACTUAL	$5,183,000	$8,035,000		
ACCUMULATED PROGRAM CONTINGENCY	$64,200,000	BUDGET	$1,290,000	$2,073,000	$2,856,000	$64,268,000
ARWA AND GBRA CASH FLOW FORECASTS						
ARWA CUMULATIVE CASH FLOW	$145,300,000	BUDGET	$4,496,000	$6,848,000	$8,761,000	$145,363,000
		ACTUAL	$2,592,000	$4,017,445		
GBRA CUMULATIVE CASH FLOW	$96,500,000	BUDGET	$4,496,000	$6,848,000	$9,761,000	$96,509,000
		ACTUAL	$2,577,000	$3,974,000		
ARWA AND GBRA CONTINGENCY ACCUMULATION FORECASTS						
ARWA CUMULATIVE CONTINGENCY ACCUMULATION	$39,500,000	BUDGET	$645,000	$1,036,000	$1,428,000	$39,462,000
GBRA CUMULATIVE CONTINGENCY ACCUMULATION	$24,400,000	BUDGET	$645,000	$1,036,000	$1,428,000	$24,806,000

ARWA PHASE 1B COST TRACKING -- ARWA PHASE 1B PROGRAM SUMMARY
Through September 2019

PHASE 1B ARWA PROGRAM SUMMARY	PLANNING BUDGET		2019 June	2019 September	2019 December	TOTAL
ARWA-ONLY PROJECTS						
WELLFIELD CUMULATIVE TOTAL	$3,800,000	PLANNED	$178,000	$200,000	$900,000	$3,800,000
		ACTUAL	$100,000	$100,000		
RAW WATER INFRASTRUCTURE CUMULATIVE TOTAL	$7,400,000	PLANNED	$900,000	$1,184,000	$1,500,000	$7,378,000
		ACTUAL	$700,000	$928,000		
ARWA-ONLY WATER TREATMENT PLANT CUMULATIVE TOTAL	$2,800,000	PLANNED	$2,564,000	$2,564,000	$2,564,000	$2,564,000
		ACTUAL	$2,564,000	$2,564,000		
BPS Seg C & ARWA DELIVERY POINTS CUMULATIVE TOTAL	$7,800,000	PLANNED	$617,000	$987,000	$1,857,000	$7,753,000
		ACTUAL	$548,000	$635,000		
INLINE EST SEG C CUMULATIVE TOTAL	$1,200,000	PLANNED	$93,000	$185,000	$370,000	$1,154,000
		ACTUAL	$93,000	$66,000		
ADMIN & OPS CENTER CUMULATIVE TOTAL	$4,300,000	PLANNED	$76,000	$157,000	$298,000	$4,386,000
		ACTUAL	$37,000	$47,000		
PIPELINE SEGMENT C CUMULATIVE TOTALS	$67,100,000	PLANNED	$2,237,000	$2,774,000	$3,232,000	$67,069,000
		ACTUAL	$1,101,500	$1,167,000		
PIPELINE SEGMENT E2 CUMULATIVE TOTALS	$6,800,000	PLANNED	$173,000	$325,000	$369,000	$6,853,000
		ACTUAL	$146,000	$179,000		
ARWA CUMULATIVE CASH FLOW -- ARWA-ONLY PROGRAM	$98,200,000	PLANNED	$6,700,000	$9,000,000	$10,000,000	$98,000,000
		ACTUAL	$5,100,000	$5,700,000	$0	
COMBINED PROGRAM PROJECTS						
WATER TREATMENT PLANT CUMULATIVE TOTAL	$24,500,000	BUDGET	$896,000	$2,886,000	$2,087,000	$24,535,000
		ACTUAL	$610,000	$1,470,000		
BPS & GBRA METERING STATIONS CUMULATIVE TOTAL	$13,300,000	BUDGET	$607,000	$955,000	$1,304,000	$13,318,000
		ACTUAL	$247,000	$411,000		
IN-LINE EST (COMBINED PROGRAM) CUMULATIVE TOTAL	$3,600,000	BUDGET	$44,000	$66,000	$89,000	$3,619,000
		ACTUAL	$29,000	$37,000		
PIPELINE SEGMENT A CUMULATIVE TOTALS	$28,600,000	BUDGET	$1,065,000	$1,676,000	$2,288,000	$28,582,000
		ACTUAL	$522,000	$887,000		
PIPELINE SEGMENT B CUMULATIVE TOTALS	$23,100,000	BUDGET	$717,000	$1,003,000	$1,818,000	$28,508,000
		ACTUAL	$478,000	$580,000		
PIPELINE SEGMENT D CUMULATIVE TOTALS	$26,300,000	BUDGET	$1,010,000	$1,845,000	$1,942,000	$26,598,000
		ACTUAL	$522,000	$731,000		
PIPELINE SEGMENT E1 CUMULATIVE TOTALS	$9,500,000	BUDGET	$199,000	$260,000	$310,000	$9,497,000
		ACTUAL	$184,000	$217,000		
ARWA CUMULATIVE CASH FLOW -- COMBINED PROGRAM	$145,300,000	PLANNED	$4,598,000	$6,981,000	$9,839,000	$145,365,000
		ACTUAL	$2,592,000	$4,018,000		
ARWA PHASE1B CUMULATIVE CASH FLOW W/O CONTINGENCY	$243,500,000	PLANNED	$11,298,000	$14,981,000	$19,839,000	$243,365,000
		ACTUAL	$7,692,000	$9,718,000		
ARWA CUMULATIVE CONTINGENCY ACCUMULATION	$105,900,000	PLANNED	$1,014,000	$2,092,000	$4,132,000	$105,611,000

ALLIANCE WATER

Budget Update

Next Steps

- Update for Program Cost Directives
- Update with 30% Cost Projections
- Continuous Monthly Tracking
- Quarterly Updates to Technical Committee and Board

ALLIANCE WATER

Kimley»Horn

Questions?

ALLIANCE WATER

Kimley»Horn

ARWA PHASE 1B COST TRACKING -- COMBINED PROGRAM

Through September 2019

PHASE 1B COMBINED PROGRAM SUMMARY	PLANNING BUDGET		2019 June	2019 September	2019 December	TOTAL
WATER TREATMENT PLANT CUMULATIVE TOTAL	$46,700,000	BUDGET	$1,791,000	$3,373,000	$4,194,000	$46,726,000
		ACTUAL	$1,221,000	$2,840,000		
BPS & GBRA METERING STATIONS CUMULATIVE TOTAL	$24,100,000	BUDGET	$1,200,000	$1,911,000	$2,607,000	$24,022,000
		ACTUAL	$493,000	$823,000		
IN-LINE EST (COMBINED PROGRAM) CUMULATIVE TOTAL	$5,200,000	BUDGET	$88,000	$111,000	$179,000	$5,239,000
		ACTUAL	$58,000	$74,000		
PIPELINE SEGMENT A CUMULATIVE TOTALS	$49,700,000	BUDGET	$2,131,000	$3,353,000	$4,575,000	$49,685,000
		ACTUAL	$1,044,000	$1,274,000		
PIPELINE SEGMENT B CUMULATIVE TOTALS	$47,400,000	BUDGET	$1,433,000	$2,007,000	$3,637,000	$47,416,000
		ACTUAL	$956,000	$1,169,000		
PIPELINE SEGMENT D CUMULATIVE TOTALS	$53,300,000	BUDGET	$2,020,000	$2,690,000	$3,865,000	$53,283,000
		ACTUAL	$1,044,000	$1,422,000		
PIPELINE SEGMENT E1 CUMULATIVE TOTALS	$15,500,000	BUDGET	$399,000	$521,000	$620,000	$15,505,000
		ACTUAL	$367,000	$433,000		
PROGRAM CUMULATIVE TOTALS WITHOUT CONTINGENCY	$241,900,000	BUDGET	$9,062,000	$13,966,000	$19,677,000	$241,875,000
		ACTUAL	$5,183,000	$8,035,000		
ACCUMULATED PROGRAM CONTINGENCY	$64,200,000	BUDGET	$1,290,000	$2,073,000	$2,856,000	$64,268,000
ARWA AND GBRA CASH FLOW FORECASTS						
ARWA CUMULATIVE CASH FLOW	$145,300,000	BUDGET	$4,496,000	$6,848,000	$9,761,000	$145,365,000
		ACTUAL	$2,592,000	$4,017,445		
GBRA CUMULATIVE CASH FLOW	$96,500,000	BUDGET	$4,496,000	$6,848,000	$9,761,000	$96,509,000
		ACTUAL	$2,577,000	$3,974,000		
ARWA AND GBRA CONTINGENCY ACCUMULATION FORECASTS						
ARWA CUMULATIVE CONTINGENCY ACCUMULATION	$39,500,000	BUDGET	$645,000	$1,036,000	$1,428,000	$39,462,000
GBRA CUMULATIVE CONTINGENCY ACCUMULATION	$24,800,000	BUDGET	$645,000	$1,036,000	$1,428,000	$24,806,000

ARWA PHASE 1B COST TRACKING -- ARWA PHASE 1B PROGRAM SUMMARY

Through September 2019

PHASE 1B ARWA PROGRAM SUMMARY	PLANNING BUDGET		2019 June	2019 September	2019 December	TOTAL
ARWA-ONLY PROJECTS						
WELLFIELD CUMULATIVE TOTAL	$3,800,000	PLANNED ACTUAL	$178,000 $100,000	$200,000 $100,000	$900,000	$3,800,000
RAW WATER INFRASTRUCTURE CUMULATIVE TOTAL	$7,400,000	PLANNED ACTUAL	$900,000 $700,000	$1,164,000 $929,000	$1,500,000	$7,378,000
ARWA-ONLY WATER TREATMENT PLANT CUMULATIVE TOTAL	$2,600,000	PLANNED ACTUAL	$2,564,000 $2,564,000	$2,564,000 $2,564,000	$2,564,000	$2,564,000
BPS Seg C & ARWA DELIVERY POINTS CUMULATIVE TOTAL	$7,800,000	PLANNED ACTUAL	$617,000 $548,000	$987,000 $635,000	$1,357,000	$7,753,000
INLINE EST SEG C CUMULATIVE TOTAL	$5,200,000	PLANNED ACTUAL	$83,000 $51,000	$105,000 $64,000	$170,000	$5,154,000
ADMIN & OPS CENTER CUMULATIVE TOTAL	$4,300,000	PLANNED ACTUAL	$76,000 $37,000	$157,000 $47,000	$238,000	$4,366,000
PIPELINE SEGMENT C CUMULATIVE TOTALS	$67,100,000	PLANNED ACTUAL	$2,237,000 $1,101,000	$2,774,000 $1,367,000	$3,232,000	$67,069,000
PIPELINE SEGMENT E2 CUMULATIVE TOTALS	$6,800,000	PLANNED ACTUAL	$173,000 $166,000	$226,000 $193,000	$269,000	$6,803,000
ARWA CUMULATIVE CASH FLOW -- ARWA-ONLY PROGRAM	$98,200,000	PLANNED ACTUAL	$6,700,000 $5,100,000	$8,000,000 $5,700,000	$10,000,000 $0	$98,000,000
COMBINED PROGRAM PROJECTS						
WATER TREATMENT PLANT CUMULATIVE TOTAL	$24,500,000	BUDGET ACTUAL	$896,000 $610,000	$1,686,000 $1,420,000	$2,097,000	$24,535,000
BPS & GBRA METERING STATIONS CUMULATIVE TOTAL	$13,300,000	BUDGET ACTUAL	$607,000 $247,000	$955,000 $411,000	$1,304,000	$13,318,000
IN-LINE EST (COMBINED PROGRAM) CUMULATIVE TOTAL	$3,600,000	BUDGET ACTUAL	$44,000 $29,000	$56,000 $37,000	$89,000	$3,619,000
PIPELINE SEGMENT A CUMULATIVE TOTALS	$28,600,000	BUDGET ACTUAL	$1,065,000 $522,000	$1,676,000 $637,000	$2,288,000	$28,582,000
PIPELINE SEGMENT B CUMULATIVE TOTALS	$29,500,000	BUDGET ACTUAL	$717,000 $478,000	$1,003,000 $585,000	$1,818,000	$29,506,000
PIPELINE SEGMENT D CUMULATIVE TOTALS	$36,300,000	BUDGET ACTUAL	$1,010,000 $522,000	$1,345,000 $711,000	$1,932,000	$36,308,000
PIPELINE SEGMENT E1 CUMULATIVE TOTALS	$9,500,000	BUDGET ACTUAL	$199,000 $184,000	$260,000 $217,000	$310,000	$9,497,000
ARWA CUMULATIVE CASH FLOW -- COMBINED PROGRAM	$145,300,000	PLANNED ACTUAL	$4,538,000 $2,592,000	$6,981,000 $4,018,000	$9,838,000	$145,365,000
ARWA PHASE1B CUMULATIVE CASH FLOW W/O CONTINGENCY	**$243,500,000**	PLANNED ACTUAL	**$11,238,000** **$7,692,000**	**$14,981,000** **$9,718,000**	**$19,838,000**	**$243,365,000**
ARWA CUMULATIVE CONTINGENCY ACCUMULATION	$105,500,000	PLANNED	$2,014,000	$2,992,000	$4,132,000	$105,611,000

December 06, 2019

Project Monthly Summary

November 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, TxDOT, TCEQ, and TWDB.
  - 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 and development of supporting materials for evaluating potential reductions in overall Program costs.
  - 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.

- 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.

- Task 7 – Environmental Management
  - 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.
  - 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
  - Continue coordination with TWDB Staff to track all EFRs and environmental reports currently under review.

- Task 10 – Design Standards
  - Finalized Front End Contract Documents based on comments from ARWA.
  - Finalized addressing comments from GBRA, ARWA, and design consultants regarding the Pipeline Construction Standards.
  - Continued coordinating with ARWA for the continued development of standards for fiber and SCADA.
  - Continued development of Cathodic Protection Program Standards.

- Task 11 – Engineering Design Management
  - Pipelines:
    - Segment A
      - Coordinated with design consultant to finalize EFR given alignment revisions.
      - Continued coordination with design consultant for final design.
    - 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 ongoing field work as part of right-of-entry process and EFR development.

o Wellfield:
▪ Continued coordination regarding front end documents for the bidding of Wells 6-9.
▪ Began scoping process coordination for construction phase.

o Raw Water Infrastructure:
▪ Reviewed and commented on 30% Design Report.
▪ Continued coordination with design consultant for 30% design development.

o Water Treatment Plant:
▪ Reviewed and commented on 30% Design Report.
▪ Continued coordination with design consultant for 30% design development.
▪ Began scoping process coordination for final design phase.

o Booster Pump Station:
▪ Reviewed and commented on 30% Design Report.

o Inline Elevated Storage Tanks:
▪ Coordinated with design consultant concerning for 30% design development and potential site selection.

o Administrative & Operations Facility
▪ Continued coordination with the design consultant to finalize scope and fee.

o 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

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

- Task 14 – Permit Coordination/Tracking
  - o Continued Permit coordination with Pipeline consultants

  - Continued coordination with Caldwell County concerning variance request for the Site Development Permit
  - Continued General Coordination with TxDOT
  - Continued General Coordination with GVEC and BBEC
  - Prepared for and attended coordination meeting with GVEC
  - On-going Permit Tracking Log Updates

- Task 17 – Other Services
  - Prepared a draft solar field feasibility analysis for the WTP site.

December 2019 Projection:

- Task 2 – Stakeholder Coordination
  - Coordination and/or meetings with entities including: Caldwell County, Guadalupe County, GVEC, Bluebonnet Electric Coop, TxDOT, 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
  - Provide any additional cost data in support of the program cost analysis process.
  - 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.

- 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
  - Attended Temporary Injunction Hearings for multiple parcels where the Program is seeking a ROE.
  - 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.
  - Assisted with TWDB budget revisions for loan submittal.

- Task 10 – Design Standards
  - Finalize 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.
      - 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.

        - Continue review of scope and fee for final design phase.
    - Segment D
        - Continue coordination with design consultant for beginning final design.
    - Segment E
        - Continue coordination with design consultant regarding ongoing field work as part of right-of-entry process and EFR development.
        - Begin scoping process coordination for final design phase.
- Wellfield:
    - Continue coordination regarding bidding of Wells 6-9.
    - Continued review of scope and fee for construction phase.
- 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.
    - Begin scoping process coordination for final design phase.
- Inline Elevated Storage Tanks:
    - Provide input on potential EST sites.
    - 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.
    - 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.
    - 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.
    - Submit solar feasibility analysis to ARWA and finalize memorandum.

Scope Elements Added/Removed:

Performance of a solar field feasibility analysis at the WTP site and preparation of memorandum.

Outstanding Issues/Concerns:

None at this time.

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

F.3 Discussion and possible recommendation to the Board to amend the Phase 1B Program to incorporate Cost Saving Measures. ~ *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 Technical Committee received an update on the measures at the November 12th meeting.

Executive Director Recommendations:
Table 1 below lists the Executive Director's recommendations for inclusion in the Phase 1B Program:

Table 1 – Cost Saving Measures

Item	Description	Recommended Implementation	Potential ARWA Savings
1	Sell Excess WTP Property	Hold (pending further data)	$0
2A	Peaking Factor – Pipelines Only	Yes - reduce Segment A to a 1.3 peaking, maintain all others at 1.5. Bid Segment at both 1.3 peaking (42") and 1.5 peaking (48").	$3,100,000
2B	Peaking Factory – Facilities Only	Yes - reduce peaking from 1.5 to 1.0.	$7,000,000
3	Phase 2 Capacity Deferral	No	$0
4	Administrative / Operations Facility Deferral	Hold (pending further evaluation)	$0
5	Inline Elevated Storage Tank Deferral	No	
6	Repackaging of Construction Contracts	Yes	$7,900,000
7	Isolation Valve Spacing Revision	Yes	$2,600,000
8	Stream Crossing Variance	Yes	$1,100,000

In addition, the Executive Director recognizes that an additional $18,000,000 in capital is available while maintaining the total planned annual debt service amounts, due to the lower than anticipated interest rates for the 2017 and 2019 issuances

Attachment(s)

- Detailed Cut Sheet for Each Cost Saving Measure (November 2019)

Technical Committee Decision Needed:

- Possible recommendation to the Board to amend the Phase 1B Program to accommodate 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

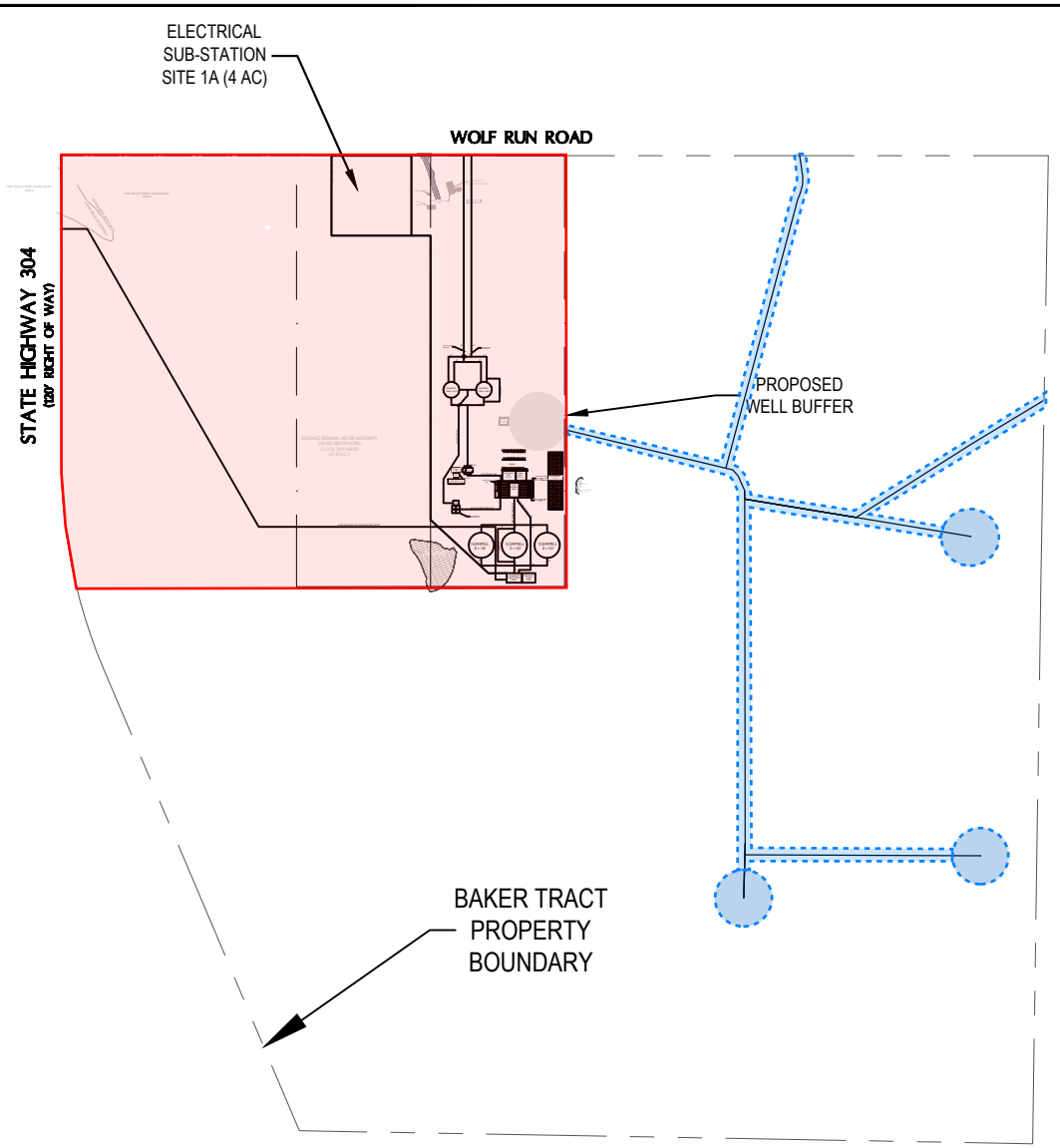
Summary

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	Cons
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.

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**



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0 500 1000

SCALE 1:1000

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
T.B.P.E. Registration No. 8053

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.

PM	JJ
DESIGNED	BDC
DRAFTED	BDC
CHECKED	
PROJECT NO.	3-00708

DRAWING NO. 1

G:\PROJECTS\3-00708\2 ENGINEERING\2.0 CAD\ARCHIVE\3-00708- ARWA1BWTP - BASE.DWG, LAYOUT1 (2), 7/10/2019 2:45:03 PM, bcanady

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

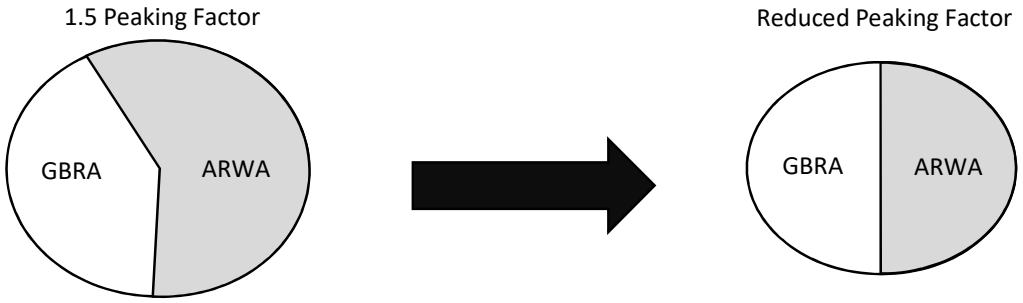
Cost Evaluation

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

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Caldwell
Martindale
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

TITLE:
Exhibit
Alliance Water Phase 1B Program

PROJECT:
ARWA - Phase 1B

DATE:
05/01/2019

1.4 Peaking Factor

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Martindale
Caldwell
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

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

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Martindale
Caldwell
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

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

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Martindale
Caldwell
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

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

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Martindale
Caldwell
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

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

Buda
Creedmoor
Travis
Mustang Ridge
Mountain City
Kyle
Niederwald
Bastrop
Wimberley
Hays
Uhland
San Marcos
Lockhart
Caldwell
Martindale
Comal
Staples
New Braunfels
Guadalupe
Luling
Gonzales
Seguin

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.

N

0 6,500 13,000 26,000 Feet

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	Cons
Reduction in pipe diameter reduces Phase 1B construction costs	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.

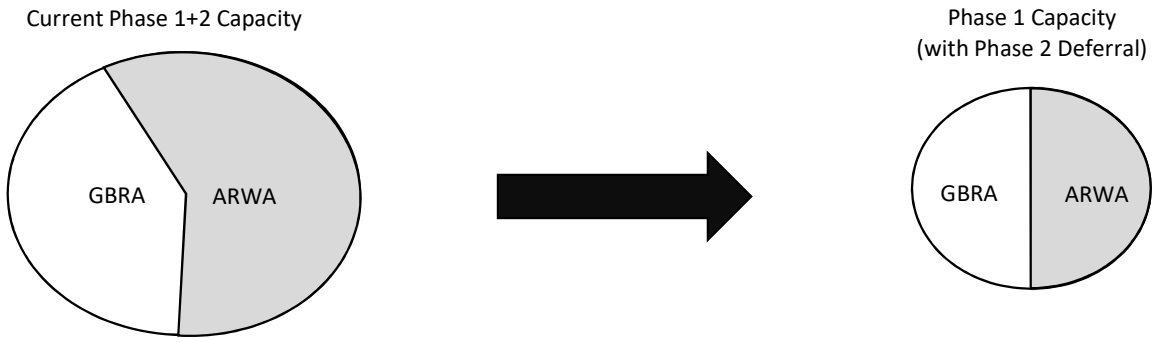
PHASE 1B PROGRAM COST - PHASE 2 DEFERRAL
PROJECTED ARWA CONSTRUCTION COST SAVINGS

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

	ARWA Potential Cost Savings			
Segment	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.

Hays
Austin
Bastrop
Travis
Buda
Creedmoor
Mustang Ridge
Mountain City
Woodcreek
36-Inch
Kyle
Bastrop
Hays
Niederwald
36-Inch
Wimberley
Uhland
42-Inch
36-Inch
42-Inch
(Phase 1 Capacity)
San Marcos
ckhart
42-Inch
Martindale
Caldwell
48-Inch
(Phase 1 Capacity)
42-Inch
Comal
Staples
36-Inch
New Braunfels
Luling
36-Inch
Guadalupe
Schertz
Gonzales
Santa Clara
Seguin
Marion
Cibolo

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.

N

0 7,500 15,000 30,000 Feet

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.

Hays
Austin
Bastrop
Travis
Buda
Creedmoor
Mustang Ridge
Mountain City
Woodcreek
30-Inch
Kyle
Bastrop
Hays
Niederwald
30-Inch
Wimberley
Uhland
30-Inch
30-Inch
San Marcos
42-Inch
Lockhart
30-Inch
48-Inch
Martindale
Caldwell
30-Inch
Comal
Staples
30-Inch
New Braunfels
Luling
24-Inch
Guadalupe
Schertz
Gonzales
Santa Clara
Seguin
Marion
Cibolo

60

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.

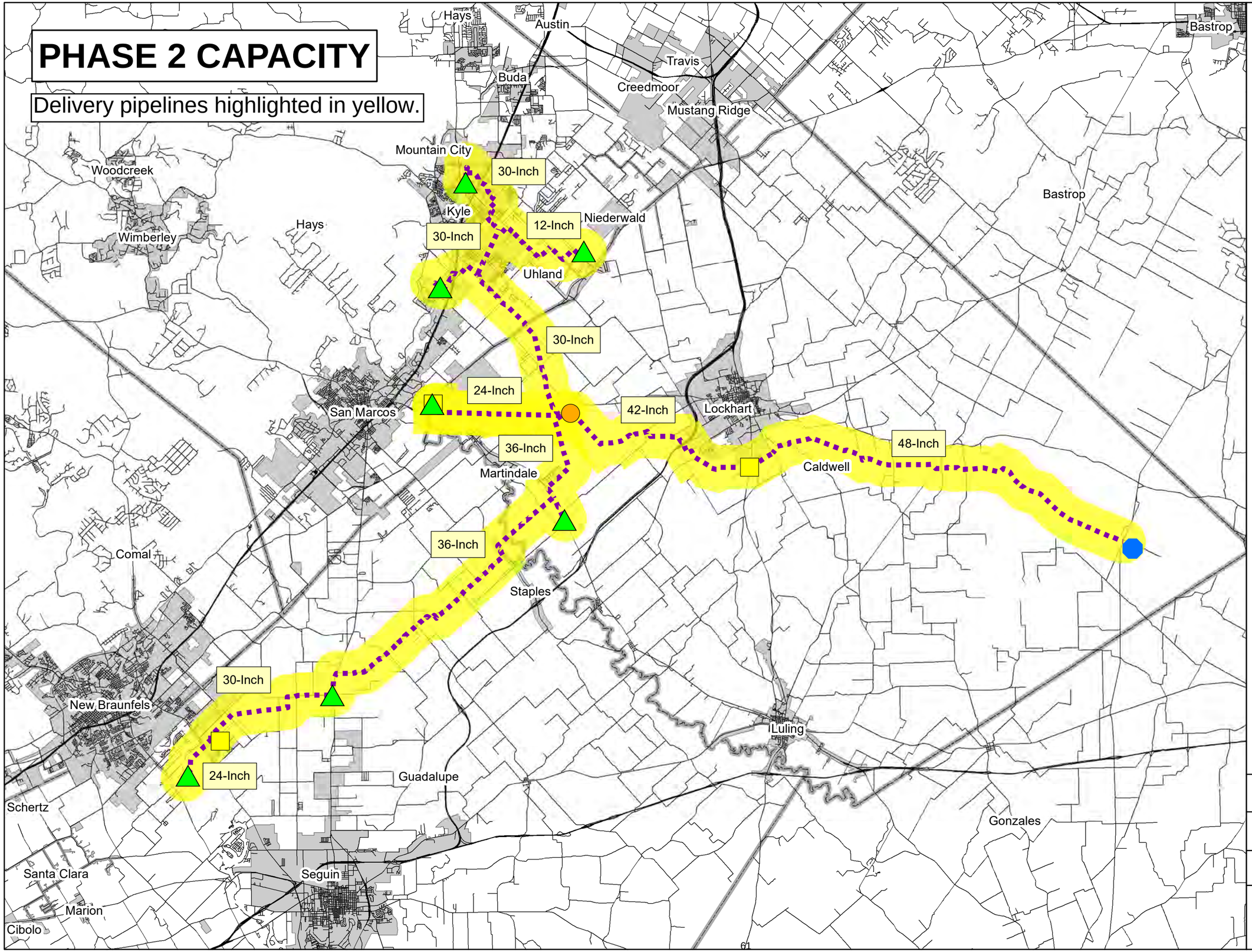
N

0 7,500 15,000 30,000 Feet

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.

N

0 7,500 15,000 30,000 Feet

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:

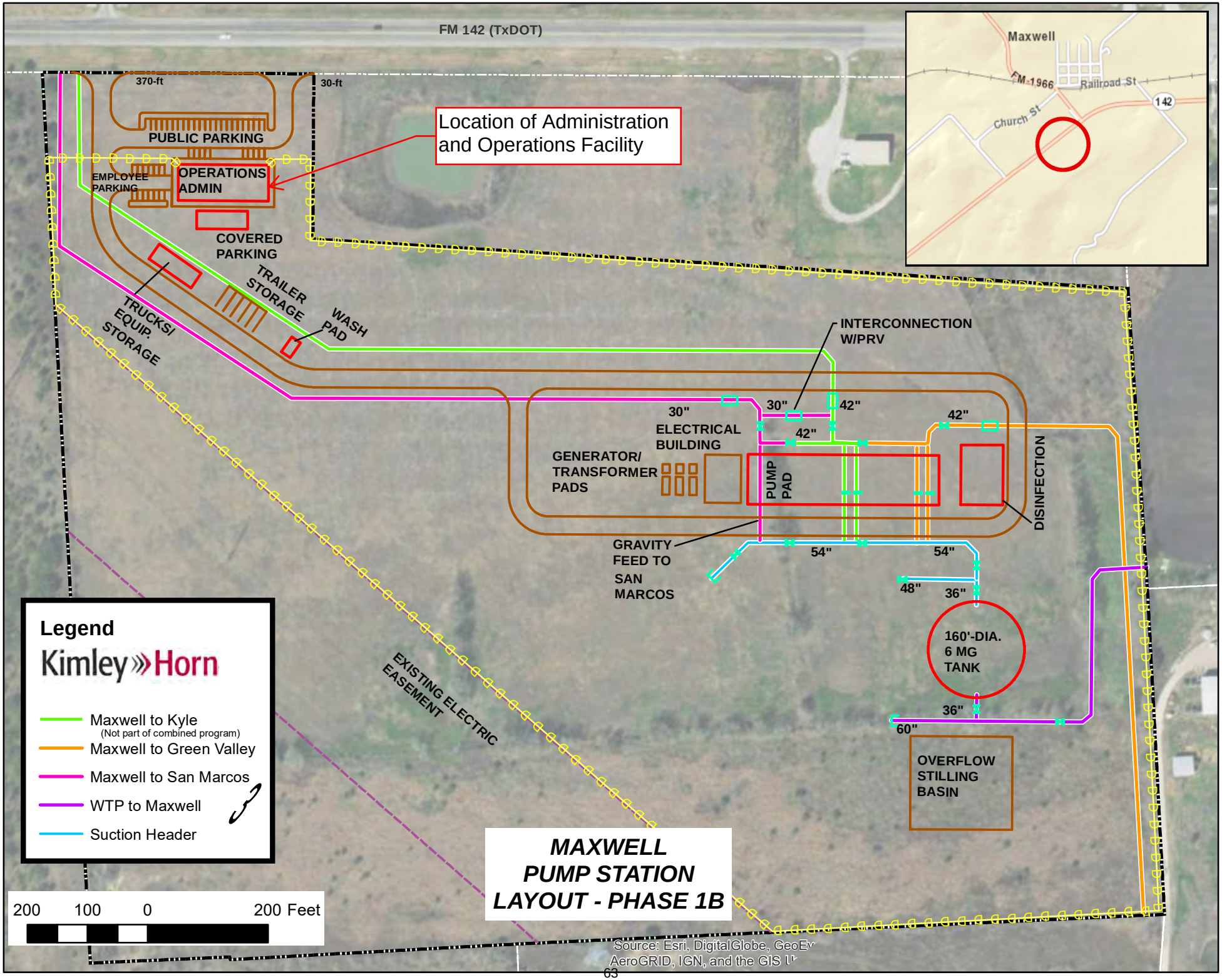
1. Defer both the Administrative and Operations facilities;
2. Defer only the Administrative portion of the facility.

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.



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

ALLIANCE WATER

Kimley»Horn

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

Woodcreek
Woodcreek
Wimberley
Mountain City
Kyle
Creedmoor
Travis
Mustang Ridge
Nied
Uhland
Hays
Bastrop
San Marcos
Martindale
Lockhart
Staples
New Braunfels
Guadalupe
Seguin
Luling
Gonzales

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.

Woodcreek
Woodcreek
Wimberley
Mountain City
Kyle
Creedmoor
Travis
Mustang Ridge
Niederwald
Uhland
Hays
San Marcos
Martindale
Staples
Lockhart
Caldwell
New Braunfels
Guadalupe
Seguin
Luling
Gonzales

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.

Woodcree
Woodcree
Wimberley
Mountain City
Kyle
Creedmoor
Travis
Mustang Ridge
Niederwald
Uhland
Hays
San Marcos
Lockhart
Caldwell
Martindale
Staples
New Braunfels
Guadalupe
Seguin
Luling
Gonzales

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

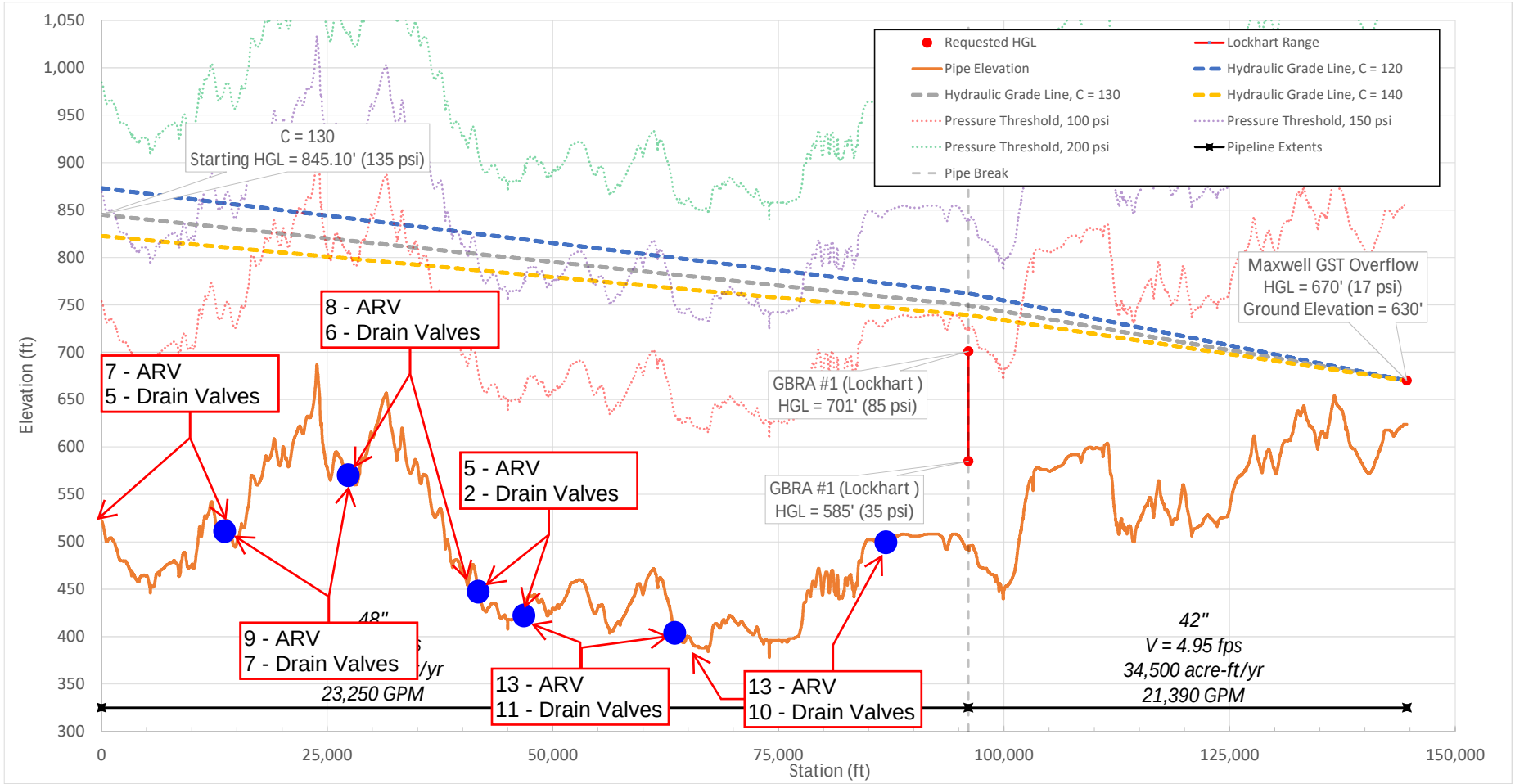
This option consists of reducing the total number of isolation valves to be placed along the pipeline segments. The original design standards required a maximum spacing of 5,000 linear feet between isolation valves. The proposed revise standards require isolation valve spacing to not exceed 13,000 linear 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

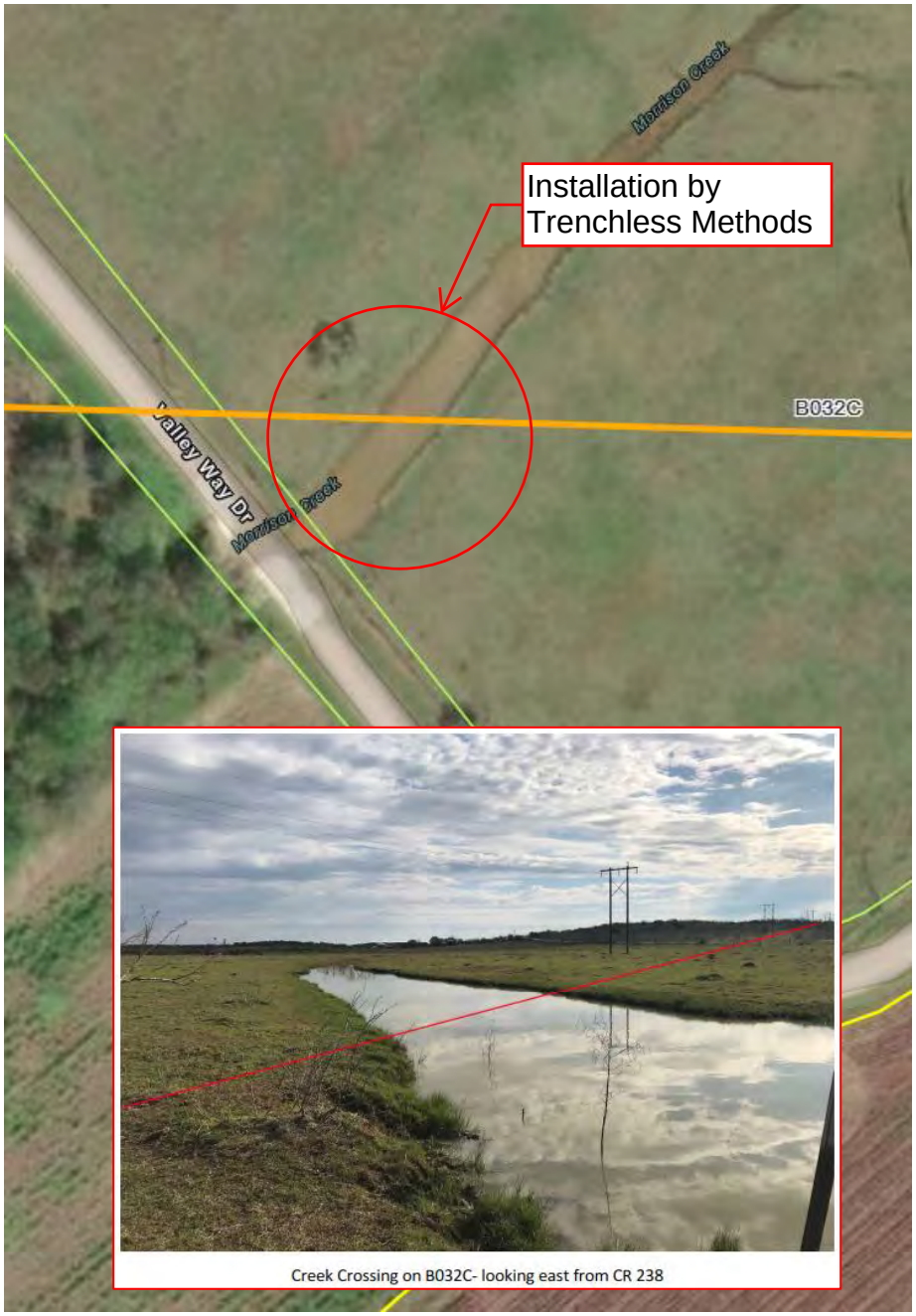
This option consists of reviewing the Pipeline Segments Technical Memorandums (TM) and identifying locations where there is a potential to reduce the quantity of installation by trenchless methods (such as boring or tunneling) as well as protective encasement pipe over the water pipeline when crossing 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
Allows for open cut construction methods at dry or no sign of regular flows	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.
Easier maintenance of the pipe in these locations without encasement over the pipe.	

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

B016C - Dry Branch crossing; slightly hilly – looking south west



Creek Crossing on B032C- looking east from CR 238

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

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

F.4 Discussion and possible action to reschedule the date of the January Technical Committee meeting. ~ *Graham Moore, P.E., Executive Director*

Background/Information
The regular meeting date for the January Technical Committee meeting would be January 8th. Due to its close proximity to the holidays, Staff is suggesting that the meeting date be moved back one week to Wednesday, January 15th so that more progress can be made on the Authority's activities and more meaningful discussion and action can occur.

Technical Committee Decision Needed:

- Possible action to rescheduled January's Technical Committee Meeting to Wednesday, January 15, 2020.

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

F.5 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 December 10th. A verbal update of the meeting's activities will be provided to the Technical Committee.

Plum Creek Conservation District (PCCD)
The PCCD is scheduled to meet on December 17th.

Groundwater Management Area 13
No update.

Region L Planning Group
No update.

Guadalupe-Blanco River Authority; Hays County Activities; CAPCOG Activities
No update.

Technical Committee decision needed:

- None.

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

G. EXECUTIVE DIRECTOR REPORT - Update on future meeting dates, locations, consultant invoices paid, approved changed orders, status of Authority procurements, Executive Director activities and other operational activities where no action is required. ~ *Graham Moore, P.E., Executive Director*

Board Meeting

- The December Board meeting will be held at the San Marcos Activity Center on Wednesday, December 18th.

Consultant Invoices Paid

- Below are reports on the consultant invoices paid in November.

FY 18-19 CONSULTANT INVOICES PAID in NOVEMBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/ Anomalies
Mark B. Taylor	$130,000.00	$0.00	$108,030.00	83%	$21,970.00	
LAN - Kyle/Buda Design	$45,469.89	$0.00	$38,049.63	84%	$7,420.26	
Patricia Ehrlinger Carls	$50,000.00	$0.00	$9,240.17	18%	$40,759.83	
RW Harden	$60,000.00	$0.00	$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	$5,663.80	$39,026.00	78%	$10,974.00	
BGE - Ph 1A CA	$181,136.00	$0.00	$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	$0.00	$8,741.78	19%	$36,258.22	
LNV - Ph 1A Observations	$205,185.59	$0.00	$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	$0.00	$10,505.00	5%	$199,495.00	
Total	**$1,173,545.09**	**$5,663.80**	**$692,925.78**		**$480,619.31**	

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

FY 19-20 CONSULTANT INVOICES PAID in NOVEMBER 2019

Consultant	Total Authorized	Current Invoice	Invoiced-to-Date	% of Contract Invoiced	Remaining	Notes/ Anomalies
Mark B. Taylor	$17,500.00	$6,845.00	$6,845.00	39%	$10,655.00	
LAN - Kyle/Buda Design	$116,280.27	$1,000.00	$1,981.95	2%	$114,298.32	
Patricia Ehrlinger Carls	$25,000.00	$6,157.75	$6,157.75	25%	$18,842.25	
RW Harden	$40,000.00	$5,133.50	$5,133.50	13%	$34,866.50	
Tx Solutions Group	$72,000.00	$6,000.00	$12,000.00	17%	$60,000.00	
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	$10,409.70	$10,409.70	23%	$34,590.30	
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	$0.00	$1,232.00	11%	$9,582.00	
Armstrong, Vaughan & Associates, P.C.	$10,715.00	$0.00	$0.00	0%	$10,715.00	
J.R. Tolles & Associates, Inc.	$199,495.00	$17,368.00	$17,368.00	9%	$182,127.00	
Total	**$458,142.37**	**$35,545.95**	**$43,759.90**		**$414,382.47**	

- Below is the report on the Phase 1B invoices paid in November.

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

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
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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

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
520 E. RR 150, Kyle, TX 78640

H. COMMITTEE MEMBER ITEMS OR FUTURE AGENDA ITEMS – Possible acknowledgement by Committee Members of future area events and/or requests for item(s) to be placed on a future agenda where no action is required.

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

REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 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 (Real Property Deliberations) regarding:*

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

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REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 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

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REGULAR MEETING
Alliance Regional Water Authority Technical Committee

COMMITTEE MEMBER PACKETS
Wednesday, December 11th, 2019 at 3:00 P.M.
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J. ADJOURNMENT
