BUILDING A WORLD OF DIFFERENCE

PROGRAM MANAGERS: WHO NEEDS THEM?

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2 March 2015

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Building a world of difference.®

AGENDA

- Black & Veatch Background with Program Management
- Program Management, What is it?
- The Flavors of Program Management
- Lessons Learned and Using the Right Tools for the Job
- Why a Program Manager?

SECTION 1
BLACK & VEATCH EXPERIENCE WITH PROGRAM MANAGEMENT

PROGRAM MANAGEMENT CLIENTS AND PROJECTS

- **San Marcos Texas, WTP Design and Water Supply with GBRA**
- **SAWS**
  - Aquifer Storage and Recovery Project, Delivery System.
  - Gonzales County Carrizo Project
  - Region Carrizo Project
  - Brackish WTP Project
- **Las Vegas**
- **Brownsville Public Utilities Board, Reuse water supply and waste lines.**
- **Tarrant Regional**
- **City of Shreveport, LA, Consent Decree programs**

COMMON THEMES AMONG THE PROGRAM MANAGEMENT OPPORTUNITIES

- **New technology or type of project**
  - New WTP type.
  - New outside water resource
- **Very large project (relatively speaking)**
  - Staffing limitations
  - Technical limitations
- **Critical project from a cost and schedule perspective.**
  - Outside contract driving the project
  - High profile
- **Multiple contracts required or desired to execute.**

WHAT IS PROGRAM MANAGEMENT?

PROJECT DEFINITIONS

LATIN – PROJECTUM – "TO THROW SOMETHING TOWARDS"

A temporary endeavor undertaken to deliver a unique product, service, or result.

i.e. Study, Plan, Design, Specification, Permitting, Construction, Procurement, Start Up, Inspection, Review, Temporary Operation, or Decommissioning

PMBOK 5th Edition page 3

PROJECT MANAGEMENT DEFINITION

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

- Use of 47 processes grouped in 5 groups and 10 knowledge areas

Villard de Honnecourt

PMBOK 5th Edition page 5

PROGRAM DEFINITION

A group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not available from managing them individually.

Ex. Reuse Water Program which includes Master Plan, Standard Specifications, Operations Manuals, Design Projects, Maintenance Schedules, Rate Studies, etc.

PMBOK 5th Edition page 9

PROGRAM MANAGEMENT DEFINITION

Program management is the application of knowledge, skills, tools, and techniques in order to meet the program requirements and obtain benefits and control not available by managing projects individually.

- Focus on Project Interdependencies and determine optimal approaches.
- Programs are often charged with aligning projects with Strategic Plans
- Ex. 1. LID Bio-retention Basin installed on at Reuse Pump Station.
- Ex. 2. Creation of standards or governing documents to be utilized throughout a program.
- Ex. 3. Bond Financing for multiple projects to reduce initial costs.

PMBOK 5th Edition page 9

PROJECT DELIVERY VS. PROGRAM DELIVERY

PROJECTS:

- Coordinate activities for single-purpose outcome
- Project risk and change management
- Individual management of functions
- Manage project-specific activities

PROGRAMS:

- Multiple integrated projects delivered together with managed interdependencies
- Program-wide risk and change management
- Coordinated management among functions
- Manage and track activities among project to achieve overall program goals
- Combine and manage escalated issues among projects

HOW ARE PROGRAMS DIFFERENT?

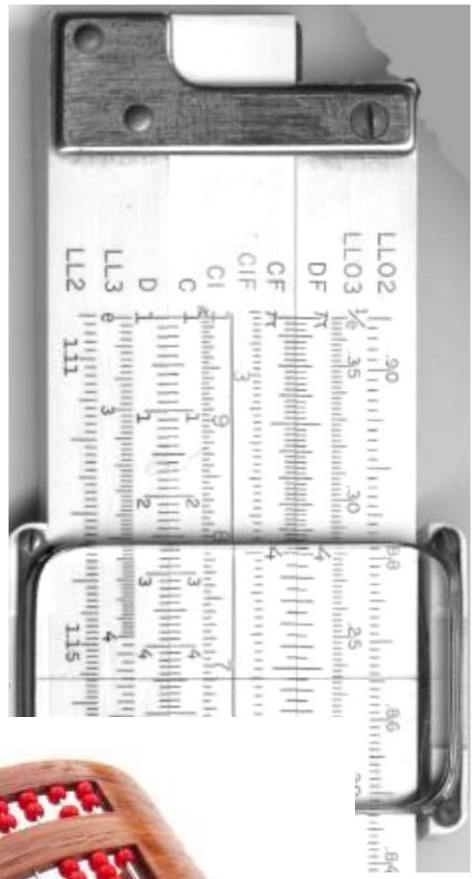
	PROGRAM MANAGEMENT	ENGINEERING SERVICES
Work Location	Owner's Office	Consultant's Office
Deliverables	Some defined – many not defined	Well Defined and Clear
Responsibility	Entire Project Lifecycle	Specific Phase (e.g. Design)
Opportunity for Knowledge Transfer	High	Low
Client Relationship	Trusted Advisor	Service Provider
Design Responsibility	Overseeing and managing multiple design firms	Performing the design services

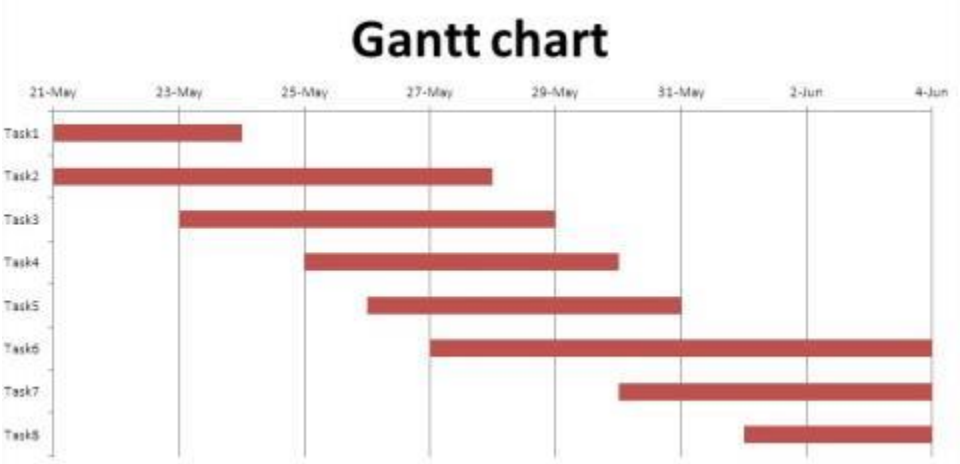
COMPARISON OF PROJECT MANAGEMENT AND PROGRAM MANAGEMENT

	Program Management	Project Management
Application – Public Project Manager	Provide low cost water that meets standards and is compatible with the system	Deliver infrastructure modification within scope and budget
Application – Professional Services Consultant	Develop program level documents review project work, manage program controls, may self perform	Deliver study, plan or construction documents, and provide construction phase services.

TYPICAL PROGRAM TOOLS

- Master Schedule
- Program Cost
- Aggregated Trend Log
- Program Requirement Register
- Risk Register
- Key Performance Indicators Matrix
- Cloud Storage





SIMPLY PUT …

Program management is the coordinated delivery of a portfolio of projects to obtain benefits for the owner
not available if managed separately

Improves value and reduces risk while controlling costs

A PROGRAMMATIC APPROACH LOOKS FOR OPPORTUNITIES TO ADD VALUE

- Technical Innovations
- Rigorous design review, value engineering and constructability reviews
- Project validation and optimized packaging
- Automation efficiencies
- Standardization
- Coordination of external programs and influences that impact progress

Value and savings from enhanced solutions

PROGRAM MANAGEMENT ASSIGNS THE RIGHT PEOPLE AT THE RIGHT TIME TO BALANCE WORK LOAD

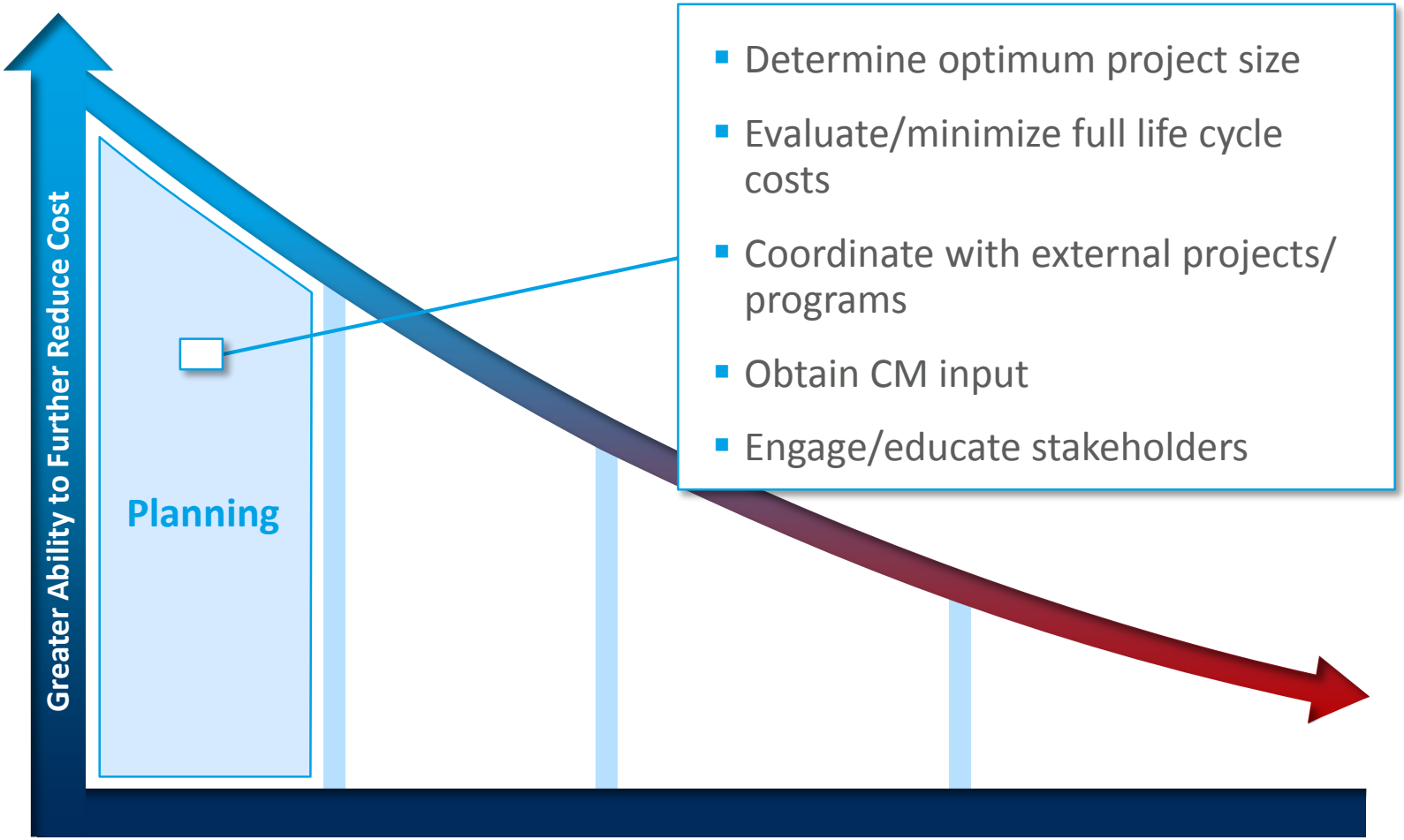
DRIVERS:

- **Limited resources to keep up with demand on assets**
  (Retiring workforce, staff reductions)
- **Discrete, one-time only program needs to be delivered**
- **Regulatory requirements with potential penalties**
  (Consent Decree)
- **Large capital delivery outside of the organization's core capabilities**

BENEFITS:

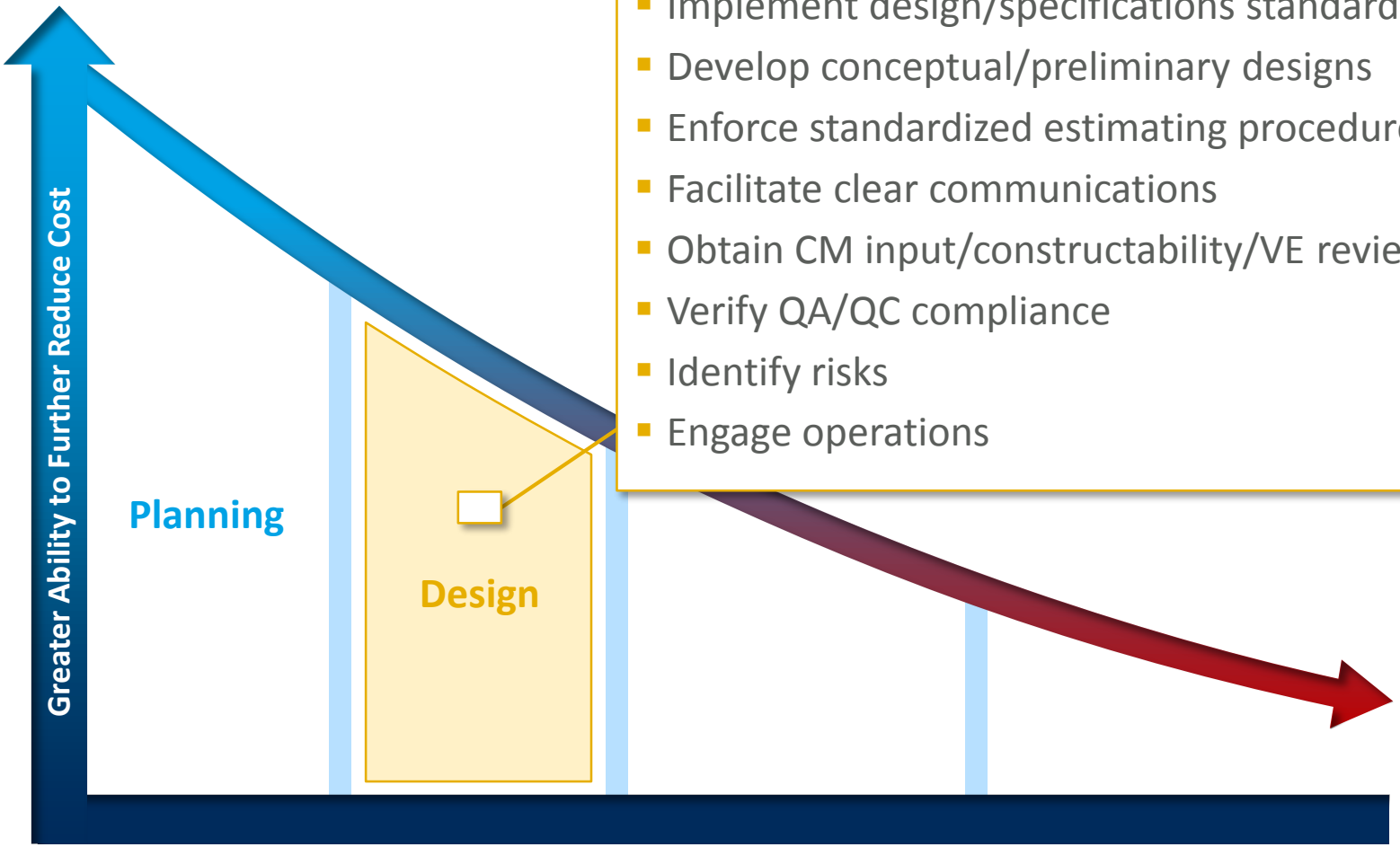
- **Global experience managing large projects and programs**
- **Deep technical experience in the subject matter**
  (CSOs, Water/ Wastewater Treatment Plants, Conveyance, etc.)
- **People who have "done this before"**
- **Well defined processes, systems, and tools that are ready to deploy**
- **Just-in-time staffing**

A PROGRAM APPROACH MAXIMIZES OPPORTUNITIES FOR PERFORMANCE ENHANCEMENTS



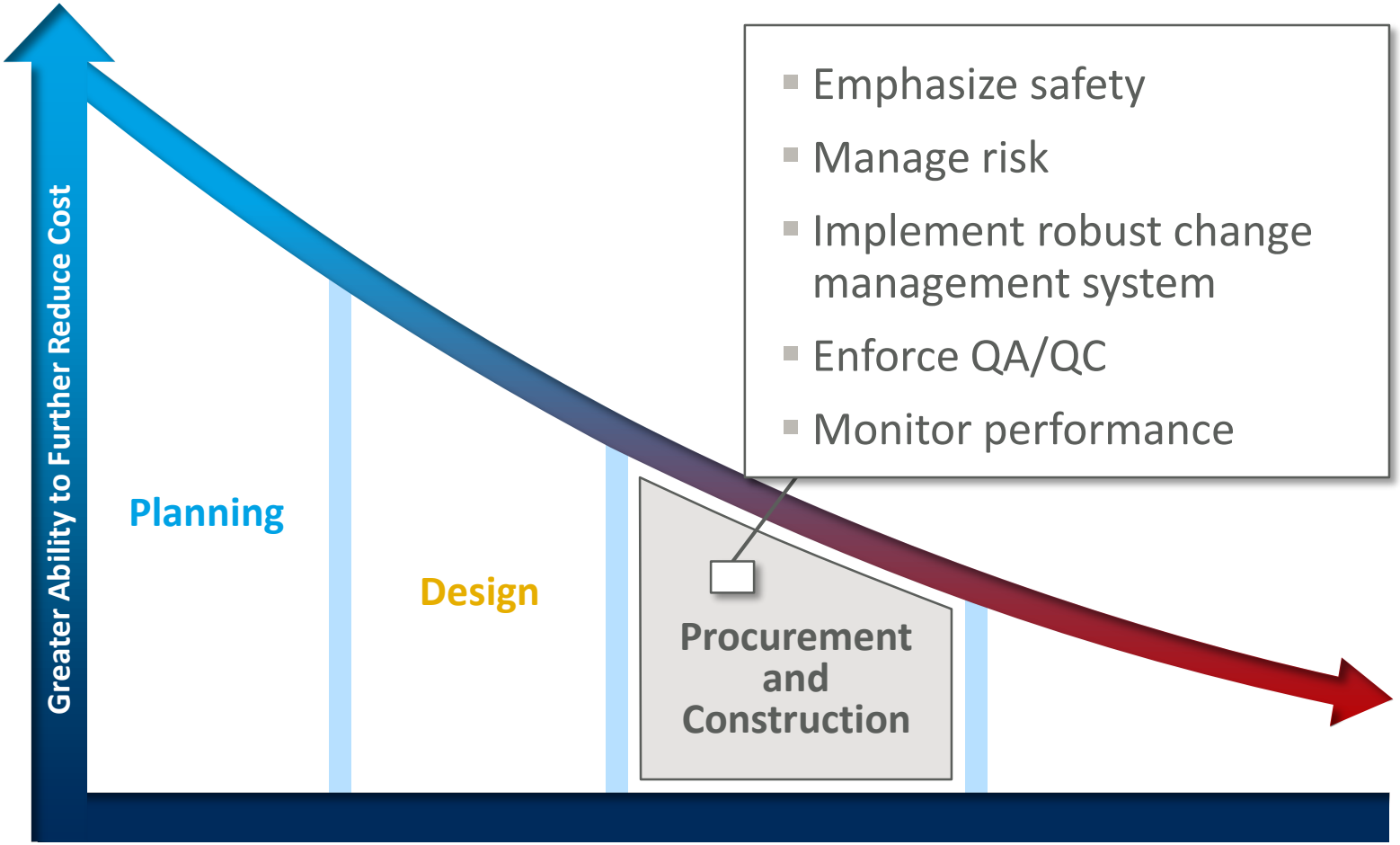
- Determine optimum project size
- Evaluate/minimize full life cycle costs
- Coordinate with external projects/ programs
- Obtain CM input
- Engage/educate stakeholders

A PROGRAM APPROACH MAXIMIZES OPPORTUNITIES FOR PERFORMANCE ENHANCEMENTS

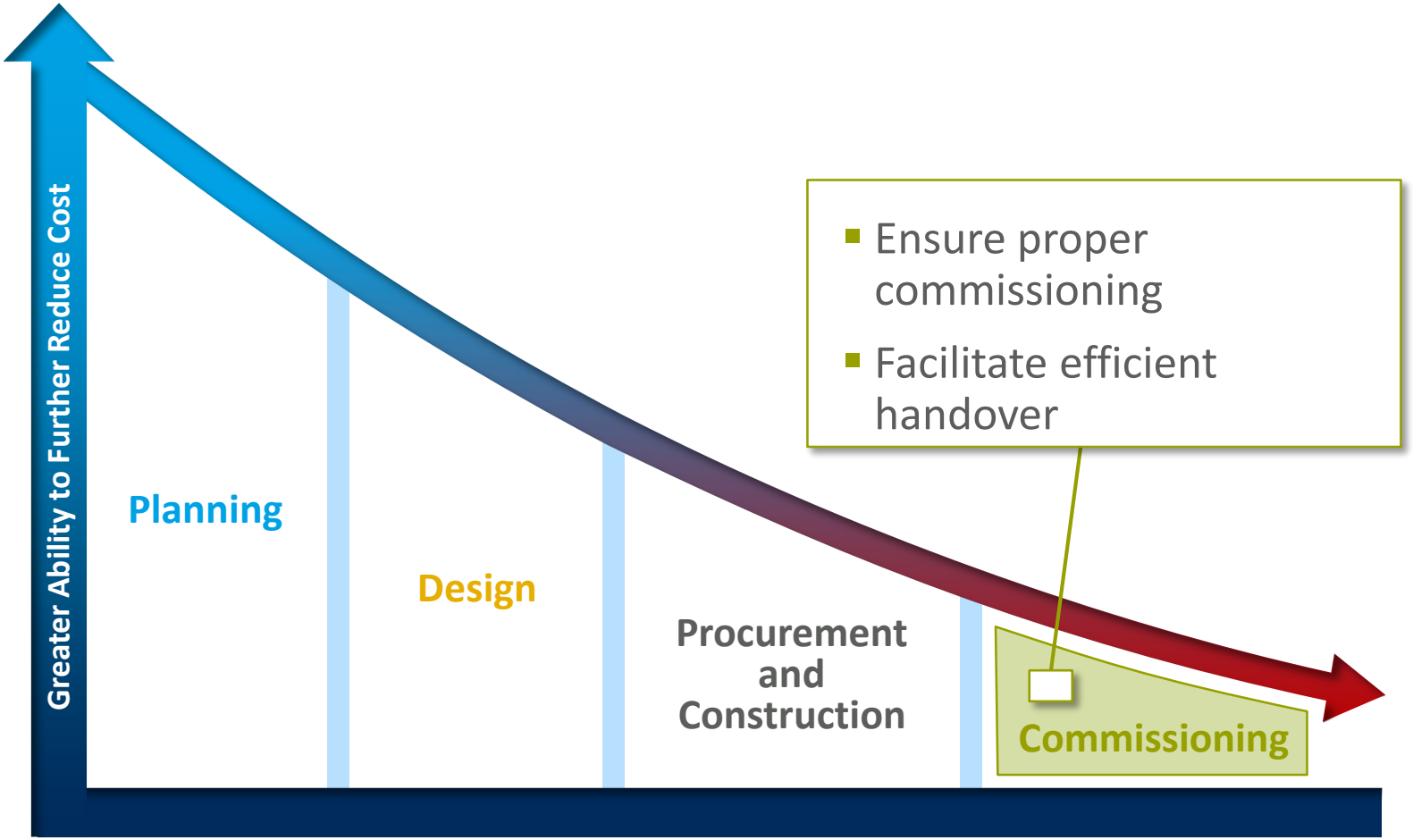


- Implement design/specifications standards
- Develop conceptual/preliminary designs
- Enforce standardized estimating procedures
- Facilitate clear communications
- Obtain CM input/constructability/VE reviews
- Verify QA/QC compliance
- Identify risks
- Engage operations

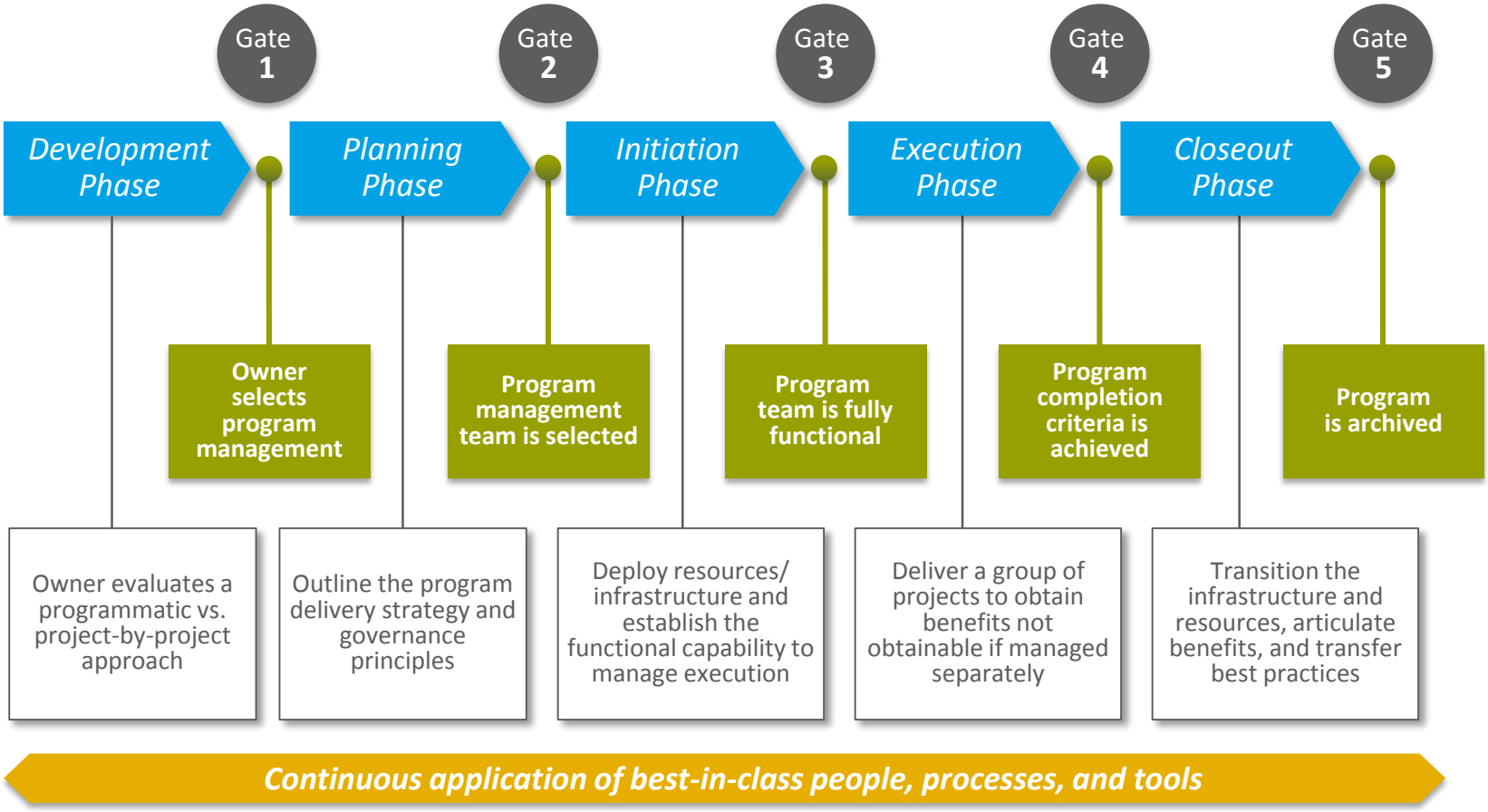
A PROGRAM APPROACH MAXIMIZES OPPORTUNITIES FOR PERFORMANCE ENHANCEMENTS



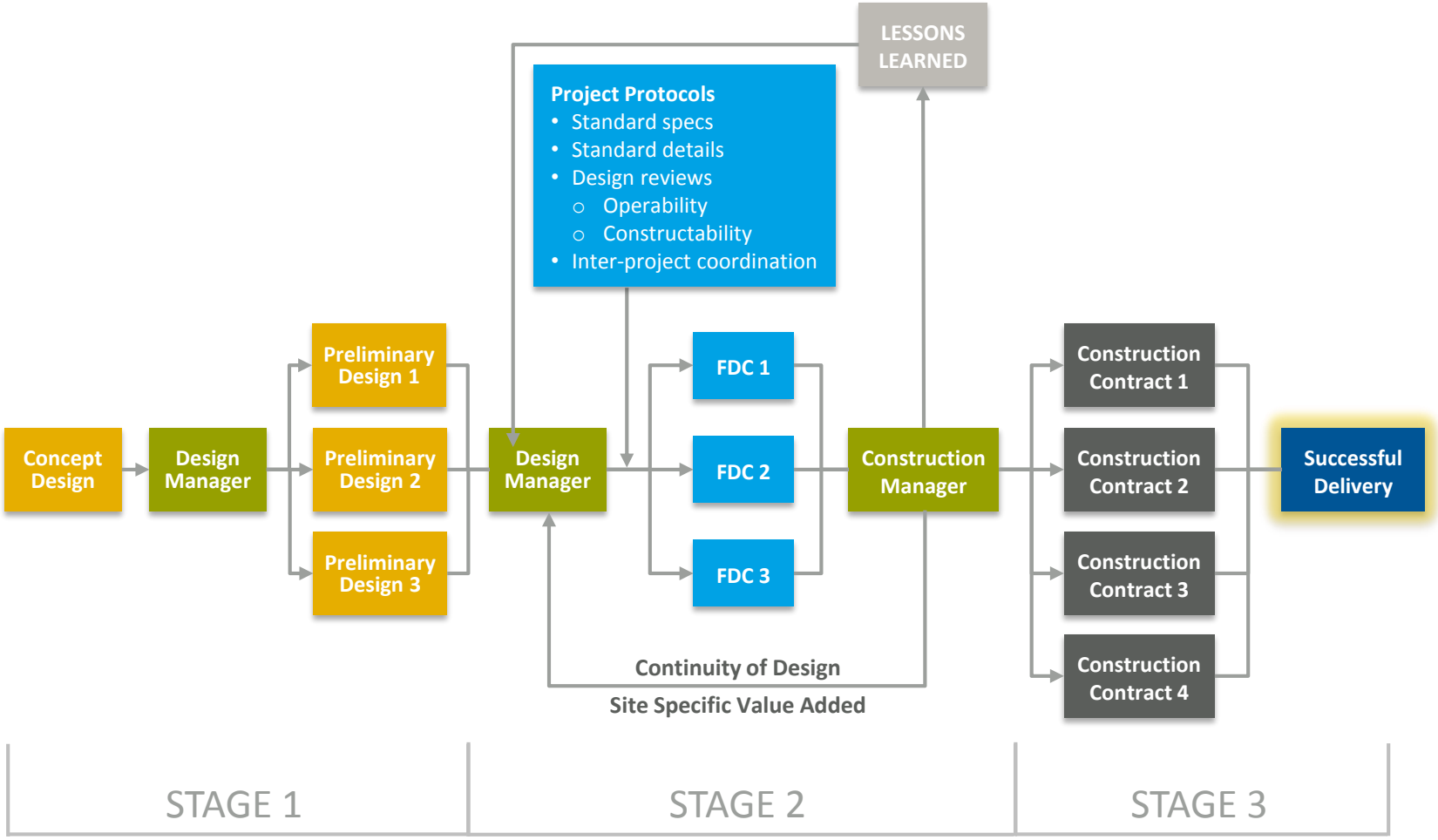
A PROGRAM APPROACH MAXIMIZES OPPORTUNITIES FOR PERFORMANCE ENHANCEMENTS



PROGRAM PROGRESSION



THE PMO HELPS CREATE A CULTURE OF CONTINUOUS IMPROVEMENT THAT LEAVES THE OWNER A LEGACY BENEFIT



TECHNICAL VS. PROGRAMMATIC SERVICES

TECHNICAL:

- Process Evaluation
- Permitting
- Design
- Material Selection
- Review
- Inspection
- Operation

PROGRAMMATIC:

- Coordination
- Presentations
- Public Outreach
- Budgeting
- Scheduling
- Procurement
- Contract Management
- Document Oversight

SECTION 3
THE VARIATIONS OF PROGRAM MANAGEMENT

ORGANIZATION MODELS SHOULD BE TAILORED TO FIT THE REQUIREMENTS OF THE PROGRAM

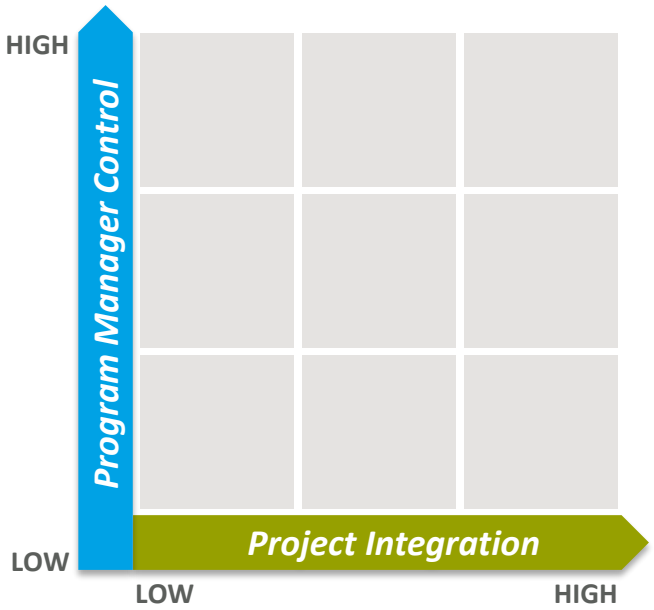
PROGRAMS HAVE A RANGE OF PROJECT INTEGRATION & PROGRAM MANAGER CONTROL

PROGRAM MANAGEMENT CONTROL

High: Full authority to make programmatic decisions, shared risks/rewards

Moderate: Partial authority to make decisions, with owner approval

Low: Minimal authority or influence on decisions, usually a staff augmentation role



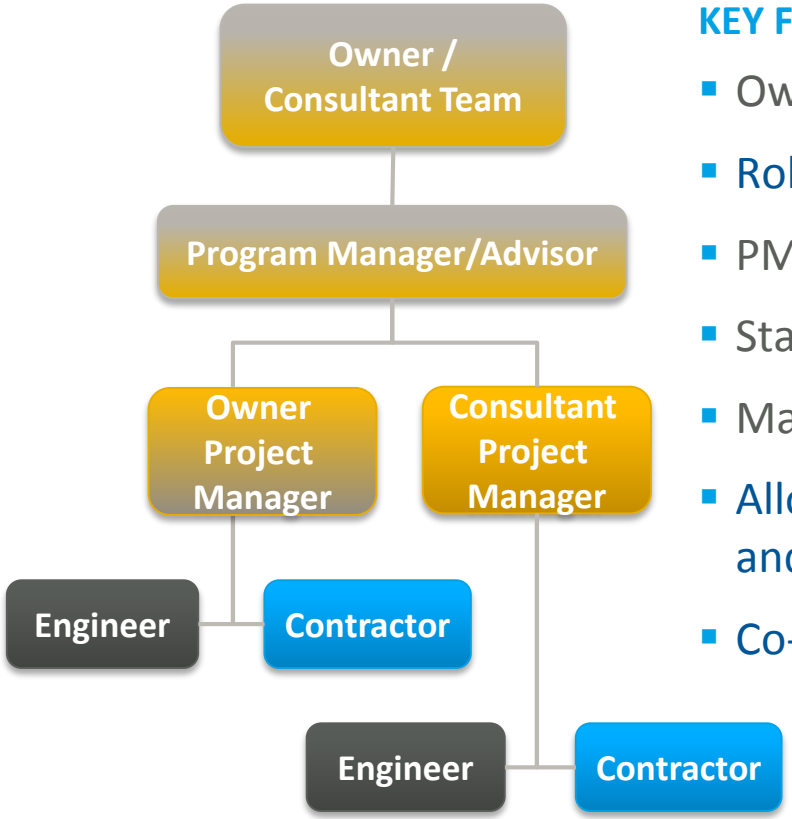
PROJECT INTEGRATION

High: Projects with complex, connected elements or high level of sequencing

Moderate: Projects with selected elements that require coordination

Low: Projects with similar scope at different locations

SHARED MANAGEMENT MODEL



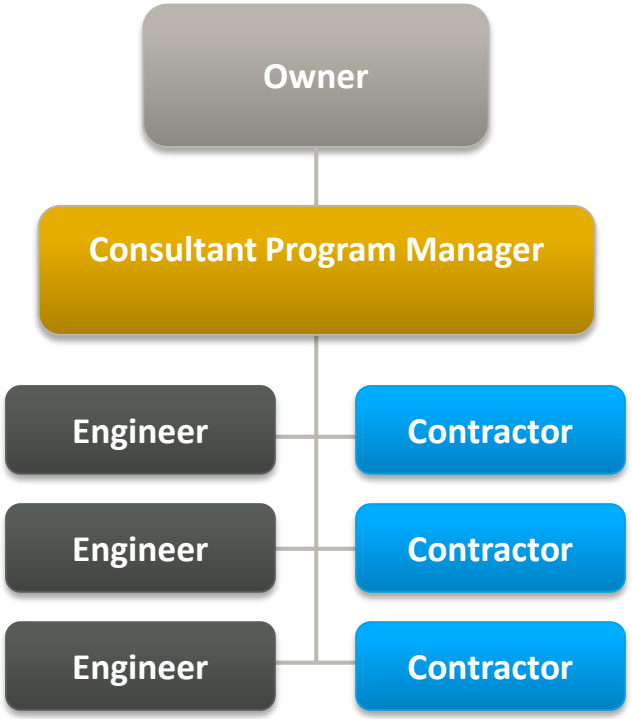
KEY FEATURES

- Owner maintains control over most decisions
- Roles/KPIs must be clearly defined
- PM can be owner or consultant
- Staff is integrated at multiple levels
- Maximum opportunity for skill sharing
- Allows rapid changes in program staff size and/or expertise
- Co-location maximizes coordination

WHEN DOES SHARED MANAGEMENT WORK BEST?

- Owner has in-place program management talent or leadership
- Owner has processes or tools but may need enhancements or upgrading
- Objective is enhancing in-house PM and project delivery expertise
- When the increased project load cannot be handled by owner's workforce and hiring would result in future overstaffing

CONSULTANT MANAGEMENT MODEL



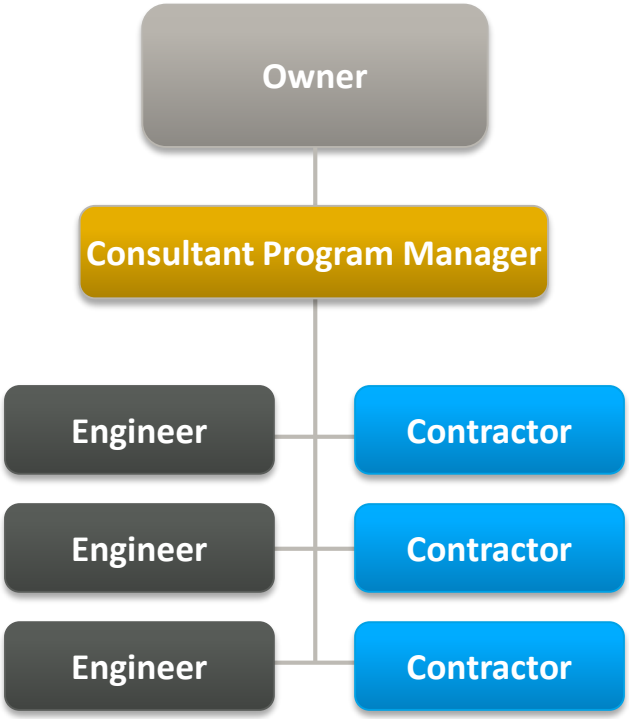
KEY FEATURES

- Consultant provides program manager
- Program manager has greater responsibility/authority
- Roles/Responsibilities/KPIs must be clearly defined
- Staff can still be integrated
- Program manager manages all aspects of the program
- Procurement follows owner's protocols

WHEN DOES CONSULTANT MANAGEMENT WORK BEST?

- When owner does not have skilled resources available to manage, integrate and optimize the many significant and diverse program activities
- Owner's staff is available and can handle non-management activities with minimal support from consultant program manager
- Owner's existing business processes are adequate for assigned tasks

CONSULTANT MANAGEMENT WITH CONTRACT AUTHORITY



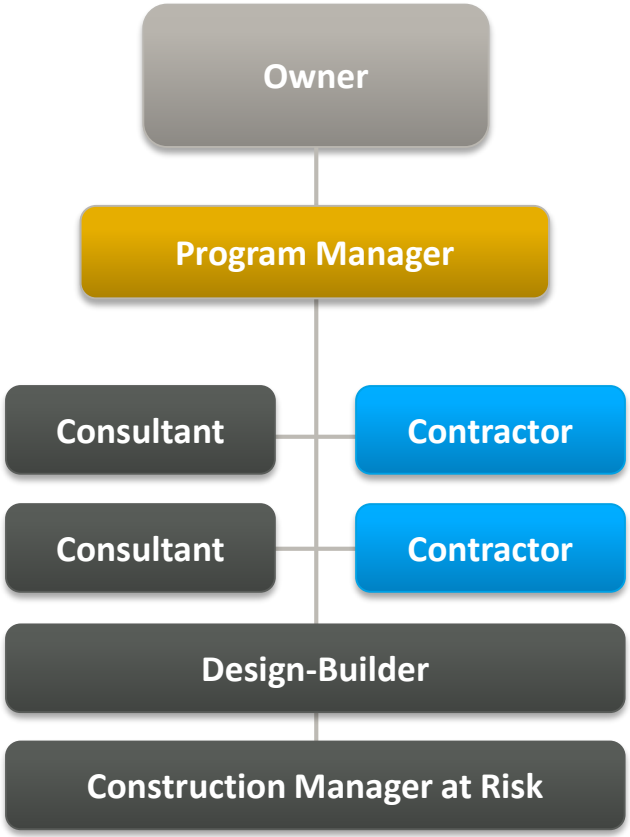
KEY FEATURES

- Owner hires PM
- PM hires engineers and may self-perform design work
- PM functions as owner's agent
- PM responsible for day-to-day management
- Construction, D-B procurement follows established procedures
- PM not At-risk Delivery Partner
- PM functions as owner's agent
- PM responsible for day-to-day management
- PM not At-risk Delivery Partner

WHEN DOES CONSULTANT MANAGEMENT WITH CONTRACT AUTHORITY WORK BEST?

- Cost and schedule are main drivers
- Owner is willing to relinquish some control to achieve cost and schedule saving (e.g., Contractual & Technical)
- Owner has flexible legal and procurement ability
- Owner must have high degree of trust in program manager

PROGRAM MANAGER AT RISK MODEL:



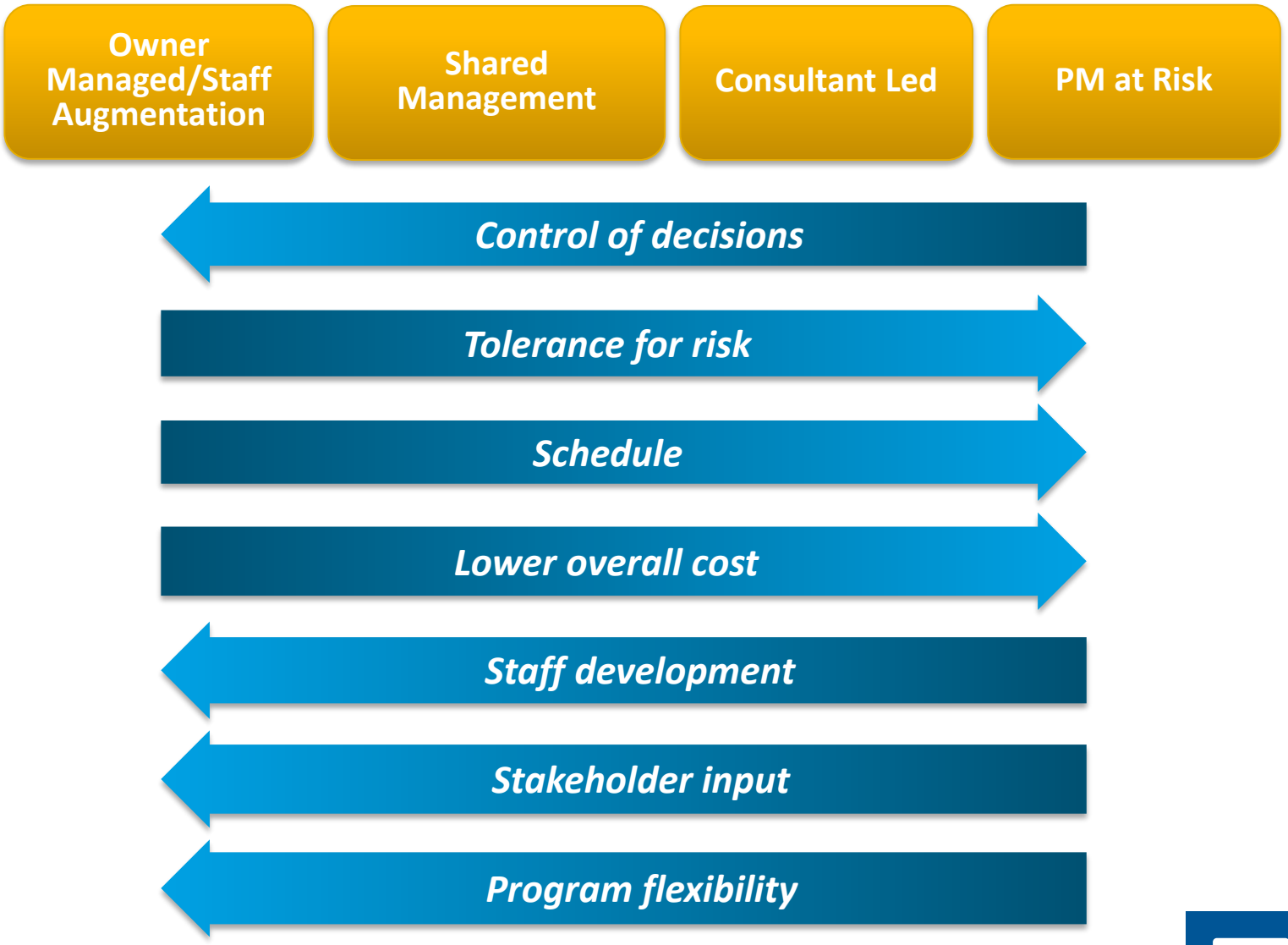
KEY FEATURES

- Can provide lowest overall cost
- Shortest completion
- Owner may have less input and control
- Program Manager assumes schedule and cost risk
- Not commonly done by US public utilities, but very successful internationally

WHEN DOES PROGRAM MANAGEMENT AT RISK WORK BEST?

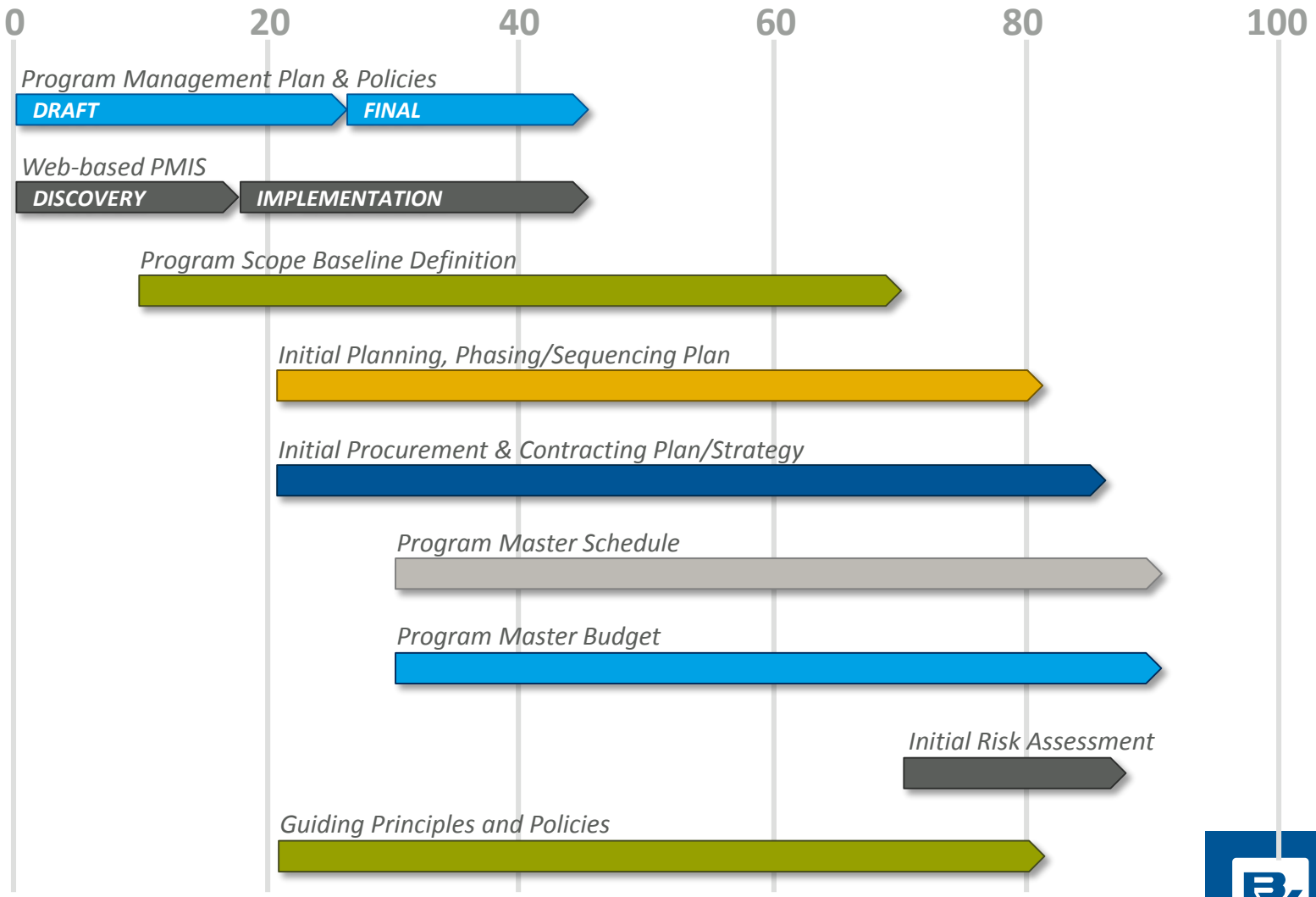
- When you need to do something that has never been done before
- When the mission is not part of the agency core competency
- When its an admissible form of contracting
- When risk transfer is an objective
- When enough reward exists for owner, incentivizing consultant performance enables shared benefit

GOVERNANCE DETERMINES DELIVERY MODEL



SECTION 4
PLANNING, TOOLS AND EXECUTION

THE INITIAL PLANNING APPROACH SETS THE STAGE FOR COLLABORATION AND EFFICIENT EXECUTION



THE BEST-VALUE IS REALIZED WHEN THE OWNER AND PM COLLABORATE ON DEVELOPMENT OF THE TRACKING SYSTEMS

Schedule Management

ORACLE Primavera P6

Microsoft Project 2010

Reporting

COGNOS

ORACLE BUSINESS INTELLIGENCE

crystal reports.

Cost and Contract Management

Meridian SYSTEMS

Skire

e-Builder

ORACLE Primavera Contract Management

Cost Estimating

sage software Timberline

HARD DOLLAR

Document Control & Collaboration

Microsoft SharePoint Server 2010

documentum a division of EMC

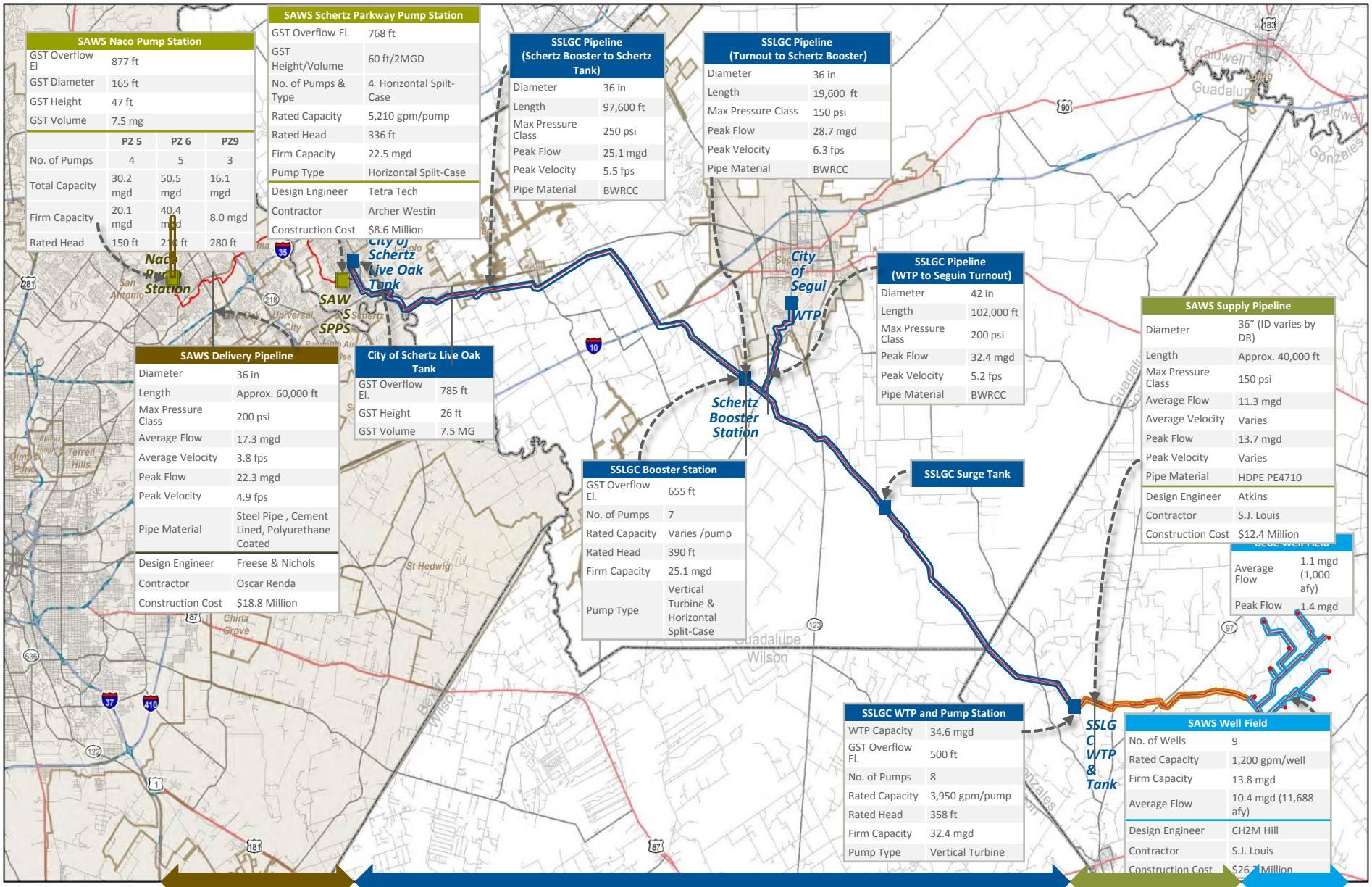
aconex

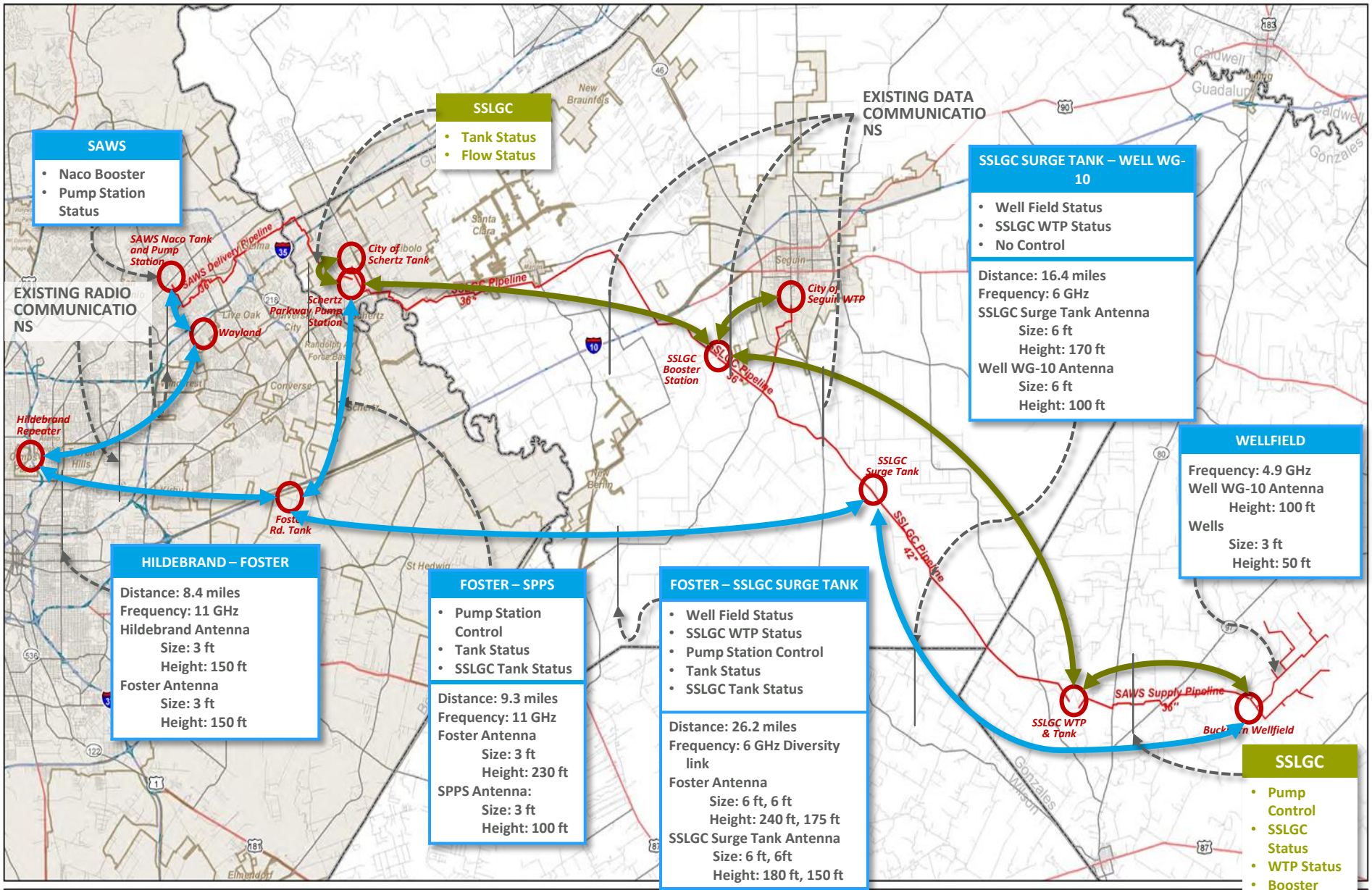
Risk Management

Active Risk Embrace risk. Build value.

ESTABLISHING AND COMMUNICATING THE TECHNICAL BASELINE

- **Define the project**
  - Capacities
  - Routing
  - Head
- **Divide the Project**
  - Project Phasing
  - Scope/responsibility for each entity.


SAWS Naco Pump Station
GST Overflow El 877 ft
GST Diameter 165 ft
GST Height 47 ft
GST Volume 7.5 mg
PZ 5 PZ 6 PZ9
No. of Pumps 4 5 3
Total Capacity 30.2 mgd 50.5 mgd 16.1 mgd
Firm Capacity 20.1 mgd 40.4 mgd 8.0 mgd
Rated Head 150 ft 210 ft 280 ft
Naco Pump Station
SAWS Schertz Parkway Pump Station
GST Overflow El. 768 ft
GST Height/Volume 60 ft/2MGD
No. of Pumps & Type 4 Horizontal Spilt-Case
Rated Capacity 5,210 gpm/pump
Rated Head 336 ft
Firm Capacity 22.5 mgd
Pump Type Horizontal Spilt-Case
Design Engineer Tetra Tech
Contractor Archer Westin
Construction Cost $8.6 Million
SSLGC Pipeline (Schertz Booster to Schertz Tank)
Diameter 36 in
Length 97,600 ft
Max Pressure Class 250 psi
Peak Flow 25.1 mgd
Peak Velocity 5.5 fps
Pipe Material BWRCC
SSLGC Pipeline (Turnout to Schertz Booster)
Diameter 36 in
Length 19,600 ft
Max Pressure Class 150 psi
Peak Flow 28.7 mgd
Peak Velocity 6.3 fps
Pipe Material BWRCC
City of Schertz Live Oak Tank
SAWS SPPS
SAWS Delivery Pipeline
Diameter 36 in
Length Approx. 60,000 ft
Max Pressure Class 200 psi
Average Flow 17.3 mgd
Average Velocity 3.8 fps
Peak Flow 22.3 mgd
Peak Velocity 4.9 fps
Pipe Material Steel Pipe , Cement Lined, Polyurethane Coated
Design Engineer Freese & Nichols
Contractor Oscar Renda
Construction Cost $18.8 Million
City of Schertz Live Oak Tank
GST Overflow El. 785 ft
GST Height 26 ft
GST Volume 7.5 MG
City of Seguin WTP
SSLGC Pipeline (WTP to Seguin Turnout)
Diameter 42 in
Length 102,000 ft
Max Pressure Class 200 psi
Peak Flow 32.4 mgd
Peak Velocity 5.2 fps
Pipe Material BWRCC
SAWS Supply Pipeline
Diameter 36" (ID varies by DR)
Length Approx. 40,000 ft
Max Pressure Class 150 psi
Average Flow 11.3 mgd
Average Velocity Varies
Peak Flow 13.7 mgd
Peak Velocity Varies
Pipe Material HDPE PE4710
Design Engineer Atkins
Contractor S.J. Louis
Construction Cost $12.4 Million
Schertz Booster Station
SSLGC Booster Station
GST Overflow El. 655 ft
No. of Pumps 7
Rated Capacity Varies /pump
Rated Head 390 ft
Firm Capacity 25.1 mgd
Pump Type Vertical Turbine & Horizontal Split-Case
SSLGC Surge Tank
Average Flow 1.1 mgd (1,000 afy)
Peak Flow 1.4 mgd
SSLGC WTP and Pump Station
WTP Capacity 34.6 mgd
GST Overflow El. 500 ft
No. of Pumps 8
Rated Capacity 3,950 gpm/pump
Rated Head 358 ft
Firm Capacity 32.4 mgd
Pump Type Vertical Turbine
SSLGC WTP & Tank
SAWS Well Field
No. of Wells 9
Rated Capacity 1,200 gpm/well
Firm Capacity 13.8 mgd
Average Flow 10.4 mgd (11,688 afy)
Design Engineer CH2M Hill
Contractor S.J. Louis
Construction Cost $26.7 Million
PROPOSED WATER DELIVERY PIPELINE
EXISTING SSLGC FACILITIES
PROPOSED WATER SUPPLY PIPELINE
PROPOSED WELL FIELD
City Limits
Data Source(s): ESRI, Bing, SAWS
0 8,000 16,000
Feet
San Antonio Water System
SAWS Regional Carrizo Project Overview Map



SAWS - Regional Carrizo Project

SCADA Communication Plan

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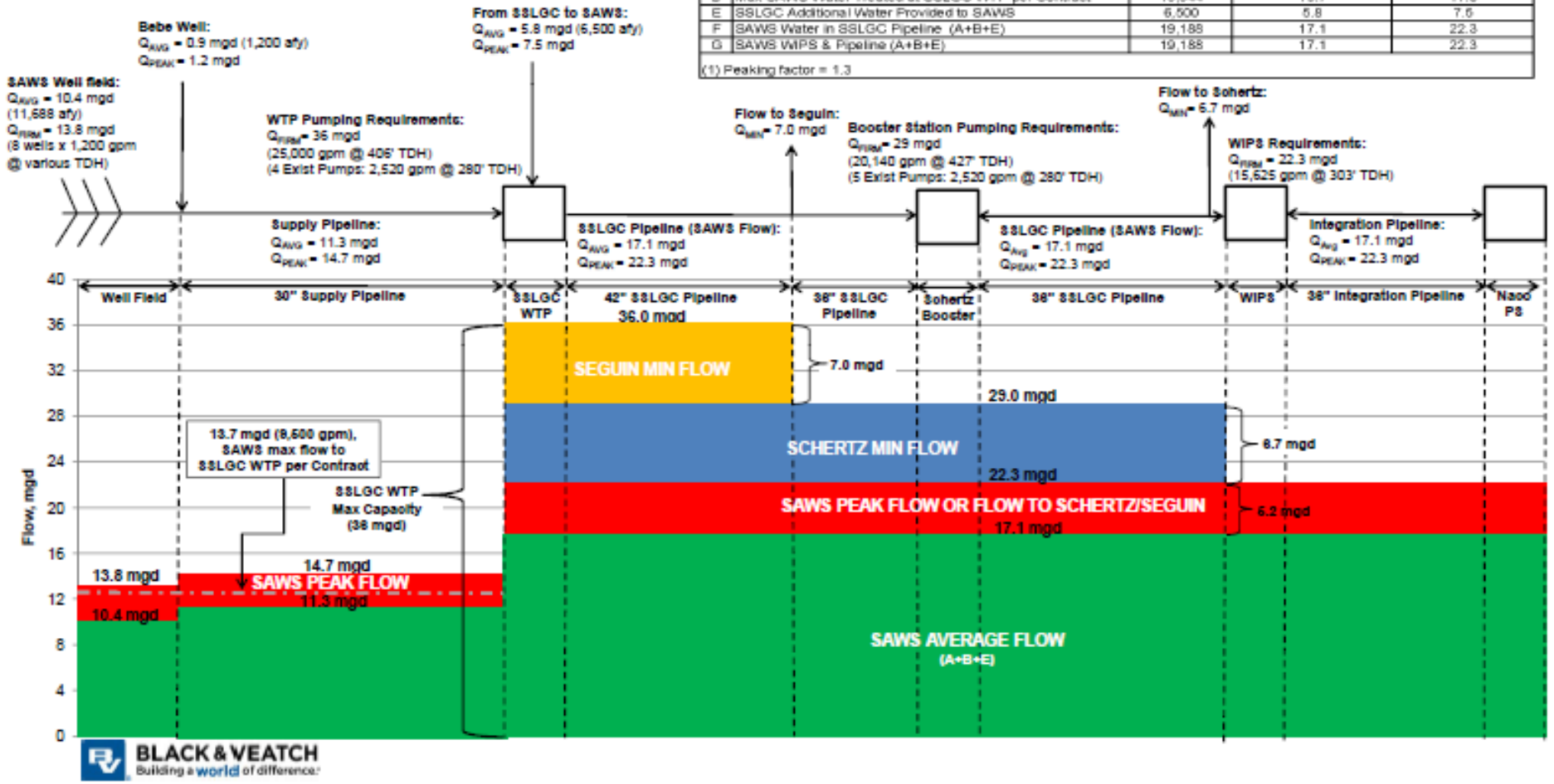
FLOW RATE SUMMARY

	Location	SAWS Average Flow		SAWS Peak Flow(1)
		acre-ft/year	mgd	mgd
A	SAWS Well Field	11,685	10.4	13.8
B	Bebe Well	1,000	0.9	1.2
C	SAWS Supply Pipeline (A+B)	12,685	11.3	14.7
D	Max SAWS Water Treated at SSLGC WTP per Contract	15,344	13.7	17.8
E	SSLGC Additional Water Provided to SAWS	6,500	5.8	7.6
F	SAWS Water in SSLGC Pipeline (A+B+E)	19,188	17.1	22.3
G	SAWS WIPS & Pipeline (A+B+E)	19,188	17.1	22.3

(1) Peaking factor = 1.3



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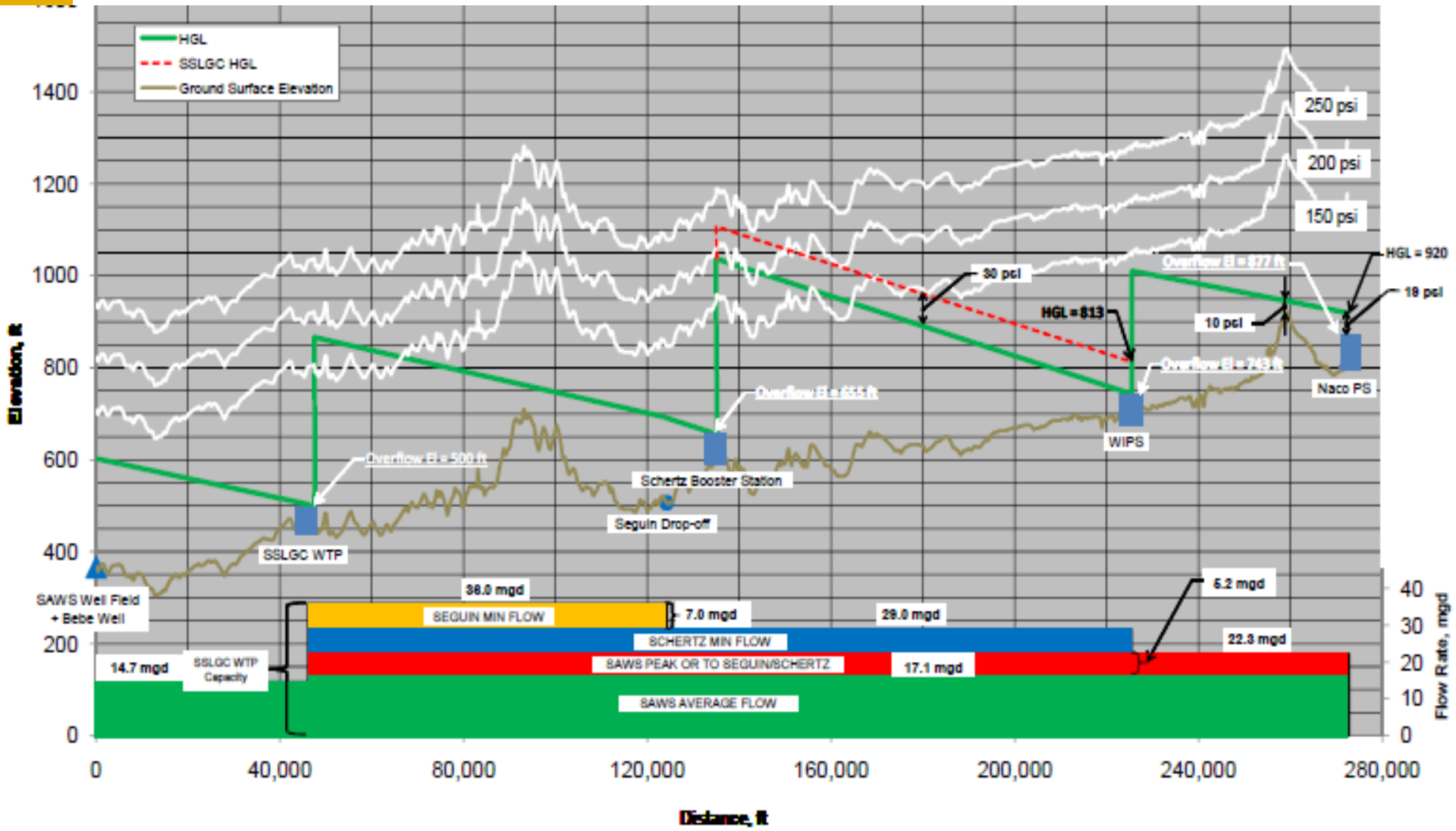
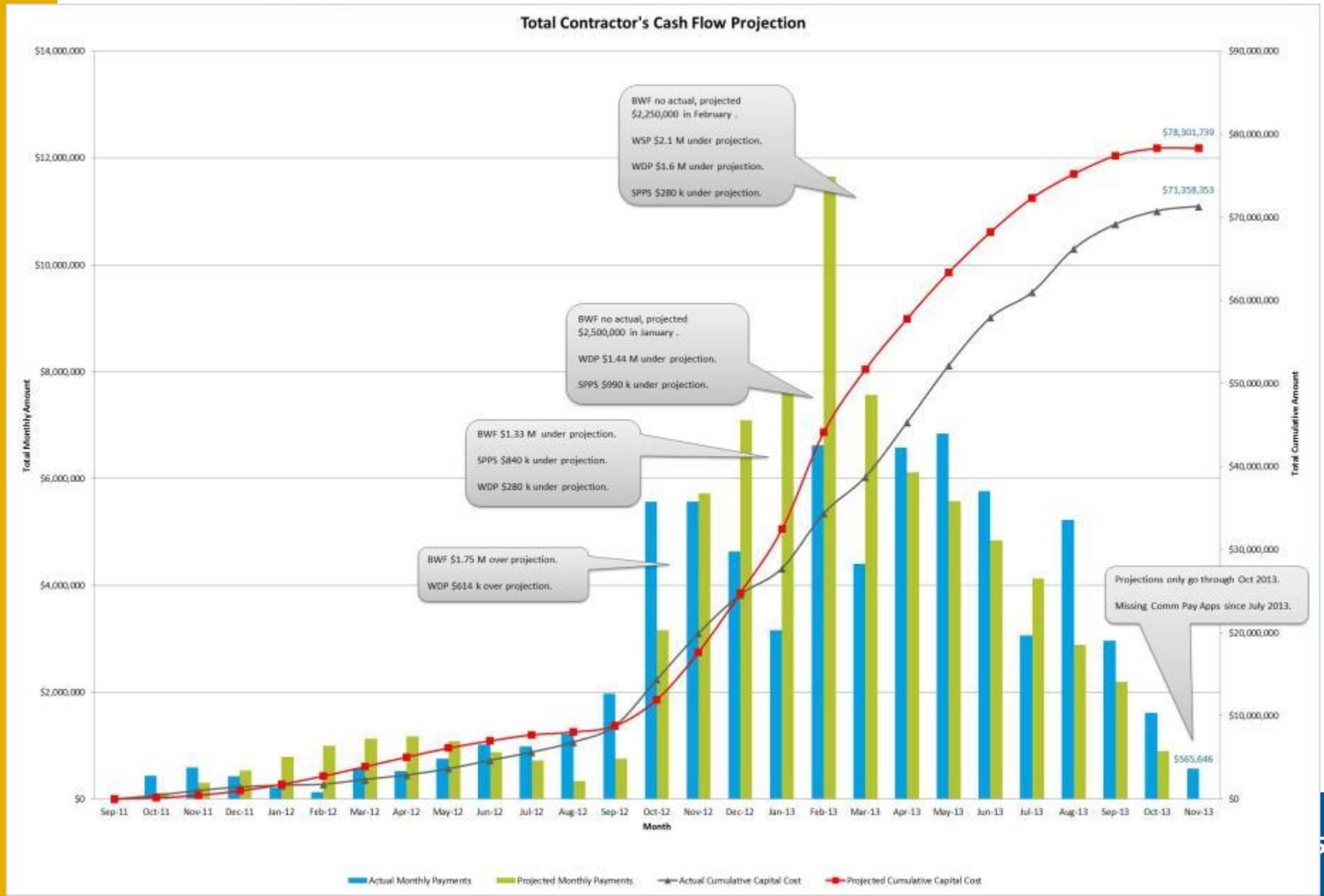
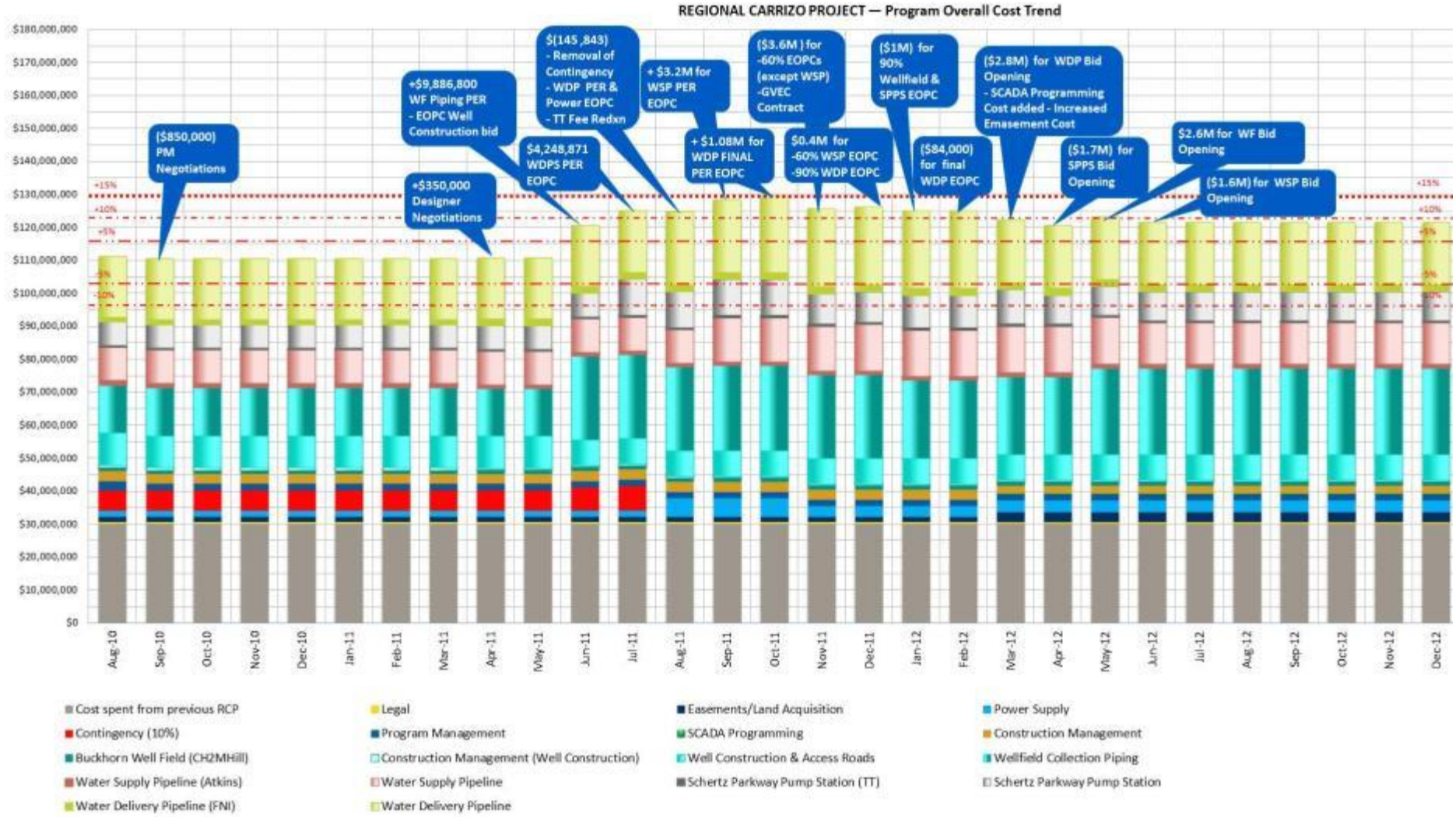
OVERALL SYSTEM HYDRAULICS



CLASSIC MONTHLY COSTS VERSUS ACTUALS AND RUNNING TOTAL

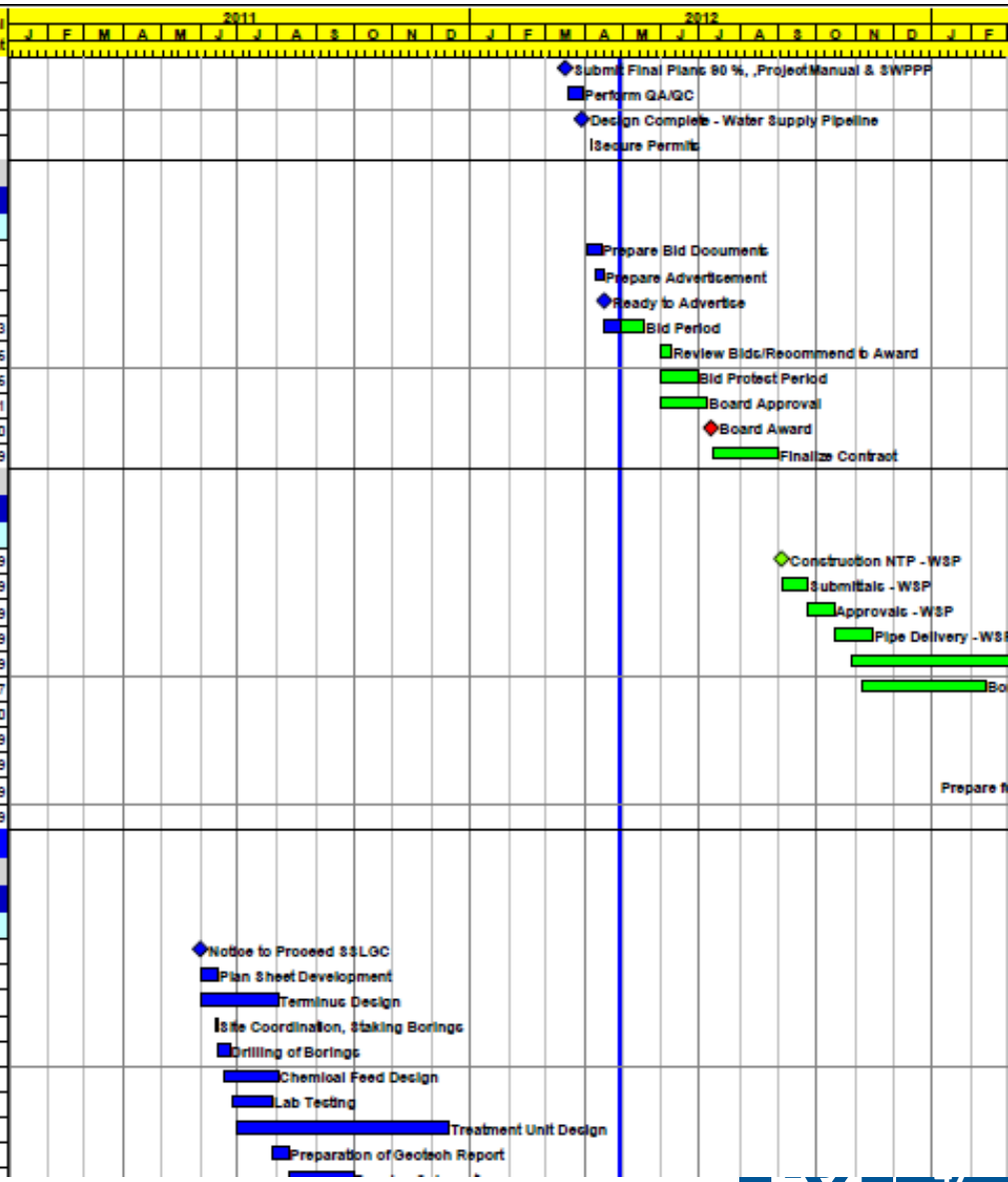


WHAT IS THE PROGRAM COST, AND WHY DID IT CHANGE?



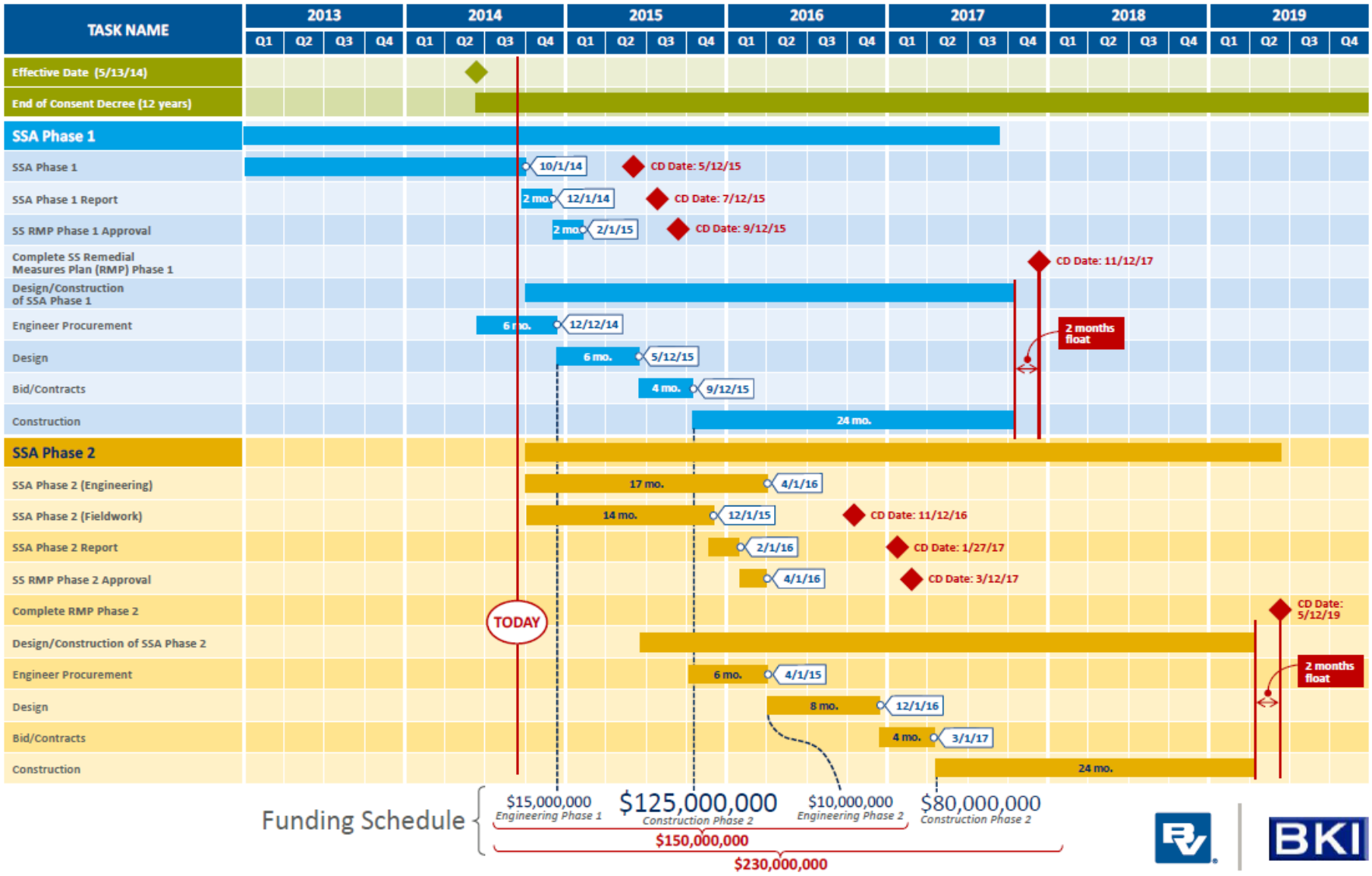
DO YOU NEED A DETAILED PRIMAVERA SCHEDULE?

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish	Total Float
6235	Submit Final Plans 90 %, ,Project Manual & SWPPP	0	0	100		16MAR12A	
6240	Perform QA/QC	10	0	100	19MAR12A	30MAR12A	
174	Design Complete - Water Supply Pipeline	0	0	100		29MAR12A	
6245	Secure Permits	1	0	100	06APR12A	06APR12A	
BID & AWARD PHASE							
6300	Prepare Bid Documents	10	0	100	02APR12A	13APR12A	
6310	Prepare Advertisement	6	0	100	09APR12A	16APR12A	
6305	Ready to Advertise	0	0	100	16APR12A		
6315	Bid Period	31	18	43	16APR12A	17MAY12	3
6325	Review Bids/Recommend to Award	6	6	0	01JUN12	08JUN12	6
6330	Bid Protest Period	20	20	0	01JUN12	28JUN12	6
6335	Board Approval	25	25	0	01JUN12	06JUL12	1
6345	Board Award	0	0	0	10JUL12		0
6340	Finalize Contract	38	38	0	11JUL12	31AUG12	19
CONSTRUCTION PHASE							
6400	Construction NTP - WSP	0	0	0	04SEP12		19
6405	Submittals - WSP	15	15	0	04SEP12	24SEP12	19
6410	Approvals - WSP	15	15	0	25SEP12	15OCT12	19
6415	Pipe Delivery - WSP	22	22	0	16OCT12	14NOV12	19
6420	Pipe Installation - WSP	200	200	0	30OCT12	15AUG13	19
6425	Boring/Tunnels - WSP	65	65	0	06NOV12	12FEB13	267
6430	Testing - WSP	45	45	0	01JUL13	03SEP13	140
6435	Revegetation - WSP	30	30	0	23JUL13	03SEP13	19
6440	Substantial Completion - WSP	0	0	0		03SEP13	19
6445	Prepare for Final Completion/Punchlist - WSP	30	30	0	17SEP13	28OCT13	39
6450	Final Completion - WSP	0	0	0		31OCT13	39
PIPELINE SCHERTZ SEGUIN LGC							
PRELIMINARY & FINAL DESIGN							
7000	Notice to Proceed SSLGC	0	0	100	01JUN11A		
7045	Plan Sheet Development	11	0	100	01JUN11A	15JUN11A	
7060	Terminus Design	44	0	100	01JUN11A	01AUG11A	
7005	Site Coordination, Staking Borings	2	0	100	13JUN11A	14JUN11A	
7010	Drilling of Borings	8	0	100	15JUN11A	24JUN11A	
7050	Chemical Feed Design	31	0	100	20JUN11A	01AUG11A	
7015	Lab Testing	23	0	100	27JUN11A	27JUL11A	
7055	Treatment Unit Design	76	0	100	01JUL11A	15DEC11A	
7020	Preparation of Geotech Report	10	0	100	28JUL11A	10AUG11A	



EXECUTIVE SCHEDULE

City of Shreveport - *EPA Consent Decree Critical Schedule Items* *1 of 2*



PERMITTING LOG: WHAT, WHO, WHEN

Anticipated Dates

Phase: I Submit during 60% Design

Phase: II Submit during/after 90% Design

Permit is responsibility of Contractor

SAWS – REGIONAL CARRIZO PROJECT
Permitting/Authorization/Approval Log

Responsible	Phase	Permits/Authorizations/Approvals	Agency	Documented on Prolog	SAWS Review Read.	Date Submitted to SAWS	Date Received From SAWS	Submittal Date to Agency	Anticipated Approval Date	Actual Approval Date	
B&V	I	CWA § 404 permit (NWP 7 & 12)	USACE	x	Yes	12/22/2011	1/17/2012	1/23/2012	3/23/2012		
	~~I~~	~~Amendment to Reverification Permit for the Wellfield~~	~~USACE~~	~~x~~	~~Yes~~	-	-	-	-	-	
	I	Texas Antiquities Permit	THC	x	No	-	-	Jun-11	Jun-11	Jul-11	
CH2M Hill	II	Plan Review/Permit to Construct	TCEQ					Feb-12	Mar-12		
	II	Utility & Pipeline Installation Request	Gonzales County	x				4/4/2012			
	II	County Road Crossing Permit	Gonzales County	x							
	II	Public Water Well Permit	TCEQ		No						
	I	Driveway & Culvert Permit (submitted by SAWS)	TxDOT	x	No						
	II	Gonzales County Floodplain Permit (submitted by SAWS)	Gonzales County	x	Yes						
	I	Pipeline Authorization and Driveway Permit (submitted by SAWS)	Gonzales County	x	Yes						
	II	NPDES general stormwater construction permit, on- & off-site	TCEQ		No						
	II	NPDES general stormwater operation permit	TCEQ		No						
Atkins	II	Permit to Construct	TCEQ	x	No			3/12/2012		4/26/2012	
	I	Permit to cross roads and install within TXDOT right of way	TxDOT		Yes	12/9/2011	1/6/2012	1/12/2012	3/12/201		
	I	Driveway & Culvert Permit	TxDOT		No	-	-		3/31/2012		
	I	Pipeline/Transmission Crossings	GVEC		Yes	9/30/2011	9/30/2011	9/30/2011	10/30/2011	12/8/2011	
	I	Pipeline/Transmission Crossings	Koch Pipeline		Yes	12/9/2011	12/22/2011	1/11/2012	3/11/2012		
	I	Pipeline/Transmission Crossings	Houston Pipeline	x	Yes	12/9/2011	12/22/2011	1/11/2012	3/11/2012	3/28/2012	
	I	SSLGC Approval	SSLGC		No	-	-	12/9/2011	12/15/2011	12/15/2011	
	I	County permit to install within county ROW (Bore Permit)	Gonzales County	x	Yes	12/9/2011		2/6/2012	3/31/2012	2/16/2012	
	II	NPDES general stormwater construction permit, on- & off-site	TCEQ		No						

CLIENT EXPECTATIONS

- **Reporting and Accountability**
  - Meetings
  - Monthly reports
- **On time**
- **On budget**
- **Good reasons if they are not**
- **Deal with tough technical and administrative issues.**

SECTION 5
WHY A PROGRAM MANAGER?

WHAT IS THE NATURE OF THE PROJECT?

- Relatively large project; over $100,000,000 or more than half of your entire CIP budget.
- Brand new technology; membranes, piping, type or project.
- High profile project: it must succeed by being in place by a fixed time and operate perfectly.
- Have an external contract in place with fixed points of schedule
- Project/Program has multiple construction projects and designers that require close coordination.

WHAT IS YOUR SITUATION?

- Limited staff to manage large projects.
- Limited administrative and IT abilities for software tools.
- Completely un-familiar with the new technology or facility type.
- Limited skill set to cover contractual requirements.

IF YOU ARE HIRING A PROGRAM MANAGER

- **Start early to get your PM on board.**
  - Hire someone you trust.
  - Start at least 90 days before the other consultants.
  - Establish technical features and limitations.
  - Set baseline timeline and budgets.
  - Set up reporting requirements.
- **Divide and conquer**
  - Phase and scope the individual components.
  - Engage designers to fit the scope.

FINAL THOUGHTS

- Don’t over complicate it.
- Use graphics to communicate.
- Work to the lower right bottom line.
- Allow room for the un-expected (Float and contingences).
- Scope the PM to meet the needs.
- Fee will match the scope; 2.5% to 7.5% and beyond.

QUESTIONS?

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