CCP Facility Master Closure Strategies

Keys to Success

Shane Harris (TVA)
Michael Stepic, PE (AECOM)
Sherry Bugg, PE (AECOM)
Nick Golden, PE (AECOM)

05.07.2015

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Presentation Outline

1 Master Closure Strategy

- What is a Master Closure Strategy?
- What are the benefits of incorporating a Master Closure Strategy?
- What are the elements of a successful Master Closure Strategy?

2 Implementing a Master Closure Strategy

- Developing a Master Closure Strategy
- Implementing a Master Closure Strategy

3 Significance of Master Closure Strategy

4 Summary

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Master Closure Strategy
Definition

01 A Master Closure Strategy is an integrated plan for long-term management of Units at a Power Plant (Facility)

- Long-term management may include closure of some or all Units (landfills and/or impoundments) or entire Facilities

02 A Master Closure Strategy should consider all aspects of long-term management.

- Planning and Scheduling
- Design
- Construction
- Compliance with new CCR Regulations

03 A Master Closure Strategy is a “living document” and should be updated as needed

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Master Closure Strategy
Definition

A Master Closure Strategy can assist in complying with the new CCR Rules

- Highlight key closure dates for CCR Units
- Identify method of closure (closure in place, clean closure, retrofit)
- Identify when key impacts may result in change (or when impact needs to be defined)
  - Triggers for closure
  - Groundwater impacts
- Developed into cost impacts
- Assessing holistically for a facility helps to consider entire facility operation

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Master Closure Strategy
Benefits

A Master Closure Strategy is necessary for:

- Effective communication
- Maintaining schedule
- Optimizing efficiency and safety
- Reducing cost
- Minimizing disruption to Facility operations
- Compliance with regulations

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Master Closure Strategy
Elements of Success

A Master Closure Strategy should include the following

01 Clear definition of Facility objectives, goals and constraints
- Objectives may change depending on regulations, future decisions, fuel prices, and other factors

02 Discussion of environmental / regulatory compliance

03 Analysis of design alternatives (for improvement or closure)

04 Preliminary planning

05 Scheduling of design and subsequent construction for each Facility
- Milestone schedules and identification of critical path activities

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Master Closure Strategy

Elements of Success

Definition of Facility Objectives, Goals and Constraints should include

01 Life of Facility Fleet

02 Remaining life of Unit

03 Identifying Goals and Constraints may drive closure decisions

Goals

- Conversion to dry disposal
- Construction of new Unit
- Increase Beneficial Use options
- Impoundment closures

Constraints

- Time
- Available property
- Environmental impacts
- Regulatory Compliance
- Some units may need to remain open
- Construction coordination with existing operations
- Resources (soil and labor)
- Construction coordination with existing operations

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Master Closure Strategy

Elements of Success

01 It is imperative to plan for **Environmental / Regulatory Compliance**

- Need to consider permitting time and background work (i.e. subsurface investigations, work plan development…etc)

02 Typically there is a need to comply with multiple regulations and consider potential environmental constraints:

- New CCR regulations
- Existing State Regulations
- 401/404 Permitting
- SWPPP Permitting
- NEPA Permitting
- NPDES Permits
- Impacts to neighboring properties—haul routes, dust mitigation

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Master Closure Strategy
Elements of Success

03 Need to revisit regulatory compliance throughout the life of the Master Closure Strategy

04 Analysis of Design Alternatives (for improvement or closure)

- Develop several design alternatives
- Preliminary economic analysis of alternatives
- Risk analysis of alternatives
- Selection of chosen design alternative
- Preliminary design of alternative

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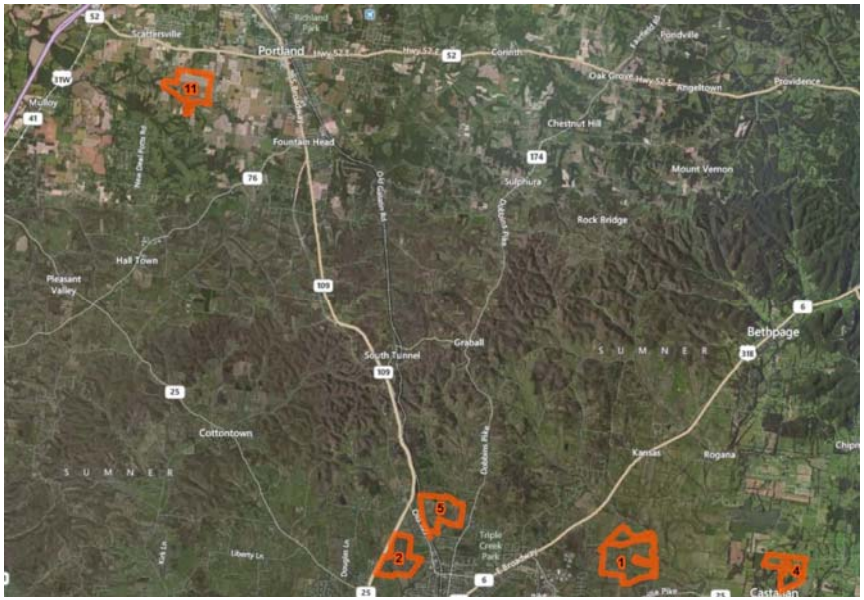
Master Closure Strategy
Elements of Success

05 Preliminary Planning – A Management Tool

- Soil resources and availability are often key
  (a borrow study may be required)
- Evaluate schedule and key planning milestones
- Develop a priorities list
- Identify potential red flags for early resolution
- Conduct workshop



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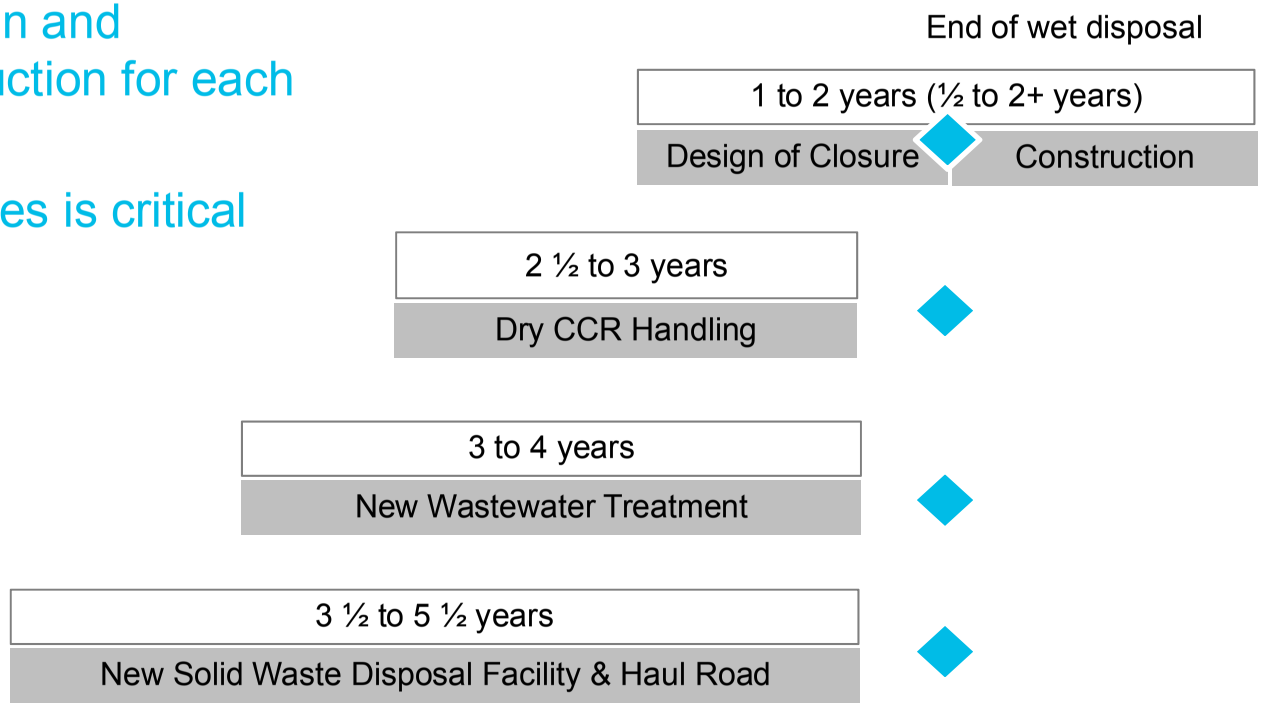
Master Closure Strategy

Elements of Success

06 Scheduling of design and subsequent construction for each Facility

07 Scheduling all phases is critical for success



These tasks, while each having their own schedules, are VERY interdependent and should be executed together.

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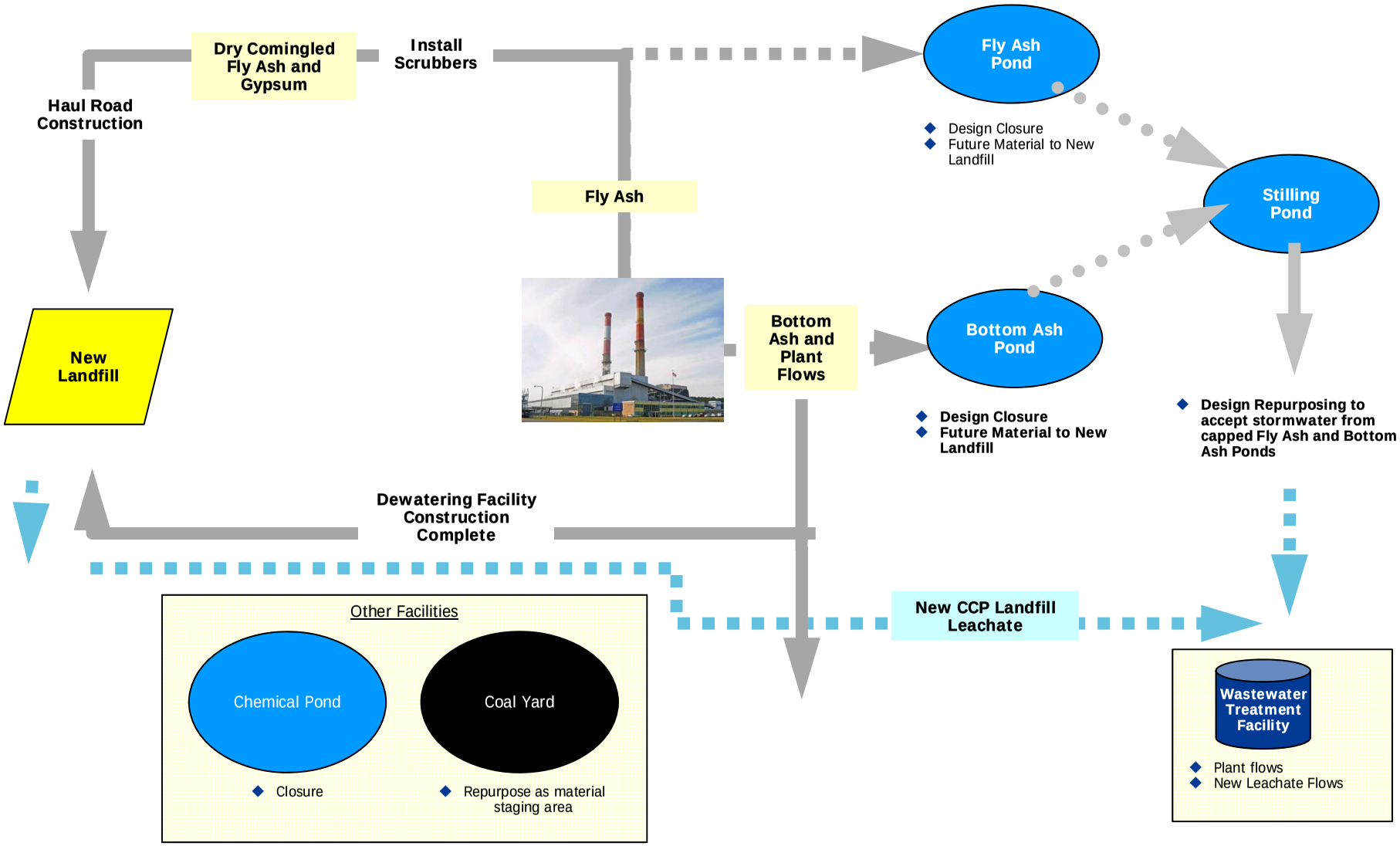
Master Closure Strategy

Flowchart



Master Closure Strategy

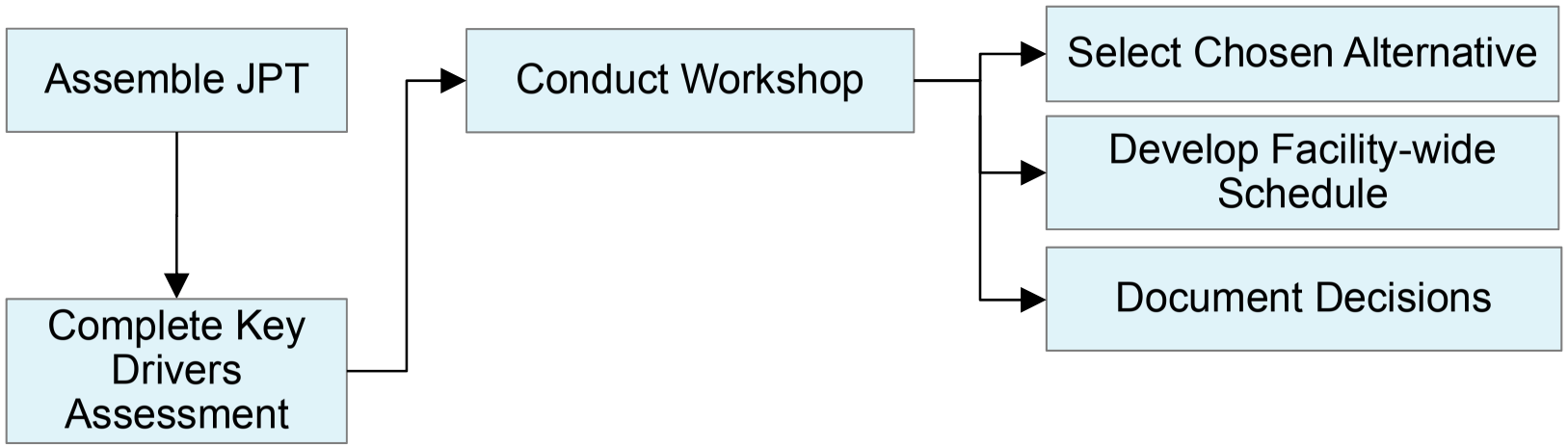
Development

01 Assemble a Joint Project Team (JPT):

02 Complete a Key Drivers Assessment- review the “Elements of Success”

03 Conduct a Workshop

04 Document decisions and path forward



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Master Closure Strategy
Development

01 Assemble a Joint Project Team (JPT)

- Facility personnel
- Facility engineers
- Facility construction team
- Regulatory experts
- Consultants
- Legal team (as needed)
- Public relations personnel (as needed)

Communication is key to implementation and success

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Master Closure Strategy
Development

02 Complete a Key Drivers Assessment- review the "Elements of Success"

- Most effective with a few members of the JPT
- Assessment will increase effectiveness of Workshop
  - Review the "Elements of Success"
  - Discuss possible alternatives for closure of Units
    - In-place closure, clean closure, phased closure, innovative closure (repurposing)
    - Preliminary economic analysis
    - Risk analysis
- Select chosen alternatives to present at Workshop

Key Drivers
- Regulatory
- Project
- Site Constraints
- Others

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Master Closure Strategy
Development

03 Conduct a Workshop

- Most effective with the entire JPT
  - Revisit the “Elements of Success”
  - Discuss selected alternatives for closure of Units
    - Pros/Cons
    - Additional constraints
  - Select Chosen Alternative for Units
  - Develop Conceptual Schedule
    - Identify key milestone dates (i.e. CCR Rule drivers)

04 Document Decisions

Elements of Success

- Facility Objectives, Goals, & Constraints
- Environmental/Regulatory Impacts
- Design Alternative Analysis
- Preliminary planning
- Scheduling

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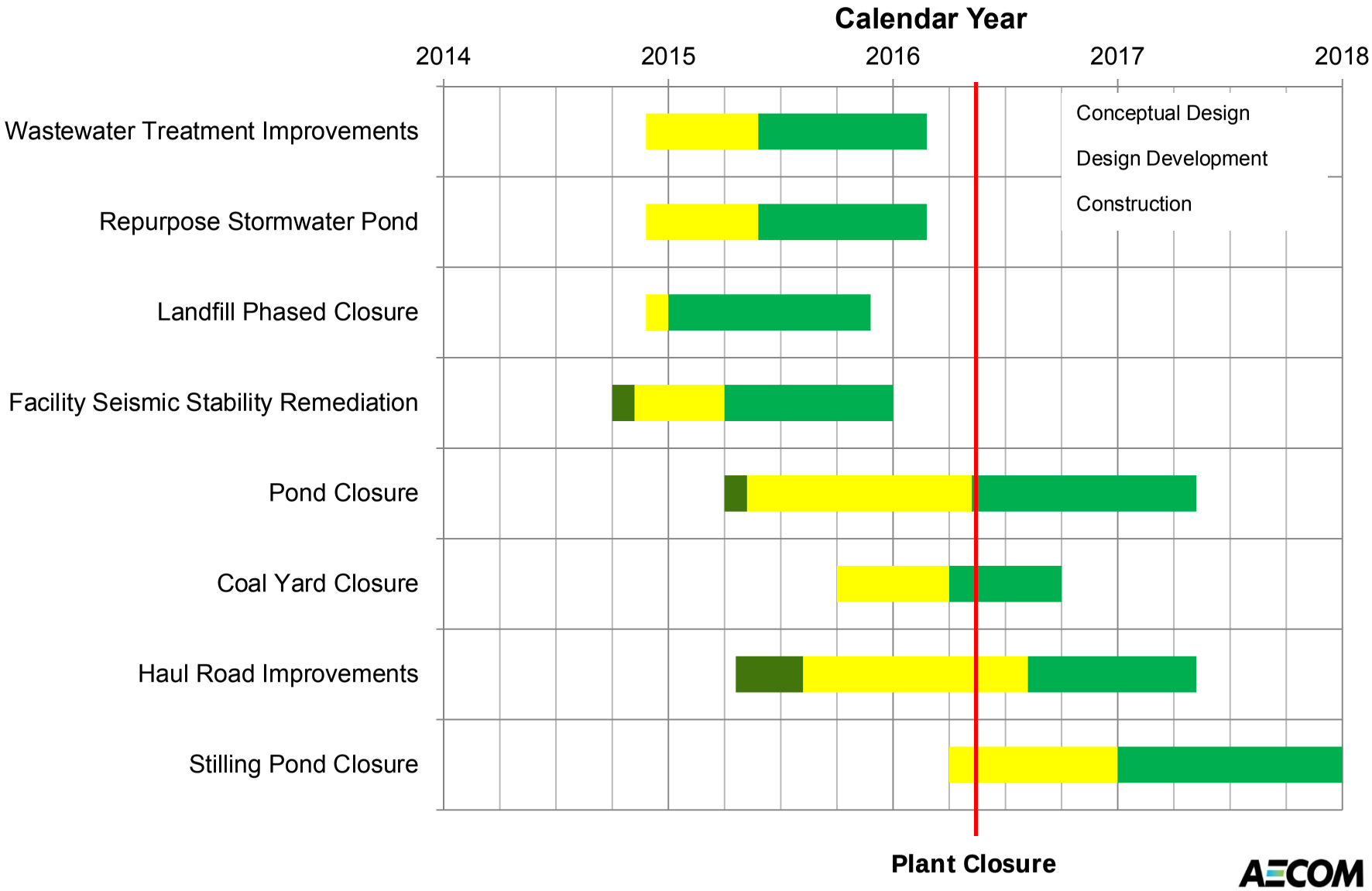
Master Closure Strategy

Development



Master Closure Strategy
Implementation

01 Develop selected alternative for each Facility

- Conduct borrow study if needed
- Design development
  - Type of Closure- phased, complete, partial, clean
  - Consider relationship to existing Units
- Environmental permits / regulatory document development
- Cost Estimating
- Detailed Schedule Development

02 Revisit as needed for Facility operational changes, regulatory updates etc.

- May require modifications to schedule and/or design

03 Meet regularly to track schedule and progress

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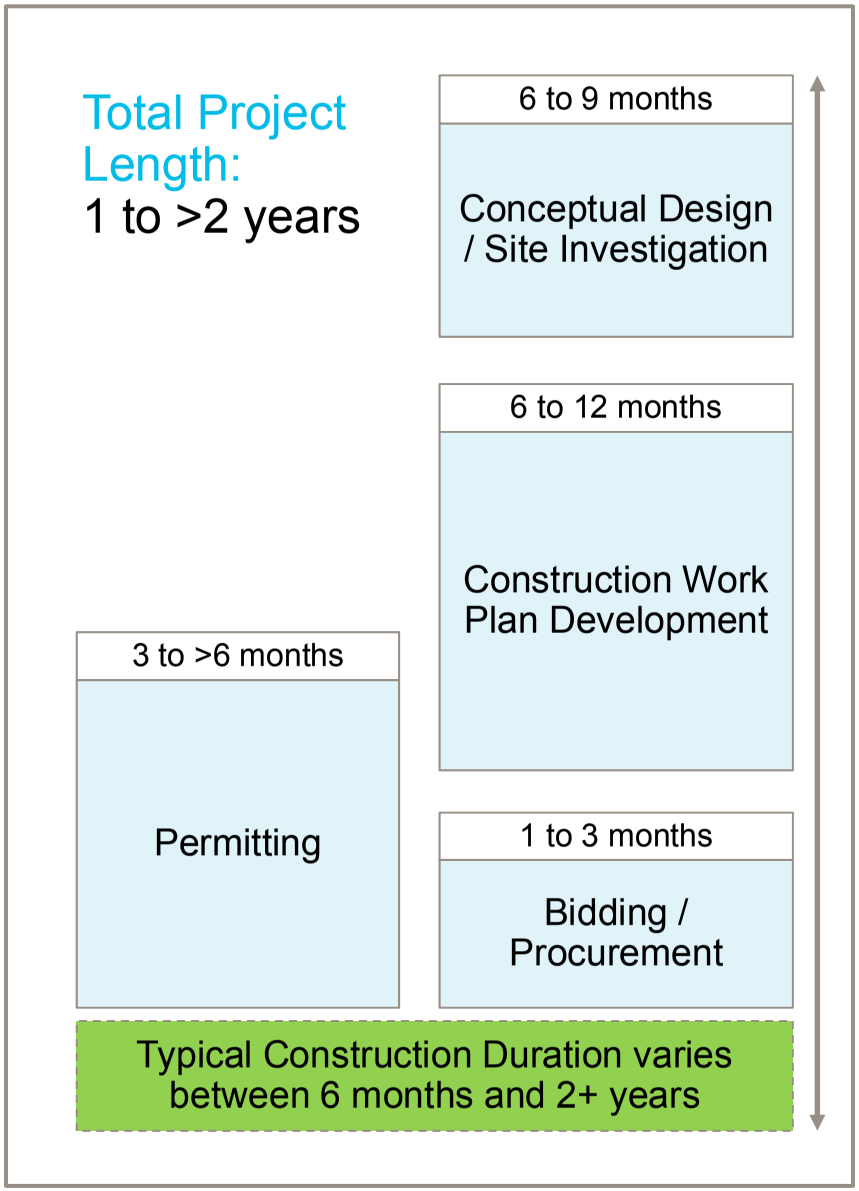
Master Closure Strategy

Typical Timeline: Closure of Facility

Basic Steps for Final Closure Design / Permitting

- Conceptual Design
- Internal Funding Allocation
- Site Investigation
- Development of Construction Work Plan
  - Design Drawings
  - Specifications
  - Contract Documents
- Permitting
  - NPDES Modifications
  - Storm Water Construction
  - Permit (SWP3)
- CCR Compliance



Master Closure Strategy

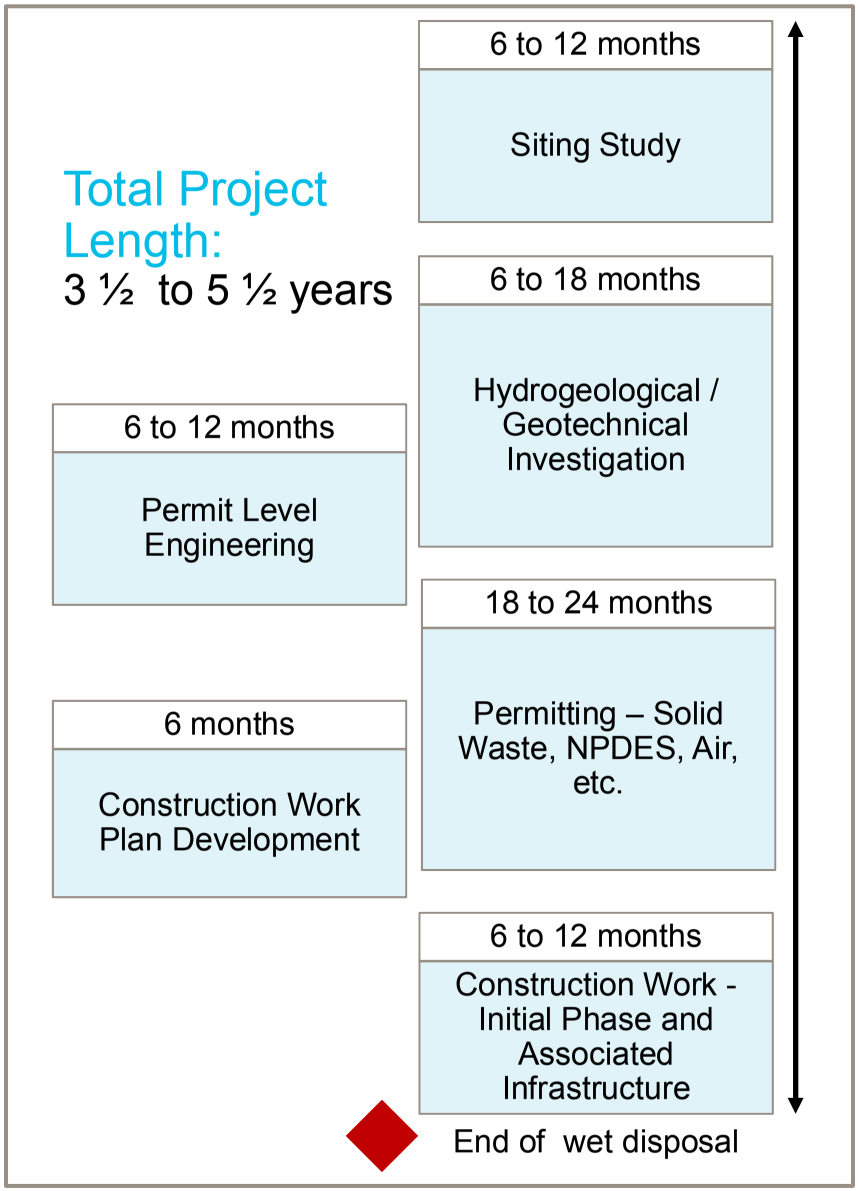
Typical Timeline: New Facility

Advanced planning / Scheduling is especially critical if a new facility is needed

Prior to the start of final unit closure, a new dry landfill will need to be:

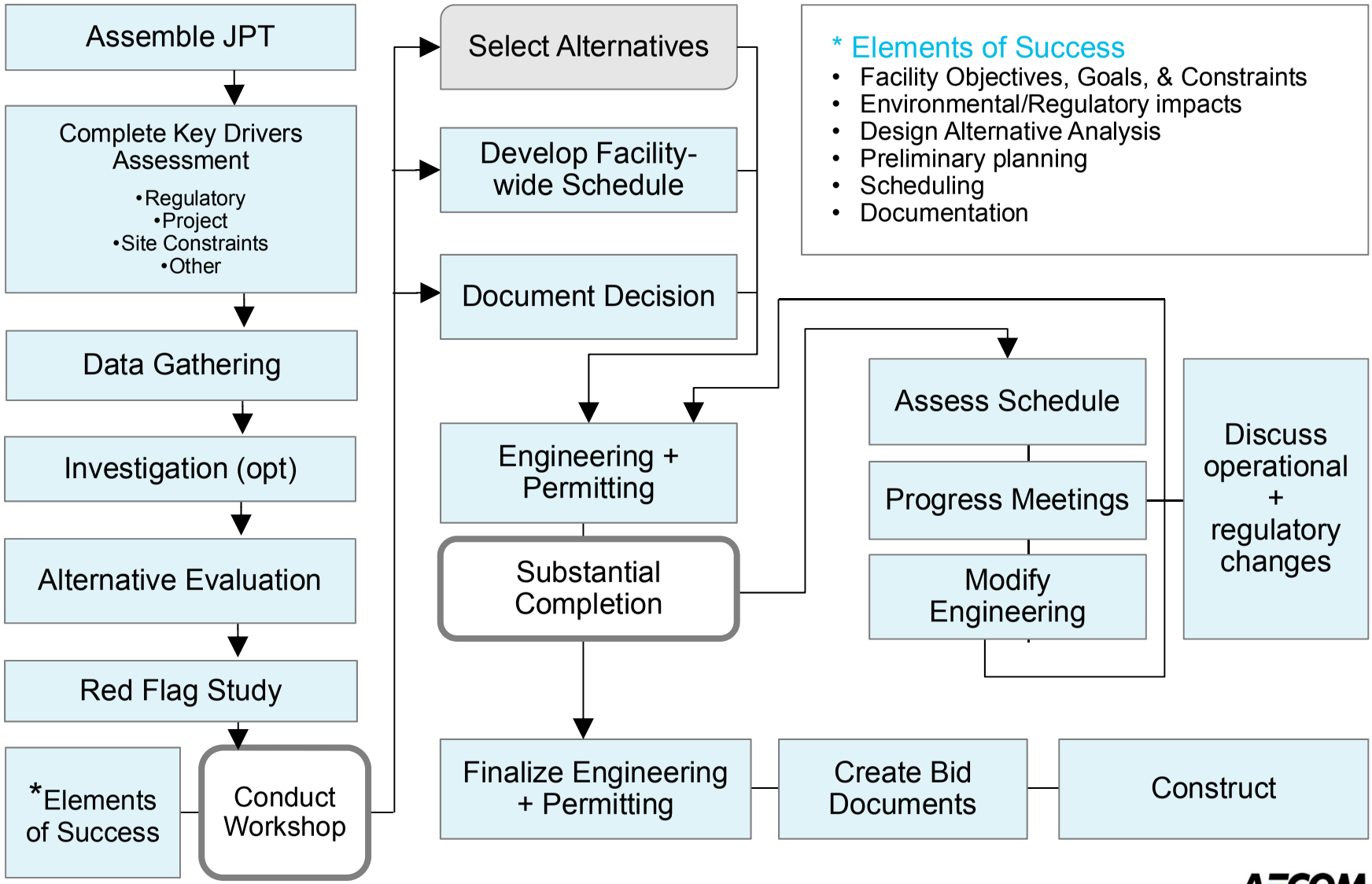
- Sited
- Permitted
- Constructed
- Operational

CCR Compliance



Master Closure Strategy
Development and Implementation

Frequent Regular Communication is Key to Successful Implementation!!!



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Master Closure Strategy

Significance

01 Environmental and Permitting Compliance

- Adherence to permits and environmental standards
- Avoidance of permit violations

02 Coordination of closures with O&M improvements

- Reduction in maintenance issues (time & money)
- Efficient Operations

03 Proper Planning results in effective compliance with design

- Site performance consistent with design
- Avoidance of stability and similar issues
- Contact water/Leachate generation minimization / storm water segregation

04 Proper Planning results in cost reductions

05 Reduction in significant correctable maintenance

06 Improved and efficient operations = cost efficiency (and predictability)

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Improvements / Lessons Learned

01 Lessons Learned

- Regular Communication

02 Success Factors and Value Added

- Be proactive / not reactive
- Allows for better long-term planning and operational projections
- More efficient utilization of designed and permitted facility
- Ability to plan for closure appropriately thus reducing areas to be maintained

03 Cost Efficiency

- Identify practices that minimize maintenance / costs
  - Higher $ today saves bigger $$ tomorrow
- Reduced financial risk
- Reduces high capital expenses in and overall cash flow

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Thank you

Please contact us for more information

Mike Stepic
AECOM

330.289.0092
Michael.stepic@aecom.com

Shane Harris
TVA

423.260.9640
rsharri0@tva.gov

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