



How Do Construction Documents Differ for Alternative Delivery Projects?

Tom Paul – Mortenson Construction

Overview

- **Define alternative delivery types**
- **What are construction documents**
- **How does alternative delivery construction documents vary from the traditional methods**
- **What is the benefit of alternative delivery construction documents**
- **How is risk mitigated thru Alternative Delivery Documents?**

Alternative Delivery Methods

Alternative Delivery Methods of Construction Include

- GC/CM – Washington State
- CM/GC – Oregon
- CM/GC – Idaho
- CM/GC – Montana

- Design Build – Washington, Oregon, Idaho, Montana
 - *Design Build Operate Maintain*
 - *Design Build Finance Operate*
 - *Design Build Operate*

Construction Documents

Design Bid Build Construction Documents

Invitation to Bidder

Specification

Drawings

Supplemental information (Geotechnical Report)



Construction Documents

Alternative Delivery Methods

Bidder's Manual

Subcontract Agreement

Schedule

Definition of Scope

Quality Expectations are defined

Safety Expectations are defined

Site Logistics Plan – Including site services

Specifications

Drawings

Supplemental Information

3D Models

Site Photographic Mapping

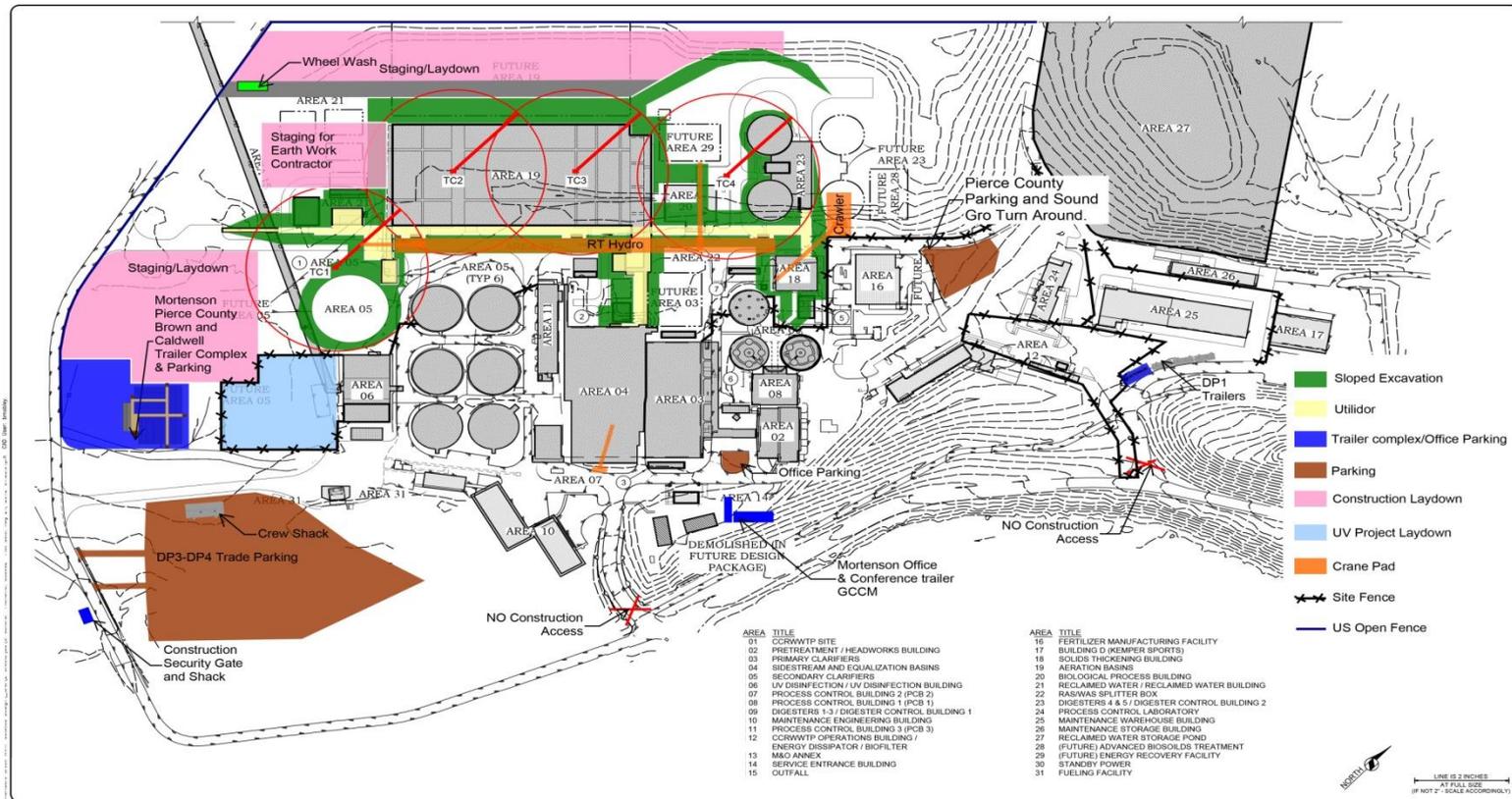
3D Scans

Geotechnical Information

Potholing Information

Existing As-Built Information

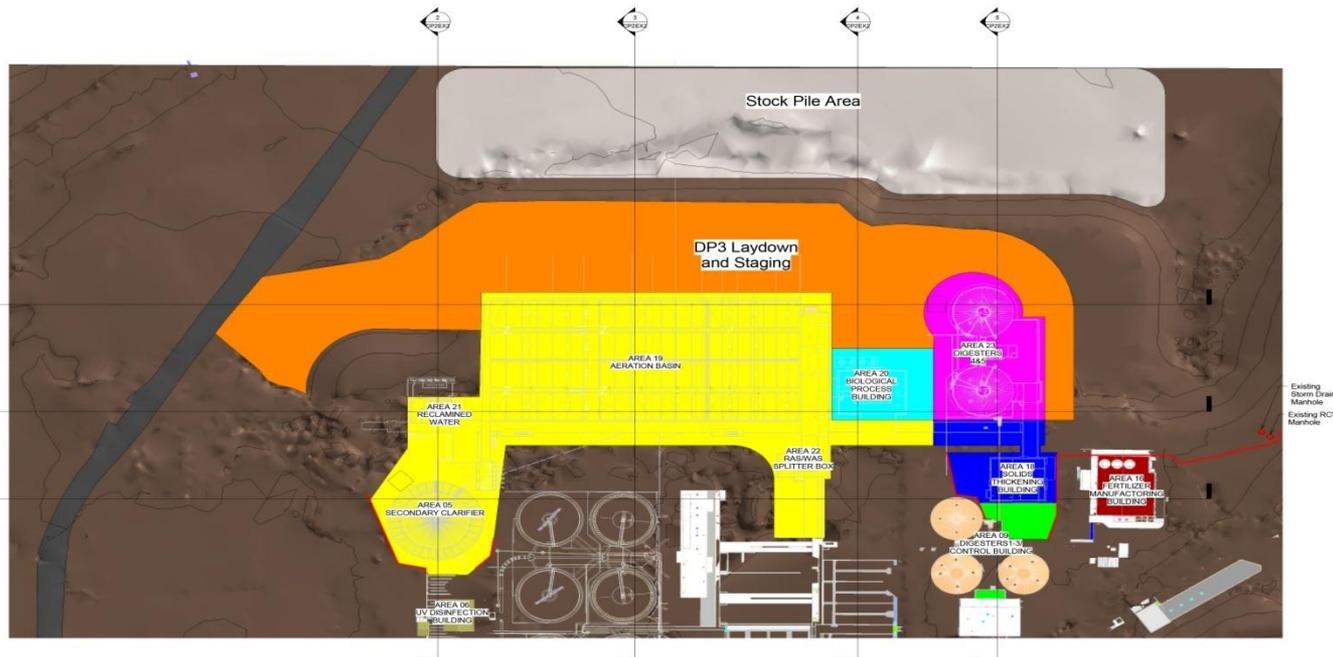
Overall Site Logistics Plan



Chambers Creek Regional Wastewater Treatment Plant - Site Logistics

Update 3/27/2013

Excavation Plan Overview



Site
1" = 60'-0"

Chambers Creek Regional Waste Water Treatment Plant Expansion
10133 Chambers Creek Road West

Drawing Key

- Elevation 29'
- Elevation 38'
- Elevation 31'
- Elevation 36'
- Elevation 36'
- Elevation 40'
- Shoring

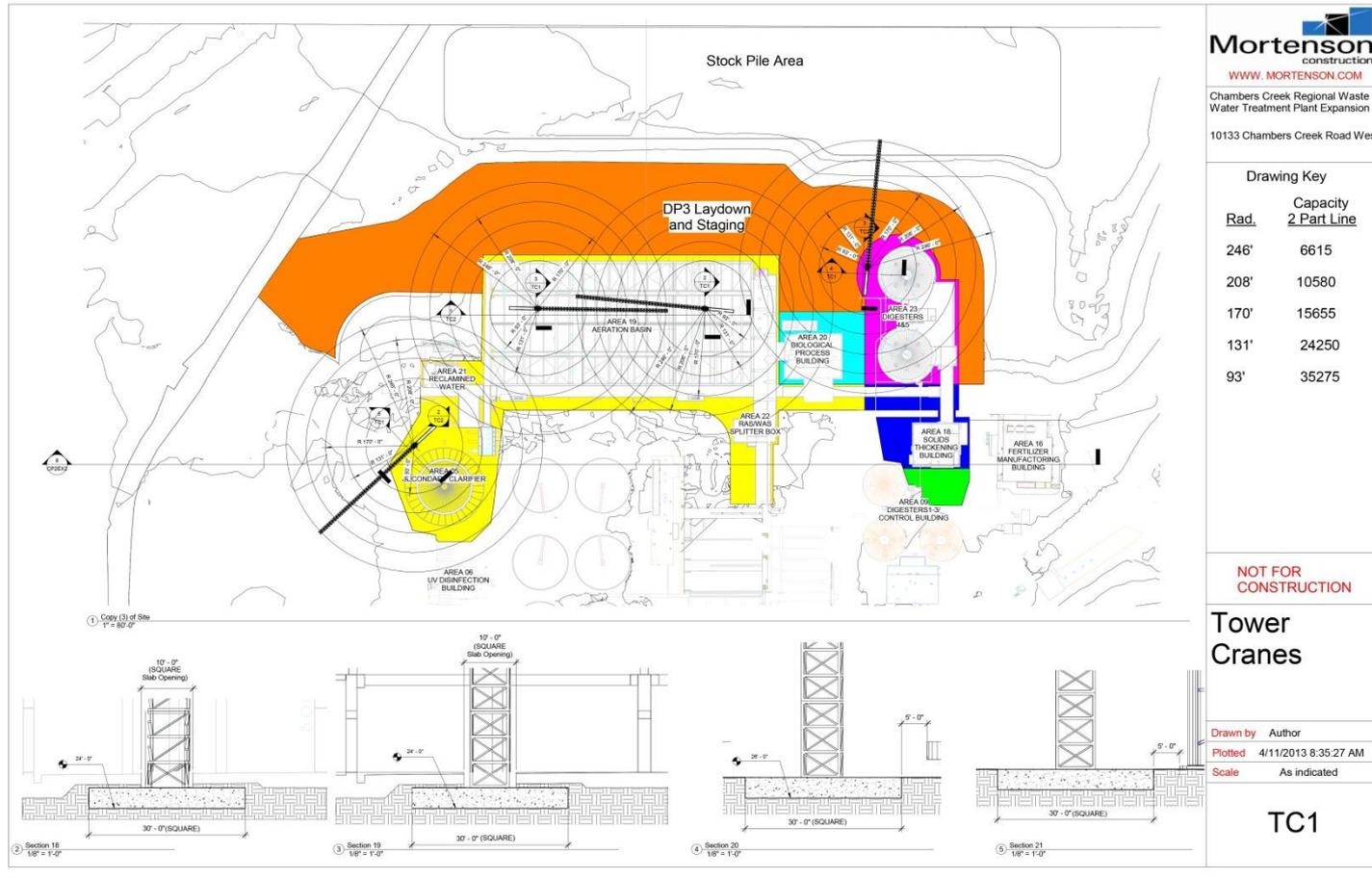
Issued for
Bid Package 201

**CP2 Mass
Excavation**

Drawn by NEG
Plotted 4/11/2013 8:17:59 AM
Scale As indicated

CP2EX1

Site Crane Logistics Plan



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Chambers Creek Regional Waste
Water Treatment Plant Expansion
10133 Chambers Creek Road West

Drawing Key

Rad.	Capacity 2 Part Line
246'	6615
208'	10580
170'	15655
131'	24250
93'	35275

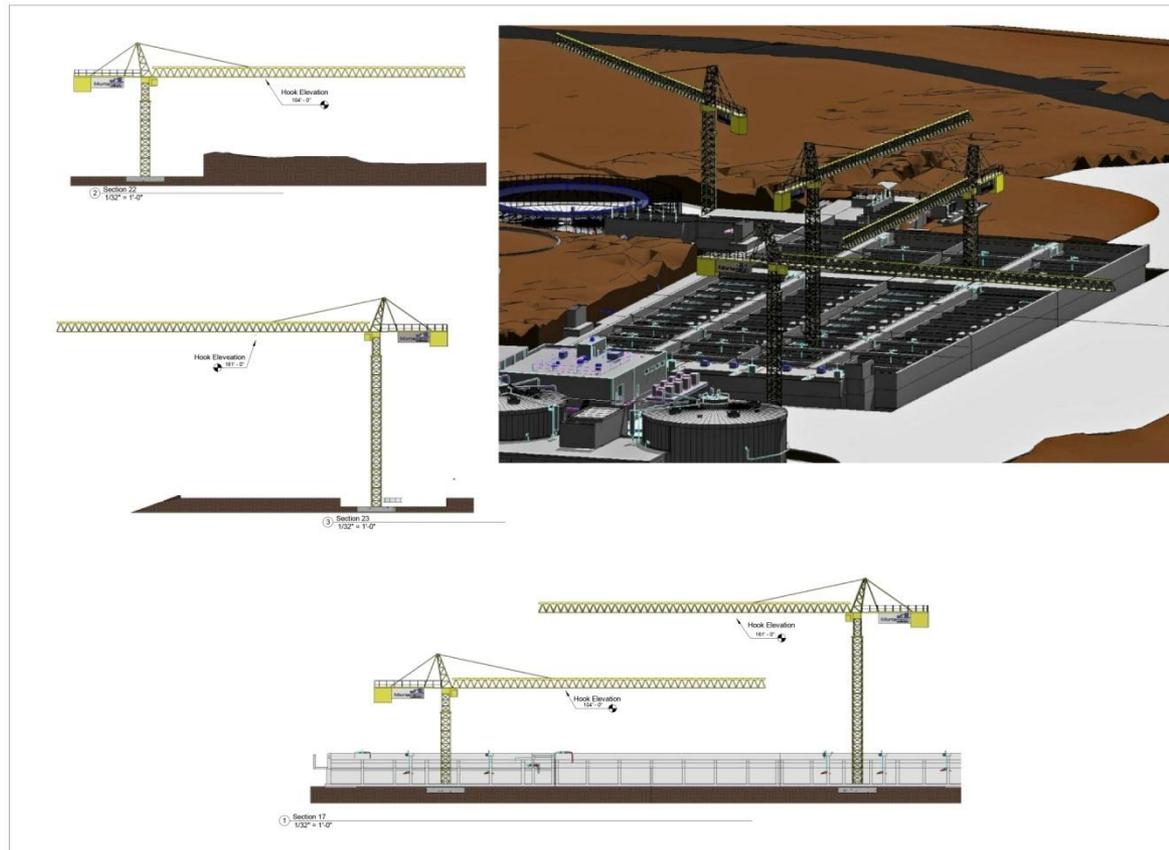
NOT FOR
CONSTRUCTION

Tower
Cranes

Drawn by Author
Plotted 4/11/2013 8:35:27 AM
Scale As indicated

TC1

Site Hoisting Plan




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Chambers Creek Regional Waste
Water Treatment Plant Expansion
10133 Chambers Creek Road West

Drawing Key

NOT FOR
CONSTRUCTION

Tower
Cranes

Drawn by Author
Plotted 4/11/2013 8:38:46 AM
Scale 1/32" = 1'-0"

TC2

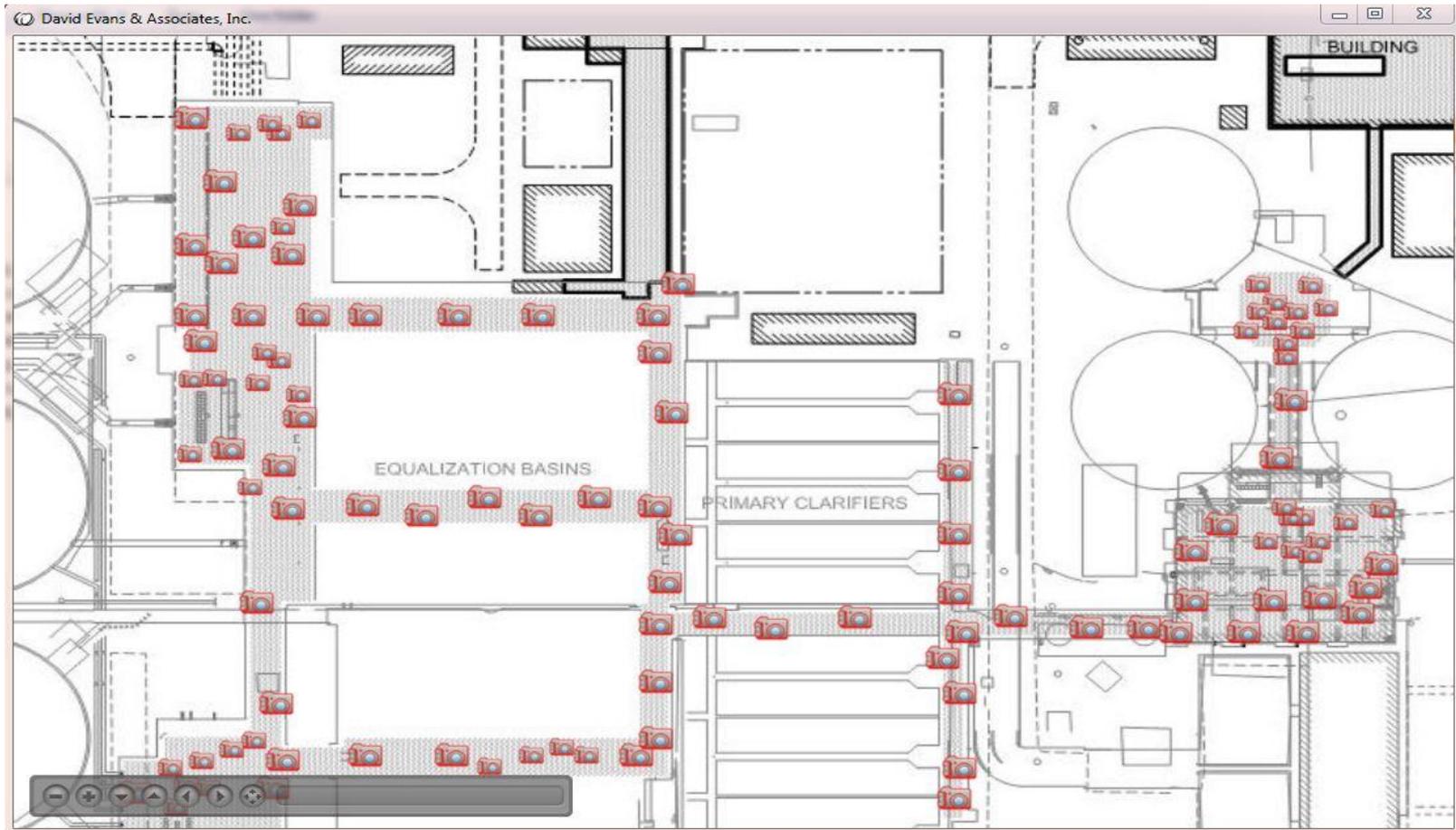
Exterior Plant Photo Data Base Map



Exterior Plant Photo Data Base



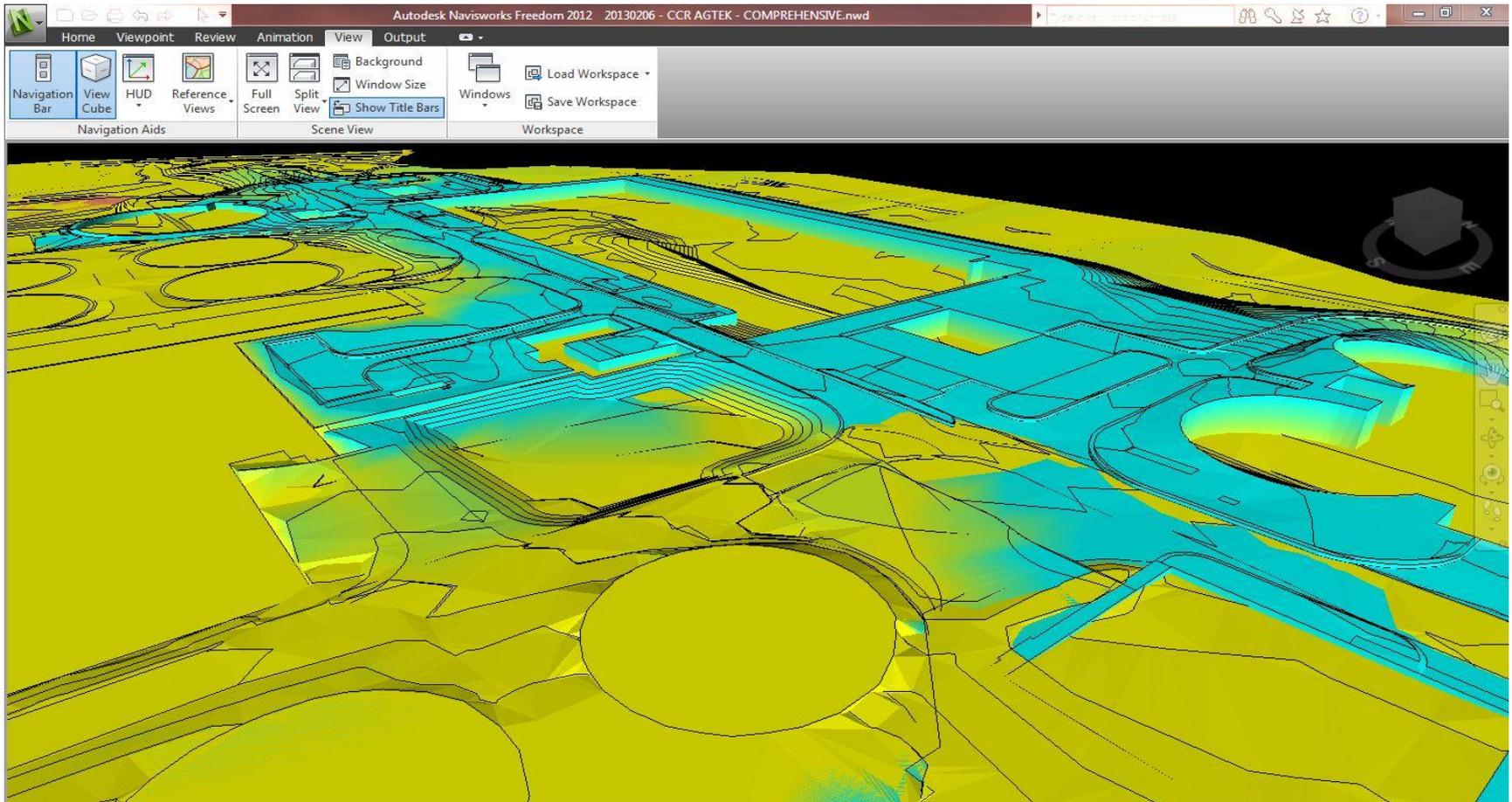
Interior Plant Photo Data Base Map



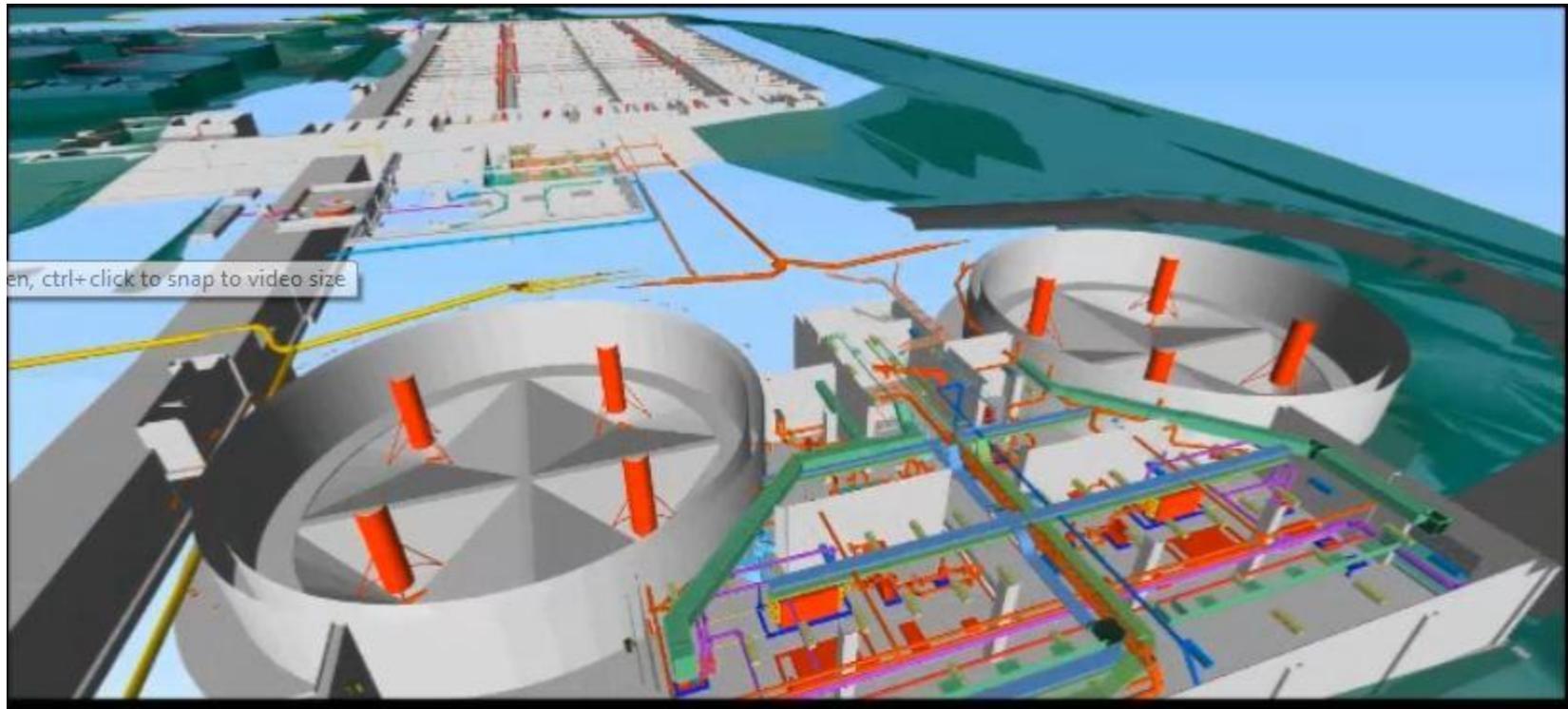
Interior Plant Photo Data Base



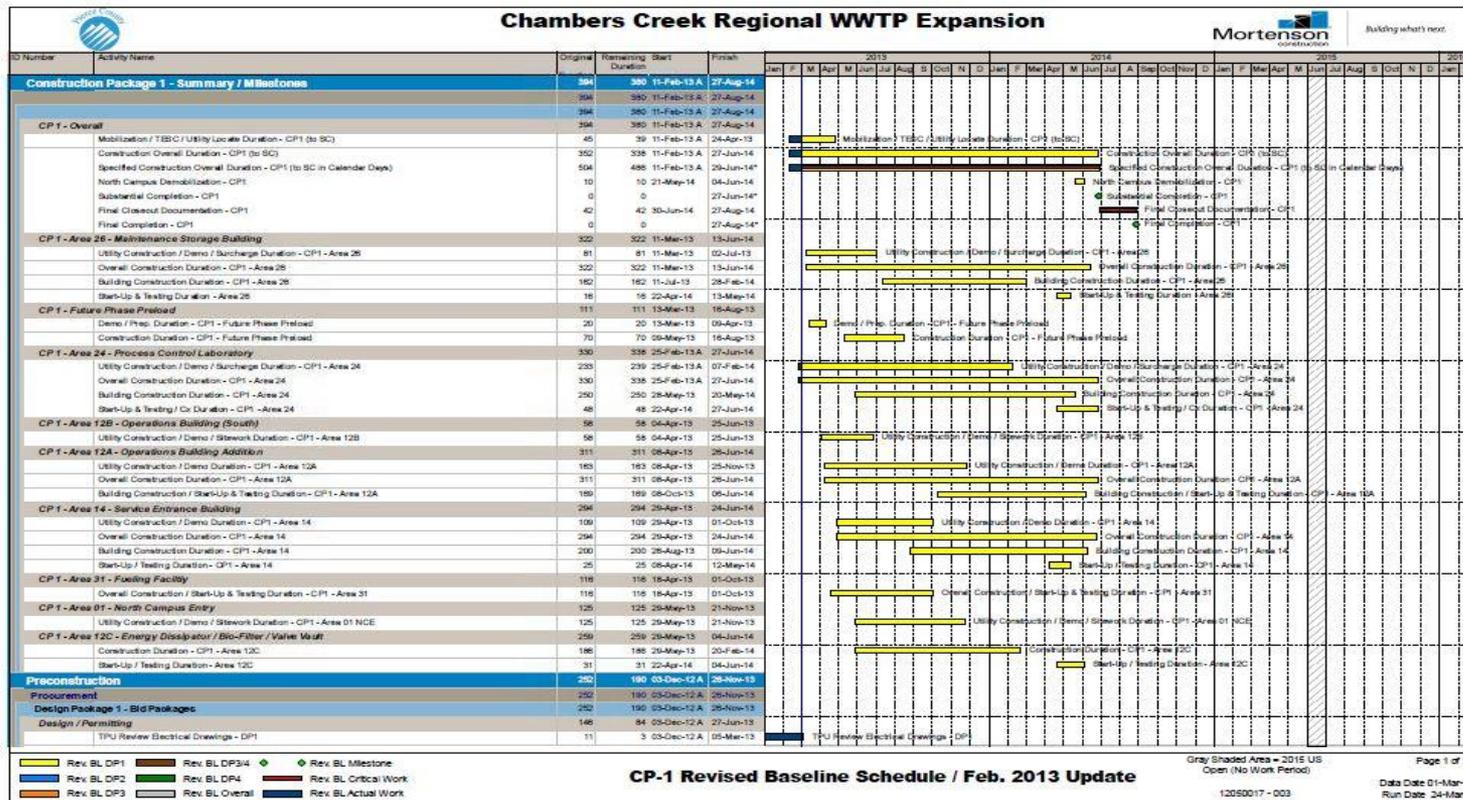
3D Excavation Plan



3D Modeling of Project Elements



Schedule Certainty



Risk Mitigation

Chambers Creek Regional Wastewater Treatment Plant Expansion											
										1 = Vlow, 5 = Vhigh	
										Pre-Mitigation	
No.	Date Added/ Due Date	Originator	Risk Item	Additional Description/Notes	Primary Carrier of Risk	Possible Consequences	Probability	Impact	Prob x Impact	Est. Cost Impact	
D-1A	4/5/2012	BC	Project costs increase compared to 30% estimate	Estimate prepared based on 30% design included a 7.5% design contingency. Estimates at 60% include a 4% contingency. As design progresses, additional construction costs beyond those covered by design contingency may occur.	Pierce County	Increases in scope, schedule, and budget result in unacceptable impacts to County rate payers. Initial estimated cost impact based on a 5% increase on a \$210M project = \$10.5M	3	4	12	\$10.5M	Based on 60% cost estimate to identify potential cost savings in estimate reconciliation will be used. BCE process will be used as a that could lead to significant cost approach will be reviewed with
D-2	10/6/2011		Incomplete 3D Model Development and Integration Leads to Uncertainty in Construction Pricing	3D models will be used as a key design tool. Over the course of the project the models will be transferred from the Design Team to the GC/CM, then back to the Design Team and ultimately to the County.	Pierce County	Est. Cost Impact based on 2% pricing uncertainty on \$210M construction cost and 1,000 hours of additional designer time @ \$100/hr	3	4	12	\$4.3M	Develop BIM execution plan to be during design, level of detail to transferred to the GC/CM for use. All members of Project Team will and expectations of the different. Review (critique) early model s
D-2A	12/15/2011	BC	Incomplete 3D Model Development and Integration Leads to	3D models will be used as a key design tool. Over the course of the project the models will be transferred from the Design Team to the GC/CM	Pierce County	Incomplete "as-built" models will require additional effort in closeout to fully document construction and convert models to asset management tool.	3	4	12	\$4.3M	Increase level of detail in 3D s inch and conduits down to 3/4-i down to 4-inch and conduit dow

Value Analysis / Constructability

Chambers Creek WWTP - Design Package 3										<u>COST MANAGEMENT LOG</u>									
Pierce County										Status Date: March 21, 2013									
University Place, WA																			
60% DESIGN ESTIMATE																			
Current Estimate (DRS 13) \$131,494,456										\$0 Max Remaining Potential Cost Reductions									
Revisions (\$36,200)										***** 30% Estimate TCC Value (incl Augercast Piles)									
Current Cost Status Revisions \$131,458,256										\$9,167,463 Current Difference to 30% Estimate									
Item #	Organizational		Date of Status Change	Description	Action Req'd		Direct Cost	TCC Value	Action Status							Comments or Remarks			
	Area	Status (auto)			Who	Date Due			BCE No or #	Design Recmnd	Owner Accept	Reject	Further Review	Design Incorp	Max				
29.0	8	I		Value of steam boiler scope carried in 60% estimate - informational only - \$xxx				incl										6/8/12 - will be shown on 60% docs but not tracked as CML item	
33.0	8	A	20-Sep-12	Re-roof existing Process Control Bldg 1 high roof (new PVC membrane and flashings)	B&C	90% Docs	\$ 98,500	\$ 104,000	DD 129			x						excludes mech and asbestos related work	
50.0	8 & 23	A	7-Mar-13	Metal clad circuit breakers for areas 8 and 23 in lieu of fuses(4 total) as required by code.	B&C	90% Docs	\$ 168,300	\$ 177,800				x						12/13/12 - will be priced after DRS 11 and 12 60% estimates are updated.	
2.0	18	I	19-Dec-11	Design Decision #38: Area 18 - add pit isolation wall, sluice gate and Pumped Mixing Alt #3.	B&C	90% Docs		incl											
9.0	18	A	20-Sep-12	Trench drain and grating revisions at Solids Thickening Building	KJ	90% Docs		n/a				x						8/9/12 - pending layout confirmation 9/20/12 - will be included in the 90% design, not tracked on CML	
10.0	18	A	20-Sep-12	Hose reels and sinks at Solids Thickening Building	KJ	90% Docs		n/a				x						8/9/12 - pending layout confirmation 9/20/12 - will be included in the 90% design, not tracked on CML	
14.0	18	A	20-Sep-12	Revise Solids Thickening Bldg control room area layout - delete restroom, relocate stair, enlarge electric room	KJ	90% Docs		n/a				x						8/9/12 - pending layout confirmation 9/20/12 - will be included in the 90% design, not tracked on CML	
				Revise RDT room rating - delete wet pit and go to standpipes, relocate floor mixer VFDs, revise															



Overview

We have compared traditional construction documents against alternative delivery modeled documents.

We have presented how much more robust alternative delivery documents can be versus the traditional method.

What you need to ask yourself is which documents you feel will provide you with the best value and lowest risk profile?

Wrap Up

Questions?

The End

Thank you for your attention

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