



Carlsbad Brine Well Remediation Project  
Carlsbad, New Mexico  
State of New Mexico - Energy, Minerals and Natural  
Resources Department (EMNRD)

Presentation to the Legislative Finance Committee  
Dan Kwiecinski, NM Operations Manager and Vickie Maranville, NM Consulting Branch Manager  
June 4, 2018

## Project Team

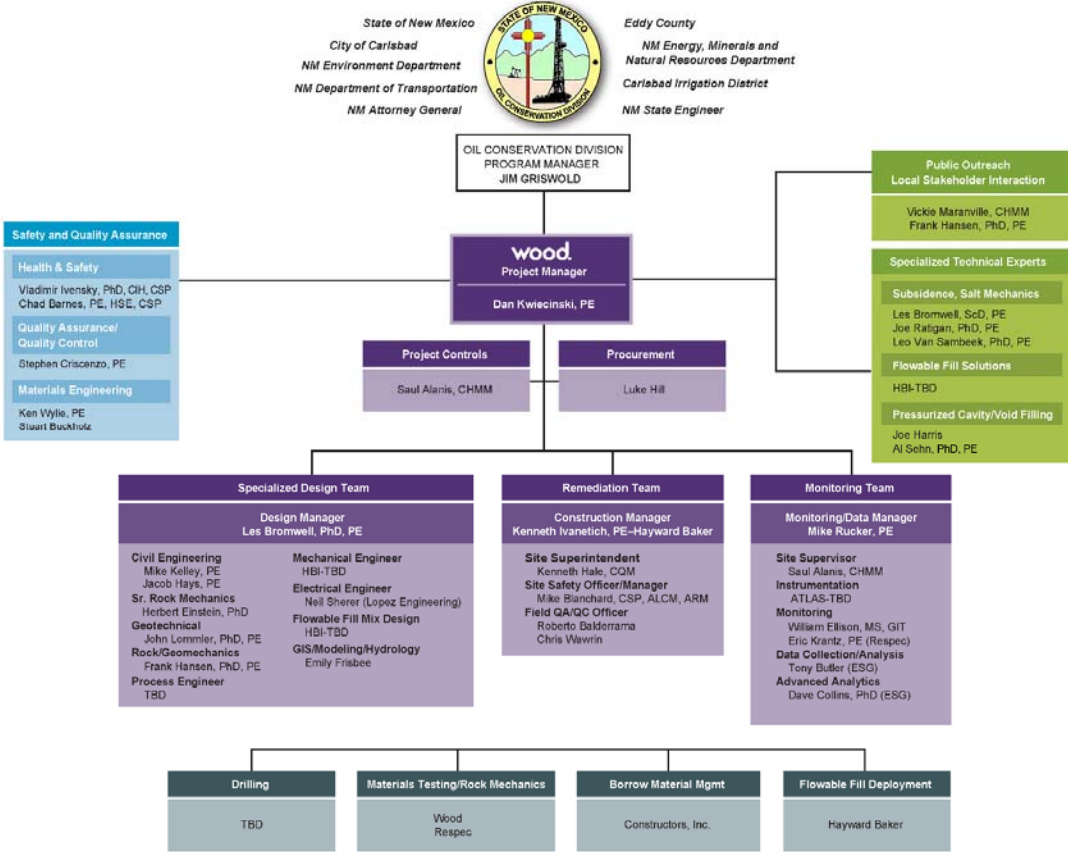
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- Amec Foster Wheeler officially changed its name on April 16, 2018 to Wood Environment & Infrastructure Solutions, Inc. This is a name change only and is administrative in nature.
- Wood has assembled a Team of specialized contractors, capable of implementing all aspects of the project.

Company	Role
Wood Environment & Infrastructure, Inc. (Wood)	Project Management/ Quality Assurance/ Design Lead
Hayward Baker Inc. (HBI)	Construction Team Lead/ Grout Deployment
RESPEC	Monitoring/ Rock Mechanics/ Public Relations Support
Constructor's Inc. (Constructors)	Local Contractor/ Borrow Material
ESG Solutions (ESG)	Microseismic Instrumentation & Data Acquisition



# Organizational Chart



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## Introduction – Project Background

- August 1, 1978 - Initial brine production, using a one well system (Eugene #1), begins at the site.
  - Initial operator is Permian Brine Sales.
- December 18, 1982 – OCD issues permit to Permian Brine Sales (Permit Number BW-006).
- July 1995 – I&W assumes ownership of the site.
- April 28, 2009 – All activity is ceased at I&W Site.
- May 1, 2009 – Installation of the Atlas monitoring system at the site is completed.



# Wood Direct Project Experience

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In 2012 retained by OCD to perform:

- Monitoring system upgrades & operation
- Evaluation of previous investigation methods
- Conduct Feasibility study

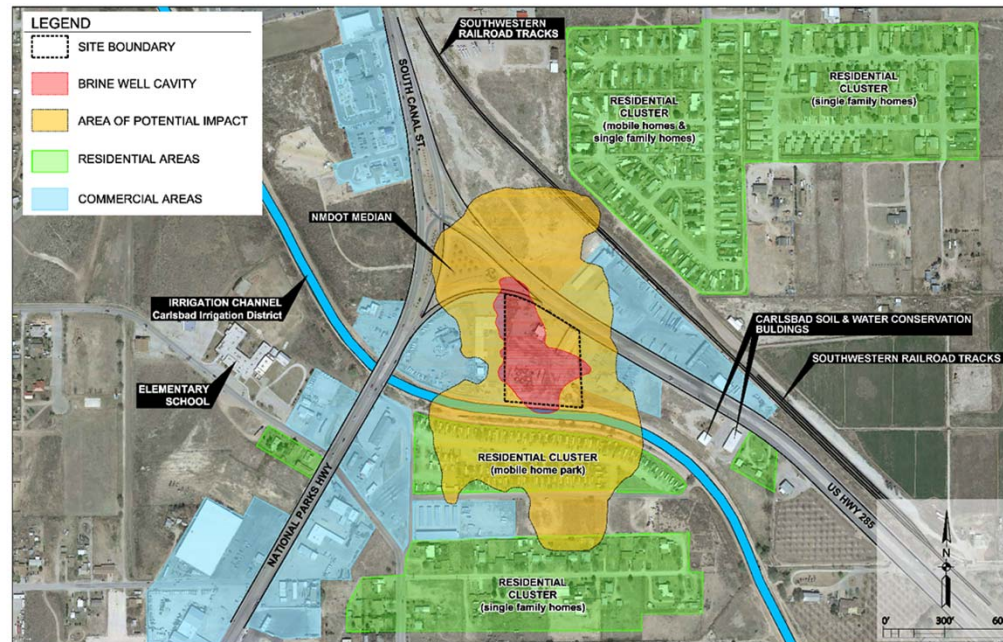
To date, we have gathered and evaluated data from site monitoring instruments over the last 5 years

- Slight pressure increases
- Decrease in microseismic activity



# Feasibility Study

- Cavity investigations performed to confirm size, shape, and mechanical parameters.
- OCD selected alternative for in-situ fill of the cavity.



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# On-going Methods of Site Monitoring

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## Microseismic (MS)

- Four MS monitoring stations
- One below cavity, three above roof

## Atlas Monitoring System (24 hours/7 days)

- Four borehole tilt meter
- Two pressure transducers to measure pressure at Eugenie #1 (well head/annulus)
- Two pressure transducers to measure depth to groundwater (shallow and deep aquifers)
- Pressure transducer to measure depth of water in canal (canal loading)
- Barometric pressure, air & soil temperatures, rain gauge



The logo for the company 'wood.' is displayed in a white, lowercase, sans-serif font. The background of the slide is a solid purple color with several overlapping, semi-transparent circles of varying shades of purple, creating a modern, abstract design.

wood.

## The Solution

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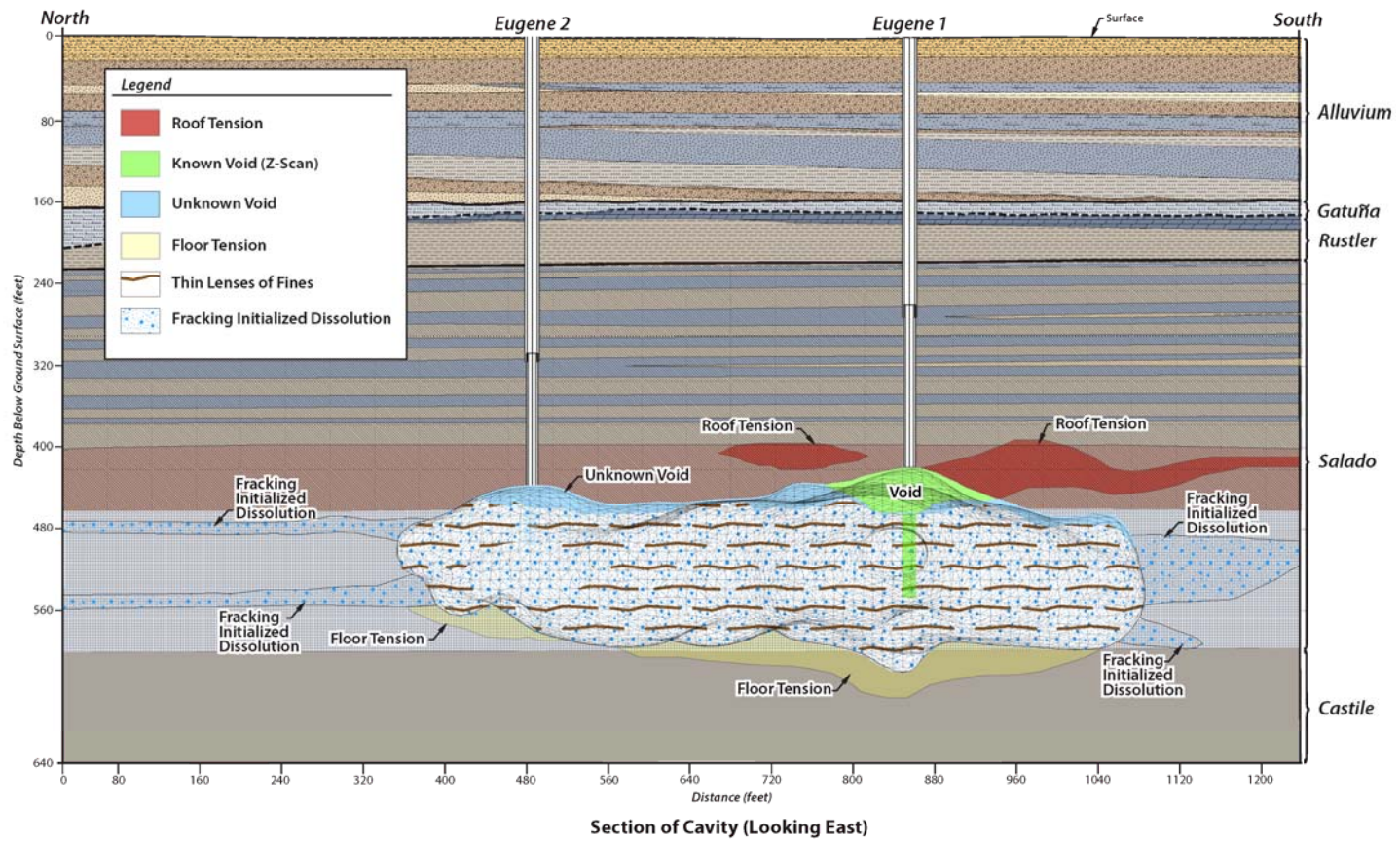


## Proposed Solution

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- Install a series of wells to extract brine and inject grout
  - Maintain cavity pressure
  - Balance volume of brine removed with volume of grout injected
  - Install a grout cap using high mobility grout to support cavity roof
  - Install grout columns using low mobility grout to support grout cap





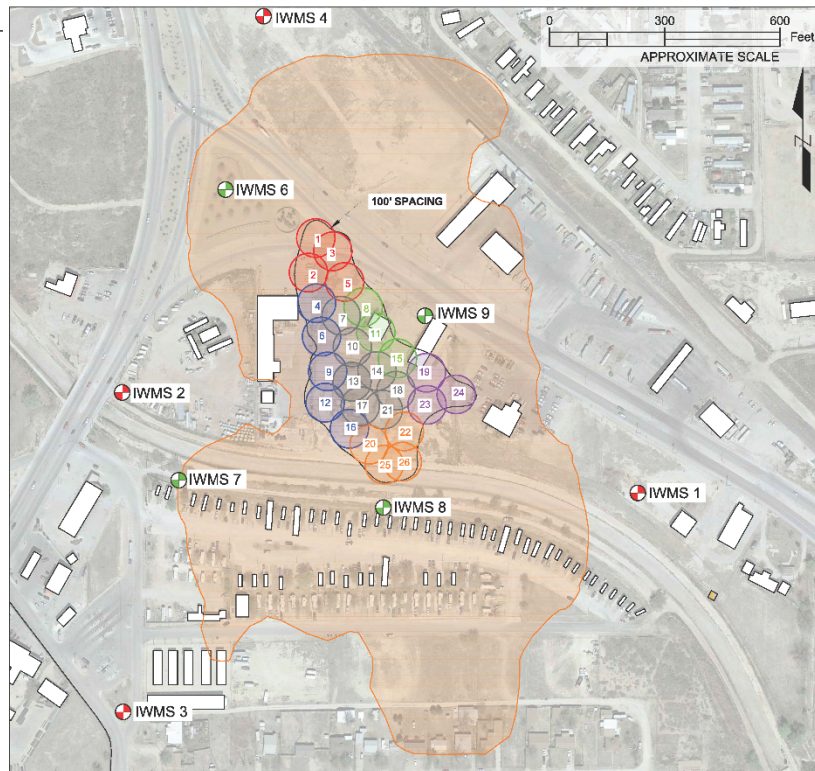
# Cavity Filling Process

## Boring & Grouting Sequencing

### LEGEND

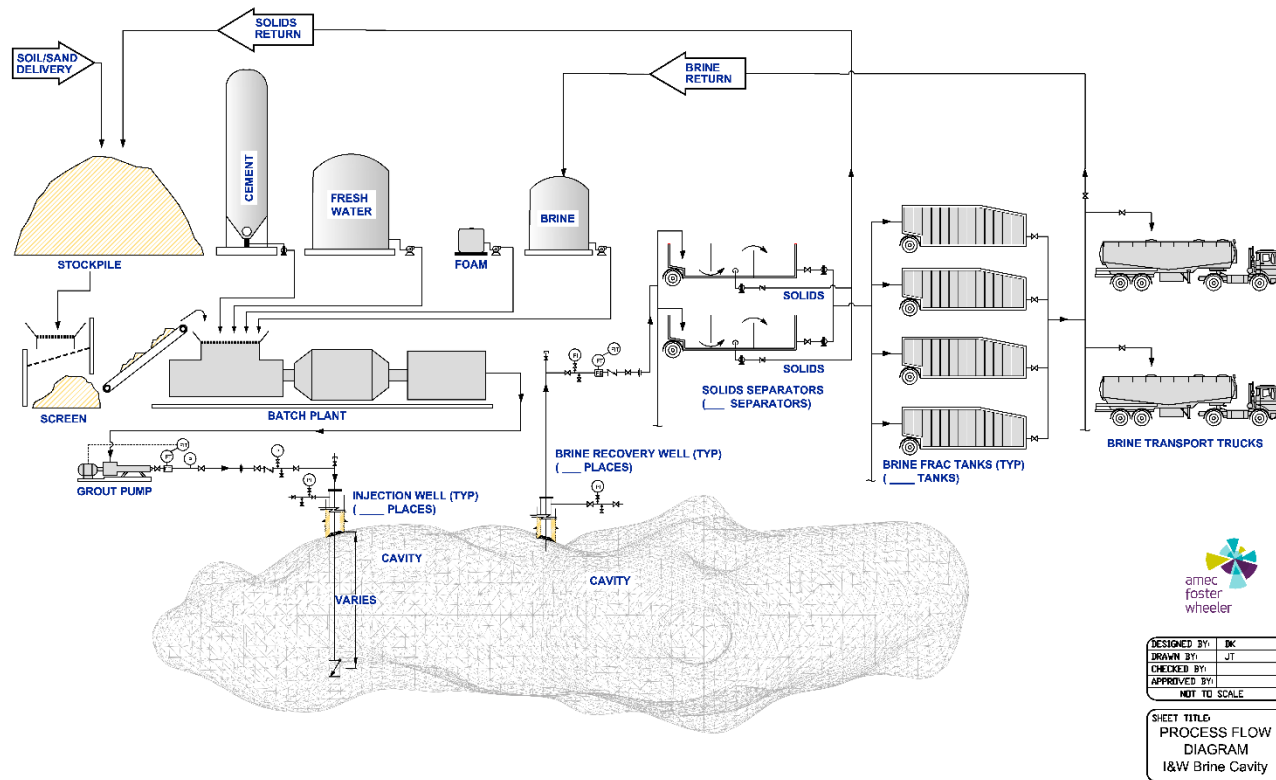
- PHASE 1 WELLS
- PHASE 2 WELLS
- PHASE 3 WELLS
- PHASE 4 WELLS
- PHASE 5 WELLS
- PHASE 6 WELLS
- AREA OF IMPACT
- EXISTING IWMS
- FUTURE IWMS

GROUT SEQUENCING		
PHASE	GROUT INJECTION WELL	BRINE RECOVERY/ MONITORING WELL
1	1	2,3
	2	3,4
	3	4,5
	5	7,8
2	24	19,23
	19	23,18
	23	18,22
3	25	20,26
	26	20,22
4	20	21,22
	22	18,21
	4	7,6
5	6	7,10
	9	10,13
	12	13,17
6	16	17,21
	8	7,11
	7	10
	10	13,14
	13	14,17
	14	17,8
	17	18,21
	21	18
	18	



# Cavity Filling Process

## Process Flow Diagram



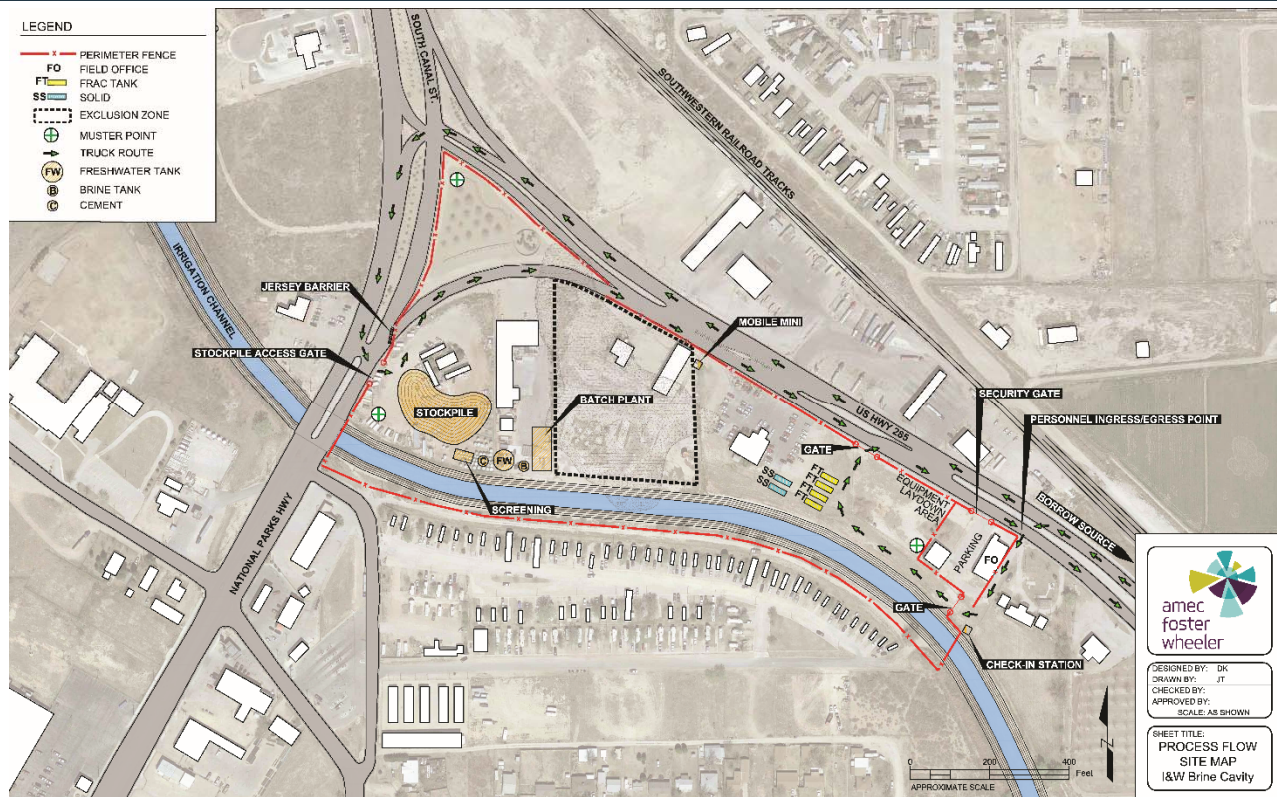
DESIGNED BY:	BK
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CHECKED BY:	
APPROVED BY:	
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SHEET TITLE: PROCESS FLOW DIAGRAM I&W Brine Cavity	





# Cavity Filling Process

## Process Flow Site Map



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## Project Timeline and Budget

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## Site Impacts – Planned Activities

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- Changes to the site
  - Installation of security/privacy fencing
  - Signage
  - Relocation of neighbors (City of Carlsbad leading effort)
    - Expanded site boundaries
    - Utility connections
  - Install additional site instrumentation
    - Additional BTM's, HIPI
    - Locations selected based on CSM
    - Relocate existing instrumentation
  - Install additional MS monitoring sites
  - Traffic patterns



## Milestone Schedule

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- June 30, 2018 -Phase 1a Preliminary Design Completed
  - Site Survey, Site Security, Traffic Control Planning, Plans and Permits
- July 11, 2018 – Presentation on traffic control to Brine Well Authority
- August 2, 2018 – Proposed Public Informational Meeting
- September 2017 – Upgrades to monitoring, site security.
- December 2018 – Complete draft design and refine cost estimate for Phase 2
- January 30, 2019 – Field mobilization and site preparation. Begin Phase 2 – Implementation.
- February 20, 2019 – Final design deliverable report





## Project Budget

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- Phase 1a/1b      \$1,522,556
  - Phase 2            \$41,285,952 (with 25% contingency)
  - Phase 3            \$1,176,492 (with 25% contingency)
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- Currently estimated with contingency because additional data gathering is required to refine cost
  - Phase 1b includes a re-baseline of the cost based on final design.
  - Phase 2 cost will be revised to include a 10% contingency.



## Cost Control

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- Development of cash flow model to forecast project spending.
- Cost and scope reviewed weekly.
- Key Team Members selected based on expertise and experience.
- Support subcontractor services competitively bid to ensure best value and use of available local resources.
- Budgets reflect approved project phases.
- Phase 1b allows for cost refinement, including re-baseline project budget with a 10% contingency.
- Invoicing will provide accounting of expenditures.
- Contingency use requires pre-approval from EMNRD.



## Change Management Process

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- All changes will be formally documented and agreed to in writing by EMNRD and Wood and between Wood and its subcontractors. End of month reports will include anticipated changes for the coming month, if any. All work will be performed under approved Task Orders.
- Appropriate approvals by EMNRD PM, Wood PM, and subcontractor PM must will be documented for each task order and contract modification.



## Public Outreach

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- E&IS responsible for overall Public Outreach and Community Interaction for this contract
- Project related press releases and public/stakeholder meetings will be coordinated with OCD
- Series of Town Hall meetings are planned throughout the project.
  - Convey project information at milestones
  - Convey accurate information to all stakeholders
- Project Fact Sheet is being developed to convey project details to stakeholders, residents, businesses and media.



**wood.**

**[woodplc.com](http://woodplc.com)**