

# Feasibility Evaluations: Extending the Lifespan of Oil- Water Separators



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# What is a Feasibility Evaluation?

- Engineering study based on field work, engineering and economic analysis.
- Presents information to determine the technical, operational and financial feasibility of a project.
- There is no universal format.
- Are completely customizable, adaptable and shaped to meet the specific needs of any given situation.



## The Validity of Feasibility Studies

*“Over the past several months, a reoccurring theme has emerged from those critical of the Corps (U.S. Army Corps of Engineers). Specifically, it is alleged that the Corps has a pro-construction mentality, ...which presumably means, the bigger the construction project, the better; even though a nonstructural option maybe a better alternative.”*

– Hon. James M. Inhofe, R-OK, 2001 – Senate Hearing on Management Practices of Feasibility Studies by the U.S. Army Corps of Engineers

# Components of a Feasibility Evaluation

- **Regulatory Compliance**
- **Conceptual Design**
- **Schedule**
- **Environmental Factors**
- **O&M Factors**
- **Capital & Operating Costs**
- **Alternatives or options that could meet the desired goals.**



## Goals

- Evaluate potential for success.
- Chart best path forward.
- Make better informed decisions.
- Program & budget funds in a rational, defensible and cost effective approach.

# The Challenge in Feasibility Evaluations

- Be open minded and limit bias.
- Justifying cost effectiveness under a range of circumstances.
- Dependent on the effectiveness and appropriateness of technology being proposed.
- Identification and analysis of other project risks.
- It is not uncommon that...
  - Assumptions are revised
  - New risks identified
  - Financial projections change
- **Consequences of skipping the Feasibility Evaluation step...**
  - **Over-looked potential issues**
  - **Creates delays while issues are analyzed & addressed**
  - **Results in increased costs**

# **An Example of a Feasibility Evaluation...**

## **Oil-Water Separator System Rehabilitation**

**Some specific questions ...**

- **What is the overall expectation for this project?**
- **Is the Oil-Water Separator System needed?**
- **Where does flow discharge?**
- **What are permit limits and monitoring requirements? Have they changed?**
- **Is there history of NOVs or Exceedances?**
- **What is the condition of the oil-water separator structure and collection piping?**
- **What are environmental, hydrologic, and soil conditions?**
- **What are current O&M concerns or issues?**
- **What are the cost considerations?**

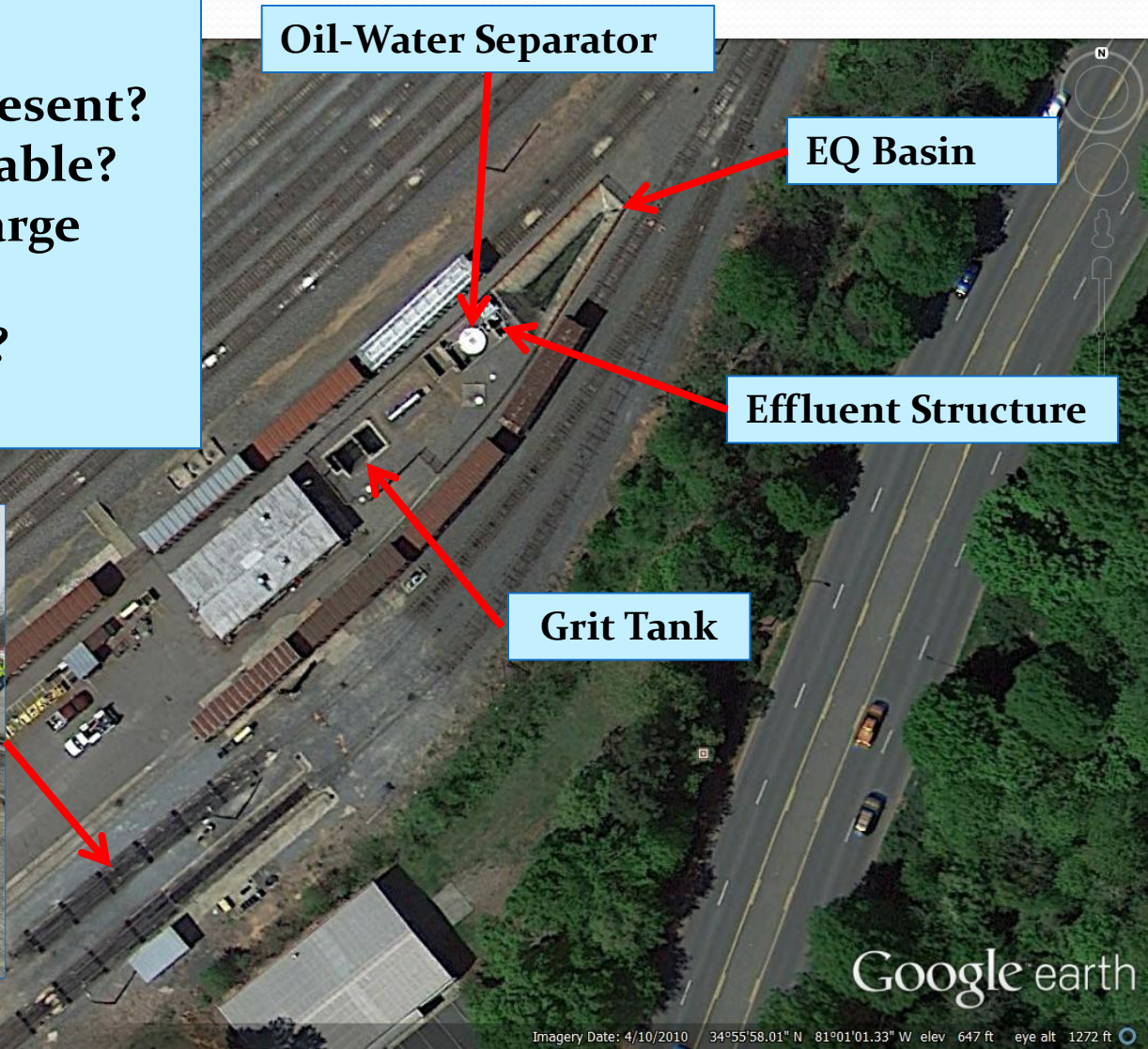
# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Planning Phase)

## Gather Information on...

- What is the Goal?
- What Operations are Present?
- As-Built Drawings Available?
- POTW or NPDES Discharge Limits?
- History of Exceedances?
- O&M Issues?



Track Pans & Engine Pit



Oil-Water Separator

EQ Basin

Effluent Structure

Grit Tank

# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Field Evaluation Phase)



## Concrete Coring:

- Determine Actual Thickness,
- Reinforcement,
- Collect Samples for Testing

# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Field Evaluation Phase)

Groundwater Piezometer



- Soil Borings to evaluate Soil Types,
- Piezometers to determine Groundwater Elevation





# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Field Evaluation Phase)

Storm Water By-Pass

Sluice Gate Valve  
- Not Operable

Sediment Accumulation

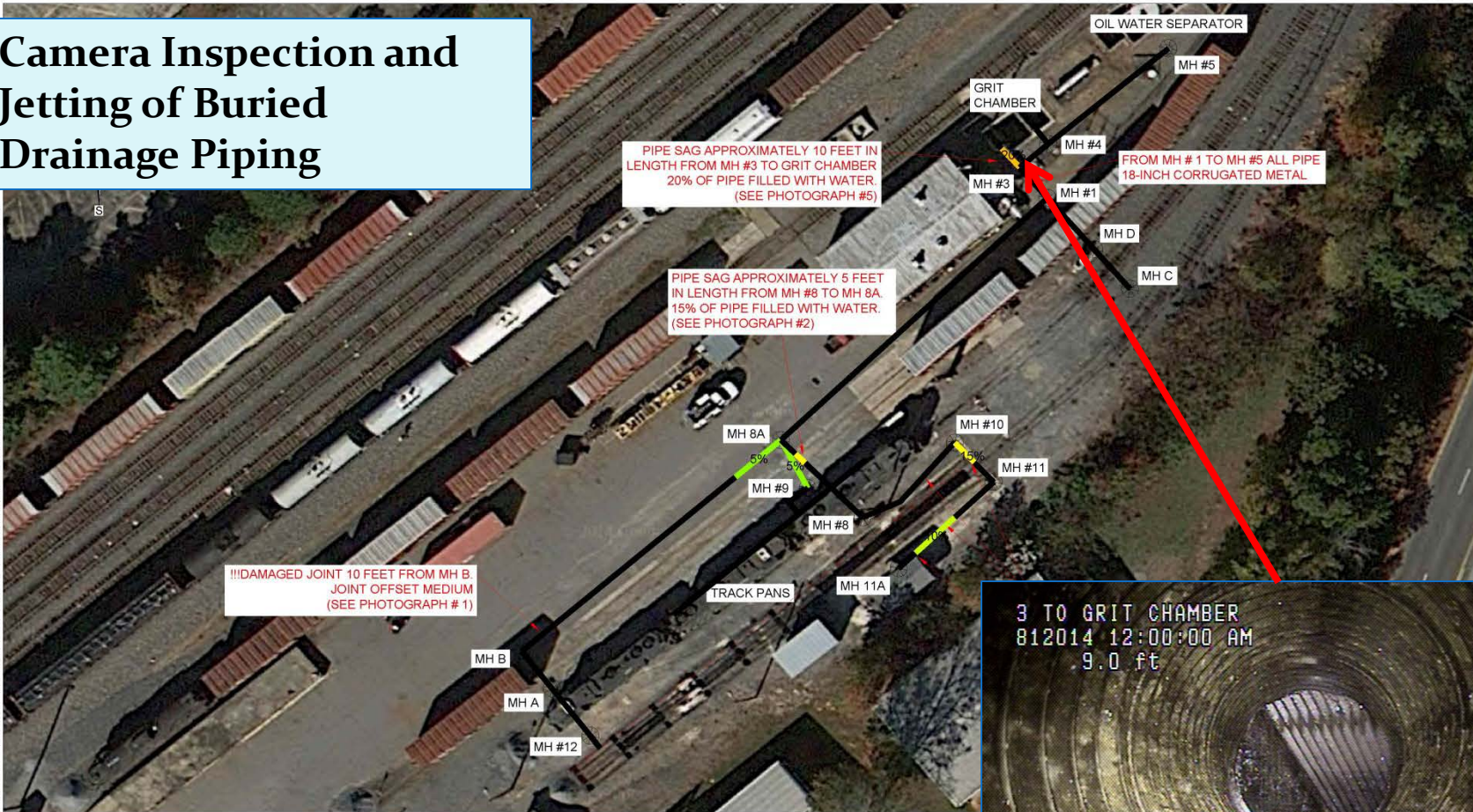
Visual Inspection and  
Field Measurements



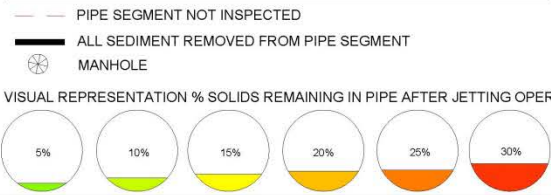
# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Field Evaluation Phase)

## Camera Inspection and Jetting of Buried Drainage Piping

H:\Projects\Norfolk Southern\1127135-03 Rock Hill, SC - OWS Repair-Oversight\Construction Oversight\Pipe Inspection Plan.dwg, 8/13/2014 1:37 PM, Sean Bricker



### LEGEND



### NOTES:

THIS DRAWING HAS NOT BEEN SURVEYED ON GOOGLE EARTH IMAGERY AND ON SITE.

MANHOLE NUMBERS ARE BASED ON SHIELD ENGINEERING, INC. RECORDS.

ALL PIPES INSPECTED WERE 12-INCH CORRUGATED METAL.



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# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Surface Drainage Area Evaluation)

## Evaluate...

- Different Storm Events
- Maximum Contained Storm Event
- Separator Velocity & Retention Times

Contributing Area  
Potentially Not Impacted  
by Fueling or Spills.

Drainage Area #02

Drainage Area #01

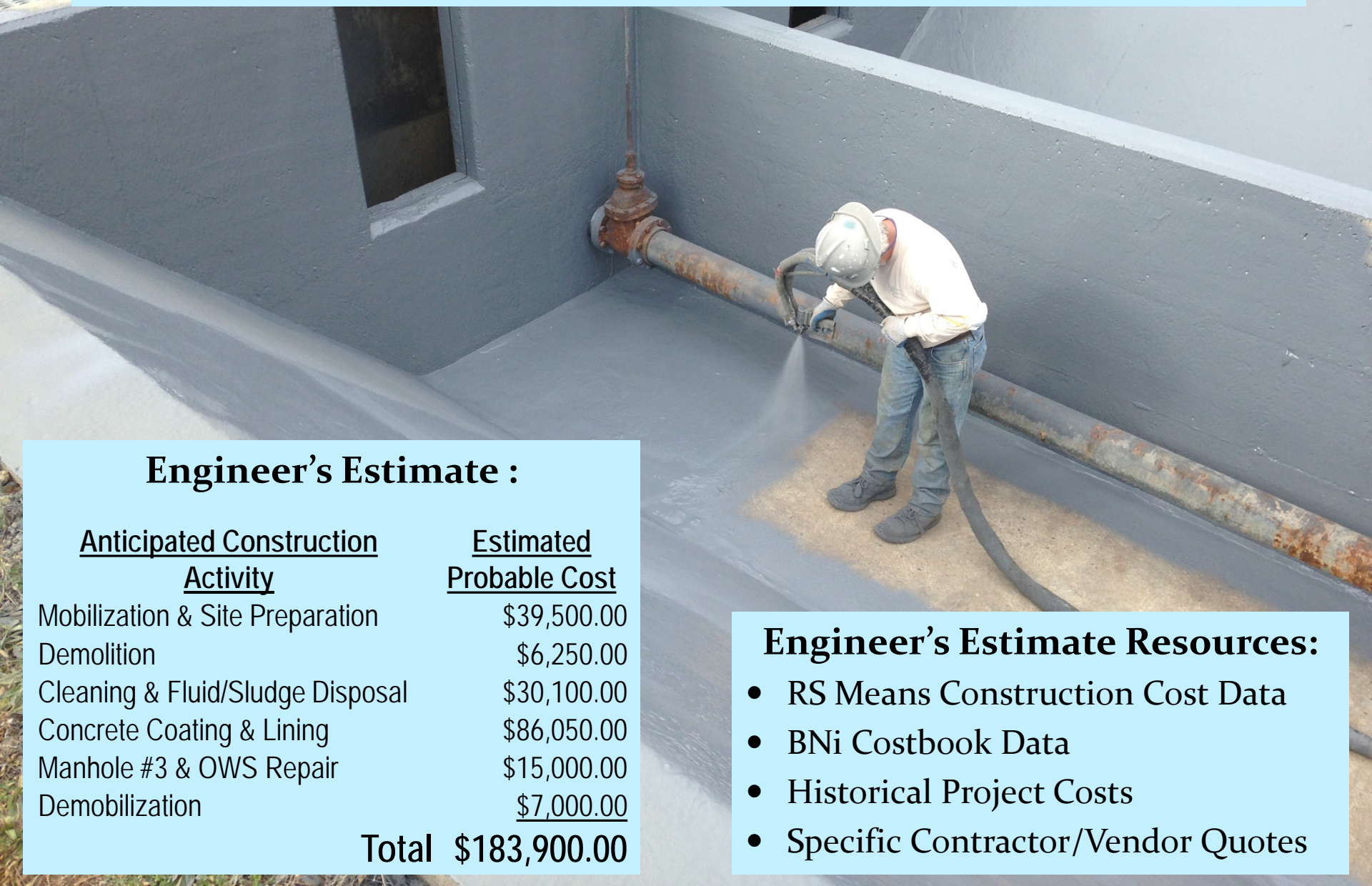
Google earth

# **Oil-Water Separator - Rock Hill Yard, Rock Hill, SC**

## **(Evaluation Findings)**

- **Yard Operation**
  - **Continues to operate Locomotives for short-haul branch-line work**
- **Regulatory Requirements**
  - **No NOVs or Exceedances**
- **Hydraulic Analysis**
  - **All storm events passed**
- **System Analysis:**
  - **Existing Concrete Structures are in good condition, with exception of EQ Basin.**
  - **Drainage Piping System is in good condition.**
  - **Influent Manhole constructed with By-Pass to Surface Water; not to Sanitary Sewer.**

# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Option #1 – Concrete Lining & Coating)



## Engineer's Estimate :

<u>Anticipated Construction Activity</u>	<u>Estimated Probable Cost</u>
Mobilization & Site Preparation	\$39,500.00
Demolition	\$6,250.00
Cleaning & Fluid/Sludge Disposal	\$30,100.00
Concrete Coating & Lining	\$86,050.00
Manhole #3 & OWS Repair	\$15,000.00
Demobilization	<u>\$7,000.00</u>
<b>Total</b>	<b>\$183,900.00</b>

## Engineer's Estimate Resources:

- RS Means Construction Cost Data
- BNi Costbook Data
- Historical Project Costs
- Specific Contractor/Vendor Quotes

# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Option #2 – New Underground Oil-Water Separator)



## Engineer's Estimate:

<u>Anticipated Construction Activity</u>	<u>Estimated Probable Cost</u>
Mobilization & Site Preparation	\$37,000.00
Demolition	\$57,950.00
Excavation & Sub-Base Preparation	\$80,100.00
New Underground Oil-Water Separator	\$208,685.00
Manhole & Piping Repairs	\$4,500.00
Demobilization	<u>\$8,000.00</u>
<b>Total</b>	<b>\$396,235.00</b>

# Oil-Water Separator - Rock Hill Yard, Rock Hill, SC (Option #3 – By-Pass EQ Basin & Segregate Non-Impacted Flow)



## Engineer's Estimate:

<u>Anticipated Construction Activity</u>	<u>Estimated Probable Cost</u>
Mobilization & Site Preparation	\$24,500.00
Demolition	\$11,750.00
Infrastructure Cleaning	\$17,700.00
New Storm Water Piping	\$15,000.00
New Manhole/Piping to Separator	\$20,260.00
Manhole & Piping Repairs	\$7,225.00
Grit Chamber Retrofit w/ Oil Baffle	\$10,350.00
Backfill & Abandon EQ Basin	\$39,110.00
New Security Fence	\$7,788.00
Demobilization	<u>\$8,000.00</u>
<b>Total</b>	<b>\$161,683.00</b>

# Conclusion

- **Skipping the Feasibility Evaluation step can have consequences!**
- **Office Preparation is key to Field Evaluation.**
- **Perform a thorough Field Evaluation.**
- **Cost/Benefit Analysis is critical.**
- **Be flexible and Open Minded.**



# Questions???



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