

Camden: old & deteriorated water infrastructure

...vulnerable to both stormwater & tidal flooding...



Residents ranked flooding as the #1 environmental problem in most of Camden's neighborhoods...



Image capture: May 2012 © 2016 Google



NJIT TAB Green Stormwater Infrastructure Decision Tree Tool

<http://www5.njit.edu/tab/sites/tab/files/GSI%20Tree%20Manual%20web%20version.pdf>

Or go to www.njit.edu/tab; click on Tools

Cost to Remediate



Environmental Benefits

[USEPA's July 2013 "Implementing Stormwater Infiltration Practices at Vacant Parcels and Brownfields Sites"](#)

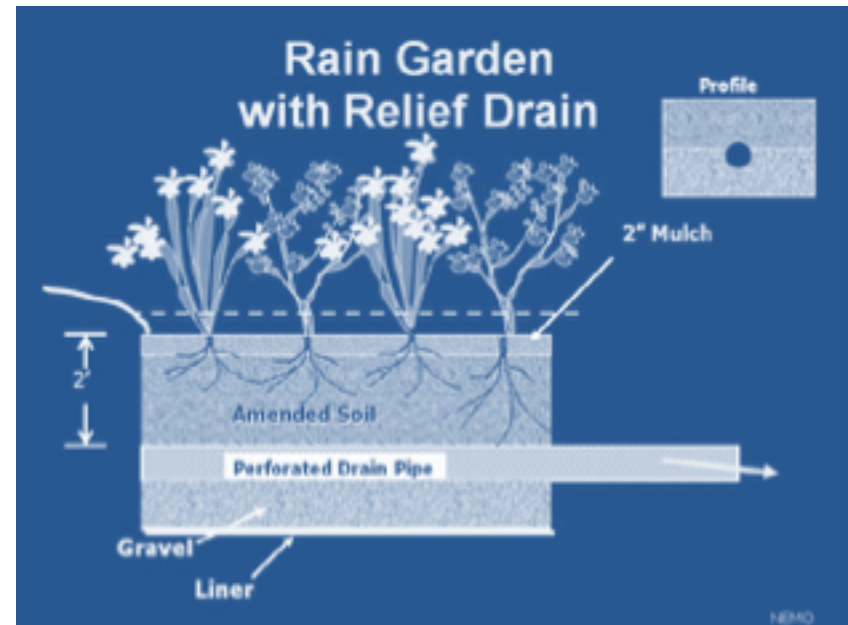
Components of the Tool

- Workflow Diagram
- Fact Sheets 1-4
 - Conceptual Site Model (CSM)
 - Cost Estimation
 - Cost Benefit Analysis
 - Risk Benefit Analysis

Option scenarios including:

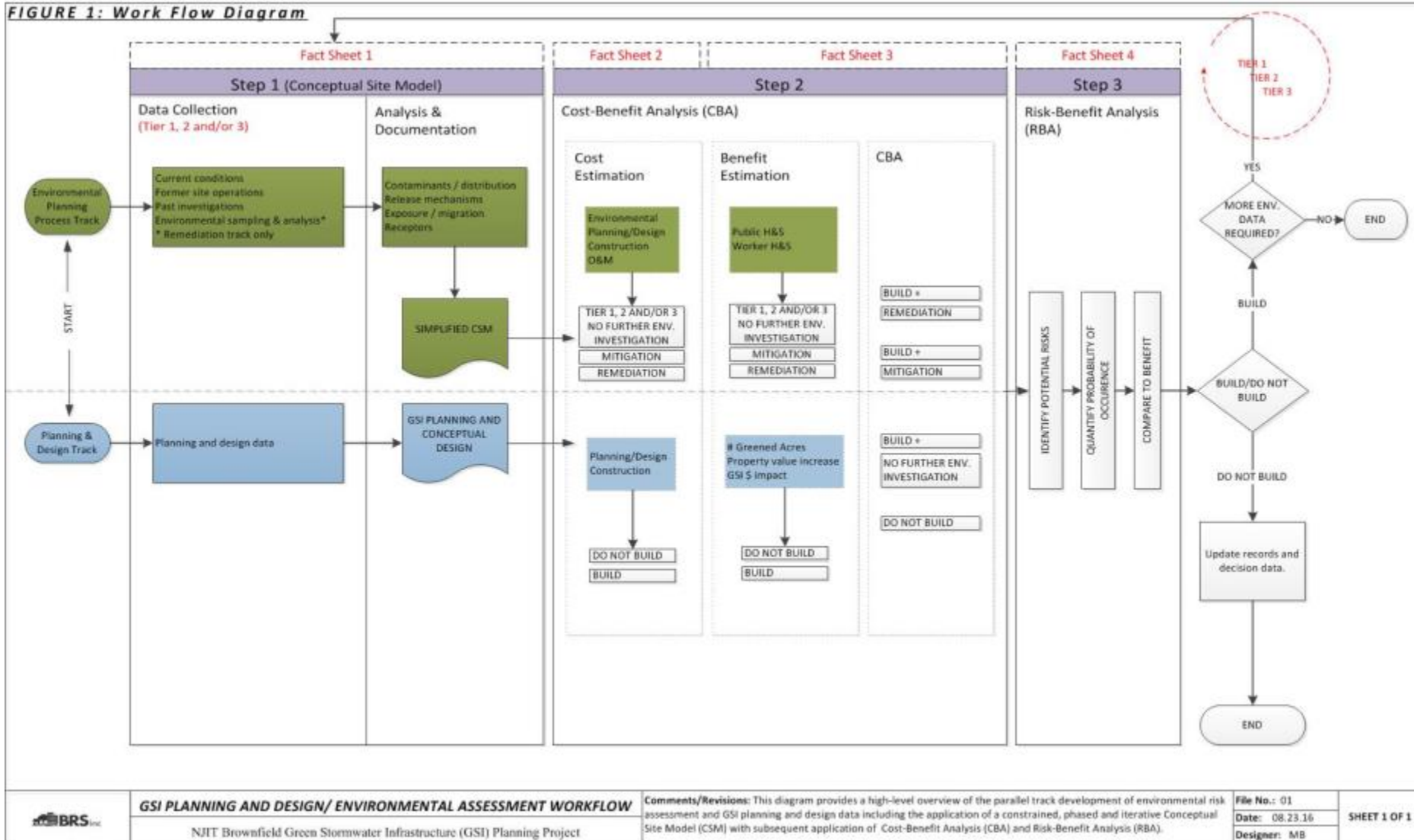
1. No further environmental investigation/no build
 2. No further environmental investigation/build
 3. Mitigation/build
 4. Remediation/build
- Decision Tree

Graphic Source: [USEPA's July 2013 "Implementing Stormwater Infiltration Practices at Vacant Parcels and Brownfields Sites"](#)



Workflow Diagram

FIGURE 1: Work Flow Diagram

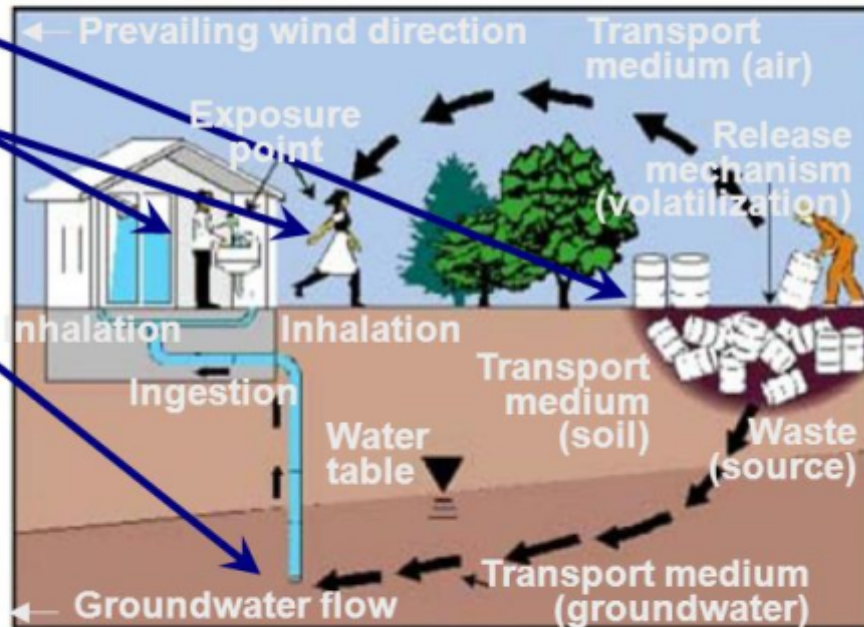


Fact Sheet 1: CSM

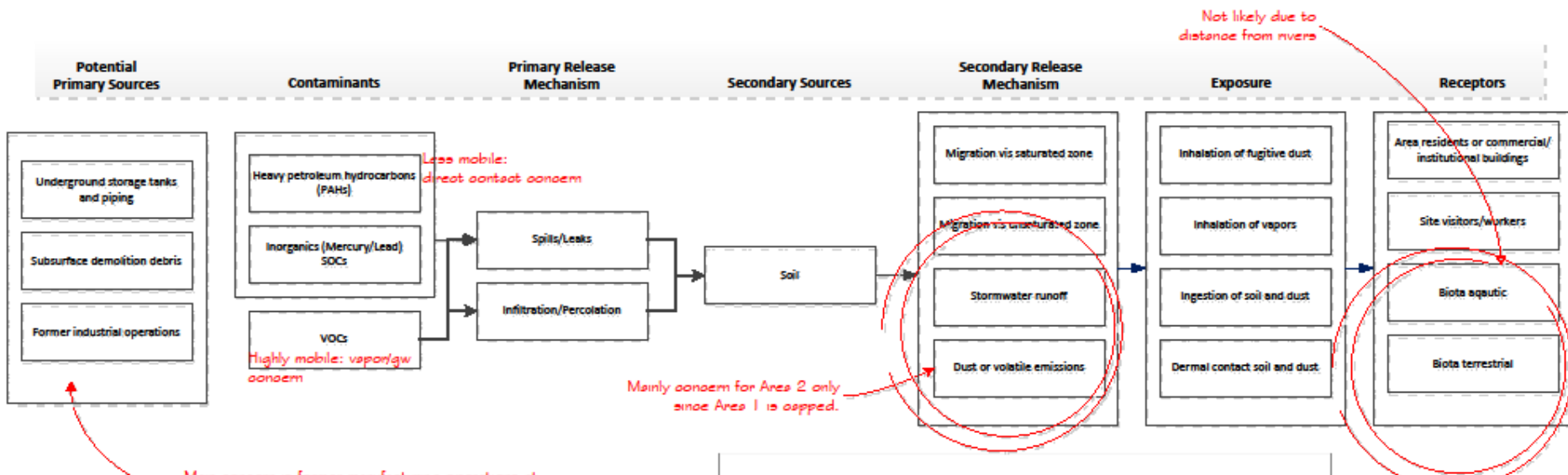
Conceptual Site Models (CSM)



- ▶ Site contaminants
- ▶ Possible receptors including future land use
- ▶ Contaminant
 - Fate
 - Transport
 - Paths to receptors
- ▶ Incorporate recently collected data
- ▶ Consistent with potential land use



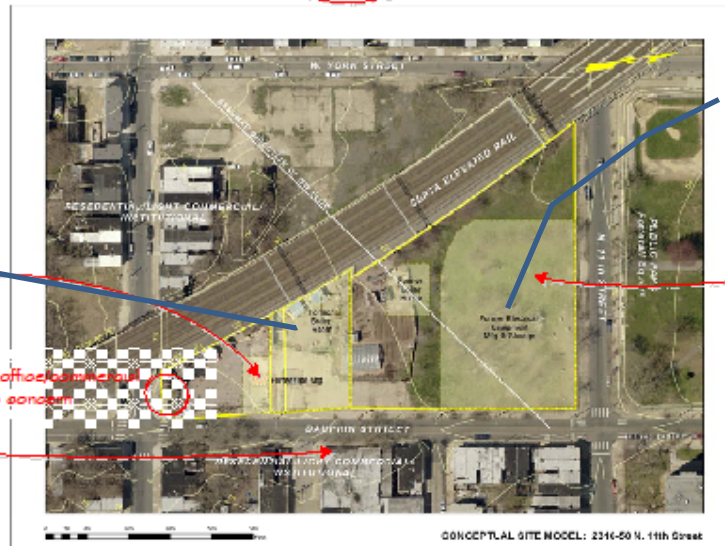
Source: ITRC Remediation Process Optimization Advanced Training
www.itrcweb.org



Main concern is former manufacturing operations at electrical equipment warehouse. Boilers existed at the electrical equipment co. and the ice manufacturing company, which indicates possibility for USTs and piping. Demolition debris in the subsurface is also of concern.

Ice Mfg.

Electrical Mfg.



Area 1: Capped

Area 2: Unpaved

Former small office building not a concern

Active store-front Church

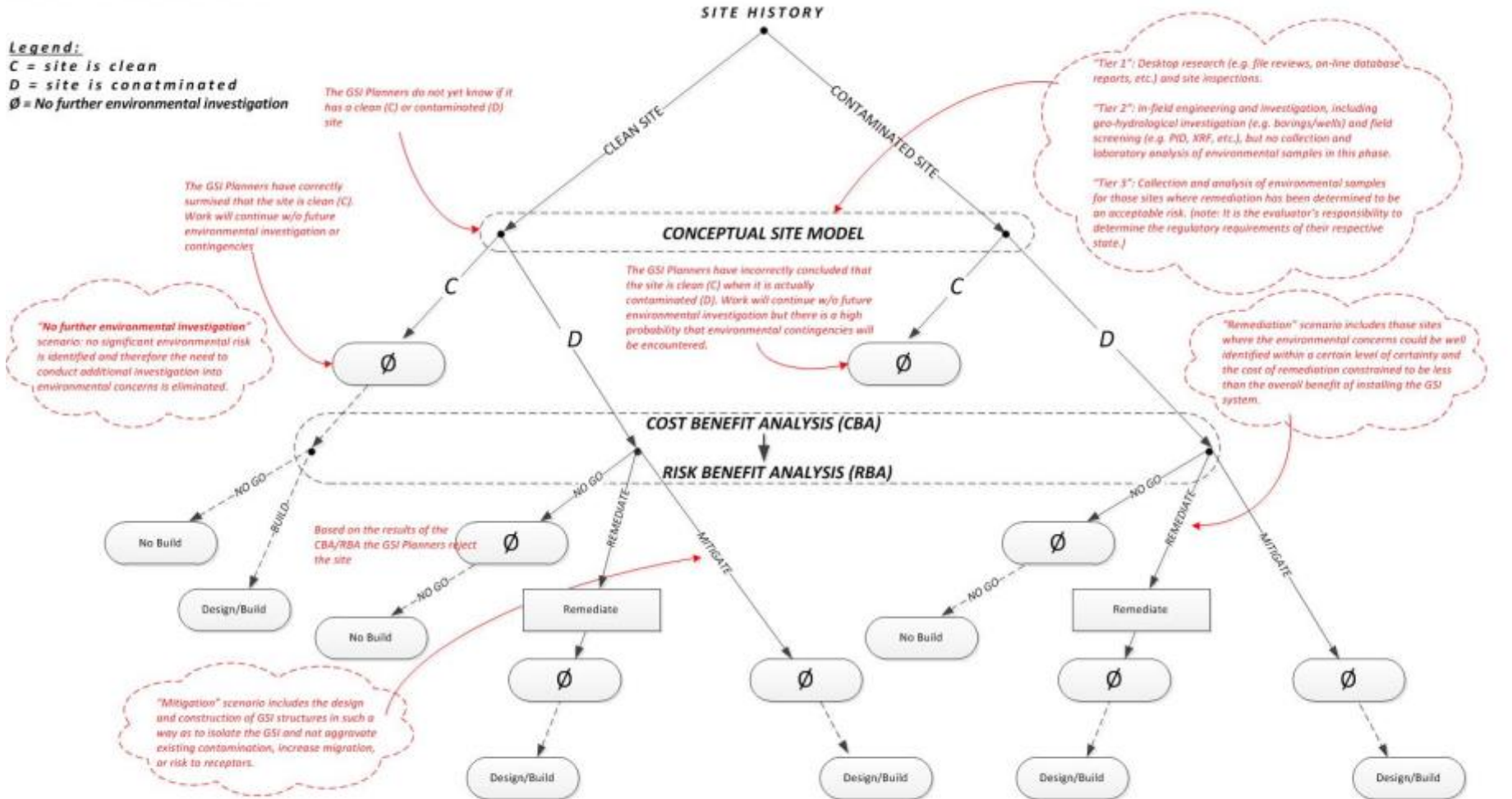
FIGURE 2: Decision Tree

Legend:

C = site is clean

D = site is contaminated

∅ = No further environmental investigation



Fact Sheet 2

Cost Estimate

How much does it cost to investigate and remediate the site?



4 Scenarios:

1. No Further environmental investigation / Don't Build GSI (aka Do Nothing / No Build)
2. No Further environmental investigation / Build GSI (aka Do Nothing/ Build)
3. Mitigation / Build GSI (aka Mitigate)
4. Remediate / Builds GSI (aka Remediate)

Fact Sheet 3 – Cost Benefit Analysis

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Costs				
Environmental Planning				
Tier 1: Desktop Investigation/Site Inspection	\$5K	\$5K	\$5K	\$5K
Tier 2: Field Screening	\$66K	\$66K	\$66K	\$66K
Tier 3: Environmental Site Investigation	\$0K	\$0K	\$0K	\$67K
Remediation	\$0K	\$0K	\$0K	\$288K
Planning, Design and Construction of GSI	\$0K	\$70K	\$88K	\$70K
O&M (10 Yr.) for GSI	\$0K	\$35K	\$44K	\$35K
Total Costs:	\$71K	\$176K	\$202K	\$531K

Fact Sheet 3 – Cost Benefit Analysis

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Costs				
Total Costs:	\$71K	\$176K	\$202K	\$531K
Benefits				
Benefits				
1. Increase in property value	\$0K	\$50K	\$50K	\$200K
2. Improved public and worker health and safety	\$0K	\$0K	\$10K	\$10K
3. Increased environmental services	\$0K	\$10K	\$10K	\$10K
4. Gray infrastructure costs avoided	\$0K	\$200K	\$200K	\$200K
OR # of new Greened Acres				
Total Benefits:	\$0K	\$260K	\$270K	\$420K

Net Benefits

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Costs				
Total Costs:	\$71K	\$176K	\$202K	\$531K
Benefits				
Total Benefits:	\$0K	\$260K	\$270K	\$420K
Net Benefits:	\$-71K	\$84K	\$68K	\$-111K



**Which is the best scenario?
What should we do?**

Decision Tree – Risk Analysis

Are you feeling lucky?



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Fact Sheet 4 – Decision Tree Risk Benefit Analysis

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Net Benefits:	-\$71K	\$84K	\$68K	-\$111K



Risk / Probability

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Total Costs:	\$71K	\$176K	\$202K	\$531K
Total Benefits:	\$0K	\$260K	\$270K	\$420K
Net Benefits:	-\$71K	\$84K	\$68K	-\$111K

Do Nothing Scenerio Net Benefit	Multiply By	Probability the Site is Clean	Risk Subtotal
\$84K	x	50%	\$42K
Remediate / Build (GO) Net Benefit	Multiply By	Probability the Site is Dirty	Risk Subtotal
-\$111K	x	50%	-\$55.5K
			Add Risk Subtotals
Calculated Risk Benefit			-\$13.5K

Risk Benefit Analysis

	Scenario			
	Do-Nothing / No Build (NO GO)	Do-Nothing / Build (GO)	Mitigate / Build (GO)	Remediate / Build (GO)
Net Benefits:	-\$71K	\$84K	\$68K	-\$111K
Risk / Benefit				
Calculated Risk Benefit Analysis (using 50% probability)	-\$71K	-\$13K	\$68K	-\$111K

Now which one looks like our best option?

NJIT TAB GSI Tool



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