

SHELTER ISLAND MASHOMACK PRESERVE

SUSTAINABILITY STRATEGIES FOR RENOVATING IN A SENSITIVE ECOSYSTEM



CLIENT The Nature Conservancy. Mike Laspia. Cynthia Belt **TEAM** G. Arnold, S. Coulter, L. Cheng, F. Dieye, R. Futrell, A. Guerrero, S. Jiang, J. Louie, E. Quigley. R. Schwarz, M. Shurtleff, M. Weiss **ADVISOR** Susanne DesRoches

INTRODUCTION SITE



Columbia University MSSM Capstone Workshop Spring 2012

INTRODUCTION CLIENT



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INTRODUCTION OBJECTIVES



CLIENT MISSION

PRIMARY

Protect the sensitive environment

SECONDARY

Fundraising, increase occupancy and further educational mission



TEAM OBJECTIVE

RESEARCH

Identify sustainable building strategies and best practices

CONSIDERATION

Minimize risk to the sensitive environment

PROJECT SITE



THE MANOR HOUSE IS THE HEART OF MASHOMACK'S OPERATIONS



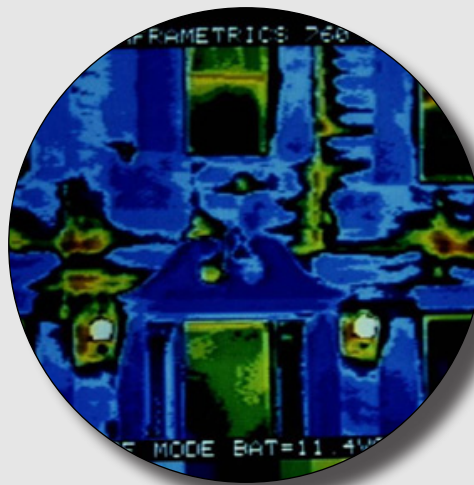
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PROJECT STRATEGY

REDUCE IMPACT ON BUILDING OPERATIONS AT MASHOMACK PRESERVE



Water Conservation &
Wastewater Management



Energy Efficiency



Renewable Energy

PROJECT CHALLENGES



OPERATIONAL

Suggested opportunities may be inconsistent with seasonal occupancy patterns



TECHNICAL

Research limited to available data



ENVIRONMENTAL

Unique site conditions prohibit installation of certain technologies

PROJECT FINDINGS

39
OPPORTUNITIES

+ 10 SUB-OPPORTUNITIES



1. Measure and document - water audit
2. Adopt water conservation behaviors
3. Install water conservation technologies
4. Institute best practices during construction
 5. Harvest rainwater for use
 6. Optimize groundwater recharge
 7. Decommission unused wells
8. Determine adequacy of treatment
 9. Consider desalination
 10. Modify or replace OWTS
 11. Perform benchmarking
 12. Perform blower door test
 13. Seal the envelope
 14. Protect basement and attic
15. Explore supplemental window insulation
 16. Install storm windows
 17. Wrap the envelope
18. Create window shading through shutters
19. Implement natural shading through planting
 20. Install outdoor entryway plantings
 21. Use natural wind breaks
 22. Utilize sun space
23. Exploit stack effect for passive cooling
 24. Implement boiler upgrades
 25. Forego boiler upgrades and replace
26. Explore supplemental heating upgrades
 27. Upgrade hot water insulation
 28. Explore alternative hot water system
 29. Upgrade indoor lighting
 30. Evaluate lighting automation
 31. Utilize natural light shelves
 32. Evaluate mechanical air conditioning
 33. Replace or remove walk-in refrigerator
 34. Small wind turbines
35. Wind and solar-powered outdoor lighting
 36. Solar electric energy
 37. Solar thermal hot water generation
 38. Tidal power energy
 39. Woody biomass

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PROJECT FINDINGS

OPPORTUNITIES		PREREQUISITES	AIR QUALITY	GHG EMISSIONS	WATER CONSERVATION	WATER QUALITY	ECOSYSTEM	OUTREACH
WCO 1	Measure and document - water audit	•						•
WCO 2	Adopt water conservation behaviors				•	•	•	•
WCO 3	Install water conservation technologies				•		•	•
WCO 4	Institute best practices during construction	•			•		•	•
WCO 5	Harvest rainwater for use				•		•	•
WCO 6	Optimize groundwater recharge				•	•	•	•
WCO 7	Decommission unused wells					•	•	•
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EEO 12	Utilize sun space		•	•			•	
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EEO 14A	Implement boiler upgrades			•				
EEO 14B	Forego boiler upgrades and replace existing			•				
EEO 14C	Explore supplemental heating upgrades		•				•	
EEO 15	Upgrade hot water insulation		•	•	•			
EEO 16	Explore alternative hot water system		•	•	•		•	•
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WCO 3

Install water conserving technologies



HOW

- Low-flow toilets & shower heads
- Faucet aerators
- Drip irrigation and soaker hose

WHY

- Protects aquifer (only source of potable water)

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EEO 8

Create window shading through shutters



HOW

- Wooden shutters with operable louvers
- Blocks thermal gains and losses

WHY

- Reduces fuel use
- Adjusts for comfort
- Permits ventilation

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REO 4

Solar thermal hot water generation



HOW

- Solar-heated fluid drawn through pipes
- Raises indoor ambient temperature
- Heats domestic water

WHY

- Efficient use of harvested energy
- Reduces demand on boiler

ANALYSIS CONTEXT



FEASIBILITY

Time and effort, ease of implementation

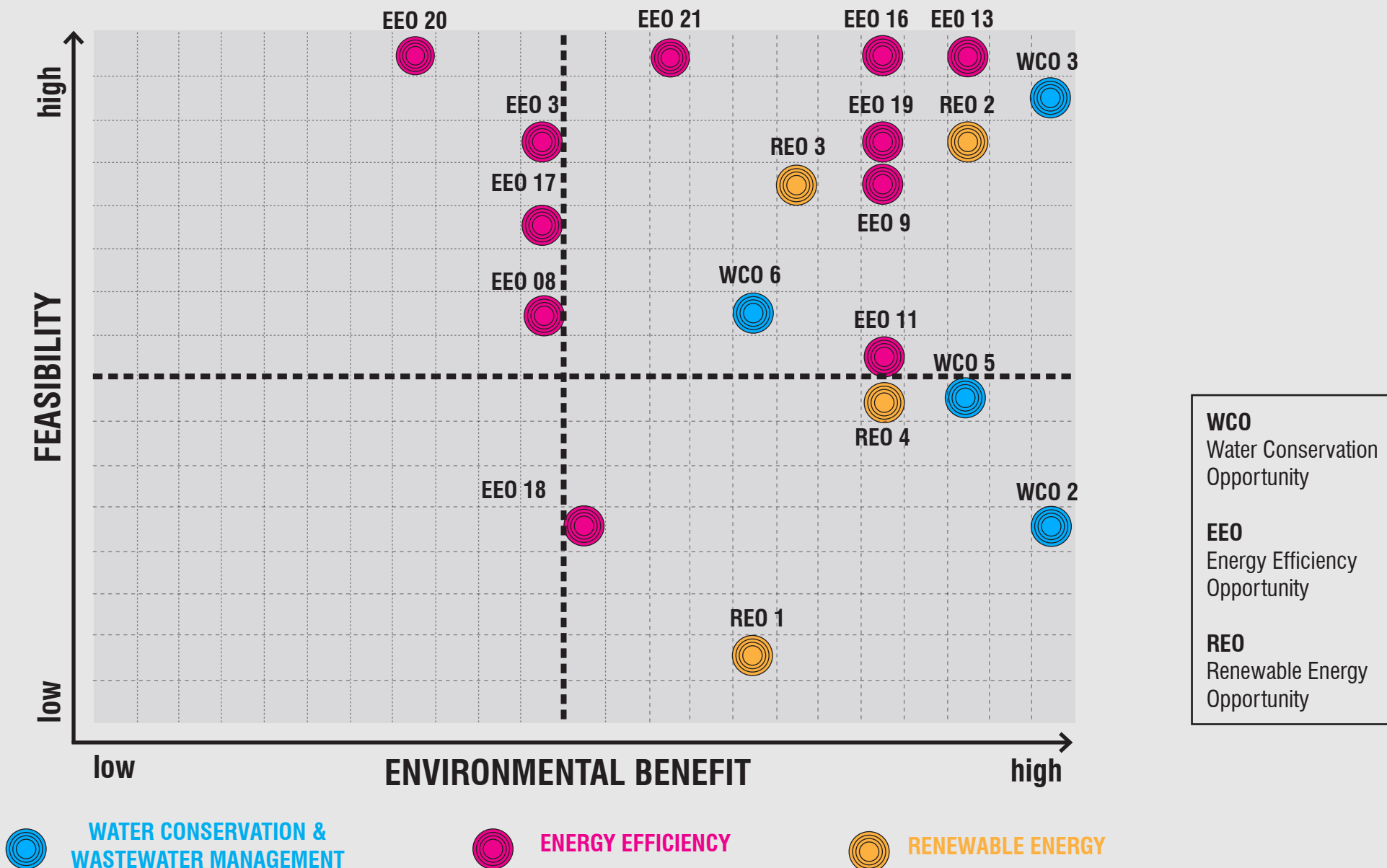
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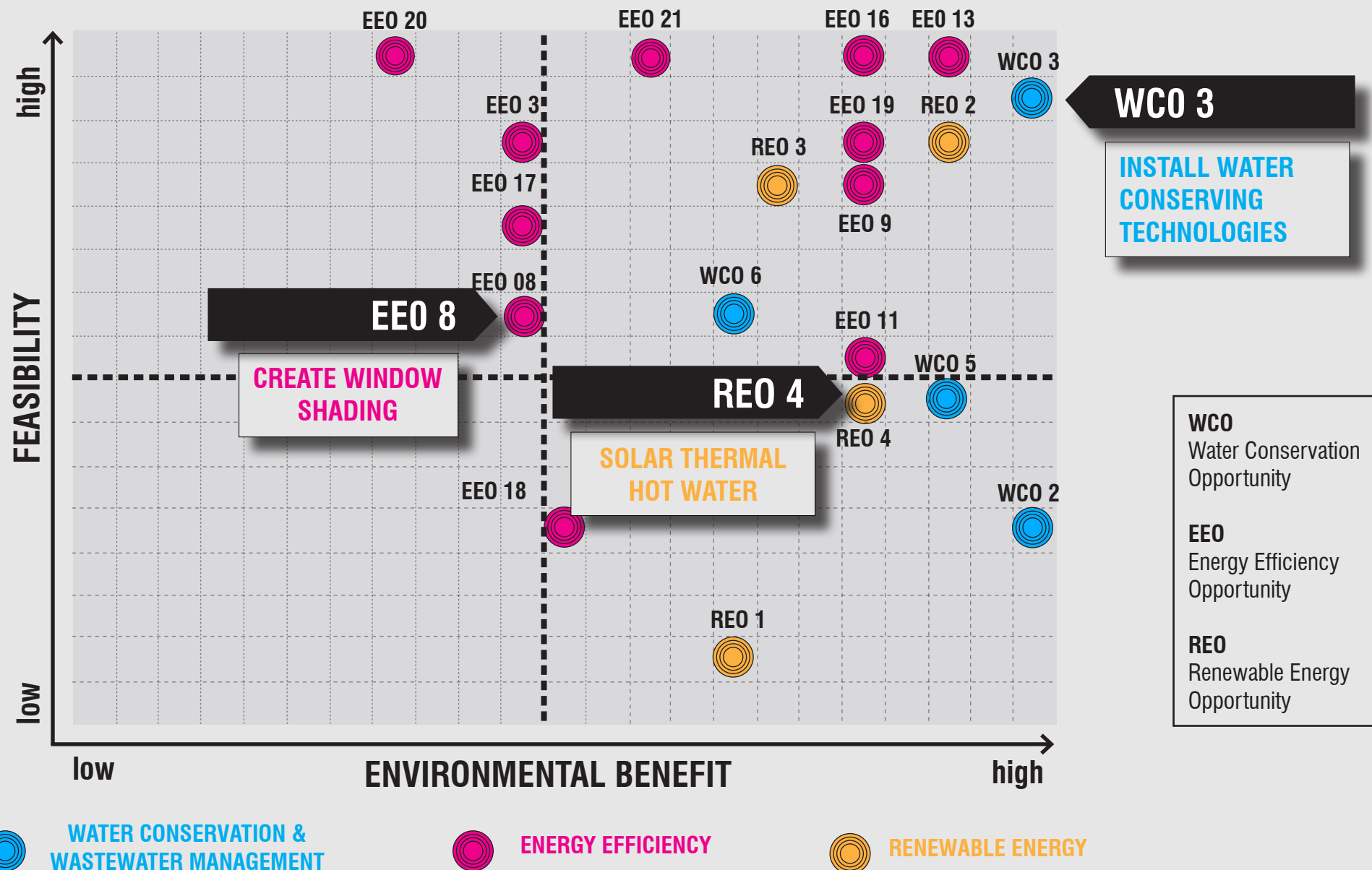
ENVIRONMENTAL BENEFIT

Impact on the ecosystem

ANALYSIS FINDINGS



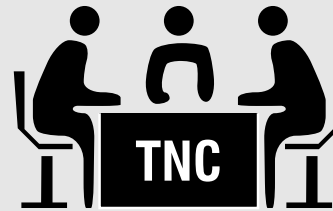
ANALYSIS FINDINGS



CONCLUSION PURPOSE



REPORT



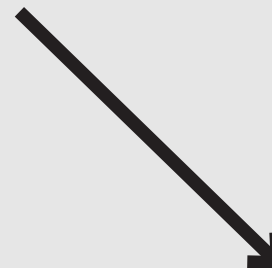
CLIENT

The Nature Conservancy
Mike Laspia
Cynthia Belt



COMMUNITY

Shelter Island
Long Island



CONSULTANTS

Engineers
Contractors
Architects



DONORS

Individuals
Community
Organizations

CONCLUSION SUMMARY

