

# Sustainable, Combined Remedies and Restoration of the Onondaga Lake Shoreline

SYRACUSE, NY



Battelle International Conference on Remediation  
and Management of Contaminated Sediments  
February 12, 2019  
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**Honeywell**



# AGENDA

- History and context
- Goals and objectives
- Site tour

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Major theme: a ***holistic approach*** is vital to combining remedies:

- ***Visibility*** and a ***venue for collaboration*** across all project scope and schedules
- ***Willingness*** to manage scope, schedule, and design within and among consultants, contractors, and various owners
- ***Institutional legacy*** is an important value



## ► Onondaga Lake



4.6 miles long x  
1 mile wide  
Average depth is  
35 feet (maximum  
depth is 63 feet)

Urbanized  
drainage basin of  
285 square miles  
Municipal  
WTP second largest  
water input

Dredging completed  
in 2014; capping  
completed in 2016  
Significant municipal  
upgrades to WTP and  
CSOs ongoing – \$1B+ in  
municipal and remedial  
investments

Habitat restoration  
ongoing – 90 acres of  
wetland restored to date,  
100s acres of benthic  
habitat enhanced, 1000+  
acres subject to  
sustainable remediation  
efforts, ~800,000 plants  
installed to date

At the center of  
Syracuse and  
first nations







TABLE 1  
CHEMICAL CHARACTERISTICS  
OF SOLVAY PROCESS WASTE

Representative Chemical Analysis (from Kulhawy, et al., 1977)

$\text{CaCO}_3$	20%	$\text{NaCl}$	6%
$2 \text{ CaO} \cdot \text{SiO}_2$	17%	$\text{CaCl}_2$	6%
$\text{H}_2\text{O}$ of hydration	12%	$\text{R}_2\text{O}_3$	6%
$\text{Mg}(\text{OH})_2$	10%	$\text{Ca}(\text{OH})_2$	4%
$\text{CaO} \cdot \text{CaCl}_2$	8%	$\text{CaSO}_4$	4%
$\text{SiO}_2$	7%		

Where R = Aluminum, Iron

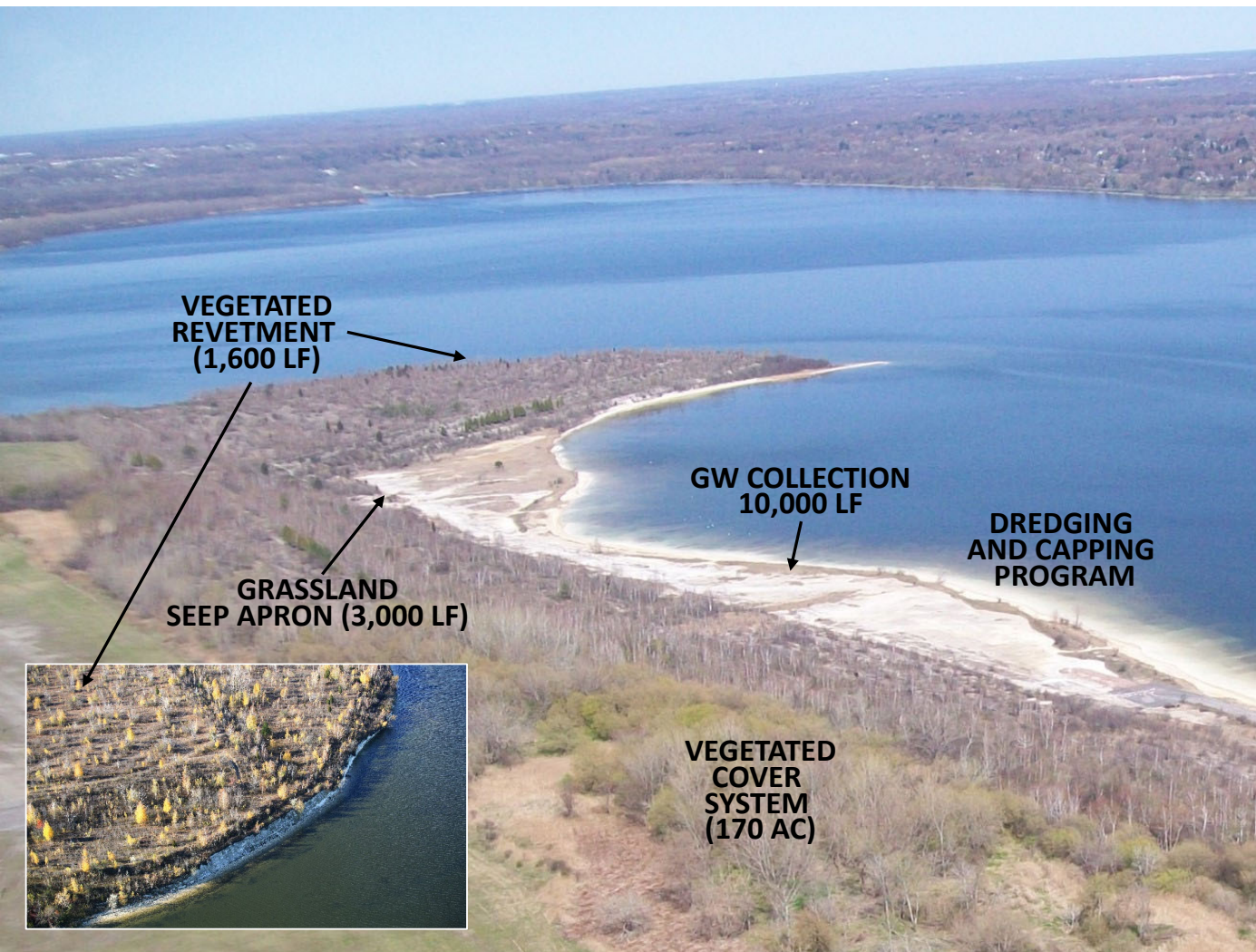
About one ton of Solvay waste was generated for every ton of soda ash product











## WASTEBEDS 1-8 REMEDIAL GOALS AND OBJECTIVES

Control groundwater discharge to Lake and tributaries

Stabilize eroding waste banks

Mitigate direct contact exposure in upland areas

Administrative Consent Order with NYSDEC for closure



GW COLLECTION (7000 LF)  
CULVERT REPAIR (6000 LF)  
SEEP APRONS (3 AC)



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## WASTEBEDS 1-8 ECOLOGICAL GOALS AND OBJECTIVES

Mitigate 10 acres of wetland impacts

Enhance overall conservation and recreation value

Support amphibian reproduction

Dovetail with other site features



## Wastebeds 1-8 Overall Site Plan





► Wastebeds 1-8 Overall Site Plan











## ► Groundwater collection system

Adjacent to wetlands

Groundwater eliminated from wetland functioning (accounted for in wetland design)

Engineered soil profile integrated with wetland design





## ► Perched wetlands

Dovetailing of wetland and seep collection liner systems

Surface water management and timing requirements

“Sterile” topsoil used on seep apron – grassland quality

Construction and planting schedule management – irrigation plan





## ► Connected wetland

Schedule management

Coordinated dredging/grading  
plan and approach

Dredge cut for segmented  
breakwater

Alignment of groundwater  
collection system





Smooth shoreline transition

Dredge cut and final grading of wetland to meet mitigation requirements





## ► Mitigation wetlands

2017, one year post planting of connected wetland; two to three years post planting of perched wetlands

Native grassland on seep apron (background/right)

Vegetated cover system (foreground)



# ► Revetment



Nature-based approach to provide habitat value

Shoreline access road repurposed as in-lake cap material

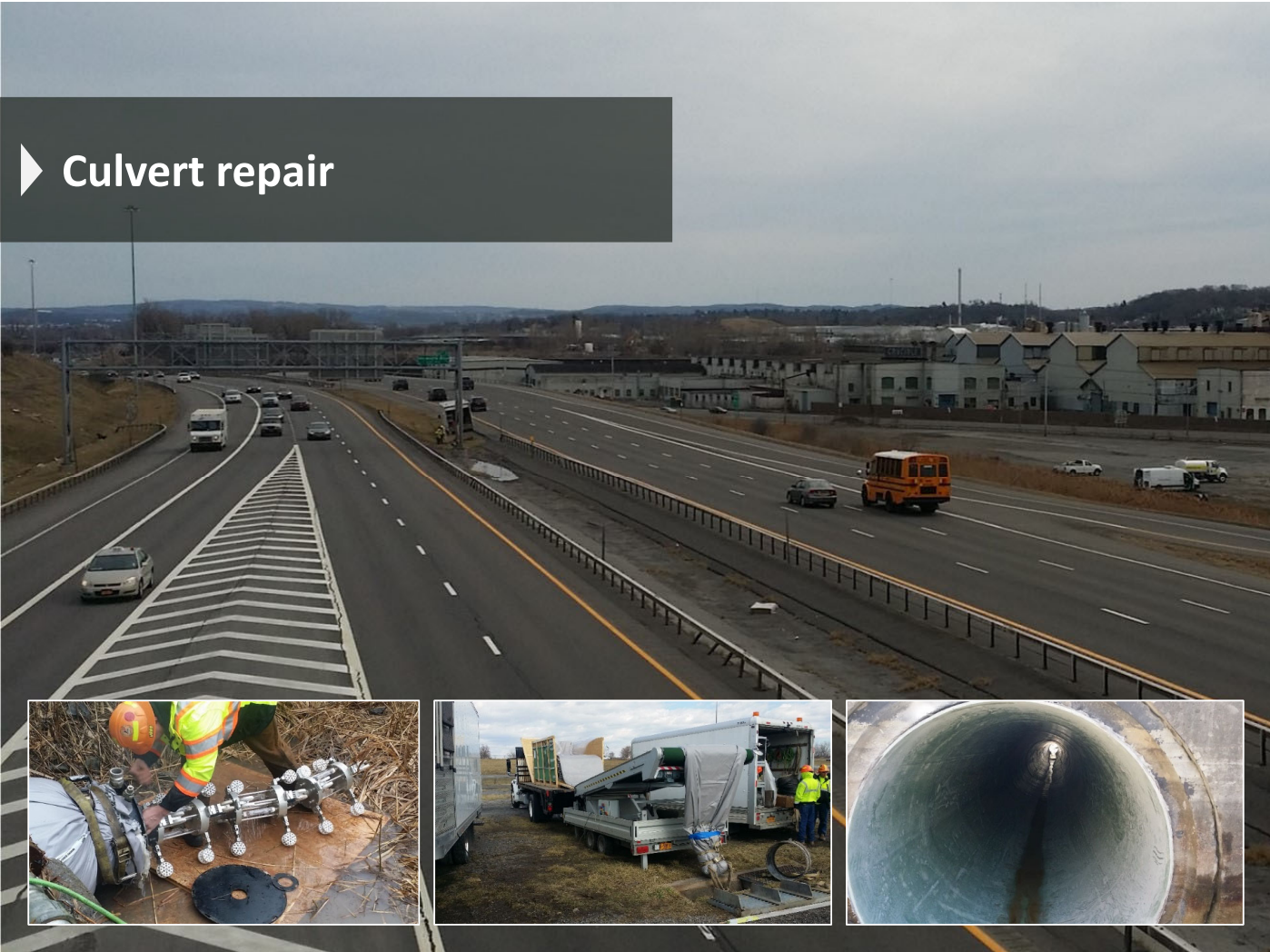
Stinger approach to meet schedule and improve safety





► Western portion of site





# ► Culvert repair



- Sustainable approach
- Schedule constraints
- Safety considerations





► Ditch remediation/seeps mitigation

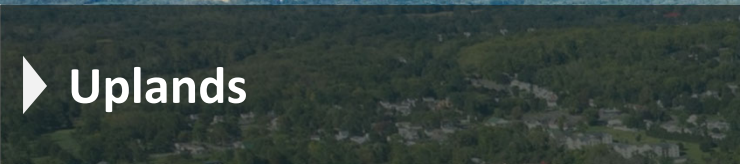
Needed to avoid recontamination of in-lake cover

Storm water management capacity maintained with GW collection below ditch

Final cover consistent with site-wide system







► Uplands





## ► Sustainable cover system

Nature-based approach to provide habitat value

Variable depths to meet remedial vs. recreational requirements throughout the site

Application of locally-sourced compost to provide protection, establish desired vegetation, and suppress invasive species









## CONCLUSIONS AND LESSONS LEARNED

Major theme: a *holistic approach* is vital to combining remedies:

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Questions?

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