

STORMWATER AND GREEN INFRASTRUCTURE INITIATIVES

McHenry County Water Resources Action Plan: Transportation

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ABOUT THE TOLLWAY

Part of a dynamic transportation network

- Connects to regional transit network
- Supports three international airports
- Part of one of the nation's largest interstate systems

Five roadways

294-mile system across 12 counties

Serves more than 1.6 million vehicles a day



MOVE ILLINOIS PROGRAM

15-year, \$14 billion capital program

Taking care of existing system - \$4 billion

- Repair roads, bridges and interchanges

Illinois Route 390, I-490 Tollway - \$3.4 billion

- Provide access to O'Hare International Airport

Central Tri-State Tollway (I-294) - \$4 billion

- Reconstruct 22 miles at heart of the system

Jane Addams Memorial Tollway (I-90) - \$2.5 billion

- Rebuild and widen 62 miles with transit options

I-294/I-57 Interchange - \$719 million

- Connect two major interstates





STORMWATER

WATERSHEDS

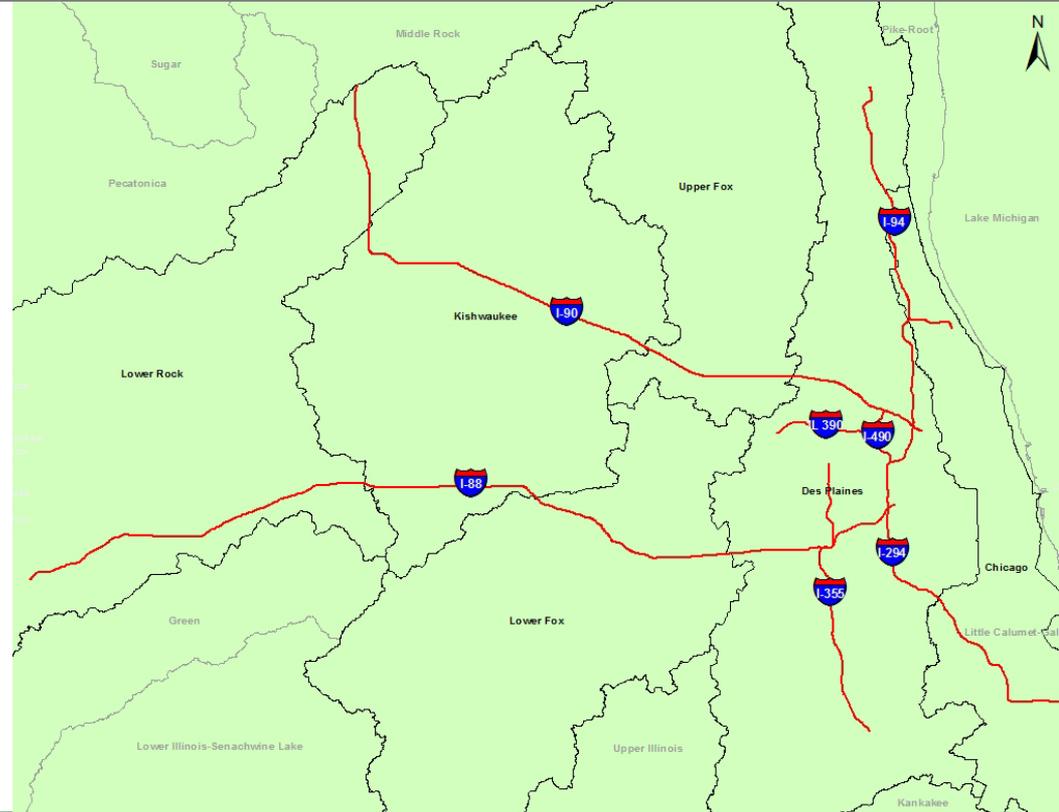
Great Lakes/Calumet River

Des Plaines River

Fox River

Kishwaukee River

Rock River



POLLUTANTS OF CONCERN

Heavy metals

Hydrocarbons

Fuel spills

Total suspended sediment

Chlorides





BIOSWALE PILOT PROJECT

TRI-STATE TOLLWAY (I-294) BIOSWALE PROJECT

Tollway's first large-scale bioswale project

Intergovernmental Agreement with the Forest Preserves of Cook County

10-year maintenance commitment

Nearly two dozen bioswales installed along 17 miles of I-294 in 2010



BIOSWALE DESIGN CRITERIA

Flood control benefits

- Greater infiltration yields reduced surface runoff
- Designed to accommodate a 2-year storm event

Pollutant filtration

- Removes heavy metals, total suspended solids
- Reduces nutrient-loading that may cause excess algae

Attenuation and infiltration

- Temporarily stores stormwater runoff
- Reduces runoff volumes and rates

Generally includes

- Native plants, soil amendments, restricted outlets



BIOSWALE CONCEPT



ILLINOIS STATE GEOLOGIC SURVEY MONITORING PROGRAM

Four monitoring locations for seven years

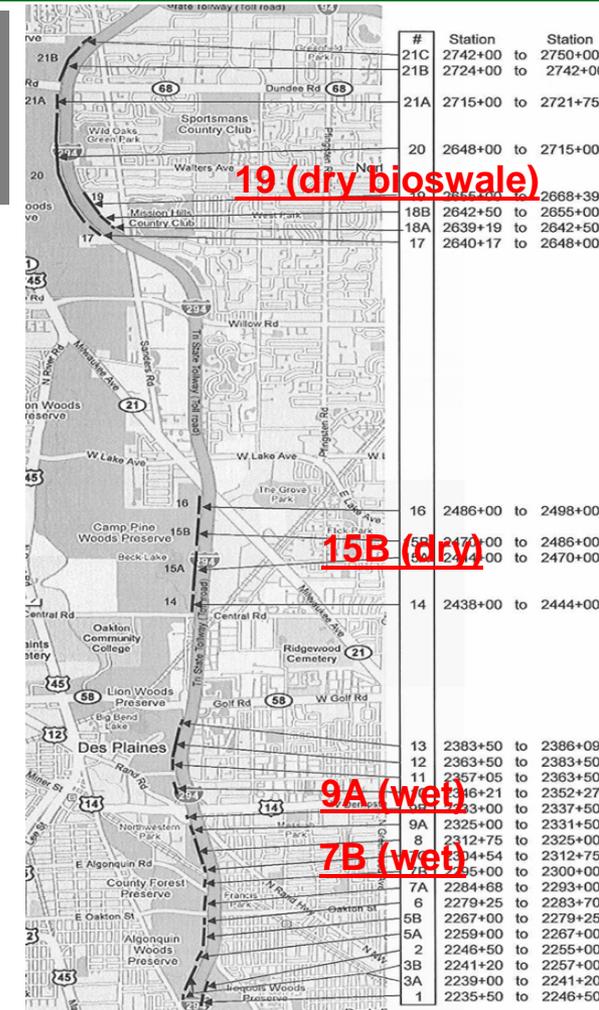
- Total suspended solids
- Total dissolved solids

Dry bioswales

- Infiltrate runoff
- Work as sand filter

Wet bioswales

- Increase stormwater residency time in ROW
- Increase nutrient and organics removal



ISGS MONITORING RESULTS

Discharge quantity

- Notable attenuation in wet bioswales
- Minimal change in dry bioswales

Discharge quality

- 63 percent decrease in TSS
- 42 percent decrease in TDS
- 44 percent decrease in chloride
- 36-81 percent decrease of roadway metals
- Wet and dry vary in performance





MOVE ILLINOIS BMPs



STORMWATER QUALITY BMPs

Bioswales

- Landscaped stormwater conveyances designed to slow, collect, infiltrate and filter stormwater to improve water quality



Detention Basins

- Excavated ponds used for stormwater peak flow reduction, storage and pollutant removal



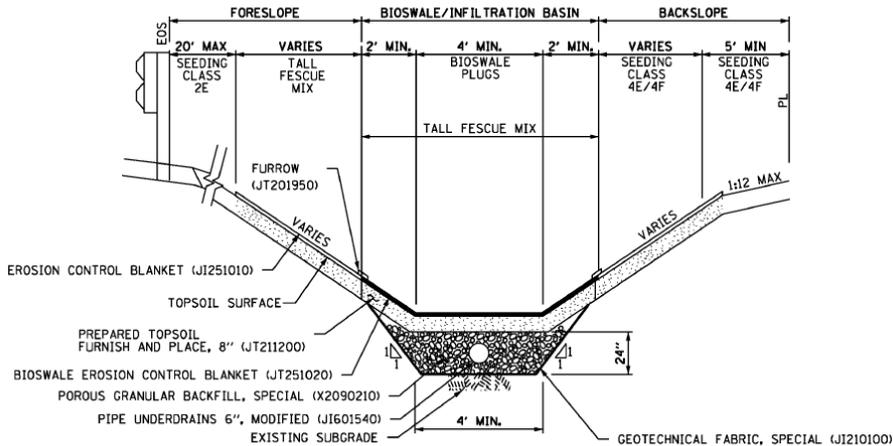
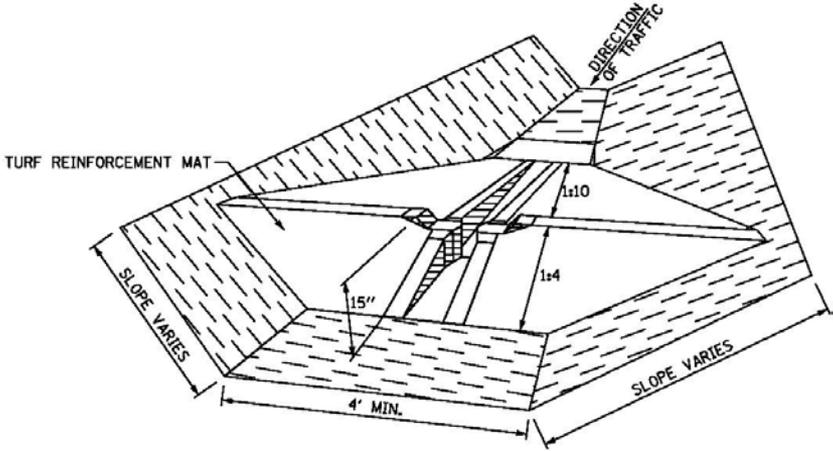
SECTION 404 CWA – PERMIT CONDITIONS

Stormwater quality via volume control

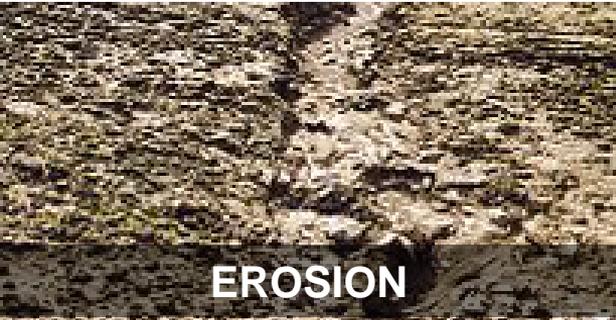
- Jane Addams Memorial Tollway (I-90) Rebuilding and Widening Project
 - 0.75-inch water quality volume
- Elgin O’Hare Western Access Project
 - 1.25-inch water quality volume (by watershed)
 - Additional FAA requirements
- Central Tri-State Tollway (I-294) Project
 - 1.00-inch water quality volume



TYPES OF BIOSWALES ALONG I-90



BIOSWALE COMMON MAINTENANCE ISSUES



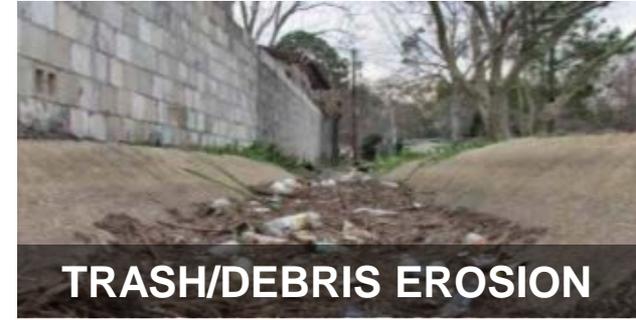
EROSION

- Indicator of poor function
- Sediment build-up
- Rills or ruts on slopes



BARE VEGETATION

- Potential environmental contaminants or abnormal pH
- Disease or pests



TRASH/DEBRIS EROSION

- Restricts flow of water
- Localized flooding and possible erosion, sediment buildup and poor aesthetics

BIOSWALE COMMON MAINTENANCE ISSUES



- Extended periods of standing water due to debris blockage may damage beneficial plants
- Sediment blockage in the underdrain
- Physical damage to ditch due to errant vehicles

- Permit compliance issues
- Outcompete natives during establishment

EVOLUTION OF TOLLWAY BIOSWALES

Initial bioswale
concepts developed
(2008)



2008

2010

2012

2014

2016

2018

2019

I-90 Rebuilding and
Widening Project
begins (2012)

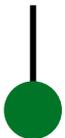


Illinois Route 390
Tollway Project
begins (2013)

Continued advances
in bioswale design
(2019)



Tri-State Tollway (I-294)
Widening is permitted
(2007)



Central Tri-State Tollway
(I-294) Project begins
(2018)





DETENTION BASINS



DETENTION BASINS



- Preferred from a traffic safety and maintenance point of view
- Soil conditions tested for percolation in design
- Successful in removing TSS

- Offer additional water quality benefits
- “First-flush” is captured within the bottom of the basin or within a forebay
- Roadside safety implications
- Better at removing excess nutrients and attenuating chlorides

COMMON MAINTENANCE ISSUES

Plants and vegetation

- Invasive plants can restrict conveyance and damage drainage structures and pipes

Erosion

- Sedimentation can cause loss of capacity and degrade the quality of discharge

Clogged outlets

- Vegetation, trash/debris, critters, etc.
- Restricts proper drainage
- Kills desirable vegetation



COMMON INVASIVE WEED SPECIES

- Cut-leaf Teasel – *Dipsacus laciniatus*
- Broadleaf Cattail – *Typha latifolia*
- Common Reed - *Phragmites australis*
- Canary Grass – *Phalaris arundinacea*
- Loosestrife – *Lythrum salicaria*
- Clover Species – *Melilotus spp.*
- Ragweed – *Ambrosia trifida*
- Ragweed – *Ambrosia trifida*
- Thistle



LESSONS LEARNED

Drainage engineers need to consider the end use

Construction timing - consider all phases necessary for project completion

Treatment without infiltration

Vegetation establishment is key



A photograph of a stream flowing through a construction site. The banks are covered with orange erosion control blankets. The water is clear and flows over rocks. The background shows green vegetation.

CHLORIDE OFFSET PROGRAM AND OPERATIONAL BMPs

WATER QUALITY REGULATIONS

General Use Water Quality Standard for chlorides

- Not to exceed 500 mg/L (~1 tsp/5 gal)

Impaired Waters

- Waters that are too polluted or otherwise degraded to meet water quality standards

Total Maximum Daily Loads

- Pollution budget that includes a calculation of the maximum amount of a pollutant that can occur in a waterbody and allocates the necessary reductions to one or more pollutant sources



MOVE ILLINOIS PROGRAM

Chloride Reductions and Offsets

Elgin O'Hare Western Access Project

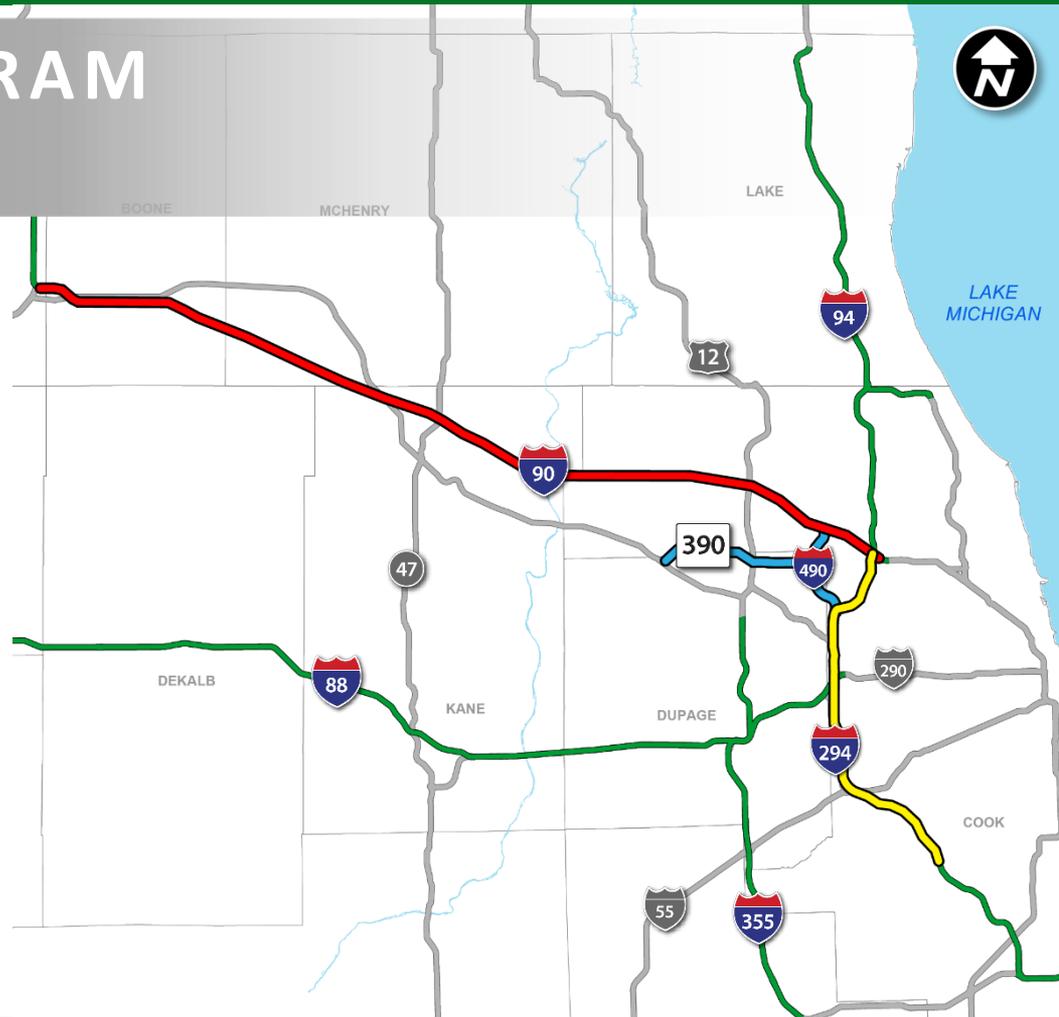
- 4,860 tons per year

Central Tri-State Tollway (I-294)

- 1,423 tons per year

Jane Addams Memorial Tollway (I-90)

- 1,249 tons per year



ELGIN O'HARE WESTERN ACCESS PROJECT AND THE DUPAGE RIVER SALT CREEK WORKGROUP (DRSCW)

New Tollway facilities

- 17 miles of new roads
- 15 new or improved interchanges

Chloride TMDLs (2004)

- Salt Creek
- West Branch DuPage River

DRSCW

- Identified chlorides as priority impairment
- Has worked to lower chlorides associated with winter deicing operations since before 2007



SECTION 401 WATER QUALITY CERTIFICATION

Salt application summary for the Elgin O'Hare Western Access Project

- a. Lane miles include arterials
- b. Considers two different salt application rates depending on the roadway class:
 - 1. Arterial/collector roads are loaded at 14 ton/lane mile/year.
 - 2. Freeways are loaded at 39.7 ton/lane mile/ year

	Lane miles (a)	Salt Applied (tons/year) (b)	Increase from Existing Condition (tons/year)
Existing (Baseline) Condition	159	3,959	N/A
Illinois Route 390 Tollway, I-490 Tollway	264	7,847	3,888
Net Increase, plus 25 percent margin of safety			4,860

ANTI-DEGRADATION AND IMPAIRED WATERS

Two steps to reach “no net increase”

1. Tollway winter operations review

- 39.7 ton/lane mile/year 2012, 10-year average
- 31.8 ton/lane mile/year, 20 percent target reduction

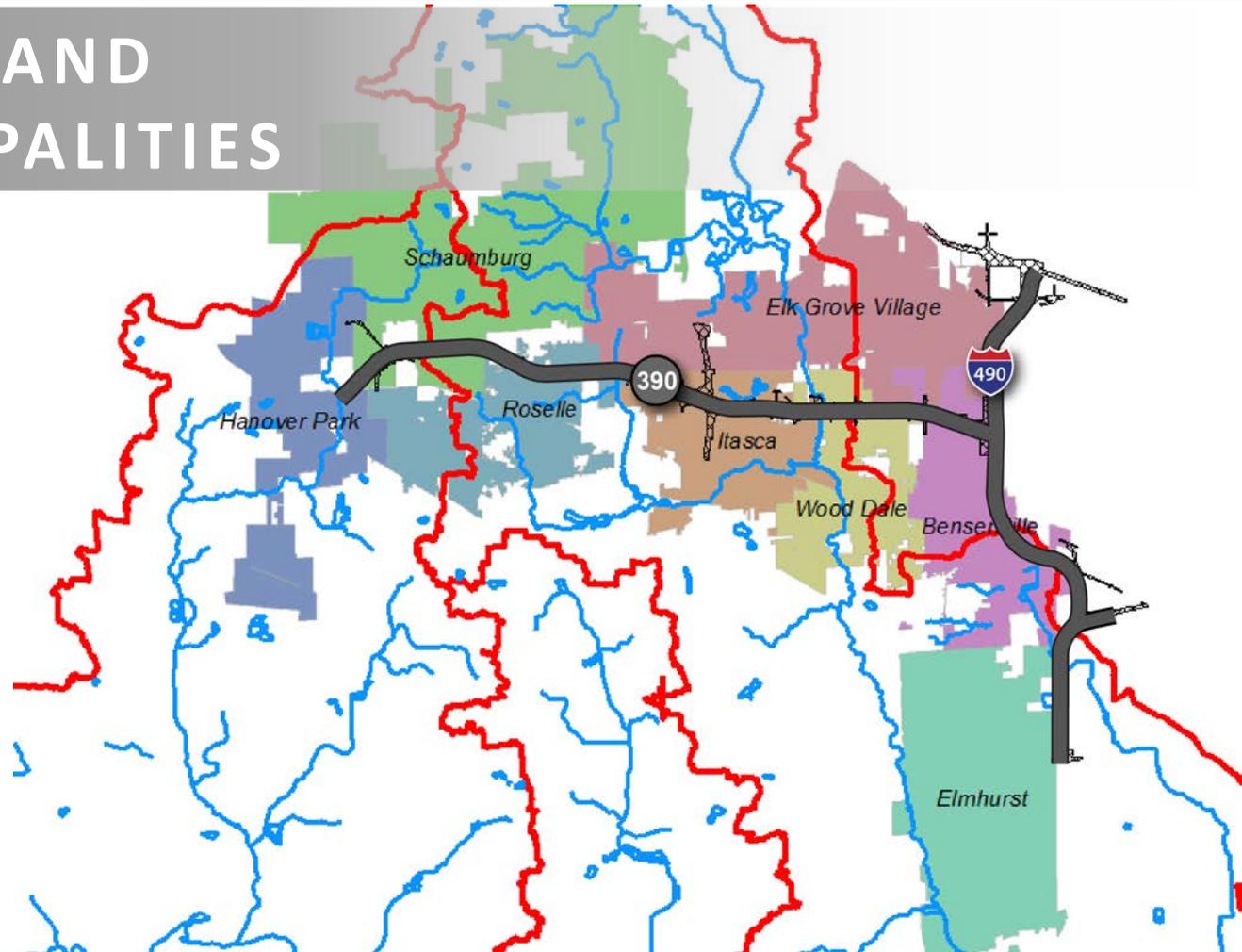
2. Remaining increase in projected loadings would be offset by reductions in loadings from communities neighboring Elgin O’Hare Western Access Project (Tier 1 communities)



PROJECT AREA AND TIER 1 MUNICIPALITIES

LEGEND

-  EOWA
-  Water Ways
-  DRSCW Watershed Boundary



ACTIVITIES – SALT REDUCTION STEPS

1. Driver training
2. Salt spreader calibration
3. Develop appropriate application rates
4. Pre-wet, deicer
5. Equipment updates
 - On-board pre-wet
 - Computer controls
6. Coordinate salt application during plowing
7. Control salt spread width
8. Prioritize road system
9. Anti-ice



TOLLWAY OPERATIONAL BMPs

Rock salt

- Application rates of 100, 200, 300 and 500 tons per lane mile

Liquids

- Two mobile brine makers for the system

Pre-wetting

- Treat all salt at the spinner
- Average 10 gallons of brine per ton of rock salt

Anti-icing

- Currently being tested at locations throughout the Tollway system



EVALUATION

Agency winter operations baseline

- 22.2 ton/lane mile/year 2018, 10-year average

Training and implementation

- Memorandum of Understanding with DRSCW
- Two active Offset Intergovernmental Agreement
- Watershed workgroup and chloride committee participation

In-stream monitoring

- Illinois State Geologic Survey actively monitoring streams throughout the Tollway system



A yellow Deere 350G excavator is shown in the process of loading a blue dump truck with soil. The excavator's arm is extended, and its bucket is tilted, pouring a large amount of dark brown earth into the truck's bed. The truck is parked on a gravel surface, and its rear is facing the camera. The background features a construction site with various equipment, trees, and a clear sky. A semi-transparent dark grey banner is overlaid across the middle of the image, containing the title text.

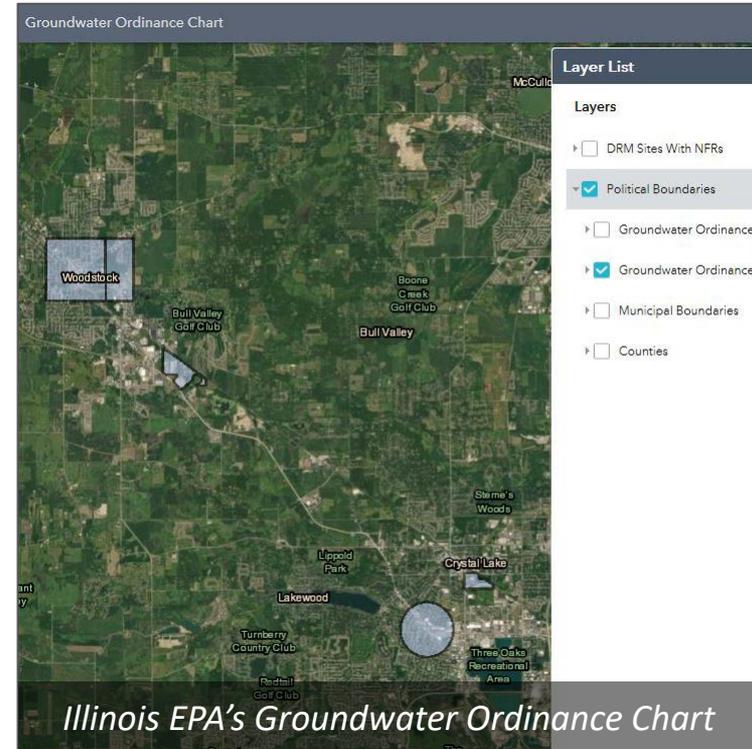
MATERIALS REUSE AND GROUNDWATER

SOIL REUSE GUIDELINES

The Tollway utilizes TACO Tier 1 remediation objectives for:

- Industrial/commercial properties
- Use of engineered barriers
- Groundwater use restrictions where soils will be placed

	Above SCGW Class 1 SROs	Below SCGW Class 1 SROs
Above Industrial Commercial SROs	Can be reused with an engineered barrier and IEPA approved groundwater ordinance	Can be reused with an engineered barrier
Below Industrial Commercial SROs	Can be reused in municipalities with IEPA approved groundwater ordinance	Can be reused



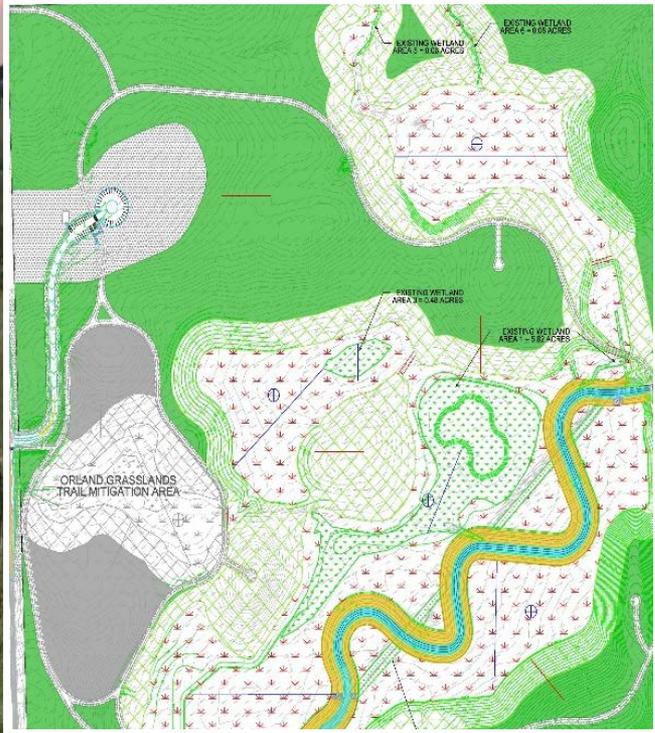


WETLAND MITIGATION

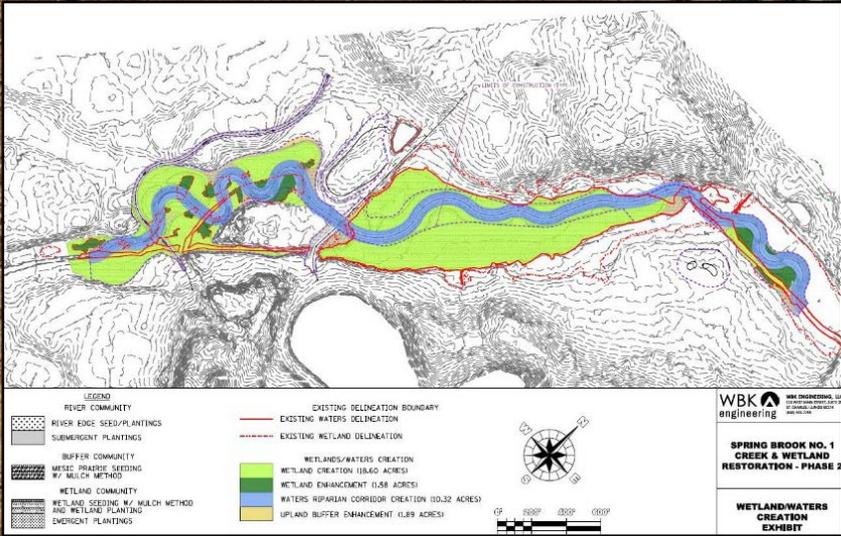
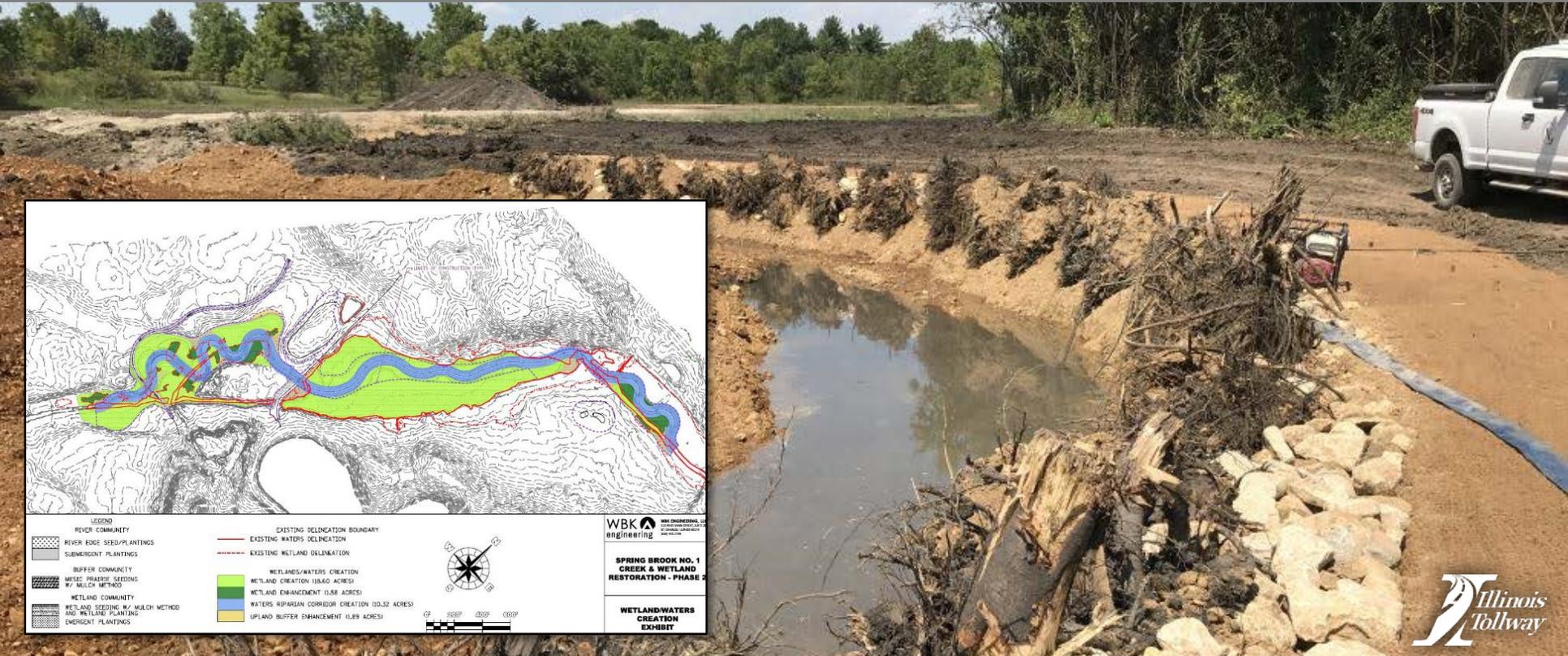
PINE DUNES: ELGIN O'HARE WESTERN ACCESS (EOWA) MITIGATION



ORLAND GRASSLANDS SOUTH ADDITION: JANE ADDAMS MEMORIAL TOLLWAY (I-90) MITIGATION



SPRING BROOK CREEK: EOWA AND CENTRAL TRI-STATE TOLLWAY (I-294) MITIGATION



The image is a composite of two photographs. The top photograph shows a highway interchange with a green roof on the embankment. A large metal sign structure stands on the roof. The bottom photograph shows a large tree nursery with rows of young trees in a field. A small pond is visible in the bottom right corner of the nursery area.

ILLINOIS TOLLWAY TREES INITIATIVE SYSTEMWIDE LANDSCAPE MASTER PLAN

SYSTEMWIDE LANDSCAPE MASTER PLAN

PROGRAM CONCEPT

Goal: Establish and maintain healthy tree communities along the 294-mile Illinois Tollway system

Objectives:

- Identification of suitable locations for planting trees along the Tollway system
- Update Tollway tree/shrub planting standards and specifications based on recommendations provided by The Morton Arboretum
- Develop experimental approaches to planting that could test new ideas for tree installation and care in stressful roadway conditions
- Develop extended-term maintenance programs to better ensure the long-term viability of future planting efforts
- Install 58,000 trees (1,000 trees for every year the Tollway has been in existence) with the intent of increasing regional tree canopy coverage
- Identification of viable living snow fence locations based on Tollway Maintenance input
- Maintain consistency with roadway design, maintenance and operational policies and guidelines
- Evaluation of available plant materials and preferred tree species through collaboration with The Morton Arboretum

SYSTEMWIDE LANDSCAPE MASTER PLAN





POLLINATOR PROGRAM

CAPITAL PROGRAM AND MAINTENANCE EFFORTS





MORE INFORMATION

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THANK YOU