

## SOLID WASTE MANAGEMENT PLAN: POST FRESH KILLS LANDFILL

**Assistant Commissioner Phillip Gleason, PE**  
Solid Waste Management Engineering

Game-Changing Initiatives for Solid Waste  
The Cooper Union  
June 10, 2015

# TOPICS + SPEAKERS

## **Fresh Kills Closure and Stewardship**

Phillip Gleason, PE

Assistant Commissioner, Solid Waste Management

## **Solid Waste Management Plan Overview**

Sarah Dolinar

Director of Environmental Review, Solid Waste Management

## **Long-Term Export: Here and Now**

Thomas Killeen

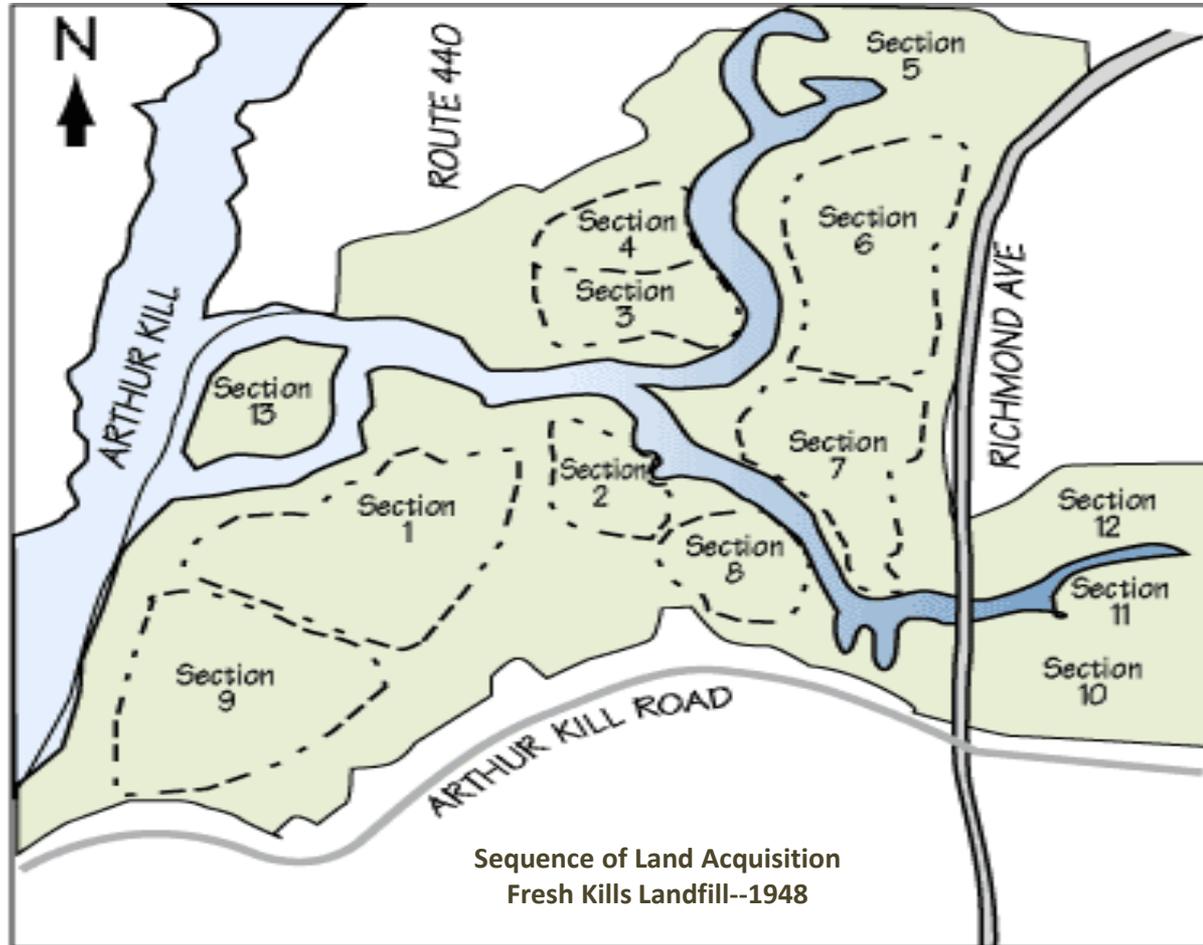
Director, Solid Waste Management

# FRESH KILLS LANDFILL

- Located on Staten Island
- Started Operations in 1948
- 3,000 acres
- Grew to Six MSW Units
- Barge- and Truck-Fed Operations



# FRESH KILLS LANDFILL – 1948





BROOK

26th St

14th St

HOUSTON

CANAL

# BACKGROUND

## **1976 – Resource Conservation and Recovery Act**

- Differentiated Solid Waste Landfills from Open Dumps
- Established regulatory timeline to upgrade Open Dumps to Solid Waste Landfills – or required closure
- Transferred oversight to approved State programs, such as established under New York State's Part 360 regulations

## **1979 – Fresh Kills Landfill Part 360 Application Submitted NYSDEC**

- Permit Application deemed administratively incomplete

# **BACKGROUND** CONTINUED

## **1980 – Order on Consent with NYSDEC**

- Authorized interim operation of the landfill
- Established mitigation schedule to upgrade landfill
- Established schedule to submit permit applications to NYSDEC

## **1985 – Order on Consent with NYSDEC**

- Removed Richmond Truckfill and Brookfield Avenue Landfill MSW Units from Fresh Kills Landfill
- Authorized interim operation
- Provided schedule to complete permit applications to NYSDEC

# **BACKGROUND** CONTINUED

## **1990 – Order on Consent**

- Authorized interim operation
- Authorized concurrent investigations, designs, regulatory reviews, regulatory authorizations and construction to upgrade the landfill to modern standards
- Established milestone dates to progressively develop and submit an administratively complete Part 360 Permit Application for continued operation

# 1990 STATUS

- 2,000 acres
- Four Operating Units
- 24 hours per day
- 6 days per week
- 17,000 tons per day
- 90% NYC's Residential Waste

# 1996 STATUS

- Approved Closure Designs Sections 2 & 8 and 3 & 4  
Construction: Approximately 80% complete
- Partial Leachate Collection System: Operating
- Leachate Treatment Plant: Constructed and Operating
- Landfill Gas Migration Control System: Constructed
- Landfill Gas Collection and Purification System: Operating

## 1996 STATUS CONTINUED

- Sequential Fill Plans, Final Grading Plans and Closure Plans for Sections 1 & 9 and 6 & 7
- Operation, Maintenance and Contingency Plans established
- Environmental Monitoring Systems established
- SPDES Permit for stormwater and Leachate Discharges
- Preparing for Landfill Gas Emissions Regulation

# 1996 STATUS CONTINUED

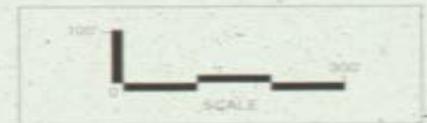
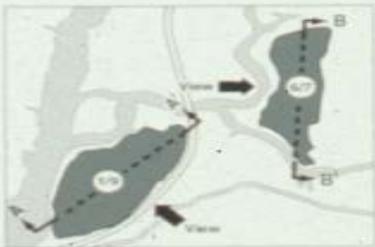
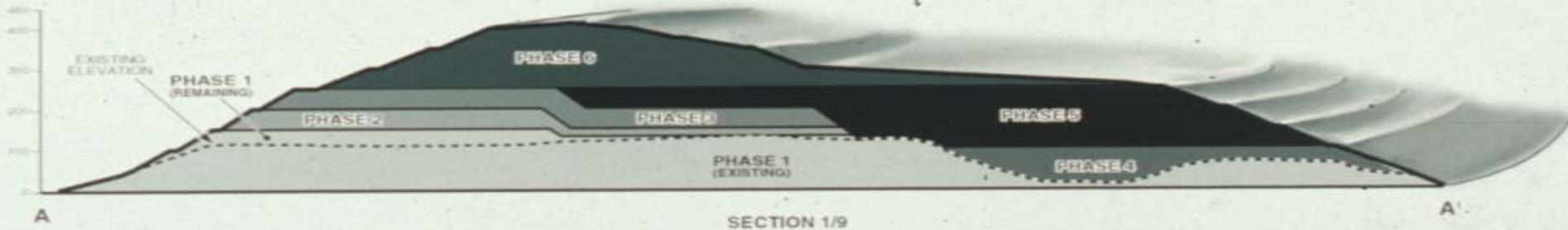
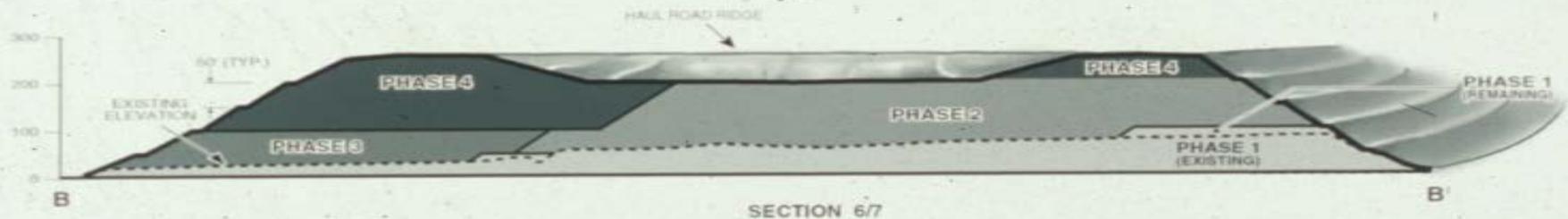
## Two Operating Units:                      Sections 1&9    Sections 6&7

- Maximum Design Elevation                      412'                      258'
- Estimated Remaining Capacity                      >100,000,000 CY
- At 13,500 tons per day, the Fresh Kills Landfill could provide NYC's Residential Waste Disposal need for >20 years

# 1997 STATUS



# 1996 SEQUENTIAL FILL + FINAL GRADING PLANS



NOTE: VERTICAL SCALE EXAGGERATED BY 30% COMPARED TO HORIZONTAL SCALE FOR ILLUSTRATIVE PURPOSES.

**FIGURE ES-5**  
SECTIONS 1/9 & 6/7 FILL PROGRESSION  
SCHEMATIC CROSS-SECTION

# 1996 + 2001 STATUS

- **March 15, 1996:** Part 360 Permit Application Submitted  
13,500 Tons Per Day – all of NYC's Residential Waste Stream
- **May 15, 1996:** Application Administratively Complete
- **May 28, 1996:** Mayor Giuliani and Governor Pataki announce  
Fresh Kills will close by January 1, 2002
- **March 22, 2001:** Last barge of garbage arrives at Fresh Kills

# LAST BARGE TO FRESH KILLS



## 2001 + 2002 STATUS

- **September 11, 2001:** Fresh Kills re-opens to support investigation, recovery and management of wreckage from the World Trade Center
- **July 15, 2002:** WTC operations at Fresh Kills concluded

# FRESH KILLS LANDFILL

- 2006 Solid Waste Management Plan?
- Green?
- Sustainable?

# 2006 SOLID WASTE MANAGEMENT PLAN

- Resource Conservation and Recovery Act (as amended in 1992)
- Subtitle D, Part 258
- Subpart G – Financial Assurance (effective April 1997):
  - Establishes guaranteed funding mechanism for closure, corrective measures and post closure care
  - Avoids Orphaned Sites

# LEGACY PROJECT – 2006 COST ESTIMATES

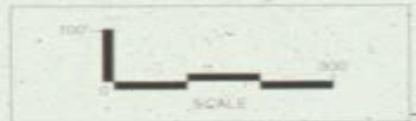
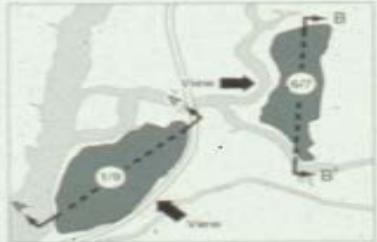
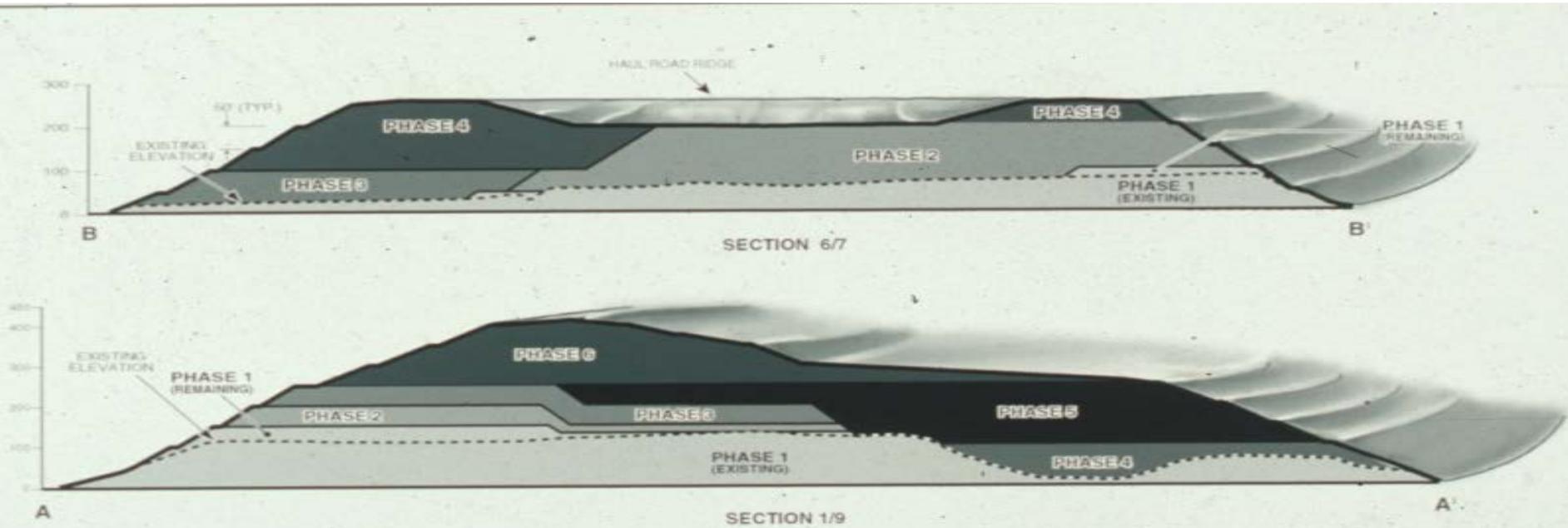
- Closure >\$ 600,000,000
- Post-Closure Care >\$ 1,000,000,000
- End-Use Development >\$ 400,000,000

# GREEN + SUSTAINABLE: CLOSURE SYSTEMS

- Grading
- Final Cover
- Stormwater and Drainage

# GREEN + SUSTAINABLE: CLOSURE SYSTEMS GRADING

1996 Sequential Fill and Final Grading Plans



NOTE: VERTICAL SCALE EXAGGERATED BY 20% COMPARED TO HORIZONTAL SCALE FOR ILLUSTRATIVE PURPOSES.

**FIGURE ES-5**  
SECTIONS 1/9 & 6/7 FILL PROGRESSION:  
SCHEMATIC CROSS-SECTION

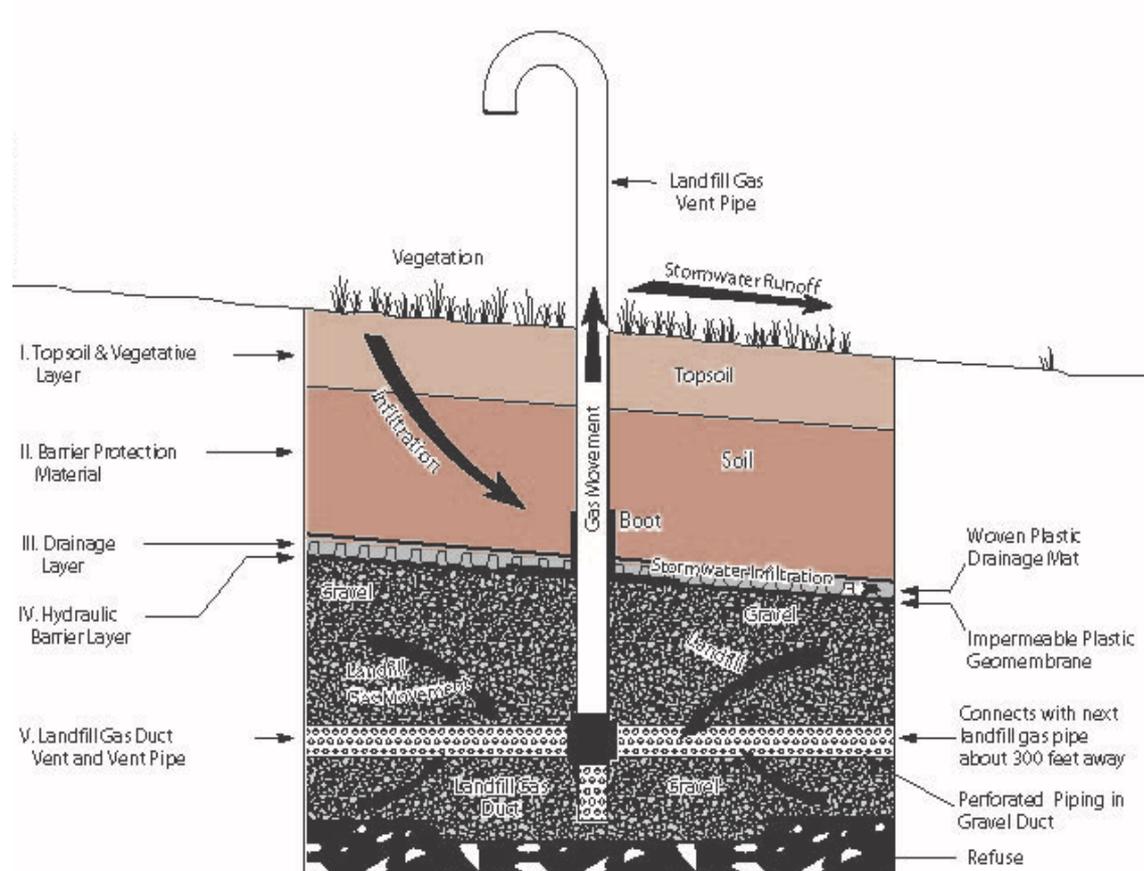
# GREEN + SUSTAINABLE: CLOSURE SYSTEMS *GRADING*

- More than 10,000,000 cubic yards of fill needed to establish minimum regulatory grades.
- Sources of recycled materials:
  - Inter-Agency Cover Program
  - Processed Dredge Material
  - Concrete Crushing and Screening Facility
  - Asphalt millings
  - Mayor’s Office of Environmental Remediation - “Soil Bank”

# GREEN + SUSTAINABLE: CLOSURE SYSTEMS

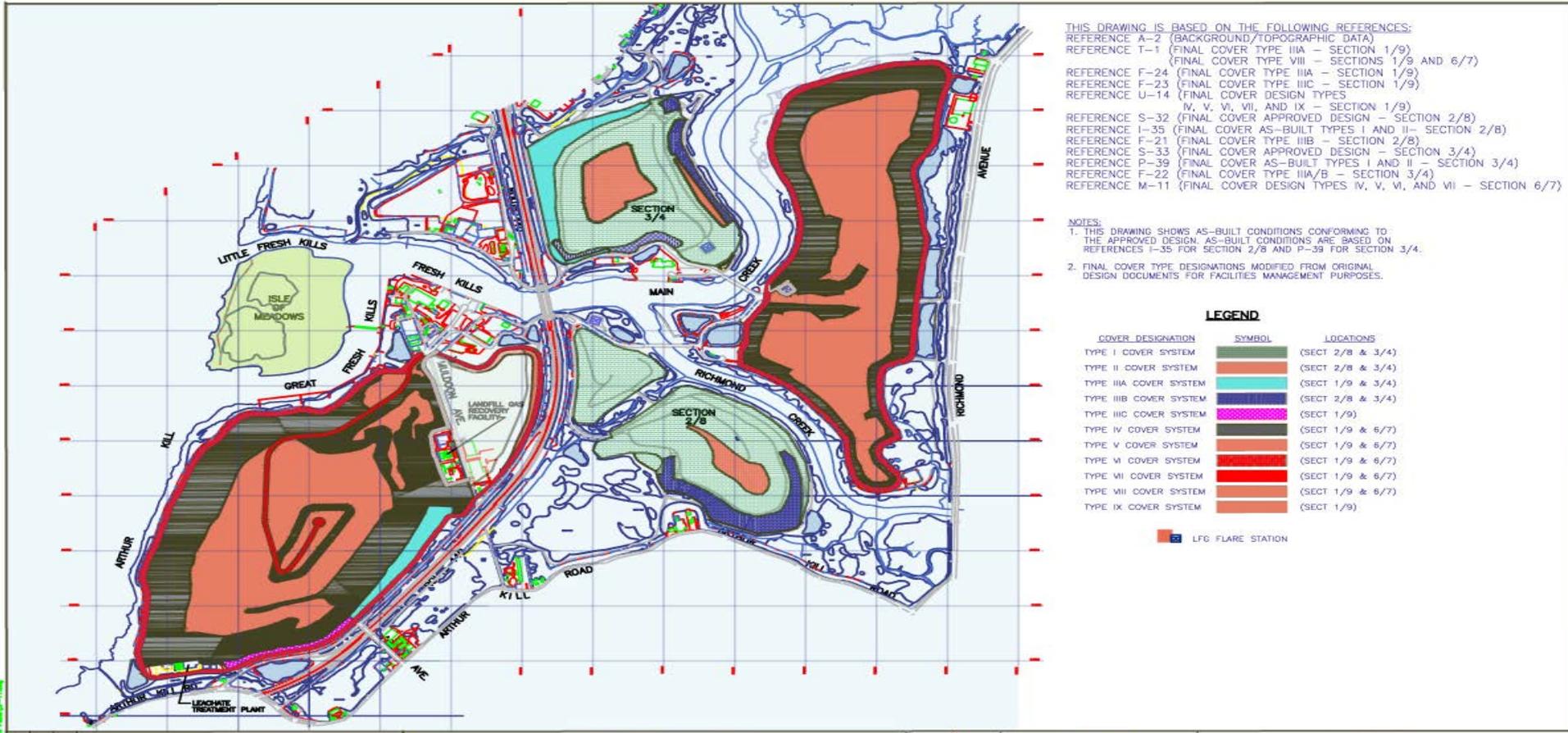
## FINAL COVER

### Typical Final Cover Cross-Section



# GREEN + SUSTAINABLE: CLOSURE SYSTEMS FINAL COVER

## Final Cover Types



FRESH KILLS LANDFILL  
 STATEN ISLAND, NEW YORK  
 FINAL CLOSURE PLANS



WESTON SOLUTIONS INC.  
 100 WEST 30TH STREET  
 NEW YORK, NY 10018  
 CITY OF NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
 605 WEST 125TH STREET  
 NEW YORK, NY 10032

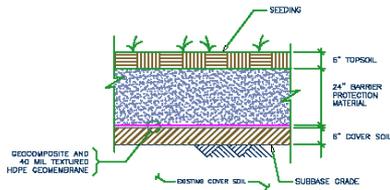
**SITING INDEX OF FINAL COVER TYPES - PLAN**

DATE: 05/09  
 SCALE: AS SHOWN  
 SHEET NO: 0  
 TOTAL SHEETS: 1

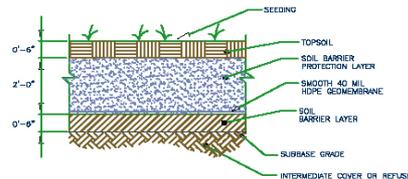
# GREEN + SUSTAINABLE: CLOSURE SYSTEMS

## FINAL COVER

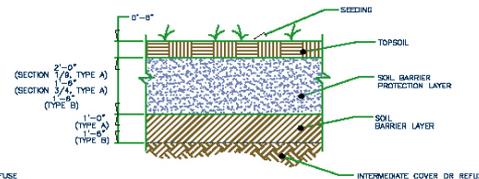
### Final Cover Types



**FINAL COVER SECTION - TYPE I**  
(SLOPES GREATER THAN 10%)  
SCALE: 1/2"=1'-0"



**FINAL COVER SECTION - TYPE II**  
(SLOPES LESS THAN OR EQUAL TO 10%)  
NO SCALE

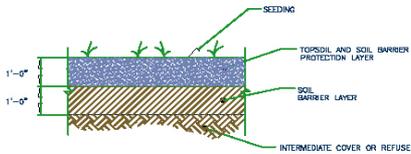


**FINAL COVER SECTION - TYPE IIIA/B**  
(LIMITED PERIMETER SLOPES)  
SCALE: 1/2"=1'-0"

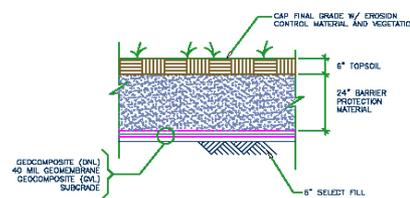
**THIS DRAWING IS BASED ON THE FOLLOWING REFERENCES:**  
REFERENCES S-32, S-33 (FINAL DESIGN COVER TYPES I AND II)  
REFERENCES F-21, F-22, F-23, F-24 (FINAL DESIGN COVER TYPES IIIA, IIIB AND IIIC)  
REFERENCES I-35, P-39 (AS-BUILT COVER TYPES I, II and IIIA/B)  
REFERENCE M-11 (FINAL DESIGN COVER TYPES IV, V, VI, VII)  
REFERENCE T-1 (FINAL DESIGN COVER TYPE VIII)  
REFERENCE U-14 (FINAL DESIGN COVER TYPE IX)

**NOTES:**

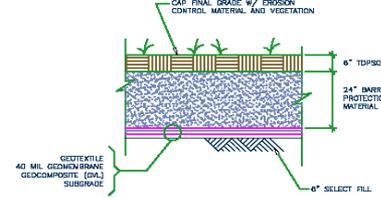
1. THIS DRAWING SHOWS AS-BUILT CONDITIONS CONFORMING TO THE APPROVED DESIGN. AS-BUILT CONDITIONS ARE BASED ON REFERENCES I-35 FOR SECTION 2/8 AND P-39 FOR SECTION 3/4.
2. FINAL COVER TYPE DESIGNATIONS MODIFIED FROM ORIGINAL DESIGN DOCUMENTS FOR FACILITIES MANAGEMENT PURPOSES.



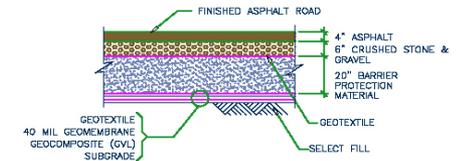
**FINAL COVER SECTION - TYPE IIIC**  
(LIMITED PERIMETER SLOPES)  
SCALE: 1/2"=1'-0"



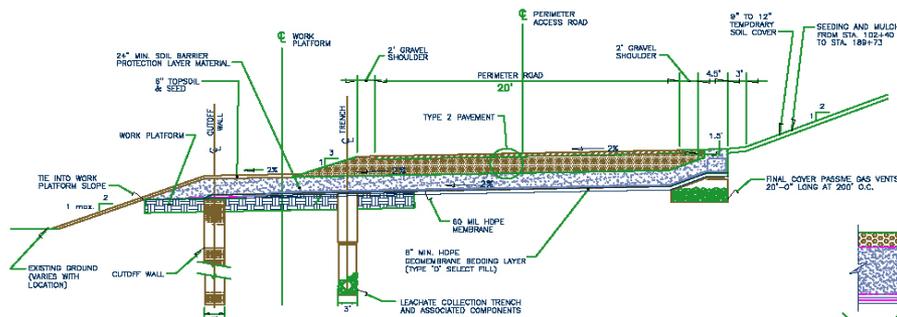
**FINAL COVER SECTION - TYPE IV**  
(SLOPES GREATER THAN 15%)  
SCALE: 1/2"=1'-0"



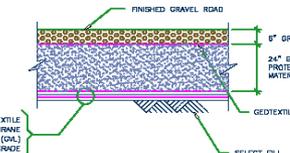
**FINAL COVER SECTION - TYPE V**  
(SLOPES LESS THAN OR EQUAL TO 15%)  
SCALE: 1/2"=1'-0"



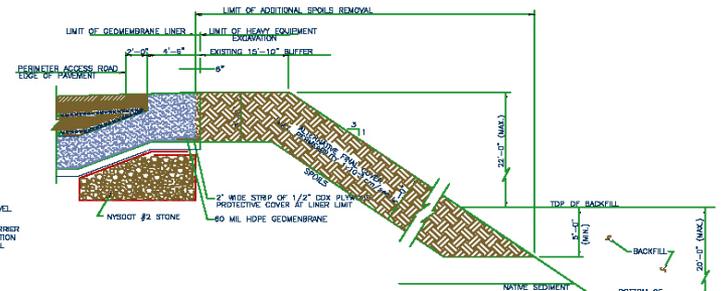
**FINAL COVER SECTION - TYPE VI**  
(ASPHALT ROAD)  
NO SCALE



**FINAL COVER SECTION - TYPE VII**  
(AT LEACHATE COLLECTION/CONTAINMENT SYSTEM SERVICE ROAD)  
NO SCALE



**FINAL COVER SECTION - TYPE VII**  
(GRAVEL ROAD)  
NO SCALE



**FINAL COVER SECTION - TYPE IX**  
(PERIMETER OF RECLAMATION AREA)  
NO SCALE

# **GREEN + SUSTAINABLE: CLOSURE SYSTEMS** ***FINAL COVER***

## **Final Cover Construction**



# **GREEN + SUSTAINABLE: CLOSURE SYSTEMS**

## ***FINAL COVER***

### **Final Cover Construction**



# **GREEN + SUSTAINABLE: CLOSURE SYSTEMS**

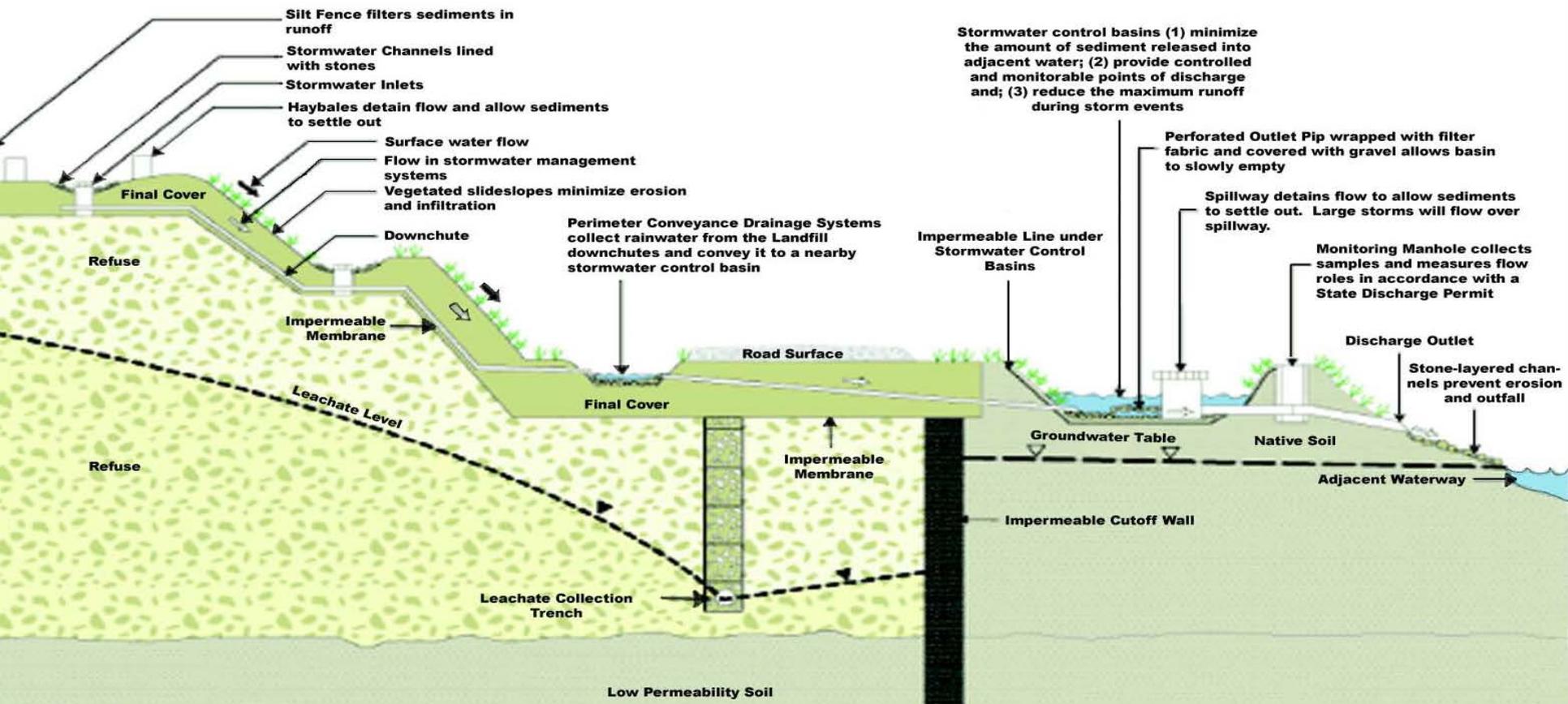
## ***STORMWATER AND DRAINAGE***

- 100-year storm event
- Sheet flow and open channel flow
- Gabions and rip-rap
- Integrated with final cover drainage layer

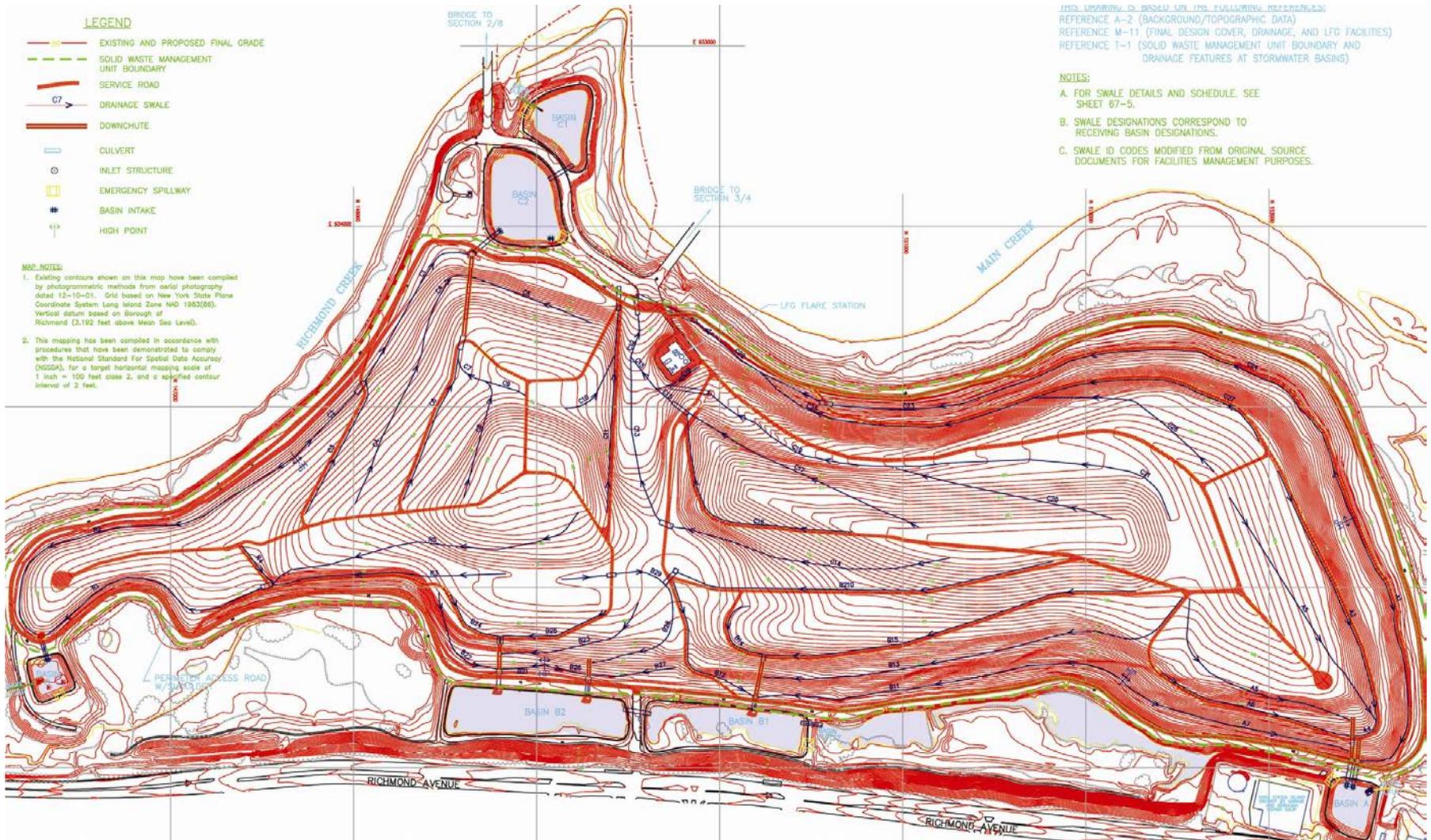
# GREEN + SUSTAINABLE: CLOSURE SYSTEMS

## STORMWATER AND DRAINAGE

### Stormwater and Drainage Systems



# GREEN + SUSTAINABLE: CLOSURE SYSTEMS STORMWATER AND DRAINAGE





## Gabions for Stormwater Run-off



# Drainage Channels and Downchute



# GREEN + SUSTAINABLE: POST CLOSURE CARE

- Overview – Part 360 Regulations
- Landfill Gas Control
- Leachate Control
- Environmental Monitoring

# GREEN + SUSTAINABLE: POST CLOSURE CARE OVERVIEW – PART 360

- Must take place over a minimum of 30 years
- Associated post-closure care cost estimate must include total cost of conducting post-closure care
- Landfills must calculate post-closure care costs estimate based on a rolling 30-year period
- 30 year post-closure period remains in effect until it is demonstrated to NYSDEC that the landfill no longer poses a threat to human health or the environment

# GREEN + SUSTAINABLE: POST CLOSURE CARE *OVERVIEW – PART 360* CONTINUED

- Fresh Kills Landfill Post-Closure Care Estimate:  
> \$1,000,000,000
- More than 60% of estimate is associated with Capital Reinvestment to Rebuild Environmental Control Systems
- Almost 40% is associated with the operation and maintenance of environmental control systems that are underutilized

# GREEN + SUSTAINABLE: POST CLOSURE CARE *OVERVIEW – PART 360* CONTINUED

- Leachate Treatment Plant \$ 1.4 million per year
- Leachate Collection Systems \$ 2.5 million per year
- Landfill Gas Emissions Controls \$ 3.2 million per year
- Final Cover and Drainage \$ 12.6 million per year

# GREEN + SUSTAINABLE: POST CLOSURE CARE

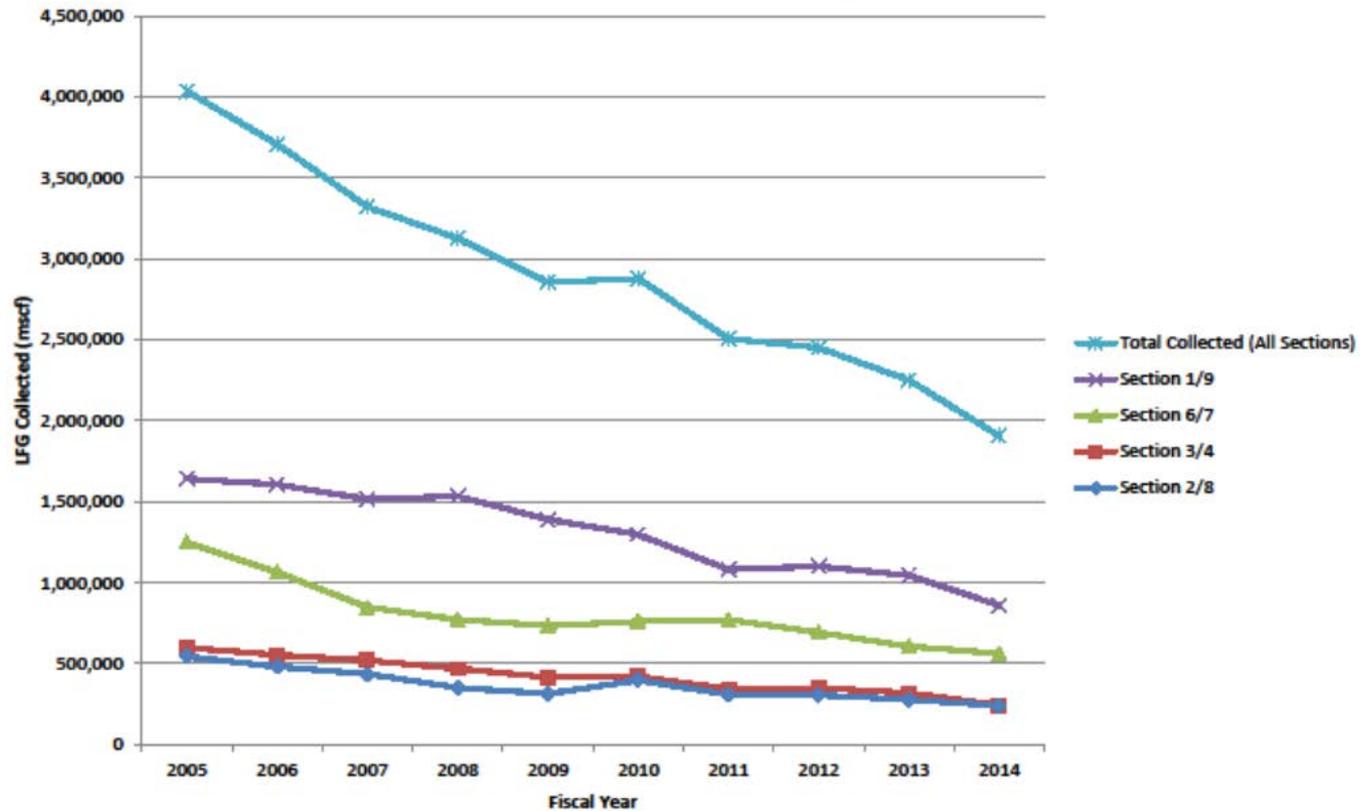
## *LANDFILL GAS CONTROL*

- Objective:
  - Landfill Gas Emissions Control
  - Separation and Purification of Methane for Sale
- Currently Collect and Process approximately 3.8 MMscf/day
- Approximately 140 Tons Per Day of LFG
- Represents approximately 1,000 Tons Per Day of CO<sub>2</sub>-E
- Flare < 4%
- Sell Balance
- Gas Generation/Collection declining approx. 8% per year

# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LANDFILL GAS CONTROL* CONTINUED

Landfill Gas Collection Volumes  
DSNY Fiscal Year 2005 Through 2014



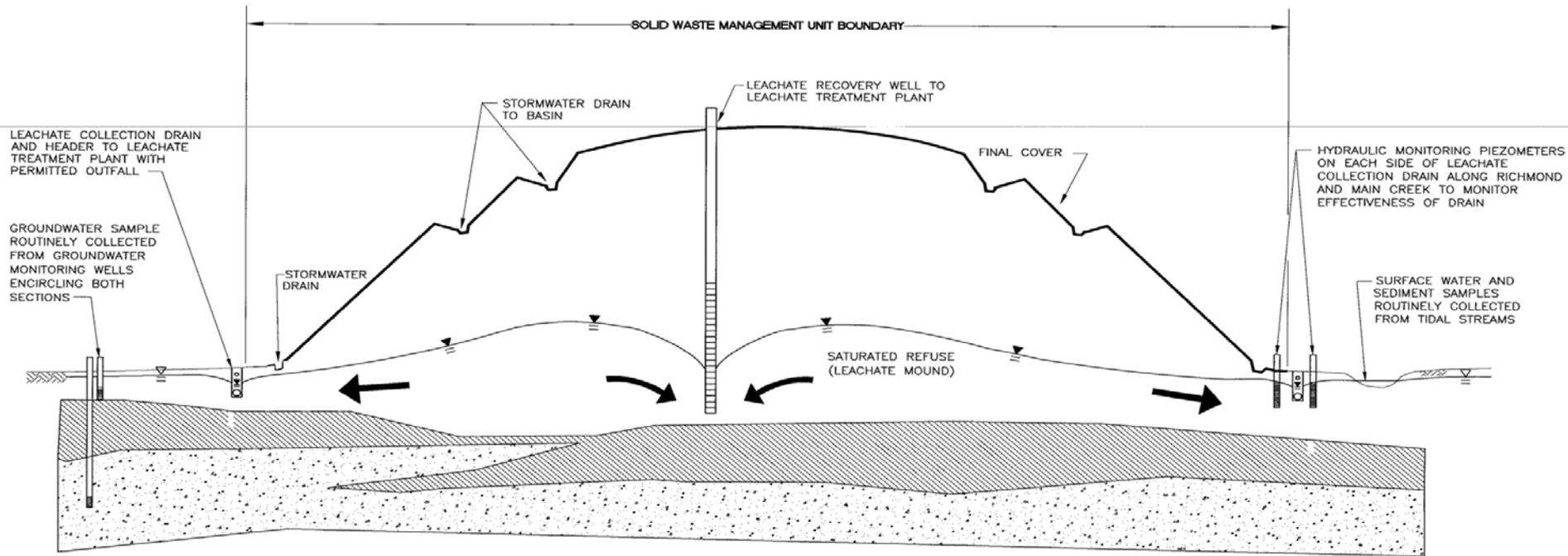
# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LANDFILL GAS CONTROL* CONTINUED

### Projected LFG Flows and Emissions

Year	SECTION 1/9		SITE - WIDE	
	Section 1/9 Flow @ 50% CH4 (cfm)	Section 1/9 NMOC Emission Rate (Mg/yr)	Site-Wide Flow @ 50% CH4 (cfm)	Site-Wide NOMC Emission Rate (Mg/yr)
2019	1296	31.2	2380	57.3
2020	1210	29.1	2221	53.5
2021	1129	27.2	2073	49.9
2022	1054	25.4	1935	46.6
2023	984	23.7	1806	43.5

# GREEN + SUSTAINABLE: POST CLOSURE CARE LEACHATE CONTROL



## LEGEND

-  PREDOMINANT LEACHATE FLOW DIRECTION THROUGH REFUSE/FILL
-  FINAL COVER
-  LOW PERMEABILITY UNIT
-  HIGH PERMEABILITY UNIT
-  GROUNDWATER LEVEL
-  LEACHATE LEVEL

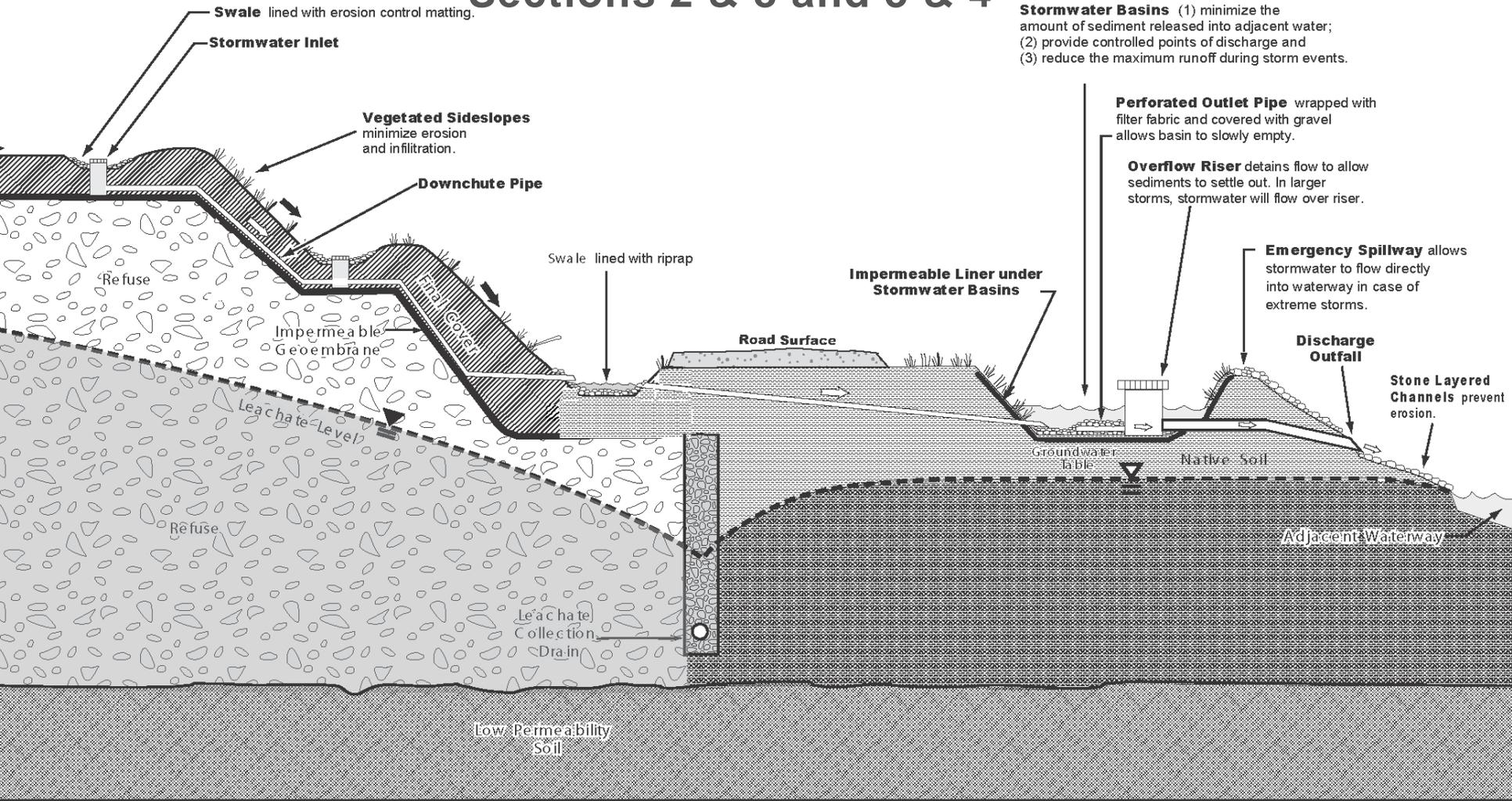
## NOTE:

1. THIS IS A CONCEPTUAL SCHEMATIC REPRESENTATION WHICH IS NOT DRAWN TO SCALE.

# GREEN + SUSTAINABLE: POST CLOSURE CARE

## LEACHATE CONTROL CONTINUED

### Sections 2 & 8 and 3 & 4



**Stormwater Basins** (1) minimize the amount of sediment released into adjacent water; (2) provide controlled points of discharge and (3) reduce the maximum runoff during storm events.

**Perforated Outlet Pipe** wrapped with filter fabric and covered with gravel allows basin to slowly empty.

**Overflow Riser** detains flow to allow sediments to settle out. In larger storms, stormwater will flow over riser.

**Emergency Spillway** allows stormwater to flow directly into waterway in case of extreme storms.

**Stone Layered Channels** prevent erosion.

➔ SURFACE WATER FLOW

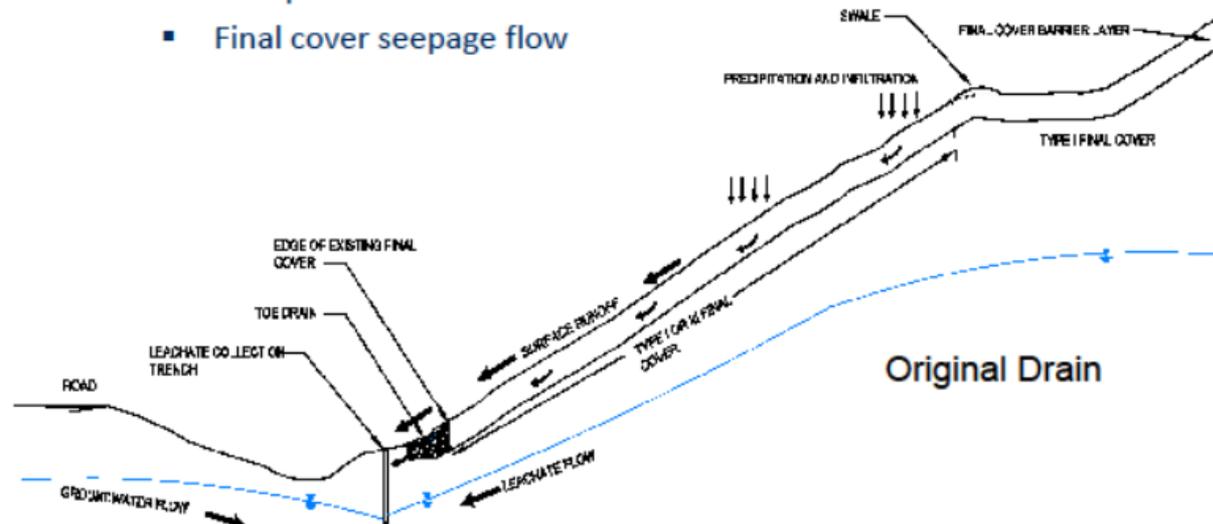
➞ FLOW IN STORMWATER MANAGEMENT SYSTEMS

# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LEACHATE CONTROL* CONTINUED

### Sections 2 & 8 and 3 & 4

- **Perimeter drains (Open system, outside of final cover)**
  - Leachate
  - Groundwater
  - Surface water
  - Precipitation runoff
  - Precipitation into drain
  - Final cover seepage flow

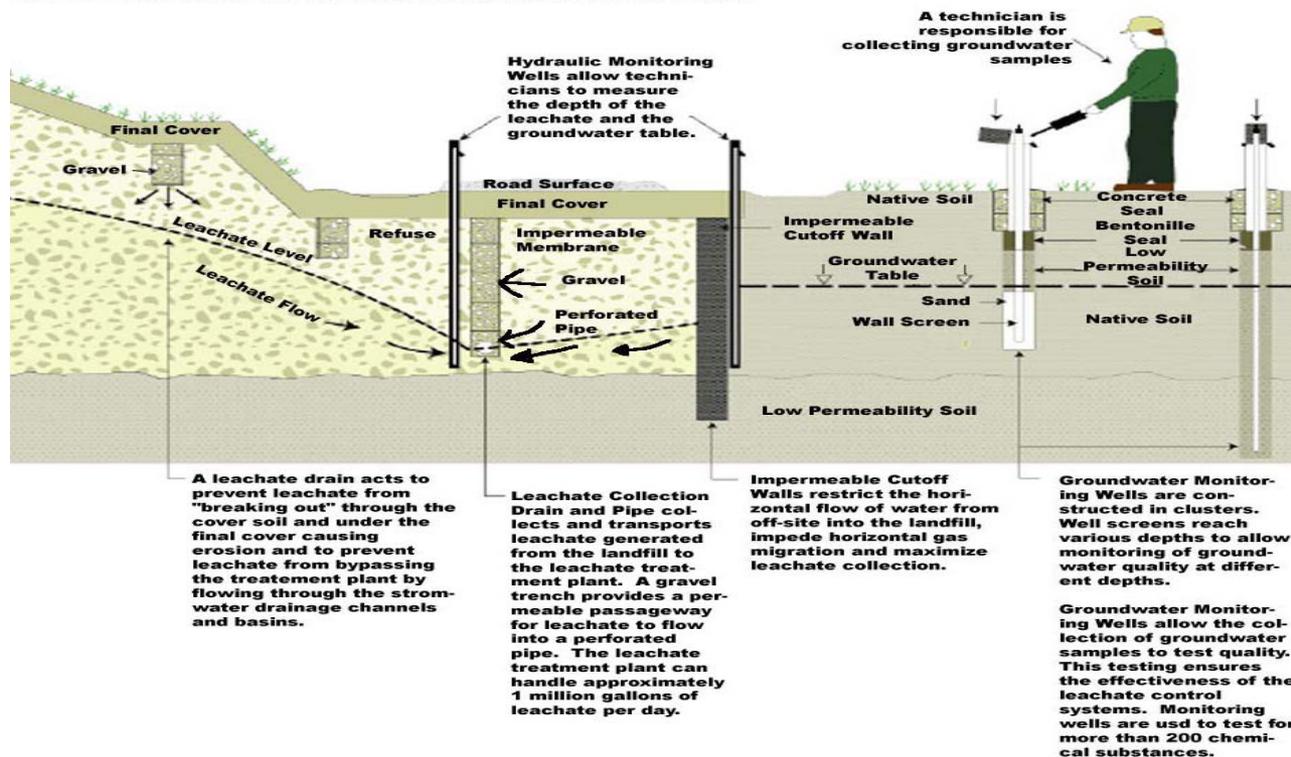


# GREEN + SUSTAINABLE: POST CLOSURE CARE

## LEACHATE CONTROL CONTINUED

### Sections 1 & 9 and 6 & 7

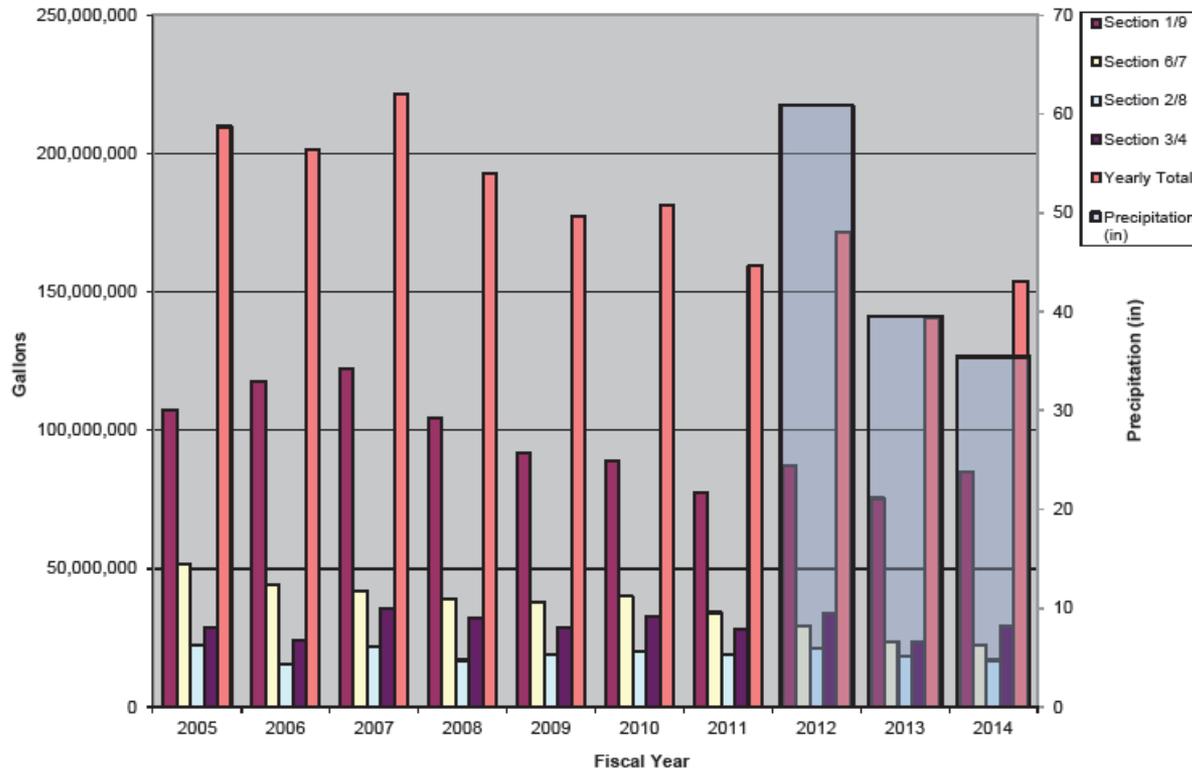
Cross Section of Leachate Collection and Containment



# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LEACHATE CONTROL* CONTINUED

Fiscal Year Leachate Collection  
2005-2014



S:\12. Common Shared\LFG Condensate & Effluent Flows\Leachate Condensate Totals FY 2005-2014.xls

# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LEACHATE CONTROL* CONTINUED

### Collection

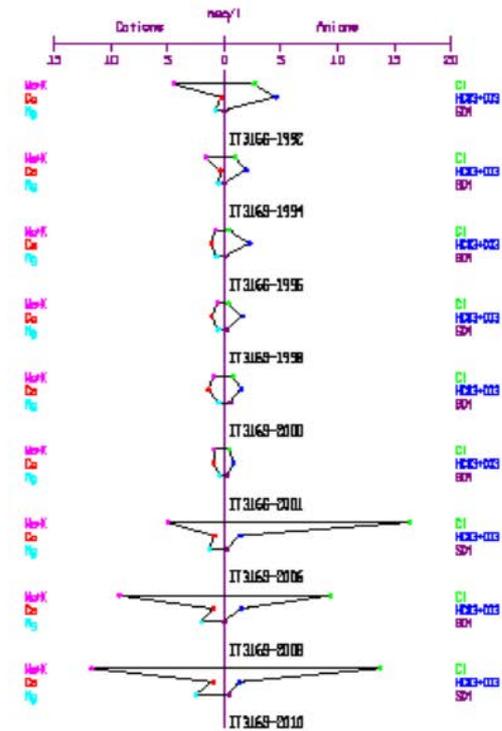
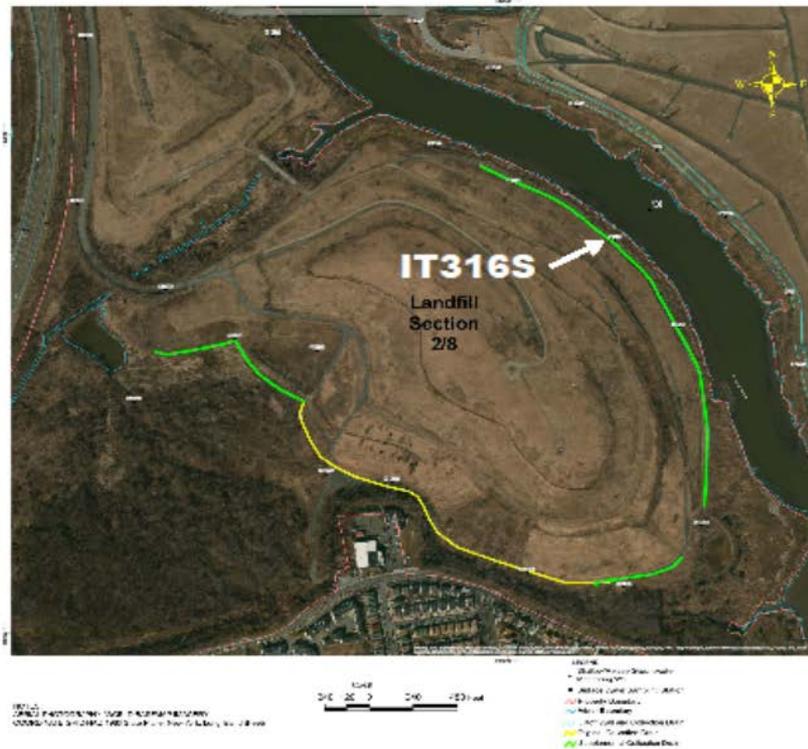
<u>Sections</u>	<u>Hydraulic Loading</u>
1 & 9	55%
6 & 7	15%
2 & 8	11%
3 & 4	19%



# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LEACHATE CONTROL* CONTINUED

### Application of Monitoring Data



# GREEN + SUSTAINABLE: POST CLOSURE CARE

## LEACHATE CONTROL CONTINUED

### Landfill Section 2/8

Year	Site-Wide Alternative 1 - Final Cover				Site-Wide Alternative 1 - Final Cover with Partial Perimeter Drain				
	Uncontrolled Leachate Flux (gpd) <sup>b</sup>			Leachate Control Efficiency <sup>d</sup>	Horizontal Flux Controlled by Original Drain (gpd) <sup>c</sup>	Uncontrolled Leachate Flux (gpd) <sup>b</sup>			Leachate Control Efficiency <sup>d</sup>
	Horizontal	Vertical	Total			Horizontal	Vertical	Total	
2000*	48,627	3,687	52,314	70%	13,129	35,498	3,687	39,185	78%
2001	46,000	3,565	49,565	72%	12,420	33,580	3,565	37,145	79%
2002	43,373	3,443	46,816	74%	11,711	31,662	3,443	35,105	80%
2003	40,746	3,321	44,067	75%	11,001	29,745	3,321	33,065	81%
2004	38,119	3,198	41,318	77%	10,292	27,827	3,198	31,026	82%
2005	35,492	3,076	38,569	78%	9,583	25,909	3,076	28,986	84%
2006	32,865	2,954	35,820	80%	8,874	23,992	2,954	26,946	85%
2007	30,238	2,832	33,071	81%	8,164	22,074	2,832	24,906	86%
2008	27,612	2,710	30,321	83%	7,455	20,156	2,710	22,866	87%
2009	24,985	2,588	27,572	84%	6,746	18,239	2,588	20,827	88%
2010	22,358	2,466	24,823	86%	6,037	16,321	2,466	18,787	89%
2011	19,731	2,344	22,074	88%	5,327	14,403	2,344	16,747	91%
2012	17,104	2,221	19,325	89%	4,618	12,486	2,221	14,707	92%
2013	14,477	2,099	16,576	91%	3,909	10,568	2,099	12,667	93%
2014	11,850	1,977	13,827	92%	3,199	8,650	1,977	10,628	94%
2015*	9,223	1,855	11,078	94%	2,490	6,733	1,855	8,588	95%

Notes:

\* Model output year

<sup>b</sup> Linear interpolation between model output years

<sup>c</sup> Based on Year 2000 model boundary fluxes; 27% controlled by drain

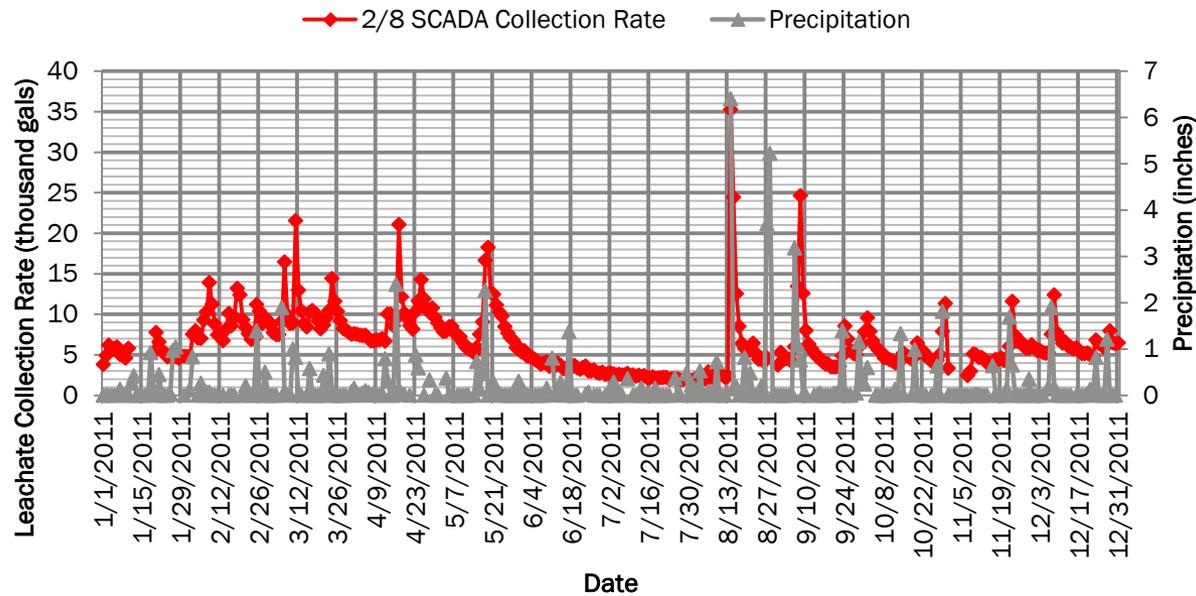
<sup>d</sup> As a percentage of total uncontrolled leachate from in the 1993 baseline period

 Year 80% leachate control efficiency achieved

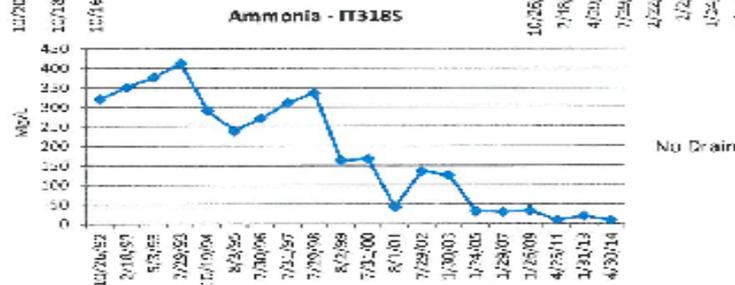
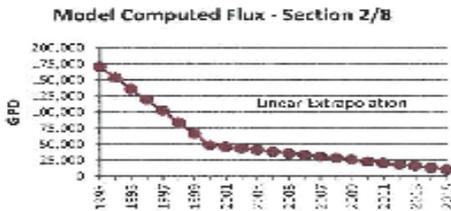
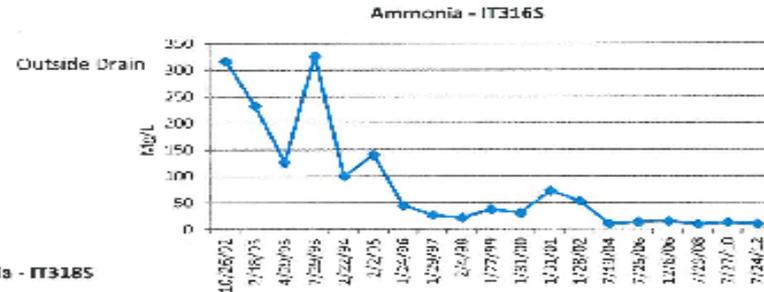
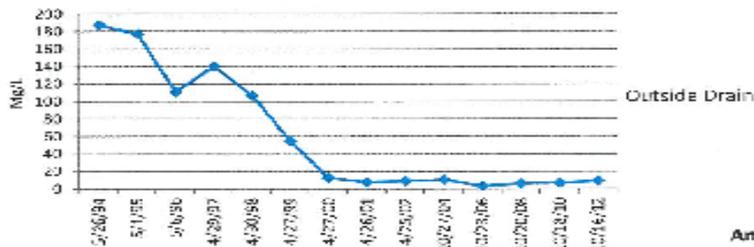
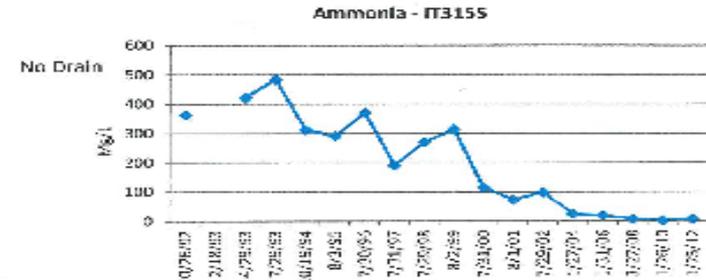
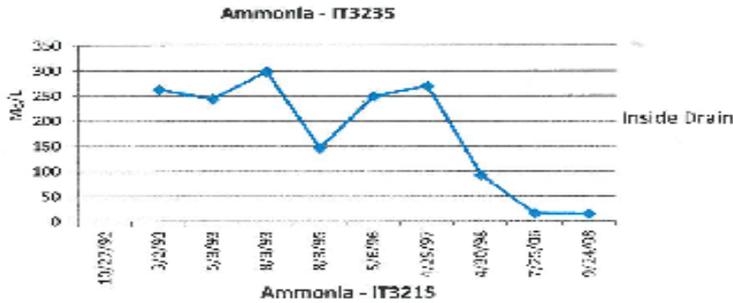
# GREEN + SUSTAINABLE: POST CLOSURE CARE

## *LEACHATE CONTROL* CONTINUED

### Precipitation Effects on Leachate Collection Rates - Year 2011



# AMMONIA CONCENTRATIONS – SECTION 2/8



# **GREEN + SUSTAINABLE: POST CLOSURE CARE**

## ***LEACHATE CONTROL*** CONTINUED

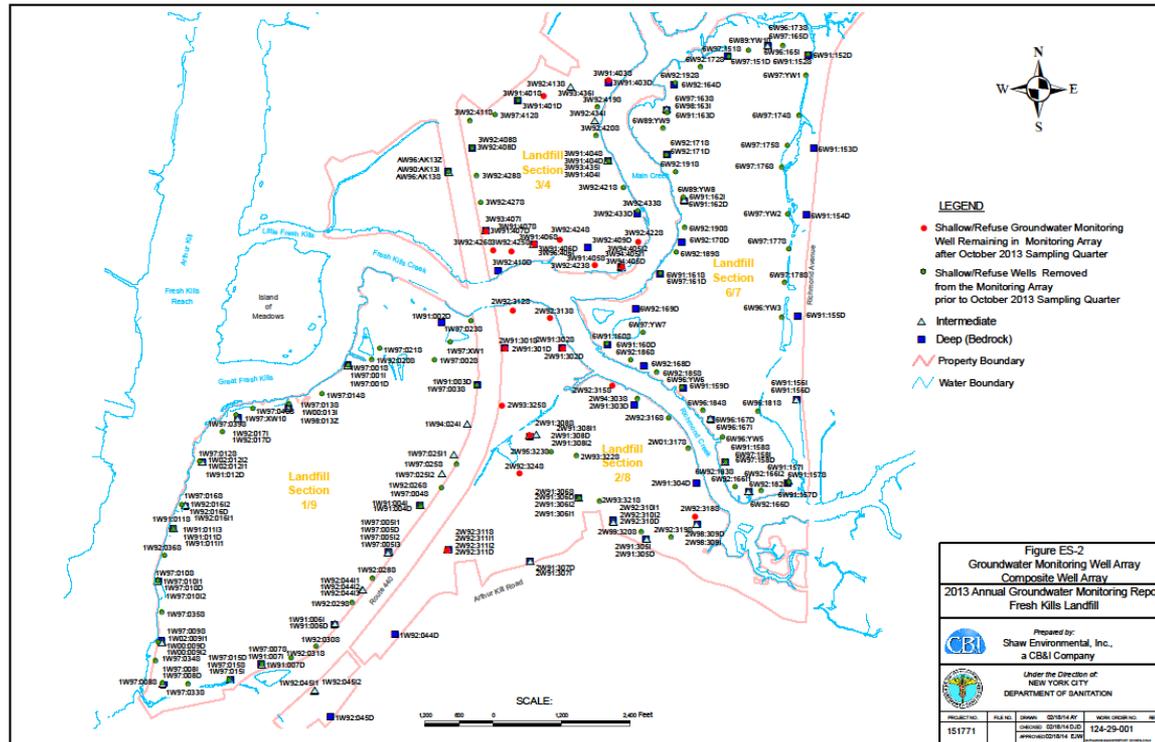
Sections 2 & 8 and 3 & 4, as demonstrated through:

- Water Chemistry Data
- Hydrologic Data
- Hydraulic Models

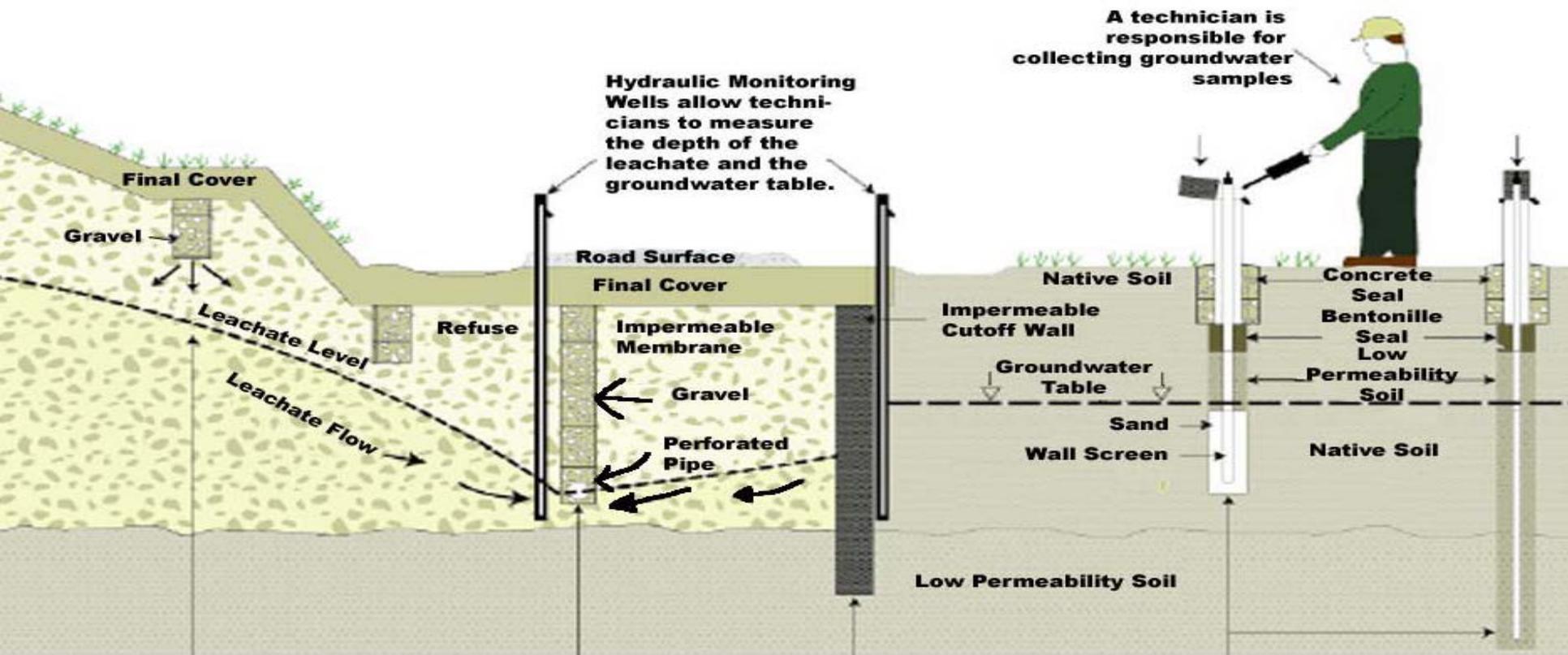
**Leachate generation has been effectively abated by final cover to maximum extent practicable**

# GREEN + SUSTAINABLE: POST CLOSURE CARE ENVIRONMENTAL MONITORING

## Groundwater Monitoring Array



# Cross Section of Leachate Collection and Containment



A technician is responsible for collecting groundwater samples

Hydraulic Monitoring Wells allow technicians to measure the depth of the leachate and the groundwater table.

A leachate drain acts to prevent leachate from "breaking out" through the cover soil and under the final cover causing erosion and to prevent leachate from bypassing the treatment plant by flowing through the stormwater drainage channels and basins.

Leachate Collection Drain and Pipe collects and transports leachate generated from the landfill to the leachate treatment plant. A gravel trench provides a permeable passageway for leachate to flow into a perforated pipe. The leachate treatment plant can handle approximately 1 million gallons of leachate per day.

Impermeable Cutoff Walls restrict the horizontal flow of water from off-site into the landfill, impede horizontal gas migration and maximize leachate collection.

Groundwater Monitoring Wells are constructed in clusters. Well screens reach various depths to allow monitoring of groundwater quality at different depths.

Groundwater Monitoring Wells allow the collection of groundwater samples to test quality. This testing ensures the effectiveness of the leachate control systems. Monitoring wells are used to test for more than 200 chemical substances.

# **GREEN + SUSTAINABLE: POST CLOSURE CARE** ***ENVIRONMENTAL MONITORING***

## Groundwater Monitoring

Long-Term Monitoring Plan (During Operation)

1993 – 2002: 240 wells

Post Closure Environmental Monitoring Plan

2003 – 2013: 238 wells

2014 – Present: 140 wells

# PHILOSOPHY

Good engineering practices and environmental management are always green and sustainable!



















**SOLID WASTE MANAGEMENT PLAN:  
AN OVERVIEW**

**Director of Environmental Review Sarah Dolinar  
Solid Waste Management**

Game-Changing Initiatives for Solid Waste  
The Cooper Union  
June 10, 2015

# WITH FRESH KILLS CLOSED

- In 2004, 12,000 tons/day of DSNY waste and more than 25,000 tons/day of commercial waste
- DSNY contracts short term with nearby disposal and private transfer stations
- Transfer stations concentrated in South Bronx, North Brooklyn, Jamaica, Queens
- Reliance on truck transfer results in community issues and rising costs

# POST-FRESH KILLS: KEY GOALS

## Solid Waste Management Plan (SWMP) for 2006 – 2025

- Expand recycling programs and develop in City processing and transfer
- Replace Fresh Kills and short-term trucking with export through 20-year contracts
- Export now – but explore new technology
- Containerize DSNY-managed waste in each borough
- Improve commercial transfer

# HARLEM RIVER YARDS



# SWMP: GREEN + SUSTAINABLE

## Addresses Environmental Issues:

- Uses nearby disposal: 20-year contract for Essex Resource Recovery Facility
- Exports by barge and rail – not truck
- Uses existing DSNY sites and transfer station capacity
- Creates new capacity in Manhattan



# SWMP: GREEN + SUSTAINABLE

## Infrastructure for DSNY Waste

- Converts 4 MTSs
  - North Shore/Queens 2200 tpd **DONE**
  - Hamilton/Brooklyn 1900 tpd **NEAR 2015**
  - E 91<sup>st</sup> Street/Manhattan 1900 tpd **UNDERWAY 2017**
  - Southwest Brooklyn/950 tpd **UNDERWAY 2017**
- MTS transport and disposal **NEAR 2015**

# SWMP: GREEN + SUSTAINABLE CONTINUED

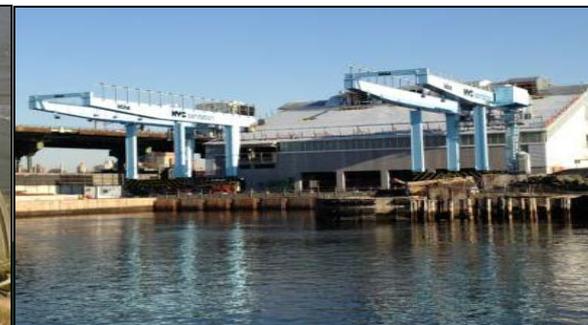
## Infrastructure for DSNY Waste

- Long-term private rail transport/disposal **DONE**
  - All Bronx (2000 tpd)
  - Part of Queens (1200 tpd)
  - Part of Brooklyn (950 tpd)
- Staten Island truck-to-container-to-rail transfer and contract for transport/disposal of Staten Island waste (750 tpd) **DONE**
- Nearby waste-to-energy facility contract (1200 tpd) **DONE**

# SWMP: GREEN + SUSTAINABLE

## Marine Transfer Stations

- Enclosed processing with negative air pressure
- Three levels - trucks don't track waste and birds don't see it
- Tugs equipped to reduce emissions and noise
- Natural odor neutralizer
- Sealed, leak-proof containers
- No on-street queuing
- LEED equivalent
- Flood-proofing



# SWMP: GREEN + SUSTAINABLE

## Improves Commercial Waste Transfer in Communities

- Uses existing barge/rail transfer stations
- Requires MTSs take commercial waste
- Requires voluntary capacity reductions
- Requires DSNY to implement/enforce new transfer station siting and operational rules
- Leverages facilities with 20-year contracts to export commercial waste by barge/rail
- Develops capacity in Manhattan

# SWMP: GREEN + SUSTAINABLE

## Results in Export Capacity in All Boroughs and Manhattan Commercial Capacity

- MTSs to accept commercial waste
- Manhattan recyclables transfer capacity at New Gansevoort MTS in Hudson River Park
- Future use of West 59<sup>th</sup> Street MTS in Manhattan for construction and demolition debris export



# SWMP: GREEN + SUSTAINABLE

## Improves Recyclables Processing

- Continues recyclable paper delivery to VISY Paper Mill
- Adds 20-year contract with Sims Municipal Recycling to process City recyclables
- Partners City and Sims on new facility to process City recyclables, featuring optical sorting and barge delivery
- Plans New Gansevoort MTS for Manhattan



# SWMP: GREEN + SUSTAINABLE

## Enhances Use of Waterborne Networks

- Multiple truck-to-barge acceptance facilities
- Most material moves by barge
- New Gansevoort MTS to barge Manhattan metal, glass and plastic to Sims in SBMT

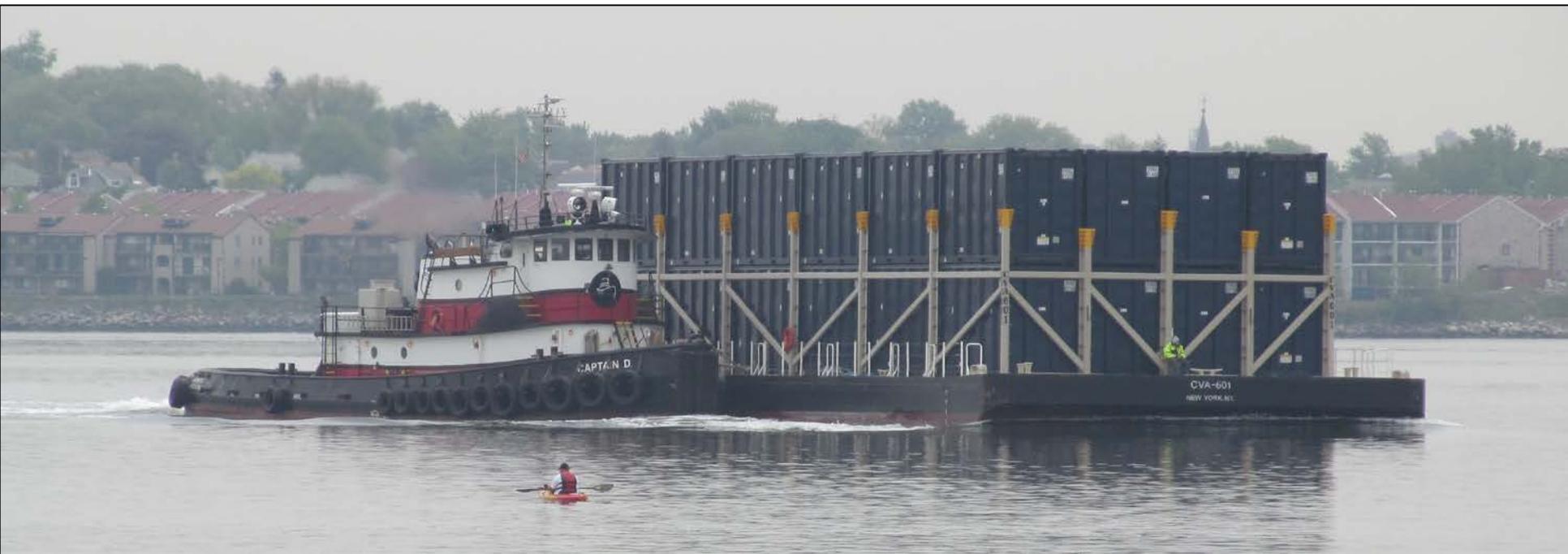


- = Sims acceptance facilities
- = Gansevoort Manhattan transfer site
- = Sims new processing facility
- = Visy Paper Mill

# SWMP: GREEN + SUSTAINABLE

## Long-term Export Contracts

- Prefer New York State disposal
- Don't create a disincentive for recycling
- Allow used equipment
- Early termination
- Recyclables processing option



# SWMP: GREEN + SUSTAINABLE

## Treats Boroughs Fairly and Builds Collaboratively

- No new capacity where concentrated
- Short-term contracts equitable
- Backyard rail assist

# SWMP: GREEN + SUSTAINABLE CONTINUED

## Treats Boroughs Fairly and Builds Collaboratively

- Benefits from stakeholder input:
  - Many meetings for each proposed facility
  - Environmental justice plans put project information in reach
  - Meetings held near sites day and evening
  - Materials in multiple languages
- Establishes 4 MTS Community Groups
  - 10 members from environmental, business and local organizations
  - group forms for New Gansevoort MTS

# SWMP: GREEN + SUSTAINABLE

## Promotes Green Innovation

- Since 1980s processing and sale of gas at FK instead of just flaring
- More FK gas revenue through sale of environmental attributes
- Requires study of new technology



# SWMP: GREEN + SUSTAINABLE CONTINUED

## Promotes Green Innovation

- Procurement issued
  - Pilot with expansion, if successful
  - Divert waste from landfills/  
reduce GHGs
  - Replace long-term  
transport contract
- Procurement cancelled
  - Lost in City site
  - Organics pilot announced
  - Interstate issues
  - Gasification – no controlled emissions data
  - Anaerobic digestion – site too small



# SWMP: GREEN + SUSTAINABLE CONTINUED

## Promotes Green Innovation

- Procurement for Hamilton Avenue and Southwest Brooklyn MTS vendor obtains optional proposals to extract and process recyclables
- Negotiations in progress
- Recyclables extraction and processing in the mix!

# SWMP: GREEN + SUSTAINABLE

## Results

- Most waste transfers in generating borough
- 90% DSNY-managed waste exports by rail
- DSNY trucks travel 2.7 million fewer miles/year and tractor trailers travel 3 million fewer miles/year
- Reduces GHG emissions by 192,000 tons/year
- Resilient, robust City controlled infrastructure
- Extracts green gas and recyclables

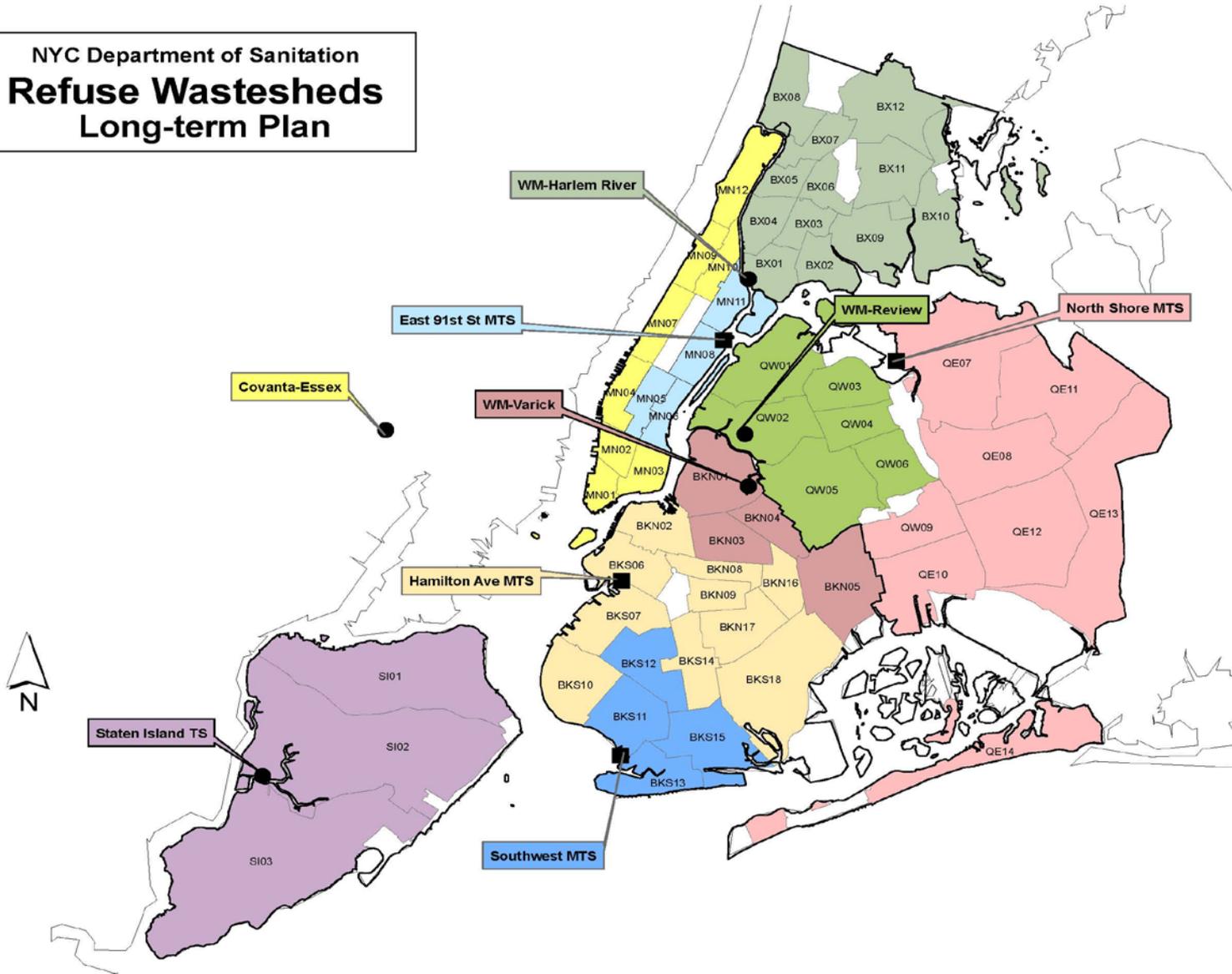
## SOLID WASTE MANAGEMENT PLAN: LONG-TERM EXPORT – HERE AND NOW

**Chief Thomas Killeen**  
**Solid Waste Management**

Game-Changing Initiatives for Solid Waste  
The Cooper Union  
June 10, 2015

# LONG TERM PLAN

## NYC Department of Sanitation Refuse Wastesheds Long-term Plan



**Legend**

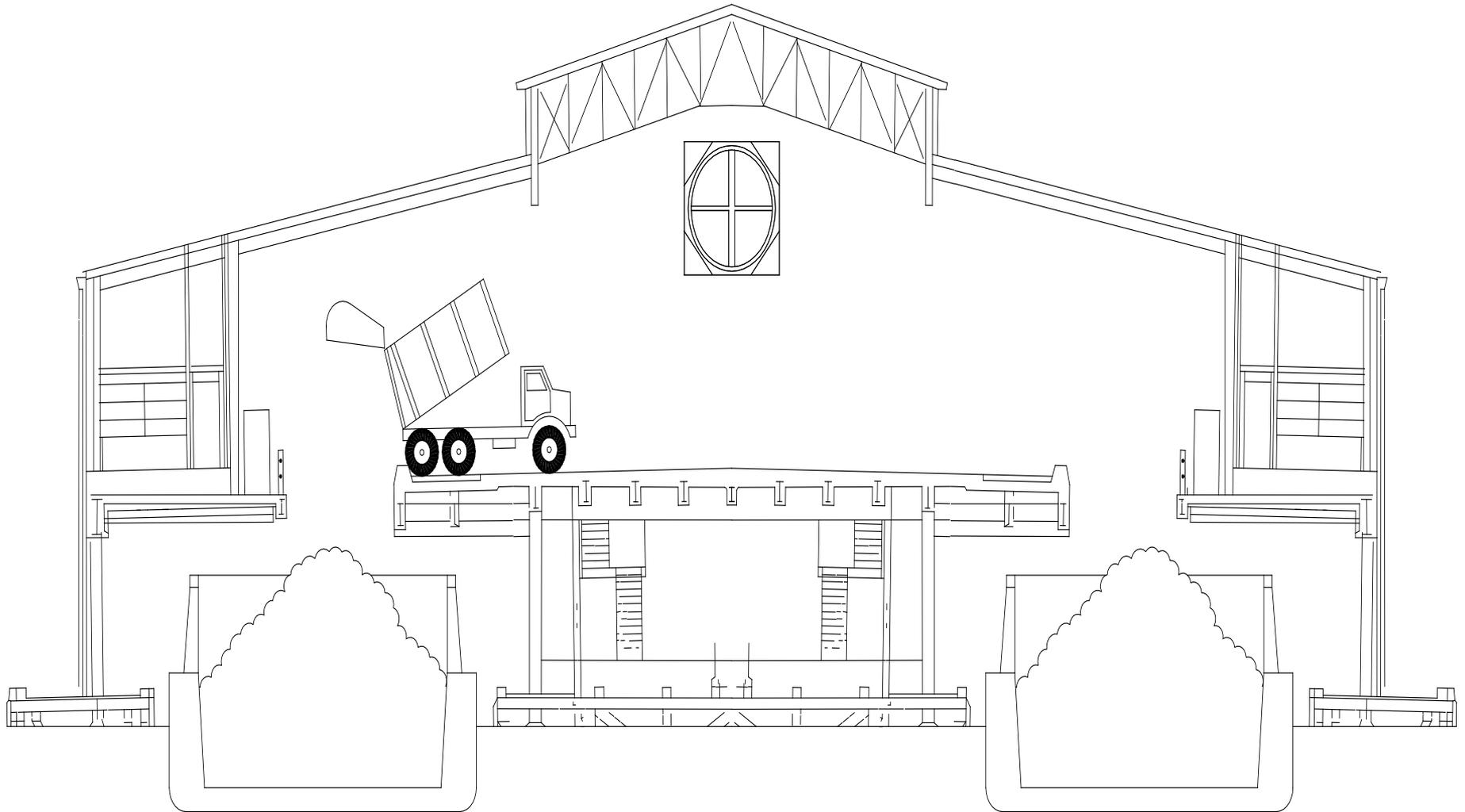
- DSNY Facility
- Contract Facility

Waste Shed		FY 2012
Formal Name		Tons Dumped (Daily Average)
	Manhattan Procurement (Covanta - Essex)	1,336
	Man Proc (Non-Burnable)	100
	91st Street MTS	573
	<b>MANHATTAN TOTAL</b>	<b>2,007</b>
	Bronx Procurement (WM-Harlem River)	2,002
	<b>BRONX TOTAL</b>	<b>2,002</b>
	Brooklyn Procurement (WM-Varick)	760
	Hamilton Avenue MTS	1,639
	Southwest MTS	858
	<b>BROOKLYN TOTAL</b>	<b>3,255</b>
	Queens West Procurement (WM-Review)	1,034
	North Shore MTS	1,801
	<b>QUEENS TOTAL</b>	<b>2,835</b>
	Staten Island TS	727
	<b>STATEN ISLAND TOTAL</b>	<b>727</b>
	<b>GRAND TOTAL</b>	<b>10,827</b>

# END OF AN ERA: OLD MARINE TRANSFER STATION



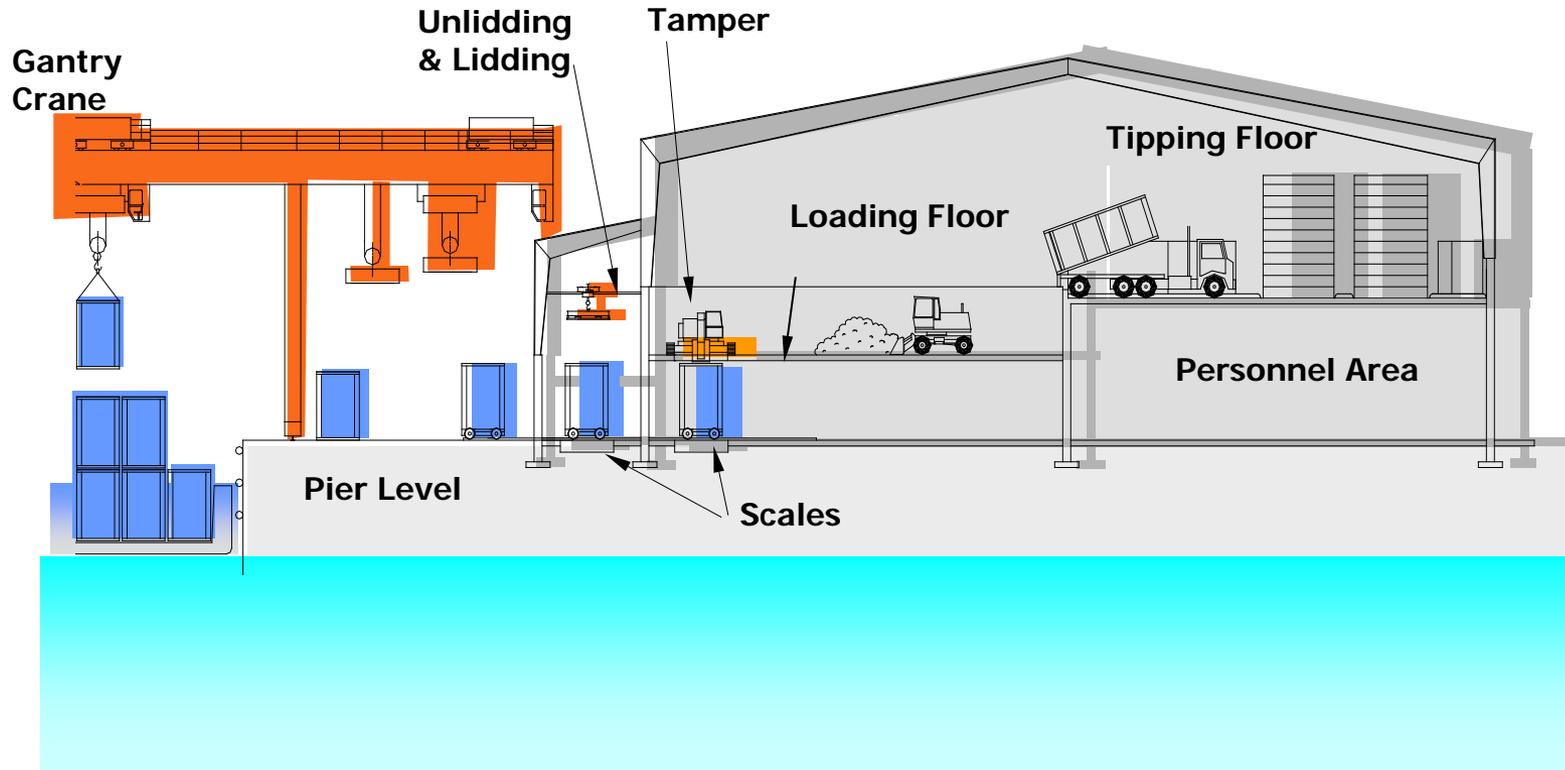
# OLD MARINE TRANSFER STATION FACILITY DESIGN



# DAWN OF A NEW ERA CONVERTED MARINE TRANSFER STATION



# NEW MARINE TRANSFER DESIGN



# NORTH SHORE MTS

- Truck-to-container-to-barge Marine Transfer Station in Flushing
- SWAMP Average tons: 2,200 tpd of DSNY waste
- Can accept up to 1,000 tpd of commercial putrescible waste
- Opened March 6, 2015
- Covanta operates gantry cranes, transports and disposes of waste under 20-year contract with service to Delaware Valley and Niagara



# HAMILTON AVENUE MTS

- Truck-to-container-to-barge Marine Transfer Station
- Average throughput: ,900 tpd of Brooklyn waste
- Can accept up to 1274 tpd of commercial putrescible waste
- 97% complete
- Expected completion: Fall 2015
- Vendor TBD to operate gantry cranes and provide transport and disposal services



# STATUS OF EAST 91ST STREET MTS

## Construction Underway

- Scheduled completion: March 2016
- Average throughput: 555 tons per day of Manhattan waste
- Can accept up to 780 tpd of commercial putrescible waste
- Covanta to operate cranes and provide container transport/disposal services

# 91<sup>ST</sup> STREET MTS CONSTRUCTION



# SOUTHWEST BROOKLYN MTS CONSTRUCTION

Construction Contract Awarded in March 2015

- Scheduled completion: Spring 2017
- Average throughput: 868 tons per day of Brooklyn waste
- Can also accept up to 828 tons per day of commercial putrescible waste

# SOUTHWEST MTS CONSTRUCTION



# STATEN ISLAND TRANSFER STATION



# STATEN ISLAND TRANSFER STATION

- Began operations in 2006
- DSNY-operated truck-to-container-to-rail facility for SI waste
- Average of 685 tpd - no commercial waste is accepted
- Long-term contract with Allied Waste Systems, Inc. (now Republic Services)
- Republic manages 6 day/wk rail service to Lee County Landfill in SC



**THANK YOU**

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