



Converting Food Waste to Clean, Renewable Energy

Varick I Solid Waste Transfer Organics Pre-processing Facility

June 3, 2015



THINK GREEN.®

Meeting Agenda



- About Waste Management
- Varick I Project Overview
- WM CORe® Solution
- Engineered BioSlurry Delivery
- Benefits & Summary

About Waste Management



- North America's largest provider of comprehensive waste services
- Largest recycler - handling over 7.6 million tons of materials per year
- Leader in single stream recycling & alternative energy production from solid waste management
- Leader in management of organic food waste in the North America

Waste Management NYC Operations



- Currently operates (4) four New York State DEC permitted solid waste transfer stations within New York City including Varick I
- Currently under long-term agreements with the NYC Department of Sanitation for disposal of residential waste in Brooklyn, Queens and the Bronx
- Currently transporting Brooklyn and Bronx waste out of the City by rail via WM operated intermodal rail yards
- Actively commissioning transfer station into an intermodal rail yard for the shipment of residential waste

WM's Approach to Organics Management



Converting Food Waste to Clean, Renewable Energy



- We don't manage "Wastes," we manage "Resources."
WM's approach is to focus on developing sustainable solutions to materials management.... socially, environmentally, and economically sustainable solutions.
- WM is striving to minimize our customers' and our own impact on the environment, and to maximize the value of the materials we manage. To be sustainable, these solutions must meet the varying needs of the communities and customers we serve across the country.

WM's Goal:
To minimize
environmental
impact and
extract the
highest value
from the
materials we
manage



New York City Organics Recycling Mandate



Meeting the City's goals of:

- ❖ waste diversion as mandated by Local Law 146 (2013)
- ❖ reducing the city's greenhouse gas emissions
- ❖ increasing the amount of renewable energy generated in the city
- ❖ Integral part of City's long term sustainability objectives



WM of New York

Varick I Solid Waste Transfer Station



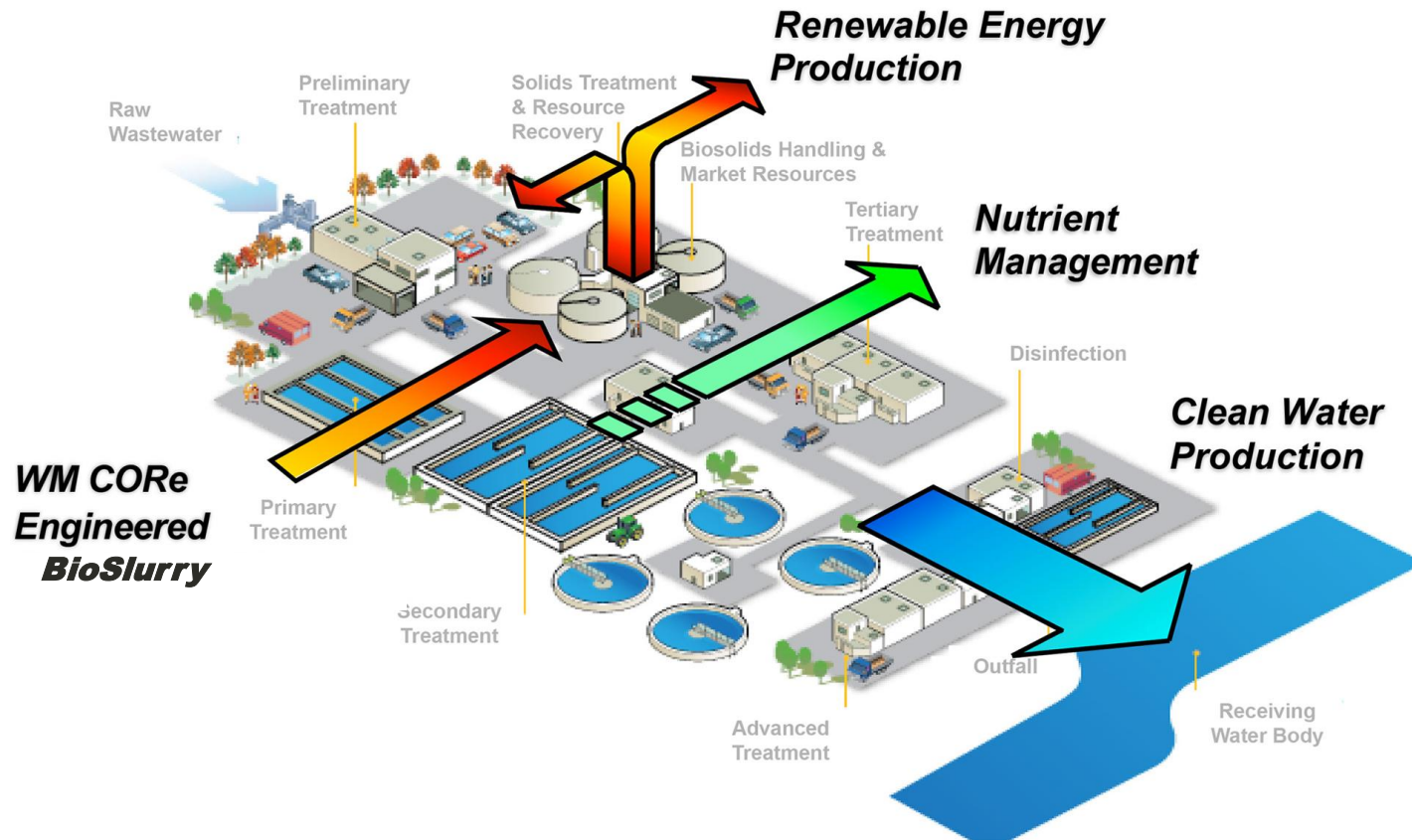
- Located in an industrial area of East Williamsburg
- Receives residential waste collected by the NYC Department of Sanitation (DSNY) from Brooklyn
- Solid waste is received within WM's fully enclosed facility and placed in sealed intermodal containers for shipment by rail
- Site selected for WM's proprietary Centralized Organic Recycling equipment ("CORe®") process

WM of NY Organic Recycling Varick I CORE[®] Project Overview



- Objective:
 - *Operate NYC's first organics recycling facility to process organic food waste for conversion to a clean renewable energy in partnership with NYC Department of Environmental Protection and Department of Sanitation*
- The organics recycling operation will be located within the existing Varick I transfer facility and will use WM's proprietary CORE[®] process
- Overall Goal:
 - *Generate insights and data to assess the overall effectiveness of organic recycling in diverting materials from the waste stream and increasing renewable energy production*

Yesterday's Wastewater Treatment Plant... Tomorrow's Resource Recovery Facility



Waste Streams → Valuable End Products

WM Organic Recycling Proprietary CRe® System - Overview

WM
WASTE MANAGEMENT

CRe
Centralized Organic Recycling equipment

Converting Food Waste to Clean, Renewable Energy



WM CRe®
Patent USP
#8,926,841

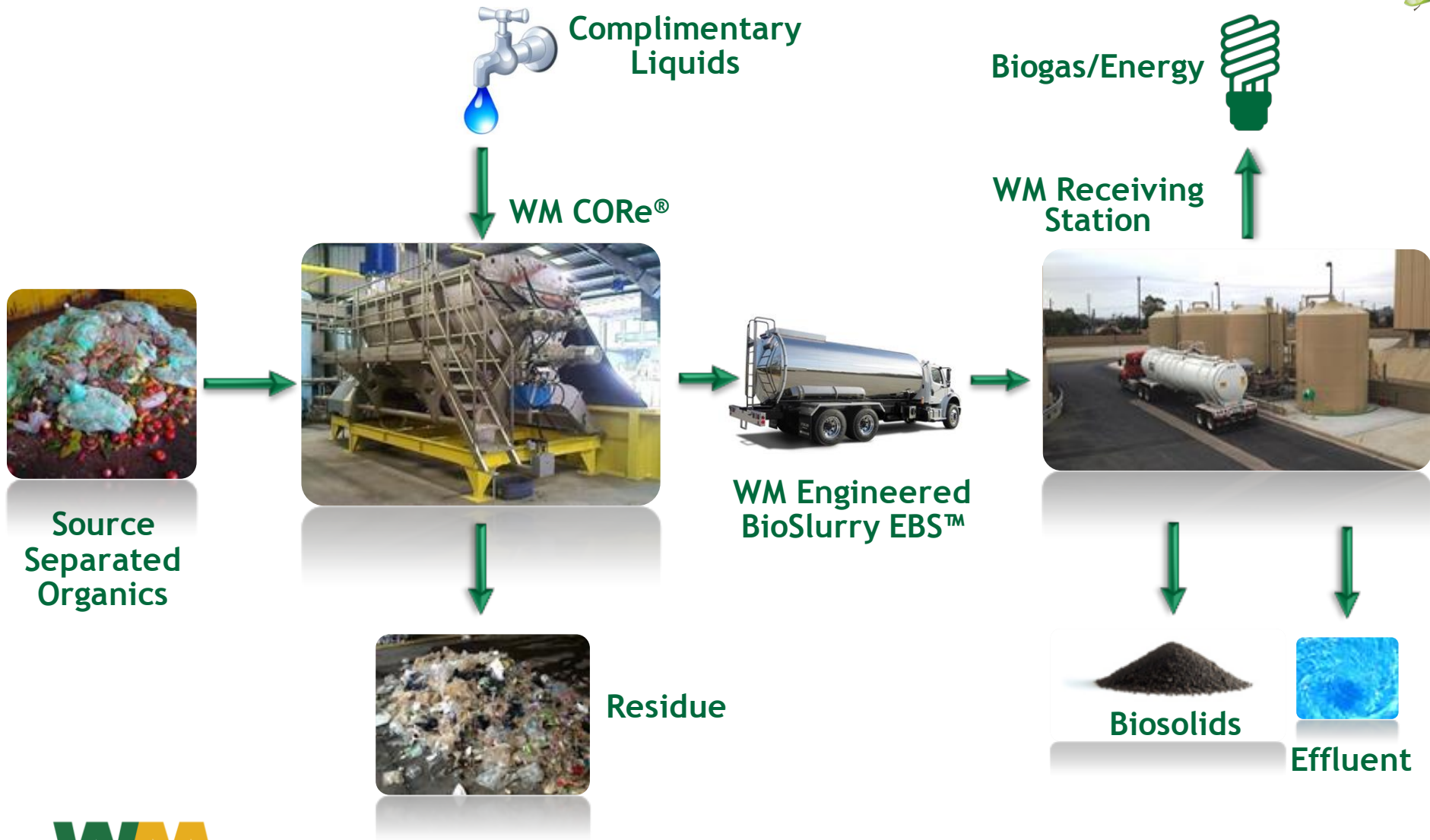


The WM CORE[®] Solution

WM
WASTE MANAGEMENT

CORE[™]
Centralized Organic Recycling equipment

Converting Food Waste to Clean, Renewable Energy



CORe® Inbound Source Separated Organic Food Waste



WM CORE[®] System Preprocessing Equipment



Feed Hopper



Bioseparator Screen

CORe[®] Engineered BioSlurry Production



CORe[®] System Engineered BioSlurry Product

WM
WASTE MANAGEMENT

CORe[™]
Centralized Organic Recycling equipment

Converting Food Waste to Clean, Renewable Energy



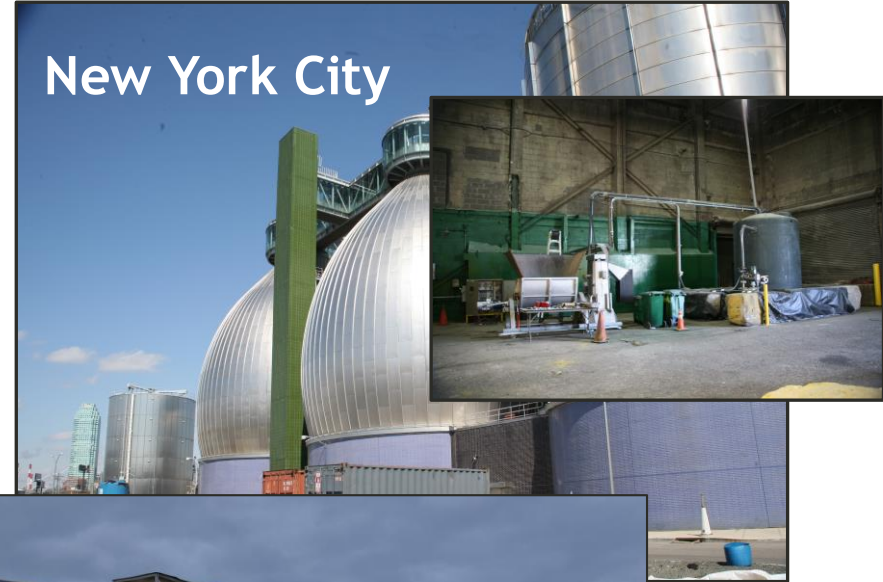
WM Organic's Projects - Converting Food Waste to Renewable Energy



Boston (MWRA)



New York City



Boston (GLSD)



Northern New Jersey



Los Angeles



Demonstration Project

Timeline

Phase I: First 6 Months

- Process 50 tons per day (TPD) of organic waste at Varick I facility
- Transport Engineered BioSlurry (EBSTTM) to DEP Newtown Creek wastewater treatment plant (WWTP)
- Add Engineered BioSlurry to the WWTP anaerobic digester
- Generating renewable energy capable of heating approximately 500 NYC homes from food waste alone



Demonstration Project

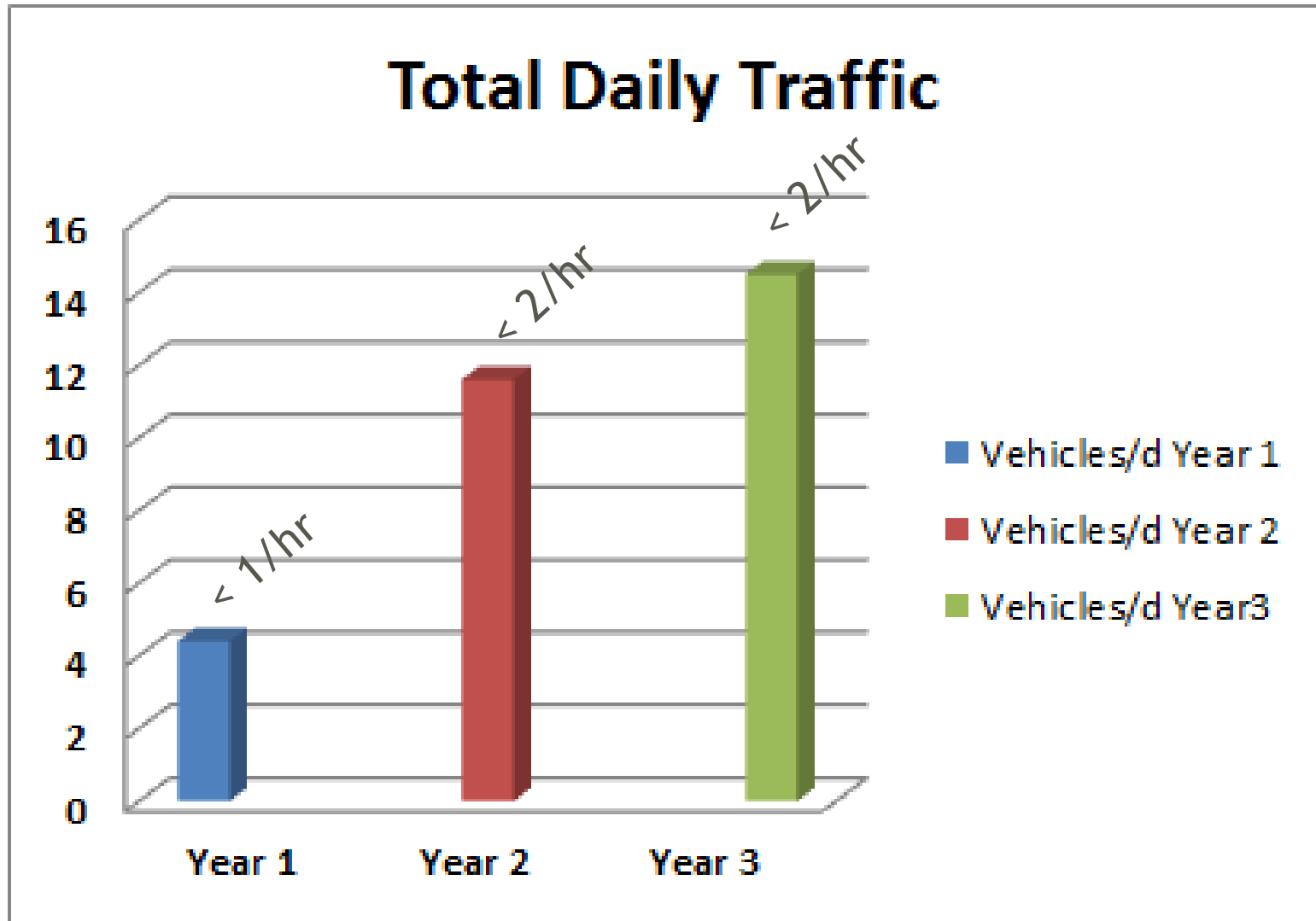
Timeline

Phase II: 6 months to Year 3

- 100 tons per day of food waste at the end of year 1
- Up to a maximum 250 TPD by end of the 3-year project
- Provide DEP and WMNY with metrics to assess overall effectiveness of the approach
- Generating enough renewable energy to heat an equivalent of approximately 2,600 NYC homes from food waste alone

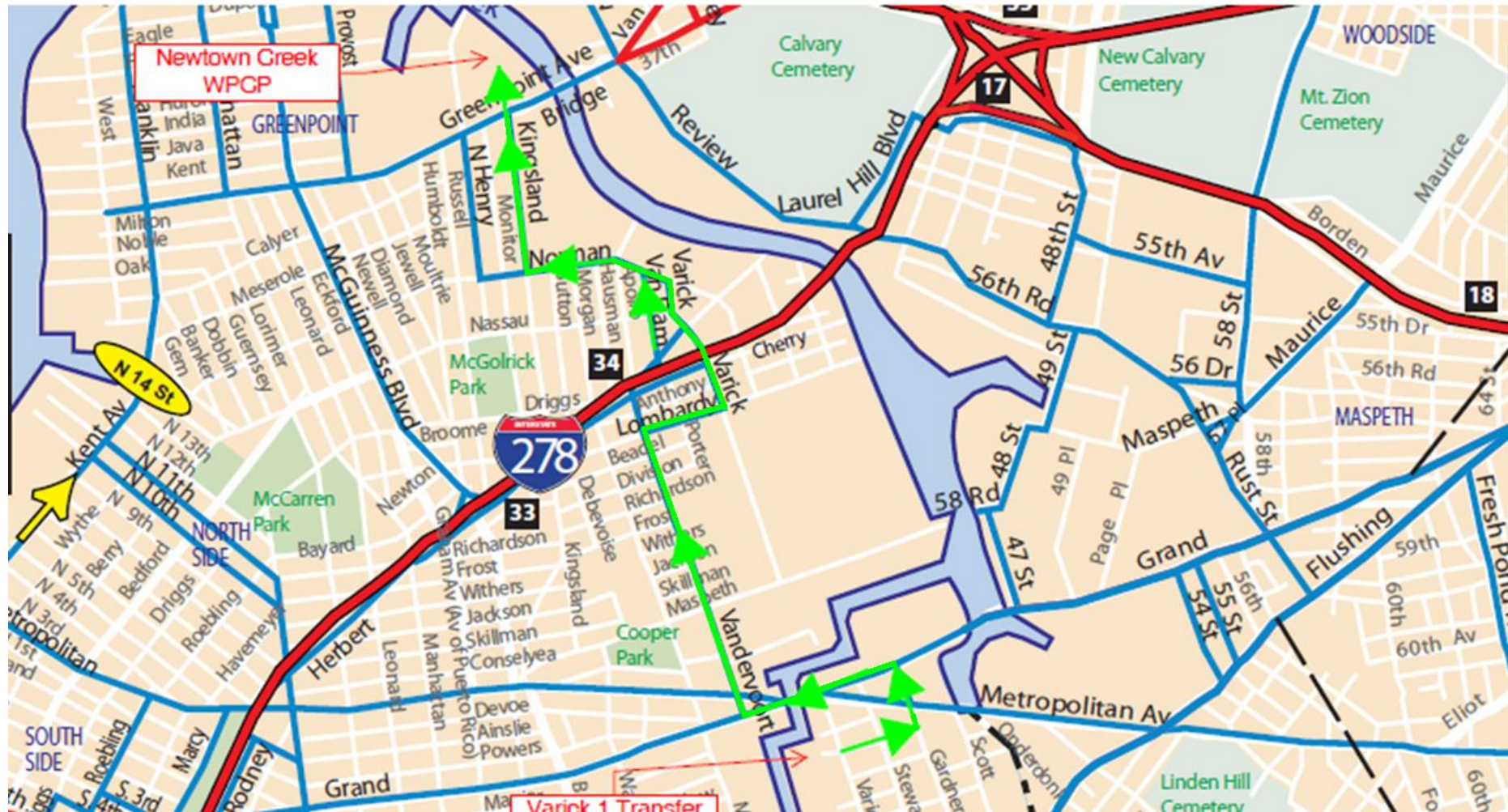


Truck Traffic (Initial & Future)



Truck Routes

Transportation Route for Tankers



Environmental and Economic Benefits



CORe[®] Facility - WMNY - NYC DEP Project Metrics @ 250 TPD of SSO

- Diversion of waste to from landfills
- Eliminate 3,500 miles per day of long-haul diesel tractor trailer trips to disposal sites
- Generate ~ renewable energy biogas from Co-digestion capable of heating nearly 2,600 New York City homes
- Reduce annual greenhouse gas emissions by more than 45,000 metric tons - the equivalent of removing nearly 9,500 cars from the road
- Help City government reach its OneNYC 80% reduction in citywide emissions (below 2006 calendar year) by 2050 and 35% reduction in emissions from municipal government operations (below 2006 fiscal year) by 2025
- Considering the use of a CNG vehicle for tanker transport



Thank you