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Appendix E

NYSDEC Natural Heritage Program dated July 2012

edr
COMPANIES

June 28, 2012

Jean Pietrusiak
New York Natural Heritage Program
625 Broadway, 5th Floor
Albany, NY 12233-4757

RE: CMW RMU-2 Facility and Mitigation Area
edr Project No. 09022

Dear Ms. Pietrusiak:

edr Companies is compiling environmental information for a proposed expansion of the existing CWM Model City Hazardous Waste Management Facility and associated wetland mitigation area, located in the Town of Porter, Niagara County, New York. The Project area is located within the Ransomville USGS 1:24,000 quadrangle (see attached project location map). Please accept this request for any information you may have concerning documented endangered and threatened wildlife and/or plant species and/or important ecological communities that may occur in or adjacent to the site.

If you have any questions regarding this data request or require additional project information, please do not hesitate to contact me at 315-471-0688. Thank you in advance for your attention to this request. We look forward to receiving your response.

Sincerely,

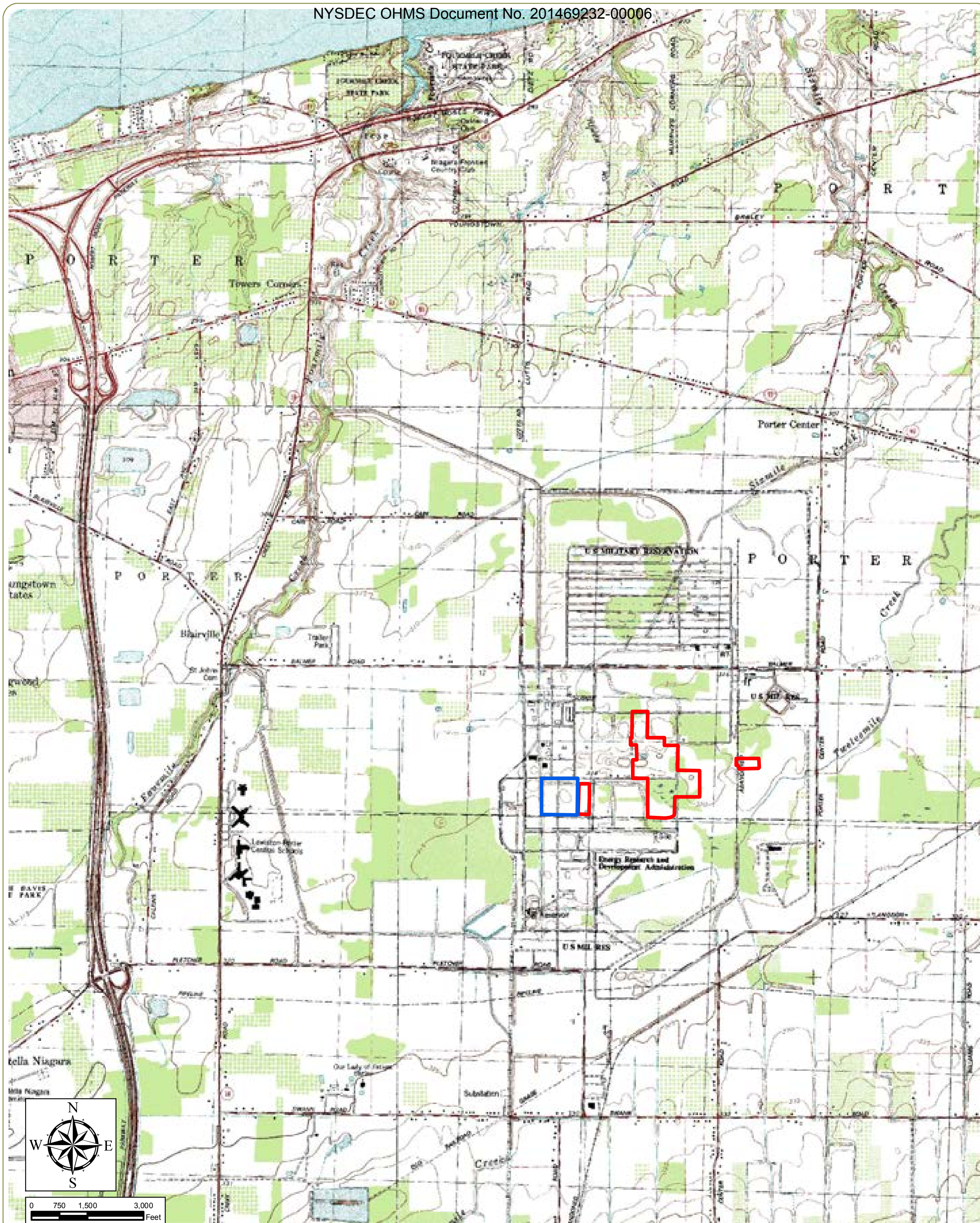
Lisa Young

Lisa Young
Senior Environmental Analyst

217 Montgomery Street, Suite 1000, Syracuse, New York 13202
P. 315.471.0688 :: F. 315.471.1061 :: www.edrcompanies.com

N 43° 02' 56", W 76° 08' 56"

NYSDEC OHMS Document No. 201469232-00006



Residuals Management Unit 2

Town of Porter, Niagara County

Project Location

June 2012

Notes: Base Map: 1 ft resolution natural color orthophotography, year 2011.

Proposed Mitigation Site

Proposed RMU-2 Site

edr COMPANIES

www.edrcompanies.com

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov

Joe Martens
Commissioner

EDR
JUL 0 9 2012
RECEIVED

July 3, 2012

Lisa Young
E D R Companies
217 Montgomery St, Suite 1000
Syracuse, NY 13202

Dear Ms. Young:

In response to your recent request, we have reviewed the New York Natural Heritage Program database, with respect to an Environmental Assessment for the proposed Hazardous Waste Management Facility expansion of existing CWM Motel City Facility, Project # 090 22, area as indicated on the map you provided, located in the Town of Porter, Niagara County.

We have no records of rare or state listed animals or plants, significant natural communities or other significant habitats, on or in the immediate vicinity of your sites.

The absence of data does not necessarily mean that rare or state-listed species, natural communities or other significant habitats do not exist on or adjacent to the proposed site. Rather, our files currently do not contain information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,
Jean Pietrusiak
Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Reg 9 , Wildlife Mgr.

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Appendix F

Exposure Information Report

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Infrastructure, environment, buildings

Imagine the result

WASTE MANAGEMENT, INC.

CWM Chemical Services, LLC.

Exposure Information Report

Residuals Management Unit 2

Model City Facility
1550 Balmer Road
Model City, Niagara County, New York

April 2003
Revised August 2009
Revised February 2013

ARCADIS

Residuals Management Unit 2
Exposure Information Report

April 2003
Revised August 2009
Revised February 2013

Tables

Figures

1. Introduction

1.1 Background Information and Purpose

The Hazardous and Solid Waste Amendments of 1984 added Section 3019 to Subtitle C of the Resource Conservation and Recovery Act (RCRA) of 1976. Under Section 3019, owners or operators of landfills or surface impoundments are required to submit exposure information about their facilities as part of a facility permit application under RCRA Section 3005(c). Specifically, Section 3019 requires the owner or operator of such a facility to provide “reasonably ascertainable” information on the potential for the public to be exposed to hazardous wastes or hazardous constituents through releases related to the unit. At a minimum, such information must address:

1. Reasonably foreseeable potential releases from both normal operations and accidents at the unit, including releases associated with transportation to or from the unit;

2. The potential pathways of human exposure to hazardous waste or constituents resulting from the releases, as described under item No. 1; and

3. The potential magnitude and nature of the human exposure resulting from such releases.

Such information, together with “other relevant information,” is then to be made available by the United States Environmental Protection Agency (USEPA) to the Agency for Toxic Substances and Disease Registry (ATSDR) within the Center for Disease Control of the United States Department of Health and Human Services. If the USEPA or any authorized state program judges that a landfill or surface impoundment poses “a substantial potential risk to human health,” then they may request the ATSDR to conduct a “health assessment” of the facility and take other appropriate action as authorized by Section 104(b) and (i) of the Comprehensive Environmental Response, Compensation and Liability Act (USEPA, 1980).

The State of New York has been authorized by the USEPA to carry out the hazardous waste management program in New York in lieu of the federal RCRA program. Pursuant to this authorization, the New York State Department of Environmental Conservation (NYSDEC) promulgated exposure information requirements identical to the federal requirements under 6 New York Codes, Rules and Regulations (NYCRR) Part 373-1.5(h)(10).

CWM Chemical Services, LLC (CWM), is submitting this Exposure Information Report (EIR) to fulfill these federal and state requirements. This EIR is an updated version of the previous EIR submitted in 1992 by CWM and has been written to specifically address Residuals Management Unit 2 (RMU-2). The earlier version served as a template document for this submittal.

1.2 Scope of Work

1.2.1 Site History

CWM owns and operates a commercial hazardous waste treatment, storage and disposal facility (TSDF) located in Model City, Niagara County, New York. The Model City Facility began operation in 1972 as ChemTrol Pollution Services, Inc. Due to corporate acquisitions and name changes, CWM Chemical Services, LLC, a subsidiary of Waste Management, Inc. (Waste Management), is present owner and operator of the facility. Waste Management is based in Houston, Texas.

The Model City Facility handles a variety of liquid, solid and semisolid organic and inorganic hazardous wastes. Its treatment, storage, disposal and recycling (TSDR) capabilities include an aqueous waste treatment system (AWTS), secure landfilling of approved waste solids and semisolids, including polychlorinated biphenyls (PCBs), container and tank storage and PCB storage.

Prior to operation as a commercial waste facility, the site was owned by the United States (U.S.) Government between the late 1930s and the 1960s and was part of the Lake Ontario Ordnance Works. U.S. Government activities at and in the vicinity of the site included explosives and solid/liquid fuel propellant research, development and production; waste storage from research, development and production conducted for the Manhattan Project and detonation of outdated or off-specification explosives. Some of these activities resulted in the contamination of certain areas of the site with organic and inorganic chemicals and low-level radioactive wastes. These areas were subjected to decontamination efforts during the 1960s by the Atomic Energy Commission and the New York State Department of Health (NYSDOH). Additional radioactive-contaminated areas on the site were addressed by the U.S. Department of Energy (USDOE) and the NYSDOH in the early to mid-1980s. The U.S. Department of Defense has an ongoing remedial investigation and feasibility study of areas of the site formerly associated with the manufacturing of trinitrotoluene and fuel repellant research and development. Contributions from these areas to on-site releases of hazardous materials are not within the scope of this report.

1.2.2 Scope of Work

An EIR was initially prepared in 1985 for the Model City Facility and addressed potential exposures to contaminants in groundwater, surface water, air, subsurface gas and soil due to potential releases from the then current activities at the Model City Facility. The 1985 EIR was then updated in 1987 to reflect changes in facility operations that had occurred over the past 2 years, as well as to address the proposed construction and operation of an additional secure landfill, SLF-12, at the site. The 1987 report considered the following issues: releases during normal operations, releases resulting from accidents, both on site and off site during transportation and the possible off-site explosion hazard created by methane migration. Qualitative information was largely provided on known releases, as well as the potential for releases in the future. Emphasis was placed on the existing units in view of the uncertainties relating to future waste characterization and facility operations.

In June 1992, the EIR was updated to reflect changes to the Model City Facility since the previous submittal and the proposed construction and operation of Residuals Management Unit 1 (RMU-1). Potential exposure pathways were evaluated for RMU-1 and its associated waste truck hauling route. Air, surface-water, groundwater and subsurface gas pathways were also evaluated.

This latest document represents the most recent update of the EIR for the Model City Facility. This EIR reflects the changes to the Model City Facility that have occurred since the last submittal, June 1992, as well as the proposed construction and operation of the new residuals management unit, RMU-2.

1.3 Organization of Report

This EIR, written specifically for RMU-2, is organized into the following sections:

1. A description of the site setting, with particular reference to human exposure pathways, is located in Section 2.

2. A description of the Model City Facility operations relevant to the EIR is located in Section 3.

3. Information regarding the potential for off-site human exposure via the air pathway is located in Section 4.

4. Information regarding the potential for off-site human exposure via the surface-water pathway is located in Section 5.

5. Information regarding the potential for off-site human exposure via the groundwater pathway is located in Section 6.

6. Information regarding the potential for off-site human exposure associated with subsurface gas migration and soil contamination, including radiological exposure, is located in Section 7.

7. Information regarding on-site management practices is located in Section 8.

2. Site Setting and Potential Receptor Locations

2.1 Model City Facility Description

CWM's Model City Facility is a fully permitted TSDR facility located in Niagara County, New York. The facility utilizes state-of-the-art technologies for the proper management of a wide variety of liquid, solid and semisolid organic and inorganic hazardous and PCB wastes. The existing on-site operations include secure land burial of approved waste solids and semisolids, waste stabilization, solvent and fuel recovery processes, hazardous waste storage, PCB storage and an AWTS. The on-site facilities include a drum storage and handling building, a waste stabilization facility, an aqueous waste treatment plant, a fully equipped analytical laboratory, personnel facilities, an administration building, data processing systems, fire protection equipment, truck wash, maintenance facilities and all necessary utilities. The entire Model City Facility is enclosed by a chain-link fence, the entrance gates of which are monitored 24 hours a day.

2.2 Environmental Setting

The Model City Facility is located in Niagara County, New York; approximately 3.4 miles east of the Canadian border (Figure 1). The Model City Facility occupies approximately 710 acres, of which, 630 acres may be permitted for hazardous waste operations, located in the Towns of Lewiston and Porter. All previous and current waste management activities at the Model City Facility lie within the Town of Porter. The property was formerly owned by the U.S. Government and was used for various research and development projects. There is a U.S. military reservation immediately north of the site and a USDOE property to the south of the site. The immediate area (i.e., the area within a 1-mile radius of the site) is rural and sparsely populated with an average of one person per 2 acres of land. The county as a whole has a number of nearby small towns and villages as summarized below (2000 U.S. Census data):

- Hamlet of Ransomville – population 5,836 and located 3.2 miles east-northeast;
- Village of Lewiston – population 2,781 and located 4.0 miles southwest;
- Village of Youngstown – population 1,957 and located 2.8 miles northwest;

- The Tuscarora Indian Reservation – population 1,138 and located 3.4 miles south-southeast;
- Town of Lewiston – population 16,257 (a portion of the facility is located within the Town of Lewiston); and
- Town of Porter – population 6,920 (a portion of the facility is located within the Town of Porter).

Another nearby population group is the Lewiston-Porter Central Schools located approximately 2 miles west of the Model City Facility. During the school year (September through June), there may be approximately 2,300 students in grades 1 through 12 in attendance during school hours.

The nearest private home is approximately 2,200 feet northeast of the site boundary near the intersection of Balmer and Porter Center roads. The residents living in the vicinity of the Model City Facility could potentially be affected by direct and indirect exposure to contaminants released into the ambient air, surface water and groundwater through construction and operation of RMU-2.

The Model City Facility occupies property that overlaps the boundaries of the Towns of Lewiston and Porter. A major portion of the Model City Facility lies within the Town of Porter and is zoned M-3, Heavy Industrial. All other property, within the Town of Porter, at the Model City Facility is zoned M-2, General Industrial. The proposed RMU-2 lies within the M-3 portion of the property and is consistent with planned and historical use of the area.

The Town of Lewiston portion of the Model City Facility is zoned I-2, Heavy Industry, while all surrounding Town of Lewiston land is zoned I-1, Industrial Housing permitted. Outside of the areas zoned for industry in both the towns of Lewiston and Porter, the land is zoned residential and agricultural.

The direction and speed of winds in the area, as measured at the meteorological station in Model City, is presented in a wind rose located in the RMU-2 Part 373 Permit Application. Winds generally originate from the west and southwest. Annual precipitation at the Model City Facility over a 6-year period (2003 to 2008) averaged approximately 29.11 inches.

The region around and including the Model City Facility is part of the Iroquois Lake Plain. The land surface slopes gently to the north towards Lake Ontario. Ground elevations on the site property vary from 308 to 338 feet above sea level with an increasing elevation moving from north to south. The majority of the site is relatively flat, with the exception of man-made structures, such as berms and landfills. Runoff from the site is directed by berms and drainage ditches to either the west drainage ditch that flows into Six Mile Swale, or to a stormwater retention basin that is discussed in greater detail in Section 5 of this EIR. All runoff from the developed portions of the Model City Facility is collected and tested prior to discharge.

As indicated on Figure 1, the surface waters within a 3-mile radius of the facility are Four Mile Creek, 1.6 miles west and Twelve Mile Creek, 1,600 feet east. It should be noted that Lake Ontario is approximately 3.2 miles north of the site and the Niagara River is approximately 3.1 miles to the west. According to the New York State (NYS) Stream Classifications, creeks in the vicinity of the Model City Facility are Class C streams suitable for the survival of fish, but due to natural conditions (i.e., intermittent flow) may not support their propagation. Four Mile Creek flows into Lake Ontario approximately 3.5 miles north of the site.

Approximately 3.4 miles west of the site, the Niagara River flows north towards Lake Ontario. The nearest U.S. drinking water intake to the Model City Facility is approximately 10 miles upstream from the site and serves Niagara County (Lewiston Water Department, July 1985). Another drinking water intake was previously located approximately 4 miles west-northwest of the site, downstream near the confluence of Niagara River and Lake Ontario (Lewiston Water Department, July 1985). This drinking water intake served the Canadian city of Niagara-On-The-Lake and is no longer active.

The hydrogeology of the site is described in the RMU-2 Part 373 Permit Application. A brief summary of local hydrogeology follows. The Model City Facility, as well as all of Niagara County, is underlain by the Queenston Shale bedrock formation. The bedrock is approximately 1,000 feet thick and is located 50 to 60 feet below the ground surface in the vicinity of the site. The bedrock is overlain with unconsolidated deposits, 15 to 20 feet of which are Glacial Tills in the uppermost layer. The vertical hydraulic conductivity for the Glacial Tills ranges from 6.0×10^{-7} centimeters per second (cm/sec) for the Upper Clay Till to 1.0×10^{-7} cm/sec for the Middle Silt Till. Below the Glacial Till, there is 7 to 20 feet of Glaciolacustrine Clay that has a vertical permeability of 2.0×10^{-8} cm/sec. The clay is underlain by 5 to 10 feet of Glaciolacustrine Silt and Sand.

This silt and sand aquifer has been identified by CWM and its consultants as the uppermost aquifer at the site. Primary aquifer recharge is from vertical flow through the Upper Glacial Tills. Five feet of Basal Red Till separate this aquifer from the bedrock. Groundwater quality analyses indicate that the water in this aquifer is saline and contains high levels of total dissolved solids (TDS), making it generally unsuitable for use as a drinking water supply. The near surface-water table in the upper tills is also considered to be part of the uppermost water-bearing unit by the NYSDEC. There are nine known private wells within 1 mile of the Model City Facility. As presented in the report, *Water Supply Well Inventory* (Golder, July 2008), two of these wells are used as a non-potable water source and the other seven wells are no longer used. According to the Town of Porter Water Authority, Balmer Road is on public water supply.

2.3 Access Route

All ingoing and outgoing shipments at the Model City Facility are currently handled by truck. Trucks approaching the Model City Facility travel along Interstate Routes 90 or 290, to 190, to NYS Route 104. From NYS Route 104, trucks travel north on NYS Route 18 and east on Balmer Road to the Model City Facility entrance. In accordance with the current Citizen's Advisory Committee Agreement for the Model City Facility, all trucks approaching and leaving the site are required to follow this route. Stopping or standing along the designated route or traveling in convoys is prohibited in Niagara County, as is entering Niagara County except during normal site operating hours.

3. Facility Operations

3.1 Waste Characterization

The Model City Facility receives and manages many of the types of hazardous waste identified and listed in 6 NYCRR Part 371. A complete list of these wastes, including USEPA identification numbers and substance descriptions, is presented in CWM's Site-Wide Part 373 Permit. The Model City Facility also receives and manages other industrial wastes listed in 6 NYCRR Part 371 (e.g., PCB wastes and site cleanup wastes). Wastes received at the Model City Facility include liquids, semisolids and solids in both bulk and container (principally drum) shipments. The nature of the wastes received at the Model City Facility has changed over the last several years to reflect the receipt of increased quantities of primarily inorganic waste streams, due to the phase-in of the Federal Land Disposal Restrictions (LDR).

Wastes specifically excluded by the Model City Facility are municipal garbage and refuse, radioactive wastes, infectious wastes, explosive, shock sensitive and pyrophoric wastes.

3.2 Treatment, Storage and Disposal Units

All hazardous wastes received and managed by the Model City Facility are delivered by truck. As described in CWM's Site-Wide Part 373 Permit, hazardous waste operations currently utilized at the Model City Facility include container storage, handling and processing; aqueous waste treatment; secure landfill disposal and PCB storage and disposal operations.

The wastes and operations associated with the landfill will be reviewed in detail in this EIR. In the planning horizon of this EIR, it is anticipated that certain changes and improvements will be made to the Model City Facility. Proposed facility modifications include:

1. The construction of a new residuals management unit, RMU-2.

2. Relocation of existing buildings and structures.

3. Upgrade of existing Facultative (Fac) Ponds 1 and 2.

4. Abandonment of Fac Ponds 3 and 8.

5. The construction of a new surface impoundment for treated wastewater, Fac Pond 5.

Additional information concerning the construction and operation of the residuals management unit is presented in the Part 373 Permit Application for RMU-2.

Each of the intermediate and final treatment, storage and disposal units at the Model City Facility associated with wastes managed by landfill or surface impoundment units at the facility, both current and proposed, is described in the following sections.

3.2.1 Container Processing

Containers are processed in one of four ways at the Model City Facility. The liquid aqueous wastes are transferred to the aqueous treatment system. Liquid organic wastes, such as solvents and oils, are transferred to other containers or tankers for eventual off-site treatment or disposal. The solid materials are disposed in landfill cells. Materials not suitable for treatment at the Model City Facility are shipped to other off-site TSDFs. Drum decanting is used to transfer liquid wastes from containers (e.g., drums) to the bulk storage tanks and then transferred for treatment, recovery or disposal of the liquid phases. Empty drums (i.e., drums with less than 1 inch of residual) from the decant operations are buried in the landfill. Organic sludges from the phase separation process are shipped off site for incineration. Details concerning the operation of the decant process and phase separation process are located in CWM's Site-Wide Part 373 Permit.

3.2.2 Truck Wash

Vehicles or any other equipment that has entered the landfill facility, where it has come into direct contact with waste, will be inspected for gross contamination prior to leaving the landfill area. Any gross contamination identified on the wheels or equipment will be physically removed, and tires and external surfaces will be washed before leaving the area to prevent contamination of on-site or off-site roads. Only those areas on the vehicle that may come in contact with waste are required to be cleaned. Typically, these areas consist of wheel wells, tires and undercarriage.

3.2.3 PCB Waste Processing

The Model City Facility's PCB waste processing activities are currently limited to storage of PCB oils in drums on site prior to off-site shipment for incineration and landfilling of whole, drained transformers that contain less than 500 parts per million (ppm) PCBs and PCB-contaminated soils. The Model City Facility no longer accepts, for decommissioning, undrained PCB transformers (i.e., containing greater than or equal to 500 ppm PCBs).

3.2.4 Waste Stabilization

Stabilization is used to reduce the mobility of hazardous constituents within the waste material. At the Model City Facility, stabilization is achieved through the induction of a chemical reaction in the wastes using one or more stabilization agents, such as cement kiln dust, lime or other pozzolanic agents. Typical wastes that are stabilized at the Model City Facility include water treatment sludges, heavy metal contaminated soils, emission control dusts and sand-blasting grit. Waste stabilization is conducted in two subsurface metal pits where the waste and reagents are mixed by an excavator.

Depending upon the waste analysis plan developed for a particular material, stabilization wastes may be tested before placement in a secure landfill cell.

3.2.5 Landfill

Currently, most of the solid wastes received at the Model City Facility are disposed by landfilling, either directly or after pretreatment. Landfill operations began at the site in 1971. There are currently 10 closed landfills and one active residuals management unit (RMU-1) on the site. RMU-1 is divided into 14 cells and is projected to be at full capacity in about 2013. The waste streams received for landfilling are listed in CWM's Site-Wide Part 373 Permit.

A separate permit application covers the proposal to construct and operate RMU-2 that is to be used once the capacity of RMU-1 is reached. The need for RMU-2 is based on the hazardous and industrial non-hazardous waste generation/disposal deficit that will become acute when RMU-1 is closed. RMU-2 may also be needed to meet requirements for disposal of on-site remediation work involving historical sources of contamination. RMU-2 has been designed to occupy an approximately 43.5-acre area at the Model City Facility. When completed, RMU-2 will be an irregular-shaped pyramidal mound with a top height above existing ground by approximately 120 feet.

The proposed unit will be a secure hazardous waste landfill employing state-of-the-art design and operating technology. RMU-2 will meet or exceed design requirements for hazardous waste landfills under New York and federal regulations. It will contain both a primary and a secondary composite liner and independent primary and secondary leachate collection and pumping systems. The unit will be designed with six cells numbered 15 through 20. Maximum waste quantities to be accepted at RMU-2 are expected to average 41,667 tons per month. The design gross airspace between the top liner system and the bottom of the final cover system is approximately 4,008,100 cubic yards (cy), of which, 3,911,900 cy will be available for waste placement. The estimated site life of RMU-2 is at least 11.1 years, based on the current maximum annual gate receipts of 500,000 tons per year for RMU-1 and an in-place waste density of 1.5 tons per cy. Based on the current rate of waste receipts, the active life of RMU-2 is likely approximately 20 to 25 years.

Wastes that will be accepted for disposal in RMU-2 include heavy metals, PCB-contaminated solids, industrial non-hazardous wastes, filter cake from the on-site wastewater treatment plant and materials from off-site and on-site remedial activities. All wastes destined for disposal in RMU-2 will meet the USEPA's LDRs.

3.2.6 Aqueous Waste Treatment System and Surface Impoundments

The AWTS is designed to treat on-site waters, landfill leachate and gate receipts from customers. The system occupies approximately 2 acres, and is located at the western edge of the existing operating facility. The facility features enclosed tanks for receipt of waste materials, reaction vessels for the precipitation of metals and cyanide from the wastes, filter presses and multi-media filters for the removal of solids, biotowers for the removal of soluble organics (alcohols and ketones), carbon adsorption for the capture of residual organics and storage tanks for the treated wastes. Treated wastewater is transferred to Fac ponds for storage and qualification prior to discharge to the Niagara River in accordance with CWM's State Pollutant Discharge Elimination System (SPDES) Permit. The alkalization/metals precipitation process, lime slurry feed, filter presses and gate receipt operation are housed in the 10,000-square-foot Aqueous Treatment Building, as well as with the control room, laboratory and offices. The 1,500-square-foot Water Treatment Building houses the multi-media filters and carbon adsorption processes. The system features a programmable logic controller (PLC) to monitor operational transfers of materials within the facility. The PLC is also used to ensure system safety by interlocking various control equipment.

The AWTS has been designed to be flexible in the treatment of waste streams. Using the AWTS in a modular fashion (i.e., selective use of treatment steps, repetitive sequencing) provides flexibility for the treatment of more difficult streams.

Existing Fac Ponds 1, 2 and 3 are currently used for storage of treated wastewater. Treated wastewater is discharged from the AWTS into Fac Ponds 1 and 2 and then periodically transferred to Fac Pond 3. Wastewater stored in Fac Pond 3 is discharged to the Niagara River following approval of pre-qualification testing. Fac Pond 8, located west of RMU-1, is currently undergoing closure in accordance with the Site-Wide Part 373 closure requirements. Fac Ponds 8 and 3 are located within the proposed RMU-2 footprint and will be eliminated. In order to compensate for the treated wastewater volume reduction due to the removal of Fac Ponds 3 and 8, existing Fac Ponds 1 and 2, located west of SLF 1-6, will be upgraded to increase capacity and a new Fac Pond 5 will be located between SLF-7 and SLF-12. Fac Pond 5 will serve as the final qualification pond.

3.2.7 Relocated Facilities

The proposed location for RMU-2 is within an existing developed portion of the Model City Facility currently occupied by the following structures, buildings and operational areas, which are currently permitted under 6 NYCRR Part 373:

1. SLF-10 Leachate Collection Building Unloading Ramp;
2. SLF 1-11 Oil/Water Separator Building Transfer Ramp;
3. Stabilization Trailer Parking Areas;
4. Full Trailer Parking Area; and
5. Drum Management Building.

The proposed RMU-2 site will require the existing SLF-10 Leachate Collection Building Unloading Ramp to be relocated. The existing ramp, currently extending from the northern wall of the SLF-10 Leachate Collection Building will be removed following the construction of a new ramp extending from the southern wall of the building. Similarly, the transfer ramp for the SLF 1-11 Oil/Water Separator Building will be relocated. Details of the new SLF-10 Leachate Collection Building Unloading Ramp and the SLF 1-11 Oil/Water Separator Building transfer ramp are provided on Permit Drawing Nos. 37 and 38 of the *RMU-2 Engineering Report* (ARCADIS, April 2003, Revised August 2009).

The existing Stabilization Trailer Parking Area and Full Trailer Parking Area used for temporary storage of large containers (e.g., rolloffs) will be impacted by the construction of RMU-2. These areas will be rebuilt outside of the RMU-2 footprint.

The proposed RMU-2 site will require the existing Drum Management Building to be relocated. The existing Drum Management Building, located west of RMU-1, will be removed following construction of a new Drum Management Building to be located east of RMU-1.

3.3 Permits and Compliance Record

Permits for the operation of all waste management units, including the landfill and surface impoundments, at the Model City Facility, issued by the NYSDEC and USEPA Region 2, are listed in the facility's Part A RCRA Permit. The current 6 NYCRR Part 373 Hazardous Waste Permit was issued by the NYSDEC effective August 5, 2005, with an expiration date of August 5, 2010.

The original SPDES Permit for the Model City Facility was issued on November 16, 1974 and permitted discharge of 100,000 gallons per day of treated effluent to an outfall in the Niagara River. Permit modifications made in 1978 did not modify the permitted volume, but established conditions under which a portion of the discharge could be made to Six Mile Creek. Following the granting of permits by the Department of the Army and the NYSDEC to construct a 10-inch-diameter outfall pipeline to the Niagara River, with a diffuser outlet at the point of discharge, the SPDES Permit was modified in 1980 to increase the rate of treated wastewater discharge to a maximum of 1,000,000 gallons per day. The NYSDEC issued a new SPDES Permit No. NY0072061 to CWM, effective October 8, 1993, with an expiration date of October 1, 1998. This permit contains the requirements for the discharge of treated wastewater to the Niagara River and point source discharge of stormwater off site. CWM submitted a SPDES Permit renewal application on March 6, 1998 that was approved by the NYSDEC on May 11, 1998, with an expiration date of October 1, 2003. All terms and conditions remained unchanged. Subsequent modifications initiated by the NYSDEC on February 11, 2000 and December 4, 2000 have significantly increased monitoring of treated wastewater and stormwater discharges and decreased allowable effluent limits. A SPDES Permit renewal was issued by the NYSDEC effective October 1, 2003, with an expiration date of October 1, 2008. On October 5, 2007, the NYSDEC initiated a draft modification to the CWM SPDES Permit with several significant proposed revisions. This modification is pending. On April 2, 2008, the NYSDEC extended the existing SPDES Permit until the proposed modification is finalized.

RCRA inspections are performed by the NYSDEC and USEPA Region 2. Toxic Substance Control Act (TSCA) inspections are performed by USEPA Region 2. The NYSDEC provides up to three full-time, on-site inspectors at the facility. Copies of the NYSDEC monitor's inspection reports can be found at the NYSDEC in Buffalo, New York and Albany, New York and at USEPA Region 2 in New York, New York. Health inspections are conducted by the Niagara County Health Department.

CWM has been in substantial compliance with all permits, regulations and standards applicable to all waste management units at the Model City Facility.

4. Air Exposure Pathway

4.1 General

To assess potential human exposures via the air exposure pathway due to construction and operation of RMU-2, Fac Pond 1/2, Fac Pond 5 and the relocated facilities, two categories of potential emissions were considered: 1) long-term, low-level releases resulting from fugitive emissions, losses from control and containment systems and controlled discharges and 2) short-term releases associated with upset and accident conditions. Based on the waste types handled at the Model City Facility, these categories were further subdivided into:

A. Long-Term, Low-Level Releases

- Emissions of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs); and
- Emissions of particulates.

B. Short-Term Releases

- Accidental mixing of incompatible wastes;
- Accidental ignition of wastes;
- Leaks and spills; and
- Traffic accidents.

This section provides the basis for the discussion of air exposure. In the case of potential long-term releases, information is provided on the control measures that prevent or limit releases. Particulate, VOCs and SVOC monitoring data are summarized and evaluated. In addition, using the USEPA's Industrial Source Complex Short-term (ISCST) atmospheric dispersion model, modeling data on volatile chemicals emitted from RMU-1 leachate and lift stations are provided and compared with NYS Annual Guideline Concentrations (AGCs). The results of the ISCST modeling for RMU-1 are applicable to RMU-2 based on the similar types of wastes to be disposed in RMU-2.

In the case of potential short-term releases, preventive measures and contingency plans incorporated in the facility operating procedure are described.

4.2 Long-Term, Low-Level Emissions

4.2.1 Volatile and Semivolatile Organic Chemicals

4.2.1.1 Emission Sources

The landfill units at the Model City Facility contain a number of organic chemicals that may volatilize and contribute to contamination of the ambient air. To minimize volatile emissions from landfills, the closed units on site have been capped with compacted clay and a synthetic liner, as well as soil and vegetation. In RMU-2, the emissions will be minimized by utilizing the following procedures:

1. Cover will be placed daily over all bulk waste deposited in the landfill cells;

2. Highly volatile wastes will be covered immediately after deposition; and

3. Drums will be covered to within two rows of the edge of the drum layer (two rows of drums remain uncovered to facilitate the placement of additional drums).

Volatile emissions that may potentially occur during the operation phase of RMU-2 will be short-term releases related to accidents, leaks and spills. The mitigation measures that will be employed to address short-term volatile releases are discussed in Section 4.3. Volatilization of organic constituents from the landfill will be minimized by compliance with LDRs that prohibit land disposal of highly organic hazardous wastes prior to treatment using best available technology that will limit hazardous constituent releases.

4.2.1.2 Ambient Air Monitoring Network

In 1984, the Model City Facility established an ambient air monitoring network. Originally, four monitoring stations were located along the north, east and west boundaries of the site. There are currently six monitoring stations. Data from these six monitoring stations include emissions from all on-site operations. These monitoring data are submitted on a monthly basis to the Buffalo and Albany offices of the NYSDEC.

The Model City Facility is located within the Niagara Frontier Air Quality Control Region. The status of the region with respect to the National Ambient Air Quality Standards (NAAQS) is attainment with respect to carbon monoxide, lead, sulfur dioxide, nitrogen dioxide and respirable particulates (PM-10). With respect to ozone, the USEPA has included NYS as part of the Northeast Ozone Transport Region. However, the USEPA has determined that the Buffalo-Niagara Falls area, specifically including Erie and Niagara County, is a Marginal Ozone Non-Attainment area.

The region is also covered by NYS AAQS. Regional air quality data has historically showed all monitoring stations within the region to be in compliance with NYS AAQS. Annual regional averages for 2003 to 2007 are shown in Table 1.

All NYS monitoring sites were in compliance with standards for sulfur dioxide, total suspended particulate, carbon monoxide, ozone, nitrogen dioxide and lead. Monitoring for sulfates, nitrates and PM-10 was also performed. The prevailing winds are predominantly from the southwest.

The Model City Facility currently has six ambient air monitoring stations, one predominantly upwind and five downwind. The facility also maintains “non-routine” air monitoring equipment and a meteorological (MET) monitoring system. During its operational history, facility-wide ambient air testing has been performed for TSP, PCBs, SVOCs, VOCs and PM-10, in addition to real-time analysis for PM-10 and VOCs at the perimeter of an operating landfill.

The location of the Ambient Air Monitoring Network is shown on Figure 2. Each location is equipped with dedicated systems to monitor for PM-10. Figure 2 also shows the location of the MET system. This system is capable of collecting and recording site wind speed, direction and variability, temperature, barometric pressure, dew point and precipitation. As a result of RMU-2 construction, the MET system will be relocated.

The following paragraphs summarize, to date, the monitoring results for PM-10, PCB-Air, SVOCs and VOCs.

4.2.1.3 Polychlorinated Biphenyls and Semivolatile Organic Compounds

Air monitoring for total PCBs occurred from March 6, 1987 through August 8, 1990. The PCB air monitoring program was revised in August 1990, to also include the following SVOCs:

- a-BHC;
- b-BHC;
- q-BHC;
- a-Chlordane;
- q-Chlordane; and
- Hexachlorobenzene.

Samples were collected for these individual compounds and the seven PCB isomers for 24 hours once every 12 days in accordance with the NYSDEC-approved *Routine Semi-Volatile Organic Compound Monitoring QA/QC Plan*.

In February 1992, the NYSDEC allowed CWM to discontinue monitoring for a-BHC, b-BHC, q-BHC, a-Chlordane, q-Chlordane and Hexachlorobenzene because no concentrations of these compounds had ever been detected (see H. Sandonato to M. Antonetti, 02-19-92).

In August 1996, the NYSDEC approved a request by CWM to discontinue monitoring for PCBs. The request and subsequent approval was based on a combination of years of data that demonstrated that PCBs were rarely detected, there were no significant differences between upwind and downwind samples and processes at the Model City Facility that were originally focused on PCB waste treatment were eliminated.

4.2.1.4 Volatile Organic Compounds

The NYSDEC approved the elimination of VOC real-time monitoring at the operating landfill in 1994 after data showed no significant differences between upwind and downwind samples. Perimeter VOC ambient air monitoring was performed at the Model City Facility starting August 1984. Samples were collected monthly from the six air stations located around the perimeter of the Model City Facility. All samples were analyzed for 22 different VOCs. The VOC concentrations at the six stations were similar and consistent regardless of the on-site activities. The VOC ambient air monitoring program’s purpose was to monitor upstream and downstream air quality and vapor emissions from the Fuels Blending operation, the Flash Distillation process and wastewater management in Lagoons and Salts Areas. The Flash Distillation process has been dismantled, the Fuels Blending Tank Farm is closed and has been removed and the Lagoons and Salts Areas have been covered with an engineered final cover system. In January 2000, CWM requested that the VOC ambient air monitoring program be suspended citing that the original purpose of the program no longer existed. On August 9, 2000, the NYSDEC approved the suspension of the VOC ambient air monitoring program.

4.2.1.5 Air Dispersion Modeling

The ISCST air dispersion model was used to estimate the annual average concentration of volatile chemicals at the fenceline of the Model City Facility as part of the 1992 RMU-1 EIR. The estimated concentrations at the property fenceline were all below the AGCs listed in the NYS Air Guide-1 (NYSDEC, 1991). These chemicals would also be emitted from the risers and lift station of RMU-2 but at lower concentrations due to the continued reduction of organics allowed in wastes for land disposal as specified in the LDRs. Therefore, the previous air dispersion model should be considered a worst-case for the types of waste that will be disposed in RMU-2.

4.2.2 Particulate Matter

4.2.2.1 Emissions Sources

A potential source of emissions associated with the construction and operation of RMU-2, as well as the closure of the existing Drum Management Building, installation of the new Drum Management Building, construction of new Fac Pond 5 and upgrade of Fac Ponds 1 and 2, is the emission of contaminated particulates (dust) into the ambient air.

Fugitive dust may result from traffic, operation of equipment and earth moving, including land clearing, demolition, excavation, landfill construction and disposal operations. Emissions of fugitive dusts will vary depending on the type of operation, level of activity and MET conditions. For instance, fugitive dust will increase with an increase of truck traffic, temperature, aridity and wind. It should be noted that these factors are not independent of each other in the production of dusty conditions. CWM currently has a Fugitive Dust Control Plan for the Model City Facility.

The plan requires identification of loads prone to dusting and adequate wetting of the waste before and during unloading. The plan also requires dust suppression of all internal roads used by waste hauling vehicles. The Model City Facility operates a PM-10 air monitoring network to determine ambient dust levels.

The fugitive dust control measures detailed in the Fugitive Dust Control Plan have consistently resulted in particulate matter levels below the AAQS. If the monitoring network begins to indicate levels above the standards, CWM will investigate the cause and revise the Fugitive Dust Control Plan as necessary.

4.2.2.2 Ambient Air Monitoring

CWM has an ambient air monitoring program for PM-10. This program determines the impact, if any, of the hazardous waste activities and other site activities on the surrounding air quality at the Model City Facility. This ambient air monitoring program has been approved by the NYSDEC.

This monitoring program demonstrates CWM’s compliance with the national primary and secondary 24-hour AAQS for particulate matter of 150 micrograms per cubic meter (µg/m^3), 24-hour average concentration. The level of the national primary and secondary annual standards for particulate matter is 50 (µg/m^3), annual arithmetic mean. Respirable particulates (PM) are monitored at six locations at the Model City Facility. CWM’s current mitigative measures for PM-10 emissions will be employed by RMU-2.

The PM-10 network measures respirable dust 10 micrometers or less in diameter for 24 hours once every 6 days in accordance with the NYSDEC-approved *PM-10 Monitoring System QA/QC Manual*. The monitoring data collected to date indicates that the facility meets the AAQS for industrial areas for PM-10 per Title 40 Code of Federal Regulations Part 50.6 and that dust contributions resulting from facility operations are minimal.

Particulate air dispersion modeling was completed in 2009 (*Air Dispersion Modeling Report, Ambient Air Quality Impact Analysis*, August 2009 by Conestoga-Rovers & Associates). The most significant potential emission sources, including RMU-1 and the Stabilization Facility, were modeled. Based on the results of the air dispersion models of ground level concentrations at on-site and off-site receptor locations for PM-10 and PM-2.5, emissions from the Model City Facility are not predicted to exceed, or significantly approach, applicable USEPA and NYSDEC standards. The six existing ambient air monitoring stations were determined to adequately measure and represent the condition of airborne particulates at CWM.

4.3 Short-Term Emissions

Short-term releases of emissions, primarily VOCs and SVOCs, could potentially occur during the operation activities of RMU-2 as a result of accidental mixing of incompatible wastes, accidental ignition of wastes, leaks and spills and traffic accidents. These sources of short-term emissions, as they relate to operation activities at RMU-2, are described in the following sections.

4.3.1 Accidental Mixing of Incompatible Wastes

With respect to short-term releases, the occurrence of incidents resulting from mixing of incompatible wastes is minimized through analysis of wastes prior to processing, in accordance with the Model City Facility's Waste Analysis Plan (WAP). The WAP results in the proper identification and segregation of wastes that may be incompatible. In addition, the landfill cells are designed to provide segregation of incompatible wastes. Acid-sensitive and acid-generating wastes are disposed only in designated areas of the landfill and separated by at least a 50-foot horizontal buffer distance. These measures are further discussed in CWM's Part 373 Permit.

Further minimization of the potential for releases of volatiles is realized through the provisions of the LDRs that prohibit land disposal of hazardous wastes unless those wastes have been treated in a manner that substantially reduces the likelihood of migration of hazardous constituents from the waste. In order to minimize potential exposures, treatment standards are based upon Best Demonstrated Achievable Technology for a particular waste.

Measures to prevent mixing of incompatible wastes are described in CWM's Site-Wide Part 373 Permit. Solids containing free cyanide and sulfide will be disposed in the acid-sensitive area of the landfill to prevent contact with acids. To prevent disposal of unsuspected cyanide and sulfide with incompatibles in RMU-2, a screening test will be performed on all incoming wastes that have waste soluble components and a pH greater than 7.

4.3.2 Accidental Ignition of Wastes

Specific measures are taken to prevent ignition of wastes, such as adequate separation of ignitable wastes from ignition sources. These measures are, with regards to RMU-2, the analysis of wastes and the separation and protection of wastes from sources of ignition. An inspection program plan will provide weekly operational checks of all fire and safety equipment. These measures are further discussed in CWM's Site-Wide Part 373 Permit.

4.3.3 On-Site Leaks and Spills

Emissions of volatile organic chemicals can potentially occur as a result of episodic leaks and spills. Spill events have occurred at the Model City Facility, mostly associated with tank truck unloading operations and equipment failures (e.g., pumps, valves and pipes), that is, primarily not related to landfilling operations. There have also been incidents of leaking drums and tanks. However, in most cases, the spills or leaks have been contained within concrete containment areas, bermed areas or ditches that were quickly dammed downgradient from the spill area and the hazardous material immediately removed and treated or disposed on site.

Free liquids are not accepted for landfilling. Therefore, any spills or leaks at RMU-2 will be either wastes containing no free liquids, or possibly leachate from the leachate collection and handling system. To minimize the potential leaks or spills from the leachate piping system at RMU-2, all underground piping will be double-walled and the unit will be inspected regularly for malfunction, deterioration, failure, operator error or other conditions that could result in unanticipated emissions. Repair orders will be issued accordingly, as described in CWM's Site-Wide Part 373 Permit. All inspections will be performed by qualified and trained individuals.

The potential for volatilization of organics, in the event of a spill or leak, will depend on the nature of the waste spilled and the speed at which the spill is cleaned up. To minimize releases to the atmosphere, the Model City Facility's Contingency Plan, provides procedures for the control, containment and cleanup of minor releases by trained emergency response team personnel. CWM has agreements with local off-site emergency providers to react to larger spills and major incidents.

To facilitate the response procedures, the Model City Facility maintains a large inventory of operating equipment that is available for containing and cleaning up an on- and off-site spill. The Emergency Coordinator, as designated in the Contingency Plan, is responsible for assembling the required response equipment, determination of the most appropriate containment or diking method and coordinating activities of supervisory personnel and off-site response teams (e.g., local fire departments, ambulance services). These rapid response procedures will control the potential for human exposures to leaks and spills.

4.3.4 Traffic Accidents

Emissions of particulates and volatile chemicals can potentially occur as the result of an off-site traffic accident involving a truck carrying hazardous waste to and from the Model City Facility. As part of the 1992 RMU-1 EIR, emissions were modeled from a worst-case accident scenario in which a car collides with a truck hauling a bulk shipment of waste destined for the facility. The accident was assumed to occur on NYS Route 18 in front of the Lewiston-Porter schools; the receptors were assumed to be 100 meters from the accident site. It was also assumed the entire contents of the truck were spilled onto the roadside and that the spilled material lay uncontrolled for 1 hour. From the many types of waste expected to be placed in RMU-1, four were chosen as having the worst potential environmental impact based on their hazardous constituents (Table 2). This worst-case scenario is also applicable to the proposed RMU-2.

In the 1992 RMU-1 EIR, the USEPA's ISCST atmospheric dispersion model was used to model releases of spilled wastes, using conservative assumptions regarding waste characterization and environmental factors (e.g., worst-case hourly meteorological conditions). The predicted ambient air concentrations of the constituents were then compared to the NYS Short-Term Guideline Concentrations (SGCs) (NYSDEC, 1991). For the RMU-2 analysis, the current USEPA-recommended air dispersion model, AERMOD, was used to show that the conclusions from the original modeling analysis are still valid using the more up-to-date air dispersion model. AERMOD, which is considered an appropriate model for spill assessments, especially for spills that may have relatively steady emissions (e.g., non-liquid spills, wind erosion) and also uses hourly meteorological data input to determine ambient concentrations due to emission sources; different types of sources can be modeled, including area emission sources, such as what may be created in a spill. The model was run using the regulatory default options. The most recent Niagara Airport (Station #04724, KIAG) surface observations and Buffalo International Airport (Station # 14733, KBUF) upper air data from 2007 through 2011 were processed using AERMET and then utilized as meteorological data input to AERMOD. Maximum 1 hour average impacts were predicted from the model.

To maintain consistency with the 1992 RMU-1 analysis, the following assumptions were used for the updated analysis:

- Analyze the potential exposure to the general public resulting from an off-site transportation accident. It was assumed that the transportation accident involves a collision between a car and a truck hauling a bulk shipment of solid waste destined for RMU-2. The forces of the collision are assumed to cause the truck to empty its entire contents onto the road and/or shoulder.

- It was assumed that the spilled material would lie on the roadside uncontrolled for 1 hour; that is, emergency responders would require 1 hour to reach the scene and cover the pile or apply foams, crusting agents, etc.

- Emissions presented in the 1992 analysis (April 8, 1992) were revised based on the most recent updates of the USEPA AP-42 emission factors and used in the AERMOD model (version 12060). At that time of the initial analysis, emissions estimates utilizing the USEPA emission factors and emission estimation methods were deemed acceptable. In cases where limited emission factors were available, manufacturers were consulted to obtain emission rate information.

- Dust collector residue, generated by lead glass manufacturing, was characterized as a soft pellet-like substance. This suggests that it has a relatively low "silt" content (e.g., low amount of extremely tiny particles), and that most of the particles are significantly larger than 10 µm (inhalable dust threshold). Because of its nature, it was assumed that it is very dry.

- Spent potliner, generated by aluminum reduction, was characterized as having a wide range of aggregate sizes in a shipment, ranging from fine powder to large chunks. This was assumed to be somewhat hygroscopic, that is, absorptive of water, resulting in a 5% moisture content.

- Mercury, as contamination on clothing, debris, etc. associated with an inorganic chlor/alkali process, would be assumed to be inorganic mercury.

- Mercury, a volatile metal, was also assumed to volatilize from the debris (as opposed to being carried off as wind-borne particulates. Mercury was conservatively assumed to have 100% volatilization. Although the mercury is not in a free liquid state, it was conservatively assumed to create a small pool (approximately 2 mm deep). The amount of the mercury in the waste thus determined the size of the hypothetical pool. The mass emission rate for the event is based on the hypothetical pool, and the source area is based on the spill area.

- Mercury's vaporization rates were calculated using a predictive model developed by the U.S. Air Force Engineering and Services Laboratory.

- The PVC waste filtercake solids were assumed to contain long-chain PVC molecules in the waste solids. These chains can tend to trap any residual unreacted vinyl chloride, somewhat inhibiting it's off gassing. It was also assumed that, by the time the waste PVC filtercake solids approach their final destination (e.g., RMU-1, RMU-2), they will have been able to offgas for a substantial amount of time. Over time, with diminishing concentrations of vinyl chloride in the PVC filtercake, volatilization becomes increasingly difficult and the rate slows. To evaluate the effects of vinyl chloride volatilizing from the waste PVC filtercake, the PVC filtercake was conservatively assumed to offgas its entire vinyl chloride content over a 30-day period (i.e., the waste accumulates on a monthly basis) at a linear, or constant rate.

Each scenario waste's hazardous constituents were evaluated in terms of ambient concentration by assuming homogenous distribution in the airborne particulate emissions in the same concentrations as found in the waste. The resultant ambient concentrations and comparison with New York State (NYS) Short-Term Guideline Concentrations (SGCs) (DAR-1 AGC/SGC Tables, updated October 8, 2010) and current ambient air standards for particulate releases are presented in Tables 3 through 6, and volatile releases are presented in Tables 7 and 8 for each scenario.

Under worst-case hourly meteorological conditions for a 5-year period, emissions of hazardous constituents from an accident involving a truck hauling certain wastes and occurring across from the Lewiston-Porter School on Route 18 should not result in concentrations that exceed the NYS Short-term Guideline Concentrations (DAR-1 AGC/SGC Tables, updated October 8, 2010) or the current ambient standards.

The results of the above analysis should be viewed in the context of its limitations. The approach developed in the initial 1992 analysis and followed in this analysis is very conservative and ignores such factors as:

- the low probability of such an accident occurring (based upon past accident history);

- the effect of shelter-in-place of potentially exposed individuals;

- the truck shielding the spilled waste from the wind;

- waste remaining in the rolloff; and
- adherence of spilled waste to soil alongside of road, etc.

Inclusion of these factors would require a more detailed evaluation of potential cavity effects and would produce results indicating decreased emission rates, lower corresponding concentrations and reduced probable risk of exposure. A more refined analysis is not warranted, given the low exposures predicted with highly conservative assumptions and the hypothetical nature of the accident scenario.

4.4 Potential Human and Environmental Exposure Due to Air Containments

Construction and operation activities associated with RMU-2, the new and upgraded Fac ponds and the relocated facilities are not expected to have a significant impact on the air quality in the region of the Model City Facility. An extensive air monitoring network has been established that has demonstrated that previous land disposal operations at the site have had little to no effect on downwind air quality. Operating practices, such as installing daily cover over the waste and wetting down dusty loads, have helped to produce this result. Implementation of the USEPA LDRs has reduced the organic content of landfilled wastes and the resulting leachate. Precautionary procedures to separate incompatible waste and eliminate sources of ignition will be followed. The Model City Facility Contingency Plan contains procedures to control, contain and cleanup on-site and off-site spills.

5. Surface-Water Exposure Pathway

5.1 General

To assess potential human exposure via the surface-water exposure pathway, two categories of potential releases of chemical contaminants to surface water have been considered: long-term releases associated with surface-water run-off and treated leachate discharge from RMU-2 and short-term releases associated with leaks and spills. A brief discussion of the site characteristics and management practices related to these potential sources of surface-water contamination is provided in the following sections, as well as a discussion of how RMU-2 might potentially impact surface-water quality in the region.

5.2 Long-Term Releases

5.2.1 Surface-Water Run-Off

Surface-water run-off (i.e., precipitation that does not come in contact with wastes) from inactive and closed portions of the CWM property drains to one of the creeks that flow through or near the Model City Facility. The major part of the property, the western portion, drains to the north and west, discharging to Six Mile Swale. Six Mile Swale empties into Four Mile Creek, approximately 2 miles northwest of the Model City Facility. Four Mile Creek is the principal watershed flowing north to Lake Ontario. A small part of the eastern portion of the site drains to Twelve Mile Creek. Four Mile Creek and Twelve Mile Creek have been designated Class C surface waters in the area of the CWM property.

The various uses of the CWM property also influence site drainage characteristics. The operational areas, including the AWTS, storage tanks and container storage and transfer areas are provided with secondary containment systems. The closed landfills have vegetative cover to limit run-off and control erosion.

Active containment and disposal areas, including the Fac ponds and landfills that are bermed, act to contain surface water and prevent run-off. These areas do not normally contribute to general site run-off and the precipitation falling on the active portions of the Model City Facility is treated in the AWTS.

Natural buffer areas consist of wooded areas, naturally occurring and man-made stormwater management ponds and topographically low areas that act as water storage areas. The buffer areas are generally located in the central and northern portions of the Model City Facility.

The on-site drainage system consists of several man-made drainage channels that eventually drain into Six Mile Swale. Surface-water run-off is monitored at downgradient locations to verify run-off from the site is not contaminated. All drainage channels have control gates to prevent the escape of any contaminated run-off. The surface-water collection system is monitored for hazardous constituents before the water is released according to the facility's Surface-Water Sampling and Analysis Plan.

During construction of RMU-2 (i.e., before placement of wastes into the cells), the Fac Ponds and any relocated/modified facilities, silt fences and hay bales will be placed as sediment control barriers. The number and location of these barriers will be determined by the progress of construction operations. Removal of these control barriers following completion of construction will occur after re-vegetation of areas that have been disturbed as a result of construction operations. During construction, surface water will be directed to the facility's existing surface-water collection system, described above.

During operation, precipitation entering the cells of RMU-2 will be collected in the leachate collection system and be handled and treated as leachate as described below in Section 5.2.2. Measures used to prevent surface-water contamination include containment of leachate lines and tanks within the facility and protection of treatment plant effluent lines to the outfall at the Niagara River.

Following closure of RMU-2, stormwater run-off from the final cover system will be treated as surface water. The run-off surface water from the final cover system will be intercepted by a series of mid-slope swales and surface-water diversion berms constructed across the slope of the final cover. The surface-water diversion berms will discharge into downflumes consisting of wide shallow channels lined with riprap-filled reno mattress (i.e., riprap encased in wire mesh baskets). The downflumes will drain into a grass-lined trapezoidal perimeter ditch that will be located along the interior edge of the perimeter berm access road. The perimeter ditch will convey stormwater into existing retention basins. The basin outlet structures contain a closed discharge valve that is opened only after testing confirms that the run-off is not contaminated. Stormwater is then discharged through the CWM Surface Waste Management System to Four Mile Creek.

5.2.2 Effluent Discharge

Discharge of treated wastewater and surface water from the facility is covered by both the hazardous waste management facility permit for the overall site and the SPDES Permit. RMU-2 will be designed and operated to minimize the production of leachate. RMU-2 leachate will be pumped from the landfill to on-site storage tanks for treatment in the AWTS.

The facility's SPDES Permit specifies that wastewater must be adequately treated and pre-qualified prior to being discharged to the Niagara River. The pre-qualification criteria include chemical analyses and biotoxicity testing. Upon approval by the NYSDEC, treated wastewater is batch discharged. Discharges that meet these permit limitations will have no significant impacts on water quality.

5.3 Short-Term Releases

Releases to surface water can potentially occur from on-site leaks and spills associated with the construction and operation of RMU-2. Since 1973, there have been some spills or leaks at the Model City Facility. These events were mostly associated with pump and pipeline failures and unloading accidents. Although unloading accidents tend to be in areas with containment structures, some spills and leaks, due to equipment failure, have in the past, resulted in runoff to drainage ditches flowing into Six Mile Swale. During these events, action was taken to dam off the drainage ditches and remove the liquid by vacuum truck for on-site treatment and/or disposal as quickly as possible. The present spill control plan would contain any spills prior to entering the drainage ditches. There is no evidence that any of these past events resulted in off-site contamination or human exposure. Should any spills occur during future operations, the Contingency Plan will be implemented to allow for rapid control and containment.

In the event that a spill of waste occurs off site on the local transportation route (i.e., within 1 mile of the facility entrance), the potential exists for run-off to the adjacent roadside ditch that ultimately drains to Four Mile Creek. The impact of the spill would depend on the nature and volume of the material spilled and mitigative measures taken to limit surface-water contamination. Potential spills of most concern are bulk liquids, because these provide the greatest potential for release and run-off of large volumes of waste. However, shipments of bulk liquids to the facility are not destined for disposal in RMU-2. While there are considerable uncertainties in assessing the impacts of spills to surface water, the potential for human exposure to hazardous constituents from such spills is considered to be small since there are no drinking water intakes on Four Mile Creek. Furthermore, the facility's Contingency Plan provides for rapid and effective control mechanisms for limiting exposures from off-site transportation spills.

5.4 Potential Human and Environmental Exposure Due to Surface-Water Contamination

Construction and operation activities associated with RMU-2, the Fac Ponds and the relocated facilities are not expected to have a significant impact on the surface-water quality in the region of the Model City Facility. Precautionary procedures will be followed during construction and operation of the units to minimize release of contaminants into the on-site surface-water collection system. In addition, the drainage system is regularly monitored to prevent accidental release of contaminants into Six Mile Swale. Leachate from RMU-2 will be treated prior to discharge into the Niagara River in conformance with the facility's SPDES Permit. Finally, the Model City Facility has a Contingency Plan for containment of on- and off-site leaks and spills of hazardous wastes.

6. Groundwater Exposure Pathway

6.1 General

To assess human exposure via the groundwater pathway, two sources of potential releases to groundwater were considered:

1. Release of leachate from RMU-2 and treated wastewater from the Fac Ponds; and

2. Releases from former surface impoundments.

Groundwater beneath the Model City Facility occurs as two distinct zones separated by an essentially impermeable deposit. The upper zone, Zone 1, is essentially “immobile” water trapped within the pore spaces of the upper tills. Groundwater in Zone 1 is encountered within 3 to 5 feet of the ground surface. The lower zone or aquifer, Zone 2, a silt/sand aquifer, is approximately 50 feet below the ground surface and extends to within 5 feet of the bedrock of the Queenston formation.

A hydrogeological characterization of the site, conducted by Golder Associates, 1985, indicates that the geology of the site consists of about 30 to 60 feet of glacial and glaciolacustrine deposits that overlay an estimated 1,000-foot sequence of red shale, siltstone and sandstone of the Queenston formation. The upper portion of the stratigraphy at the site includes low-permeability silt and clay tills (Zone 1) over Glaciocustrine Clay, underlain by a Glaciocustrine Silt/Sand unit. Beneath these units is a lodgment till above the shale bedrock. Over the northwestern portion of the site, the Glaciolacustrine Clay unit is separated into an upper and lower member by Silt Till (Middle Silt Till).

Hydraulic conductivities of the geologic formations indicate that the Glaciolacustrine Silt/Sand stratum is the most permeable geological unit and forms the uppermost aquifer beneath the site. The Silt Till, Clay Till and Glaciolacustrine Clay above this aquifer are very low-permeability materials that restrict aquifer recharge from infiltration. Although there is a downward gradient, vertical flow rates through the geological units above the aquifer are low, on the order of feet to fractions of a foot per year. Horizontal gradients in the aquifer and upper geological units are also low.

Specific conductance measurements at the site indicate that TDS in the groundwater at the site are high and concentrations increase with depth. These TDS estimates indicate the groundwater in the glacial soils and shallow rock are considered saline by the NYSDEC groundwater quality standards and are not suitable for use as a potable water supply.

6.2 Groundwater Quality

A groundwater monitoring system for the site is installed in the Glaciolacustrine Silt/Sand aquifer and in the Upper Tills. As mentioned previously, the Glaciolacustrine Silt/Sand aquifer is considered to be the uppermost aquifer beneath the facility. The Upper Tills do not represent an aquifer under RCRA guidelines, but do comprise a saturated zone above the uppermost aquifer. CWM's current monitoring plan includes wells in this geologic unit.

Since 1981, monitoring data has been collected for the RCRA indicator parameters of pH, specific conductance, total organic carbon and total organic halogens (TOX) for the original RCRA wells on site. Throughout this monitoring period, statistically significant differences have been noted in groundwater quality that has led to subsequent investigations.

A May 1983 statistical comparison of RCRA indicator parameters indicated significant differences between several upgradient and downgradient monitoring wells with respect to pH, specific conductance and TOX. An assessment study instituted by CWM indicated that the differences were due to the unique hydrogeology of the site and contamination during well boring and that no hazardous waste or hazardous constituents had entered the aquifer from on-site operations

A broader study of groundwater quality at the site performed by Golder Associates in 1985 included both RCRA interim status monitoring wells and the site monitoring wells installed for other regulatory purposes. Various chemical compounds and/or statistically significant changes in indicator parameters were identified. Evaluation of the data, sampling methods, analytical methods and well construction details indicated that some of these identifications were due to artifacts of well construction (e.g., polyvinyl chloride glue in older wells), contamination during sampling, laboratory contamination during analytical testing and/or natural geochemical variations. Some of the initial chemical compound identifications could not be repeated in subsequent testing and thus were not considered indicative of groundwater contamination from the waste disposal operations.

There is no evidence of any overall groundwater contamination or specific plumes of contamination associated with the current site operations in the aquifer. There is some evidence of groundwater contamination in the saturated zone above the aquifer that has been associated with past activities at the site. However, there is no evidence of the movement of contaminants within the saturated zone. This groundwater contamination is the subject of approved RCRA Facility Corrective Measures. In order to prevent off-site migration, CWM operates groundwater pump and treat systems at several locations at the Model City Facility where historical contamination was found..

As discussed in Section 2.2 of this report, due to the saline nature of the area groundwater, there are no drinking water wells in the vicinity of the Model City Facility.. Private wells are used for agricultural purposes only.

6.3 Impact of RMU-2 on Groundwater

Construction activities associated with RMU-2, the Fac Ponds and the relocated facilities are not expected to impact groundwater. However, the leachate produced by infiltration and percolation of water or liquids through the land disposal unit and/or treated wastewater in the Fac Ponds is a potential source of groundwater contamination. CWM has incorporated landfill design strategies and management practices in a leachate management program designed to reduce the potential for groundwater contamination from leachate produced during operation of RMU-2. In addition, current federal landfill disposal regulations minimize land disposal of leachable wastes.

6.3.1 Design Safeguards

The design of RMU-2 incorporates a liner system that is composed of two composite liners with leachate collection and removal systems (i.e., primary liner and leachate collection system and the secondary liner and leachate collection system) above and between the liners. The double composite liner system prevents leachate from infiltrating the groundwater.

The primary liner system includes a low-permeability barrier of geosynthetic clay liner (GCL) and 80-mil textured high-density polyethylene (HDPE) geomembrane. The secondary liner system includes an 80-mil textured HDPE geomembrane over 3 feet of compacted clay.

The primary leachate collection system is installed over the primary liner and is designed to limit the leachate head to less than the maximum allowable 1 foot of head on the liner. The secondary leachate collection system is designed to provide redundancy in the event the primary liner system fails. The secondary leachate collection system is essentially identical in composition to the primary leachate collection system that means the two systems have equal hydraulic collection and conveyance capacity to the cell sump. The primary and secondary leachate collection systems each contain 1-foot-thick of granular drainage material and a geocomposite drainage layer. The proposed design for RMU-2 exceeds the 6 NYCRR Part 373 regulations governing the design of landfill liner systems.

The upgrades to Fac Ponds 1 and 2 and the construction of new Fac Pond 5 also consist of a baseliner system consisting of a 3-foot-thick compacted clay base, primary and secondary geomembrane liners and a leak detection system.

A system of new groundwater monitoring wells will be installed at RMU-2 and Fac Pond 5 (groundwater monitoring wells already exist at Fac Pond 1/2). Sampling and analysis of the groundwater from these wells is used to identify potential leaks in the liner systems.

6.3.2 Waste Control Measures

The potential for groundwater contamination by RMU-2 will also be reduced by the USEPA's LDRs. The LDRs specify concentration criteria for leachable hazardous constituents that are used to determine if those wastes can be land disposed. The LDRs also prohibit the land disposal of wastes that do not meet certain criteria with respect to the mobility of the hazardous constituents within the waste. As an example, wastes containing leachable lead are not allowed to be land disposed until the lead is stabilized (i.e., immobilized or "bound up" within the waste such that it will not readily leach out). The LDRs also indicate best available treatment technologies on a waste-by-waste basis. The Model City Facility will accept for disposal in RMU-2 only those wastes that meet the LDRs.

6.3.3 Response Action Plan

A Response Action Plan (RAP) has been prepared for RMU-2 as part of CWM's overall leachate management program. The RAP establishes evaluation criteria and associated response actions to address the accumulation of liquids in the secondary leachate collection systems (SLCS). The RAP describes the sources and the anticipated volumes of liquids potentially entering the SLCS based on the design of RMU-2.

6.4 Surface Impoundment Seepage

The lagoons and salts areas that were previously used for the storage and treatment of hazardous waste liquids have been taken out of service and closed, thus limiting these former surface impoundments as long-term sources of groundwater contamination. These former surface impoundments were closed using in-situ stabilization of contaminated soils and sediments and installation of an engineered final cover system. In addition, these units are not related to the construction or operation of RMU-2.

6.5 Potential Human and Environmental Exposure Due to Groundwater Contamination

Based on the preceding analysis, human receptors are unlikely to be impacted by leachate releases from RMU-2 or by releases from the Fac Ponds to local groundwater. The units are designed to minimize the potential for liquid infiltration to groundwater. In addition, the Model City Facility will comply with LDRs that prevent land disposal of leachable wastes and has in place a RAP that will address accumulation of liquids in the RMU-2 SLCS.

7. Other Potential Sources of Exposure

7.1 Subsurface Gas Migration

The USEPA has indicated a concern for exposure to off-site populations to explosions that may occur as a result of the generation and subsurface migration of methane gas in areas near buried putrescible waste. At concentrations in excess of 5%, methane forms an explosive mixture with air. The Model City Facility accepts no municipal-type or other putrescible waste; therefore, methane generating waste has not been deposited within the site boundary. There is no readily known source for the generation of methane gas and consequently the potential for human exposure to hazardous constituents via off-site migration and explosion of methane gas is considered to be negligible.

7.2 Current Soil Contamination Safeguards

The USEPA has indicated a concern for exposure to off-site populations living near hazardous waste areas to contaminated soil and, in cases where food crops are grown in or adjacent to contaminated soil, food chain contamination. The potential for these exposures is addressed below for both current exposures and exposures after site closure.

7.2.1 Current Exposures

For current exposures, the security measures for the site are believed to be adequate to prevent unauthorized entry to the facility and eliminate any concern for direct exposure to off-site populations to any contaminated soil. The security measures include the following:

1. Chain-link fence surrounding the property;

2. A 24-hour-per-day security surveillance;

3. Locked or guarded gates; and

4. Warning signs.

For indirect exposures via off-site transport of contaminated soil, the facility's operating procedures are designed to control both the generation of contaminated soil and the transport of contaminated soils off site via fugitive dust emissions. Measures to limit emissions of contaminated particulates from landfilling and the associated construction and transportation operations are summarized in Section 4 of this report. Measures for spill prevention, spill cleanup and the control of surface-water run-off are described in Section 5.

7.2.2 Closure/Post-Closure Exposures

The concerns for future exposures after the site becomes inactive are addressed in the Facility Closure and Post-Closure Plans. These plans provide for the long-term isolation of waste from human contact by decontaminating all areas of the facility except the secure landfills that will be closed and capped. The RMU-2 final cover system will consist of the following components in descending order:

- 6 inches of vegetated topsoil;
- 18 inches of general soil fill;
- A layer of geocomposite;
- A 40-mil textured HDPE geomembrane;
- A GCL layer that will provide a maximum equivalent hydraulic conductivity equal to or less than 2 feet of compacted clay with a hydraulic conductivity of 1 x 10^{-7} cm/sec; and
- 6 inches of general soil fill to be used as a grading layer.

Existing closed landfill units have been capped as described in Section 3.2 of this report. CWM has agreed to provide perpetual care and maintenance of all closed landfills at the Model City Facility. The existing Site-Wide Part 373 Permit includes a formula to determine the value of funds needed to provide this financial assurance.

The potential for human exposure to hazardous constituents due to off-site transport of contaminated soil associated with RMU-2 is considered to be small. In addition, the potential for exposure to hazardous constituents via the food chain is also considered to be small.

7.3 Potential for Radiological and Chemical Contamination During Construction

As discussed in Section 3.1.2 of the Draft Environmental Impact Statement, the USDOE performed several investigations and remedial activities within the vicinity properties of the Model City Facility and adjacent areas to address radiological contamination concerns. Certifications were issued by the United States Department of Health (USDOH) that the areas investigated and remediated were in compliance with applicable federal radiological decontamination criteria. In order to confirm the findings in the USDOE certification, the NYSDEC, acting in conjunction with the USDOH, required that CWM conduct additional investigations to further evaluate the current conditions of the Model City Facility property. A major component of this evaluation included a gamma radiation walkover surface survey of all accessible areas of the property (approximately 450 acres); detailed investigation and sampling of those areas identified during the survey that exceed the accepted radiological investigation level and an alpha and beta radiation survey inside six legacy buildings that were previously used by the US Government. URS Corporation (URS) (Buffalo, New York) completed the survey in 2008. The results of the survey are included in the report entitled *Results of Gamma Walkover Survey, Soil Sampling, and Legacy Building Surveys* (URS, December 2008).

The radiological survey at the Model City Facility conducted by URS determined that a vast majority of the accessible areas of the property were well below the screening level. Less than 0.15% of over 4 million readings collected during the survey exceeded the threshold of 16,000 counts per minute (cpm). The readings that exceeded the 16,000 cpm threshold were generally in small areas and were often associated with the discovery of discrete, high activity sources that were removed with the sampling effort. A few elevated source items were found in the clay liner of Fac Pond 8; however, most of the rocks with elevated activity were in the cap systems of landfills and isolated areas on site. The majority of these items were removed as part of the investigation and sampling effort. The radiological characteristics exhibited by the items found during the survey were consistent with the radiological materials that were historically managed on the site by the US Government from the 1940s to the mid-1960s.

Areas where elevated sources were identified but the source material was not removed include the base of Fac Pond 8, the former Syms Property and along the former railroad bed. With the exception of Fac Pond 8, these areas are not impacted by the RMU-2 project. URS determined that the presence of such items does not pose a significant health or environmental issue because of the relative isolation from site workers and the general public.

As required by the 2005 Part 373 Permit, CWM has conducted recent radiological monitoring of groundwater, surface water, treated wastewater and air. Initial results were submitted as part of the *Radiation Environmental Monitoring Plan* (CWM, March 2006). All results obtained to date show no elevated radiological constituents in any of these media. Sampling and radiological analysis is ongoing and will be continued until approval to terminate is received from the NYSDEC. In addition to the surface survey and environmental media testing, CWM conducted a chemical and radiological subsurface sampling program in areas that would be affected by the RMU-2 project between August 2008 and February 2009 (*Results of Subsurface Soil and Pond Sediment Sampling for RMU-2*; URS, April 2009). These areas include the RMU-2 footprint, location of the relocated Drum Management Building, location of new Fac Pond 5, Fac Pond 3 and Fac Pond 1/2. Soil borings up to 20 feet deep were completed in a systematic grid-based pattern within the areas of RMU-2, Fac Pond 5 and the Drum Management Building. The soil cores were scanned for chemical and radiological contamination. If the meter identified elevated readings, a sample was collected and sent off site for analysis. In addition, sediments from the floor of Fac Ponds 1/2 and 3 were radiologically screened and samples were obtained for radiological analysis.

Over 300 sample locations were evaluated during the subsurface investigation program. Only three locations exhibited levels that exceeded background levels. At one location within the original RMU-2 footprint (Location 63), the boring contained some plastic pieces that likely were the source of the higher concentrations of radionucleids found in the adjacent soil. Two other locations within the original RMU-2 footprint (locations 43 and 61) indicated significant chemical contamination which is likely attributable to past historical activities on the property (*Letter Report on RMU-2 Footprint Investigation Boring Program*; Golder, March 2009). As a result of these discoveries, the RMU-2 footprint was revised to exclude these three areas.

CWM has developed a plan for performing chemical and radiological evaluation for routine small soil excavation projects. For smaller projects, chemical and radiological instrumentation will be used. Prior to any excavation, a radiological survey meter and VOC meter would be used to screen the soil surface prior to excavation. Investigation levels would be set to determine whether the excavation can safely proceed. Soil would be removed in approximately 6-inch lifts. During excavation, these same methods would be used on each lift prior to proceeding to the next deeper level. Finally, the radiological and chemical screening would be performed on the final excavated surface and the resulting stockpile of excavated soil. If readings higher than the investigation levels are detected at any stage, appropriate actions will be taken, such as stopping the excavation, characterization of the high reading, removal of suspect sources, detailed analysis of the contamination and disposal of the contaminated materials. For large project excavations, such as RMU-2, CWM has developed a similar plan for evaluating potential chemical and radiological contamination, which is included in Section K of the RMU-2 Part 373 Permit Application.

8. Management Practices

8.1 General

Management practices and the occurrence of worker exposures are also considered as an indicator of potential release and off-site receptor exposures at a hazardous waste facility. Worker exposure data and the management practices used to provide safe handling of hazardous wastes at the Model City Facility are summarized below.

8.2 Worker Exposure

An extensive personal air monitoring program was undertaken to assess the exposure to organic compounds experienced by all employees in all job classifications, from secretaries to material handlers at the Model City Facility. Both passive (e.g., badge) and active (e.g., air pump and charcoal canister) methods were used for sampling. A wide range of chemicals were sampled at all areas of the site. The dosimetry data indicated that exposures were generally several orders of magnitude below Threshold Limit Value (TLV) levels. The TLV is an exposure standard set by a committee of the American Conference of Governmental Industrial Hygienist. TLVs are published annually in a booklet and are based on available animal and human exposure studies. TLVs are recommended values, not legal limits, and do not guarantee protection to all workers and are not intended to be used for community exposure. TLV refers to airborne concentrations of substances and represents conditions under which it is believed nearly all workers may be repeatedly exposed day after day, without adverse health. CWM notes that the TLV system expresses a judgment regarding permissible occupational exposures to various substances. These levels were selected based on different standards and judgments than the standards for environmental exposure developed by the USEPA in the NAAQS and National Emissions Standard for Hazardous Air Pollutants programs. Consequently, the TLV system is not directly relevant to measurement or analysis of ambient air quality. Workers at RMU-2 will also be monitored on a regular basis to ensure they do not suffer adverse health effects due to airborne contaminants. They will be required to use personal protective equipment in the secured landfill work area, and encouraged to wash before eating, smoking or drinking, and shower before going home.

Historical data shows that workers at the Model City Facility have not been exposed to contaminant levels that exceed the TLV levels or other occupational standards.

8.3 Occupational Safety and Health Administration Claims

CWM has reviewed its files and can find no Occupational Safety and Health Administration (OSHA) claims that reflect or concern employees who will be working at RMU-2. Any existing OSHA claims concerning or reflecting operations, procedures or designs that have been changed or that no longer exist have not been included, because historic reports or information do not address “reasonably foreseeable” potential release, potential pathways of human exposure or the potential magnitude and nature of any human exposure within the meaning of Section 3019 of RCRA, or related to RMU-2 if the conditions contributing to the claims no longer exist.

8.4 Worker Illnesses and Injuries

Section 3019 of RCRA requires submission of information on “the potential for the public to be exposed to hazardous waste or hazardous constituents through releases related to unit” 42 U.S.C. § 6929(a) (emphasis added). Data regarding any injuries, accidents or illnesses for workers who are on-site for at least 8 hours every day, 5 days a week, are not directly correlated to the potential for the public to be exposed to hazardous waste or hazardous constituents from the landfill. Moreover, as a practical matter, an analysis of this data sufficient to determine whether there are any patterns of occurrence indicating that releases have occurred would be difficult due to the relatively small size of the database. In 2003, two OSHA reportable cases were filed, five were filed in 2004, two in 2005, five in 2006, three in 2007 and zero in 2008. All of the reported accidents were typical of an industrial environment (i.e., cuts, bruises, chemical burns and other minor incidents). None of the accidents resulted in the release of hazardous materials beyond the immediate on-site area. These data suggest that current site waste management practices will be sufficient to prevent releases of hazardous waste and/or constituents from RMU-2 to the off-site environment.

8.5 Training Programs

CWM will emphasize accident prevention in RMU-2 operations, as well as in specific duties related to each job function. No facility employee will be permitted to work under reduced supervision until his supervisor has determined that he or she has successfully completed appropriate training. Similarly, in the event of a release, response procedures to mitigate the effects of such releases are defined in the Model City Facility’s Contingency Plan. Specific responsibilities for facility personnel are identified in the Contingency Plan, including a designated Emergency Coordinator responsible for coordinating the response effort. The Emergency Coordinator, or a designated alternate, is available by telephone in the event of an emergency. Pertinent aspects of the Contingency Plan are referred to in the pathway-specific sections of this report. These management practices ensure the safe handling of waste and minimize the potential for releases from the facility.

8.6 Other Facility Assessment Reports

In accordance with CWM's Site-Wide Part 373 Permit and 6 NYCRR 373-2.8(h), a Certificate of Liability Insurance was established for the Model City Facility. The insurance continues to be in force and contains no expiration date.

CWM has not located any other existing risk assessment reports and information that reflect or concern the landfill units at the Model City Facility as they currently exist or currently are operated and maintained. Any existing risk assessment reports and information concerning or reflecting operations, procedures or designs that have been changed or that no longer exist have not been included in this response, because such historic reports or information do not address "reasonably foreseeable" potential releases, potential pathways of human exposure or the potential magnitude of any human exposure within the meaning of Section 3019 of RCRA.

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Tables

TABLE 1
NIAGARA FRONTIER QUALITY CONTROL REGION
REGIONAL AIR QUALITY DATA SUMMARY

Parameter	2003		2004		2005		2006		2007	
	Site No.	Avg.	Site No.	Avg.	Site No.	Avg.	Site No.	Avg.	Site No.	Avg.
Sulfur Dioxide (ppm)	3102-25	0.004	3102-25	0.003	3102-25	0.003	3102-25	0.004	3102-25	0.003
Carbon Monoxide (ppm)	3102-25	0.40	3102-25	0.20	3102-25	0.20	3102-25	0.40	3102-25	0.20
Ozone (ppm)	3120-02N	0.028	3120-02N	0.030	3120-02N	0.036	3120-02N	0.028	3120-02N	0.030
Nitrogen Dioxide (ppm)	1451-03N	0.013	1451-03N	0.012	1451-03N	0.013	1451-03N	0.013	1451-03N	0.012
Lead (μg/m^3)	3102-25	0.01	3102-25	NA	3102-25	NA	3102-25	0.01	3102-25	NA
Sulfate (PM-10, μg/m^3)	3102-25	4.3	3102-25	3.9	3102-25	NA	3102-25	4.3	3102-25	3.9
Nitrate (PM-10, μg/m^3)	3102-25	0.8	3102-25	0.5	3102-25	NA	3102-25	0.8	3102-25	0.5
Inhalable Particulate (PM-10, μg/m^3)	3102-17N	17	3102-17N	17	3102-17N	NA	3102-17N	17	3102-17N	17

Notes:
Data is from 2007 Annual New York State Air Quality Report Ambient Air Monitoring System.
μg/m^3 – micrograms per cubic meter
ppm – parts per million

TABLE 2
TRAFFIC ACCIDENT SCENARIO WASTES

Waste	Constituents of Concern	Type of Hazard
Baghouse dust from lead glass manufacturing	Cadmium Lead	Dust
Spent potliner from aluminum reduction	Cyanides Fluorides	Dust
Mercury-contaminated debris from chlor/alkali production	Mercury	Dust Volatilization
Waste PVC solids as filtercake from PVC production	Vinyl chloride monomer	Dust Volatilization

Notes:
PVC – polyvinyl chloride

Table 3
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Fugitive Particulate Scenario--

Waste = Baghouse Dust
Max Conc = 11.67 ug/m^3 Year = 2010

Compound	Wt% in Waste	Ambient 1-hr Conc. ug/m^3	NYS DEC Short-term Guideline Conc. ug/m^3	Ambient Impact Exceed SCG? (Yes/No)	Safety Factor
Cadmium	3.212%	0.3749	--	No	--
Lead[a]	30%	3.501			

[a] Lead does not have a NYS DEC AGC or SGC. Rather the US EPA primary lead standard is currently applied for compliance purposes. Lead has a standard that is a rolling 3-month average and are thus evaluated as a group below.

Compound	Wt% in Waste	Ambient 3-Mnth Conc. [b] ug/m^3	US EPA Primary Standard ug/m^3	Ambient Impact Exceed Standard? (Yes/No)	Safety Factor
Lead[a]	30%	0.002	0.15	No	92.54

[b] Rolling 3-month average ambient concentration determined based on the following assumptions:

1) Only one accident in 3 months at the original accident site (consistent with past record);
2) Spilled waste is covered, etc. within one hour;
3) Spill is remediated promptly; and
4) 3-month average concentration from the one hour emissions is determined by dividing the maximum 1-hour concentration by 90 days and 24 hours.

Table 4
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Fugitive Particulate Scenario--

Waste = Spent Potliner

Max Conc = 11.67 ug/m^3 Year = 2010

Compound	Wt% in Waste	Ambient 1-hr Conc. ug/m^3	NYS DEC Short-term Guideline Conc. ug/m^3	Ambient Impact Exceed SCG? (Yes/No)	Safety Factor
Cyanide	0.010%	0.0012	380	No	325,602
Fluorides[a]	6%	0.700	5.3	No	7.57

[a] The spent potliner can contain up to 2% each of LiF, MgF_2, and or CaF_2, for a maximum of 6% content of total fluoride compounds.

Reference: NYS DEC Short-term Guideline Concentration obtained from the NYS DEC document, DAR-1 AGC/SGC Table (10-18-2010).

Table 5
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Fugitive Particulate Scenario--

Waste = Mercury-Contaminated Debris

Max Conc = 4.74 ug/m^3 Year = 2010

Compound	Wt% in Waste	Ambient 1-hr Conc. ug/m^3	NYS DEC Short-term Guideline Conc. ug/m^3	Ambient Impact Exceed SCG? (Yes/No)	Safety Factor
Hg	1.0%	0.0474	0.6	No	12.66

Reference: NYS DEC Short-term Guideline Concentration obtained from the NYS DEC document, DAR-1 AGC/SGC Table (10-18-2010).

Table 6
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Fugitive Particulate Scenario--

Waste = Waste PVC Solids

Max Conc = 4.74 ug/m^3 Year = 2010

Compound	Wt% in Waste	Ambient 1-hr Conc. ug/m^3	NYS DEC Short-term Guideline Conc. ug/m^3	Ambient Impact Exceed SCG? (Yes/No)	Safety Factor
Vinyl Chloride Monomer	0.099%	0.0047	180,000	No	3.84E+07

Reference: NYS DEC Short-term Guideline Concentration obtained from the NYS DEC document, DAR-1 AGC/SGC Table (10-18-2010).

Table 7
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Volatilization Scenario--

Waste = Mercury-Contamination Debris

Max Conc = 0.56 ug/m^3 Year = 2010

Compound	**Ambient 1-hr Conc. ug/m^3**	**NYS DEC Short-term Guideline Conc. ug/m^3**	**Ambient Impact Exceed SCG? (Yes/No)**	**Safety Factor**
Mercury	0.56	0.6	No	1.07

Reference: NYS DEC Short-term Guideline Concentration obtained from the NYS DEC document, DAR-1 AGC/SGC Table (10-18-2010).

Table 8
Comparison of Contaminant Concentrations with NYS DEC Short-term Guideline Concentrations (SGC)
-- Volatilization Scenario--

Waste = Waste PVC Solids

Max Conc = 69.11 ug/m^3 Year = 2011

Compound	Ambient 1-hr Conc. ug/m^3	NYS DEC Short-term Guideline Conc. ug/m^3	Ambient Impact Exceed SCG? (Yes/No)	Safety Factor
Vinyl Chloride Monomer	69.11	180,000	No	2604.7

Reference: NYS DEC Short-term Guideline Concentration obtained from the NYS DEC document, DAR-1 AGC/SGC Table (10-18-2010).

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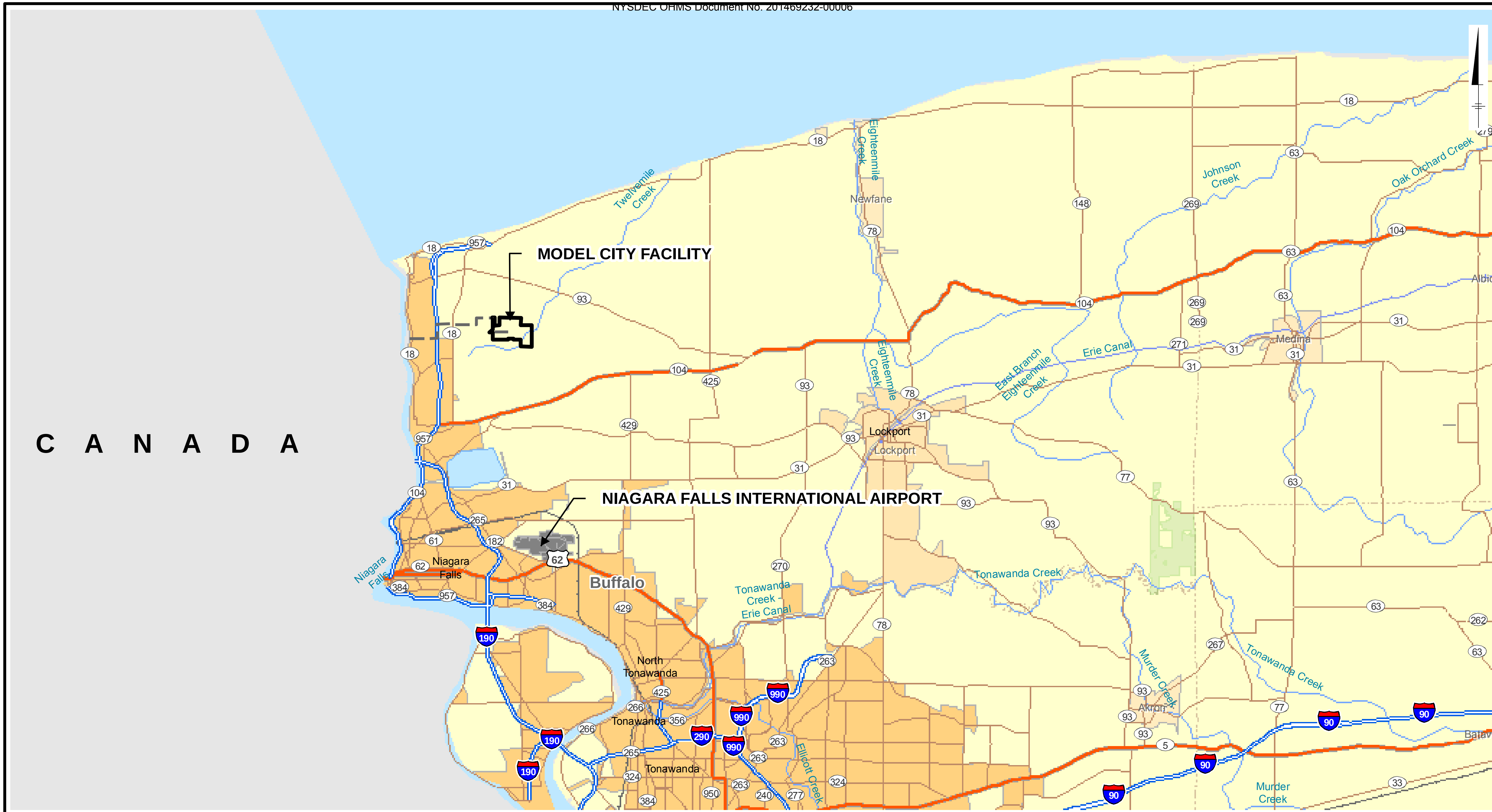
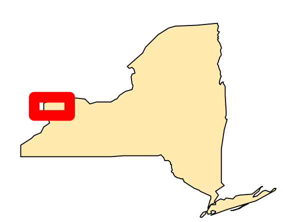
Figures



NOTES:

1. PROPERTY LINES ARE APPROXIMATE.
2. NO DRINKING WATER WELLS EXIST WITHIN 1/4 MILE OF THE FACILITY.
3. THE TREATED EFFLUENT DISCHARGE IS LOCATED AT THE NIAGARA RIVER.
4. 710 TOTAL ACRES.
5. 630 RCRA PERMITTED ACRES.



AREA LOCATION

0 5 10
MILES
GRAPHIC SCALE

DRAFT

CWM CHEMICAL SERIVCES, LLC
MODEL CITY, NEW YORK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

REGIONAL LOCATION OF MODEL CITY

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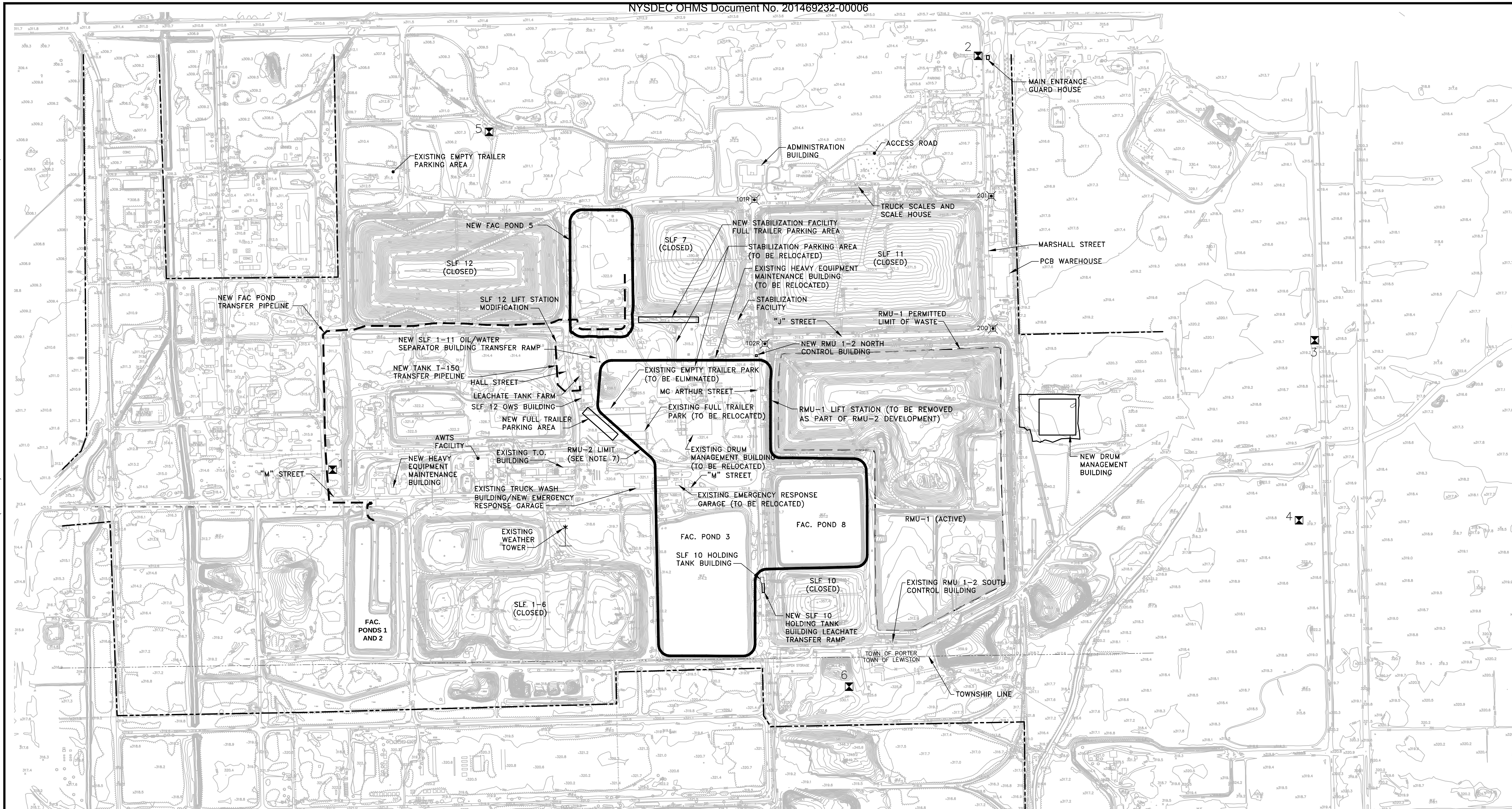
FIGURE 1

CITY: CLE DIV/GROUP: AIT 40 DB:L.GREENE LD: EAL PIC: WP PM: TM: GNG TR:
MODEL CITY 23725.003
Friday, June 19, 2009 1:37:16 PM
G:\enviro\Common\GIS\CWM\ModelCity\RevisionsToDEIS\mxd\FacilityLocationDetail_regional.mxd



NOTES:

1. TOPOGRAPHIC BASE MAP CONSISTS OF COMBINATION OF DATA COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED 5/31/01 BY AIR SURVEY CORP. PROJECT NO.71010503. AND AN AUGUST 2008 SURVEY BY ENSOL.
2. VERTICAL DATUM BASED ON NGS MEAN SEA LEVEL.
3. GRID BASED ON LOCAL COORDINATE SYSTEM.
4. CONTOUR INTERVAL 2 FT.
5. DASHED CONTOURS INDICATE THAT GROUND IS PARTIALLY OBSCURED BY VEGETATION OR SHADOWS. THESE AREAS MAY NOT MEET STANDARD ACCURACY AND REQUIRE FIELD TESTING COMPLETION.
6. PROPERTY LINES ARE APPROXIMATE.
7. RMU-2 LIMIT REPRESENTS TOE OF PERIMETER MSE WALL.
8. 710 TOTAL ACRES.
9. TURNS ACROSS TRAFFIC LANES ARE REQUIRED FOR TRUCKS APPROACHING ALONG BALMER ROAD FROM THE EAST.
10. LOCATION OF AIR MONITORING AND METEOROLOGICAL STATIONS ARE APPROXIMATE.

LEGEND

SLF	=	SECURE LANDFILL
FAC	=	FACULTATIVE
LAG	=	LAGOON
*	=	INACTIVE
LHTB	=	LEACHATE HOLDING TANK BUILDING
GWHTB	=	GROUNDWATER COLLECTION HOLDING TANK BUILDING
(symbol)		METEROOLOGICAL STATION AND TELEMETRY SYSTEM
1 (symbol)		AIR MONITORING STATION

0 300' 600'
GRAPHIC SCALE

CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK

AIR MONITORING LOCATIONS

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FIGURE
2

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: K.DAVIS LD: PIC: W. POPHAM PM: W. RANKIN TM: B. STONE LYR: ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0023725\2013\00003\DWG\REPORT\DEIS\23725G02.DWG LAYOUT: 2 SAVED: 10/31/2013 3:09 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 10/31/2013 3:11 PM BY: DAVIS, KATHI
XREFS: 23725X02 23725X01 23725XLD IMAGES:

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Appendix G

Traffic Noise Impact

CWM CHEMICAL SERVICES INC.
NOISE ASSESSMENT
FOR PROPOSED
TRUCK TRAFFIC VOLUME ALTERNATIVES
MODEL CITY, NEW YORK

Prepared for

BETTIGOLE ANDREWS & CLARK INC.
237 Main Street
Suite 1030
Buffalo, New York 14203

Prepared by

NORMANDEAU ASSOCIATES INC.
170 Oberlin Avenue
Lakewood, New Jersey 08701

R-13518.00

April 1993

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1.0 INTRODUCTION

Normandeau Associates Inc. (NAI) has been contracted by Bettigole Andrews and Clark, Inc. to model potential noise impacts at selected receptor locations along the designated transportation route (Figure 1) to the CWM Chemical Services Inc. (CWM) Model City, New York facility under current and alternative truck traffic scenarios. As part of the planned construction and operation of Residuals Management Unit-1 ("RMU-1") at the CWM Model City facility, truck traffic volumes are expected to increase due to increased gate receipts above existing levels. This study examines projected changes in noise levels from existing conditions for two proposed truck traffic scenarios: (1) "Expanded Operations" and (2) "No Action." These scenarios are described in Section 2.4. Two alternative trucking schedules were examined for the Expanded Operations scenario in order to assess the potential noise impacts associated with increased truck volumes.

There are no noise level criteria specifically promulgated to assess noise impacts associated with increased utilization of existing roadways. For reference purposes, therefore, we have identified noise level criteria applicable to the design and construction or reconstruction of highways using federal funds.

The Federal Highway Administration (FHWA) highway design and construction noise level criteria identify several receptors that are most sensitive to traffic noise, including residences, churches, hospitals, schools, libraries, meeting halls, parks, and nature preserves. Businesses are also somewhat sensitive to traffic noise, although to a lesser degree. The most sensitive land use adjacent to the study area is primarily residential. CWM and their consultant, SEC Donohue, have identified several receptors (three residential areas and a school complex) that occupy representative positions closest to the transportation route, and thus represent the maximum potential for noise impacts. Impacts associated with these receptors can therefore be assumed to represent potential worst case exterior noise level impacts to the other homes and sensitive receptors.

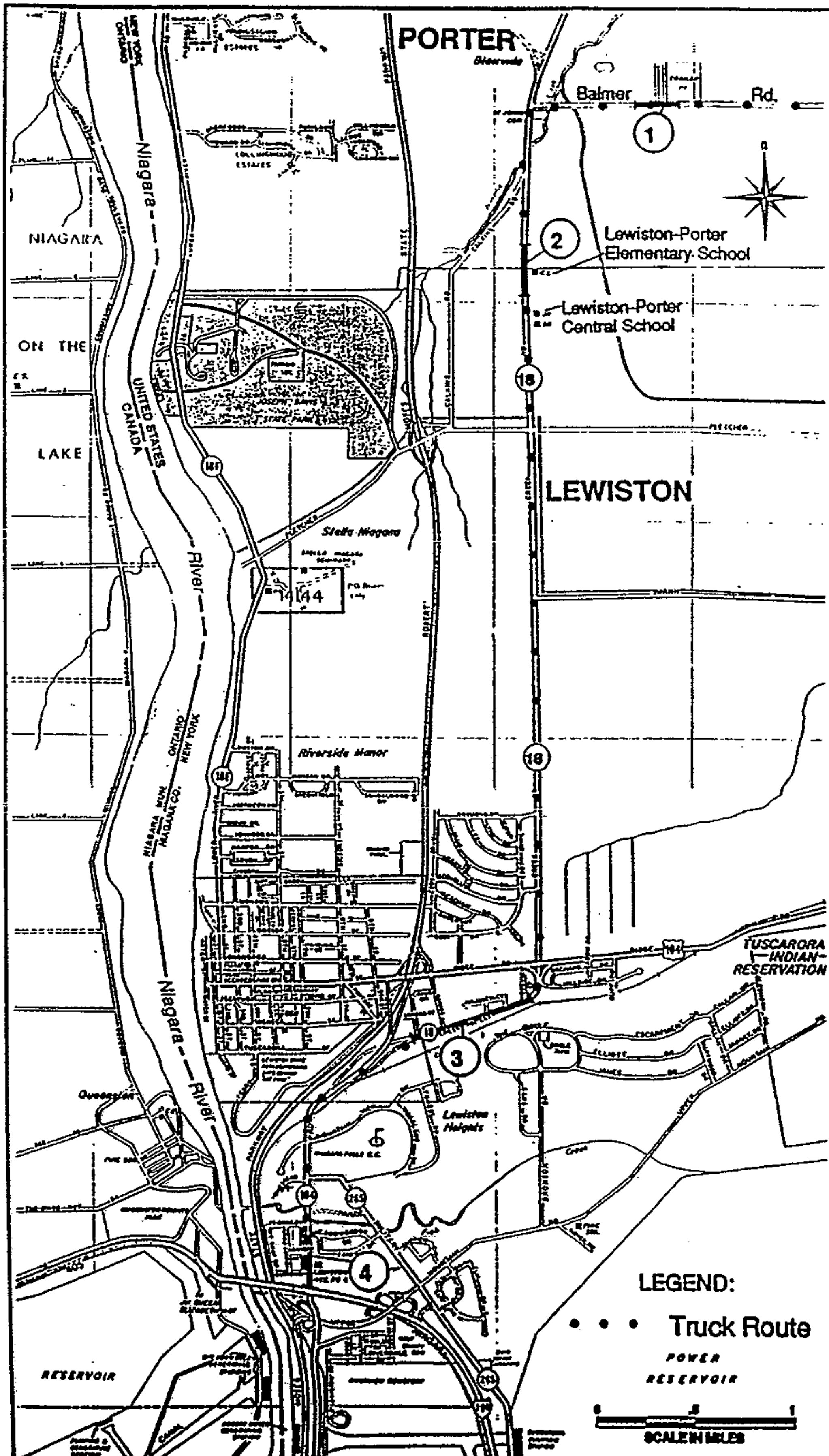

Figure 1. Highway segments modeled for noise impacts along the designated transportation route to Model City. CWM Chemical Services Noise Assessment, 1992.

2.0 METHODOLOGY

2.1 NOISE EVALUATION GUIDELINES

The FHWA has developed a set of noise standards that includes traffic noise prediction requirements for noise analyses and noise abatement criteria (23 U.S.C. 109 (i)). These standards specifically apply to federal or federal-aided construction or improvement projects. Although this study is being conducted for a private-sector project involving the use of existing state and local roadways, the FHWA standards were used as a reference to assess the potential noise impacts associated with the traffic loading alternatives. The STAMINA 2.0 noise prediction model, originally developed by FHWA, was used to model traffic noise. This model is discussed in greater detail in Section 2.2.

Two sets of criteria were used to assess the noise levels predicted using the STAMINA 2.0 model. FHWA defines significant traffic noise impacts as (1) those which occur when the predicted noise levels approach or exceed the noise abatement criteria for particular land uses [see Table 1], or (2) when the predicted traffic noise levels substantially exceed the existing noise levels (FHWA 1982). These criteria refer primarily to exterior areas, where "frequent human use occurs and a lowered noise level would be of benefit." For this project, the focus is on external noise abatement criteria for activity category B as described in Table 1 (i.e., urban areas with residences and schools).

The New York State Department of Transportation (NYSDOT) uses a criterion to determine whether or not predicted increases in noise levels are significant. The NYSDOT criterion is predicated upon the understanding that a noise level of about 3 decibels (dBA) represents the threshold of a discernible change in sound level. The NYSDOT defines "no impact" as increases less than 6 dBA and sound levels less than 67 dBA for activity category B (Mr. William McColl, NYSDOT, pers. comm.).

TABLE 1. FHWA NOISE ABATEMENT CRITERIA FOR HIGHWAY PROJECTS.[a]

	HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (DBA)	
ACTIVITY CATEGORY	$L_{eq}(h)$[b]	DESCRIPTION OF ACTIVITY
A	57 (Exterior)	Lands on which serenity and quiet of extraordinary significance serve an important public purpose and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities, not included in Categories A or B.
D	--	Undeveloped lands.
E	52 (Interior)	Interior spaces of Category B, where applicable.

[a]Source: Federal Highway Administration 1982.
[b]Hourly A-weighted sound level measured in DBA.

2.2 NOISE ASSESSMENT MODEL

The FHWA noise prediction model STAMINA 2.0 was used to assess noise levels. This method calculates sound energy expressed as the hourly A-weighted sound level, or $L_{eq}(h)$, in decibels (dBA). This quantity is the equivalent steady-state sound level which during a one-hour time period contains the same acoustic energy as the time-varying sound level during the same period. The sound level intensity at a receptor location is estimated according to the three-dimensional geometric relationship (taking into account horizontal and vertical distances and elevation) between straight line roadway segments and the receptors. The sound emission characteristics of the sound source (traffic) are defined by speed-dependent reference noise emission levels and vehicle density by vehicle type. Noise emission levels for cars, light trucks, and heavy (semi-) trucks are internally defined by the model; these three vehicle types are included in the project's traffic volume estimates. In addition to these vehicle types, school buses form a portion of the traffic volume, particularly near the school complex. Buses were combined with the light truck category for this study. Finally, the path between the source and the receptor can be characterized by including the effects on noise levels of barriers (structures, trees, etc.), topography, and atmospheric absorption.

2.3 ROADWAY SEGMENTS AND RECEIVERS

Four roadway segments were defined for this study, three of which are adjacent to residences and one to a school complex (Lewiston-Porter Schools). These segment locations and their characteristics are described in Table 2. For all segments, the edge-of-pavement closer to the receptor was used to define the distance between the roadway and the receiver. Because the noise abatement criteria focus is on external useable areas, locations in the front yards of each receptor were specified as the receptor position. Receptor #1 is 153 feet north of Balmer Road; receiver #2 is 457 feet east of Route 18; receptor #3 is 35

TABLE 2. HIGHWAY SEGMENT CHARACTERISTICS AT DESIGNATED LOCATIONS ALONG TRUCK ROUTE. CWM NOISE ASSESSMENT, 1992.

HIGHWAY SEGMENT	ROAD	LOCATION	RECEPTOR	HORIZONTAL DISTANCE FROM ROADWAY (FT)	OPERATING SPEED (MPH)	NO. LANES	ROAD WIDTH	SHOULDER WIDTH	TERRAIN (SUBSTRATE)
1	Balmer Road	Trailer Park	Residence	153	55	2	24'	6'	Level (grass lawn)
2	NY 18 (Creek Road)	Lewiston-Porter Schools	School	457	55	2	24'	8'	Level (grass lawn)
3	NY 18 (Creek Road Ext.)	Between Walker Dr. & Ridgeview Ave.	Residence	35	40	2	24'	5'	Slightly Sloped (grass lawn)
4	NY 104 (Lewiston Rd.)	Between Meadowbrook Dr. & I-190	Residence	73	45	4	50'	Curb	Sloped (grass lawn)

feet north of the Route 18 segment; and receptor #4 is 73 feet east of the Route 104 segment.

2.4 TRUCK TRAFFIC SCENARIOS

For each of the two truck traffic scenarios described below, the proposed changes in truck volumes were estimated using the existing volume of trucks entering and leaving the CWM facility (as of April 1992) along with guidance from CWM personnel at the site. The volume differences were then evaluated for noise levels in the STAMINA 2.0 model.

Expanded Operations

CWM has identified a specific number of trucks required to haul the increased amount of waste projected to be handled by RMU-1. At present, approximately 350,000 tons of waste (including "exempt" waste) destined for landfilling are received at the CWM facility. This amount is projected to increase to 500,000 tons per year, requiring an additional 43 waste trucks (or 86 truck trips to and from the facility) per day.

For the first iteration of this scenario, operations were planned to extend over a 24-hour period. One truck per hour was assumed to enter and exit the facility (i.e., one round trip) during the period of 5 p.m. to 7 a.m. This accounts for 28 truck trips over this 14 hour period. For the 7 a.m. to 5 p.m. period, three trucks per hour were assumed to enter and exit the facility. Over this 10 hour period, this results in a total of 60 truck trips. Over the full 24 hour period, this scenario accounts for a total of 44 trucks (one more than actually required), or 88 truck trips, above existing truck volumes.

A second Expanded Operations scenario was developed to avoid running additional trucks during the overnight period. This required an iterative screening procedure using the STAMINA 2.0 model to determine how the required number of waste-hauling trucks could be best distributed over the greatest number of hours in a 24-hour period without resulting in a predefined significant impact to the existing noise environment. The development of this scenario is discussed further in Section 3.0.

No Action

For the No Action scenario it was assumed that RMU-1 would not be constructed and that all landfilling activities would stop when the existing landfill capacity was reached. Hence there would be a decline in truck volumes compared to existing conditions. Truck volumes would decline by 25 to 30 trucks per hour during the 7 a.m. to 8 a.m. period, and by 7 to 10 trucks per hour during the 4 p.m. to 5 p.m. period. This is discussed further in Section 3.0.

2.5 EXISTING NOISE ENVIRONMENT

Existing hourly traffic volume data were supplied by Bettigole Andrews & Clark, Inc. (Table 3). Separate traffic counts were taken for each segment of the designated truck route during May and November, 1992. Since the objective of the study is to determine how the required number of waste-hauling trucks can be best distributed over the greatest number of hours in a twenty-four hour period, traffic counts were taken during ten one hour periods encompassing morning and afternoon "rush hour" traffic, mid-day traffic, and overnight traffic periods. These hours were utilized to determine the number of additional trucks that can be added to the highway system during critical hours of traffic and noise conditions. Noise levels based on existing traffic volumes as modeled using STAMINA 2.0 are also noted in Table 3.

TABLE 3. EXISTING TRAFFIC VOLUMES (TWO-WAY) AND NOISE LEVELS[a] AT DESIGNATED HIGHWAY SEGMENTS DURING TEN ONE-HOUR PERIODS. CWM NOISE ASSESSMENT, 1992.

HOUR	TOTAL	AUTOS	BUSES	TRUCKS	SEMIS	NOISE LEVEL[a] (dBA)
HIGHWAY SEGMENT 1 - BALMER ROAD						
2-3 a.m.	7	7	0	0	0	38.8
5-6 a.m.	22	22	0	0	0	43.8
6-7 a.m.	92	83	1	2	6	55.0
7-8 a.m.	179	118	9	5	47	62.5
12-1 p.m.	136	89	0	5	42	61.7
4-5 p.m.	159	131	4	2	22	59.4
5-6 p.m.	109	102	2	2	3	54.1
6-7 p.m.	95	94	0	0	1	51.3
7-8 p.m.	68	67	1	0	0	49.3
8-9 p.m.	64	64	0	0	0	48.4
HIGHWAY SEGMENT 2 - LEWISTON-PORTER SCHOOLS[b]						
7-8 a.m.	349	286	26	10	27	53.8
4-5 p.m.	374	353	3	10	8	50.8
HIGHWAY SEGMENT 3 - NY ROUTE 18						
2-3 a.m.	17	17	0	0	0	48.8
5-6 a.m.	55	53	1	0	1	56.9
6-7 a.m.	195	176	4	0	15	65.9
7-8 a.m.	496	434	11	11	40	70.4[c]
12-1 p.m.	337	276	0	7	54	70.8[c]
4-5 p.m.	487	450	1	15	21	68.5[c]
5-6 p.m.	419	397	9	3	10	66.4
6-7 p.m.	279	269	2	1	7	64.4
7-8 p.m.	202	195	1	0	6	63.2
8-9 p.m.	184	177	6	1	0	60.8

(continued)

TABLE 3. (Continued)

HOUR	TOTAL	AUTOS	BUSES	TRUCKS	SEMIS	NOISE LEVEL[a] (dBA)
HIGHWAY SEGMENT 4 - NY ROUTE 104						
2-3 a.m.	33	32	0	1	0	49.4
5-6 a.m.	127	121	3	0	3	57.3
6-7 a.m.	513	487	6	2	18	63.9
7-8 a.m.	1733	1634	12	38	49	69.1[c]
12-1 p.m.	1665	1526	4	52	83	70.2[c]
4-5 p.m.	1959	1904	4	27	24	68.0[c]
5-6 p.m.	1026	1006	11	0	9	64.6
6-7 p.m.	705	687	10	0	8	63.4
7-8 p.m.	511	505	2	0	4	61.3
8-9 p.m.	457	447	5	0	5	61.4

[a]modeled noise levels at designated receivers based on recorded traffic volumes; traffic data for 2-3 a.m., 7-8 a.m., 12-1 p.m. and 4-5 p.m. collected during May 1992, and traffic data for 5-6 a.m., 6-7 a.m., 5-6 p.m., 6-7 p.m., 7-8 p.m., and 8-9 p.m. collected during November 1992.

[b]data collected only during morning and evening peak hours since buildings are unoccupied before and after those hours

[c]existing noise level exceeds 67 dBA criterion (see Table 1)

In order to compare the noise levels produced by the STAMINA 2.0 model and those measured at each receptor site, sound level data were collected during the September 22-24, 1992 period at the four receptor sites. Fifteen-minute integrated sound data were collected over the target periods using Quest model 1400 and 155 sound level meters; the one-hour Leq was calculated from this data according to methods described in Menge (1985). The measured noise levels were compared to background noise conditions as modeled using STAMINA 2.0 and the traffic counts taken in May, 1992 during the 7-8 a.m., 4-5 p.m., and 2-3 a.m. periods. Using existing traffic volumes, the STAMINA 2.0 model calculated a noise level within 2 dBA of measured levels for the 7-8 a.m., 4-5 p.m.; and 2-3 a.m. periods at Segments 3 (NY Route 18) and 4 (NY Route 104); for the 2-3 a.m. period at Segment 1 (Balmer Road); and for the 4-5 p.m. period at Segment 2 (Lewiston Porter Schools). Differences of 3 dBA or less between measured and modeled noise levels are considered to be acceptable (FHWA pers. comm. 1991).

The differences between measured and modeled noise levels at the Balmer Road receptor during the 7-8 a.m. and 4-5 p.m. periods, and at the school complex during the 7-8 a.m. period, were about 9-10 dBA. Since the STAMINA 2.0 model addresses noise contributed solely by the traffic count data entered into the model, other background noise (traffic on secondary roads, air conditioners in nearby buildings, wind, etc.) likely caused this discrepancy. Specifically, when noise levels at receptors 1 and 2 were collected during these periods, conditions on site were windy, creating additional background noise not accounted for in the model. Since additional traffic count data needed to be collected to evaluate the Expanded Operations scenario, an additional comparative study was undertaken in November, 1992 using one full hour of concurrent traffic count data and sound level data. This data was collected at Segment 3 from 6-7 a.m. under ideal (i.e., calm) conditions. The measured Leq(h) was 63.9 dBA, while the modeled Leq(h) was 65.9 dBA; this 2 dBA variance is in the acceptable range and verified the similarity between measured noise data and that projected by the model.

The remaining inputs to the model used to further define the noise environment involved adjustments to account for shielding factors and the sound propagation rate. Alpha factors were used to modify the sound propagation rate to reflect the nature of the surface over which sound travels. Soft ground tends to absorb sound; when the sound propagation path is covered by vegetation, an alpha factor is specified to account for the excess attenuation that is not achieved over hard ground. This adjustment for soft ground was applied to all of the receptor sites. Shielding factors modify the sound level directly, and are specified when rows of trees or houses or some other barrier provide an additive attenuation to the sound level. For example, if a shielding factor of 1 is specified, the sound level is decreased by 1 dBA. In this study, there generally are no existing barriers, natural or artificial, between the roadway and the receptors. Although at some receptors some trees are present, the stand of trees would have to be about 100 feet thick and at least 15 feet higher than the sound source to provide measurable shielding (FHWA 1991, pers. comm.). Lesser amounts of trees may provide a filtering effect for certain wavelengths of sound, but do not reduce the overall sound level. Therefore, no shielding factors were applied in this effort.

3.0 RESULTS AND DISCUSSION

Initial Screening Procedure

Given the projected truck volumes discussed in Section 2.4 and using the FHWA and NYSDOT noise abatement criteria as references for discussion and comparison purposes, the screening procedure was undertaken to evaluate the maximum number of hours per day that the projected number of trucks could travel the designated corridor. Using the NYSDOT 6 dBA criterion, a total of 3 truck trips could be added during the 5:00 a.m. to 6:00 a.m. interval; up to 30 truck trips per hour could be added during the 6:00 a.m. to 7:00 a.m. interval (Table 4). This is based on the 9 one-hour intervals during the 5:00 a.m. to 9:00 p.m. period for which traffic count data were collected. Using the FHWA 67 dBA criterion for the same intervals, it would take an additional 150 truck trips to reach 67 dBA during the 5:00 a.m. to 6:00 a.m. interval and an additional 134 truck trips to reach the criterion during the 6:00 a.m. to 7:00 a.m. period. Because of low traffic volumes observed during the 9:00 p.m. to 5:00 a.m. overnight period (as represented by the 2:00 a.m. to 3:00 a.m. data), and the logarithmic nature of the A-weighted decibel scale, one added semi-truck per hour would increase the noise level by more than 6 dBA at receptors in Segments 1 and 3.

Based on this information, a general distribution of trucks for the Expanded Operations and No Action scenarios was developed (Table 5). The ten one-hour periods during which data were collected were divided into four study periods to represent a full 24 hour period. The distribution for a 24 hour operation is shown for comparison, although any additional trucks during the overnight period would exceed the referenced NYSDOT 6 dBA noise abatement criterion. The distribution as given in Table 5 allows for more than the projected number of trucks. There is a great deal of flexibility in the 6:00 a.m. to 5:00 p.m. period for CWM to develop a distribution that best meets their needs.

TABLE 4. NUMBER OF ADDITIONAL TRUCK TRIPS ABOVE EXISTING LEVELS THAT CAUSE AN EXCEEDANCE OF THE REFERENCED NYSDOT AND FHWA NOISE ABATEMENT CRITERIA CWM NOISE ASSESSMENT, 1992.

			ADDED TRUCK TRIPS TO REACH	
HIGHWAY SEGMENT	TIME	EXISTING dBA	+6 dBA	67 dBA
1-Balmer Rd	2-3 a.m.	38.8	1	150
	5-6 a.m.	43.8	3	160
	6-7 a.m.	55.0	30	134
	7-8 a.m.	62.5	160	120
	12-1 p.m.	61.7	130	110
	4-5 p.m.	59.5	90	130
	5-6 p.m.	54.1	25	150
	6-7 p.m.	51.3	15	150
	7-8 p.m.	49.3	8	140
	8-9 p.m.	48.4	9	150
3-NY 18	2-3 a.m.	48.8	1	50
	5-6 a.m.	56.9	7	25
	6-7 a.m.	65.9	55	6
	7-8 a.m.	70.4	160	--[a]
	12-1 p.m.	70.8	175	--
	4-5 p.m.	68.5	100	--
	5-6 p.m.	66.4	70	3
	6-7 p.m.	64,4	40	13
	7-8 p.m.	63.2	35	15
	8-9 p.m.	60.8	20	20
4-NY 104	2-3 a.m.	49.4	4	60
	5-6 a.m.	57.3	20	60
	6-7 a.m.	63.9	90	30
	7-8 a.m.	69.1	220+	--
	12-1 p.m.	70.2	280+	--
	4-5 p.m.	68.0	200+	--
	5-6 p.m.	64.6	100+	30
	6-7 p.m.	63.4	70	40
	7-8 p.m.	61.3	50	50
	8-9 p.m.	61.4	50	50

[a]-- Already exceeds 67 dBA under existing conditions

TABLE 5. RELATIVE CHANGE IN SEMI-TRUCK VOLUMES PER HOUR COMPARED TO EXISTING LEVELS FOR THE EXPANDED OPERATIONS AND NO ACTION SCENARIOS. CHANGE EXPRESSED AS TRUCK TRIPS. CWM NOISE ASSESSMENT, 1992.

TRAFFIC SCENARIO	NUMBER OF TRUCK TRIPS PER HOUR ADDED OR SUBTRACTED FOR EACH STUDY PERIOD					
	OVERNIGHT	EARLY MORNING		DAYTIME	EVENING	24-HOUR[a] TOTAL
	(9 pm-5 am)	(5 am-6 am)	(6 am-7 am)	(7 am-5 pm)	(5 pm-9 pm)	
EXPANDED OPERATIONS						
a) 24-hr operation	+2	+2	+2	+7	+2	+98
b) 5 am-9 pm operation	0	+2	+4	+7	+4	+92
NO ACTION						
Segment 1	0	0	-30[b]	-10[b]	0	
Segment 2	0	0	-25	-7	0	
Segment 3	0	0	-25	-7	0	
Segment 4	0	0	-25	-7	0	

[a] More than the actual number of truck trips required to meet projected waste-hauling needs.
[b] For this scenario, "Early Morning" period was defined as 7-8 am only; "Daytime" period defined as 4-5 pm only.

As noted in Section 2.4, truck volumes would decrease under the No Action scenario. The resulting decreases are also noted in Table 5.

Noise Model Results Based on Optimal Distribution of Truck Trips

Based on the screening procedure, it was clear that more than the projected number of additional trucks (shown in Table 5) could be added to the existing traffic volumes without causing any adverse impacts to the noise environment for the 5 a.m.-9 p.m. Expanded Operations scenario. For this scenario, the actual changes in noise levels due to the added or subtracted trucks were modeled to show specifically what the projected increases or decreases would be (Table 6).

Under the 5 a.m.-9 p.m. Expanded Operations Scenario, noise levels generally increased less than 2 dBA but never more than 5.5 dBA (5 a.m.-6 a.m. at the Balmer Road receptor) at all receptors. Therefore, the NYSDOT standard of an incremental change of +6 dBA was not met or exceeded. As noted above, under the 24-hour Expanded Operations scenario, this standard was exceeded during the 2 a.m.-3 a.m. period for receptors located in Segments 1 and 3 (but not in Segment 4).

In several instances, existing noise levels were determined to be above the 67 dBA FHWA Noise Abatement Criterion (Table 6). However, the predicted noise increases under the Expanded Operations scenario were always less than 1.4 dBA, and therefore would not be discernible. During the 5-6 p.m. period at Segment 3, the 0.7 dBA increase under the 5 a.m.-9 p.m. Expanded Operations scenario is sufficient to bring the noise level 0.1 dBA above the 67 dBA Noise Abatement Criterion. Although this is the only true exceedance of the FHWA noise abatement criterion for the Expanded Operations scenario, the small increase in the noise level should not be discernible.

TABLE 6. STAMINA 2.0 MODEL PREDICTED NOISE LEVELS (AND INCREMENTAL CHANGE) UNDER EXISTING CONDITIONS AND EACH TRUCK VOLUME SCENARIO. CWM NOISE ASSESSMENT, 1992.

HOUR	EXISTING	EXPANDED OPERATIONS 24-HRS	EXPANDED OPERATIONS 5AM-9PM	NO ACTION
HIGHWAY SEGMENT 1 - BALMER ROAD RESIDENCE				
2-3 a.m.	38.8	48.4 (+9.6)[a]	38.8 (0)	38.8 (0)
5-6 a.m.	43.8	49.3 (+5.5)	49.3 (+5.5)	--
6-7 a.m.	55.0	55.8 (+0.8)	56.4 (+1.4)	--
7-8 a.m.	62.5	63.0 (+0.5)	63.0 (+0.5)	59.2 (-3.3)
12-1 p.m.	61.7	62.3 (+0.6)	62.3 (+0.6)	--
4-5 p.m.	59.5	60.5 (+1.0)	60.5 (+1.0)	57.7 (-1.8)
5-6 p.m.	54.1	55.0 (+0.9)	55.8 (+1.7)	--
6-7 p.m.	51.3	52.9 (+1.6)	54.1 (+2.8)	--
7-8 p.m.	49.3	51.7 (+2.4)	53.2 (+3.9)	--
8-9 p.m.	48.4	51.2 (+2.8)	52.9 (+4.5)	--
HIGHWAY SEGMENT 2 - LEWISTON-PORTER SCHOOLS				
7-8 a.m.	53.8	54.4 (+0.6)	54.4 (+0.6)	51.0 (-2.8)
4-5 p.m.	50.8	51.8 (+1.0)	51.8 (+1.0)	49.4 (-1.4)
HIGHWAY SEGMENT 3 - NY ROUTE 18 RESIDENCE				
2-3 a.m.	48.8	56.7 (+7.9)	48.8 (0)	48.8 (0)
5-6 a.m.	56.9	59.4 (+2.5)	59.4 (+2.5)	--
6-7 a.m.	65.9	66.3 (+0.4)	66.7 (+0.8)	--
7-8 a.m.	70.4	70.9 (+0.5)	70.9 (+0.5)	67.9 (-2.5)
12-1 p.m.	70.8	71.3 (+0.5)	71.3 (+0.5)	--
4-5 p.m.	68.5	69.2 (+0.7)	69.2 (+0.7)	67.5 (-1.0)
5-6 p.m.	66.4	66.8 (+0.4)	67.1 (+0.7)	--
6-7 p.m.	64.4	64.9 (+0.5)	65.4 (+1.0)	--
7-8 p.m.	63.2	63.9 (+0.2)	64.6 (+1.4)	--
8-9 p.m.	60.8	62.0 (+1.2)	62.9 (+2.1)	--

(continued)

TABLE 6. (Continued)

HOUR	EXISTING	EXPANDED OPERATIONS 24-HRS	EXPANDED OPERATIONS 5AM-9PM	NO ACTION
HIGHWAY SEGMENT 4 - NY ROUTE 104 RESIDENCE				
2-3 a.m.	49.4	53.7 (+4.3)	49.4 (0)	49.4 (0)
5-6 a.m.	57.3	58.3 (+1.0)	58.3 (+1.0)	--
6-7 a.m.	63.9	64.2 (+0.3)	64.4 (+0.5)	--
7-8 a.m.	*69.1*	*69.3* (+0.2)	*69.3* (+0.2)	*67.9* (-1.2)
12-1 p.m.	*70.2*	*70.4* (+0.2)	*70.4* (+0.2)	--
4-5 p.m.	*68.0*	*68.3* (+0.3)	*68.3* (+0.3)	*67.6* (-0.4)
5-6 p.m.	64.6	64.9 (+0.3)	65.1 (+0.5)	--
6-7 p.m.	63.4	63.7 (+0.3)	63.9 (+0.5)	--
7-8 p.m.	61.3	61.7 (+0.4)	62.1 (+0.8)	--
8-9 p.m.	61.4	61.8 (+0.4)	62.2 (+0.8)	--

*Exceedences of Noise Abatement Criteria are noted in italics.

For the two time periods examined for the school complex (Segment 2), noise levels always remained below 55 dBA and never increased by more than 1.9 dBA. Other time periods were not examined for this segment because the facility would not be occupied during those periods.

For the No Action scenario, noise levels were projected to decrease for all segments. During the majority of the periods, the predicted decrease in noise levels under the No Action alternative is less than 2 dBA, and thus would not be discernible. In spite of these decreases, noise levels at the Segment 4 receptor were still predicted to be above 67 dBA.

The only significant difference between the options of expanding waste hauling activities over a 24-hour period or the 16-hour period between 5 a.m. and 9 p.m. is the predicted impact on noise levels during the overnight period (as measured using data for the 2 a.m.-3 a.m. time period). During the other nine one-hour intervals examined, the modeled differences in noise increases were negligible between these two options.

4.0 SUMMARY

The FHWA noise prediction model STAMINA 2.0 was used to model noise levels at four segments along the truck route from Interstate 190 to the CWM Chemical Services Inc. facility. Projected noise levels were calculated for two truck traffic scenarios. Within the Expanded Operations scenario, differences between operating on a 24-hour basis or a 16-hour (5 a.m.-9 p.m.) basis were also examined.

Noise levels at receptor Segments 3 (Route 18 residence) and 4 (Route 104 residence) exceed the FHWA Noise Abatement level of 67 dBA under existing conditions as well as under all scenarios (including No Action) during certain hours. Based on the NYSDOT criterion, noise impacts <u>above</u> existing conditions were predicted <u>only</u> for the 2-3 a.m. period for the Expanded Operations scenario. The increase of two truck trips per hour under a 24-hour operation would raise the noise levels by more than 6 dBA at two residential receptor sites (in Segments 1 and 3) during this overnight period.

The only significant difference between the options of expanding waste hauling activities over a 24-hour period or a 16-hour period between 5 a.m. and 9 p.m. is the impact on noise levels during the overnight period. During the other nine one-hour intervals examined, the modeled differences in noise levels between these two options were found to be negligible and, thus, insignificant.

When operations were limited to the 5 a.m.-9 p.m. period, no significant impacts to the noise environment were predicted for the projected truck volumes at any segment for the Expanded Operations scenario. Modeled noise increases were never more than 5.5 dBA, and were generally predicted to be less than 2 dBA.

5.0 REFERENCES

Federal Highway Administration. 1982. Federal-Aid Highway Program Manual, Procedures for Abatement of Highway Noise and Construction Noise. Transmittal 348, August 9, 1982.

__________. 1983. Noise Barrier Cost Reduction Procedure STAMINA 2.0/OPTIMA: User's Manual. FHWA-DP-58-1, April 1982, revised March 1983.

Menge, Christopher W. 1985. The One-Minute L_{eq} Measurement Method. In: Issues in Transportation-Related Environmental Quality. Transportation Research Record 1033. Transportation Research Board, National Research Council. Washington, DC.

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Appendix H

Soil Management Plan

WASTE MANAGEMENT, INC.

CWM Chemical Services, LLC.

Soil Management Plan

Residuals Management Unit 2

Model City Facility

1550 Balmer Road

Model City, Niagara County, New York

April 2003
Revised August 2009
Revised November 2013

Figures

Appendices

1. Introduction

This Soil Management Plan (SMP) is being prepared for Residuals Management Unit 2 (RMU-2) at the CWM Chemical Services, LLC (CWM) facility located in Model City, Niagara County, New York that is owned and operated by CWM. Soil management is needed for this project to compare the quantity of existing soil that will be excavated during construction of RMU-2 with the amount of soil required to construct the landfill baseliner system, mechanically stabilized earth (MSE) wall, and the final cover, as well as the amount of soil required to construct the various relocated facilities and Facultative (Fac) Pond 5. Management of soils at this site will require soil stockpiling and transport during the construction phases of the RMU-2 facility and activities to minimize erosion of these soils into nearby drainage channels and streams. This SMP addresses four key issues:

- Provision of soil balance information regarding the use and final disposition of soils excavated from RMU-2, as well as additional soil materials brought onto the site;
- Soil requirements for the construction of RMU-2, Fac Pond 5 and the relocated facilities;
- Soil stockpile locations and storage capacity; and
- An erosion and sediment control plan.

Section 2 of this SMP presents a discussion of soil materials needs, on-site soil availability and the soil volumes that will be transported from off-site sources and stockpiled on the RMU-2 site. Section 3 presents calculations of the storage capacity and volume of each stockpile area, an erosion control plan and a discussion of traffic flow in and around RMU-2 and the stockpiles. Section 4 presents a summary of Sections 2 and 3 as a comprehensive plan addressing soil management during the construction phases of RMU-2.

2. Soil Materials Management

2.1 Residuals Management Unit 2 and Fac Pond Construction

Soil materials will be required for the construction of the RMU-2 landfill and construction of Fac Pond 5. Clay soils are required for the construction of a secondary liner and gravel is required for construction of primary and secondary leachate drainage and collection systems and various structural soils are required for MSE wall, perimeter berms, and final landfill cover. A portion of the required soil materials will be obtained from on-site excavation for RMU-2 and Fac Pond 5. Soils not available on site will be obtained from off-site sources on a contract basis.

The construction of the RMU-2 landfill will be conducted in phases (i.e., one to two cells at a time). Activities will include subbase excavation, construction of perimeter berms, construction of a secondary clay liner and leachate collection system and construction of a primary soil liner and leachate collection system. As each cell achieves its waste capacity, final cover (consisting of additional soil materials) will be installed. The excavation and initial landfill construction for each cell will require one construction season. Construction of Fac Pond 5 will be completed in one construction season.

An inventory of soil material requirements was developed for the construction operations to determine soil needs and stockpile area requirements.

The soil volume estimates were based on landfill design parameters associated with the area and depths proposed for RMU-2 and the proposed grades for the Fac pond. Estimates of the portion of excavated soil that can be used for construction were based on soil boring and engineering data obtained from CWM. Estimates of soil types and volumes required for construction were based on design dimensions and components. The *RMU-2 Engineering Report* (ARCADIS, April 2003, Revised August 2009, February 2013, June 2013, and November 2013) provides design criteria for RMU-2 and the Fac pond.

Excavation of the subbase for RMU-2 and Fac Pond 5 will produce clay, general fill and topsoil. All excavated soils will remain on the CWM Property. If any of these soils are determined to be contaminated, they will be separately managed and properly disposed. Uncontaminated clay may be used for liner construction only if it passes the qualifications contained in the *RMU-2 Engineering Report* and the Technical Specifications (ARCADIS, April 2003, Revised August 2009, March 2011, January 2012, February 2013, and August 2013). For the purposes of this SMP, it is assumed that the excavated clay will not be used so that the worst-case scenario may be evaluated. Excavated general fill and topsoil may be used during RMU-2 and Fac pond construction.

During the construction of the RMU-2 and Fac Pond 5 baseliner systems, approximately 233,618 cubic yards of clay and 154,235 cubic yards of aggregate will be required. Additionally, approximately 801,815 cubic yards of fill material (general fill and various types of aggregate) will be required to construct the design subgrade for RMU-2 and Fac Pond 5, including materials for the MSE wall of RMU-2 and the perimeter berm for Fac Pond 5. The estimated 266,947 cubic yards of excavated material that will be generated to reach design subgrade for RMU-2 and Fac Pond 5 will be stockpiled on site within the footprint of RMU-2 or on adjacent areas for use in construction. Assuming the full amount of excavated material will be suitable for use in construction of RMU-2 and Fac Pond 5 as general fill, structural fill, or topsoil, approximately 534,868 cubic yards of additional material will be transported from off-site locations. The proposed site stockpile locations and capacity calculations are presented in Section 3.

Although the on-site stockpile area cannot accommodate all the soil volumes required for the construction of RMU-2 and Fac Pond 5, sufficient stockpile area is available to store soil materials during phased (i.e., one to two cells at a time) construction operations. Therefore, the transport of materials from off site will be planned so that on-site storage capacity is not exceeded.

2.2 Relocated Facilities

The relocated facilities associated with the RMU-2 project include the construction of a new Drum Management Building, relocation of existing leachate unloading ramps for the SLF-10 Leachate Building and the SLF 1-11 Oil/Water Separator Building and new Stabilization and Full Trailer Parking Areas. The construction of these facilities will require some minor regrading of existing soils in the proposed building locations and it is anticipated that the minor amounts of general fill materials required for the construction of the foundations of these structures will be available from existing on-site stockpiles or soils generated from the site grading process. General fill material used in construction of these facilities will be screened for potential presence of contamination. If any of these soils are determined to be contaminated, they will be managed separately and properly disposed. Uncontaminated soils may be used for construction if it meets the qualifications contained in the *RMU-2 Engineering Report* and the Technical Specifications.

3. Stockpile Requirements

3.1 Stockpile

The areas to be utilized for stockpiling soil materials in the immediate vicinity of RMU-2 are presented on Figure 1. As previously presented, RMU-2 will be constructed in phases (i.e., one to two cells at a time). Because RMU-2 is located in a largely developed area, the entire footprint of RMU-2 may be used for stockpiling materials. This stockpiling will be relocated as construction progresses. The stockpile area will be accessible by road.

The base grade of each stockpile area will slope from 6 to 10% and sideslopes will not be steeper than 1.5 horizontal to 1 vertical (H:V). Typically, stockpiles will rise to a maximum height of 30 feet and have a minimum platform width of 210 feet. This width will allow as many as four trucks to operate simultaneously. Approximate stockpile dimensions are shown on Figures 2 and 3. Capacities of typical stockpiles were calculated and are summarized below. Calculations are shown in Appendix A.

Typical Stockpile Area	
Stockpile Height	30 feet
Stockpile Length	400 feet
Stockpile Width	300 feet (base) 210 feet (platform)
Ground Area Required	120,000 square feet (ft^2) or 2.75 acres
Stockpile Capacity	66,667 cubic yards (yd^3)
Surface Area	124,570 ft^2 or 2.86 acres

3.2 Soil Erosion and Sediment Yield

This section presents soil erosion control measures and estimates of sediment yields from the stockpiles during construction of RMU-2. Because the stockpiles are temporary structures, this SMP proposes the utilization of perimeter channels, silt fences, hay bales and rock check dams as the primary sediment control measures to prevent soil from entering into the site drainage system.

Soil erosion from the stockpiles can be calculated using the Universal Soil Loss Equation (Wishmeier and Smith, 1965):

$$A = R * K * LS * C * P$$

Where:

A: Soil loss in tons/acre/year;
R: Rainfall faction;
K: Soil erodability factor;
LS: Slope factor;
C: Cover and management factor; and
P: Support practice factor.

Soil erosion calculations are provided in Appendix B. Based on the calculations, approximately 206 tons per acre per year of soil loss is estimated for the indicated stockpile dimensions. The specified sediment control measures should adequately entrap eroded soil and minimize silting in drainage paths leading from the site. Periodic cleaning and/or replacement of sediment control features will be performed on an as-needed-basis.

3.3 Runoff Calculations

The degree of soil erosion will be most significantly affected by the severity of precipitation and runoff potential in the stockpile area.

The table below presents the maximum runoff rates and rainfall intensity for a 2-, 10-, 25- or 100-year rainstorm event. Runoff rates were calculated using the Rational Method (Appendix C):

$$q = C * i * A$$

Where:

q: The maximum runoff rate (cubic feet per hour [ft^3/hr]);
C: Runoff coefficient serves the function of converting the average rainfall rate to peak runoff intensity and is based on type and character of the surface (dimensionless number);
i: The rainfall intensity (inches per hour [in/hr]); and

A: The drainage area (acres).

For this calculation, a factor of 0.40 was used for C, reflective of rural catchments (less than 10 square kilometers [km^2]) and bare surfaces.

Rainfall Return Period	Peak Runoff Rate	Rainfall Intensity (inches/24 hours)
2-year event	7,682 ft^3/hr (57,472 gallons per hour [gal/hr])	2.0
10-year event	11,570 ft^3/hr (86,546 gal/hr)	3.0
25-year event	15, 426 ft^3/hr (115,395 gal/hr)	4.0
100-year event	21,789 ft^3/hr (162,995 gal/hr)	5.65

3.4 Traffic Flow

3.4.1 Construction

The stockpile areas will be accessed from Balmer Road by the site's access roads. The truck entrance is located along Balmer Road at the northern section of the site where Balmer Road intersects the site's Marshall Street. Marshall Street provides access to perimeter access roads immediately adjacent to RMU-2. Trucks from off site enter the Stockpile Area from the side perimeter access road. Construction vehicles are expected to enter this area through the Porter Center Road gate east of the proposed RMU-2 area.

4. Summary

RMU-2 will be constructed and operated in a number of phases. It is anticipated that construction of the landfill clay liner and leachate collection systems for each cell will be completed during one construction season. Prior to the completion of waste filling operations in each cell, construction will be initiated to complete successive cells as appropriate. Construction of Fac Pond 5 will occur during one construction season.

Soil materials are required for construction of the MSE wall, secondary clay liner, primary and secondary leachate collection systems and final landfill cover associated with RMU-2 and the liner systems and perimeter berm of Fac Pond 5. When possible, these soil materials will be obtained on site during excavation. Additional soil materials will be obtained from off-site sources on a contract basis, as required.

During the RMU-2 and Fac Pond 5 construction operations, a total of approximately 801,815 cubic yards of fill material(e.g., general fill, structural fill, various types of aggregate, and topsoil) will be required to reach design subgrade, of which approximately 266,947 cubic yards will be generated by excavation to reach design subgrade, leaving a net import of approximately 534,868 cubic yards from off-site locations. Importing of fill material will occur at needed once the on-site material produced by excavation to design subgrade has been exhausted. Construction of the RMU-2 and Fac Pond 5 liner systems will require approximately 233,618 cubic yards of clay and 154,235 cubic yards of aggregate, all of which is assumed to be imported from off-site locations. An area within the RMU-2 area and other adjacent areas are planned to accommodate stockpiled soil materials. All stockpiles will be approximately 30 feet in height and have side slopes no steeper than 1.5H:1V.

Erosion from the soil stockpiles was estimated by application of the Universal Soil Loss Equation (Wischmeier and Smith, 1965). Based on these estimates and depending on rainfall, there is a maximum total potential stockpile erosion rate of approximately 206 tons per acre per year. Although no standard has been established to determine the acceptability of this anticipated quantity of erosion, it is the regulatory intent to minimize erosion and sediment impacts to adjacent receptors through the use of erosion and sediment control features. Sedimentation controls, such as rock check dams, hay bales and silt fence will be installed adjacent to stockpiles and maintained, as needed, to minimize impacts due to anticipated erosion rates.

A traffic routing scheme has been identified to accommodate construction activities and the transportation of soil materials.

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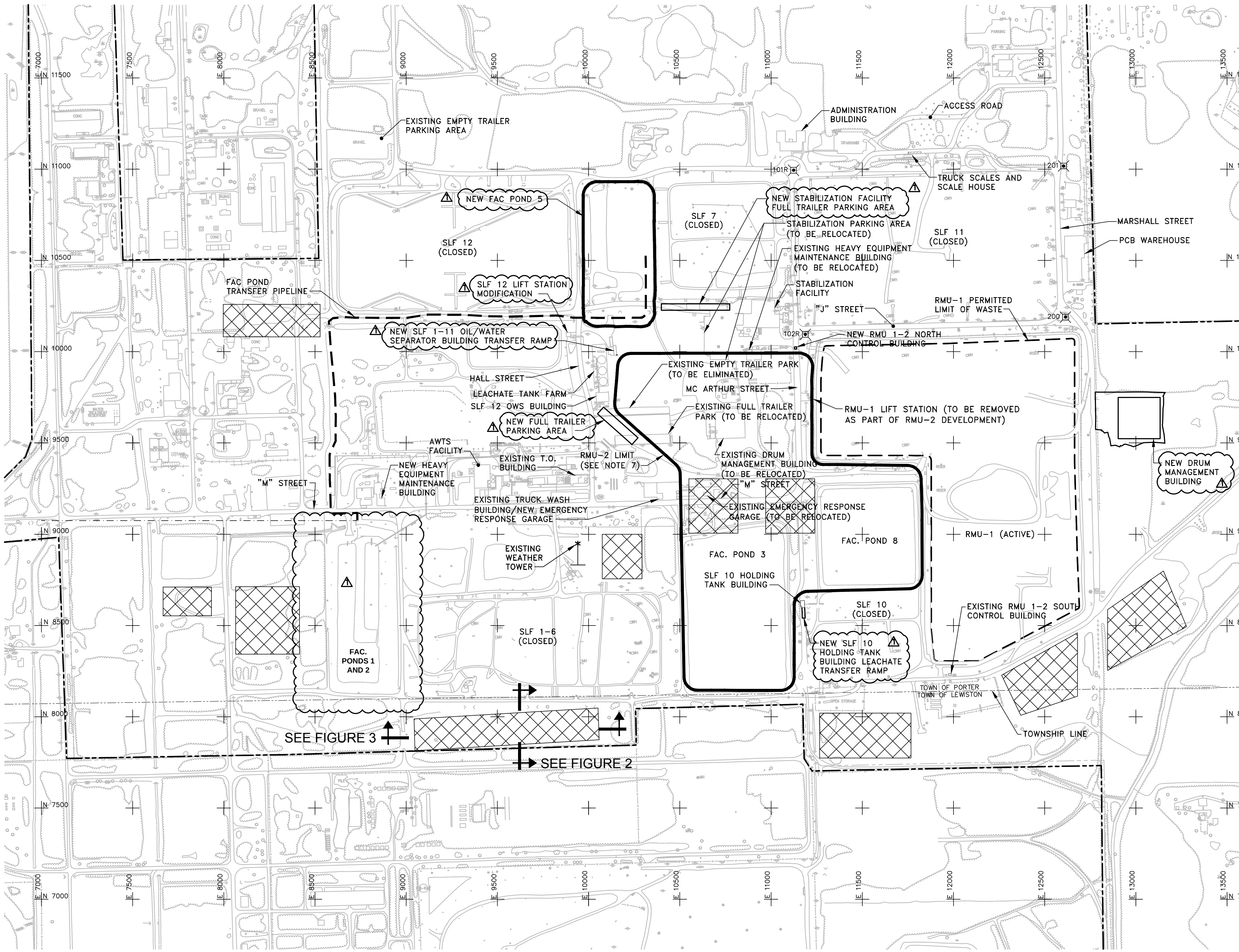
Figures



LEGEND:

- BRUSHLINE
- CABLE MARKER
- CATCH BASIN
- DROP INLET
- FENCE
- FIRE HYDRANT
- GUARD RAIL
- LIGHT POLE
- MISCELLANEOUS POLE
- MONUMENT
- POST
- RAILROAD TRACKS
- SIGN
- SWAMP
- TRAFFIC LIGHT
- TREE
- TREELINE
- UNIDENTIFIED OBJECT
- UTILITY POLE
- VALVE
- WATER LINE
- EXISTING CONTOUR
- EXISTING GRADEBREAK
- PROPERTY LINE
- NEW FAC POND TRANSFER PIPELINE
- 200 CONTROL MONUMENT (SEE TABLE BELOW)
- E 13500 / N 7000 COORDINATE GRID (SEE NOTE 3)
- STOCKPILE AREA

RMU-1/RMU-2 CONTROL MONUMENTS

MONUMENTS	ELEVATION	CWM PLANT GRID		RMU-1 GRID		NY STATE PLANE COORDINATES (NAD-27)		NGVD-29 ELEVATION
		NORTHING	EASTING	NORTHING	EASTING	NORTHING	EASTING	
102R	319.72	100+94.55	111+87.56	100+94.65	11+87.56	1,175,430.46	396,380.12	319.66
200	318.33	101+89.56	126+13.77	101+89.56	26+13.77	1,175,488.28	397,808.18	318.27
101R	316.01	109+94.28	111+23.09	---	---	1,176,331.436	396,339.034	315.92
201	316.62	110+17.82	126+3.49	---	---	---	---	---

CONTROL MONUMENTS NOTE:

1. RMU-1 EASTING GRID COORDINATES ARE SIMPLIFIED PLANT GRID COORDINATES. SUBTRACTING 10,000 FROM THE CWM PLANT GRID EASTING COORDINATE WILL CONVERT THE CWM PLANT GRID TO THE RMU-1 GRID. NOTE THAT NO CONVERSION IS REQUIRED FOR NORTHING COORDINATES.

NOTES:

1. TOPOGRAPHIC BASE MAP CONSISTS OF COMBINATION OF DATA COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED 5/31/01 BY AIR SURVEY CORP. (PROJECT NO.71010503). AND AN AUGUST 2008 SURVEY BY ENSOL, INC.
2. VERTICAL DATUM BASED ON NGS MEAN SEA LEVEL.
3. GRID COORDINATES SHOWN ARE CWM PLANT GRID.
4. CONTOUR INTERVAL 2 FT.
5. DASHED CONTOURS INDICATE THAT GROUND IS PARTIALLY OBSCURED BY VEGETATION OR SHADOWS. THESE AREAS MAY NOT MEET STANDARD ACCURACY AND REQUIRE FIELD VERIFICATION.
6. PROPERTY LINE IS APPROXIMATE. EASEMENTS AND RIGHT-OF-WAYS NOT SHOWN.
7. RMU-2 LIMIT REPRESENTS TOE OF PERIMETER MSE WALL.

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: K. DAVIS LD: PIC: W. POPHAM PM: W. RANKIN TM: B. STONE LYR: ON=*;OFF=*REF* PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 11/1/2013 11:35 AM BY: DAVIS, KATHI
G:\ENVCAD\SYRACUSE\ACT\B0023725\2013\00003\DWG\CONTRACT\IMPACT\23725G01.DWG LAYOUT: 1 SAVED: 11/1/2013 11:35 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ----
XREFS: 23725X02 23725X01 23725X00 IMAGES: PROJECTNAME: ----

300' 0 300' 600'
1"=300'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	11/2013	REMOVED FAC POND 1/2 RECONSTRUCTION	GNG	BMS

Professional Engineer's Name: **JOSEPH MOLINA**
Professional Engineer's No.: 072644
State: NY | Date Signed: | Project Mgr.: WAR
Designed by: BMS/PTO | Drawn by: LAF | Checked by: BMS

ARCADIS OF NEW YORK, INC.

CWM CHEMICAL SERVICES, LLC • MODEL CITY, NEW YORK
RESIDUALS MANAGEMENT UNIT 2 DRAFT ENVIRONMENTAL IMPACT STATEMENT

STOCKPILE LOCATIONS: EXISTING AND POTENTIAL

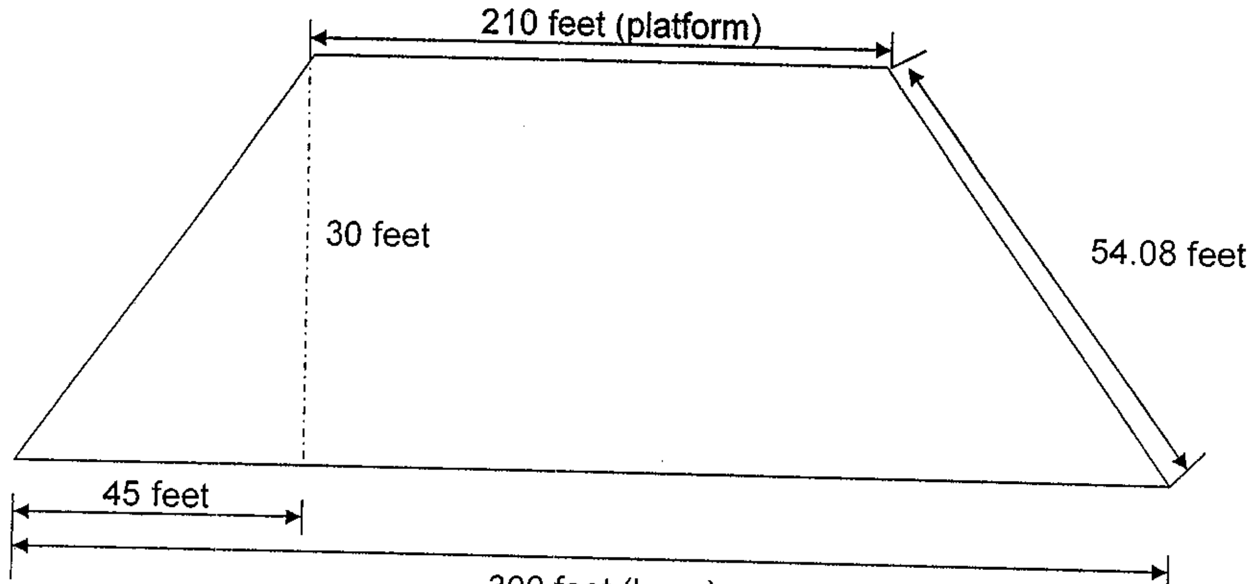
GENERAL

ARCADIS Project No. B0023725.2009.00006
Date OCTOBER 2009

ARCADIS of New York, Inc.
6723 Towpath Road
P.O. Box 66
Syracuse, New York
TEL. 315.446.91220

1

Figure 2



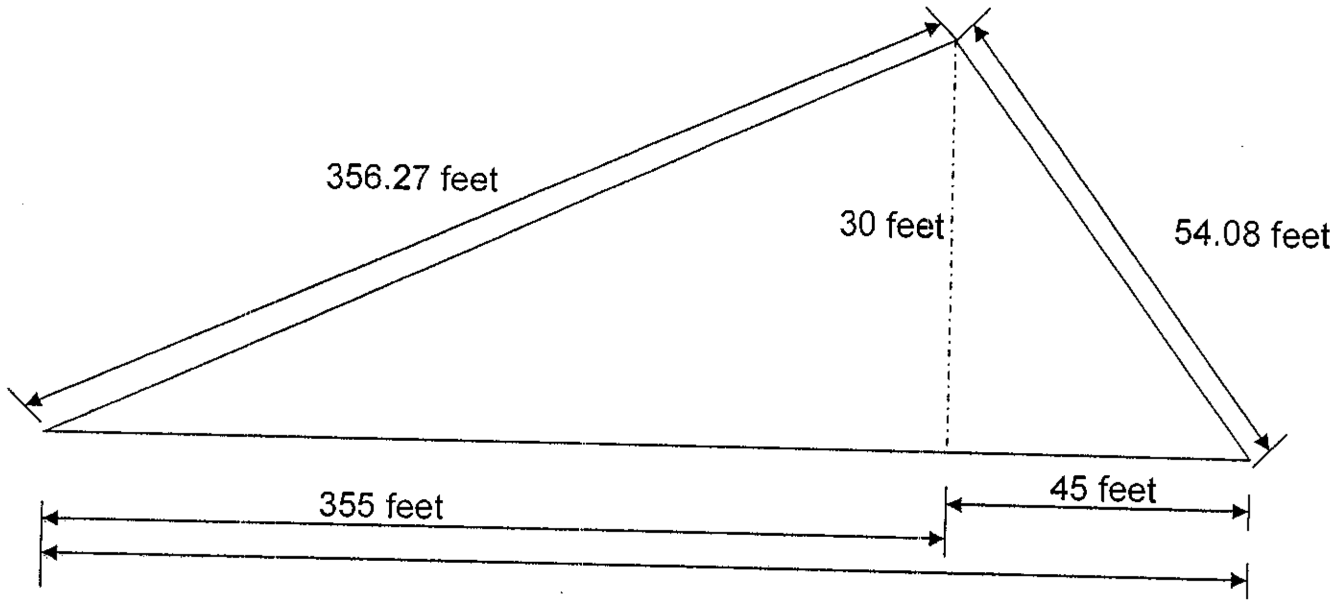


Figure 3

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Appendix A

Stockpile Capacity Calculations

STOCKPILE CAPACITY CALCULATION
CWM CHEMICAL SERVICES, LLC.
MODEL CITY, NEW YORK

1. Typical Stockpile Capacity:

- Stockpile Length: 400 feet
- Stockpile Width: 300 feet (base)
  210 feet (platform)
- Stockpile Slope: 10% (face)
  33.6% (sideslopes)
- Stockpile Height: 30 feet

2. Stockpile Volumes and Areas:

- Cross Section Area:

$$A = \frac{1}{2} * b * h$$

where:
b: 400 feet
h: 30 feet

$$A = \frac{1}{2} * 400\,ft * 30\,ft$$
$$A = 6{,}000\,ft^2$$

- Cross Section Volume:

$$Volume = Area * Platform$$

where:
Area: 6,000 ft^2
Platform: 210 feet

$$Volume = 6{,}000\,ft^2 * 210\,ft$$
$$Volume = 1{,}260{,}000\,ft^3$$

- Sideslopes: Assume 2 wedges of identical size.

$$Volume = \frac{1}{2} * l * h * b * 2$$

where:
l: 400 feet
b: 45 feet

h: 30 feet

$$Volume = \left(\frac{1}{2} * 400\,ft * 30\,ft * 45\,ft \right) * 2$$
$$Volume = 540{,}000\,ft^3$$

- Total Volume:

$$Volume_{Total} = CrossSectionVolume + SideslopeVolume$$
$$Volume_{Total} = 1{,}260{,}000\,ft^3 + 540{,}000\,ft^3$$
$$Volume_{Total} = 1{,}800{,}000\,ft^3 \cong 66{,}666.67\,yd^3$$

3. Storage Area Required:

- Ground Area Required:

$$Area = l * w$$

where:
l: 400 feet
w: 300 feet

$$Area = 400\,ft * 300\,ft$$
$$Area = 120{,}000\,ft^2 \cong 2.75 acres$$

- Surface Area:

$$Face = 356.27\,ft * 210\,ft$$
$$Face = 74{,}816.7\,ft^2$$

$$Sideslope = (\ 54.08\,ft * 355\,ft\ ) * 2$$
$$Sideslope = 38{,}396.8\,ft^2$$

$$Sideslope_{End} = 54.08\,ft * 210\,ft$$
$$Sideslope_{End} = 11{,}356.8\,ft^2$$

Total Surface Area:

$$TotalSurfaceArea = Face + Sideslope + Sideslope_{End}$$
$$TotalSurfaceArea = 74{,}816.7\,ft^2 + 38{,}396.8\,ft^2 + 11{,}356.8\,ft^2$$
$$TotalSurfaceArea = 124{,}570.3\,ft^2 \cong 2.86 acres$$

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Appendix B

Stockpile Soil Erosion Calculations

STOCKPILE SOIL EROSION CALCULATIONS
CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK

1. Universal Soil Loss Equation:

$$A = R * LS * K * C * P$$

where:

R: Rainfall faction, value = 75
LS: Variable
K: Silty clay/clay soils, value = 0.26
C: Management practice, value = 0.45
P: Vegetative cover, value = 1

2. Determination of LS variable (Side):

$$LS_{Side} = \frac{(54.08)^{0.9}}{72.6} * \left[65.41 * (0.5545)^2 + 4.56 * (0.5545) + 0.065\right]$$

$$LS_{Side} = 23.206$$

3. Soil Loss (Side):

$$A = 75 * 23.206 * 0.26 * 0.45 * 1$$

$$A = 203.633 tons / acre / year$$

4. Determination of LS Variable (Face):

$$LS_{Face} = \frac{(356.27)^{0.5}}{72.6} * \left[65.41 * (0.0958)^2 + 4.56 * (0.0958) + 0.065\right]$$

$$LS_{Face} = 0.2855$$

5. Soil Loss (Face):

$$A = 75 * 0.2855 * 0.26 * 0.45 * 1$$

$$A = 2.51 tons / acre / year$$

6. Total Soil Loss Erosion:

$$TotalLoss = A_{Side} + A_{Face}$$

$$TotalLoss = 203.633 + 2.51$$

$$TotalLoss = 206.14 tons / acre / year$$

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Appendix C

Stockpile Runoff Calculations

STOCKPILE RUN-OFF CALCULATIONS
CWM CHEMICAL SERVICES, LLC.
MODEL CITY, NEW YORK

Rational Method: $q = C * i * A$

$q =$ Run-off rate
$C =$ Dimensionless coefficient $\equiv$ Bare Surface 0.40
$i =$ Rainfall intensity
$A =$ Drainage area $\equiv$ 64 acres $\rightarrow$ RMU-2 footprint not including RMU-1 tie-in area

	$\underline{i}$ (per 24-hour storm)
2 year rainstorm event:	2.0 inches
10 year rainstorm event:	3.0 inches
25 year rainstorm event:	4.0 inches
100 year rainstorm event:	5.65 inches

<u>2 year</u>:

$$q = C * i * A$$

$$q\left(ft^3/\sec\right) = (0.40)\left(\frac{0.083in}{hr}\right)\left(\frac{1hr}{3600\sec}\right)(64acres)\left(\frac{43560\,ft^2}{1acre}\right)\left(\frac{0.083\,ft}{1in}\right)$$

$$= 2.134\frac{ft^3}{\sec} * \frac{3600\sec}{1hr} * \frac{7.481gal}{1\,ft^3} \equiv 57{,}472\frac{gal}{hr}$$

<u>10 year rainstorm event</u>:

$$q = 86{,}546.14\frac{gal}{hr}$$

<u>25 year rainstorm event</u>:

$$q = 115{,}394.85\frac{gal}{hr}$$

<u>100 year rainstorm event</u>:

$$q = 162{,}995.23\frac{gal}{hr}$$

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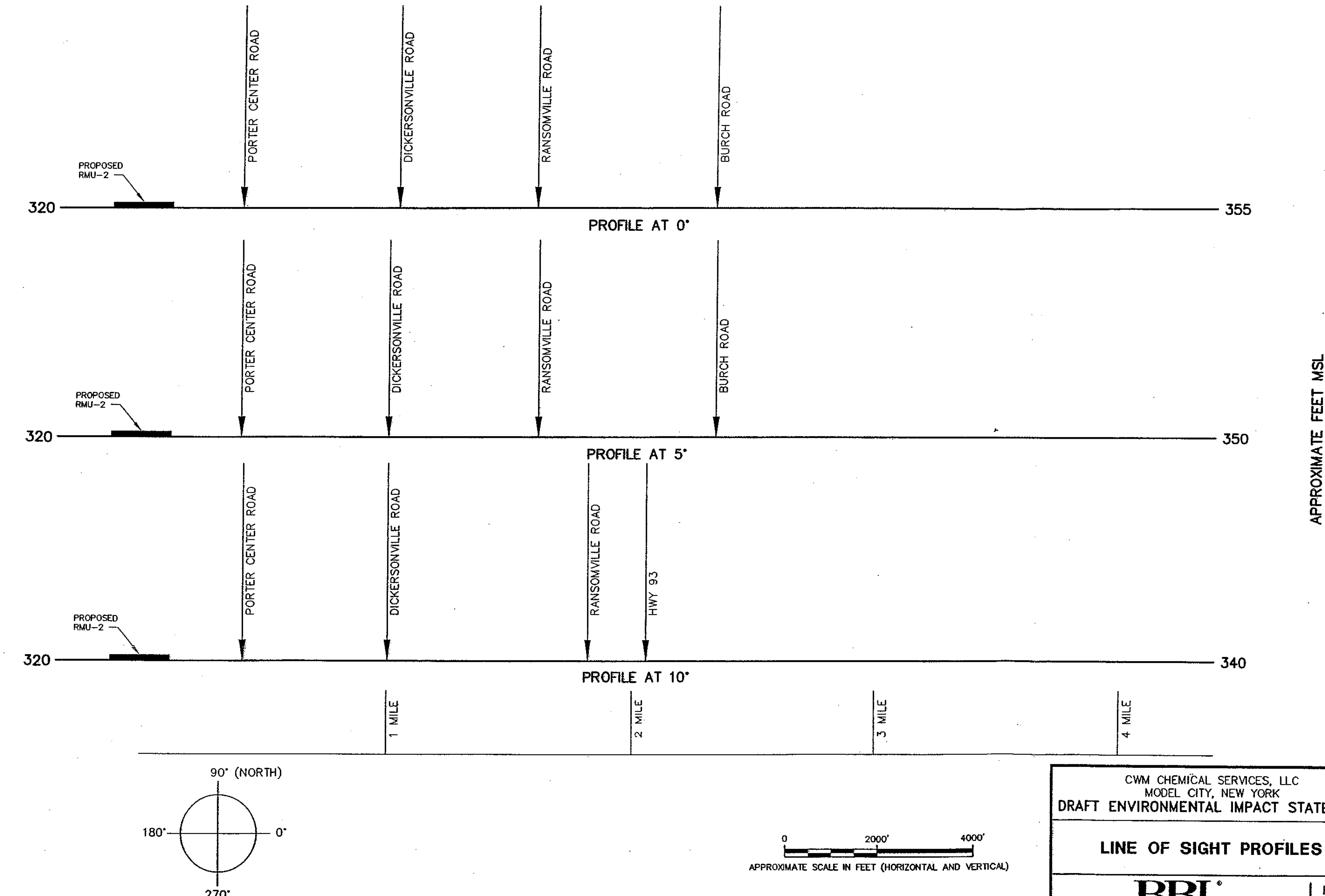
Appendix I

Line of Site Profiles



X: (XREF)
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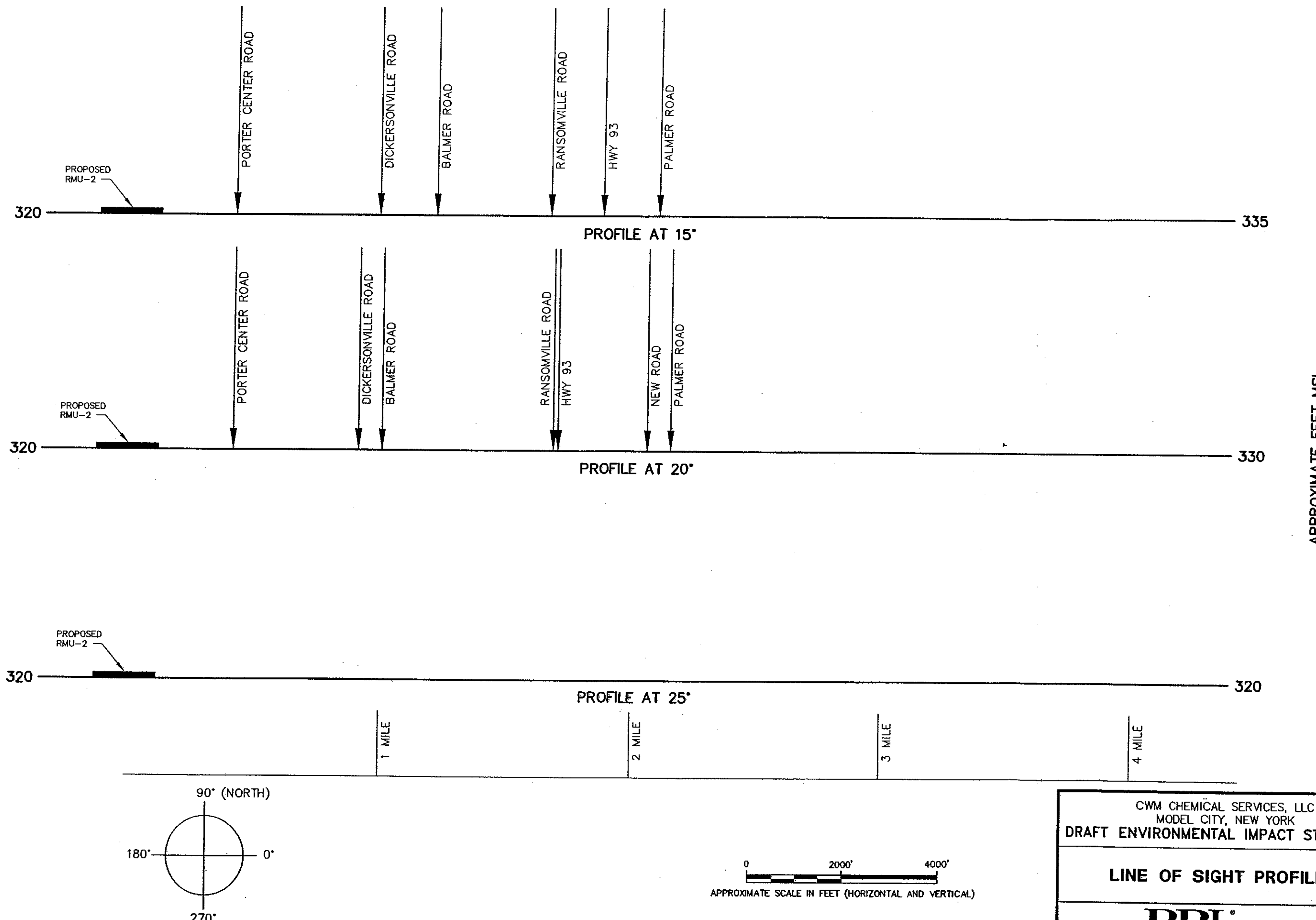
P: PAGESET/PLT-BL
12/30/02 ROC-54-SLM
05027007/DEIS/05027G08.DWG

CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

LINE OF SIGHT PROFILES

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
I-1



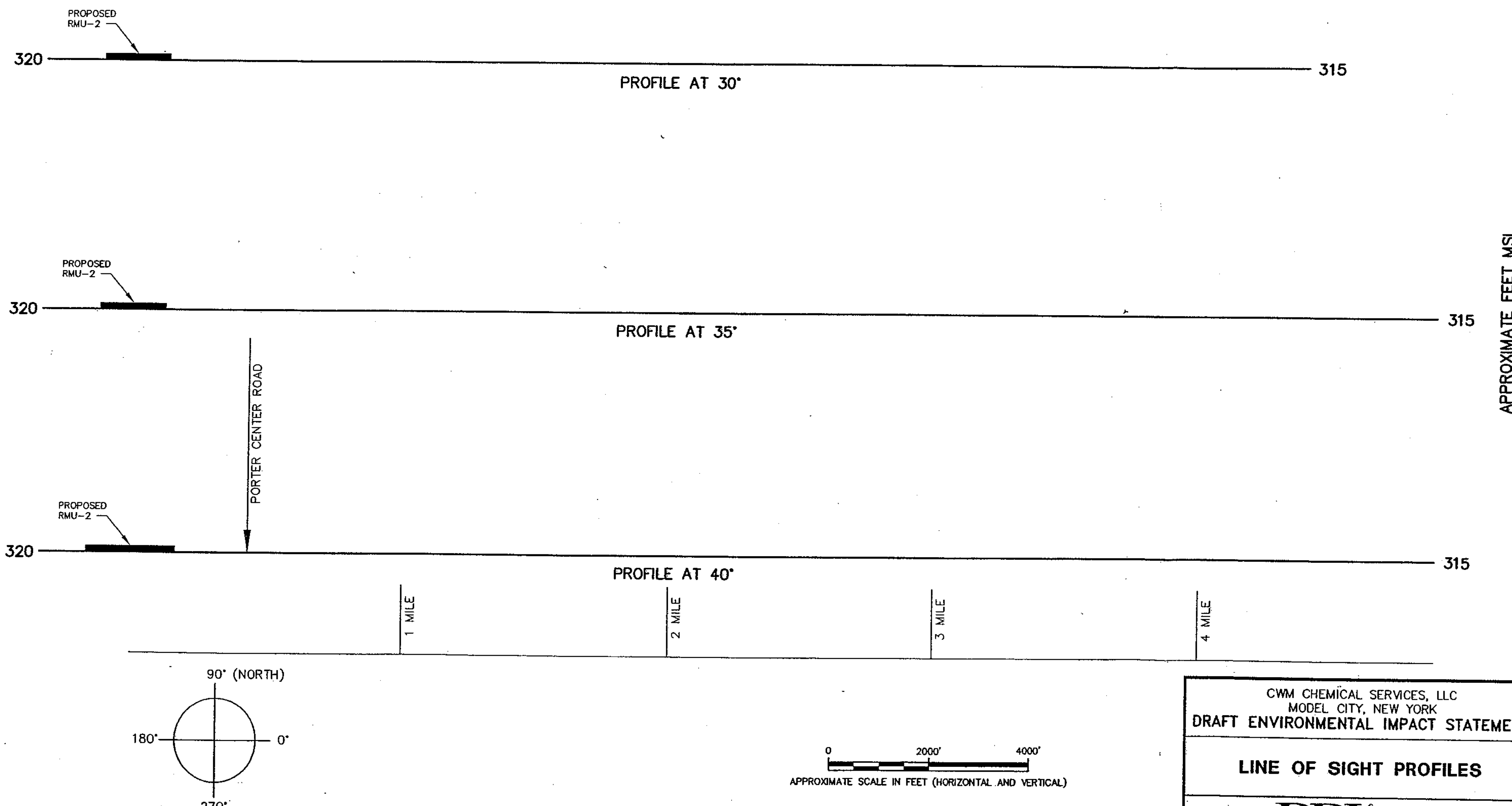
CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

LINE OF SIGHT PROFILES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
I-2

X: (XREF)
L: (LAYER)
P: PAGESET/PLT-BL
1/15/03 ROC-54-SLM
05027007/DEIS/05027G09.DWG



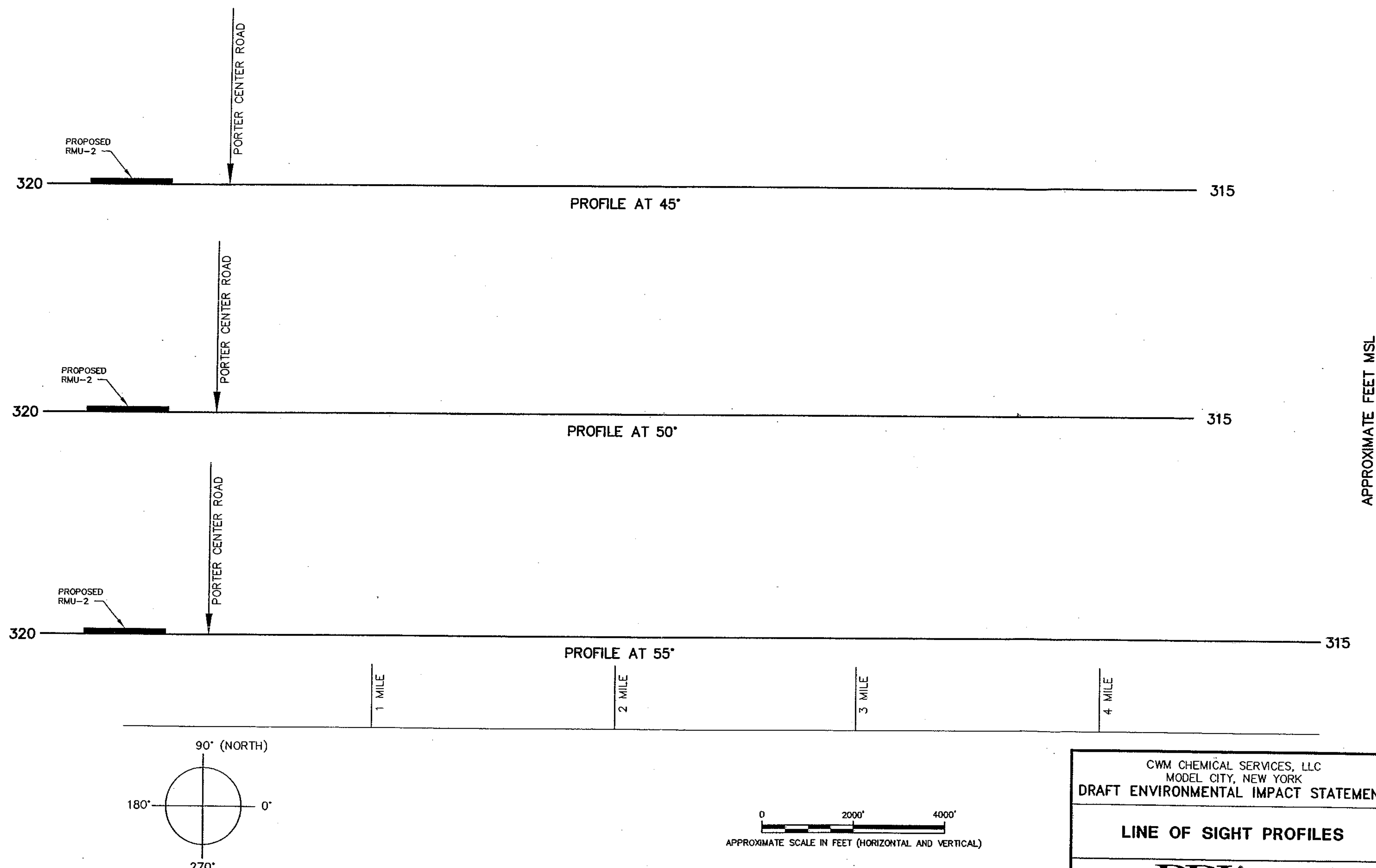
X: (XREF)
L: (LAYER)
P: PAGESET/PLT-BL
1/15/03 ROC-54-SLM
05027007/DEIS/05027G10.DWG

CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

LINE OF SIGHT PROFILES

BBL® BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE I-3



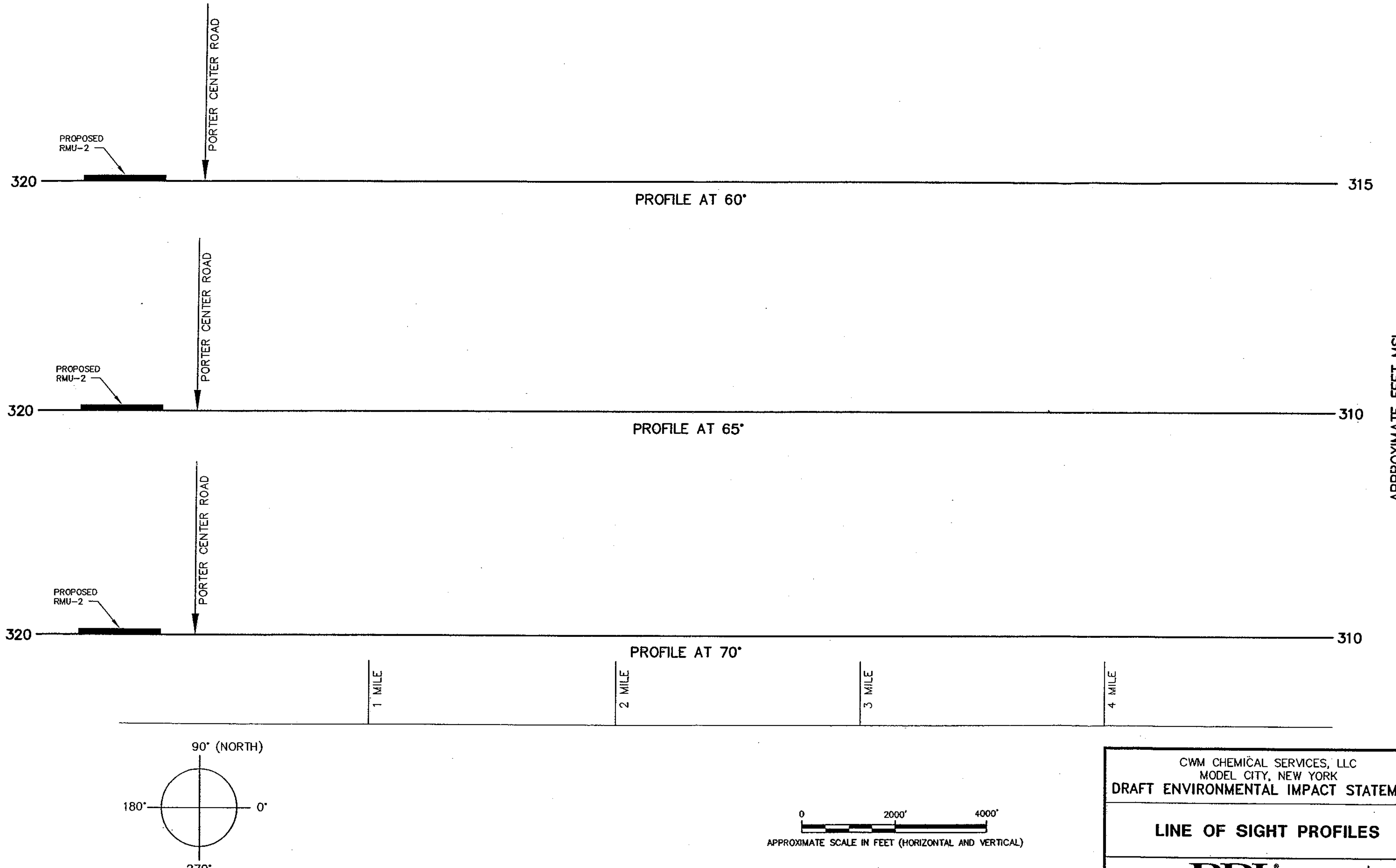
CWM CHEMICAL SERVICES, LLC
MODEL CITY, NEW YORK
DRAFT ENVIRONMENTAL IMPACT STATEMENT

LINE OF SIGHT PROFILES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE
I-4

X: (XREF)
L: (LAYER)
P: PAGESET/PLT-BL
1/15/03 ROC-54-SLM
05027007/DEIS/05027G11.DWG



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MODEL CITY, NEW YORK
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LINE OF SIGHT PROFILES

BBL
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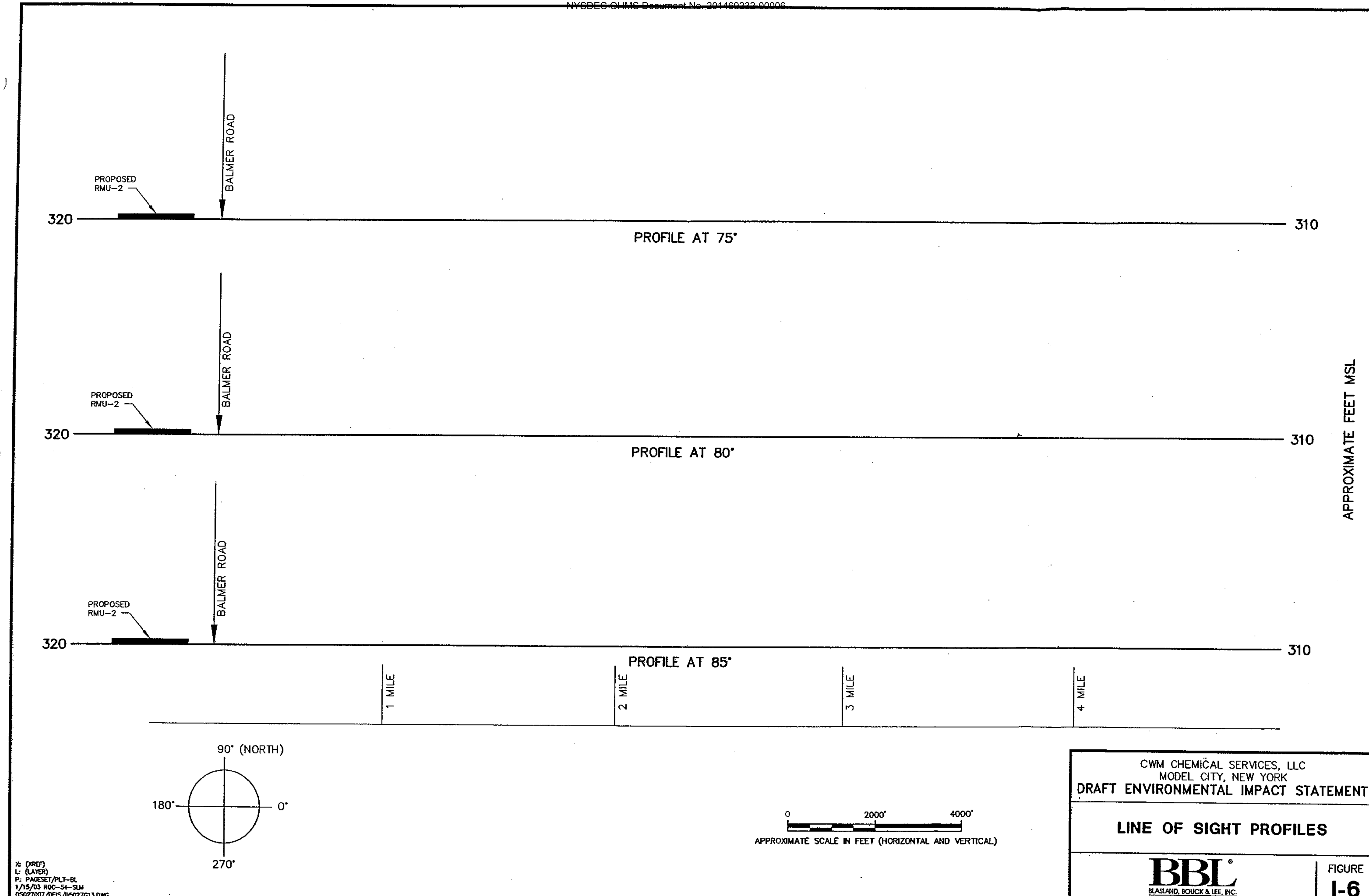
FIGURE
I-5



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MODEL CITY, NEW YORK
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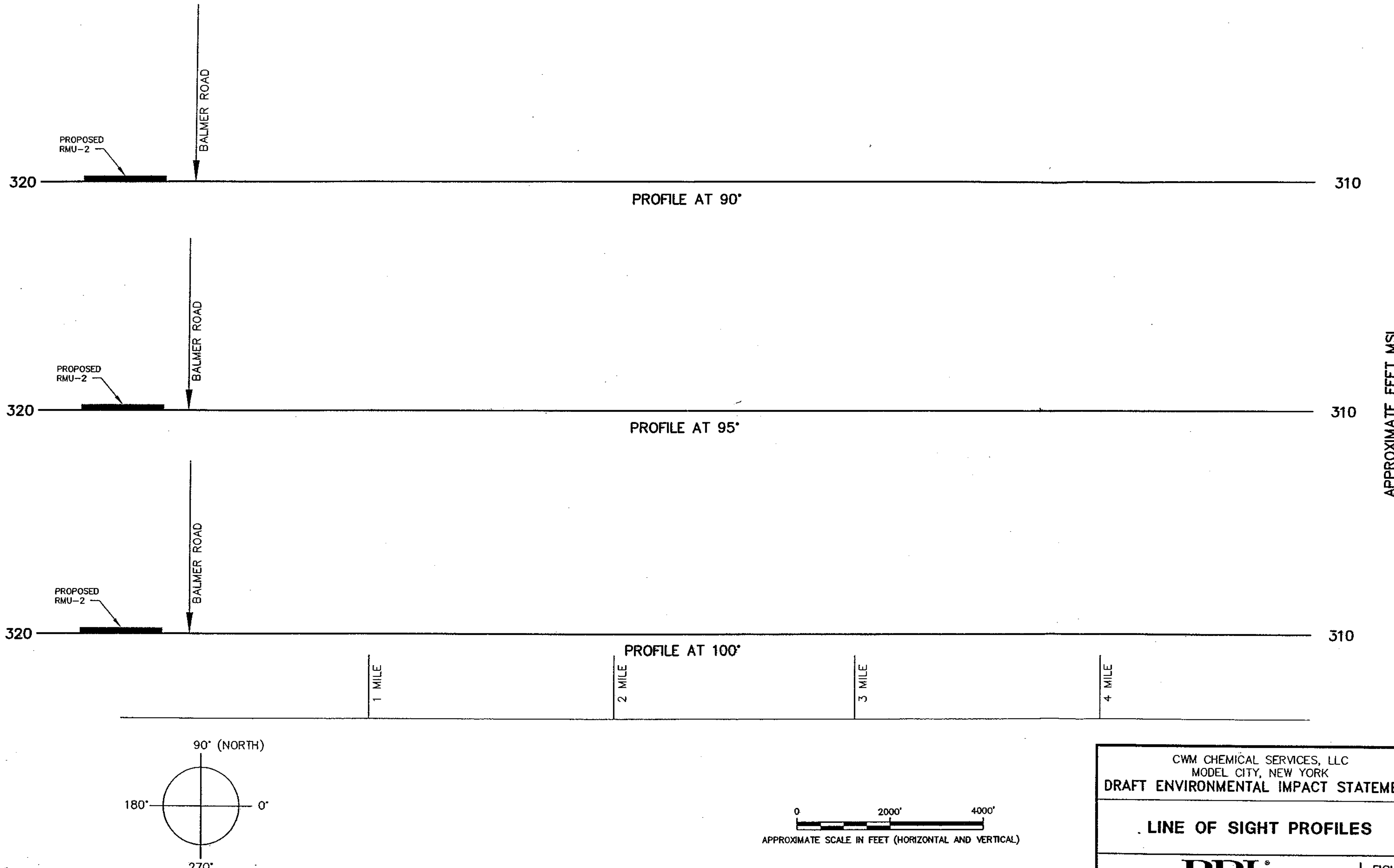
LINE OF SIGHT PROFILES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

FIGURE I-6



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LINE OF SIGHT PROFILES

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FIGURE
I-7

X: (XREF)
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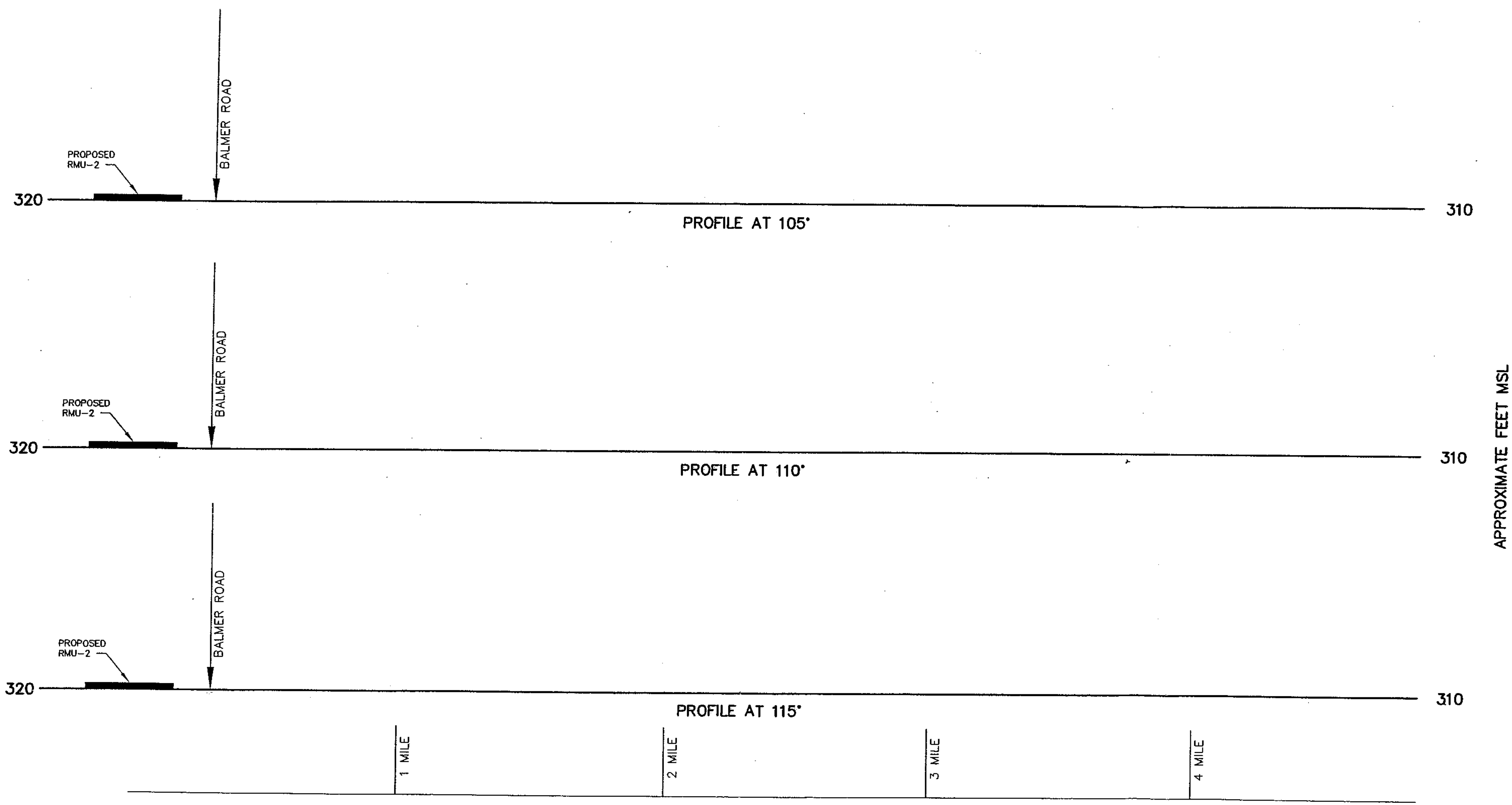

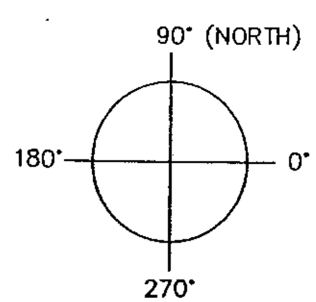

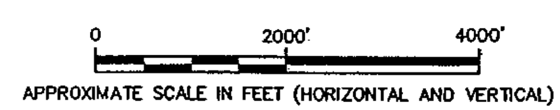

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05027007/DEIS/05027G15.DWG

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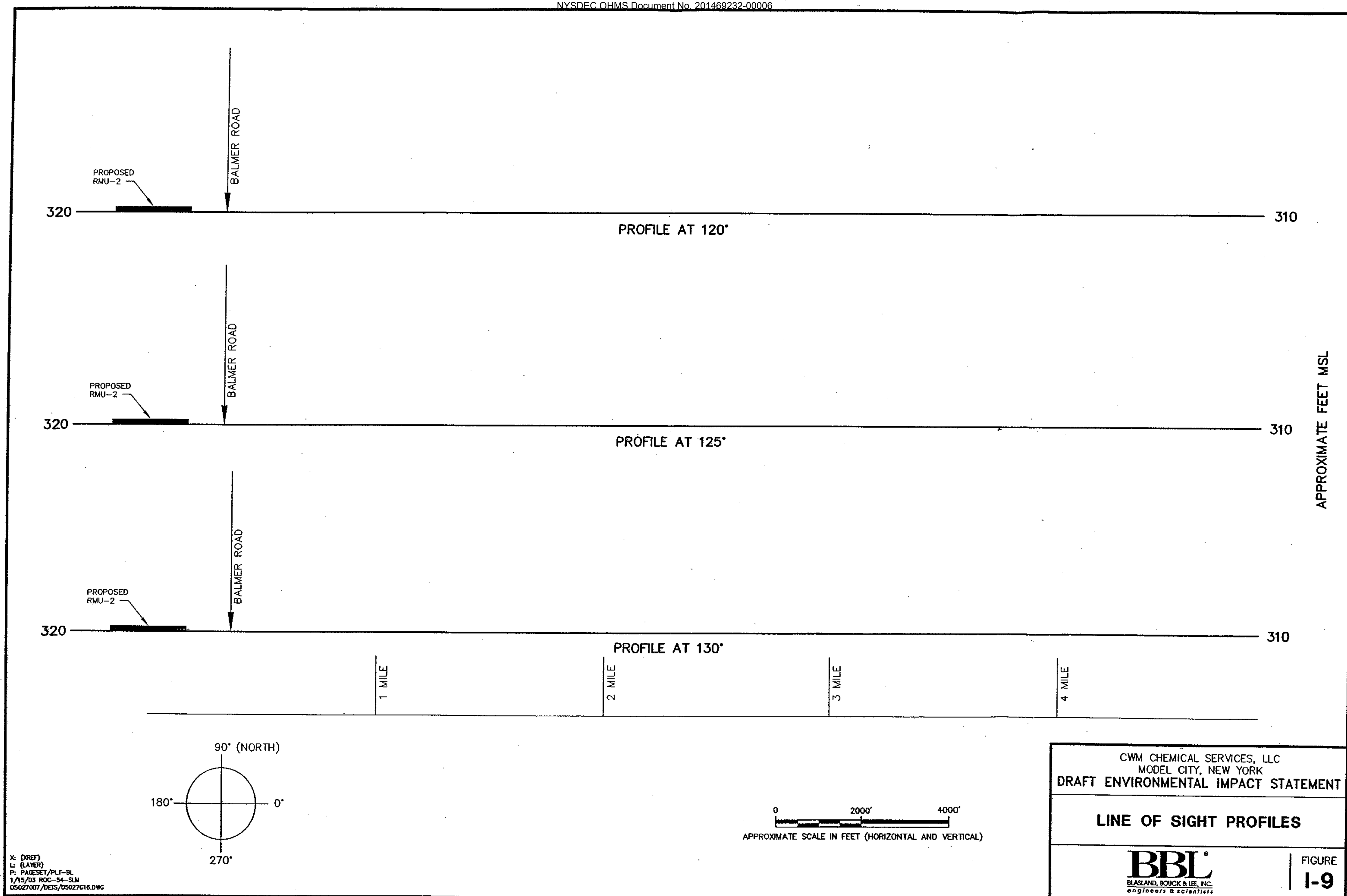
FIGURE
I-8


BALMER ROAD
PROPOSED RMU-2
320
310
PROFILE AT 120°
BALMER ROAD
PROPOSED RMU-2
320
310
PROFILE AT 125°
BALMER ROAD
PROPOSED RMU-2
320
310
PROFILE AT 130°
APPROXIMATE FEET MSL
1 MILE
2 MILE
3 MILE
4 MILE
90° (NORTH)
180°
0°
270°
0
2000'
4000'
APPROXIMATE SCALE IN FEET (HORIZONTAL AND VERTICAL)
X: (XREF)
L: (LAYER)
P: PAGESET/PLT-BL
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05027007/DEIS/05027C16.DWG
CWM CHEMICAL SERVICES, LLC
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DRAFT ENVIRONMENTAL IMPACT STATEMENT
LINE OF SIGHT PROFILES
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists
FIGURE
I-9

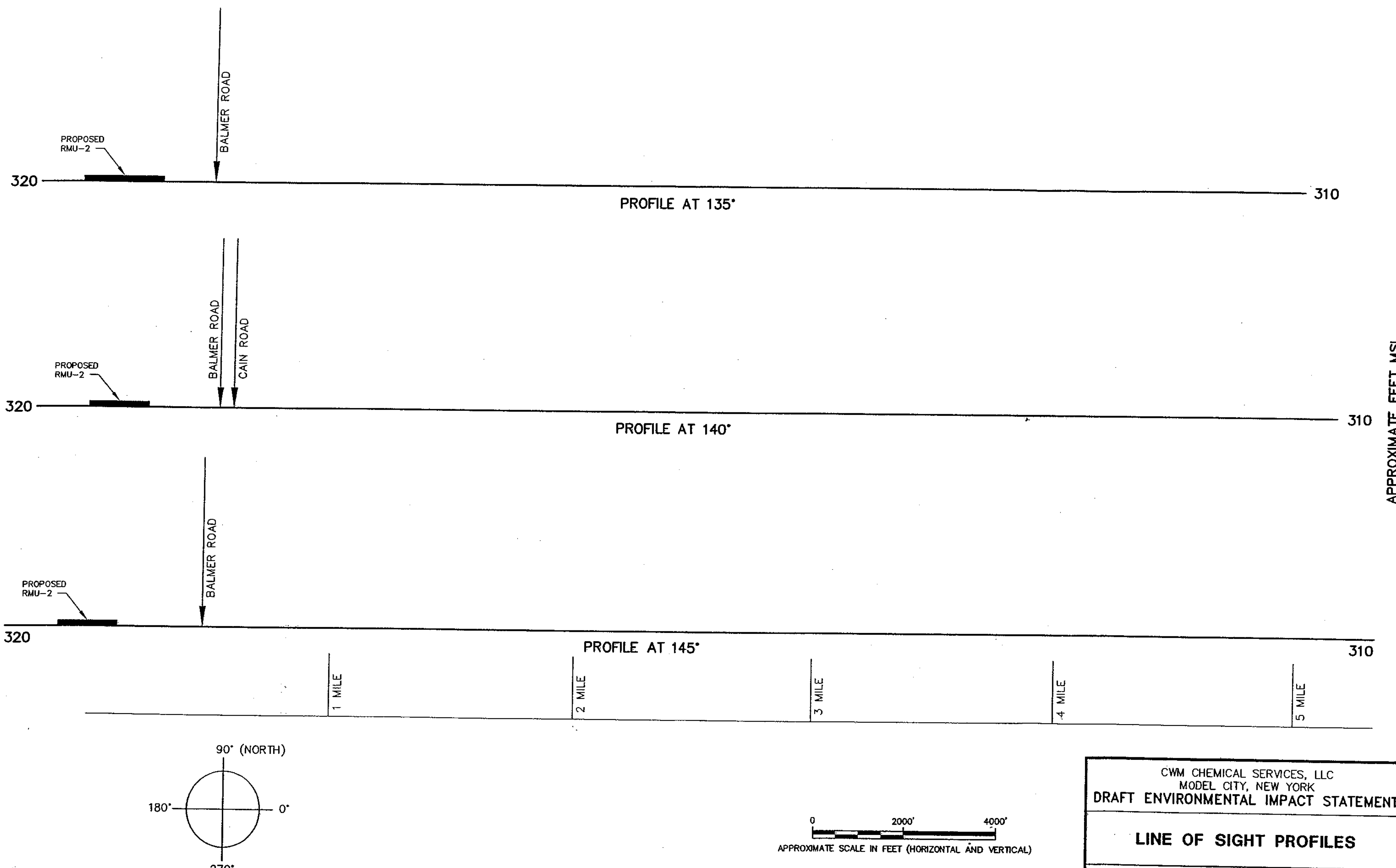

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FIGURE **I-10**

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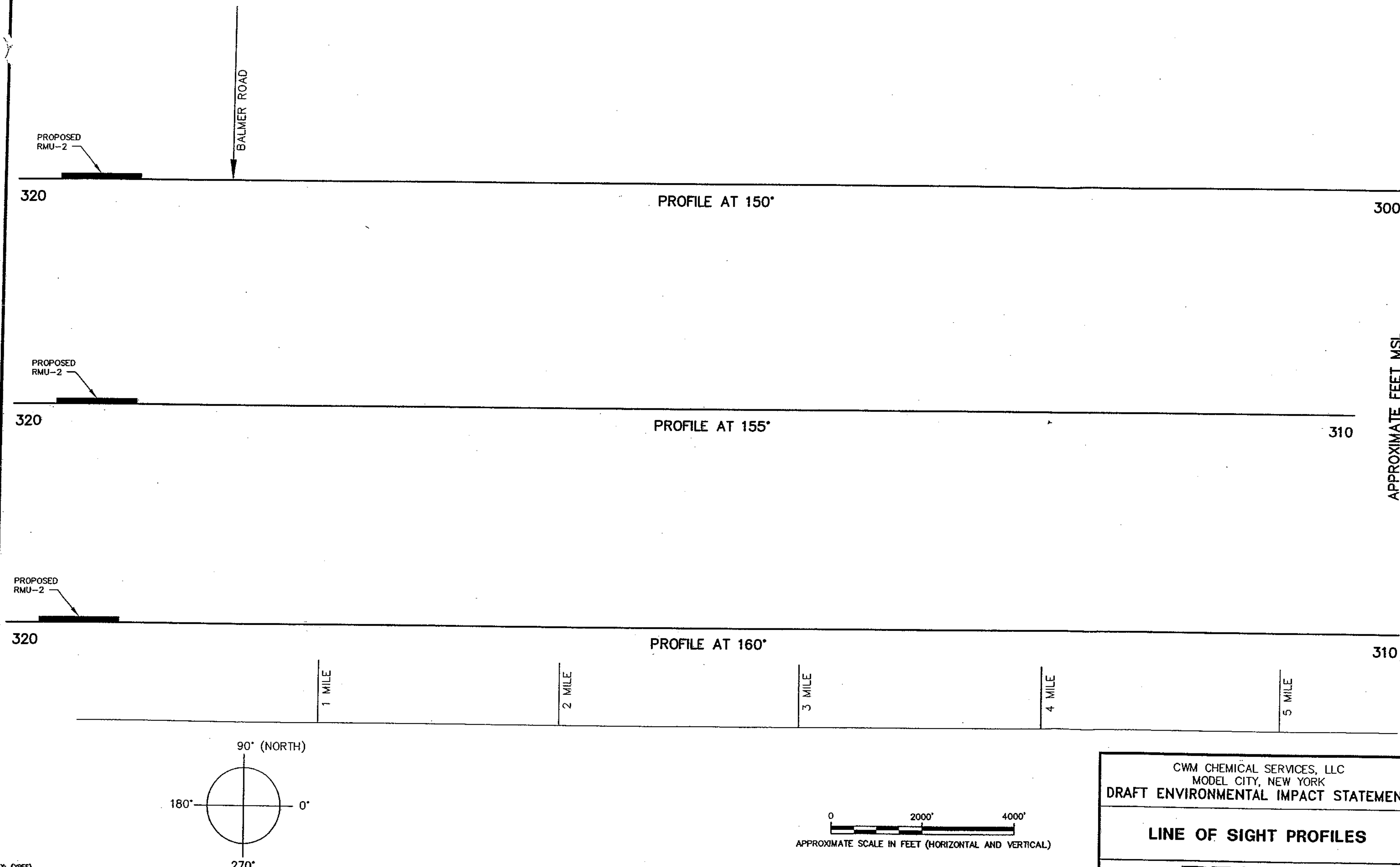
05027007/DEIS/05027G17.DWG



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05027007/DEIS/05027G18.DWG

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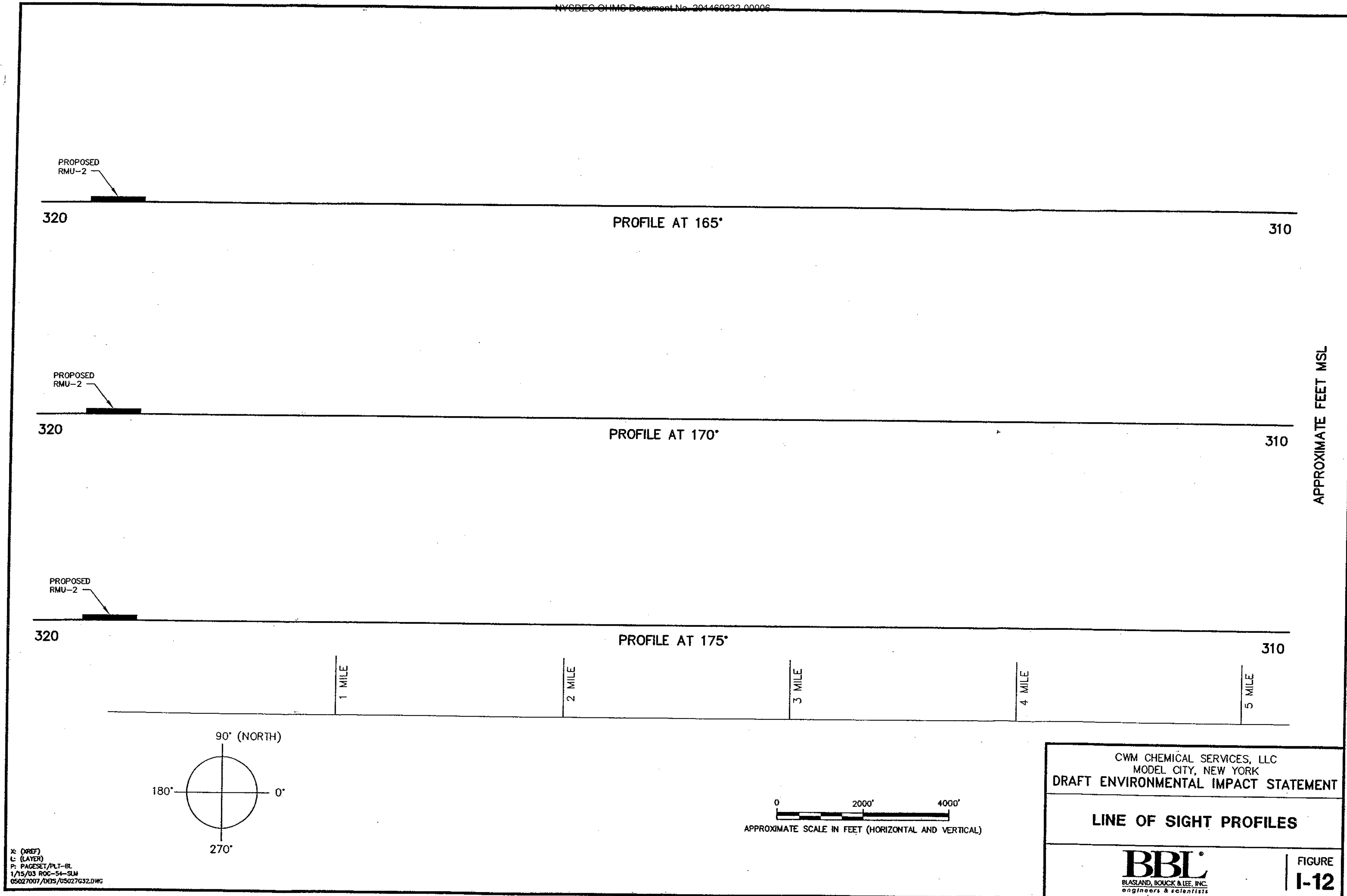
FIGURE
I-11


PROPOSED
RMU-2
320
PROFILE AT 165°
310
PROPOSED
RMU-2
320
PROFILE AT 170°
310
PROPOSED
RMU-2
320
PROFILE AT 175°
310
APPROXIMATE FEET MSL
1 MILE
2 MILE
3 MILE
4 MILE
5 MILE
90° (NORTH)
180°
0°
270°
0
2000'
4000'
APPROXIMATE SCALE IN FEET (HORIZONTAL AND VERTICAL)
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L: (LAYER)
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1/15/03 ROC-54-SLM
05027007/DEIS/05027G32.DWG
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LINE OF SIGHT PROFILES
BBL
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engineers & scientists
FIGURE
I-12

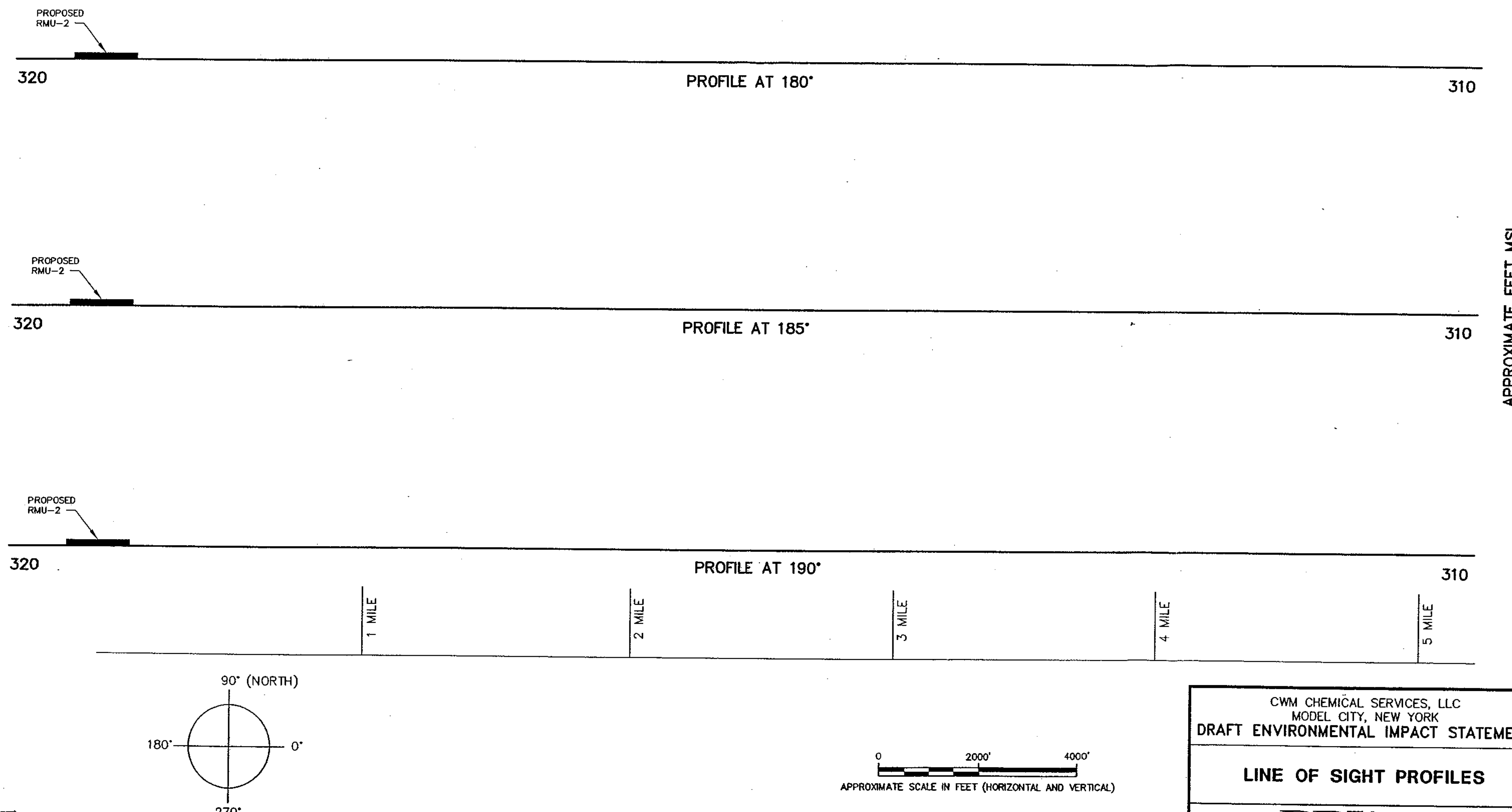

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FIGURE
I-13

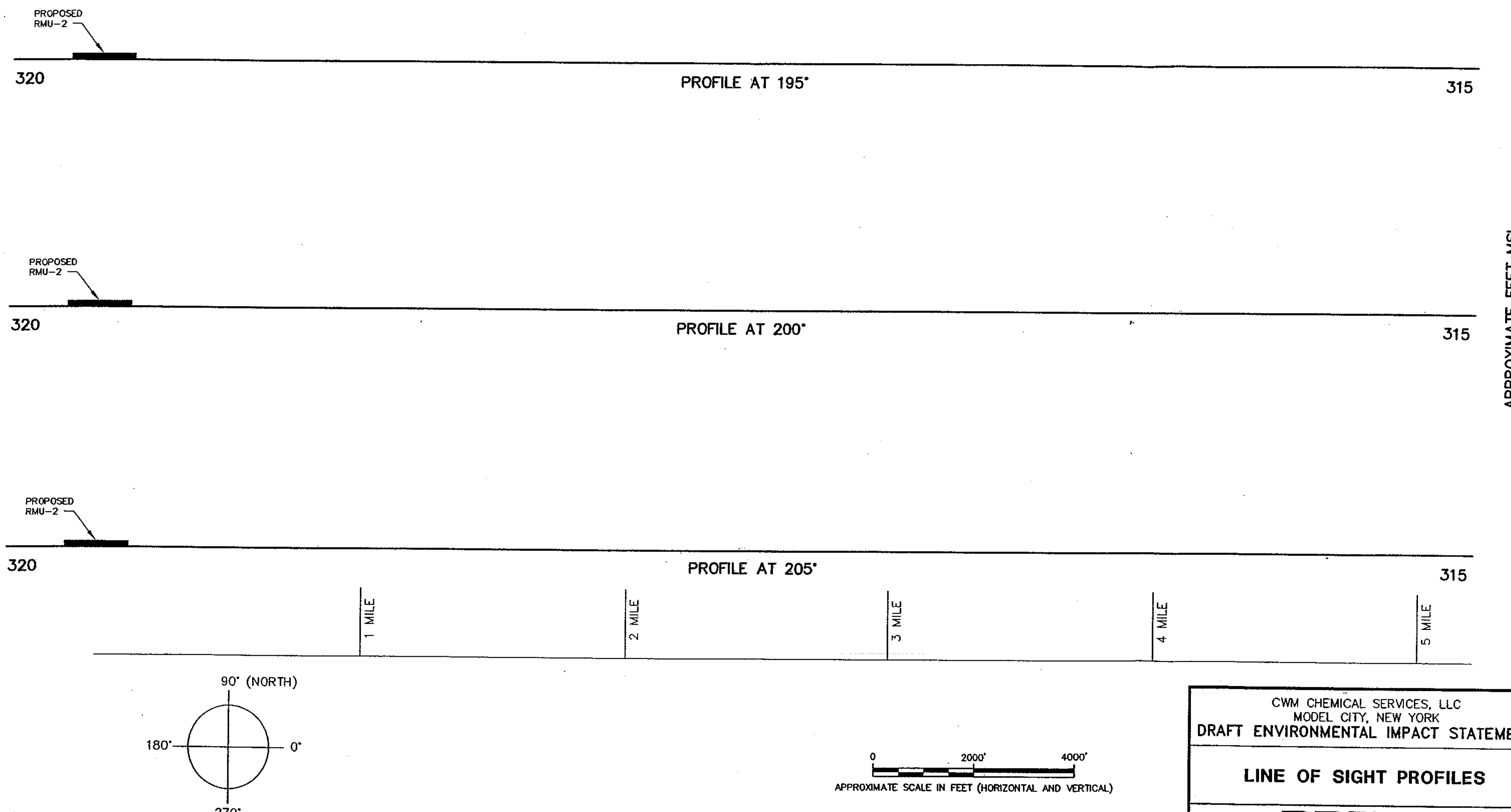

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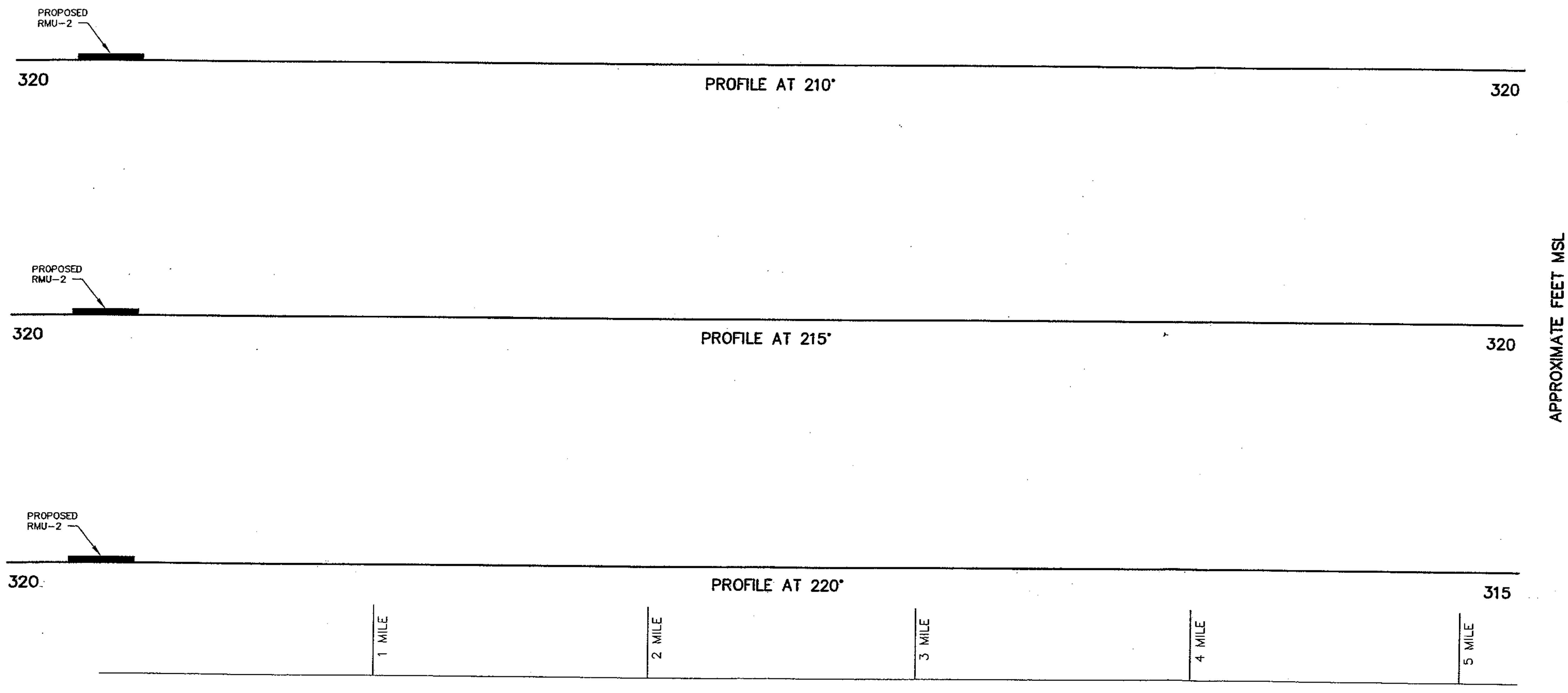
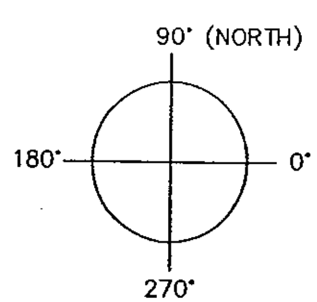
FIGURE
I-14





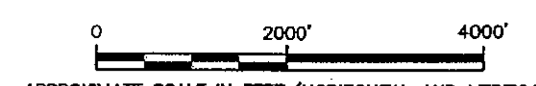


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FIGURE
I-15

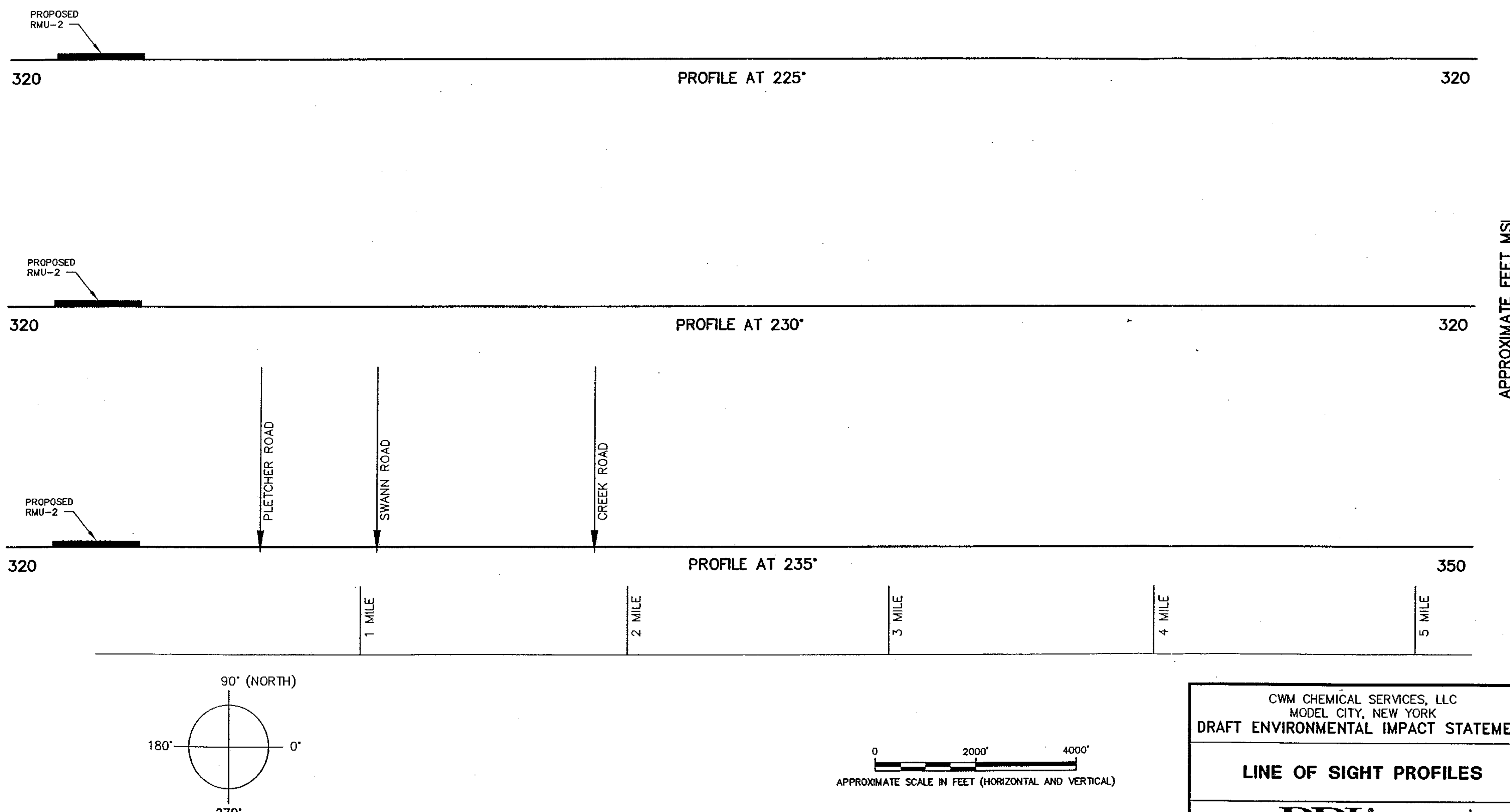

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FIGURE
I-16

X: (XREF)
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P: PAGESET/PLT-BL
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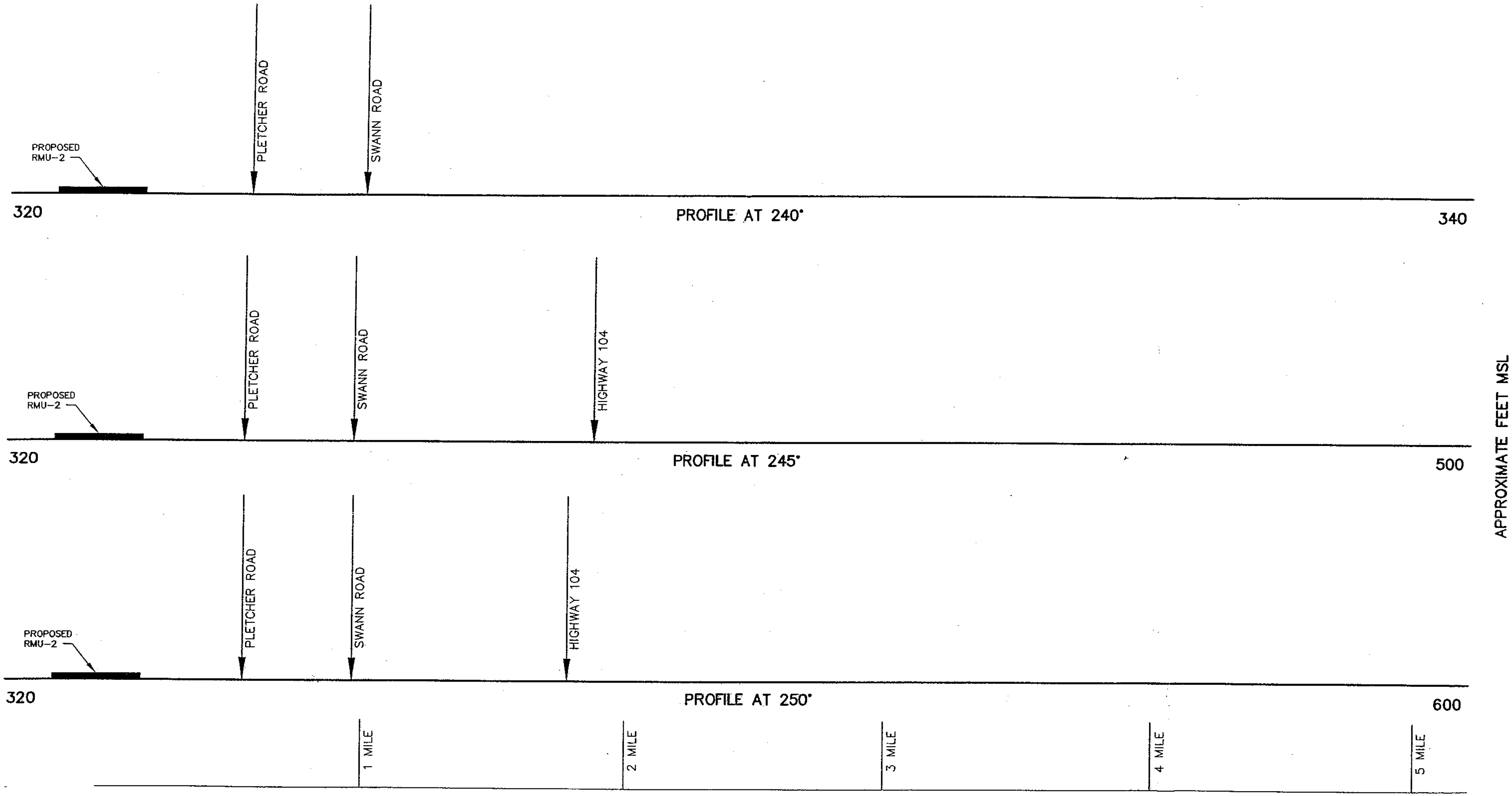

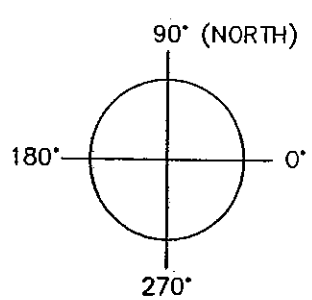

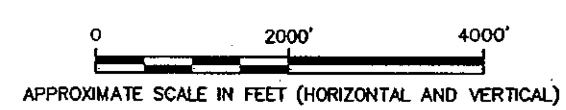

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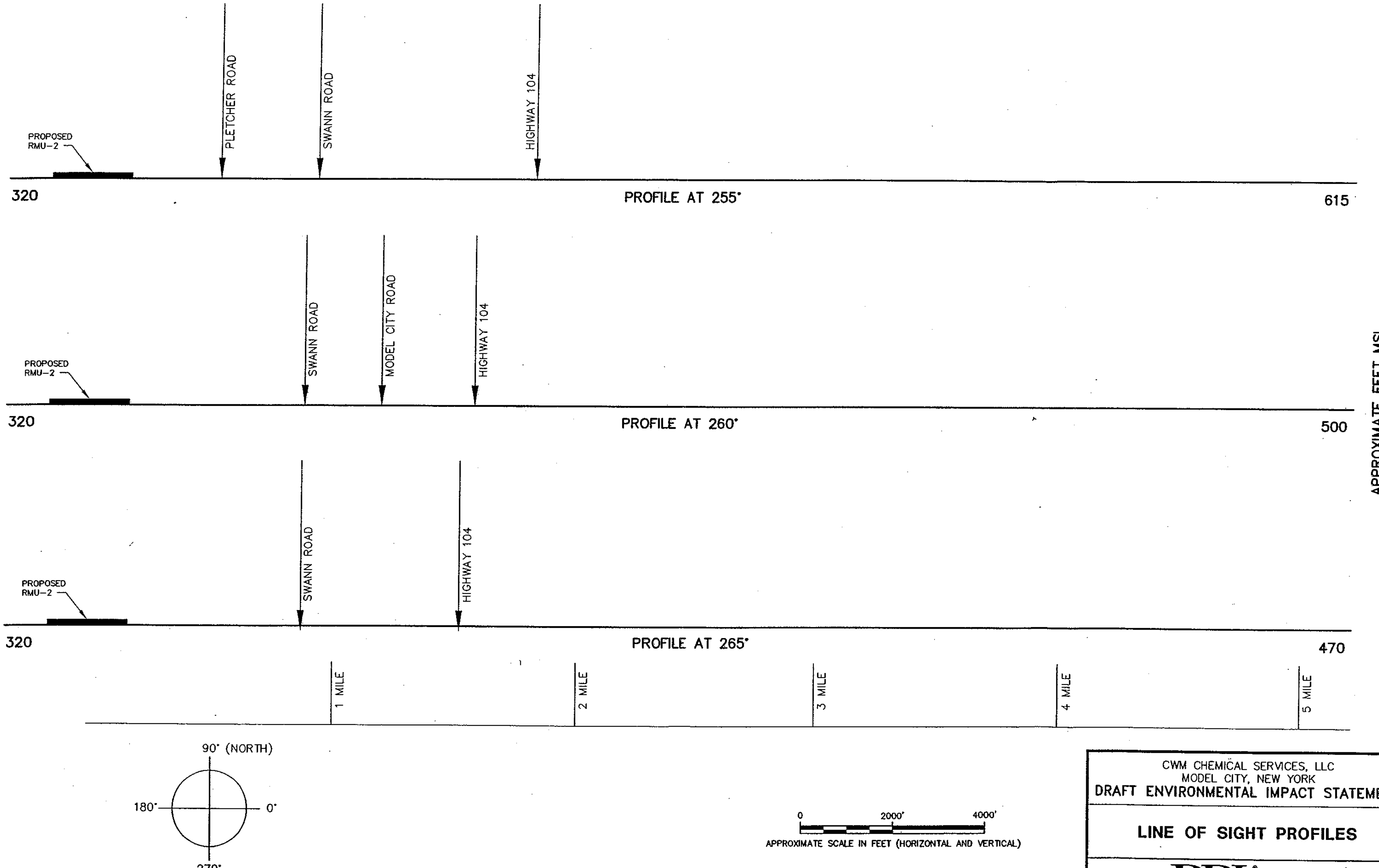
FIGURE
I-17



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LINE OF SIGHT PROFILES

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FIGURE
I-18

X: (XREF)
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05027007/DEIS/05027G25.DWG

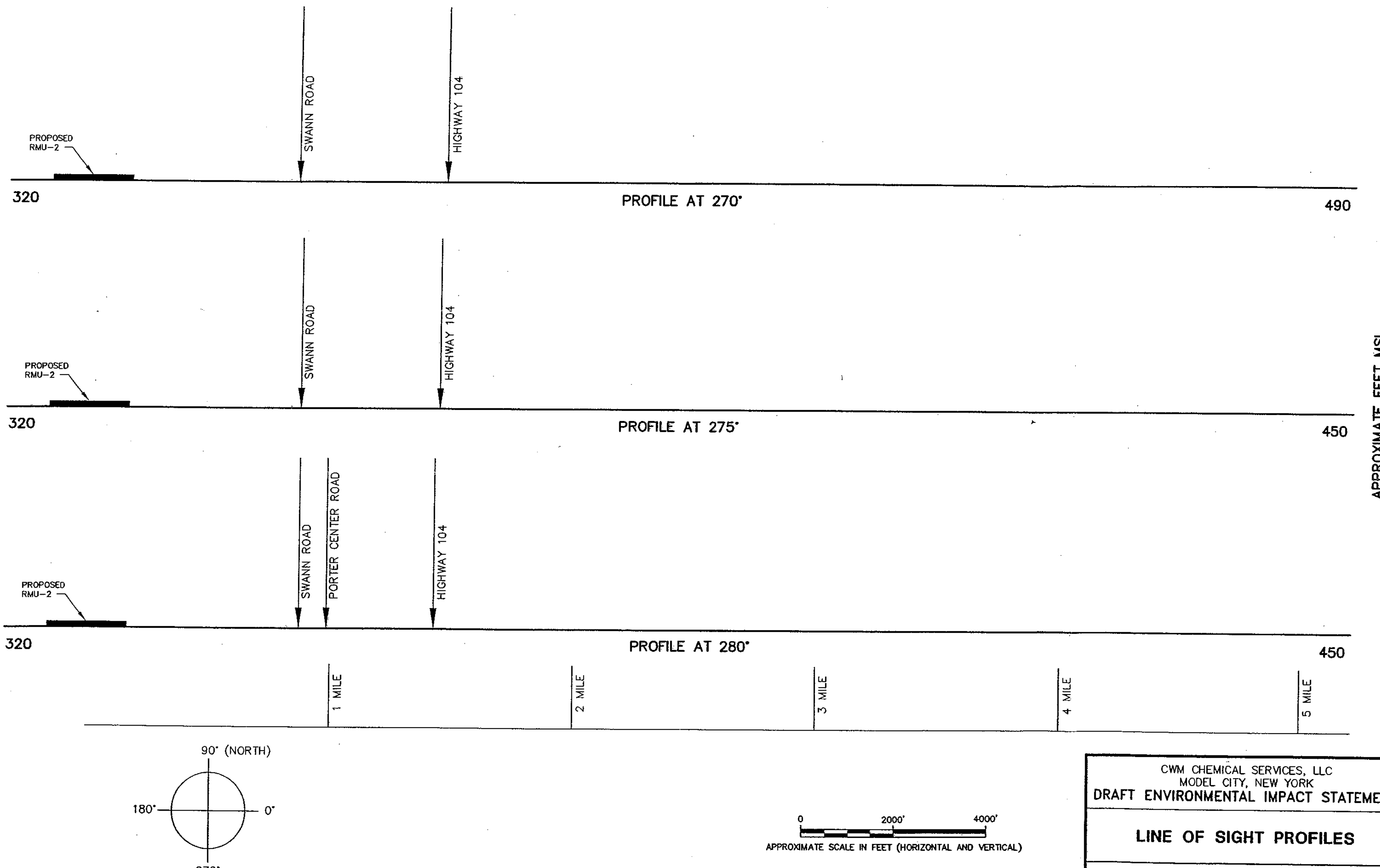

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FIGURE
I-19

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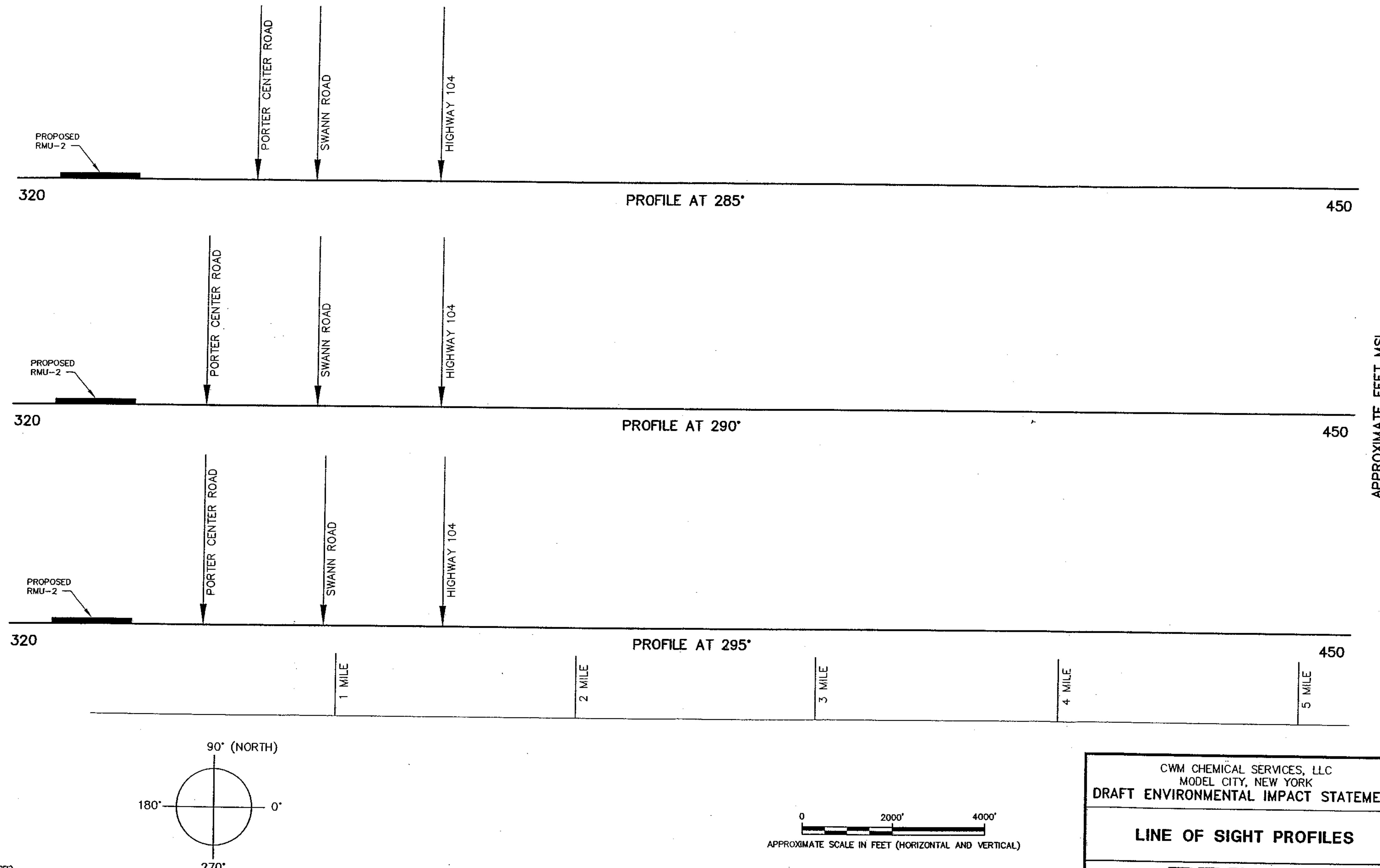

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FIGURE
I-20

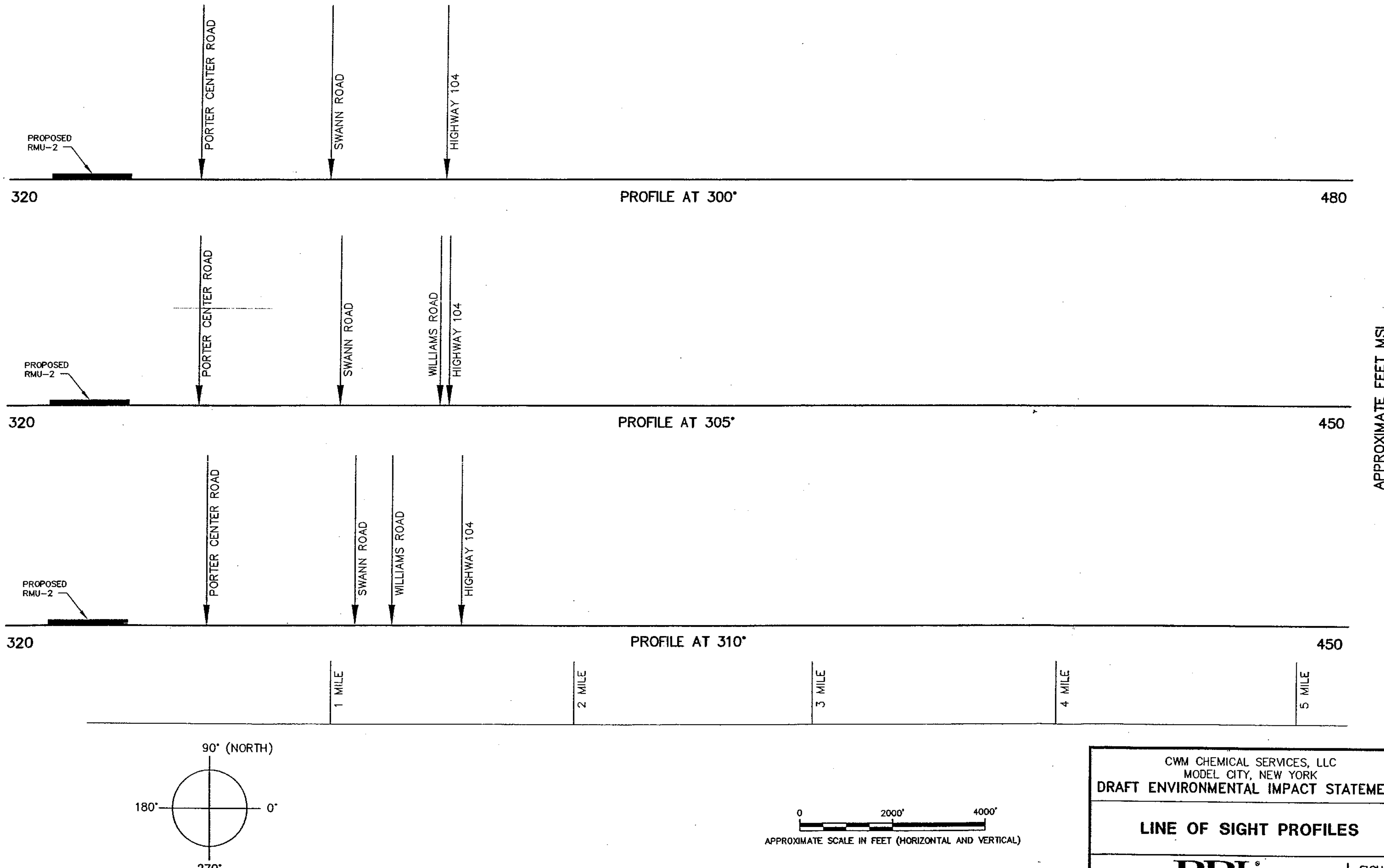

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FIGURE
I-21

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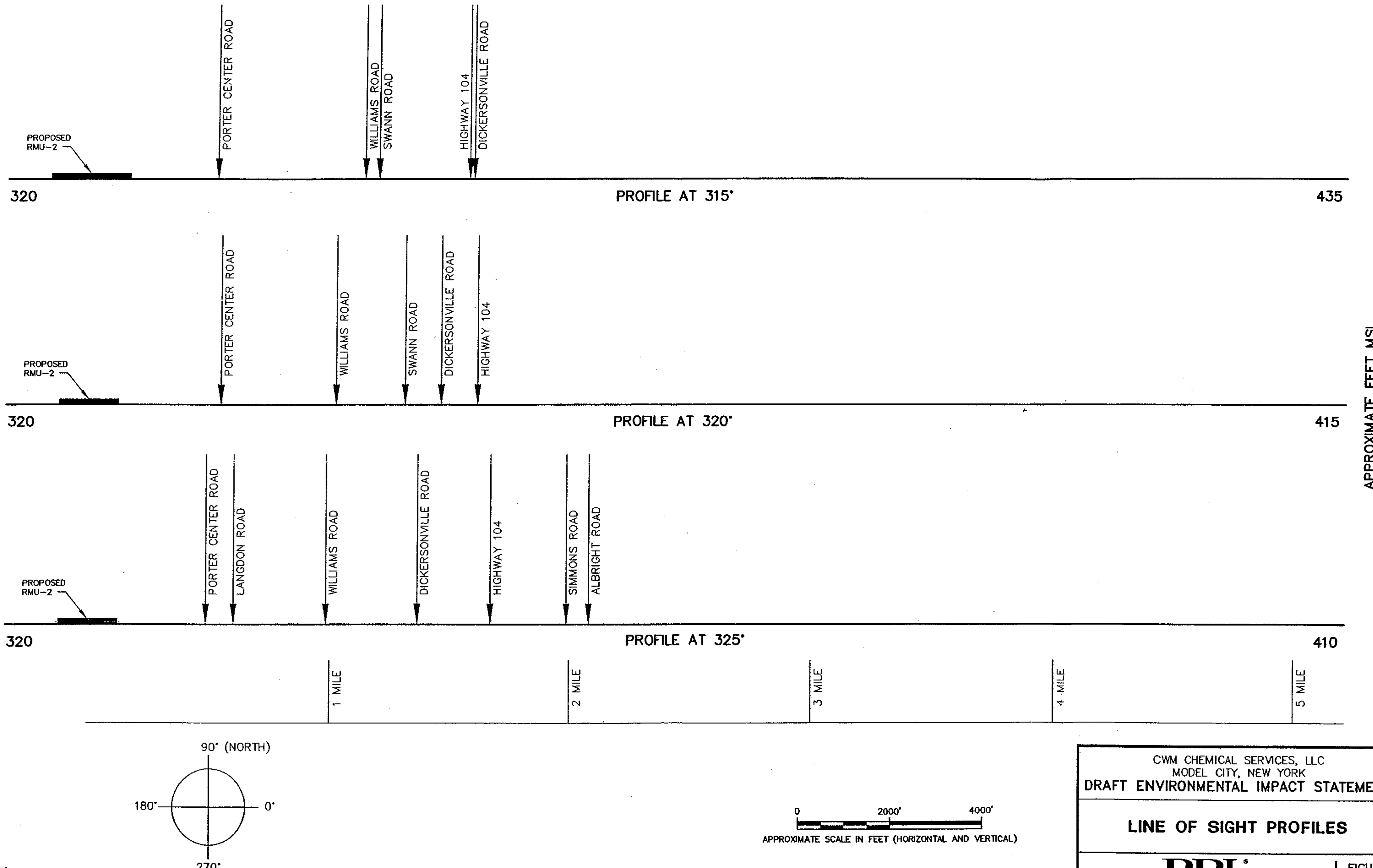

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FIGURE
I-22

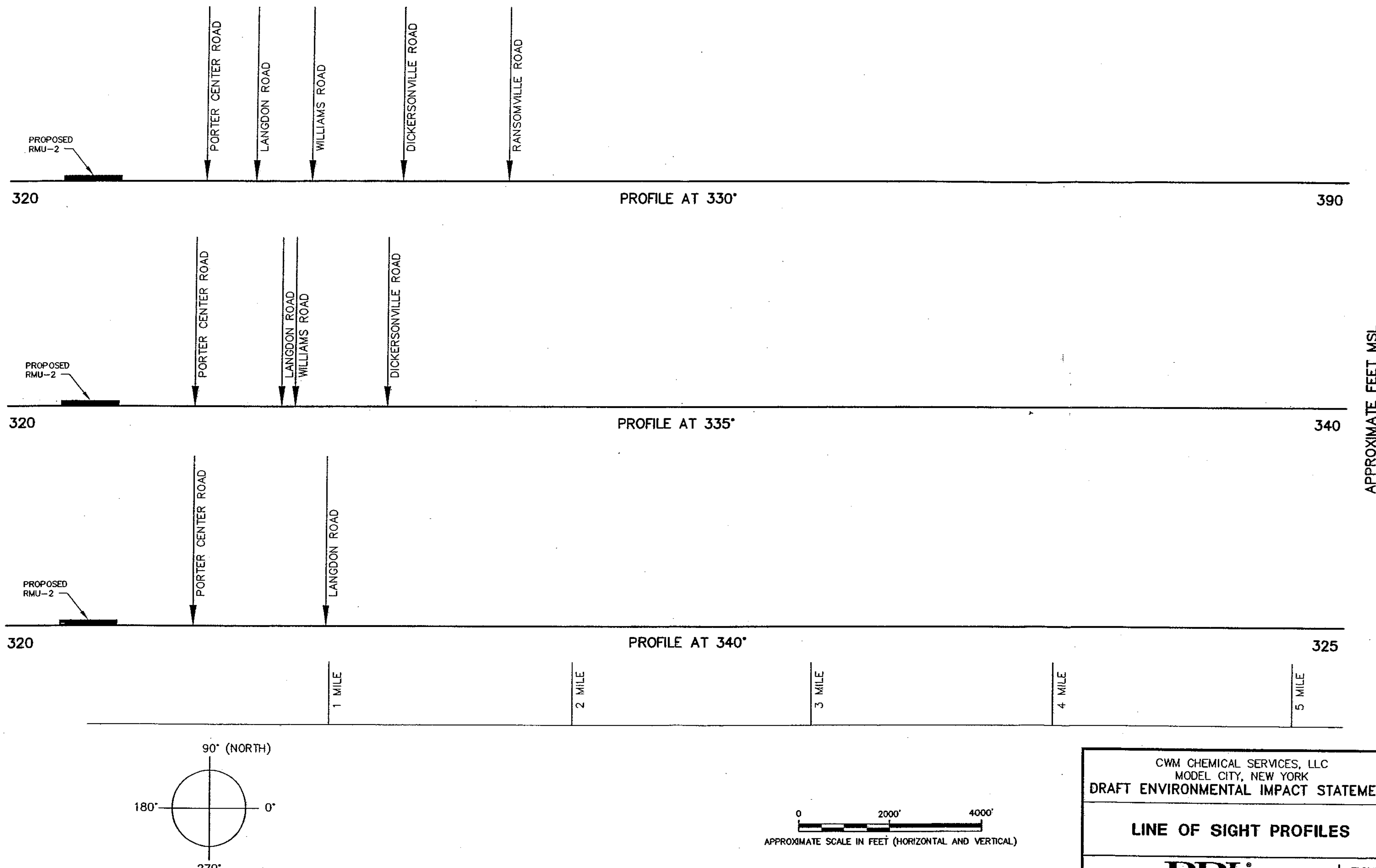

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FIGURE
I-23

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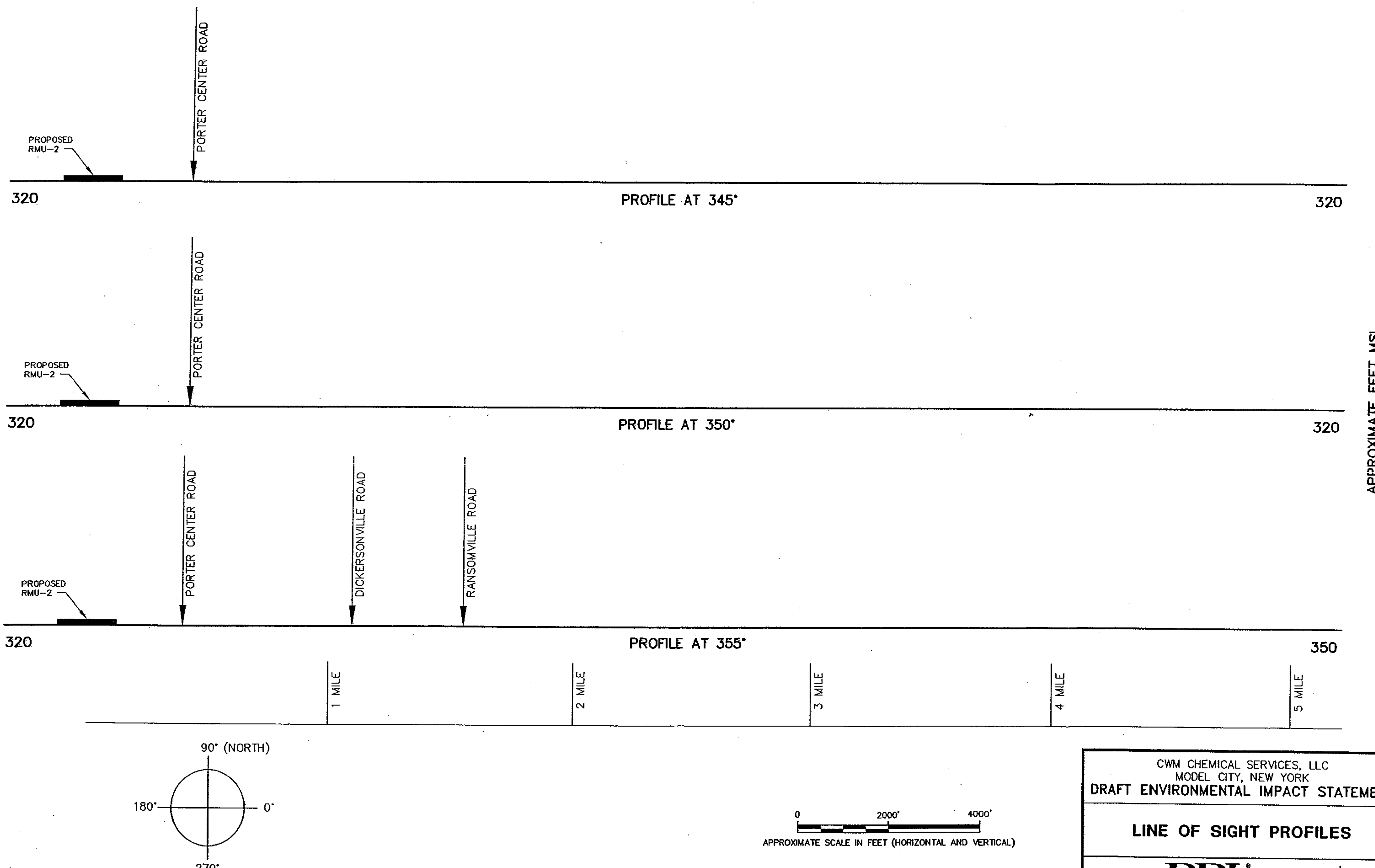

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FIGURE **I-24**

ARCADIS

Appendix J

Visual Impact Analyses Reports

EDR

217 Montgomery Street
Suite 1000
Syracuse, NY 13202
315.471.0688
F: 315.471.1061
www.edrpc.com

December 21, 2007

Mr. John Hino
CWM Chemical Services, Inc.
1550 Balmer Road
Model City, New York 14107

RE: RMU2 Landfill Expansion – Visibility Assessment
EDR Project No. 07094

Dear Mr. Hino:

The following is a report of findings from a visibility analysis of CWM Chemical Services' proposed RMU-2 Landfill Expansion (the Project). The landfill is located in the Town of Porter, Niagara County, New York (Figures 1 and 2). The proposed landfill expansion would be located adjacent to an existing landfill (RMU-1), and would occupy area approximately 50 acres in size in the central portion of the CWM facility. At the highest point, the proposed landfill would be 120' above existing ground level.

The area surrounding the Project is characterized by a mix of crop fields, orchards, fallow and reverting fields, hedgerows, and scattered woodlots. Land use consists primarily of agriculture and low-density commercial and rural development.

The visual study area (defined as the area within a 5-mile radius around the proposed Project) consists of relatively level topography, with the exception of the Niagara River shoreline located approximately 3.5 miles west of the Project, and the steeply sloping Niagara Escarpment located approximately 3.0 miles south of the proposed Project. The study area is bordered to the north, west and south by transportation corridors. These include State Route 104 (Ridge Road), The Robert Moses Parkway, and Route 18 (The Seaway Trail) (See Figure 3).

The visibility analysis performed by Environmental Design & Research, Landscape Architecture, Planning, Environmental Services, Engineering and Surveying, P.C. (EDR) assessed the potential visibility of the proposed Project by 1.) Creating viewshed analysis maps to understand the influences of topography and vegetation on project visibility, 2.) Using line-of-sight cross sections to determine visibility from specific sensitive sites, 3.) Performing field verification by raising a 15-foot long helium filled balloon at the location and height of the proposed landfill.

Project methodology and results are presented below.

METHODOLOGY

Viewshed Analysis

Topographic viewshed maps for the Project were prepared using USGS digital elevation model (DEM) data (7.5-minute series), the location and height the proposed landfill, and ESRI ArcView® software with the Spatial Analyst extension.

The ArcView® program defines the viewshed (using topography only) by reading every cell of the DEM data and assigning a value based upon visibility from observation points throughout the 5-mile radius of the study area. The resulting topographic viewshed map (Figure 4) defines the maximum area from which the completed Project could potentially be seen within the study area (ignoring the screening effects of existing vegetation and structures). Because the screening provided by vegetation and structures is not considered in this analysis, the topographic viewshed represents a "worst case" assessment of potential Project visibility.

In addition, a vegetation viewshed analysis was also prepared to better illustrate the potential screening effect of forest vegetation. The vegetation viewshed (Figure 5) utilized a base vegetation layer created with USGS National Land Cover Data (forests) with an assumed height of 40 feet. This layer was added to the digital elevation model to produce a base layer for the viewshed analysis, as described above (using the proposed location and maximum height of the landfill). Once the viewshed analysis was completed, the areas covered by the forest vegetation layer were designated as "screened by overhead canopy" on the resulting data layer to reflect the fact that views from within forested areas will be at least partially, if not completely, screened.

Line-of-Sight Cross Sections

To further illustrate the screening effect of vegetation and structures within the study area, three representative line-of-sight cross sections (ranging from 8 to 10 miles long) were cut through the study area (Figure 6). Cross section locations were chosen so as to include visually sensitive areas (e.g., villages, wildlife areas, and major roads) within the 5-mile radius study area. The cross sections are based on forest vegetation and topography as indicated on the 7.5-minute USGS quadrangle maps and digital aerial photographs. For the purposes of this analysis, a uniform 40-foot tree height was assumed. A 10-fold vertical exaggeration was used to increase the accuracy of the analysis and facilitate reader interpretation.

Field Verification

On November 28, 2007, EDR raised a 15-foot helium filled balloon 120 feet above existing ground level (the proposed finished height of the landfill expansion). The location of the balloon was based on the approximate center of the proposed landfill expansion area (See Figure 5). An area of unused lawn was chosen to avoid existing operations. Field verification then involved driving public roads and photographically documenting publicly accessible views within the 5-mile study area. Photographs were taken with a Nikon D200 Digital SLR camera with a lens setting equivalent to 45-

55 mm. The viewpoint location was documented using a handheld GPS unit. At each viewpoint, the location, number of photos, time, balloon visibility, and viewpoint description were recorded (See Appendix A). Upon fieldwork completion, photographs were cataloged and the most suitable image from each viewpoint was chosen to represent that viewpoint (Figure 7). In photographs where the balloon is visible, the balloon was highlighted with a red arrow. Viewpoint locations are shown on Figure 5 as having visibility (red) or not having visibility (blue).

Fieldwork was completed during 'leaf off' conditions during a high visibility day (despite a high cloud ceiling) to provide maximum balloon visibility.

To understand existing resources within the study area, EDR consulted publicly available resources to map sensitive sites within the five-mile study area. Available information on National Historic Register Sites, State Parks, County Parks, Cemeteries, Schools, Scenic By-ways, and highways are all shown in Figure 3. Sensitive sites are generally given greater consideration when performing field verification.

RESULTS

Viewshed Analysis

The viewshed analysis based on topography only (disregarding the screening effects of vegetation) shows 79% of the 5-mile study area with potential visibility. Areas screened by topography include portions of Lake Ontario, the Niagara River, and areas located south of the Niagara Escarpment. The vegetation viewshed analysis, which factors in the potential screening effects of vegetation, showed a significant reduction in visibility. Based on the vegetation viewshed only 11% of the study area has potential visibility. This reduction in areas with visibility is largely due to the frequency of scattered woodlots throughout the study area combined with the relatively flat topography and low profile of the proposed project.

Line-of-Sight Cross Sections

The line-of-sight cross section results are consistent with those of the vegetation viewshed analysis. Section A-A' (Figure 6 - Sheet 2) shows area with visibility approaching and on the Niagara Escarpment. Portions of Swann Road show areas with potential visibility. Four Mile Creek State Park, Robert Moses Parkway, Lake Road (Seaway Trail), and the Niagara Frontier Country Club are all indicated as not exhibiting visibility.

Section B-B' (Figure 6 - Sheet 3) runs West to East through portions of Joseph Davis State Park, the Niagara River, Lower River Road (Seaway Trail), Robert Moses Parkway, Lewiston-Porter Central Schools, all of which show potential screening by vegetation. A small portion of open fields outside the Village of Ransomville showed potential visibility.

Section C-C' (Figure 6 - Sheet 4) begins at Lake Ontario, Northwest of the project site and runs through the Lake Road (Seaway Trail), Robert Moses Parkway, and Bond Lake County Park, Southeast of the project site. None of the aforementioned sites are indicated as having visibility. Only portions of the Project site, and some small open field areas to the south east of the Project site show areas of potential visibility.

Field Verification

Field review indicated that actual Project visibility is likely to be more limited than suggested by the topography viewshed analysis due to actual tree height (which may be greater than the assumed 40 feet) and trees being more widespread than indicated on the USGS map. Visibility was documented in less than 17% of the viewpoints visited (see Appendix A for field results). The highest concentration of viewpoints showing visibility was recorded along the Niagara Escarpment, approximately 3 miles south of the proposed site. Visibility was recorded at only one foreground viewpoint (within 0-.5 miles of the Project site) on Balmer Road (Figure 7 - Viewpoint 1). The view from this area was indicated as "screened by overhead canopy" on the viewshed analysis map, but the balloon was plainly visible through the trees. This is due to the fact that this viewpoint was recorded at one of the site entry gates, which had less dense vegetative cover. It should be noted that several of the viewpoints visited were also observed in a previous RMU-1 study conducted in 1998 to evaluate the initial landfill expansion of the facility (EDR, 1998). Only three of six viewpoints originally evaluated in 1998 exhibited visibility during the 2007 field verification. These viewpoints are listed in Table 1.

Table 1. Comparison of Previous and Current Viewpoint Visibility

Simulated Viewpoint (March 1998)	New Viewpoint (November 2007)	Balloon Visible
43	8	Yes
62	10	No
74	40	Yes
75	5	No
87	2	No
117	1	Yes

No midground (.5-2 Miles) views of the balloon were detected. Background views (outside 2 miles) of the balloon exist only along the Niagara Escarpment between 3 and 3.5 miles to the south of the proposed Project. In most of these background views the balloon was just visible above the existing municipal solid waste landfill owned by Modern Corporation.

EDR visited multiple sensitive resources during field verification and no views of the balloon were recorded from any of the sensitive resources. These include: Barnabite Fathers Seminary, Our Lady of Fatima Shrine, Stella Niagara Seminary, Fort Niagara Light House, Frontier House, Old Fort Niagara, Saint John's Episcopal Church, Fort Niagara State Park, Earl W. Brydges Art Park, Four

Mile Creek State Park, Joseph Davis State Park, The Seaway Trail, and the Robert Moses Parkway (Appendix A).

CONCLUSIONS

Based on the visibility analysis performed by EDR, visibility of the proposed RMU-2 landfill expansion will be essentially limited to a few areas in the background distance category (beyond 2 miles) due to the low profile of the vertical enhancement, the relatively flat topography in the study area, and the screening effect of existing vegetative buffers. With the exception of one observed area in the foreground and midground areas (Viewpoint 1 on Balmer Road near the CWM entrance gate), these vegetative buffers are effective at screening foreground and midground views during leaf-off conditions, so it should be expected that visibility would be further reduced during the growing season (leaf on conditions).

Therefore, due to the existence of these mitigating factors, the proposed RMU-2 landfill expansion has very minimal visibility throughout the 5-mile study area. This lack of visibility is likely to diminish the potential for an adverse visual impact.

Sincerely,

Gordon Perkins
Project Manager

FIGURES & APPENDIX

RMU-2 Visibility Assessment

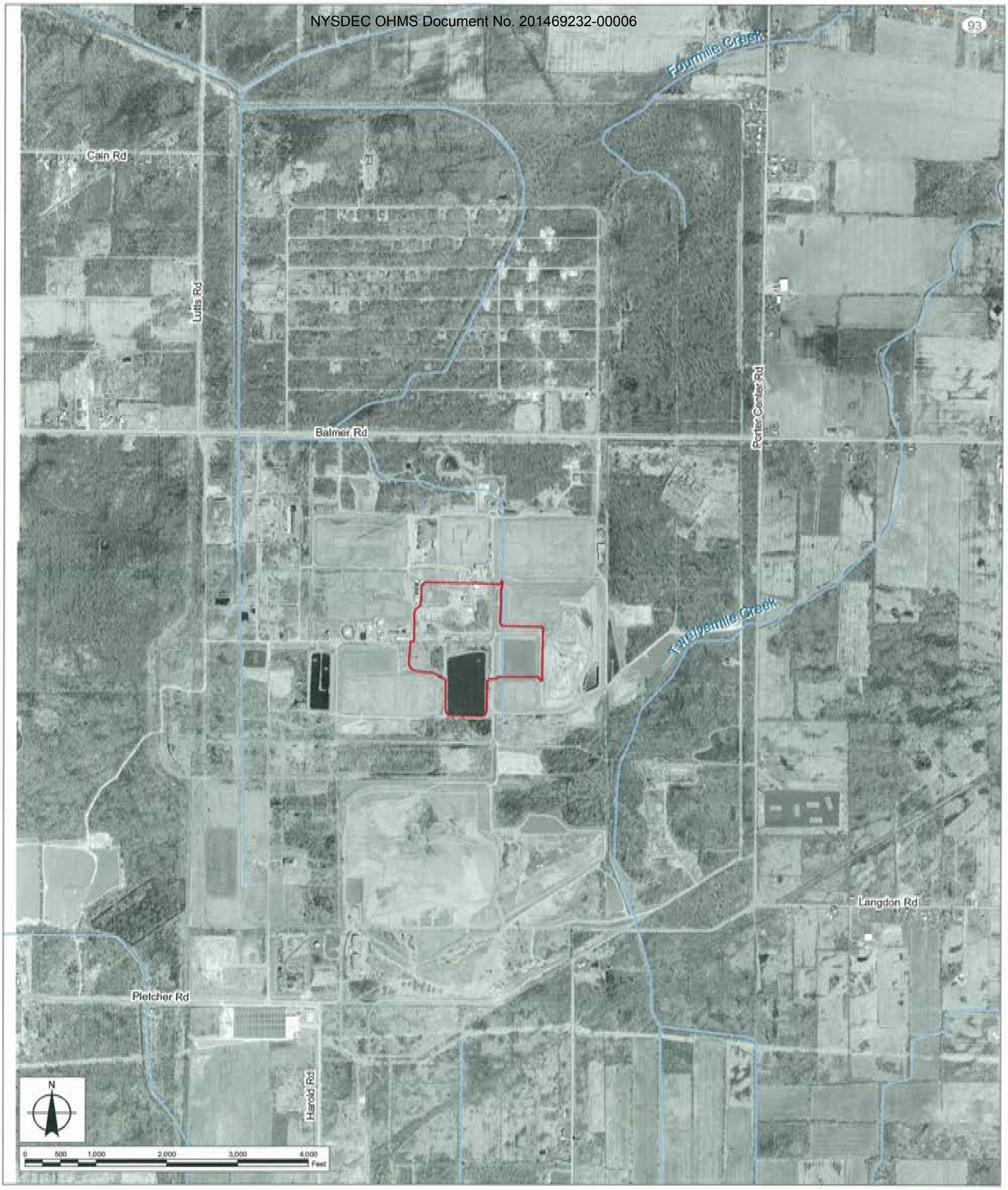
Towns of Lewiston and Porter - Niagara County, New York

Figure 1: Regional Site Location

December 2007

Notes:
Base Map: ESRI StreetMap USA.

EDR



RMU-2 Visibility Assessment

Towns of Lewiston and Porter - Niagara County, New York

Proposed Landfill Expansion

Figure 2: Site Location

December 2007

Notes:
Base Map: 2-ft. Orthophotography, Year 2005

EDR

RMU-2 Visibility Assessment

Towns of Lewiston and Porter - Niagara County, New York

Figure 3: Visually Sensitive Resources

December 2007

5-Mile Study Area
Proposed Landfill Expansion
Cemetery
School
Scenic Byway
Snowmobile Trail
Military
NPS Historic Register Site
Race Track
Golf Course
Areas of Intensive Land Use
State Park

Notes:
Base Map: ESRI StreetMap USA.

EDR

RMU-2 Visibility Assessment

Towns of Lewiston and Porter - Niagara County, New York

Figure 4: Viewshed Analysis - Proposed Landfill Height (120 ft.) Topography Only

December 2007

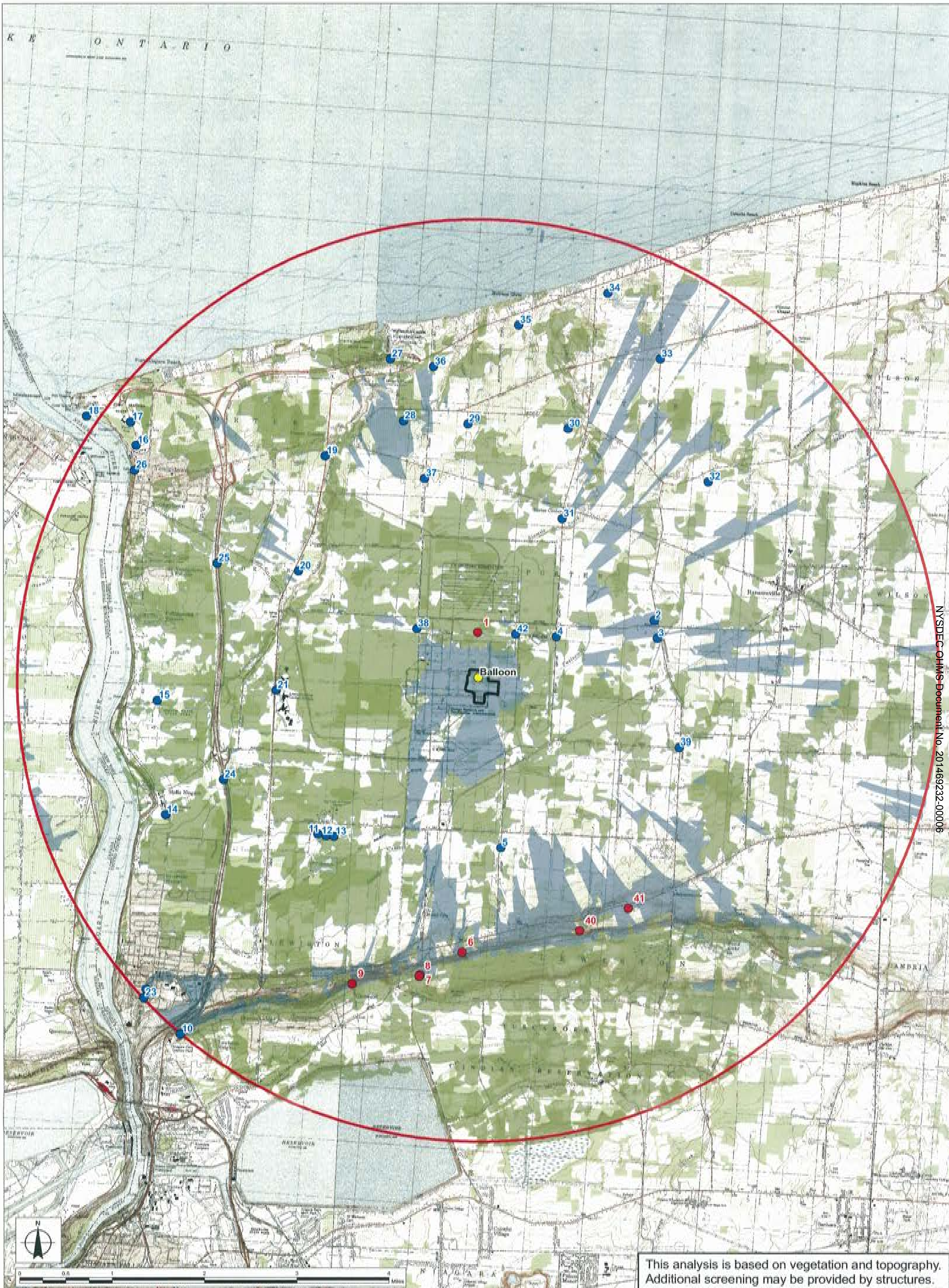
Proposed Landfill Expansion

5-Mile Study Area

Potentially Visible

Notes:
Base Map: USGS 1:24000 Ransomville and Sixmile Creek Quadrangles

EDR



RMU-2 Visibility Assessment

Towns of Lewiston and Porter - Niagara County, New York

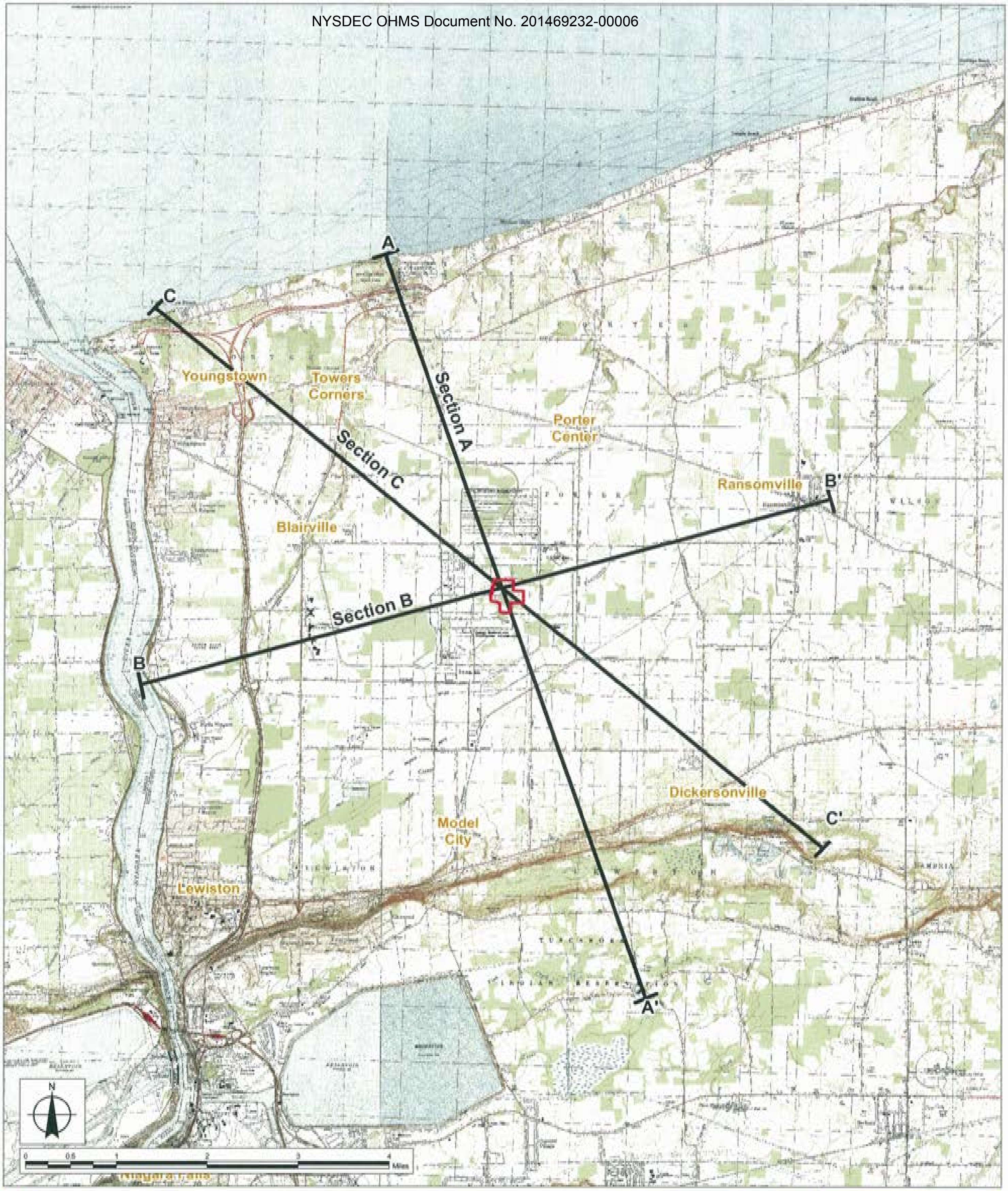
Figure 5: Viewshed Analysis - Proposed Landfill Height (120 ft.)
Vegetation and Topography

December 2007

- Balloon Location (Proposed Project)
- Viewpoint Location - Balloon Visible
- Viewpoint Location - Balloon Not Visible
- 5-Mile Study Area
- Proposed Landfill Expansion
- Potentially Visible
- Visibility Screened by Overhead Tree Canopy

Notes:
Base Map: USGS 1:24000 Ransomville and Sixmile Creek Quadrangles.

EDR



RMU-2 Visibility Assessment

Towns of Lewiston and Porter - Niagara County, New York

Figure 6: Line of Sight Cross Sections

Sheet 1 of 4 - Section Location Map

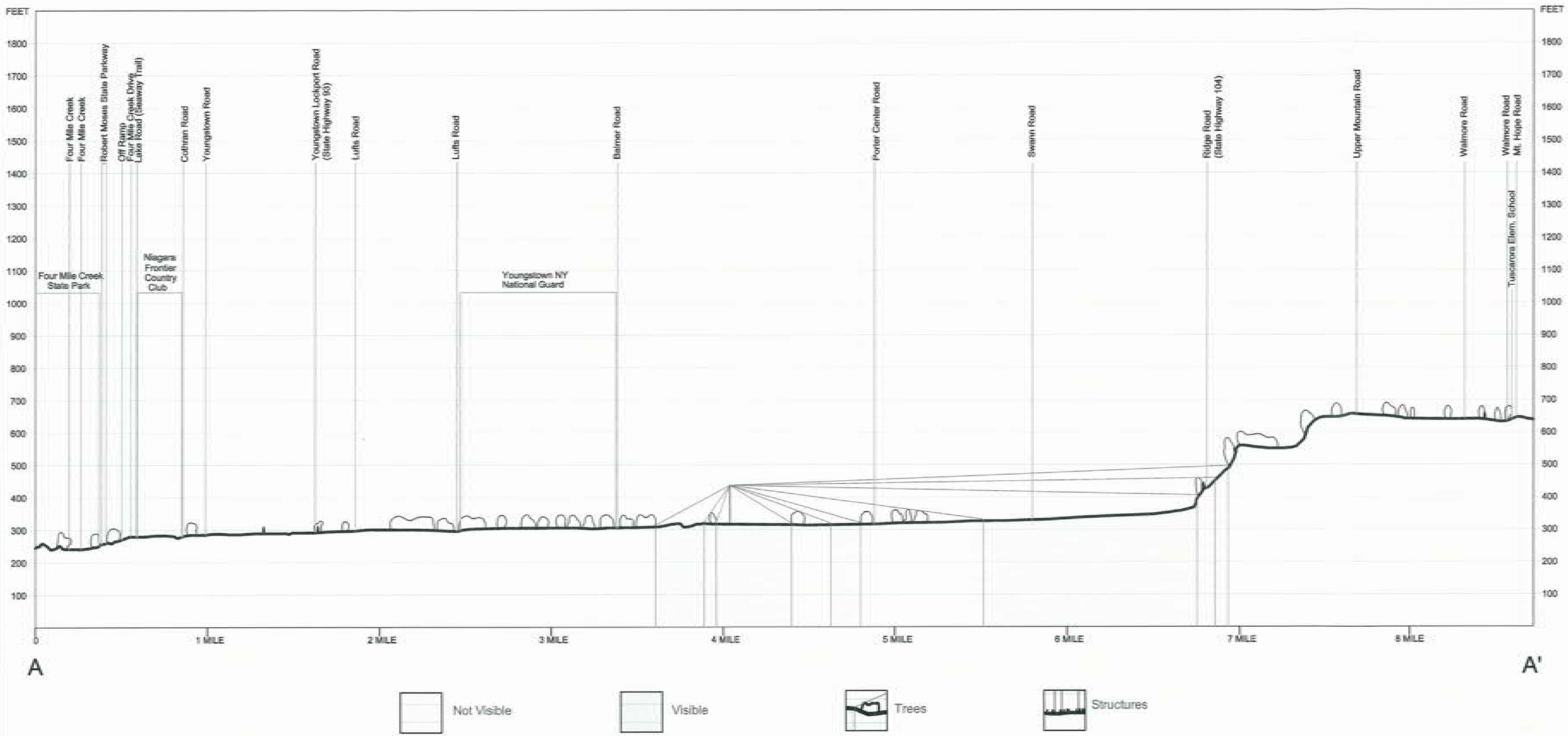
December 2007

Proposed Landfill Expansion

Cross Section Lines

Notes:
USGS 1:24000 Fort Niagara, Lewiston, Sixmile Creek and Ransomville Quadrangles

EDR



RMU-2 Visibility Assessment

Towns of Lewiston and Porter
Niagara County, New York

Figure 6: Line of Sight Cross Sections

Sheet 2 of 4 - Section A-A'

December 2007

Note: Vertical Scale 10x Horizontal Scale

EDR

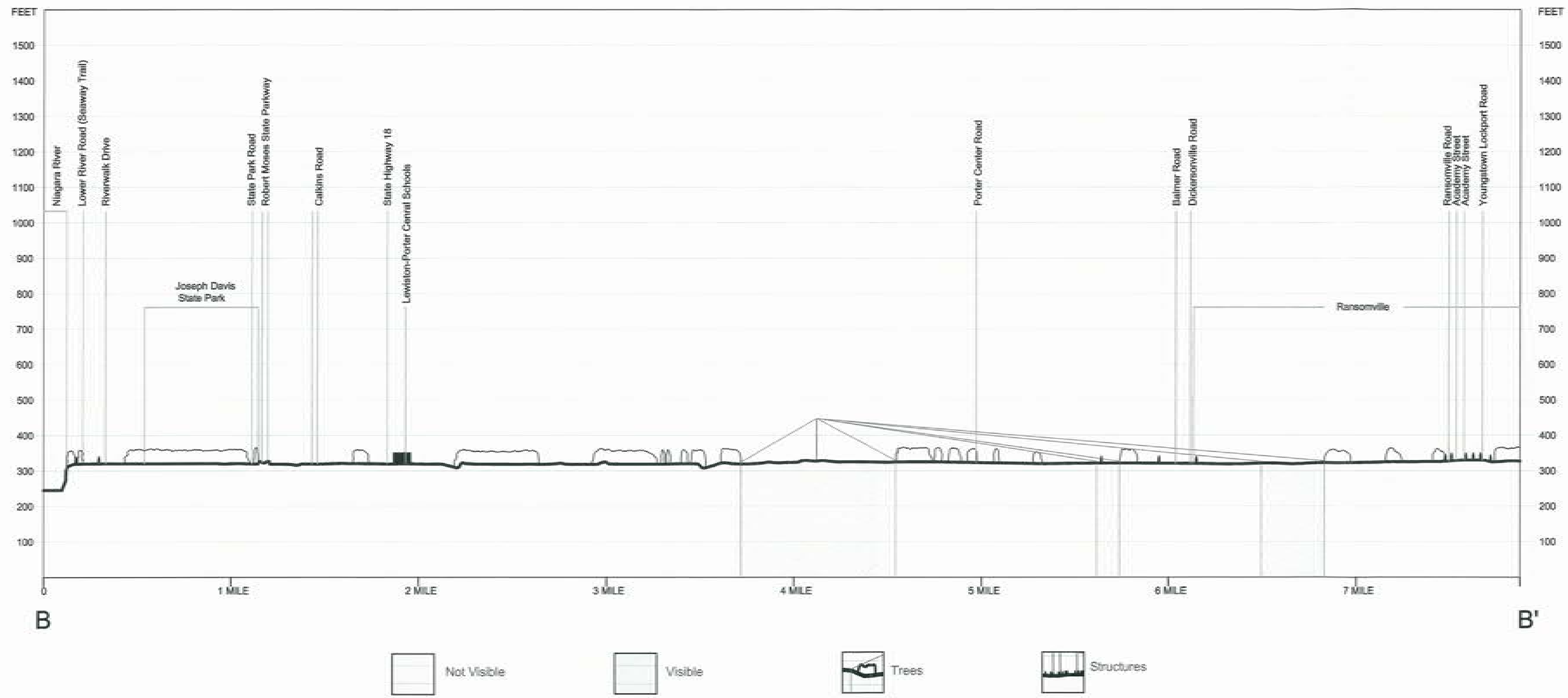
RMU-2 Visibility Assessment

Towns of Lewiston and Porter
Niagara County, New York

Figure 6: Line of Sight Cross Sections

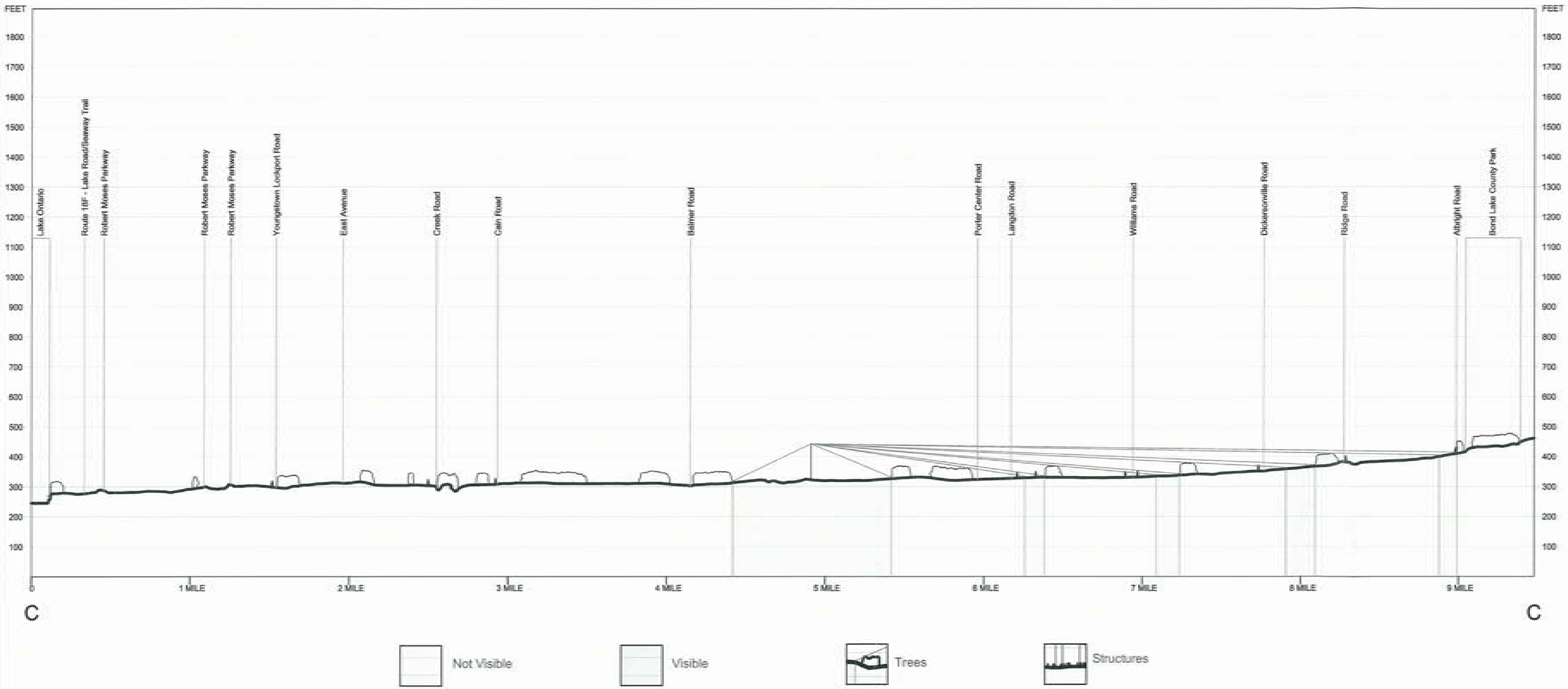
Sheet 3 of 4 - Section B-B'

December 2007



Note: Vertical Scale 10x Horizontal Scale

EDR



RMU-2 Visibility Assessment

Towns of Lewiston and Porter
Niagara County, New York

Figure 6: Line of Sight Cross Sections

Sheet 4 of 4 - Section C-C'

December 2007

Note: Vertical Scale 10x Horizontal Scale

EDR