BENEFICIAL USE DETERMINATION (BUD) APPLICATION

PORT OF ROCHESTER
ROCHESTER, NEW YORK

January 2010 (Rev. February 2011) 0191-001-100

Prepared for:

City of Rochester - DES

Prepared By:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

in association with

LABELLA Associates, P.C.

BENEFICIAL USE DETERMINATION (BUD) APPLICATION
PORT OF ROCHESTER

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1.0 INTRODUCTION

1.1 Site Location

The Port of Rochester site is located at 4590, 4630 and 4752 Lake Avenue and 1000 North River Street in the City of Rochester, New York. The Site is generally bounded by Lake Avenue to the west, the Genesee River to the east, Corrigan Street to the north, and River Street to the south (see Figure 1).

1.2 Site History

In the mid to late 1800's to the mid-1920's Charlotte Iron Works was an operational steel mill located on the western portion of the Site. Waste products, including foundry sand and slag, generated from the facility were used to expand the shoreline eastward toward the Genesee River and subsequently across the Site. Beginning in 2000, samples from **several soil borings and test pits at the Site** have been collected and **analyzed.**

1.3 Planned Marina Project

Currently the City is preparing a preliminary design for the development of the Site into a functioning public marina. The project is proposed to be completed in two phases (see Figure 2). During the first phase of construction approximately 143,000 cubic yards of material, including approximately 47,000 cubic yards of iron slag will be mechanically excavated. Initial demolition and construction activities for the first phase are planned to begin in the Fall of 2011. The second phase of the marina has not been scheduled, but will include the mechanical excavation of and additional approximately 79,000 cubic yards of material, including approximately 31,000 cubic yards of slag

1.4 Purpose & Scope

As part of the planned marina development project, the City of Rochester proposes to seek and secure a case-specific Beneficial Use Determination (BUD) for the excavated and separated slag fill in accordance with Solid Waste Management Facility Regulations (6NYCRR Part 360).

2.0 MATERIAL DESCRIPTION, PROCESSING, & USE

2.1 Material Description

As defined by the American Society of Testing and Materials (ASTM C125 Definition of Terms Relating to Concrete and Concrete Materials) iron slag is "the non-metallic product consisting essentially of silicates and aluminosilicates of calcium and other bases that is developed in a molten condition simultaneously with iron in a blast furnace". Descriptions of the subsurface slag materials encountered in previously completed borings and test pits indicated that there were color variances in the slag. The corresponding analytical data (Summarized in Appendix F) do not indicate significant variances in the concentration and types of metals detected amongst the various colored slag materials.

2.1.1 Chemical Characteristics (General)

According to the National Slag Association (See Appendix A), the primary constituents of iron slag are oxides of silica, alumina, calcium and magnesia which comprise approximately 95% of slag's total makeup. The remaining elements include manganese, iron and sulfur compounds as well as trace quantities of several others. As in natural geological formations, the major oxides are combined to form various silicate and alumnosilicate minerals such as melilite and woolastonite. The chemical composition of iron slag from a given source generally varies within relatively narrow limits since raw materials charged into the furnace are carefully selected and blended. Changes in the raw materials charged into the iron furnaces over time are likely reflected in the color changes in the slag.

2.1.2 Physical Characteristics (General)

According to the National Slag Association (see Appendix A), iron slag has a characteristically vesicular structure with many non-connected cells. Crushing slag forms angular, roughly cubical pieces with few flat or elongated fragments. Due to iron slag's vesicular structure, it generally has a greater surface area and lower density than other natural aggregates of equal volume. Iron slag is a non-corrosive material that provides an excellent bond with Portland cement, resists polishing, and is highly durable when subjected to weathering.

2.1.3 Subsurface Site Lithology

LaBella Associates, P.C. completed numerous soil borings at the Site to determine among other things, the nature and extent of slag and other fill deposition on the Site. Soil borings locations are depicted on Figure 3.

According to LaBella's boring logs, the deposits of slag consisted mainly of large chunks up to approximately 2-inch diameter. However, the maximum size was limited to the 2-inch diameter of the split spoon. Larger size chunks are likely to be present. The thickness of the slag fill layer varies from zero to 16.3 feet across the footprint of the proposed marina project.

2.1.4 Physical Testing of Site Slag Fill

Samples of the slag material from the Site were supplied to 3rd Rock, LLC of East Aurora, NY for analysis of particle size distribution and for the potential expansion of aggregates from hydration reactions (See Appendix B). The grain size distribution of the slag consisted of 63.8% gravel, 29.2% sand, and 7% fines. The distribution may be slightly skewed based on the action of the rotary drill and split spoon sampling. The slag was also tested and found to be non-expansive, consistent with most iron slag.

2.1.5 Analytical Testing of Site Slag Fill

LaBella collected composite samples of slag from the soil borings completed at the Site. The samples analyzed for semi-volatile organic compounds (SVOCs) and metals. As shown in Table 1, no SVOCs were detected in the slag samples and all metals meet the NYSDEC Part 375 Soil Cleanup Objectives (SCOs) for the protection of groundwater and restricted residential use.

The synthetic precipitation leaching procedure (SPLP) analysis was also completed to determine the leaching potential of the Site slag. As shown in Table 2, very low concentrations of metals leached from the slag, thus making the material well-suited for surface or subsurface reuse.

2.2 Material Processing

To facilitate the processing of the slag, an approximately 2.5-acre portion of the Site will be used for: storage of the raw material; processing of the slag including, crushing, screening and possibly magnetic separation of iron as required for the intended beneficial use ,and ;temporary staging of the reusable processed slag product(s). Off-site stockpiling of the processed slag products may also be necessary. Careful planning, observation and field control of excavation of the slag layer is critical to both maximize slag recovery as well as minimizing the cost and amount of mechanical processing of the excavated raw slag fill.

2.2.1 Material Excavation and On-Site Management

During Site excavation, overburden materials will be handled and disposed off-site in accordance with contract documents to be developed for the project. When the excavation reaches the slag layer, the in-place slag fill material will be dewatered as necessary and transported to the slag processing area of the Site where the slag will be processed. The raw unprocessed slag as excavated and until separated from other mixed fill materials shall be managed as a regulated solid waste in accordance with the Solid Waste Control Plan (see Appendix G). Nominal quantities of mixed fill materials separated from the slag during processing shall also be managed as a regulated solid waste in accordance with the Solid Waste Control Plan . The separated and processed slag product, subject to the BUD issued by the NYSDEC in accordance with this Application is not a regulated solid waste and therefore not subject to the Solid Waste Control Plan, .

2.2.2 Proposed Analytical Sampling of BUD Product

In order to ensure a consistent quality of the iron slag for beneficial use, one representative composite sample will be analyzed for each 10,000-tons of processed slag. The composite sample will consist of at least five grab samples. Each grab sample will consist of random aliquots taken from the lower, middle and upper sections of the working face of the excavation area or from the stockpile. Approximately equal volumes of each grab sample will be thoroughly manually mixed in the field or laboratory with a pre-cleaned stainless steel spoon in a pre-cleaned stainless steel or plastic pre-cleaned bowl to form the composite sample subject to analytical testing. Proper chain-of -custody procedures will be followed to assure sample integrity.

Each sample will be analyzed by a NYSDOH-approved (ELAP certified) analytical laboratory for RCRA Metals using EPA methods 6010C with 7471B for mercury. If the analytical results exceed the NYSDEC "Protection of Groundwater" values, SPLP extraction will be performed on split samples. Additional contingency sampling and analysis may be required the analytical data shows significantly different concentrations than the initial sampling. All data will be summarized and submitted to the NYSDEC.

2.2.3 Solid Waste Control Plan

The Solid Waste Control Plan (SWCP), provided under separate cover, describes the different native and fill materials expected to be encountered (i.e. slag, slag intermingled with mixed fill , and materials) and outlines the appropriate handling and disposition of the materials excavated from the Port of Rochester site.

2.3 Reclaimed Slag Product Uses (General)

According to the National Slag Association iron slag is an extremely versatile and durable building material with applications in concrete, asphaltic pavement, masonry units, lightweight embankments, and waterway applications.

Some of the processed slag will be used on-site as a base or sub-base for construction roadways, building foundation backfill and parking area surfacing. A portion of the material will also be used off-site on other City parcels or projects.

2.3.1 Road Base and Sub-Base

Iron slag can be crushed and screened to fulfill the grading requirements of the various City Departments or City projects, as specified by their consulting engineers and/or the City Engineer.

2.3.2 Structural Fill

The vesicular structure of iron slag results in a lower unit weight than most other natural aggregates. The slag is also very angular, well graded, and structurally competent for compaction and grading as an alternative to run-of-crusher or gravel aggregate.

2.3.3 Chip & Seal Aggregate

Iron slag has a rough surface and is resistant to weathering, making it a superior component in asphaltic wearing courses. Freezing and thawing has little to no effect on slag and since the melting point of slag is above 2100ºF slag is resistant to high temperature.

2.3.4 Portland Cement Uses

According to the Portland Cement Association's July 2005 Sustainable Manufacturing Fact Sheet for Iron and Steel Byproducts (see Appendix D), iron slag can be used in the production of clinker, blended cements, and/or as an aggregate in Portland cement concrete. In July 2005 there were 39 Portland cement plants using slag as a raw material in the production of clinker and 11 plants blending slag into one or more cement products.

2.4 Previously-Approved BUD Applications for Iron Slag

According to the New York State Department of Environmental Conservation (NYSDEC), Division of Solid and Hazardous Materials, Bureau of Solid Waste (see Appendix E) no fewer than four Beneficial Use Determinations have been granted for iron (blast furnace) slag.

The uses approved by the NYSDEC include use as a road base, a road sub-base, aggregate, and structural fill. Table 3 summarizes the list of BUD Approvals for iron slag.

2.5 Proposed Beneficial Use of Site Slag

Based upon the physical and chemical characteristics of the Site slag as presented herein which are consistent with industry-wide iron slag material, we propose the following beneficial uses of the Site slag for:

- Road base and sub-base
- Structural fill on non-residential properties
- Chip and seal aggregate
- Asphalt aggregate
- Concrete aggregate

3.0 REFERENCES

National Slag Association, *Blast Furnace Slag; The Material of Choice.*

Portland Cement Association, *Sustainable Manufacturing Fact Sheet: Iron and Steel Byproducts*, July 2005.

Labella Associates, P.C. *Data Summary Package, Port Marina Predevelopment Site Conditions Gap Investigation (DRAFT)* prepared for the City of Rochester Division of Environmental Quality, September 2009.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

SUMMARY OF SLAG ANALYTICAL RESULTS

PORT OF ROCHESTER
ROCHESTER, NEW YORK

Parameter [1]	Phase I Slag (A)	Phase I Slag (B)	Phase II Slag	[2]Residential SCOs (ppm)	[2]SCOs for the Protection of GW (ppm)
TAL Metals - mg/kg					
Aluminum	27300 E	23900 E	20600 E	--	--
Antimony	0.56 NE	0.61 NE	0.46 NE	--	--
Arsenic	5.1 E	7.8 E	8.3 E	**16**	**16**
Barium	171 E	120 E	124 E	**350**	**820**
Beryllium	4.6 E	2.9 E	2.9 E	**14**	**47**
Cadmium	<0.014	0.048 NE	0.67 NE	**2.5**	**7.5**
Calcium	251000 *	243000 *	166000 *	--	--
Chromium	3.1 E	5.7 E	12.1 E	**22**	**19**
Cobalt	<0.040	<0.040	1.1	--	--
Copper	3.3 NE*	7.7 NE*	17.4 NE*	**270**	**1720**
Iron	3610 *	7170 *	51900 *	--	--
Lead	3.3 E	4.9 E	15.1 E	**400**	**450**
Magnesium	26100 *E	3980 *E	18200 *E	--	--
Manganese	256	312	634	**2000**	**2000**
Mercury	<0.0057	0.009 E	0.028 E	**0.81**	**0.73**
Nickel	4.1 E	5.6 E	12 E	**140**	**130**
Potassium	2290 E	2500 E	2250 E	--	--
Selenium	1.1 N	1.3 N	<0.77	**36**	**4**
Sodium	1230	1160	1290	--	--
Thallium	2.3 N	1.8 N	0.55 N	--	--
Vanadium	6.3 E	12.1 E	17.8 E	--	--
Zinc	3.1 NE	7.3 NE	47.7 NE	**2200**	**2480**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per NYSDEC Part 375 Soil Cleanup Objectives (June 2006);

Definitions:
= Sample result exceeds the residential use SCO.
= Sample result exceeds the SCO for the protection of groundwater.
ND = Parameter not detected above laboratory detection limit.
"--" = No SCO available.
* = Denotes the inorganic duplicate analysis was not within the established QC control limit as specified by the laboratory.
N = Denotes the inorganic analysis is associated with a spike sample not within control limits.
E = Denotes the reported value is estimated because of the presence of interference, as determined by the serial dilution analysis.

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TABLE 2

SUMMARY OF SYNTHETIC PRECIPITATION LEACHING PROCEDURE (SPLP)
ANALYTICAL RESULTS

PORT OF ROCHESTER
ROCHESTER, NEW YORK

Parameter [1]	Phase I Slag (A)	Phase I Slag (B)	Phase II Slag	NYSDEC Groundwater Quality Standards (µg/L)
TAL Metals - µg/L				
Aluminum	937	676	231	--
Barium	208	75.6 B	28.1 B	**1000**
Calcium	74600	45700	36800	--
Chromium	<1.1	1.4 B	<1.1	**50**
Iron	<61	<61	66.8 B	**300**
Magnesium	79.9 B	<77	102 B	**35000**
Potassium	2070	2860	1170	--
Selenium	33.4	26 B	16.2 B	**10**
Silver	1.9 B	1.3 B	0.86 B	**50**
Sodium	9290	11200	20000	**20000**
Vanadium	12.2 B	8.9 B	20.3 B	**14**
Zinc	10.1 B	8.3 B	<7.7	**2000**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.

Definitions:
= Sample result exceeds the NYSDEC Groundwater Quality Standards.
ND = Parameter not detected above laboratory detection limit.
"--" = No Groundwater Quality Standard available.
B = Denotes that a "trace" cooncentration was detected below the reporting limit and equal to or above the detection limit.

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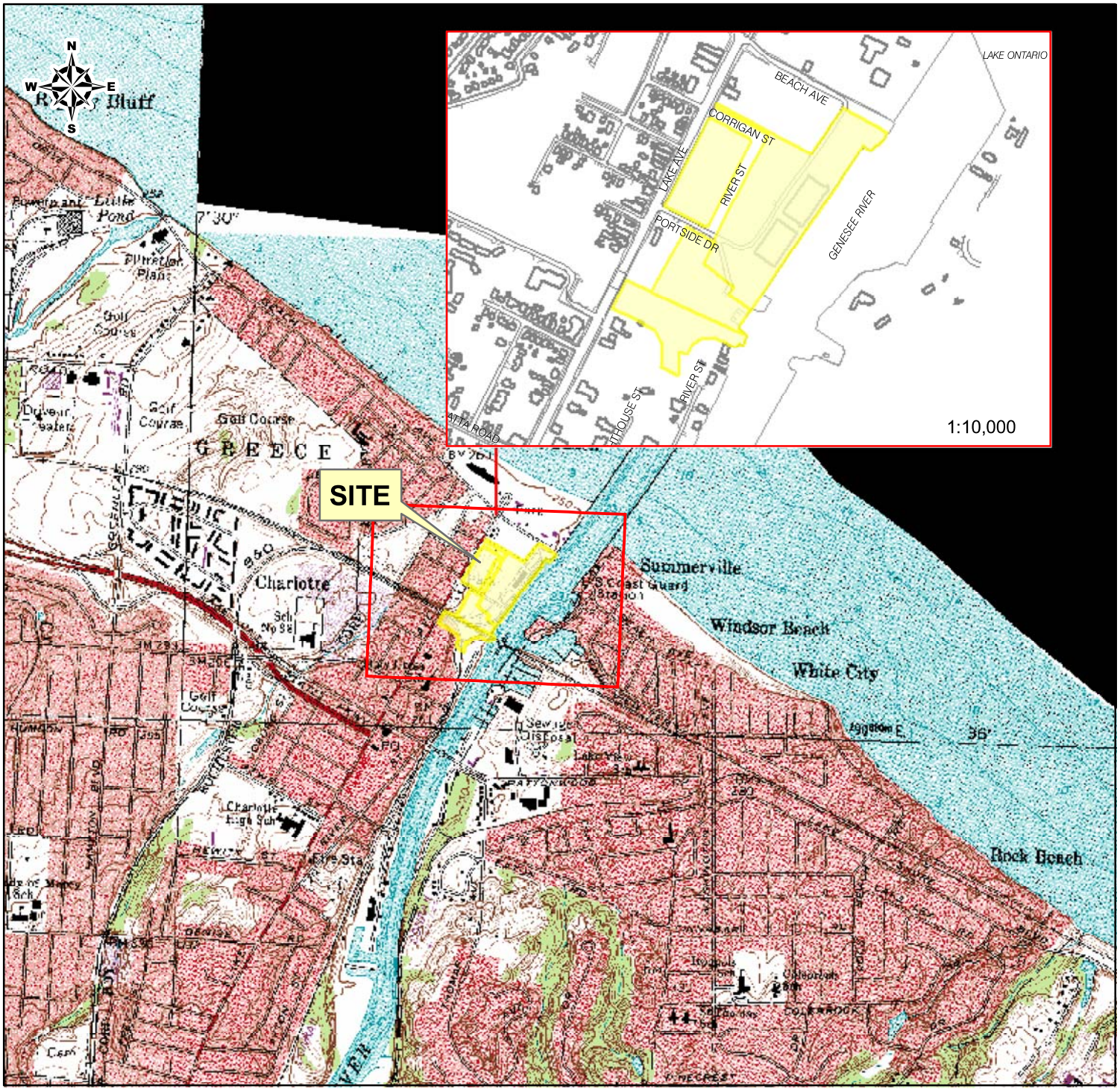
TABLE 3

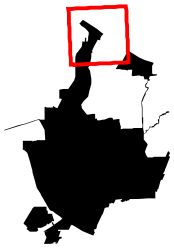
BUD APPROVALS FOR SIMILAR MATERIAL

PORT OF ROCHESTER
ROCHESTER, NEW YORK

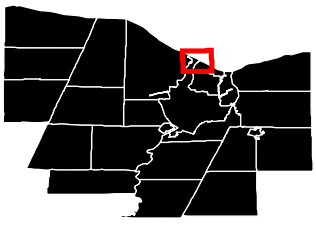
BUD #	Region	Facility Name	City	State	Beneficial Use
050-9-15	9	Buffalo Crushed Stone Inc.	Buffalo	NY	Base (road; sub); Aggregate
342-9-15	9	Buffalo Crushed Stone Inc.	Buffalo	NY	Base (sub)
406-3-00	OS	Waylite Corporation	Bethlehem	PA	Fill (lightweight)
515-4-42	4	King Road Materials	Albany	NY	Fill (lightweight); Base (sub)

FIGURES

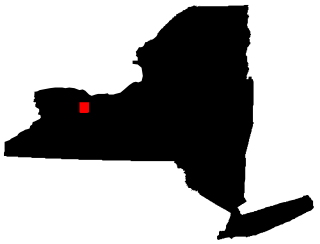




Location within City of Rochester



Location within Monroe County



Location within NY State

PROJECT/DRAWING NUMBER

209447

FIGURE 1

DRAWING TITLE

SITE LOCATION AND VICINITY MAP

1:24,000

ISSUED FOR: REVIEW

DATE: 3/13/2009

DESIGNED BY: XX

DRAWN BY: XX

REVIEWED BY: XX

PROJECT/CLIENT

BENEFICIAL USE DETERMINATION APPLICATION

PORT OF ROCHESTER
Proposed Marina Option 7

LABELLA Associates, P.C.

300 STATE STREET
ROCHESTER, NY 14614
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www.labellapc.com

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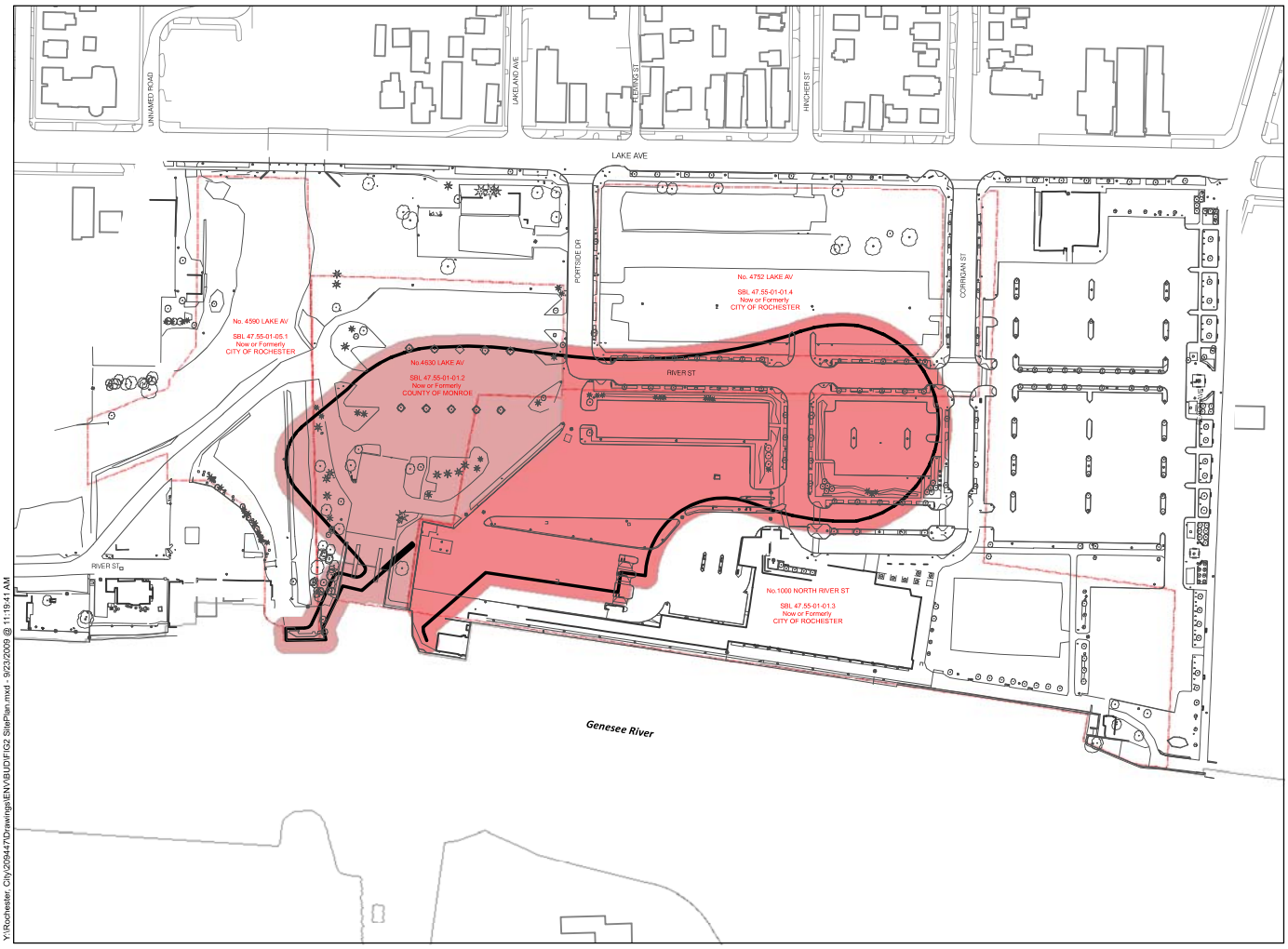


LABELLA Associates, P.C.

PORT OF ROCHESTER
Proposed Marina Option 7

BENEFICIAL USE DETERMINATION APPLICATION

SITE PLAN

September 2009

Legend

- Proposed Public Boardwalk (updated April 2009)
- Marina Redevelopment Phase I
- Marina Redevelopment Phase II
- Parcels

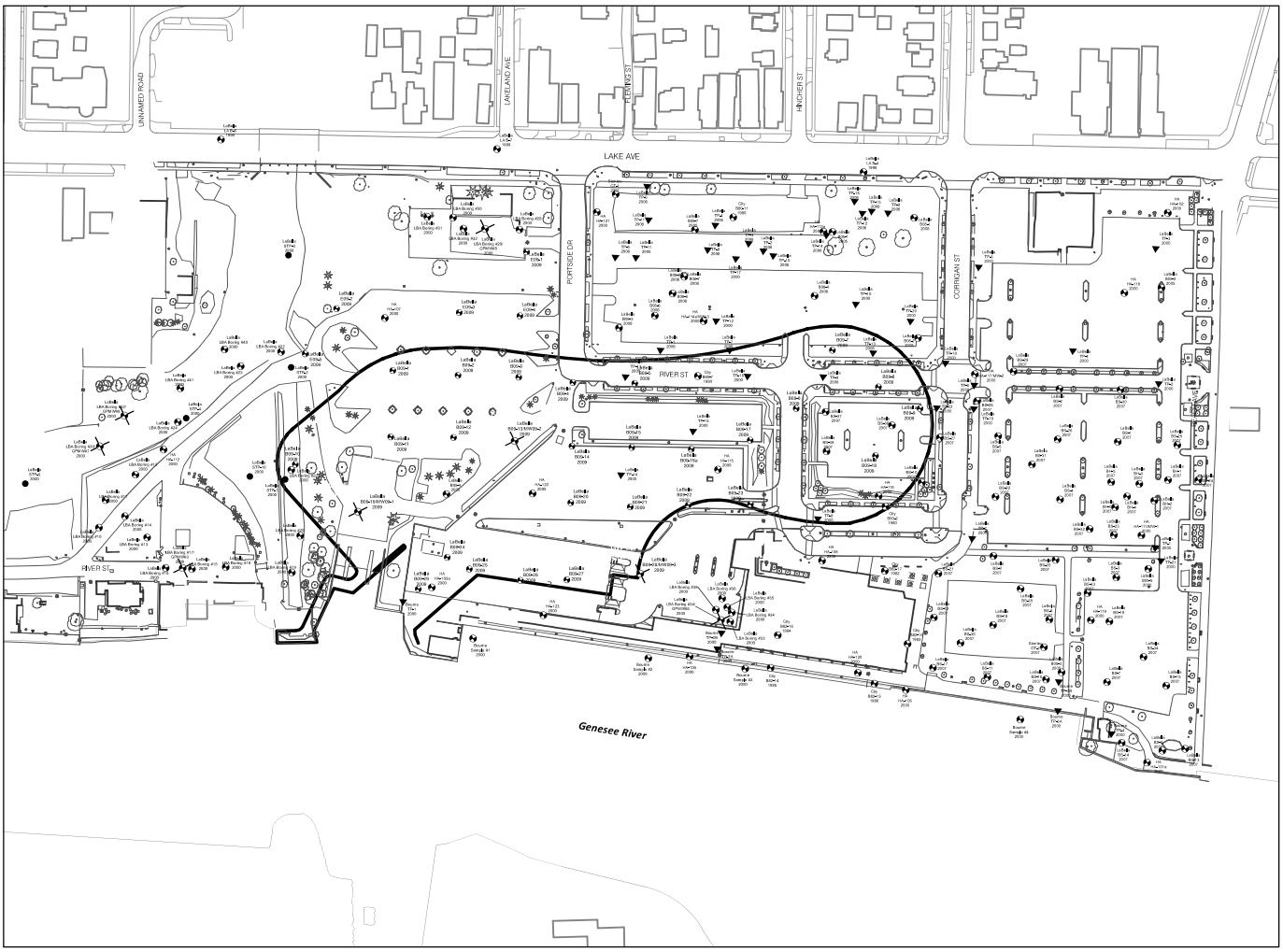
Sources:
(1) City of Rochester Site Survey, 2008.
(2) Passero Figure 7, updated April 2009.
(3) LaBella Port Redevelopment Mapping 2003
(4) LaBella GIS data 2005 through 2009
(5) City of Rochester GIS (buildings and street features)

0 150
1 inch = 150 feet

209447

FIGURE 2

Y:\Rochester, City\209447\Drawings\ENV\BUDF\G2 SitePlan.mxd - 9/23/2009 @ 11:19:41 AM



LABELLA Associates, D.P.C.

PORT OF ROCHESTER
Proposed Marina Option 7

BENEFICIAL USE DETERMINATION APPLICATION

BORING LOCATIONS

September 2009

Legend

- Soil Boring
- Hand Auger Point
- Monitoring Well
- Test Pit
- Proposed Public Boardwalk (updated April 2009)
- Former Vortex Sewer

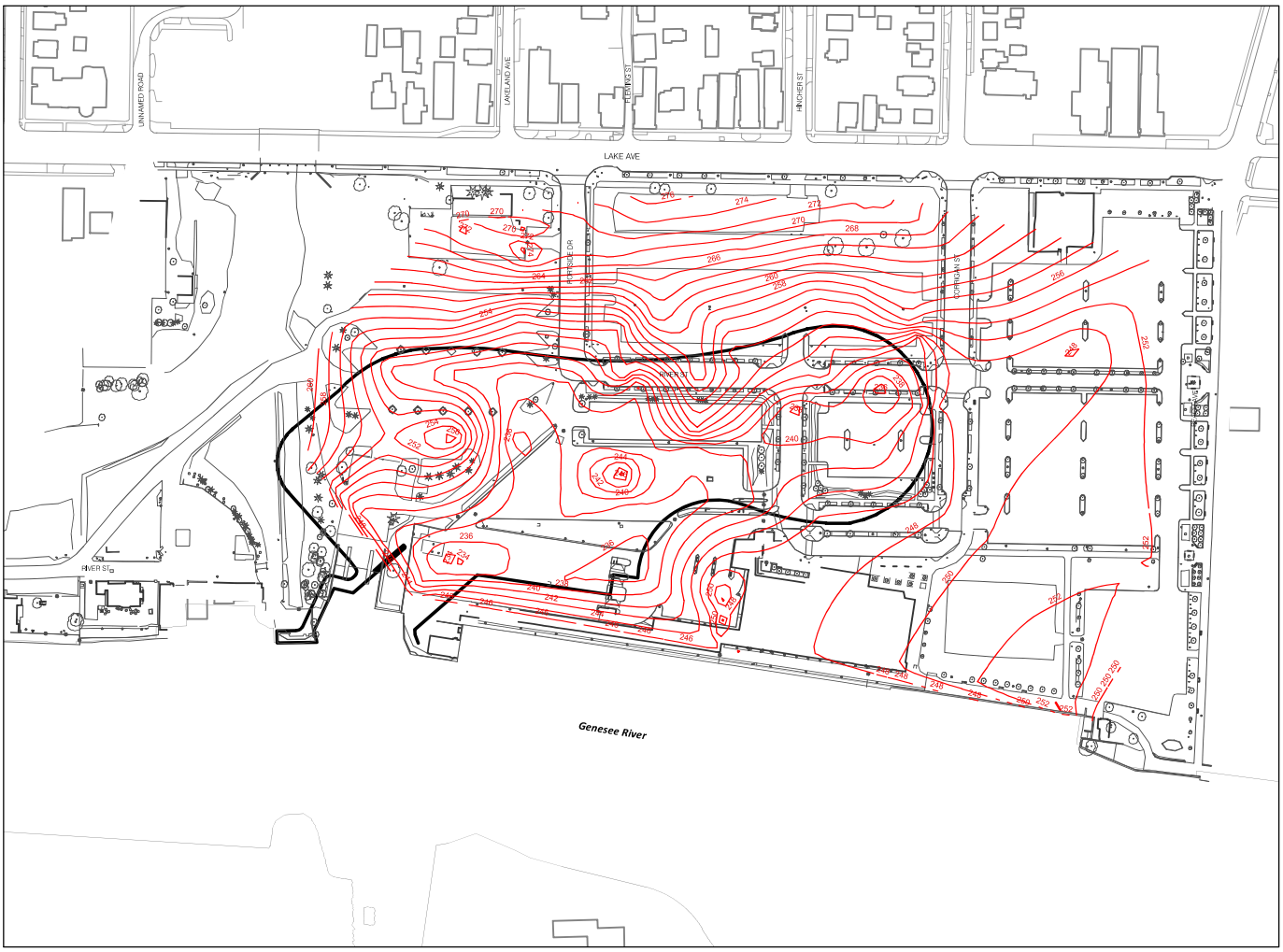
Sources:
(1) City of Rochester Site Survey, 2008.
(2) Passero Figure 7, updated April 2009.
(3) LaBella Port Redevelopment Mapping 2003
(4) LaBella GIS data 2005 through 2009
(5) City of Rochester GIS (buildings and street features)

0 150
1 inch = 150 feet

209447

FIGURE 3

Path: \\Projects2\ProjectsNZ-2\Rochester, City\209447 Port Marina Data Gap Analysis\Drawings\ENV\BUD\FIG3 BoringsTransects.mxd



LABELLA Associates, D.P.C.

PORT OF ROCHESTER
Proposed Marina Option 7

BENEFICIAL USE DETERMINATION APPLICATION

BOTTOM OF RECOVERABLE SLAG CONTOURS

September 2009

Legend

- Bottom of Slag Contours August 2009
- Proposed Public Boardwalk (updated April 2009)

Notes:
(1) Contours generated with Golden Surfer 8 software using the Natural Neighbor algorithm.
(2) Elevation in feet, based on the City of Rochester Datum.

Sources:
(1) City of Rochester Site Survey, 2008.
(2) Passero Figure 7, updated April 2009.
(3) LaBella Port Redevelopment Mapping 2003
(4) LaBella GIS data 2005 through 2009
(5) City of Rochester GIS (buildings and street features)

0 150
1 inch = 150 feet

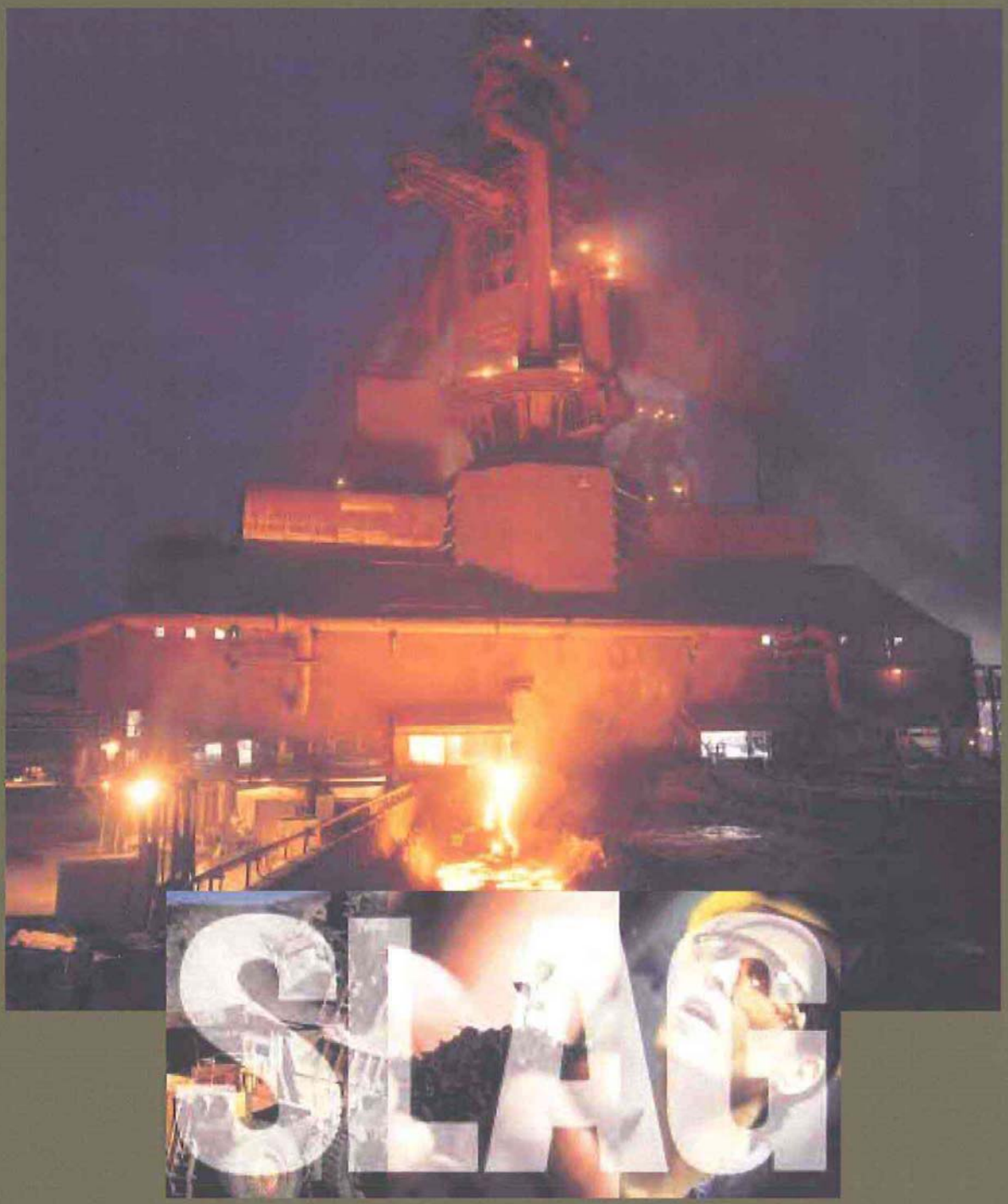
209447

FIGURE 4

APPENDIX A

BLAST FURNACE SLAG:
THE CONSTRUCTION MATERIAL OF CHOICE

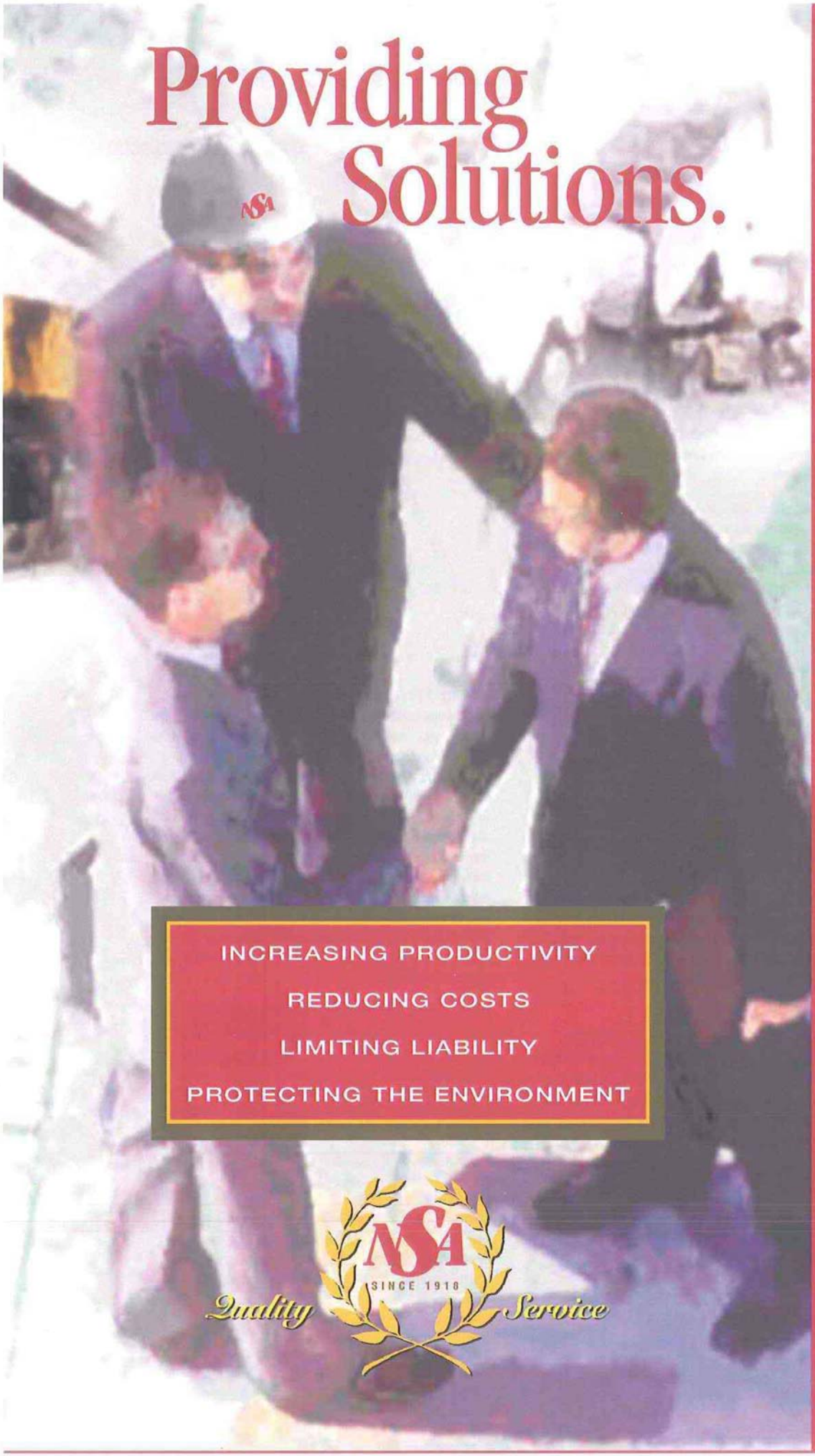
BLAST FURNACE SLAG



The Construction Material of Choice

NATIONAL SLAG ASSOCIATION

Providing NSA Solutions.



INCREASING PRODUCTIVITY

REDUCING COSTS

LIMITING LIABILITY

PROTECTING THE ENVIRONMENT

NSA SINCE 1918

Quality Service

NSA
SINCE 1918
NATIONAL SLAG ASSOCIATION

The All-Purpose Construction Aggregate

At the turn of the Twentieth Century, producers of pig iron began to look into possible applications for slag which was being produced simultaneously with the iron coming from their furnaces. In 1908 Carnegie Steel launched a study to look for a variety of possible uses of slag. As early as 1911, a Carnegie report, "Furnace Slag in Concrete" established a position for slag as a suitable product for use as an aggregate in concrete.

In 1917, it was evident that slag had become a valuable product and producing companies would benefit from a more united promotional effort. It was also apparent that slag operators were having difficulty obtaining railroad cars due to the war effort, and a cooperative effort was needed to acquire them. In 1918 ten men met in Columbus, Ohio and voted to organize the National Slag Association. The U.S. Bureau of Public Roads concluded in a 1919 survey that there were 32 plants being operated by 14 companies producing slag.

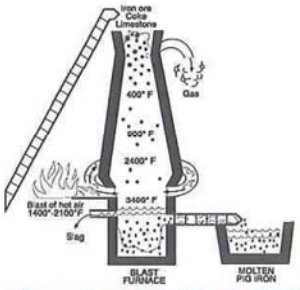
Slag has transcended it's beginnings as a road building aggregate in Ancient Rome, to its present day status of a value added construction material with diverse applications. By way of modern, state of the art processing methods, slag has present day applications in nearly every facet of the construction industry including: Ground granulated blast furnace slag (GGBF), blended cements, lightweight hydraulic fill, masonry, structural concrete, asphaltic concrete, granular base aggregate, railroad ballast, mineral wool, roofing, soil conditioning, glass, and many others.

The united effort of today's National Slag Association members worldwide, is the driving force that makes slag "the construction material of choice". This effort represents a continued emphasis on providing innovative, value added quality products to the construction industry well into the new millennium.

Definition and Description of Slag

The American Society of Testing and Materials (ASTM C125 Definition of Terms Relating to Concrete and Concrete Materials) defines blast furnace slag as "the non-metallic product consisting essentially of silicates and alumino silicates of calcium and other bases, that is developed in a molten condition simultaneously with iron in a blast furnace."

In the production of iron, the blast furnace is charged with iron ore, flux stone (limestone and/or dolomite) and coke for fuel. Two products are obtained from the furnace: molten iron and slag. The slag consists primarily of the silica and alumina from the original iron ore, combined with calcium and magnesium oxides from the flux stone. It comes from the furnace in a molten state with temperatures exceeding 1480°C (2700°F). There are four distinct methods of processing the molten slag: air cooled, expanded, pelletized and granulated. Each of these methods produces a unique slag material.



Iron and slag making process through a blast furnace.

Chemical Properties

The principle constituents of blast furnace slag are silica, alumina, calcium and magnesia (reported as oxides), which comprise 95% of slag's total makeup. Minor elements include manganese, iron and sulfur compounds as well as trace quantities of several others. Analysis of most blast furnace slags fall within the ranges that are shown below. It should be noted, however, that the major oxides shown do not occur in free form in the slag. In air-cooled BF slag, they are combined to form various silicate and aluminosilicate minerals such as melilite, merwinite, wollastonite, etc., as found in natural geological forms. In the case of granulated and pelletized slag, these elements exist primarily as glass. The chemical composition of slag from a given source varies within relatively narrow limits since raw materials charged into the furnace are carefully selected and blended.

Typical Chemical Constituents

	Percent		Percent
Silica (SiO_2)	32-42	Sulfur (S)*	1-2
Alumina (Al_2O_3)	7-16	Iron Oxide (Fe_2O_3)	1-1.5
Calcium (CaO)	32-45	Manganese Oxide (MnO)	0.2-1.0
Magnesia (MgO)	5-15		

* Principally in the form of calcium sulfide

Physical Properties

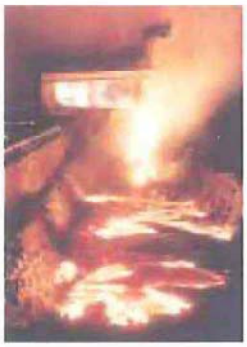
The physical characteristics-weight, particle size, structural properties, etc.-vary according to the method used in processing the molten slag. Accordingly, end use of the processed material varies, which helps to explain the unique diversity of slag products.

Types of Blast Furnace Slag Processing

Air-Cooled

ATMOSPHERIC COOLING

Extremely versatile and durable building material



Description

Air-Cooled Blast Furnace (ACBF) Slag as defined in ASTM C 125 is: "The material resulting from solidification of molten blast-furnace slag under atmospheric conditions. Subsequent cooling may be accelerated by application of water to the solidified surface."

M-5/I-96 concrete interchange, Farmington Hills, MI. Used ACBF slag for open grade drainage course and concrete pavement.

Texture and Shape

The solidified slag characteristically has a vesicular structure with many non-connected cells. ACBF slag crushes to angular, roughly cubical pieces with a minimum of flat or elongated fragments. The rough vesicular texture of slag gives it a greater surface area than smoother aggregates of equal volume and provides an excellent bond with portland cement and high stability in bituminous mixtures. For embankment applications, the rough surfaces improve the angle of internal friction or interlocking of the pieces.

Specific Gravity

The bulk specific gravity (dry basis) of ACBF slag coarse aggregate generally falls in the range of 2.0 to 2.5. Since large vesicules cannot exist in small particles, the smaller size have higher specific gravities. Slag sand (#4 to 0 size) approaches natural sand in bulk specific gravity. Due to the cellular nature of slag, it is important that bulk specific gravity be used rather than apparent specific gravity for purposes of computing yield or estimating quantities.

Unit Weight

The unit weight varies with: (a) size and grading of the slag, (b) method of measuring and (c) bulk specific gravity of the slag. Typical unit weight (compacted) of crushed and screened air-cooled slag, graded as ordinarily used in concrete, is usually in the range of 1121 kg to 1281 kg per m^3 or 70 to 85 lb per ft^3. Slag has an economic advantage in construction because it has a lower unit weight than most natural aggregates. Allowance for this differential should always be considered for design and specifications in order to assure equal volume irrespective of the type of aggregate used.

Grading

ACBF slag is crushed and screened to conform to the grading requirements of the various state highway departments, municipalities and other specifying bodies. Gradations specified in national standards, such as ASTM D 448. Standard sizes of coarse aggregate for highway construction, are usually preferred and often the most readily available.

Absorption

Absorption of ACBF slag is usually in the range of 1 to 5% by weight, as it has a greater surface area and lower specific gravity than most natural aggregates. Little water ever enters the interior vesicular cells; therefore, the degree of saturation (portion of the total void space filled by water) is low. The empty cells are similar to the air bubbles in air-entrained cement pastes and the resultant durability is outstanding.

The core of the protective breakwater at the Hammond Marina (Hammond, Ind.) consists of 65,000 tons of ACBF slag. After extensive testing, Indiana's Department of Environmental Management approved ACBF slag as an acceptable product for use in Lake Michigan.

Resistance to Polishing

An outstanding characteristic of ACBF slag is its toughness and resistance to polishing under traffic. Notwithstanding its toughness, the degradation of slag, as tested in the Los Angeles (LA) Abrasion machine, is generally higher than for round or smooth-surfaced natural aggregates. This is due mainly to the rough edges on the surface breaking off under impact of the steel balls constituting the test charge. It has been proven that there is no correlation between the LA Abrasion loss for slag in laboratory tests and degradation in field applications. For this reason ASTM has deleted this test for slag in its specifications (see ASTM D 692, D1139, etc.) and D.O.T.'s in states where slag is available do not require this test for slag. LA Abrasion limits for slag, if included in specifications, should be somewhat higher than that for natural aggregates - to a maximum of approximately 50% loss.

This higher loss, however, does not mean that slag is softer than natural aggregates. The hardness of slag as measured by the Mohs scale is between 5 and 6. This compares favorably with the hardness reported for such materials as durable igneous rocks. Tests show the fines resulting from the LA Abrasion test on slag to be non-plastic.

Non-Corrosive

The small amounts of sulfur in slag are present in combined alkaline compounds, similar to that in portland cement. These are harmless to concrete and do not cause corrosion of reinforcing steel. The corrosive properties of coal ash or cinders should not be mistakenly applied to blast furnace slag. Examination of reinforcing bars taken from slag concrete structures after 30 years of service has shown no evidence of corrosion. The pH of solutions in contact with slag is always basic which tends to inhibit corrosion.

Durability

Slag is highly resistant to the action of weathering. It will withstand an unusually large number of cycles of the sulfate soundness test (ASTM C 88). Freezing and thawing or wetting and drying tests, also have little or no effect. High temperatures have very little effect on slag as it is formed in the blast furnace at about 1480 C or 2700 F. ACBF slag shows a slow but very uniform coefficient of expansion of approximately 0.000006 per degree F, up to its melting point (1150 to 1426C/2100 to 2600F). This figure is normally accepted as the coefficient of expansion for cement mortar and steel, hence, slag, when combined with these ingredients to form reinforced concrete, affords a high degree of compatibility.

Ohio toll road: ACBF slag was utilized in asphaltic wearing course for superior friction properties.

APPLICATIONS

- CONCRETE
- ASPHALTIC PAVEMENT
- LIGHTWEIGHT EMBANKMENT
- WATERWAY APPLICATIONS
- MASONRY UNITS
- MINERAL WOOL
- SOIL CONDITIONING
- METALLURGICAL FLUX
- GLASS MAKING

AREAS OF ADDED VALUE

- Excellent paste - aggregate bond in concrete
- Greater yield for all construction applications
- Improved skid resistance and stability in asphaltic pavements
- High angle of internal friction resulting in improved aggregate interlock
- Lower unit weight/Improved engineering properties for lightweight embankment
- Improved fire resistance for masonry and concrete applications
- Lower freight and labor costs due to lower unit weight
- Replenished soil with mineral and pH balance
- Economical alternative to Wollastonite as key ingredient in metallurgical mold powders and flux products
- Physical and chemical suitability for mineral wool production

Types of Blast Furnace Slag Processing

Expanded

CONTROLLED WATER-COOLING

Lightweight vesicular material obtained by controlled processing

The Process

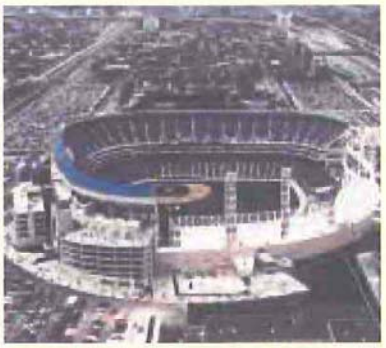
Controlled quantities of water are used to accelerate the solidification process of molten blast furnace slag, resulting in a low density material. The solidified expanded slag is crushed and screened for use as a lightweight structural aggregate.

Texture and Shape

Expanded blast furnace slag is angular and cubical in shape, with negligible flat or elongated particles. Due to the action of the water and resulting steam on the solidification process, the open cellular structure of the particles is even more pronounced than particles of air cooled blast furnace slag.

Grading

Expanded blast furnace slag is crushed and screened to desired product sizing. Typically this is a blend of coarse and fine aggregate particles. The actual grading of products should be reviewed with the local supplier.



The new Comiskey Park (Chicago, IL) contains over 900,000 lightweight concrete block, used EXPANDED BLAST FURNACE SLAG AGGREGATE in order to achieve the desired weight, as well as fire resistance requirements.

Fire Resistance Ratings (American Insurance Association) Walls and Partitions

Type of Coarse Aggregate	Minimum Equivalent Thickness for Ratings of 4 hrs.	3 hrs.	2 hrs.	1 hr.
Expanded Blast Furnace Slag or Pumice	4.7	4.0	3.2	2.1
Expanded Clay or Shale	5.7	4.8	3.8	2.6
Limestone, Cinders or Air Cooled Blast Furnace Slag	5.9	5.0	4.0	2.7
Calcarious Gravel	6.2	5.3	4.2	2.8
Siliceous Gravel	6.7	5.7	4.5	3.0

APPLICATIONS

- MEDIUM TO LIGHTWEIGHT CONCRETE MASONRY UNITS
- LIGHTWEIGHT EMBANKMENT
- MEDIUM TO LIGHTWEIGHT STRUCTURAL CONCRETE

AREAS OF ADDED VALUE

- Expanded blast furnace slag aggregate is a specialty product made for the masonry block industry.
- Masonry units containing expanded blast furnace slag aggregate possess many desirable properties such as reduced weight, improved sound absorption and excellent thermal properties.
- Substantial improvements in labor efficiencies can also be realized as masons can handle and place more lower weight units per day.
- Improvements in fire resistance ratings have also been documented for masonry and structural concrete units made from expanded blast furnace slag aggregate, as documented in the above table representing the findings of the American Insurance Association.

NATIONAL SLAG ASSOCIATION

Pelletized

ACCELERATED COOLING

A Unique Process that Facilitates the Manufacture of "Value Added" Products

The Process

In the pelletizing process, a molten blast furnace slag stream is directed onto an inclined vibrating feed plate where it is quenched with water. The addition of water at this stage causes the slag to foam. While in this expanded pyroplastic state the slag stream flows from the feed plate onto a revolving finned drum. as the drum rotates, the fins repeatedly strike the slag stream with sufficient force to propel the slag into the air, dispersing it and forming spherical droplets. These droplets, or slag pellets, freeze rapidly to a solid state as they are launched through the air away from the pelletizer.

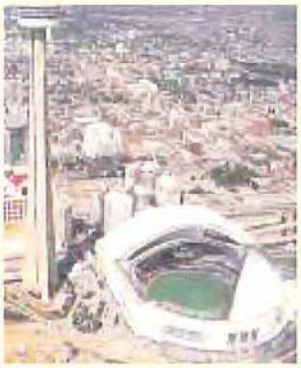
Sound Cell System™
(offered by Best Block & Richvale York Block)

Texture and Shape

The treatment of the molten blast furnace slag with water and the resultant foaming action, lead to a unique internal cellular structure within each slag pellet. This cellular structure (many voids only detectable with the aid of an electron microscope) is contained within a smooth spherical skin. The combination of these characteristics leads to the formation of a low density aggregate, with diverse applications as a construction material.

Gradations and Densities

Pelletized slag is available in a number of sizes or gradations. The most common sizes processed are: Structural Coarse (1/2″ x 3/16″), Coarse (3/8″ clear), Fine (-3/16″) and Blend (-3/8″). Densities range from 912 kg/m³ (54 lbs/ft³) to 1105 kg/m³ (69 lbs/ft³), depending on gradation.



Sky Dome, Toronto, Canada

Areas of Added Value

In addition to serving as an excellent aggregate for concrete and masonry units, pelletized slag can also be ground into slag cement. Concrete mixes incorporating the use of slag cement show improved workability and pumpability characteristics. There is also a notable reduction in the heat of hydration, which can be significant in mass concrete placement applications. Slag cement also offers a high resistance to sulfate attack and alkali-silica reaction.

Pelletized slag in masonry and structural concrete offers advantages in fire resistance, sound absorption, thermal properties and a reduction in dead loads.

APPLICATIONS

- RAW MATERIAL FOR THE MANUFACTURE OF SLAG CEMENT.
- MEDIUM TO LIGHTWEIGHT CONCRETE MASONRY UNITS.
- AGGREGATE FOR USE IN STRUCTURAL CONCRETE.
- LIGHTWEIGHT FILL.
- MASS CONCRETE PLACEMENT APPLICATIONS

AREAS OF ADDED VALUE

- Facilitates "Value Added" products

SLAG CEMENT

- Improved workability
- Controls heat of hydration
- Resistance to sulfate attack

PELLETIZED AGGREGATE

- Fire Resistance
- Sound absorption
- Thermal properties
- Reduction in "Dead Loads"

Types of Blast Furnace Slag Processing

Granulated

WATER QUENCHING

Glassy, granular material formed when slag is rapidly chilled, as by immersion in water.

The Process

The most common process for granulating blast furnace slag involves the use of high water volume, high pressure water jets in direct contact with the molten blast furnace slag at a ratio of approximately 10 to 1 by mass. The molten blast furnace slag is quenched almost immediately, forming a material generally smaller than a #4 sieve.

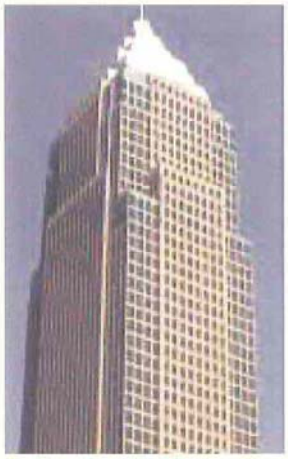
The efficiency to which the molten blast furnace slag is rapidly chilled, as well as the chemical composition of the slag source, largely determine its cementitious properties for use in concrete. After the granulated blast furnace slag is formed, it must be dewatered, dried and ground, using processes similar to those used with portland cement clinker to make portland cement.

Typically, granulated slag is ground to an air - permeability (blaine) fineness exceeding that of portland cement to obtain increased hydraulic activity at early ages. As with portland cement and pozzolans, the rate of reaction increases with the particle fineness.

Ground Granulated Blast Furnace (GGBF) Slag

When GGBF slag is mixed with water, initial hydration is much slower as compared with portland cement. Therefore, portland cement or alkali salts are used to increase the reaction rate. In the hydration process, GGBF slag produces calcium silicate hydrate cement paste. This valuable contribution from GGBF slag improves the paste-to-aggregate bond in concrete. GGBF slag mixtures with portland cement typically result in greater strength and reduced permeability.

ASTM C989 provides three strength grades of GGBF slag, depending on their respective mortar strengths when blended with an equal amount of portland cement. As summarized below, the classifications are grade 80, 100 and 120, based on the slag activity index. (See chart below.)



Key Tower, Cleveland, Ohio.

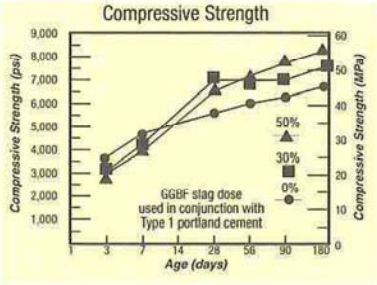
Color

GGBF slag is considerably lighter in color than most portland cements and will produce a lighter concrete end product. Occasionally, concrete containing GGBF slag may exhibit a blue-green coloration. While this coloration effect seldom occurs, it is attributed to a complex reaction of the sulfide sulfur in the GGBF slag with other compounds in the cement and will diminish with age.

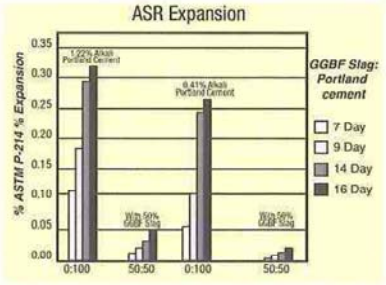
ASTM C989 Slag Activity Index Standards

	Slag-activity index, Minimum percent	
Age and Grade	Average of last five consecutive samples	Any individual sample
7 - day index		
Grade 80	–	–
Grade 100	75	70
Grade 120	95	90
28-day index		
Grade 80	75	70
Grade 100	95	90
Grade 120	135	110

NSA
SINCE 1918
NATIONAL SLAG ASSOCIATION

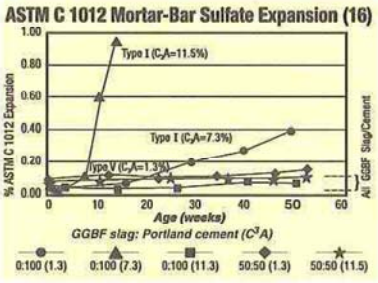


Strength Development of GGBF Slag (Grade 100)

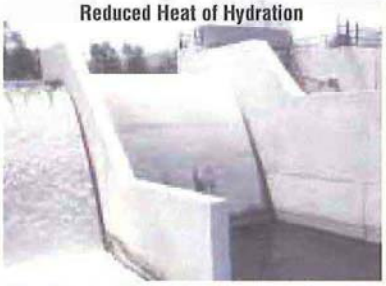


ASR Expansion. Reduced alkali-silica reaction

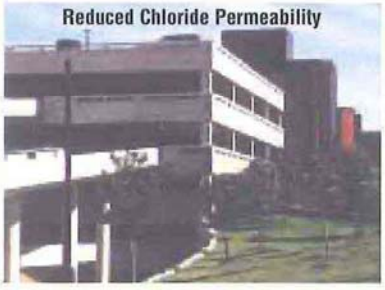
Rock and Roll Hall of Fame and Museum, Cleveland, Ohio.



ASTM C1012 Mortar Bar Expansion: Improved sulfate resistance over Type V cement.



Mass Concrete: Sylvan Lake Dam, stilling basin, Rome City, IN



Baltimore-Washington International Airport Parking Structure.

GENERAL APPLICATIONS

- RAW MATERIAL FOR THE MANUFACTURE OF CEMENT
- LIGHTWEIGHT FILL
- RAW MATERIAL FOR THE MANUFACTURE OF GLASS

FACTORS AFFECTING CEMENTITIOUS PROPERTIES

- Chemical composition of GGBF slag
- Alkali concentration of the reacting system
- Glass content of the GGBF slag
- Fineness of the GGBF slag and portland cement

AREAS OF ADDED VALUE

GGBF SLAG SPECIALTY CONCRETE APPLICATIONS

- Reduced chloride permeability
- Improved resistance to sulfate attack
- Reduced heat of hydration in mass concrete
- Improved compressive and flexural strength
- Reduced alkali-silica reaction

SINCE 1918
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Environmental Commitment

In the early 1900s, prior to the development of viable construction markets for blast furnace slag, millions of tons were either stockpiled or disposed of by other means.

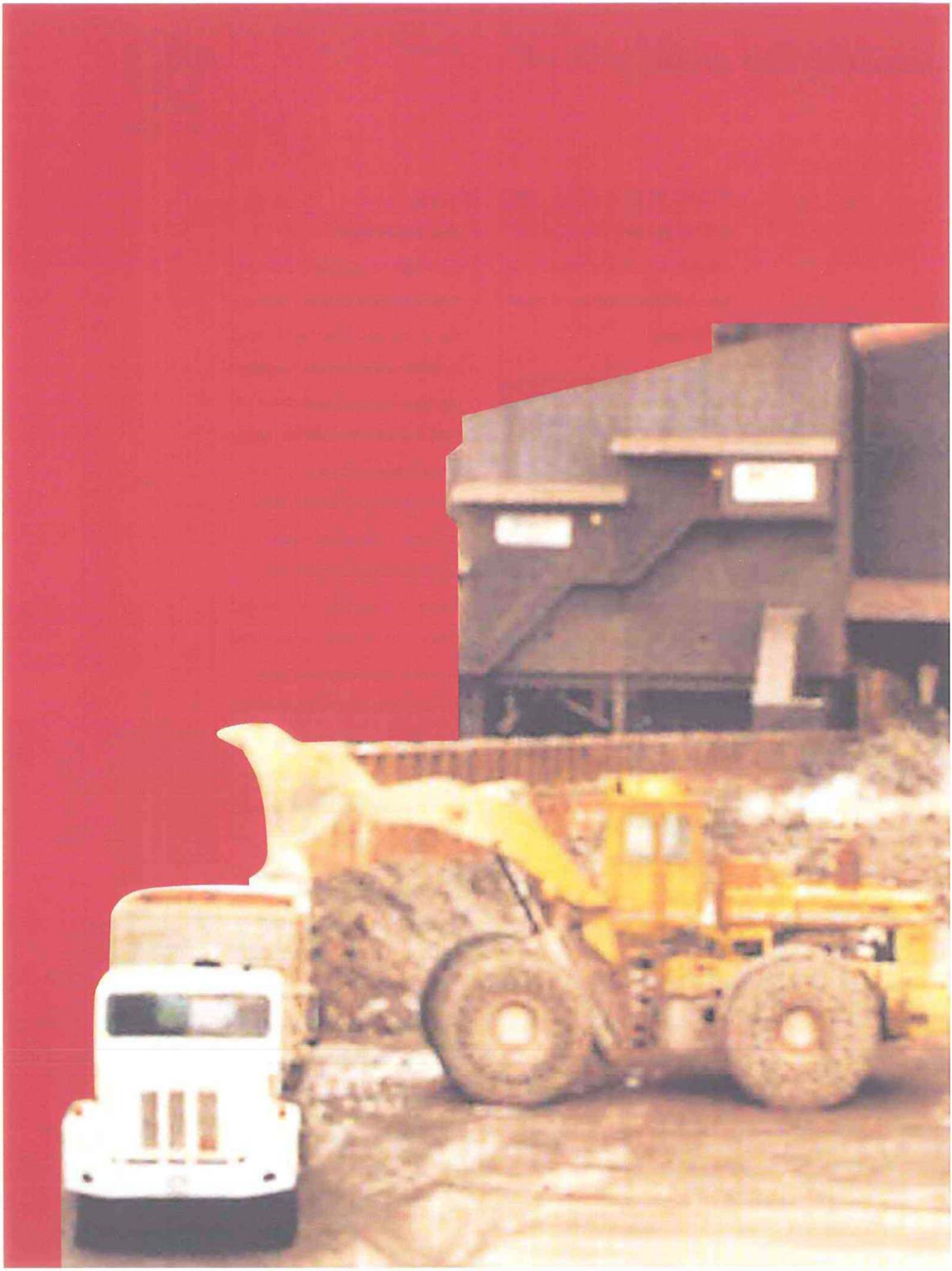
Interprovincil Steel Corp. (IPSCO) Regina, Saskatchewan, Canada

Though the marketing and research efforts of the National Slag Association's (NSA) member companies, blast furnace slag has become recognized as the "material of choice" for many construction related applications, utilizing over thirteen (13) million tons annually in North America.

Steel Slag Coalition

In an attempt to provide industry with a comprehensive environmental assessment of blast furnace slag, the "Steel Slag Coalition" (SSC) was formed in 1995. This coalition, comprised of iron and steel manufacturers and slag processors, hired an independent nationally renowned chemical laboratory and risk assessment team to conduct a human and ecological health risk assessment of blast furnace slag. The risk assessment scientists analyzed samples from each participating company in accordance with EPA's risk assessment guidelines. The results of this study reinforced that blast furnace slag conforms to EPA's stringent requirements and does not pose a threat to human or plant life. Consequently, it should continue to be recommended for a wide variety of construction applications (Further information can be obtained through the NSA Office).

The National Slag Association and its member companies recognize their responsibility in protecting the environment and conserving the earth's natural resources. For this reason, they will continue to remain committed to researching and recommending responsible end uses for this environmentally safe, man made resource.



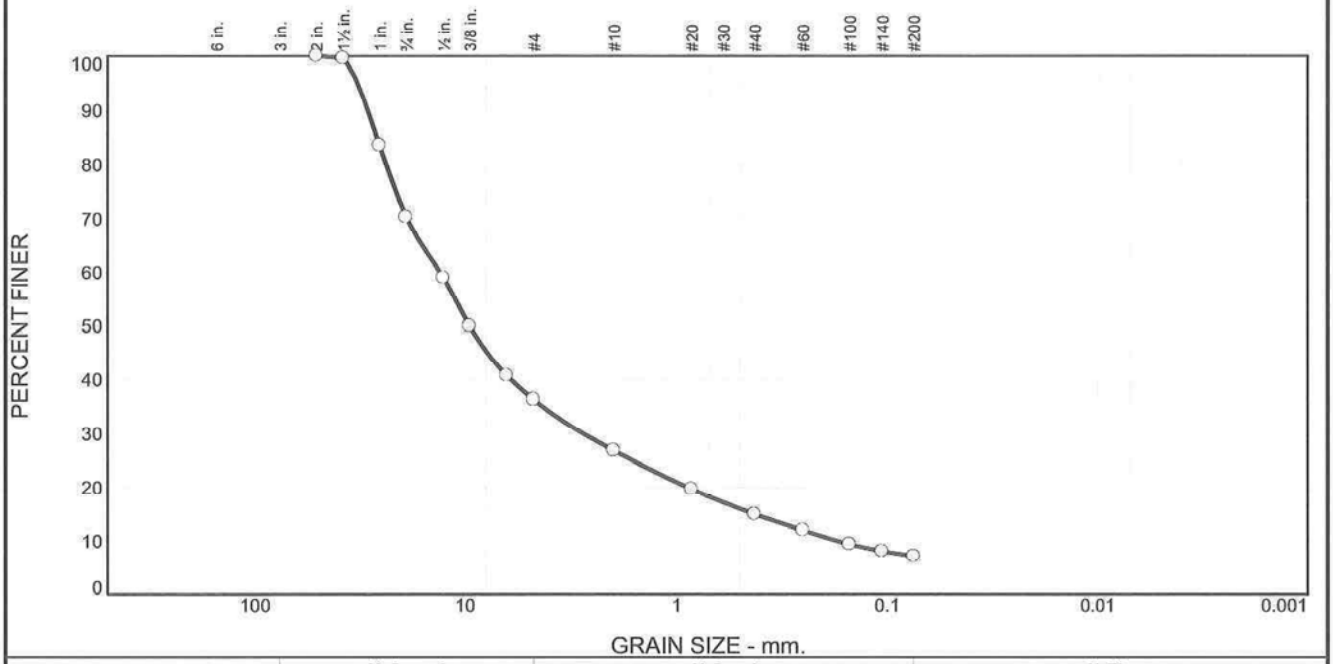
NATIONAL SLAG ASSOCIATION

Suite 2
110 W. Lancaster Avenue
Wayne, Pennsylvania 19087-4043
Phone: 610/971-4840
Fax: 610/971-4841
E-mail: useslag@aol.com
Internet: http://www.nationalslagassoc.org

APPENDIX B

GEOLOGICAL TESTING DATA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	29.8	34.0	9.4	11.9	7.9	7.0	

TEST RESULTS (D6913)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2	100.0		
1.5	99.6		
1	83.5		
.75	70.2		
.5	58.9		
.375	49.8		
.25	40.7		
#4	36.2		
#10	26.8		
#20	19.6		
#40	14.9		
#60	11.9		
#100	9.3		
#140	8.0		
#200	7.0		

* (no specification provided)

Material Description

ID#09-399

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 28.9494 D_{85}= 26.1518 D_{60}= 13.2317
D_{50}= 9.5795 D_{30}= 2.8009 D_{15}= 0.4306
D_{10}= 0.1734 C_u= 76.33 C_c= 3.42

Remarks

Date Received: 7/20/09 **Date Tested:** 7/27/09

Tested By: RP

Checked By: JMA

Title: LM

Source of Sample: Phase I **Date Sampled:**

Sample Number: Phase I

3rd Rock, LLC

East Aurora, NY

Client: LaBella Associates, P.C.

Project: Phase I & II Slag Expansion Study

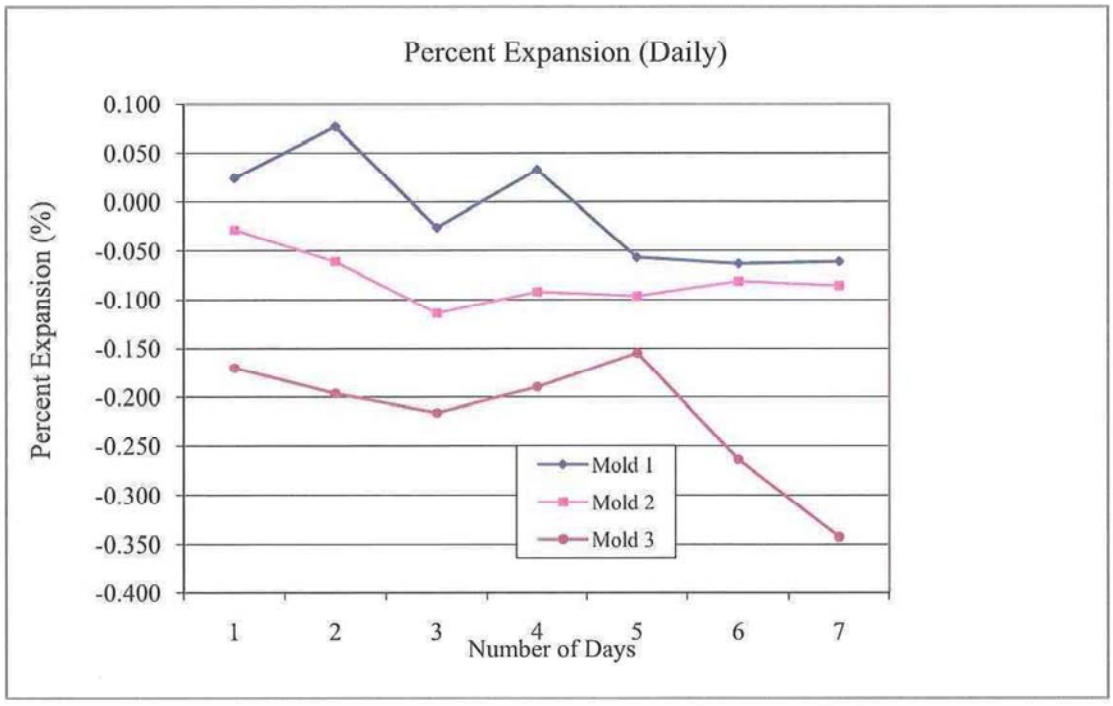
Project No: 09-022 **Figure**

3rd rock

Potential Expansion of Aggregates from Hydration Reactions
ASTM D4792
Final Report

Project:	Slag Invest., Labella Associates	**Project No:**	09-022
Sample No.	Phase I Area	**Lab ID#:**	09-399
Testing Dates:	7/23/09-7/30/09		

	Mold 1		Mold 2		Mold 3	
Initial/Final Water Content, %	11.6	13.7	13.6	13.6	15.8	14.9
Initial Dry Density, pcf	122.5	--	123.9	--	120.6	--
Base Reading, in.	0.378	--	0.386	--	0.3775	--
	Daily Reading	Percent Expansion	Daily Reading	Percent Expansion	Daily Reading	Percent Expansion
Day 1	0.3769	0.024	0.3873	-0.028	0.3853	-0.170
2	0.3745	0.076	0.3888	-0.061	0.3865	-0.196
3	0.3792	-0.026	0.3912	-0.113	0.3874	-0.216
4	0.3765	0.033	0.3902	-0.092	0.3862	-0.190
5	0.3806	-0.057	0.3904	-0.096	0.3846	-0.155
6	0.3809	-0.063	0.3897	-0.081	0.3896	-0.264
7	0.3808	**-0.061**	0.3899	**-0.085**	0.3932	**-0.342**
					Average:	**-0.163**



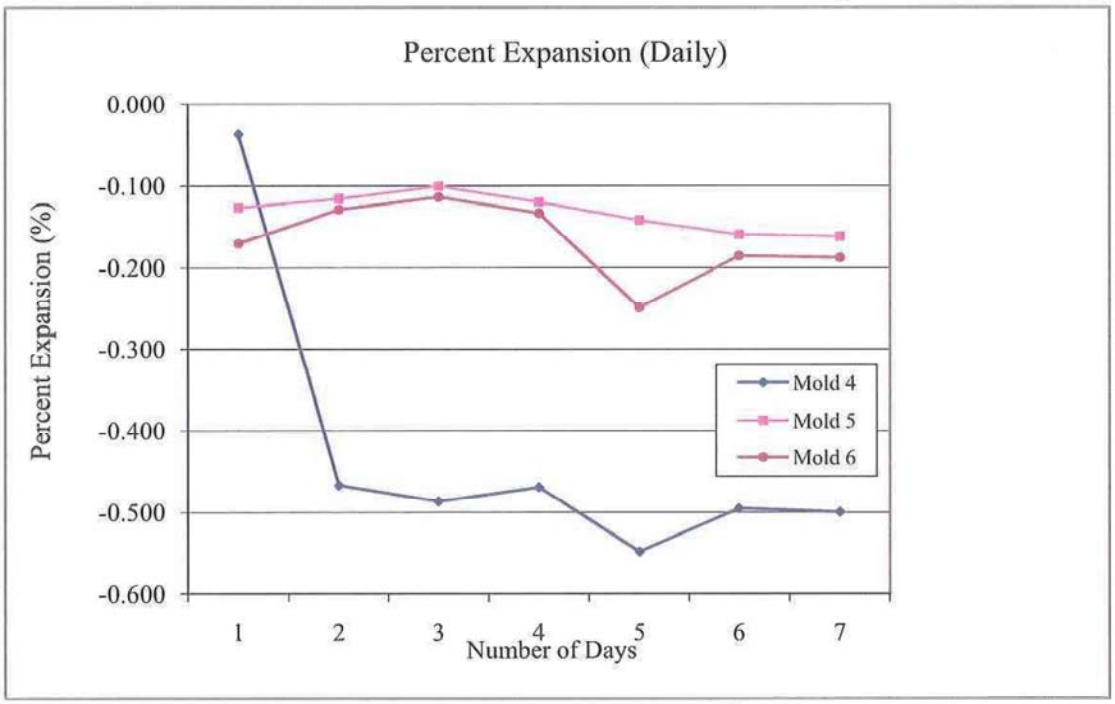
3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)655-4933

3rd rock

Potential Expansion of Aggregates from Hydration Reactions
ASTM D4792
Final Report

Project:	Slag Invest., Labella Associates	**Project No:**	09-022
Sample No.	Phase II Area	**Lab ID#:**	09-399
Testing Dates:	7/30/09-8/6/09		

	Mold 4		Mold 5		Mold 6	
Initial/Final Water Content, %	9.6	13.4	11.1	12.6	11.5	13.1
Initial Dry Density, pcf	119.4	--	121.7	--	122.6	--
Base Reading, in.	0.3801	--	0.38	--	0.381	--
	Daily Reading	Percent Expansion	Daily Reading	Percent Expansion	Daily Reading	Percent Expansion
Day 1	0.3818	-0.037	0.3858	-0.127	0.3888	-0.170
2	0.4015	-0.467	0.3853	-0.116	0.3869	-0.129
3	0.4024	-0.486	0.3846	-0.100	0.3862	-0.113
4	0.4016	-0.469	0.3855	-0.120	0.3871	-0.133
5	0.4052	-0.548	0.3865	-0.142	0.3924	-0.249
6	0.4028	-0.495	0.3873	-0.159	0.3895	-0.185
7	0.403	**-0.500**	0.3874	**-0.161**	0.3896	**-0.188**
					Average:	**-0.283**



3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)655-4933

APPENDIX C

ANALYTICAL DATA

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE I SLAG (A)

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-04A

Sample wt/vol: 30.4 (g/mL) G Lab File ID: S3F8476.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 23 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	Bis(2-chloroethyl)ether	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
95-50-1	1,2-Dichlorobenzene	420	U
108-60-1	2,2'-oxybis(1-Chloropropane)	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
111-91-1	Bis(2-chloroethoxy)methane	420	U
87-68-3	Hexachlorobutadiene	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	860	U
131-11-3	Dimethylphthalate	420	U
208-96-8	Acenaphthylene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	860	U
83-32-9	Acenaphthene	420	U
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	860	U
86-30-6	N-Nitrosodiphenylamine	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U

SW846

1E - FORM I SV-2

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE I SLAG (A)

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-04A

Sample wt/vol: 30.4 (g/mL) G Lab File ID: S3F8476.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 23 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	Bis(2-ethylhexyl)phthalate	420	U
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenzo(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE I SLAG (B)

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-05A

Sample wt/vol: 30.3 (g/mL) G Lab File ID: S3F8477.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 22 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	Bis(2-chloroethyl)ether	420	U
541-73-1	1,3-Dichlorobenzene	420	U
106-46-7	1,4-Dichlorobenzene	420	U
95-50-1	1,2-Dichlorobenzene	420	U
108-60-1	2,2'-oxybis(1-Chloropropane)	420	U
621-64-7	N-Nitroso-di-n-propylamine	420	U
67-72-1	Hexachloroethane	420	U
98-95-3	Nitrobenzene	420	U
78-59-1	Isophorone	420	U
120-82-1	1,2,4-Trichlorobenzene	420	U
91-20-3	Naphthalene	420	U
106-47-8	4-Chloroaniline	420	U
111-91-1	Bis(2-chloroethoxy)methane	420	U
87-68-3	Hexachlorobutadiene	420	U
91-57-6	2-Methylnaphthalene	420	U
77-47-4	Hexachlorocyclopentadiene	420	U
91-58-7	2-Chloronaphthalene	420	U
88-74-4	2-Nitroaniline	850	U
131-11-3	Dimethylphthalate	420	U
208-96-8	Acenaphthylene	420	U
606-20-2	2,6-Dinitrotoluene	420	U
99-09-2	3-Nitroaniline	850	U
83-32-9	Acenaphthene	420	U
132-64-9	Dibenzofuran	420	U
121-14-2	2,4-Dinitrotoluene	420	U
84-66-2	Diethylphthalate	420	U
7005-72-3	4-Chlorophenyl-phenylether	420	U
86-73-7	Fluorene	420	U
100-01-6	4-Nitroaniline	850	U
86-30-6	N-Nitrosodiphenylamine	420	U
101-55-3	4-Bromophenyl-phenylether	420	U
118-74-1	Hexachlorobenzene	420	U
85-01-8	Phenanthrene	420	U
120-12-7	Anthracene	420	U
86-74-8	Carbazole	420	U
84-74-2	Di-n-butylphthalate	420	U
206-44-0	Fluoranthene	420	U

SW846

1E - FORM I SV-2

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE I SLAG (B)

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-05A

Sample wt/vol: 30.3 (g/mL) G Lab File ID: S3F8477.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 22 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
129-00-0	Pyrene	420	U
85-68-7	Butylbenzylphthalate	420	U
91-94-1	3,3'-Dichlorobenzidine	420	U
56-55-3	Benzo(a)anthracene	420	U
218-01-9	Chrysene	420	U
117-81-7	Bis(2-ethylhexyl)phthalate	420	U
117-84-0	Di-n-octylphthalate	420	U
205-99-2	Benzo(b)fluoranthene	420	U
207-08-9	Benzo(k)fluoranthene	420	U
50-32-8	Benzo(a)pyrene	420	U
193-39-5	Indeno(1,2,3-cd)pyrene	420	U
53-70-3	Dibenzo(a,h)anthracene	420	U
191-24-2	Benzo(g,h,i)perylene	420	U

1D - FORM I SV-1

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE II SLAG

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-06A

Sample wt/vol: 30.3 (g/mL) G Lab File ID: S3F8478.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 19 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
111-44-4	Bis(2-chloroethyl)ether	400	U
541-73-1	1,3-Dichlorobenzene	400	U
106-46-7	1,4-Dichlorobenzene	400	U
95-50-1	1,2-Dichlorobenzene	400	U
108-60-1	2,2´-oxybis(1-Chloropropane)	400	U
621-64-7	N-Nitroso-di-n-propylamine	400	U
67-72-1	Hexachloroethane	400	U
98-95-3	Nitrobenzene	400	U
78-59-1	Isophorone	400	U
120-82-1	1,2,4-Trichlorobenzene	400	U
91-20-3	Naphthalene	400	U
106-47-8	4-Chloroaniline	400	U
111-91-1	Bis(2-chloroethoxy)methane	400	U
87-68-3	Hexachlorobutadiene	400	U
91-57-6	2-Methylnaphthalene	400	U
77-47-4	Hexachlorocyclopentadiene	400	U
91-58-7	2-Chloronaphthalene	400	U
88-74-4	2-Nitroaniline	820	U
131-11-3	Dimethylphthalate	400	U
208-96-8	Acenaphthylene	400	U
606-20-2	2,6-Dinitrotoluene	400	U
99-09-2	3-Nitroaniline	820	U
83-32-9	Acenaphthene	400	U
132-64-9	Dibenzofuran	400	U
121-14-2	2,4-Dinitrotoluene	400	U
84-66-2	Diethylphthalate	400	U
7005-72-3	4-Chlorophenyl-phenylether	400	U
86-73-7	Fluorene	400	U
100-01-6	4-Nitroaniline	820	U
86-30-6	N-Nitrosodiphenylamine	400	U
101-55-3	4-Bromophenyl-phenylether	400	U
118-74-1	Hexachlorobenzene	400	U
85-01-8	Phenanthrene	400	U
120-12-7	Anthracene	400	U
86-74-8	Carbazole	400	U
84-74-2	Di-n-butylphthalate	400	U
206-44-0	Fluoranthene	400	U

SW846

1E - FORM I SV-2

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PHASE II SLAG

Lab Name: MITKEM LABORATORIES Contract:

Lab Code: MITKEM Case No.: H1235 Mod. Ref No.: SDG No.: SH1235TAL

Matrix: (SOIL/SED/WATER) SOIL Lab Sample ID: H1235-06A

Sample wt/vol: 30.3 (g/mL) G Lab File ID: S3F8478.D

Level: (LOW/MED) LOW Extraction: (Type) SONC

% Moisture: 19 Decanted: (Y/N) N Date Received: 07/08/2009

Concentrated Extract Volume: 1000 (uL) Date Extracted: 07/13/2009

Injection Volume: 1.0 (uL) GPC Factor: 1.00 Date Analyzed: 07/20/2009

GPC Cleanup: (Y/N) N pH: Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
129-00-0	Pyrene	400	U
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	400	U
56-55-3	Benzo(a)anthracene	400	U
218-01-9	Chrysene	400	U
117-81-7	Bis(2-ethylhexyl)phthalate	400	U
117-84-0	Di-n-octylphthalate	400	U
205-99-2	Benzo(b)fluoranthene	400	U
207-08-9	Benzo(k)fluoranthene	400	U
50-32-8	Benzo(a)pyrene	400	U
193-39-5	Indeno(1,2,3-cd)pyrene	400	U
53-70-3	Dibenzo(a,h)anthracene	400	U
191-24-2	Benzo(g,h,i)perylene	400	U

SW846

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

PHASE I SLAG (A)

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235TAL

Matrix (soil/water): SOIL Lab Sample ID: H1235-04

Level (low/med): MED Date Received: 07/08/2009

% Solids: 77.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27300		E	P
7440-36-0	Antimony	0.56	B	NE	P
7440-38-2	Arsenic	5.1		E	P
7440-39-3	Barium	171		E	P
7440-41-7	Beryllium	4.6		E	P
7440-43-9	Cadmium	0.014	U	NE	P
7440-70-2	Calcium	251000		*	P
7440-47-3	Chromium	3.1		E	P
7440-48-4	Cobalt	0.040	U	E	P
7440-50-8	Copper	3.3		N*E	P
7439-89-6	Iron	3610		*	P
7439-92-1	Lead	3.3		E	P
7439-95-4	Magnesium	26100		*E	P
7439-96-5	Manganese	256			P
7439-97-6	Mercury	0.0057	U		CV
7440-02-0	Nickel	4.1		E	P
7440-09-7	Potassium	2290		E	P
7782-49-2	Selenium	1.1	B	N	P
7440-22-4	Silver	0.090	U	E	P
7440-23-5	Sodium	1230			P
7440-28-0	Thallium	2.3		N	P
7440-62-2	Vanadium	6.3		E	P
7440-66-6	Zinc	3.1		NE	P

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

PHASE I SLAG (B)

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235TAL

Matrix (soil/water): SOIL Lab Sample ID: H1235-05

Level (low/med): MED Date Received: 07/08/2009

% Solids: 78.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23900		E	P
7440-36-0	Antimony	0.61	B	NE	P
7440-38-2	Arsenic	7.8		E	P
7440-39-3	Barium	120		E	P
7440-41-7	Beryllium	2.9		E	P
7440-43-9	Cadmium	0.048	B	NE	P
7440-70-2	Calcium	243000		*	P
7440-47-3	Chromium	5.7		E	P
7440-48-4	Cobalt	0.040	U	E	P
7440-50-8	Copper	7.7		N*E	P
7439-89-6	Iron	7170		*	P
7439-92-1	Lead	4.9		E	P
7439-95-4	Magnesium	39800		*E	P
7439-96-5	Manganese	312			P
7439-97-6	Mercury	0.0090	B		CV
7440-02-0	Nickel	5.6		E	P
7440-09-7	Potassium	2500		E	P
7782-49-2	Selenium	1.3	B	N	P
7440-22-4	Silver	0.091	U	E	P
7440-23-5	Sodium	1160			P
7440-28-0	Thallium	1.8		N	P
7440-62-2	Vanadium	12.1		E	P
7440-66-6	Zinc	7.3		NE	P

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

PHASE II SLAG

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235TAL

Matrix (soil/water): SOIL Lab Sample ID: H1235-06

Level (low/med): MED Date Received: 07/08/2009

% Solids: 81.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	20600		E	P
7440-36-0	Antimony	0.46	B	NE	P
7440-38-2	Arsenic	8.3		E	P
7440-39-3	Barium	124		E	P
7440-41-7	Beryllium	2.9		E	P
7440-43-9	Cadmium	0.67		NE	P
7440-70-2	Calcium	166000		*	P
7440-47-3	Chromium	12.1		E	P
7440-48-4	Cobalt	1.1	B	E	P
7440-50-8	Copper	17.4		N*E	P
7439-89-6	Iron	51900		*	P
7439-92-1	Lead	15.1		E	P
7439-95-4	Magnesium	18200		*E	P
7439-96-5	Manganese	634			P
7439-97-6	Mercury	0.028	B		CV
7440-02-0	Nickel	12.0		E	P
7440-09-7	Potassium	2250		E	P
7782-49-2	Selenium	0.77	U	N	P
7440-22-4	Silver	0.078	U	E	P
7440-23-5	Sodium	1290			P
7440-28-0	Thallium	0.55	B	N	P
7440-62-2	Vanadium	17.8		E	P
7440-66-6	Zinc	47.7		NE	P

Comments:

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1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

PHASE I SLAG (A)

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235SPLP

Matrix (soil/water): WATER Lab Sample ID: H1235-04

Level (low/med): MED Date Received: 07/08/2009

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	937			P
7440-36-0	Antimony	4.6	U		P
7440-38-2	Arsenic	5.3	U		P
7440-39-3	Barium	208			P
7440-41-7	Beryllium	0.13	U		P
7440-43-9	Cadmium	0.14	U		P
7440-70-2	Calcium	74600			P
7440-47-3	Chromium	1.1	U		P
7440-48-4	Cobalt	1.2	U		P
7440-50-8	Copper	5.0	U		P
7439-89-6	Iron	61.0	U		P
7439-92-1	Lead	2.2	U		P
7439-95-4	Magnesium	79.9	B		P
7439-96-5	Manganese	0.96	U		P
7439-97-6	Mercury	0.056	U		CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	2070			P
7782-49-2	Selenium	33.4			P
7440-22-4	Silver	1.9	B		P
7440-23-5	Sodium	9290			P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	12.2	B		P
7440-66-6	Zinc	10.1	B		P

Comments:

SPLP

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1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

PHASE I SLAG (B)

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235SPLP

Matrix (soil/water): WATER Lab Sample ID: H1235-05

Level (low/med): MED Date Received: 07/08/2009

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	676			P
7440-36-0	Antimony	4.6	U		P
7440-38-2	Arsenic	5.3	U		P
7440-39-3	Barium	75.6	B		P
7440-41-7	Beryllium	0.13	U		P
7440-43-9	Cadmium	0.14	U		P
7440-70-2	Calcium	45700			P
7440-47-3	Chromium	1.4	B		P
7440-48-4	Cobalt	1.2	U		P
7440-50-8	Copper	5.0	U		P
7439-89-6	Iron	61.0	U		P
7439-92-1	Lead	2.2	U		P
7439-95-4	Magnesium	77.0	U		P
7439-96-5	Manganese	0.96	U		P
7439-97-6	Mercury	0.056	U		CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	2860			P
7782-49-2	Selenium	26.0	B		P
7440-22-4	Silver	1.3	B		P
7440-23-5	Sodium	11200			P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	8.9	B		P
7440-66-6	Zinc	8.3	B		P

Comments:

SPLP

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1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

PHASE II SLAG

Lab Name: Mitkem Laboratories Contract: 209447

Lab Code: MITKEM Case No.: SAS No.: SDG No.: SH1235SPLP

Matrix (soil/water): WATER Lab Sample ID: H1235-06

Level (low/med): MED Date Received: 07/08/2009

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	231			P
7440-36-0	Antimony	4.6	U		P
7440-38-2	Arsenic	5.3	U		P
7440-39-3	Barium	28.1	B		P
7440-41-7	Beryllium	0.13	U		P
7440-43-9	Cadmium	0.14	U		P
7440-70-2	Calcium	36800			P
7440-47-3	Chromium	1.1	U		P
7440-48-4	Cobalt	1.2	U		P
7440-50-8	Copper	5.0	U		P
7439-89-6	Iron	66.8	B		P
7439-92-1	Lead	2.2	U		P
7439-95-4	Magnesium	102	B		P
7439-96-5	Manganese	0.96	U		P
7439-97-6	Mercury	0.056	U		CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1170			P
7782-49-2	Selenium	16.2	B		P
7440-22-4	Silver	0.86	B		P
7440-23-5	Sodium	20000			P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	20.3	B		P
7440-66-6	Zinc	7.7	U		P

Comments:

SPLP

APPENDIX D

PORTLAND CEMENT ASSOCIATION: SUSTAINABLE MANUFACTURING FACT SHEET

Portland Cement Association Sustainable Manufacturing Fact Sheet

July 2005

Concrete Thinking for a sustainable world

PCA Portland Cement Association

IRON AND STEEL BYPRODUCTS

Resource efficiency means using fewer virgin raw materials. Increasingly, cement plants are turning to industrial byproducts and materials that otherwise would be discarded as sources for the basic elements needed for cement making.

After completing detailed analyses on their chemical characteristics to determine the effect on process chemistry and facility emissions, many cement plants can utilize byproducts from the iron and steel industries as a raw material in the manufacture of the clinker—the intermediate product in the process—or as an ingredient in the final cement product.

more

continued

Three byproducts of the iron and steel industries can be used in the manufacture of portland cement: foundry sand, mill scale, and slag.

Foundry sand can provide silica and possibly iron for the production of clinker. Mill scale contains iron oxides that can replace other iron-bearing materials in the kiln feed. Slag contains high percentages of calcium oxide and silicon dioxide and varying amounts of aluminum oxide and iron oxides. All of these components are needed in the cement manufacturing process. Select slags can be interground with the portland cement to produce a blended cement product. Foundry sand and some slags can replace natural stone as an aggregate in portland cement concrete. Nearly 70% of U.S. portland cement plants use one or more of these byproducts to produce clinker or cement.

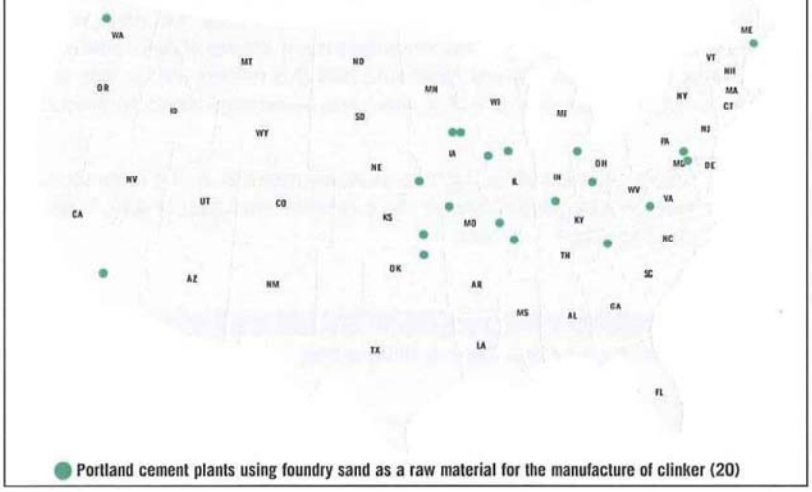
Foundry Sand

Foundry sand forms the mold into which molten metal is poured for casting iron, steel, and other metal components. After multiple uses, this high-quality silica sand degrades and is no longer used. In the United States, there are approximately 3,000 foundries that produce collectively 6 to 10 million short tons of foundry sand per year [FHWA 2004]. Because used foundry sand may contain trace amounts of metals from the castings, chemical binders used in shaping the molds, and other impurities, portland cement plants carefully analyze and monitor the foundry sands they use.

It is unknown how much foundry sand is used by the portland cement industry, but in 2005, 20 plants were using it as a raw material in the manufacture of clinker (as shown on Figure 1).

FIGURE 1

Map of U.S. Portland Cement Plants Currently Utilizing Foundry Sand



Mill Scale

During the processing of steel, iron oxides will form on the surface of the metal. These oxides, known as mill scale, occur during continuous casting, reheating, and hot rolling operations. The scale is removed by water sprays and often recycled by the steel plant. Mill scale that cannot be recycled by steel plants has been used by portland cement plants as an iron source.

Although the total amount of mill scale used by portland cement plants is unknown, in 2005, 51 plants were using it as a raw material in the manufacture of clinker (Figure 2).

Slag

There are two major types of slag: blast furnace slag and steel furnace slag. Blast furnace slag is a byproduct from the smelting of iron ore or iron pellets with coke and a flux, such as limestone or dolomite. The calcium in the stone combines with the aluminates and silicates in the ore and ash from the coke to produce this non-metallic material [NSA undated]. The slag is removed

THE CEMENT-MAKING PROCESS

Portland cement manufacturing is a four-step process:

1. Raw materials, including limestone and small amounts of sand and clay, come from a quarry usually located near the cement manufacturing plant. Limestone is typically about 80% of the raw mix and is the primary source of calcium. The remaining raw materials provide the silica and the necessary small amounts of alumina and iron.
2. The materials are carefully analyzed, precisely combined and blended, and then ground for further processing. This is called kiln feed.
3. The ground materials are heated in an industrial furnace, called a kiln, that reaches gas temperatures of 1,870°C (3,400°F). The heat causes the kiln feed to turn into a new substance called clinker. The kiln flame is fueled by powdered coal, powdered petroleum coke, natural gas, oil, and/or recycled materials burned for energy recovery.
4. Red-hot clinker is cooled and ground with a small amount of gypsum and typically other mineral components. The end result is a fine, gray-colored powder called portland cement.

At each stage, process data are continuously monitored to produce a high-quality product, improve energy efficiency, and minimize emissions.

CEMENT OR CONCRETE?

The terms cement and concrete are often misused. Cement is an ingredient of concrete. It is the fine gray powder that, when mixed with water, sand, and gravel or crushed stone, forms the rock-like mass known as concrete. Cement acts as the binding agent or glue.

FIGURE 2

Map of U.S. Portland Cement Plants Currently Utilizing Mill Scale

from the furnace for further processing. Blast furnace slag can be used in the production of clinker, blended cements, and/or as an aggregate in portland cement concrete.

Steel slag is a byproduct from the processing of iron or scrap steel in a basic oxygen furnace or electric arc furnace. Once again, limestone or dolomite is used as a flux to remove impurities [NSA undated]. The steel furnace slag is air cooled, and after free iron products are removed, it can be used as a raw material in the manufacture of clinker [NSA undated]. For 2003, the United States Geographical Survey estimated that 8.8 million metric tons of steel furnace slag was produced, and that over 5% of it was used by cement plants to produce clinker [USGS 2003].

In 2005, 39 portland cement plants were using slag as a raw material in the manufacture of clinker, and 11 plants were blending it into one or more cement products. (Figure 3 shows the locations of the plants utilizing slag.) | more

FIGURE 3

Map of U.S. Portland Cement Plants Currently Utilizing Slag

FOUNDRY SAND

MILL SCALE

SLAG

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continued

Types of Blast Furnace Slags

Blast furnace slag is processed in one of the following methods:

- Air-cooled slag is allowed to cool slowly in ambient air. It can be used in the kiln feed or as an aggregate in concrete products [NSA undated]. Of the 7.3 million metric tons of air-cooled slag produced in the U.S. in 2003, nearly 16% was used in concrete products and nearly 6% in clinker production [USGS 2003].
- Expanded slag is cooled by a controlled quantity of water to produce a low density material. It is used as an aggregate in medium to light-weight ready-mixed concrete products. The USGS does not report the production or final use of it [USGS, 2003].
- Pelletized slag is cooled by water on a vibrating plate, which produces a foam-like material that is further processed into pellets. It can also be used as an aggregate in medium to light-weight ready-mixed concrete materials, or if finely ground, can be used in blended portland cements [NSA undated]. The USGS does not report the production or final use of pelletized slag [USGS 2003].
- Granulated slag is cooled rapidly by jets of water in direct contact with the molten material. This is the most common slag used in the production of blended portland cements [NSA Undated]. For 2003, the USGS estimated that 3.6 million metric tons of ground granulated blast furnace slag (GGBFS) was produced and the majority used in cement [USGS 2003].

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Concrete Thinking for a sustainable world

PCA Portland Cement Association

Portland Cement Association is a trade association representing cement companies in the United States and Canada. PCA's U.S. membership consists of 46 companies operating 102 plants in 36 states. PCA members account for more than 97% of cement-making capacity in the United States and 100% in Canada.

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APPENDIX E

NYSDEC BUD APPROVALS LIST

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials, Bureau of Solid Waste, Reduction Recycling
625 Broadway, Albany, NY, 12233-7253

Granted Beneficial Use Determinations
Sorted by Waste Type

BUD #	Region	Facility Name	City	State	Waste Types	Beneficial Use
866-6-33	6	North Country Minerals (NCM)	Holland Patent	NY	Abrasive, spent	Abrasive
453-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Abrasives	Cement (Iron Source)
517-9-32	9	Solid Surface Acrylics; Inc.	North Tonawanda	NY	Abrasives (Glass Bead Dust)	Filler (Table Tops)
333-0-00	OS	US Technology Corporation	Canton	OH	Abrasives (Plastic)	Marble Products (Cultured)
427-0-00	OS	Composite Leasing Corp.	Minocqua	WI	Abrasives (Plastic)	Resin Substitute (Acrylic)
037-6-45	6	St. Lawrence Seaway Development Corp.	Massena	NY	Abrasives (Sandblast)	Aggregate (Concrete)
219-6-45	6	St. Lawrence Seaway Development Corp.	Massena	NY	Abrasives (Sandblast)	Aggregate (Concrete)
334-6-45	6	Northeastern Industrial Maintenance; Inc	Waddington	NY	Abrasives (Sandblast)	Base (Sub)
739-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Abrasives (Sandblast)	Cement (Iron Substitute)
728-6-22	6	Sunbelt Industries	Little Falls	NY	Abrasives (Sandblast-Alumina)	Sandblasting media
735-2-43	2	Caddell Dry Dock & Ship Repair Co.	Staten Island	NY	Abrasives (Sandblast-Alumina)	Aggregate; Asphalt
689-6-33	6	North Country Minerals (NCM)	Holland Patent	NY	Abrasives (waterjet garnet)	Abrasive Media
375-8-37	OS	Innovative Municipal Products; Inc. (IM U.S.)	Ava	NY	Alcohol Distillate (Ethyl)	De-icer
195-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Alumina Sand	Cement
243-4-00	4	ACI Industries; Ltd. L.P.	Delaware	OH	Alumina Sand	Cement (Red Shale Substitute)
456-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Alumina Tri-Nitrate Dust	Cement
392-9-07	9	Dunkirk International Glass & Ceramics	New York	NY	Alumina/Silica/Lime/Ash	Glass (Aluma) Manufacture
189-4-20	4	Lehigh Cement Company	Catskill	NY	Alumino-Silica Clay (Bauxite)	Cement (Red Shale Substitute)
587-0-00	4	Lafarge Building Materials; Inc.	Ravena	NY	Alumino-Silica Clay (Bauxite)	Cement (Alumina Source)
207-6-23	OS	Black River Power; LLC	Syracuse	NY	Ash (Coal)	Liming Agent; Land Application
339-3-36	3	MKA Realty Corp. c/o Geovation Inc.	Florida	NY	Ash (Coal)	Base (Sub)
472-3-14	3	Town of Stanford	Stanfordville	NY	Ash (Coal)	Base (Sub)
539-7-55	7	Cornell Univ. Central Heating Plant	Ithaca	NY	Ash (Coal)	Traction Agent
676-6-45	OS	Black River Power; LLC	Syracuse	NY	Ash (Coal)	Bulking Agent (Waste Sludge)
745-9-61	9	Hillcrest Industries	Attica	NY	Ash (Coal)	abrasive; blasting media
749-3-36	3	Dynegy Northeast Generation	Newburgh	NY	Ash (Coal)	cinder ballast
536-9-15	9	Protective Closures; Inc.	Buffalo	NY	Ash (Coal)/Slag/Ballast	Fill (Structural-Bldg. Found)
240-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Ash (Coal/CTS/Tire/Wood)	Cement
641-8-51	8	AES Hickling; L.L.C.	Corning	NY	Ash (Coal/CTS/Tire/Wood)	Cement
273-8-51	8	AES Hickling; L.L.C.	Corning	NY	Ash (Coal/CTS/Tire/Wood-Bottom	Traction Agent
642-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Ash (Coal/CTS/Tire/Wood-Bottom	Traction Agent
489-9-15	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal/CTS-Bottom)	Traction Agent; Asphalt; Shing
488-9-15	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal/CTS-Fly)	Aggregate; Gypsum; Calcium Chl
578-9-07	OS	Pohlman Materials Recovery Inc.	Lakeview	NY	Ash (Coal/Petro Coke-Fly)	Filler (Flowable Fill)
594-0-00	OS	Pohlman Materials Recovery Inc.	Lakeview	NY	Ash (Coal/Petro Coke-Fly)	Filler (Concrete)
595-0-00	OS	Pohlman Materials Recovery Inc.	Lakeview	NY	Ash (Coal/Petro Coke-Fly)	Filler (Aggregate)
596-0-00	OS	Pohlman Materials Recovery Inc.	Lakeview	NY	Ash (Coal/Petro Coke-Fly)	Surface Material (Barnyard Pad
165-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Ash (Coal/Tire-Bottom)	Traction Agent
164-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Ash (Coal/Tire-Fly)	Cement
122-0-34	OS	NRG Dunkirk Operations; Inc.	Dunkirk	NY	Ash (Coal-Bottom)	Traction Agent; Fill (Structur
212-7-34	OS	NRG Dunkirk Operations; Inc.	Dunkirk	NY	Ash (Coal-Bottom)	Asphalt (Hot-Mix)
262-9-15	9	Valley Coal	Buffalo	NY	Ash (Coal-Bottom)	Fill (Structural); Traction Ag
286-9-32	9	AES Somerset; L.L.C.	Barker	NY	Ash (Coal-Bottom)	Base (Sub)
372-7-34	7	Trigen-Syracuse Energy Corporation	Syracuse	NY	Ash (Coal-Bottom)	Base (Road; Sub-Fill)
398-3-14	3	Harlem Valley Psy. Clr c/o CDPC; Unit Q	Albany	NY	Ash (Coal-Bottom)	Base (Sub)
429-8-28	8	Eastman Kodak Company	Rochester	NY	Ash (Coal-Bottom)	Surface Material (Trail)
436-7-04	7	AES Westover; L.L.C.	Johnson City	NY	Ash (Coal-Bottom)	Surface Material (Running Trac
443-7-38	7	Clark Concrete Company; Inc.	Syracuse	NY	Ash (Coal-Bottom)	Traction Agent
450-8-26	8	Joseph A. Errigo	Conesus	NY	Ash (Coal-Bottom)	Traction Agent
482-8-28	8	Eastman Kodak Company	Rochester	NY	Ash (Coal-Bottom)	Road Construction
506-9-15	9	Gernatt Gravel Products; Inc.	Collins	NY	Ash (Coal-Bottom)	Concrete (Lt); Traction Agent
525-8-28	4	New York State Canal Corporation	Albany	NY	Ash (Coal-Bottom)	Sealant (Coffer Dams)
597-0-00	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal-Bottom)	Traction Agent; Fill (Structur
598-0-00	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal-Bottom)	Asphalt (Hot-Mix)

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645-7-55	7	AES Cayuga; L.L.C.	Lansing	NY	Ash (Coal-Bottom)	Surface Material (Running Trac
593-6-45	OS	Black River Power; LLC	Syracuse	NY	Ash (Coal-FBC)	Aggregate (Road Surface)
502-6-23	OS	Black River Power; LLC	Syracuse	NY	Ash (Coal-FBC-Fly)	Surface Material (Barnyard Pad)
023-4-20	4	Lehigh Cement Company	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
035-7-12	7	Pozzolanic International	Ithaca	NY	Ash (Coal-Fly)	Filler (Concrete)
048-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
076-7-34	OS	NRG Dunkirk Operations; Inc.	Dunkirk	NY	Ash (Coal-Fly)	Filler (Flowable Fill)
096-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
102-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
113-6-23	6	Drum Ready Mix Company	Amsterdam	NY	Ash (Coal-Fly)	Filler (Concrete)
146-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
171-3-56	3	Eastern Stabilized Products	Waldwick	NJ	Ash (Coal-Fly)	Stabilizing Agent
182-4-29	4	Cranesville Block Company; Inc.	Amsterdam	NY	Ash (Coal-Fly)	Filler (Concrete)
208-4-29	4	Cranesville Block Company; Inc.	Amsterdam	NY	Ash (Coal-Fly)	Filler (Concrete)
209-9-07	9	Jamestown Board of Public Utilities	Jamestown	NY	Ash (Coal-Fly)	Filler (Concrete)
265-4-20	4	Lehigh Cement Company	Catskill	NY	Ash (Coal-Fly)	Cement (Shale Substitite)
284-9-15	9	NRG Energy; Inc.	Minneapolis	MN	Ash (Coal-Fly)	Fill (Structural)
303-9-32	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal-Fly)	Fill
423-3-36	3	Ecomat; Inc.	Poughkeepsie	NY	Ash (Coal-Fly)	Filler (Lumber (Synthetic))
530-7-04	7	AES Westover; L.L.C.	Johnson City	NY	Ash (Coal-Fly)	Filler (Flowable Fill)
542-7-04	7	AES Westover; L.L.C.	Johnson City	NY	Ash (Coal-Fly)	Base (Sub)
543-7-04	7	AES Westover; L.L.C.	Johnson City	NY	Ash (Coal-Fly)	Landfill Cover (Posishell (TM)
599-0-00	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal-Fly)	Filler (Flowable Fill)
632-4-48	4	Callanan Industries Incorporated	Albany	NY	Ash (Coal-Fly)	Cement (Additive)
635-9-15	OS	NRG Huntley Operations; Inc.	Tonawanda	NY	Ash (Coal-Fly)	Absorbent
636-9-07	OS	NRG Dunkirk Operations; Inc.	Dunkirk	NY	Ash (Coal-Fly)	Absorbent
873-0-00	0	Stollberg, Inc.	Niagara Falls	NY	Ash (Coal-Fly)	Flux, Mold Casting
272-1-52	1	Rolite; Inc. Ash Management	Wayne	PA	Ash (MSW)	Landfill Closure
341-3-14	3	Dutchess County Resource Recovery Agency	Poughkeepsie	NY	Ash (MSW)	Landfill Cover (Daily; Interme
445-1-00	1	U.S. Environmental; Inc.	King of Prussia	PA	Ash (MSW)	Vilrified Product (Dec. Stone)
222-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ash (Papermill Sludge)	Cement
176-6-25	6	Lyonsdale Power Company LLC	Lyons Falls	NY	Ash (Wood)	Fertilizer
177-6-22	6	Union Tools Co.; Inc.	Frankfort	NY	Ash (Wood)	Fertilizer (Soil; Compost)
198-0-00	OS	Generic BUD - Wood Ash	Unknown	NY	Ash (Wood)	Fertilizer
384-6-25	6	Lyonsdale Power Company LLC	Lyons Falls	NY	Ash (Wood)	Traction Agent
421-4-13	4	Norbord Industries; Inc.	Deposit	NY	Ash (Wood)	Land Application
583-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Ash (Wood)	Bulking; Stabilizing Agent
717-5-46	5	International Paper - Corinth	Corinth	NY	Ash (Wood)	WWTP sludge stabilizing agent
736-6-23	OS	Black River Power; LLC	Syracuse	NY	Ash (Wood);Ash (Coal)	stabilizer; sludge
569-6-23	6	City of Watertown	Watertown	NY	Ash (WWTP Sludge)	Fill (Roads)
570-4-01	4	Albany County Sewer District	Albany	NY	Ash (WWTP Sludge)	Landfill Cover; Soil (Top)
382-9-15	9	Natural Environmental; Inc.	Buffalo	NY	Asphalt Shingle	Base (Road)
483-9-32	9	Modern Landfill; Inc.	Model City	NY	Asphalt Shingle	Landfill Base (Road-Parking)
484-4-01	4	King Road Materials; Inc.	Albany	NY	Asphalt Shingle	Asphalt (Hot-Mix) Concrete
516-9-32	9	Parker Bay Consultants; Inc.	Buffalo	NY	Asphalt Shingle	Base (Road; Sub)
145-0-41	OS	Proterized Schiabo Neu; Co.	Jersey City	NJ	Auto Shredder Res (PROPAT)	Landfill Cover (Daily)
730-9-07	9	Hazard Evaluations; Inc.	Orchard Park	NY	Bauxite/alumiglass/ceramics	Fill
859-4-20	4	Lehigh Cement	Glens Falls	NY	Biosolids (Class A)	Fuel
789-2-24	2	New York City Department of Sanitation	New York	NY	Brick (Refactory)	Fill
193-6-45	6	Aluminum Company of America (ALCOA)	Massena	NY	Brick (Refractory)/Cement	Base (Road); Fill
451-7-38	7	BBL Environmental Services; Inc.	Syracuse	NY	Brine (Calcium Chloride)	De-icer; Dust Control
309-3-03	3	Gun Hill Trucking; Ltd.	Bronx	NY	C&D	Landfill Cover; Fill
180-9-15	9	Hartford Paving Corporation	Cheektowaga	NY	C&D (Concrete)	Base (Sub)
197-0-00	OS	New York State Department of Transportation	Albany	NY	C&D (Concrete)	Aggregate (Concrete)

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271-9-15	9	Custom Topsoil; Inc.	Buffalo	NY	C&D (Concrete)	Aggregate
278-9-15	9	Swift River Associates; Inc.	Tonawanda	NY	C&D (Concrete)	Base (Sub)
353-9-32	9	Carborundum Company	Niagara Falls	NY	C&D (Concrete)	Aggregate
254-0-00	OS	Generic BUD - Recycled Concrete	Unknown	NY	C&D (Concrete/Masonery)	Aggregate
698-3-36	3	TKM Materials; Inc.	Montgomery	NY	C&D (gypsum wallboard)	Feedstock
259-0-00	OS	Generic BUD - Roofing Gravel	Unknown	NY	C&D (Roofing Gravel)	Fill; Roads
287-8-28	8	Xerox Corporation	Webster	NY	C&D (Roofing Gravel)	Base (Road)
290-3-44	3	CEK International	Setauket	NY	C&D (Screenings)	Landfill Cover (Daily)
336-3-24	2	Waste Management of New York	Brooklyn	NY	C&D (Screenings)	Landfill Cover (Daily/Interim)
656-2-41	1	Keyspan Energy	Hicksville	NY	C&D (Screenings)	Fill
849-3-60	3	L.C. Main, LLC	Bedford Hills	NY	C&D Material/Soil	Fill
870-3-36	3	Town of Monroe (Taylor Recycling)	Monroe	NY	C&D Screenings	Alternate Grading Material
344 3 40	3	COH Corporation; Inc.	Brewster	NY	Carbon (Activated)	Carbon (Reactivate)
510-3-60	3	Waste Conversion Technologies	White Plains	NY	Cardboard (Waxed)	Fuel Pellets
647-4-11	4	Wil-Roc Farms c/o Earthworks	Claverack	NY	Cardboard (Waxed)	Bedding (Animal - Farm)
637-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Catalyst (Alumina Silicate)	Cement (Alumina Source)
149-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Catalyst (Alumina)	Cement (Alumina Source)
158-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Catalyst (Alumina)	Cement (Alumina Source)
223-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Catalyst (Alumina)	Cement (Alumina Source)
414-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Catalyst (Alumina)	Cement (Alumina Source)
452-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Catalyst (Alumina)	Cement (Alumina Source)
242-4-00	4	ACI Industries; Ltd. L.P.	Delaware	OH	Catalyst (Fe-Cr)	Cement (Iron Oxide Substitute)
241-4-00	4	ACI Industries; Ltd. L.P.	Delaware	OH	Catalyst (Ni-Mo)	Cement (Alumina Substitute)
605-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Catalyst (Regenerated Fluid)	Cement
370-7-27	7	Gray-Syracuse; Inc. c/o PLS Engineering	Chittenango	NY	Ceramic Castings	Base (Road)
323-8-51	8	Corning Inc.	Corning	NY	Ceramic Cullet	Fill (Structural)
742-9-05	9	Dal-Tile Corp.	Olean	NY	Ceramic Cullet	aggregate substitute
841-9-15	9	Zoladz Construction Co.	Alden	NY	China, offspec	Base (Sub)
009-9-15	9	Concrete Recycling Corp.	Niagara Falls	NY	Concrete	Aggregate (Concrete); Base (Su
115-3-56	3	Fin-Pan	Albany	NY	Concrete	Base (Sub); Fill (Backfill Tre
842-3-60	3	Blackacre Partners OPS	New York	NY	Concrete	Fill
032-9-32	9	Carbon/Graphite Group; Inc.	Niagara Falls	NY	Concrete (A. Sideblocks)	Fill (General Fill)
091-9-32	9	Carbon/Graphite Group; Inc.	Niagara Falls	NY	Concrete (L. Sideblocks)	Fill (General Fill)
110-3-40	3	Unilock	Brewster	NY	Concrete (Rejected Blocks)	Base (Sub)
502-1-52	1	John P. O'Donnell	Bellport	NY	Concrete (Uncontaminated)	Aggregate (Natural)
705-7-34	7	Trigen-Syracuse Energy Corporation	Syracuse	NY	Converter Waste - Paper	Fuel
181-9-15	9	GEMUS; Inc.	Williamsville	NY	Deposits (Wine/Juice Vat-Argol	Acid (Tartaric)
812-4-01	4	Grain Processing Corporation	Muscatine	IA	De-sugared sugar beet molasses	De-icing agent
688-0-00	OS	Sears Ecological Applications Company; LLC	Rome	NY	Distillers' Condensed Solubles	Roadway Deicing
827-8-37	8	Millenium Roads, LLC	Lyndonville	NY	Distillers' Condensed Solubles	anti-icing agent
352-4-47	4	W Larned & Sons c/o Ingalls;Smart Assts.	Schenectady	NY	Dredge	Fill
377-3-36	3	ARMA Textile Printers	Newburgh	NY	Dredge	Fill
428-3-60	3	Canal Asphalt; Inc.	Mount Vernon	NY	Dredge	Aggregate (Asphalt)
535-1-30	1	Posillico Brothers Asphalt Co.	Farmingdale	NY	Dredge	Aggregate (Asphalt-Hot-Mix)
621-1-30	1	City of Glen Cove	Glen Cove	NY	Dredge	Aggregate (Asphalt); Base (Sub)
653-3-60	3	Westchester County Department of Public Works	White Plains	NY	Dredge	Fill (Subgrade)
654-2-03	2	New York City Parks & Recreation	Flushing	NY	Dredge	Soil (Top)
666-2-41	OS	New York State Department of Transportation	Albany	NY	Dredge	Fill
718-4-47	4	New York State Canal Corporation	Albany	NY	Dredge	Aggregate
782-9-15	9	Erie County Department of Environment & Planning	Buffalo	NY	Dredge	Fill; unrestricted
130-4-42	4	Troy Sand and Gravel Co.; Inc.	Watervliet	NY	Dredge (Sand/Gravel)	Traction Agent; Fill
646-1-30	1	Blue Water Environmental (Posillico Brothers)	Farmingdale	NY	Dredge (Sand/Gravel)	Aggregate (Asphalt-Hot-Mix)
807-6-22	6	NYS Canal Corporation	Albany	NY	Dredge Material	Unrestricted use
682-1-52	1	Town of Brookhaven	Medford	NY	Dredged Material	Landfill Cover (Daily)

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BUD #	Region	Facility Name	City	State	Waste Types	Beneficial Use
695-6-22	4	New York State Canal Corporation	Albany	NY	Dredged Material	Soil (Top)
697-9-15	OS	New York State Department of Transportation	Albany	NY	Dredged Material	Soil (Grading Material)
711-3-14	3	Town of East Fishkill c/o Morris Associates	Poughkeepsie	NY	Dredged Material	Unrestricted use
737-4-29	4	New York State Canal Corporation	Albany	NY	Dredged Material	Sand & Gravel; Commercial
738-6-33	4	New York State Canal Corporation	Albany	NY	Dredged Material	Topsoil
752-4-47	4	New York State Canal Corporation	Albany	NY	Dredged Material	sand and gravel
754-4-42	4	New York State Canal Corporation	Albany	NY	Dredged Material	fill and gravel
755-7-34	4	New York State Canal Corporation	Albany	NY	Dredged Material	Road base
784-3-60	3	Village of Sleepy Hollow	Sleepy Hollow	NY	Dredged Material	Fill, structural
790-1-30	1	Jones Inlet Marina; Inc.	Riverhead	NY	Dredged Material	Fill
799-2-43	2	New York City Department of Sanitation	New York	NY	Dredged Material	Alternate Grading Material
803-1-52	1	Westhampton Mining Aggregates, Inc.	Westhampton Beach	NY	Dredged Material	Aggregate
814-1-52	1	RAMCO Development Corp.	Bay Shore	NY	Dredged Material	Topsoil
846-2-24	2	New York Sand & Stone, LLC	Brooklyn	NY	Dredged Material	Aggregate
877-2-24	2	TN & Associates	Milwaukee	WI	Dredged Material	Aggregate
819-3-60	3	Village of Rye Brook	Rye Brook	NY	Dredged Material	Fill
832-3-40	3	Pelham Country Club c/o LBG Environmental Serices	Trumbull	CT	Dredged Material	Fill
853-8-59	8	NYS Canal Corp	Liverpool	NY	Dredged Material	Fill
854-6-33	6	NYS Canal Corp	Liverpool	NY	Dredged Material	Fill
855-6-33	6	NYS Canal Corp	Liverpool	NY	Dredged Material	Fill
860-1-52	1	Costello Marine Contracting Corporation	Greenport	NY	Dredged Material	Fill
890-1-52	1	Irene Detmer Property	East Setauket	NY	Dredged Material	Fill
884-2-43	2	380 Development, LLC			Dredged Material	Fill
709-2-24	2	Brooklyn Navy Yard Development Corp.	Brooklyn	NY	Dredged Material/Fly Ash/ Spent Grit	Grading Material/Industrial Fill
390-9-15	9	Riefill Corp.	Buffalo	NY	Dust (Baghouse)	Flowable Fill
033-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Dust (Cement Kiln)	Filler (Asphalt)
325-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Dust (Cement Kiln)	Liming;Stabilizer;Filler;LF Co
600-0-00	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Dust (Cement Kiln)	Liming Agent (Agricultural)
039-7-34	7	Waste Stream Environmental, Inc.	Jordan	NY	Dust (Cement Kiln)/Sludge	Liming Agent (Agricultural)
220-7-00	OS	United Environmental Services Group	Phillisburg	NJ	Dust (Cement Kiln)/Sludge	Liming Agent (Agricultural)
492-8-62	8	AES Greenidge; L.L.C.	Dresden	NY	E-Fuel	Fuel
469-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Felts (Paper Machine Dryer)	Benthic Mat
478-5-46	5	International Paper Company; Hudson River Mil	Corinth	NY	Felts (Paper Machine Dryer)	Benthic Mat
138-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Ferrous	Cement (Iron Feedstock)
806-3-40	3	BMJ Construction (Brewster WWTP)	Yonkers	NY	Filter media (WWTP)	subbase
322-3-40	3	CLEARPOOL Camp	Carmel	NY	Filter Sand	Bedding (Septic; Sewer)
346-3-42	3	Integrated Building Systems	East Greenbush	NY	Filter Sand	Fill; Base (Sub)
369-3-60	3	New York City Department of Environmental Protection	Valhalla	NY	Filter Sand	Fill; Base (Sub)
408-3-60	3	New York City Department of Environmental Protection	Valhalla	NY	Filter Sand	Bedding (Pipe); Base(Sub)
413-3-53	3	Grahamsville Sewage Treatment Plant	Grahamsville	NY	Filter Sand	Fill; Grading
419-4-13	3	New York City Department of Environmental Protection	Valhalla	NY	Filter Sand	Fill (Backfill-Pipe)
500-4-20	3	New York City Department of Environmental Protection	Valhalla	NY	Filter Sand	Fill
514-3-53	3	Narrowsburg Water & Sewer Districts	Narrowsburg	NY	Filter Sand	Fill; Base (Sub)
547-3-36	3	Town of Montgomery	Montgomery	NY	Filter Sand	Base (Road)
560-6-33	OS	New York State Thruway Authority	Albany	NY	Filter Sand	Fill
619-4-20	OS	New York State Thruway Authority	Albany	NY	Filter Sand	Fill
620-0-00	OS	New York State Thruway Authority	Albany	NY	Filter Sand	Fill
648-3-36	3	Dept. of Army; US Military Academy	West Point	NY	Filter Sand	Fill
649-1-52	1	Leisure Village WWTP/Suffolk Co. DPW	Yaphank	NY	Filter Sand	Fill
393-7-34	7	Anheuser-Busch; Inc.	Baldwinsville	NY	Filter Sand/Compost/Wood	Compost (Class I)
441-4-20	4	Pioneer Savings Bank	Rensselaer	NY	Filter Sand/Stone	Base (Sub); Fill (Backfill Tre
518-3-14	3	Town of Wappinger Falls	Wappinger Falls	NY	Filter Sand/Stone	Fill
766-8-26	8	Village of Geneseo	Geneseo	NY	Filter Sand/Stone	Subbase; backfill
362-5-46	5	Corinth Bio-Conversion; Inc. c/o Petruzzo Pro	Corinth	NY	Food	Feed (Animal - Supplement)

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BUD #	Region	Facility Name	City	State	Waste Types	Beneficial Use
005-6-45	6	GM Powertrain Group	Massena	NY	Foundry Sand	Aggregate (Concrete; Asphalt)
040-7-34	7	Caldwell & Ward Brass Company	Syracuse	NY	Foundry Sand	Aggregate (Concrete)
042-7-34	7	Wolf & Dungey; Inc.	Syracuse	NY	Foundry Sand	Aggregate (Concrete)
073-9-32	9	Dussault Foundry Corp.	Lockport	NY	Foundry Sand	Aggregate (Asphalt; Flowable F
155-9-15	9	Buffalo Metal Casting Co.; Inc.	Buffalo	NY	Foundry Sand	Aggregate (Asphalt)
156-9-15	9	Scott Castings; Inc.	Buffalo	NY	Foundry Sand	Base (Sub); Fill
230-9-15	9	Gernatt Asphalt Products; Inc.	Collins	NY	Foundry Sand	Aggregate (Asphalt-Hot-Mix)
320-9-07	9	Monofrax; Inc.	Falconer	NY	Foundry Sand	Aggregate (Blacktop)
439-7-04	7	Broome County Division of Solid Waste	Binghamton	NY	Foundry Sand	Landfill Cover (Daily)
519-4-20	4	Wormuth Brothers Foundry; Inc.	Athens	NY	Foundry Sand	Alternate Grading Material
520-4-20	4	Wormuth Brothers Foundry; Inc.	Athens	NY	Foundry Sand	Cement (Source of Silica)
551-9-15	OS	Pohlman Materials Recovery Inc.	Lakeview	NY	Foundry Sand	Flowable Fill
567-7-27	7	Santaro Trucking/ Crouse-Hinds c/o Spectra En	East Syracuse	NY	Foundry Sand	Aggregate (Asphalt Concrete)
713-4-20	4	Wormuth Brothers Foundry; Inc.	Athens	NY	Foundry Sand	Fill (Regrading)
748-4-20	4	Wormuth Brothers Foundry; Inc.	Athens	NY	Foundry Sand	Fill; grade and subbase
772-3-14	3	Tallix; Inc.	Beacon	NY	Foundry Sand	Aggregate; Asphalt
829-9-07	9	Chautauqua Hardware c/o Haley & Aldrich	Grand Rapids	NY	Foundry Sand	Fill, structural
139-9-15	9	Pohlman Foundry Company	Buffalo	NY	Foundry Sand/Lime Slurry	Aggregate; Fill
199-8-08	8	Chemung Co. Solid Waste Management Dist.	Elmira	NY	Foundry Sand/Sludge (WWTP)	Landfill Cover (Daily)
363-7-34	7	Crushed Products Inc.	Syracuse	NY	Foundry Slag	Base (Sub); Fill (Structural)
400-9-07	9	Monofrax; Inc.	Falconer	NY	Foundry Slag	Fill; Base (Sub); Ballast
411-9-32	9	International Waste Removal; Inc.	Niagara Falls	NY	Foundry Slag	Fill
045-4-20	4	Wormuth Brothers Foundry; Inc.	Athens	NY	Foundry Slag/Sand	Mulch; Landfill Cover (Daily)
732-5-58	5	GL&V Foundry	Hudson Falls	NY	Foundry Slag/Sand	various
813-6-33	6	Germanium Corporation of America	Utica	NY	Germanium Tetrachloride processing wastes	Germanium Tetrachloride production
137-7-34	6	General Crushed Stone Company	Easton	PA	Glass	Aggregate (Asphalt-Hot-Mix)
160-6-23	6	Jefferson Co. Dept. Recycling & Waste Mgmt	Watertown	NY	Glass	Base (Road)
161-5-16	5	Essex County Dept. of Public Works	Elizabethtown	NY	Glass	Base (Sub)
172-1-30	1	Omni Recycling of Westbury; Inc.	Westbury	NY	Glass	Landfill Base (Road)
185-6-25	6	Lewis County Department Of Solid Waste	Lowville	NY	Glass	Base (Sub)
227-0-00	OS	Generic BUD - Glass as Fill	Unknown	NY	Glass	Fill; Base (Sub)
229-8-51	8	Sanitary Disposal Company	Savona	NY	Glass	Fill
234-0-45	OS	Waste Stream; Inc.	Potsdam	NY	Glass	Base; Filter (Sand); Fill
248-5-58	5	Bola Landfill	Albany	NY	Glass	Landfill Barrier Protect; Gas
381-4-13	4	Delaware Borders Inc.	Walton	NY	Glass	Filler (Plastics)
828-6-22	6	Andela Products, Ltd.	Richfield Springs	NY	Glass	abrasive blasting media
798-6-45	6	St. Lawrence County Solid Waste Dept.	Canton	NY	Glass;Plastic	Base (Sub)
244-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Grit (Flume)	Landfill Cover; Closure
283-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Grit (Flume)	Bedding (Animal)
275-9-32	9	Occidental Chemical Corporation	Niagara Falls	NY	Gypsum	Land Application
376-9-32	9	AES Somerset; L.L.C.	Barker	NY	Gypsum	Gypsum Wallboard
385-9-15	9	Natural Environmental; Inc.	Buffalo	NY	Gypsum Wallboard	Absorbent
463-9-15	9	Natural Environmental; Inc.	Buffalo	NY	Gypsum Wallboard	Land Application
528-4-47	4	Good Riddance Inc.	Alplaus	NY	Gypsum Wallboard	Land Application
557-4-47	4	Good Riddance Inc.	Alplaus	NY	Gypsum Wallboard	Gypsum Wallboard
558-4-47	4	Good Riddance Inc.	Alplaus	NY	Gypsum Wallboard	Absorbent
206-7-55	7	AES Cayuga; L.L.C.	Lansing	NY	Gypsum; Calcium Chloride Salt	Gypsum Wall; De-icer; Dust Sup
304-6-25	6	Lyons Falls Pulp & Paper	Lyons Falls	NY	Lignosulfonate	Dust Suppressant
178-8-19	8	Batavia (C) Water Treatment Plant	Batavia	NY	Lime (WTP)	Liming Agent
245-5-16	7	Specialty Minerals; Inc.	Oswego	NY	Lime Grit	Liming Agent
615-6-25	6	FAXE Paper Pigments (Huber Engineered Materia	Havre de Grace	MD	Lime Grit	Liming Agent (Agricultural)
727-9-07	9	Bush Industries Inc.	Jamestown	NY	MDF/particle board sawdust	Bedding (Animal)
824-6-33	6	HP Hood	Vernon	NY	Milk waste, treated	Fertilizer
851-4-01	4	Lafarge Building Materials, Inc.	Ravena	NY	Mill Spillage (Limestone)	Fill

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817-6-23	6	Shred-Con	Watertown	NY	Paper	Bedding (Animal)
817-6-23	6	Shred-Con	Watertown	NY	Paper	Bedding (Animal)
224-7-34	7	Anheuser-Busch; Inc.	Baldwinsville	NY	Paper (Phone Books)	Compost
038-0-15	OS	Waste Stream Technology; Inc.	Buffalo	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
049-0-52	OS	Recycling Technologies of New York	Massapequa	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
075-6-33	6	American Soil and Waste Disposal	Oneida Castle	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
088-9-15	OS	Waste Stream Technology; Inc.	Buffalo	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
101-0-00	OS	United Retek Corporation	Medway	MA	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
105-8-61	8	Griffith Oil Co.; Inc.	Wyoming	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
121-4-01	4	Cibro Petroleum Products; Inc.	Albany	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
123-0-30	OS	Tyree Brothers Environmental Services	Farmingdale	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
129-0-00	OS	American Reclamation Corporation	Southborough	MA	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
136-1-52	1	National Westminster Bank/Posillico	West Hempstead	NY	Petroleum Contaminated Soil	Aggregate (Asphalt)
203-0-00	OS	Generic BUD - PCS - Cold-mix asphalt	Unknown	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
211-0-00	OS	Environmental Soil Solutions; Inc.	Acton	MA	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
218-1-52	1	Prima Asphalt Corporation	Holtsville	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold; Hot)
260-3-36	3	Alternative Recycling Services; Inc.	Northvale	NJ	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
302-3-36	3	Al Turi Landfill; Inc.	Mahwah	NJ	Petroleum Contaminated Soil	Landfill Cover (Daily)
394-1-30	1	Rason Asphalt Inc.	Old Bethpage	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Hot-Mix)
426-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Petroleum Contaminated Soil	Cement (Silica Substitute)
485-7-55	7	Village of Cayuga Heights	Ithaca	NY	Petroleum Contaminated Soil	Aggregate (Asphalt-Cold-Mix)
673-9-15	OS	New York State Department of Transportation	Albany	NY	Petroleum Contaminated Soil	Fill
774-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Petroleum Contaminated Soil	Cement (Silica Substitute)
788-1-30	1	Avilas/Mairoll	White Plains	NY	Petroleum Contaminated Soil	subbase
200-9-15	9	Buffalo China; Inc.	Buffalo	NY	Plaster (Paris)	Gypsum Wallboard
079-0-00	OS	AWT Capital	Unknown	NY	Plastic	Product
133-0-27	OS	Canastota Recycling; Ltd.	Canastota	NY	Plastic	Aggregate (Asphalt-Cold-Mix)
491-8-62	8	AES Greenidge; L.L.C.	Dresden	NY	Plastic & Cellulose Fiber	Fuel
188-0-00	OS	EZflow; L.P.	Oakland	TN	Plastic (Polystyrene)	Fill (Bedding-Pipe)
880-3-14	3	Gaia Institute	LaGrangeville	NY	Plastic, misc.	Growth Medium, rooftop
142-8-19	8	Lepp Insulator Company	LeRoy	NY	Porcelain (Insulators)	Aggregate
147-9-15	9	Buffalo China; Inc.	Buffalo	NY	Pottery	Base (Sub); Concrete
187-9-15	9	Buffalo China; Inc.	Buffalo	NY	Pottery	Fill
179-6-45	6	Reynolds Metals Company	Massena	NY	Roaster Ore	Cement
847-6-45	6	ALCOA	Massena	NY	Sand (Industrial WWTP)	Asphalt (Hot-Mix)
836-3-40	3	BMJ Construction	Yonkers	NY	Sand (WWTP)	Fill
216-1-52	1	Town of Brookhaven	Medford	NY	Shells (Clam)	Bedding (Setting Substrate)
217-1-52	1	Town of Huntington	Huntington	NY	Shells (Clam/Oyster)	Bedding (Setting Substrate)
108-1-52	1	Winter Harbor Fisheries; Inc.	Greenport	NY	Shells (Conch)	Bedding (Setting Substrate)
407-1-52	1	Cornell Cooperative Extension - Southold	Southold	NY	Shells (Shellfish)	Bedding (Setting Substrate)
050-9-15	9	Buffalo Crushed Stone; Inc.	Buffalo	NY	Slag (Blast Furnace)	Base (Road; Sub); Aggregate
342-9-15	9	Buffalo Crushed Stone; Inc.	Buffalo	NY	Slag (Blast Furnace)	Base (Sub)
406-3-00	OS	Waylite Corporation	Bethlehem	PA	Slag (Blast Furnace)	Fill (Lightweight)
515-4-42	4	King Road Materials; Inc.	Albany	NY	Slag (Blast Furnace)	Fill (Lt Wt); Base (Sub)
109-5-58	5	Town of Granville	Granville	NY	Slag (Slate)	Landfill Grading Layer
345-7-06	7	Auburn Steel Company; Inc.	Auburn	NY	Slag (Steel)	Fill; Aggregate; Base
404-4-01	4	Al-tech Specialty Steel Corp.\REALCO Inc.	Watervliet	NY	Slag (Steel)	Landfill Closure; Aggregate
487-9-07	9	Erie Shore Commodities; Inc.	Brunswick	OH	Slag (Steel)	Base; Traction; Aggregate (Asp
555-9-15	9	Bethlehem Steel Corporation	Bethlehem	PA	Slag (Steel)	Fill; Aggregate(Asphalt); Base
776-2-43	2	New York City Department of Sanitation	New York	NY	Slag (Steel)	Landfill closure; base(sub); fill
691-7-06	7	Nucor Steel Auburn; Inc	Auburn	NY	Slag Lime	Soil Liming Agent
729-6-33	6	Upper Mohawk Valley Regional Water Board	Utica	NY	Sludge (Alum)	Soil (Potting)
022-8-19	8	Lapp Insulator Company	LeRoy	NY	Sludge (Clay)	Fill
114-3-14	3	IBM - East Fishkill	Hopewell Junction	NY	Sludge (Electroplating)	Cement

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120-0-00	OS	NYSDEC; Division of Fish & Wildlife	Albany	NY	Sludge (Fish Hatchery)	Land Application
883-4-01	4	CSX Transportation c/o AMEC Earth & Environmental	Schenectady	NY	Sludge (Industrial)	Fill
431-4-01	4	Lafarge Building Materials; Inc.	Ravena	NY	Sludge (Iron Oxide)	Cement
191-4-20	4	Lehigh Cement Company	Catskill	NY	Sludge (Kaolin)	Cement
822-0-00	0	Marcal Paper Mills, Inc.	Elmwood Park	NY	Sludge (Kaolin)	Bedding (Animal)
424-3-56	3	Northeast Solite Corporation	Mt. Marion	NY	Sludge (Lagoon Fines)	Landfill Closure
420-0-00	OS	Innovative Municipal Products; Inc. (IM U.S.)	Ava	NY	Sludge (Lignosulfonate)	Dust Palliative
086-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Sludge (MgOH)	Cement
716-8-28	8	Squidd's Bait Co.	Rochester	NY	Sludge (paper mill)	Worm bedding
014-5-46	5	International Paper Company; Hudson River Mil	Corinth	NY	Sludge (Papermill)	Soil Amendment;Mulch;Grow Me
017-5-57	5	Encore Paper Co/(James River Corp.)	South Glens Falls	NY	Sludge (Papermill)	Landfill Cover; Grading
044-5-46	5	Mohawk Paper Mills; Inc.	Cohoes	NY	Sludge (Papermill)	Paper Board
084-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Sludge (Papermill)	Cement
085-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Sludge (Papermill)	Cement
134-5-57	5	American Tissue of Greenwich	Greenwich	NY	Sludge (Papermill)	Landfill Cover; Grading
151-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Sludge (Papermill)	Paper Products
167-5-46	5	International Paper Company; Hudson River Mil	Corinth	NY	Sludge (Papermill)	Landfill Cover; Grading
170-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Sludge (Papermill)	Landfill Cover (Daily)
196-0-33	OS	Advanced Recovery Solutions; Inc.	Foxborough	MA	Sludge (Papermill)	Absorbent
202-5-46	5	International Paper Company; Hudson River Mil	Corinth	NY	Sludge (Papermill)	Blocks & Panels (Building)
317-5-57	5	Hollingsworth & Vose Paper Co.	Greenwich	NY	Sludge (Papermill)	Landfill Cover; Grading
459-6-33	6	Oneida-Herkimer Solid Waste Authority	Utica	NY	Sludge (Papermill)	Landfill Cover (Daily)
477-5-46	5	Corinth Fibre LLC	Corinth	NY	Sludge (Papermill)	Bedding (Animal)
480-5-46	5	Petruzzo Products; Inc.	Corinth	NY	Sludge (Papermill)	Bed (Animal); Kitty Litter; Absorbent
512-5-46	5	Corinth Fibre LLC	Corinth	NY	Sludge (Papermill)	Absorbent
513-5-46	5	Corinth Fibre LLC	Corinth	NY	Sludge (Papermill)	Bedding (Animal - Caged)
533-0-00	OS	Marcal	Elmwood Park	NJ	Sludge (Papermill)	Bedding (Animal); Kitty Litter
562-7-38	7	International Paper Company; Oswego	Oswego	NY	Sludge (Papermill)	Compost (Amendment)
568-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Sludge (Papermill)	Bulking Agent (Waste Sludge)
573-0-00	5	Earth Alliance of Saratoga Limited (EAL)	South Glens Falls	NY	Sludge (Papermill)	Mulch
674-6-23	6	James S. Juczak	Watertown	NY	Sludge (Papermill)	Cement
690-0-00	OS	Domtar Inc.; Communication Papers Division	Cornwall	ON	Sludge (Papermill)	Soil Liming Agent
740-5-46	5	Earth Alliance of Saratoga Limited (EAL)	South Glens Falls	NY	Sludge (Papermill)	Animal Bedding; Absorbent; Cat Litter
757-7-34	7	Syracuse Fiber Recycling; LLC	Solvay	NY	Sludge (Papermill)	Amendment; compost
876-0-00	0	Synagro	Houston	TX	Sludge (Papermill)	Non-Contact Poultry Litter
872-9-32	9	Norampac (c/o Mark Cerrone, Inc.)	Niagara Falls	NY	Sludge (Papermill)	Amendment (Soil)
683-7-34	7	Syracuse Fiber Recycling; LLC	Solvay	NY	Sludge (Papermill)/Cement Kiln Dust	Bedding (Animal)
319-7-34	7	Syracuse Fiber Recycling; LLC	Solvay	NY	Sludge (Papermill)/CKD	Fuel; Bedding (Animal)
468-6-33	6	Oneida-Herkimer Solid Waste Authority	Utica	NY	Sludge (Papermill)/Sand	Landfill Cover (Intermediate)
305-6-23	6	Development Authority of North Country	Rodman	NY	Sludge (Papermill/WWTP)	Landfill Cover (Daily)
422-4-13	4	Norbord Industries; Inc.	Deposit	NY	Sludge (Settling)	Fill
449-4-01	4	Town of Guilderland	Guilderland	NY	Sludge (WTP - Alum)	Landfill Contouring (C&D LF)
509-4-42	4	City of Troy; Dept. of Public Works	Troy	NY	Sludge (WTP - Alum)	Landfill Soil (Top)
777-4-42	4	City of Troy; Dept. of Public Works	Troy	NY	Sludge (WTP - Alum)	Topsoil; manufactured
825-3-14	3	Duffy Layton Contracting, Inc.	Stanfordville	NY	Sludge (WTP - Alum)	soil conditioner
826-6-33	6	City of Rome Water Filtration Plant	Rome	NY	Sludge (WTP - Alum)	soil, Manufactured
501-2-41	2	Woodhue; Ltd.	Wrightstown	NJ	Sludge (WTP - Alum) w/Soil	Landfill Vegetative Layer
337-4-47	4	City of Poughkeepsie; WTP	Poughkeepsie	NY	Sludge (WTP- Alum)	Landfill Cover (Daily)
471-6-22	6	Village of Ilion	Ilion	NY	Sludge (WTP Lagoon Sediment)	Soil (Top)
434-7-55	7	Southern Cayuga Lake Intermunicipal Water Commission	Ithaca	NY	Sludge (WTP)	Growing Media
455-9-15	9	Erie County Water Authority	Cheektowaga	NY	Sludge (WTP)	Land Application; Soil (Top)
581-3-60	3	Town of New Castle Department of Public Works	Chappaqua	NY	Sludge (WTP)	Fill
660-9-15	9	Erie County Water Authority	Cheektowaga	NY	Sludge (WTP)	Land Application; Fill
454-7-55	7	Southern Cayuga Lake Intermunicipal Water Commission	Ithaca	NY	Sludge (WTP/WWTP)	Growing Media (Nursery)

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704-4-01	4	Town of Bethlehem; DPW	Delmar	NY	Sludge (WTP-Alum)	Fill
012-7-34	OS	United Environmental Services Group	Phillisburg	NJ	Sludge (WWTP)	Liming Agent (Agricultural)
025-3-14	3	Engelhard Corporation	Peekskill	NY	Sludge (WWTP)	Landfill Closure
162-4-20	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Sludge (WWTP)	Cement
213-3-60	3	Westchester County (YJTP)	Yonkers	NY	Sludge (WWTP)	Liming Agent (Agricultural)
215-3-53	3	World Envirotech; Inc.	New York	NY	Sludge (WWTP)	Aggregate (Asphalt)
338-0-53	3	World Envirotech; Inc.	New York	NY	Sludge (WWTP)	Mulch
720-3-14	3	IBM - East Fishkill	Hopewell Junction	NY	Sludge (WWTP/non-haz)	Cement (Calcium source)
268-5-46	5	GE Silicones; Waterford	Waterford	NY	Sludge (WWTP-Process Plant)	Asphalt (Hot-Mix)
577-4-20	4	NYSDEC; Bureau of Design and Construction	Albany	NY	Sludge (Zeolite/Clinoptilolite	Land Application
306-7-34	7	Landis Plastics - Solvey	Solvey	NY	Soil	Fill
415-9-32	9	Niagara Falls Bridge Commission	Niagara Falls	NY	Soil	Fill
753-1-52	1	Town of Riverhead	Riverhead	NY	Soil	Aggregate; asphalt
862-8-28	8	Cornhill Landing, LLC	Rochester	NY	Soil	Fill
602-0-00	OS	Clean Waters of America	Epsom	NH	Soil (Asphalt Emulsion Contami	Aggregate (Asphalt-Cold-Mix)
606-4-20	OS	Clean Waters of America	Epsom	NH	Soil (Coal Tar Contaminated)	Aggregate (Asphalt-Cold-Mix)
617-5-58	5	Environmental Soil Management of NY (ESMI)	Fort Edward	NY	Soil (Coal Tar Contaminated)	Fill; Base; Landfill; Asphalt
810-9-15	9	BIDCO Marine Group	Buffalo	NY	Soil (contaminated)	Fill
823-2-41	2	Phelps Dodge Corp.			Soil (Contaminated)	Fill, subbase
610-5-58	5	Environmental Soil Management of NY (ESMI)	Fort Edward	NY	Soil (Contaminated-Various)	Fill; Base (Sub); Asphalt
092-5-46	5	Edinburg Landfill Reclamation	Edinburg	NY	Soil (Landfill Reclamation)	Landfill Cover; Base (Sub)
714-5-58	5	Environmental Soil Management of NY (ESMI)	Fort Edward	NY	Soil (PCB Contaminated)	Construction Applications
127-1-30	1	Posillico Brothers Asphalt Co.	Farmingdale	NY	Soil (PCS)/Soil (Coal Tar Con	Aggregate (Asphalt); Base (Sub
750-2-24	2	F.C. Gowanus	Islandia	NY	Soil (PCS)/Soil (Coal Tar Con	Fill
391-6-33	OS	New York State Department of Transportation	Albany	NY	Soil (PCS/Coal)/Coal	Fill
175-3-56	3	New Paltz Central School District	New Paltz	NY	Soil (Pesticide-contaminated)	Fill
546-3-44	3	Town of Haverstraw	Garnerville	NY	Soil (Pesticide-contaminated)	Landfill Cover (Final; Interim
875-3-60	3	City of Yonkers	Yonkers	NY	Soil (Petroleum-Contaminated)	Fill
871-1-52	1	Westhampton Mining Aggregates, Inc.	Westhampton Beach	NY	Soil (Petroleum-Contaminated)	Aggregate
857-1-52	1	Transmine, Inc.	Westhampton Beach	NY	Soil (Petroleum-Contaminated)	Aggregate (Cold-Mix Asphalt)
473-9-15	9	New York State Office of General Services	Albany	NY	Soil/Cinders (Excavated)	Fill (Berm Construction)
838-9-15	9	New York State Department of Transportation	Buffalo	NY	Soil/Cinders (Excavated)	Fill
721-7-34	7	General Motors - Former IFG	Massena	NY	Soil/contaminated	Commercial Fill (same site)
767-2-41	2	Metropolitan Transportation Authority	New York	NY	Soil/contaminated	Fill
773-2-41	2	Phelps Dodge Corp.	Queens	NY	Soil/contaminated	Fill
778-1-52	1	Cantor Brothers	Farmingdale	NY	Soil/contaminated	Aggregate; Asphalt; Fill
781-2-24	3	New York City Department of Environmental Protection	Valhalla	NY	Soil/contaminated	Alternate Grading Material
467-3-14	3	T.T. Materials Corp.	Wingdale	NY	Soil/Rubber (Crumb)	Asphalt (Cold-Mix)
816-7-38	7	Northeast Biofuels	Fulton	NY	Spent corn, grain	Animal feed
371-5-10	5	Ayerst Laboratories Inc.	Rouses Point	NY	Sugar Solution	Feed (Cattle-Supplement)
634-0-00	OS	Nature's World	Glen Cove	NY	Tailings (Coal Mining)	Mulch
210-5-57	5	Barton Mines Corporation	Lake George	NY	Tailings (Mine)	Landfill Closure
152-5-16	5	NYCO Minerals; Inc.	Willsboro	NY	Tailings (Wollastonite)	Base (Road)
440-5-16	5	NYCO Minerals; Inc.	Willsboro	NY	Tailings (Wollastonite)	Fill; Base (Sub); Grading; LF
623-7-34	7	Honeywell/Allied Signal	Solvay	NY	Tar	Sealant (Driveway)
625-7-34	7	Honeywell/Allied Signal	Solvay	NY	Tar	Solvent (BTEX); Fuel
626-7-34	7	Honeywell/Allied Signal	Solvay	NY	Tar	Fuel (No. 2)
192-9-07	9	Enviromelt Corporation	West Milford	NJ	Television Tube Cullet	Glass Products
166-5-10	5	Marina at Lighthouse Point; Inc.	Rouses Point	NY	Tire	Breakwater
225-7-55	7	Ms. Sara Jones & Mr. Craig Dunn	Ithaca	NY	Tire	Wall
228-9-32	9	National Fuel Supply Corporation	Hamburg	NY	Tire	Bedding (Pipe)
235-6-23	6	Fort Drum	Fort Drum	NY	Tire	Wall
263-4-20	4	Lehigh Cement Company	Catskill	NY	Tire	Fuel
335-4-01	4	St. Lawrence Cement Co.; LLC	Catskill	NY	Tire	Fuel

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials, Bureau of Solid Waste, Reduction Recycling
625 Broadway, Albany, NY, 12233-7253

Granted Beneficial Use Determinations
Sorted by Waste Type

BUD #	Region	Facility Name	City	State	Waste Types	Beneficial Use
374-5-57	5	Chestertown Conservation Club	Chestertown	NY	Tire	Backstop (Shooting Range)
493-3-56	3	Town of Shawangunk	Wallkill	NY	Tire	Erosion Control Mat
499-6-22	6	Town of Webb	Old Forge	NY	Tire	Erosion Control
588-6-25	6	Adirondack International Speedway	Castorland	NY	Tire	Wall (Barrier-Racetrack)
609-4-01	4	Arthritis Foundation; NENY Chapter	Albany	NY	Tire	Wall (Barrier-Racetrack; Temp)
650-4-47	4	Tire Conversion Technologies; Inc.	Glenville	NY	Tire	Lumber (Synthetic)
684-3-56	3	Steve Goldman; PE	West Nyack	NY	Tire	Fill
702-9-32	9	Modern Recycling; Inc.	Model City	NY	Tire	Mulch (Landscaping)
703-9-32	9	Modern Recycling; Inc.	Model City	NY	Tire	Playground Surface Material
796-7-06	7	Interstate Recycling Corp.	Auburn	NY	Tire	Rumble strips
764-9-07	9	Chautauqua County	Falconer	NY	Tire (Bales)	Base; road
250-9-32	9	Modern Recycling; Inc.	Model City	NY	Tire (Buffings)	Surface Material (Horse Arena)
343-9-02	9	Houghton College Equestrian Center	Houghton	NY	Tire (Buffings)	Surface Material (Horse Arena)
010-4-20	4	Dave Osborn's Family Fun Park	Catskill	NY	Tire (Chips)	Base (Road)
043-3-56	3	Jodi Scribner	Saugerties	NY	Tire (Chips)	Base (Road)
103-3-56	3	Tire Recycling; Inc.	Saugerties	NY	Tire (Chips)	Fill
174-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Tire (Chips)	Fuel
380-4-01	9	New York State Office of General Services	Albany	NY	Tire (Chips)	Fill
565-4-01	4	Town of Colonie DPW	Cohoes	NY	Tire (Chips)	Landfill Road
611-1-52	1	Town of Brookhaven	Medford	NY	Tire (Chips)	Landfill Road
612-1-52	1	Town of Brookhaven	Medford	NY	Tire (Chips)	Erosion Control
613-1-52	1	Town of Brookhaven	Medford	NY	Tire (Chips)	Berm
671-5-18	5	South Stream Enterprises; Inc.	Amsterdam	NY	Tire (Chips)	Base (Road)
685-4-13	4	Delaware County	Delhi	NY	Tire (Chips)	Base (Road)
751-4-13	4	Delaware County	Delhi	NY	Tire (Chips)	Stormwater Management structure
046-3-56	3	Ridge Runners Rod and Gun Club	Kingston	NY	Tire (Shreds)	Backstop (Shooting Range)
432-4-00	4	The Tire Shredder; Inc.	Central Bridge	NY	Tire (Shreds)	Fill
534-4-20	4	Casings; Inc.	Catskill	NY	Tire (Shreds)	Aggregate (Drainage Layer)
614-3-56	3	Town of Shawangunk	Wallkill	NY	Tire (Shreds)	Fill
723-0-00	OS	Rubber Resources Limited	Hudson	FL	Tire (Shreds)	Playground Surface Material
725-0-00	OS	Rubber Resources Limited	Hudson	FL	Tire (Shreds)	Landscaping Mulch
579-7-04	OS	New York State Department of Transportation	Albany	NY	Tire (Shreds/Chips)	Base (Road-Embankment Fil
159-0-00	OS	Generic BUD - RUMAC - Glassphalt	Unknown	NY	Tire/Glass	Aggregate (Asphalt)
848-9-32	9	High Tread International	Lockport	NY	Tires	Mulch, Playground material
843 4 47	4	Alan R. Knight	Duanesburg	NY	Tires	Retaining Wall
821-0-00	0	NYSDEC	Albany	NY	Tires	Tire derived aggregate
867-5-46	5	Sara Spa Rod & Gun Club	Greenfield Center	NY	Tires	Wall, shooting range
868-3-56	3	Unity Creations	Saugerties	NY	Tires (chips)	Backfill, foundation
448-0-00	OS	Generic BUD - Aquatic Vegetation	Unknown	NY	Vegetation (Aquatic)	Land Application
668-5-58	4	New York State Canal Corporation	Albany	NY	Vegetation (Aquatic)	Land Application
681-6-45	6	Reynolds Metals Company	Massena	NY	Wet Enriched Alumina Ore	Port cement mix
051-0-36	OS	Ben Veltidi; Inc.	Valley Cottage	NY	Wood	Mulch
054-5-17	5	Boralex Chateaugay; Inc.	Chateaugay	NY	Wood	Fuel
125-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Wood	Mulch; Landscape
144-6-25	6	Lyonsdale Power Company LLC	Lyons Falls	NY	Wood	Fuel
190-4-01	4	Howard Hoose; Jr.	Feura Bush	NY	Wood	Mulch
233-7-34	7	Clifton Recycling	Syracuse	NY	Wood	Fuel
239-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Wood	Fuel
274-9-61	9	Dry Creek Products; Inc.	Arcade	NY	Wood	Fuel
281-5-16	5	International Paper Company; Ticonderoga Mill	Ticonderoga	NY	Wood	Mulch; Landscaping Material
292-9-15	9	Concord Engineering; P.C.	Springville	NY	Wood	Compost
308-5-58	5	Washington County Dept. of Public Works	Fort Edward	NY	Wood	Fuel
310-5-58	5	Telescope Casual Furniture; Inc.	Granville	NY	Wood	Fuel
331-5-58	5	Darilee Industries; c/o Lemery & Reid;PC	Saratoga Springs	NY	Wood	Bedding (Animal)

New York State Department of Environmental Conservation
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625 Broadway, Albany, NY, 12233-7253

Granted Beneficial Use Determinations
Sorted by Waste Type

BUD #	Region	Facility Name	City	State	Waste Types	Beneficial Use
332-9-07	9	Westfield Pellet	Portland	NY	Wood	Bedding (Animal)
386-9-32	9	Pallet Pallet Inc. - New York Division	Buffalo	NY	Wood	Bedding;Compost;Paper;Absorb;M
412-9-15	9	Pallet Services; Inc.	Tonawanda	NY	Wood	Mulch; Fuel Pellets
461-1-30	1	Universal Recycling Services Corp.	Glen Cove	NY	Wood	Mulch; Landscape
495-9-05	9	U.S. Carbon Corporation	Ellicottville	NY	Wood	Carbon (Activated)
497-9-07	9	Bush Industries Inc.	Jamestown	NY	Wood	Fuel; Particle Board
523-9-15	9	CanFiber U.S. Ltd.	Newport Beach	CA	Wood	Fiberboard (Medium Density)
529-4-47	4	Good Riddance Inc.	Alplaus	NY	Wood	Fuel
639-8-51	8	AES Hickling; L.L.C.	Corning	NY	Wood	Fuel
640-8-62	8	AES Greenidge; L.L.C.	Dresden	NY	Wood	Fuel
677-0-00	4	New York State Canal Corporation	Albany	NY	Wood	Mulch; Bed; Fuel; Erosion;Bulk
768-4-01	4	City of Albany; Dept. of Gen. Services	Albany	NY	Wood	Base; Road
850-5-46	5	Finch, Pruyn, & Co., Inc.	Glens Falls	NY	Wood	Fuel
719-4-01	4	Windows; Doors & More	Delmar	NY	Wood (Adulterated)	Mulch
402-7-09	7	AES Jennison; L.L.C.	Bainbridge	NY	Wood (co-fired with Coal)	Fuel
643-8-51	8	AES Hickling; L.L.C.	Corning	NY	Wood (co-fired with Coal)	Fuel
644-8-62	8	AES Greenidge; L.L.C.	Dresden	NY	Wood (co-fired with Coal)	Fuel
494-8-62	8	AES Greenidge; L.L.C.	Dresden	NY	Wood (Particle & Fiber Board)	Fuel
655-7-09	7	LOK-N-LOGS; Inc.	LaFayette	NY	Wood (Tim-bor Treated)	Fiberboard (Medium Density)
379-3-56	3	Trolley Museum of New York	Kingston	NY	Wood (Treated-Telephone Pole)	Wood (Treated-Electric Pole)
724-6-33	6	Oneida-Herkimer Solid Waste Authority	Utica	NY	Wood (Unadulterated Pallets)	Fuel/Landscape Mulch
758-6-33	9	Pallet Services; Inc.	Tonawanda	NY	Wood (Unadulterated Pallets)	Fuel
761-7-34	7	McIntosh Box and Pallet	East Syracuse	NY	Wood (Unadulterated Pallets)	Fuel
762-6-33	7	McIntosh Box and Pallet	East Syracuse	NY	Wood (Unadulterated Pallets)	Fuel
707-7-09	7	LOK-N-LOGS; Inc.	LaFayette	NY	Wood Chips w/ Sodium Borate	Bedding (Animal)
575-9-05	9	Cherry Creek Woodcrafters; Inc.	South Dayton	NY	Wood Dust (MDF)	Fuel
576-9-05	9	Cherry Creek Woodcrafters; Inc.	South Dayton	NY	Wood Dust (MDF)	Bedding (Animal - Farm)
603-4-13	4	Indian Country; Inc.	Deposit	NY	Wood Dust (MDF)	Fuel
279-9-15	9	Myco Enterprises	Albion	NY	Wood/Paper	Bedding (Animal)
204-5-17	5	J. & J. Dowd Wood Products; Inc.	Chateaugay	NY	Wood; Ash (Wood)	Fuel; Fertilizer
770-5-10	5	New England Waste Services of NY; Inc.	Morrisonville	NY	Wood;Brick (Refactory)	Base(sub); road
030-0-00	OS	Monroe Co. Cornell Cooperative Extension	Rochester	NY	Yard Waste	Land Application
116-8-28	OS	Monroe Co. Cornell Cooperative Extension	Rochester	NY	Yard Waste	Land Application
194-9-15	9	Schichtel's Nursery	Orchard Park	NY	Yard Waste	Land Application
291-1-52	1	Association for Resource Conservation	Centerport	NY	Yard Waste	Land Application

APPENDIX F

AUTUMN HEIGHTS ANALYTICAL DATA

Table F-1

Existing Data Consolidation
Port of Rochester
Rochester, New York

Summary of Detected Volatile Organic Compounds (VOCs) in Slag/Fill
Test Results in milligrams per Kilogram (mg/Kg) or parts per million (ppm)

Constituent	Sample ID						Part 375 Restricted Use Soil Cleanup Objectives (SCOs)	
	Bourne TP-2a (5')	B-33 (4.0'-8.0')	B-34 (4.0'-5.5')	B-37 (4.0'-8.0')	BS-39 (6.0'-6.7')	TP-7 (1.0')	Protection of Public Health - Restricted Residential Use	Protection of Groundwater
	Slag (color unknown)	Black & Gray Slag	Red Slag	Black Slag	Gray Slag	Red Slag		
	1/11/2000	2000	2000	2000	11/10/2006	9/9/2008		
Acetone	ND<0.726 U	NA	NA	NA	0.008 J	ND<0.0401 U	100	0.05
Benzene	**3.14**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	4.8	0.06
Carbon disulfide	ND<0.726 U	NA	NA	NA	0.001 J	ND<0.00802 U	--	--
Ethylbenzene	**7.76**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	41	1
Isopropylbenzene	1.68	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	--	--
Naphthalene	9.03	ND<0.0503 U	7.15	ND<0.0507 U	ND<.005 U	ND<0.00802 U	100	12
n-Propylbenzene	**6.77**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	100	3.9
Methylene chloride	ND<0.726 U	NA	NA	NA	0.013	ND<0.0201 U	100	0.05
Toluene	**0.992**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	100	0.07
1,2,4-Trimethylbenzene	**48**	ND<0.0101 U	**32.3**	ND<0.0101 U	ND<.005 U	ND<0.00802 U	52	3.6
1,3,5-Trimethylbenzene	**13.5**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	52	8.4
sec-Butylbenzene	1.21	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	100	11
p-Isopropyltoluene	0.815	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	--	--
m,p-Xylene	**25.6**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	0.0114	100	1.6
o-Xylene	**5.91**	ND<0.0101 U	ND<1.33 U	ND<0.0101 U	ND<.005 U	ND<0.00802 U	100	1.6

Notes:

VOC analysis by United States Environmental Protection Agency (USEPA) Method 8260B
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Public Health - Restricted Residential Use.
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Groundwater
NA denotes value not available.
U - Denotes that the compound was not detected above the reported laboratory method detection limit.
J - Denotes an estimated value.

Table F-2

Existing Data Consolidation
Port of Rochester
Rochester, New York

Summary of Detected Semivolatile Organic Compounds (SVOCs) in Slag/Fill
Test Results in milligrams per Kilogram (mg/Kg) or parts per million (ppm)

Constituent	Soil Sample Identification						Part 375 Restricted Use Soil Cleanup Objectives (SCOs)	
	Bourne TP-1 (0-2')	TP-6 (4.0')	TP-10 (3.0')	BS-21 (4.0'-4.5')	BS-31 (2.0'-2.9')	TP-7 (1.0')		
	Slag (color unknown)	White & Blue Slag	Red & Blue Slag	Blue/Green Slag	White, Brown, & Black Slag	Red Slag	Protection of Public Health - Restricted Residential Use	Protection of Groundwater
	1/11/2000	2/28/2000	2/28/2000	11/10/2006	11/10/2006	9/9/2008		
Anthracene	ND<0.305 U	ND<0.368 U	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	1000
Acenaphthylene	ND<0.305 U	ND<0.368 U	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	107
Acenaphthene	ND<0.305 U	ND<0.368 U	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	98
Benzo (a) anthracene	ND<0.356 U	1.99	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	1	1
Benzo (a) pyrene	ND<0.356 U	1.7	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	1	22
Benzo (b) fluoranthene	ND<0.356 U	3.79	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	1	1.7
Benzo (g,h,i) perylene	ND<0.356 U	2.24	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	1000
Benzo (k) fluoranthene	ND<0.356 U	26.1	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	3.9	1.7
Chrysene	ND<0.356 U	19.5	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	3.9	1
Dibenz(a,h)anthracene	ND<0.356 U	0.63	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	3.3	1000
Fluoranthene	ND<0.356 U	2.59	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	1000
Fluorene	ND<0.356 U	ND<0.368 U	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	386
Indeno (1,2,3-cd) pyrene	ND<0.305 U	2.2	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	0.5	8.2
Naphthalene	ND<0.305 U	ND<0.368 U	ND<0.318 U	ND<0.350 U	ND<1.90 U	0.0114	100	12
Phenanthrene	ND<0.305 U	0.554	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	1000
Pyrene	ND<0.305 U	2.97	ND<0.318 U	ND<0.350 U	ND<1.90 U	ND<0.372 U	100	1000
Total SVOCs	None Detected	23.194	None Detected	None Detected	None Detected	0.0114		

Notes:

SVOC analysis by United States Environmental Protection Agency (USEPA) Method 8270C.
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Public Health - Restricted Residential Use.
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Groundwater
ND<372 U - Denotes the compound was not detected above the reported laboratory detection limit shown.
U - Denotes that the compound was not detected above the reported laboratory method detection limit.
J - Denotes an estimated value.

Table F-3

Existing Data Consolidation
Port of Rochester
Rochester, New York

Summary of Detected Metals in Slag/Fill
Test Results in milligrams per Kilogram (mg/Kg) or parts per million (ppm)

USEPA TAL Metals	Sample Identification																				Part 375 Restricted Use Soil Cleanup Objectives (SCOs)	
	Bourne TP-1	Bourne TP-2	TP-6	TP-6	TP-9	TP-10 (3')	TP-15 (6-8')	TP-18	B-21 (1.0'-4.0')	B-34 (4.0'-5.5')	BS-12 (0.4'-0.6')	BS-21 (4.0'-4.5')	BS-31 (2.0'-2.9')	BS-34 (4.0'-5.5')	BS-39 (6.0'-6.7')	TP-7 (1.0')	Phase I Slag (a)	Phase I Slag (b)	Phase II Slag		
	Slag (color unknown)	Slag (color unknown)	White Slag	Black Slag	Red Slag	Red & Blue Slag	White Slag	Green Slag	Blue Slag	Red Slag	Gray Slag	Blue/Green Slag	White, Brown, and Black Slag	Red Slag	Gray Slag	Red Slag	Blue/Green Slag	Blue/Green Slag	Blue/Green Slag	Protection of Public Health - Restricted Residential Use	Protection of Groundwater
	1/11/2000	2/28/2000	2/28/2000	2/28/2000	2/28/2000	2/29/2000	2/29/2000	2/29/2000	8/22/2000	8/23/2000	11/10/2006	11/10/2006	11/10/2006	11/10/2006	11/10/2006	9/9/2008	7/1/2009	7/6/2009	6/29/2009		
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	44,400 E	9,870	27,300 E	23,900 E	20,600 E	--	--
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND <14.7 U	NA	NA	NA	ND<151 U	ND<5.62 U	0.56 N,E	0.61 N,E	0.46 N,E	--	--
Arsenic	20.6	0.875	ND<6.23 U	17.6	ND<4.9 U	51.10	7.12	7.12	16.5	ND<0.367 U	5.1	ND<2.0 U	18.5	ND<0.367 U	ND<20.1 U	10.9	5.1 E	7.8 E	8.3 E	16	16
Barium	188	511	81	193	177	22.2	657	ND<4.40 U	72.9	12.7	NA	NA	NA	12.7	269 E	156.0	171 E	120 E	124 E	400	820
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.70 E	NA	NA	NA	4.2 E	1.39	4.6 E	2.9 E	2.9 E	72	47
Cadmium	19	2.84	ND<0.623 U	ND<0.535 U	ND<0.49 U	0.604	ND<0.382 U	80.2	ND<0.554 U	13.1	0.32	ND<0.20 U	1.8	13.1	ND<2.0 U	1.830	ND<0.014 N,E	0.048 N,E	0.67 N,E	4.3	7.5
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	202,000	54,300	251,000*	243,000	166,000	--	--
Chromium	43	ND<1.96 U	2.24	11.8	3.04	3.72	17.8	ND<0.440 U	7.41	9.38	9.0 E	1.4 E	39.0 E	9.38	ND<5.0 U	14.4	3.1 E	5.7 E	12.1 E	290	19
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND<5.0 U	6.3	ND<0.040 E	ND<0.040 E	1.1 E	--	--
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.1	NA	NA	NA	ND<10.1 U	17.9	3.5* E	7.7 E	17.4 E	270	1720
Total Cyanide	ND<1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11,000	NA	NA	NA	27	40
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,780 N,E	50,600	3,610*	7,170	51,900	--	--
Lead	191	ND<9.80 U	ND<0.623 U	4.18	ND<0.49 U	5.33	3.29	ND<0.440 U	80.9	15	38.1 E	NA	NA	15	ND<10.1 U	35.9	3.3 E	4.9 E	15.1 E	400	450
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28,600 E	13,200	26,100* E	39,800 E	18,200 E	--	--
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	422 E	816	256	312	634	2000	2000
Mercury	ND<0.103 U	ND<0.0690 U	ND<0.0878 U	0.0774	ND<0.098 U	0.240	ND<0.059 U	ND<0.0760 U	ND<0.045 U	0.088	0.063	ND<0.019 U	0.025	0.088	ND<0.016 U	0.0145	ND<0.0057 U	0.0090	0.0280	0.81	0.73
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10.0 E	NA	NA	NA	ND<5.0 U	14.3	4.1 E	5.6 E	12.0 E	310	130
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,060 N,E	1,510	2,290 E	2,500 E	2,250 E	--	--
Selenium	ND<1.08 U	ND<0.980 U	ND<6.23	ND<5.35 U	ND<4.9 U	ND<5.03 U	ND<3.82 U	ND<4.40 U	1.31	ND<0.367 U	ND <3.9 U	NA	NA	ND<0.367 U	ND<40.2 U	ND<0.552 U	1.1 N	1.3 N	ND<0.77 N	180	4
Silver	ND<1.08 U	ND<0.980 U	3.74	ND<2.15 U	ND<1.96 U	ND<2.01 U	ND<1.53 U	1.76	ND<1.11 U	1.79	ND <0.53 U	NA	NA	1.79	ND<5.0 U	2.4	ND<0.090 E	ND<0.091 E	ND<0.078 E	180	8.3
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND<1,410 U	489	1,230	1,160	1,290	--	--
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND <5.9	NA	NA	NA	ND<60.4 U	ND<0.662 U	2.3 N	1.8 N	0.55 N	--	--
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,800 N,E	25.5	6.3 E	12.1 E	17.8 E	--	--
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	160	NA	NA	NA	ND<10.1 U	111	3.1 N,E	7.3 N,E	47.7 N,E	10000	2480

Notes:

TAL Metals analysis by United States Environmental Protection Agency (USEPA) Methods 6010 and 7471 (Mercury)
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Public Health - Restricted Residential Use.
Highlighted type denotes that the compound exceeds its associated 6 NYCRR Part 375-6.8(b) SCO - Protection of Groundwater
NDs/372 U - Denotes the compound was not detected above the reported laboratory detection limit shown.
U - Denotes that the compound was not detected above the reported laboratory method detection limit.

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials, Region 8
6274 East Avon-Lima Road, Avon, New York, 14414-9516
Phone: (585) 226-2466 • **Fax:** (585) 226-5470
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

January 20, 2010

Mr. Mark Gregor
Port Redevelopment Manager
City of Rochester Department of Environmental Services
30 Church Street
Rochester, NY 14614

Dear Mr. Gregor:

RE: Beneficial Use Determination (BUD) Petition for the Reuse of Iron Slag Rochester(C) Monroe (C)

I've reviewed the draft BUD petition submitted by the City of Rochester for reuse of iron slag excavated as part of the Port of Rochester Marina Project. I offer the following comments:

2.1.1 Chemical Composition (General)
Considering the volume of material to be excavated during the marina project, the analytical data provided in the BUD petition is insufficient to establish the composition of the slag and to demonstrate it is consistent. A minimum of one composite sample for every 10,000 ton of slag to be excavated is required. The samples should be tested for total (bulk) RCRA metals (mg/kg) using EPA methods 6010C with 7471B for mercury. If these results are lower than Table 375-6.8(b) "Protection of Groundwater" values, SPLP analysis will not be required.

A review of the reports generated as part of the Autumn Height slag removal project indicate there were at least four (4) different colors of slag excavated during the Fast Ferry Project. It is assumed the same variation will be present in the slag that will be excavated constructing the marina. The BUD petition should address possible physical and chemical variations in the different colored slag. This will require physical and chemical analysis. Depending on where the samples used to characterize the site for the Fast Ferry Project were taken, some of that analytical data may be useable for this purpose.

2.1.5 Analytical Testing of Site Slag Fill
As you mentioned at our meeting, using Part 375-6 soil cleanup objectives as a reference in the SPLP data table ("Table 2") is inappropriate. Please use Part 703 ground water standards as the reference in this table. "Table 2" contains the SPLP results for two samples. Three (3) SPLP reports are included in the petition. All SPLP results should be included in "Table 2".

As analytical testing can yield minimum detection levels above guidance values, non-detect value results should be listed as "less than values". For example if the minimum detection value

for a contaminant is 0.05 ug/l, a non-detect value should be listed as < 0.05 ug/l.

Please be aware 6NYCRR Part 375 was developed for use by the Division of Environmental Remediation (DER) for use in the Brownfields clean-up program. The Division of Solid and Hazardous Materials (DSHM) utilizes some of these guidance values for evaluating BUD petitions. In general, materials with contaminate levels that do not exceed the lower of the values listed in "Table 375-6.8(b) "Residential" and "Protection of Groundwater" can be considered by the department for a BUD.

Normally, the values in the columns labeled "Restricted Residential", "Commercial" and "Industrial" in Table 375-6.8(b) are not used to evaluate a material's eligibility for a case specific BUD. As such, they should not be used as reference values in the BUD petition.

2.2 Material Processing, and 2.2.1 Material Excavation
6 NYCRR Part 360-1.15 (d) (1) lists information that should be included in all case specific BUD petitions. The petition submitted lacks a solid waste control plan that describes the following: [see 360-1.15 (d) (1) (iv) (a)]

- The disposition of any solid waste which may result from the manufacture of the product into which the solid waste under review is intended to be incorporated;
- A description of the type of storage (e.g., tank or pile) and the maximum anticipated inventory of the solid waste under review (not to exceed 90 days) before being used;
- Procedures for run-on and run-off control of the storage areas for the solid waste under review; and
- A program and implementation schedule of best management practices designed to minimize uncontrolled dispersion of the solid waste under review before and during all aspects of its storage as inventory and/or during beneficial use.

  *Please note a dust control and monitoring plan for the crushing operation must be included as part of the best management practices program.

The petition indicates slag will be excavated, dewatered, stockpiled (unprocessed), crushed, screened, and stockpiled (processed) on about a 2.5 acres section of the site, and that off-site stock piling of finished product may be necessary. Any off-site location used for stock piling unsold, processed slag will require Department approval. Off-site storage, and/or processing of unprocessed slag, would require a permit.

Be aware that if a BUD is granted, excavated slag will continue to be regulated as a solid waste until such time that it has been processed into a product.

- All products would need to consist of slag with a deminimus quantity of physical contamination, meet applicable industry specifications, and require no additional processing by the end user.
- Aggregate produced for use as road base or sub-base would need to meet NYSDOT specification for Type 1 or Type 2 aggregate.
- Slag derived aggregate produced for use as chip & seal aggregate, or for use in Portland cement would need to meet the specification of potential end users.

Examples of typical end user specifications, and a letter from these users indicating such material is acceptable for their use, should be included in the BUD petition. The Department suggests the City contact NYSDOT to prequalify the slag as an acceptable source of aggregate for NYSDOT projects.

General comments:

The petition should include a description of the type of arrangement the City will enter into with the contractor that will process the slag. Please indicate if the slag will be sold by the City to the contractor unprocessed, or if the city will retain ownership until the processed material is sold to the end user.

Several of the cross sectional drawings show a layer identified as "regulated waste", please identify the waste, and indicate how it will be removed from and kept segregated from the slag. Please indicate how the regulated waste will be disposed of.

Finally, at the conclusion of our meeting you mentioned the City may propose using slag as fill in Lake Ontario to alter water flow patterns by the Ontario Beach Pier. Please be aware such use would require approval/input from other NYSDEC Divisions. If this reuse is being considered it should be included in the BUD petition. It is likely additional analytical testing of the slag would be required if this reuse is proposed.

If you or your consultant has any questions concerning this letter, or BUDs in general, please contact me at (585) 226-5414 or gmmaslan@gw.dec.state.ny.us.

Sincerely,

Gary Maslanka
Environmental Engineer

cc: Scott Foti, NYSDEC
Tom Haley, NYSDEC

City of Rochester

Office of the Commissioner
Department of Environmental Services
City Hall Room 300B, 30 Church Street
Rochester, New York 14614-1290
www.cityofrochester.gov

Division of
Environmental Quality

March 11, 2011

Mr. Gary Maslanka, P.E.
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Re: Beneficial Use Determination (BUD) Petition for Reuse of Iron Slag
Port of Rochester, Rochester, New York
Response to NYSDEC Comments dated January 20, 2010

Dear Mr. Maslanka:

Enclosed are two hard copies and one electronic copy of the City's Port Slag BUD application and associated Solid Waste Control Plan for your consideration. The Port Marina Development Project continues to be a top priority for the City of Rochester. The new marina and associated redevelopment combine the promise of the creation of a regional significant recreational destination with unique opportunities for mixed-use redevelopment and associated economic growth. As we have discussed previously, approximately one third of the volume of material required to be excavated for the marina basin is expected to be iron slag from a former iron works located on a portion of the Port site. An effective beneficial use determination for the iron slag that will be removed during the marina project is crucial to the financial viability of the project. The City has considered options available for the beneficial reuse of the slag and how the sorted and processed slag can be contractually managed. In order to ensure that this slag is managed in a responsible and cost-effective manner the City intends to direct the reuse of the slag to City project sites and capital programs. These uses will generally be for public works and other commercial-type applications undertaken by the City. The City will ensure that slag is not used in residential settings.

We have also carefully considered the comments and suggestions provided in your January 20, 2010 letter. The City, with the support of our BUD consultant team, LaBella Associates and Benchmark, offers the following responses:

Comment 1: *Section 2.1.1 Chemical Composition (General) & Section 2.2.2*

Considering the volume of material to be excavated during the marina project, the analytical data provided in the BUD petition is insufficient to establish the composition of the slag and to demonstrate it is consistent. A minimum of one composite sample for every 10,000 ton of slag to be excavated is required. The samples should be tested for total (bulk) RCRA metals (mg/kg) using EPA methods 6010C with 7471B for mercury. If these results are lower than Table 375-6.8(b) "Protection of Groundwater" values, SPLP analysis will not be required.

RESPONSE: Acknowledged. The referenced sections and other applicable sections of the report have been revised.

Comment 2: *Section 2.1.1 Chemical Composition (General)*

A review of the reports generated as part of the Autumn Height slag removal project indicate there were at least four (4) different colors of slag excavated during the Fast Ferry Project. It is assumed the same

variation will be present in the slag that will be excavated constructing the marina. The BUD petition should address possible physical and chemical variations in the different colored slag. This will require physical and chemical analysis. Depending on where the samples used to characterize the site for the Fast Ferry Project were taken, some of that analytical data may be useable for this purpose.

RESPONSE: Appendix F, containing tabulated analytical results from the previous analysis of slag from the Port site including a discussion of the different colored slag has been added to Section 2.1 of the BUD petition. After reviewing existing laboratory analytical data associated with the various Port slag color types, we do not find chemical "fingerprints" or patterns associated with specific slag colors.

Comment 3: Section *2.1.5 Analytical Testing of Site Slag Fill*
As you mentioned at our meeting, using Part 375-6 soil cleanup objectives as a reference in the SPLP data table ("Table 2") is inappropriate. Please use Part 703 ground water standards as the reference in this table. "Table 2" contains the SPLP results for two samples. Three (3) SPLP reports are included in the petition: All SPLP results should be included in "Table 2".

RESPONSE: Table 2 has been corrected to show all three (SPLP) summary data.

Comment 4: Section *2.1.5 Analytical Testing of Site Slag Fill*

As analytical testing can yield minimum detection levels above guidance values, non-detect value results should be listed as "less than values". For example if the minimum detection value for a contaminant is 0.05 ug/l, a non-detect value should be listed as < 0.05 ug/l.

RESPONSE: Acknowledged. Tables 1 and 2 have been revised accordingly.

Comment 5: Section *2.1.5 Analytical Testing of Site Slag Fill*

Please be aware 6NYCRR Part 375 was developed for use by the Division of Environmental Remediation (DER) for use in the Brownfields clean-up program. The Division of Solid and Hazardous Materials (DSHM) utilizes some of these guidance values for evaluating BUD petitions. In general, materials with contaminate levels that do not exceed the lower of the values listed in "Table 375-6.8(b) "Residential" and "Protection of Groundwater" can be considered by the department for a BUD.

Normally, the values in the columns labeled "Restricted Residential", "Commercial" and "Industrial" in Table 375-6.8(b) are not used to evaluate a material's eligibility for a case specific BUD. As such, they should not be used as reference values in the BUD petition.

RESPONSE: In order to ensure that reuse of processed slag is limited to City public works and commercial-type applications the City intends to retain control of the slag throughout the marina construction project as well as its beneficial reuse. A review of the available data indicates that while there are some data in excess of the Residential values in 375-6.8 the slag consistently meets Restricted Residential values. We believe that by closely controlling the reuses of the slag the City can beneficially reuse the slag and meet the intent of the Department to prevent improper reuses. The City's proposed uses of the reclaimed slag are all non-residential in nature (i.e., road base, structural fill for City facilities, etc.) with very limited potential for direct contact. Consistent with this approach and level of reuse control, we propose that processed slag not exceed the lower of the values listed in "Table 375-6.8(b) "Restricted Residential" and "Protection of Groundwater" for this BUD. We believe that this approach is both protective of public health and makes the best use of the slag that will be removed during the project as a cost-effective resource.

Comment 6: *Sections 2.2 Material Processing, and 2.2.1 Material Excavation*

6 NYCRR Part 360-1.15(d)(1) lists information that should be included in all case specific BUD petitions. The petition submitted lacks a solid waste control plan that describes the following: [see 360-1.15(d)(1)(iv)(a)]

- *The disposition of any solid waste which may result from the manufacture of the product into which the solid waste under review is intended to be incorporated;*
- *A description of the type of storage (e.g., tank or pile) and the maximum anticipated inventory of the solid waste under review (not to exceed 90 days) before being used;*
- *Procedures for run-on and run-off control of the storage areas for the solid waste under review; and*
- *A program and implementation schedule of best management practices designed to minimize uncontrolled dispersion of the solid waste under review before and during all aspects of its storage as inventory and/or during beneficial use.*

**Please note a dust control and monitoring plan for the crushing operation must be included as part of the best management practices program.*

RESPONSE: Reference to the required Solid Waste Control Plan (SWCP) has been added to section 2.2.3 of the BUD petition. The SWCP, which addresses the requirements identified in Comment 6, has been prepared and is enclosed.

Comment 7: *Sections 2.2 Material Processing, and 2.2.1 Material Excavation*

The petition indicates slag will be excavated, dewatered, stockpiled (unprocessed), crushed, screened, and stockpiled (processed) on about a 2.5 acres section of the site, and that off-site stock piling of finished product may be necessary. Any off-site location used for stockpiling unsold, processed slag will require Department approval. Off-site storage, and/or processing of unprocessed slag, would require a permit.

RESPONSE: Acknowledged. Section 2.2.1 has been modified to include the statement that "Any off-site location used for stockpiling unsold, processed slag will require Department approval. Off-site storage, and/or processing of unprocessed slag, would require a permit." Due to limitations on the available acreage on site for construction activities the City expects to stockpile processed slag off site on City controlled property. We will identify proposed off-site storage locations to the Department as early as possible during the project.

Comment 8: *General Comment*

All products would need to consist of slag with a deminimus quantity of physical contamination, meet applicable industry specifications, and require no additional processing by the end user.

RESPONSE: Acknowledged.

Comment 9: *General Comment*

Aggregate produced for use as road base or sub-base would need to meet NYSDOT specification for Type 1 or Type 2 aggregate.

RESPONSE: The City's BUD application will identify required specifications or gradations required for each type of reuse that is contemplated. In some cases this may include DOT Type 1 or 2 aggregate specifications or similar requirements to be determined by the City Engineer. The requirements will also be established based on the particular reuse. The City Engineer will approve the materials suitability for all potential uses of reclaimed slag in City capital or

maintenance projects, including, but not limited to reuses in the Port of Rochester construction projects.

Comment 10: *General Comment*

Slag derived aggregate produced for use as chip & seal aggregate, or for use in Portland cement would need to meet the specification of potential end users.

RESPONSE: Acknowledged. The City, as the potential end user, will evaluate the specification requirements for slag aggregate in applications in the Port marina project and other applications. We have also identified chip seal aggregate as a potential municipal reuse in our BUD application.

Comment 11: *General Comment*

Examples of typical end user specifications, and a letter from these users indicating such material is acceptable for their use, should be included in the BUD petition. The Department suggests the City contact NYSDOT to prequalify the slag as an acceptable source of aggregate for NYSDOT projects.

RESPONSE: As mentioned in the response to Comment 9 above, the City's BUD application identifies contemplated slag reuses, locations where possible, volumes needed, and general material gradation or specification requirements. This list of municipal reuses is not intended to be precise with regard to the quantities but to provide the range of realistic potential City reuses. We believe that the information provided in this list meets the intent of 6NYCRR Part 360-1.15(d)(1)(iii) which requires a demonstration that there is a known or reasonably probable market for the intended use of the solid waste under review for a BUD. We anticipate informing the NYSDEC about actual reuses as they are confirmed and prior to the actual reuse taking place.

We are also providing generally available slag reuse information that illustrates that slag has received previous NYSDEC BUD approvals, the Portland Cement Associations: Sustainable Materials Fact Sheet (Appendix D of the BUD petition) illustrates its use for slag, and Appendix A contains the National Slag Association's information booklet for the reuse of slag.

Comment 12: *General Comment*

The petition should include a description of the type of arrangement the City will enter into with the contractor that will process the slag. Please indicate if the slag will he sold by the City to the contractor unprocessed, or if the city will retain ownership until the processed material is sold to the end user.

RESPONSE: We have determined that the most appropriate contractual approach is for the City to maintain ownership of the slag while it is being processed on site. Although the City had also considered contractually "selling" the slag to the contractor we now plan to retain control of the reuse of the processed slag. The City will maintain ownership and control of the reclaimed slag for on-site use in the marina project, off-site storage, and use on other City projects. The processing of the reclaimed slag will be included as a component of the overall marina contract documents. The contract documents will include the BUD, BUD petition and SWCP. The contract documents will also include specifications to the contractor regarding slag excavation, and the City's agreement for engineering inspection services will include requirements for identifying, monitoring, tracking and inspecting slag and slag management activities.

Comment 13: *General Comment*

Several of the cross sectional drawings show a layer identified as "regulated waste", please identify the waste, and indicate how it will he removed from and kept segregated from the slag. Please indicate how the regulated waste will be disposed of.

RESPONSE: Acknowledged. We believe a more appropriate description of the referenced fill materials is "mixed fill" as it may contain some solid waste as well as intermixed construction and demolition debris, soil, slag and historic fill. In section 2.2.1 a discussion of removing the "regulated waste" from the slag has been added. The "regulated waste" will then be handled in accordance with the overall project environmental management plan and contract documents which will direct the management and disposal of non slag waste materials.

Comment 14: *General Comment*

Finally, at the conclusion of our meeting you mentioned the City may propose using slag as fill in Lake Ontario to alter water flow patterns by the Ontario Beach Pier. Please be aware such use would require approval and input from other NYSDEC Divisions. If this reuse is being considered it should be included in the BUD petition. It is likely additional analytical testing of the slag would be required if this reuse is proposed.

RESPONSE: Acknowledged. While the conditions of the pier and beach water quality remains of interest and concern to the City we are not pursuing this option at this time.

Thank you for your continued assistance and patience with this matter. Please contact us if you have any questions or require additional information. We look forward to working with you on this important project.

Sincerely,

Mark D. Gregor, CHMM
Manager, Division of Environmental Quality

Enclosures

C: P. Holahan W/O Enc.
J. McIntosh W/O Enc.
T. Hubbard W/O Enc.
T. Haley, NYSDEC W/O Enc.
D. Porter, LaBella Associates W/O Enc.
P. Werthman, Benchmark W/O Enc.

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Joe Martens
Commissioner

June 20, 2011

Mr. Mark Gregor
Port Redevelopment Manager
City of Rochester Department of Environmental Services
30 Church Street
Rochester, NY 14614

Dear Mr. Gregor:

RE: Beneficial Use Determination (BUD) Petition for Iron Slag
Rochester(C) Monroe (C)

NYSDEC staff has reviewed the BUD petition submitted by the City of Rochester for the iron slag that will be excavated as part of the Port of Rochester Marina Project. The data included in the petition suggests products produced from the slag might be able to serve as an effective aggregate substitute, if used above the water table. However, the petition lacks information on the product(s) that will be produced, where and how the product(s) will be used, and how the product(s) will be stored prior to use. As such, the petition fails to demonstrate that there is a known or reasonably probable market for the material and a BUD cannot be granted at this time.

The petition indicates the City of Rochester plans to retain ownership of the slag and use the derived product(s) in unspecified city projects. To help clarify the types of uses/projects being proposed and to demonstrate a "market" for the product(s) please provide the following:

1) A description of, and specification for, the products that will be produced,

2) A letter from the City of Rochester Engineering Department listing the types of project at which the product(s) will be used. To the extent possible include a list of specific project with an approximate volume of product that will be used at each. This letter should be signed by the city engineer and should contain a statement indicating the proposed product(s) meet their city's specification for the intended use.

3) A list of City owned properties (address and site description) at which the product(s) will be stored prior to use. Include a description of the inventory controls that will be used to insure the product(s) are used as approved by the BUD.

Please remember the excavated slag will be regulated as a solid waste until such time that it has been processed into a product. All product(s) produced must contain a deminimus quantity of physical contamination, and require no additional processing prior to use.

As I indicated in my January letter, producing a product that meets the specification for NYSDOT Type 1 or Type 2 aggregate would increase the number of approvable applications and simplify storage and inventory control requirements.

If you or your consultant has any questions concerning this letter, please contact me at (585) 226-5414 or gmmaslan@gw.dec.state.ny.us.

Sincerely,

Gary Maslanka
Environmental Engineer

cc: S. Foti, NYSDEC
K. Prather NYSDEC
T. Haley, NYSDEC

City of Rochester

Department of Environmental Services
City Hall Room 300B, 30 Church Street
Rochester, New York 14614-1290
www.cityofrochester.gov

one city Bureau of Architecture and Engineering

September 19, 2012

Mr. Gary Maslanka, P.E.
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Re: Beneficial Use Determination (BUD) Petition for Reuse of Iron Slag
Port of Rochester, Rochester, New York
Response to NYSDEC Comments dated June 20, 2011

Dear Mr. Maslanka:

This letter is in response to the additional information requested in your June 20, 2011 letter to Mark Gregor regarding the City BUD petition for iron slag at the Port of Rochester. After the completion of an extended SEQR process the City is now proceeding into final marina design with the goal of beginning construction in the first half of 2013.

We are proposing that the slag product generated by the Marina project meet specifications defined in the NYSDOT Standard Specifications, as updated through September 6, 2012. We anticipate that some level of processing, e.g. crushing, blending, etc, will be necessary to achieve gradations specified under certain items. Although we are proposing a number of City of Rochester projects and reuses we understand that the use of the slag product on NYSDOT or FHWA sponsored projects would require the approval of the NYSDOT, and product stock piles would need to be deemed "approved sources" for intended uses so that the quantities placed are eligible for state and/or federal reimbursement.

Listed below are the additional items requested in your June 20, 2011 letter and followed by the City's response:

I) A description of, and specification for, the products that will be produced.

Proposed BUD NYSDOT specifications and associated material descriptions:

304.15 Subbase Course, Optional Type
Types 1, 3 and 4 Subbase materials may consist of approved Blast Furnace Slag, Stone, Sand, and Gravel, or blends of these materials. For Type 2, materials consisting of approved Blast Furnace Slag or of Stone which is the product of crushing or blasting ledge rock, or a blend of Blast Furnace Slag and of Stone.

203.03 Embankment In Place
In general, any mineral (inorganic) soil, blasted or broken rock and similar materials of natural or man-made (i.e. recycled) origin, including mixtures thereof, are considered suitable materials.

203.21 Select Structural Fill
Material consisting of rock, stone, slag, cobbles, or gravel, substantially free of shale or other soft, poor durability particles

2) A letter from the City of Rochester Engineering Department listing the types of project at

which the product(s) will be used. To the extent possible include a list of specific project with an approximate volume of product that will be used at each. This letter should be signed by the city engineer and should contain a statement indicating the proposed product(s) meet their city's Specification for the intended use.

This letter is being submitted by the City Engineer in order to meet the requirements of item 2.

The City will use the slag product on public works projects, in the public right of way, and on City of Rochester properties not intended for residential re-use. In general, slag product will be suitable for reuse on highway projects as road and sidewalk sub-base, for gravel parking lot construction, or as general backfill. Slag product has been identified for the following list of currently planned and potential projects and recurring municipal uses:

1. Ridgeway Avenue (Ramona to Minder)
This City street reconstruction project is planned and the City will need approximately 10,000 cubic yards of material that meets the NYSDOT 304.15 specification.

2. Durand Eastman Beach parking lot improvements.
Much of the parking area for Durand Beach is currently unimproved dirt and gravel and would benefit from improvements. The potential volume of slag product could be up to 5,000 cubic yards assuming an application of 12 inches of product meeting the DOT 304.15.

3. Inner Loop East Project
The City is working on plans to reconstruct a 2/3 mile stretch of the eastern segment of the Inner Loop between Monroe Avenue and Charlotte Street into a multi-lane, street-level boulevard.
The City is in the process of developing the design for the Inner Loop East Project. Approximately 155,333 cubic yards of fill will be required for the project. It is expected that as much as 50,000 cubic yards of material meeting DOT 203.03 specifications will be required for the project. As the design progresses more refined estimates of the volume of slag product that could be used will be developed. Based on the estimates of slag which could be removed from the marina project site it is possible that the majority of the slag product would be reused on the Inner Loop project alone. The City is planning a new application to the Recovery Act-funded Transportation Investment Generating Economic Recovery (TIGER) grant program for the Inner Loop East Project.

4. 354 Whitney Street and 415 Orchard Street
The site which is being investigated under the Environmental Restoration Program contains substantial tunnels and subsurface structures that will require filling and on portions of the site rough grading with select structural fill and or embankment in place. Estimated quantities for this site would be about 2-3,000 cubic yards.

5. Select structural fill
The City periodically requires substantial fill for municipal new or existing municipal facilities. In general these types of project would require DOT 203.21 for foundation backfill. The availability of a stockpile of slag product would be a very helpful resource to the City.

6. Right-of-Way excavation backfill
The City of Rochester routinely performs excavations for utility repairs and replacement within the public right-of-way. These excavations are backfilled and restored using material that requires DOT 304.15 requirements. The City annually completes about 750 of these excavations and approximately 3,500 cubic yards of such backfill material.

7. 1655 Lexington Avenue – Former Emerson Street Landfill
At this 23.9 acre site slag product could be used for haul/access road preparation, re-grading, berming, and base layer construction for a final cover system. Approximately 10,000 to 15,000 cubic yards of slag product could be used for these purposes. The slag reuses associated with this location are part of the area of the City's former Emerson Street Landfill that remains on the NYS Inactive Hazardous Waste Disposal Site Inventory. Depending on the specific reuse, each of the three proposed product specifications would be used. The proposed slag staging and reuse would be coordinate with the Division of Environmental Remediation. The City is currently planning on completing remedial investigation activities at this site over the next year and proceeding into remedy selection.

The City of Rochester has also previously developed project-specific material specifications for unique applications. Most recently a special specification was developed for the Broad Street tunnel filling project. Although we are not proposing a special specification at this time we would like to identify the procedure for modifying the slag BUD if a project is identified in the near future that would require a slag product with a special specification.

The proposed specifications for the slag product indicated in item 1) above are consistent with the requirements for the projects and uses listed above and meet the City's specification for the intended use.

3) A list of City owned properties (address and site description) at which the product(s) will be stored prior to use. Include a description of the inventory controls that will be used to insure the product(s) are used as approved by the BUD.

The City proposes to use secure, City-owned properties at 1655 Lexington Avenue and 210 Colfax Street for storage of slag product for subsequent reuse. The City proposes to use approximately 11.7 acres (northern portion) of the 23.9 acre parcel located at 1655 Lexington Avenue and a portion of the 18.9 acre City Operations Bureau facility at 110-210 Colfax Street for storage of slag product produces during the port marina project.

Both locations are fenced, gated, locked, and under the direct control of the City of Rochester. Reuse of the slag product and the slag inventory will be controlled by the Manager of the City's Division of Environmental Quality. Potential reuse locations and projects, including those listed above under item 2), will be reviewed by the DEQ for consistency with the limitations approved by the NYSDEC. In addition, the City Engineer will evaluate the engineering and geotechnical suitability of the slag product for each proposed reuse.

The City DEQ will track the amounts, by volume, of slag product leaving the storage sites as well as the locations where the product is being beneficially reused. Periodic storage area inspections will be performed. Inventory tracking records will be maintained by the City DEQ until all the product has been beneficially reused at which point a final inventory control report will be prepared. As indicated in the City's March 2011 letter the intended reuses will be restricted to non-residential applications.

Thank you for your continued assistance and patience with this matter. Please contact us if you have any questions or require additional information. We look forward to working with you on this important project.

Sincerely,

Jim McIntosh, PE
City Engineer

xc: T. Caffoe, NYSDEC Region 8
P. Holahan
M. Gregor
T. Hubbard
T. Haley, NYSDEC
D. Porter, LaBella Associates
P. Werthman, Benchmark

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City of Rochester

Office of the Commissioner
Department of Environmental Services
City Hall Room 300B, 30 Church Street
Rochester, New York 14614-1290
www.cityofrochester.gov

Division of
Environmental Quality

January 9, 2012

Mr. Gary Maslanka, P.E.
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Re: Beneficial Use Determination (BUD) Petition for Reuse of Iron Slag
Port of Rochester, Rochester, New York
Response to 12-27-2012 email questions

Dear Mr. Maslanka:

This letter is in response to your email of 12-27-2012 and our subsequent telephone conversation regarding additional details about the volumes of the proposed NYSDOT specifications identified in the letter of September 19, 2012 from the City Engineer to you. In your email you posed the following questions:

> *"...it is not clear to me what gradation specification the slag will be processed to prior to storage? and eventual reuse. Do you plan to process know volumes of slag into type 1, type 2, type 3, and type 4, aggregate then store that material for later use at one of the listed locations? If yes this approach will work and I just need to get a rough estimate on the various volumes. If not I will need a bit more information on your plan for processing and storing the material."*

We have proposed producing 304.15 Subbase Course, Optional Type, 203.03 Embankment In Place, or 203.21 Select Structural Fill from the slag material excavated from the site. The production of one or more of these specifications from excavated slag will take place on the site before transportation to one of the proposed off-site staging locations.

The City's determination regarding which DOT specifications will be produced and in what volumes is very much cost dependent. Of the three specifications that we have proposed under the BUD we anticipate that 304.15 Subbase Course, Optional Type involve the most handling and would have the most cost to produce. The City currently intends to decide which DOT specifications to produce and the approximate volumes after it receives bids from the contractor. No processing of slag will take place until after a notice to proceed is issued to the selected contractor. The notice to proceed will be issued only after bids are opened and reviewed and the contract is awarded. The City will contact you prior to the issuance of the notice to proceed regarding its determination of the slag specification(s) that will be produced. Also if at some point after the BUD approval is issued by the NYSDEC the City determines that a different special specification would be desirable to produce we will contact your office with information about the proposed specification and use. We understand that the BUD would need to be modified prior to include the special specification and slag product use prior to production.

Thank you for your continued assistance this matter. Please contact us if you require any additional information in order to approve our BUD application.

Sincerely,

Mark Gregor
Manager, Division of Environmental Quality

C: T. Caffoe, NYSDEC Region 8
P. Holahan
J. McIntosh, City Engineer.
T. Hubbard W/O Enc.
T. Haley, NYSDEC
D. Porter, LaBella Associates
P. Werthman, Benchmark