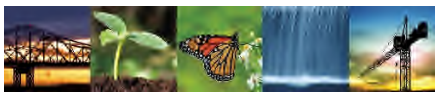

Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

GZA GeoEnvironmental of NY
104 West 29th Street
10th Floor
New York, NY 10001
212.594.8140
www.gza.com

September 30, 2015
File No. 12.0076158.00

Charles Post, Engineering Geologist
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7016

Subject: Addendum to the Remedial Action Work Plan # 2
Oxygen Release Compound Application
Silver Star Motors Site
37-14 36th Street
Long Island City, New York
NYSDEC Site No. C241156

Dear Mr. Post:

Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA) has received the June 26, 2014 Decision Document prepared by the NYSDEC approving the *Revised* Remedial Action Work Plan (RAWP) for the NYSDEC Site No. C241156 located at 37-14 36th Street, Long Island City (herein referred to as the "Site"). The approved RAWP states that all on-Site soils at the Site that exceed restricted-residential Soil Cleanup Objectives (SCOs) (Track 4), as defined by 6 NYCRR Part 375-6.8, will be excavated and transported off-Site for disposal. In addition, Oxygen Release Compound (ORC) was proposed to be placed in the excavation back fill in accordance with the manufactures recommendations. On September 25, 2015, the NYSDEC requested that the ORC application design be submitted to the NYSDEC for review.

This document is an addendum to the approved Remedial Action Work Plan and includes the following information used to design the ORC placement program:

- Attachment 1: A cross section showing the location of observed petroleum impacted soils and total petroleum hydrocarbon concentrations in soil as depicted in the previously submitted waste characterization report;
- Attachment 2: A soil sample location plan from the previously submitted waste characterization report;
- Attachment 3: The groundwater gradient map from the previously submitted remedial investigation report;
- Attachment 4: A figure showing a summary of soil cleanup objective exceedances from the previously submitted remedial investigation report;
- Attachment 5: A figure showing a summary of the groundwater ambient quality water standard exceedances;

- Attachment 6: The proposed area of ORC application based on physical and chemical evidence of petroleum impacted soils and groundwater;
- Attachment 7: The Regensis Design Input Form based on and including data generated in the previously submitted remedial investigation report; and
- Attachment 8: The ORC Advanced Pellets Application Design Summary provided by Regenesis.

Remedial Objectives

The remedial action objective (RAO) of the ORC application is:

- To allow for accelerated natural attenuation of any residual absorbed or dissolved petroleum contamination beneath the proposed building slab that may remain following excavation at the Site.
- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards; and,
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.
- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.

ORC Advanced Pellets Application Design

GZA provided Regenesis with Site specific data (Attachments 1 through 7) including:

- The length of the petroleum impacted area (120 feet);
- The width of the petroleum impacted area (120 feet);
- The top of the Treatment Area (12 feet bgs);
- The bottom of the Treatment Area (14 feet bgs);
- The type of soils at the Site (fine to medium sands);
- The maximum concentrations of petroleum compounds in soil and groundwater (see attachments); and
- Site specific hydrogeologic data including estimates of porosity, hydraulic gradient and hydraulic conductivity as summarized in the remedial investigation report.

This information was used by Regenesis to calculate the amount of ORC Advanced Pellets required to biodegrade approximately 63 pounds of total petroleum hydrocarbons using known chemical and geologic relationships as well as standard chemical stoichiometry (Attachment 8). Regenesis recommended the application of 1,267 pounds of ORC Advanced Pellets for the treatment area or 0.2 pounds per square foot in the treatment area; see Attachment 8.

Proactive by Design

ORC Advanced Pellets Placement

The NYSDEC Decision Document, as well as the approved RAWP, called for the excavation of impacted soils to a depth to accommodate the building foundation elements. Therefore, soils will be excavated to approximately 14 feet below ground surface across the Site. This is approximately 3 feet below the observed water table. So, an active dewatering system will depress the water table to below 14 feet bgs during excavation and construction of the final building foundation slab.

Within the petroleum impacted area, ORC Advanced pellets will be added at an application rate of approximately one 55-pound container per 225 square foot area (15' x 15') once the excavation has been completed to final grade. The ORC pellets will be raked into the exposed soils either by hand or with excavation equipment. Following placement of ORC into the soils, a layer of gravel will in placed over the treated soils and the building foundation working mat slab will be poured over the gravel. Once the working mat slab cures, the structural foundation slab will be installed along with the approved vapor barrier liner/water proofing material. As the foundation slab cures the structural engineer will inform the contractor when the dewatering operations can be turned off. At that point, the depressed water table will rise to its static level and make contact with the ORC Advanced pellets resulting in hydration of the ORC and release of oxygen into the water table.

Due to the presence of additional oxygen released through the ORC Advanced pellets, the earthwork and/or concrete contractor will be advised that the appropriate health and safety procedures will need to be implemented.

Should you have any questions or comments, please contact David Winslow at 973-774-3300.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

David Winslow, Ph.D., P.G.
Principal

Ernest Hanna, P.E.
Principal/Consultant Reviewer

Proactive by Design

CERTIFICATIONS

I, Ernest Hanna, certify that I am currently a New York State Registered Professional Engineer and that this Remedial Action Work Plan Addendum was prepared in accordance with all applicable statutes and regulations and in substantial conformance with DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

Ernest R. Hanna, P.E
PE Name

065440
NYS PE License Number

09/30/15

Attachements:

- Attachment 1: A cross section showing the location of observed petroleum impacted soils and total petroleum hydrocarbon concentrations in soil as depicted in the previously submitted waste characterization report;
- Attachment 2: A soil sample location plan from the previously submitted waste characterization report;
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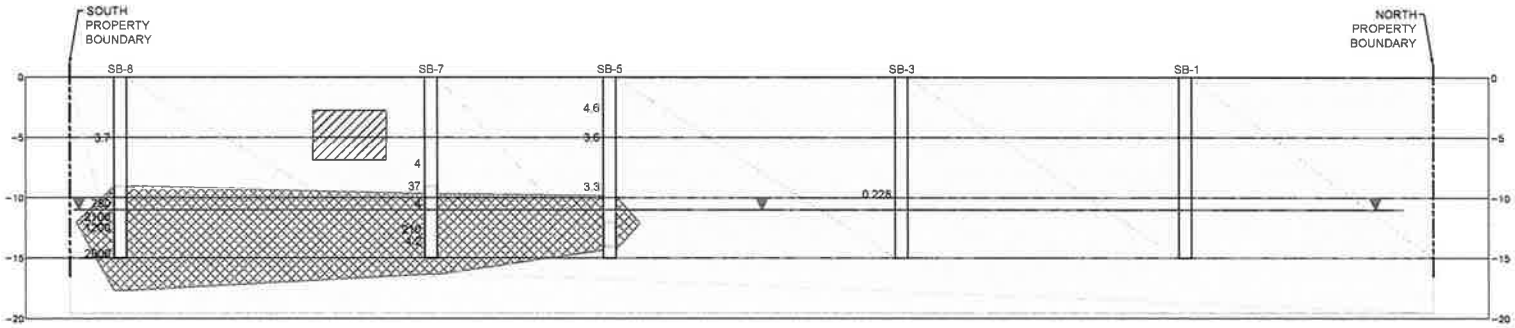
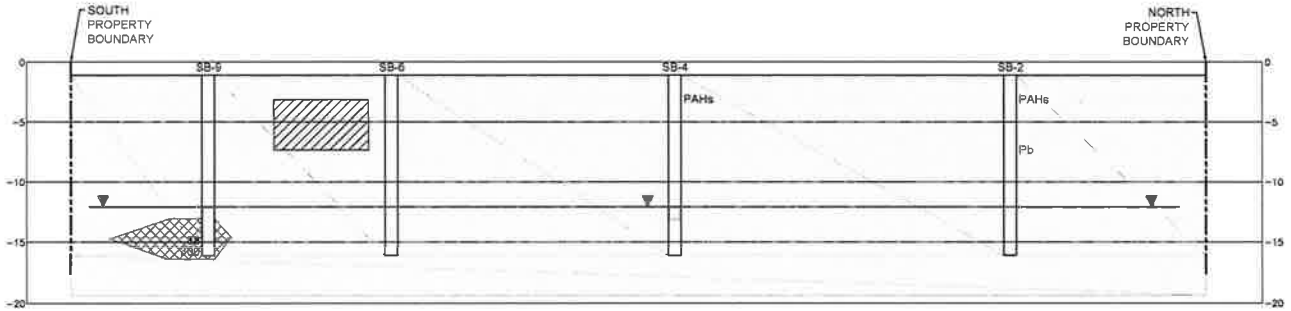
- Attachment 7: The Regensis Design Input Form including based on data generated in the previously submitted remedial investigation report;
- Attachment 8: The ORC Advanced Pellets Application Design Summary for provided by Regenesis;
- Attachment 9: MSDS for ORC Pellets

Attachment 1





0 5' 10' 20'
VERTICAL SCALE IN FEET

0 10' 20' 40'
HORIZONTAL SCALE IN FEET

LEGEND:

- PROPERTY BOUNDARY
- SAND
- ODORS NOTED IN STAINING
- GEOPHYSICAL ANOMALY
- PETROLEUM IMPACTED SOIL
- 3.6 TPH-GRO
- APPROXIMATE GROUNDWATER ELEVATION

37-14 36TH STREET
QUEENS, NEW YORK

WASTE WATER QUALITY CONTROL APPLICATION
CROSS SECTIONS

PREPARED BY: GZA GeoEnvironmental of New York, Engineers and Scientists, 104 WEST 29TH STREET, 10TH FLOOR, NEW YORK, NEW YORK 10001		PREPARED FOR: JANS REALTY, LP	
PROJ MGR: HT	REVIEWED BY: HT	CHECKED BY: HT	FIGURE 8
DESIGNED BY: HT	DRAWN BY: MT	SCALE: N.T.S.	
DATE: JANUARY 2014	PROJECT NO.: 41.0076158.02	REVISION NO.:	SHEET NO.

Attachment 2

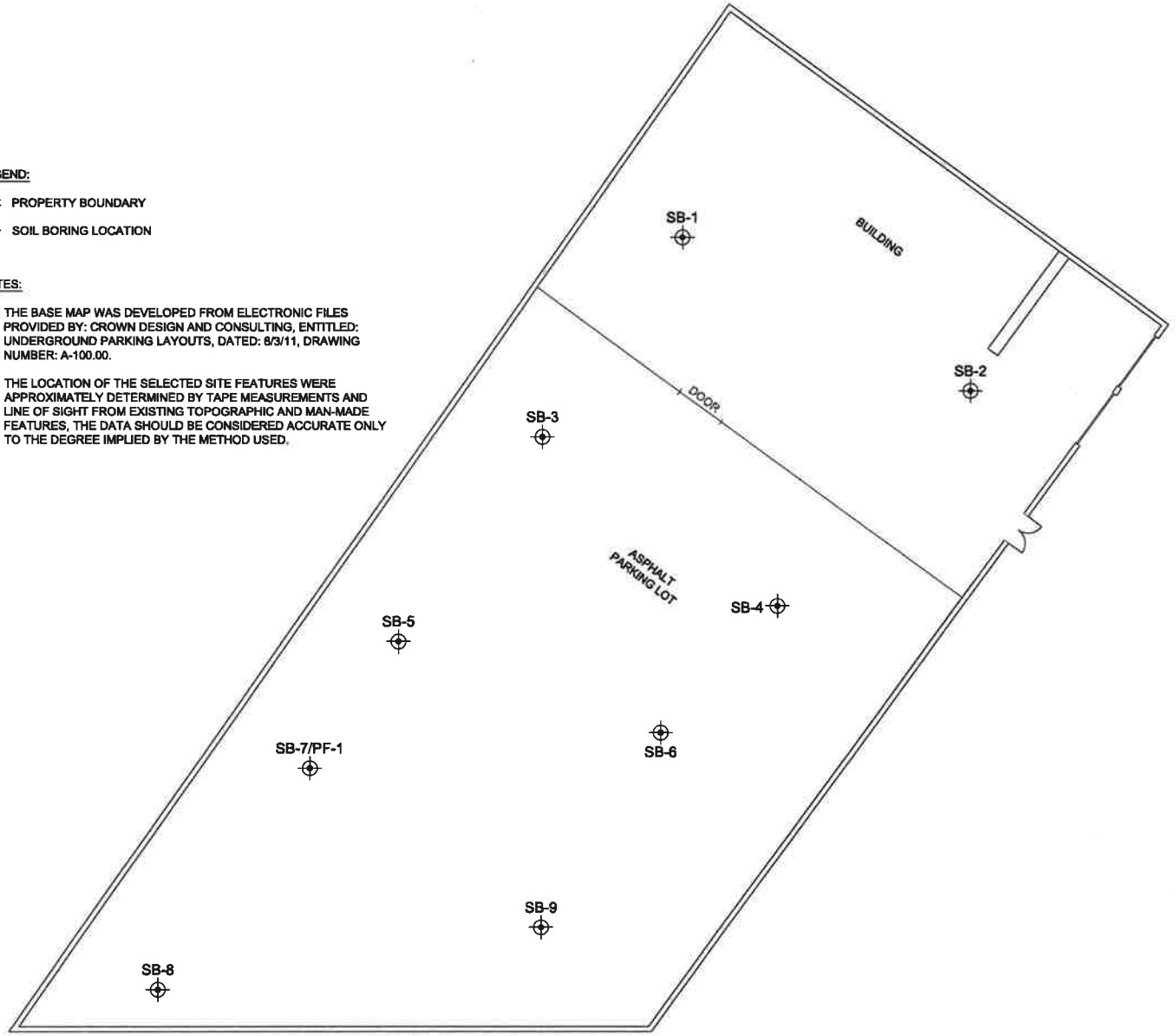
LEGEND:

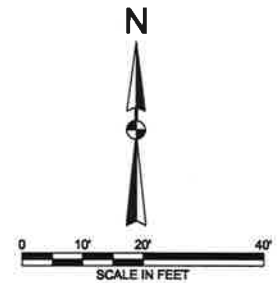
PROPERTY BOUNDARY

SB-8 SOIL BORING LOCATION

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM ELECTRONIC FILES PROVIDED BY: CROWN DESIGN AND CONSULTING, ENTITLED: UNDERGROUND PARKING LAYOUTS, DATED: 8/3/11, DRAWING NUMBER: A-100.00.
2. THE LOCATION OF THE SELECTED SITE FEATURES WERE APPROXIMATELY DETERMINED BY TAPE MEASUREMENTS AND LINE OF SIGHT FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES, THE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.





NO.	ISSUE/DESCRIPTION	BY	DATE

37-14 36TH STREET
QUEENS, NEW YORK

SOIL WASTE CHARACTERIZATION SAMPLING
BORING LOCATION PLAN

PREPARED BY: GZA GeoEnvironmental of New York, Engineers and Scientists, 104 WEST 29TH STREET, 10TH FLOOR, NEW YORK, NEW YORK 10001		PREPARED FOR: JANS REALTY LP	
PROJ MGR: DW	REVIEWED BY: SS	CHECKED BY: DW	FIGURE 1
DESIGNED BY: SS	DRAWN BY: MT	SCALE: 1" = 20'	
DATE: DEC. 2013	PROJECT NO. 12.0076158.01	REVISION NO.	SHEET NO.

Attachment 3

LEGEND:

PROPERTY BOUNDARY

GROUNDWATER MONITORING WELL

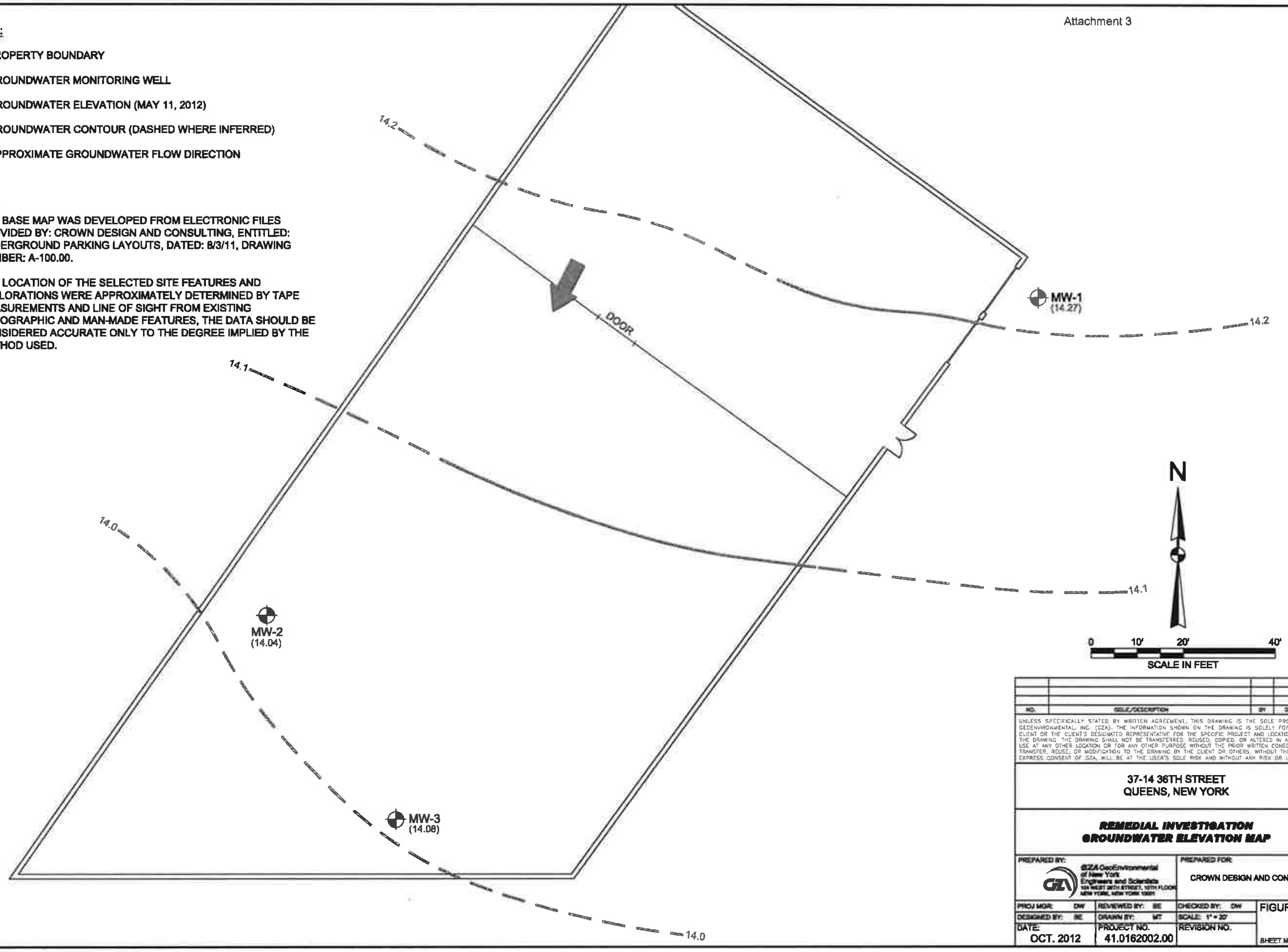
(14.06) GROUNDWATER ELEVATION (MAY 11, 2012)

14.1 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)

APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM ELECTRONIC FILES PROVIDED BY: CROWN DESIGN AND CONSULTING, ENTITLED: UNDERGROUND PARKING LAYOUTS, DATED: 8/3/11, DRAWING NUMBER: A-100.00.
2. THE LOCATION OF THE SELECTED SITE FEATURES AND EXPLORATIONS WERE APPROXIMATELY DETERMINED BY TAPE MEASUREMENTS AND LINE OF SIGHT FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES, THE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.



NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

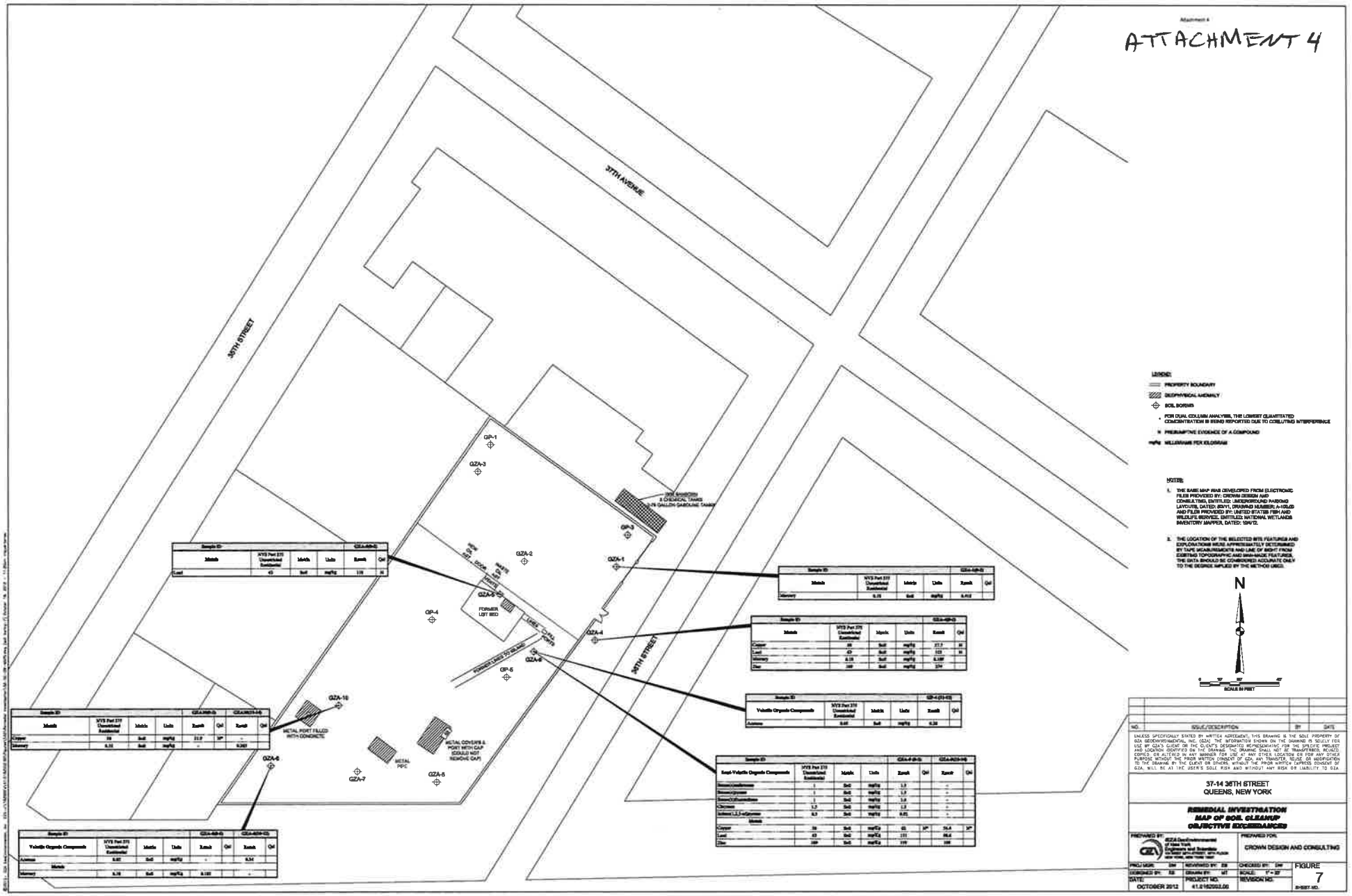
37-14 36TH STREET
QUEENS, NEW YORK

REMEDIAL INVESTIGATION
GROUNDWATER ELEVATION MAP

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental of New York, Engineers and Scientists		CROWN DESIGN AND CONSULTING	
PROJ MGR: DW	REVIEWED BY: BE	CHECKED BY: DW	FIGURE
DESIGNED BY: BE	DRAWN BY: MT	SCALE: 1" = 20'	6
DATE: OCT. 2012	PROJECT NO. 41.0162002.00	REVISION NO.	SHEET NO.

Attachment 4

ATTACHMENT 4



LEGEND:

- PROPERTY BOUNDARY
- GEOPHYSICAL ANOMALY
- SOIL BORING

* FOR DUAL COLUMN ANALYSIS, THE LOWEST QUANTITATED CONCENTRATION IS BEING REPORTED DUE TO COELUTING INTERFERENCE

N PRESUMPTIVE EVIDENCE OF A COMPOUND

mg/kg MILLIGRAMS PER KILOGRAM

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM ELECTRONIC FILES PROVIDED BY: CROWN DESIGN AND CONSULTING, ENTITLED: UNDERGROUND PARKING LAYOUTS, DATED: 8/9/11, DRAWING NUMBER: A-100JS AND FILES PROVIDED BY: UNITED STATES FISH AND WILDLIFE SERVICE, ENTITLED: NATIONAL WETLANDS INVENTORY MAPPER, DATED: 10/4/12.
2. THE LOCATION OF THE SELECTED SITE FEATURES AND EXPLORATIONS WERE APPROXIMATELY DETERMINED BY TAPE MEASUREMENTS AND LINE OF SIGHT FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES. THE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

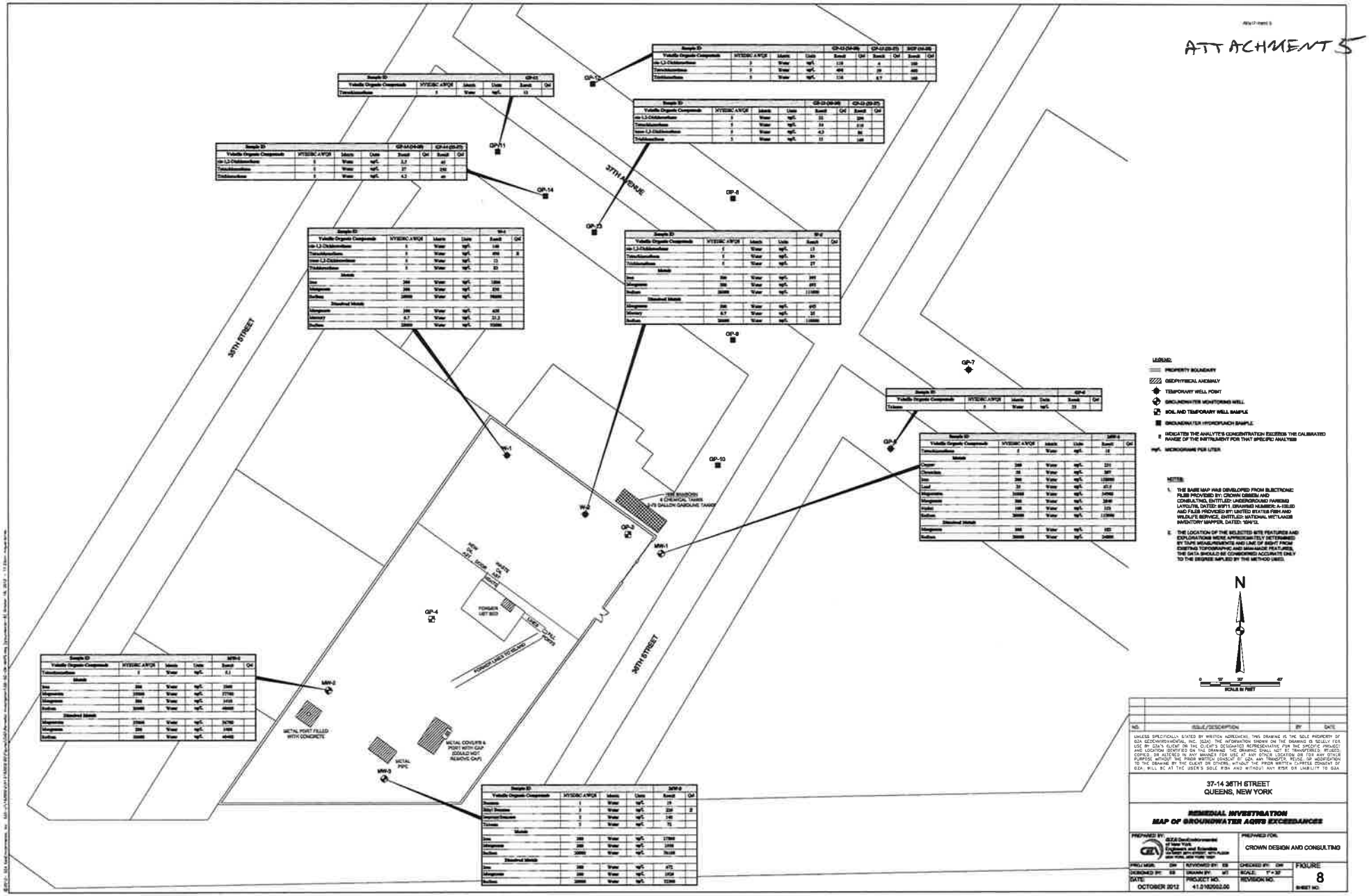
NO.	ISSUE/DESCRIPTION	BY	DATE

37-14 36TH STREET
QUEENS, NEW YORK

REMEDIAL INVESTIGATION
MAP OF SOIL CLEANUP OBJECTIVE EXCEEDANCES

PREPARED BY: GZA GeoEnvironmental of New York, Engineers and Scientists	PREPARED FOR: CROWN DESIGN AND CONSULTING
PROJ. MGR.: DW / REVIEWED BY: EB / CHECKED BY: DW	FIGURE 7
DESIGNED BY: EB / DRAWN BY: MT / SCALE: 1" = 20'	
DATE: OCTOBER 2012 / PROJECT NO.: 41.0162002.00 / REVISION NO.:	SHEET NO.

ATTACHMENT 5



LEGEND:

EXCAVATION BOUNDARY

ORC APPLICATION AREA

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM ELECTRONIC FILES PROVIDED BY: CROWN DESIGN AND CONSULTING, ENTITLED: UNDERGROUND PARKING LAYOUTS, DATED: 8/3/11, DRAWING NUMBER: A-100.00 AND FILES PROVIDED BY: UNITED STATES FISH AND WILDLIFE SERVICE, ENTITLED: NATIONAL WETLANDS INVENTORY MAPPER, DATED: 10/4/12.

N

0 15' 30' 60'

SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

37-14 36TH STREET
QUEENS, NEW YORK

ORC APPLICATION AREA

PREPARED BY:

GZA GeoEnvironmental of New York
Engineers and Scientists
104 WEST 29TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10001

PREPARED FOR:

36 STREET QDP, LLC

PROJ MGR: DW	REVIEWED BY: BE	CHECKED BY: DW	FIGURE 1
DESIGNED BY: BE	DRAWN BY: MT	SCALE: 1" = 30'	
DATE: SEPT. 2015	PROJECT NO. 12.0076158.01	REVISION NO.	SHEET NO.

ATTACHMENT 7

REGENESIS

Preliminary Site Evaluation

PRIMARY SITE INFO (PLEASE FILL OUT APPLICABLE SECTIONS BELOW)

Site Name	SSM	
Street Address	37-14 36th Street	
Site (City, State, Zip)	Queens, NY	
Treatment Unit (Dissolved Plume, Vadose Soil, Saturated Soil)	saturated zone	
Other Technologies Considered	excavation, vapor barrier	
Contact Name (Company)	Cloelle Danforth (GZA)	973-774-3321
Lead Regulatory Agency	NYSDEC	
Date Submitted to Regenesis	5/21/2015	
Estimated Remedy Implementation Date		

TREATMENT AREA (define the box)

Width of treatment area	120	ft
Length of treatment area	120	ft
Square Footage of Treatment Area	7000	ft^2
Top Treatment Interval	12	ft bgs
Bottom Treatment Interval	14	ft bgs
Thickness of contaminated zone	2	
Nominal aquifer soil (pick most rep.- gravel, sand, silty sand, silt, clay, bedrock)	fill, fine to med sand	
Average depth to water in treatment area	12	ft

Representative Contaminant Concentrations and Remedial Objectives	Groundwater (mg/L)	GW Cleanup Goal (mg/L) (enter applicable)	Soil (mg/kg)	Soil Cleanup Goal (mg/kg) (enter applicable)
PETROLEUM				
Benzene	0.0	1.00	0.1	0.1
Toluene	0.1	5.00	0.1	0.7
Ethylbenzene	0.2	5.00		
Xylenes	0.5	-		
MTBE				
Naphthalenes	0.1	-		
Trimethylbenzenes				
TPH-g			2100.0	
TPH-d				
Total	0.9		2100.15	
CHLORINATED SOLVENTS				
Tetrachloroethene (PCE)	0.7	5.000		
Trichloroethene (TCE)		5.000		
cis-1,2-dichloroethene (DCE)	3.4	5.000		
Vinyl Chloride (VC)				
1,1,1-Trichloroethane (TCA)				
1,1-Dichloroethane (DCA)				
Totals	4.11		0.00	

Additional Notes

Chlorinated solvents are originating from an upgradient source. Area to be treated is roughly an equilateral triangular (120'). Most of the contaminated soil is to be excavated to 2' below the water table.

What is currently driving remediation at this site? (real estate transaction, state reimbursement, voluntary, other) --->	voluntary brownfield cleanup

ATTACHMENT 8

REGENESIS

Project Info		
SSM		
Queens, NY		
Excavation		
Prepared For:		
Cloelle Danforth (GZA)		
Target Treatment Zone (TTZ) Info	**Unit**	**Value**
Treatment Area	ft^2	6,236
Top Treat Depth	ft	12.0
Bot Treat Depth	ft	14.0
Vertical Treatment Interval	ft	2.0
Treatment Zone Volume	ft^3	12,472
Treatment Zone Volume	cy	462
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	30,788
Treatment Zone Effective Pore Volume	gals	18,659
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	1.3E+06
Recommended Weight of ORC Advanced/Wt. of Soil	%	0.1%
ORC Advanced Pellets Required	**lbs**	**1,267**
Estimated Degradation Capacity as TPH	*lbs*	*63*
ORC Advanced® Pellets Application Design Summary		
Application Method	--	**Excavation Application**
Excavation Width	ft	79.0
Excavation Length	ft	79.0
Areal Extent (square ft)	sq. ft.	6,236
Top Application Depth (ft bgs)	ft	12
Bottom Application Depth (ft bgs)	ft	14
Estimated Saturated Treatment Thickness	ft	2
ORC Advanced to be Applied (lbs)	**lbs**	**1,267**
ORC Advanced per 1 ft lift	lb/ft	634

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by GZA. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

Prepared By:

Andy Lowy - Design Specialist ***5/21/2015***

REGENESIS

Purchasing Information		
SSM – Excavation		
ORC Advanced Required	**lbs**	**1,267.3**
ORC Advanced Cost*	**$**	**$11,342**
Estimated Tax and Freight %	%	15%
Estimated Tax and Freight Cost	$	$1,701
Estimated Total Product Cost	**$**	**$13,044**

***Note that the combined tax and freight costs are preliminary estimates only. Please contact your local sales manager or Customer Service at 949-366-8000 to obtain a shipping quote. You will be asked to provide a ship-to address and estimated time of delivery.**

Currently Available Packaging Options

Package Type**	# of packages	lbs required
55.1 lb plastic containers	23	1,267

****Available Package Types are subject to change.**

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier **Oxygen Release Compound Advanced (ORC Advanced®)**

Other means of identification None.

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 2
Health hazards	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May intensify fire; oxidizer. Causes skin irritation. Causes serious eye damage.

Precautionary statement

Prevention Keep away from heat. Keep/Store away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Wash thoroughly after handling. Wear protective gloves/eye protection/face protection.

Response If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Calcium hydroxide oxide	682334-66-3	≥85
Calcium hydroxide	1305-62-0	≤15
Dipotassium Phosphate	7758-11-4	<5
Monopotassium Phosphate	7778-77-0	<5

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
Ingestion	Never give anything by mouth to a victim who is unconscious or is having convulsions. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	Take off all contaminated clothing immediately. Contact with combustible material may cause fire. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water spray, fog (flooding amounts). Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: metal oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.
Specific methods	Cool containers exposed to flames with water until well after the fire is out.
General fire hazards	May intensify fire; oxidizer. Contact with combustible material may cause fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect dust using a vacuum cleaner equipped with HEPA filter. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. Stop the flow of material, if this is without risk. Absorb in vermiculite, dry sand or earth and place into containers. Large Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Shovel the material into waste container. Minimize dust generation and accumulation. Avoid the generation of dusts during clean-up. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Place all material into loosely covered plastic containers for later disposal. For waste disposal, see section 13 of the SDS. Wear appropriate protective equipment and clothing during clean-up.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Avoid contact with water and moisture. Do not get this material in contact with eyes. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Calcium hydroxide (CAS 1305-62-0)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection

Use dust-tight, unvented chemical safety goggles when there is potential for eye contact.

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. Frequent change is advisable. Recommended gloves include rubber, neoprene, nitrile or viton.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Recommended use: Wear respirator with dust filter.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state

Solid.

Form

Powder.

Color

White to pale yellow.

Odor	Odorless.
Odor threshold	Not available.
pH	12.5 (3% suspension/water)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Oxidizer.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Slightly soluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	527 °F (275 °C)
Viscosity	Not available.
Other information	
Bulk density	0.5 - 0.9 g/ml
Explosive limit	Non-explosive.

10. Stability and reactivity

Reactivity	Greatly increases the burning rate of combustible materials.
Chemical stability	Decomposes on heating. Product may be unstable at temperatures above: 275°C/527°F.
Possibility of hazardous reactions	Reacts slowly with water.
Conditions to avoid	Heat. Moisture. Avoid temperatures exceeding the decomposition temperature. Contact with incompatible materials.
Incompatible materials	Acids. Bases. Salts of heavy metals. Reducing agents. Combustible material.
Hazardous decomposition products	Oxygen. Hydrogen peroxide (H_2O_2). Steam. Heat.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Ingestion may cause irritation and malaise.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Calcium hydroxide (CAS 1305-62-0)		
Acute		
Oral		
LD50	Rat	7340 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Due to the physical form of the product it is not expected to be an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Calcium hydroxide (CAS 1305-62-0)			
Aquatic			
Fish	LC50	Zambezi barbel (Clarias gariepinus)	33.8844 mg/l, 96 hours

Persistence and degradability Decomposes in the presence of water. The product contains inorganic compounds which are not biodegradable.

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil This substance has very low solubility in water and low mobility in the environment.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN1479

UN proper shipping name Oxidizing solid, n.o.s. (Calcium hydroxide oxide)

Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Label(s)	5.1
Packing group	II
Environmental hazards	
Marine pollutant	No
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	62, IB8, IP2, IP4, T3, TP33
Packaging exceptions	152
Packaging non bulk	212
Packaging bulk	240

IATA

UN number	UN1479
UN proper shipping name	Oxidizing solid, n.o.s. (Calcium hydroxide oxide)
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	No
ERG Code	5L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1479
UN proper shipping name	OXIDIZING SOLID, N.O.S. (Calcium hydroxide oxide)
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-Q
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Calcium hydroxide (CAS 1305-62-0)

US. New Jersey Worker and Community Right-to-Know Act

Calcium hydroxide (CAS 1305-62-0)
Calcium hydroxide oxide (CAS 682334-66-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Calcium hydroxide (CAS 1305-62-0)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 02-April-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings Health: 3
Flammability: 0
Physical hazard: 2

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Post, Charles H (DEC)

From: Post, Charles H (DEC)
Sent: Monday, October 05, 2015 8:08 AM
To: 'David Winslow'
Subject: RE: Final 76158 RAWP Addendum 093015

David,

The Department has received and reviewed the RAWP Addendum for the application of ORC at the Silver Star Site #C24156 and has no further comments. The RAWP is approved. Please include photo-documentation in the daily reports and the FER of the ORC being applied in each sector.

Thank you.

Charlie

Charles Post
Project Manager, Division of Environmental Remediation

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www.dec.ny.gov | |

From: David Winslow [mailto:david.winslow@gza.com]
Sent: Wednesday, September 30, 2015 3:27 PM
To: Post, Charles H (DEC)
Cc: James Bellew
Subject: Final 76158 RAWP Addendum 093015

Charlie

I added RAO Objectives and added the certification language from DER-10. I had our PE sign and seal it. Let me know if you need anything else.