

INVESTIGATION AND REMEDIATION WORK SCOPE AND SCHEDULE
CHAPEL STREET FORMER MGP SITE
347 CHAPEL STREET
NEW HAVEN, CONNECTICUT

by Haley & Aldrich, Inc.
Rocky Hill, Connecticut

for The Southern Connecticut Gas Company
Orange, Connecticut

File No. 35697-044
September 2017





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22 September 2017

File No. 35697-044

The Southern Connecticut Gas Company
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Attention: Ken Quirke

Subject: Consent Order Compliance - Scope and Schedule
Chapel Street Former MGP Site (the "Site")
347 Chapel Street
New Haven, Connecticut

Dear Ken:

This document presents a general scope of work, a description of our proposed phased investigation and remediation approach, and a schedule for compliance with the requirements of the CT DEEP Consent Order (CO) to be issued by the Commissioner in connection with the above referenced Site. Please contact us if you have any comments or questions.

Sincerely yours,
HALEY & ALDRICH, INC.

A handwritten signature in blue ink that reads "Katherine A. LaBella".

Katherine A. LaBella, P.E.
Project Manager

A handwritten signature in blue ink that reads "Sean M. Carroll".

Sean M. Carroll, P.E., LEP
Senior Engineer

Enclosures

c: Connecticut Department of Energy and Environmental Protection; John Duff and Tome RisCassi

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1. Introduction

When representatives of Southern Connecticut Gas (SCG), Haley & Aldrich, Inc. (Haley & Aldrich) and the Connecticut Department of Environmental Protection (CT DEEP) met on 30 October 2015, CT DEEP requested that SCG and Haley & Aldrich prepare and submit a comprehensive scope of work (SOW) and a schedule for investigation and remediation of the Chapel Street former Manufactured Gas Plant (MGP) Site for CT DEEP review and approval (the “Scope and Schedule”). This Scope and Schedule is intended to satisfy this request and provides a summary of the expected scope and phasing of the work that will be compatible with the operations of the on-site business (i.e., Gateway Terminal bulk salt storage and distribution) and capable of achieving the investigative and remedial objectives required by and listed in the Consent Order and those that are incorporated in the Consent Order by reference. It was discussed and agreed that this document would be a “living document”, meaning that it will be prepared in advance of the start of the investigation work and will be revised, as necessary, as more is learned about the subsurface conditions at the Site. In addition, this Scope and Schedule provides a proposed schedule for conducting investigation activities at the 347 Chapel Street property (the “Site”). Any and all changes to the schedule must be subject to review and approval by the Commissioner of Energy and Environmental Protection (“Commissioner”).

Representatives of SCG, Haley & Aldrich, and CT DEEP met on 9 June 2017 to discuss revisions to the Scope and Schedule. Those revisions are incorporated in this updated version of the Scope and Schedule.

1.1 SITE SETTING

The Site is located east of downtown New Haven, Connecticut and is bounded by Chapel Street to the South, the Mill River to the east and north, and a north/south railroad right-of-way to the west. Please refer to Figure 1 for a Site Plan with an aerial photo showing current Site Features.

The property east of the railroad track is owned by the SCG and is currently used by Gateway Terminal, which operates a shipping terminal and storage for bulk materials (rock, aggregate, sand, and road salt) and construction materials (steel) that arrive by trucks, trains, and barges. There are several piles of bulk materials on the Site, partially contained by modular pre-cast concrete walls. These piles are dynamic; their size and location change with time, as materials are imported, stored, processed, and exported. A railroad spur comprised of three railroad tracks is located in the central portion of the Site. Three buildings are located in the southwestern portion of the site: a former Office, a former Power Plant, and a former Laboratory. Large salt or sand-salt mixture stockpiles are located in the northern and southern portions of the Site. The eastern and northeastern Site boundary is a retaining wall, comprised primarily of stone blocks (large granite and sandstone blocks) and concrete separating the 347 Chapel Street property from the Mill River. The elevation of the top of the retaining wall is approximately 7.5 to 8.5 ft above mean sea level (NGVD 1929), which is approximately 2 to 3 ft above the typical high tide level in the Mill River.

The property west of the railroad right-of-way north of Chapel Street, east of East Street, and south of Ives Place is owned by Simkins Industries and is leased to Gateway Terminal for materials storage operations. MGP activity (primarily gas storage in gas holders) occurred on this parcel as well.

Prior to filling the Site for development, the Site was a tidal marsh along the western shore of the Mill River. Beginning in the late 1800s, filling occurred along the Mill River and the western shoreline moved

eastward, creating the land east of the railroad. From 1861 until the mid-1960's, the site was operated as a manufactured gas plant (MGP). The MGP was razed in the mid-1960's, except for three buildings (office, power plant, and laboratory buildings). From this time until 1994, the Site was used by Southern Connecticut Gas as an operations center and maintenance facility. Starting in 1998, the Site has been leased to Gateway Terminal for use as a bulk material storage facility.

1.2 REGULATORY SETTING AND PROJECT OBJECTIVES

CT DEEP issued a proposed Consent Order to investigate and remediate the former MGP Site on 7 October 2015; SCG and CT DEEP are currently negotiating the language of the Consent Order and it is anticipated that the Order will be executed by the end of August 2017.

In January 1996, The State of Connecticut promulgated the Remediation Standard Regulations (RSRs). The RSRs provide numeric baseline criteria used to evaluate the need for clean-up at certain properties including "Establishments" as defined within Section 22a-134 of the Connecticut General Statutes (C.G.S.), those undergoing "Voluntary Remediation" pursuant to Section 22a-133 of the C.G.S., and those subject to CT DEEP enforcement action. As stated in the proposed Consent Order, SCG must conduct appropriate assessment, investigation and, as necessary, remediation to meet the requirements of the Consent Order and demonstrate compliance with the RSRs.

The Site is an industrial/commercial property located within an area where CT DEEP has classified the groundwater as "GB." Applicable RSR criteria include:

- Residential Direct Exposure Criteria (RDEC) and Industrial/Commercial Direct Exposure Criteria (I/CDEC);
- GB Pollutant Mobility Criteria (GBPMC);
- Residential Volatilization Criteria (RVC) and Industrial/Commercial Volatilization Criteria (I/CVC); and,
- Surface Water Protection Criteria (SWPC).

The PMC apply to soils above the seasonal high groundwater table; the DEC apply to soil within 15 ft of the ground surface. The VC and SWPC apply to groundwater. Given that the intention is to place an Industrial/Commercial Environmental Land Use Restriction (ELUR) on the property, future investigation data were also compared to I/CDEC and I/CVC as allowed by the RSRs.

The Mill River, which bounds the Site to the East and North, is classified as SD/SB. This surface water classification indicates that it presently does not meet water quality criteria or one or more designated uses due to pollution. The goal for such water is Class SB.

1.3 HISTORICAL OVERVIEW

1.3.1 Mill River

The Mill River shoreline has changed over time. In 1842, the Mill River encompassed the former MGP site with the shoreline extending east towards the railroad alignment. By 1886, the northeast quadrant of the former MGP site had been filled, with a seawall bounding the Mill River and the southeast quadrant remained as a harbor to the Mill River. By 1901, the southeast quadrant of the former MGP

site had been filled, with the current seawall configuration bounding the Mill River which has remained unchanged.

1.3.2 Owner and Operations Overview

Beginning in the 1860s, the Site operated as a former MGP site as summarized below.

Date	Description
Prior to 1853	Tidal Marsh
1853	New Haven Gas Company purchased the Site.
1853-1924	The Site was gradually backfilled and the property west of the railroad tracks was acquired.
1861-1960s	Gas was produced at the Site. MGP-related uses of the Site included a tank farm, tar processing and storage, and ammonia plant. Non-MGP uses included a lumber yard and a brass foundry.
1950s	Large holder was constructed.
1960s-1992	Most of the plant structures were razed.
1967	New Haven Gas Company becomes Southern Connecticut Gas Company (SCG).
1989	Large holder caught on fire as it was demolished.
1967-1994	Site occupied by SCG Operations Center and Offices.
1994-1998	Site was vacant.
1998-present	SCG is the current property owner. Site leased to Gateway Terminals for the storage of salt, coal, metal and large boulders.

1.3.3 Structures and Features

An oil and gas tank area was historically located in the northern portion of the Site, tar tanks were present in the eastern portion of the Site along the Mill River, a gas holder was located in the southeastern corner of the Site, and MGP support buildings were historically located in the center and southern portions of the Site. Four gas holders were historically located on the property currently owned by Simkins Industries to the west of the railroad right-of-way. Foundation elements from the former MGP remain in the subsurface; such elements include concrete piles (expected to be spaced approximately 5 ft from each other) on which the gas holders were built, and concrete footings and slabs for site buildings. An active railroad line has run along the western Site boundary since at least the mid-1800s. A detailed description of the history of Site structures and features is presented in the Phase I report.

1.3.4 Adjoining Properties

North: Immediately north of the Site was The New Haven Pulp and Board Company which was founded in 1901. The plant was occupied and used as a manufacturer of paper products through the early 2000s. In 2010 the buildings were demolished and the property has remained vacant. Simkins Industries, the third generation company owner, is listed as the current owner.

South: Immediately south of the Site is Chapel Street. Beyond Chapel Street were a series of industrial/commercial properties. From at least 1886 through 1920s, the New Haven Steam Saw Mill and Lumber Sheds were located south of Chapel Street. By 1951, these properties were vacant. By 1973, a former filling station and current auto service station were located at the corner of Chapel and

East Streets. Also by 1973, a scrap metal yard currently occupied and owned by York Hill Trap Rock Quarry Co. (who sells rock and concrete products) was located on the former saw mill property.

East: The Mill River is located east of the Site.

West: Immediately west of the Site is a rail right-of-way that has been present since prior to the start of MGP operations at the Site. West of the rail right-of-way is a property currently owned (since October 31, 1983) by Simkins Industries, on which MGP activities occurred (primarily gas storage in gas holder structures). West of East Street were a series of industrial/commercial properties. The 1886 Sanborn Map depicts The L. Candee Rubber Works (est 1842), C. T. Warner Iron Foundry, and New Haven Brewing Company. By 1901, the Rubber Works and Barrel Storage/ Repairing occupied the property. By 1923, The L. Candee Rubber Works occupied the entire block but the plant was closed in 1929. In 1951, the entire block was controlled by the Associated Realty Corp and occupied by various tenants labeled as “bowling”, “lofts”, and “machine shop”. These buildings were demolished and in 1965, a new building was constructed for The H.B. Ives Co who manufactured “builders hardware”. The H.B. Ives Co closed in 2009 and this building was vacant in 2010 and demolished in 2011, and this property has been used as a storage yard since 2012.

2. Current Conceptual Site Model

A preliminary conceptual site model (CSM) is presented in this section, based on the results of the historical review and previous subsurface characterization work.

2.1 GEOLOGY

The Site geology has changed over time due to changes in the Mill River shoreline and associated filling activities for development purposes. Soil borings conducted by C.T. Main in 1992 provide the basis for a preliminary conceptual geologic cross section below consisting of fill, silty clay, silty sand, sand and then bedrock.



2.2 HYDROLOGY

Groundwater is tidally influenced and brackish. The general gradient is towards the Mill River to the east; however this gradient is expected to be both relatively slight and dynamic, fluctuating with the tidal cycles. Depth to groundwater observed is generally 4 to 8 feet below ground surface (ft bgs).

2.3 POTENTIAL SOURCES OF CONTAMINATION

A review of historical maps indicates the presence of numerous potential sources of contamination associated with former MGP features. These features include holders, tank farm and ammonia plant north onsite, tar tanks along the Mill River east onsite, buildings at the center of the Site, buildings south of railroad spurs, buildings south of railroad right-of-way, and subsurface utilities.

2.4 CONSTITUENTS OF CONCERN

MGP residuals in the form of non-aqueous phase liquid (NAPL) are expected to be present in the subsurface. Dense NAPL (DNAPL) sinks to a lower confining layer and light NAPL (LNAPL) concentrates at the water table elevation and smears across the water table.

Chemicals of concern associated with MGP residuals include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs; predominantly poly-cyclic aromatic hydrocarbons [PAHs]), metals, and cyanide. Cyanide is also used in current site operations; it is present in the commercial road salt that is stored on the Site, as an anti-caking agent. Additionally, ammonia is often a byproduct of the MGP process and on the northern portion of the Site there was an ammonia plant; therefore ammonia is also a constituent of concern. Polychlorinated biphenyls (PCBs) were not typically used at MGPs; however PCBs were used in natural gas compressor stations and have been detected in some natural gas transmission and distribution systems and associated equipment. If natural gas meters or other equipment were stored or serviced at the property during the post-MGP era, PCB contamination may be present in surficial soils. However, based on communications with SCG, we understand that PCB liquids have not been detected in high or low pressure natural gas pipe in the New Haven area of SCG's territory.

2.5 POTENTIAL MIGRATION OF CONTAMINATION

LNAPL, if present onsite, is expected to be observed at the water table beneath former MGP structures associated with tar (tar wells, tar utilities, purifiers, holders, tanks, etc.). Vertical migration of LNAPL is limited by fluctuations in the water table. Horizontal migration of LNAPL is influenced by groundwater gradients, NAPL viscosity, and other factors. A passive LNAPL recovery system operated from approximately 1990 to 1994 in the northern tank farm area adjacent to the former pump house. A RE Wright oil bailer was used and approximately 1,000-gallons of oil (4,000-gallons oil/water) were removed. The system was shut down in 1994-ish when the system was not producing enough oils to warrant keeping it in operation.

DNAPL is expected beneath former MGP structures associated with tar (tar wells, tar utilities, purifiers, holders, tanks, etc.). Oil-like material (OLM) and tar-like material (TLM), associated with releases from structures such as these, have been observed throughout the fill onsite. Vertical migration of DNAPL is limited by geologic confining layers; DNAPL tends to be mobile through sand and less mobile through clays. Sandy layers, if present within the silty clay layer, can allow downward vertical migration of DNAPL. Additionally, the silty clay confining layer was penetrated for the installation of hundreds of foundation piles during construction of MGP buildings and gas holders, possibly resulting in preferential pathways for contaminant migration. Horizontal migration of DNAPL is influenced by geology and subsurface utilities, which can create preferential pathways. In previous investigations (CT Main, 1992), DNAPL has been observed in the eastern portion of the former MGP site. Deep borings (CTM-1, CTM- 7, and CTM-9) conducted by CT Main in 1992 have identified OLM extending into the sandy layers beneath the silty clay at 40 to 50 ft bgs. The 1992 CT Main borings were completed using hollow-stem augers (HSA). There is the potential that in CTM-1, CTM-7, and CTM-9 nearer surface impacts were dragged down to deeper depths via the HSA drilling approach. Deeper impacts will be confirmed during future investigation activities to determine the vertical extent of impacts.

Migration of MGP residuals to Mill River sediments has occurred, causing impacts to sediment.

2.6 AREAS OF CONCERN

Based on the preliminary conceptual site model, the following 11 AOCs have been identified as described in the attached Table I and shown on Figure 2:

AOC ID	AOC NAME
Onsite AOCs	
1	Tank Farm and Ammonia Plant North
3	Holder No. 7 Southeast
4	Eastern Waterfront
5	Northeastern Waterfront
6	Tar Tanks Along Mill River East
7	Buildings Center of Site
8	Buildings South of Railroad Spurs
9	Buildings East of Railroad ROW
10	Mill River Sediments
11	Site-wide Groundwater

The table below lists off-Site AOCs; i.e., AOCs not located on the 347 Chapel Street Property. This includes the former gas holder area (AOC 2), which was part of the former MGP operation, and also three additional AOCs, AOCs 12, 13, and 14, which are based on the potential presence of off-site, non-MGP related sources of contamination with the potential to impact the former MGP site. These AOCs are included on Figure 2 and Table I. The project objectives do not include investigation and remediation of the offsite AOCs (12, 13, and 14) unless it is determined during the site investigation that releases originating at the Site have migrated onto offsite property; for this Scope and Schedule they are being identified for the purpose of noting them as potential sources of contamination that have the potential to contribute to contamination on the Site.

AOC ID	AOC NAME
Offsite AOCs	
2	Holder Area on the property currently owned by Simkins Industries West of Railroad ROW
12	Railroad ROW
13	Adjacent Simkins Property North of the Site
14	Adjacent HB Ives Property West

The RR ROW bisects the subject Site where holders (potential sources) are to the west and previously documented subsurface impacts to the east were observed. There is the potential for subsurface impacts within the RR ROW.

AOC-13, the Simkins Property North of the Site, is an adjacent property to the north with documented non-MGP related releases that have the potential to impact the former MGP site. Two releases were large, and included ammonia and heating fuel.

The HB Ives Property is immediately west of East Street. HB Ives is in an upgradient location with violations associated with handling of hazardous wastes onsite and reported spills. There is the potential for HB Ives to impact the former MGP site.

3. Former MGP Site Investigation and Remediation Scope and Schedule

In order to accommodate the on-site business operations and due to the expected complexities associated with identification of sources of contamination, assessing the extent of MGP impacts, and selecting a remediation strategy for this former MGP Site, investigation and remediation will be performed in phases. A summary of the proposed scope of work and a description of the phased approach to characterization and remediation of Site-related contamination is presented in this section. This approach has been developed based on what is currently known or can be reasonably expected at this time and we expect that the approach will be modified as more is learned about conditions at the Site.

A Phase I Environmental Site Assessment (ESA) has been performed for the former MGP Site as a whole. The Phase I ESA presents:

- A summary of Site history, with particular emphasis on former MGP operational history and identification of potential sources of contamination;
- Mapping of former MGP structures and foundation elements; and
- Lists AOCs based on the potential for releases of contaminants to the environment.

The Phase I ESA will be submitted to CT DEEP within 30 days of execution of the Consent Order.

For project planning purposes, we have divided the MGP-affected areas into the following six “Operable Units” (OUs) based on ownership and current use, which are shown on Figure 3:

- OU-A: 347 Chapel Street upland property waterfront and Mill River sediments
- OU-B: Northern stockpile area
- OU-C: Southern stockpile area
- OU-D: Commercial stone yard
- OU-E: Roadways and rail tracks on 347 Chapel Street property
- OU-F: Property west of the Penn Central rail ROW, north of Chapel Street, east of East Street, and south of Ives Street, which is owned by Simkins Industries

The investigation and remediation objectives, scope, and schedule are expected to be different for each of these OUs due to differences in physical environment (e.g., river sediments vs. land), current use (e.g., salt storage piles, steel storage, roadways, etc.), and current property ownership. Project objectives, work scope, and preliminary schedule are proposed below. The Scope and Schedule are based on several assumptions, the most critical assumptions being the following:

- Salt storage piles will be drawn down over the winters and will be small between March and June; and
- Gateway will be able to adjust delivery times and storage practices in order to accommodate access needs in the salt pile areas.

In the event that site conditions are not consistent with these assumptions (e.g., a warm winter occurs and the salt piles are not drawn down), a request to modify the scope and/or schedule for site

characterization and remediation may be prepared and submitted for the Commissioner's review and approval.

SCG is in the process of discussing investigation access needs (i.e., the third bullet above) with Gateway.

3.1 FORMER MGP SITE OPERABLE UNITS (OPERABLE UNITS A, B, C, D, E, AND F)

The Operable Units comprising the areas where former MGP operations occurred will be investigated and remediated in a phased manner, which will be coordinated with the needs of the on-site operations. Each of these Operable Units will present challenges to conventional subsurface characterization methods and remediation techniques. In general, historical MGP building foundations are expected at the locations where former MGP buildings or other features are shown on Figure 2. Based on what we currently understand, we expect that we will need to overcome the following specific challenges at these Operable Units:

- **OU-A (347 Chapel Street Waterfront and Mill River Sediments):** The site characterization data indicate that coal tar impacted sediments are present in the Mill River in an area approximately 100 ft by 100 ft in size in the western portion of the Mill River. Because this contamination represents a current ecological exposure pathway and investigation and remediation can be performed with minimal interference with current on-site activities, the OU-A characterization and remediation process will be performed on a different schedule than the characterization and remediation of the remainder of the former MGP Site.
- **OU-B (Northern stockpile):** Gateway stores road salt in this area. The pile is depleted to some extent over the course of each winter, the degree of depletion depending on the amount of salt used during the winter (as an example, in early April 2015, the salt piles were nearly completely depleted after the heavy demand of the 2014-2015 winter). In spring, salt is delivered by barge to the Site and the storage pile grows as salt is accumulated for the next winter. *Therefore late February through April is the time of the year this area is typically available for characterization and remediation work.* During times of salt delivery, heavy truck traffic occurs to and from the salt pile, and front-end loaders and dozers are used extensively to transport salt and build the salt pile. During the winter, heavy truck traffic also occurs as trucks arrive, are loaded with salt, and depart the property.
- **OU-C (Southern stockpile):** Gateway also uses this area for storage of road salt. The eastern portion of this area is used for bulk salt storage, and the western area is used to mix salt and other additives and store the mixed salt for distribution during the winter. *Similar to OU-B, late February through April is the time of the year this area is typically available for characterization and remediation work.* The former Gas Holder #7 foundation is located in the eastern portion of OU-C, as shown on Figure 2. The foundation system for this gas holder is believed to have been a network of approximately 220 concrete piles and associated pile caps, installed around the outer holder wall, in a ring approximately midway between the wall and the center, and near the center of the holder.
- **OU-D (Commercial stone yard):** During the warm weather months, use in this area is relatively limited. Various types of landscaping stone are stored in bins around the perimeter of this area, which landscape contractors occasionally purchase and transport off-site. During the winter months, Gateway maintains a small salt distribution pile on the northern side of the former

power plant building, and truck traffic is heavy in this area, particularly around winter snow and ice storms. *Therefore, late spring through early fall (i.e., May through October) is the time of the year this area is typically available for characterization and remediation work.*

- **OU-E (Roadways and rail tracks):** These areas are generally accessible all year; however access would need to be coordinated to avoid times of heavy truck and rail traffic, and during the winter snow piles associated with plowing of the roadways interfere with access in some areas. In general, heavy truck traffic occurs on a frequent basis on the Site. During times of salt delivery, heavy truck traffic occurs to and from the salt piles, and front-end loaders and dozers are used extensively to transport salt and build the salt pile. During the winter, heavy truck traffic also occurs as trucks arrive, are loaded with salt, and depart the property. The on-site rail spurs are also used occasionally for deliveries of steel. Steel comes in rail cars and is unloaded by cranes and then transported by truck to OU-F, where it is stored until it is purchased and sent off-site for delivery. *Late spring through early fall (i.e., May through October) is the time of the year this area is typically available for characterization and remediation work, working around salt and steel delivery schedules.*
- **OU-F (Former MGP Site property west of the Site/Penn Central rail ROW):** Four former gas holders (a relief holder, and Gas Holders #4, #5, and #6) were located on OU-F, west of the Site. The foundations for these holders remain in place. The foundation systems for holders #5 and #6 are believed to have been a network of approximately 470 concrete piles, installed in a grid pattern, 5 ft on center. A concrete slab was constructed over the tops of the piles. The foundation systems for the relief holder and Gas Holder #4 are not known. Access to this property for investigation and remediation must be arranged with the property owner and will need to be coordinated with Gateway so that steel can be cleared from areas in order to perform investigation and remediation work.

3.2 OU-A OBJECTIVES

- The Mill River is presently and has historically been an active shipping channel with extensive industrial activity occurring adjacent to the River and within its general vicinity. Direct discharges to the River and indirect run-off from these uses have likely resulted in sediment contamination and ecological degradation unrelated to the Site. Therefore, the local ambient background conditions will be characterized by collecting sediment and surface water samples at upstream and downstream locations. Background samples will be representative of fully mixed conditions within the river and will not be collected in the immediate area of influence of other known sources of contamination.
- Delineate the horizontal and vertical extent of site-related contaminants to determine the nature and extent of contamination in the Mill River sediments;
- Delineate the nature and extent of site-related contamination that is impacting the groundwater and Mill River surface water.
- Characterize the horizontal and vertical extent of site-related contaminants on the 347 Chapel Street property along the upland waterfront;

- Design and implement a remedy that will:
 - Remediate sediments containing site-related contaminants in excess of ambient urban background conditions to be protective of human health and ecological receptors;
 - Prevent migration of site-related contaminants in excess of RSR criteria or other criteria approved by DEEP from the 347 Chapel Street property to surface water and sediments of the Mill River; and
 - Achieve compliance with the SWPC at the site groundwater discharge and western boundary of the Mill River.

3.3 WORK SCOPE FOR OU-A

1. Prepare a plan for management practices for the prevention of pollution discharging to the Mill River through the storm water system at the site (the “Mill River Pollution Prevention Plan”).
2. Prepare a “Scope of Study” for the characterization of the degree and extent of contamination, as described in Section 3.2.
3. Phased investigation work to characterize the horizontal and vertical extent of site-related contaminants on the 347 Chapel Street property upland waterfront: This work is anticipated to include TarGOST probing, soil borings, soil sampling, monitoring well installation, and groundwater sampling along the upland waterfront area.
4. Phased investigation work to characterize the horizontal and vertical extent of site-related contaminants in Mill River sediments. This work is anticipated to include surface water and sediment sampling for laboratory analysis, deployment and collection of Dart samplers, and collection of background sediment samples beyond the influence of the Site and the immediate area of influence of other known sources to characterize the ambient, urban background conditions in the Mill River sediments in the vicinity of the Site.
5. Prepare and submit to CT DEEP for review and approval an Investigation Report that will include the results of the characterization investigation work performed on the Site and in the Mill River, a conceptual site model for OU-A, and a summary the nature and extent of site-related contaminants in OU-A.
6. Perform a Pre-remedial design investigation in Mill River sediments to collect information needed to design the remedy;
7. Prepare a Remedial Action Plan (RAP) which will include:
 - a. a conceptual remedial plan to accomplish the remedial objectives listed above;
 - b. a list of the required permits;
 - c. a proposed monitoring plan to assess remedy effectiveness; and
 - d. a schedule for remedy design and application for required permits.
8. Remedy design and applications for required permits; and,
9. Implementation of the OU-A remedy, once all required permits have been obtained.

3.4 OU-A SCHEDULE

- A Mill River Pollution Prevention Plan will be submitted to CT DEEP within 120 days of the effective date of the CO.
- A Scope of Study for the OU-A characterization of the upland and Mill River portions of OU-A, as described in Section 3.2, will be submitted to CT DEEP within 90 days of the effective date of the CO for Commissioner review and written approval. As required in the CO, the Scope of Study will include a proposed schedule for completing the investigation work, and a schedule for submitting the Investigation Report.
- Subsequent submittals (i.e., the Investigation Report and the RAP) will include schedules for future work.

3.5 OU-B, C, D, E, AND F INVESTIGATION AND REMEDIATION OBJECTIVES

- Characterize the horizontal and vertical extent of Site-related contamination. Anticipating a containment remedy, the investigation will focus on the Site perimeter to assess the potential for off-site contaminant migration however additional site investigation may be deemed necessary by the Commissioner;
- Identify and remediate sources of contamination, such as underground tanks or other structures containing tars or oils (SCG will consider interim actions as practicable and appropriate); and
- Design and implement a remedy that will:
 - Remediate the Site-related impacts to comply with the Connecticut RSRs (Section 22a-133k-1, et. seq. of the Regulations of Connecticut State Agencies) and
 - Immobilize and contain MGP NAPL in place if that is determined to be the most appropriate and permanent remedy available at the Site.

Based on the Site setting and current and anticipated future use, SCG anticipates that this remedy will incorporate engineering and institutional controls (e.g., clean soil cover or cap, pavement, and ELURs to limit potential exposure to soils; installation of impermeable barriers to render soils environmentally isolated) and waivers (e.g., widespread polluted fill; technical impracticability for NAPL removal) in order to achieve compliance with the RSRs.

3.6 OU-B, C, D, E, AND F WORK SCOPE

The scope of work for these operable units is as follows:

1. Phased investigation work to characterize the nature and extent of contamination, accommodating the needs of the on-site business, and making use of times when traffic activity is low and smaller volumes of material are stored on the Site. This work is anticipated to include TarGOST probing, test pits, soil borings, soil sampling, monitoring well installation, and groundwater sampling. TarGOST probing will be used to delineate the extent of MGP NAPL in the subsurface. Conventional soil borings and soil sampling will be used to confirm TarGOST delineation results and obtain geologic data and soil samples for chemical analysis. Test pits will be used to investigate former Site features and investigate potential source areas. Investigation locations will need to be planned and adjusted in the field to avoid subsurface foundation

elements. The primary focus of the investigation work will be to identify sources of contamination (e.g., subsurface features containing oils or tar, and areas of soil containing high concentrations of NAPL) and on perimeter exploration to assess whether off-site migration of coal tar has occurred. As characterization data are reviewed, SCG will evaluate whether characterization work is warranted on additional properties in order to delineate the extent of Site-related contamination that may have migrated off site;

2. As sources of contamination are identified, where appropriate SCG will propose to CT DEEP interim actions to remove or remediate identified sources when such actions will result in measurable short-term benefit, are practicable, and in locations that can be accommodated by the on-site operations;
3. When the Site-related contamination has been adequately characterized, SCG will prepare an Investigation Report, which will present the conceptual site model, and summarize the horizontal and vertical extent of contamination;
4. Prepare and submit to CT DEEP for review and approval a RAP which will include:
 - a. an evaluation of the feasibility of remediation alternatives to address Site-related contamination;
 - b. a conceptual remedial plan to accomplish the remedial objectives listed in Section 3.2 above;
 - c. a list of the required permits;
 - d. a proposed monitoring plan to assess remedy effectiveness; and
 - e. a schedule for remedy design and application for required permits.
5. Remedy design and applications for required permits;
6. Implementation of the remedy, once all required permits have been obtained; and,
7. Perform monitoring consistent with the plan proposed in the RAP to assess the effectiveness of the remedy.

SCG currently anticipates preparing comprehensive Investigation Report and RAP documents for these OUs as a group. However, depending on the details of the degree and extent of contamination, property access, and the pace of characterization of the operable units (i.e., if there are delays on one or some operable units), SCG may request that CT DEEP allow preparation of Investigation Report and RAP documents for smaller numbers of OUs in order to enable the project to continue to progress.

3.7 OU-B, C, D, E, AND F SCHEDULE

As discussed above, OU-B and OU-C (northern and southern salt stockpiles) are typically most accessible between late February and the end of April. OU-D (Commercial stone yard) is most accessible during May through October, and OU-E (roadways and rail tracks) and OU-F (property west of Penn Central rail ROW) are generally accessible, working around high traffic periods associated with materials deliveries. SCG will need to negotiate an agreement for access to OU-F prior to performing investigative or remediation work on this property. Based on these considerations, the following is the preliminary investigation schedule:

February, March, and April 2018: Perform first phase of investigation work in OU-B and OU-C (Note that this will correspond with OU-A investigation work).

April through October 2018: Perform first phase of investigation work in OU-D, OU-E, and OU-F (Pending an access agreement with the OU-F property owner).

October 2018 through January 2019: Compile first phase of investigation results.

We currently anticipate performing up to three iterations of this phased investigation schedule as needed to complete the delineation of the extent of Site-related contamination. The Investigation Report will be completed and submitted for CT DEEP review and approval by the end of February, 2021. As appropriate and approved by CT DEEP, interim actions may be performed during this period to address sources identified during the investigation phase of work.

Within 18 months of CT DEEP approval of the Investigation Report, SCG will submit a RAP for CT DEEP review and approval. The schedule for remedy design, permitting, remedy implementation and monitoring will be dependent on the scope of the remedy and will be provided in the RAP.

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TABLE I
AREAS OF CONCERN
CHAPEL STREET FORMER MGP SITE
NEW HAVEN, CONNECTICUT

AOC		Phase I Findings	
#	Name	Description	Previous Exploration Locations
ONSITE			
1	Tank Farm and Ammonia Plant North	Rationale: Tanks are potential source areas. Area of former LNAPL passive recovery from 1990 to 1994. Former explorations documented subsurface impacts. 1886 & 1901 – area operated by the Mallory Wheeler Lock and Knob Mfy for use as a Store House for the National Folding & Paper Box Co and was developed in the 1920s as described below. A 1939 Site Map labels this area as "Am. Tar Products Co."	-
	Tar Oil Storage 1-10	1923 Sanborn depicts tanks 6-10 as ammonia tanks. In the 1930s, tanks 1-4 were removed. Between 1973 and 1991, the remaining tanks were removed.	B-7 (CTM, 1991): 7-9' TLM; 9-13' free product; 15' EoB CTM-4 (CTM, 1991): 8-10' TLM; 10-12' staining; 14' EoB
	Tarbond Products (L&O)	In the 1920s, these tanks are ammonia tanks and by the 1930s they are 100,000 gals each water tar and gas tanks. Between 1973 and 1991, the tanks were removed.	B-8 (CTM, 1991): 4' TLM; 4'11" foundation encountered; 5' (R) SCG-2 (GWI, 1991): no visual impacts; 14' EoB
	Oil Tank 11, 12, 14	Sizes were two 440,000 gals tanks and one 100,000 gal tank. Between 1973 and 1991, the tanks were removed.	SCG-1 (GWI, 1991): 5-12' TLM; 13' EoB
	Tar Tank 10 and Ammonia Tank 9	By 1930s, both tanks were used as tar tanks and were 440,000 gals each. Between 1973 and 1991, the tanks were removed.	SCG-4 (GWI, 1991): 5-7' TLM; 13' EoB SCG-10 (GWI, 1991): no visual impacts; 17' EoB SCG-12 (GWI, 1991): 5-7 OLM; 17' EoB
	Ammonia and Benzol Plant	First appeared on 1923 maps and by the 1930s, this plant became a storage and locker room building.	none
	Tar Stills and Tanks	First appeared on 1923 maps and by the 1930s, tar stills and tanks appear removed.	CTM-1 (CTM, 1991): 8-23' sheen; 23' 1" TLM; 31-51' sheen; 55' EoB B-2 (CTM, 1991): no visual impacts; 4' EoB
	Pump House	First appeared on 1923 maps. Between 1973 and 1991, the pump house was removed.	SCG-11 (GWI, 1991): no visual impacts; 17' EoB
	Light Oil Washing Plant	First appeared on 1923 maps. Between 1973 and 1991, the plant was removed.	SCG-3 (GWI, 1991): 10-12' staining; 14' EoB SCG-13 (GWI, 1991): no visual impacts; 17' EoB SCG-14 (GWI, 1991): no visual impacts; 17' EoB
3	Holder No. 7 Southeast	Rationale: Holders are potential source areas. Former explorations documented subsurface impacts. Constructed in 1949. Holder had a 5,000,000 cu ft capacity. Foundation was a 6" slab supported on 218 concrete piles and "waterless" type. This holder was removed during a fire in 1989.	B114 (H&A, 1998): staining and product in fill above clay (fill thickness 13.5-16 ft)
4	Eastern Waterfront	Rationale: Former utilities in this area are potential sources and conduits for contamination. Former explorations documented subsurface impacts. Seawall constructed in early 1900s and remains today. The Mill River is approximately 300 ft wide with an ~ 200 ft wide and 12 ft deep (below MLLW) navigation channel at the center of the river. The navigational channel begins ~50 ft east of the site. Depth of water within 50 ft of the site ranges from 3 ft to 8 ft deep (below MLLW). The Mill River is tidal, but flow is generally in the southern direction. Former utilities in this area include gas, coke oven, and sewer.	B101-B113, B115 (H&A, 1998): staining and product in fill above clay (fill thickness 13.5-16 ft) CTM-9 (CTM, 1991): 0-10' concrete and boulders; 40-40.5' OLM and TLM; 47 EoB
5	Northeastern Waterfront	Rationale: Former utilities in this area are potential sources and conduits for contamination. Former explorations documented subsurface impacts. Seawall constructed in 1800s and remains today. The Mill River is approximately 200 ft wide with an ~ 125 ft wide and 10 ft deep (below MLLW) navigation channel at the center of the river. The navigational channel begins less than 25 ft northeast of the site. Depth of water within 25 ft of the site ranges from 4 ft to 9 ft deep (below MLLW). The Mill River is tidal, but flow is generally in the southern direction. Former utilities in this area include water, tar, and sewer.	SCG-5 (GWI, 1991): 5-12' TLM; 13' EoB SCG-15 (GWI, 1991): no visual impacts; 17' EoB SCG-16 (GWI, 1991): no visual impacts; 7' *
6	Tar Tanks Along Mill River East	Rationale: Tanks are potential source areas. Former explorations documented subsurface impacts. Tanks first appear on 1923 maps. The storage tar tanks were 100,000-gals each in a depressed diked area. The tanks were empty in 1949 and subsequently removed.	CTM-8 (CTM, 1991): 6-22' staining; 24-26' OLM; 35-47 OLM; 50' EoB

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AREAS OF CONCERN
CHAPEL STREET FORMER MGP SITE
NEW HAVEN, CONNECTICUT

AOC		Phase I Findings	
#	Name	Description	Previous Exploration Locations
7	Buildings Center of Site	Rationale: Purifiers are potential source areas. Former explorations documented subsurface impacts. 1886- Area E of RR tracks was partially marshy land associated with Mill River	CTM-5 (CTM, 1991): 2-6' staining, TLM and blue; 8-12' staining; 14-16' TLM; 20' EoB CTM-6 (CTM, 1991): 7-14' TLM; 16' EoB B1 thru B3 (GWI, 1988): no visual impacts; 16.5' EoB SCG6 (GWI, 1991): no visual impacts; 12' EoB SCG7 (GWI, 1991): 2-6' concrete; 13' EoB SCG8 (GWI, 1991): 10-12: OLM; 13' EoB
	Coal Storage then Storage Building	At least 1886 through 1930s, this was used as a coal shed prior to being used as a storage building. Between 1991 and 2004, the building was removed.	none
	Retort Houses then Service and Storage Buildings	At least 1886 through 1910s, this was used as retort houses prior to being used as a storage building. Between 1991 and 2004, the building was removed.	none
	Purifiers (x3)	At least 1886 through 1910s, only one purifier was present. By the 1920s, the three purifiers were in use. Between 1973 and 1991, the purifiers were removed.	B9 (CTM, 1991): 2-4' TLM; 7' (R) B10 (CTM, 1991): 6-7.5' blue; 7.5' (R) B11 (CTM, 1991): no visual impacts; 7.5' (R)
8	Buildings South of RR Spurs	Rationale: Former explorations documented subsurface impacts. 1886: Area E of RR tracks was marshy land associated with Mill River. Historical documents reviewed show a series of support buildings on the southern portion of the site including: 1901: Blacksmith Shop and E. H. Wardwell Ammonia Mfy 1923 & 1938: Boiler House, Office, Lock Rooms, Exhauster/Condenser/Scrubber Building, Tar Well, Retort Houses, Coal Storage 1951 & 1973: Similar to 1938 except the Exhauster/Condenser/Scrubber and Retort Buildings are storage buildings and the large Coal Storage Building is demolished and replaced with Holder 7. Of these structures, only a 4,800 sq. ft. office building constructed in 1912 and a 4,600 warehouse building constructed in 1902 remain.	CTM-7 (CTM, 1991): 10-17' OLM; 18' EoB B-1 (CTM, 1991): 0-3' concrete; 10-12' sheen; 22' EoB B-5 (CTM, 1991): no visual impacts; 4' (R) B-13 (CTM, 1991): 9-14' TLM; 16-20' OLM; 22' EoB
9	Buildings East of RR ROW	Rationale: Former explorations documented subsurface impacts. 1886: The H. W. Stow Lumber Yard and E. H. Wardwell Ammonia Mfy were located along the southern portion of the site along Canal Street. Historical documents reviewed show a series of support buildings immediately east of the RR tracks including: 1901: Wagon Shed and Meter House 1923: Water Gas Plant, Wagon Shed, Oil Tanks, Laboratory, Meter House, Tar Scrubbers, Naphthalene Scrubbers 1938, 1951 & 1973: Water Gas Plant, Storage Garage, Tar Pumps, Tar Separator, Oil Tanks, Laboratory, Naphthalene Scrubbers Of these structures, only a 600 sq. ft. storage building remains.	CTM-2 (CTM, 1991): 10-10.5' creosote soaked wood; 16' EoB CTM-3 (CTM, 1991): 6-14' product; 16' EoB B-3 (CTM, 1991): 0-3' staining; 4-6' TLM; 6-8' OLM & TLM; 8' EoB because bricks encountered B-4 (CTM, 1991): 4-9' product; 9' EoB B-6 (CTM, 1991): no visual impacts; 24' EoB B-15 (CTM, 1991): 10-12' sheen; 12-14 TLM; 16' EoB
10	Mill River Sediments	Rationale: A 2014 sediment investigation identified coal tar in Mill River sediments. Reports in 2008 and 2014 of coal tar wastes in the storm drain systems and entering the Mill River.	2014 H&A Sediment Investigation: 12 vibracores and 44 dart samplers. Three vertical distribution patterns of MGP residuals were observed in the data: • Shallow MGP residuals: In some cases, Dart and vibracore results indicated the presence of MGP residuals in shallow sediments (the top 1.5 ft.) and lesser impacts in deeper sediments. These locations were generally located at least 15 ft. out into the channel and are greater than 20 ft. downstream of the outfall. • Deeper MGP residuals: In other locations, shallow sediments contained lower concentrations of MGP residuals and deeper sediments contained higher concentrations of residuals. These locations were typically close to the seawall and at least 15 ft. upstream or downstream of the outfall. • Approximately uniform presence with depth: Locations within an approximate 40-ft wide corridor, 20 ft. upstream and downstream of the centerline of the outfall, tended to exhibit approximately uniform MGP impacts from 0 to the 3-ft sampler depth.
11	Site-wide Groundwater	Rationale: Former exploations documented subsurface impacts that have the potential to impact groundwater quality. Groundwater in the area is GB and there are no known drinking water sources in the vicinity of the site.	none

TABLE I
AREAS OF CONCERN
CHAPEL STREET FORMER MGP SITE
NEW HAVEN, CONNECTICUT

AOC		Phase I Findings	
#	Name	Description	Previous Exploration Locations
OFFSITE			
2	Holder Area West of RR ROW	Rationale: Holders are potential source areas.	-
	Relief Holder	Constructed in the late 1800s. Holder was a double lift gas holder with iron/ steel 62'-6" diameter tank and 110,300 cu ft capacity. Foundation was at grade supported on piles. Between 1973 and 1991, the holder was removed.	none
	Holder No. 4	Constructed in 1893 and rebuilt in 1927. Holder was a triple lift gas holder constructed of iron and 492,390 cu ft capacity. Foundation was at grade supported on piles. Between 1973 and 1991, the holder was removed.	none
	Holder No. 5	Constructed in 1903. Holder was a 4-lift gas holder with steel tank and 2,117,000 cu ft capacity. Foundation was at grade, supported on piles, and "water" type. Between 1973 and 1991, the holder was removed.	none
	Holder No. 6	Constructed in 1911. Holder was a 5-lift gas holder with 3,120,000 cu ft capacity. Foundation was at grade supported on 469 concrete piles driven down to rest on sands and "water" type. Between 1973 and 1991, the holder was removed.	none
12	RR ROW	Rationale: The RR ROW bisects the site where holders (potential sources) are to the west and previously documented impacts to the east were observed. There is the potential for subsurface impacts within the RR ROW. Constructed in 1800s.	none
13	Adjacent Simkins Property North	Rationale: The adjacent property to the north has documented releases that may be impacting the former MGP site. Immediately north of the site was The New Haven Pulp and Board Company which was founded in 1901. The plant was occupied and used as a manufacturer of paper products through the early 2000s. In 2010 the buildings were demolished and the property has remained vacant. Simkins Industries, the third generation company owner, is listed as the current owner. In 2011, a LUST was reported. A 2,000-gal gasoline UST was removed. ETPH and VOC results were above GBPMC. ETPH was above RDEC. In March 2011, LNAPL was observed entering the Mill River. Source was determined to be heating fuel coming from a rupture in underground pipeline on the Magellen property. Recovery wells were installed. 12,423 gallons of product was recovered in November 2011. 6.5 gallons of product were recovered in November 2012. Monitoring events will continue. A spill dated 3/12/85 indicated there was a large ammonia release. No further details were provided.	none

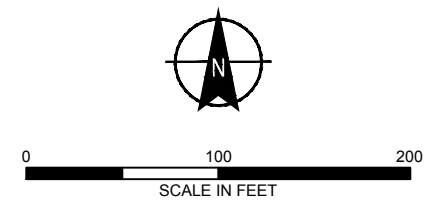
TABLE I
AREAS OF CONCERN
CHAPEL STREET FORMER MGP SITE
NEW HAVEN, CONNECTICUT

AOC		Phase I Findings	
#	Name	Description	Previous Exploration Locations
14	Adjacent HB Ives Property West	<p>Rationale: HB Ives is in an upgradient location with violations associated with handling of hazardous wastes onsite and reported spills. There is the potential for HB Ives to impact the former MGP site.</p> <p>Immediately west of the site and East Street. Beyond East Street were a series of industrial/commercial properties. The 1886 Sanborn Map depicts The L. Candee Rubber Works (est 1842), C. T. Warner Iron Foundry, and New Haven Brewing Company. By 1901, the Rubber Works and Barrel Storage/ Repairing occupied the property. By 1923, The L. Candee Rubber Works occupied the entire block but the plant was closed in 1929. In 1951, the entire block was controlled by the Associated Realty Corp and occupied by various tenants labeled as "bowling", "lofts", and "machine shop". These buildings were demolished and in 1965, a new building was constructed for The H.B. Ives Co who manufactured "builders hardware". Electroplating occurred. The H.B. Ives Co closed in 2009 and this building was vacant in 2010, demolished in 2011, and used as a storage yard since 2012.</p> <p>This facility generated hazardous wastes which were manifested offsite. This facility had violations associated with handling of hazardous wastes onsite. Dragout solution from a combination of alkaline cleaning, bright dipping, and rack stripping operations in support of electroplating was released through a breach in the upper region of a concrete containment sump. Soils beneath the sump are impacted with metals. The use of the sump was discontinued.</p>	none



NOTE

SOURCE: OCTOBER 2014 AERIAL IMAGERY COURTESY GOOGLE EARTH PRO



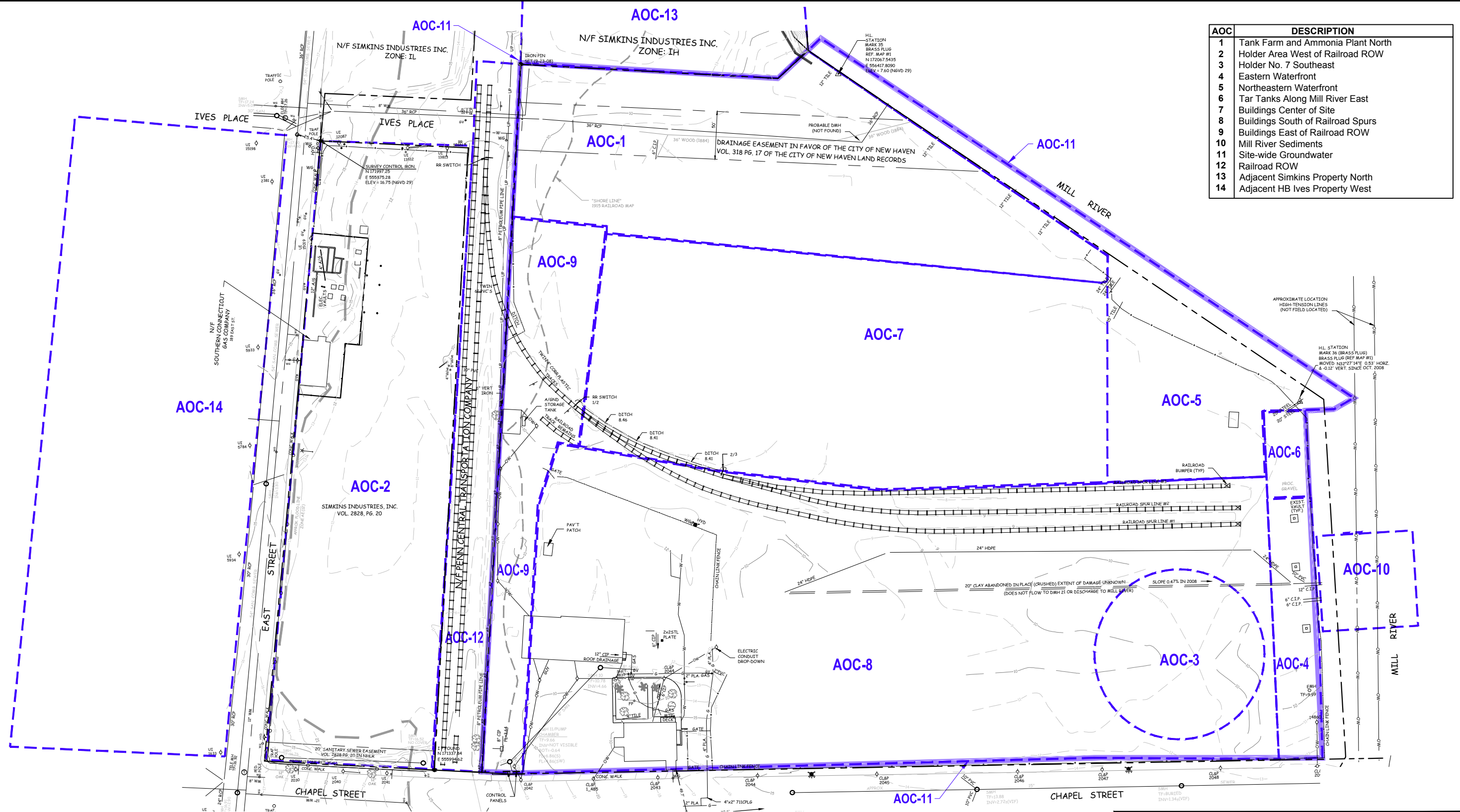
**HALEY
ALDRICH**

FORMER CHAPEL STREET MGP
347 CHAPEL STREET
NEW HAVEN, CONNECTICUT

CURRENT SITE PLAN

SCALE: AS SHOWN
NOVEMBER 2015

FIGURE 1

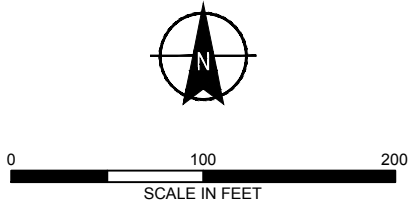


AOC	DESCRIPTION
1	Tank Farm and Ammonia Plant North
2	Holder Area West of Railroad ROW
3	Holder No. 7 Southeast
4	Eastern Waterfront
5	Northeastern Waterfront
6	Tar Tanks Along Mill River East
7	Buildings Center of Site
8	Buildings South of Railroad Spurs
9	Buildings East of Railroad ROW
10	Mill River Sediments
11	Site-wide Groundwater
12	Railroad ROW
13	Adjacent Simkins Property North
14	Adjacent HB Ives Property West

- LEGEND**
- AREA OF CONCERN (AOC)
 - SITE-WIDE GROUNDWATER AREA OF CONCERN (AOC-11)
 - HISTORIC STRUCTURE
 - HISTORIC UTILITY

NOTES

1. BASE PLAN IS A DECEMBER 2013 SURVEY BY AESCHLIMAN LAND SURVEYING, INC. (ALS), RECEIVED IN ELECTRONIC FORMAT.
2. HORIZONTAL DATUM REFERENCE: CONNECTICUT STATE GRID (PAGE 5)
3. VERTICAL DATUM REFERENCE: NGVD 1929
4. HISTORICAL FEATURES ARE SHOWN AS GRAY DASHED FEATURES AND WERE LOCATED BASED ON 1934 SANBORN MAPS AND OTHER HISTORIC PLANS. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
5. SUBSURFACE EXPLORATIONS BY OTHERS WERE LOCATED FROM AN UNDATED PLAN PREPARED BY CHARLES T. MAIN, INC., ENTITLED "PLATE 2, 347 CHAPEL STREET, NEW HAVEN, CT. FACILITY CURRENT & PAST INVESTIGATION PROGRAMS. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.
6. PREVIOUS EXPLORATIONS SHOWN IN GRAYSSCALE.



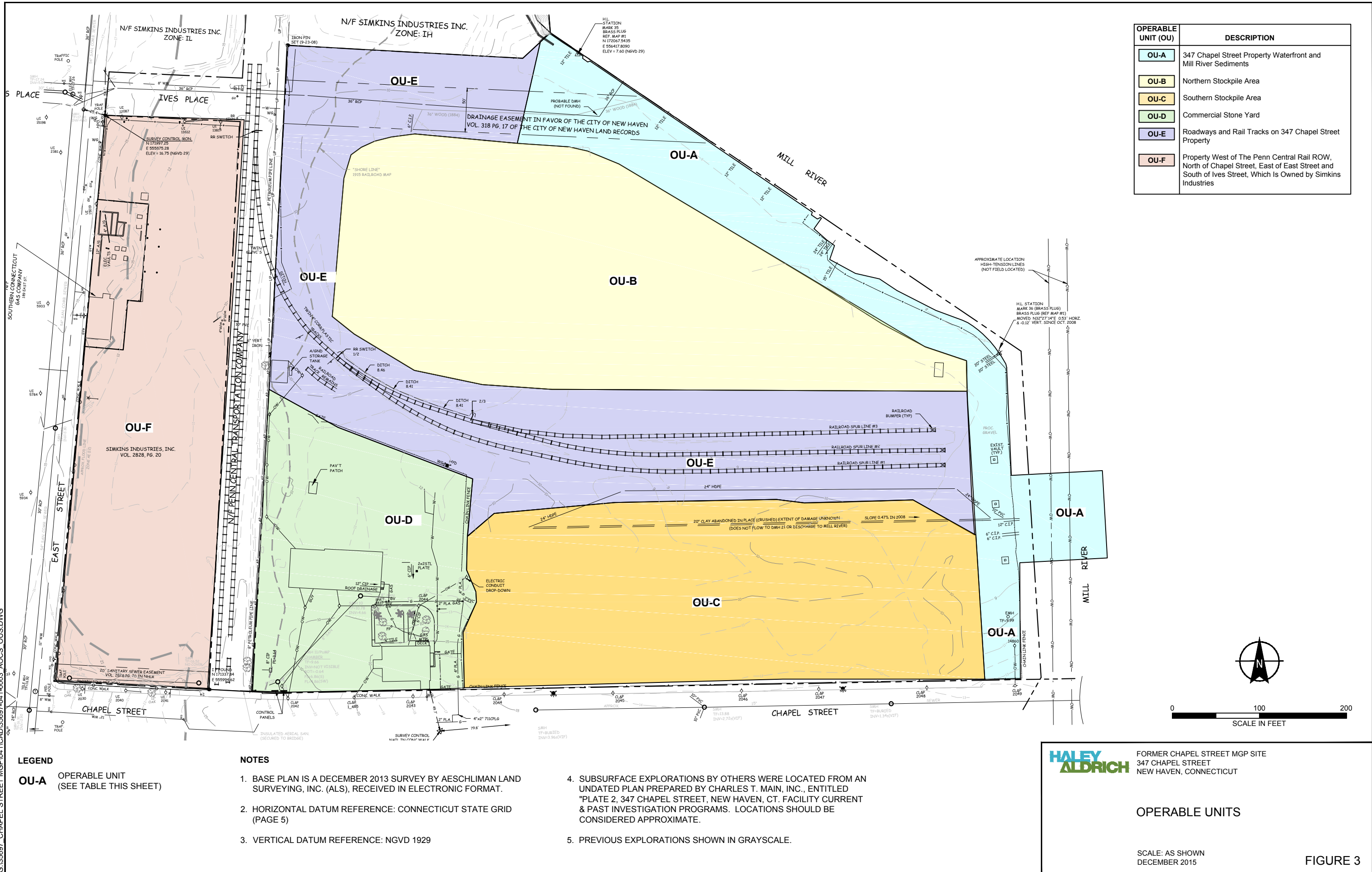
**HALEY
ALDRICH**

FORMER CHAPEL STREET MGP SITE
347 CHAPEL STREET
NEW HAVEN, CONNECTICUT

SITE AREAS OF CONCERN

SCALE: AS SHOWN
DECEMBER 2015

FIGURE 2



OPERABLE UNIT (OU)	DESCRIPTION
OU-A	347 Chapel Street Property Waterfront and Mill River Sediments
OU-B	Northern Stockpile Area
OU-C	Southern Stockpile Area
OU-D	Commercial Stone Yard
OU-E	Roadways and Rail Tracks on 347 Chapel Street Property
OU-F	Property West of The Penn Central Rail ROW, North of Chapel Street, East of East Street and South of Ives Street, Which Is Owned by Simkins Industries