SITE INVESTIGATION WORK PLAN
West Plant Site
500 West Waukau Avenue
Oshkosh, Wisconsin
BRRTS No. 02-71-587406

June 17, 2021
File No. 20.0157080.00

PREPARED FOR:
Oshkosh Defense, LLC
c/o Godfrey & Kahn, S.C.

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June 17, 2021
File No. 20.0157080.00

Mr. Kevin McKnight, Hydrogeologist
Wisconsin Department of Natural Resources
625 East County Road Y, Suite 700
Oshkosh, Wisconsin 54901-9731

Subject: Site Investigation Work Plan
West Plant Site
500 West Waukau Avenue
Oshkosh, Wisconsin
BRRTS No. 02-71-587406

Dear Mr. McKnight:

GZA GeoEnvironmental, Inc. (GZA), on behalf of Oshkosh Defense, LLC (Oshkosh/"Client") and its outside legal counsel, Godfrey & Kahn, S.C., has prepared this Site Investigation Work Plan ("Work Plan") for Oshkosh at 500 West Waukau Avenue in Oshkosh, Wisconsin, referred to as the West Plant ("Site"). The scope of work is based on the findings of the Site investigation activities conducted on November 7, 2020.

The supplemental investigation activities proposed by GZA are intended to satisfy the relevant sections of Wisconsin Administrative Code (Wis. Adm. Code) NR 716. We appreciate your review of this Work Plan in consideration of our previous discussions. Please feel free to contact us with any comments or questions.

Very truly yours,

GZA GeoEnvironmental, Inc.

Kevin M. Hedinger
Senior Hydrogeologist

John C. Osborne, P.G.
Principal Hydrogeologist

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Attachments

cc: Mr. Edward B. Witte, Godfrey & Kahn, S.C.
Mr. Kevin Tubbs, Oshkosh Corporation

FIGURES

APPENDICES

1.0 GENERAL INFORMATION

GZA GeoEnvironmental, Inc. (GZA), on behalf of Godfrey & Kahn, S.C., outside legal counsel for Oshkosh Defense, LLC (Oshkosh/"Client"), has prepared this Site Investigation Work Plan ("Work Plan") for the property located at 500 West Waukau Avenue in Oshkosh, Wisconsin, referred to as the West Plant ("Site"). This Work Plan summarizes the previous investigation activities and results, and presents a scope of work to further evaluate the presence of per- and polyfluoroalkyl substances (PFAS) in soil and groundwater at the Site.

The Responsible Party for the Site is as follows:

Oshkosh Defense, LLC
Mr. Kevin Tubbs
1917 Four Wheel Drive
Oshkosh, Wisconsin 54902
ktubbs@oshkoshcorp.com
920-502-3043

The environmental consultant for this project is:

GZA GeoEnvironmental, Inc.
Mr. Kevin Hedinger
17975 West Sarah Lane, Suite 100
Brookfield, Wisconsin 53045
kevin.hedinger@gza.com
262-754-2578

The Site name and address are:

Oshkosh Defense, LLC West Plant
500 West Waukau Avenue
Oshkosh, Wisconsin 54902

The Site is part of a property that covers an area of approximately 81 acres and is identified by Parcel ID No. 1413490000 in the City of Oshkosh Parcel Viewer. The Site and property are located in a commercial and industrial use area within the southwest ¼ of the southeast ¼ of Section 35, Township 18 North, Range 16 East, Winnebago County, Wisconsin, as shown on Figure 1. The Site is located in the southwest corner of the property, near the intersection of Hughes Street and West Waukau Avenue, adjacent to the north side of the building referred to as the Oshkosh Defense West Plant (West Plant). The WTM91 coordinates for the approximate center of the Site are as follows X: 636276.87731, Y: 390914.88644.

The Site is bordered to the north by an industrial storage yard that is part of Oshkosh's property; to the west by Hughes Street, beyond which is Wittman Regional Airport; to the south by industrial properties; and to the east by other Oshkosh manufacturing buildings. The previous investigation activities at the Site focused on a grass-covered area on the north side of the West Plant, along the approximate middle of the building. The Site is between an at-grade driveway entrance into the West Plant building on the east and a depressed loading dock on the west. The loading dock is depressed approximately 3.5 feet below surrounding grade at the deepest point and the grade rises along the driveway toward the north until it meets the surrounding grade. Along the sides of the concrete loading dock driveway, concrete aprons flank both sides that cover the side slope created due to the depressed nature of the loading dock. Walk doors are located on both the east and west sides of the loading dock, which allow for access into the building. The loading dock is used for routine delivery of supplies to the West Plant. Located east of the sub-grade loading dock and underlying a portion of the grass area is a 25-foot by 50-foot, subterranean extension of the West Plant that extends approximately 15 feet deep and is accessible from inside of the West Plant. The extension houses water treatment and handling equipment for a chiller used in the operations at the West Plant. The West Plant is used for painting activities, therefore, it is equipped with a fire suppression system for Class B fires. The fire suppression system utilizes Alcohol-Resistant-Aqueous Film Forming Foam (AR-AFFF) that contains PFAS. In the past, the fire suppression system was tested, and the foam was discharged from a pipe on the north side of the building onto the grass area and loading dock area. Figure 2 shows the Site layout on the north side of the West Plant building, including the surface slope indication, underground utilities, surface covering, and pertinent features in the investigation area.

Based on the previous fire suppression testing activities that discharged AR-AFFF-containing PFAS, on behalf of Oshkosh, GZA conducted a subsurface investigation, as summarized in this Work Plan. This Work Plan is also subject to the Limitations provided in Appendix A.

2.0 BACKGROUND AND SITE HISTORY

A review of publicly available aerial photographs from 1951 through 2020, indicated that the original portion of the West Plant is the center portion of the building, which was constructed between 1976 and 1980. The original portion of the building included the loading dock area on the east end and extended to near the current west end. In the 1992 aerial photograph, the West Plant building expanded to the current extent to the west and to the approximate extent to the east. The 2013 aerial photograph shows a small addition to the east end of the building, but no other substantial changes to the building. The 2020 aerial photograph shows an addition to the northeast corner of the building; this appears to be the current building configuration.

The West Plant is used for vehicle painting activities. The paint kitchen in the West Plant is served by a fire suppression system capable of controlling or extinguishing Class B fires involving flammable and combustible liquids. The fire suppression system was charged with AR-AFFF that contained PFAS, as specified by the National Fire Protection Association (NFPA) for high-hazard fires and was tested to ensure that it was operating properly. The fire suppression system has not been discharged because of a fire, but is inspected annually. At the time of testing, AR-AFFF was discharged out of the pipe via a hose and nozzle to the grass area and loading dock area on the north side of the building. Following discharge, the foam was allowed to break down in the grass and loading dock areas. The exterior area closest to the discharge pipe is underlain by the subterranean basement extension that was constructed in the late 1970s, and covered by approximately 9 inches of soil.

The depressed loading dock contains a storm sewer catch basin that drains water that collects in the loading dock from precipitation. The foam that was discharged during testing migrated to the storm sewer through breakdown of the foam and from residuals in surface water runoff in the loading dock area. The location, route, construction, and discharge location for the storm sewer in the loading dock area is shown on Figure 3. The storm sewer water is conveyed to the east through piping along the north side of the West Plant. The storm sewer pipe extends to the east beyond the West Plant building approximately 500 feet where it turns to the north and eventually discharges into Glatz Creek approximately 1,300 feet north of the Site. The approximate route of the storm sewer discharge pipe is shown on Figure 3.

GZA's November 7, 2020 investigation focused on evaluating on-Site soils for the presence of residual PFAS that may remain in soils surrounding the AR-AFFF discharge area. The investigation area included the grass area east of the depressed loading dock.

PFAS that historically comprised AFFF are a complex class of fluorinated compounds developed in the 1950s and used in manufacturing processes and commercially available products, including AR-AFFF. Until approximately 2000, the PFAS compounds, most commonly perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), were manufactured to contain carbon chain lengths with eight completely fluorinated carbons, referred to as long-chain PFAS. The strength of the carbon-fluorine bond has resulted in PFOS, PFOA, and other PFAS persisting in the environment, and the bioaccumulating nature of these compounds within humans and other organisms enhance their toxicity.

Between 2000 and 2006, chemical manufacturers committed to reducing the manufacturing of long-chain PFAS, those having a carbon chain length of eight fluorinated carbons, such as PFOS and PFOA. The United States Environmental Protection Agency (USEPA) indicates that by 2010, 95% of long-chain PFAS was eliminated and by 2015, the elimination of long-chain PFAS manufacturing was reportedly complete.

The discharges of AFFF from testing of the fire suppression system spans the time during which manufacturers phased out foams containing an eight fluorinated carbon chain length (C8 foams) to the six fluorinated carbon chain length foams (C6 foams). During the manufacturing process of the PFAS used in the C8 foam concentrate, PFOS and PFOA were the predominant PFAS present; however, other substances may have also been present. The C8 foams, depending on the age, while likely containing PFOS and PFOA, also commonly include fluorotelomers and other PFAS impurities. The fluorotelomers do not contain fully fluorinated carbon chains and can be precursors to other perfluoroalkyl substances that are generated by degradation of the fluorotelomers. Given the timing of the phase out and the testing performed, it is likely that the foam discharges contained PFOS, PFOA, fluorotelomers, and short-chain PFAS compounds. In addition, it is likely that after the phase out of PFOS and PFOA manufacturing was complete in 2015, the AR-AFFF concentrate inventory on-Site could have contained PFOS and PFOA given the long shelf life of the AR-AFFF.

The AR-AFFF used in the Site fire suppression system originally contained C8 AR-AFFF, specifically, Ansulite Low Viscosity 3x3 AR-AFFF Foam Concentrate. As part of each testing event, the AR-AFFF tank was topped off with additional concentrate to maintain a full tank. As described in further detail below, the AR-AFFF that was added to the tank changed to short-chain (C6) PFAS with the phase out of the C8 AR-AFFF from 2006 through 2015. Currently, the foam concentrate material in the tank at the West Plant that is on-Site for use in the fire suppression system is believed to be a blend of C8 and C6 foams. For at least the last six years, the AR-AFFF that was added to the tank following annual testing would have been C6 foams that are manufactured using fluorotelomers that do not contain or degrade to PFOS and PFOA.

3.0 GEOLOGIC AND HYDROGEOLOGIC SETTING

The Site is located within a region of Winnebago County characterized by glacially derived, unconsolidated deposits of the Kewaunee Formation ranging from lake sediments associated with glacial Lake Oshkosh to various glacial till units primarily associated with the Kirby Lake Member of the Kewaunee Formation. The till deposits are described as red, clayey silt that contains some coarser-grained deposits and is generally at least 3 meters thick and tend to have low relief, flat-lying topography. In the area of the Site, the Kirby Lake member is reported to include thin (less than 6 feet) patches of lake sediment. Other characteristics of these units include:

- A higher percentage of fine-grained sediment with sand, silt, and clay grain-size distributions averaging 24%, 42%, and 34%, respectively; and

- Measured hydraulic conductivity values in field tests averaging 7.19 x 10-5 centimeters per second (cm/sec) while laboratory testing indicated averages of 9.46 x 10-8 cm/sec.

The upper bedrock unit in eastern Winnebago County underlying the Site is dolomite of the Ordivician Sinnipee Group. The bedrock is generally encountered less than 40 feet below ground surface (bgs) in this portion of the County.

While groundwater occurs in both the unconsolidated glacial units and bedrock formations, the glacial deposits are generally not considered part of the regional aquifer system. These fine-grained glacial deposits that cover most of the broad lowlands in the eastern portion of the County are believed to hydraulically confine the underlying bedrock aquifers and tend to restrict groundwater recharge and discharge to shallow and deeper regional groundwater systems. Based on general topography and the location of recharge areas and shallow groundwater discharge zones, the groundwater flow direction in the area of the Site is expected to be predominantly eastward toward Lake Winnebago.

Surface water in the Site area is controlled by storm sewer catch basins in the loading dock and surrounding roadways that flow into a sewer line north of the Site. The storm sewer water is conveyed to the east through piping along the north side of the West Plant. The storm sewer pipe extends to the east beyond the West Plant building approximately 500 feet where it turns to the north and eventually drains into Glatz Creek approximately 1,300 feet north of the Site.

The soil lithology encountered at the Site during the soil boring activities conducted on November 7, 2020, found subsurface conditions to fit within the regional geological context described above. Approximately 0.5-foot of topsoil and grass was underlain by red/brown clay to a depth of 9 to 10 feet bgs. Brown, fine to medium sand was encountered in two borings at depths of 9.5 to 11 feet bgs. In boring WP-B6, which was advanced to 15 feet bgs, the sand was approximately 1 foot thick and was underlain by 2 to 3 feet of silt. The soils in the upper 2 to 3 feet of the soil column appeared to be disturbed, likely caused by surface regrading activities related to improvements at the West Plant.

The potential migration pathways for PFAS at this Site are through groundwater and surface water. Groundwater at the Site was not previously evaluated and is anticipated to be encountered at a depth of 8 to 10 feet bgs. The groundwater flow direction is anticipated to be north toward Glatz Creek, which flows across the northwest corner of the Oshkosh property and discharges to the east into Lake Winnebago. The headwaters of Glatz Creek are on the west side of Interstate 41 (I-41), approximately 2 miles to the west. The creek flows through the Experimental Aircraft Association (EAA) property and the Wittman Airport property before reaching the Oshkosh property. The creek is an open channel until it reaches the airport property. On the airport property, the creek flows through a combination of open-channel and covered culvert sections until it crosses under Perimeter Road east of the airport, beyond which it remains an open channel to its discharge point into Lake Winnebago.

During previous investigation activities, drilling and soil sampling encountered thin sand seams within silty clay deposits. Based on the soil types, it is anticipated that below the water table, groundwater will be evident in the sand seams, which may be intermittent and have limited hydraulic connection. The silty clay is also likely saturated; however, groundwater movement through the silty clay is limited due to the low hydraulic conductivity.

Based on a review of the water wells records on the WDNR water well database in the area surrounding the Site, there are numerous domestic water supply wells. These domestic water supply well records indicate that most of the wells were installed prior to the 1990s, and are completed in the Niagara dolomite. Based on the age of the well records and the available municipal water system, the wells may not be in use. The closest high-capacity wells are located on the EAA and airport properties to the west, which are hydraulically upgradient. The high-capacity wells are also completed in the dolomite and are not hydraulically connected directly to the unconsolidated groundwater.

4.0 SITE INVESTIGATION ACTIVITIES

Based on the potential release of PFAS during periodic testing of the firefighting system, GZA performed Site investigation activities and sampling to evaluate soil conditions at the Site and identify the distribution of PFAS in unsaturated soils in the area most likely to be affected. This area was considered to be the landscaped grass area. On November 7, 2020, GZA provided oversight of its subcontractor, On-Site Environmental, Inc. (OSE), during the advancement of seven Geoprobe® borings (WP-B1 through WP-B6 and WP-B8) and one hand auger boring (WP-B7) on the Site at the locations identified on Figure 4. Geoprobe® borings WP-B1 through WP-B5 were advanced to a depth of 10 feet bgs, WP-B8 was advanced to a depth of 5 feet bgs for visual observation of the upper soil column, and WP-B6 was advanced to a depth of 15 feet bgs to determine underlying geologic conditions. WP-B7 was hand-excavated with a stainless-steel trowel to a depth of 9 inches bgs or the top of the concrete basement structure.

Because of the nature of the AR-AFFF discharges being applied to the surface, the focus of analytical testing for evidence of PFAS impacts was the upper portion of the soil column. Soil samples for laboratory analysis were collected in the upper 3 feet of the subsurface and from a second sample interval that was near, but above, the observed water table at the time of drilling. Therefore, two soil samples from each boring were selected for laboratory analysis, except for boring WP-B7, in which one soil sample was selected for laboratory analysis because of the limited soil thickness. Additionally, in borings WP-B4 and WP-B5, the deeper sample was held by the laboratory pending the results of the shallower interval.

During boring advancement, bedrock was not encountered in any of the borings and there was no indication of weathered bedrock in any of the borings. Groundwater was visually observed to be present in the sand layer. The overlying clay deposit appeared to be moist, but groundwater was not readily apparent. The sand layer and coinciding depth to groundwater in WP-B1 adjacent to the loading dock driveway was observed at a depth of 9 feet bgs, which is approximately 6 to 7 feet below the deepest part of the loading dock and the storm sewer line that follows the driveway to the north. The groundwater in the sand layer was not observed to be under pressure head.

A total of 11 soil samples were analyzed for the Wisconsin list of 36 PFAS compounds. The only PFAS compounds with proposed residual contaminant levels (RCLs) are PFOS and PFOA for industrial and non-industrial direct contact exposure. The WDNR has provided guidance that the soil-to-groundwater pathway RCLs are to be calculated using the USEPA Risk-based Regional Screening Tool and WDNR default values outlined in the WDNR guidance document dated January 23, 2014.

GZA used the Risk-based Screening Tool to obtain the necessary toxicological data for PFOS and PFOA to develop the soil-to-groundwater RCLs. Following the guidance document, the risk-based screening levels calculated by the tool were converted to a screening level relative to the proposed Chapter NR 140 (Wisconsin Administrative Code [Wis. Admin. Code]) Enforcement Standard (ES) of 20 nanograms per liter (ng/L) (0.02 micrograms per liter [µg/L]) for combined PFOS and PFOA. The soil-to-groundwater RCL for PFOS was calculated to be 0.038 micrograms per kilogram (µg/kg) and the soil-to-groundwater RCL for PFOA was calculated to be 0.017 µg/kg.

The soil sample analytical results indicate that six constituents were detected above the method detection limits, including 1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS), Perfluoroheptanoic Acid (PFHpA), Perfluorohexanoic acid (PFHxA), PFOS, PFOA, and Perfluoropentanoic acid (PFPeA). The only constituents detected that currently have soil or groundwater standards are PFOS and PFOA, whereas the other constituents detected in the soil do not have soil or groundwater standards for comparison purposes. Also note that because of the limited detections of PFAS in the shallower soil samples analyzed, the deeper samples retained during field sampling were held and did not require analysis.

PFOA was detected in WP-B-3 (2-3') at 4.5 µg/kg and PFOS was detected in WP-B-1 (1-2') at 1.3 µg/kg, which exceed the calculated soil-to-groundwater RCL of 0.017 µg/kg and 0.038 µg/kg for these constituents, respectively. These borings are located near the center of the north wall of the basement structure and adjacent to the loading dock driveway, respectively. The soil samples from the deeper interval in both of these borings have reported concentrations of PFOS and PFOA less than the respective method detection limits, indicating the PFOA and PFOS had not migrated vertically. The soil samples from the other borings had reported concentrations less than the respective method detection limits.

The lack of concentrations in the deeper sample intervals indicate that the PFOA and PFOS may be limited to the upper 3 feet of the soil column in each boring. The PFOA and PFOS concentrations detected in the soil appear to coincide with the periodic nature of the discharge of AR-AFFF-containing long-chain PFAS during the fire suppression system testing. The limited horizontal distribution of PFOA and PFOS in the soil samples from the borings may be a result of the shallow, low permeability clay soils limiting infiltration and promoting surface water runoff.

6:2 FTS was detected above the method detection limit in samples WP-B-2 (2-3'), WP-B-3 (2-3'), and WP-B-3 (5-6'). 6:2 FTS is a fluorotelomer with eight carbon atoms, but unlike PFOS and PFOA, only six of the carbon atoms are completely fluorinated. The structure of this fluorotelomer allows for it to be degraded under aerobic conditions. The degradation of fluorotelomers can result in the generation of PFHxA and PFPeA. 6:2 FTS and its breakdown products are generally believed to be of lower toxicity than PFOS and PFOA due to the shorter carbon chain length, lack of bioaccumulation, and shorter half-lives.

PFHpA was detected above the method detection limit in samples from WP-B-3 (2-3'), WP-B-3 (5-6'), and WP-B-4 (2-3'). PFHpA is a seven-carbon chain compound with only six fully fluorinated carbon atoms. PFHpA may be present from the degradation of fluorotelomers or other impurities in the C8 foam discharged to the surface.

The breakdown products PFHxA and PFPeA were detected above the method detection limit in WP-B-1 (1-2'), WP-B-3 (2-3'), WP-B-3 (5-6'), and WP-B-4 (2-3'). The presence of 6:2 FTS confirms that during more recent years of fire suppression testing, the AR-AFFF included short-chain formulations following the phase out of the long-chain PFAS. The soil samples in which 6:2 FTS and its breakdown products were detected above the method detection limits are from borings along the north edge of the basement structure. Of these samples, the only boring with a detected concentration in the deeper interval was WP-B-3 (5-6'). 6:2 FTS, PFHxA, and PFPeA do not have regulatory standards for comparison.

Only the breakdown products of 6:2 FTS were detected in the samples collected WP-B-1 (1-2') and WP-B-4 (2-3'). The lack of 6:2 FTS in these samples appear to indicate limited migration of the breakdown products from the area of boring WP-B-2 and WP-B-3. Also note that given the low concentrations of 6:2 FTS detected in the soil samples, it is possible that 6:2 FTS is present, but below the method detection limit.

The soil samples collected from WP-B-5, WP-B-6, and WP-B-7 did not detect PFAS constituents at concentrations above method detection limits. Borings WP-B-5 and WP-B-6 were located the furthest downslope to evaluate the potential for lateral migration away from the AR-AFFF discharge area. Boring WP-B7 was collected from the soil on top of the basement structure nearest the discharge point. The lack of PFAS constituents in these samples appears to indicate that the releases of AR-AFFF during testing was focused, showing a limited area of impact near the north edge of the basement structure and loading dock area, but not evidence of widespread migration away from the discharge point.

5.0 SCOPE OF WORK AND RATIONALE

The scope of work presented below considers the body of information developed on the West Plant Site, our initial investigation observations and findings, as well as the Wisconsin Department of Natural Resources' (WDNR) comments and requested supplemental investigation activities. Each item requested by the WDNR is provided below with our proposed Work Plan activities:

1. PFAS was detected at concentrations exceeding the soil to groundwater RCL, therefore, a groundwater monitoring well will be installed near the location of WP-B-3:

   GZA proposes to advance one soil boring adjacent to soil boring WP-B-3 and convert it to a Chapter NR 141 monitoring well to evaluate the potential for PFAS impacts to groundwater. The approximate location of the monitoring well to be installed is shown on Figure 4. The steps taken to construct and sample the monitoring well include the following:

   - GZA will oversee the construction of the monitoring well by the drilling subcontractor following the advancement of the soil boring using hollow-stem auger drilling techniques and sampling the soil continuously to a depth of approximately 20 feet bgs or until bedrock is encountered. The well depth will be determined based on the observed groundwater level at the time of drilling. Groundwater may not be visibly present, so other indications such as observations of soil color and changes in apparent soil moisture will be used to estimate the depth to groundwater. The well will be constructed of 2-inch, Schedule 40, polyvinyl chloride (PVC), 0.010-inch, 10-foot-long well screen and riser pipe. A sand filter pack will be placed around the well screen from the bottom of the boring to a depth approximately 1 to 2 feet above the top of the well screen. The annular space from the top of the sand filter pack to the surface will be filled with bentonite chips or pellets. The well will be constructed as a flush-mount completion with an 8-inch protective cover surrounded by a concrete apron.

   - Following well installation, the well will be allowed to equilibrate to a static condition prior to development in order to remove sediment and improve hydraulic connection with the native formation. The soils at the Site consist of low permeability clay with thin sand seams, which reduces the groundwater recovery rate and limits the volume of groundwater that can be removed during development. The well will be developed by surging the water in the well using a disposable, polyethylene bailer and purging the water from the well using the bailer. The volume of water removed from the well will be dependent on the groundwater recovery rate and, if possible, 10 well volumes will be removed in accordance with the WDNR groundwater sampling guidance manual. If the well purges dry prior to 10 well volumes, the well will be allowed to recover three times and purged until the water is evacuated from the well. It is anticipated that the well will be allowed to equilibrate for 7 to 10 days before it is developed, and that development may require multiple events.

   - Soil will be generated during the boring activities. This soil will be placed in a 55-gallon drum until proper disposal arrangements can be determined.

   - Field equipment used in the sampling and development activities will comply with GZA's Standard Operating Procedures for PFAS sites, which specifies PFAS-free componentry and field protocols for sampling teams to reduce the potential for sample bias or cross-contamination.

   - Once well development is complete, the groundwater level will be allowed to reach equilibrium prior to measuring the depth to water from the top of casing and collecting a groundwater sample using low-flow sampling techniques. The equipment placed in the well will be dedicated to the well and will not be reused. A polyethylene tube will be placed in the well and connected to a peristaltic pump to remove water. A multimeter will be connected on the discharge side of the pump to monitor the field parameters (dissolved oxygen [DO], oxidation-reduction potential [ORP], temperature, pH, conductivity, and turbidity) during purging. The well will be purged until the field parameters stabilize within a range acceptable for this method of sampling. The water will be collected in a 5-gallon bucket and will be placed in a 55-gallon drum for storage until proper disposal can be arranged. During purging, the personnel will use a new pair of disposable gloves between setup, purging, and sample collection to reduce the potential for cross-contamination. The reusable equipment that is placed in the well will be decontaminated with a non-phosphate detergent and distilled water wash and a distilled water rinse between each well.

- Following completion of purging, the multimeter will be disconnected from the peristaltic pump and the groundwater sample will be collected directly from the discharge tubing. The sample will be collected in a laboratory-supplied, PFAS-free container. The sample will be submitted for laboratory analysis of 16 PFAS with proposed enforcement standards (perfluorooctane sulfonamide [FOSA], Hexafluoropropylene oxide dimer acid [HPFO-DA], perfluorobutanoic acid [PFBA], perfluorobutanesulfonic acid [PFBS], perfluorododecanoic acid [PFDoA], perfluorohexanoic acid [PFHxA], perfluorotetradecanoic acid [PFTeA], perfluoroundecanoic acid [PFUnA], 4,8-Dioxa-3H-perfluorononanoic acid [DONA], perfluorooctadecanoic acid [PFODA], perfluorohexasulfonic acid [PFHxS], perfluorononanoic acid [PFNA], perfluorodecanoic acid [PFDA], N-ethyl perfluorooctane sulfonamidoacetic acid [NEtFOSAA], PFOS, and PFOA). In addition to the groundwater sample, a quality assurance/quality control (QA/QC) equipment blank will be collected from the water level indicator to evaluate the decontamination procedure and potential for cross-contamination. The samples will be placed in laboratory-supplied sample containers, placed on ice that is double-bagged in Ziplock® plastic bags, and shipped under chain-of-custody control via overnight carrier to Pace Analytical® (Pace) in West Columbia, South Carolina.

2. Consideration of the storm sewer catch basin in the loading dock area and sewer line that flows to Glatz Creek as a mechanism for PFAS discharge.

   This sewer line has historically been used at the Site since its development in the late 1970s. In an effort to understand the potential stormwater that historically flowed through this sewer line, GZA will review historic utility information including the sewer routing through the plant area, the condition of and discharge location of the sump in the West Plant basement, other sources of contributions to this sewer line along the alignment prior to Glatz Creek, and the general flow volumes and characteristics of the stormwater discharges that enter the sewer. The historic information reviewed will include utility maps, historic plant maps, aerial photographs, and other available information. The approximate locations of the former storm sewer and current storm sewer for the Site are shown on Figure 3.

   To evaluate the potential for shallow soil impacts at the outfall location, one soil boring will be advanced near the outfall of the storm sewer line near the Glatz Creek stream channel located approximately 1,300 feet north of the fire suppression system discharge area. The boring will be advanced using a hand auger. The approximate location of the soil sample is shown on Figure 3. The sampling activities will include the following:

   - The soil boring will be advanced within 10 to 15 feet of the outfall to a depth of approximately 3feet or auger refusal, whichever is encountered first. The boring will be continuously sampled from the surface to the final boring depth and divided into 1-foot intervals. The soil lithology and visual description of the soils will be recorded on a soil boring log by the field geologist. One soil sample will be collected from the 1- to 2-foot depth interval and will be submitted for laboratory analysis of 6:2 FTS, PFHpA, PFHxA, PFPeA, PFOS, and PFOA, which are the constituents that had been detected during the Site investigation. The sample will be placed in laboratory-supplied sample containers, placed on ice that is double-bagged in Ziplock® plastic bags, and shipped under chain-of-custody control via overnight carrier to Pace in West Columbia, South Carolina.

3. GZA will perform a field topographic elevation survey following the monitoring well construction and soil sampling activities. Features to be surveyed will include the ground surface and top of casing elevation of the monitoring well, and ground surface elevation of the soil sample locations. This information will be combined with previous elevation survey data including the elevations of the catch basin located in the loading dock and used in presenting and interpreting the data and findings.
4. Upon receipt of the laboratory analytical results, GZA will prepare data tables and figures for review and discussion. Depending on the findings and the next steps in the project, GZA will prepare a report documenting the field observations, analytical results, data interpretations, and provide its conclusions and recommendations.

6.0 CERTIFICATIONS

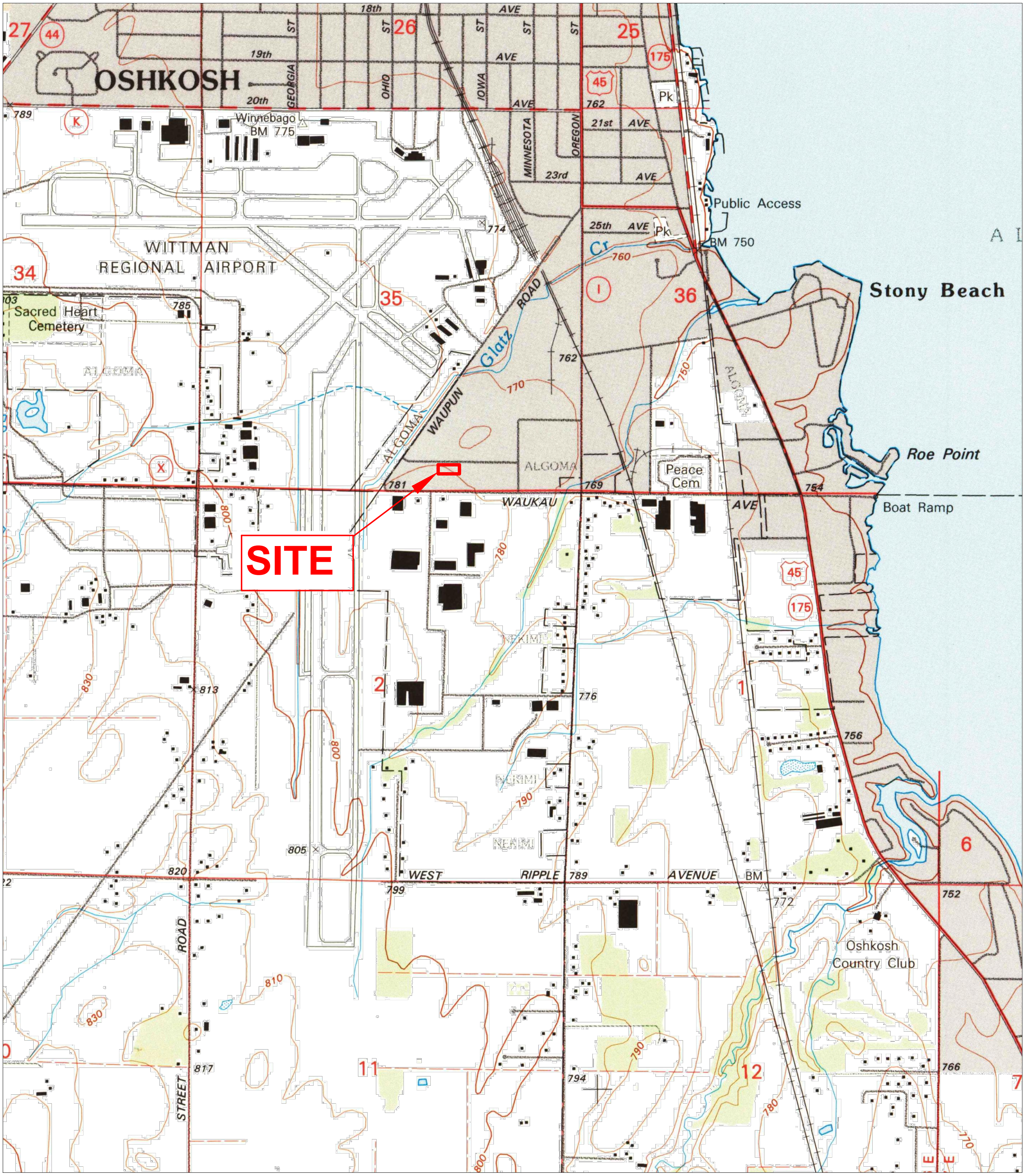
"I, Kevin M. Hedinger, hereby certify that I am a hydrogeologist as that term is defined in s NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

______________________________ June 17, 2021

Kevin M. Hedinger — Date

Senior Project Manager / Hydrogeologist

FIGURES



0 1,000' 2,000' 4,000'

SCALE IN FEET 1" = 2,000'

NO.	ISSUE/DESCRIPTION	BY	DATE

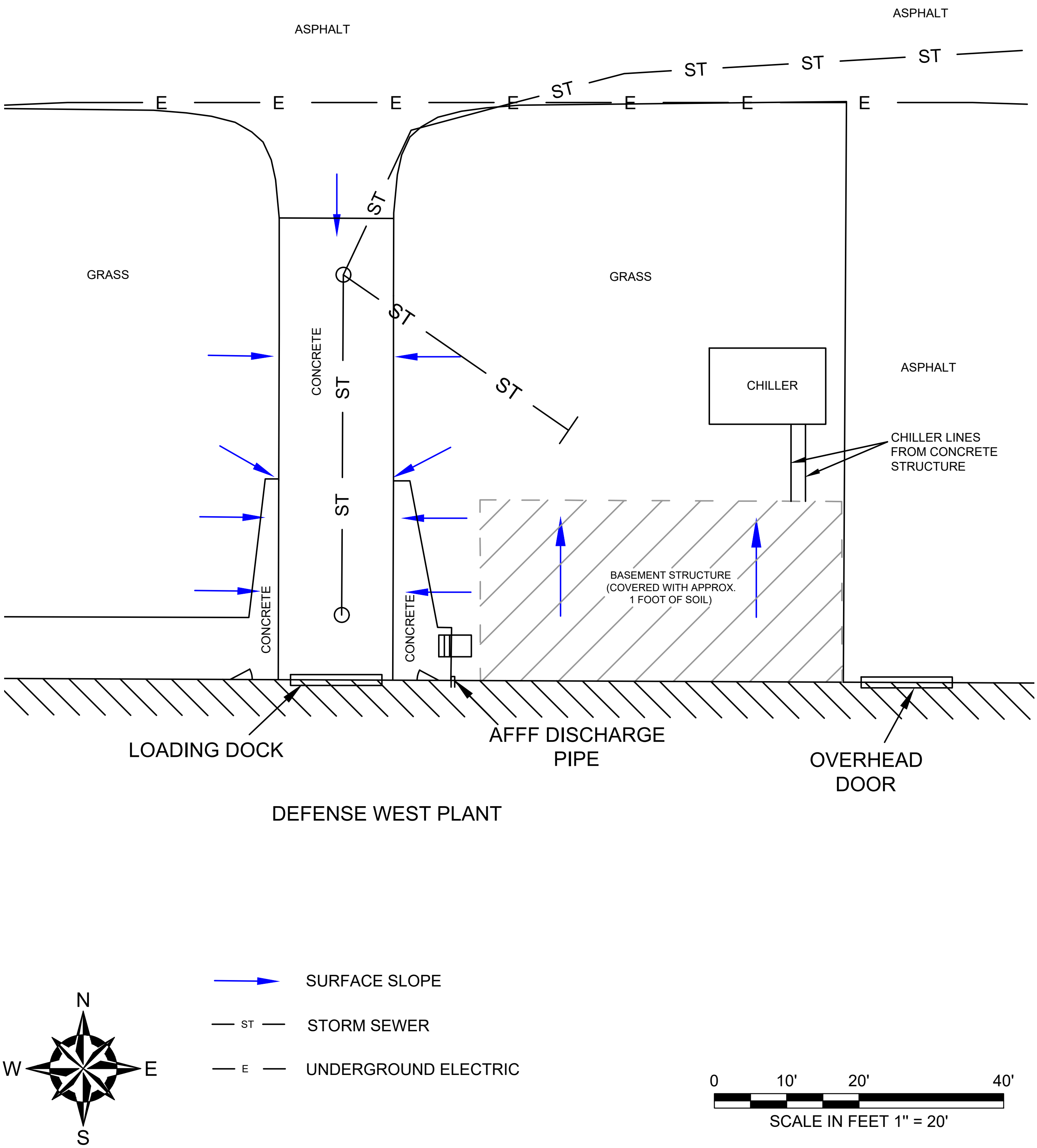
OSHKOSH CORPORATION
DEFENSE WEST PLANT
OSHKOSH, WISCONSIN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
OSHKOSH CORPORATION
OSHKOSH, WISCONSIN

SITE LOCATION

PROJ MGR: KMH	REVIEWED BY: JCO	CHECKED BY: JCO	FIGURE
DESIGNED BY: KMH	DRAWN BY: KMH	SCALE: AS SHOWN	1
DATE: 12/29/2020	PROJECT NO. 20.0157080.01	REVISION NO.	SHEET NO.



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OSHKOSH, WISCONSIN

SITE PLAN

PROJ MGR: KMH	REVIEWED BY: JO	CHECKED BY: JO	FIGURE 2
DESIGNED BY: KMH	DRAWN BY: KMH	SCALE: 1"=20'	
DATE: JANUARY 2021	PROJECT NO. 20.0157080.00	REVISION NO.	SHEET NO.

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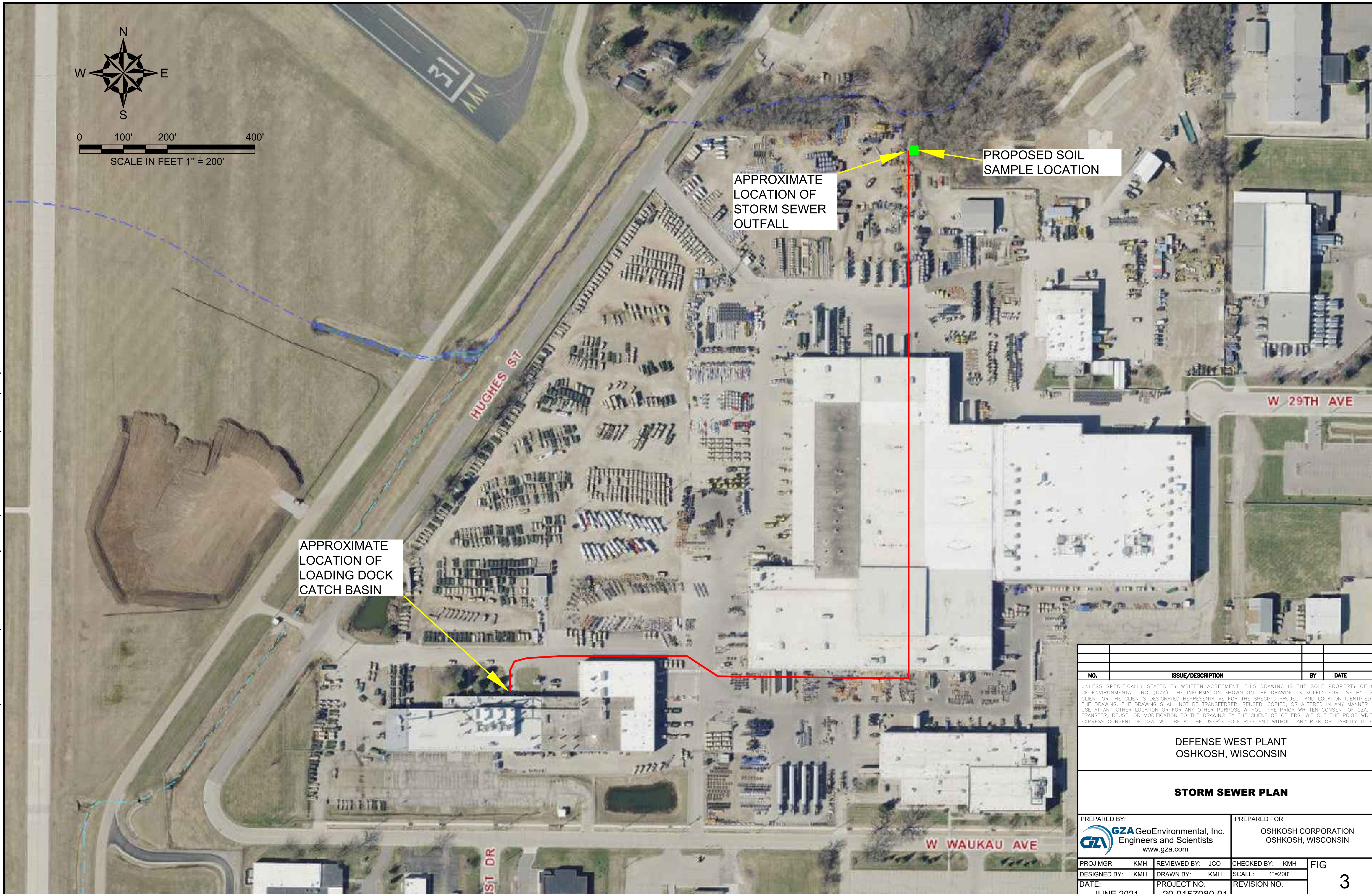

NO.	ISSUE/DESCRIPTION	BY	DATE

DEFENSE WEST PLANT
OSHKOSH, WISCONSIN

STORM SEWER PLAN

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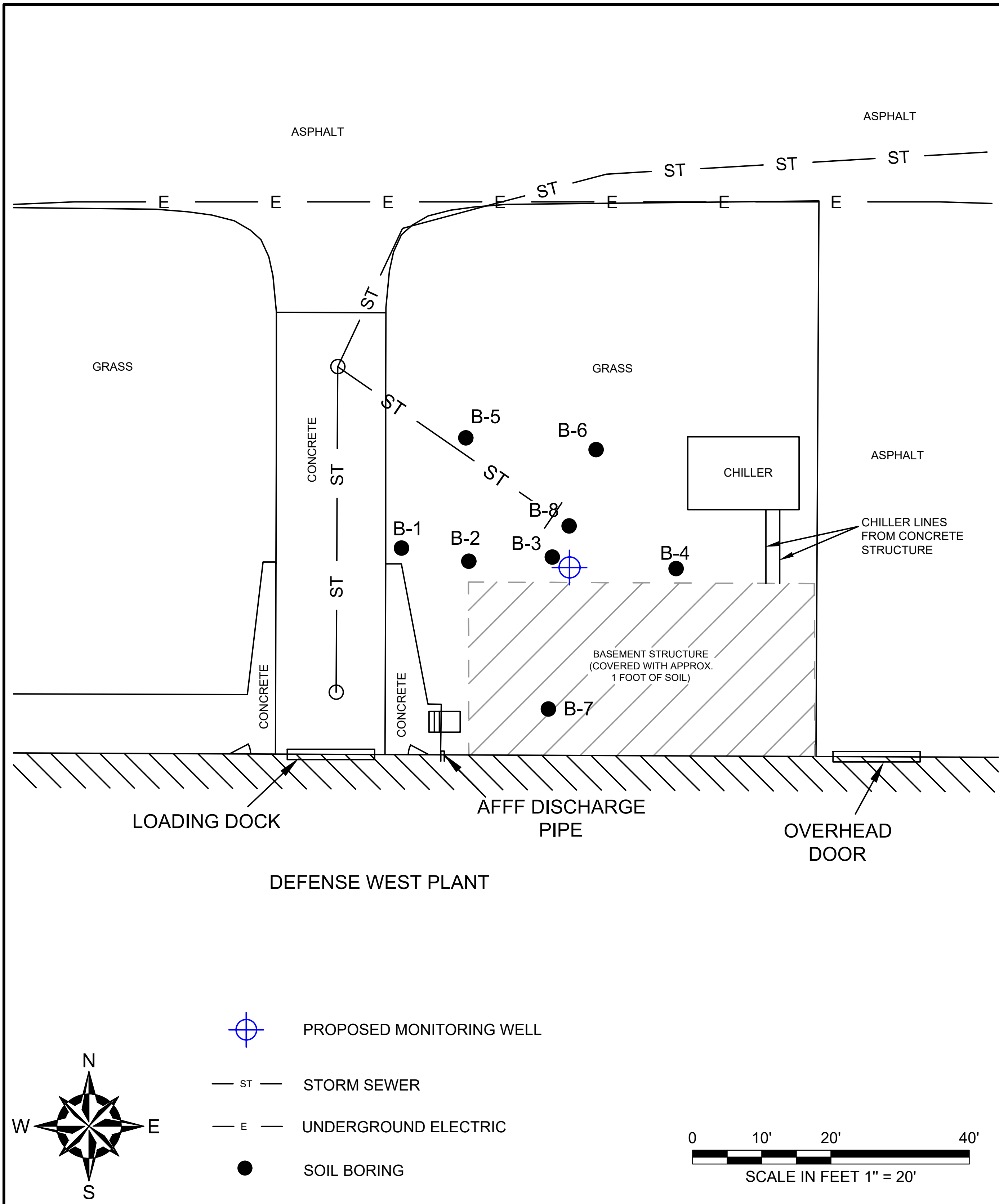
OSHKOSH CORPORATION
OSHKOSH, WISCONSIN

PROJ MGR: KMH	REVIEWED BY: JCO	CHECKED BY: KMH	FIG
DESIGNED BY: KMH	DRAWN BY: KMH	SCALE: 1"=200'	3
DATE: JUNE 2021	PROJECT NO. 20.0157080.01	REVISION NO.	SHEET NO.



NO.	ISSUE/DESCRIPTION	BY	DATE

DEFENSE WEST PLANT
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OSHKOSH, WISCONSIN

SOIL BORING PLAN & PROPOSED MONITORING WELL LOCATION

PROJ MGR: KMH	REVIEWED BY: JO	CHECKED BY: JO	FIGURE
DESIGNED BY: KMH	DRAWN BY: KMH	SCALE: 1"=20'	4
DATE: JANUARY 2021	PROJECT NO. 20.0157080.00	REVISION NO.	SHEET NO.

APPENDIX A

LIMITATIONS

LIMITATIONS

Standard of Care

1. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the proposal and/or report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

2. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state, or federal agency.

3. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the report.

Subsurface Conditions

4. The generalized soil profile(s) provided in our report are based on widely spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and were based on our assessment of subsurface conditions. The composition of strata and the transitions between strata may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location, refer to the exploration logs.

5. Water level readings have been made in test holes (as described in the report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater, however, occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the report.

Compliance with Codes and Regulations

6. GZA used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various and possibly contradictory interpretations. Interpretations and compliance with codes and regulations by other parties are beyond our control.

Screening and Analytical Testing

7. GZA collected environmental samples at the locations identified in the report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future site activities and uses may result in a requirement for additional testing.

8. Our interpretation of field screening and laboratory data is presented in the report. Unless otherwise noted, GZA relied on the laboratory's quality assurance (QA)/quality control (QC) program to validate these data.

9. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the report.

Interpretation of Data

10. Our opinions are based on available information, as described in the report, and on our professional judgment. Additional observations made over time and/or space may not support the opinions provided in the report.

Additional Information

11. In the event that Client or others authorized to use this report obtain information on environmental or hazardous waste issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

Additional Services

12. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction and/or property development/ redevelopment at the site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.