

December 13, 2017



Wisconsin Department of Natural Resources  
Oshkosh Service Center  
625 East County Road Y, Suite 700  
Oshkosh, Wisconsin 54901-9731

Attention: Ms. Jennifer Borski

RE: Supplemental NR 716 Site Investigation Work Plan  
Ahlgrimm Explosives Company, Inc.  
W9899 Givens Road  
Town of Hortonia, Outagamie County, Wisconsin  
WDNR BRRTS #02-45-558037 (Prill Area)  
Terracon Project No. 58127001

Dear Ms. Borski:

Terracon Consultants, Inc. (Terracon) has prepared this *Supplemental NR 716 Site Investigation Work Plan* for the Wisconsin Department of Natural Resources (WDNR) Environmental Repair Program (ERP) Prill Area case (BRRTS #02-45-558037) at the subject site in general conformance with Wisconsin Administrative Code (WAC), Chapter NR 716. An outline of the project, the scope of services, and potential schedule, are provided in the following sections. In addition, Ahlgrimm Explosives is requesting approval of the well construction variance (Section 3.2.1) so well construction can proceed the week of December 19, 2017.

## 1.0 PROJECT INFORMATION

The WDNR performed a limited sampling effort on November 16, 2011 at the above-referenced facility in the Town of Hortonia. A total of six (S-01 through S-06) soil samples were collected from four separate areas: 1) in an area where trucks were routinely washed outside the east door of a building, 2) outside the building near where a pipe discharges fluids generated during drill bit sharpening, 3) at a burn pit area, and 4) in the area where granular ammonium nitrate is stored in an aboveground bin (Figure 1). Based on the soil testing results, the WDNR opened four separate case numbers. Terracon prepared a work plan for an NR 716 Site Investigation to concurrently investigate via test pit soil sampling the contaminants of concern in each area including volatile organic compounds (VOCs); various metals; polynuclear aromatic hydrocarbons (PAHs); nitrite-nitrate as nitrogen ( $\text{NO}_{2-3}$  as N); and ammonia-ammonium as nitrogen ( $\text{NH}_{3-4}$  as N).

Following WDNR approval of the work plan with several minor modifications on September 28, 2012, the site investigation commenced in October 2012, which consisted of excavating a total of 20 test pits including three background test pits to help determine background concentrations of



Terracon Consultants, Inc. 9856 South 57<sup>th</sup> Street Franklin, Wisconsin 53132  
P [414] 423 0255 F [414] 423 0566 terracon.com

Geotechnical



Environmental



Construction Materials



Facilities

## Supplemental NR 716 Site Investigation Work Plan

Ahlgrimm Explosives ■ Town of Horton, Wisconsin  
December 13, 2017 ■ Terracon Project No. 58127001



aluminum, iron, copper, and zinc. Based on the results of the site investigation (SI), Terracon proposed remedial action excavation of soil from small areas associated with the drill bit grinding area, burn pit area, and prill area as described in Terracon's *NR 716 Site Investigation Report* dated July 31, 2013. That report also included a Remedial Action Plan (RAP). On September 11, 2013, the WDNR approved Terracon's SI and RAP with the following condition:

- n At the completion of the excavation, confirmation samples must be collected and analyzed for the appropriate parameters.

Based on the data presented in the SI report, the WDNR required no additional work for the East Door-Truck Wash Area (BRRTS #02-45-558040) and reclassified the case to "No Action Required". The proposed remedial action for the Prill Area (BRRTS #02-45-558037), Drill Bit Grinding Area (BRRTS #02-45-558038), and Burn Area (BRRTS #02-45-558039), proceeded in November 2013. The remedial action was documented in Terracon's *Remedial Action Documentation Report* (RAR) dated February 3, 2014.

Upon review of the RAR and discussion with the closure committee in April 2014, the WDNR project manager Jennifer Borski indicated that a groundwater investigation in the ammonium-nitrate bin area was necessary to receive site closure. The closure committee also requested information related to the site potable well and soil verification sampling near the ammonium-nitrate bin. Terracon prepared and submitted an *NR 716 Groundwater Investigation Work Plan*, dated December 16, 2014, for the requested investigation.

The site investigation proceeded in December 2014. Following preliminary review of data collected during the investigation, the WDNR determined that additional groundwater monitoring wells and quarterly groundwater sampling were necessary. Following approval of a monitoring well construction variance to allow smaller diameter wells to be constructed by Ahlgrimm Explosives, nine groundwater monitoring wells were constructed in September 2015. The monitoring wells, consisting of eight observation wells and one piezometer, were developed and sampled in September 2015 following by quarterly groundwater sampling events in December 2015, and March and June 2016. The results were documented in Terracon's *NR 716 Groundwater Site Investigation and Supplemental Remedial Action Report*, dated September 18, 2017. In preparation for site closure, Ahlgrimm Explosives submitted the fee and requested a technical review of the report. Following a preliminary review of the data, the WDNR requested additional investigation, including soil sampling and construction of an additional offsite, upgradient groundwater monitoring well. Ahlgrimm Explosives requested a pause in the technical review in order to collect that data. This work plan provides the scope of work to collect that data.

## 2.0 LOCAL GEOLOGY

The local geology consists of a thin veneer of unconsolidated material overlying bedrock. Bedrock lies at a depth of approximately 4 feet below grade (bg) in the area, but varies by several feet across the site. Bedrock in this area consists of dolomite and sandy limestone of the Lower Ordovician Prairie du Chien Group. The Prairie du Chien Group overlies Cambrian Sandstone from which local potable wells draw their water. The contact between the Prairie du Chien and Cambrian sandstone is exposed in a road cut along Highway 15 a short distance to the northwest of the site. Shallow groundwater is generally present at a depth greater than 10 feet bg within the bedrock.

## 3.0 SCOPE OF SERVICES

This recommended scope of services to conduct additional investigation was developed in accordance with the WDNR's preliminary response to the *NR 716 Groundwater Site Investigation Report* technical review request, which was informally presented during a site meeting with WDNR in November 2017. Specifically, the WDNR requested that the soil beneath the prill bin be resampled and that an offsite monitoring well be constructed. The following scope of services has been developed to fulfill the requested additional investigation:

- n Resample the soil fill placed between the footers following the November 2013 excavation for nitrite-nitrate as nitrogen ( $\text{NO}_{2-3}$  as N) to confirm that the fill was clean and to support the idea that only a small volume of residual soil contamination remains that could not be accessed during the various excavations.
- n Construct an offsite observation well (MW-9) in the farm field upgradient of existing observation well MW-6, which is upgradient of the prill bin source area. The well construction will require access permission from the offsite owner prior to the work being performed.
- n Develop the proposed monitoring well and survey the top-of-casing elevation relative to MW-6.
- n Perform an additional groundwater monitoring event to include measuring water levels from the entire monitoring well network and collecting samples for analysis of  $\text{NO}_{2-3}$  as N from the proposed monitoring well MW-9, and existing observation wells MW-1, MW-2, MW-3, MW-4, and MW-6.
- n Prepare a Supplemental NR 716 Site Investigation Report that will document the results of the additional investigation.

### 3.1 Verification Soil Sampling

Terracon will advance two hand-auger borings beneath the ammonium-nitrate bin as shown on the attached Figure 2 to collect soil samples from the sand backfill placed following the 2013

contaminated soil excavations. Each of these borings will be advanced to approximately 4 feet bg. Terracon proposes to collect a sample from each boring at 1 foot bg or from just below the plastic liner placed under the prill bin following the 2015 excavation, whichever is deeper and from the terminus of each boring at a depth of approximately 4 feet bg. The samples will be placed on ice in a cooler and transported to a Wisconsin-certified laboratory under chain-of-custody protocols for analysis of NO<sub>2-3</sub> as N.

### **3.2 Monitoring Well Construction, Development, and Survey**

As requested, Terracon proposes to construct an offsite groundwater monitoring well in the farm field upgradient (south) of existing observation well MW-6, subject to access permission being granted by the owner. The approximate proposed monitoring well location is shown on the attached Figure 3. The final location may be different than shown in consideration access and field conditions. The proposed monitoring well will be constructed in a manner similar to the existing monitoring wells, which will require approval of a monitoring well construction variance.

#### **3.2.1 Monitoring Well Construction and Variance Request**

Terracon anticipates that the well borehole will be drilled by Ahlgrimm Explosives personnel using their own air hammer drilling rig to advance the monitoring well borehole. An approximate 6-inch diameter hole will initially be drilled into the top part of the bedrock at a depth of approximately 5 to 8 feet bg, and temporarily cased with steel or polyvinyl chloride (PVC) piping to prevent caving of unconsolidated materials. An approximate 4-inch diameter hole will be drilled inside the temporary casing to the terminal depth of the boring in bedrock. Soil samples will not be collected. This method typically does not require the introduction of significant quantities of water or drilling fluids to maintain an open borehole and purge the cuttings.

As the boring is advanced through bedrock, the drill cuttings will be continuously observed by Terracon's field geologist. Generally, a grab sample of drill cuttings will be collected and logged at 5-foot intervals. Logging intervals, however, may be modified based upon visually noticeable changes in drill cutting characteristics, such as color, moisture content, bit drop, or rate of advance.

The depth to the static groundwater table will be measured in existing observation well MW-6 prior to drilling the proposed groundwater monitoring well. Historically, the depth to groundwater at observation well MW-6 has been approximately 20 feet bg. However, for the purposes of preparing this work plan, Terracon assumes that the depth to groundwater at the location of proposed monitoring well MW1 may be approximately 25 feet bg. Proposed monitoring well MW-9 will be constructed as an observation well using a 10-foot screen that spans the water table. Terracon estimates that the bottom of the screen for monitoring well MW-9 may be installed to as deep as approximately 32 feet below grade.

Observation well MW-9 will be constructed using 1-inch diameter, No. 10-slot, Schedule 40, PVC well screen and riser pipe. The annular space will be sealed according to the requirements of NR 141, WAC. The well will be completed with an above-grade protective cover and a locked cap. Because the well will be constructed with a 1-inch diameter screen and riser within a nominal 4-inch diameter borehole, a well construction variance will be required. As such, Ahlgrimm Explosives requests approval of this variance so that the proposed monitoring well can be constructed in similar fashion to the existing monitoring wells during the week of December 19, 2017. The requested monitoring well construction variance is presented on the attached monitoring well construction form.

### **3.2.2 Monitoring Well Development and Survey**

The monitoring well will be developed per Chapter NR 141, WAC by surging and purging with a disposable bailer or by surging and pumping with a submersible pump depending upon how much water the formation produces. As with agricultural chemical sites managed by the Department of Agriculture, Trade, and Consumer Protection (DATCP), Terracon proposes to spread the soil cuttings and development/purge water on the ground near the wellhead.

Upon installation of monitoring well MW-9, the ground surface elevation and top of the well casing elevation will be surveyed to an accuracy of 0.01 foot using an automatic level. However, since there are no benchmarks in the area, the well will be surveyed relative to the top-of-casing-elevation of existing observation well MW-6.

### **3.3 Groundwater Sampling**

Prior to purging, the depth to groundwater will be measured in each of the monitoring wells in the monitoring well network to within 0.01 foot with an electronic water level indicator. Groundwater samples will be collected from the new monitoring well MW-9 and existing monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-6 and submitted to a Wisconsin-certified laboratory for analysis of NO<sub>2-3</sub> as N. The samples will be placed on ice in a cooler and transported to the laboratory for analysis under chain-of-custody protocols.

## **4.0 REPORTING**

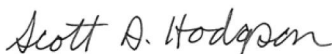
Terracon will prepare a Supplemental NR 716 Site Investigation Report that will document the soil sampling, monitoring well construction, and groundwater sampling results following receipt of the laboratory test results. The report will provide recommendations for closure or additional investigation, as appropriate.

## 5.0 PROJECT SCHEDULE

The soil sampling, monitoring well construction, and groundwater sampling activities are scheduled for the week of December 18, 2017. Laboratory analyses will be performed with a 48-hour turnaround. The Supplemental NR 716 Site Investigation Report will be submitted within approximately 28 days following receipt of the laboratory results. If you have any questions or need additional information, please call or email the undersigned.

Sincerely,



  
Scott A. Hodgson, P.G.  
Senior Project Manager

  
Timothy P. Welch  
Environmental Department Manager

SAH/TPW:sah/N:\Projects\2012\58127001\PROJECT DOCUMENTS (Reports-Letters-Drafts to Clients)\58127001.Ahlgrimm Expl.prill area.add SI work plan.Dec2017.docx

Attachments: Figure 1: Site Map  
Figure 2: Proposed Hand Auger Boring Locations  
Figure 3: Proposed Groundwater Monitoring Well Location  
Well Construction Variance

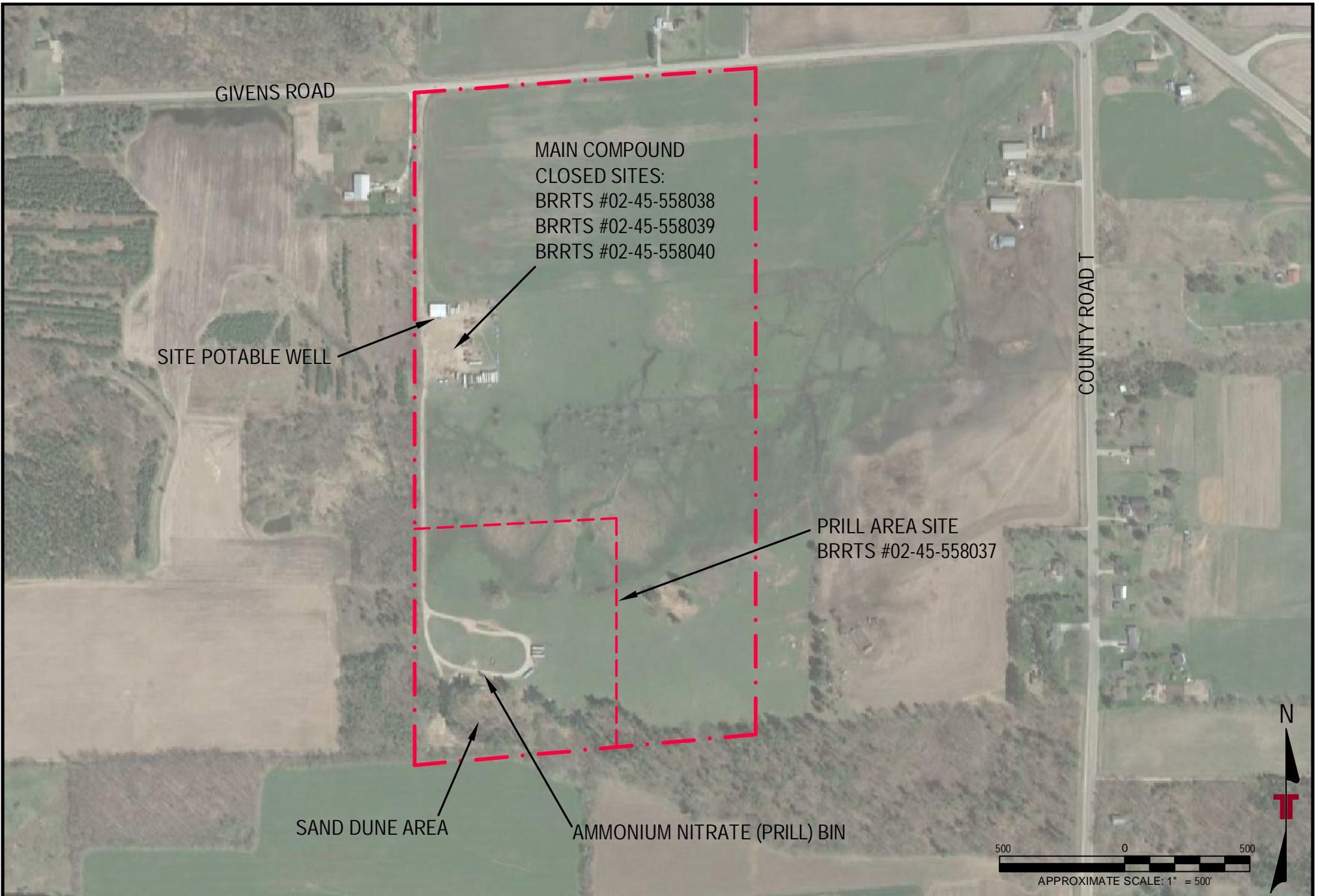
Copies to: John Ahlgrimm  
File

## 6.0 CERTIFICATION

I, Scott A. Hodgson, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. [GHSS 2](#), Wis. Adm. Code, or licensed in accordance with the requirements of ch. [GHSS 3](#), 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.

*Scott A. Hodgson* PG-1229  
Signature

Senior Project Manager  
Title



**LEGEND**  
 - · - APPROXIMATE AHLGRIMM EXPLOSIVES BOUNDARY  
 IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015  
 DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mgr:	SAH	Project No.	58127001
Drawn By:	JLM (41)	Scale:	AS SHOWN
Checked By:	SAH	File No.	58127001C1
Approved By:	SAH	Date:	9/2017

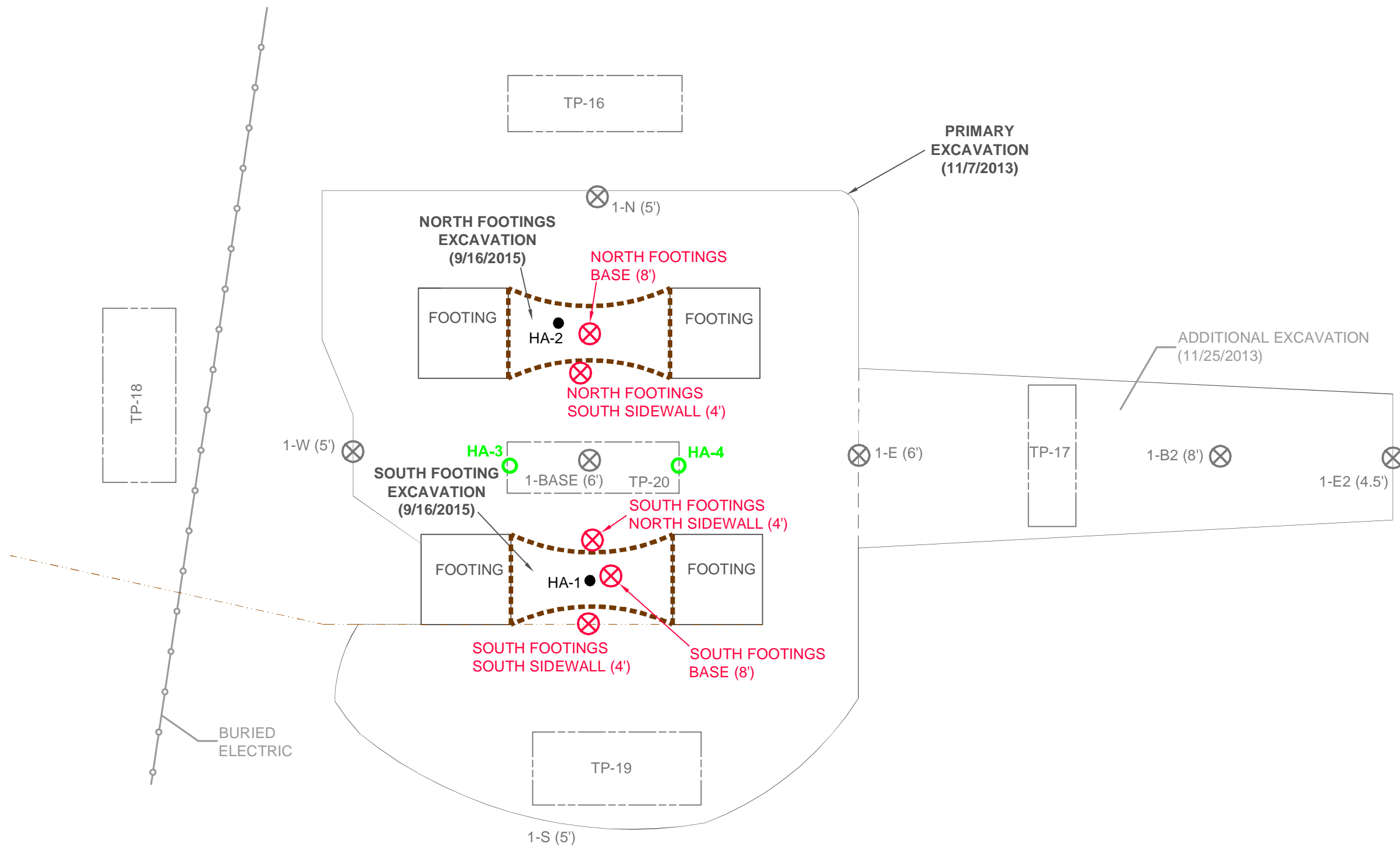
**Terracon**  
 Consulting Engineers and Scientists  
 9856 SOUTH 57th STREET FRANKLIN, WI 53132  
 PH. (414) 423-0255 FAX. (414) 423-0566

**SITE MAP**  
 AHLGRIMM EXPLOSIVES - PRILL AREA  
 W9899 GIVENS ROAD  
 HORTONVILLE WISCONSIN

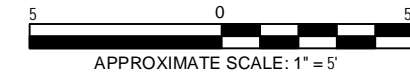
**FIGURE**  
 1



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LEGEND	
●	HAND AUGER BORING LOCATION
⊗	SIDEWALL/BASE SAMPLE (DEPTH SHOWN IN FEET)
⊗	PREVIOUS EXCAVATION SIDEWALL/BASE SAMPLE (DEPTH SHOWN IN FEET)
—	EXCAVATION AREA
- - -	TEMPORARY SIDEWALL FENCELINE
○	PROPOSED HAND AUGER BORING



Project Mngr:	PAL	Project No.:	58127001
Drawn By:	LEB	Scale:	AS SHOWN
Checked By:	SAH	File No.:	58127001C2-NBEA
Approved By:	SAH	Date:	9/2017

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Consulting Engineers and Scientists  
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PH. (414) 423-0255 FAX. (414) 423-0566

PROPOSED HAND AUGER BORING LOCATIONS	
AHLGRIMM EXPLOSIVES - PRILL AREA W9899 GIVENS ROAD HORTONVILLE WISCONSIN	

FIGURE  
**2**

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.



PARCEL 120055800 20 ACRES  
OWNER: JAMES AND GLORIA BAUER

PROPOSED OBSERVATION  
WELL MW-9 LOCATION

LEGEND	
	OBSERVATION WELL LOCATIONS
	PIEZOMETER LOCATIONS
	APPROXIMATE PROPERTY LINE

Project Mng:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH

Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	6/2017

**Terracon**  
Consulting Engineers and Scientists

9856 SOUTH 57th STREET FRANKLIN, WI 53132  
PH. (414) 423-0255 FAX. (414) 423-0566

PROPOSED MONITORING WELL LOCATION	
AHLGRIMM EXPLOSIVES - PRILL AREA W9899 GIVENS ROAD	
HORTONVILLE	WISCONSIN

FIGURE  
**3**

IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015  
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Facility/Project Name <b>Ahlgriem Explosives</b>		Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> E. <input type="checkbox"/> S. <input type="checkbox"/> W.		Well Name <b>Proposed Variance</b>	
Facility License, Permit or Monitoring No.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Well Location <input type="checkbox"/>		Wis. Unique Well No. <input type="checkbox"/> DNR Well ID No. <input type="checkbox"/>	
Facility ID		Lat. _____ " Long. _____ "		Date Well Installed ____/____/____	
Type of Well Well Code <b>11 / MW</b>		Section Location of Waste/Source 1/4 of _____ 1/4 of Sec. _____, T. _____ N, R. _____ <input type="checkbox"/> E <input type="checkbox"/> W		Well Installed By: Name (first, last) and Firm <b>Ahlgriem Explosives and Terracon Consultants</b>	
Distance from Waste/Source _____ ft.		Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known		Gov. Lot Number _____	

- A. Protective pipe, top elevation \_\_\_\_\_ ft. MSL
- B. Well casing, top elevation \_\_\_\_\_ **+2.0** ft. MSL
- C. Land surface elevation \_\_\_\_\_ ft. MSL
- D. Surface seal, bottom \_\_\_\_\_ ft. MSL or **1.0** ft.

12. USCS classification of soil near screen:  
 GP  GM  GC  GW  SW  SP   
 SM  SC  ML  MH  CL  CH   
 Bedrock

13. Sieve analysis performed?  Yes  No

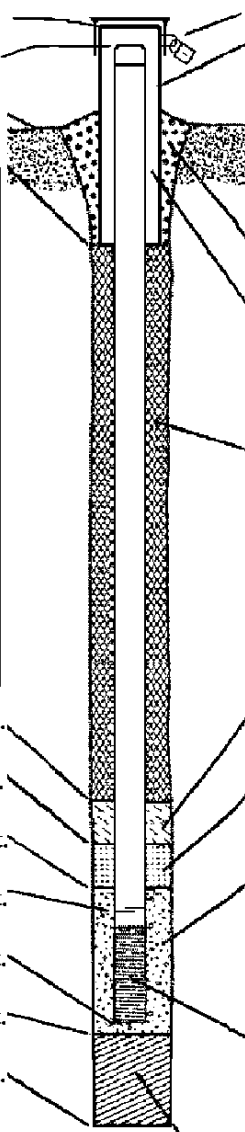
14. Drilling method used: Rotary  5 0  
 Hollow Stem Auger  4 1  
**Air Hammer** Other

15. Drilling fluid used: Water  0 2 Air  0 1  
 Drilling Mud  0 3 None  9 9

16. Drilling additives used?  Yes  No

Describe \_\_\_\_\_

17. Source of water (attach analysis, if required):  
 \_\_\_\_\_



- 1. Cap and lock? friction cap over PVC riser  Yes  No
- 2. Protective cover pipe:
  - a. Inside diameter: \_\_\_\_\_ in.
  - b. Length: \_\_\_\_\_ ft.
  - c. Material: Steel  0 4  
Other
  - d. Additional protection?  Yes  No  
If yes, describe: inside fenced area with locked gate
- 3. Surface seal: Bentonite  3 0  
Concrete  0 1  
Other
- 4. Material between well casing and protective pipe: Bentonite  3 0  
Other
- 5. Annular space seal:
  - a. Granular/Chipped Bentonite  3 3
  - b. \_\_\_\_\_ Lbs/gal mud weight . . . Bentonite-sand slurry  3 5
  - c. \_\_\_\_\_ Lbs/gal mud weight . . . . . Bentonite slurry  3 1
  - d. \_\_\_\_\_ % Bentonite . . . . . Bentonite-cement grout  5 0
  - e. \_\_\_\_\_ Ft<sup>3</sup> volume added for any of the above
  - f. How installed: Tremie  0 1  
Tremie pumped  0 2  
Gravity  0 8
- 6. Bentonite seal:
  - a. Bentonite granules  3 3
  - b.  1/4 in.  3/8 in.  1/2 in. Bentonite chips  3 2
  - c. \_\_\_\_\_ Other
- 7. Fine sand material: Manufacturer, product name & mesh size  
 a. none  
 b. Volume added \_\_\_\_\_ ft<sup>3</sup>
- 8. Filter pack material: Manufacturer, product name & mesh size  
 a. coarse sand  
 b. Volume added \_\_\_\_\_ ft<sup>3</sup>
- 9. Well casing: Flush threaded PVC schedule 40  2 3  
 Flush threaded PVC schedule 80  2 4  
 Other
- 10. Screen material:
  - a. Screen type: Factory cut  1 1  
Continuous slot  0 1  
Other
  - b. Manufacturer \_\_\_\_\_
  - c. Slot size: 0.010 in.
  - d. Slotted length: 10 ft.
- 11. Backfill material (below filter pack): None  1 4  
Other

- E. Bentonite seal, top \_\_\_\_\_ ft. MSL or **1.0**ft.
- F. Fine sand, top \_\_\_\_\_ ft. MSL or none ft.
- G. Filter pack, top \_\_\_\_\_ ft. MSL or 8.5ft.
- H. Screen joint, top \_\_\_\_\_ ft. MSL or 10.5ft.
- I. Well bottom \_\_\_\_\_ ft. MSL or 20.5ft.
- J. Filter pack, bottom \_\_\_\_\_ ft. MSL or 21.0ft.
- K. Borehole, bottom \_\_\_\_\_ ft. MSL or 21.0ft.
- L. Borehole, diameter 4.0 in.
- M. O.D. well casing 1.0 in.
- N. I.D. well casing \_\_\_\_\_ in.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature \_\_\_\_\_ Firm \_\_\_\_\_

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.