

TECHNICAL MEMORANDUM

To: Mr. Ken Groat

From: Jonathan Horowitz

Date: April 17, 2015

Subject: Monitoring Well Redevelopment and First Quarter Groundwater Monitoring Results

Hydrocon Environmental, LLC (HydroCon) is submitting this technical memorandum to Groat Brothers, Inc. to document the work completed at 608 West Scott Avenue in Woodland, Washington (the site) in March 2015. The work was conducted according to our proposal, dated February 10, 2015 and the work plan submitted to the Washington Department of Ecology (Ecology).

On March 26, 2015, HydroCon personnel mobilized to the site to complete the redevelopment of the monitoring wells (MW-4 through MW-7), collect a round of groundwater levels (MW-1 through MW-7), and perform quarterly groundwater monitoring (MW-4 through MW-7).

Upon arrival at the site, the well cap on each well was removed and the water level was allowed to equilibrate prior to measuring the depth to water (DTW). Monitoring well MW-3 was unable to be located; however based on the location, the number of remaining wells, and a conversation with Mr. Panjini Balaraju (with Ecology), the absence of a water level measurement from this well was not deemed to be a significant data gap. Since the completion field work, MW-3 has been located and a water level measurement will be collected during subsequent sampling events. The depth to water in each well was measured using a clean electronic water level indicator. Water levels were measured at the scribed reference mark (north end of the top of the PVC casing) at each well. A table detailing the groundwater levels and elevations and a figure indicating the groundwater flow direction are included in the attachments. Depth to water in the wells ranged from 3.55 to 7.06 feet below top of casing. Groundwater elevations were calculated based on an arbitrary measuring point. Based on the measured groundwater elevations, the groundwater flows towards the southeast at an approximate gradient of 0.003 feet/foot. After the completion of water level measurements, monitoring wells MW-4 through MW-7 were redeveloped using the methodology described below.

HydroCon developed monitoring wells MW-4 through MW-7 by surging and pumping techniques. A clean stainless steel bailer attached to a new length of poly rope was used to surge and bail turbid water from the well. The well was then pumped using new LDPE tubing attached to a peristaltic pump. The process was conducted until no further improvement in water clarity was noted.

Once the wells had been redeveloped, based on a high level of groundwater recharge, the wells were sampled. The wells were purged with a low flow peristaltic pump equipped with new length of LDPE tubing attached to a new length of silicone tubing. Field parameters (pH, temperature and specific conductivity) were measured and recorded on a Groundwater Sample Collection field form along with the depth to water measurements (included in the attachment). Purging was completed when the field parameters had stabilized.

Samples were collected immediately after purging and placed in labeled laboratory-prepared sample bottles. The samples were shipped in an iced cooler along with chain-of-custody documentation to the project laboratory for analysis.

A total of five groundwater samples were collected for laboratory analysis. Each sample was analyzed for the following set of parameters:

- Diesel Range Organics (DRO) and Motor Oil Range Organics (ORO) by Northwest Method NWTPH-Dx.

DRO and ORO were detected at concentrations above the laboratory Method Reporting Limits (MRLs) in the samples submitted from MW-4, MW-5, and MW-7. The detected concentrations were below the applicable MTCA Method A Cleanup Levels with the exception of ORO in the sample submitted from MW-5. ORO was detected at a concentration of 550 µg/L which exceeds the MTCA Method A Cleanup Level of 500 µg/L. A summary data table and the laboratory report are included in the attachments.

Based on the analytical results, HydroCon recommends the following:

- The next round of monitoring should be conducted during the second quarter of 2015, instead of on the 18-month frequency as described in the proposal.
- Prior to the next sampling event (currently scheduled for mid-May 2015), monitoring well MW-5 should be redeveloped using a stinger and vacuum truck.

We appreciate the opportunity to perform these services for Groat Brothers, Inc. Please contact the undersigned at (360) 703-6079 if you have any questions regarding the information provided in this letter report.

Sincerely,

HydroCon



Jonathan Horowitz, PE
Project Engineer



Attachments – Figures
Tables
Groundwater Monitoring Field Forms
Laboratory Report and Chain-of-Custody Documentation

ATTACHMENTS

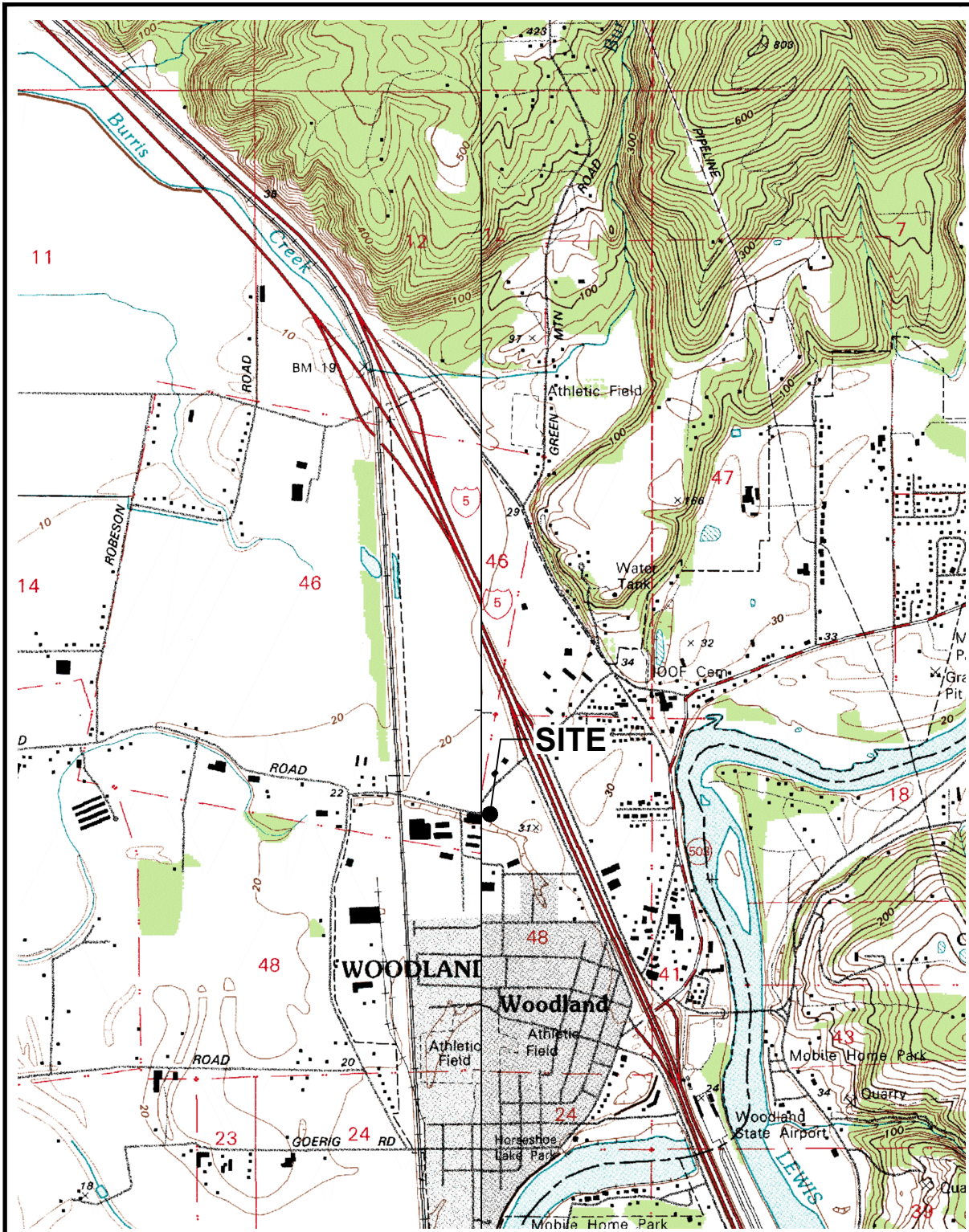
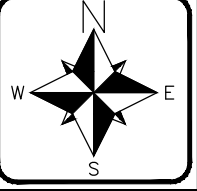
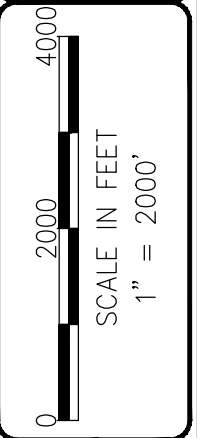


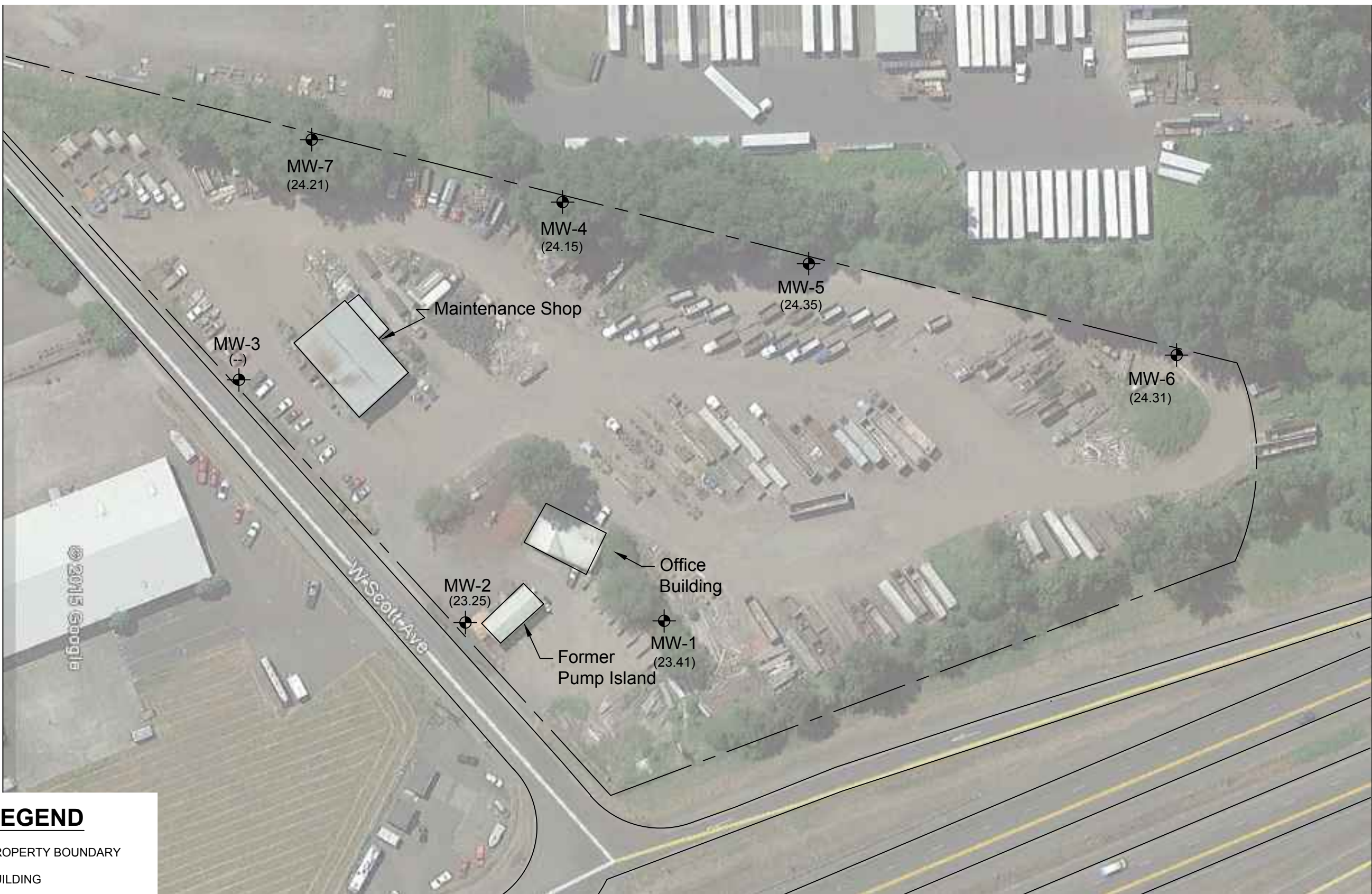
FIGURE 1
SITE LOCATION MAP
GROAT BROTHERS, INC.
608 WEST SCOTT AVENUE
WOODLAND, WA

DATE: 04-08-15
DWN: MG
CHK: JH
APPROVED:
PRJ. MGR: DB
PROJECT NO: 2015-006



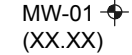


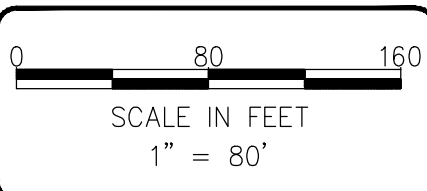
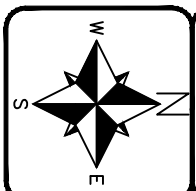
NOTE(S):
USGS, DEER ISLAND/WOODLAND QUADRANGLE
WASHINGTON
7.5 MINUTE SERIES (TOPOGRAPHIC)

\\SBSERVER\Redirection\Folders\MaxG\My Documents\CAD Files_local\Goat Brothers\2015_006.dwg 2.17.2014



LEGEND

-  PROPERTY BOUNDARY
-  BUILDING
-  MONITORING WELL
GROUNDWATER ELEVATION
(NAVD88)

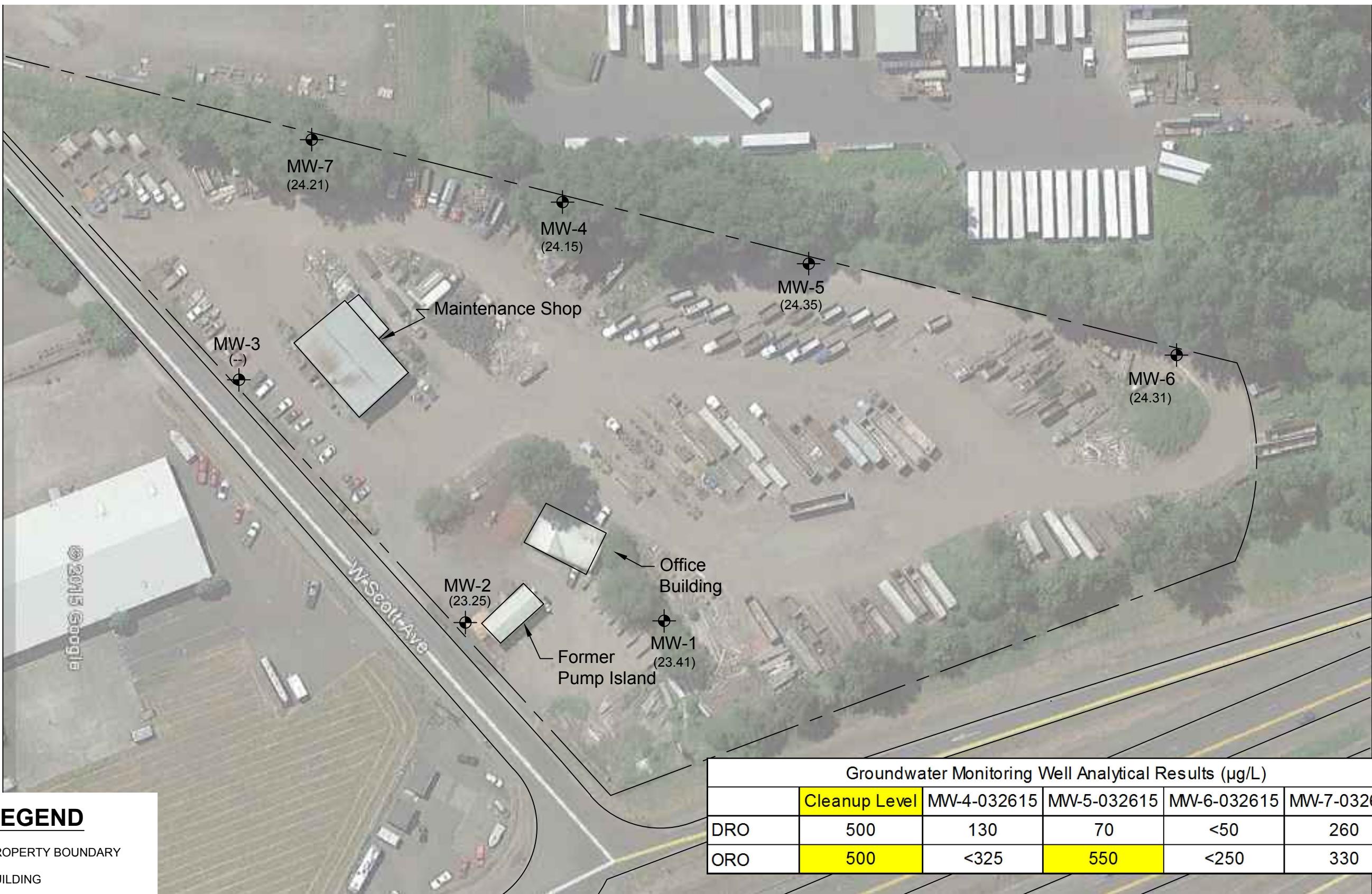



510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 04-08-15
 DWN: MG
 CHK: JH
 APPROVED:
 PRJ. MGR: DB
 PROJECT NO:
 2015-006

FIGURE 2
 SITE FEATURES
 GROAT BROTHERS, INC.
 608 INDUSTRIAL WAY
 WOODLAND, WA

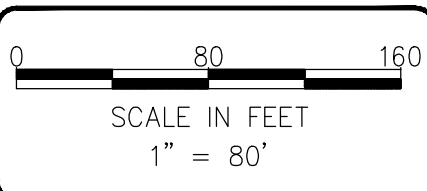
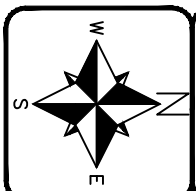
\\SBSERVER\Redirection\Folders\MaxGMy Documents\CAD Files_local\Goat Brothers\2015_006.dwg 2.17.2014



LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01
(XX.XX) MONITORING WELL
GROUNDWATER ELEVATION
(NAVD88)

Groundwater Monitoring Well Analytical Results (µg/L)					
	Cleanup Level	MW-4-032615	MW-5-032615	MW-6-032615	MW-7-032615
DRO	500	130	70	<50	260
ORO	500	<325	550	<250	330



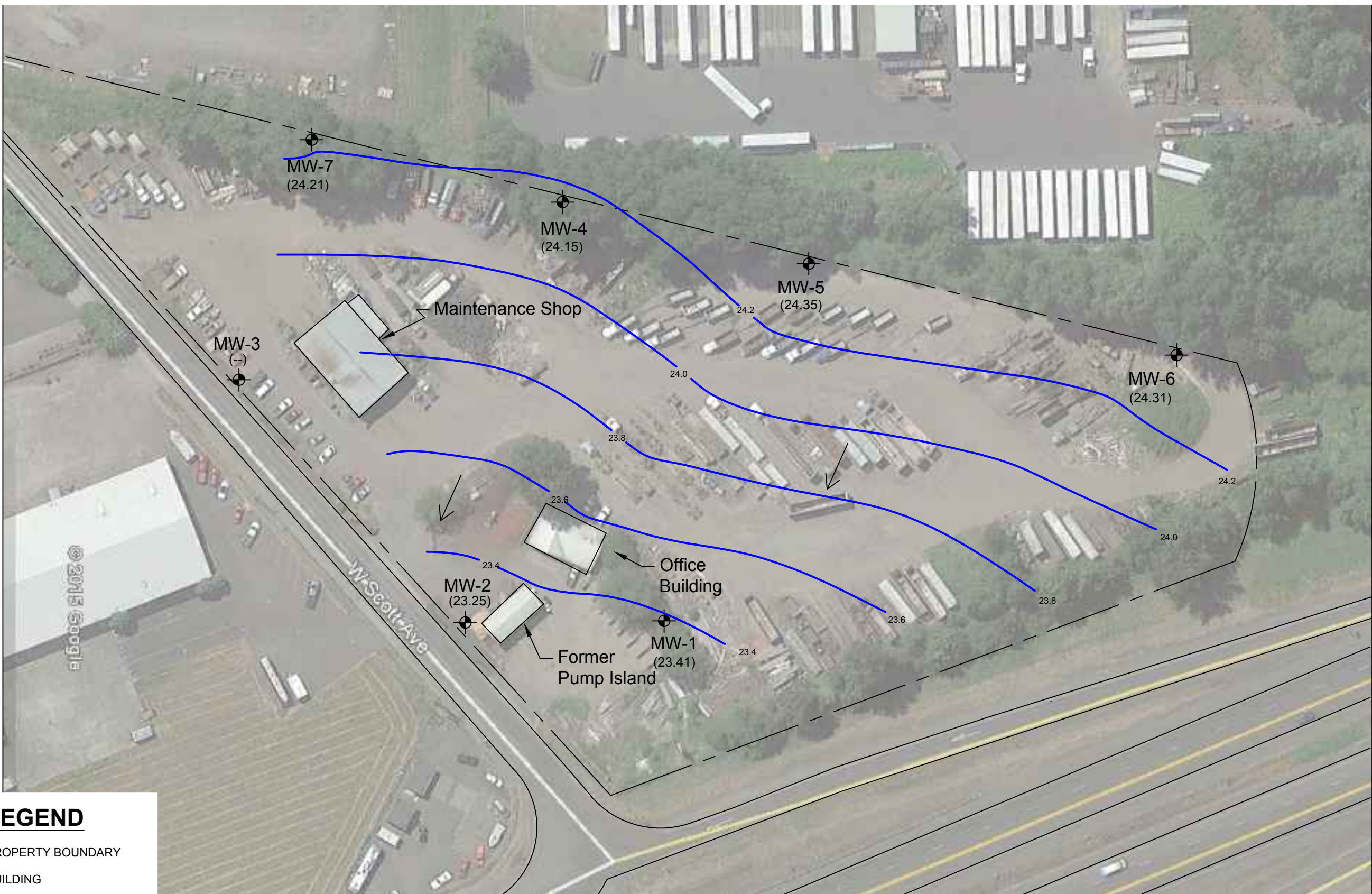
510 Allen St. Suite B Kelso, Wa 98626, Ph(360)-703-6086

DATE: 04-08-15
 DWN: MG
 CHK: JH
 APPROVED:
 PRJ. MGR: DB
 PROJECT NO:
 2015-006



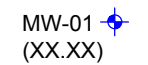

FIGURE 3
 GROUNDWATER ANALYTICAL RESULTS

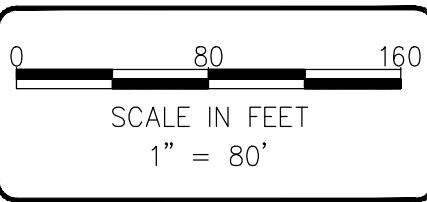
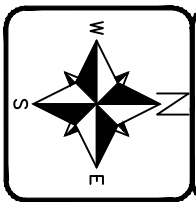
GROAT BROTHERS, INC.
 608 INDUSTRIAL WAY
 WOODLAND, WA

\\SBSERVER\Redirection\Folders\maxg\My Documents\CAD Files_local\2015-006 Groat Brothers\2015_006.dwg 2.17.2014



LEGEND

-  PROPERTY BOUNDARY
-  BUILDING
-  MONITORING WELL (GROUNDWATER ELEV.)
-  GROUNDWATER CONTOUR



DATE: 04-08-15
 DWN: MG
 CHK: JH
 APPROVED:
 PRJ. MGR: DB
 PROJECT NO:
 2015-006

FIGURE 4
 GROUNDWATER ELEVATION & CONTOUR MAP
 GROAT BROTHERS, INC.
 608 INDUSTRIAL WAY
 WOODLAND, WA

Table 1
Summary of Groundwater Elevations
Groat Brothers, Inc.
Woodland, Washington
HydroCon Project Number 2015-006

Monitoring Well ID	Date	MPE*	Depth to Water	Groundwater Elevation
MW-1	03/26/15	30.47	7.06	23.41
MW-2	03/26/15	28.07	4.82	23.25
MW-3	03/26/15	26.5	NM	NA
MW-4	03/26/15	28.96	4.81	24.15
MW-5	03/26/15	27.90	3.55	24.35
MW-6	03/26/15	27.97	3.66	24.31
MW-7	03/26/15	30.06	5.85	24.21

Notes:

MPE = Measuring Point Elevation

* = Elevation measured relative to NAVD 1988

NM = Well not measured dues to inability to locate it.

Table 2
Summary of Groundwater Monitoring Wells Analytical Results
Groat Brothers, Inc.
Woodland, Washington
HydroCon Project Number 2015-006

Sample ID				MW-4-032615	MW-5-032615	MW-6-032615	MW-7-032615				
Lab Sample ID				503520-01	503520-02	503520-03	503520-04				
Collection Date				3/26/15	3/26/15	3/26/15	3/26/15				
Parameter	Method	Unit	Ecology MTCA Level A	Value	Q	Value	Q	Value	Q	Value	Q
Total Petroleum Hydrocarbons (TPH)											
TPH Diesel Range (DRO)	NWTPH-Dx	µg/L	500	130	x	70	x	<50		260	x
TPH Motor Oil Range (ORO)	NWTPH-Dx	µg/L	500	<325		550		<250		330	x

Notes and Qualifiers: (Q; only shown in Table if reported by laboratory)

< = Compound not detected above the laboratory Method Reporting Limits (MRLs).

µg/L = micrograms per liter (parts per billion)

x = The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Color highlighted cells indicate reported concentration exceeds corresponding MTCA Level A Cleanup Value.

GROUNDWATER MONITORING FIELD FORMS



GROUNDWATER PURGE AND SAMPLE COLLECTION

Well I.D. Number: MW-4

Project Name (Number): Grant Bos. Sample I.D.: MW-4-032615 Time: 12:25
 Hydrocon Project Number: 2015-006 Field Duplicate I.D.: - Time: _____
 Date: 3/26/15 Personnel: JPH

WELL INFORMATION

Monument condition: Good Needs repair: _____ Water in Monument
 Well cap condition: Good Replaced Needs Replacement Surface Water Well Infiltration
 Headspace reading: Not measured PID Reading _____ ppm Odor: _____
 Well diameter: 2-inch 4-inch 6-inch Other: _____
 Comments: _____

PURGING INFORMATION

Total well depth: _____ ft Bottom: Hard Soft Not measured Screen Interval(s): _____
 Depth to product: _____ ft
 Depth to water: 4.81 ft Intake Depth (BTOC): _____ Begin Purging Well: _____
 Casing volume: _____ ft (H₂O) X _____ gal/ft = _____ gal. X 3 = _____ gal.
 Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type Peristaltic Centrifugal Dedicated Bladder Non-Dedicated Bladder Other _____
 Bailer type: _____ Water Disposal: Drummed Remediation System Other _____

FIELD PARAMETERS

Odor and/or Sheen: _____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
12:15	4.81		11.7	0.098		5.56	83	
12:20	4.86		11.5	0.103		5.60	75	
12:25	4.86		11.5	0.104		5.65	68	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
 Purging Comments: _____

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments: _____



GROUNDWATER PURGE AND SAMPLE COLLECTION

Well I.D. Number: MW-5

Project Name (Number): Grant Bros.
Hydrocon Project Number: 2015-006
Date: 3/26/15

Sample I.D.: MW-5-032615 Time: 12:45
Field Duplicate I.D.: - Time: -
Personnel: JPH

WELL INFORMATION

Monument condition: Good Needs repair: _____ Water in Monument
Well cap condition: Good Replaced Needs Replacement Surface Water Well Infiltration
Headspace reading: Not measured PID Reading _____ ppm Odor: _____
Well diameter: 2-inch 4-inch 6-inch Other: _____
Comments _____

PURGING INFORMATION

Total well depth: _____ ft Bottom: Hard Soft Not measured Screen Interval(s): _____
Depth to product: _____ ft
Depth to water: 3.59 ft Intake Depth (BTOC): _____ Begin Purging Well: _____
Casing volume: _____ ft (H₂O) X _____ gal/ft = _____ gal. X 3 = _____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type Peristaltic Centrifugal Dedicated Bladder Non-Dedicated Bladder Other _____
Bailer type: _____ Water Disposal: Drummed Remediation System Other _____

FIELD PARAMETERS

Odor and/or Sheen: _____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
12:35	3.59		11.7	0.073		5.73	50	
12:40	3.66		11.6	0.073		5.80	49	
12:45	3.67		11.7	0.074		7.77	49	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.

Purging Comments: _____

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments: _____



GROUNDWATER PURGE AND SAMPLE COLLECTION

Well I.D. Number: MW-6

Project Name (Number): Great Bros
Hydrocon Project Number: 2015-006
Date: 3/26/15

Sample I.D.: MW-6-032615 Time: 1:05
Field Duplicate I.D.: - Time: -
Personnel: JPH

WELL INFORMATION

Monument condition: Good Needs repair: _____ Water in Monument
Well cap condition: Good Replaced Needs Replacement Surface Water Well Infiltration
Headspace reading: Not measured PID Reading _____ ppm Odor: _____
Well diameter: 2-inch 4-inch 6-inch Other: _____
Comments: _____

PURGING INFORMATION

Total well depth: _____ ft Bottom: Hard Soft Not measured Screen Interval(s): _____
Depth to product: _____ ft
Depth to water: 3.66 ft Intake Depth (BTOC): _____ Begin Purging Well: _____
Casing volume: _____ ft (H₂O) X _____ gal/ft = _____ gal. X 3 = _____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type Peristaltic Centrifugal Dedicated Bladder Non-Dedicated Bladder Other _____
Bailer type: _____ Water Disposal: Drummed Remediation System Other _____

FIELD PARAMETERS

Odor and/or Sheen: _____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
12:55	3.66		12.4	0.071		5.59	102	
1:00	3.71		12.8	0.073		5.60	103	
1:05	3.71		12.9	0.073		5.60	110	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
Purging Comments: _____

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments: _____



GROUNDWATER PURGE AND SAMPLE COLLECTION

Well I.D. Number: MW-7

Project Name (Number): Great Bros.
Hydrocon Project Number: 2015-006
Date: 3/26/15

Sample I.D.: MW-7-032615 Time: 12:05
Field Duplicate I.D.: - Time: -
Personnel: JPH

WELL INFORMATION

Monument condition: Good Needs repair: _____ Water in Monument
Well cap condition: Good Replaced Needs Replacement Surface Water Well Infiltration
Headspace reading: Not measured PID Reading _____ ppm Odor: _____
Well diameter: 2-inch 4-inch 6-inch Other: _____
Comments: _____

PURGING INFORMATION

Total well depth: _____ ft Bottom: Hard Soft Not measured Screen Interval(s): _____
Depth to product: _____ ft
Depth to water: 5.85 ft Intake Depth (BTOC): _____ Begin Purging Well: _____
Casing volume: _____ ft (H₂O) X _____ gal/ft = _____ gal. X 3 = _____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type Peristaltic Centrifugal Dedicated Bladder Non-Dedicated Bladder Other _____
Bailer type: _____ Water Disposal: Drummed Remediation System Other _____

FIELD PARAMETERS

Odor and/or Sheen: _____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
11:55	5.85		12.7	0.106		5.53	88	
12:00	5.95		12.3	0.111		5.46	92	
12:05	5.95		12.1	0.109		5.47	91	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.

Purging Comments: _____

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments: _____

LABORATORY AND CHAIN-OF-CUSTODY DOCUMENTATION

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 31, 2015

Jonathan Horowitz, Project Manager
HydroCon
510 Allen St, Suite B
Kelso, WA 98626

Dear Mr. Horowitz:

Included are the results from the testing of material submitted on March 27, 2015 from the Groat Bros 2015-006, F&BI 503520 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
HDC0331R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 27, 2015 by Friedman & Bruya, Inc. from the HydroCon Groat Bros 2015-006, F&BI 503520 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>HydroCon</u>
503520 -01	MW-4-032615
503520 -02	MW-5-032615
503520 -03	MW-6-032615
503520 -04	MW-7-032615

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/31/15
Date Received: 03/27/15
Project: Groat Bros 2015-006, F&BI 503520
Date Extracted: 03/27/15
Date Analyzed: 03/27/15

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
MW-4-032615 503520-01 1/1.3	130 x	<325	77
MW-5-032615 503520-02	70 x	550	79
MW-6-032615 503520-03	<50	<250	79
MW-7-032615 503520-04	260 x	330 x	92
Method Blank 05-634 MB	<50	<250	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/31/15

Date Received: 03/27/15

Project: Groat Bros 2015-006, F&BI 503520

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	90	61-133	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

