RAILROAD COMMISSION OF TEXAS
HEARINGS DIVISION

OIL AND GAS DOCKET
NO. 02-0289582

FINAL ORDER
GRANTING THE APPLICATION OF PYOTE RECLAMATION SYSTEMS, LLC, PURSUANT TO STATEWIDE RULE 8 FOR A PERMIT TO MAINTAIN AND OPERATE A COMMERCIAL STATIONARY TREATMENT AND DISPOSAL FACILITY, HOHN ROAD FACILITY, DEWITT COUNTY, TEXAS

The Commission finds that after statutory notice in the above-numbered docket heard on September 10-12, 2014, and December 15, 2015, the presiding Examiners have made and filed a report and amended proposal for decision containing findings of fact and conclusions of law, which was served on all parties of record; that the proposed application is in compliance with all statutory requirements; and that this proceeding was duly submitted to the Railroad Commission of Texas at conference held in its offices in Austin, Texas.

The Commission, after review and due consideration of the examiners' report and proposal for decision, the findings of fact and conclusions of law contained therein, and any exceptions and replies thereto, hereby adopts as its own the findings of fact and conclusions of law contained therein, and incorporates said findings of fact and conclusions of law as if fully set out and separately stated herein.

Therefore, it is **ORDERED** by the Railroad Commission of Texas that the Application of Pyote Reclamation Systems, LLC, Pursuant to Statewide Rule 8 for a Permit to Operate a Commercial Stationary Reclamation, Treatment and Disposal Facility, Application Control Nos. STF 062 and associated pits, Dewitt County, Texas, is hereby **GRANTED** in accordance with the attached permit.

Each exception to the examiners' proposal for decision not expressly granted herein is overruled. All requested findings of fact and conclusions of law which are not expressly adopted herein are denied. All pending motions and requests for relief not previously granted or granted herein are denied.

It is further **ORDERED** by the Commission that this order shall not be final and effective until 25 days after the Commission's order is signed, unless the time for filing a motion for rehearing has been extended under Tex. Gov't Code §2001.142, by agreement under Tex. Gov't Code §2001.147, or by written Commission Order issued pursuant to Tex. Gov't Code §2001.146(e). If a timely motion for rehearing of an application is filed by any party at interest, this order shall not become final and effective until such motion is overruled, or if such motion is granted, this order shall be subject to further action by the

Commission. Pursuant to Tex. Gov't Code §2001.146(e), the time allotted for Commission action on a motion for rehearing in this case prior to its being overruled by operation of law is hereby extended until 90 days from the date Commission Order is signed.

Done this 3rd day of May, 2016.

RAILROAD COMMISSION OF TEXAS

CHAIRMAN DAVID PORTER

COMMISSIONER CHRISTI CRADDICK

COMMISSIONER RYAN SITTON

ATTEST:

SECRETARY

PERMIT TO RECEIVE, STORE, TREAT AND DISPOSE OF CERTAIN NONHAZARDOUS OIL AND GAS WASTES

Permit Nos. STF-062
LT-0343
P011994, P011995, P011996, P011997,
P011998A-P011998H, P011999A-P011999H

PYOTE RECLAMATION SYSTEMS, LLC
8700 CROWNHILL BLVD SUITE 801
SAN ANTONIO TX 78209

Based on information contained in your application received April 5, 2013 and subsequent information received to date, you are hereby authorized to receive, store, handle, treat, and dispose of certain nonhazardous oil and gas wastes subject to the jurisdiction of the Commission as specified below at the following facility:

Hohn Road Facility
Approx. 204 Acres of the J.W. Hassell Survey, A-241, the O.L. Eckhardt Survey, A-562, and the Indianola R.R. Co. Survey, A-251
Latitude, Longitude: 28.92023°, -97.59686°
DeWitt County, Texas
RRC District 02, San Antonio

NARRATIVE DESCRIPTION OF PROCESS:

Incoming waste will be offloaded into a Settling Basin (Collecting Pit), the Drying Cell, a Landtreatment Cell or the active Disposal Cell (Disposal Pit) depending on the liquid content and composition of the waste. Liquid waste will be separated into solids and liquids using the Settling Basin system.

The Truck Wash (Washout Pit) and Settling Basins (Collecting Pits) are designed as an interconnected system. Washout water from the inside of the waste hauling vessels will be collected in the Truck Wash. The Truck Wash will convey washout water from the Truck Wash to the Settling Basins. Settlings Basins will passively separate solids, liquids, and oil.

Separated liquids will be pumped to tanks for further separation into the oil and water tanks. Skim oil will be sold or salvaged, and waste water will be reused in the Truck Wash or disposed of offsite in an authorized manner.

Solids collected from the Settling Basins will be delivered to the Drying Pad, or disposed of directly into a Landtreatment Cell or the active Disposal Pit. Dry waste received at the facility and waste from the Drying Pad that has met disposal criteria will be disposed of in the active Disposal Pit.

Authority is granted to receive, store, handle, treat and dispose of oil and gas wastes in accordance with Texas Administrative Code (TAC) Title 16, Part 1, Chapter 3.8 (Statewide Rule 8) and subject to the following minimum conditions:

I. GENERAL PERMIT CONDITIONS

A. This permit is effective on **May 3, 2016**, and it expires on **May 2, 2021**.

B. No waste may be received at the referenced facility until financial security in the amount of $3,663,384.00 for Permit Nos. **STF-062, LT-0343, P011994, P011995, P011996, P011997, P011998A-P011998H, and P011999A-P011999H** is provided to and approved by the Commission.

C. In accordance with Texas Administrative Code (TAC) Title 16, Part 1, Chapter 3.78 (Statewide Rule 78), financial security must be provided to the Railroad Commission of Texas (RRC) in the amount necessary to close the facility. If any changes that would increase the cost to close the facility are planned, an updated closure cost estimate and the associated financial security must be submitted to and approved by the Commission prior to implementing the changes.

D. No waste may be received at the referenced facility until a restrictive covenant is signed by a representative of permittee, the landowner, and a representative of the RRC; and the signed document is filed in the Real Property Records of DeWitt County, Texas, and proof of filing with DeWitt County is submitted to the Commission.

E. No waste may be received at the referenced facility until the monitor wells required by Condition IX. of this permit have been completed. The documentation required by Condition IX.H. must be provided to and approved by Technical Permitting within 30 days after installation of monitor wells.

F. No waste may be received at the referenced facility until, upon completion of facility construction, a Spill Prevention, Control and Countermeasure (SPCC) Plan is provided to Technical Permitting. A copy of the approved SPCC Plan must be maintained on-site and made available for review and inspection.

G. Technical Permitting in Austin and the appropriate District Office must be notified in writing when construction of the facility is initiated.

H. Technical Permitting in Austin and the appropriate District Office must be notified in writing upon final completion of construction of the facility. The permittee may not begin receiving, storing, handling, or treating oil and gas waste until the District Office has performed its inspection of the completed facility and has verified that the facility is constructed in accordance with the application and this permit.

I. The permittee may not begin receiving, storing, handling, or treating oil and gas waste at the facility until any necessary air permits or exemptions are obtained from the Texas Commission on Environmental Quality (TCEQ).

J. A Skim Oil/Condensate Report (Form P-18) must be filed for every month in which skim oil is recovered during the operation of this facility.

K. All waste haulers received at the facility must be permitted Oil and Gas Waste Haulers and must have the subject facility listed as an authorized disposal facility on their Form WH-3.

L. An On-Site Sewage Facility (OSSF) may be constructed, operated, and maintained within the boundaries of the subject facility without an additional permit from the Commission if: the OSSF waste is not commingled with any other oil and gas waste; the system is designed by a professional engineer registered in the state of Texas or a sewage system installer licensed in the state of Texas; and the construction, operation, and maintenance of the OSSF complies with all applicable local, county, and state requirements.

M. The permittee must make all records available for review and copying upon request of Commission personnel.

N. All laboratory analyses required to be performed in accordance with this permit must be performed using appropriate EPA or Standard Methods by an independent National Environmental Laboratory Accreditation Program (NELAP) certified laboratory neither owned nor operated by the permittee. Any sample collected for laboratory analysis must be collected in a manner appropriate for that analytical method.

O. Material Safety Data Sheets must be submitted to Technical Permitting in Austin for any chemical proposed to be used in the treatment of waste at the facility. Use of the chemical contingent on Commission approval.

P. The permittee must submit a Quarterly Report containing the applicable information required in Conditions II.B.5., III.C., IV.H., V.Q., VI.K., VII.B.16., VIII.C.8., IX.J., and XII.F. of this permit.

The first Quarterly Report must cover the period beginning on the effective date of the permit and ending **June 30, 2016**. The reporting periods must thenceforth be January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31 of each year.

The Quarterly Reports must be submitted to Technical Permitting in Austin no later than the 30th day of the month following each reporting period, or each January 30, April 30, July 30, and October 30, respectively.

Q. This permit may be considered for administrative renewal upon request and subsequent review by the Commission. Any request for permit renewal must be received by Technical Permitting in Austin within 60 days of the expiration of this permit.

R. This permit is **nontransferable** without the consent of the Commission. Any request for permit transfer should be filed with Technical Permitting in Austin.

S. Unless otherwise dictated by this permit, construction and operation of the facility must be as represented in the original application and subsequent information received to date by Technical Permitting in Austin. Any deviation from the permit must be approved by amendment from Technical Permitting in Austin before implementation.

T. Failure to comply with any provision of this permit or any determination by the RRC that this permit is being abused will be cause for enforcement action including, but not limiting to, assessing an administrative penalty, and modification, suspension, or termination of this permit.

II. INCOMING WASTES

A. AUTHORIZED WASTES

1. Only the following RCRA-exempt or nonhazardous wastes subject to the jurisdiction of the Railroad Commission of Texas may be received or processed at this facility:
   a. Water-based drilling fluids and associated cuttings;
   b. Oil-based drilling fluids and associated cuttings;
   c. Tank bottoms from gas plants, crude oil reclamation plants, and crude oil production/separation facilities;
   d. Contaminated soils from crude oil or condensate spills, pipeline and saltwater spills from production operations;
   e. Material from produced water collecting pits;
   f. Formation sands and other solids from saltwater storage tanks or vessels and saltwater pits;
2. RCRA non-exempt wastes subject to the jurisdiction of the Commission may be accepted and processed at the facility if analytical results demonstrate that the waste is characteristically nonhazardous.
3. This permit does not authorize the reclamation of crude oil from oil and gas waste. A request for authorization under Statewide Rule 57 must be submitted to and approved by Technical Permitting in Austin prior to any reclamation activities at the referenced facility. No free oil may be disposed of at the facility.
4. No iron sulfide waste may be received or disposed of at the facility unless the waste has been fully oxidized.

5. No oil and gas NORM (Naturally Occurring Radioactive Material) waste defined in 16 TAC §4.603 or waste from a facility that is licensed by the Texas State Health Services to process or treat oil and gas NORM waste may be received at this facility.
6. No waste may be received or disposed of at the facility if it is not a waste under the jurisdiction of the Railroad Commission of Texas. No hazardous waste as defined by the U.S. Environmental Protection Agency in 40 CFR Part 261 or industrial waste may be received or disposed of at the facility.

B. TESTING REQUIREMENTS FOR INCOMING WASTES

1. For the purposes of this permit, a representative sample of incoming waste is defined as a composite sample composed of one grab sample from each 50 cubic yards of waste material from each job (e.g., from each well, pit, spill location.)
2. Prior to receipt at the site, representative samples of waste from commercial oil and gas facilities and reclamation plants must be analyzed and may not exceed the limit for the following parameter:

PARAMETER	**LIMITATION**
Total Organic Halide (TOX) EPA Method 9020B	100 mg/L

Special authorization for disposal of waste with a TOX > 100 ppm may be considered. Authority must be obtained from Technical Permitting in Austin prior to receipt of waste.

3. Prior to receipt at the site, representative samples of incoming RCRA non-exempt waste subject to the jurisdiction of the Commission must be analyzed for the following parameters and may not exceed the following levels:

PARAMETER	**LIMITATION**
Corrosivity	pH 2.0 – 12.5 s.u. *EPA Method 1110A*
Ignitability	Flash point < 60°C *EPA Method 1010A, 1020B, or 1030A*
Reactivity	No materials exhibiting the characteristic of reactivity as defined by RCRA

Toxicity	No materials exhibiting the characteristic of toxicity as defined by RCRA *EPA Method 1311 (TCLP)*

PARAMETER	**LIMITATION**
Benzene (TCLP) *EPA Method 8260/8021B*	< 0.5 mg/L
Metals (TCLP): *EPA Method 6010/6020/7147A*	
Arsenic	< 5.0 mg/L
Barium	< 100.0 mg/L
Cadmium	< 1.0 mg/L
Chromium	< 5.0 mg/L
Lead	< 5.0 mg/L
Mercury	< 0.2 mg/L
Selenium	< 1.0 mg/L
Silver	< 5.0 mg/L

4. Each load of incoming waste, other than water-based drilling fluid and the associated cuttings, or oil-based drilling fluid and the associated cuttings, must be scanned for the presence of naturally occurring radioactive material (NORM) using a scintillation meter with a sodium iodide detector. Any load with a maximum reading of 50 microroentgens per hour or more may not be unloaded or processed at the facility unless further analysis of the waste demonstrates that the waste does not exceed 30 picocuries per gram Radium-226 combined with Radium-228 or 150 picocuries per gram of any other radionuclide.
5. A report of the records required by Condition II.B.3. must be submitted to Technical Permitting in Austin and the appropriate District Office as part of the Quarterly Report required in Condition I.P. of this permit.

III. RECORDKEEPING REQUIREMENTS

A. The permittee must maintain the following records on each load of waste received at the facility for a period of three years from the date of receipt:

1. Description of the site where the waste was generated, including:
   a. Generator name;
   b. Lease name and number or gas ID or API Well Number;
   c. Latitude/Longitude coordinates if waste was not generated on a lease;

d. County;

2. Name of transporter;

3. Amount of waste material (specify units); and

4. A description of the type of waste material, including:

   a. Fluid-to-Solid ratio; and

   b. Detailed description of the type of waste including any analysis required by Condition II.B. above.

B. The permittee must maintain the following records on each load of outgoing waste sent from the referenced facility to an authorized disposal facility for a period of three years from the date of shipment:

1. Description of the facility to where the waste is sent to for disposal, including:

   a. Disposal operator name;

   b. Disposal permit number; and

   c. County;

2. Name of transporter;

3. Volume of waste material (barrels); and

4. A detailed description of the type of waste material.

C. A report of all records required by Conditions III.A. and III.B. above, as well as a summary of waste receipts including the cumulative volume of each type of material received, cumulative volume disposed of in each Landtreatment Cell and Disposal Pit, and cumulative volume of each type of waste that leaves the facility for disposal on a monthly basis must be submitted to Technical Permitting in Austin and the appropriate District Office as part of the Quarterly Report required in Condition I.P. of this permit.

IV. GENERAL SITE CONSTRUCTION AND MAINTENANCE REQUIREMENTS

A. Unless otherwise specified by this permit, the general layout and arrangement of the facility must be consistent with the schematic provided in the "SITE PLAN" (Figure 1), received on September 28, 2015, which is attached to and incorporated as part of this permit as **Permit Appendix A.**

B. The facility must consist of the following waste management units:

1. One Truck Wash (Washout Pit - P011997)

2. Two Settling Basins (Collecting Pits - P011998A-P011998H, P011999A-P011999H);

3. Two Disposal Cells (Disposal Pits - P011994 and P011996)

4. One Drying Cell (P011995)
5. Four Landtreatment Cells (LT-0343)

C. A sign must be posted at each entrance to the facility, which must show the Stationary Treatment Facility permit number in letters and numerals at least three inches in height.

D. All tanks must be maintained in a leak-free condition. If inspection of a tank reveals deterioration or leaks, the tank must be emptied and repaired before resuming use.

E. The perimeter of the property must be enclosed with a fence suitable to keep out unauthorized access. The site is to be attended continuously or secured when unattended. Access gates must be closed and locked when not attended by facility personnel.

F. The entrance/exit to the facility must have a concrete/asphalt berm that is at least one-foot in height and eight-feet wide with a grated trench on the interior side to capture surface flow from the site. Construction of the entrance/exit must be consistent with the schematic provided in the "DETAILS" (Figure 4), received on September 28, 2015, which is attached to and incorporated as part of this permit as **Permit Appendix B.**

G. Any spill of waste, chemical, or any other material must be collected and cleaned up within 24 hours, and disposed of in an authorized manner.

H. A monthly inspection of all components and equipment at the facility must be performed. The "HOHN ROAD INSPECTION FACILITY CHECKLIST", received on August 5, 2014, should be completed in accordance with the monthly inspection. Records of each inspection must be kept on site and submitted as part of the Quarterly Report required by Condition I.P. of this permit.

V. TRUCK WASH AREA AND SETTLING BASINS

A. Unless otherwise specified by this permit, the general layout an arrangement of the Truck Wash and Settling Basins Area must be consistent with the schematic provided in "TRUCK WASH LAYOUT AND DETAILS" (Figure 11), and "SETTLING BASIN LAYOUT AND DETAILS" (Figure 12) received on April 5, 2013, which are attached to and incorporated as part of this permit as **Permit Appendix C**. The Truck Wash and Settling Basins Area must consist of the following waste management units:

1. One Truck Wash Area (Washout Pit - P011997);
2. Two Settling Basins (Collecting Pits – P011998A-P011998H, P011999A-P011999H);
3. Two 1,000-bbl oil storage tanks; and

4. Two 1,000-bbl water storage tanks.

B. The Truck Unloading Bays will have a six-inch concrete bump curb designed to keep out storm water run-on from a 50-year, 24-hour storm event.

C. The Washout Pit must be 220-feet long by six-feet wide and three-feet deep.

D. The Washout Pit must be constructed of reinforced concrete at least six-inches thick.

E. The Washout Pit storage capacity must not exceed 600 barrels.

F. The Settling Basin (Collecting Pits – P011998A-H & P011999A-H) must be 128.5-feet long by 86.5-feet wide and must be divided into eight Collecting Pits, each approximately 72-feet long by 12-feet wide by four-feet deep.

G. Collecting Pits must be constructed of reinforced concrete at least six-inches thick.

H. The storage capacity of each Collecting Pit must not exceed 500 barrels.

I. Concrete walls at least two-feet tall and six-inches wide must be maintained on all sides of each Collection Pit with two-foot deep weirs connecting adjacent pits.

J. At least two feet of freeboard must be maintained between the fluid level of each pit and the top of that pit.

K. A sign must be posted at the Washout Pit and each Collecting Pit, which must show the Pit Permit number in numerals at least three inches in height.

L. No oil may be allowed to accumulate on top of the water stored in any pit. Any oil on top of the water must be skimmed off.

M. Whenever the permittee observes evidence of liner failure, the permittee must empty the pit and inspect the liner within seven days of the observation. The appropriate District Office must be notified by phone or email at least 48 hours before each inspection.

N. The Washout Pit and Collecting Pits must be emptied and the liner must be visually inspected annually for deterioration and leaks. The appropriate District Office must be notified by phone or email at least 48 hours before each inspection.

O. If inspection of the liner reveals a leak or other loss of liner integrity, the liner must be replaced or repaired before resuming use of the pit.

P. All tanks must be maintained in a leak-free condition. If inspection of a tank reveals deterioration or leaks, the tank must be emptied and repaired before resuming use.

Q. The permittee must maintain a record of when the Washout Pit, Collecting Pits and tanks are inspected and the results of each inspection. A copy of the records must be submitted to Technical Permitting in Austin as part of the Quarterly Report required in Condition I.P. of the permit.

VI. DRYING CELL (P011995)

A. Unless otherwise specified by this permit, the general layout and arrangement of the Drying Cell (DTC-4) must be consistent with the schematic provided in **Permit Appendix A**.

B. The Drying Cell must be an approximately eight-acre area used to temporarily hold solids for drying before disposal into the onsite active Disposal Pit.

C. The Drying Cell floor must consist of a 60-mil HDPE liner overlain with a twelve-inch thick layer of compacted soil.

D. The capacity of the Drying Cell must not exceed 12,907 Cubic Yards.

E. The maximum height of waste spread over the Drying Pad must not exceed one foot.

F. A berm must be constructed around the Drying Cell with a minimum height of four feet and be consistent with "DETAILS" (Figure 2), which is attached to and incorporated as part of this permit as **Permit Appendix D.**

G. This permit does not authorize the discharge of any oil and gas waste from the Drying Cell.

H. Slope of the berm sides must not be steeper than 1:4 (vertical to horizontal) ratio.

I. The Drying Cell must be inspected annually to determine if the liner has been compromised or deteriorated. The appropriate District Office must be notified by phone or email at least 48 hours before each inspection.

J. If inspection reveals loss of liner integrity, the Drying Cell must be repaired before resuming operations in the Drying Cell.

K. The permittee must maintain a record of when the Drying Cell is inspected and the results of each inspection must be submitted to Technical Permitting in Austin as part of the Quarterly Report required in Condition I.P. of this permit.

VII. DISPOSAL CELL CONSTRUCTION AND OPERATION

A. CONSTRUCTION

1. Unless otherwise specified by this permit, the general layout and arrangement of the Disposal Pits must be consistent with the schematic provided in **Permit Appendix A.** In Permit Appendix A, the Disposal Pits are labeled as "DC-1" (**P011994**), and "DC-3" (**P011996**).

2. No Disposal Pit may exceed the following parameters:
    a. 12 acres;
    b. 380,000 Cubic Yards capacity above grade;
    c. 320,500 Cubic Yards capacity below grade;
    d. 25-feet depth below grade; and
    e. 23-feet height above grade.
3. Technical Permitting in Austin and the appropriate District Office must be notified in accordance with Permit Condition I.H. upon final completion of construction of a Disposal Pit. The permittee may not begin using the pit until the District Office has completed an inspection of the pit and provided verification that the pit is constructed in accordance with the application and permit.
4. A sign must be posted identifying each Disposal Pit using letters and numerals at least three inches in height.
5. Once a Disposal Pit begins to accept waste above grade, the waste collected in that Disposal Pit must be maintained to prevent collapse of the structure and must not have a slope steeper than a 1:3 (vertical to horizontal) ratio.
6. A berm must be constructed and maintained around each Disposal Pit with a minimum height of four feet and be consistent with "DETAILS" (Figure 2), which is attached to and incorporated as part of this permit as **Permit Appendix D**.
7. A liner anchor trench must be used to key the synthetic liner to the berm.
8. The floor of each Disposal Pit must have at least a 2% slope to allow fluids to drain to the leachate collection system.
9. The pit must be constructed in accordance with the liner installation methods included in the application and consists of a 12" protective soil layer, a 60-mil high-density polyethylene (HPDE) primary (top) liner, a 60-mil HPDE secondary (bottom) liner and a one-foot tertiary liner of recompacted native soil.
10. Disposal Pits must be equipped with a leak detection system, which will consist of a 200-mil transmissive geocomposite placed between the primary and secondary liners connected to a sump and pipe to be used for collection of fluid.
11. The Disposal Pits, their liners and leak detection system, and leachate collection system must be constructed and installed in accordance with sound engineering practices and manufacturer's specifications.

B. OPERATION

1. Only one Disposal Pit may be considered active and accept oil and gas waste at any time.
2. Before the Permittee may begin excavation of the second Disposal Pit, the first Disposal Pit must be filled to grade, and the Permittee must have received approval from the appropriate District Office. The second Disposal Pit may not begin accepting waste until (1) waste is no longer being accepted in the first Disposal Pit, (2) capping and closure of the first Disposal Pit has begun and (3) the Permittee has received approval from the appropriate District Office to begin accepting waste in the second Disposal Pit.
3. The permittee must not construct or use Disposal Pits in a manner that could exceed the financial security required by Condition I.B.
4. This permit does not authorize the discharge of any oil and gas waste from a Disposal Pit.
5. The leak detection system must be monitored at least weekly and the permittee must maintain a record of when the liner and the leak detection system are inspected and the results of each inspection.
6. If the leak detection system indicates a failure, the appropriate District Office must be notified by phone or email of that fact within 24 hours of detection of liner failure. Liner system failure is defined as any of the following:
    a. If a leak occurs at a rate greater than 100 gallons per acre per day, or 1,200 gallons per day, from the primary liner of any Disposal Pit.
    b. Any failure in the leak detection system or any component thereof.
    c. Any detected damage to or leakage from the secondary liner.
7. If liner system failure is detected, the affected component must be inspected for deterioration and leaks within seven days of detection of liner failure. After inspection, the affected component must be replaced or repaired before use of the Disposal Pit is resumed.
8. The Disposal Pit must be equipped with a leachate collection system. Leachate collected in the leachate collection sump must be removed through the leachate removal pipe and disposed of in an authorized manner.
9. The leachate collection system must be monitored at least weekly and the permittee must maintain a record of when the leachate collection system is inspected and the results of each inspection. All waste must pass the Paint Filter Test (EPA Method 9095) prior to disposal in a Disposal Pit and the permittee must maintain records of the results from each Paint Filter Test.

10. No free oil may be allowed to accumulate on top of the waste stored in the Disposal Pit. Any free oil on top of the waste must be skimmed off.
11. No freestanding fluids may accumulate in a Disposal Pit. Any fluids must be removed within 72 hours of discovery and disposed of in an authorized manner.
12. Upon final cessation of the use of a Disposal Pit, the pit must be closed in accordance with Condition XI.L. of this permit. Any request to modify the closure plan must be filed with Technical Permitting in Austin.
13. Unless otherwise required by the conditions of this permit, construction, use, maintenance, and closure of the pit must be in accordance with the information represented on the permit application and the attachments thereto.
14. Technical Permitting in Austin and the appropriate District Office must be notified in writing at least 45 days prior to commencement of closure activities.
15. A report of the records required by Conditions VII.B.5., VII.B.9., and VII.B.10. must be submitted to Technical Permitting in Austin as part of the Quarterly Report required by Condition I.P. of this permit.

VIII. LANDTREATMENT CELLS (LT-0343)

A. CONSTRUCTION

1. Unless otherwise specified by this permit, the general layout and arrangement of the Landtreatment Area must be consistent with the schematic provided in **Permit Appendix A.**
2. The Landtreatment Area must consist of four Landtreatment Cells (LTC-1a, LTC-2, LTC-3, LTC-4) on approximately 60.8 acres. Each Landtreatment Cell may not exceed the following:
    a. LTC-1a, Four Acres;
    b. LTC-2, 20 Acres;
    c. LTC-3, 20 Acres; and
    d. LTC-4, 16.8 Acres.
3. Berms must be constructed to surround each Landtreatment Cell. These dikes must be constructed and maintained to a height of two feet and a slope no steeper than one to three (vertical to horizontal ratio) on each side. Dikes must be constructed as shown in **Permit Appendix D**. No waste may be received until the appropriate District Office has verified the construction of the berms.
4. A sign must be posted at each Landtreatment Cell, which must show the Landtreatment Permit number and the cell number in numerals at least three inches in height.

5. Storm water run-on must be controlled and diverted around the Landtreatment Cells.
6. The water well within LTC-2 must be surrounded by a concrete apron that extends four-feet out from the water well creating a square with the well in the center. The apron will have concrete walls that are at least two-feet tall and six-inches wide and constructed as shown in **Permit Appendix B.** This area is not considered part of LTC-2 and is prohibited from disposing of oil and gas waste.

B. OPERATION

1. The waste must be applied in such a manner that the waste will not pool or migrate off the approved Landtreatment Cell or enter any drainage ditch, dry creek, flowing creek, river, or any other body of surface water.
2. Waste must be applied evenly to a maximum thickness of 2,000 barrels per acre or three inches per application. Each application must be immediately and thoroughly tilled into the soil.
3. The permittee must ensure that the waste is uniformly tilled to a depth not to exceed 12 inches.
4. The cumulative waste applied to any Landtreatment Cell must not exceed 12 inches.
5. No waste may be applied to a Landtreatment Cell during periods of rainfall.
6. Fertilizer must be added as required to maintain optimum Carbon, Nitrogen, and Phosphorous ratio (C:N:P).
7. Any standing or pooling rainwater in the Landtreatment Cells must be removed and disposed of in an authorized manner.
8. Tank bottoms may not be applied to any Landtreatment Cell.

C. MONITORING

1. For the purposes of monitoring and sampling the soils, the following definitions will be employed:

Treatment Zone	**Zone Depth**
Surface Treatment Zone (STZ)	surface to 12"
Waste Treatment Zone (WTZ)	12" to 24"
Compliance Monitoring Zone (CMZ)	24" to 36"

2. For the purpose of sampling, there must be one composite sample for every four acres of each cell for each treatment zone, rounding to the nearest positive integer (i.e., a six-acre cell would require two composite samples for each zone).

3. The area representing each composite sample must be divided into adjacent, one-acre subsections. A minimum of one grab sample from each subsection must be combined into a composite sample.

4. A Landtreatment Cell is considered active once it accepts waste and remains active until Technical Permitting determines it has met all closure requirements. While a cell is active, the composite samples from the STZ and WTZ must be analyzed quarterly, and the composite samples from the CMZ must be analyzed annually. All composite samples shall be analyzed for and must not exceed the following parameters:

PARAMETER	**LIMITATION**
pH *EPA Method 9045C*	6 to10 standard units
Electrical conductivity (EC)	≤ 4 mmhos/cm
Sodium Absorption Ratio (SAR)	≤ 12
Cation-Exchange Capacity (CEC)	Report
Soluble Cations and Anions (Listed) *Louisiana Dept. of Natural Resources Lab Procedures for Analysis of E&P Waste or equivalent*	Report
BTEX *EPA Method 8260/8021B*	≤ 30 mg/kg
Total petroleum hydrocarbons (TPH) *Method TX1005*	≤ 10,000 mg/kg
Metals (total): *EPA Method 6010/6020/7471A*	
Arsenic	≤ 10.0 mg/kg
Barium	≤ 10,000 mg/kg
Cadmium	≤ 1.0 mg/kg
Chromium	≤ 5.0 mg/kg
Lead	≤ 200 mg/kg
Mercury	≤ 10.0 mg/kg
Selenium	≤ 5.0 mg/kg
Silver	≤ 200 mg/kg

5. If any parameter from a composite sample exceeds its limitation required by Condition VIII.C.4., the area representing the sample must be tilled, and the area must be resampled for that parameter. This process must be performed no less than once per month until the sample does not exceed its limitation. If the area representing the sample continues to exceed its limitation in any parameter after

three months of sampling, the cell is not authorized to accept additional waste until the sample does not exceed its limitation.

6. The appropriate District Office must be notified by phone or email at least 48 hours prior to any sampling event.
7. More frequent analyses may be required depending on the results of analyses required by Condition VIII.C.4.
8. A report of the records required by Condition VIII.C.4. and VIII.C.5. must be submitted to Technical Permitting in Austin and the appropriate District Office as part of the Quarterly Report required in Condition I.P. of this permit.

IX. MONITOR WELLS

A. Six monitor wells must be installed and numbered as represented in the schematic provided in **Permit Appendix A**.

B. Monitor wells must be completed in accordance with 16 TAC Part 4, Chapter 76 (Water Well Drillers and Water Well Pump Installers).

C. Monitor wells must be completed in the shallowest groundwater zone and the completion must isolate that zone from any deeper groundwater zone.

D. The screened interval of the wells must be designed to intercept at least five feet of groundwater from the first groundwater-bearing unit.

E. Provision must be made to protect the well heads from damage by vehicles and heavy equipment.

F. Monitor wells must be maintained in good condition and in a way that prohibits unauthorized access.

G. Monitor wells must be able to provide a sample of groundwater that is representative of the groundwater underlying the site for the duration of facility operations. If a monitor well is not capable of providing a representative sample, the permittee must notify Technical Permitting in Austin and install a replacement monitor well that is acceptable to the Commission.

H. The following information must be submitted after the wells are completed:

1. A soil boring log for each well, with the soils described using the Unified Soil Classification System (equivalent to ASTM D 2487 and 2488). The log must also include the method of drilling, total depth, and the top of the first encountered water or saturated soils.

2. A well installation diagram for each well detailing construction specifications for each well, including riser and screen length, screen slot size, bentonite and cement intervals. The sand pack size should be compatible with well screen slot size and local lithology.

3. A survey elevation for each well head reference point.
4. A potentiometric map showing static water levels and the calculated direction of groundwater flow.

I. The monitor wells must be sampled and monitored for the following parameters after installation and quarterly thereafter:

1. Static Water Level
2. Total Depth
3. Benzene, *EPA Method 8260/8021B*
4. Total Petroleum Hydrocarbons (TPH), *Method TX1005 (at least to C_{40})*
5. Total Dissolved Solids (TDS), *Standard Method 2540C*
6. pH, *EPA Method 9045C*
7. Soluble Cations and Anions (Listed), *Louisiana Dept. of Natural Resources Lab Procedures for Analysis of E&P Waste or equivalent.*

J. Copies of the results must be submitted as part of the Quarterly Report required by Condition I.P. of this permit.

X. STORM WATER CONTROL

A. A perimeter berm must be constructed to surround the entire facility and must be designed to prevent storm water run-on and prevent storm water runoff from the site. The perimeter berm must be constructed to a minimum height of at least four feet with a minimum 1:3 slope (vertical to horizontal) ratio. It must include a rip rap rock drainage swale in the perimeter ditch that extends two feet up the interior side of the perimeter berm and the access road to prevent erosion.

B. Berms or containment structures must be constructed around all waste management units referenced in Condition IV.B. These structures must be used to divert non-contact storm water around the waste management areas, contain contact storm water within the waste management units. Construction must be consistent with "Details" (Figure 3), which is attached to and incorporated as part of this permit as **Permit Appendix E.**

C. Contact storm water must be contained within the waste management units. Contact storm water must be removed and disposed of in an authorized manner.

D. Non-contact storm water within the facility must be conveyed away from the waste management units to the Storm Water Retention Ponds using a series of ditches and culverts.

E. The Storm Water Retention Ponds must be constructed to contain contact and noncontact storm water in the event of a containment failure from a 50-year, 24-hour storm event. Construction and design must be able to contain the capacities provided in "Storm Water Calculations" (Attachment C-1, C-2 and C-3) and "Storm Water Calculations" (Attachment D-1, D-2 and D-3) for a 100-year, 24 hour storm event, which are attached to and incorporated as part of this permit as **Permit Appendix F.**

F. In the event that contact storm water enters the Storm Water Retention Ponds the permittee must submit a written report detailing the event to Technical Permitting in Austin before disposing of the contents of the ponds. Contact storm water must be removed and disposed of in an authorized manner.

G. All above ground tanks must be diked. Dikes must be constructed and maintained to contain the largest tank's maximum capacity, plus freeboard to contain a 50-year, 24-hour storm event.

H. A discharge permit from the EPA may be required for non-contact storm water discharges. If required, the permit from the EPA must be in place prior to commencement of discharge operations.

XI. FACILITY CLOSURE

A. The facility must be closed when all Disposal Pits and Landtreatment Cells have met their permitted capacity.

B. Technical Permitting and the appropriate District Office must be notified in writing at least 45 days prior to commencement of closure activities.

C. Upon completing all closure activities, a summary of the closure activities must be submitted to the appropriate District Office and Technical Permitting in Austin.

D. Unless otherwise allowed by this permit all waste, chemicals, and materials must be removed from the facility and disposed of in an authorized manner.

E. All berms must be leveled to original grade.

F. Any storm water retention ponds and all associated drainage channels must be backfilled with clean fill and restored to natural grade. Topsoil must be contoured and seeded with appropriate vegetation.

G. Excluding Disposal Pit areas, the entire facility must be backfilled as necessary and contoured to original grade.

H. Soil grab samples must be collected from any area where any contamination may have occurred (i.e., any discolored, odorous, or otherwise conspicuous soil or media).

I. Soil samples must be analyzed and the following constituent levels must not be exceeded:

PARAMETER	**CLOSURE LIMIT**
pH *EPA Method 9045C*	6.0 to 10.0 standard units
Electrical Conductivity (EC) *Louisiana Dept. of Natural Resources Lab Procedures for Analysis of E&P Waste or equivalent*	≤ 4.0 mmhos/cm
Total petroleum hydrocarbons (TPH) *Method TX1005*	≤ 10,000 mg/kg
BTEX *EPA Method 8021/8260B*	≤ 30.0 mg/kg
Metals (total): *EPA Method 6010/6020/7471A*	
Arsenic	≤ 10.0 mg/kg
Barium	≤ 10,000 mg/kg
Cadmium	≤ 1.0 mg/kg
Chromium	≤ 5.0 mg/kg
Lead	≤ 200 mg/kg
Mercury	≤ 10.0 mg/kg
Selenium	≤ 5.0 mg/kg
Silver	≤ 200 mg/kg

J. When acceptable constituent levels have been verified in writing by Technical Permitting, all areas of the facility, excluding Disposal Pits, must be restored to natural grade and seeded with natural vegetation. The pits must be backfilled with clean fill, compacted, and closed in such a manner that rainfall will not collect at the pit location.

K. Closure of the Wash Truck and Settling Basin Area must proceed as follows:

1. The contents of the Drying Cell, the Washout Pit and all Collecting Pits, tanks, vessels or other containers must be disposed of in an authorized manner.
2. All treatment equipment and tanks will be removed and salvaged, if possible, or disposed of in an authorized manner.
3. The concrete pits and pads must be dewatered and emptied. The floors and walls of the pits and pads must be steam cleaned, and must be broken into rubble and buried in the pit, or disposed of offsite in an authorized manner.

4. Soil samples must be taken as follows to characterize the scope of any contamination within the Truck Wash and Settling Basin Area and Drying Cell.
   a. A minimum of one soil grab sample must be taken from soils under each individual pit;
   b. A minimum of one soil grab sample must be taken from soils under each individual tank pad or secondary containment area of any storage tanks;
   c. A minimum of one soil grab sample per acre must be taken from the drying pad;
   d. At the time of notification of closure and prior to sampling, a soil sampling plan must be submitted to Technical Permitting in Austin.

L. Closure of the Disposal Pits must be as follows:

1. Once a Disposal Pit has reached its permitted capacity:
   a. Waste material in the Disposal Pit must be stabilized, so that the structure will not fail or erode;
   b. Waste material in the Disposal Pit must be graded so that rainwater will not collect on top of the pit; and
   c. The Disposal Pit must be covered with a cap that must consist of a high density polyethylene liner with a thickness of at least 60 mils, overlain by an impermeable compacted one-foot thick clay liner, overlain by a one-foot thick layer of soil seeded with appropriate vegetation.
2. Unless otherwise required by conditions of this permit, closure of Disposal Pits must be performed in accordance with plans submitted with the application and subsequent information received to date by Technical Permitting in Austin.

M. Closure of the Landtreatment Cells must be as follows:

1. Once a Landtreatment Cell has reached its permitted capacity, has been sufficiently tilled, and does not exceed limitations in Condition VIII.C.4.:
   a. The Landtreatment Cell dikes must be leveled;
   b. The Landtreatment Cell must be contoured to its original condition; and
   c. The Landtreatment Cell must be reseeded with appropriate vegetation.
2. Unless otherwise required by conditions of this permit, closure of Landtreatment Cells must be performed in accordance with plans submitted with the application and subsequent information received to date by Technical Permitting in Austin.

XII. POST-CLOSURE CARE AND MONITORING

A. The site will be monitored for a period of no less than five years after closure of the facility.

B. Post-closure care must include quarterly inspections of the entire facility by a Texas-registered Professional Engineer for signs of deterioration.

C. Any areas showing signs of erosion must be contoured, backfilled, and reseeded as necessary.

D. All monitor wells must remain unplugged. All monitoring well reporting requirements remain effective until written approval from Technical Permitting in Austin is granted for plugging the monitor wells.

E. The leak detection system and the leachate collection system must be maintained and monitored quarterly. Any leachate detected must be pumped out and disposed of in an authorized manner.

F. A summary of the results of the post-closure monitoring activity must be submitted to Technical Permitting in Austin as part of a Quarterly Report required in Condition I.P. of this permit.

G. The permittee must request in writing permission to cease post-closure monitoring. Post-closure monitoring requirements may be extended by Technical Permitting based on the monitoring results.

This authorization is granted subject to review and cancellation should investigation show that such authorization is being abused.

APPROVED AND ISSUED ON MAY 3, 2016, IN ACCORDANCE WITH THE FINAL ORDER ISSUED IN OIL & GAS DOCKET NO. 02-0289582.

Permit Appendix A

"SITE PLAN" (Figure 1)

Site Entrance/Exit Access Gates
Proposed AEP Distribution Easement 3.390 Acres
Truck Entrance/Exit Detail
Hohn Road
MW-1
Office Trailer
Site Entrance/Exit Access Gates
Proposed AEP Substation Location 6.832 Acres
Truck Entrance/Exit Detail
LTC-1a Area: 4.0 AC
SB-9
4-Foot Tall Site Perimeter Berm
Culvert
EL = 390.7
EL = 389.0
Soil Stockpile
SB-8
Water Supply Well Protection Detail
Stormwater Retention Pond North
MW-2
Well
SB-1
LTC-2 Area: 20.0 AC
Approximate Drainage Divide
MW-5
Culvert
EL = 389.0
EL = 392.0
LTC-3 Area: 20.0 AC
Pipeline Access Gate
SB-4
SB-3
LTC-4 Area: 16.8 AC
PIPELINE ROW
PIPELINE ROW
SB-7
EL = 403.2
EL = 401.0
Culvert
Stormwater Retention Pond South
Culvert
EL = 401.4
DTC-4 Area: 8.0 AC
EL = 399.0
SB-6
Culvert
EL = 396.9
EL = 394.0
SB-2
MW-3
DC-1 Area: 12.0 AC
MW-6
Pipeline Access Gate
Stormwater Retention Pond East
Residence with Water Well
DC-3 Area: 11.3 AC
EL = 391.5
EL = 391.8
Culvert
SB-5
4-Foot Tall Site Perimeter Berm
MW-4

EXPLANATION

- Property Boundary
- Soil Stockpile Area
- Existing Pond
- Soil Boring Location
- Well
- Proposed Monitoring Well Location
- CPL Easement
- 4ft Tall Site Perimeter Berm
- Approximate Drainage Divide
- Existing 2 Ft. Contour
- Existing 10 Ft. Contour
- Proposed 2 Ft. Contour
- Proposed 10 Ft. Contour

N

Scale In Feet
0 200 400

STATE OF TEXAS
PATRICK J. BEHLING
79872
LICENSED
PROFESSIONAL ENGINEER
09-28-15

RECEIVED
RRC OF TEXAS
SEP 28 2015
AUSTIN, TX

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD FACILITY

Figure 1

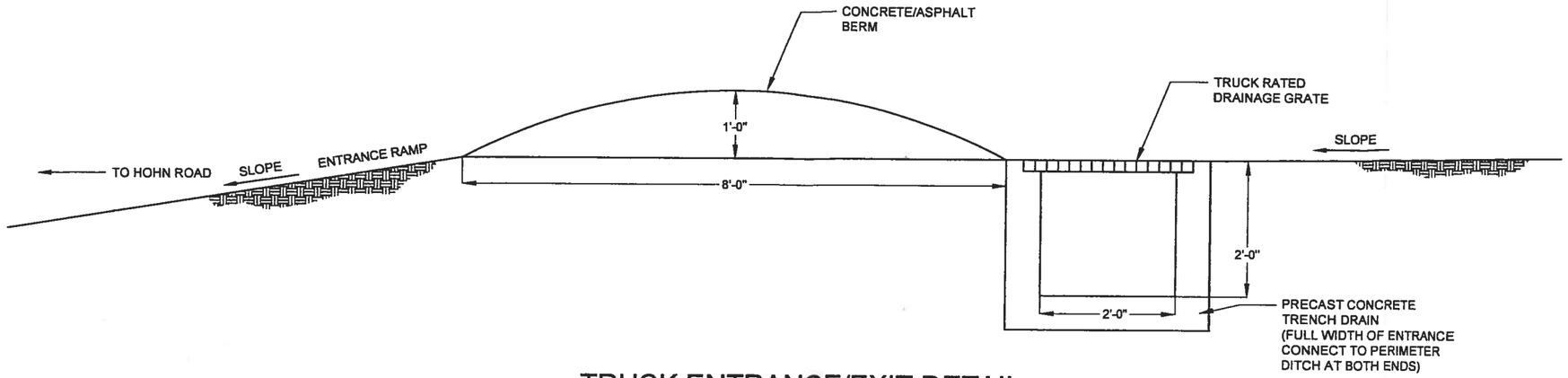
SITE PLAN

PROJECT: 1925	BY: MKS	REVISIONS
DATE: SEP., 2015	CHECKED: PJB	

PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

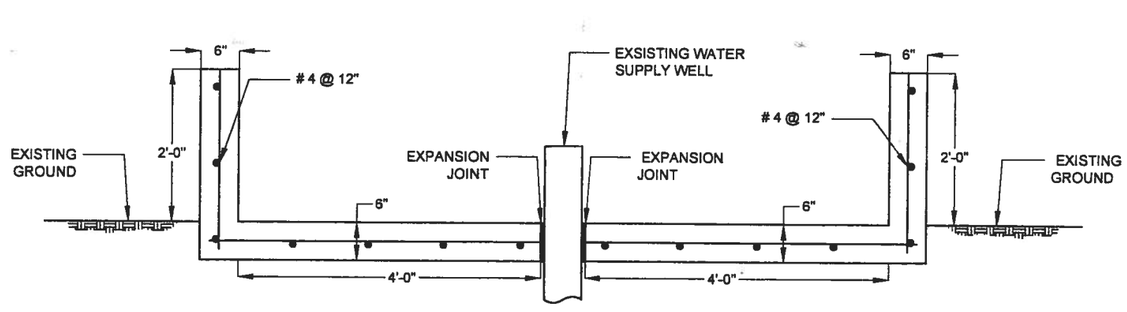
Permit Appendix B

"DETAILS" (Figure 4)



TRUCK ENTRANCE/EXIT DETAIL

SCALE: 1"=2' 0 2



WATER SUPPLY WELL PROTECTION DETAIL

SCALE: 1"=2' 0 2

STATE OF TEXAS
PATRICK J. BEHLING
79872
LICENSED
PROFESSIONAL ENGINEER

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD FACILITY

FIGURE 4

DETAILS

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DATE: SEP., 2015	CHECKED: PJB	

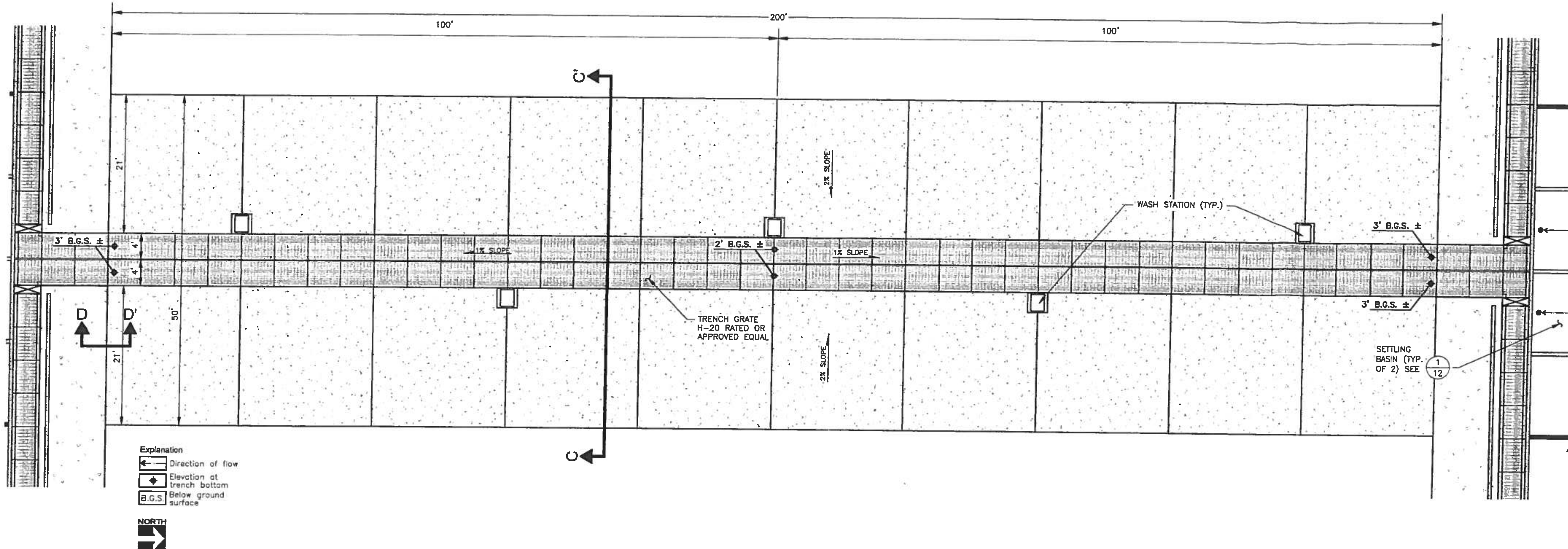
PASTOR, BEHLING & WHEELER, LLC
CONSULTING ENGINEERS AND SCIENTISTS

Permit Appendix C

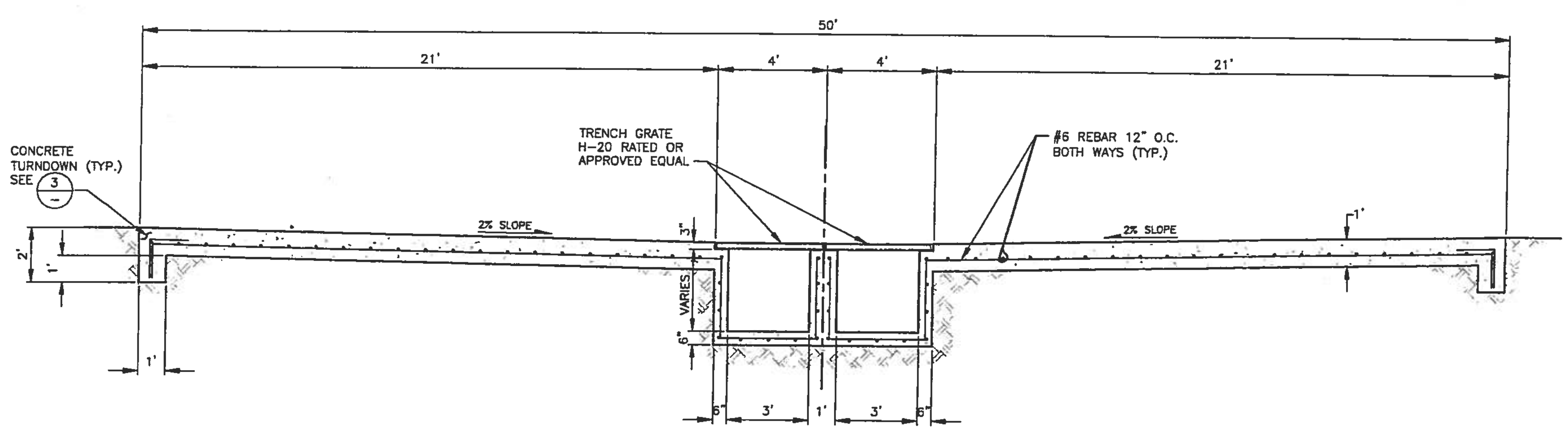
"TRUCK WASH LAYOUT AND DETAILS" (Figure 11)

and

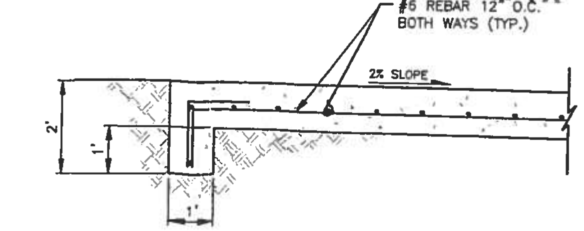
"SETTLING BASIN LAYOUT AND DETAILS" (Figure 12)



TRUCK WASH STATION PLAN 1/-
N.T.S.



TRUCK WASH SECTION C-C' 2/-
N.T.S.



NOTES:
1. SECTION D-D' IS TYPICAL FOR ALL OUTSIDE EDGES OF THE TRUCK WASH STATION

TYPICAL TRUCK WASH CONCRETE TURNDOWN SECTION D-D' 3/-
N.T.S.

NOT FOR CONSTRUCTION
THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF PERMITTING UNDER THE AUTHORITY OF GUNDAR PETERSON, P.E. 103091 ON 3/22/2013. IT IS NOT TO BE USED FOR CONSTRUCTION OR BIDDING PURPOSES.

NO	DATE	BY	REVISION MADE

FILE NAME:

Daniel B. Stephens & Associates, Inc.
TEXAS REGISTERED ENGINEERING, FIRM F-286
ENVIRONMENTAL SCIENTISTS & ENGINEERS
4030 WEST BRAKER LANE, SUITE 325
AUSTIN, TEXAS 78759
(512) 821-2765

DESIGNED BY: TG, KJ
DRAWN BY: KOB, EL
CHECKED BY: GDP
DATE: 3/22/2013

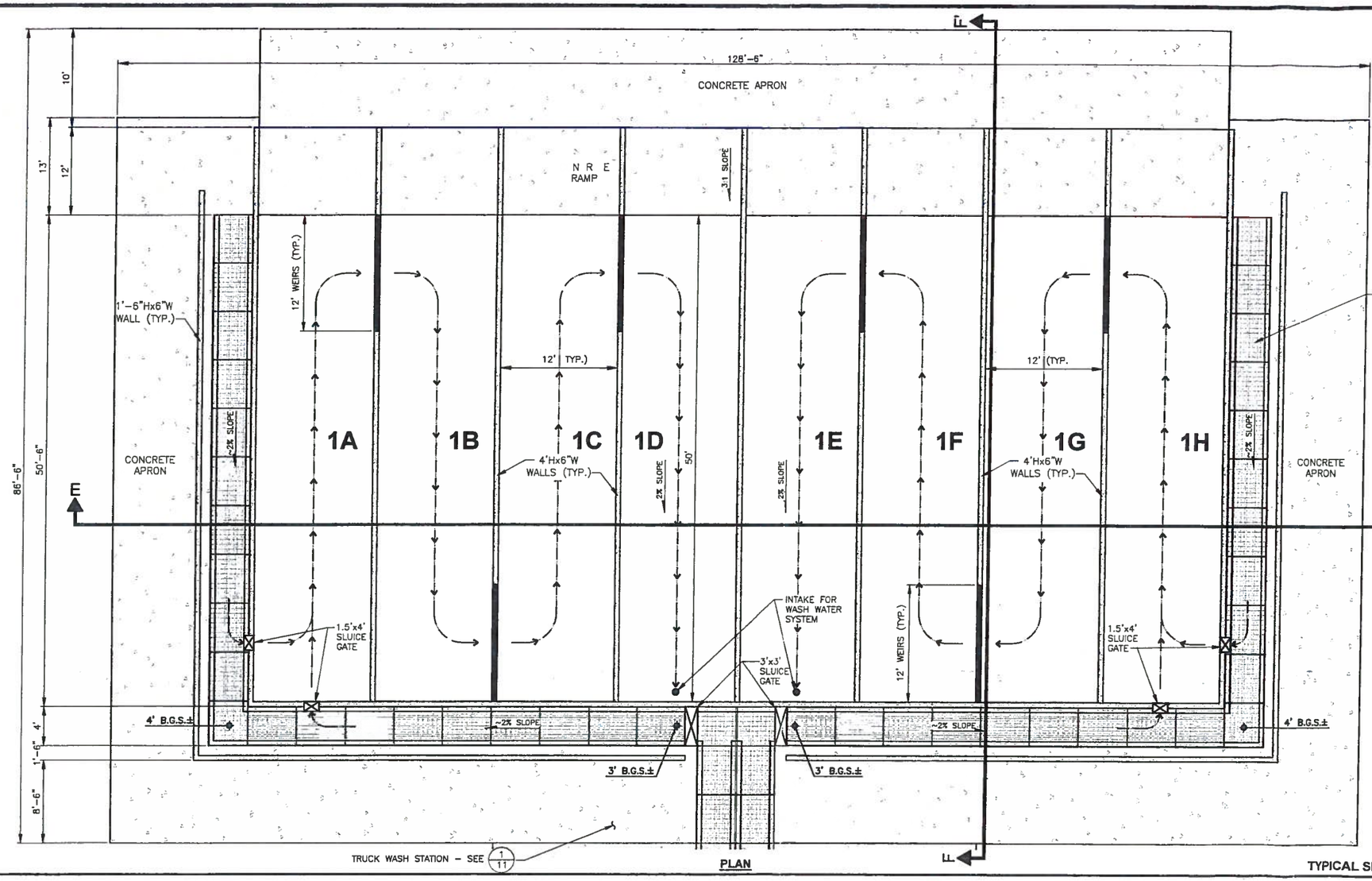
COMMERCIAL LANDTREATMENT
HOHN ROAD RECLAMATION FACILITY
NORDHEIM, DEWITT COUNTY, TEXAS

TRUCK WASH LAYOUT AND DETAILS

STATE OF TEXAS
GUNDAR PETERSON
103091
LICENSED
PROFESSIONAL ENGINEER
DATE: 3/20/13

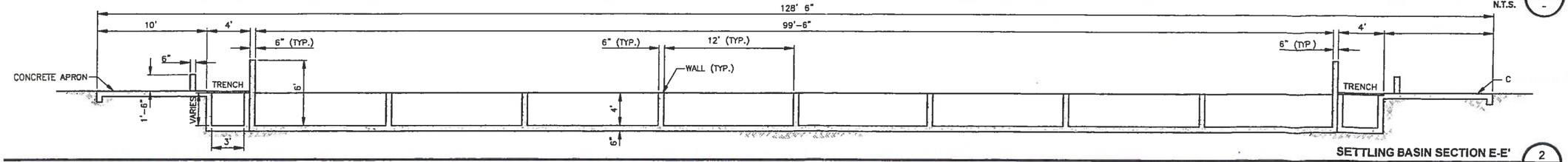
JOB NO.
ES12.0229.00

FIGURE 11

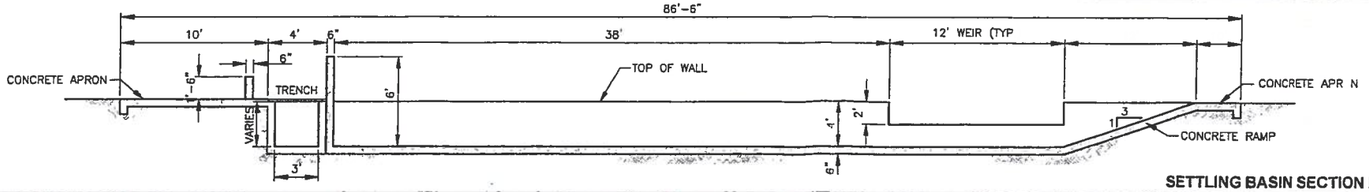


PLAN

TYPICAL SETTLING BASIN LAYOUT 1/- N.T.S.



SETTLING BASIN SECTION E-E' 2/- N.T.S.



SETTLING BASIN SECTION F-F' 3/- N.T.S.

NOTES:

1. SUB BASINS IDENTIFIED ON THIS TYPICAL DETAIL REFER TO THE NORTH SETTLING BASIN.
2. SUB-BASINS FOR THE SOUTH SETTLING BASIN SHALL BEGIN WITH THE NUMBER 2 (E.G. 2A, 2B, ETC.)
3. ADD WEEP HOLES AT THE BASE OF THE 1'-6" TALL WALL EVERY 20' TO ALLOW DRAINAGE FROM THE CONCRETE APRON INTO THE SETTLING BASIN. 2-INCH SCH 40 PVC OR EQUIVALENT.
4. SUBSURFACE RECYC PIPING SHALL BE DO OR INCLUDE LEAK D

NO	DATE	BY	REVISION MADE

FILE NAME: [illegible]

Daniel B. Stephens & Associates, Inc.
TEXAS REGISTERED ENGINEERING FIRM F-285
ENVIRONMENTAL SCIENTISTS & ENGINEERS
2030 WEST SEVILLE LANE, SUITE 325
AUSTIN, TEXAS 78745
(512) 421-2785

DESIGNED BY: TG, NJ
DRAWN BY: MM, EL
CHECKED BY: GP
DATE: 3/22/2013

COMMERCIAL LANDTREATMENT
HORN ROAD RECLAMATION FACILITY
NORDHEIM, DEWITT COUNTY, TEXAS

SETTLING BASIN LAYOUT AND DETAILS

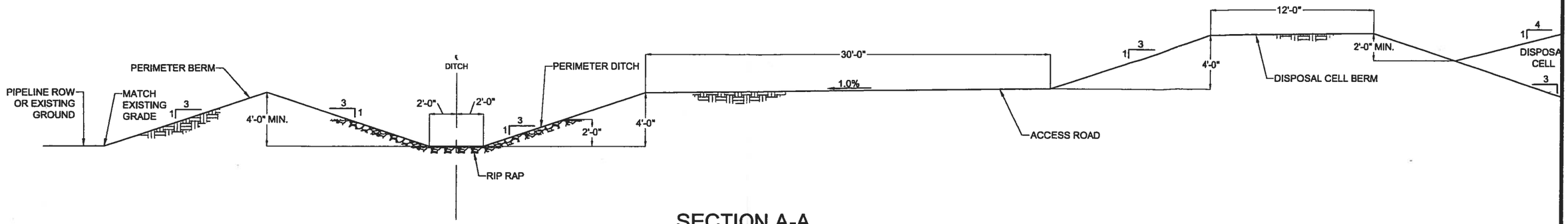
STATE OF TEXAS
GUNDAR PETERSON
103091
LICENSED
PROFESSIONAL ENGINEER
DATE: 3/22/13

JOB NO.
ES12.0229.00

FIGURE 12

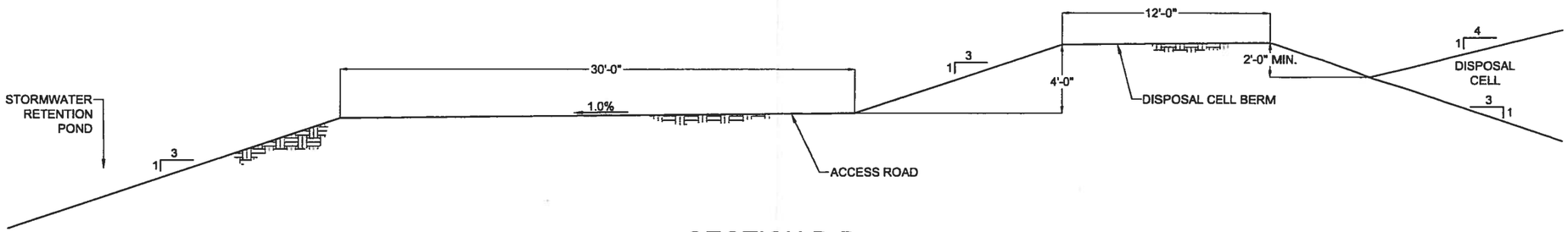
Permit Appendix D

"DETAILS" (Figure 2)



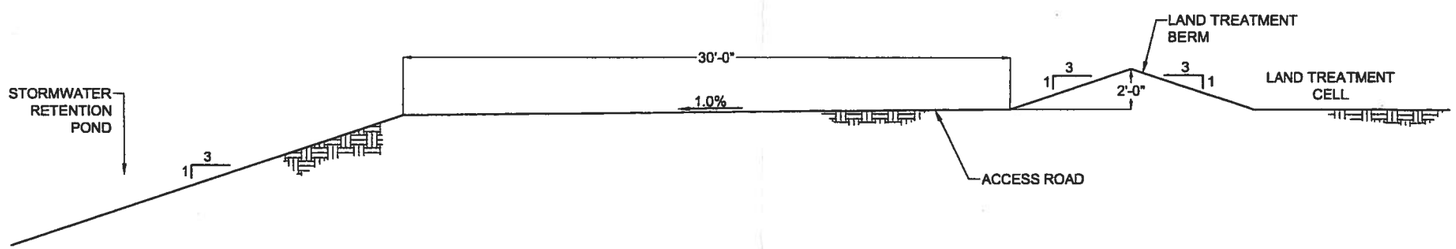
SECTION A-A

SCALE: 1"=7.5' 0 7.5



SECTION B-B

SCALE: 1"=7.5' 0 7.5



SECTION C-C

SCALE: 1"=7.5' 0 7.5

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD FACILITY

FIGURE 2

DETAILS

PROJECT: 1925	BY: MKS	REVISIONS
DATE: SEP., 2015	CHECKED: PJB	

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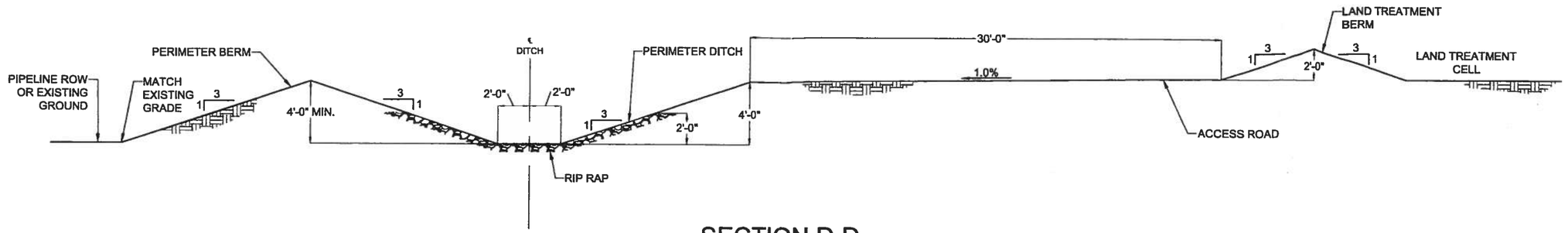
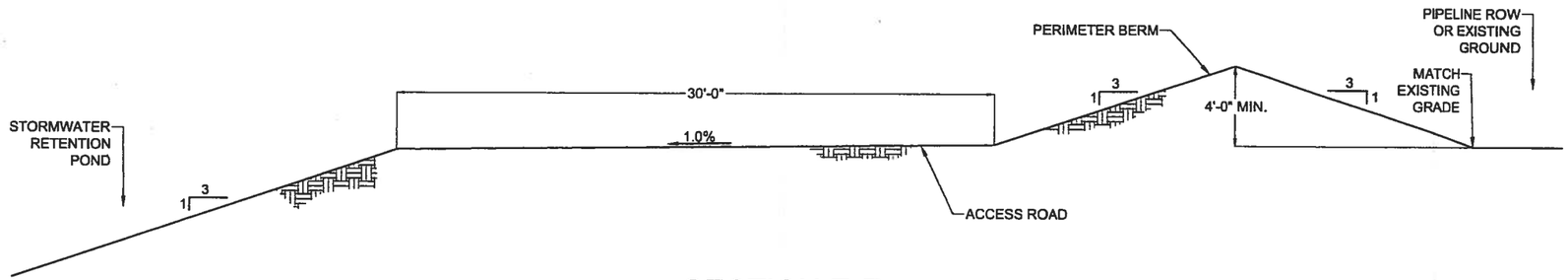
Permit Appendix E

"DETAILS" (Figure 3)



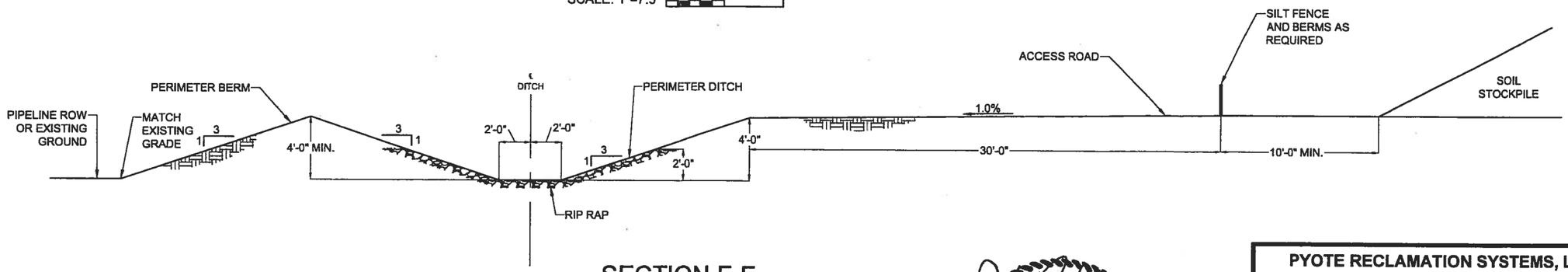
SECTION D-D

SCALE: 1"=7.5' 0 7.5



SECTION E-E

SCALE: 1"=7.5' 0 7.5



SECTION F-F

SCALE: 1"=7.5' 0 7.5

STATE OF TEXAS
PATRICK J. BEHLING
79872
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PROFESSIONAL ENGINEER

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HOHN ROAD FACILITY

FIGURE 3

DETAILS

PROJECT: 1925	BY: MKS	REVISIONS
DATE: SEP., 2015	CHECKED: PJB	

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Permit Appendix F

"Storm Water Calculations"

(Attachment C-1, C-2 and C-3) and;

"Storm Water Calculations"

(Attachment D-1, D-2 and D-3)

ATTACHMENT C-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water - storm water that comes into contact with waste

Non-contact Storm Water - storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be designed for run-off from a 50-year, 24-hr storm.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Active Land Treatment Cells	Gravel	22.1
Soil Stockpile Area	Grass	9.9
Truck Wash Area	Gravel	2.9
Access Roads	Gravel	4.9
Perimeter Ditchs and Berms	Grass	4.2
	Total Site Area:	44.0

acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:

DeWitt County 50-Yr, 24-hr: 0.42 in/hr
10.08 in/day

ATTACHMENT C-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN = 69 (Established vegetation, fair condition)
- For Gravel areas and Active Waste Units, use CN = 85 (Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Active Land Treatment Cells	Gravel	22.1	85	1,878.5
Soil Stockpile Area	Grass	9.9	69	680.6
Truck Wash Area	Gravel	2.9	85	250.2
Access Roads	Gravel	4.9	85	415.3
Perimeter Ditchs and Berms	Grass	4.2	69	289.8
		44.0		3514.3

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 79.9

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

S = (1000/CNW)-10

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

ATTACHMENT C-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

S = 2.52 inches

2) Calculate Depth of Runoff (Q)

Q = [(P-0.2S)^2]/[P-0.8S)

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 7.58 inches

3) Calculate Volume of Non-Contact Storm Water

V = Q X A

where: Q = depth of runoff, ft
A = Total Area, sf

Q = 7.58 inches
Q = 0.63 feet
Area = 44.0 acres
Area = 1,916,313 sf

Storm Water Volume:	**1,210,897 cf**
	9,057,511 gal
	215,655 bbls

ATTACHMENT C-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,210,897	
Precipitation on Pond (ft):	0.84	50-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	221,908	
Volume of Percipitation on Pond (cf):	186,403	
Required Pond Volume (cf):	1,397,300	

North Pond Attributes

Civil 3D Calc. Area of pond base (sf):	149,775	
Max Depth of Water in Pond (ft):	9.4	
Civil 3D Calc. Area of Water Surface (sf):	191,481	
Civil 3D Calc. Pond Volume (cf):	1,399,019	
FreeBoard (ft):	2	
Total Pond Depth (ft):	11.4	**From Deepest Point in Pond to Lowest Point on Pond Rim, (which is lower elevation than Inlet Culvert Inverts).**
Elevation Lowest Point on Pond Rim:	**387.7**	
Elevation Deepest Point in Pond:	**376.3**	

ATTACHMENT C-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water - storm water that comes into contact with waste

Non-contact Storm Water - storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be designed for run-off from a 50-year, 24-hr storm.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Active Land Treatment Cells	Gravel	38.7
Access Roads	Gravel	3.6
Perimeter Ditchs and Berms	Grass	2.9
	Total Site Area:	45.2

acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:

DeWitt County 50-Yr, 24-hr: 0.42 in/hr
10.08 in/day

ATTACHMENT C-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN =	69	(Established vegetation, fair condition)
- For Gravel areas, use CN =	85	(Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Active Land Treatment Cells	Gravel	38.7	85	3,289.5
Access Roads	Gravel	3.6	85	307.5
Perimeter Ditchs and Berms	Grass	2.9	69	200.1
		45.2		3797.1

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 84.0

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

S = (1000/CNW)-10

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

S = 1.91 inches

ATTACHMENT C-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

2) Calculate Depth of Runoff (Q)

Q = [(P-0.2S)^2]/[P+0.8S)

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 8.10 inches

3) Calculate Volume of Non-Contact Storm Water

V = Q X A

where: Q = depth of runoff, ft
A = Total Area, sf

Q =	8.10 inches
Q =	0.68 feet
Area =	45.2 acres
Area =	1,969,663 sf

Storm Water Volume:	**1,330,120 cf**
	9,949,296 gal
	236,888 bbls

ATTACHMENT C-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,330,120	
Precipitation on Pond (ft):	0.84	50-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	212,636	
Volume of Percipitation on Pond (cf):	178,614	
Required Pond Volume (cf):	1,508,734	

South Pond Attributes

Civil 3D Calc. Area of pond base (sf):	136,378	
Max Depth of Water in Pond (ft):	10.8	
Civil 3D Calc. Area of Water Surface (sf):	185,050	
Civil 3D Calc. Pond Volume (cf):	1,532,633	
Freeboard (ft):	2	
Total Pond Depth (ft):	12.8	**From Deepest Point in Pond to Lowest Point on Pond Rim, (which is lower elevation than Inlet Culvert Inverts).**
Elevation Lowest Point on Pond Rim:	**398.8**	
Elevation Deepest Point in Pond:	**386.0**	

ATTACHMENT C-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water -	storm water that comes into contact with waste
Non-contact Storm Water -	storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be designed for run-off from a 50-year, 24-hr storm.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Capped Disposal Pits	Grass	11.3
Active Disposal Cells and Drying Cell	Gravel	20.0
Access Roads	Gravel	5.4
Ditchs and Berms	Grass	7.4
	Total Site Area:	44.1 acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:

DeWitt County 50-Yr, 24-hr:	0.42 in/hr
	10.08 in/day

ATTACHMENT C-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN = 69 (Established vegetation, fair condition)
- For Gravel areas, use CN = 85 (Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Capped Disposal Pits	Grass	11.3	69	779.7
Active Disposal Cells and Drying Cell	Gravel	20.0	85	1,700.0
Access Roads	Gravel	5.4	85	459.0
Perimeter Ditchs and Berms	Grass	7.4	69	510.6
		44.1		3449.3

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 78.2

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

S = (1000/CNW)-10

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

S = 2.79 inches

ATTACHMENT C-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

2) Calculate Depth of Runoff (Q)

$Q = [(P-0.2S)^2]/[P+0.8S)$

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 7.37 inches

3) Calculate Volume of Non-Contact Storm Water

V = Q X A

where: Q = depth of runoff, ft
A = Total Area, sf

Q =	7.37 inches
Q =	0.61 feet
Area =	44.1 acres
Area =	1,920,996 sf

Storm Water Volume:	**1,179,494 cf**
	8,822,618 gal
	210,062 bbls

ATTACHMENT C-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
50-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,179,494	
Precipitation on Pond (ft):	0.84	50-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	320,469	
Volume of Percipitation on Pond (cf):	269,194	
Required Pond Volume (cf):	1,448,688	

East Pond Attributes

Civil 3D Calc. Area of pond base (sf):	251,852	
Max Depth of Water in Pond (ft):	7.8	
Civil 3D Calc. Area of Water Surface (sf):	284,786	
Civil 3D Calc. Pond Volume (cf):	1,459,097	
Freeboard (ft):	2	
Total Pond Depth (ft):	9.8	**From Deepest Point in Pond to invert of the Inlet Culvert**
Invert Elevation of Inlet Culvert:	**391.5**	
Elevation Deepest Point in Pond:	**381.7**	

ATTACHMENT D-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water - storm water that comes into contact with waste
Non-contact Storm Water - storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be evaluated to confirm a 100-year, 24-hr storm will be contained in the pond freeboard.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Active Land Treatment Cells	Gravel	22.1
Soil Stockpile Area	Grass	9.9
Truck Wash Area	Gravel	2.9
Access Roads	Gravel	4.9
Perimeter Ditchs and Berms	Grass	4.2
	Total Site Area:	44.0

acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:
DeWitt County 100-Yr, 24-hr: 0.47 in/hr
11.28 in/day

ATTACHMENT D-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN =	69	(Established vegetation, fair condition)
- For Gravel areas and Active Waste Units, use CN =	85	(Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Active Land Treatment Cells	Gravel	22.1	85	1,878.5
Soil Stockpile Area	Grass	9.9	69	680.6
Truck Wash Area	Gravel	2.9	85	250.2
Access Roads	Gravel	4.9	85	415.3
Perimeter Ditchs and Berms	Grass	4.2	69	289.8
		44.0		3514.3

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 79.9

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

$S = (1000/CNW)-10$

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

S = 2.52 inches

ATTACHMENT D-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

2) Calculate Depth of Runoff (Q)

$Q = [(P-0.2S)^2]/[P-0.8S)$

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 8.74 inches

3) Calculate Volume of Non-Contact Storm Water

$V = Q \times A$

where: Q = depth of runoff, ft
A = Total Area, sf

Q = 8.74 inches
Q = 0.73 feet
Area = 44.0 acres
Area = 1,916,313 sf

Storm Water Volume:	**1,394,972 cf**
	10,434,392 gal
	248,438 bbls

ATTACHMENT D-1

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL TREATMENT/DISPOSAL FACILITY
STORM WATER POND NORTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,394,972	
Precipitation on Pond (ft):	0.94	100-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	221,908	
Volume of Percipitation on Pond (cf):	208,593	
Required Pond Volume (cf):	1,603,566	

North Pond Attributes

Civil 3D Calc. Area of pond base (sf):	149,775	
Max Depth of Water in Pond (ft):	10.5	
Civil 3D Calc. Area of Water Surface (sf):	197,485	
Civil 3D Calc. Pond Volume (cf):	1,612,942	
FreeBoard (ft):	0.9	
Total Pond Depth (ft):	11.4	**From Deepest Point in Pond to Lowest Point on Pond Rim, (which is lower elevation than Inlet Culvert Inverts).**
Elevation Lowest Point on Pond Rim:	**387.7**	
Elevation Deepest Point in Pond:	**376.3**	
Water Level After 100 yr, 24 hr Storm:	**386.8**	

ATTACHMENT D-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water -	storm water that comes into contact with waste
Non-contact Storm Water -	storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be evaluated to confirm a 100-year, 24-hr storm will be contained in the pond freeboard.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Active Land Treatment Cells	Gravel	38.7
Access Roads	Gravel	3.6
Perimeter Ditchs and Berms	Grass	2.9
Total Site Area:		45.2 acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:

DeWitt County 100-Yr, 24-hr:	0.47 in/hr
	11.28 in/day

ATTACHMENT D-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN =	69	(Established vegetation, fair condition)
- For Gravel areas and Active Waste Units, use CN =	85	(Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Active Land Treatment Cells	Gravel	38.7	85	3,289.5
Access Roads	Gravel	3.6	85	307.5
Perimeter Ditchs and Berms	Grass	2.9	69	200.1
		45.2		3797.1

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 84.0

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

$S = (1000/CNW)-10$

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

S = 1.91 inches

ATTACHMENT D-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

2) Calculate Depth of Runoff (Q)

$Q = [(P-0.2S)^2]/[P+0.8S)$

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 9.27 inches

3) Calculate Volume of Non-Contact Storm Water

$V = Q \times A$

where: Q = depth of runoff, ft
A = Total Area, sf

Q =	9.27 inches
Q =	0.77 feet
Area =	45.2 acres
Area =	1,969,663 sf

Storm Water Volume:	**1,522,260 cf**
	11,386,503 gal
	271,107 bbls

ATTACHMENT D-2

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND SOUTH
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,522,260	
Precipitation on Pond (ft):	0.94	100-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	212,636	
Volume of Percipitation on Pond (cf):	199,878	
Required Pond Volume (cf):	1,722,138	

South Pond Attributes

Civil 3D Calc. Area of pond base (sf):	136,378	
Max Depth of Water in Pond (ft):	11.9	
Civil 3D Calc. Area of Water Surface (sf):	191,161	
Civil 3D Calc. Pond Volume (cf):	1,739,541	
Freeboard (ft):	0.9	
Total Pond Depth (ft):	12.8	**From Deepest Point in Pond to Lowest Point on Pond Rim, (which is lower elevation than Inlet Culvert Inverts).**
Elevation Lowest Point on Pond Rim:	**398.8**	
Elevation Deepest Point in Pond:	**386.0**	
Water Level After 100 yr, 24 hr Storm:	**397.9**	

ATTACHMENT D-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Definitions

Contact Water -	storm water that comes into contact with waste
Non-contact Storm Water -	storm water that falls outside of an active waste management area and does not come into contact with waste

Assumptions

1) Non-contact storm water and contact water will be collected in the on-site storm water pond.
2) The storm water pond will be evaluated to confirm a 100-year, 24-hr storm will be contained in the pond freeboard.
3) The maximum volume of non-contact storm water and contact water will be generated for the entire Facility assuming failure of contact water containment and discharge to pond.
4) Storm water runoff volumes are estimated using the Curve Number method as described in USDA's Urban Hydrology for Small Water Sheds (TR-55).

Areas that Generate Non-Contact Storm Water

Description	Surface Type	Area (acres)
Capped Disposal Pits	Grass	11.3
Active Disposal Cells and Drying Cell	Gravel	20.0
Access Roads	Gravel	5.4
Ditchs and Berms	Grass	7.4
	Total Site Area:	44.1

acres (Does not include storm water pond)

Design Rainfall

From TXDOT Intensity Curves for Texas:

DeWitt County 100-Yr, 24-hr: 0.47 in/hr
11.28 in/day

ATTACHMENT D-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

Soil Types and Hydrologic Group

1) Assume all soils used to close/cap the areas will be from on-site
2) From DeWitt County Soil Survey Map, surficial soils in the vicinity of the Site are representative of hydrologic group B as listed in TR-55

Curve Numbers

From TR-55, Table 2-3d:

- For Grass/vegetated areas, use CN = 69 (Established vegetation, fair condition)
- For Gravel areas and Active Waste Units, use CN = 85 (Gravel streets and roads)

Calculate Weighted Curve Number for Site

Description	Surface Type	Area (acres)	CN	Area X CN
Capped Disposal Pits	Grass	11.3	69	779.7
Active Disposal Cells and Drying Cell	Gravel	20.0	85	1,700.0
Access Roads	Gravel	5.4	85	459.0
Perimeter Ditchs and Berms	Grass	7.4	69	510.6
		44.1		3449.3

Weighted Curve Number = (Sum of CN X A) /(Total Area)
Weighted Curve Number = 78.2

Calculate Non-Contact Stormwater Volume Using TR-55 Procedures

1) Calculate Potential Retention of Water (S)

$S = (1000/CNW)-10$

where: S = Potential Retention of Water, inches
CNW = Weighted Curve Number for Site

S = 2.79 inches

ATTACHMENT D-3

PYOTE RECLAMATION SYSTEMS, LLC
HOHN ROAD COMMERCIAL RECLAMATION/TREATMENT/DISPOSAL FACILITY
STORM WATER POND EAST
STORM WATER CALCULATIONS
100-YR, 24-HR STORM WITH DEEPER PONDS AND CONTACT WATER CONTAINMENT FAILURE

2) Calculate Depth of Runoff (Q)

$Q = [(P-0.2S)^2]/[P+0.8S)$

where: Q = depth of runoff, inches
S = Potential Retention of Water, inches
P = design rainfall, inches

Q = 8.51 inches

3) Calculate Volume of Non-Contact Storm Water

$V = Q \times A$

where: Q = depth of runoff, ft
A = Total Area, sf

Q =	8.51 inches
Q =	0.71 feet
Area =	44.1 acres
Area =	1,920,996 sf

Storm Water Volume:	**1,362,631 cf**
	10,192,480 gal
	242,678 bbls

ATTACHMENT D-3

PYOTE RECLAMATION SYSTEMS, LLC
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STORM WATER POND EAST
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Required Storm Water Pond Dimensions

- Assume storm water pond sides have a 3:1 slope
- Add 2 feet of freeboard to depth
- Include precipitation on storm water pond in calculation

Volume of pond = h/3(A1+A2+sq.root(A1XA2))

where: A1 = area of base of pond
A2 = area of water surface in pond
h = depth of water in pond

Note: Volume and areas of the pond were calculated using AutoCAD Civil 3D software. A Cut/Fill Report is attached to this worksheet.

Required Pond Volume (Prior to Direct Precipitation On Pond) (cf):	1,362,631	
Precipitation on Pond (ft):	0.94	100-Yr, 24-Hr storm
Civil 3D Area of pond at ground level (sf):	320,469	
Volume of Percipitation on Pond (cf):	301,241	
Required Pond Volume (cf):	1,663,872	

East Pond Attributes

Civil 3D Calc. Area of pond base (sf):	251,852	
Max Depth of Water in Pond (ft):	8.6	
Civil 3D Calc. Area of Water Surface (sf):	289,947	
Civil 3D Calc. Pond Volume (cf):	1,688,987	
Freeboard (ft):	1.2	
Total Pond Depth (ft):	9.8	From Deepest Point in Pond to invert of the Inlet Culvert
Invert Elevation of Inlet Culvert:	**391.5**	
Elevation Deepest Point in Pond:	**381.7**	
Water Level After 100 yr, 24 hr Storm:	**390.3**	