GeoTrans, Inc.
A TETRA TECH COMPANY
175 N. Corporate Drive
Suite 100
Brookfield, WI 53045
www.geotransinc.com
262-792-1282 FAX 262-792-1310

August 5, 2005
(1011.003)

Ms. Jenny Easterly
Wisconsin Department of Natural Resources
625 E. County Road Y. Suite 700
Oshkosh, Wisconsin 54901-9731

Re: Interim Landfill Gas Extraction System Design, FF/NN Landfill, Ripon, Wisconsin

Dear Jennie:

This letter provides design information about the proposed interim landfill gas (LFG) extraction system at the FF/NN Landfill in Ripon, Wisconsin. A documentation report on the *Pilot Test for Landfill Gas Extraction System* was submitted on June 29, 2005 and it detailed the recent pilot study and provided information on historic gas measurements and current conditions. It also included general information about the proposed LFG extraction system.

A permanent LFG extraction system, if proposed for the site, will require subsurface work to install header piping and a condensate collection trap. A decision whether to do this work will likely not be made until late 2006. However, to address the LFG migration issue this year, we propose to use temporary above-grade piping to run the system until freezing weather returns.

Proposed Interim System

Blower System

For this interim system, we propose to use a blower system that will also be appropriate for the permanent design. Therefore, we request that you review the system specifications for use in the interim and permanent designs. We are proposing to use an available trailer-mounted vapor extraction system. This system has the following components:

- Roots URAI 33 positive displacement pump, 1 phase, 240 V, 5HP motor
- Vacuum range –up to14 inches Hg
- Air flow 0 to170 cfm
- Liquid Separator – 300 gallon capacity with auto shut-off and pump-out capability
- Particulate filter and air-dryer, in-line with liquid separator
- In-line sample collection and flow monitoring device
- Enclosed trailer-mounted with outside electrical panel
- Sensaphone auto dialer

A process flow diagram for the system is included in Attachment A. The trailer is proposed to be located east of the landfill near monitor well MW-102, as shown on Figure 1. This location may be dependent upon approval of the landowner, David Sauer. Access to this location will be

from Highway FF, to the east. Power will likely originate from the power pole located south of the blower system, as shown on Figure 1.

Piping

The existing passive gas venting system will be utilized for gas extraction. The extraction system header pipe will be connected to vents GV-1, GV-4, GV-6, GV-7, GV-9 and GV-12. These same vents can be used in the permanent system. The system would also have the ability to draw from the three leachate head wells. The layout of above-ground piping for the interim system is shown on Figure 1. A valve will be provided on the piping to each separate vent.

The temporary above-ground piping is black corrugated HDPE pipe that was purchased new for the May 2005 pilot study. It is a flexible pipe that snaps together at joints and is further secured with duct tape. This piping would only be used for the interim system.

Condensate Collection

Condensate will form when the moist air that is extracted from within the landfill is cooled. Condensate may be generated within the pipe running from the extraction points. To remove this condensate, the piping will be sloped downhill to the east.

No condensate was produced during the pilot test. This may be because it was relatively warm out during the pilot test. It should be noted that the temperature of the gas extracted during the pilot test was similar to ambient temperature (i.e., 60 to 80 degrees Fahrenheit) during the test. This may be because the passive gas vent piping is only 3 feet below the ground surface and the vapors within it are affected by ambient air temperatures and not significantly affected by the heat produced by degradation deeper in the landfill. If the temperature of extracted gas is similar to the ambient air temperature, then relatively little condensate will be generated.

The only provision for condensate collection for the interim system is the knock-out tank in the blower system trailer. Based on the topography of the landfill (see as-build drawing of the top of the topsoil at the time of cap construction in 1996; this figure follows Figure 3), it is expected that the piping can be placed so that it drains to the knock-out tank in the trailer. The interim system will be operated as long as possible before freezing of condensate in the pipes is a problem. The current plan is to truck condensate for treatment and disposal at the Ripon POTW. The condensate will be characterized prior to shipment to the POTW.

System Evaluation

A purpose of the interim system is to manage the off-site migration of LFG and vinyl chloride. Therefore, the most effective tool to evaluate whether the system is working is to measure methane levels in the off-site gas probes. Methane concentrations will be measured in gas probes before and after startup of the interim system and quarterly thereafter. The concentrations of vinyl chloride in monitor wells near the landfill, particularly MW-103, MW-104 and MW-112, will be used to evaluate whether the interim system is improving groundwater quality.

groundwater 9-20-05
↑ Confirmed w/ Jerry.
JSB

Conceptual Plan of Final Gas System

We are also providing a conceptual plan of the permanent gas extraction system. While the PRP Group is not committed to or asking for approval of this permanent system, your comments will expedite completing our design of the permanent system, should such a system be deemed necessary. The same blower system can be used for both the interim and permanent systems.

Piping
A layout of header piping is shown on Figure 2, and a cross section of the pipe trench is provided on Figure 3. The header piping will have a slope of at least 2%. The header pipe is proposed to be constructed above the membrane liner of the landfill cap.

Condensate Collection
A condensate trap and an additional storage tank for condensate (in addition to the 300 gallon tank in the blower trailer) can also be constructed as a part of the interim or permanent system, if needed.

We request that you review the interim gas system that we have proposed so that it can be installed and commence operations this fall.

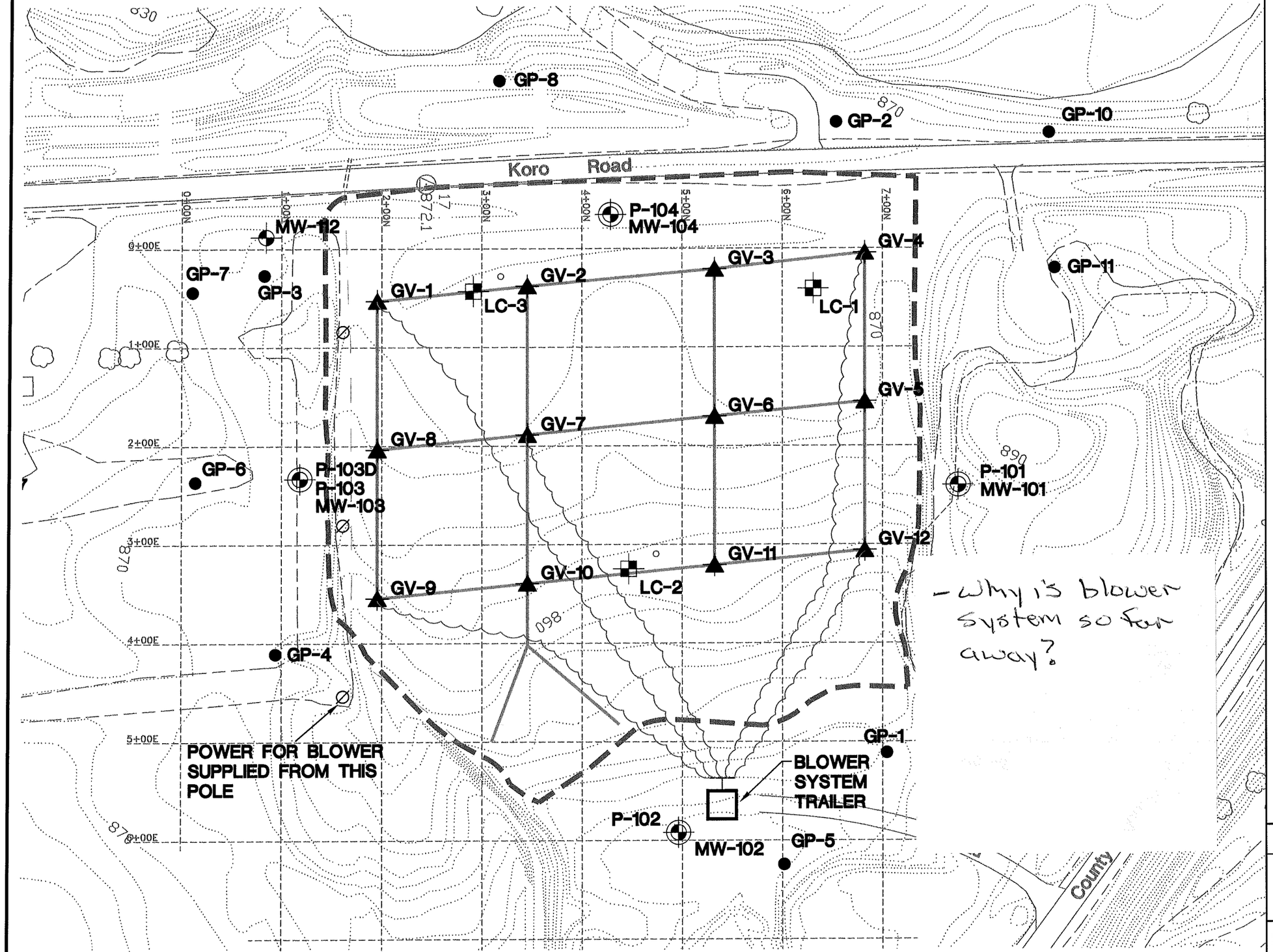
I trust that this information meets your requirements. If you have any questions, feel free to call me.

Sincerely,

GeoTrans, Inc.
Gerald DeMers

Gerald L. DeMers
Senior Engineer, Associate

Cc: Steve Barg, City of Ripon (via email)
Lee Archiquette, WDNR
Nelson Olavarria
Raymond Roder
Bernard Schorle, USEPA



EXPLANATION

- P-104 / MW-104 — MONITOR WELL, PIEZOMETER LOCATION, DESIGNATION
- LC-2 — LEACHATE HEAD WELL LOCATION, DESIGNATION
- OUTLINE OF CLOSED LANDFILL
- GP-1 — GAS PROBE LOCATION AND DESIGNATION
- GV-9 — GAS VENT LOCATION AND DESIGNATION
- PASSIVE GAS COLLECTION SYSTEM PIPING
- 3-INCH CORRUGATED HDPE ABOVE-GROUND PIPING
- ∅ POWER POLE

NOTE: CONTOURS ON LANDFILL DO NOT REFLECT CURRENT TOPOGRAPHY.

- why is blower system so far away?

N

SCALE

0 200

Feet

FF/NN LANDFILL
RIPON, WISCONSIN

INTERIM GAS SYSTEM LAYOUT

DATE:	8/5/05
DESIGNED:	GLD
CHECKED:	RHS
APPROVED:	GLD
DRAWN:	HJW
PROJ.:	1011.002

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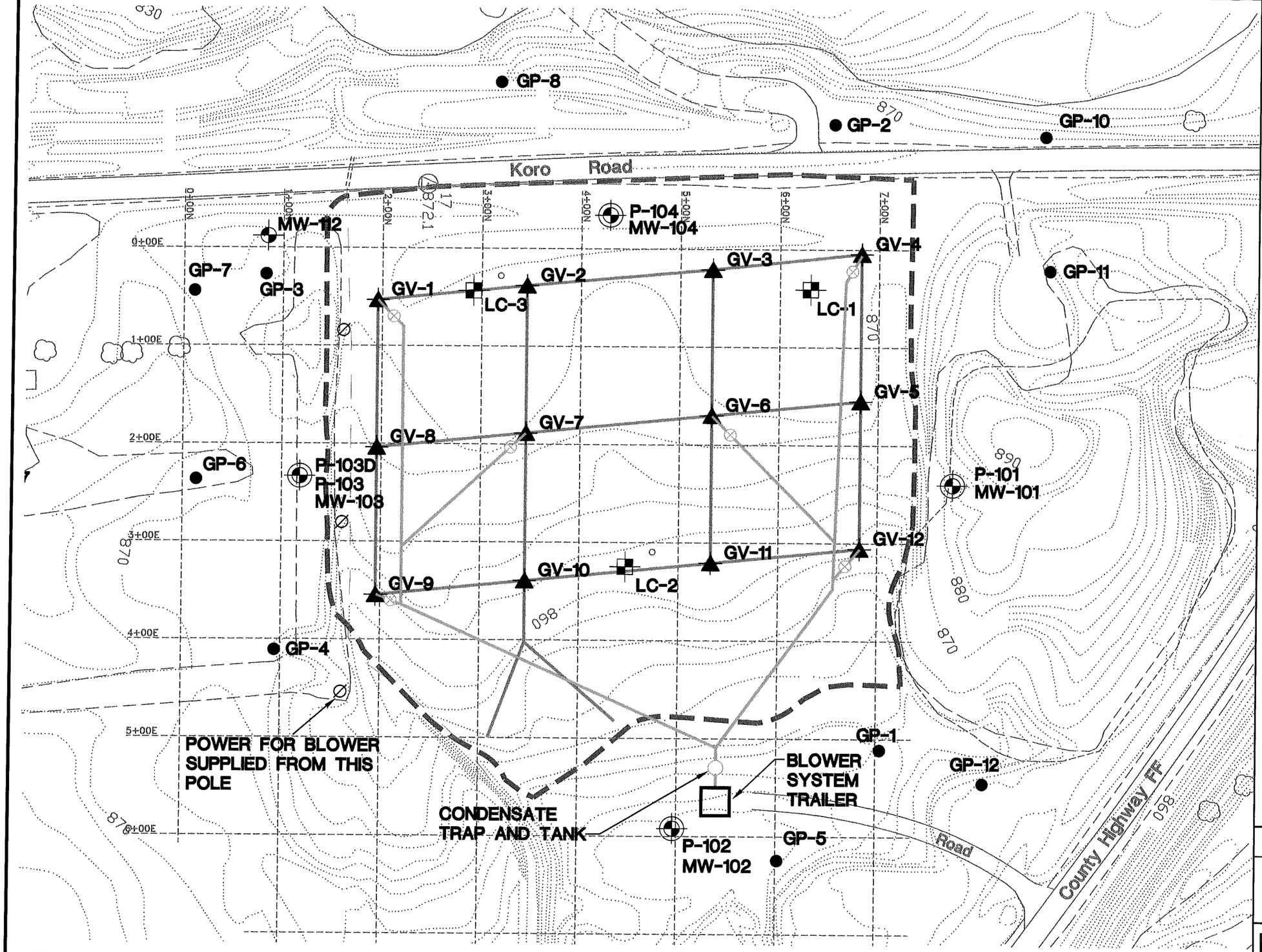
Figure 1

S:\CAD\Ripon\1011.002\8-1-05\1011002Fig1.dwg 08/01/2005 14:56:53



EXPLANATION

- P-104 / MW-104 — MONITOR WELL, PIEZOMETER LOCATION, DESIGNATION
- LC-2 — LEACHATE HEAD WELL LOCATION, DESIGNATION
- OUTLINE OF CLOSED LANDFILL
- ● GP-1 — GAS PROBE LOCATION AND DESIGNATION
- GV-9 — GAS VENT LOCATION AND DESIGNATION
- PASSIVE GAS COLLECTION SYSTEM PIPING
- UNDERGROUND HEADER PIPE
- ⊗ CONTROL VALVE
- ∅ POWER POLE

NOTE: CONTOURS ON LANDFILL DO NOT REFLECT CURRENT TOPOGRAPHY.

N

SCALE
0 — 200
Feet

FF/NN LANDFILL
RIPON, WISCONSIN

CONCEPT PLAN FOR FINAL GAS SYSTEM LAYOUT

DATE:	8/5/05
DESIGNED:	GLD
CHECKED:	RHS
APPROVED:	GLD
DRAWN:	HJW
PROJ.:	1011.002

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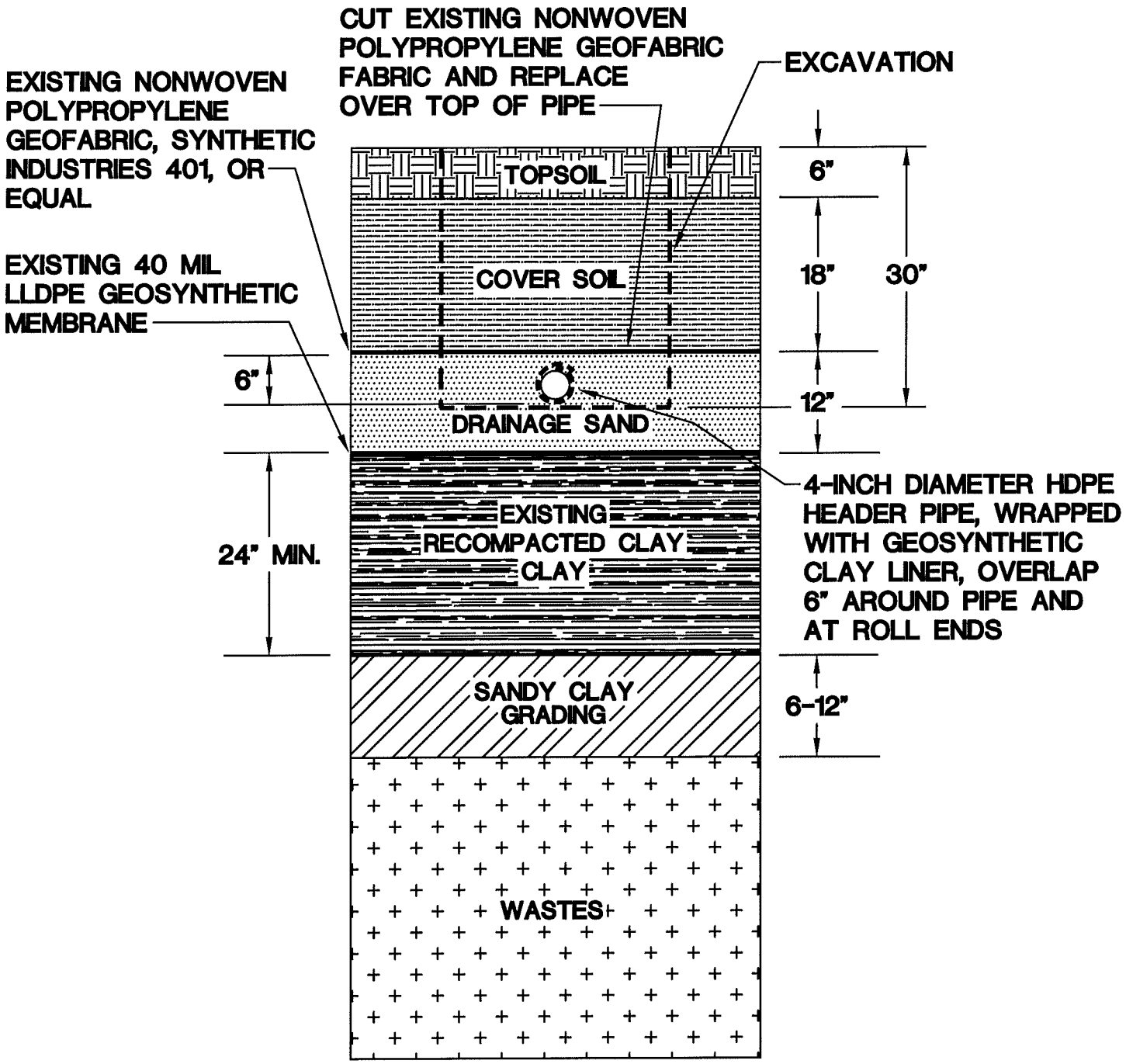
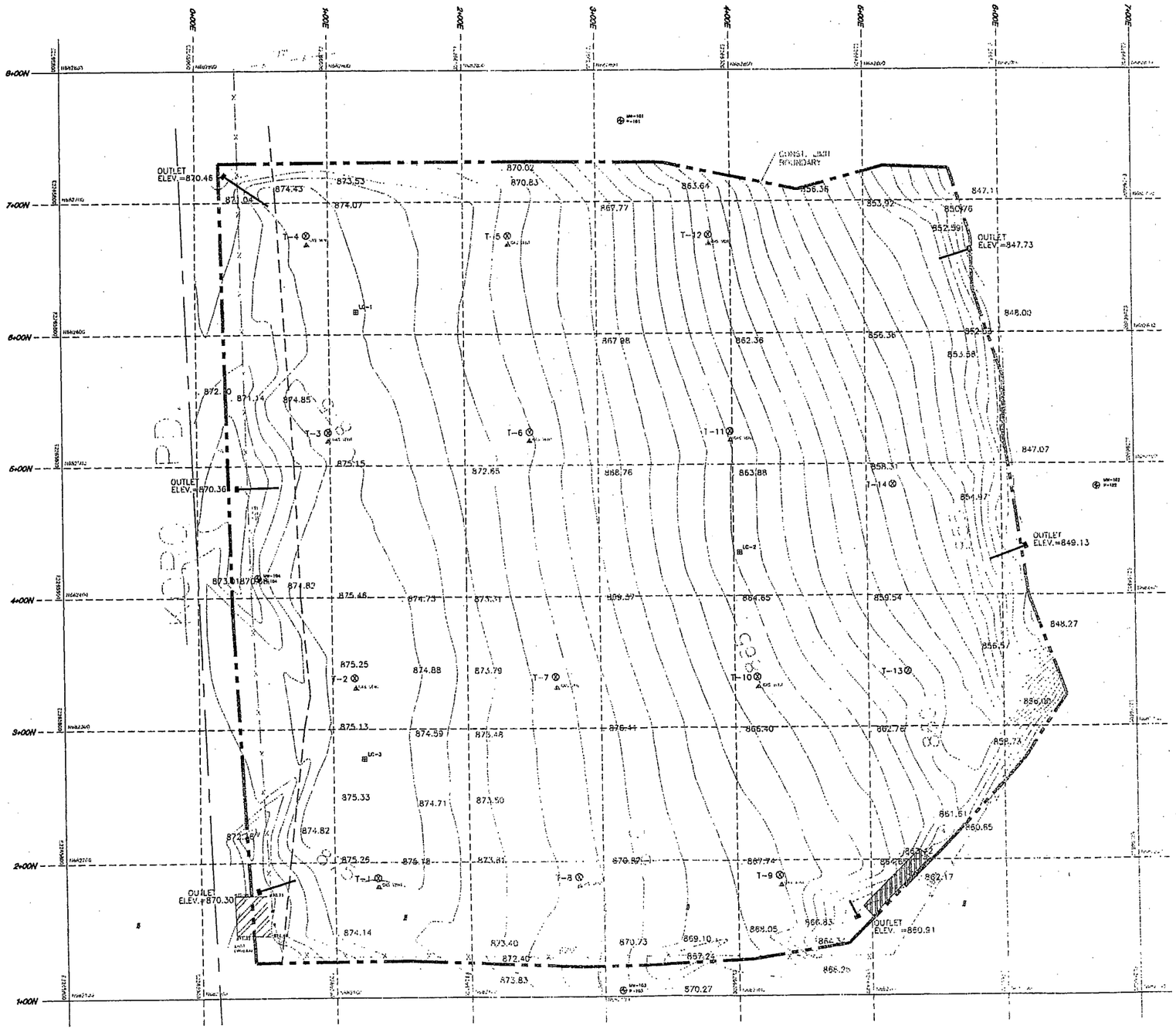
Figure 2

S:\CAD\Ripon\1011.002\8-1-05\1011002Fig2.dwg 08/05/2005 11:07:43



FF/NN LANDFILL RIPON, WISCONSIN	DATE: 8/5/05 DESIGNED: GLD CHECKED: GLD APPROVED: GLD DRAWN: HJW PROJ.: 1011.002
LANDFILL GAS HEADER TRENCH CROSS-SECTION	
GeoTrans, Inc. A TETRA TECH COMPANY	**Figure 3**

S:\CAD\Ripon\1011.002\8-1-05\1011002Fig3.dwg 08/05/2005 11:37:33



N

W E

S

SCALE:1" = 40'

40 0 40 80 120 Feet

LEGEND

- ⊕ MW/P-101 — EXISTING MONITOR WELL/PIEZOMETER NEST LOCATION AND DESIGNATION
- ⊞ LC-3 — EXISTING LEACHATE HEAD WELL LOCATION AND DESIGNATION
- ---x--- FENCE
- — — — RIGHT OF WAY
- — - — CENTERLINE OF ROAD
- ▲ GAS VENT LOCATION
- P POWER POLE
- CONSTRUCTION LIMIT BOUNDARY
- 870 CONTOUR LINE AND ELEVATION
- DRAINAGE LAYER OUTLET PIPE
- GATE POST
- DRIVEWAY
- T-2 ⊗ TOPSOIL TESTING LOCATION AND DESIGNATION
- RIP – RAP
- 872.65 SPOT ELEVATIONS

SURVEYOR
JAMES R. GROTHMAN
625 E. SLIFER ST.
PORTAGE, WI. 53901
Phone (608) 742-7788
Fax (608) 743-0434
PO BOX 373 PORTAGE, WI 53901

NOTE: SITE GRID IN STATE PLANE COORDINATES

TOPSOIL TESTING LOCATIONS AND LOCATION OF RIP – RAP PROVIDED BY HYDRO-SEARCH, INC.

HYDRO-SEARCH, INC.
A Tetra Tech Company

HIGHWAY FF/NN LANDFILL
RIPON, WISCONSIN

FINAL GRADES OF TOPSOIL

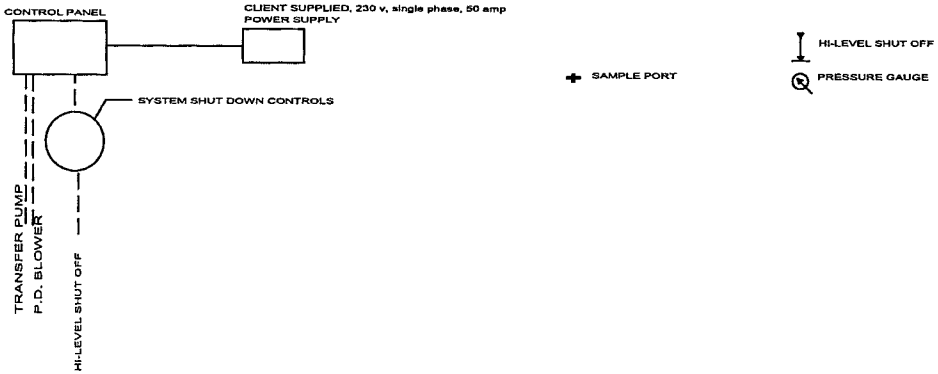
FOR: SMITH ENVIRONMENTAL

G&A

GROTHMAN & ASSOC. S.C.
625 E. SLIFER ST., PORTAGE, W. 53901

FILE NO. 596-259
DRAWING NO. 596259

ATTACHMENT A
BLOWER SYSTEM INFORMATION



EQUIPMENT LIST

PD blower and motor: Roots URAI 33 frame, with
5 hp, single phase, 230 volt motor, makeup air valve, silencer
interlocked to high-level shutoff on air/water separator

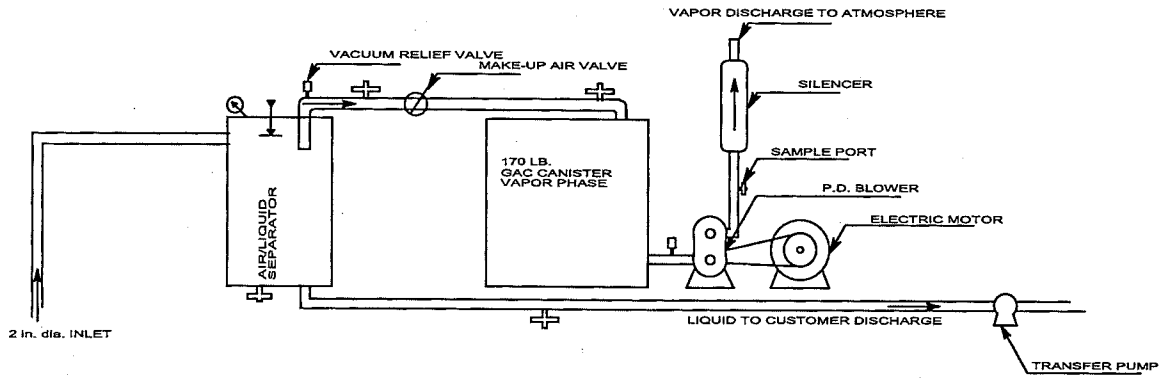
AIR / WATER Separator, w/2 in. dia. inlet, vacuum relief valve,
site tube, manual pump out, vacuum gauge, hi/hi shutoff interlock to panel

TRANSFER PUMP, Moyno 1/2 hp, 20 gpm, manual operation only

PANEL, exterior mounted NEMA 4X

WIRING, interior non-XP, w/exhaust fan on thermostat

TRAILER, 7 ft. x 12 ft. w/ rear doors



PROCESS FLOW DIAGRAM

Customer: Cardinal Resources

Chemviron Midwest, Inc.

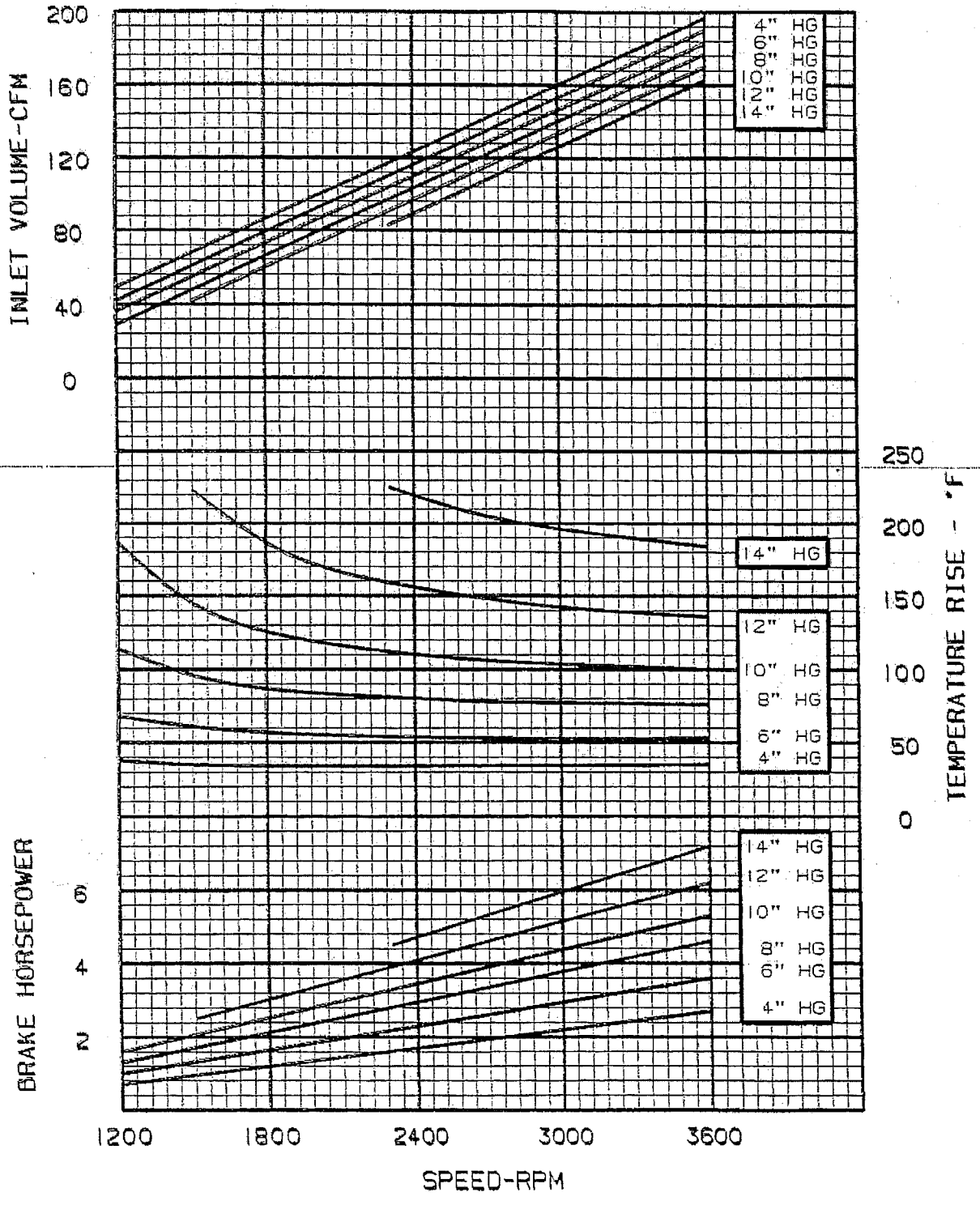
427 SOUTH GRANT STREET
WOOSTER, OHIO 44691

DATE Aug. 2 2006
CONTRACT
SCALE none
SHEET No. OF
DRAWING No.
REV

DRESSER INDUSTRIES, INC.
ROOTS DIVISION
300 WEST MOUNT STREET
CONNERSVILLE, INDIANA 47331
PRINTED IN U.S.A.

PERFORMANCE BASED ON
INLET AIR = 68°F
DISCHARGE PRESSURE = 30" HG ABS.
JULY, 1994

VACUUM PERFORMANCE
FRAME 33 UNIVERSAL RAI BLOWER
MAXIMUM VACUUM=15 IN. HG
MAXIMUM SPEED=3600 RPM



From: "Kevin Jones" <kjones@cardinalres.com>
To: "Jerry DeMers" <gdemers@geotransinc.com>
Date: 8/3/05 10:15AM
Subject: RE: Extraction system

Jerry,

Please find attached the pump curve, and spec sheet for the sensaphone. In addition, the height of the discharge stack is as built 10 feet from ground surface made out of 2 inch NPT pipe. You can easily add to this if needed. The power vent is a CertainTeed ventilator rated at 1170cfm, 1/4 horsepower.

We sent the system from our parking lot to the shop in Ohio for a final check out. I'll look for a photo in our project files or have the people at the shop forward a photo.

Kevin Jones

From: Jerry DeMers [mailto:gdemers@geotransinc.com]
Sent: Tuesday, August 02, 2005 3:52 PM
To: Kevin Jones
Cc: olavarri@cooperindustries.com; Heidi Yantz
Subject: RE: Extraction system

Some additional information that I need:

* a picture of the system, if available
* pump curve for blower
* specifications or cut sheet on the silencer, sensaphone autodialer, thermostat, fan
* height of discharge
* Gerald DeMers, P.E.
  GeoTrans, Inc.
  175 N. Corporate Drive, Suite 100
  Brookfield, Wisconsin 53045
  (262)792-1282 fax (262)792-1310

>>> "Kevin Jones" <kjones@cardinalres.com> 08/02/05 01:54PM >>>

Jerry,

I apologize for the delay in getting you this simple flow diagram for

the trailer unit.

Kevin Jones

From: Jerry DeMers [mailto:gdemers@geotransinc.com]
Sent: Thursday, July 28, 2005 11:24 AM
To: Kevin Jones
Cc: olavarri@cooperindustries.com
Subject: Extraction system

Kevin-

If you could get me the information on the blower system in the next few days, that would be great. I talked with Lee Archiquette, the reviewer for the WDNR for the gas system at the Ripon Landfill. His schedule is currently open for reviewing the proposed system, and he will be on vacation the latter part of August and I will be on vacation after August 5, so I would like to get it to him next week.

Thanks!

Gerald DeMers, P.E.
GeoTrans, Inc.
175 N. Corporate Drive, Suite 100
Brookfield, Wisconsin 53045
(262)792-1282 fax (262)792-1310

CC: <olavarri@cooperindustries.com>, "Heidi Yantz" <hyantz@geotransinc.com>

From: "Kevin Jones" <kjones@cardinalres.com>
To: "Jerry DeMers" <gdemers@geotransinc.com>
Date: 7/26/05 1:44PM
Subject: RE: Blower system for Ripon

Jerry,

In answer to your questions,

It does have a silencer

I will try to find the pump curve for the unit.

This system is not explosion proof.

The system comes with a 1 year warranty on all the major components. Prior to sending the system out it will be reconditioned and tested.

The knock-out tank is relatively small. It does have a float switch and pump that can be used to pump the water out for treatment or disposal. We have another system that is a twin to this one that pumps to a larger poly tank for testing and disposal.

Our proposal assumes that the service will be at the location. We would hire a local electrician to go from the meter to our system.

Basic start-up of the system is included. We would hook up the system to the provided extraction point (if we have multiple points we would have to add some material costs for building a manifold), start-up the main blower, make sure all control, such as high level, and pressure switches are functioning, monitor air flow (between 100-170 cfm), monitor vacuum (5 plus inches of Hg) at the extraction unit, and confirm that the auto dialer is programmed and functioning. Once the system is running we would spend approximately 2-days on-site under the proposal. If further start-up activities, such as monitoring flow, or vacuum in the landfill, we would charge a day rate of $700/day which includes the person, field vehicle, hotels and per diem.

Regards,

Kevin Jones

From: Jerry DeMers [mailto:gdemers@geotransinc.com]
Sent: Tuesday, July 26, 2005 12:17 PM
To: Kevin Jones
Cc: olavarria@cooperindustries.com
Subject: RE: Blower system for Ripon

A few questions regarding the proposal:

* Does it have (or need) a silencer?
* I would like to see the pump curve. It is not avaliable on the Roots web site, but this blower model apparently has a vacuum of up to 15 inches of mercury, which is a lot more than we need.
* Is it explosion-proof?
* Warranty available?
* The knock-out tank may be small for our needs, but it is hard to tell at this point. However, when we install underground piping of the permanent system, we will need a tank for any condensate to drain to, so we will probably need another underground tank at that point anyway.
* The power drop would be provided by Alliant Energy, possibly at no cost, unless we need a power pole. It would make sense for Cardinal to retain a local electrician to connect up the system.
* Can you provide startup, too?
* Gerald DeMers, P.E.
  GeoTrans, Inc.
  175 N. Corporate Drive, Suite 100
  Brookfield, Wisconsin 53045
  (262)792-1282 fax (262)792-1310

>>> "Kevin Jones" <kjones@cardinalres.com> 07/26/05 10:36AM >>>

Jerry, Nelson,

Please find attached Cardinal Resources Inc.'s proposal for providing a blower system for the Ripon Wisconsin landfill. The system is available, however, I left a 3 week window for delivery for coordinating with the electrical and telephone service.

Thank you for the opportunity to provide Cooper Industries with this proposal. If you have any questions, please contact me anytime.

Kevin Jones

412-374-0989 - office

412-841-3029 - cell

From: Jerry DeMers [mailto:gdemers@geotransinc.com]
Sent: Thursday, July 21, 2005 10:58 AM
To: kjones@cardinalres.com
Cc: olavarri@cooperindustries.com
Subject: Blower system for Ripon

I hadn't heard from you regarding the blower system for Ripon-- and I don't have your phone number to give you a call. Did you provide something to Nelson? If so, please send it also to me.

Thanks.

Gerald DeMers, P.E.
GeoTrans, Inc.
175 N. Corporate Drive, Suite 100
Brookfield, Wisconsin 53045
(262)792-1282 fax (262)792-1310

CC: <olavarria@cooperindustries.com>