TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

VOLUME 5 OF 6

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Prepared by

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WCG Project No. 0771-368-11-123

This document is intended for permitting purposes only.

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PART III – SITE DEVELOPMENT PLAN
APPENDIX III I
LANDFILL GAS MANAGEMENT PLAN

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
MATT K. STUTZ
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2/22/22

1 INTRODUCTION

1.1 Scope

This Landfill Gas Management Plan (LGMP) has been developed for Turkey Creek Landfill consistent with the requirements set forth in the Texas Commission on Environmental Quality (TCEQ) Municipal Solid Waste (MSW) regulations Title 30 Texas Administrative Code (TAC) §330.371, §330.159, and RCRA Subtitle D regulations in 40 CFR §258.23. The existing landfill is owned and operated by Texas Regional Landfill Company, LP.

This LGMP describes the existing and proposed upgrades to the landfill gas (LFG) monitoring network. It also discusses the operation and monitoring of this network, notification procedures, and possible remediation activities, if required. In addition, this LGMP includes a description of the existing Landfill Gas Collection and Control System (GCCS) and future installation.

1.2 Purpose

Title 30 TAC §330.159 requires landfills to develop a LGMP in accordance with Title 30 TAC §330.371. Compliance with Title 30 TAC §330.371 requires landfills to implement a routine monitoring program for methane to verify that (1) the concentration of methane gas generated by the facility does not exceed 1.25% by volume in facility structures (excluding LFG control or recovery system components) within the permit boundary, and (2) the concentration of methane gas does not exceed 5% by volume in monitoring points, probes, subsurface soils, or other matrices at the facility boundary as defined by the legal description in the permit or permit by rule.

The purpose of the LGMP is to provide guidelines for management of LFG at the site. These guidelines cover the evaluation of LFG migration at the permit boundary and in structures within the permit boundary. The presence of LFG will be verified by monitoring LFG concentrations in monitoring probes near the facility's permit boundary and within on-site occupied structures. LFG migration may be controlled by various options which are discussed in Section 5.

The LFG monitoring (postclosure care period) program will continue for a period of 30 years after final closure of the facility or until the owner or operator receives written authorization from TCEQ to revise or discontinue the program.

2 SITE CHARACTERISTICS

2.1 Introduction

The Turkey Creek Landfill is an existing Type I municipal solid waste (MSW) disposal facility located approximately 2.5 miles south of Alvarado in Johnson County, Texas. The address of the landfill is:

Turkey Creek Landfill
9100 South I-35 West
Alvarado, TX 76009

A site plan for the Turkey Creek Landfill is included as Figure III I-A-1 in Appendix III I-A. The current TCEQ approved LFG monitoring probe network includes a total of thirteen (13) existing LFG monitoring probes and seven utility trench vents located along the existing permit boundary as shown on Figure III I-A-1. Information regarding the existing LFG monitoring probes is included in Appendix III I-C.

This LGMP addresses the existing monitoring probes/trench vents as well as the additional monitoring probes required by the proposed expansion of the Turkey Creek Landfill. As a result of the proposed landfill expansion, 9 existing LFG monitoring probes will be abandoned, 13 new probes will be installed, and 4 existing probes will remain in-place. In addition, existing 7 trench vents will remain in-place as well. The 9 existing probes will be abandoned to allow for future filling and site operations. At landfill completion, the monitoring network will consist of 17 LFG monitoring probes and 7 trench vents as shown on Figure III I-A-1 in Appendix III I-A. Table III I-1 summarizes the probes that will remain in-place, probes that will be abandoned, and the probes that will be added as part of this plan. Refer to Section 3 for a detailed discussion on the perimeter monitoring network.

Table III I-1
List of Existing and Proposed LFG Monitoring Probes

Existing Probes To Remain In-Place	Existing Probes To Be Abandoned	New Probes To Be Added
GMP-6	GMP-1	GMP-1A
GMP-11	GMP-2	GMP-2A
GMP-12	GMP-3	GMP-3A
GMP-13A	GMP-4	GMP-4A
	GMP-5A	GMP-5B
	GMP-7A	GMP-7B
	GMP-8	GMP-8A
	GMP-9A	GMP-9B
	GMP-10A	GMP-10B
		GMP-14
		GMP-15
		GMP-16
		GMP-17

NOTE: The existing LFG monitoring probe boring logs installed by CURA and Golder Associates were originally designated as GW. However, the notations have been changed to GMP to be consistent with other parts of the application, hence corresponding numbers have not changed (i.e., GW-1 is now GMP-1).

The design of the LFG monitoring system for this site is based on the following factors: geologic conditions, hydrogeologic conditions, hydraulic conditions, location of facility structures and off-site structures, underground utilities, land use, nature and age of waste, climate, and depth of waste. These factors are described in detail in the following subsections.

2.2 Geologic Conditions

According to the Texas Bureau of Economic Geology (BEG), the site is located upon an outcrop of the Woodbine Formation as shown on the Figure IIIG-A-1 – Regional Geologic Map (adapted from the BEG, Geologic Atlas of Texas, Dallas Sheet, 1987). The Woodbine Formation is described as a sequence of cross-stratified, fluvial sands interbedded with shale and clay and some gravel.

The site stratigraphy is presented in the text, borings, and geologic cross sections in Part III, Appendix IIIG. The site-specific lithologies include upper sand, lower sand, and bounding shale unit strata. Groundwater occurs in the upper sand and lower sand, as well as within saturated portions of the bounding shale. Refer to Part III, Appendix IIIG – Geology Report for additional information on geologic conditions at the site. Based on the site geology, a single probe design will be used for the proposed new probes.

2.3 Hydrogeologic Conditions

The uppermost groundwater at the site is generally located in the lower sand and saturated portion of the bounding shale units. This uppermost groundwater is continuous beneath the site and is predominately confined with unconfined conditions present in the northernmost site area near Turkey Creek. Groundwater flows predominantly from the south and southwest toward the north and northeast beneath the site. Refer to Part III, Appendix IIIG – Geology Report for additional information on hydrogeologic conditions at the site. The groundwater data was evaluated in the design of the probe depths. Based on historical groundwater data the seasonal low groundwater elevation was at times below the landfill liner elevations. As such, to provide for complete coverage in monitoring soil layers from near ground surface to the bottom of waste, the probes were extended down to the lowest bottom of waste elevation within 1,000 feet of the probe location.

2.4 Hydraulic Conditions

The site is located to the immediate south of Turkey Creek within the North Fork Chambers Creek watershed in Johnson County, Texas. The site drains north to Turkey Creek as well as to the east and west to unnamed tributaries of Turkey Creek. Turkey Creek discharges to Chambers Creek approximately 35 miles southeast of the site. The hydraulic conditions were considered in the layout of the LFG monitoring probes. Each probe location was evaluated, and no interference with surface drainage was observed (e.g., probes not located within channels, letdowns, ponds, etc.).

2.5 Facility Structures Within the Permit Boundary

Currently, there are four on-site enclosed structures located within the existing permit boundary: landfill office, scalehouse, third party energy plant office/maintenance facility, and the landfill maintenance building. The third party energy plant office/maintenance facility will be relocated to the northeast corner of the site as shown on Figure III I-F-1 prior to landfill development in that area. All these structures are and will be equipped with continuous LFG monitoring systems. However, the third party energy plant/maintenance facility will be monitored in accordance with their TCEQ registration requirements. Existing and future onsite structures (per any future permit amendments or modifications), including but not limited to buildings, subsurface vaults, utilities, or any other areas where potential gas buildup would be of concern installed within the permit boundary will be monitored as described in

Section 3.2 of this appendix. For future development at the site, the LFG monitoring system will be reviewed and revised as needed to protect human health and the environment.

2.6 Underground Utilities

In developing the design of the LFG monitoring system, the location of underground utilities was reviewed as possible pathways for LFG migration. Passive vent pipes have been installed near underground utilities where they cross the permit boundary to monitor for the potential presence of LFG.

Currently, the BP pipeline easement containing a buried gas pipeline crosses the northwest and southeast permit boundary, and the Texas pipeline easement containing a buried gas pipeline crosses the southwestern permit boundary at two locations. In addition, the third party energy plant buried sales gas line also crosses along the southeast permit boundary. Seven utility trench vents (UV-1 through UV-7) have been installed nearby these utility crossings to monitor for the potential presence of LFG, as shown on Figure III I-A-1 in Appendix III I-A.

In addition, all future underground utilities which cross the permit boundary will be vented and monitored as well. A construction detail for the passive trench vent pipes is provided on Figure III I-A-2 in Appendix III I-A. The vents will be equipped with monitoring ports to facilitate routine methane monitoring.

2.7 Land Use and Offsite Structures

Land use within one mile of the site consists of predominantly wooded floodplain, open/agricultural lands and rural residential with scattered commercial and light industrial facilities located in the near vicinity the landfill property. There are several rural residential areas scattered to the east and west of the landfill property, including rural residential properties located east of the landfill property, across IH-35W. The nearest residence is within 1,000 feet from the southwest portion of the permit boundary. Please refer to Parts I/II, Section 7-Land Use for additional information.

A site map showing the off-site structures located within 1,000 feet of the permit boundary is presented in Appendix III I-B. Based on the surrounding land use and off-site structures, the inter-probe spacing was adjusted based on nearby off-site structures. The inter-probe spacing between the probes will be less than 1,000 feet except for in areas where there are nearby off-site structures, in which case the spacing will be less than 600 feet. For future development at the site, the LFG monitoring system will be reviewed and revised as needed to protect human health and the environment.

2.8 Nature and Age of Waste

The Turkey Creek Landfill is currently operated as a Type I municipal solid waste disposal facility. The facility accepts waste for disposal from both public and private entities in and around Johnson County and surrounding counties.

The major classifications of solid waste to be accepted at the Turkey Creek Landfill include municipal solid waste, household waste, yard waste, commercial waste, industrial waste (nonhazardous), construction-demolition waste, and some special wastes. Consistent with Title 30 TAC §330.15, the facility will not accept for disposal liquid waste, regulated hazardous waste, prohibited PCBs, infectious medical waste, and other wastes prohibited by TCEQ regulations.

The currently permitted 146.4 acres Type I MSW disposal area began accepting waste in 1983. Refer to Parts I/II, Sections 2 and 3 for additional information. The nature and age of waste was used in LFG generation modeling to estimate current and future LFG generation for the site.

2.9 Climate

The climate of the region is characterized as very warm and humid. According to the U.S. Climate Data for the region, the average annual precipitation is approximately 37.6 inches. The temperature ranges between an average low of 33°F in January and an average high of 96°F in July and August. The climate was considered in the surface completion design of the probes. Based on the existing probe information a, bentonite/concrete surface seal was used in the gas probe to reduce the potential of surface water infiltration.

2.10 Depth of Waste and Liner Description

The filled areas of the existing landfill were constructed consistent with the permit requirements in effect at that time. The existing disposal areas consist of approximately 15.8 acres of pre-Subtitle D lined area, 130.6 acres of Subtitle D-lined area.

The liner system for the pre-Subtitle D area was developed by excavating to the permitted grade and installing a 3-foot-thick compacted clay liner. The Subtitle D areas has a liner system consisting of 2-3 feet of compacted clay liner, 60-mil HDPE geomembrane, drainage geocomposite, and a protective cover layer. The minimum elevation of the landfill liner system excavation is 648 feet above mean sea level (ft-msl) and the maximum elevation of the landfill final cover will be increased from 946 ft-msl to 996 ft-msl. This application also includes a separation liner system (overliner) installation over the pre-Subtitle D areas prior to placement of additional waste. Refer to Appendix IIIA for detail information on liner system and waste depth.

Waste depth and liner configurations were considered in the probe design. The proposed probes are designed to monitor subsurface soil layers and extend down to the lowest bottom of waste elevation near the probe location.

2.11 Summary

The probe design and monitoring system layout were based on the geologic conditions, hydrogeologic conditions, hydraulic conditions, location of the facility structures, underground utilities, land use, climate, and depth of waste discussed in the above sections. The LFG monitoring system, along with quarterly monitoring, will continue to meet the performance standards of Title 30 TAC §330.371(a) based on above mentioned parameters and the probe design.

3 MONITORING

3.1 Perimeter Monitoring

3.1.1 Existing Perimeter Monitoring Network

The site currently has thirteen permanent existing LFG monitoring probes and seven utility trench vents to monitor the concentration of methane gas in accordance with Title 30 TAC §330.371(a)(2). The locations of the existing perimeter monitoring probes/vents are shown on Figure III I-A-1 in Appendix III I-A. The boring logs for the existing LFG monitoring probes are included in Appendix III I-C.

Currently, there are no LFG monitoring probes installed along the northern perimeter of the permit boundary due to the presence of Turkey Creek, which act as a natural barrier to any potential LFG migration in this area. However, a utility trench vent has been installed to serve the gas pipeline along the northern permit boundary shown on Figure III I-A-1 in Appendix III I-A. Given that there are no changes to the permit boundary or the waste placement along the northern boundary and Turkey Creek runs along the vicinity which acts as a natural barrier for gas migration, the northern trench vent will continue to be monitored concurrent with other perimeter probes/vents monitoring events along the northern permit boundary. In addition, the post-closure land use will not interfere with the gas monitoring system.

As a result of the proposed landfill expansion as listed in Table III I-1, 9 of the existing LFG monitoring probes will be abandoned and re-drilled, 4 new probes will be added, and 4 of the existing LFG monitoring probes will remain. At landfill completion, the monitoring network will consist of 17 LFG monitoring probes as shown on Figure III I-A-1 in Appendix III I-A. The existing probes will be abandoned and re-drilled to allow for future filling and site operations. The abandonment will include removing the surface completion material, attempting to pull the probe casing materials, and grouting the borehole with bentonite grout from the total depth to surface. The probes will be abandoned and plugged in accordance with applicable rules in Title 16 TAC Chapter 76.

3.1.2 Proposed Landfill Gas Monitoring Network

As part of the proposed landfill expansion, 9 existing probes will be abandoned and 13 new probes will be installed as the site develops. The proposed perimeter landfill gas monitoring network will consist of seventeen (17) LFG monitoring probes. The proposed probe will be installed prior to abandoning the existing probes and installed in accordance with applicable rules in Title 16 TAC Chapter 76.

The location of the proposed new probes, the existing probes that will be abandoned, and the existing probes that will be remain in-place are shown on Figure III I-A-1 in Appendix III I-A. The proposed probe is designed to be single tube probe and will be installed similar to the detail shown on Figure III I-A-2 in Appendix III I-A. The depth of the new probe will be dependent on the field conditions at the time of installation, however at a minimum; the depth of the probe will extend down to the lowest bottom of waste placement elevation within 1,000 feet of the proposed probe location. Data regarding the new probes is summarized in Table III I-2 below.

Table III I-2
Proposed LFG Monitoring Probe Data[1]

Probe ID	Probe Ground Surface Elevation[2] (ft msl)	Lowest Bottom of Waste within 1,000 ft[3] (ft msl)	Proposed Probe Bottom Elevation (ft msl)	Proposed Boring Depth (ft bgs)
GMP-1A	693	656	654	39
GMP-2A	673	653	651	22
GMP-3A	689	656	654	35
GMP-4A	704	665	663	41
GMP-5B	711	667	665	46
GMP-7B	708	672	670	38
GMP-8A	705	670	668	37
GMP-9B	710	662	660	50
GMP-10B	692	655	653	39
GMP-14	700	665	663	37
GMP-15	730	674	672	58
GMP-16	712	672	670	42
GMP-17	702	659	657	45

1 The data given is approximate. Actual probe ground elevation, bottom elevation, and depth will be determined prior to and/or at the time of installation.
2 Probe ground surface elevation based on aerial topographic survey flown on January 8, 2021.
3 Lowest bottom of waste elevation within 1,000 feet of the proposed probe based on Drawing I/IIA.9 – Excavation/Overliner Plan included in Parts I/II, Appendix A.

3.1.3 Proposed Passive Trench Vents

LFG trench vents have been installed near the existing underground utilities trenches where they cross the permit boundary, as discussed in Section 2.6 and shown on Figure III I-A-1. Future passive trench vents will also be installed in or near any future underground utilities which crosses the permit boundary. A typical detail of the vent pipe construction is shown on Figure III I-A-2 in Appendix III I-A. The underground utility locations will be identified and located by representatives of the utility easement owners.

3.1.4 Monitoring Procedures

All monitoring probes/trench vents will be sampled for methane during the quarterly monitoring period. In addition, sampling for specified trace gases may be conducted as requested by the Executive Director of the TCEQ.

Methane concentrations will be measured using a portable gas detection device pre-calibrated against reference methane standard. In accordance with manufacturer recommendations, the portable gas detector will be field calibrated prior to each monitoring event. As such, the portable gas detector will be field calibrated at least once a quarter prior to taking the quarterly probe measurements. The portable gas detection device will be equipped with a suction sampling line. The sampling line will be connected to the top of each probe and on each passive trench vent to enable gas samples to be drawn directly into the monitoring instrument without diluting the sample. The instrument is designed to give a direct reading of the methane concentration in, either percent of the LEL or percent methane by volume. A qualified landfill representative or consultant will conduct the monitoring and the percent methane by volume reading from the device will be recorded. The monitoring equipment will be maintained and calibrated in accordance with the manufacturer's recommended procedures prior to use.

Monitoring data will be recorded on the Landfill Gas Monitoring Report (LGMR) form shown in Appendix III I-D, or a similar form, and the data maintained in the facility's Site Operating Record. Probe and passive trench vent monitoring procedures will be as recommended by the gas detection device instrument manufacturer. The manufacturers' information on perimeter monitoring equipment currently used at the site is provided in Appendix III I-E. However, the site may use equipment, similar or equivalent to the existing equipment to measure methane concentrations in the future.

If LFG monitoring determines that methane has been detected in concentrations exceeding the regulatory limit, notification procedures, as described in Section 4, and remediation procedures, as described in Section 5, will be implemented.

3.1.5 Maintenance Procedures

As part of the overall maintenance program, routine inspection of the probes/trench vents will be conducted at least once a quarter. In addition, each time LFG monitoring is conducted, the sampler will inspect the integrity of the monitoring probes/trench vent. The sampler will record pertinent information on the LGMR form (Appendix III I-D) or similar form. Each probe/trench vent will be routinely inspected once a quarter for the following:

- Verify that the monitoring probes/trench vents are clearly numbered.
- Verify that the protective cover or piping is intact and is not bent or excessively corroded.
- Verify that the concrete pad is intact.
- Verify that the padlock is functional on the probe casing.
- Verify that the visible portion of the PVC riser is intact.

If damage or excessive wear to the monitoring probe/trench vent is observed, it will be reported to the Landfill Manager and the monitoring probe/trench vent will be repaired if the damage is affecting the accuracy of the probe. If it is not possible to repair the monitoring probe/trench vent and the damage can potentially affect the accuracy of future monitoring results, the monitoring probe/trench vent will be abandoned and replaced with a new monitoring probe/trench vent in accordance with Sections 3.1.2, 3.1.3, and 3.4 of this plan.

3.2 Monitoring of Facility Structures

3.2.1 Monitoring Procedures

All on-site structures will be sampled for methane during the quarterly monitoring period. In addition, sampling for specified trace gases may be conducted as requested by the Executive Director of the TCEQ.

All on-site occupied enclosed structures, including, but not limited to buildings, subsurface vaults, utilities, or any other areas where potential gas build-up would be of concern, as applicable will be equipped with a continuous monitor/alarm that provides an audible alarm if methane concentrations exceed 1.25% by volume (which is 25 percent of lower explosive limit (LEL)) for methane. If a methane level above the regulatory limit is detected, it will be documented in percent methane by volume and reported as outlined in Section 3.3.

The continuous monitors' performance will be tested using a known methane calibration gas at least once a quarter prior to taking the quarterly measurements and will be documented on the LGMR form shown in Appendix III I-D or using a similar form. If the monitoring equipment alarm does not test properly during quarterly testing, they will be repaired or replaced. The manufacturer's information regarding the monitors/alarms currently used at the site is provided in Appendix III I-E.

If methane concentrations exceeding the regulatory limits are detected within an enclosed building, the building will be immediately evacuated and ventilated by opening doors and windows. Notification procedures described in Section 4 will then be implemented. If existing enclosed structures are removed from the site to allow for the continued development of the landfill, the monitors/alarms installed in the structures will be decommissioned.

3.2.2 Maintenance Procedures

The continuous LFG monitors/alarms will be maintained and tested in accordance with the manufacturer's recommendations and specifications. According to the manufacturer's information in Attachment III I-D, the alarm does not require regular maintenance and it uses a self-purging semi-conductor sensor that has a 7-10 year life expectancy. As such, the sensor will be replaced every 7-10 years. In addition, on a quarterly basis the monitors/alarms will be inspected to ensure they are properly installed and connected to power.

3.3 Recordkeeping/Reporting

The recordkeeping and reporting requirements will be consistent with those outlined in Title 30 TAC §330.159, §330.371, and §330.125. Records will be maintained for the methane monitoring. The records will be kept on site and maintained as part of the Site Operating Record. Field data will be recorded on the LGMR form (or similar form) shown in Appendix III I-D.

The LFG monitoring probes/trench vents and any on-site occupied structures will be monitored quarterly and the results will be placed in the Site Operating Record and made available to the TCEQ upon request. In the event continuous LFG monitors/alarms require replacement, then it will be documented in the Site Operating Record.

For those quarterly LFG monitoring events when the measured methane levels are either: (1) above 5% methane by volume in monitoring points, probes, subsurface soils, or other matrices at the facility boundary defined by the legal description in the permit; or (2) above 1.25% methane by volume in air in facility structures (excluding gas control or recovery system components), LFG monitoring reports will be submitted to the TCEQ.

3.4 Contingency Plan

In accordance with Title 30 TAC §330.371(g)(3), the following contingency plan will be used if the main monitoring system breaks down or becomes ineffective.

LFG Monitoring Probes/Trench Vents

1. Within 60 days, when it is noted that an LFG monitoring probe/trench vent has become inoperative, a notification will be submitted to the TCEQ. The notification will describe the proposed repair and the schedule for implementation. The damaged or inoperative LFG monitoring probe/trench

vent will be replaced with a new probe/trench vent similar to the details of the existing probe/trench vent.

2. Should a monitoring event occur prior to replacement of a damaged probe/trench vent, a bar-hole will be placed next to the damaged probe/trench vent, and a portable gas detection device suitable for methane detection will be used until the probe/trench vent is replaced. The portable gas detection device will be calibrated prior to use per the manufacturer's guidance.
3. Upon completion of the replacement probe/trench vent, an installation report including any boring logs and construction details will be submitted to the TCEQ.

Continuous LFG Monitors/Alarms

1. Damaged or inoperative continuous monitors/alarms will be repaired or replaced within 30 days of the monitoring event during which the damage was noted.
2. A portable gas detection device calibrated for 1.25% volume will be used to monitor weekly until the stationary unit(s) is replaced.

4 EXCEEDANCE ACTION PLAN

4.1 Exceedance Response Measures

This action plan has been prepared for the protection of human health and the environment in the event concentrations of methane exceed allowable limits either within any enclosed structures that may be constructed within the permit boundary or in the LFG monitoring probes. The appropriate emergency response is different for each situation; therefore, the following plan will address the situations for enclosed structures and probes separately.

This action plan will be implemented upon the initial exceedance of a perimeter monitoring probe/trench vent or enclosed structure monitor.

4.1.1 Initial Action

The initial action in the event methane is detected at levels above regulation limits is to immediately take all necessary steps to ensure protection of human health and notify the Executive Director, local and county officials, emergency officials, and the public as outlined in Section 4.2. The specific response depends on the circumstances of the situation.

Building/Structures. If a continuous monitoring device installed within an occupied enclosed structure located within the permit boundary is triggered or if LFG monitoring equipment indicates that 1.25 percent methane by volume has been exceeded, the building or structure is to be immediately evacuated of all personnel and the Landfill Manager will be notified. Personnel (except for qualified monitoring personnel) will not be allowed to re-enter the affected building or structure until additional measures are taken. Notification procedures will be implemented as described in Section 4.2.

Perimeter Monitoring Probes/Trench Vents. If an exceedance of allowable limits of methane is detected at the permit boundary in one of the monitoring probes/trench vents, the Landfill Manager will be notified immediately. The immediate emergency response measure will be for the Landfill Manager to determine if any nearby buildings or structures (including off site) are at risk and if evacuation of the buildings should be requested. Notification procedures will be implemented as described in Section 4.2.

4.2 Notification Procedures

When methane levels above the regulatory limit have been detected, sampling personnel will immediately notify the Landfill Manager by telephone, SMS text message, or e-mail. The Landfill Manager or his representative will then notify the Executive Director of the TCEQ, and the following local/county officials, and emergency officials by writing (telephone, letter, fax, or e-mail) within 7-days after initial detection:

Executive Director
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087
Telephone: 512-239-3900
Fax: 512-239-3939
E-mail: execdir@tceq.texas.gov

City of Alvarado
104 W. College Street
Alvarado, TX 76009
Telephone: 817-790-3351
Fax: 817-783-7925

Johnson County Emergency Management
201 Walls Drive
Cleburne, TX 76033
E-mail: em@johnsoncountytx.org

City of Alvarado Fire Department
104 W. College Street
Alvarado, TX 76009
Telephone: 817-790-8884

The public (property owners located within 1,000 feet of the affected probe/vent) will also be notified by writing or telephone, or e-mail after the initial detection.

The site will then take action as described in Section 5. Subsequent notifications during remediation activities will be followed as described in the remediation plan, if deemed necessary.

The TCEQ will be notified again in writing for any additional monitored points that were not part of the original notification which now exhibit methane exceedances above the regulatory limit. If the new monitored points affect property owners which were not originally notified, they will be notified as described above.

4.3 Placement into Operating Record

Records of LFG monitoring, including the data and methane gas levels, whether for routine monitoring, or remediation purposes, will be maintained and placed in the Site Operating Record. In the event that levels of methane above the regulatory limit have been detected either in facility structures and monitoring points, in monitoring probes/trench vents, a description of steps taken to protect human health must also be placed in the Site Operating Record. Notifications made verbally or in writing will also be recorded and placed into the Site Operating Record. These placements into the Site Operating Record will occur within 7 days after detection of methane above the regulatory limit.

5 REMEDIATION PLAN

Once methane levels above regulatory limits have been accurately detected in the facility buildings/structures or in one or more of the LFG monitoring probes/utility trench vents at the permit boundary, the remediation plan as listed below will be developed and implemented within 60 days of detection. An incident specific remediation plan may also be prepared and/or implemented. The Executive Director may establish an alternative schedule for demonstrating compliance with routine monitoring and required actions if methane gas exceeds the limits noted in Title 30 TAC §330.371(a).

The first remediation action will be an investigation of the cause of the methane levels. The investigation may include some or all of the following elements, depending on the circumstances:

- Bar-hole probe or hydropunch testing in the vicinity of the impacted monitoring probe/trench vent
- Sampling and laboratory analysis of LFG samples collected from the monitoring probe/trench vent to determine the concentration of methane and trace compounds
- A gas analysis to try to determine the source
- Additional LFG monitoring

Using accumulated data, an assessment will be made to determine an appropriate course of action to mitigate the LFG migration. Such actions may vary with the specific incident, but may include (and are not limited to) installation of the following:

- Passive vents
- Cut-off trenches
- Active GCCS

The incident specific remediation actions will be performed within 60 days of the detection per Title 30 TAC §330.371(c)(3). The TCEQ will be notified that this or an incident-specific remediation plan has been implemented within 60 days of detection.

6 LFG COLLECTION AND CONTROL SYSTEMS

6.1 Existing LFG System

Currently, the Turkey Creek Landfill has an active LFG collection and control system (GCCS) as shown on Figure III I-F-2 in Appendix III I-F.

The existing GCCS consists of vertical LFG extraction wells, horizontal LFG collectors, a piping network, condensate management system, a flare facility, and a third party LFG-to-energy (LFGTE) facility. The LFGTE facility is owned and operated by an independent third party. The gas collection piping system conveys the extracted LFG from the collection points (i.e., vertical wells/horizontal collectors) to the LFGTE facility and/or flare facility. The condensate generated from existing GCCS is drained into the condensate collection sumps located along the perimeter LFG collection piping. The collected condensate is pumped from the sumps into the forcemain which terminates at the existing leachate storage tank and then disposed of along with leachate from the landfill and/or will be solidified in the permitted liquid waste solidification facility.

The existing GCCS will be expanded as needed to control LFG and in accordance with New Source Performance Standards for Municipal Solid Waste Landfill (NSPS) as discussed below.

6.2 Future GCCS Installation

As the site develops, additional vertical LFG extraction wells and related GCCS components will be installed in phases as needed to reduce the buildup of internal gas pressures caused by the increased generation of LFG. The future GCCS will include LFG extraction wells, a LFG collection piping network, condensate management system, and associated LFG system components as shown on Figure III I-F-1. The typical details of the future GCCS components are included in Appendix III I-F.

The Turkey Creek Landfill proposed expansion also consists of an overlay of additional waste placed over a portion of pre-Subtitle D area of the landfill. Future LFG extraction wells installed outside of or above the separation liner (overliner) system area will be constructed as shown in Detail 2 on Figure III I-F-3. If the wells are in place prior to the installation of the separation liner, they will be installed/extended as shown in Detail 1 on Figure III I-F-3 or the existing wells may be connected to the horizontal LFG collector as shown in Detail 11 on Figure III I-F-6 and new wells may be installed above the separation liner system as shown in Detail 2 on Figure III I-F-3, but there will be no drilling through the overliner.

In addition, interim horizontal LFG collectors may also be installed in areas of the landfill that are not yet at final grade and will be replaced by future LFG extraction wells once the landfill achieves its final elevation. The horizontal LFG collectors will be installed similar to the detail shown on Figure III I-F-6 of Appendix III I-F. Each LFG extraction well will be installed in vertical borings drilled within the waste and completed similar to the detail shown on Figure III I-F-3 of Appendix III I-F. The extraction wells will not be drilled closer to the liner system than the distance specified on Figure III I-F-3 of Appendix III I-F. Excavated waste from the borings will be temporarily accumulated next to the borehole and then transported to an onsite active disposal area and/or to a nearby permitted landfill.

Based on industry standards for internal extraction wells, a spacing of approximately 200 to 300 feet was used to develop the future extraction well layout. Future wells may be installed in closer spacing as needed to facilitate the operations of the existing LFG facility. However, at a minimum future LFG extraction wells will be installed as shown on Figure III I-F-1 of Appendix III I-F. The LFG extraction wells spacing may varies during interim phases of the landfill. Existing LFG extraction wells in areas receiving additional waste will be extended and/or replaced with a new well as necessary based on the additional waste fill.

Each extraction well and horizontal collector will be equipped with a control valve and monitoring port similar to the detail shown on Figure III I-F-3 of Appendix III I-F. These control valves and monitoring ports, used in conjunction with controls on the blower, will allow the site to regulate vacuum and LFG levels at each individual extraction well/horizontal collector. This will allow the site to make adjustments in order to effectively reduce the potential for subsurface migration and odors, as well as to protect the integrity of the final cover system.

It is expected that the GCCS will be installed prior to final cover placement and the LFG extraction wells will be connected to the geomembrane with a boot when the final cover system is installed. If installation of a LFG extraction well is required after the final cover installation, the geomembrane cover will be cut and removed in the work area prior to LFG extraction well installation and then the geomembrane boot will be installed.

The as-built information for each phase of the GCCS installation will be maintained in the site operating record. The as-built information will document the location of the extraction wells, piping, and related GCCS components. The GCCS will be installed as described in this section; as such, no additional authorization (i.e. permit modification) will be required to install each phase of the GCCS unless there is a significant change in the number of extraction wells or the layout of GCCS.

Following each GCCS installation, an as-built GCCS drawing will be submitted to the TCEQ to incorporate each GCCS installation into the existing permit in the form of revision to Appendix III I-F. The new drawing will be placed behind the existing Figure III I-F-2. In addition, the existing site layout will also be submitted in the form of revision to Figure III I-F-2 of Appendix III I-F to update the existing GCCS conditions.

6.3 GCCS Operation and Maintenance

The operation and maintenance of the proposed GCCS will be performed consistent with industry guidelines and practices. Wellhead and system monitoring will be performed on a routine basis to monitor overall system performance. As needed, system adjustments will be made to optimize the extraction of LFG from the landfill to control LFG migration, odors, and greenhouse gases.

APPENDIX III I-A

PERIMETER LANDFILL GAS MONITORING SYSTEM
LANDFILL GAS PROBE/VENT DETAILS

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes Figures III I-A-1 and III I-A-2

LEGEND

— - — - —	PERMIT BOUNDARY
— — — —	PERMITTED LIMITS OF WASTE
- - - - - -	PROPOSED LIMITS OF WASTE
—750—	EXISTING CONTOUR
N 6816000	STATE PLANE COORDINATE
32° 21' 20"	GEODETIC COORDINATE
— - — - —	EXISTING EASEMENT
— - — - —	RELOCATED EASEMENT
MW-7	EXISTING GROUNDWATER MONITORING WELL
GMP-12	EXISTING LFG MONITORING PROBE
UV-1	EXISTING UTILITY TRENCH VENT
GMP-17	PROPOSED LFG MONITORING PROBE
GMP-8	EXISTING LFG MONITORING PROBE (TO BE ABANDONED)

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED PROFESSIONAL ENGINEER
2/22/22

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY DALLAS AERIAL SURVEYS FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. LOCATION OF THE PROPOSED LFG MONITORING PROBES ARE APPROXIMATE. ACTUAL LOCATION WILL BE DETERMINED BASED ON FIELD CONDITIONS AT THE TIME OF INSTALLATION.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: III I-A-1 LFG MONITORING SYSTEM.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

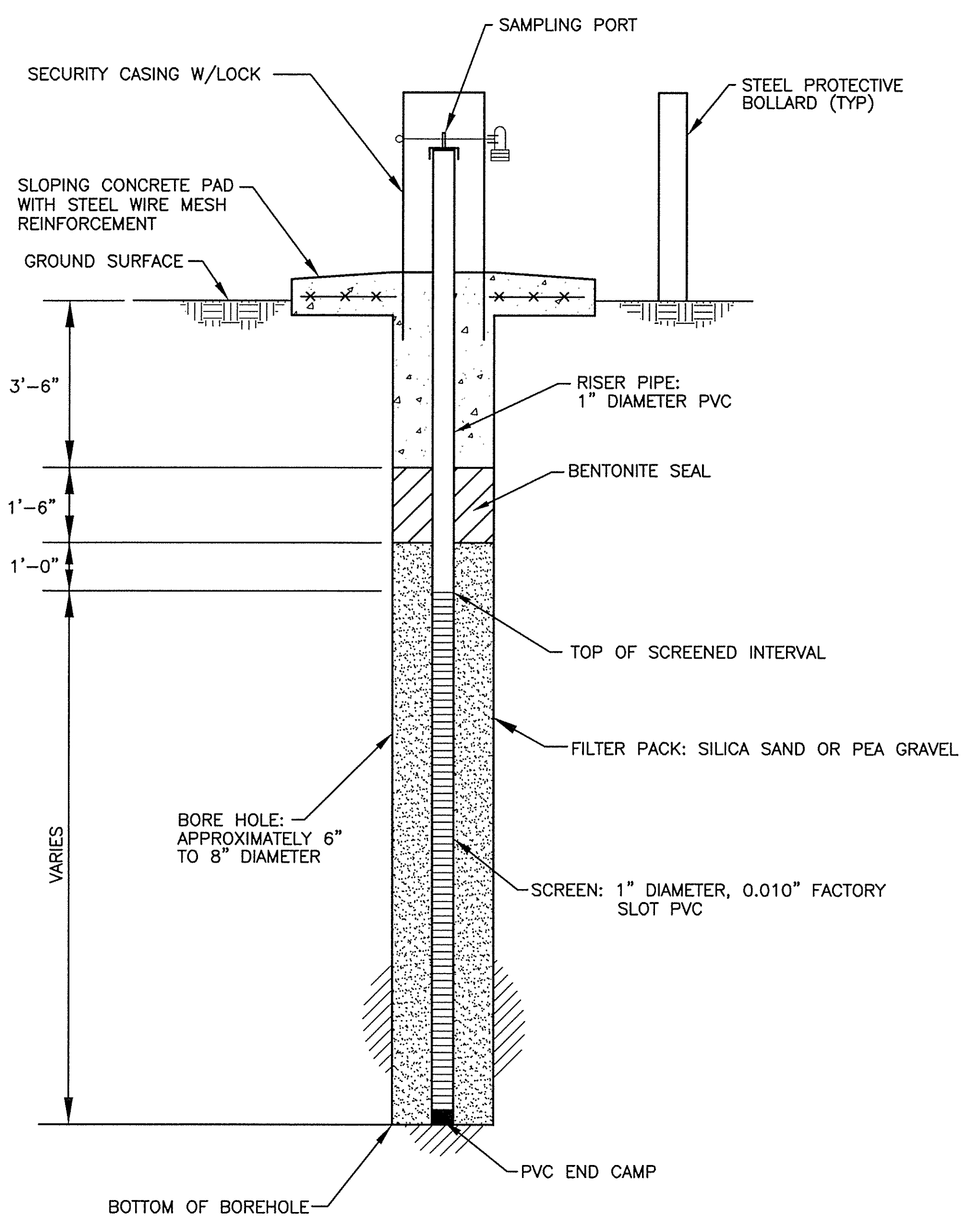
MAJOR PERMIT AMENDMENT PERIMETER LANDFILL GAS MONITORING SYSTEM

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE III I-A-1

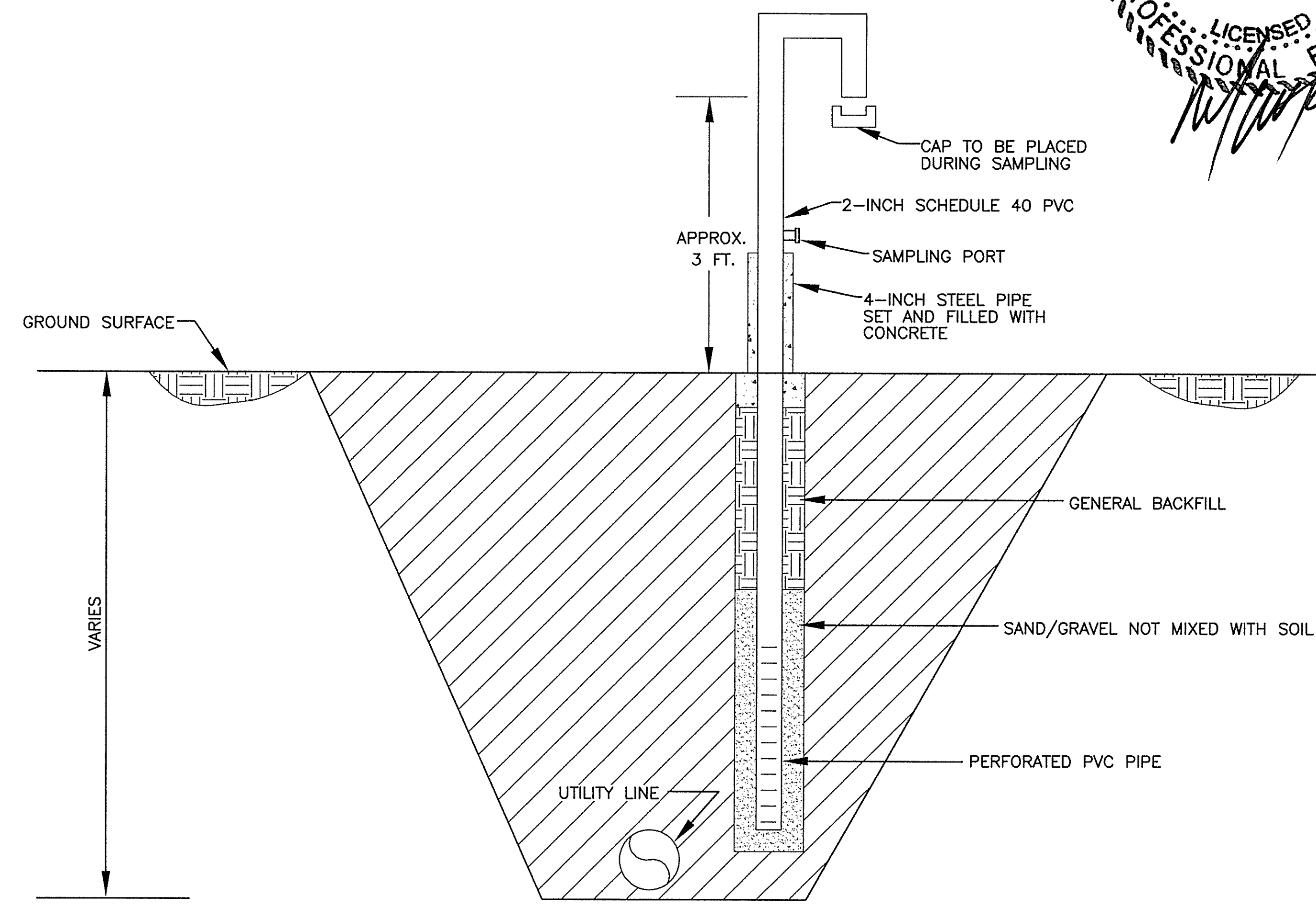
O:\0771\368\EXPANSION 2021\PART III\III I-A-1_LFG MONITORING SYSTEM.dwg, rarrington, 1:2



LFG MONITORING PROBE (LFG1 / I-A-2)
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. ACTUAL DIMENSION OF THE GAS MONITORING PROBE WILL BE DETERMINED BASED ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION.



LFG TRENCH VENT (LFG2 / I-A-2)
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. ACTUAL DIMENSION OF THE LFG TRENCH VENT WILL BE DETERMINED BASED ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION.

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER
2/22/22

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771–368–11
CAD: III I–A–2 PROBE/VENT DETAILS.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F–3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
LANDFILL GAS PROBE/ VENT DETAILS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE III I–A–2

O:\0771\368\EXPANSION 2021\PART III\III\III I–A–2_PROBE DETAILS.dwg, rarrington, 1:2

APPENDIX III I-B

SURROUNDING DEVELOPMENT MAP

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes Figure III I-B-1

0 500 1000
SCALE IN FEET

LEGEND

(line)	PERMIT BOUNDARY
(dashed line)	LIMITS OF WASTE
F (hatch)	FEMA 100-YEAR FLOODPLAIN
L	LANDFILL
R	RESIDENTIAL
A	AGRICULTURAL/OPEN SPACE
GMP-12	EXISTING LFG MONITORING PROBE
UV-1	EXISTING UTILITY TRENCH VENT
GMP-17	PROPOSED LFG MONITORING PROBE

NOTE:
1. AERIAL PHOTOGRAPH PROVIDED BY GOOGLE MAPS FROM AERIAL PHOTOGRAPHY FLOWN 2018.

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
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2/22/22

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: III I-B-1 SURROUNDING DEVELOPMENT.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: NT

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

MAJOR PERMIT AMENDMENT SURROUNDING DEVELOPMENT MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE III I-B-1

APPENDIX III I-C

EXISTING LANDFILL GAS MONITORING PROBE INFORMATION

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes pages III I-C-1 through III I-C-29

Note: The contents of this appendix were taken from permitted Appendix III I-LGMP (MSW Permit No. 1417C).

TABLE 1

TURKEY CREEK LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

SUMMARY OF MONITORING PROBE SURVEY DATA

GAS PROBE NUMBER	COORDINATES (feet) (Notes 1,2)		ELEVATIONS (ft. MSL)	
	NORTHING	EASTING	TOP OF RISER (Note 3)	GROUND SURFACE
GW-1	852.0	71.7	698.22	695.2
GW-2	1186.9	437.5	680.89	677.3
GW-3	677.0	-128.0	689.83	688.1
GW-4	146.7	-705.9	705.35	701.8
GW-5 (4)	-871.6	-1339.6	720.71	717.9
GW-5A	-708.9	-1186.9	713.38	710.0
GW-6	-1350.2	-552.2	719.69	716.8
GW-7 (6)	-1304.9	166.8	711.51	708.2
GMP-7A	1357.9	182.1	712.33	709.4
GW-8	-1702.4	907.1	707.46	704.2
GW-9 (7)	-1335.6	1585.8	706.82	703.8
GMP-9A	TBD	TBD	TBD	TBD
GW-10 (8)	-781.0	2579.1	673.51	670.8
GMP-10A	1051.80 South	2316.2	—	---
GW-11	-167.2	2748.6	684.95	681.3
GW-12	574.0	2898.5	676.49	673.6
GW-13 (5)(6)	1176.8	2657.1	671.93	667.3
GMP-13A	1355.0	2600.1	649.75	646.9

Notes:

1. Surveying for original probes was performed by Landes and Associates (Fort Worth, Texas) on June 29-30, 1994 and March 17, 1995.
2. Coordinates are referenced to the facility coordinate system.
3. Top of riser elevations are taken on the front edge of the riser (nearest the lock). The riser is PVC pipe with the cap removed, not metal. No survey measurements correspond to any part of the protective metal casing.
4. Decommissioned March 10, 1995.
5. GW-13 was raised during a berm construction in July 2000.
6. Decommissioned May 22, 2002.
7. Decommissioned May 24, 2013.
8. Decommissioned November 26, 2001.

TBD - to be determined

— - data not available

TABLE 2
TURKEY CREEK LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

GAS MONITORING PROBE CONSTRUCTION DETAILS

GAS PROBE NUMBER	INSTALLATION DATE (Note 1)	INSTALLATION INTERVALS (feet)								
		BELOW GROUND SURFACE				BELOW TOP OF RISER		REFERENCE ELEVATIONS (ft. MSL)		
		BASE OF BOREHOLE (Note 2)	SURFACE GROUT	BENTONITE SEAL	20/40 SAND	SOLID RISER (Note 3,4)	0.010-INCH SLOTTED SCREEN	BOTTOM OF BOREHOLE	BOTTOM OF ADJACENT WASTE	BOTTOM OF WASTE WITHIN 1000-ft. RADIUS
Installed by CURA, Inc. (Dallas, Texas)										
GW-1	1/27/94	35	0 to 2	2 to 4	4 to 35	0 to 7.53	7.53 to 37.53	660	660	656
GW-2	1/27/94	25	0 to 5	5 to 7	7 to 25	0 to 8.00	8.00 to 25.00	652	658	655
GW-3	1/28/94	15	0 to 5	5 to 7	7 to 15	0 to 8.00	8.00 to 15.00	673	670	657
Installed by Golder Associates Inc. (Houston, Texas)										
GW-4	6/25/94	25	0 to 1	1 to 3	3 to 25	0 to 7.50	7.50 to 27.50	677	697	667
GW-5 (5)	6/23/94	30	0 to 1	1 to 3	3 to 30	0 to 7.50	7.50 to 32.50	688	700	694
GW-5A	3/10/95	30	0 to 1	1 to 3	3 to 30	0 to 7.50	7.50 to 32.50	680	700	694
GW-6	6/22/94	10	0 to 1	1 to 3	3 to 10	0 to 7.50	7.50 to 12.50	707	697	687
GW-7 (7)	6/22/94	10	0 to 1	1 to 3	3 to 10	0 to 7.50	7.50 to 12.50	698	691	680
GW-8	6/23/94	20	0 to 1	1 to 3	3 to 20	0 to 7.50	7.50 to 22.50	684	687	675
GW-9 (8)	6/23/94	25	0 to 1	1 to 3	3 to 25	0 to 7.50	7.50 to 27.50	679	675	668
GW-10 (9)	6/22/94	10	none	0 to 1.5	1.5 to 10	0 to 5.00	5.00 to 12.50	661	670	662
GW-11	6/22/94	15	0 to 1	1 to 3	3 to 15	0 to 7.50	7.50 to 17.50	666	665	655
GW-12	6/22/94	20	0 to 1	1 to 3	3 to 20	0 to 7.50	7.50 to 27.50	654	660	655
GW-13 (6)(7)	6/22/94	23	0 to 13.5	13.5 to 14.5	14.5 to 23	0 to 18.00	18.00 to 25.50	646	655	655
Installed by Weaver Boos and Gordon (Fort Worth, Texas)										
GMP-10A	11/28/01	42	0 to 2	2 to 5	5 to 6*	0 to 6.00	6.00 to 42.00	654.5	670	656
Installed by The Carel Corporation (Keller, Texas)										
GMP-7A	6/3/02	45	0 to 2	2 to 5	5 to 6*	0 to 6.00	6.00 to 45.00	664.4	691	680
GMP-9A	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	675	668
GMP-13A	5/22/02	10	0 to 2	2 to 5	5 to 6*	0 to 6.00	6.00 to 10.00	636.9	655	655

Notes:
1. Drilling services for Golder provided by Alliance Environmental, Inc. of Houston, Texas and Andrews & Foster of Waxahachie, Texas for GW-5A.
2. Alliance boreholes were drilled with 4 1/4-inch (nominal) ID hollow-stem augers to a final diameter of 8 3/4-inch (nominal).
3. Probes are 2-inch (nominal) OD Schedule 40 PVC pipe, except GMP-7A, GMP-10A, and GMP-13A which are 1-inch.
4. Typical riser stick-up is approximately 3 feet above ground surface.
5. Decommissioned March 10, 1995.
6. GW-13 was raised during a berm construction in July 2000.
7. Decommissioned May 22, 2002.
8. Decommissioned May 24, 2013.
9. Decommissioned November 26, 2001.

TBD - to be determined.

* - pea gravel filter pack from base of sand to total depth.

CURA INC.

2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 620 - 787

RECORD OF SUBSURFACE EXPLORATION

...ect No.: 11-94035	Well/Boring #: GW-1
Date Drilled: 01/27/94	Drilling Co.: GM ENTERPRISES
Drilling Method: CA	Project: JOHNSON COUNTY LANDFILL, ALVARADO, TEXAS
Driller: DAVID	Logged By: C.D.H.

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS
0	Tan-red, fine sand, well sorted				Dry
2.5					
5.0	Tan-gray, silty clay, laminated		ST		
7.5					Dry
10.0			ST		
12.5					
15.0			ST		
17.5					
20.0	Gray, sandy clay, laminated		ST		Dry
22.5					
25.0	Gray-black, clay with sandy clay stringers, laminated		ST		Dry
27.5					Moist
30.0	Tan-red, fine sand, well sorted		ST		Saturated @ 30'
32.5	Gray, sandy clay				Saturated
35.0			ST		

ABBREVIATIONS AND SYMBOLS

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Cone

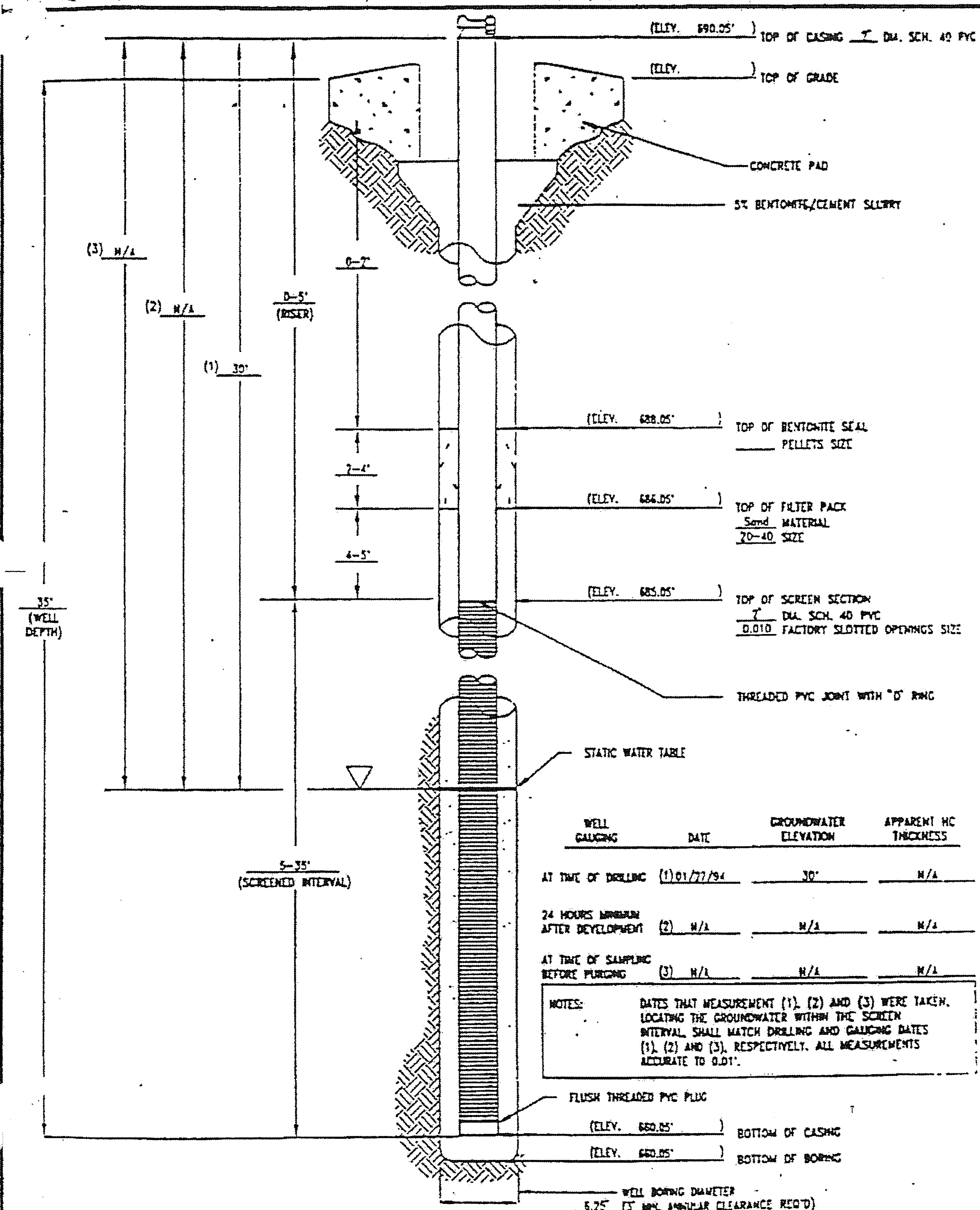
Sample Submitted to Lab
WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

CURA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

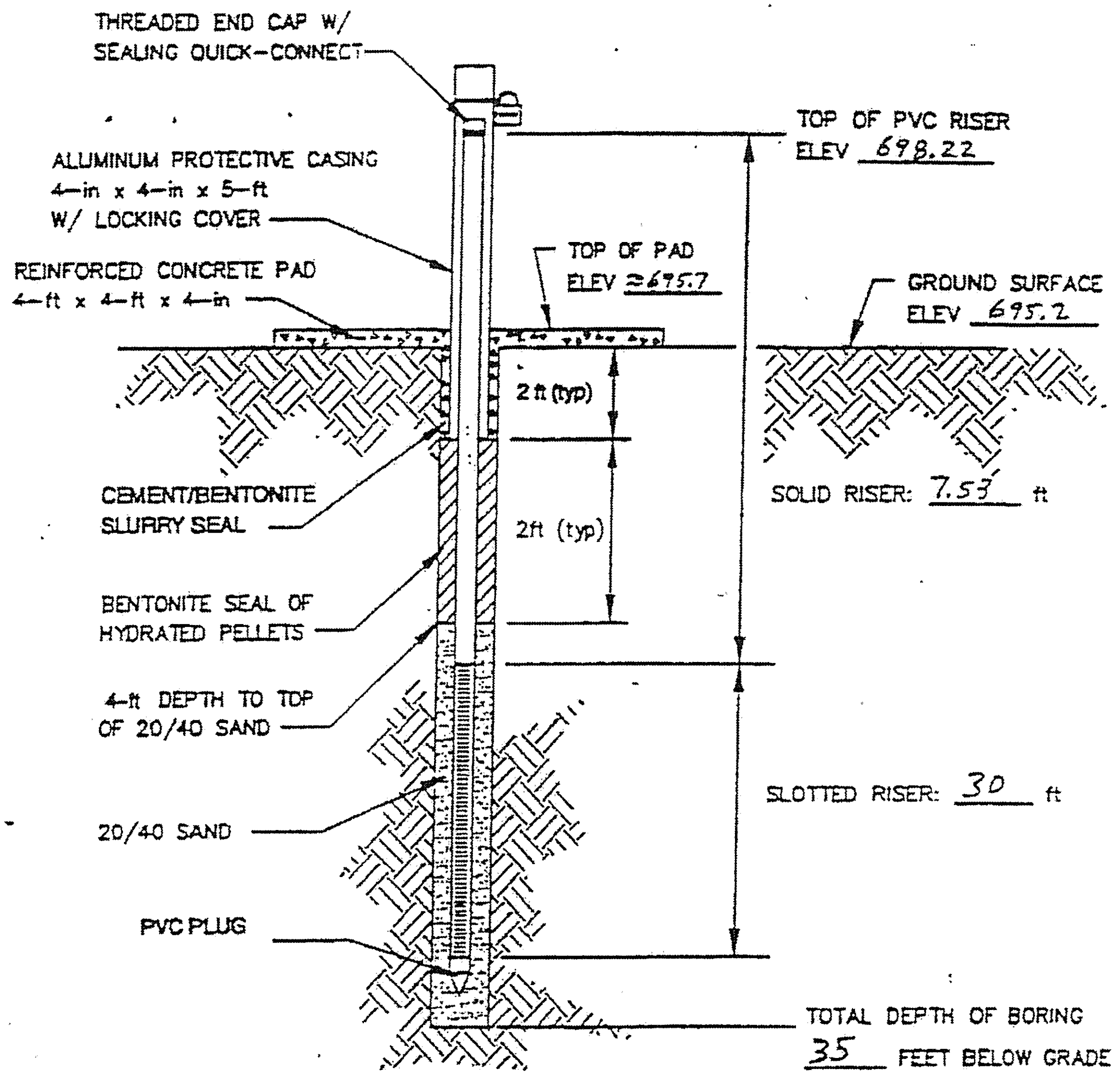
MONITOR WELL INSTALLATION DETAIL

LOCATION:	PROJECT NUMBER:	INSTALLATION DATE:	MONITOR WELL NUMBER:
JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	11-94035	01/27/94	GW-1



WELL GAUGING	DATE	GROUNDWATER ELEVATION	APPARENT HC THICKNESS
AT TIME OF DRILLING	(1) 01/27/94	30'	N/A
24 HOURS MINIMUM AFTER DEVELOPMENT	(2) N/A	N/A	N/A
AT TIME OF SAMPLING BEFORE PURGING	(3) N/A	N/A	N/A

NOTES: DATES THAT MEASUREMENT (1), (2) AND (3) WERE TAKEN, LOCATING THE GROUNDWATER WITHIN THE SCREEN INTERVAL, SHALL MATCH DRILLING AND GAUGING DATES (1), (2) AND (3), RESPECTIVELY. ALL MEASUREMENTS ACCURATE TO 0.01'.



Subsurface details are as reported by Cura (See Appendix A-1)

STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

Mark R Funkhouser 7-22-94

BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE

GAS PROBE DETAIL
GW-1

DRAWN	dhg	CHECKED	R.P	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	9?3-4027	DWG NO.		FIGURE NO.	

CURA INC.

2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 620 - 7117

RECORD OF SUBSURFACE EXPLORATION

No.: 11-84035	Well/Boring #: GW-2	Date Drilled: 01/27/94	
Project: JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	Drilling Co.: GM ENTERPRISES	Drilling Method: CA	
	Driller: DAVID	Logged By: C.D.H.	

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS
0	Tan-red, clayey sand				Damp
2.5					
5.0	Tan-gray, sandy clay		ST		Damp
7.5					
10.0			ST		
12.5	Tan-gray, silty clay				Damp
15.0			ST		
17.5	Tan, sandy clay				Moist
20.0			ST		
22.5					
25.0			ST		Saturated @ 25'
27.5					
30.0					
32.5					
35.0					

ABBREVIATIONS AND SYMBOLS

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Cone
CT-5' - Continuous Sampler

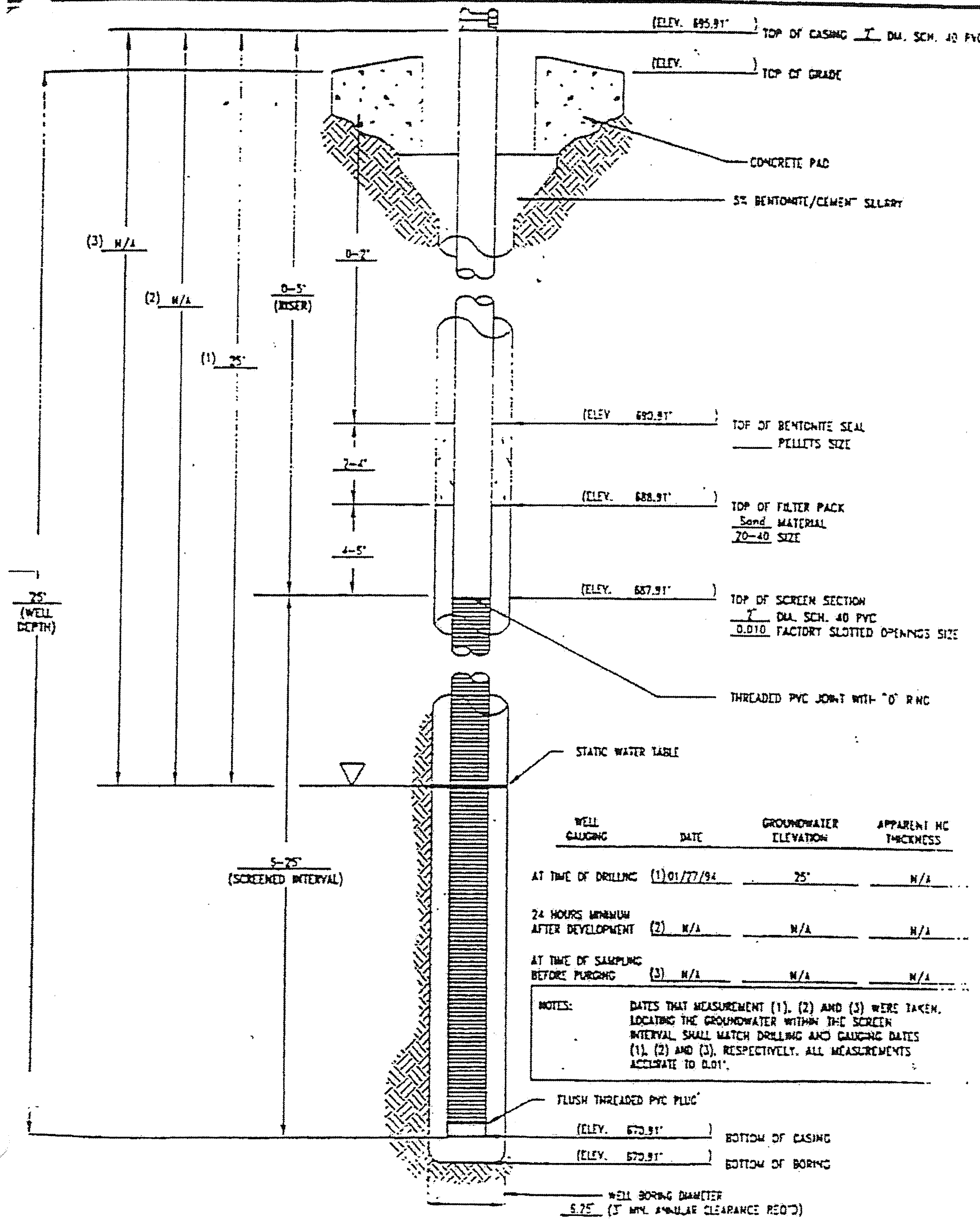
■ Sample Submitted to Lab
WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

INC.
1735 VILLA CREEK DRIVE – TWO METRO SQUARE
BLDG. C – SUITE 250 – DALLAS, TX 75234
620-7107 FAX – 620-8219

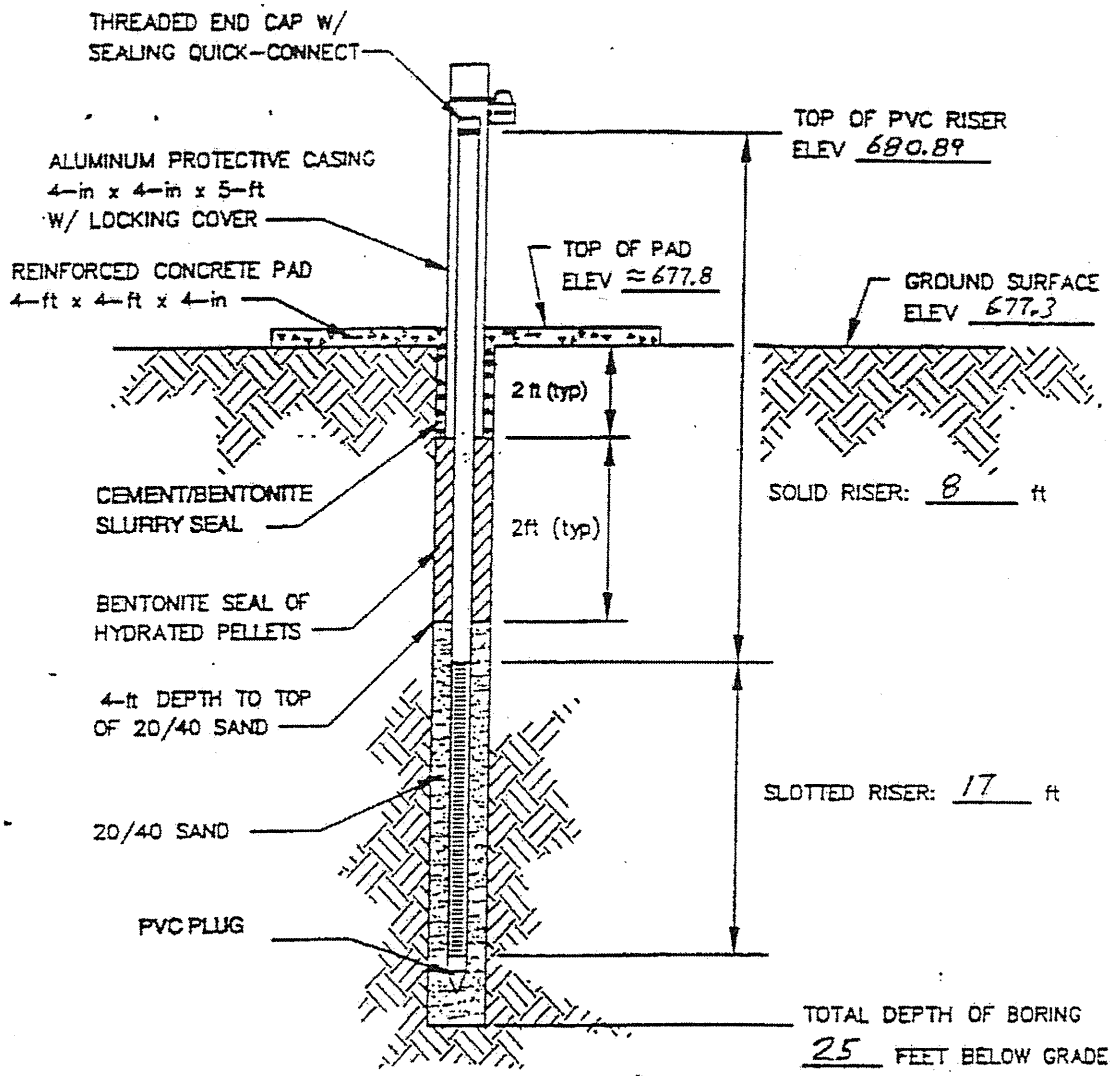
MONITOR WELL INSTALLATION DETAIL

LOCATION:	PROJECT NUMBER:	INSTALLATION DATE:	MONITOR WELL NUMBER:
JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	11-94035	01/27/94	GW-2



WELL GAUGING	DATE	GROUNDWATER ELEVATION	APPARENT HC THICKNESS
AT TIME OF DRILLING	(1) 01/27/94	25'	N/A
24 HOURS MINIMUM AFTER DEVELOPMENT	(2) N/A	N/A	N/A
AT TIME OF SAMPLING BEFORE PURGING	(3) N/A	N/A	N/A

NOTES: DATES THAT MEASUREMENT (1), (2) AND (3) WERE TAKEN, LOCATING THE GROUNDWATER WITHIN THE SCREEN INTERVAL, SHALL MATCH DRILLING AND GAUGING DATES (1), (2) AND (3), RESPECTIVELY. ALL MEASUREMENTS ACCURATE TO 0.01'.



Subsurface details are as reported by Cura (See Appendix A-1)

STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
Mark R. Funkhouser 7-22-94

BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-2

DRAWN	dhg	CHECKED	RP	REVIEWED	MF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

CURA INC.

2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 620 - 7107

RECORD OF SUBSURFACE EXPLORATION

Project No.: 11-94035	Well/Boring #: GW-3	Date Drilled: 01/28/93	
Project: JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	Drilling Co.: GM ENTERPRISES	Drilling Method: CA	
	Driller: DAVID	Logged By: C.D.H.	

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS	
0	Tan, sandy clay				Damp	0
2.5	Gray-tan, sandy clay					2.5
5.0			ST		Damp	5.0
7.5						7.5
10.0	Brown, clayey sand		ST		Damp	10.0
12.5					Moist	12.5
15.0			ST		Saturated @ 15'	15.0
17.5						17.5
20.0						20.0
22.5						22.5
25.0						25.0
27.5						27.5
30.0						30.0
32.5						32.5
35.0						35.0

ABBREVIATIONS AND SYMBOLS

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Cone

▩ Sample Submitted to Lab
WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

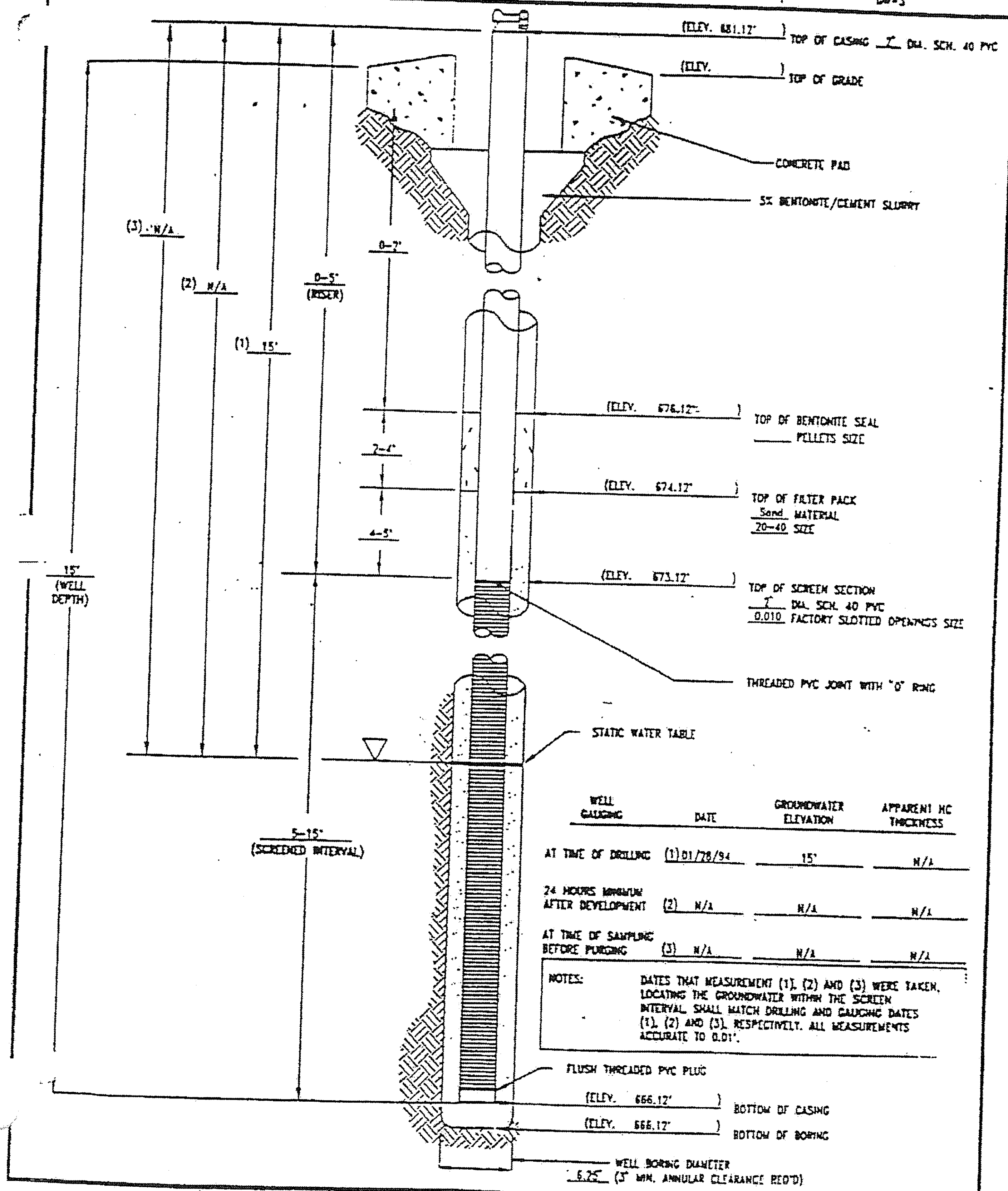
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

INC.

2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7?0 FAX - 620-62?8

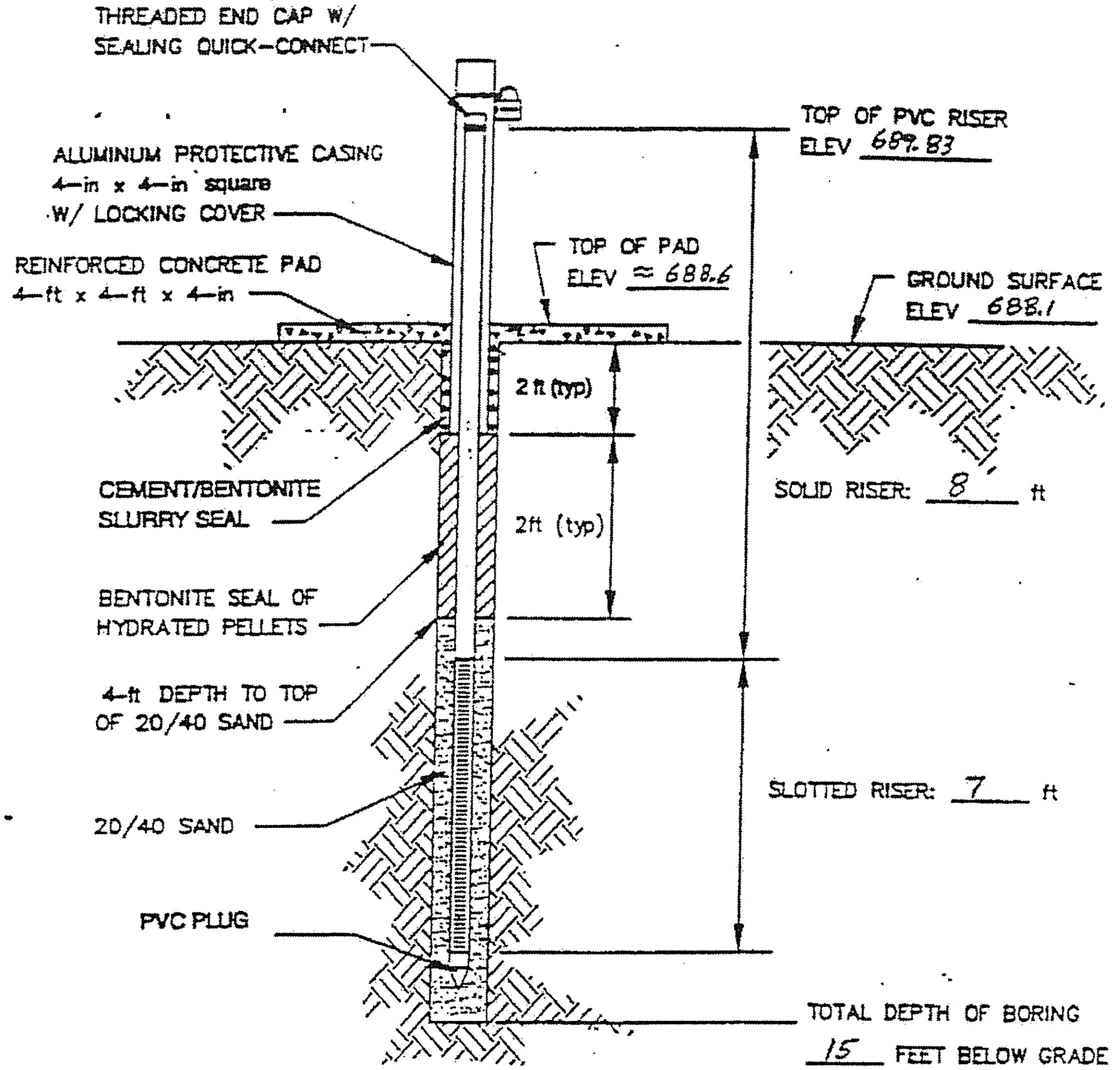
MONITOR WELL INSTALLATION DETAIL

LOCATION: JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	PROJECT NUMBER: 11-94035	INSTALLATION DATE: 01/28/94	MONITOR WELL NUMBER: GW-3



WELL GAUGING	DATE	GROUNDWATER ELEVATION	APPARENT HC THICKNESS
AT TIME OF DRILLING	(1) 01/28/94	15'	N/A
24 HOURS MINIMUM AFTER DEVELOPMENT	(2) N/A	N/A	N/A
AT TIME OF SAMPLING BEFORE PURGING	(3) N/A	N/A	N/A

NOTES: DATES THAT MEASUREMENT (1), (2) AND (3) WERE TAKEN, LOCATING THE GROUNDWATER WITHIN THE SCREEN INTERVAL SHALL MATCH DRILLING AND GAUGING DATES (1), (2) AND (3), RESPECTIVELY. ALL MEASUREMENTS ACCURATE TO 0.01'.



Subsurface details are as reported by Cura (See Appendix A-1)

STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

Mark R Funkhouser
7-22-94

BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-3

DRAWN dhg	CHECKED RP	REVIEWED MRF
DATE JUNE 1994	SCALE NONE	JOB NO. 943-4219
FILE NO. 953-4022	DWG NO.	FIGURE NO.

RECORD OF BOREHOLE GW-4

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

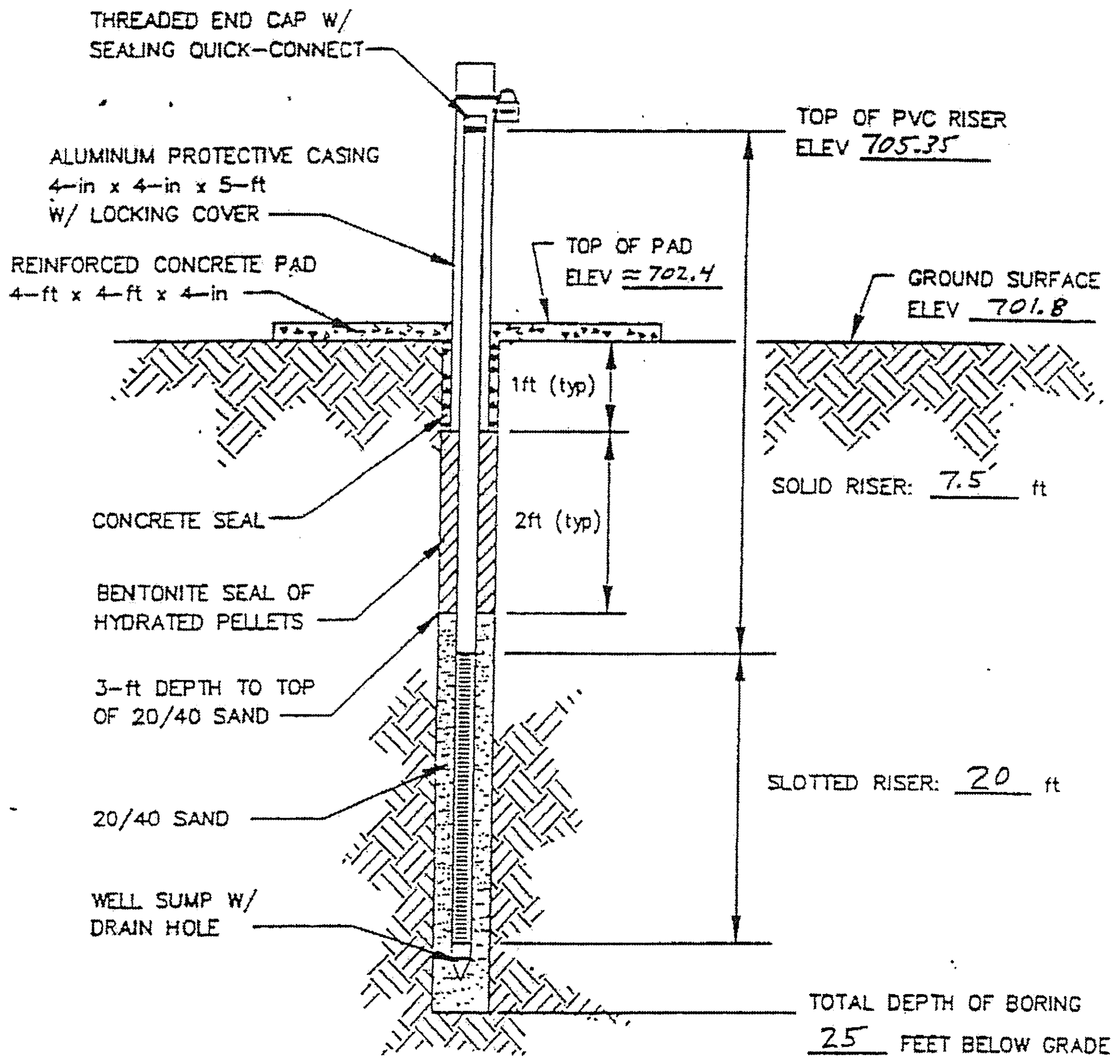
BORING DATE: 6/25/94
BORING LOCATION: See Figure 1

SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	DESCRIPTION	USCS	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Brown Sandy CLAY to Gray CLAY.	CL/SC								Concrete
		- with ferrous and lignitic stains and sand pockets to 10 ft.									Bentonite
5					1	3" ST	PUSH		24/24		
10					2	3" ST	PUSH		24/24		
		- gray below 15 ft.		14.00							20/40 Sand
15		- with silt partings at 15 ft.			3	3" ST	PUSH		24/24		
20		- damp at 20 ft.	CH		4	3" ST	PUSH		24/24		
		- hard and dry at 24 ft.			5	3" ST	PUSH		6/12		
25		Boring terminated at 25-ft-penetration.		25.00						No water level detected, 1405, 6/25/94.	
30											
35											
40											

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEL Houston,TX

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-4

DRAWN dhg | CHECKED RP | REVIEWED MF
DATE JUNE 1994 | SCALE NONE | JOB NO. 943-4219
FILE NO. 903-4077 | DWG NO. | FIGURE NO.

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 953-4262.1

RECORD OF BOREHOLE GW-5A

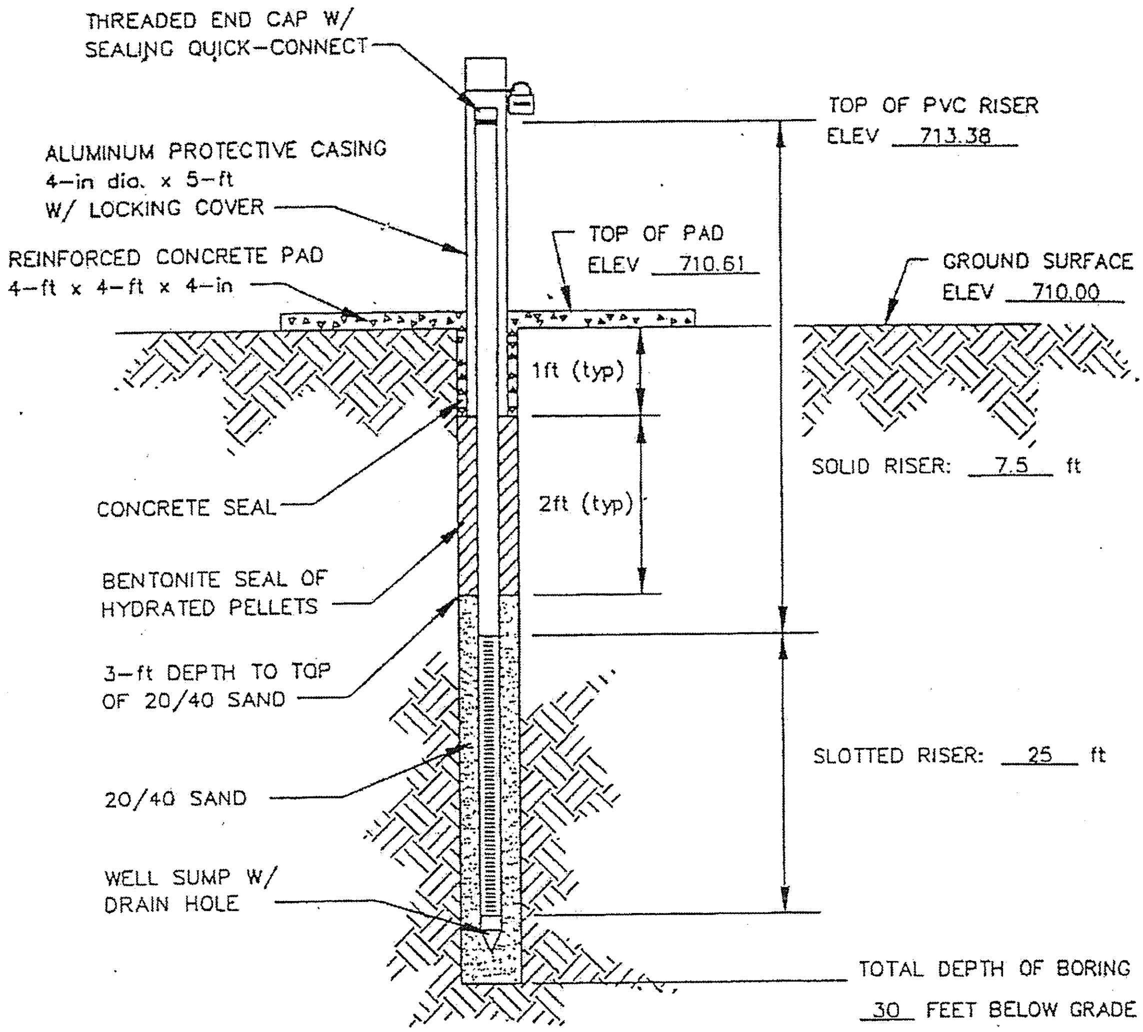
BORING DATE: 3/10/95
BORING LOCATION: See Figure 1

SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Brown to grey CLAY, some red ferrous partings and little grey silty sand partings.	CL/CH									Concrete; Bentonite
5						1	3" ST	PUSH		24/24		
		Dense, brown fine SAND and SILT, some red ferrous staining, few fine sand layers.	SP/SM		7.00							
10						2	3" ST	PUSH		24/24		
		Grey CLAY, trace of fine sand lenses.	CL/CH		11.00							
15						3	3" ST	PUSH		24/24		20/40 Sand
20						4	3" ST	PUSH		24/24		
25		Grey CLAY, some to and fine sand, trace med. to coarse gravel, saturated.				5	3" ST	PUSH		24/24		
						6	3" ST	PUSH		24/24		
30		Boring terminated at 30-ft.			30.00							
35												
40												

DRILL RIG: Failing F-6
DRILLING CONTRACTOR: A & E Waco, TX

LOGGED: CDC
CHECKED: CDC



BOREHOLE DIAMETER:	8 3/4 inches (nominal)
RISER DIAMETER:	2.0 inches (nominal)
SLOT SIZE:	0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-5A

DRAWN dhg	CHECKED CDC	REVIEWED MRF
DATE MARCH 1995	SCALE NONE	JOB NO. 953-4262
FILE NO.	DWG NO.	FIGURE NO. 2

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-6

BORING DATE: 8/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Red Silty SAND.	SM									Concrete
												Bentonite
						1	3" ST	PUSH		12/24		1630 8/25/94
5		- with brown clay pockets at 5 ft.										
												20/40 Sand
		- wet at 8 ft.										
		- cemented below 9 ft.				2	2" SS	11-16-19		18/18		
10					10.00							
		Boring terminated at 10.5-ft-penetration.										
15												
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61

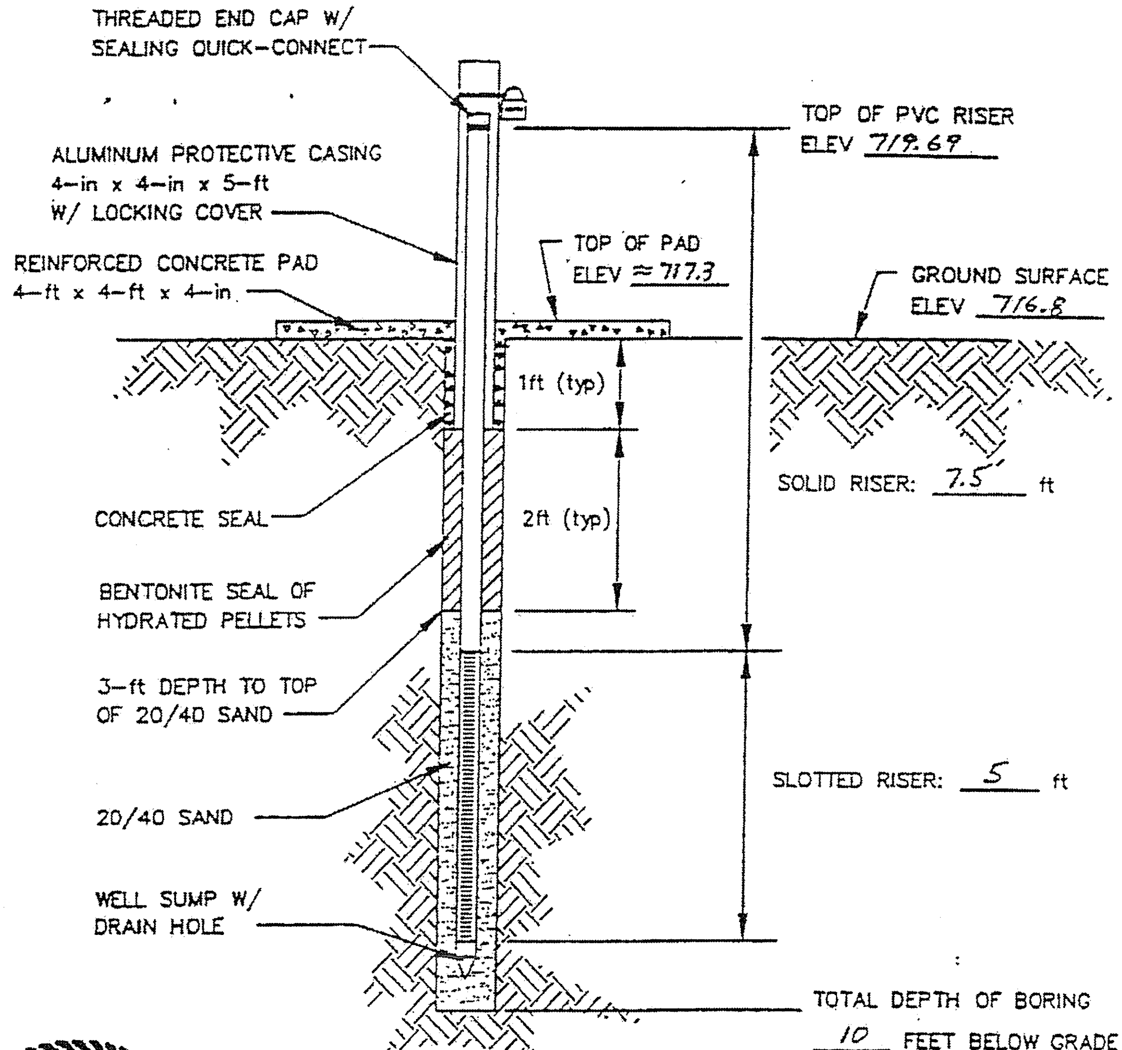
DRILLING CONTRACTOR: AEL Houston, TX

Golder Associates

LOGGED: RCP

CHECKED: RCP

DATE: 8/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

Mark R Funkhouser
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

TITLE
GAS PROBE DETAIL
GW-6

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN dhg	CHECKED R.P	REVIEWED MRF
DATE JUNE 1994	SCALE NONE	JOB NO. 943-4219
FILE NO. 903-4022	DWG NO.	FIGURE NO.

The Carel Corporation

Providing Environmental, Ground-Water and Waste Management Services

GAS PROBE NUMBER
GMP-7A

Page 1 of 1

PROJECT NAME: Gas Probe Plug and Relocation
LOCATION: Turkey Creek Landfill
DRILLING CO: Dixie Drilling
DRILLING METHOD: Mud Rotary
GEOLOGIST: Philip M. Ward

BORING DIAMETER: 6"
TOTAL DEPTH: 45'
GROUND SURFACE ELEVATION: 709.4
NORTHING: 1357.9
EASTING: 182.1

DATE BEGUN: 6/3/02 DATE COMPLETED: 6/4/02

DEPTH (BGS)*	DESCRIPTION	MOISTURE	ANNULUS MATERIAL	Depth (MSL)*
0.0	SILTY SAND: Brown, with organics (roots) intermixed	(slightly moist)	-cement	
	SANDY CLAY: Brown, with very fine-grained sand		-bentonite plug	
5.0	CLAYEY SAND: Dark red and tan, with organic traces		-20/40 silica sand	705
	SANDSTONE: Tan, poorly cemented	(wet)		
10.0				700
	-moderate to well cemented			
	-siltstone seam @ 14 ft.			
15.0				695
20.0	-ironstone seam @ 20 ft.			690
	CLAYEY SHALE: Dark gray and wet, with siltstone, sandstone, and lignite seams scattered throughout			
25.0				685
	-ironstone seam @ 28 ft.			
30.0	-siltstone seam @ 30 ft.		-1/4 inch gravel pack	680
	-lignite seam @ 34 ft.			
35.0	-siltstone seam @ 35 ft.			675
	-siltstone seam @ 37.5 ft.			
	-lignite seam @ 38 ft.			
40.0	-siltstone seam @ 40 ft.			670
	-sandstone seam @ 42.5 ft.			
45.0	-GMP-7A set @ 45 ft.			665
50.0				660

*(BGS)-Below Ground Surface
*(MSL)-Mean Sea Level

Remarks: Boring advanced using 6" O.D. hollow stem auger and 5' continuous sampler to 45'. 1" PVC well w/39' screen set to 45'.

GAS PROBE DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 6/3/02 & 6/4/02
Well Location: Latitude (or northing): 1357.9

MSW Permit No.: 1417B
Gas Monitoring Probe No.: GMP-7A

Longitude (or easting): 182.1

Monitor Well Driller:
Name: Dixie Drilling
License No.: 4707

Note:
Geologist or engineer supervising well installation: Andrew Robertson
Name of geologic formation(s) in which probe is completed: Woodbine

Type of locking device: Padlock

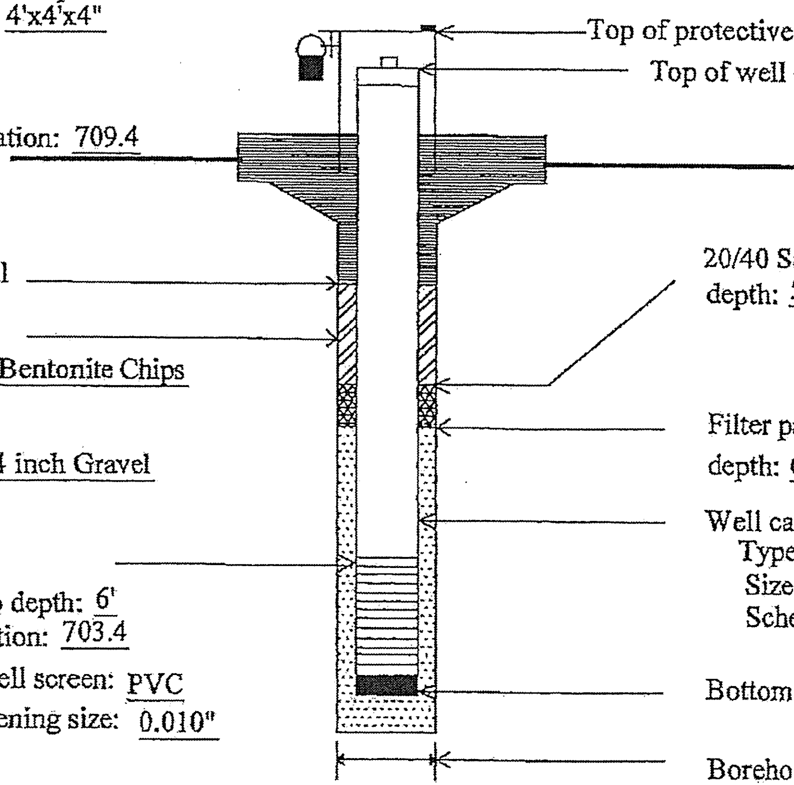
Type of well casing protection: Steel

Concrete surface pad dimensions: 4'x4'x4"

Top of protective collar elevation: 712.42

Top of well casing elevation: 712.33

Surface elevation: 709.4



Concrete seal depth: 2'

Casing seal material: 3' Bentonite Chips

20/40 Sand Seal Top depth: 5' elevation: 704.4

Filter pack material: 1/4 inch Gravel

Filter pack top depth: 6' elevation: 703.3

Well screen
Screen top depth: 6'
Top elevation: 703.4
Type of well screen: PVC
Screen opening size: 0.010"

Well casing
Type: PVC
Size (diameter): 1"
Schedule or thickness: Sch. 4

Bottom cap (depth: 45')

Borehole diameter: 6 in.

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-8

BORING DATE: 8/23/94
BORING LOCATION: See Figure 1

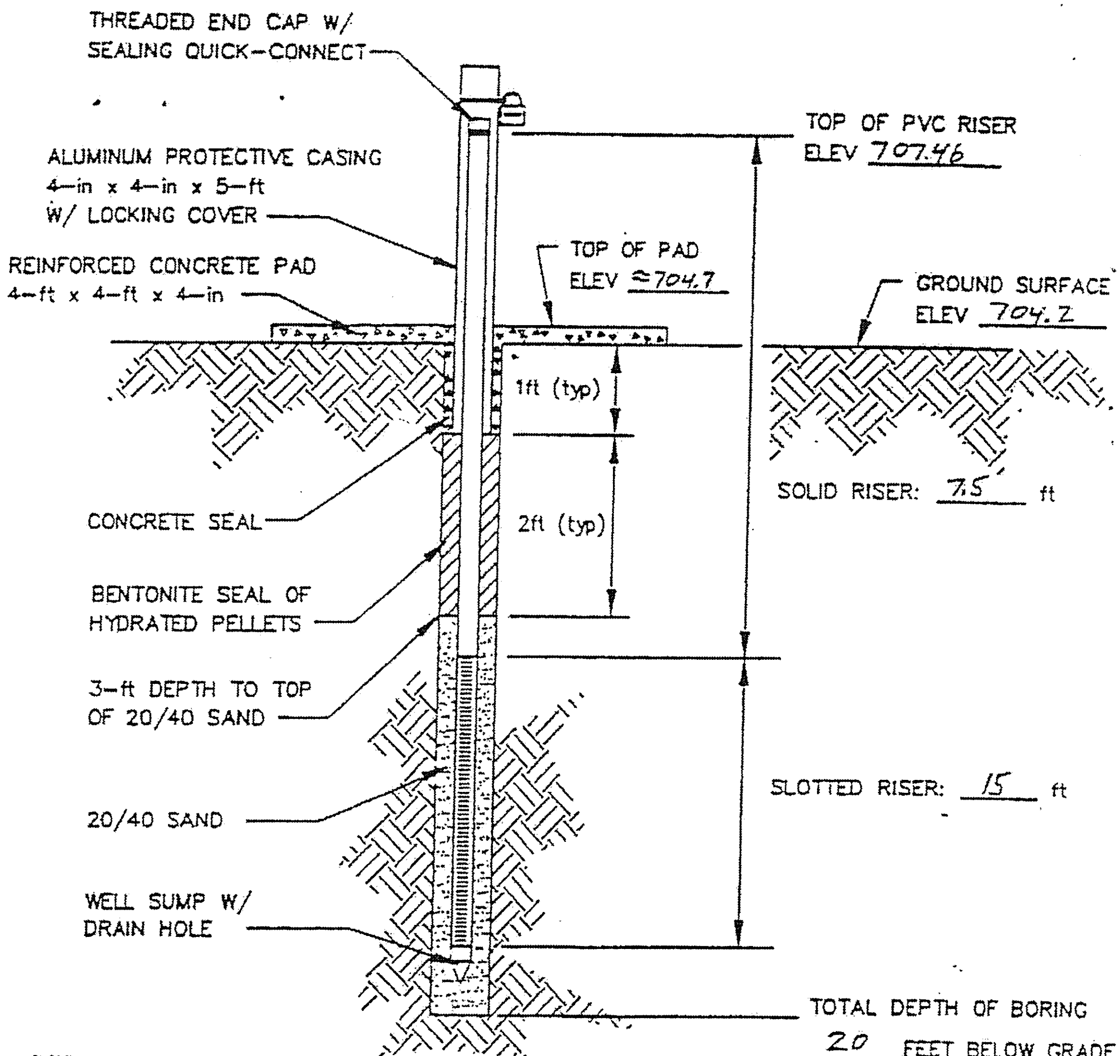
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Red and orange fine SAND.	SP									Concrete; Bentonite
		- damp at 4 ft.				1	2" SS	Ref / 6"		6/6		
5												1725 8/25/94
		- wet at 8 ft.										
10						2	2" SS	Ref / 6"		6/6		20/40 Sand
15						3	2" SS	Ref / 6"		6/6		
						4	2" SS	Ref / 4"		4/4		
20		Boring terminated at 20-ft-penetration.			20.00							
25												
30												
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEL Houston, TX
DRILLER: Z. Rufio

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 8/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER

Mark R Funkhouser 7-22-94

BORESHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-8

DRAWN	dhg	CHECKED	R.P	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

LOG OF GAS PROBE NO. GMP-9A

Project Description: GMP-9A Installation

CAREL Corporation

Location: Turkey Creek Landfill
Top of PVC El.: 707.22 feet MSL
Surface El.: 704.1 feet MSL
Completion Depth: 36 feet
Date Boring Started: 6/26/2013
Date Boring Completed: 6/26/2013

Northing: -1362.18
Easting: 1585.34

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Gas Probe Construction Details	Gas Probe Description
			SAND, reddish brown, fine grained, slightly moist to dry		Concrete from surface to 2' bgs
					Bentonite chips from 2' bgs to 4' bgs
5					Bentonite granules from 4' bgs to 5' bgs
10			orange-red at 10-feet		20/40 Silica sand filter pack from 5' bgs to 35.5' bgs
15					
20			moist, some clay at 20-feet		
			wet at 22-feet		
25					0.01" Slotted screen from 5' bgs to 35' bgs
			CLAY, gray, hard		
30					
35					6" of boring caved-in

Drilling Contractor: Roddy Qualls Env. Drilling
Drilling Method: SFA
Sampling Method: Continuous
Geologist: Steven J. Wimmer
Project No.: 13-05-23

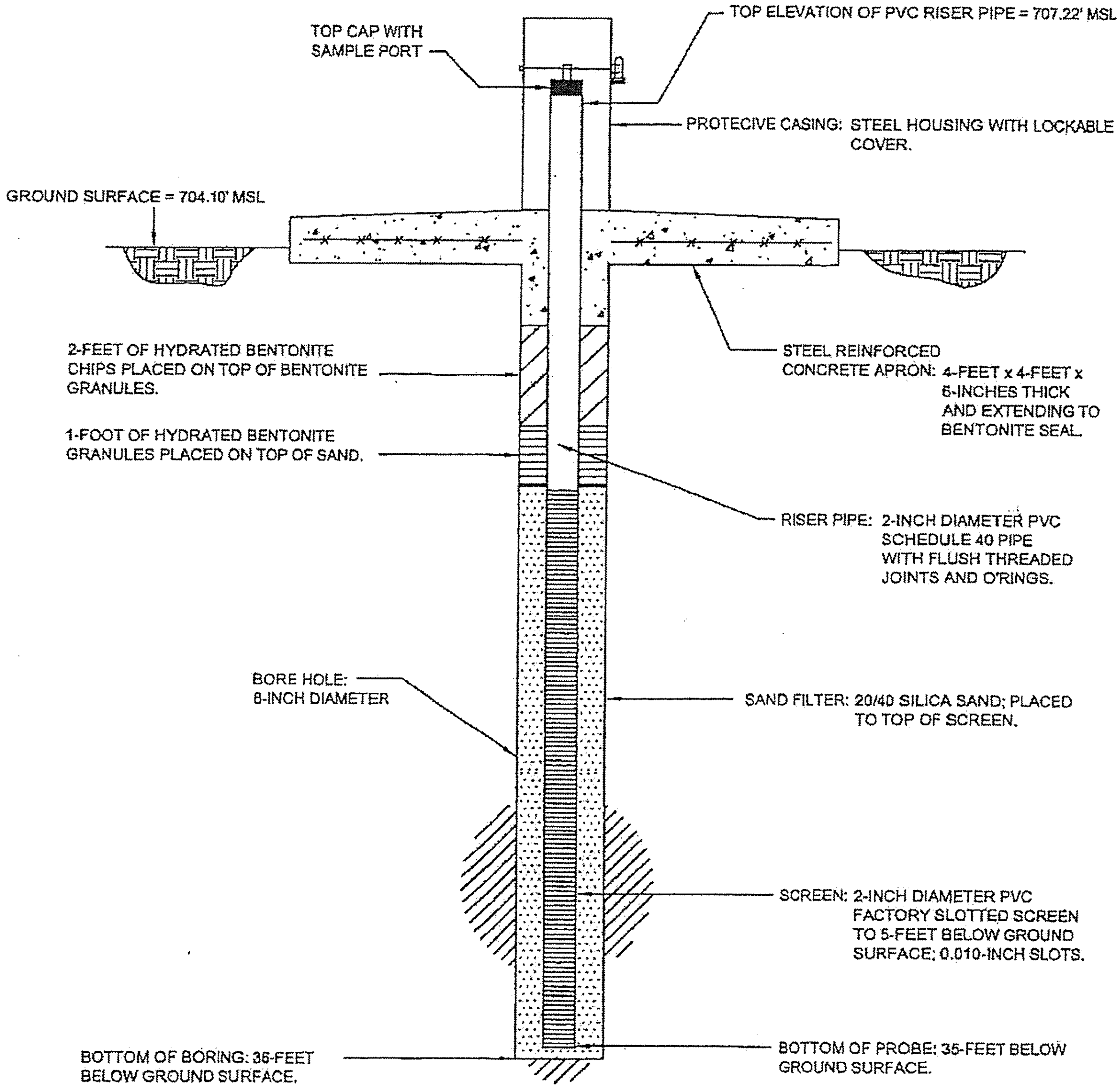
Groundwater Observations	
Date	Depth

Remarks: 8-inch diameter boring

GAS PROBE - B&W TURKEY CREEK.GPJ CAREL2.GDT 07/12/13

LOG OF GAS PROBE NO. GMP-9A
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

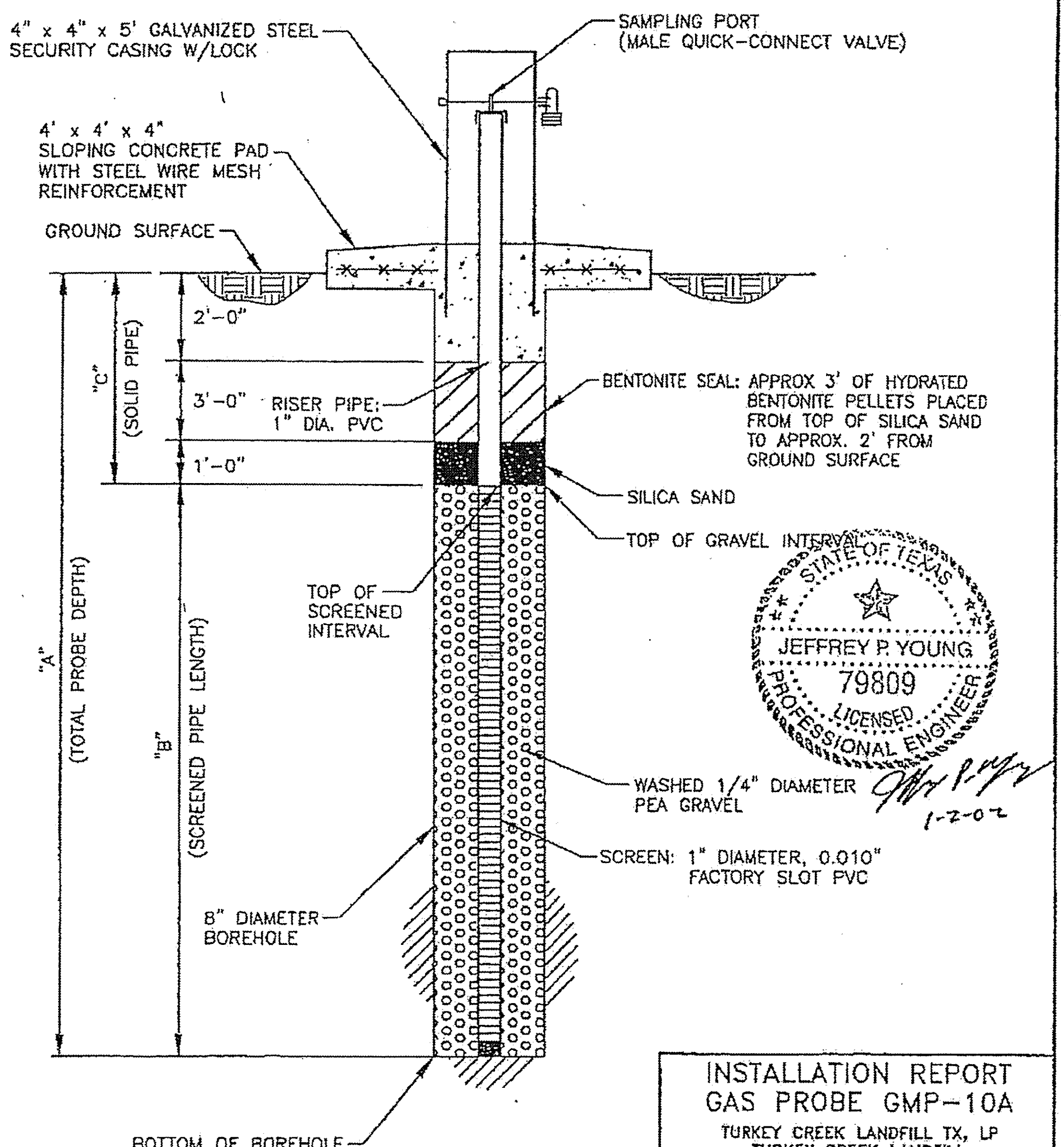


NOT TO SCALE

The CAREL CORPORATION 135 Pecan Street, Keller, TX 76248	**GAS MONITORING PROBE GMP-9A CONSTRUCTION DIAGRAM** TURKEY CREEK LANDFILL JOHNSON COUNTY, TEXAS	DATE: July 12, 2013 FILENAME: [illegible] DRAWN BY: SJW DRAFTED BY: SJW

LFG MONITORING PROBE LOCATION

PROBE NO.	TOP ELEV. (FT.)	BOTTOM ELEV. (FT.)	DEPTH OF WASTE WITHIN 1,000 (FT.)	DIM "A" TOTAL PROBE DEPTH (FT.)	DIM "B" SCREENED PIPE DEPTH (FT.)	DIM "C" SOLID PIPE UNDER GRADE (FT.)	APPROX. LOCATION EASTING	APPROX. LOCATION SOUTHING (S) NORTHING (N)
GMP-10A	696.50	654.50	656	42	36	6	2316.16	1051.80 (S)



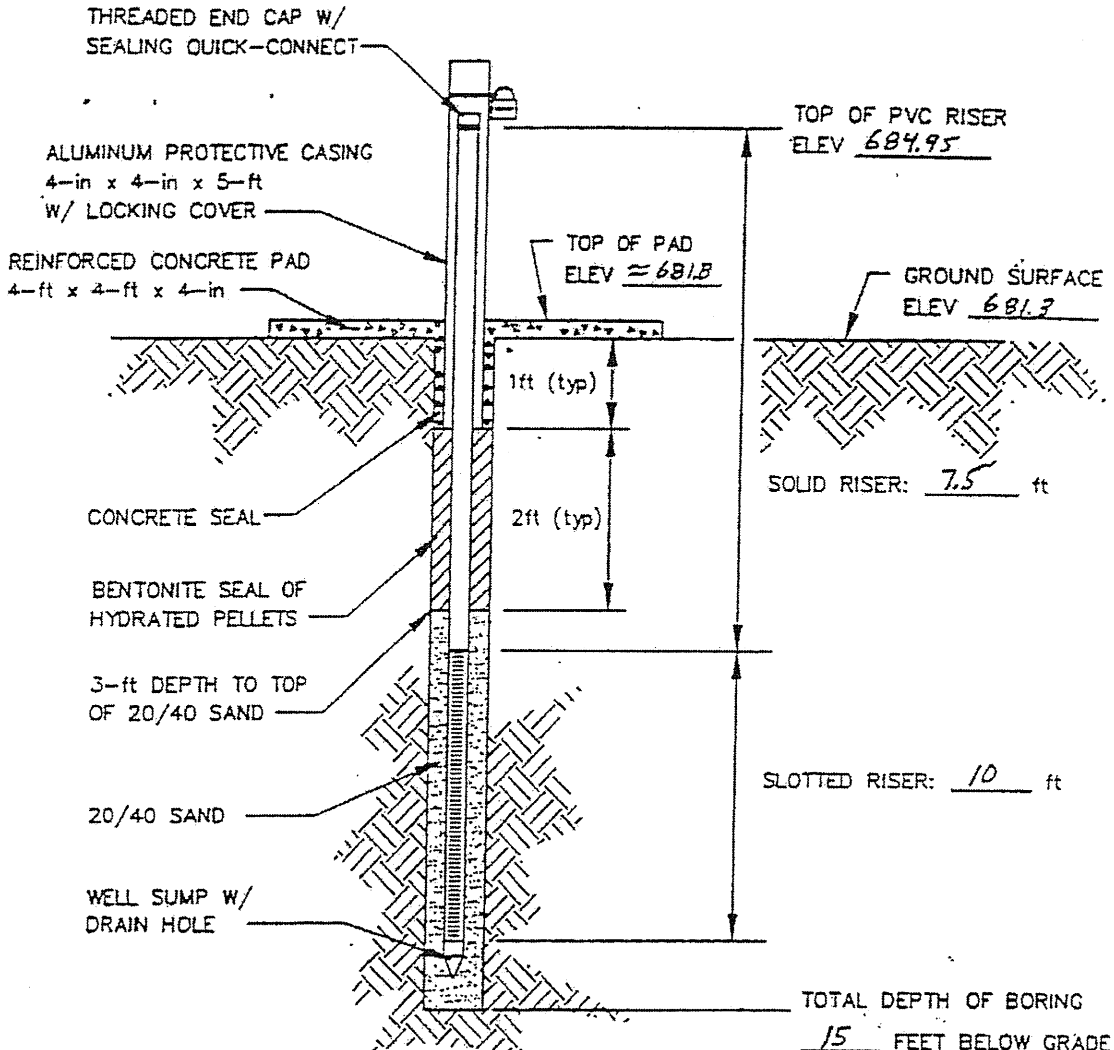
LFG MONITORING PROBE DETAIL 1/1|2
NTS

INSTALLATION REPORT
GAS PROBE GMP-10A
TURKEY CREEK LANDFILL TX, LP
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

Weaver Boos & Gordon, Inc.
ALBUQUERQUE, NM CHICAGO, IL GLEN ELLYN, IL — FORT WORTH, TX (817) 735-9770 — GRIFFITH, IN SOUTH BEND, IN SPRINGFIELD, IL

DRAWN BY: SRC	DATE: 12/2001	FILE: 0120-72-11-09-00
REVIEWED BY: BF	CAD: GP-DETL.DWG	FIGURE 2

0:\0120\72\PERMIT MOD\GP-DETL.DWG



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

Mark R Funkhouser
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-11

DRAWN dhg	CHECKED RP	REVIEWED MRF
DATE JUNE 1994	SCALE NONE	JOB NO. 943-4219
FILE NO. 903-4022	DWG NO.	FIGURE NO.

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-11

BORING DATE: 8/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Orange Silty SAND.	SM									Concrete; Bentonite
5						1	2" SS	39-45		12/12		
10		- damp at 9 ft. - light grey seam at 9.5 ft. - wet at 10 ft.				2	2" SS	11-15-19		18/18		20/40 Sand; 14.25 8/25/94
15		Grey CLAY with sand partings.	CL/CH		14.00	3	2" SS	17-23-41		18/18		
		Boring terminated at 15.5-ft-penetration.			15.50							

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: AEI, Houston, TX

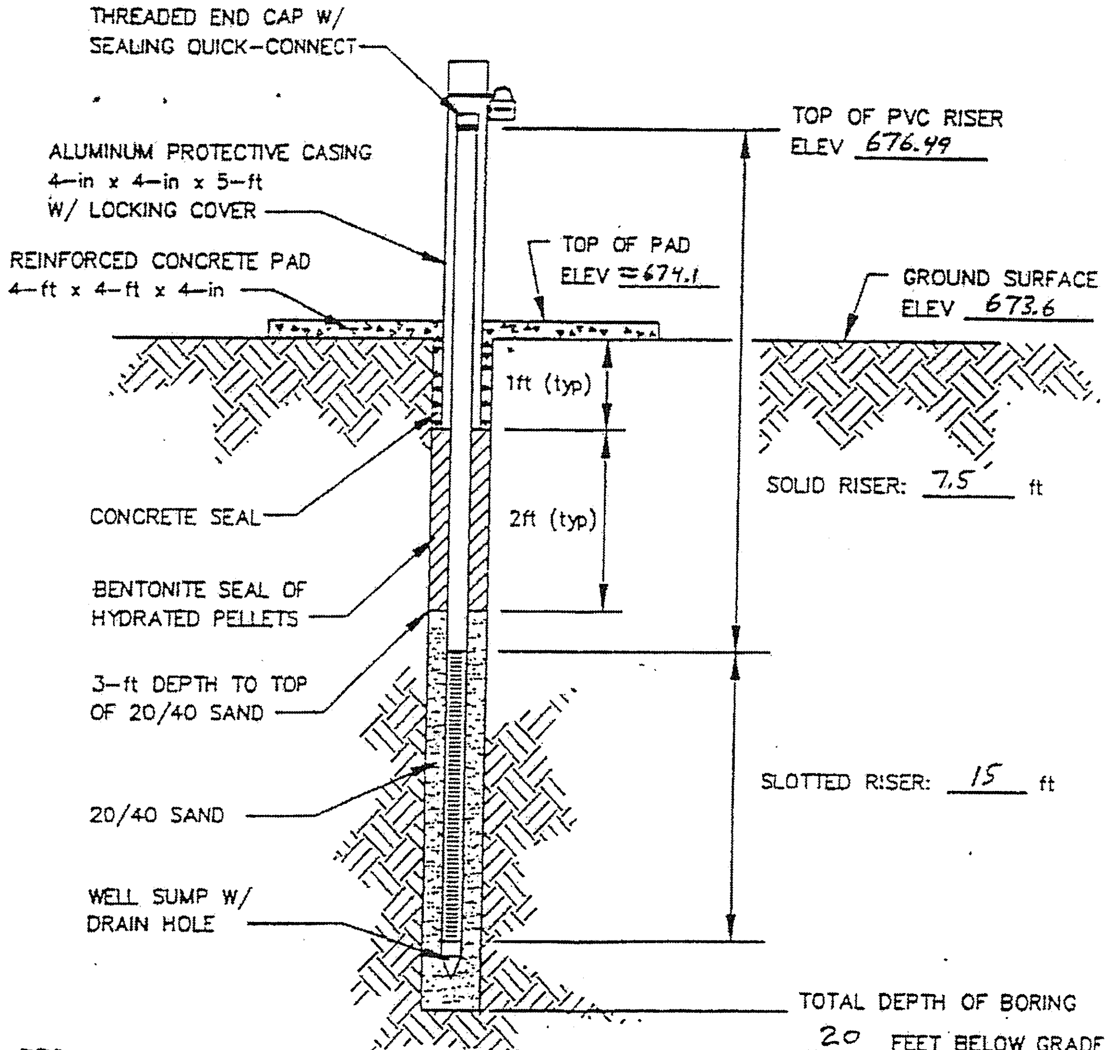
DRILLER: Z. Rubin

LOGGED: RCP

CHECKED: RCP

DATE: 8/30/94

Golder Associates



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER

Mark R. Funkhouser 7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates Houston, Texas	TITLE **GAS PROBE DETAIL GW-12**		
LAIDLAW WASTE SYSTEMS, INC.	DRAWN dhg	CHECKED RJP	REVIEWED MRF
JOHNSON COUNTY LANDFILL	DATE JUNE 1994	SCALE NONE	JOB NO. 943-4219
ALVARADO, JOHNSON COUNTY, TEXAS	FILE NO. 903-4022	DWG NO.	FIGURE NO.

PROJECT: Gas Pro[illegible]

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-12

BORING DATE: 6/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Brown CLAY with ferrous and lignitic stains and micaceous sand pockets.	CL/CH									Concrete; Bentonite
5						1	3" ST	PUSH		24/24		
10		- with sand partings below 9 ft.				2	3" ST	PUSH		18/24		20/40 Sand
15						3	3" ST	PUSH		18/24		
		- hard, grey, and with silt partings below 18 ft.				4	3" ST	PUSH		24/24		
20		Boring terminated at 20-ft-penetration.			20.00						No water level detected, 1450, 6/25/94.	
25												
30												
35												
40												

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: AEI, Houston, TX

DRILLER: Z. [illegible]

LOGGED: RCP

CHECKED: RCP

DATE: 6/30/94

Golder Associates

The Carel Corporation

Providing Environmental, Ground-Water and Waste Management Services

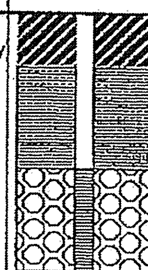
GAS PROBE NUMBER
GMP-13A

PROJECT NAME: Gas Probe Plug and Relocation
LOCATION: Turkey Creek Landfill
DRILLING CO: Dixie Drilling
DRILLING METHOD: Hollow Stem Auger
GEOLOGIST: Philip M. Ward

BORING DIAMETER: 7"
TOTAL DEPTH: 10'
GROUND SURFACE ELEVATION: 646.9
NORTHING: 1355
EASTING: 2600.1

DATE BEGUN: 5/22/02 DATE COMPLETED: 5/22/02

DEPTH (BGS)*	LITHOLOGY	DESCRIPTION	MOISTURE	GAS PROBE CONSTRUCTION	ANNULUS MATERIAL	Depth (MSL)*
0.0		SILTY SAND: Tan, with organics (roots) top 6"				
		SANDY CLAY: Brown, with organics (roots), iron nodules, very fine grained sand	(slightly moist)		-cement	645
5.0		SILTY CLAY: Dark Brown, with organics (roots), scattered iron nodules -some very fine-grained sand intermixed to total depth -color change to brown and gray	(moist)		-bentonite plug -20/40 silica sand -1/4 inch gravel pack	640
10.0		-GMP-13A set @ 10 ft.				635
15.0						630
20.0						625
25.0						620
30.0						615
35.0						610
40.0						



*(BGS)-Below Ground Surface
*(MSL)-Mean Sea Level

Remarks: Boring advanced using 7" O.D. hollow stem auger and 5' continuous sampler to 10'. 1" PVC well w/4' screen set to 10'.

GAS PROBE DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 5/22/02
Well Location: Latitude (or northing): 1355
Monitor Well Driller:
Name: Dixie Drilling
License No.: 4707

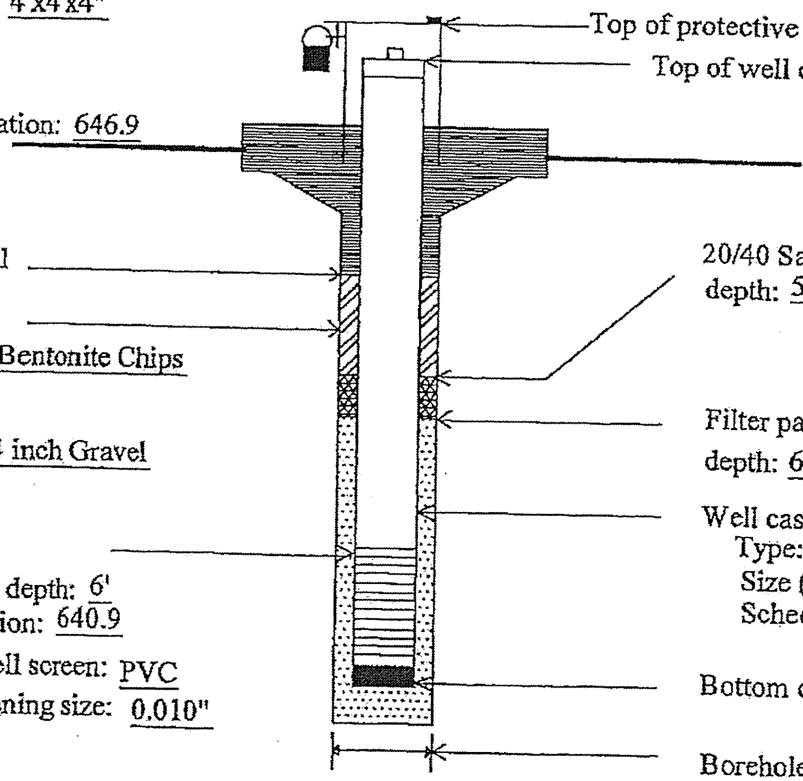
MSW Permit No.: 1417B
Gas Monitoring Probe No.: GMP-13A

Longitude (or easting): 2600.1

Note:
Geologist or engineer supervising well installation: Philip M. Ward
Name of geologic formation(s) in which probe is completed: Woodbine

Type of locking device: Padlock
Concrete surface pad dimensions: 4'x4'x4"

Type of well casing protection: Steel



Top of protective collar elevation: 650.21
Top of well casing elevation: 649.75

Surface elevation: 646.9

Concrete seal depth: 2'
Casing seal material: 3' Bentonite Chips

20/40 Sand Seal Top depth: 5' elevation: 641.9

Filter pack material: 1/4 inch Gravel

Filter pack top depth: 6' elevation: 640.9

Well screen
Screen top depth: 6'
Top elevation: 640.9
Type of well screen: PVC
Screen opening size: 0.010"

Well casing
Type: PVC
Size (diameter): 1"
Schedule or thickness: Sch. 4(

Bottom cap (depth: 10')

Borehole diameter: 7 in.

APPENDIX III I-D

LANDFILL GAS
MONITORING REPORT FORM

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes page III I-D-1

TURKEY CREEK LANDFILL
LANDFILL GAS MONITORING REPORT FORM

Sampled by:___________________________ Date:_____________________________

Time:_______(Start) _________ (Finish) Temperature:________________________

Weather:___________________ Barometric Pressure (optional): ______________

Monitoring Equipment:_______________ Date of Calibration: ________________

CALIBRATION:

Standard Concentration: ______ % by Vol. Instrument Reading: ____________%

Probe No.	% METHANE (By Volume)[3] 0-100	%[1] LEL 0-100	STATIC PRESSURE "w.c."[2] (Optional)	O_2% (Optional)	PROBE INTEGRITY VERIFIED Yes/No
GMP-1A					
GMP-2A					
GMP-3A					
GMP-4A					
GMP-5B					
GMP-6					
GMP-7B					
GMP-8A					
GMP-9B					
GMP-10B					
GMP-11					
GMP-12					
GMP-13A					
GMP-14					
GMP-15					
GMP-16					
GMP-17					
UV-1					
UV-2					
UV-3					
UV-4					
UV-5					
UV-6					
UV-7					

ONSITE STRUCTURES	Verify if Continuous LFG Alarm is Operational (Circle One)		Was Continuous LFG Alarm Tested (Circle One)		Continuous LFG Alarm Activated (>1.25% CH_4 by volume / LEL>25%)[3] During Previous Quarter (Circle One)	
Landfill Office	YES	NO	YES	NO	YES	NO
Scalehouse	YES	NO	YES	NO	YES	NO
Energy Plant Office/Maintenance Facility	YES	NO	YES	NO	YES	NO
	YES	NO	YES	NO	YES	NO

1 % LEL = (20) x (observed % methane) – Note: Record >100% in LEL column if percent methane is over 5%. The reference to LEL is for methane by volume % conversion purpose only.

2 "w.c." – Inches Water Column

3 Monitoring results shall be recorded as percent methane by volume. The reference to LEL is for methane by volume % conversion purpose only.

APPENDIX III I-E

TYPICAL MONITORING EQUIPMENT MANUFACTURER'S INFORMATION

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes pages III I-E-1 through III I-E-12

PERIMETER MONITORING EQUIPMENT

CES LANDTEC
An ISO 9001 Certified Company

GEM™ 2000
PORTABLE GAS ANALYZER
Instrumentation

The GEM ™ 2000 combines the GEM ™ 500 and the GA-90 into one faster, more accurate, intrinsically safe instrument

The **GEM™2000** was designed by **CES-LANDTEC** specifically for use on landfills to monitor landfill gas (LFG) extraction systems, flares, and migration control systems.

The **GEM™2000** samples and analyzes the Methane, Carbon Dioxide and Oxygen content of landfill gas. The easy-to-read LCD screen shows the results as percentages of CH_4, CO_2, O_2 and "balance" gas. The **GEM™2000** calculates and displays gas flow rate. It also measures and displays Btu content, temperature (w/optional probe), relative and atmospheric pressures and CH_4 LEL (Lower Explosive Limit).

GEM™ 2000
"The Future of Landfill Gas Monitoring"

Performance
New technological advances in hardware and software dramatically improve speed and accuracy

Safe
Certified Intrinsically Safe for landfill use

Efficient
Two operating modes, each with two screens for streamlined functionality

Flexible
DataField software offers integration with various PC applications

Experience
Built on the success of hundreds of field-tested instruments

"The best just got better!"

DataField COMPATIBLE

GEM™2000 Multi-Functional Analyzer

Diverse Field Applications... monitors migration control systems, gas extraction systems, flares, migration probes, and more.

Gas Extraction Monitor Mode... provides automatic sampling and analysis of gas composition % by volume CH_4, CO_2, O_2 and balance gas, % LEL CH_4, temperature (with optional probe), static pressure, differential pressure, and barometric pressure. Calculates gas flow rates (SCFM) as well as Btu content.

Landfill Gas Analyzer Mode... provides automatic sampling and analysis of gas composition % by volume CH_4, CO_2, O_2 and % balance gas, % LEL CH_4, temperature (with optional probe), barometric pressure and relative pressure. Can be used for data logging, with user programmed intervals.

Easy to Read Display... extra large backlit LCD shows up to five gases, atmospheric and gas vacuum pressure, temperature, ID code – all at the same time.

Intrinsically Safe... essential for protecting personnel who work with hazardous and explosive landfill gases.

On Site Calibration... rapid field calibration checking or adjustment can be carried out on site.

Automatic Purge... automatically purges analyzer when a new ID is selected. (This feature can be turned off).

Light-Weight Compact Size... easy to carry. Weighs less than five pounds.

Quick Analysis... completes sampling and displays gas analysis and flow results in less than one minute.

Infrared Gas Analyzer... provides accurate measurements of methane (CH_4), and carbon dioxide (CO_2).

Gas Temperature... read when using optional temperature probe or can be entered manually.

Durable Oxygen Sensor... provided by the galvanic cell principle, not influenced by other gases (i.e. CH_4, CO_2, CO, SO_2 or H_2S).

User Friendly On-Screen Menu... in each mode the user performs most operations in just two screens.

PC Data Downloading... provided by RS232 interface with **DataField CS** software (Release 3.0 or later).

Data Storage/Retrieval... stores prior measurements taken for each monitoring point, 900 monitoring points total.

Date/Time Stamp... recorded for all stored data.

Prior Data Recall... allows user to view prior data for each monitoring point.

Methane Analysis... displayed as either % CH_4 by volume or LEL CH_4 (Landfill Gas Analyzer Mode only).

Durable Construction... built of strong, durable plastic material suitable for harsh landfill environments.

All Weather Use... designed to operate in extremes from 32°F to 104°F. Sealed, weather-tight case.

Built-in Adjustable Alarms... allows user to set alarm limits for CH_4 and O_2.

Rechargeable Batteries... internal, rechargeable nickel metal hydride batteries are standard.

Operating Time... approximately 8 hours with normal pump usage (approximately 10 hours without pump running).

Fast Recharge Time... approximately 3 hours from complete discharge.

Battery Check... battery life is continuously displayed.

Monitoring Point ID Codes... provides alphanumeric identification of monitoring points for data storage and recall.

ID Comments... allows user to answer up to 3 questions with a list of 9 potential answers each.

Imperial vs. SI Units... can display measurements in Imperial (USA) or SI (metric) units.

Interfaces to DataField Management Software... which provides statistical analysis and reporting of LFG data.

Multiple Flow Meter Analysis... calculates gas flow with Accu-Flo Wellheads, Orifice plates and Pitot tubes.

Gold Warranty Service Program... ensures that your analyzer is properly maintained for optimum performance. (Optional).

Additional Information

The **CES-LANDTEC** team is committed to introducing new and more efficient technologies into an industry which recognizes innovation.

The **GEM™2000** is part of **CES-LANDTEC**'s family of products developed specifically for the landfill industry. Other **CES-LANDTEC** products and services include:

- GEM™500
- SEM-500
- Accu-Flo Wellheads
- DataField Online Service
- DataField SES Environmental Management System
- MANAGEbyNet Project Management Software
- QuickSWPPP Software

— Providing Technology and Software for a better Environment —

GEM™2000 Typical Accuracy

CONCENTRATION	% CH_4 by VOLUME	% CO_2 by VOLUME	% O_2 by VOLUME
5% (LEL CH_4)	±0.3%	±0.3%	±1.0%
FULL SCALE	±3.0%(70%)	±3.0%(40%)	±1.0%(25%)

GEM™2000 Specifications

	SENSOR RANGE	RESOLUTION
Methane- CH_4	0-70%	0.1%
Carbon Dioxide - CO_2	0-40%	0.1%
Oxygen - O_2	0-25%	0.1%
Pressures (diff)	0-10" W.C.	0.001" W.C.
(static)	0-100" W.C.	0.1" W.C.

Pump Flow Rate – 500 cc/min at nominal flow, 250 cc/min at 80" W.C.
Vacuum – Up to 80" W.C.
UL Certified to Class 1, Zone 1, AEx Ib d IIa T4

SWANA MEMBER

An involved and contributing member of the Solid Waste Association of North America.

CES LANDTEC
An ISO 9001 Certified Company

850 South Via Lata, Suite 112 Colton, CA 92324

Western Sales Office
(800) 821-0496 • Fax (909) 825-0591
Eastern Sales Office
(800) 390-7745 • Fax (301) 391-6546

ensure the best possible accuracy.

2.13 Update Site Data

Allows the user to answer questions (pre-defined in LSGAM software) relating to the site (e.g. name of operator, weather conditions, etc.). Site Questions are different than ID Questions. Once answered, site answers to site questions will be associated with all subsequent readings until the instrument is turned off or the question answers are updated.

This is covered in detail in section 3.2 of this manual.

2.14 Data Logging (GA mode only)

Enables the user to leave the Instrument unattended to take samples at pre-determined intervals. The reading interval and pump run time may be edited prior to commencing the logging cycle. The ID code may ONLY be set in LSGAM communication software.

Once the logging function is activated, the instrument will carry out a 30 second 'Warm-up' countdown (displayed bottom right) and begin the first sample. After each sample, the unit will automatically sleep to conserve power if the time between the pump ending and the next sample is greater than 30 seconds.

The instrument is reactivated (awakened) during a logging cycle, the LANDTEC logo will be displayed for a few seconds and the Gas Reading screen will be displayed. This will initiate a 30 second countdown to the next sample being taken unless the operator stops the logging function. The data will be logged against the ID setup through LSGAM for the Data Logging function

2.15 Operating Language

The operating language of the instrument can be set to English, German, Spanish, French, Italian or Brazilian Portuguese through this option.

2.16 View Data

The view data allows the user to see the readings that are in the GEM2xxx memory. Often the amount of data stored is more than can be displayed adequately on one screen so pressing the ⑤ key will allow the user to see additional screens with stored data. The 2 '^', 4 '<', 6 '>' and 8 'v' cursor keys will move forward or backwards through the instruments memory. Pressing the ① key will exit to the Gas Reading screen.

2.17 Adjust Contrast

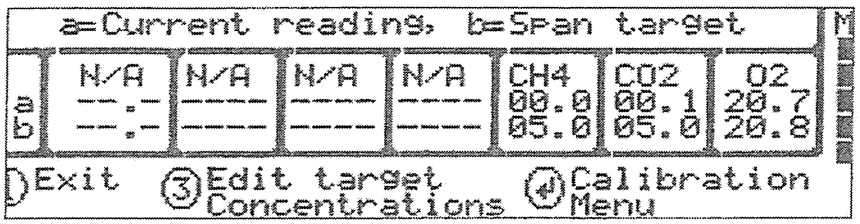
The GEM2xxx automatically adjusts the screen contrast according to the ambient temperature to maintain normal viewing.

The contrast can be manually adjusted by using the 4 '<' and 6 '>' cursor keys. The manual contrast setting is stored when the '↵' key is pressed.

2.18 Field Calibration

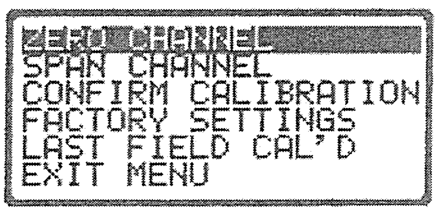
Whenever carrying out a user calibration function it is important to ensure the correct values are entered. Additionally, in the case of a zeroing function, ensure only certified gas or ambient air is used and no connection is made to a probe or wellhead fitting. Additionally, ensure the instrument is purged of any residual gas that may be inside the instrument prior to zeroing. Calibration cylinders are sold by LANDTEC. The regulator, sold by LANDTEC, is set to 0.5 liters per minute and 15 psig maximum. A normal field calibration usually requires the gas to be running for about two minutes.

Upon selecting this option, the Field Calibration screen is displayed. A brief description of the user span calibration procedure and the current reading (row 'a') and user span calibration gas values (row 'b') are displayed.



The span gas values may be changed via the '③ **Edit Target Concentrations**' option. Once this option has been selected, **all** the gas values will require entry. Each entry is to be confirmed by pressing the '↵' key. It is important to confirm the concentration of the calibration gas(es) used and enter the value(s) properly.

The calibration menu has the following menu options:



2.18.1 Zero Channels

Selected from the '**Field Calibration**' - '**↵-Calibration Menu**' allows the relevant reading to be zeroed. When selected, a list of the available options will be displayed, this usually includes CH_4, and O_2, also the Gas Pod (if fitted).

Supply a zero gas mixture to the instrument for the gas to be zeroed. Ensure the reading for the selected gas has settled to its lowest value before selecting the zero function. When the required option is selected, the user zero function will be carried out automatically. The operation will be carried out when the '↵' key is pressed.

2.18.2 Span Channels

Spanning Channels should be carried out prior to use or when the ambient operating temperature changes greater than +/- 20 degrees Fahrenheit. Selected from the '**Field Calibration**' - '**↵-Calibration Menu**', allows the relevant reading to be span calibrated (in accordance with the calibration value entered). When selected, a list of the available options will be displayed, which includes CH_4, CO_2, O_2, (CO & H_2S internally for the Plus) and if an external Gas Pod is fitted (H2S, CO, SO2, H2, NO2, Cl2, or HCN).

When the required option is selected from the list, the span calibration function will be carried out automatically. When carrying out this procedure, ensure the span calibration procedure (as outlined below) is followed:

1. Apply the relevant known certified gas concentration through the inlet port of the Instrument.
2. Wait until the current gas reading has stabilized.
3. Select the required calibration option via the '**↵-Calibration Menu**'.

2.18.3 Factory Settings

This will clear any user zero and span calibration data. It will also restore the pre-programmed factory settings for **ALL** channels – CH_4, CO_2, O_2 (CO & H_2S for the Plus) or Gas Pod (if fitted) and pressure transducers.

2.18.4 Last Field Cal

Displays the date the last field calibration was carried out (zero or span).

2.19 Mode of Operation

Allows changing instrument between GA mode and GEM mode of operation.

2.20 Information Screen

The information screen will automatically display the following information:

```
          INSTRUMENT INFORMATION

   Software Version 3.10L, 09/21/09

Serial Number     : GM11953
Full service due  : 13 Mar 2010
Last Field Cal.   : **:** **/**/**
Language          : English
Communications    : BAUD-38400H
Readings taken    : 0005 of 1800
ID's in use       : 011 of 998
Date format       : MM/dd/yy
```

Navigation

Note: This menu item is specific to GEM2NAV instrument models.

This feature has two options Navigation Screen ON and Navigation Screen OFF. If the Navigation is turned ON, a navigation screen will appear after selecting a well ID. If the Navigation screen is OFF you will skip entering through the navigation screen. If all well locations are known, the user may choose to turn this feature off. Even if this feature is turned off, the GPS will record the related information with readings.

2.21 Exit Menu

The Exit Menu simply exits the main menu screen and returns to the gas reading screen.

7 Service & Maintenance

7.1 Factory Service

LANDTEC Facilities are the ONLY authorized service centers for the GEM™ Family of instruments. LANDTEC offers a several service plans to facilitate your bi-annual Factory Servicing of the instrument. Please contact your LANDTEC representative for more information on the service plan that best fits your specific needs. Factory Service includes but is not limited to the following;

General operations
The main functions of the gas analyzers operation are checked to ensure that they are within specification.

Barometric pressure reading
The barometric pressure reading is checked to ensure it is within specification. This is carried out by way of comparing the atmospheric reading against a known standard. If necessary, reprogramming is quoted.

Static and differential pressure readings
The static and differential pressure transducers are checked to ensure they are within specifications. This is carried out by comparing instrument readings to a known standard, applying a known pressure and noting both readings. If necessary, reprogramming will be quoted.

Pump functionality (flow and vacuum)
All flow and vacuum functions of the internal pump are checked to ensure the operation is within specification.

Water ingress/blockage
The internal filters are checked for cleanliness and moisture ingress to ensure they are not contaminated.

Flow fail setting
The flow fail function is checked to ensure proper operation within the specified limits.

Gas pod and Temperature probe connectivity reading
The connectivity of the gas analyzer is checked to ensure correct operation and reading performance with accessories.

Computer controlled gas check
Inward and outward gas checks are carried out by way of connecting the gas analyzer to a custom built computer controlled calibration chamber and proprietary software. At the inward stage, two sets of readings are taken - one using the customer's calibration settings and a second set using factory calibration settings. During this process a range of gases are used that span the reading range of the gas analyzer.

Structural and aesthetics check
The instrument is checked for cracks, scratches and broken or missing pieces.

7.2 Factory Service Facilities

LANDTEC North America
850 S. Via Lata, Suite 112
Colton, CA 92324
USA
Sales Tel: +1 (800) 821-0496 or +1 (909) 783-3636
Service Tel: 1 (909) 783-3636 x6141
Web: www.LANDTECNA.com

LANDTEC Europe
Formerly Geotechnical Instruments
Sovereign House Queensway
Leamington Spa, Warwickshire CV31 3JR,
England
Tel: +44(0)1926 338111
Web: www.geotech.co.uk

LANDTEC South America
LANDTEC Produtos e Servicoŝ Ambientais Ltda.
Rua Pedroso de Carmargo, 237 - Chácara
Santo Antonio - SP/SP CEP 0417-010
Brazil
Phone: +55(11) 5181-6591
Web: www.landtecbrazil.com.br

7.3 User Maintenance

This instrument is designed to be low maintenance and rugged. However, field calibrations are recommended prior to use or when the ambient operating temperature of the instrument changes more than +/- 20 degrees Fahrenheit. See section 2.18 for further information on field calibrations. Additionally, it may be necessary to change the user accessible filters and o-rings from time to time.

There are two user accessible filters, the particulate filter is located in the back of the instrument, see section 1.1 for location, and the water trap filter which is part of the included hose kit. There are four user changeable o-rings, one on the particulate filter cover, one on the outside of the water trap filter housing, one on the inside of the water trap filter housing, and one on the ends of each male quick connect fitting included on the hose kits.

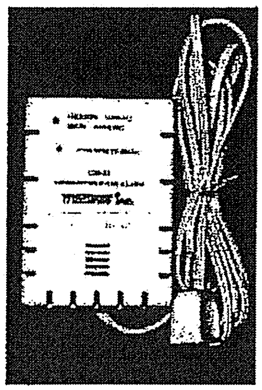
Note: The o-rings on the male quick connect fittings should be routinely checked as dust and dirt from the various wells they connect to can be abrasive. A damaged or leaky o-ring may allow air intrusion into your gas sample. This intrusion of air may not be noticed when calibrating the instrument because the calibration does not occur under vacuum.

BUILDING MONITORING EQUIPMENT

GAS DETECTION
Macurco inc.

COMBUSTIBLE GAS ALARM

Residential landfill buildings commercial



GD-21

- 120 VOLT PLUG IN UNIT
- ATTRACTIVE CASE
- LOUD BUZZER ALARM
- EASY INSTALLATION
- GAS DETECTION IS FIRE PREVENTION

FEATURES:

- Detects many combustible gases: Natural Gas, LP, Propane, Butane, and Gasoline Fumes.
- Standard Calibration setting is 25% of LEL (Lower Explosive Limit) for natural gas.
- Loud Buzzer (similar to a smoke alarm buzzer) wakes even heavy sleepers.
- Stand Alone Unit: Plug into any 120 VAC power outlet.
- Ignition protected: Explosion Proof Design.
- Maintenance free electronic sensor, supervised.
- Small, compact, attractive white case.
- Easy to install: Just hang unit on a screw or nail, and plug it in.
- Special calibrations are available.

SPECIFICATIONS:

POWER: 120 VAC, 60 Hz
CURRENT: Less than 10 watts
SHIPPING WEIGHT: 1 lb
COLOR: White
ALARM SOUND: 88 dB @ 10 ft
ALARM SET POINT: 25% of LEL natural gas
SENSOR MAINTENANCE: none
SENSOR LIFE: 7 – 10 years
SIZE: 4½ x 3¼ x 1¾ inches

DETECTOR LOCATION:

WHERE: Gas detectors should be placed near the source of the potential leak, namely near a gas appliance such as a furnace, water heater, or gas log fireplace. Because of various odors and gases given off in cooking, place the unit near, but not in the kitchen.

MOUNTING HEIGHT: For natural gas and methane which are lighter than air, mount the unit 1 ft below the ceiling. For propane, LP, and other gases that are heavier than air, mount the detector 1 ft above the floor

MANUFACTURER:

Macurco Inc.
3946 S. Mariposa Street
Englewood, CO 80110
303-781-4062 Fx: 303-761-6640
www.macurco.com

DISTRIBUTED BY:

MACURCO GAS DETECTORS
GD-21
INSTALLATION & OPERATING INSTRUCTIONS
WWW.MACURCO.COM

GENERAL INFORMATION

The GD-21 is a 120VAC plug in type unit, with a self-contained alarm. The standard calibration is to 25% of LEL (Lower Explosive Level) of a mixture of Methane (natural gas) and air. The GD-21 will alarm at about 25% of LEL of Propane, Butane and LP Gas. To detect the complete list of gases on the data sheet will normally require a special calibration, for a nominal charge. However, the following gases can be detected with the standard calibration: Acetylene, Gasoline fumes and Lacquer thinners. See the GD-21 data sheet for a list of other gases that can be detected, and other technical information.

LOCATION

The unit on average can cover about 900 sq. ft. The coverage depends on air movement in the room or facility. Locate the unit high if the gas of concern is lighter than air, such as natural gas (methane). If the gas of concern is heavier than air; such as butane, propane, alcohols or gasoline; mount the detector relatively low. Extra detectors may be needed near any areas were people work or the air is stagnant.

The location selected should not be near a corner, as this can be dead air space. The location selected must also have a 120 VAC power outlet within nine feet. It is not suggested to locate gas detectors in kitchens or bathrooms, because of frequent unwanted alarms due to the normal use in those rooms of products containing combustible gases.

INSTALLATION

At the desired location, start a #6 or #8 wood screw of adequate length. Turn the screw into the wall until only 1/4 inch of the screw protrudes. Note the keyhole shaped mounting pattern on the back of the detector. Slip the larger part of this mounting pattern over the mounting screw head and allow the GD-21 to settle over the screw. Insert the plug into a 120 VAC outlet.

OPERATION

When power is first applied to the detector, it will go through a warm-up period of about two minutes. The unit has an internal delay that prevents alarms during the warm-up period. The green light will blink on and off during the two-minute delay period, and will glow brightly, continuously afterwards. The ***PUSH HERE TO RESET*** button resets the 2 minute delay. Once the unit is fully operational (the green light on continuously) test the unit by directing gas from an *un-lighted* butane cigarette lighter into the detector near the slot closest to the word ALARM on the decal. The buzzer will alarm loudly and the light should turn red. The GD-21 will shut off the buzzer and turn the light green automatically once the air clears. However, the ***PUSH HERE TO RESET*** button may be pushed to reset the two minute delay and silence the buzzer while the air clears.

The unit has a trouble signal to indicate problems in the gas-sensing element. This is a chirping sound, along with the light changing to a yellow color, to indicate your detector is inoperable. Return the unit to the factory for service. The detector should be tested regularly, about every 6 months, by using gas from an *un-lighted* cigarette lighter, as detailed above.

REV. 12/97

ALARM ACTIONS

Various fumes and gases from normal household products such as aerosol spray cans and cleaning agents can cause the GD-21 to alarm. Strong cooking odors may cause the GD-21 to alarm. The data sheet has a list of the gases that can cause alarms. If such an alarm occurs, push the *PUSH HERE TO RESET* button on the detector, which will silence the alarm for two minutes, while allowing the air to clear.

All of the above mentioned unwanted alarms are related to normal day time activities in a home, and should be of no concern if they can be easily traced to by-products of normal activities. **HOWEVER, DURING THE NIGHT WHEN THERE IS NOT NORMAL ACTIVITY TO PRODUCE FUMES, ALL ALARMS BY THE GD-21 MUST BE TREATED AS POTENTIAL EMERGENCIES.**

SENSOR POISONS

The gas sensing tip in the detector is designed with extreme sensitivity to the environment. As a result, the sensing function of the tip may be deteriorated if it is exposed to a direct spray from aerosols such as paints, silicone vapors, etc., or to a high density of corrosive gases (such as hydrogen sulfide, sulfur dioxide) for an extended period of time.

SERVICING OF UNIT

The GD-21 does not require regular maintenance. The unit uses a self-purging semi-conductor sensor that has a 7-10 year life expectancy. All maintenance and repair of products manufactured by Macurco, Inc. are to be performed at the Macurco manufacturing facility. Macurco does not sanction any third-party repair facilities.

LIMITED WARRANTY

The GD-21 gas detectors are warranted to be free from defective material and workmanship for a period of one (1) year from the date of installation. If any component becomes defective during the warranty period, it will be replaced or repaired free of charge, if the unit is returned in accordance with the instructions below. This warranty does not apply to units that have been altered or had repair attempted, or that have been subjected to abuse, accidental or otherwise. The above warranty is in lieu of all other express warranties, obligations or liabilities. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM THE PURCHASE DATE. Macurco shall not be liable for any incidental or consequential damages for breach of this or any other warranty express or implied arising out of or related to the use of said gas detector. Manufacturer or its agents liability shall be limited to replacement or repair as set forth above. Buyer's sole and exclusive remedies are return of the goods and repayment of the price, or repair and replacement of non-conforming goods or parts. (The Uniform Commercial Code applicable in the State of Colorado shall govern.)

RETURN INSTRUCTIONS

Call (303) 781-4062 for a Return Authorization number. Then carefully pack the gas detector with a written description of the nature of the return. Send the unit to the following address:

Macurco Inc.
3946 South Mariposa Street
Englewood, Colorado 80110

WWW.MACURCO.COM

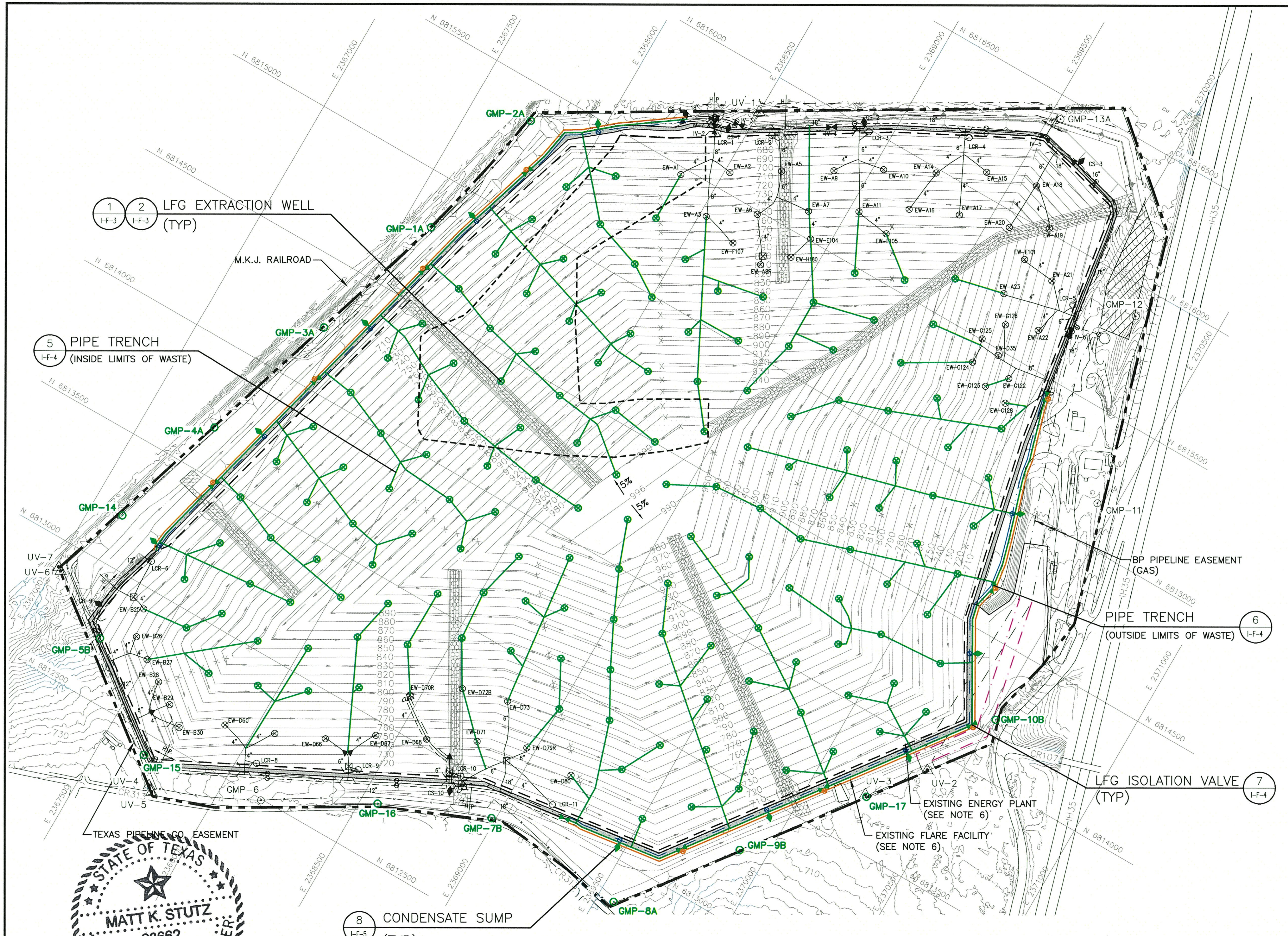
APPENDIX III I-F

LANDFILL GAS COLLECTION AND CONTROL SYSTEM PLAN

STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER

2/22/22

Includes Figures III I-F-1 through III I-F-6



STATE OF TEXAS
MATT K. STUTZ
93662
LICENSED
PROFESSIONAL ENGINEER
2/22/22

LEGEND

0 100 200 400
SCALE IN FEET

	PERMIT BOUNDARY
	LIMITS OF WASTE
	LIMITS OF OVERLINER
730	EXISTING CONTOUR
N 6816000	STATE PLANE COORDINATE
32° 21' 20"	GEODETIC COORDINATE
	EXISTING EASEMENT
	RELOCATED EASEMENT
	LIMITS OF PRE-SUBTITLE D AREA
GMP-12	EXISTING LFG MONITORING PROBE
UV-1	EXISTING UTILITY TRENCH VENT
	EXISTING LEACHATE FORCEMAIN
EW-A9	EXISTING LFG EXTRACTION WELL
	EXISTING LFG COLLECTION PIPING
LCR-1	EXISTING LCR CONNECTION
CS-3	EXISTING CONDENSATE SUMP
IV-2	EXISTING ISOLATION VALVE
	EXISTING REMOTE WELLHEAD
	EXISTING ROAD CROSSING
	EXISTING BLIND FLANGE
	EXISTING HDPE CAP
	EXISTING PIPE REDUCER
	EXISTING AIR SUPPLY PIPING
	EXISTING CONDENSATE FORCEMAIN
	EXISTING AIR/FORCEMAIN VALVE
GMP-17	PROPOSED LFG MONITORING PROBE
	PROPOSED LFG EXTRACTION WELL
	PROPOSED GAS COLLECTION PIPING
	PROPOSED CONDENSATE SUMP
	PROPOSED LFG ISOLATION VALVE
	PROPOSED AIR SUPPLY LINE
	PROPOSED CONDENSATE FORCEMAIN
	PROPOSED AIR/FORCEMAIN VALVE
	FUTURE LFGTE FACILITY LOCATION

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. LOCATIONS SHOWN FOR THE PROPOSED LFG EXTRACTION WELLS, COLLECTION PIPING, SUMPS, VALVES, AND ASSOCIATED LFG SYSTEM COMPONENTS ARE APPROXIMATE. ACTUAL NUMBERS, LOCATIONS, AND PIPING CONFIGURATION TO BE DETERMINED BASED ON THE FIELD CONDITIONS AT THE TIME OF INSTALLATION.
3. PROPOSED LFG SYSTEM COMPONENTS WILL BE INSTALLED IN PHASES AS NEEDED.
4. AT LOCATIONS WHERE NEW WELLS MAY BE INSTALLED AFTER OVERLINER INSTALLATION, THE EXTRACTION WELL WILL BE INSTALLED ABOVE THE OVERLINER AS SHOWN IN DETAIL 2 OF FIGURE III I-F-3.
5. IN THE OVERLINER AREA WHERE EXTRACTION WELLS HAVE BEEN INSTALLED PRIOR TO THE OVERLINER INSTALLATION, THE EXTRACTION WELLS WILL BE EXTENDED THROUGH THE OVERLINER AS SHOWN IN DETAIL 1 OF FIGURE III I-F-3 AND ADDITIONAL EXTRACTION WELLS MAY BE INSTALLED ADJACENT TO THE EXTENDED WELLS ABOVE THE OVERLINER AS SHOWN IN DETAIL 2 OF FIGURE III I-F-3 OR THE EXISTING EXTRACTION WELLS MAY BE CONNECTED TO HORIZONTAL LFG COLLECTORS AS SHOWN IN DETAIL 11 OF FIGURE III I-F-6 AND NEW WELLS MAY BE INSTALLED ABOVE THE OVERLINER AS SHOWN IN DETAIL 2 OF FIGURE III I-F-3 BUT THERE WILL BE NO DRILLING THROUGH THE OVERLINER.
6. THE EXISTING FLARE FACILITY AND ENERGY PLANT WILL BE RELOCATED PRIOR TO LANDFILL DEVELOPMENT.

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DATE: 02/2022
FILE: 0771-368-11
CAD: III I-F-1 GCCS COMPLETION PLAN.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: NT

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MAJOR PERMIT AMENDMENT
GCCS COMPLETION PLAN

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE III I-F-1

O:\0771\368\EXPANSION 2021\PART III\IIII\III I-F-1_COMPLETION PLAN.dwg, rarrington, 1:2

0 100 200 400
SCALE

LEGEND

	PERMIT BOUNDARY
	LIMITS OF WASTE
730	EXISTING CONTOUR
N 6816000	STATE PLANE COORDINATE
32° 21' 20"	GEODETIC COORDINATE
	EASEMENT
	LIMITS OF PRE-SUBTITLE D AREA
GMP-12	EXISTING LFG MONITORING PROBE
UV-1	EXISTING UTILITY TRENCH VENT
	EXISTING LEACHATE FORCEMAIN
EW-A9	EXISTING LFG EXTRACTION WELL
	EXISTING LFG COLLECTION PIPING
HZ-10	EXISTING HORIZONTAL LFG COLLECTOR WITH CHIMNEY WELLS
LCR-1	EXISTING LCR CONNECTION
CS-3	EXISTING CONDENSATE SUMP
IV-2	EXISTING ISOLATION VALVE
	EXISTING REMOTE WELLHEAD
	EXISTING ROAD CROSSING
	EXISTING BLIND FLANGE
	EXISTING HDPE CAP
	EXISTING PIPE REDUCER
	EXISTING AIR SUPPLY PIPING
	EXISTING CONDENSATE FORCEMAIN
	EXISTING AIR/FORCEMAIN VALVE

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY DALLAS AERIAL SURVEYS FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. EXISTING HORIZONTAL LFG COLLECTOR LOCATIONS ARE APPROXIMATE.

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FILE: 0771-368-11
CAD: III I-F-2 EXISTING GCCS LAYOUT.DWG
DRAWN BY: VRS
DESIGN BY: SR
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MAJOR PERMIT AMENDMENT EXISTING GCCS LAYOUT

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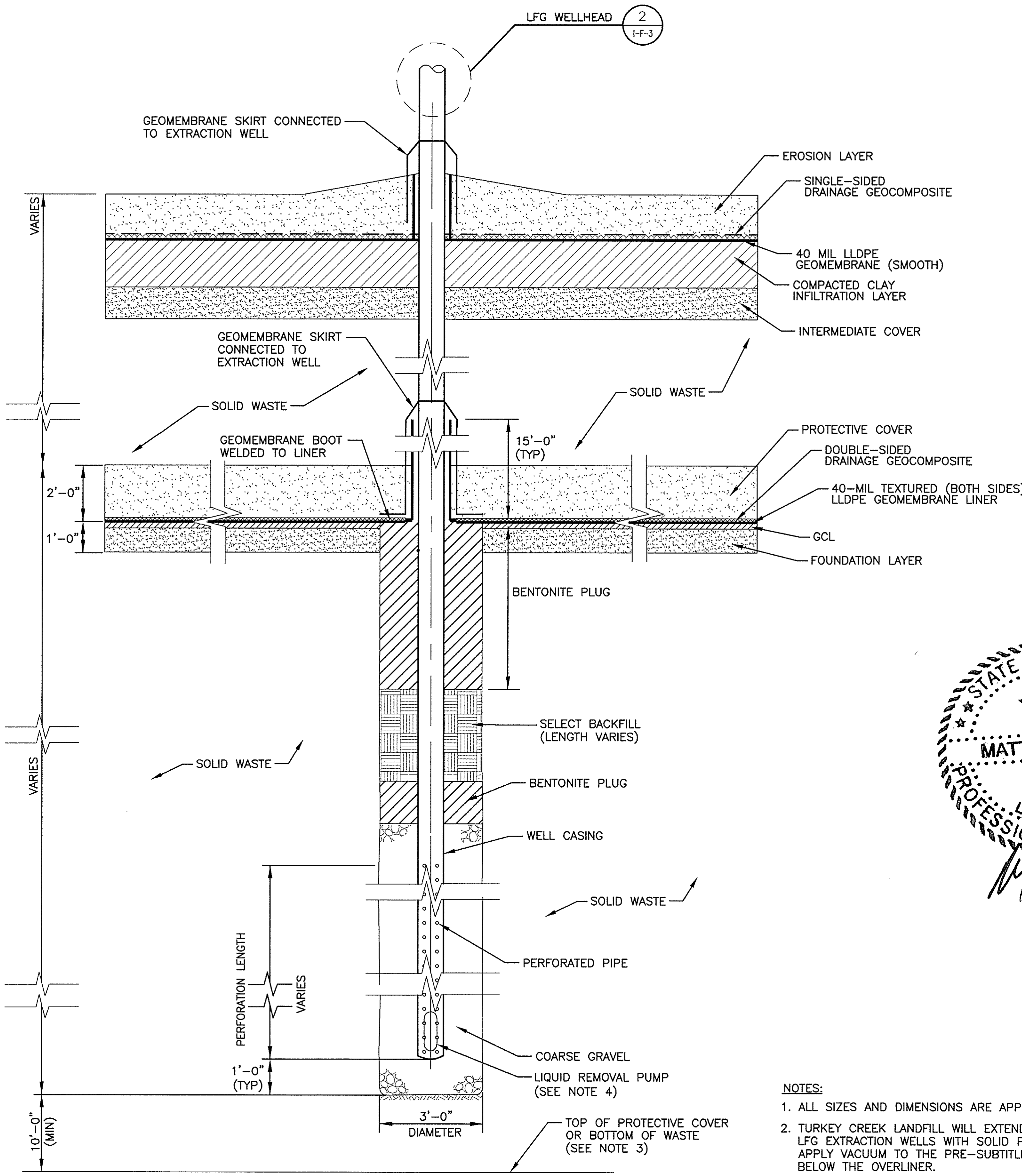
FIGURE III I-F-2

O:\0771\368\EXPANSION 2021\PART III\III I-F-2_EXISTING GCCS LAYOUT.dwg, rarrington, 1:2



LFG EXTRACTION WELL

INSTALLED WITH SEPARATORY OVERLINER SYSTEM
NTS

1
I-F-3

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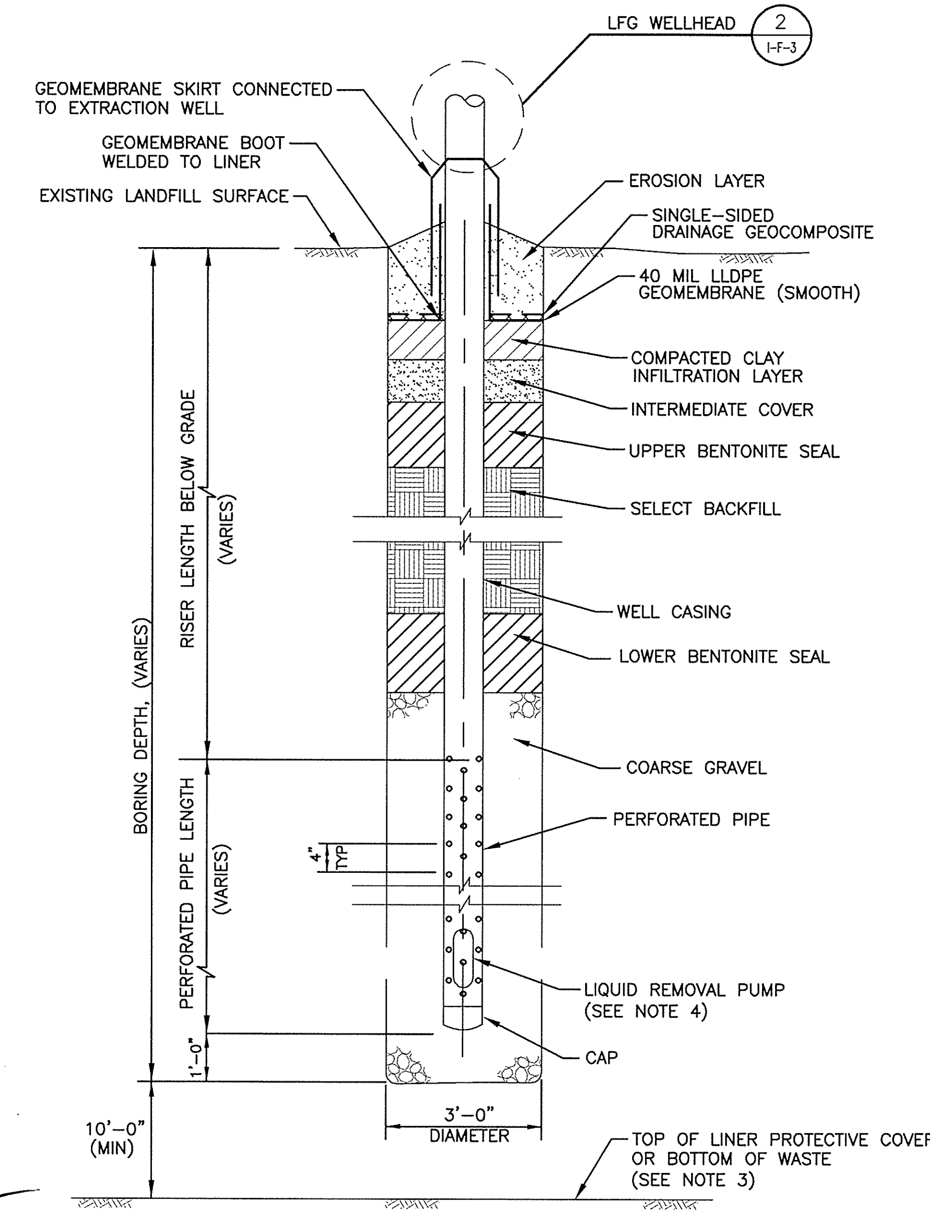

LFG EXTRACTION WELL

INSTALLED OUTSIDE OR ABOVE THE SEPARATORY OVERLINER SYSTEM
NTS

2
I-F-3

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. TURKEY CREEK LANDFILL WILL EXTEND EXISTING LFG EXTRACTION WELLS WITH SOLID PIPING TO APPLY VACUUM TO THE PRE-SUBTITLE D AREA BELOW THE OVERLINER.
3. THE ELEVATION OF THE SEPARATORY OVERLINER SYSTEM OR OTHER EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.
4. PUMPS MAY BE INSTALLED AS NEEDED.

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. GEOMEMBRANE BOOT AND SKIRT ONLY APPLICABLE IN LANDFILL AREAS WITH GEOMEMBRANE FINAL CAP.
3. THE ELEVATION OF THE SEPARATORY OVERLINER SYSTEM OR OTHER EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.
4. PUMPS MAY BE INSTALLED AS NEEDED.

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EXTRACTION WELL DETAILS

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JOHNSON COUNTY, TEXAS

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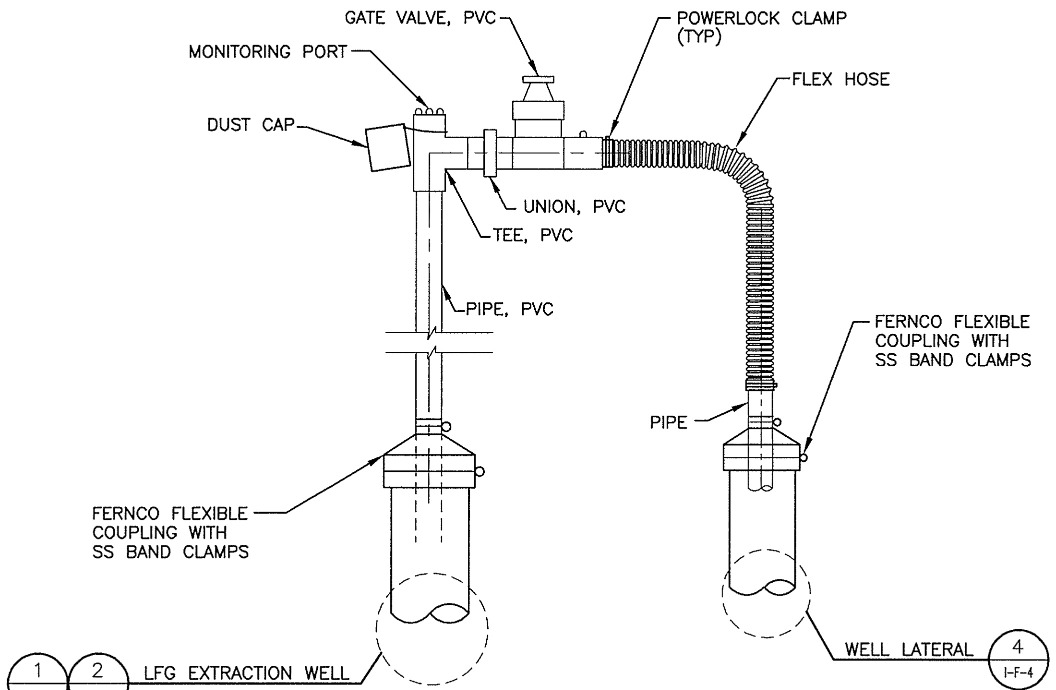
FIGURE III I-F-3

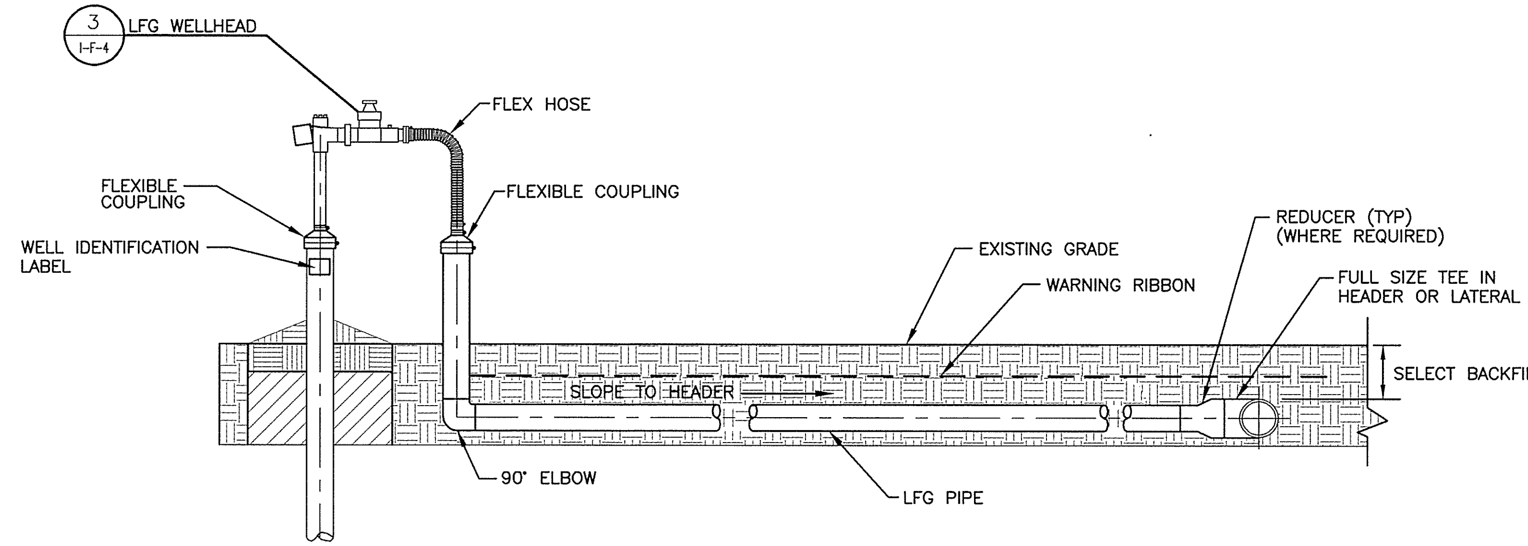
O:\0771\368\EXPANSION 2021\PART III\III\III I-F-3 EXTRACTION WELL DETAILS.dwg, rarrington, 1:2



LFG WELLHEAD 3 I-F-4
NTS

NOTES:

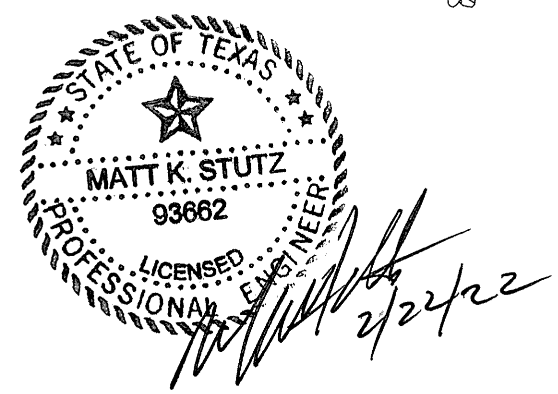
1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. EXACT WELLHEAD CONFIGURATION DEPENDS ON MANUFACTURER.

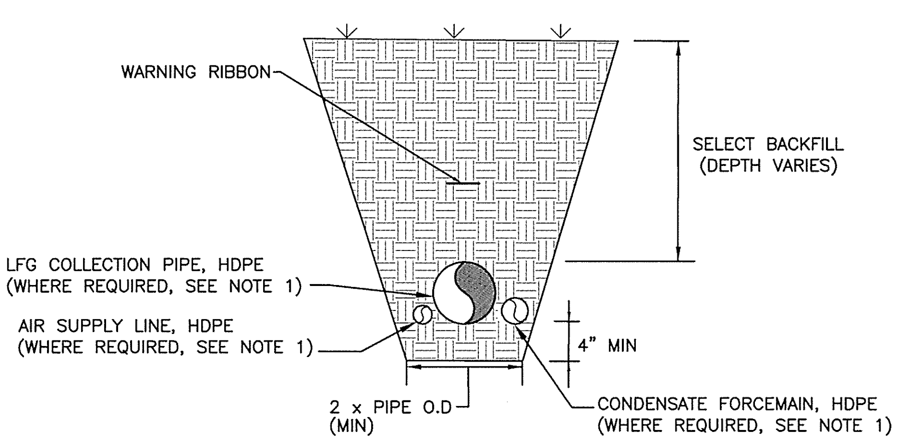


WELL LATERAL 4 I-F-4
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THIS DETAIL REPRESENTS TYPICAL WELL LATERAL INSTALLED WITHOUT OR ABOVE FINAL COVER. SHOULD THE WELL LATERAL BE INSTALLED BELOW THE FINAL COVER WITH GEOMEMBRANE; A GEOMEMBRANE SKIRT COMPONENT WILL BE ADDED.

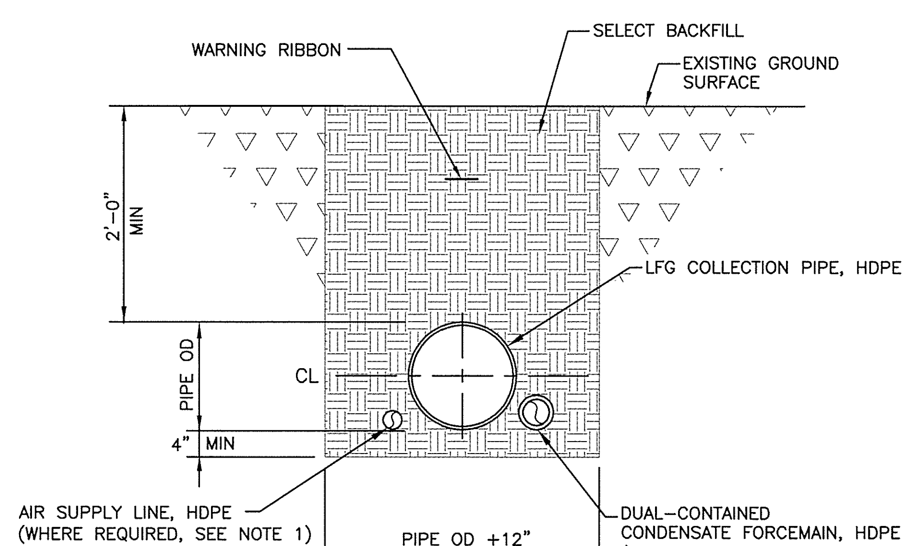




PIPE TRENCH 5 I-F-4
(INSIDE LIMITS OF WASTE)
NTS

NOTES:

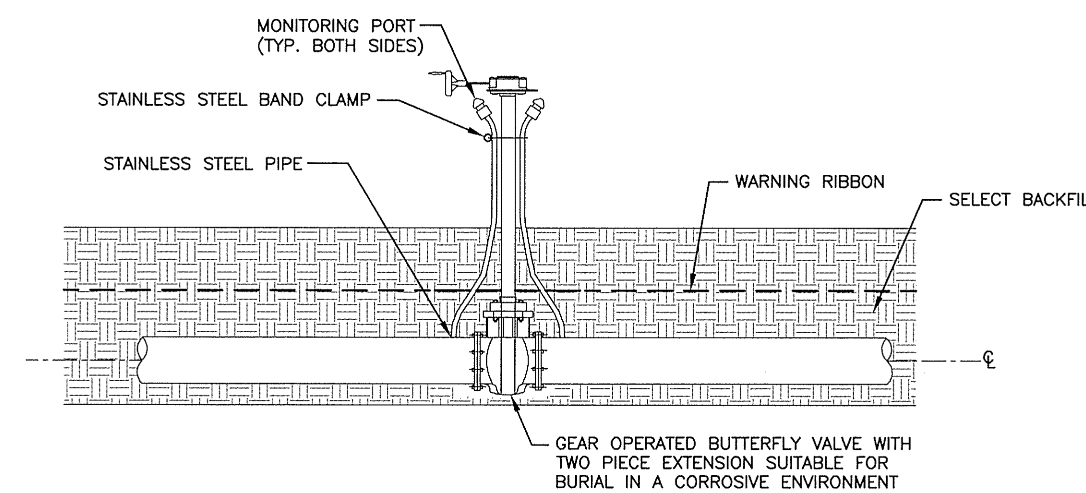
1. THE NUMBER OF PIPES IN THE PIPE TRENCH VARIES.
2. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.



PIPE TRENCH 6 I-F-4
(OUTSIDE LIMITS OF WASTE)
NTS

NOTES:

1. THE NUMBER OF PIPES IN THE PIPE TRENCH VARIES.
2. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.



LFG ISOLATION VALVE 7 I-F-4
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THIS DETAIL REPRESENTS TYPICAL LFG ISOLATION VALVE INSTALLED WITHOUT OR ABOVE FINAL COVER. SHOULD THE LFG ISOLATION VALVE BE INSTALLED BELOW THE FINAL COVER WITH GEOMEMBRANE; A GEOMEMBRANE SKIRT COMPONENT WILL BE ADDED.

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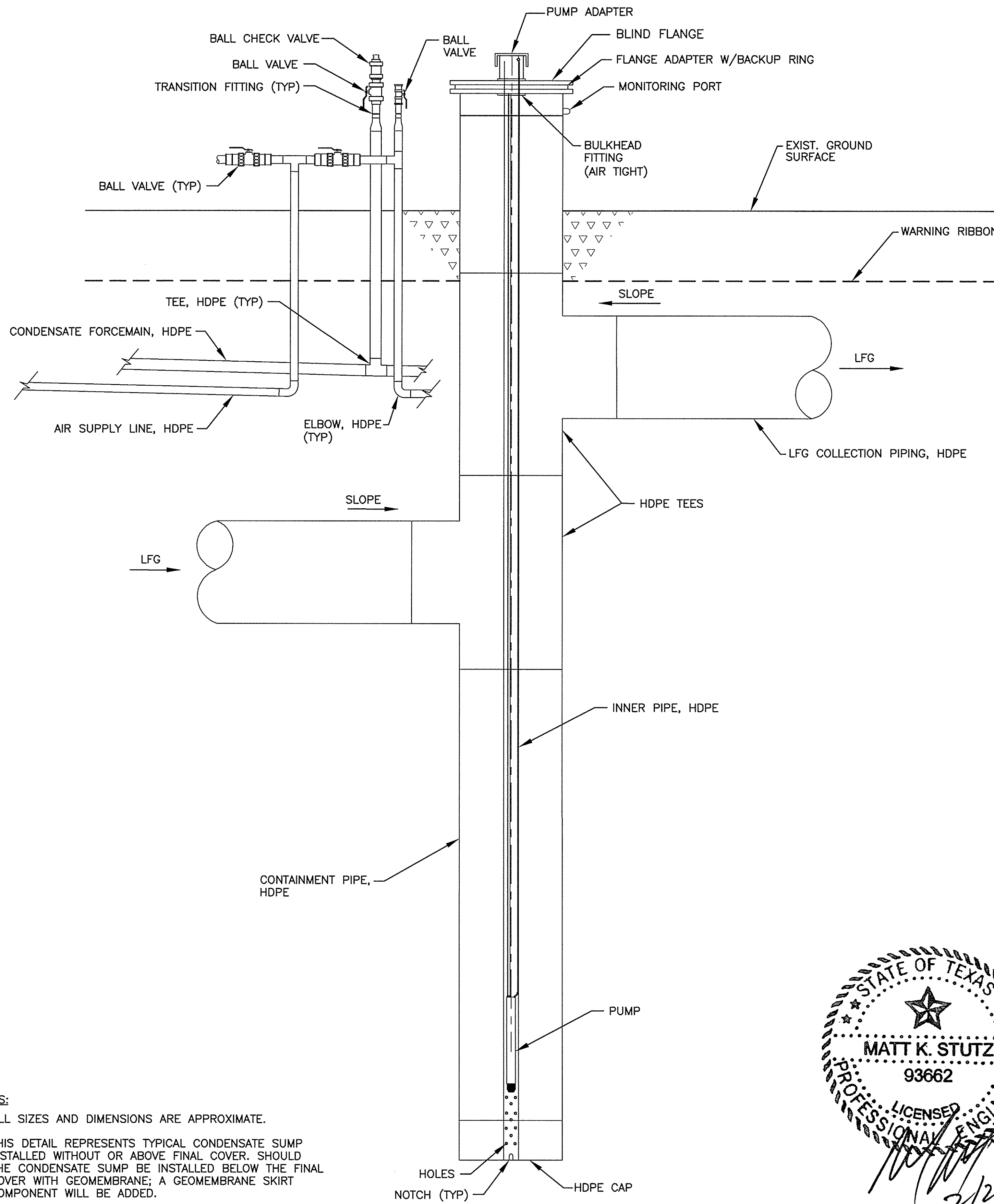
FIGURE III I-F-4

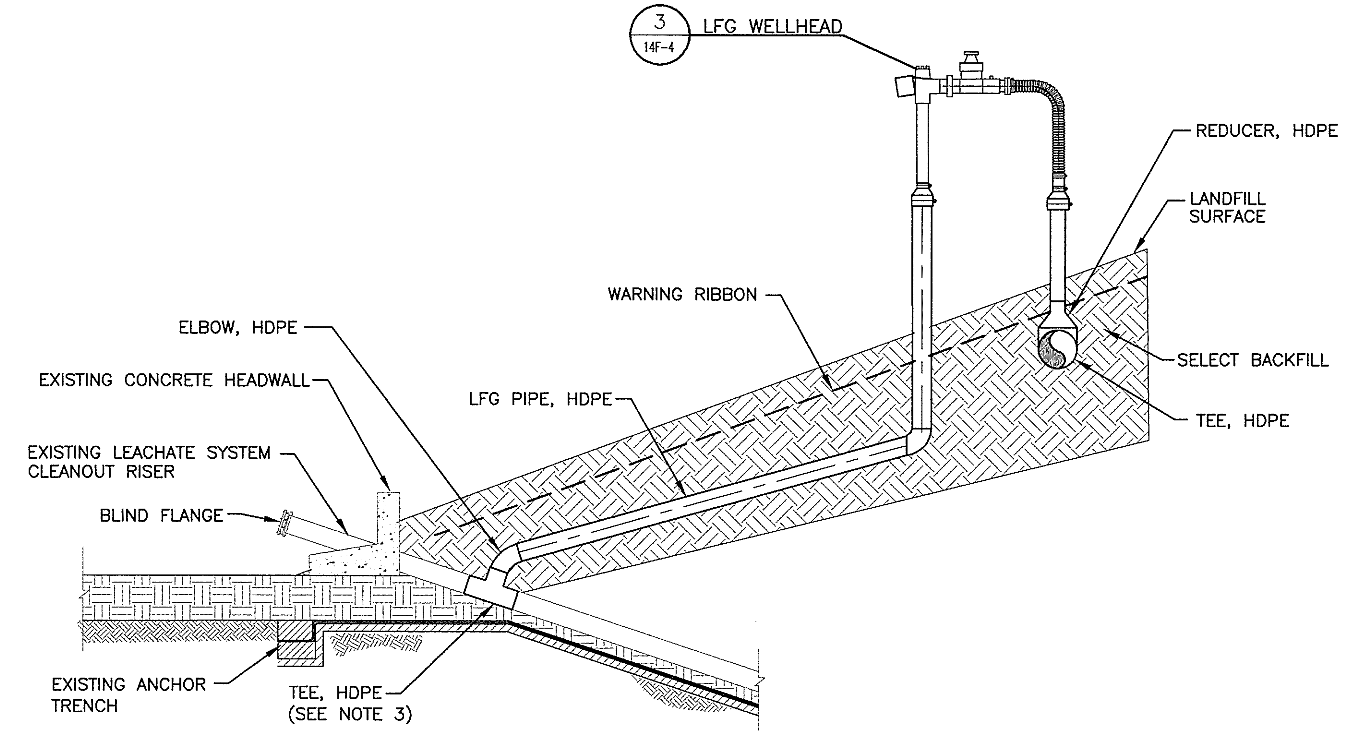
O:\0771\368\EXPANSION 2021\PART III\III\III I-F-4 PIPING DETAILS.dwg, rarrington, 1:2



CONDENSATE SUMP 8 I-F-5
NTS

NOTES:

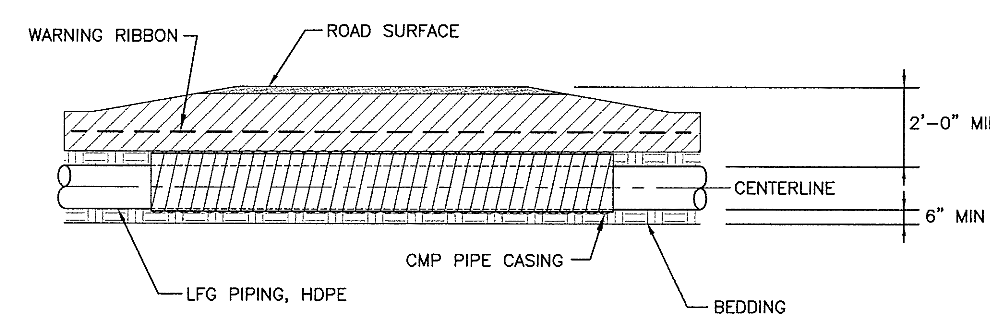
1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THIS DETAIL REPRESENTS TYPICAL CONDENSATE SUMP INSTALLED WITHOUT OR ABOVE FINAL COVER. SHOULD THE CONDENSATE SUMP BE INSTALLED BELOW THE FINAL COVER WITH GEOMEMBRANE; A GEOMEMBRANE SKIRT COMPONENT WILL BE ADDED.



LFG PIPING TO LCR CONNECTION 9 I-F-5
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THIS DETAIL REPRESENTS TYPICAL LFG PIPING TO LCR CONNECTION INSTALLED WITHOUT OR ABOVE FINAL COVER. SHOULD THE LFG PIPING TO LCR CONNECTION BE INSTALLED BELOW THE FINAL COVER WITH GEOMEMBRANE; A GEOMEMBRANE SKIRT COMPONENT WILL BE ADDED.
3. THE ELEVATION OF THE EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.



ROAD CROSSING 10 I-F-5
NTS

NOTE:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.

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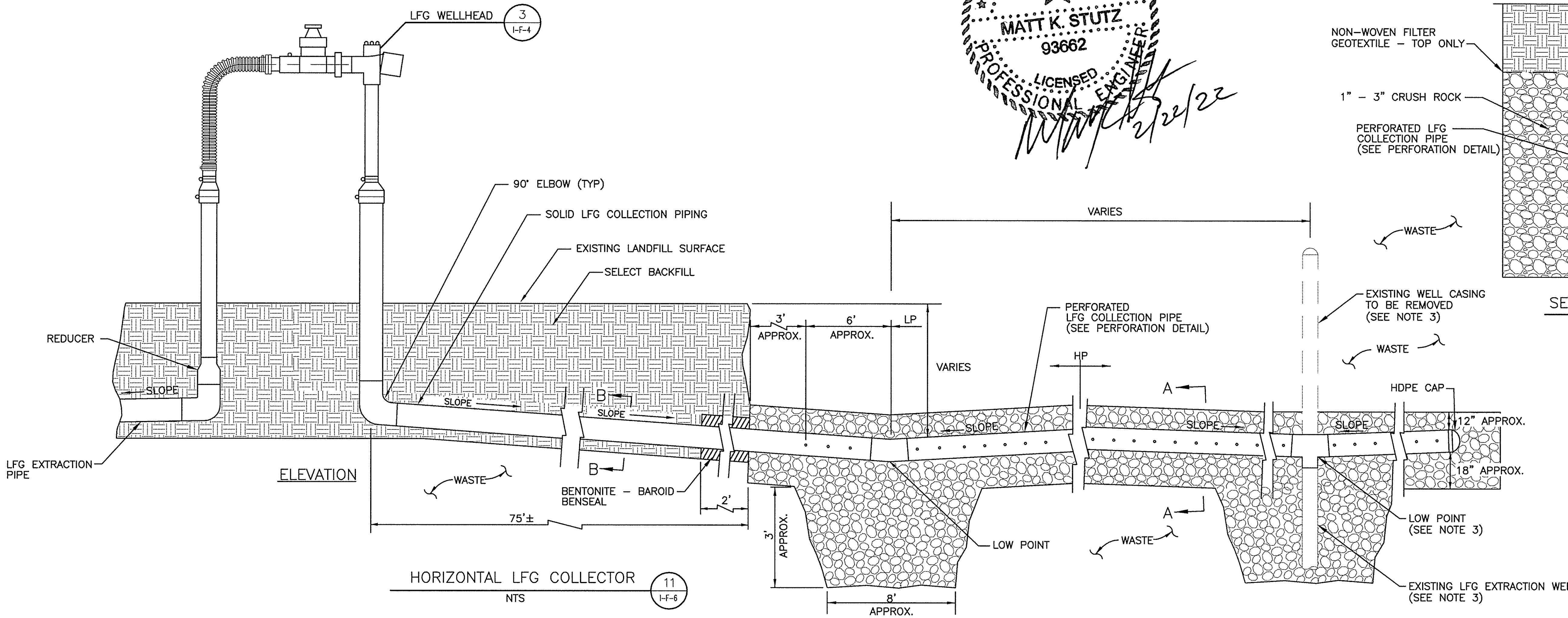
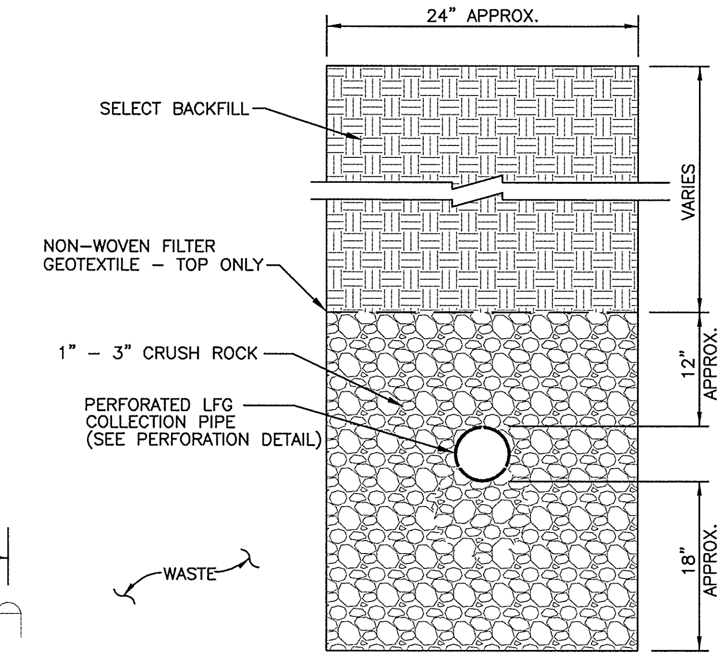
DATE: 02/2022 FILE: 0771-368-11 CAD: III I-F-5 DETAILS.DWG DRAWN BY: VRS DESIGN BY: SR REVIEWED BY: NT	REVISIONS NO. / DATE / DESCRIPTION	TURKEY CREEK LANDFILL JOHNSON COUNTY, TEXAS
Weaver Consultants Group TBPE REGISTRATION NO. F-3727		WWW.WCGRP.COM — FIGURE III I-F-5

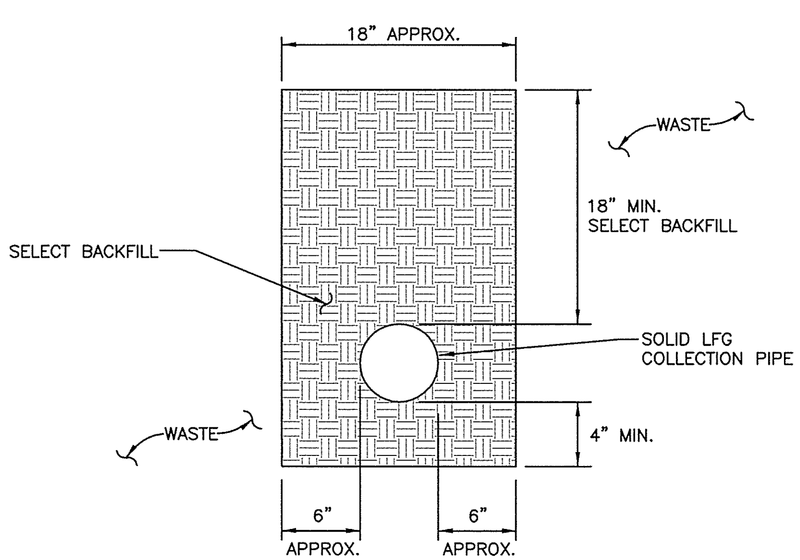
O:\0771\368\EXPANSION 2021\PART III\III\III I-F-5 SUMP_LCR DETAILS.dwg, rarrington, 1:2



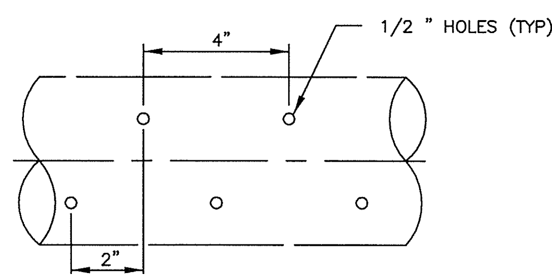
HORIZONTAL LFG COLLECTOR
11
I-F-6
NTS



SECTION A–A
NTS



SECTION B–B
NTS



LFG COLLECTION PIPE PERFORATION DETAIL
NTS

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. HORIZONTAL LFG COLLECTORS MAY BE USED FOR INTERIM GAS CONTROL.
3. IN THE OVERLINER AREA WHERE EXTRACTION WELLS HAVE BEEN INSTALLED PRIOR TO OVERLINER INSTALLATION, THE EXTRACTION WELLS MAY BE CONNECTED TO HORIZONTAL LFG COLLECTORS AND NEW WELLS MAY BE INSTALLED ABOVE THE OVERLINER AS SHOWN IN DETAIL 2 OF FIGURE III I-F-3.

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MAJOR PERMIT AMENDMENT
HORIZONTAL LFG COLLECTOR DETAILS

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FIGURE III I-F-6

O:\0771\368\EXPANSION 2021\PART III\III\III I-F-6 HZ COLLECTOR DETAILS.dwg, rarrington, 1:2

APPENDIX III I-G

LFG GENERATION MODEL

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Includes pages III I-G-1 through III I-G-3

LANDFILL GAS GENERATION MODEL

Table 14-G-1 presents the results of an LFG generation rate estimate prepared for the Turkey Creek Landfill. The estimate was generated using the U.S. Environmental Protection Agency (EPA) Landfill Gas Emission Model (LandGEM), Version 3.02. The modeling results reflect the estimated waste quantities accepted over the operating life of the site, including the proposed landfill expansion.

The gas generation established by the EPA in AP-42, Compilation of Air Pollutant Emission Factors, recommends a methane generation potential (L_o) of 100 cubic meters per megagram of solid waste, and a methane generation constant (k) of 0.04 year^{-1}. For converting methane to LFG, a methane content of 50 percent was assumed.

The results suggest the LFG generation rate will continue to increase with time as more waste is placed in the landfill. Based on LandGEM model results and using the site life calculations, the peak LFG generation is expected to be achieved in year 2036 with a maximum generation rate of approximately 7,118 standard cubic feet per minute.

Table III I-G-1
Estimated Landfill Gas Generation Rate
Turkey Creek Landfill

Year	Waste Acceptance (Mg/yr)	Waste In Place (Mg)	Landfill Gas Generation (scfm)
1983	11,680	0	0
1984	12,498	11,680	6
1985	13,135	24,178	13
1986	13,897	37,313	19
1987	14,480	51,209	26
1988	14,596	65,690	32
1989	14,655	80,286	39
1990	14,669	94,941	45
1991	14,875	109,610	51
1992	15,157	124,485	57
1993	15,415	139,642	62
1994	15,800	155,057	68
1995	16,322	170,858	74
1996	16,730	187,179	80
1997	17,282	203,909	85
1998	17,956	221,191	91
1999	18,620	239,147	97
2000	18,676	257,767	103
2001	221,076	276,444	109
2002	568,768	497,520	221
2003	670,987	1,066,288	513
2004	619,331	1,737,275	847
2005	567,293	2,356,606	1,141
2006	603,111	2,923,899	1,396
2007	27	3,527,010	1,659
2008	44	3,527,037	1,594
2009	152,376	3,527,081	1,532
2010	272,389	3,679,457	1,552
2011	338,870	3,951,846	1,635
2012	399,654	4,290,716	1,750
2013	394,581	4,690,370	1,892
2014	478,503	5,084,951	2,026
2015	448,314	5,563,454	2,200
2016	517,838	6,011,768	2,350
2017	537,076	6,529,606	2,531
2018	517,838	7,066,682	2,716
2019	593,200	7,584,520	2,883
2020	621,115	8,177,720	3,083
2021	613,732	8,798,835	3,290
2022	777,863	9,412,568	3,485
2023	824,957	10,190,431	3,759
2024	837,763	11,015,387	4,047
2025	850,767	11,853,150	4,331
2026	863,973	12,703,917	4,610
2027	877,385	13,567,890	4,885

Table III I-G-1
Estimated Landfill Gas Generation Rate
Turkey Creek Landfill

Year	Waste Acceptance (Mg/yr)	Waste In Place (Mg)	Landfill Gas Generation (scfm)
2028	891,004	14,445,275	5,157
2029	904,835	15,336,280	5,425
2030	918,881	16,241,115	5,690
2031	931,025	17,159,996	5,952
2032	943,330	18,091,021	6,210
2033	955,797	19,034,351	6,465
2034	968,429	19,990,148	6,716
2035	808,084	20,958,577	6,964
2036	**0**	**21,766,662**	**7,118**
2037	0	21,766,662	6,839
2038	0	21,766,662	6,570
2039	0	21,766,662	6,313
2040	0	21,766,662	6,065
2041	0	21,766,662	5,827
2042	0	21,766,662	5,599
2043	0	21,766,662	5,379
2044	0	21,766,662	5,168
2045	0	21,766,662	4,966
2046	0	21,766,662	4,771
2047	0	21,766,662	4,584
2048	0	21,766,662	4,404
2049	0	21,766,662	4,232
2050	0	21,766,662	4,066

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIJ
CLOSURE PLAN

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9970

WCG Project No. 0771-368-11-123

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CONTENTS

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02/22/22

TABLES AND FIGURES

Tables

Figures

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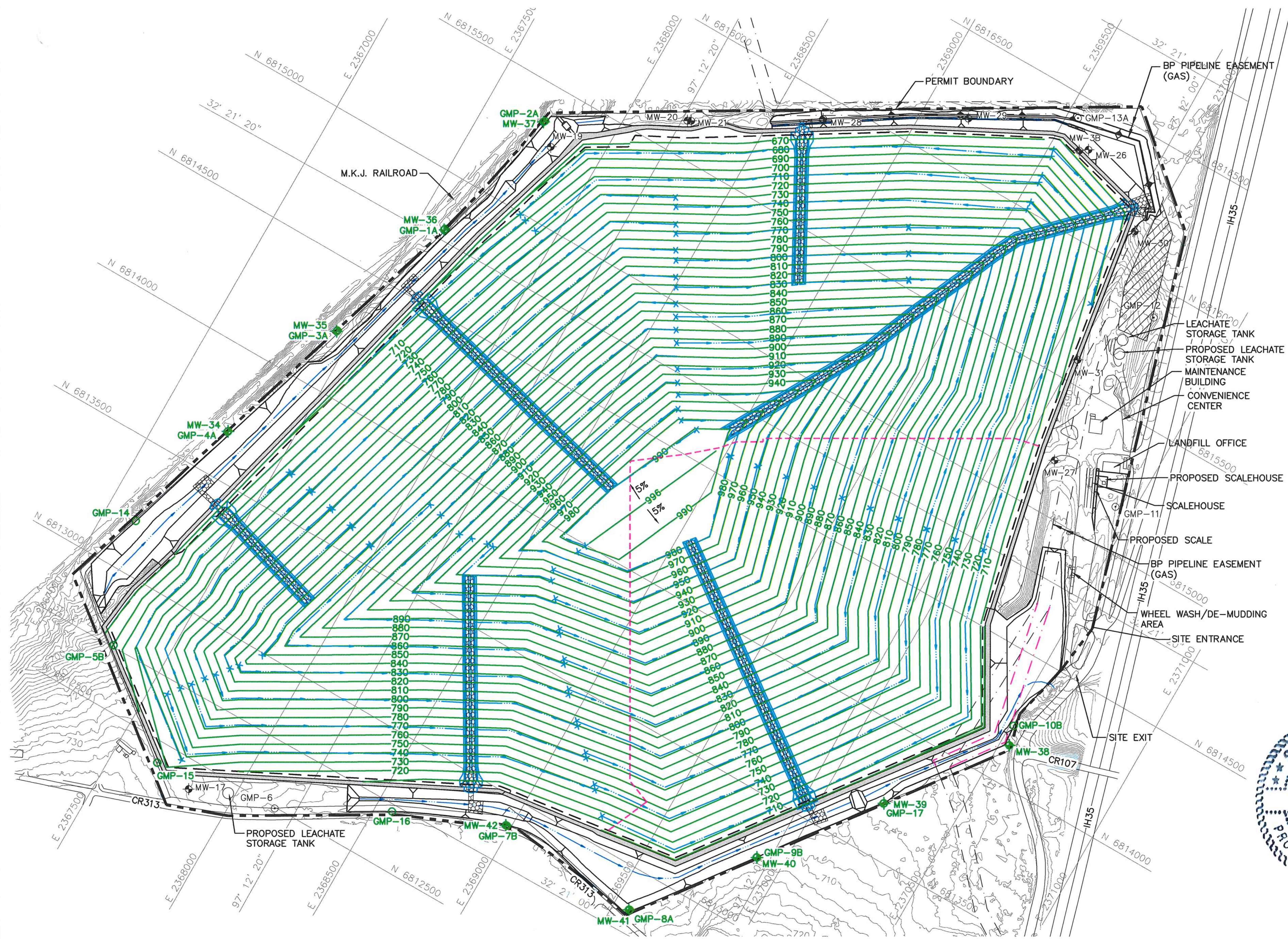
1 INTRODUCTION

This appendix addresses §330.63(h) and §330.451 through §330.461.

This Final Closure Plan has been prepared for the Turkey Creek Landfill consistent with Title 30 Texas Administrative Code (TAC) Section 330, Subchapter K, §330.451 through §330.461, as well as §330.63(h). In accordance with Title 30 TAC §330.457(f)(1), a copy of the approved closure plan will be placed in the site operating record prior to the initial receipt of waste. The landfill completion plan for this site consists of final contours and drainage features for the completed landfill. The landfill completion plan is provided on Figure IIIJ-1. In addition, Figure IIIJ-2 – Types of Final Cover shows the extents of each type of final cover area.

This appendix also addresses the closure procedures for the Liquid Waste Solidification Facility and other structures (buildings, etc.) located on-site.



LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- 750 EXISTING CONTOUR
- N 6816000 STATE PLANE COORDINATE
- 32' 21' 20" GEODETIC COORDINATE
- EASEMENT
- RELOCATED EASEMENT
- 800 FINAL COVER CONTOUR
- LIMIT OF CLASS 1 WASTE DISPOSAL AREA
- DRAINAGE LETDOWN
- DRAINAGE SWALE
- GABIONS
- MW-7 EXISTING GROUNDWATER MONITORING WELL
- GMP-12 EXISTING GAS MONITORING PROBE
- MW-7 PROPOSED GROUNDWATER MONITORING WELL
- GMP-17 PROPOSED GAS MONITORING PROBE
- FUTURE LFGTE FACILITY LOCATION

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.

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☐ DRAFT ☒ FOR PERMITTING PURPOSES ONLY ☐ ISSUED FOR CONSTRUCTION	PREPARED FOR TEXAS REGIONAL LANDFILL COMPANY, LP	MAJOR PERMIT AMENDMENT LANDFILL COMPLETION PLAN
DATE: 02/2022 FILE: 0771-368-11 CAD: IIIJ-1-COMPLETION PLAN.DWG	DRAWN BY: JDW DESIGN BY: BPY REVIEWED BY: NT	TURKEY CREEK LANDFILL JOHNSON COUNTY, TEXAS

REVISIONS

NO.	DATE	DESCRIPTION

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

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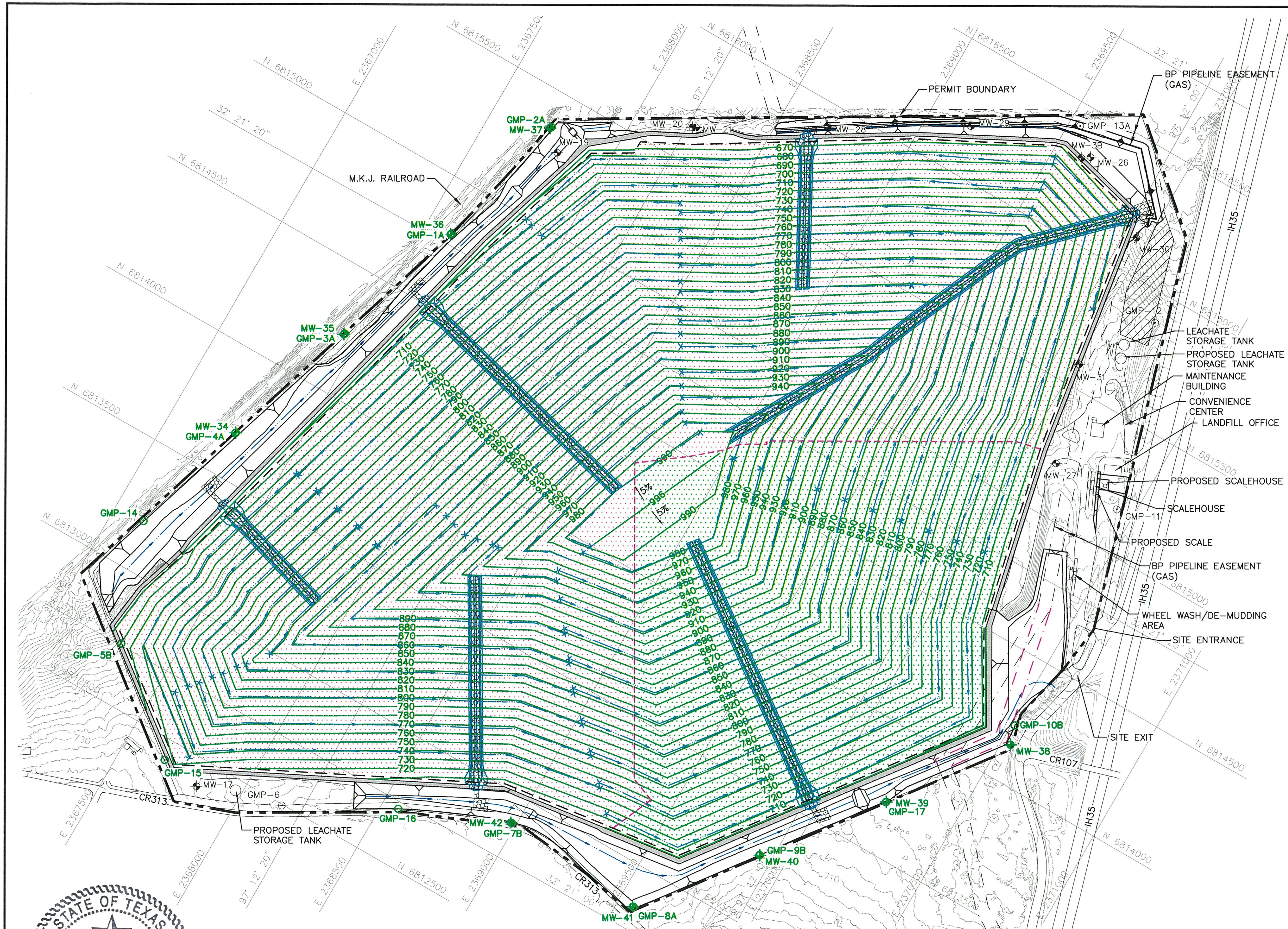
FIGURE IIIJ-1



LEGEND

PERMIT BOUNDARY
LIMITS OF WASTE
EXISTING CONTOUR
STATE PLANE COORDINATE
GEODETIC COORDINATE
EASEMENT
RELOCATED EASEMENT
FINAL COVER CONTOUR
LIMIT OF CLASS 1 WASTE DISPOSAL AREA
DRAINAGE LETDOWN
DRAINAGE SWALE
GABIONS
EXISTING GROUNDWATER MONITORING WELL
EXISTING GAS MONITORING PROBE
PROPOSED GROUNDWATER MONITORING WELL
PROPOSED GAS MONITORING PROBE
CLASS 1 DISPOSAL AREA FINAL COVER SYSTEM (SEE NOTE 5)
MSW FINAL COVER SYSTEM (SEE NOTE 5)
FUTURE LFGTE FACILITY LOCATION

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. REFER TO APPENDIX IIIF-SURFACE WATER DRAINAGE PLAN FOR DRAINAGE DESIGN.
3. TYPICAL SIDESLOPES IN THE MSW AREA ARE 3.5H:1V. TYPICAL SIDESLOPES IN THE CLASS 1 AREA ARE 4H:1V. TYPICAL TOPSLOPE IS 6%. A SMALL AREA WILL STAY ONLY AS PRE-SUBTITLE D.
4. FINAL COVER DETAILS ARE INCLUDED IN APPENDIX IIIA-A-LINER, OVERLINER, AND FINAL COVER DETAILS.
5. FINAL COVER SYSTEM FOR EACH AREA IS DETAILED IN SECTION 2 OF APPENDIX IIIJ.
6. A SMALL PRE-SUBTITLE D AREA THAT IS NOT VERTICALLY EXPANDED WILL ALSO RECEIVE FINAL COVER SYSTEM SPECIFIED FOR THE SUBTITLE D MSW AREA.

STATE OF TEXAS
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PROFESSIONAL ENGINEER

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TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
TYPE OF FINAL COVER

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FIGURE IIIJ-2

2 FINAL COVER SYSTEM

2.1 Introduction

The final cover system for the Turkey Creek Landfill has been developed to incorporate the requirements of Title 30 TAC §330.457(f)(4). The rules state that the owner or operator of an MSW landfill unit shall complete closure activities for the unit in accordance with the approved closure plan within 180 days following the initiation of closure activities (closure activities for MSW landfill units shall begin no later than 30 days after the date on which the unit receives the known final receipt of wastes, or, if the unit has remaining capacity and there is a reasonable likelihood that the unit will receive additional wastes, no later than one year after the most receipt of wastes). Such a system will include installation of a multi-layer cover system and a storm water runoff control system. The storm water runoff controls are addressed in Appendix IIIF – Surface Water Drainage Plan. The surface drainage and erosion control measures include in Appendix IIIF are applicable to all final cover options. The final cover system design is discussed below. Final cover system design drawings are included in Appendix IIIA-A.

2.2 Cover System Design

Both standard Subtitle D and alternative final cover systems will be available for the closure of the site. The final cover system will provide a low maintenance cover, protect against erosion, reduce rainfall percolation through the cover system and subsequently minimize leachate generation within the landfill. As depicted on Figure IIIJ-1 (and Drawing A.3 – Landfill Completion Plan in Appendix IIIA-A), a maximum slope of 6 percent is provided for the top slopes. Typical sideslopes 3.5H:1V for the MSW only area and 4H:1V for the Class 1 area are provided to minimize erosion and facilitate drainage of the landfill.

2.2.1 Final Cover System Options

The final cover system options that are applicable for both composite liner (Class 1 and MSW areas) and overliner areas, as well as pre-Subtitle D areas that currently do not have final cover, are shown in Table IIIJ-1 and as depicted in Figure IIIJ-2. To date, no final cover has been placed at the site.

The erosion layer is provided to minimize the erosion potential of the cover slopes. This layer was evaluated using the universal soil loss equation (USLE) developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS). The evaluation is presented in Appendix IIIF. The final cover systems are designed to minimize infiltration of surface water into the underlying waste material.

Addition to standard Subtitle D final cover options, Two WB final cover options (not applicable to Class 1 area) are presented in Appendix IIIE-B.

Table IIIJ-1
Final Cover System Components

Subtitle D Composite Final Cover System[1] (§330.457(a)(1) and (2))		Subtitle D Composite Final Cover System for Above Grade Class 1 Waste Areas		WB Final Cover System[1]			
				Option 1		Option 2	
Top Slopes	Side Slopes	Top Slopes	Side Slopes	Top Slopes	Side Slopes	Top Slopes	Side Slopes
12-inch-thick erosion layer	12-inch-thick erosion layer	24-inch-thick erosion layer	24-inch-thick erosion layer	6-inch thick vegetation top soil layer	6-inch thick vegetation top soil layer	N/A	12-inch thick vegetation top soil layer
Single-sided drainage geocomposite	Double-sided drainage geocomposite	Single-sided drainage geocomposite	Double-sided drainage geocomposite	3 ft-10-inch thick storage layer	3 ft-10-inch thick storage layer	N/A	30-inch thick storage layer
40 mil LLDPE geomembrane (smooth)	40 mil LLDPE geomembrane (textured)	40 mil LLDPE geomembrane (smooth)	40 mil LLDPE geomembrane (textured)	Refer to Appendix IIIE-B for WB Final Cover Options Design Information.			
18-inch-thick compacted clay infiltration layer with $k \leq 10^{-5}$ cm/s	18-inch-thick compacted clay infiltration layer with $k \leq 10^{-5}$ cm/s	4-foot-thick compacted clay infiltration layer with $k \leq 10^{-7}$ cm/s	4-foot-thick compacted clay infiltration layer with $k \leq 10^{-7}$ cm/s				

[1] Applicable to non-Class 1 areas. The Subtitle D composite final cover will also be installed over the pre-Subtitle D areas that will receive overliner.

Landfill gas generated in the landfill will be managed as discussed in Appendix III I – Landfill Gas Management Plan. The landfill gas system will reduce gas pressure buildup under the final cover and control gas emission from the site.

2.3 Installation Methods and Procedures

The final cover system will be constructed in accordance with the requirements listed on the permit drawings in Appendix IIIA-A and the Final Cover System Quality Control Plan (FCSQCP) presented in Appendix IIIE (Appendix IIIE-B for WB Final Cover). Testing and evaluation of the final cover system during construction will be in accordance with FCSQCP.

3 CLOSURE PROCEDURES

3.1 Sequence of Final Cover Placement

The Turkey Creek Landfill may place final cover over the landfill unit throughout the active life of the landfill or at closure for the entire final cover area as a single construction event. As detailed on Drawings I/II-A.4 through I/II-A.8, final cover may be placed as the site is being developed, although final cover may be installed as a single construction event at the end of the site life. The final cover placement procedure listed below will be followed until the entire waste footprint is closed:

- Survey controls will be implemented to control the filling of solid waste to the top of the daily/intermediate cover layer elevation.
- The final cover system layers will be constructed over areas that have reached the bottom of final cover grades. Testing of the various components of the final cover system will be performed in accordance with this closure plan (see Section 2.3).
- A final cover certification report, complete with an as-built survey, will be prepared by an independent licensed professional engineer and submitted to the TCEQ for approval.
- The TCEQ approved final cover certification report will be maintained in the Site Operating Record, and the final cover log (see Part IV – Section 4.18.4) will be updated to reflect the area where final cover has been placed. The TCEQ Regional Office will also be notified that final cover placement has occurred at the site.

Note that the placement of final cover does not represent closure of a portion of the site. Closure for the landfill unit is discussed in Section 3.2 and closure of the other MSW units at the site is discussed in Section 3.3. Requirements for final closure of the site are discussed in Section 4. Post-closure care activities will commence once the entire site has been closed as discussed in Section 4.

3.2 Landfill Unit Closure During Active Life

Should closure of the landfill become necessary at any time during the active life of the landfill, the following steps will be taken:

- Engineering plans will be developed to address site closure at the time of discontinued waste filling.
- The final waste received will be placed and properly compacted.
- Excavations will be filled with suitable material, and the site will be graded to promote runoff and prevent ponding.
- The final cover system will be constructed according to specifications.
- The top of the landfill will be regraded and reshaped as needed to provide the proper slope for positive drainage.
- As noted above (first bullet), a revised final closure plan will be developed and submitted to the TCEQ for approval.
- Following application of final cover, the site will be vegetated with appropriate grasses to minimize erosion. The established grasses will provide a minimum of 90 percent coverage of the final cover system.
- A surface water management system will be constructed to minimize erosion.
- A closure certification will be prepared by an independent licensed professional engineer and submitted to TCEQ for approval.
- All proper notices and documentation will be filed with the appropriate agencies.

3.2.1 Estimate of Largest Active Disposal Area

Consistent with Title 30 TAC §330.503(a), the largest area that could be open within the next year is shown on Figure IIIL-1 in Appendix IIIL. Consistent with this rule and TCEQ guidelines for financial assurance to complete closure and postclosure activities, financial assurance will be posted for the current active area as discussed in Appendix IIIL – Cost Estimate for Closure and Postclosure Care. As additional liner areas developed, Appendix IIIL will be updated (closure plan does not need to be updated) per §305.70(j) to ensure continued compliance with financial assurance requirements. The entire 219.6-acre site will also need to be administratively closed.

Supporting calculations are presented in Appendix IIIL – Cost Estimate for Closure and Postclosure Care.

3.2.2 Estimate of Maximum Inventory of Waste Ever On Site

The estimate of maximum inventory of waste (defined as waste and daily cover) ever on site over the active life of the facility is approximately 37.7 million cubic yards. The site life calculations (Appendix IIIN – Site Life Calculations) show that approximately 20,950,000 cubic yards of airspace remain (using the January 8, 2021 topographic map and the proposed closure plan).

3.3 Liquid Waste Solidification Facility Closure

It is anticipated that the Liquid Waste Solidification Facility will continue to operate throughout the active life of the Turkey Creek Landfill (i.e., the Liquid Waste Solidification Facility will be closed at the same time or no later than the landfill unit closure). During closure of the site, the following steps will be taken to decommission the Liquid Waste Solidification Facility.

- The final waste received or stored at the facility will be solidified and transferred to the working face for disposal. General cleanup of the site, including all areas around the Liquid Waste Solidification Facility (including removal of bulking agents) will be performed.
- Any equipment used at the facility will be removed from the site.

A description of the Liquid Waste Solidification Facility closure procedures will be included in the closure certification report. Refer to Appendix IVE - Liquid Waste Solidification Plan for a detailed discussion of the Liquid Waste Solidification Facility closure procedures.

3.4 Leachate Storage Tanks and Piping

Leachate storage tanks and piping will continue to operate throughout the active life of the site and the postclosure period. Once the postclosure period has ended, the following steps will be taken to decommission leachate storage tanks and piping.

- The remaining leachate will be transferred to a properly permitted offsite treatment or disposal facility.
- General cleanup of the site, including areas around the leachate storage tanks (i.e., washdown of the concrete truck loading pad, etc.) will be performed.

The tanks will be demolished and the debris will be disposed of at a permitted MSW facility.

4 SCHEDULE OF UNIT CLOSURE AND FACILITY FINAL CLOSURE

4.1 Final Closure Requirements

The site will be closed in an orderly fashion, consistent with Title 30 TAC §330.457 and §330.461, implementing the following steps:

- No later than 45 days prior to initiation of final closure activities for the municipal solid waste landfill (MSWLF) unit, the Executive Director of TCEQ will be notified of the intent to close the unit and that a notice of the intent to close the unit has been placed in the operating record.
- No later than 90 days prior to initiation of final facility closure, a public notice of facility closure which contains the name, address, and physical location of the facility, the permit number, and the last date of intended receipt of waste, will be provided in the newspaper of the largest circulation in the vicinity of the facility. Texas Regional Landfill Company, LP will also make available a copy of the approved final closure and postclosure plan at the landfill office for public access and review.
- Consistent with Title 30 TAC §330.461(b) and following notification of the Executive Director of TCEQ, a minimum of one sign will be posted at the main entrance and all other frequently used points of access for the facility notifying all persons utilizing the facility of the closure date or date after which further receipt of waste is prohibited. In addition, access control is provided by perimeter fencing and a locked gate following the closure date to prevent unauthorized disposal or dumping of solid waste at the facility.
- Final closure activities will commence for the MSWLF unit no later than 30 days after the date the MSWLF unit receives the known final receipt of wastes. If the MSWLF unit has remaining capacity and there is a reasonable likelihood that the MSWLF unit will receive additional wastes, final closure activities will commence no later than 1 year after the most recent receipt of wastes.

  Final closure activities of the MSWLF unit will be completed in accordance with the Closure Plan (this appendix) within 180 days following the initiation of closure activities as defined in Title 30 TAC §330.457(f)(3). If necessary, as noted in Title 30 TAC §330.457(f)(4), a request for an extension of the completion of final closure activities may be submitted and granted by the Executive Director. The request will include all applicable documentation necessary to demonstrate that final closure will take longer than 180 days and all steps have been taken and will continue to be taken to prevent threats to human health and the environment from the unclosed site.

- Following completion of final closure activities of the MSWLF unit, the facility will comply with the post-closure care requirements specified in Title 30 TAC §330.463(b). Within ten days after completion of final closure activities, a documented certification, signed by an independent licensed professional engineer, will be submitted to the Executive Director of the TCEQ for review and approval. This certification will verify that final closure has been completed in accordance with the approved final closure plan and will include all applicable documentation necessary for certification of final closure. Once approved, this certification will be placed in the Site Operating Record.
- Within 10 days after completion of final closure activities of the facility, a certified copy of an Affidavit to the Public (most current format provided by the TCEQ will be used) will be submitted to the Executive Director of the TCEQ by registered mail and placed in the facility's site operating record. In addition, a certified notation will be recorded on the deed to the facility that will in perpetuity notify any potential purchaser of the property that the land has been used as a landfill facility and the use of the land is restricted according to the provisions specified in Title 30 TAC §330.465. Within 10 days after completion of final closure activities of the facility, a certified copy of the modified deed will be submitted to the Executive Director and placed in the operating record.

Following receipt of the required final closure documents and an inspection report from the TCEQ Regional Office verifying proper closure of the MSWLF facility according to this Closure Plan (this appendix), the Executive Director may acknowledge the termination of operation and closure of the facility and deem it properly closed. The steps in the closure process are depicted on Figure IIIJ-3 – Final Closure Schedule. Consistent with Title 30 TAC §330.461(c)(2), a professional engineer certification will be submitted to TCEQ within 10 days of completion of closure. In accordance with Title 30 TAC §330.463(b), the postclosure care period begins immediately upon the date of final closure.

4.2 Provisions for Extending Closure Period

If the Turkey Creek Landfill has remaining capacity at the time of its closure, final closure activities will begin no later than one year after the most recent receipt of wastes. A request for an extension beyond the one-year deadline for the initiation of final closure may be submitted to the Executive Director for review and approval and will include all applicable documentation to demonstrate that the unit or site has the capacity to receive additional waste, and that the Turkey Creek Landfill has taken all steps necessary to prevent threats to human health and the environment.

Turkey Creek Landfill
Figure IIIJ-3 – Final Closure Schedule

	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS	30 DAYS
Written notification of closure to TCEQ										
Public notice of facility closure published in newspaper										
Posting of sign										
Initiation of final closure activities										
Time interval for completion of final closure activities										
Submit engineering certification of final closure to TCEQ										
Submit certified copies of Affidavit to the Public and modified deed to TCEQ										

Note: Schedule is based on anticipated date of beginning final closure activities. Heavy vertical line signifies final receipt of waste. Schedule is shown for reference purposes only. Implementation of closure activities shall follow the TCEQ approved closure plan and applicable rules.

5 CLOSURE COST ESTIMATE

A detailed written cost estimate, in current dollars, showing the cost of hiring a third party to close the largest area of the landfill ever requiring a final cover at any time during the active life of the unit is provided in Part III, Appendix IIIL – Closure and Postclosure Care Cost Estimate.

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIJ-A
WATER BALANCE FINAL COVER DESIGN – OPTION 1

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
NEVZAT TURAN
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02/22/22

Prepared by

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Project No. 0771-368-11-123

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1 WB FINAL COVER DESIGN – OPTION 1

This option has been developed based on Section 4.1 Option 1 – Statewide Design Table included in the TCEQ Guidance for Requesting a Water Balance (WB) Alternative Final Cover for a Municipal Solid Waste Landfill, March 2017 (RG-494). Any changes related to Option 1 in the referenced guidance document will be adapted to this design per §305.70(j). A typical detail describing both Option 1 and Option 1 is shown on Figure IIIJ-A-1.

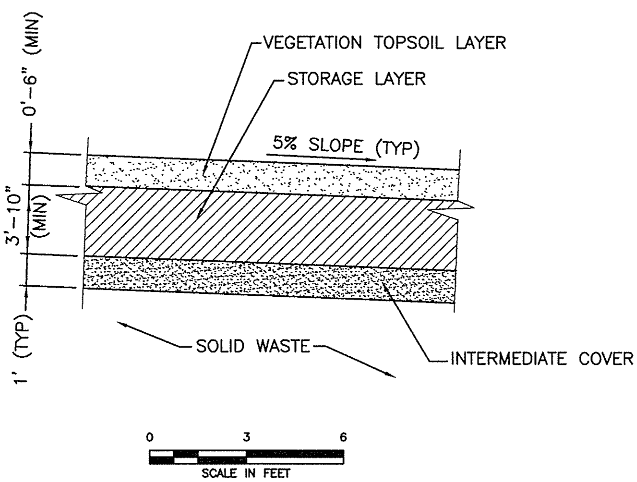
Based on the TCEQ Guidance document, the site is located in the Geoclimatic Region 7-Dallas which allows for a 3 ft. 10 inches thick minimum storage layer thickness that will be overlain by a 6-inch thick erosion layer. The following final cover description is based on the TCEQ Guidance document:

- Final cover storage layer thickness = 3 feet 10 inches
- Erosion layer thickness = 6 inches
- Hydraulic conductivity of final cover storage layer at construction = 1×10^{-8} cm/s
- Hydraulic conductivity of final cover storage layer at service = 1×10^{-6} cm/s

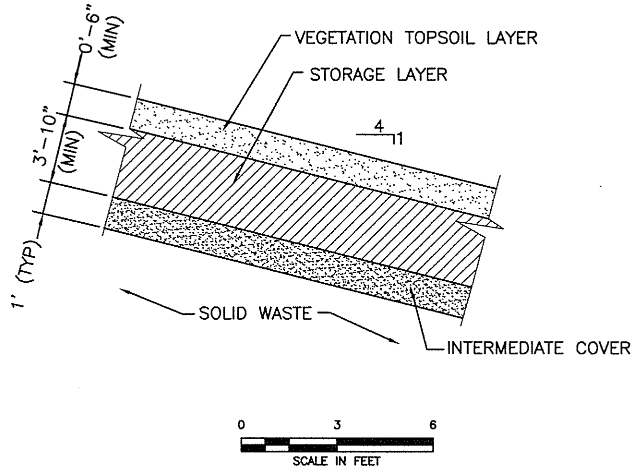
Vegetation will be established to cover a minimum of 90 percent. The erosion layer will be capable of sustaining vegetative growth. The final cover will be constructed in accordance with Appendix IIIE-B – Water Balance Final Cover System which includes the provision of Section 9 of the TCEQ Guidance document.

OPTION 1:

This option of WB AFC is developed based on Option 1 – WB Final Cover Performance Verification included in *TCEQ Guidance for requesting Water Balance (WB) Alternative Final Cover for a Municipal Solid Waste Landfill*, March 2017 (RG–494). Refer to Appendix IIIJ–A for the material properties and construction requirements.



WB FINAL COVER – TOPSLOPE



WB FINAL COVER – SIDESLOPES

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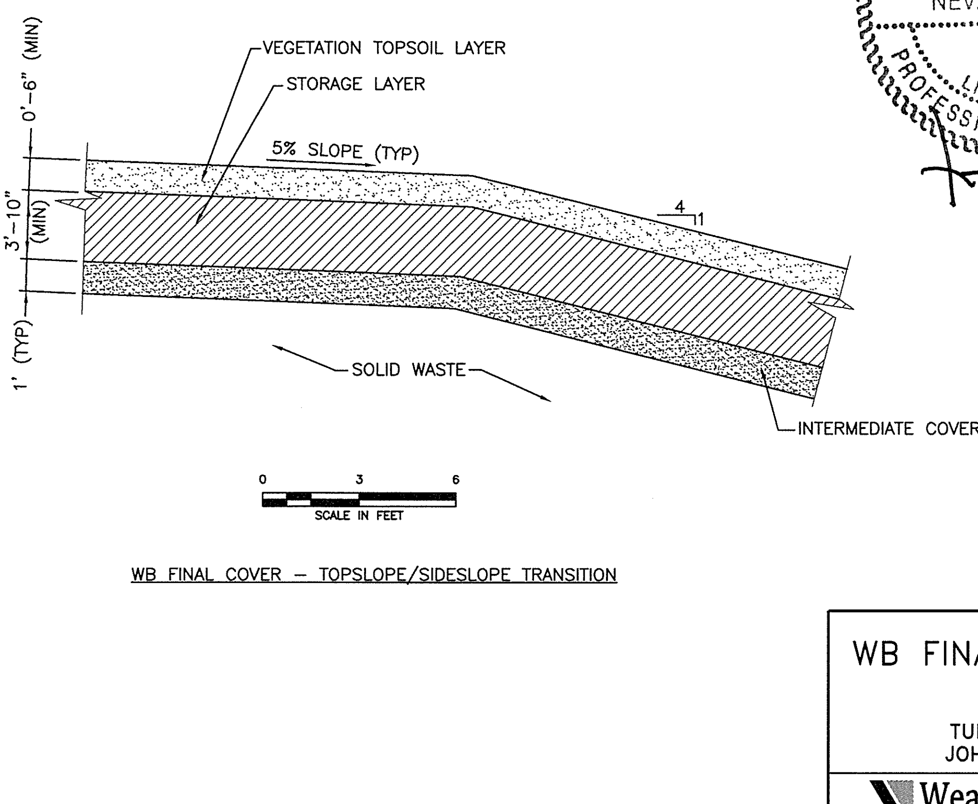

WB FINAL COVER – TOPSLOPE/SIDESLOPE TRANSITION

WB FINAL COVER OPTION 1 DETAILS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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REGISTRATION NO. F–3727

DRAWN BY: JDW	DATE: 02/2022	FILE: 0771–368–11
REVIEWED BY: NT	CAD: IIIJ–D–1 WB OPTIONS.DWG	FIGURE IIIJ–A–1

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIJ-B
WATER BALANCE FINAL COVER DESIGN- OPTION 2

Prepared for

Texas Regional Landfill Company, LP

February 2022

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1 INTRODUCTION

The purpose of this appendix is to present a water balance (WB) final cover design as an alternative to the Subtitle D composite final cover for the Turkey Creek Landfill. Two WB final cover options have been developed for the site. The first WB final cover (refer to Appendix IIIJ-A for Option 1) is based on Section 4.1 – Statewide Design Table included in the TCEQ Guidance Document (RG-494 dated March 2017). The second WB final cover (Option 2) consists of soil and vegetation that removes moisture stored in the soil matrix. The WB final cover system based on Option 2 – WB Final Cover Performance Verification will consist of the following layers:

- 12-inch-thick Vegetation Topsoil Layer. Soil for this layer will be selected to support the rapid establishment of a vegetative cover that will consist of native and introduced grasses that will provide an excellent cover for this area.
- 30-inch-thick Storage Layer. The soils in this layer will be capable of storing moisture in the final cover system so that the moisture can be removed by evaporation and transpiration from vegetation growing on the cover.

The above WB final cover system is designed to minimize infiltration of stormwater into the underlying wastes. The WB cover consists of a cover that employs a thick layer of soil with adequate soil-water storage capacity to retain any infiltrated water until it can be removed through evapotranspiration. The WB cover concept relies on making moisture stored in the soil layer available for vegetative growth. A key to the design is that the vegetation rooting medium be designed thick enough to hold infiltration of precipitation until the water can be consumed by evapotranspiration.

Consistent with Title 30 Texas Administrative Code (TAC) §330.457(d)(1) and (2), the WB final cover is designed to be equivalent with the prescriptive composite final cover system. The equivalency demonstration has been developed in accordance with the Texas Commission on Environmental Quality (TCEQ) guidance document titled, "Guidance for Requesting a Water Balance Alternative Final Cover for a Municipal Solid Waste Landfill," dated March 2017.

The following sections as applicable to Option 2 of this appendix discuss the requirements of the equivalency demonstration, a description of the numeric model, Unsaturated Soil Water and Heat Flow Model (UNSAT-H) used to make the equivalency demonstration, a summary of the model input parameters, a summary of the equivalency demonstration, and specifications for the WB final cover system. In addition, the following information is presented in appendices listed below.

- Appendix IIIJ-B-A – WB Final Cover UNSAT-H Analysis. This appendix includes the UNSAT-H model input and output files for the WB final cover. The UNSAT-H output file includes annual summaries from 1991 to 2020. This analysis is based on using actual evaporation data to represent PET.
- Appendix IIIJ-B-B – Precipitation and Evapotranspiration Data Summary. This appendix includes precipitation and evapotranspiration data that was used as input into the UNSAT-H model.

A Vegetation Establishment Verification Plan is included in Appendix IIIE-B-1-B in Appendix IIIE-B – Water Balance Final Cover System. This plan sets forth the procedures that will be used to verify that the vegetation layer is established consistent with the designs used in the WB final cover demonstration included in this appendix. Additionally, Performance Verification Plan for Option 2 WB Cover is included in Appendix IIIE-B-1. This plan sets forth the design and monitoring procedures that will be used to verify the percolation rate for the 10-acre test plot. Soil moisture and basal percolation information will be collected using automatic data acquisition systems. The actual percolation rate will be compared to the required performance criteria to verify that the constructed WB final cover is performing as designed before additional WB final cover is constructed at the site.

2 EQUIVALENCY DEMONSTRATION REQUIREMENTS

Consistent with Title 30 TAC §330.457(d)(1) and (2), the Option 2 of the WB final cover is designed such that it achieves an equivalent reduction in infiltration and provides protection from wind and water erosion equivalent to the composite final cover design. The equivalency demonstration is based on the TCEQ guidance document titled, "TCEQ Guidance for Requesting a Water Balance Alternative Final Cover for a Municipal Solid Waste Landfill," dated March 2017. This demonstration was completed using the UNSAT-H model.

Through the use of the UNSAT-H computer model, it will be demonstrated that the estimated percolation through the WB final cover will be less than 4 mm/yr. As stated in the TCEQ guidance document, alternative cover designs that limit infiltration to 4 mm/yr or less will be considered to have achieved an equivalent reduction in infiltration as standard designs that employ a geomembrane. The WB final cover may also be used for the pre-Subtitle D final cover areas. The UNSAT-H model input and output files for the final cover design are included in Appendix IIIJ-B-A. As discussed in Appendix IIIE-B-1, the performance of the WB final cover system will also be verified through the implementation of the Final Cover Performance Verification Test Plan.

Additionally, Title 30 TAC §330.457(d)(2) requires an alternative final cover that provides equivalent protection from wind and water erosion. The proposed WB cover meets these requirements as the final cover drainage structures are identical to the final cover erosion control structures used for the composite and pre-Subtitle D final cover system options (refer to Appendix IIIF).

3 UNSAT-H FINAL COVER MODEL

UNSAT-H Version 3.01 was selected to model the WB final cover. UNSAT-H is a one-dimensional physically based model and is the most commonly used model for alternative final covers. UNSAT-H incorporates WB in the analysis, which is the combination of direct evaporation from the soil and transpiration through vegetation. The UNSAT-H parameter groups that include climate, vegetation, and soils are discussed in the following subsections. Parameters used in UNSAT-H for WB cover are discussed below, and the input files are provided and listed in Appendix IIIJ-B-A.

3.1 General

The WB final cover is a 3.5-foot-thick soil layer which consists of a 12-inch-thick vegetation topsoil layer and a 30-inch-thick storage layer. The design is based on the soil conditions expected at the site and vegetation characteristics expected to occur at the area (e.g., growing seasons, selected species, etc.).

The UNSAT-H modeling approach for the WB final cover has been developed consistent with the TCEQ guidance document titled, "Guidance for Requesting a Water Balance Alternative Final Cover for a Municipal Solid Waste Landfill" dated March 2017. This guidance document states that alternative water balance (WB) final cover designs that limit infiltration to 4 mm/yr or less will be considered to have achieved an equivalent reduction in infiltration as standard composite final cover systems. The following sections discuss climate, vegetation, and soil input parameters.

3.2 Climate

In Johnson County, rapid changes in temperature are common during the winter months when cold fronts from the northern Rocky Mountains and Plain States sweep across northern Texas. Most of the areas rainfall occurs from October through June. Actual daily rainfall data was obtained from the NOAA Cleburne Weather Station. The Cleburne Weather Station was chosen due to its close proximity to the Turkey Creek landfill (approximately 12 miles west of the landfill). Actual hourly precipitation data was obtained from the NOAA Burleson Weather Station. This station was chosen due to its close proximity to the Turkey Creek landfill (approximately 8 miles north and 13 miles northwest respectively).

Actual precipitation data between 1991 to 2020 is used for the model simulation. The potential evaporation data was obtained from the NOAA Whitney Dam Weather Station and the NOAA Benbrook Dam Weather Station.

The NOAA collected daily total precipitation data at the Burleson Weather Station for the years 2014 to 2020. For the period that only has daily total precipitation, hourly data was estimated using the average number of hours per rainfall amount from 1991 to 2013. For example, if it rained 0.1 cm on March 25, 2018, the rainfall duration for 0.1 cm of rainfall from 1991 to 2013 would be averaged. For the years 2014 to 2020, it was recorded that rainfall began at hour 1 for each event for consistency. Estimated rainfall durations for given rainfall volumes are presented in Table 3-1.

PET data sets were developed for the UNSAT-H simulations using 70.5 percent of PET data. An UNSAT-H simulation was completed using this set of PET data which was based on an approach used in the agricultural industry to estimate water needs for various crops. For days that were missing evaporation data, the average value for all available data was used for the missing day. For example, if data for July 24, 2000 were missing, the average value for all available data for July 24 in the 30-year period (1991 to 2020) would be used. To develop this adjusted PET data, the evaporation data was multiplied by a factor of 0.705 as suggested by the U.S. EPA report "User Manual for the Pesticide Root Zone Model (PRZM) Release 1" (EPA-600/3-84-109, December 1984).

A detailed weather data summary as well as the actual precipitation and evapotranspiration data input files are included in Appendix IIIJ-B-B. The annual average rainfall used for the modeling is 38.4 inches (97.5 cm/yr or 2,924 cm for the modeling period of 30 years as shown on pages IIIJ-B-A-1 through IIIJ-B-A-3).

3.3 Soil Input Parameters

The major soil input parameters for both Option 1 and Option 2 are summarized in Table 3-2. The major soil input parameters for the WB cover system is discussed below.

- Saturated Volumetric Water Content of Soils. Saturated water content of 39 percent has been used for the WB final cover. This value is conservatively used for the lower 30-inch portion of the final cover. The upper 12 inches of the final cover is modeled with 30 percent saturated water content to add a further factor of safety.
- Residual Volumetric Water Content of Soils. The residual water content of 12 percent for the top 12 inches of soil and 4 percent for the bottom 30 inches of soil is conservatively used for the WB final cover system.
- Saturated Hydraulic Conductivity. A saturated hydraulic conductivity of 1.0×10^{-4} cm/s (0.36 cm/hr) has been used for the upper 12 inches of the WB final cover. A hydraulic conductivity of 1×10^{-5} cm/s (0.036 cm/hr) has been used for the lower 30 inches portion of the WB soil final cover.

- Suction Head. UNSAT-H utilizes the initial suction head of the soil layers for initial hydraulic conditions. An initial matric suction of 15,000 cm has been used. The impact of initial suction head for each year on the multi-year program is insignificant to represent low water content. The values of initial suction head for each year were adjusted by the program for subsequent years based on results from previous years when the program is run for multiple years (i.e., program uses the soil suction head estimated for the ending day of the year as the initial suction head for the next year automatically).

The UNSAT-H Version 3.01 model allows for the ability to consider hysteresis in the water retention function. The tolerance limit on entrapped air content below which volumetric air content is considered zero was $1x10^{-10}$ cm. The tolerance limit on head changes below which a change in head does not trigger a path reversal was also $1x10^{-10}$ cm. The maximum head value for all materials above which hysteresis does not occur was considered 1000 cm. In this particular simulation, there is a maximum of 7 hysteretic paths with a maximum of 0.25 entrapped air content. The factor relating the imbibition α_i to the desorption of α_d is 2.0. The soil-specific maximum suction head above which hysteresis is not operable is 1000 cm.

3.4 Vegetation

The establishment of vegetation is a key component of the WB cover. The critical parameters are the percent ground cover and root penetration. A percent ground cover of 90 percent was used for the WB soil final cover. This is a very conservative assumption given that the WB cover will support a denser ground cover. Table 3-3 provides a summary of how the vegetation performance specification was developed to verify that the WB cover will meet or exceed the selected input value in the UNSAT-H model. In addition, Table 3-3 provides a summary of how characteristics of the seed mix used for the vegetation establishment will meet the performance specification included in Appendix IIIE-B-1-B.

Table 3-1
Duration for Rainfall Volumes Based on the Average Duration of the Same Rainfall Volumes for the Years 1991 through 2013

Rainfall Volume (cm)	Duration (hrs)
Less than 0.02	1.00
0.02 – 0.25	2.00
0.25 – 0.50	3.00
0.50 – 1.00	6.00
1.00 – 2.00	10.00
2.00 – 5.00	16.00
Over 5.00	24.00

Table 3-2
WB Final Cover Soil Property Summary at Construction

Soil Property	Option 1		Option 2	
	Vegetation Topsoil Layer (Upper 6 inches)	Storage Layer (Lower 46 inches)	Vegetation Topsoil Layer (Upper 12 inches)	Storage Layer (Lower 30 inches)
Residual Water Content, θ_r (% Volume)	Option 1 is based on the statewide design tables.		12	4
Saturated Water Content, θ_S (% Volume)			30	39
α Coffecient of Van Genuchten Function			0.005	0.005
n Coefficient of Van Genuchten Function			1.4	1.4
Maximum Saturated Hydraulic Condutivity, (cm/s)	N/A	$1x10^{-8}$	$1x10^{-4}$	$1x10^{-5}$

Table 3-3
WB Final Cover Vegetation Performance Specification

WB Cover UNSAT-H Vegetation Input Parameter	Parameter Value Used in UNSAT-H Model Demonstration	Seed Mix[1]
Percent Vegetative Cover[2]	90	The seed mix has been selected to include grass species with deep root penetration (Sideoats Grama root penetration is generally up to 3 to 5 feet, and Little Bluestem root penetration is up to between 5 and 8 feet deep).
Root Penetration, Inches[3]	40	

1 Refer to Section 3 of WB Final Cover System (Appendix IIIE-B) for the complete discussion of the specified vegetation specifications.

2 As explained in Appendix IIIE-B-1-B, vegetation will be maintained (e.g., mowed, fertilized, irrigated, and re-seeded) as appropriate depending on season, weather conditions, etc.

3 The root penetration shown indicates the deepest root penetration used in UNSAT-H model. Based on the selected vegetation species, the root depth is expected to reach 40 inches. During the evaluation of established vegetation, the root depth will be measured in accordance with Appendix IIIE-B-1-B – Vegetation Establishment Verification Plan.

4 EQUIVALENCY DEMONSTRATION SUMMARY

A summary of the equivalency demonstration utilizing the results from UNSAT-H program modeling is provided in Table 4-1. As shown, the WB final cover system provides less than 4 mm per year of percolation at the bottom of final cover soil profile, as required by TCEQ guidance.

Table 4-1
Equivalency Demonstration Summary

Year	Precipitation (in)	Percolation (mm)	Percolation Design Criteria	Percolation less than Design Criteria
1991	54.71	0.000	< 4 mm	YES
1992	36.49	0.000	< 4 mm	YES
1993	31.12	0.000	< 4 mm	YES
1994	39.33	0.000	< 4 mm	YES
1995	39.31	0.000	< 4 mm	YES
1996	34.75	0.000	< 4 mm	YES
1997	42.37	0.000	< 4 mm	YES
1998	37.09	0.000	< 4 mm	YES
1999	19.80	0.000	< 4 mm	YES
2000	45.04	0.000	< 4 mm	YES
2001	40.64	0.000	< 4 mm	YES
2002	38.84	0.000	< 4 mm	YES
2003	31.58	0.000	< 4 mm	YES
2004	49.99	0.000	< 4 mm	YES
2005	23.10	0.000	< 4 mm	YES
2006	35.93	0.000	< 4 mm	YES
2007	55.94	0.000	< 4 mm	YES
2008	32.52	0.000	< 4 mm	YES
2009	46.75	0.000	< 4 mm	YES
2010	37.88	0.000	< 4 mm	YES
2011	25.67	0.000	< 4 mm	YES
2012	27.35	0.000	< 4 mm	YES
2013	33.35	0.000	< 4 mm	YES
2014	30.67	0.000	< 4 mm	YES
2015	72.83	0.000	< 4 mm	YES
2016	45.17	0.000	< 4 mm	YES
2017	30.46	0.000	< 4 mm	YES
2018	46.17	0.000	< 4 mm	YES
2019	31.64	0.000	< 4 mm	YES
2020	34.82	0.000	< 4 mm	YES

5 WB FINAL COVER MATERIAL REQUIREMENTS

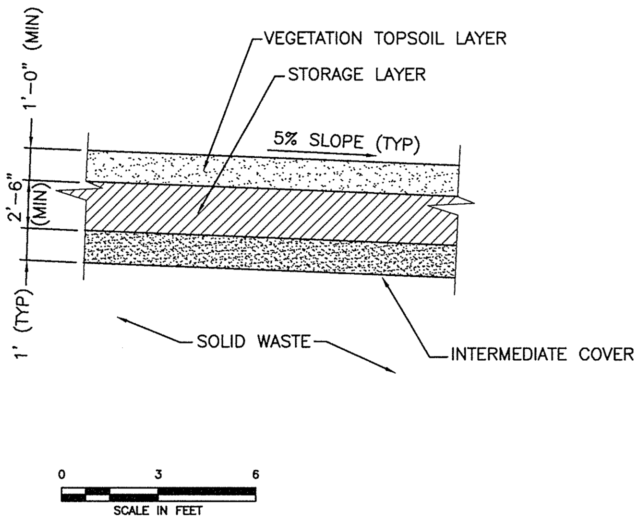
The purpose of this section is to summarize the material requirements and specifications for each WB final cover system layer. These requirements are incorporated into the detailed material specifications and quality control procedures included in Appendix IIIE-B – Water Balance Final Cover System. The WB final cover soil includes two layers (from top to bottom): a vegetation topsoil layer and a storage layer as shown on Figure IIIJ-B-1.

In general, both layers will meet the soil moisture characteristic curve requirements included in Appendix IIIE-B. If soils that do not meet the soil moisture characteristic curve requirements are used, a prior written authorization will be obtained from the TCEQ under the provisions of Title 30 TAC §305.70.

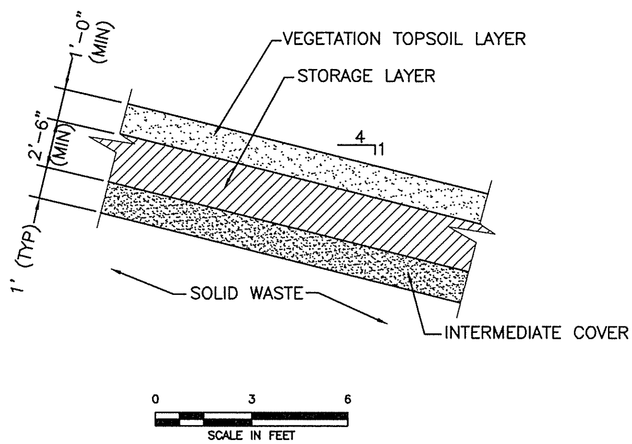
Construction Quality Assurance and Quality Control procedures for each of these layers, including surveying requirements, are addressed in Appendix IIIE-B – Water Balance Final Cover System.

OPTION 2:

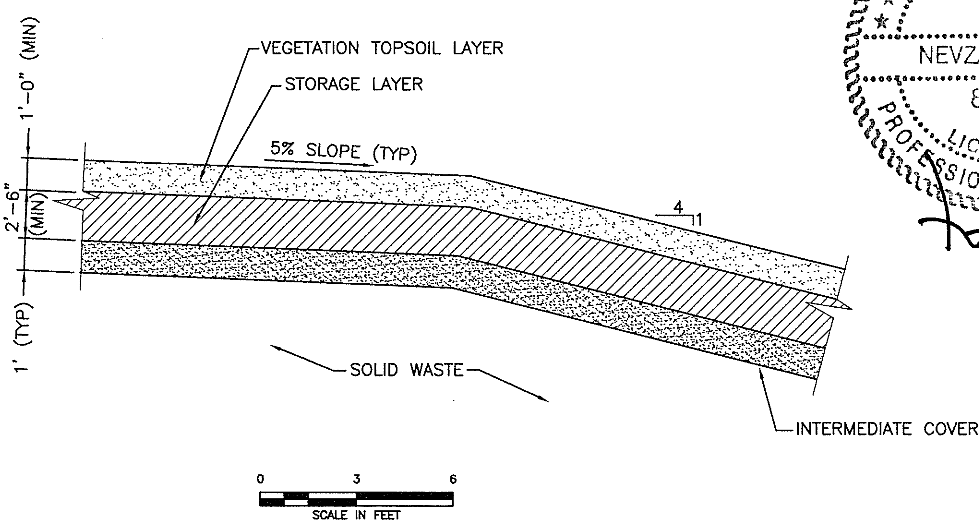
This option of WB AFC is developed based on Option 2 – WB Final Cover Performance Verification included in *TCEQ Guidance for requesting Water Balance (WB) Alternative Final Cover for a Municipal Solid Waste Landfill,* March 2017 (RG–494). Refer to Appendix IIIJ–B for the material properties and construction requirements.



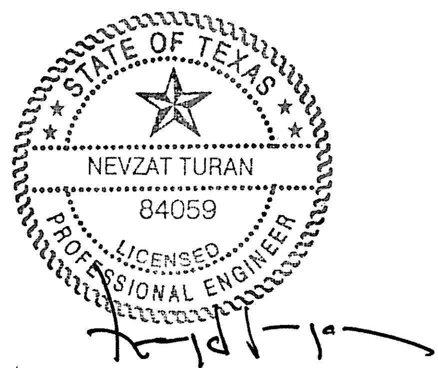
WB FINAL COVER – SIDESLOPES



WB FINAL COVER – SIDESLOPES



WB FINAL COVER – TOPSLOPE/SIDESLOPE TRANSITION



02/22/22

WB FINAL COVER OPTION 2

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

Weaver Consultants Group
REGISTRATION NO. F–3727

DRAWN BY: JDW	DATE: 02/2022	FILE: 0771–368–11
REVIEWED BY: NT	CAD: IIIJ–C–1 WB OPTIONS.DWG	FIGURE IIIJ–B–1

O:\0771\368\EXPANSION 2021\PART III\IIIJ\IIIJ–B–1 WB FC OPTIONS.dwg, rarrington, 1:2

APPENDIX IIIJ-B-A

WB FINAL COVER UNSAT-H ANALYSIS

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Includes pages IIIJ-B-A-1 through IIIJ-B-A-109

TURKEY CREEK LANDFILL
0771-368-11-123
WB MONOLITHIC FINAL COVER
UNSAT-H MODEL SUMMARY

Purpose:

Evaluate the performance of WB final cover using UNSAT-H (Version 3.01) computer program for the following main criterias:

1. Annual average drainage rate, and
2. Annual average water storage

Method:

1. Run UNSAT-H simulations for a period of 30 years using precipitation and evapotranspiration data for the soil saturated moisture content used and generate annual summary table for a period of 30 years by using "BSUM301.EXE" included in the UNSAT-H Computer Program.

2. Determine average annual drainage (percolation) through the final cover for a period of 30 years for the soil saturated moisture content used.

3. Determine the number of years with more than 4 mm per year of percolation within the 30 year period for each soil porosity modeled.

4. Determine the annual average water storage in the final cover for a period of 30 years.

5. Determine the average runoff coefficient for the 30 year period simulated.

6. Determine the relationship between the water storage capacity provided and water storage capacity required as estimated by UNSAT-H.

7. Conclusion.

References:

1. UNSAT-H Version 3.0: *Unsaturated Soil Water and Heat Flow Model, Theory, User Manual, and Examples*. Pacific Northwest National Laboratory, Richland, Washington, June 2000.

2. Quian, Xuede, R.M. Koerner, D. H. Gray, "Geotechnical Aspects of Landfill Design and Construction", Prentice-Hall, Inc., New Jersey, 2002.

3. The Hydrologic Evaluation of Landfill Performance (HELP) Model, Engineering Documentation for Version3. US EPA Office of Research and Development, Washington, DC, EPA/600/R-94/168b, September 1994.

4. *Cover Design Using Storage Capacity & Unsaturated Soil Properties*. Craig H. Benson, Water Balance Covers. September 26, 27, and 28, 2006, Austin, Texas.

Solution:

1. Run UNSAT-H simulations for a period of 30 years using precipitation and evapotranspiration data for the soil saturated moisture content used and generate annual summary table for a period of 30 years by using "BSUM301.EXE" included in the UNSAT-H Computer Program.

UNSAT-H input and output files are included in Appendix IIIJ-B-A.
The annual summary table for a period of 30 years obtained from the BSUM301.EXE file included in the UNSAT-H program is presented below. All units are cm unless indicated otherwise.

Initial Storage = 12.424 cm (calculated by UNSAT-H, listed in input file on page IIIJ-B-A-7)

Year	Year	Precipitation	PET	P/PET	Transpiration	Evaporation	Runoff	% Runoff	Drainage	Storage	Time Steps	Mass Balance Error	Adjusted Drainage (mm)
1991	1	138.96	141.48	0.98	25.27	9.97	96.32	73	0.00	19.83	1901962	0.00	0.03
1992	2	92.69	143.72	0.64	38.77	10.78	44.67	47	0.00	18.27	1699300	0.03	0.34
1993	3	79.05	157.04	0.50	35.20	9.83	35.75	44	0.00	16.53	1396519	0.00	0.01
1994	4	99.90	141.11	0.71	33.60	10.19	51.36	54	0.00	21.27	1703350	0.02	0.18
1995	5	99.85	138.30	0.72	38.02	10.81	56.86	54	0.00	15.39	1610273	0.04	0.39
1996	6	88.27	153.53	0.57	32.74	10.52	43.36	50	0.00	17.03	1621590	0.01	0.15
1997	7	107.62	133.42	0.81	37.36	9.68	58.30	55	0.00	19.31	1326072	0.01	0.08
1998	8	94.21	154.40	0.61	33.26	8.56	51.92	55	0.00	19.75	1268447	0.03	0.32
1999	9	50.29	152.82	0.33	26.14	9.81	19.87	36	0.00	14.19	1709336	0.03	0.34
2000	10	114.40	159.85	0.72	30.50	9.78	69.57	63	0.00	18.73	1467023	0.02	0.17
2001	11	103.23	142.50	0.72	36.83	9.84	57.91	55	0.00	17.36	1470982	0.02	0.17
2002	12	98.65	127.89	0.77	32.67	9.84	55.09	56	0.00	18.38	1521795	0.02	0.22
2003	13	80.21	137.44	0.58	37.62	11.20	36.00	42	0.00	13.75	1613463	0.02	0.25
2004	14	126.97	130.99	0.97	35.91	10.49	77.14	62	0.00	17.17	1529268	0.01	0.10
2005	15	58.67	149.77	0.39	27.38	9.66	26.16	41	0.00	12.64	1838428	0.00	0.01
2006	16	91.26	169.66	0.54	25.03	9.50	51.97	60	0.00	17.39	1765717	0.00	0.02
2007	17	142.09	132.60	1.07	34.06	10.58	99.71	69	0.00	15.11	1677761	0.03	0.26
2008	18	82.60	154.67	0.53	28.00	11.12	45.31	54	0.00	13.28	1959205	0.01	0.14
2009	19	118.75	149.43	0.79	39.53	10.96	62.10	55	0.00	19.43	1402278	0.01	0.09
2010	20	96.22	146.31	0.66	34.92	10.29	55.29	55	0.00	15.12	1638259	0.03	0.26
2011	21	65.20	180.74	0.36	22.32	8.35	32.96	52	0.00	16.68	1431999	0.02	0.18
2012	22	69.47	164.19	0.42	27.24	10.34	34.44	48	0.00	14.11	1674878	0.02	0.18
2013	23	84.71	167.95	0.50	26.35	10.78	46.32	56	0.00	15.36	1966898	0.00	0.01
2014	24	77.90	155.53	0.50	26.53	10.53	40.70	52	0.00	15.49	1836501	0.01	0.09
2015	25	184.99	171.42	1.08	41.69	10.19	130.40	72	0.00	18.17	1254497	0.03	0.26
2016	26	114.73	179.71	0.64	43.13	12.05	63.17	53	0.00	14.53	1537625	0.03	0.30
2017	27	77.37	172.60	0.45	30.66	11.25	35.37	46	0.00	14.61	1861862	0.00	0.01
2018	28	117.27	173.40	0.68	31.57	10.67	71.40	63	0.00	18.23	1787212	0.01	0.14
2019	29	80.37	165.43	0.49	37.85	11.00	33.51	41	0.00	16.22	1544661	0.03	0.31
2020	30	88.44	169.84	0.52	35.66	10.30	43.43	49	0.00	15.24	1357022	0.03	0.31
	SUM=	2924.32	4617.72	0.63	985.79	308.87	1626.30	1613.51	0.00	498.55		0.53	5.32
	Average=	97.48	153.92		32.86	10.30	54.21		0.000	16.62		0.018	0.177

2. Determine average annual drainage (percolation) through the final cover for a period of 30 years for the soil saturated moisture contented used.

The average annual drainage for a period of 30 years	=	Total drainage obtained for 30 years (cm)/30 years * 10mm/cm
	=	(0.00 cm /30 yrs)*10mm/cm
	=	0.00 mm/yr
The maximum drainage modeled for a single year	=	Maximum drainage value modeled (cm) * 10mm/cm
	=	0.00 cm*10mm/cm
	=	0.00 mm

The maximum drainage modeled for a single year is 0.00mm which is less than the maximum allowable 4 mm; therefore, the design is acceptable.

Adjusted Drainage is calculated using the following formula: [Total Drainage (cm) + (Total Mass Balance Error (cm)]/30 years * 10 mm/cm
= (0.00cm + 0.53cm)/30 yrs *10 mm/cm
= 0.18 mm/yr

3. Determine the number of years with more than 4 mm per year of percolation over the 30 year period for each soil porosity modeled.

From the output summary presented in page IIIJ-B-A-2, the number of years with more than 4 mm of drainage is
= 0

4. Determine the annual average water storage in the final cover for a period of 30 years.

The annual average water storage for a period of 30 years	=	Total storage obtained for 30 years from the model (cm)/30 years
	=	498.55 cm/30 yrs
	=	16.62 cm/yr
	=	6.54 in/yr

5. Determine the average runoff coefficient for the 30 year period simulated.

The average runoff coefficient for the 30 year period	=	[Average runoff for 30 years (cm)/ Average precipitation for 30 years (cm)]*100
	=	(54.21 cm /97.48 cm)*100
	=	55.6 percent

TURKEY CREEK LANDFILL
0771-368-11-123
WB ALTERNATIVE FINAL COVER
UNSAT-H MODEL SUMMARY

6. Determine the relationship between the storage capacity provided and water storage capacity required as estimated by UNSAT-H.

The following procedure is used to calculate storage capacity provided and storage capacity required for comparison

Saturated Water Content (top 12")=	0.30	vol/vol	12 inches, top layer thickness as modeled by UNSAT-H.
Saturated Water Content (lower 36")=	0.39	vol/vol	30 inches, lower layer thickness as modeled by UNSAT-H.

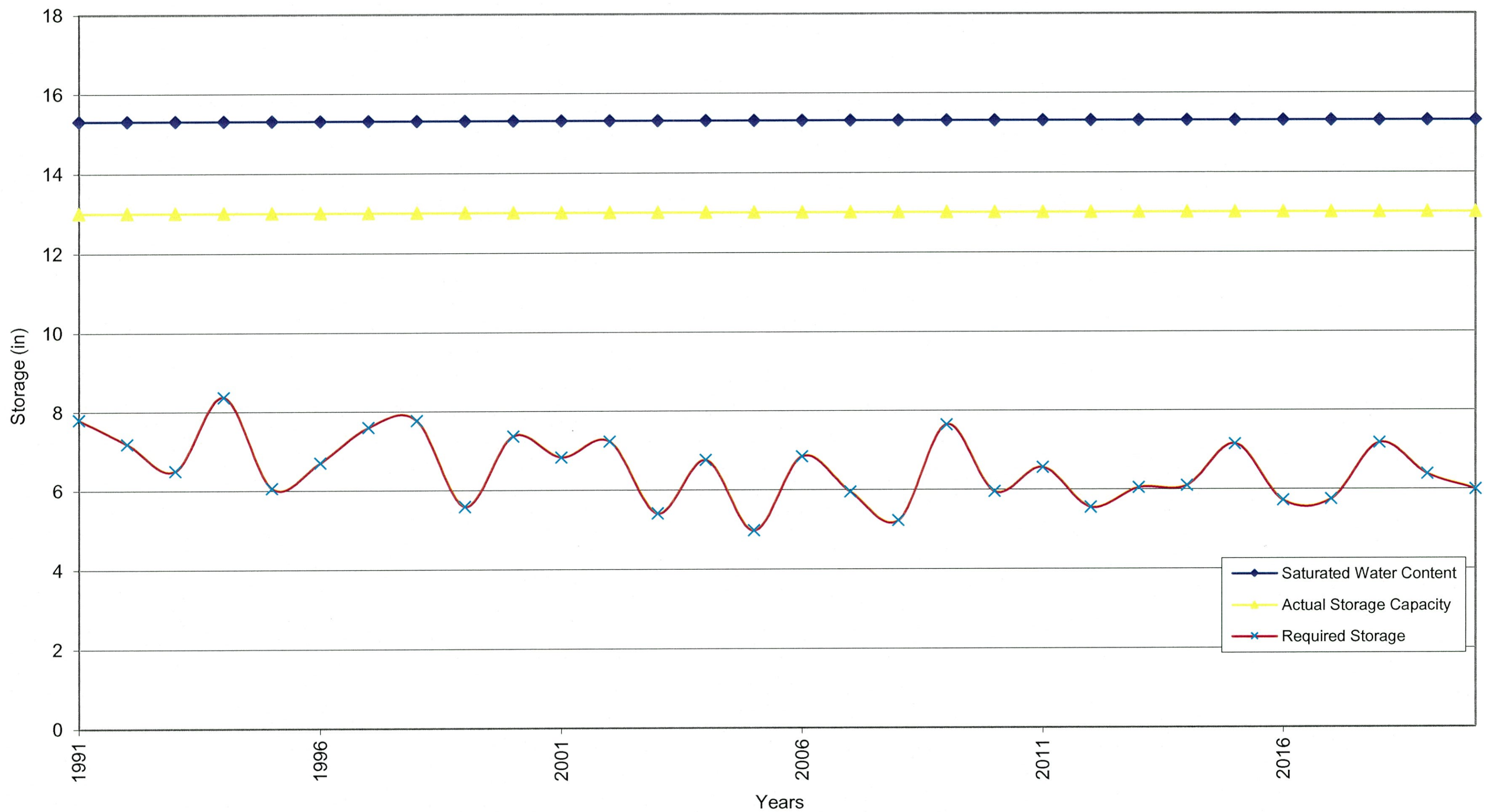
Saturated Water Content (in)= 12 in x 0.30 vol/vol + 36 in x 0.39 vol/vol = 15.3 in
Actual Storage Capacity (in)= Saturated Water Content (in) x 0.85 = 13.01 in (it is taken to be 85% of the saturated water content to include further factor of safety)

Required Storage (in) = Storage Estimated by UNSAT-H (cm)/2.54 cm/in
Storage estimated by UNSAT-H is included on page IIIJ-C-A-1 under the column heading "Storage".

Year	Saturated Water Content (in)	Actual Storage Capacity (in)	Required Storage (in)
1991	15.3	13.01	7.81
1992	15.3	13.01	7.19
1993	15.3	13.01	6.51
1994	15.3	13.01	8.37
1995	15.3	13.01	6.06
1996	15.3	13.01	6.70
1997	15.3	13.01	7.60
1998	15.3	13.01	7.78
1999	15.3	13.01	5.59
2000	15.3	13.01	7.37
2001	15.3	13.01	6.83
2002	15.3	13.01	7.24
2003	15.3	13.01	5.41
2004	15.3	13.01	6.76
2005	15.3	13.01	4.98
2006	15.3	13.01	6.85
2007	15.3	13.01	5.95
2008	15.3	13.01	5.23
2009	15.3	13.01	7.65
2010	15.3	13.01	5.95
2011	15.3	13.01	6.57
2012	15.3	13.01	5.55
2013	15.3	13.01	6.05
2014	15.3	13.01	6.10
2015	15.3	13.01	7.15
2016	15.3	13.01	5.72
2017	15.3	13.01	5.75
2018	15.3	13.01	7.18
2019	15.3	13.01	6.38
2020	15.3	13.01	6.00

7. Conclusion.
As shown in steps 2 and 3, the average annual drainage rate is less than 4mm/yr in accordance with TCEQ draft guidelines. As shown in step 6, the actual storage capacity provided by the WB monolithic soil final cover is greater than the storage required as calculated by UNSAT-H.

Figure 4-2: Storage Capacity and Required Storage Comparison



[1]Refer to Appendix IIIJ-B-A (page IIIJ-B-A- 1-4) for saturated water content, field capacity and actual storage capacity calculations. The required storage is estimated by UNSAT-H program. The UNSAT-H program output (bsum301.exe output) is included on page IIIJ-B-A-2 for the modeled years.

WB FINAL COVER INPUT FILE

```
-------------------------------------------------------------------------------
!                              Program DATAINH                                 !
!                                Version 3.01                                  !
-------------------------------------------------------------------------------
 Input Filename: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App
IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
 Date Processed: 19 Jul 2021
 Time Processed: 12:40:07.29
 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover

 General options:

 IPLANT =    1        NGRAV =    1
 IFDEND =  366       IDTBEG =    1        IDTEND =  366
    IYS = 1991       NYEARS =   30        ISTEAD =    0
 IFLIST =    1       NFLIST =  270
 NPRINT =    0       STOPHR = 0.000E+00
 ISMETH =    1       INMAX  =    3        ISWDIF =    0       DMAXBA = 0.100E-03
 DELMAX = 1.000E+00  DELMIN = 1.000E-10  OUTTIM = 1.000E+00
  RFACT = 1.800E+00  RAINIF = 1.000E-06   DHTOL = 0.000E+00
  DHMAX = 0.000E+00  DHFACT = 0.000E+00
   KOPT =    4         KEST =    3           WTF = 0.000E+00
 ITOPBC =    0       IEVOPT =    1        NFHOUR =    2        LOWER =    1
  HIRRI = 0.000E+00    HDRY = 1.000E+06    HTOP = 0.000E+00      RHA = 9.900E-01
 IETOPT =    0       ICLOUD =    0        ISHOPT =    0
  IRAIN =    0          HPR = 1.000E+00

 Hysteresis options:

   IHYS =    1       AIRTOL = 1.000E-10  HYSTOL = 1.000E-10  HYSMXH = 1.000E+03

 Heat flow options:

  IHEAT =    0       ICONVH =    0        DMAXHE = 0.000E+00
 UPPERH =    0       TSMEAN = 0.000E+00   TSAMP = 0.000E+00  QHCTOP = 0.000E+00
 LOWERH =    0       QHLEAK = 0.000E+00   TGRAD = 0.000E+00

 Vapor flow options:

 IVAPOR =    1         TORT = 6.600E-01   TSOIL = 2.910E+02  VAPDIF = 2.400E-01

 Grid options:

   MATN =    2          NPT =   46

 Soil hydraulic properties:

   KOPT = 4: van Genuchten hydraulic functions

   Material No.    1
   THETA = f(H), Soil 1 retention
               THET = 0.30000        THTR = 0.12000       ALPHA = 5.00000E-03
                  N =  1.4000           M = 0.28571
  K =f(H), Soil 1 conductivity
              RKMOD = 2.00000E-16      SK = 0.36000           A = 5.00000E-03
                  N =  1.4000           M = 0.28571        EPIT = 0.50000

   Material No.    2
   THETA = f(H), Soil 2 retention
               THET = 0.39000        THTR = 4.00000E-02   ALPHA = 5.00000E-03
                  N =  1.4000           M = 0.28571
  K =f(H), Soil 2 conductivity
```

```
        RKMOD = 2.00000E-16       SK = 3.60000E-02       A = 5.00000E-03
            N =  1.4000            M = 0.28571        EPIT = 0.50000
```

Surface node bounding values:

```
  HIRRI = 0.000E+00   THETA = 3.000E-01   K = 3.600E-01   C =-1.374E-08
   HDRY = 1.000E+06   THETA = 1.260E-01   K = 2.351E-13   C =-2.386E-09
```

Hysteresis parameters:

IHYS > 0

```
              MAX NO.
  Material    PATHS          SARWA           ALFACT          HYSHPH
  Soil 1 Hysteresis parameters
  No.  1        7       2.5000000E-01  2.0000000E+00  1.0000000E+03
  Soil 2 Hysteresis parameters
  No.  2        7       2.5000000E-01  2.0000000E+00  1.0000000E+03
```

Initial Conditions:

NDAY =   0

NODE	Z	MAT	HEAD	CONDUCTIVITY	CAPACITY	THETA	TEMP
1	0.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
2	0.20	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
3	0.30	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
4	0.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
5	0.70	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
6	1.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
7	1.40	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
8	1.90	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
9	2.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
10	3.30	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
11	4.40	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
12	5.70	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
13	7.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
14	9.90	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
15	13.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
16	15.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
17	17.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
18	19.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
19	22.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
20	25.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
21	27.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
22	28.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
23	29.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
24	30.00	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
25	30.30	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
26	30.40	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
27	30.50	1	1.5000E+04	6.9425E-08	-8.5093E-07	0.1520	291.0
28	30.60	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
29	30.80	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
30	31.10	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
31	31.60	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
32	32.40	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
33	33.60	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
34	35.40	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
35	38.10	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
36	41.20	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
37	44.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
38	47.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
39	50.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0

40	55.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
41	62.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
42	72.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
43	82.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
44	92.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
45	102.00	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0
46	106.68	2	1.5000E+04	6.9425E-09	-1.6546E-06	0.1022	291.0

Total Initial Storage (cm) = 1.242360E+01

Plant parameters:

LEAF= 1, NFROOT= 1, NUPTAK= 1, NFPET= 1, NSOW= 1, NHRVST=366, BARE=0.100

NFROOT = 1: Negative exponential representation of root growth
AA (intersection of curve at z=0 with abscissa) = 4.000
B1 (coefficient defining degree of curvature) = 0.034
B2 (coefficient determining the value of asymptote = 1.000

Root depth, density, and weight/node versus depth

DAY	MAX ROOT DEPTH	ROOT DENSITY (cm/cm)	NORMALIZED DENSITY (1/cm)
1	0.00	0.000	0.0000
1	0.20	4.973	0.0231
1	0.30	4.959	0.0231
1	0.50	4.933	0.0229
1	0.70	4.906	0.0228
1	1.00	4.866	0.0226
1	1.40	4.814	0.0224
1	1.90	4.750	0.0221
1	2.50	4.674	0.0217
1	3.30	4.575	0.0213
1	4.40	4.444	0.0207
1	5.70	4.295	0.0200
1	7.50	4.100	0.0191
1	9.90	3.857	0.0179
1	13.00	3.571	0.0166
1	15.00	3.402	0.0158
1	17.00	3.244	0.0151
1	19.00	3.097	0.0144
1	22.00	2.893	0.0134
1	25.00	2.710	0.0126
1	27.00	2.597	0.0121
1	28.50	2.518	0.0117
1	29.50	2.467	0.0115
1	30.00	2.442	0.0114
1	30.30	2.428	0.0113
1	30.40	2.423	0.0113
1	30.50	2.418	0.0112
1	30.60	2.413	0.0112
1	30.80	2.404	0.0112
1	31.10	2.389	0.0111
1	31.60	2.366	0.0110
1	32.40	2.329	0.0108
1	33.60	2.276	0.0106
1	35.40	2.200	0.0102
1	38.10	2.095	0.0097
1	41.20	1.986	0.0092
1	44.00	1.896	0.0088
1	47.00	1.809	0.0084

```
   1       50.00     1.731      0.0080
   1       55.00     1.616      0.0075
   1       62.00     1.486      0.0069
   1       72.00     1.346      0.0063
   1       82.00     1.246      0.0058
   1       92.00     1.175      0.0055
   1      102.00     1.125      0.0052

  MXROOT (deepest node that roots penetrate) =  45
-------------------------------------------------------------------------------
 NUPTAK = 1:  Feddes et al. 1975 moisture dependent sink term

  For Material No.   1
   THETAW (wilting point moisture content)           =     0.1520
   THETAD (lower limit of optimum moisture content) =     0.2513
   THETAN (upper limit of optimum moisture content) =     0.2992

  For Material No.   2
   THETAW (wilting point moisture content)           =     0.1022
   THETAD (lower limit of optimum moisture content) =     0.2953
   THETAN (upper limit of optimum moisture content) =     0.3885
-------------------------------------------------------------------------------
 ET parameters:

  NFHOUR = 2:  User subroutine for hourly PET provided

  0.0100   0.0100   0.0100   0.0100   0.0100   0.0100   0.0150   0.0440
  0.0699   0.0911   0.1061   0.1139   0.1139   0.1061   0.0911   0.0699
  0.0440   0.0150   0.0100   0.0100   0.0100   0.0100   0.0100   0.0100
-------------------------------------------------------------------------------
 Lower Boundary Option:

  LOWER = 1:  unit gradient
-------------------------------------------------------------------------------

 Multiyear Option
 Sim Year    PET input file name
       1     pet1991.pen_u7
       2     pet1992.pen_u7
       3     pet1993.pen_u7
       4     pet1994.pen_u7
       5     pet1995.pen_u7
       6     pet1996.pen_u7
       7     pet1997.pen_u7
       8     pet1998.pen_u7
       9     pet1999.pen_u7
      10     pet2000.pen_u7
      11     pet2001.pen_u7
      12     pet2002.pen_u7
      13     pet2003.pen_u7
      14     pet2004.pen_u7
      15     pet2005.pen_u7
      16     pet2006.pen_u7
      17     pet2007.pen_u7
      18     pet2008.pen_u7
      19     pet2009.pen_u7
      20     pet2010.pen_u7
      21     pet2011.pen_u7
      22     pet2012.pen_u7
      23     pet2013.pen_u7
      24     pet2014.pen_u7
      25     pet2015.pen_u7
      26     pet2016.pen_u7
```

```
      27    pet2017.pen_u7
      28    pet2018.pen_u7
      29    pet2019.pen_u7
      30    pet2020.pen_u7
 Multiyear Option
 Sim Year    Precipitation input file name
       1    rain1991.dat
       2    rain1992.dat
       3    rain1993.dat
       4    rain1994.dat
       5    rain1995.dat
       6    rain1996.dat
       7    rain1997.dat
       8    rain1998.dat
       9    rain1999.dat
      10    rain2000.dat
      11    rain2001.dat
      12    rain2002.dat
      13    rain2003.dat
      14    rain2004.dat
      15    rain2005.dat
      16    rain2006.dat
      17    rain2007.dat
      18    rain2008.dat
      19    rain2009.dat
      20    rain2010.dat
      21    rain2011.dat
      22    rain2012.dat
      23    rain2013.dat
      24    rain2014.dat
      25    rain2015.dat
      26    rain2016.dat
      27    rain2017.dat
      28    rain2018.dat
      29    rain2019.dat
      30    rain2020.dat
--------------------------------------------------------------------------------
 PET partitioning:

 NFPET = 1:
   PET is partitioned into PT and PE according to the
   relationship developed by Ritchie (1972)
   The user-specified coefficients are:
     a =  1.300
     b =  0.130
     c =  0.020
     d =  0.100 (below this LAI, PT is zero)
     e =  2.700 (above this LAI, PT=f(e))
```

DAY	PET	PTRANS	PEVAPO	DAY	PET	PTRANS	PEVAPO
1	0.1791	0.1612	0.0179	2	0.1970	0.1773	0.0197
3	0.1612	0.1451	0.0161	4	0.1970	0.1773	0.0197
5	0.2597	0.2337	0.0260	6	0.2149	0.1934	0.0215
7	0.1791	0.1612	0.0179	8	0.2059	0.1853	0.0206
9	0.2149	0.1934	0.0215	10	0.2149	0.1934	0.0215
11	0.1880	0.1692	0.0188	12	0.1970	0.1773	0.0197
13	0.1791	0.1612	0.0179	14	0.1791	0.1612	0.0179
15	0.1791	0.1612	0.0179	16	0.1701	0.1531	0.0170
17	0.1880	0.1692	0.0188	18	0.1522	0.1370	0.0152
19	0.1791	0.1612	0.0179	20	0.2507	0.2256	0.0251
21	0.2597	0.2337	0.0260	22	0.2328	0.2095	0.0233
23	0.2059	0.1853	0.0206	24	0.1791	0.1612	0.0179

25	0.1970	0.1773	0.0197	26	0.1970	0.1773	0.0197
27	0.2328	0.2095	0.0233	28	0.2238	0.2014	0.0224
29	0.2328	0.2095	0.0233	30	0.2238	0.2014	0.0224
31	0.2865	0.2578	0.0287	32	0.2686	0.2417	0.0269
33	0.2059	0.1853	0.0206	34	0.2149	0.1934	0.0215
35	0.2597	0.2337	0.0260	36	0.1253	0.1128	0.0125
37	0.1880	0.1692	0.0188	38	0.2238	0.2014	0.0224
39	0.2955	0.2660	0.0295	40	0.2328	0.2095	0.0233
41	0.2865	0.2578	0.0287	42	0.2507	0.2256	0.0251
43	0.2238	0.2014	0.0224	44	0.3044	0.2740	0.0304
45	0.3402	0.3062	0.0340	46	0.2059	0.1853	0.0206
47	0.3044	0.2740	0.0304	48	0.2149	0.1934	0.0215
49	0.2417	0.2175	0.0242	50	0.3223	0.2901	0.0322
51	0.2865	0.2578	0.0287	52	0.2776	0.2498	0.0278
53	0.1433	0.1290	0.0143	54	0.2328	0.2095	0.0233
55	0.3402	0.3062	0.0340	56	0.4029	0.3626	0.0403
57	0.2597	0.2337	0.0260	58	0.2865	0.2578	0.0287
59	0.3671	0.3304	0.0367	60	0.1074	0.0967	0.0107
61	0.6805	0.6125	0.0680	62	0.5193	0.4674	0.0519
63	0.2507	0.2256	0.0251	64	0.3850	0.3465	0.0385
65	0.8327	0.7494	0.0833	66	0.6357	0.5721	0.0636
67	0.2686	0.2417	0.0269	68	0.2776	0.2498	0.0278
69	0.4029	0.3626	0.0403	70	0.5730	0.5157	0.0573
71	0.5909	0.5318	0.0591	72	0.6357	0.5721	0.0636
73	0.4029	0.3626	0.0403	74	0.3134	0.2821	0.0313
75	0.0537	0.0483	0.0054	76	0.1791	0.1612	0.0179
77	0.4029	0.3626	0.0403	78	0.2865	0.2578	0.0287
79	0.4298	0.3868	0.0430	80	0.1164	0.1048	0.0116
81	0.4656	0.4190	0.0466	82	0.5730	0.5157	0.0573
83	0.4298	0.3868	0.0430	84	0.6357	0.5721	0.0636
85	0.4298	0.3868	0.0430	86	0.3402	0.3062	0.0340
87	0.5283	0.4755	0.0528	88	0.2417	0.2175	0.0242
89	0.3492	0.3143	0.0349	90	0.3223	0.2901	0.0322
91	0.4029	0.3626	0.0403	92	0.4835	0.4351	0.0484
93	0.2597	0.2337	0.0260	94	0.4835	0.4351	0.0484
95	0.3044	0.2740	0.0304	96	0.2238	0.2014	0.0224
97	0.2417	0.2175	0.0242	98	0.3134	0.2821	0.0313
99	0.6805	0.6125	0.0680	100	0.6536	0.5882	0.0654
101	0.5103	0.4593	0.0510	102	0.4835	0.4351	0.0484
103	0.5014	0.4513	0.0501	104	0.2865	0.2578	0.0287
105	0.6267	0.5640	0.0627	106	0.5462	0.4916	0.0546
107	0.3044	0.2740	0.0304	108	0.4566	0.4109	0.0457
109	0.5372	0.4835	0.0537	110	0.3760	0.3384	0.0376
111	0.4566	0.4109	0.0457	112	0.1164	0.1048	0.0116
113	0.2059	0.1853	0.0206	114	0.3223	0.2901	0.0322
115	0.1522	0.1370	0.0152	116	0.3134	0.2821	0.0313
117	0.4387	0.3948	0.0439	118	0.4477	0.4029	0.0448
119	0.2776	0.2498	0.0278	120	0.5283	0.4755	0.0528
121	0.6536	0.5882	0.0654	122	0.2507	0.2256	0.0251
123	0.3760	0.3384	0.0376	124	0.2507	0.2256	0.0251
125	0.4029	0.3626	0.0403	126	0.1433	0.1290	0.0143
127	0.4298	0.3868	0.0430	128	0.5103	0.4593	0.0510
129	0.4029	0.3626	0.0403	130	0.1074	0.0967	0.0107
131	0.2507	0.2256	0.0251	132	0.3940	0.3546	0.0394
133	0.3671	0.3304	0.0367	134	0.6715	0.6044	0.0671
135	0.3492	0.3143	0.0349	136	0.3671	0.3304	0.0367
137	0.2865	0.2578	0.0287	138	0.5372	0.4835	0.0537
139	0.2417	0.2175	0.0242	140	0.2059	0.1853	0.0206
141	0.4477	0.4029	0.0448	142	0.2776	0.2498	0.0278
143	0.2686	0.2417	0.0269	144	0.3492	0.3143	0.0349
145	0.6357	0.5721	0.0636	146	0.4387	0.3948	0.0439
147	0.5999	0.5399	0.0600	148	0.3671	0.3304	0.0367
149	0.4745	0.4270	0.0474	150	0.5551	0.4996	0.0555

151	0.6626	0.5963	0.0663	152	0.4835	0.4351	0.0484
153	0.4387	0.3948	0.0439	154	0.9312	0.8381	0.0931
155	0.2059	0.1853	0.0206	156	0.4745	0.4270	0.0474
157	0.5999	0.5399	0.0600	158	0.2776	0.2498	0.0278
159	0.0985	0.0887	0.0098	160	0.4387	0.3948	0.0439
161	0.4387	0.3948	0.0439	162	0.2776	0.2498	0.0278
163	0.6894	0.6205	0.0689	164	0.4029	0.3626	0.0403
165	0.4835	0.4351	0.0484	166	0.7431	0.6688	0.0743
167	0.6894	0.6205	0.0689	168	0.1791	0.1612	0.0179
169	0.4566	0.4109	0.0457	170	0.5730	0.5157	0.0573
171	0.5641	0.5077	0.0564	172	0.6805	0.6125	0.0680
173	0.6178	0.5560	0.0618	174	0.4745	0.4270	0.0474
175	0.3492	0.3143	0.0349	176	0.4119	0.3707	0.0412
177	0.6357	0.5721	0.0636	178	0.4029	0.3626	0.0403
179	0.5014	0.4513	0.0501	180	0.8058	0.7252	0.0806
181	0.4477	0.4029	0.0448	182	0.4298	0.3868	0.0430
183	0.7790	0.7011	0.0779	184	0.7431	0.6688	0.0743
185	0.6088	0.5479	0.0609	186	1.1013	0.9912	0.1101
187	0.3760	0.3384	0.0376	188	0.6267	0.5640	0.0627
189	0.4477	0.4029	0.0448	190	0.6357	0.5721	0.0636
191	0.8685	0.7817	0.0868	192	0.9491	0.8542	0.0949
193	1.0028	0.9025	0.1003	194	0.7073	0.6366	0.0707
195	0.4477	0.4029	0.0448	196	1.0655	0.9589	0.1065
197	0.7342	0.6608	0.0734	198	0.5999	0.5399	0.0600
199	0.7342	0.6608	0.0734	200	0.8058	0.7252	0.0806
201	0.8864	0.7978	0.0886	202	0.8954	0.8059	0.0895
203	0.7790	0.7011	0.0779	204	0.6894	0.6205	0.0689
205	0.7342	0.6608	0.0734	206	0.3671	0.3304	0.0367
207	0.5193	0.4674	0.0519	208	0.6178	0.5560	0.0618
209	0.6626	0.5963	0.0663	210	0.3940	0.3546	0.0394
211	0.6178	0.5560	0.0618	212	0.6626	0.5963	0.0663
213	0.6894	0.6205	0.0689	214	0.6357	0.5721	0.0636
215	0.7163	0.6447	0.0716	216	0.6715	0.6044	0.0671
217	0.8148	0.7333	0.0815	218	0.7610	0.6849	0.0761
219	0.6447	0.5802	0.0645	220	0.7969	0.7172	0.0797
221	0.7163	0.6447	0.0716	222	0.4745	0.4270	0.0474
223	0.4745	0.4270	0.0474	224	0.4924	0.4432	0.0492
225	0.3402	0.3062	0.0340	226	0.5551	0.4996	0.0555
227	0.4208	0.3787	0.0421	228	0.1970	0.1773	0.0197
229	0.5551	0.4996	0.0555	230	0.4029	0.3626	0.0403
231	0.5372	0.4835	0.0537	232	0.5730	0.5157	0.0573
233	0.5730	0.5157	0.0573	234	0.5014	0.4513	0.0501
235	0.6447	0.5802	0.0645	236	0.5641	0.5077	0.0564
237	0.4745	0.4270	0.0474	238	0.4745	0.4270	0.0474
239	0.4656	0.4190	0.0466	240	0.5193	0.4674	0.0519
241	0.6088	0.5479	0.0609	242	0.4835	0.4351	0.0484
243	0.3402	0.3062	0.0340	244	0.3492	0.3143	0.0349
245	0.3581	0.3223	0.0358	246	0.1433	0.1290	0.0143
247	0.6178	0.5560	0.0618	248	0.3850	0.3465	0.0385
249	0.2865	0.2578	0.0287	250	0.3223	0.2901	0.0322
251	0.4298	0.3868	0.0430	252	0.3940	0.3546	0.0394
253	0.5999	0.5399	0.0600	254	0.4387	0.3948	0.0439
255	0.4656	0.4190	0.0466	256	0.4656	0.4190	0.0466
257	0.4029	0.3626	0.0403	258	0.2865	0.2578	0.0287
259	0.5999	0.5399	0.0600	260	0.3850	0.3465	0.0385
261	0.2686	0.2417	0.0269	262	0.4029	0.3626	0.0403
263	0.1791	0.1612	0.0179	264	0.4387	0.3948	0.0439
265	0.2955	0.2660	0.0295	266	0.2328	0.2095	0.0233
267	0.1791	0.1612	0.0179	268	0.3223	0.2901	0.0322
269	0.3313	0.2982	0.0331	270	0.4656	0.4190	0.0466
271	0.3492	0.3143	0.0349	272	0.3940	0.3546	0.0394
273	0.3760	0.3384	0.0376	274	0.5014	0.4513	0.0501
275	0.4298	0.3868	0.0430	276	0.5462	0.4916	0.0546

277	0.4029	0.3626	0.0403	278	0.4387	0.3948	0.0439
279	0.4477	0.4029	0.0448	280	0.3940	0.3546	0.0394
281	0.3581	0.3223	0.0358	282	0.3492	0.3143	0.0349
283	0.4566	0.4109	0.0457	284	0.3760	0.3384	0.0376
285	0.3492	0.3143	0.0349	286	0.4387	0.3948	0.0439
287	0.3850	0.3465	0.0385	288	0.4119	0.3707	0.0412
289	0.3760	0.3384	0.0376	290	0.3850	0.3465	0.0385
291	0.3492	0.3143	0.0349	292	0.4745	0.4270	0.0474
293	0.3671	0.3304	0.0367	294	0.3313	0.2982	0.0331
295	0.3313	0.2982	0.0331	296	0.3044	0.2740	0.0304
297	0.3492	0.3143	0.0349	298	0.2955	0.2660	0.0295
299	0.2865	0.2578	0.0287	300	0.4029	0.3626	0.0403
301	0.3492	0.3143	0.0349	302	0.2776	0.2498	0.0278
303	0.3223	0.2901	0.0322	304	0.3044	0.2740	0.0304
305	0.3044	0.2740	0.0304	306	0.3223	0.2901	0.0322
307	0.2865	0.2578	0.0287	308	0.2865	0.2578	0.0287
309	0.2328	0.2095	0.0233	310	0.3223	0.2901	0.0322
311	0.2776	0.2498	0.0278	312	0.2597	0.2337	0.0260
313	0.2597	0.2337	0.0260	314	0.2686	0.2417	0.0269
315	0.2597	0.2337	0.0260	316	0.2776	0.2498	0.0278
317	0.2507	0.2256	0.0251	318	0.2776	0.2498	0.0278
319	0.2507	0.2256	0.0251	320	0.2417	0.2175	0.0242
321	0.2507	0.2256	0.0251	322	0.2149	0.1934	0.0215
323	0.2149	0.1934	0.0215	324	0.2417	0.2175	0.0242
325	0.2507	0.2256	0.0251	326	0.2507	0.2256	0.0251
327	0.2507	0.2256	0.0251	328	0.2776	0.2498	0.0278
329	0.2328	0.2095	0.0233	330	0.2238	0.2014	0.0224
331	0.2776	0.2498	0.0278	332	0.3671	0.3304	0.0367
333	0.2507	0.2256	0.0251	334	0.2686	0.2417	0.0269
335	0.4119	0.3707	0.0412	336	0.2597	0.2337	0.0260
337	0.1880	0.1692	0.0188	338	0.2328	0.2095	0.0233
339	0.2238	0.2014	0.0224	340	0.2417	0.2175	0.0242
341	0.1970	0.1773	0.0197	342	0.1701	0.1531	0.0170
343	0.1433	0.1290	0.0143	344	0.1880	0.1692	0.0188
345	0.2059	0.1853	0.0206	346	0.1701	0.1531	0.0170
347	0.1612	0.1451	0.0161	348	0.2238	0.2014	0.0224
349	0.2059	0.1853	0.0206	350	0.2597	0.2337	0.0260
351	0.2686	0.2417	0.0269	352	0.1253	0.1128	0.0125
353	0.2059	0.1853	0.0206	354	0.2149	0.1934	0.0215
355	0.1970	0.1773	0.0197	356	0.2328	0.2095	0.0233
357	0.1880	0.1692	0.0188	358	0.2059	0.1853	0.0206
359	0.1612	0.1451	0.0161	360	0.2417	0.2175	0.0242
361	0.3313	0.2982	0.0331	362	0.2238	0.2014	0.0224
363	0.1791	0.1612	0.0179	364	0.1791	0.1612	0.0179
365	0.2149	0.1934	0.0215				

Totals: PET = 141.4748
PTRANS = 127.3273
PEVAPO = 14.1475

Precipitation/irrigation parameters:

IRAIN = 0: precipitation data provided

NWATER (number of days of rain/irrigation) = 98

Rainfall/Irrigation Details

Day	Time (hr)	Amount (cm)	Application Type	Efficiency	Changes In Rate/Head
2	0.000	0.0508	1	1.000	2
	1.000	0.0000			

4	16.000	0.0508	1	1.000	2
	17.000	0.0000			
5	4.000	0.4318	1	1.000	2
	13.000	0.0000			
6	6.000	0.8890	1	1.000	2
	21.000	0.0000			
9	8.000	1.4732	1	1.000	2
	12.000	0.0000			
10	11.000	1.2954	1	1.000	2
	14.000	0.0000			
15	16.000	0.5334	1	1.000	2
	17.000	0.0000			
17	9.000	0.2286	1	1.000	2
	10.000	0.0000			
18	16.000	3.2512	1	1.000	2
	18.000	0.0000			
19	17.000	0.7874	1	1.000	2
	18.000	0.0000			
24	21.000	0.5334	1	1.000	2
	22.000	0.0000			
30	23.000	0.4572	1	1.000	2
	24.000	0.0000			
35	9.000	1.7272	1	1.000	2
	10.000	0.0000			
36	0.000	0.5080	1	1.000	2
	1.000	0.0000			
37	7.000	0.0762	1	1.000	2
	8.000	0.0000			
43	10.000	0.0508	1	1.000	2
	11.000	0.0000			
48	9.000	0.1524	1	1.000	2
	10.000	0.0000			
52	7.000	0.1778	1	1.000	2
	9.000	0.0000			
53	8.000	1.3970	1	1.000	2
	9.000	0.0000			
60	7.000	0.6604	1	1.000	2
	8.000	0.0000			
61	6.000	0.0254	1	1.000	2
	7.000	0.0000			
74	9.000	0.0762	1	1.000	2
	10.000	0.0000			
75	15.000	0.0762	1	1.000	2
	16.000	0.0000			
76	14.000	0.1778	1	1.000	2
	15.000	0.0000			
81	2.000	0.1016	1	1.000	2
	3.000	0.0000			
86	3.000	1.4478	1	1.000	2
	4.000	0.0000			
94	8.000	0.2286	1	1.000	2
	9.000	0.0000			
97	10.000	0.0254	1	1.000	2
	11.000	0.0000			
101	21.000	0.2540	1	1.000	2
	22.000	0.0000			
103	5.000	16.3322	1	1.000	2
	14.000	0.0000			
107	15.000	1.9050	1	1.000	2
	17.000	0.0000			
108	15.000	0.0508	1	1.000	2
	17.000	0.0000			
114	19.000	2.1844	1	1.000	2

	24.000	0.0000			
118	11.000	1.8034	1	1.000	2
	13.000	0.0000			
122	16.000	0.3048	1	1.000	2
	17.000	0.0000			
123	8.000	0.1778	1	1.000	2
	9.000	0.0000			
124	15.000	0.7874	1	1.000	2
	20.000	0.0000			
128	3.000	4.1148	1	1.000	2
	7.000	0.0000			
134	13.000	1.4732	1	1.000	2
	15.000	0.0000			
138	15.000	2.3622	1	1.000	2
	18.000	0.0000			
139	7.000	0.0508	1	1.000	2
	8.000	0.0000			
140	10.000	0.2286	1	1.000	2
	11.000	0.0000			
145	5.000	2.8448	1	1.000	2
	8.000	0.0000			
154	19.000	5.2324	1	1.000	2
	21.000	0.0000			
158	5.000	0.7874	1	1.000	2
	8.000	0.0000			
161	4.000	0.0762	1	1.000	2
	5.000	0.0000			
166	3.000	0.9398	1	1.000	2
	10.000	0.0000			
167	11.000	1.0414	1	1.000	2
	16.000	0.0000			
180	15.000	0.0508	1	1.000	2
	16.000	0.0000			
184	14.000	0.0508	1	1.000	2
	15.000	0.0000			
206	7.000	0.1524	1	1.000	2
	8.000	0.0000			
207	3.000	0.1270	1	1.000	2
	4.000	0.0000			
209	20.000	2.6416	1	1.000	2
	21.000	0.0000			
222	11.000	1.0668	1	1.000	2
	12.000	0.0000			
223	11.000	0.9906	1	1.000	2
	12.000	0.0000			
224	4.000	3.6576	1	1.000	2
	6.000	0.0000			
225	19.000	0.1524	1	1.000	2
	21.000	0.0000			
226	5.000	6.5786	1	1.000	2
	13.000	0.0000			
233	4.000	0.1016	1	1.000	2
	5.000	0.0000			
242	3.000	1.0414	1	1.000	2
	7.000	0.0000			
243	15.000	0.6096	1	1.000	2
	16.000	0.0000			
244	12.000	0.4064	1	1.000	2
	13.000	0.0000			
247	13.000	0.0762	1	1.000	2
	14.000	0.0000			
249	19.000	1.0668	1	1.000	2
	22.000	0.0000			

250	16.000	2.4384	1	1.000	2
	21.000	0.0000			
258	16.000	0.0254	1	1.000	2
	17.000	0.0000			
259	16.000	0.1524	1	1.000	2
	17.000	0.0000			
260	12.000	1.4224	1	1.000	2
	13.000	0.0000			
261	12.000	1.8796	1	1.000	2
	14.000	0.0000			
262	13.000	2.3114	1	1.000	2
	16.000	0.0000			
266	8.000	0.0254	1	1.000	2
	9.000	0.0000			
267	2.000	0.1524	1	1.000	2
	5.000	0.0000			
277	7.000	0.0254	1	1.000	2
	8.000	0.0000			
299	7.000	4.3942	1	1.000	2
	11.000	0.0000			
300	0.000	4.3942	1	1.000	2
	2.000	0.0000			
301	6.000	5.1054	1	1.000	2
	18.000	0.0000			
302	3.000	6.8072	1	1.000	2
	14.000	0.0000			
303	4.000	0.3048	1	1.000	2
	6.000	0.0000			
304	5.000	1.8542	1	1.000	2
	14.000	0.0000			
318	20.000	0.0254	1	1.000	2
	21.000	0.0000			
319	18.000	0.0254	1	1.000	2
	19.000	0.0000			
320	19.000	0.3302	1	1.000	2
	21.000	0.0000			
321	2.000	1.3208	1	1.000	2
	16.000	0.0000			
323	9.000	1.9050	1	1.000	2
	16.000	0.0000			
334	14.000	0.0254	1	1.000	2
	15.000	0.0000			
335	7.000	0.2794	1	1.000	2
	9.000	0.0000			
336	13.000	1.2446	1	1.000	2
	22.000	0.0000			
342	22.000	0.1016	1	1.000	2
	23.000	0.0000			
343	0.000	2.5654	1	1.000	2
	12.000	0.0000			
345	13.000	1.0414	1	1.000	2
	19.000	0.0000			
346	7.000	0.1270	1	1.000	2
	8.000	0.0000			
352	8.000	0.5588	1	1.000	2
	19.000	0.0000			
353	0.000	2.5654	1	1.000	2
	18.000	0.0000			
354	7.000	12.7508	1	1.000	2
	24.000	0.0000			
355	5.000	2.5908	1	1.000	2
	13.000	0.0000			
356	4.000	0.5588	1	1.000	2

```
      13.000    0.0000
 360   7.000    0.7874         1           1.000          2
      15.000    0.0000
 361   1.000    0.2540         1           1.000          2
       2.000    0.0000

 Total Water Applied (cm) =  1.389634E+02
--------------------------------------------------------------------------------
Program DATAINH terminated normally.
```

WB FINAL COVER OUTPUT FILES FOR THE YEARS 1991 THROUGH 2020

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1991.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.500E+04	0.1520	291.00	2	2.000E-01	1.500E+04	0.1520	291.00
3	3.000E-01	1.500E+04	0.1520	291.00	4	5.000E-01	1.500E+04	0.1520	291.00
5	7.000E-01	1.500E+04	0.1520	291.00	6	1.000E+00	1.500E+04	0.1520	291.00
7	1.400E+00	1.500E+04	0.1520	291.00	8	1.900E+00	1.500E+04	0.1520	291.00
9	2.500E+00	1.500E+04	0.1520	291.00	10	3.300E+00	1.500E+04	0.1520	291.00
11	4.400E+00	1.500E+04	0.1520	291.00	12	5.700E+00	1.500E+04	0.1520	291.00
13	7.500E+00	1.500E+04	0.1520	291.00	14	9.900E+00	1.500E+04	0.1520	291.00
15	1.300E+01	1.500E+04	0.1520	291.00	16	1.500E+01	1.500E+04	0.1520	291.00
17	1.700E+01	1.500E+04	0.1520	291.00	18	1.900E+01	1.500E+04	0.1520	291.00
19	2.200E+01	1.500E+04	0.1520	291.00	20	2.500E+01	1.500E+04	0.1520	291.00
21	2.700E+01	1.500E+04	0.1520	291.00	22	2.850E+01	1.500E+04	0.1520	291.00
23	2.950E+01	1.500E+04	0.1520	291.00	24	3.000E+01	1.500E+04	0.1520	291.00
25	3.030E+01	1.500E+04	0.1520	291.00	26	3.040E+01	1.500E+04	0.1520	291.00
27	3.050E+01	1.500E+04	0.1520	291.00	28	3.060E+01	1.500E+04	0.1022	291.00
29	3.080E+01	1.500E+04	0.1022	291.00	30	3.110E+01	1.500E+04	0.1022	291.00
31	3.160E+01	1.500E+04	0.1022	291.00	32	3.240E+01	1.500E+04	0.1022	291.00
33	3.360E+01	1.500E+04	0.1022	291.00	34	3.540E+01	1.500E+04	0.1022	291.00
35	3.810E+01	1.500E+04	0.1022	291.00	36	4.120E+01	1.500E+04	0.1022	291.00
37	4.400E+01	1.500E+04	0.1022	291.00	38	4.700E+01	1.500E+04	0.1022	291.00
39	5.000E+01	1.500E+04	0.1022	291.00	40	5.500E+01	1.500E+04	0.1022	291.00
41	6.200E+01	1.500E+04	0.1022	291.00	42	7.200E+01	1.500E+04	0.1022	291.00
43	8.200E+01	1.500E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 12.4236 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.13416	0.10219	0.10219
Head (cm) =	1.15304E+05	1.50000E+04	1.50000E+04
LiqWater Flow (cm)=	-4.78614E-03	1.66619E-07	1.66619E-07
IsoVapor Flow (cm)=	-8.51080E-03	4.19610E-18	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
12.4236+	0.0000+	0.0000 -	0.0179-	0.0000-	0.0000 =	12.4057 vs.	12.4057

```
Mass Balance = -1.6044E-07 cm;  Time step attempts = 3941 and successes = 3810
  Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

-------------------------------------------------------------------------------


DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number         =       2          41          46
Depth (cm)          =    0.20000    62.00000   106.68000
Water (cm3/cm3)     =    0.22803     0.17080     0.10219
Head (cm)           = 3.21967E+02 2.28891E+03 1.50000E+04
LiqWater Flow (cm)=-2.13749E-02 3.11791E-03 1.66619E-07
IsoVapor Flow (cm)=-1.25923E-08 4.58235E-05 0.00000E+00
Plant Sink (cm)     = 5.10955E-04 3.76231E-03 0.00000E+00

                                                   LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS     DRAIN     NEWSTOR       STORAGE
 19.9714+ 0.0000+ 0.0000 - 0.0215- 0.1180-  0.0000 =   19.8319 vs.   19.8319

Mass Balance = -2.1339E-06 cm;  Time step attempts =  546 and successes =  500
  Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
Transpiration:  Potential =  0.1934 cm, Actual =  0.1180 cm
1
-------------------------------------------------------------------------------
                         UNSAT-H Version 3.01
                          SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.4147E+02     [cm]
Potential Transpiration               =  1.2733E+02     [cm]
Actual Transpiration                  =  2.5266E+01     [cm]
Potential Evaporation                 =  1.4147E+01     [cm]
Actual Evaporation                    =  9.9712E+00     [cm]
Evaporation during Growth             =  9.9712E+00     [cm]
Total Runoff                          =  9.6315E+01     [cm]
Total Infiltration                    =  4.2649E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.0816E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                   =  1.3896E+02     [cm]
Actual Rainfall                       =  1.3896E+02     [cm]
Actual Irrigation                     =  0.0000E+00     [cm]
Total Final Moisture Storage          =  1.9832E+01     [cm]
Mass Balance Error                    =  2.8284E-03     [cm]
Total Successful Time Steps           =   1901962
Total Attempted Time Steps            =   2004994
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary  =    464679
Total Time Actually Simulated         =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.2677E+01	0.100	3.4282E+01	0.250	3.3782E+01
0.400	3.3419E+01	0.600	3.2980E+01	0.850	3.2550E+01
1.200	3.2059E+01	1.650	3.1534E+01	2.200	3.0944E+01
2.900	3.0237E+01	3.850	2.9335E+01	5.050	2.8244E+01
6.600	2.6870E+01	8.700	2.5060E+01	11.450	2.2791E+01
14.000	2.0815E+01	16.000	1.9331E+01	18.000	1.7912E+01
20.500	1.6216E+01	23.500	1.4310E+01	26.000	1.2816E+01
27.750	1.1810E+01	29.000	1.1111E+01	29.750	1.0699E+01
30.150	1.0481E+01	30.350	1.0373E+01	30.450	1.0318E+01
30.550	1.0265E+01	30.700	1.0171E+01	30.950	1.0012E+01
31.350	9.7605E+00	32.000	9.3552E+00	33.000	8.7440E+00
34.500	7.8641E+00	36.750	6.6419E+00	39.650	5.2725E+00
42.600	4.1047E+00	45.500	3.1528E+00	48.500	2.3688E+00
52.500	1.5504E+00	58.500	6.1197E-01	67.000	1.0632E-02
77.000	1.0698E-04	87.000	6.1957E-05	97.000	6.0873E-05
104.340	6.0821E-05	106.680	6.0816E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.1875E-01	0.300	1.1919E-01
0.500	1.6003E-01	0.700	2.0130E-01	1.000	2.8395E-01
1.400	3.6770E-01	1.900	4.5228E-01	2.500	5.7821E-01
3.300	7.8501E-01	4.400	9.8509E-01	5.700	1.2529E+00
7.500	1.6483E+00	9.900	2.0573E+00	13.000	1.7791E+00
15.000	1.3287E+00	17.000	1.2639E+00	19.000	1.5019E+00
22.000	1.6728E+00	25.000	1.2984E+00	27.000	8.6902E-01
28.500	6.0099E-01	29.500	3.5320E-01	30.000	1.8649E-01
30.300	9.2700E-02	30.400	4.6261E-02	30.500	4.6172E-02
30.600	7.0059E-02	30.800	1.1634E-01	31.100	1.8489E-01
31.600	2.9626E-01	32.400	4.4284E-01	33.600	6.2636E-01
35.400	8.4046E-01	38.100	8.7654E-01	41.200	6.6717E-01
44.000	4.6628E-01	47.000	2.9846E-01	50.000	2.0953E-01
55.000	1.0100E-01	62.000	2.0055E-02	72.000	3.5017E-04
82.000	1.0081E-05	92.000	4.5016E-07	102.000	1.8746E-08
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1992.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

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NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	3.222E+02	0.2280	291.00	2	2.000E-01	3.220E+02	0.2280	291.00
3	3.000E-01	3.218E+02	0.2280	291.00	4	5.000E-01	3.216E+02	0.2281	291.00
5	7.000E-01	3.214E+02	0.2281	291.00	6	1.000E+00	3.210E+02	0.2281	291.00
7	1.400E+00	3.205E+02	0.2281	291.00	8	1.900E+00	3.198E+02	0.2282	291.00
9	2.500E+00	3.191E+02	0.2282	291.00	10	3.300E+00	3.180E+02	0.2283	291.00
11	4.400E+00	3.165E+02	0.2283	291.00	12	5.700E+00	3.146E+02	0.2284	291.00
13	7.500E+00	3.120E+02	0.2286	291.00	14	9.900E+00	3.083E+02	0.2288	291.00
15	1.300E+01	3.032E+02	0.2291	291.00	16	1.500E+01	2.999E+02	0.2292	291.00
17	1.700E+01	2.965E+02	0.2294	291.00	18	1.900E+01	2.930E+02	0.2296	291.00
19	2.200E+01	2.878E+02	0.2298	291.00	20	2.500E+01	2.826E+02	0.2301	291.00
21	2.700E+01	2.792E+02	0.2303	291.00	22	2.850E+01	2.767E+02	0.2304	291.00
23	2.950E+01	2.750E+02	0.2305	291.00	24	3.000E+01	2.742E+02	0.2305	291.00
25	3.030E+01	2.737E+02	0.2305	291.00	26	3.040E+01	2.735E+02	0.2305	291.00
27	3.050E+01	2.734E+02	0.2306	291.00	28	3.060E+01	2.731E+02	0.2686	291.00
29	3.080E+01	2.721E+02	0.2687	291.00	30	3.110E+01	2.706E+02	0.2689	291.00
31	3.160E+01	2.682E+02	0.2692	291.00	32	3.240E+01	2.647E+02	0.2697	291.00
33	3.360E+01	2.602E+02	0.2703	291.00	34	3.540E+01	2.552E+02	0.2710	291.00
35	3.810E+01	2.516E+02	0.2715	291.00	36	4.120E+01	2.532E+02	0.2711	291.00
37	4.400E+01	2.604E+02	0.2688	291.00	38	4.700E+01	2.767E+02	0.2636	291.00
39	5.000E+01	3.093E+02	0.2555	291.00	40	5.500E+01	4.334E+02	0.2425	291.00
41	6.200E+01	2.289E+03	0.1708	291.00	42	7.200E+01	1.438E+04	0.1033	291.00
43	8.200E+01	1.500E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 19.8319 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.23929	0.17797	0.10219
Head (cm) =	1.27849E+02	1.99312E+03	1.50000E+04
LiqWater Flow (cm)=	5.15988E-01	3.98080E-03	1.66619E-07
IsoVapor Flow (cm)=	3.38736E-09	4.55410E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
19.8319+	0.5317+	0.0017 -	0.0128-	0.0000-	0.0000 =	20.3509 vs.	20.3229

```
Mass Balance =  2.7977E-02 cm;  Time step attempts = 2750 and successes = 2615
  Evaporation:  Potential =  0.0170 cm, Actual =  0.0128 cm
Transpiration:  Potential =  0.1531 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
-------------
Node Number        =       2         41         46
Depth (cm)         =     0.20000   62.00000   106.68000
Water (cm3/cm3)    =     0.21030    0.13554     0.10246
Head (cm)          = 1.04926E+03 5.09868E+03 1.48387E+04
LiqWater Flow (cm)=-1.50240E-01 7.51337E-04 1.72103E-07
IsoVapor Flow (cm)=-7.13410E-07 3.17227E-05 0.00000E+00
Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                                LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO   TRANS     DRAIN    NEWSTOR       STORAGE
 18.4204+ 0.0000+ 0.0000 - 0.1522- 0.0000-  0.0000 =   18.2682 vs.   18.2682

Mass Balance = -2.3197E-06 cm;  Time step attempts = 1709 and successes = 1579
  Evaporation:  Potential =  0.1522 cm, Actual =  0.1522 cm
Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:             =    1
Potential Evapotranspiration         =  1.4372E+02     [cm]
Potential Transpiration              =  1.2921E+02     [cm]
Actual Transpiration                 =  3.8773E+01     [cm]
Potential Evaporation                =  1.4509E+01     [cm]
Actual Evaporation                   =  1.0775E+01     [cm]
Evaporation during Growth            =  1.0775E+01     [cm]
Total Runoff                         =  4.4666E+01     [cm]
Total Infiltration                   =  4.8018E+01     [cm]
Total Basal Liquid Flux (drainage)   =  6.2166E-05     [cm]
Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
Total Applied Water                  =  9.2685E+01     [cm]
Actual Rainfall                      =  9.2685E+01     [cm]
Actual Irrigation                    =  0.0000E+00     [cm]
Total Final Moisture Storage         =  1.8268E+01     [cm]
Mass Balance Error                   =  3.3537E-02     [cm]
Total Successful Time Steps          =   1699300
Total Attempted Time Steps           =   1795257
Total Time Step Reductions (DHMAX)   =         0
Total Changes in Surface Boundary    =    310126
Total Time Actually Simulated        =  3.6600E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.7243E+01	0.100	3.9066E+01	0.250	3.8287E+01
0.400	3.7873E+01	0.600	3.7434E+01	0.850	3.7026E+01
1.200	3.6545E+01	1.650	3.6001E+01	2.200	3.5381E+01
2.900	3.4641E+01	3.850	3.3691E+01	5.050	3.2532E+01
6.600	3.1057E+01	8.700	2.9114E+01	11.450	2.6679E+01
14.000	2.4566E+01	16.000	2.2982E+01	18.000	2.1469E+01
20.500	1.9664E+01	23.500	1.7637E+01	26.000	1.6053E+01
27.750	1.4988E+01	29.000	1.4250E+01	29.750	1.3815E+01
30.150	1.3586E+01	30.350	1.3471E+01	30.450	1.3415E+01
30.550	1.3358E+01	30.700	1.3274E+01	30.950	1.3132E+01
31.350	1.2906E+01	32.000	1.2543E+01	33.000	1.1994E+01
34.500	1.1201E+01	36.750	1.0090E+01	39.650	8.8056E+00
42.600	7.6459E+00	45.500	6.6180E+00	48.500	5.6668E+00
52.500	4.5296E+00	58.500	3.1353E+00	67.000	1.8575E+00
77.000	6.4455E-01	87.000	9.2806E-02	97.000	7.2896E-03
104.340	5.6460E-04	106.680	6.2166E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3801E-01	0.300	1.3873E-01
0.500	1.8691E-01	0.700	2.3583E-01	1.000	3.3389E-01
1.400	4.3405E-01	1.900	5.3550E-01	2.500	6.8571E-01
3.300	9.3285E-01	4.400	1.1733E+00	5.700	1.4965E+00
7.500	1.9743E+00	9.900	2.4744E+00	13.000	2.1490E+00
15.000	1.6114E+00	17.000	1.5399E+00	19.000	1.8390E+00
22.000	2.0658E+00	25.000	1.6166E+00	27.000	1.0870E+00
28.500	7.5408E-01	29.500	4.4394E-01	30.000	2.3457E-01
30.300	1.1664E-01	30.400	5.8213E-02	30.500	5.8106E-02
30.600	9.0164E-02	30.800	1.4999E-01	31.100	2.3902E-01
31.600	3.8488E-01	32.400	5.8059E-01	33.600	8.3991E-01
35.400	1.1818E+00	38.100	1.3791E+00	41.200	1.2602E+00
44.000	1.1306E+00	47.000	1.0546E+00	50.000	1.2564E+00
55.000	1.5315E+00	62.000	1.5763E+00	72.000	1.1877E+00
82.000	5.2862E-01	92.000	8.0987E-02	102.000	6.1827E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1993.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.051E+03	0.2102	291.00	2	2.000E-01	1.049E+03	0.2103	291.00
3	3.000E-01	1.048E+03	0.2103	291.00	4	5.000E-01	1.046E+03	0.2104	291.00
5	7.000E-01	1.044E+03	0.2105	291.00	6	1.000E+00	1.041E+03	0.2106	291.00
7	1.400E+00	1.036E+03	0.2107	291.00	8	1.900E+00	1.029E+03	0.2109	291.00
9	2.500E+00	1.021E+03	0.2112	291.00	10	3.300E+00	1.009E+03	0.2116	291.00
11	4.400E+00	9.905E+02	0.2120	291.00	12	5.700E+00	9.689E+02	0.2122	291.00
13	7.500E+00	9.389E+02	0.2126	291.00	14	9.900E+00	8.993E+02	0.2133	291.00
15	1.300E+01	8.502E+02	0.2141	291.00	16	1.500E+01	8.207E+02	0.2146	291.00
17	1.700E+01	7.931E+02	0.2151	291.00	18	1.900E+01	7.678E+02	0.2156	291.00
19	2.200E+01	7.344E+02	0.2162	291.00	20	2.500E+01	7.065E+02	0.2168	291.00
21	2.700E+01	6.909E+02	0.2171	291.00	22	2.850E+01	6.806E+02	0.2173	291.00
23	2.950E+01	6.745E+02	0.2174	291.00	24	3.000E+01	6.716E+02	0.2175	291.00
25	3.030E+01	6.699E+02	0.2175	291.00	26	3.040E+01	6.694E+02	0.2175	291.00
27	3.050E+01	6.689E+02	0.2176	291.00	28	3.060E+01	6.675E+02	0.2339	291.00
29	3.080E+01	6.603E+02	0.2343	291.00	30	3.110E+01	6.505E+02	0.2349	291.00
31	3.160E+01	6.365E+02	0.2357	291.00	32	3.240E+01	6.192E+02	0.2368	291.00
33	3.360E+01	6.022E+02	0.2379	291.00	34	3.540E+01	5.905E+02	0.2387	291.00
35	3.810E+01	5.914E+02	0.2386	291.00	36	4.120E+01	6.097E+02	0.2367	291.00
37	4.400E+01	6.420E+02	0.2332	291.00	38	4.700E+01	6.977E+02	0.2288	291.00
39	5.000E+01	7.780E+02	0.2253	291.00	40	5.500E+01	9.749E+02	0.2193	291.00
41	6.200E+01	5.099E+03	0.1355	291.00	42	7.200E+01	1.309E+04	0.1057	291.00
43	8.200E+01	1.379E+04	0.1043	291.00	44	9.200E+01	1.450E+04	0.1030	291.00
45	1.020E+02	1.484E+04	0.1025	291.00	46	1.067E+02	1.484E+04	0.1025	291.00

Initial Water Storage = 18.2682 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22548	0.13861	0.10246
Head (cm) =	3.90584E+02	4.70622E+03	1.48387E+04
LiqWater Flow (cm)=	2.83338E-01	8.93338E-04	1.72102E-07
IsoVapor Flow (cm)=	-5.90001E-09	3.30493E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR		STORAGE
18.2682+	0.3049+	0.2031 -	0.0177-	0.0000-	0.0000 =	18.5554	vs.	18.5554

```
Mass Balance =  2.8282E-06 cm;  Time step attempts = 5924 and successes = 5845
  Evaporation:  Potential =  0.0179 cm, Actual =  0.0177 cm
Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =        2          41          46
Depth (cm)         =     0.20000    62.00000   106.68000
Water (cm3/cm3)    =     0.20533     0.10461     0.10230
Head (cm)          = 1.22429E+03 1.36354E+04 1.49384E+04
LiqWater Flow (cm)=-1.42606E-02 1.19591E-05 1.68689E-07
IsoVapor Flow (cm)=-8.86892E-08 2.43389E-06 0.00000E+00
Plant Sink (cm)    = 2.36841E-04 9.15729E-05 0.00000E+00

                                                LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO    TRANS     DRAIN     NEWSTOR        STORAGE
 16.5963+ 0.0000+ 0.0000 - 0.0143- 0.0499-  0.0000 =   16.5321 vs.   16.5321

Mass Balance = -9.8091E-07 cm;  Time step attempts =  335 and successes =  283
  Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
Transpiration:  Potential =  0.1290 cm, Actual =  0.0499 cm
1
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                           UNSAT-H Version 3.01
                            SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

Transpiration Scheme is:             =    1
Potential Evapotranspiration         =  1.5704E+02     [cm]
Potential Transpiration              =  1.4134E+02     [cm]
Actual Transpiration                 =  3.5196E+01     [cm]
Potential Evaporation                =  1.5704E+01     [cm]
Actual Evaporation                   =  9.8324E+00     [cm]
Evaporation during Growth            =  9.8324E+00     [cm]
Total Runoff                         =  3.5751E+01     [cm]
Total Infiltration                   =  4.3294E+01     [cm]
Total Basal Liquid Flux (drainage)   =  6.2309E-05     [cm]
Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
Total Applied Water                  =  7.9045E+01     [cm]
Actual Rainfall                      =  7.9045E+01     [cm]
Actual Irrigation                    =  0.0000E+00     [cm]
Total Final Moisture Storage         =  1.6532E+01     [cm]
Mass Balance Error                   =  8.3641E-04     [cm]
Total Successful Time Steps          =   1396519
Total Attempted Time Steps           =   1477556
Total Time Step Reductions (DHMAX)   =         0
Total Changes in Surface Boundary    =    314897
Total Time Actually Simulated        =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.3461E+01	0.100	3.4795E+01	0.250	3.4260E+01
0.400	3.3939E+01	0.600	3.3574E+01	0.850	3.3223E+01
1.200	3.2816E+01	1.650	3.2317E+01	2.200	3.1722E+01
2.900	3.0984E+01	3.850	3.0013E+01	5.050	2.8844E+01
6.600	2.7406E+01	8.700	2.5525E+01	11.450	2.3167E+01
14.000	2.1111E+01	16.000	1.9566E+01	18.000	1.8086E+01
20.500	1.6317E+01	23.500	1.4334E+01	26.000	1.2790E+01
27.750	1.1756E+01	29.000	1.1041E+01	29.750	1.0621E+01
30.150	1.0399E+01	30.350	1.0289E+01	30.450	1.0234E+01
30.550	1.0179E+01	30.700	1.0098E+01	30.950	9.9604E+00
31.350	9.7422E+00	32.000	9.3937E+00	33.000	8.8742E+00
34.500	8.1377E+00	36.750	7.1295E+00	39.650	5.9985E+00
42.600	5.0073E+00	45.500	4.1627E+00	48.500	3.4323E+00
52.500	2.6552E+00	58.500	2.0329E+00	67.000	1.0239E+00
77.000	2.1075E-01	87.000	1.9542E-02	97.000	1.9563E-03
104.340	-2.4854E-04	106.680	6.2309E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3824E-01	0.300	1.3866E-01
0.500	1.8595E-01	0.700	2.3357E-01	1.000	3.2889E-01
1.400	4.2525E-01	1.900	5.2177E-01	2.500	6.6477E-01
3.300	8.9977E-01	4.400	1.1268E+00	5.700	1.4337E+00
7.500	1.8917E+00	9.900	2.3762E+00	13.000	2.0738E+00
15.000	1.5603E+00	17.000	1.4948E+00	19.000	1.7882E+00
22.000	2.0071E+00	25.000	1.5645E+00	27.000	1.0483E+00
28.500	7.2557E-01	29.500	4.2659E-01	30.000	2.2527E-01
30.300	1.1198E-01	30.400	5.5881E-02	30.500	5.5774E-02
30.600	8.5747E-02	30.800	1.4234E-01	31.100	2.2603E-01
31.600	3.6177E-01	32.400	5.4088E-01	33.600	7.7031E-01
35.400	1.0614E+00	38.100	1.2041E+00	41.200	1.0717E+00
44.000	9.2991E-01	47.000	8.3383E-01	50.000	9.5988E-01
55.000	1.1646E+00	62.000	1.2712E+00	72.000	8.3182E-01
82.000	2.0700E-01	92.000	2.6427E-02	102.000	4.0992E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1994.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

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NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.225E+03	0.2053	291.00	2	2.000E-01	1.224E+03	0.2053	291.00
3	3.000E-01	1.224E+03	0.2053	291.00	4	5.000E-01	1.224E+03	0.2053	291.00
5	7.000E-01	1.223E+03	0.2054	291.00	6	1.000E+00	1.222E+03	0.2054	291.00
7	1.400E+00	1.221E+03	0.2054	291.00	8	1.900E+00	1.220E+03	0.2054	291.00
9	2.500E+00	1.217E+03	0.2055	291.00	10	3.300E+00	1.214E+03	0.2056	291.00
11	4.400E+00	1.210E+03	0.2057	291.00	12	5.700E+00	1.204E+03	0.2059	291.00
13	7.500E+00	1.195E+03	0.2061	291.00	14	9.900E+00	1.181E+03	0.2065	291.00
15	1.300E+01	1.164E+03	0.2069	291.00	16	1.500E+01	1.153E+03	0.2072	291.00
17	1.700E+01	1.143E+03	0.2075	291.00	18	1.900E+01	1.133E+03	0.2078	291.00
19	2.200E+01	1.120E+03	0.2082	291.00	20	2.500E+01	1.108E+03	0.2085	291.00
21	2.700E+01	1.101E+03	0.2087	291.00	22	2.850E+01	1.097E+03	0.2089	291.00
23	2.950E+01	1.094E+03	0.2089	291.00	24	3.000E+01	1.093E+03	0.2090	291.00
25	3.030E+01	1.092E+03	0.2090	291.00	26	3.040E+01	1.092E+03	0.2090	291.00
27	3.050E+01	1.091E+03	0.2090	291.00	28	3.060E+01	1.091E+03	0.2131	291.00
29	3.080E+01	1.088E+03	0.2133	291.00	30	3.110E+01	1.083E+03	0.2136	291.00
31	3.160E+01	1.077E+03	0.2139	291.00	32	3.240E+01	1.069E+03	0.2144	291.00
33	3.360E+01	1.062E+03	0.2148	291.00	34	3.540E+01	1.062E+03	0.2148	291.00
35	3.810E+01	1.085E+03	0.2134	291.00	36	4.120E+01	1.153E+03	0.2096	291.00
37	4.400E+01	1.270E+03	0.2037	291.00	38	4.700E+01	1.497E+03	0.1939	291.00
39	5.000E+01	1.931E+03	0.1797	291.00	40	5.500E+01	6.066E+03	0.1292	291.00
41	6.200E+01	1.364E+04	0.1046	291.00	42	7.200E+01	1.423E+04	0.1035	291.00
43	8.200E+01	1.456E+04	0.1029	291.00	44	9.200E+01	1.487E+04	0.1024	291.00
45	1.020E+02	1.495E+04	0.1023	291.00	46	1.067E+02	1.494E+04	0.1023	291.00

Initial Water Storage = 16.5321 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.20427	0.10471	0.10230
Head (cm)	=	1.26596E+03	1.35822E+04	1.49385E+04
LiqWater Flow (cm)	=	-2.12829E-02	1.30647E-05	1.68684E-07
IsoVapor Flow (cm)	=	-1.44985E-07	2.64852E-06	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
16.5321	+	0.0000	+	0.0000	-	0.0215	-	0.0000	-	0.0000	=	16.5106	vs.	16.4987

```
Mass Balance =  1.1859E-02 cm;  Time step attempts =  381 and successes =  321
  Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
Transpiration:  Potential =  0.1934 cm, Actual =  0.0000 cm
```

```
DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =        2          41          46
Depth (cm)         =      0.20000    62.00000   106.68000
Water (cm3/cm3)    =      0.23767     0.22346     0.10222
Head (cm)          = 1.51280E+02 8.26849E+02 1.49859E+04
LiqWater Flow (cm)= 1.54206E-01 2.41265E-02 1.67088E-07
IsoVapor Flow (cm)=-3.59754E-09 3.93700E-06 0.00000E+00
Plant Sink (cm)    = 5.86735E-04 7.06277E-03 0.00000E+00

                                                 LIQUID
 PRESTOR    INFIL  RUNOFF     EVAPO    TRANS      DRAIN      NEWSTOR        STORAGE
 21.2478+ 0.1763+ 0.1031 - 0.0216- 0.1348-   0.0000 =    21.2678 vs.    21.2678

Mass Balance = -5.9551E-07 cm;  Time step attempts = 1876 and successes = 1816
  Evaporation:  Potential =  0.0242 cm, Actual =  0.0216 cm
Transpiration:  Potential =  0.2175 cm, Actual =  0.1348 cm
1
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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
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Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.4111E+02      [cm]
Potential Transpiration               =  1.2700E+02      [cm]
Actual Transpiration                  =  3.3601E+01      [cm]
Potential Evaporation                 =  1.4111E+01      [cm]
Actual Evaporation                    =  1.0188E+01      [cm]
Evaporation during Growth             =  1.0188E+01      [cm]
Total Runoff                          =  5.1355E+01      [cm]
Total Infiltration                    =  4.8543E+01      [cm]
Total Basal Liquid Flux (drainage) =  6.1264E-05      [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00      [cm]
Total Applied Water                   =  9.9898E+01      [cm]
Actual Rainfall                       =  9.9898E+01      [cm]
Actual Irrigation                     =  0.0000E+00      [cm]
Total Final Moisture Storage          =  2.1268E+01      [cm]
Mass Balance Error                    =  1.8265E-02      [cm]
Total Successful Time Steps           =   1703350
Total Attempted Time Steps            =   1797255
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary  =    315904
Total Time Actually Simulated         =  3.6500E+02      [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH          FLOW        DEPTH          FLOW        DEPTH          FLOW
  --------    -----------   --------    -----------   --------    -----------
```

0.000	3.8355E+01	0.100	4.0047E+01	0.250	3.9410E+01
0.400	3.9014E+01	0.600	3.8556E+01	0.850	3.8113E+01
1.200	3.7581E+01	1.650	3.7017E+01	2.200	3.6435E+01
2.900	3.5760E+01	3.850	3.4856E+01	5.050	3.3718E+01
6.600	3.2265E+01	8.700	3.0345E+01	11.450	2.7936E+01
14.000	2.5840E+01	16.000	2.4266E+01	18.000	2.2759E+01
20.500	2.0955E+01	23.500	1.8927E+01	26.000	1.7339E+01
27.750	1.6271E+01	29.000	1.5531E+01	29.750	1.5094E+01
30.150	1.4864E+01	30.350	1.4749E+01	30.450	1.4692E+01
30.550	1.4635E+01	30.700	1.4541E+01	30.950	1.4382E+01
31.350	1.4131E+01	32.000	1.3726E+01	33.000	1.3118E+01
34.500	1.2241E+01	36.750	1.1011E+01	39.650	9.5845E+00
42.600	8.2872E+00	45.500	7.1239E+00	48.500	6.0217E+00
52.500	4.6705E+00	58.500	2.7996E+00	67.000	9.0644E-01
77.000	5.1193E-02	87.000	1.6257E-03	97.000	2.8107E-04
104.340	-8.5675E-05	106.680	6.1264E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2914E-01	0.300	1.2972E-01
0.500	1.7449E-01	0.700	2.1984E-01	1.000	3.1088E-01
1.400	4.0391E-01	1.900	4.9820E-01	2.500	6.3858E-01
3.300	8.7028E-01	4.400	1.0974E+00	5.700	1.4021E+00
7.500	1.8515E+00	9.900	2.3197E+00	13.000	2.0143E+00
15.000	1.5107E+00	17.000	1.4443E+00	19.000	1.7264E+00
22.000	1.9364E+00	25.000	1.5119E+00	27.000	1.0152E+00
28.500	7.0361E-01	29.500	4.1404E-01	30.000	2.1874E-01
30.300	1.0876E-01	30.400	5.4278E-02	30.500	5.4178E-02
30.600	8.3608E-02	30.800	1.3902E-01	31.100	2.2136E-01
31.600	3.5602E-01	32.400	5.3646E-01	33.600	7.7379E-01
35.400	1.0825E+00	38.100	1.2460E+00	41.200	1.1221E+00
44.000	9.9324E-01	47.000	9.1938E-01	50.000	1.0797E+00
55.000	1.2289E+00	62.000	8.8113E-01	72.000	1.6042E-01
82.000	1.5445E-02	92.000	3.0290E-03	102.000	9.1802E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1995.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.515E+02	0.2377	291.00	2	2.000E-01	1.513E+02	0.2377	291.00
3	3.000E-01	1.512E+02	0.2377	291.00	4	5.000E-01	1.510E+02	0.2377	291.00
5	7.000E-01	1.507E+02	0.2377	291.00	6	1.000E+00	1.504E+02	0.2377	291.00
7	1.400E+00	1.500E+02	0.2378	291.00	8	1.900E+00	1.495E+02	0.2378	291.00
9	2.500E+00	1.489E+02	0.2378	291.00	10	3.300E+00	1.481E+02	0.2379	291.00
11	4.400E+00	1.470E+02	0.2379	291.00	12	5.700E+00	1.458E+02	0.2380	291.00
13	7.500E+00	1.442E+02	0.2381	291.00	14	9.900E+00	1.421E+02	0.2382	291.00
15	1.300E+01	1.397E+02	0.2383	291.00	16	1.500E+01	1.382E+02	0.2383	291.00
17	1.700E+01	1.368E+02	0.2384	291.00	18	1.900E+01	1.355E+02	0.2384	291.00
19	2.200E+01	1.337E+02	0.2384	291.00	20	2.500E+01	1.321E+02	0.2384	291.00
21	2.700E+01	1.310E+02	0.2384	291.00	22	2.850E+01	1.303E+02	0.2384	291.00
23	2.950E+01	1.299E+02	0.2384	291.00	24	3.000E+01	1.297E+02	0.2383	291.00
25	3.030E+01	1.296E+02	0.2383	291.00	26	3.040E+01	1.295E+02	0.2383	291.00
27	3.050E+01	1.295E+02	0.2383	291.00	28	3.060E+01	1.295E+02	0.2893	291.00
29	3.080E+01	1.300E+02	0.2889	291.00	30	3.110E+01	1.308E+02	0.2883	291.00
31	3.160E+01	1.324E+02	0.2873	291.00	32	3.240E+01	1.352E+02	0.2854	291.00
33	3.360E+01	1.406E+02	0.2832	291.00	34	3.540E+01	1.512E+02	0.2802	291.00
35	3.810E+01	1.729E+02	0.2752	291.00	36	4.120E+01	2.072E+02	0.2690	291.00
37	4.400E+01	2.478E+02	0.2624	291.00	38	4.700E+01	3.049E+02	0.2547	291.00
39	5.000E+01	3.796E+02	0.2473	291.00	40	5.500E+01	5.447E+02	0.2356	291.00
41	6.200E+01	8.268E+02	0.2235	291.00	42	7.200E+01	2.173E+03	0.1735	291.00
43	8.200E+01	1.263E+04	0.1066	291.00	44	9.200E+01	1.495E+04	0.1023	291.00
45	1.020E+02	1.499E+04	0.1022	291.00	46	1.067E+02	1.499E+04	0.1022	291.00

Initial Water Storage = 21.2678 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	= 2	41	46
Depth (cm)	= 0.20000	62.00000	106.68000
Water (cm3/cm3)	= 0.23518	0.22441	0.10222
Head (cm)	= 1.90026E+02	7.96375E+02	1.49860E+04
LiqWater Flow (cm)	=-1.38597E-02	2.45468E-02	1.67087E-07
IsoVapor Flow (cm)	=-5.20281E-09	3.74741E-06	0.00000E+00
Plant Sink (cm)	= 0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
21.2678+	0.0000+	0.0000 -	0.0143-	0.0000-	0.0000 =	21.2534 vs.	21.2176

```
Mass Balance =  3.5833E-02 cm;  Time step attempts =  255 and successes =  221
  Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
Transpiration:  Potential =  0.1290 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =       2          41          46
Depth (cm)         =     0.20000    62.00000   106.68000
Water (cm3/cm3)    =     0.19931     0.10608     0.10256
Head (cm)          = 1.48834E+03 1.28857E+04 1.47826E+04
LiqWater Flow (cm)=-1.72579E-02 1.34898E-05 1.74074E-07
IsoVapor Flow (cm)=-1.73597E-07 2.29149E-06 0.00000E+00
Plant Sink (cm)    = 2.66192E-04 1.88099E-04 0.00000E+00

                                                LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR        STORAGE
 15.4608+ 0.0000+ 0.0000 - 0.0179- 0.0507-  0.0000 =   15.3922 vs.   15.3922

Mass Balance = -1.0439E-06 cm;  Time step attempts =  459 and successes =  402
  Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
Transpiration:  Potential =  0.1612 cm, Actual =  0.0507 cm
1
-------------------------------------------------------------------------------
                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:            =    1
Potential Evapotranspiration        =  1.3830E+02     [cm]
Potential Transpiration             =  1.2447E+02     [cm]
Actual Transpiration                =  3.8020E+01     [cm]
Potential Evaporation               =  1.3830E+01     [cm]
Actual Evaporation                  =  1.0807E+01     [cm]
Evaporation during Growth           =  1.0807E+01     [cm]
Total Runoff                        =  5.6857E+01     [cm]
Total Infiltration                  =  4.2991E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.2843E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                 =  9.9847E+01     [cm]
Actual Rainfall                     =  9.9847E+01     [cm]
Actual Irrigation                   =  0.0000E+00     [cm]
Total Final Moisture Storage        =  1.5392E+01     [cm]
Mass Balance Error                  =  3.9006E-02     [cm]
Total Successful Time Steps         =   1610273
Total Attempted Time Steps          =   1700907
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary  =    366769
Total Time Actually Simulated       =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.2184E+01	0.100	3.3776E+01	0.250	3.3232E+01
0.400	3.2842E+01	0.600	3.2388E+01	0.850	3.1951E+01
1.200	3.1452E+01	1.650	3.0913E+01	2.200	3.0298E+01
2.900	2.9569E+01	3.850	2.8649E+01	5.050	2.7512E+01
6.600	2.6065E+01	8.700	2.4156E+01	11.450	2.1766E+01
14.000	1.9692E+01	16.000	1.8137E+01	18.000	1.6653E+01
20.500	1.4883E+01	23.500	1.2905E+01	26.000	1.1367E+01
27.750	1.0337E+01	29.000	9.6246E+00	29.750	9.2061E+00
30.150	8.9851E+00	30.350	8.8753E+00	30.450	8.8205E+00
30.550	8.7660E+00	30.700	8.6908E+00	30.950	8.5645E+00
31.350	8.3635E+00	32.000	8.0401E+00	33.000	7.5523E+00
34.500	6.8477E+00	36.750	5.8587E+00	39.650	4.7241E+00
42.600	3.7522E+00	45.500	2.9824E+00	48.500	2.4205E+00
52.500	1.8830E+00	58.500	1.3814E+00	67.000	1.0347E+00
77.000	6.3163E-01	87.000	1.1793E-01	97.000	1.0490E-02
104.340	7.0029E-04	106.680	6.2843E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.4374E-01	0.300	1.4412E-01
0.500	1.9318E-01	0.700	2.4267E-01	1.000	3.4182E-01
1.400	4.4210E-01	1.900	5.4293E-01	2.500	6.9283E-01
3.300	9.3971E-01	4.400	1.1793E+00	5.700	1.5034E+00
7.500	1.9856E+00	9.900	2.4908E+00	13.000	2.1678E+00
15.000	1.6279E+00	17.000	1.5572E+00	19.000	1.8607E+00
22.000	2.0872E+00	25.000	1.6295E+00	27.000	1.0938E+00
28.500	7.5790E-01	29.500	4.4589E-01	30.000	2.3553E-01
30.300	1.1710E-01	30.400	5.8439E-02	30.500	5.8330E-02
30.600	8.9373E-02	30.800	1.4857E-01	31.100	2.3657E-01
31.600	3.8067E-01	32.400	5.7459E-01	33.600	8.3302E-01
35.400	1.1797E+00	38.100	1.3818E+00	41.200	1.2385E+00
44.000	1.0648E+00	47.000	9.4253E-01	50.000	1.0728E+00
55.000	1.2628E+00	62.000	1.3431E+00	72.000	1.0846E+00
82.000	5.3436E-01	92.000	1.0356E-01	102.000	9.4946E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1996.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.489E+03	0.1993	291.00	2	2.000E-01	1.488E+03	0.1993	291.00
3	3.000E-01	1.488E+03	0.1993	291.00	4	5.000E-01	1.487E+03	0.1993	291.00
5	7.000E-01	1.486E+03	0.1994	291.00	6	1.000E+00	1.485E+03	0.1994	291.00
7	1.400E+00	1.483E+03	0.1994	291.00	8	1.900E+00	1.481E+03	0.1995	291.00
9	2.500E+00	1.478E+03	0.1995	291.00	10	3.300E+00	1.474E+03	0.1996	291.00
11	4.400E+00	1.467E+03	0.1997	291.00	12	5.700E+00	1.460E+03	0.1999	291.00
13	7.500E+00	1.449E+03	0.2001	291.00	14	9.900E+00	1.435E+03	0.2004	291.00
15	1.300E+01	1.419E+03	0.2007	291.00	16	1.500E+01	1.411E+03	0.2009	291.00
17	1.700E+01	1.405E+03	0.2010	291.00	18	1.900E+01	1.400E+03	0.2012	291.00
19	2.200E+01	1.395E+03	0.2013	291.00	20	2.500E+01	1.391E+03	0.2014	291.00
21	2.700E+01	1.390E+03	0.2014	291.00	22	2.850E+01	1.388E+03	0.2014	291.00
23	2.950E+01	1.388E+03	0.2014	291.00	24	3.000E+01	1.388E+03	0.2014	291.00
25	3.030E+01	1.387E+03	0.2014	291.00	26	3.040E+01	1.387E+03	0.2014	291.00
27	3.050E+01	1.387E+03	0.2014	291.00	28	3.060E+01	1.387E+03	0.1984	291.00
29	3.080E+01	1.388E+03	0.1983	291.00	30	3.110E+01	1.390E+03	0.1982	291.00
31	3.160E+01	1.394E+03	0.1981	291.00	32	3.240E+01	1.402E+03	0.1977	291.00
33	3.360E+01	1.422E+03	0.1969	291.00	34	3.540E+01	1.472E+03	0.1949	291.00
35	3.810E+01	1.620E+03	0.1894	291.00	36	4.120E+01	1.994E+03	0.1779	291.00
37	4.400E+01	2.850E+03	0.1601	291.00	38	4.700E+01	6.399E+03	0.1273	291.00
39	5.000E+01	9.983E+03	0.1132	291.00	40	5.500E+01	1.174E+04	0.1086	291.00
41	6.200E+01	1.289E+04	0.1061	291.00	42	7.200E+01	1.342E+04	0.1050	291.00
43	8.200E+01	1.385E+04	0.1042	291.00	44	9.200E+01	1.448E+04	0.1031	291.00
45	1.020E+02	1.481E+04	0.1025	291.00	46	1.067E+02	1.478E+04	0.1026	291.00

Initial Water Storage = 15.3922 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	= 2	41	46
Depth (cm)	= 0.20000	62.00000	106.68000
Water (cm3/cm3)	= 0.20423	0.10608	0.10256
Head (cm)	= 1.26750E+03	1.28859E+04	1.47829E+04
LiqWater Flow (cm)	= 5.74503E-02	1.34793E-05	1.74062E-07
IsoVapor Flow (cm)	= 1.21070E-08	2.29207E-06	0.00000E+00
Plant Sink (cm)	= 0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
15.3922+	0.0762+	0.0000 -	0.0175-	0.0000-	0.0000 =	15.4509 vs.	15.4389

```
 Mass Balance =  1.1975E-02 cm;  Time step attempts = 3482 and successes = 3384
   Evaporation:  Potential =  0.0197 cm, Actual =  0.0175 cm
 Transpiration:  Potential =  0.1773 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2         41          46
 Depth (cm)         =     0.20000   62.00000   106.68000
 Water (cm3/cm3)    =     0.17883    0.15632     0.10226
 Head (cm)          = 3.22851E+03 3.09325E+03 1.49606E+04
 LiqWater Flow (cm)=-1.16961E-01 2.15912E-03 1.67940E-07
 IsoVapor Flow (cm)=-2.88028E-05 3.26840E-05 0.00000E+00
 Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                                   LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO    TRANS     DRAIN     NEWSTOR        STORAGE
  17.1497+ 0.0000+ 0.0000 - 0.1212- 0.0000-   0.0000 =   17.0285 vs.   17.0285

 Mass Balance = -1.8359E-06 cm;  Time step attempts = 9219 and successes = 8500
   Evaporation:  Potential =  0.1701 cm, Actual =  0.1212 cm
 Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                              UNSAT-H Version 3.01
                               SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:              =    1
 Potential Evapotranspiration          =  1.5353E+02     [cm]
 Potential Transpiration               =  1.3802E+02     [cm]
 Actual Transpiration                  =  3.2737E+01     [cm]
 Potential Evaporation                 =  1.5506E+01     [cm]
 Actual Evaporation                    =  1.0522E+01     [cm]
 Evaporation during Growth             =  1.0522E+01     [cm]
 Total Runoff                          =  4.3355E+01     [cm]
 Total Infiltration                    =  4.4910E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.2512E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                   =  8.8265E+01     [cm]
 Actual Rainfall                       =  8.8265E+01     [cm]
 Actual Irrigation                     =  0.0000E+00     [cm]
 Total Final Moisture Storage          =  1.7028E+01     [cm]
 Mass Balance Error                    =  1.4523E-02     [cm]
 Total Successful Time Steps           =   1621590
 Total Attempted Time Steps            =   1714169
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary  =    322665
 Total Time Actually Simulated         =  3.6600E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	3.4388E+01	0.100	3.6140E+01	0.250	3.5578E+01
0.400	3.5210E+01	0.600	3.4769E+01	0.850	3.4317E+01
1.200	3.3809E+01	1.650	3.3257E+01	2.200	3.2653E+01
2.900	3.1940E+01	3.850	3.1043E+01	5.050	2.9950E+01
6.600	2.8557E+01	8.700	2.6707E+01	11.450	2.4370E+01
14.000	2.2315E+01	16.000	2.0761E+01	18.000	1.9263E+01
20.500	1.7463E+01	23.500	1.5426E+01	26.000	1.3821E+01
27.750	1.2738E+01	29.000	1.1985E+01	29.750	1.1541E+01
30.150	1.1306E+01	30.350	1.1189E+01	30.450	1.1131E+01
30.550	1.1073E+01	30.700	1.0986E+01	30.950	1.0836E+01
31.350	1.0598E+01	32.000	1.0212E+01	33.000	9.6244E+00
34.500	8.7649E+00	36.750	7.5402E+00	39.650	6.1126E+00
42.600	4.8556E+00	45.500	3.7861E+00	48.500	2.8225E+00
52.500	1.7837E+00	58.500	7.5209E-01	67.000	8.5568E-02
77.000	3.8526E-03	87.000	1.2524E-03	97.000	5.9020E-04
104.340	-4.9380E-04	106.680	6.2512E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3242E-01	0.300	1.3291E-01
0.500	1.7845E-01	0.700	2.2446E-01	1.000	3.1660E-01
1.400	4.1011E-01	1.900	5.0445E-01	2.500	6.4435E-01
3.300	8.7501E-01	4.400	1.1006E+00	5.700	1.4070E+00
7.500	1.8644E+00	9.900	2.3518E+00	13.000	2.0643E+00
15.000	1.5601E+00	17.000	1.5017E+00	19.000	1.8043E+00
22.000	2.0402E+00	25.000	1.6056E+00	27.000	1.0832E+00
28.500	7.5310E-01	29.500	4.4394E-01	30.000	2.3472E-01
30.300	1.1676E-01	30.400	5.8278E-02	30.500	5.8179E-02
30.600	8.9143E-02	30.800	1.4860E-01	31.100	2.3738E-01
31.600	3.8354E-01	32.400	5.8221E-01	33.600	8.4854E-01
35.400	1.1995E+00	38.100	1.3750E+00	41.200	1.1693E+00
44.000	9.3495E-01	47.000	7.3328E-01	50.000	6.9462E-01
55.000	5.5646E-01	62.000	2.4136E-01	72.000	4.3712E-02
82.000	1.9858E-02	92.000	9.2896E-03	102.000	3.3792E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1997.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	3.282E+03	0.1785	291.00	2	2.000E-01	3.229E+03	0.1788	291.00
3	3.000E-01	3.201E+03	0.1790	291.00	4	5.000E-01	3.147E+03	0.1794	291.00
5	7.000E-01	3.092E+03	0.1798	291.00	6	1.000E+00	3.011E+03	0.1805	291.00
7	1.400E+00	2.904E+03	0.1813	291.00	8	1.900E+00	2.776E+03	0.1824	291.00
9	2.500E+00	2.634E+03	0.1837	291.00	10	3.300E+00	2.465E+03	0.1854	291.00
11	4.400E+00	2.273E+03	0.1874	291.00	12	5.700E+00	2.096E+03	0.1896	291.00
13	7.500E+00	1.917E+03	0.1920	291.00	14	9.900E+00	1.757E+03	0.1945	291.00
15	1.300E+01	1.628E+03	0.1967	291.00	16	1.500E+01	1.571E+03	0.1977	291.00
17	1.700E+01	1.527E+03	0.1985	291.00	18	1.900E+01	1.493E+03	0.1992	291.00
19	2.200E+01	1.454E+03	0.2000	291.00	20	2.500E+01	1.424E+03	0.2007	291.00
21	2.700E+01	1.407E+03	0.2010	291.00	22	2.850E+01	1.396E+03	0.2012	291.00
23	2.950E+01	1.389E+03	0.2014	291.00	24	3.000E+01	1.386E+03	0.2015	291.00
25	3.030E+01	1.384E+03	0.2015	291.00	26	3.040E+01	1.384E+03	0.2015	291.00
27	3.050E+01	1.383E+03	0.2015	291.00	28	3.060E+01	1.381E+03	0.1986	291.00
29	3.080E+01	1.371E+03	0.1990	291.00	30	3.110E+01	1.357E+03	0.1997	291.00
31	3.160E+01	1.336E+03	0.2006	291.00	32	3.240E+01	1.306E+03	0.2020	291.00
33	3.360E+01	1.270E+03	0.2037	291.00	34	3.540E+01	1.231E+03	0.2056	291.00
35	3.810E+01	1.202E+03	0.2070	291.00	36	4.120E+01	1.201E+03	0.2071	291.00
37	4.400E+01	1.226E+03	0.2058	291.00	38	4.700E+01	1.281E+03	0.2032	291.00
39	5.000E+01	1.371E+03	0.1990	291.00	40	5.500E+01	1.655E+03	0.1882	291.00
41	6.200E+01	3.093E+03	0.1563	291.00	42	7.200E+01	1.151E+04	0.1091	291.00
43	8.200E+01	1.480E+04	0.1025	291.00	44	9.200E+01	1.498E+04	0.1022	291.00
45	1.020E+02	1.498E+04	0.1022	291.00	46	1.067E+02	1.496E+04	0.1023	291.00

Initial Water Storage = 17.0285 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.18876	0.15717	0.10226
Head (cm) =	2.16281E+03	3.03643E+03	1.49608E+04
LiqWater Flow (cm) =	-1.41579E-02	2.23819E-03	1.67934E-07
IsoVapor Flow (cm) =	-7.30582E-07	3.24949E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
17.0285	+	0.0000	+	0.0000	-	0.0116	-	0.0000	-	0.0000	=	17.0168	vs.	17.0168

```
 Mass Balance = -1.8274E-07 cm;  Time step attempts =  744 and successes =  685
   Evaporation:  Potential =  0.0116 cm, Actual =  0.0116 cm
 Transpiration:  Potential =  0.1048 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.22290     0.16554     0.10248
 Head (cm)          = 4.54053E+02 2.54401E+03 1.48286E+04
 LiqWater Flow (cm)=-2.16454E-02 2.91821E-03 1.72453E-07
 IsoVapor Flow (cm)=-2.27942E-08 3.24022E-05 0.00000E+00
 Plant Sink (cm)    = 4.73557E-04 3.55162E-03 0.00000E+00

                                                LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR      STORAGE
  19.4415+ 0.0000+ 0.0000 - 0.0215- 0.1096-  0.0000 =   19.3105 vs.   19.3105

 Mass Balance = -1.9989E-06 cm;  Time step attempts =  427 and successes =  371
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.1096 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

 Transpiration Scheme is:             =    1
 Potential Evapotranspiration         =  1.3342E+02     [cm]
 Potential Transpiration              =  1.2008E+02     [cm]
 Actual Transpiration                 =  3.7358E+01     [cm]
 Potential Evaporation                =  1.3342E+01     [cm]
 Actual Evaporation                   =  9.6749E+00     [cm]
 Evaporation during Growth            =  9.6749E+00     [cm]
 Total Runoff                         =  5.8296E+01     [cm]
 Total Infiltration                   =  4.9323E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.2004E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                  =  1.0762E+02     [cm]
 Actual Rainfall                      =  1.0762E+02     [cm]
 Actual Irrigation                    =  0.0000E+00     [cm]
 Total Final Moisture Storage         =  1.9310E+01     [cm]
 Mass Balance Error                   =  7.9968E-03     [cm]
 Total Successful Time Steps          =   1326072
 Total Attempted Time Steps           =   1404935
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary  =    280525
 Total Time Actually Simulated        =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH        FLOW        DEPTH        FLOW        DEPTH        FLOW
  --------  -----------   --------  -----------   --------  -----------
```

0.000	3.9648E+01	0.100	4.0879E+01	0.250	4.0376E+01
0.400	4.0079E+01	0.600	3.9747E+01	0.850	3.9387E+01
1.200	3.8929E+01	1.650	3.8367E+01	2.200	3.7722E+01
2.900	3.6978E+01	3.850	3.6049E+01	5.050	3.4899E+01
6.600	3.3434E+01	8.700	3.1497E+01	11.450	2.9062E+01
14.000	2.6933E+01	16.000	2.5330E+01	18.000	2.3793E+01
20.500	2.1952E+01	23.500	1.9878E+01	26.000	1.8253E+01
27.750	1.7160E+01	29.000	1.6400E+01	29.750	1.5953E+01
30.150	1.5716E+01	30.350	1.5599E+01	30.450	1.5540E+01
30.550	1.5481E+01	30.700	1.5387E+01	30.950	1.5228E+01
31.350	1.4975E+01	32.000	1.4566E+01	33.000	1.3945E+01
34.500	1.3036E+01	36.750	1.1729E+01	39.650	1.0175E+01
42.600	8.7580E+00	45.500	7.4987E+00	48.500	6.3342E+00
52.500	4.9574E+00	58.500	3.2742E+00	67.000	1.7346E+00
77.000	6.1242E-01	87.000	8.6698E-02	97.000	6.6003E-03
104.340	4.7439E-04	106.680	6.2004E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3432E-01	0.300	1.3476E-01
0.500	1.8084E-01	0.700	2.2729E-01	1.000	3.2012E-01
1.400	4.1388E-01	1.900	5.0802E-01	2.500	6.4787E-01
3.300	8.7867E-01	4.400	1.1043E+00	5.700	1.4112E+00
7.500	1.8699E+00	9.900	2.3536E+00	13.000	2.0576E+00
15.000	1.5494E+00	17.000	1.4848E+00	19.000	1.7770E+00
22.000	1.9982E+00	25.000	1.5634E+00	27.000	1.0510E+00
28.500	7.2904E-01	29.500	4.2924E-01	30.000	2.2683E-01
30.300	1.1280E-01	30.400	5.6297E-02	30.500	5.6196E-02
30.600	8.6699E-02	30.800	1.4432E-01	31.100	2.3030E-01
31.600	3.7202E-01	32.400	5.6520E-01	33.600	8.2684E-01
35.400	1.1852E+00	38.100	1.4046E+00	41.200	1.2802E+00
44.000	1.1327E+00	47.000	1.0414E+00	50.000	1.2194E+00
55.000	1.4433E+00	62.000	1.4605E+00	72.000	1.1119E+00
82.000	4.9809E-01	92.000	7.3412E-02	102.000	5.4924E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1998.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	4.543E+02	0.2229	291.00	2	2.000E-01	4.541E+02	0.2229	291.00
3	3.000E-01	4.539E+02	0.2229	291.00	4	5.000E-01	4.536E+02	0.2229	291.00
5	7.000E-01	4.534E+02	0.2229	291.00	6	1.000E+00	4.529E+02	0.2230	291.00
7	1.400E+00	4.523E+02	0.2230	291.00	8	1.900E+00	4.515E+02	0.2230	291.00
9	2.500E+00	4.506E+02	0.2231	291.00	10	3.300E+00	4.493E+02	0.2231	291.00
11	4.400E+00	4.473E+02	0.2232	291.00	12	5.700E+00	4.449E+02	0.2233	291.00
13	7.500E+00	4.412E+02	0.2235	291.00	14	9.900E+00	4.360E+02	0.2237	291.00
15	1.300E+01	4.287E+02	0.2240	291.00	16	1.500E+01	4.238E+02	0.2242	291.00
17	1.700E+01	4.187E+02	0.2244	291.00	18	1.900E+01	4.135E+02	0.2246	291.00
19	2.200E+01	4.056E+02	0.2249	291.00	20	2.500E+01	3.977E+02	0.2252	291.00
21	2.700E+01	3.926E+02	0.2254	291.00	22	2.850E+01	3.888E+02	0.2255	291.00
23	2.950E+01	3.863E+02	0.2256	291.00	24	3.000E+01	3.851E+02	0.2257	291.00
25	3.030E+01	3.843E+02	0.2257	291.00	26	3.040E+01	3.841E+02	0.2257	291.00
27	3.050E+01	3.838E+02	0.2257	291.00	28	3.060E+01	3.834E+02	0.2557	291.00
29	3.080E+01	3.812E+02	0.2560	291.00	30	3.110E+01	3.781E+02	0.2563	291.00
31	3.160E+01	3.731E+02	0.2568	291.00	32	3.240E+01	3.659E+02	0.2575	291.00
33	3.360E+01	3.569E+02	0.2585	291.00	34	3.540E+01	3.475E+02	0.2594	291.00
35	3.810E+01	3.419E+02	0.2583	291.00	36	4.120E+01	3.490E+02	0.2534	291.00
37	4.400E+01	3.707E+02	0.2494	291.00	38	4.700E+01	4.148E+02	0.2442	291.00
39	5.000E+01	4.873E+02	0.2383	291.00	40	5.500E+01	6.952E+02	0.2279	291.00
41	6.200E+01	2.544E+03	0.1655	291.00	42	7.200E+01	1.112E+04	0.1101	291.00
43	8.200E+01	1.335E+04	0.1052	291.00	44	9.200E+01	1.435E+04	0.1033	291.00
45	1.020E+02	1.482E+04	0.1025	291.00	46	1.067E+02	1.483E+04	0.1025	291.00

Initial Water Storage = 19.3105 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22261	0.16986	0.10248
Head (cm) =	4.66304E+02	2.33204E+03	1.48285E+04
LiqWater Flow (cm) =	-1.97410E-02	3.40852E-03	1.72457E-07
IsoVapor Flow (cm) =	-2.31902E-08	3.24953E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
19.3105+	0.0000+	0.0000 -	0.0197-	0.0000-	0.0000 =	19.2908 vs.	19.2648

```
 Mass Balance =  2.6004E-02 cm;  Time step attempts =  333 and successes =  294
   Evaporation:  Potential =  0.0197 cm, Actual =  0.0197 cm
 Transpiration:  Potential =  0.1773 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number          =       2          41          46
 Depth (cm)           =     0.20000    62.00000   106.68000
 Water (cm3/cm3)      =     0.21816     0.22604     0.10241
 Head (cm)            = 6.24558E+02 7.46616E+02 1.48722E+04
 LiqWater Flow (cm)=-2.83676E-02 2.17243E-02 1.70948E-07
 IsoVapor Flow (cm)=-4.29270E-08 1.77950E-05 0.00000E+00
 Plant Sink (cm)      = 5.95211E-04 9.61278E-03 0.00000E+00

                                                   LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO    TRANS     DRAIN     NEWSTOR       STORAGE
  19.9255+ 0.0000+ 0.0000 - 0.0286- 0.1456-  0.0000 =   19.7513 vs.   19.7513

 Mass Balance = -2.6569E-06 cm;  Time step attempts =  452 and successes =  395
   Evaporation:  Potential =  0.0286 cm, Actual =  0.0286 cm
 Transpiration:  Potential =  0.2578 cm, Actual =  0.1456 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:              =    1
 Potential Evapotranspiration          =  1.5439E+02     [cm]
 Potential Transpiration               =  1.3896E+02     [cm]
 Actual Transpiration                  =  3.3261E+01     [cm]
 Potential Evaporation                 =  1.5439E+01     [cm]
 Actual Evaporation                    =  8.5568E+00     [cm]
 Evaporation during Growth             =  8.5568E+00     [cm]
 Total Runoff                          =  5.1917E+01     [cm]
 Total Infiltration                    =  4.2291E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.2999E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                   =  9.4209E+01     [cm]
 Actual Rainfall                       =  9.4209E+01     [cm]
 Actual Irrigation                     =  0.0000E+00     [cm]
 Total Final Moisture Storage          =  1.9751E+01     [cm]
 Mass Balance Error                    =  3.2177E-02     [cm]
 Total Successful Time Steps           =   1268447
 Total Attempted Time Steps            =   1343798
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary  =    261515
 Total Time Actually Simulated         =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	3.3734E+01	0.100	3.5246E+01	0.250	3.4807E+01
0.400	3.4535E+01	0.600	3.4200E+01	0.850	3.3859E+01
1.200	3.3414E+01	1.650	3.2904E+01	2.200	3.2331E+01
2.900	3.1640E+01	3.850	3.0775E+01	5.050	2.9771E+01
6.600	2.8522E+01	8.700	2.6866E+01	11.450	2.4774E+01
14.000	2.2943E+01	16.000	2.1566E+01	18.000	2.0247E+01
20.500	1.8670E+01	23.500	1.6903E+01	26.000	1.5525E+01
27.750	1.4600E+01	29.000	1.3960E+01	29.750	1.3583E+01
30.150	1.3383E+01	30.350	1.3284E+01	30.450	1.3235E+01
30.550	1.3186E+01	30.700	1.3112E+01	30.950	1.2985E+01
31.350	1.2784E+01	32.000	1.2459E+01	33.000	1.1967E+01
34.500	1.1249E+01	36.750	1.0224E+01	39.650	9.0020E+00
42.600	7.8832E+00	45.500	6.9176E+00	48.500	6.0583E+00
52.500	5.0596E+00	58.500	3.7763E+00	67.000	1.8408E+00
77.000	5.3995E-01	87.000	6.7877E-02	97.000	5.4176E-03
104.340	-7.3598E-05	106.680	6.2999E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.1686E-01	0.300	1.1726E-01
0.500	1.5737E-01	0.700	1.9786E-01	1.000	2.7900E-01
1.400	3.6122E-01	1.900	4.4410E-01	2.500	5.6799E-01
3.300	7.7326E-01	4.400	9.7534E-01	5.700	1.2498E+00
7.500	1.6623E+00	9.900	2.1020E+00	13.000	1.8399E+00
15.000	1.3846E+00	17.000	1.3265E+00	19.000	1.5868E+00
22.000	1.7796E+00	25.000	1.3883E+00	27.000	9.3181E-01
28.500	6.4592E-01	29.500	3.8024E-01	30.000	2.0094E-01
30.300	9.9932E-02	30.400	4.9878E-02	30.500	4.9790E-02
30.600	7.7299E-02	30.800	1.2873E-01	31.100	2.0538E-01
31.600	3.3153E-01	32.400	5.0320E-01	33.600	7.3443E-01
35.400	1.0488E+00	38.100	1.2469E+00	41.200	1.1316E+00
44.000	9.7452E-01	47.000	8.6229E-01	50.000	9.9382E-01
55.000	1.2472E+00	62.000	1.4201E+00	72.000	1.1229E+00
82.000	4.8435E-01	92.000	7.2087E-02	102.000	7.5523E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc1999.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	6.249E+02	0.2181	291.00	2	2.000E-01	6.246E+02	0.2182	291.00
3	3.000E-01	6.244E+02	0.2182	291.00	4	5.000E-01	6.240E+02	0.2182	291.00
5	7.000E-01	6.236E+02	0.2182	291.00	6	1.000E+00	6.231E+02	0.2182	291.00
7	1.400E+00	6.222E+02	0.2183	291.00	8	1.900E+00	6.212E+02	0.2183	291.00
9	2.500E+00	6.199E+02	0.2183	291.00	10	3.300E+00	6.180E+02	0.2184	291.00
11	4.400E+00	6.153E+02	0.2185	291.00	12	5.700E+00	6.118E+02	0.2186	291.00
13	7.500E+00	6.066E+02	0.2188	291.00	14	9.900E+00	5.989E+02	0.2191	291.00
15	1.300E+01	5.881E+02	0.2194	291.00	16	1.500E+01	5.808E+02	0.2196	291.00
17	1.700E+01	5.733E+02	0.2198	291.00	18	1.900E+01	5.656E+02	0.2200	291.00
19	2.200E+01	5.540E+02	0.2203	291.00	20	2.500E+01	5.426E+02	0.2206	291.00
21	2.700E+01	5.353E+02	0.2208	291.00	22	2.850E+01	5.300E+02	0.2210	291.00
23	2.950E+01	5.265E+02	0.2211	291.00	24	3.000E+01	5.248E+02	0.2211	291.00
25	3.030E+01	5.238E+02	0.2211	291.00	26	3.040E+01	5.235E+02	0.2212	291.00
27	3.050E+01	5.232E+02	0.2212	291.00	28	3.060E+01	5.224E+02	0.2435	291.00
29	3.080E+01	5.187E+02	0.2438	291.00	30	3.110E+01	5.133E+02	0.2442	291.00
31	3.160E+01	5.049E+02	0.2449	291.00	32	3.240E+01	4.930E+02	0.2458	291.00
33	3.360E+01	4.783E+02	0.2470	291.00	34	3.540E+01	4.626E+02	0.2483	291.00
35	3.810E+01	4.503E+02	0.2493	291.00	36	4.120E+01	4.476E+02	0.2485	291.00
37	4.400E+01	4.540E+02	0.2458	291.00	38	4.700E+01	4.708E+02	0.2426	291.00
39	5.000E+01	4.987E+02	0.2394	291.00	40	5.500E+01	5.738E+02	0.2339	291.00
41	6.200E+01	7.466E+02	0.2260	291.00	42	7.200E+01	6.327E+03	0.1277	291.00
43	8.200E+01	1.407E+04	0.1038	291.00	44	9.200E+01	1.469E+04	0.1027	291.00
45	1.020E+02	1.489E+04	0.1024	291.00	46	1.067E+02	1.487E+04	0.1024	291.00

Initial Water Storage = 19.7513 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.22220	0.22559	0.10241
Head (cm)	=	4.38460E+02	7.59620E+02	1.48724E+04
LiqWater Flow (cm)	=	3.54588E-02	2.16953E-02	1.70941E-07
IsoVapor Flow (cm)	=	-6.25192E-09	1.66293E-05	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
19.7513	+	0.0508	+	0.0000	-	0.0142	-	0.0000	-	0.0000	=	19.7879	vs.	19.7535

```
 Mass Balance =  3.4386E-02 cm;  Time step attempts = 1137 and successes = 1094
   Evaporation:  Potential =  0.0143 cm, Actual =  0.0142 cm
 Transpiration:  Potential =  0.1290 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number       =       2          41          46
 Depth (cm)        =     0.20000    62.00000   106.68000
 Water (cm3/cm3)   =     0.17191     0.10321     0.10228
 Head (cm)         = 4.43780E+03 1.44027E+04 1.49480E+04
 LiqWater Flow (cm)=-2.84837E-02 1.57872E-06 1.68365E-07
 IsoVapor Flow (cm)=-1.16268E-05 3.21222E-07 0.00000E+00
 Plant Sink (cm)   = 1.72920E-04 8.13795E-05 0.00000E+00

                                                  LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO   TRANS     DRAIN     NEWSTOR       STORAGE
  14.2720+ 0.0000+ 0.0000 - 0.0295- 0.0507-   0.0000 =   14.1918 vs.   14.1918

 Mass Balance = -1.2080E-06 cm;  Time step attempts = 1323 and successes = 1244
   Evaporation:  Potential =  0.0295 cm, Actual =  0.0295 cm
 Transpiration:  Potential =  0.2659 cm, Actual =  0.0507 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.5282E+02     [cm]
 Potential Transpiration             =  1.3754E+02     [cm]
 Actual Transpiration                =  2.6141E+01     [cm]
 Potential Evaporation               =  1.5282E+01     [cm]
 Actual Evaporation                  =  9.8108E+00     [cm]
 Evaporation during Growth           =  9.8108E+00     [cm]
 Total Runoff                        =  1.9865E+01     [cm]
 Total Infiltration                  =  3.0427E+01     [cm]
 Total Basal Liquid Flux (drainage)  =  6.1973E-05     [cm]
 Total Basal Vapor Flux (temp-grad)  =  0.0000E+00     [cm]
 Total Applied Water                 =  5.0292E+01     [cm]
 Actual Rainfall                     =  5.0292E+01     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.4192E+01     [cm]
 Mass Balance Error                  =  3.4258E-02     [cm]
 Total Successful Time Steps         =   1709336
 Total Attempted Time Steps          =   1808145
 Total Time Step Reductions (DHMAX)  =         0
 Total Changes in Surface Boundary   =    298279
 Total Time Actually Simulated       =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	2.0616E+01	0.100	2.2663E+01	0.250	2.2070E+01
0.400	2.1688E+01	0.600	2.1254E+01	0.850	2.0876E+01
1.200	2.0461E+01	1.650	2.0013E+01	2.200	1.9520E+01
2.900	1.8953E+01	3.850	1.8246E+01	5.050	1.7422E+01
6.600	1.6378E+01	8.700	1.4992E+01	11.450	1.3251E+01
14.000	1.1745E+01	16.000	1.0620E+01	18.000	9.5535E+00
20.500	8.2908E+00	23.500	6.8933E+00	26.000	5.8165E+00
27.750	5.0992E+00	29.000	4.6046E+00	29.750	4.3144E+00
30.150	4.1612E+00	30.350	4.0852E+00	30.450	4.0472E+00
30.550	4.0093E+00	30.700	3.9580E+00	30.950	3.8728E+00
31.350	3.7374E+00	32.000	3.5210E+00	33.000	3.1986E+00
34.500	2.7422E+00	36.750	2.1241E+00	39.650	1.4747E+00
42.600	9.9768E-01	45.500	7.0192E-01	48.500	5.3899E-01
52.500	4.2831E-01	58.500	4.2750E-01	67.000	5.9258E-01
77.000	1.7422E-01	87.000	1.7840E-02	97.000	1.7406E-03
104.340	-1.7370E-04	106.680	6.1973E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	9.4346E-02	0.300	9.5103E-02
0.500	1.2873E-01	0.700	1.6316E-01	1.000	2.3256E-01
1.400	3.0484E-01	1.900	3.7930E-01	2.500	4.9009E-01
3.300	6.7363E-01	4.400	8.5634E-01	5.700	1.1023E+00
7.500	1.4666E+00	9.900	1.8441E+00	13.000	1.5997E+00
15.000	1.1966E+00	17.000	1.1380E+00	19.000	1.3509E+00
22.000	1.5021E+00	25.000	1.1634E+00	27.000	7.7765E-01
28.500	5.3770E-01	29.500	3.1606E-01	30.000	1.6691E-01
30.300	8.2975E-02	30.400	4.1409E-02	30.500	4.1331E-02
30.600	6.2257E-02	30.800	1.0345E-01	31.100	1.6458E-01
31.600	2.6415E-01	32.400	3.9646E-01	33.600	5.6976E-01
35.400	7.9417E-01	38.100	8.9580E-01	41.200	7.6648E-01
44.000	6.4342E-01	47.000	5.6867E-01	50.000	6.5199E-01
55.000	7.8248E-01	62.000	8.7663E-01	72.000	6.6039E-01
82.000	1.6917E-01	92.000	2.2042E-02	102.000	3.2804E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\SOLID WASTE\WC\TURKEY CREEK\EXPANSION 2021\PART III-SDP\APP IIIJ\APP IIIJ-C\APP IIIJ-C-B\UNSAT-H\tc2000.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	4.462E+03	0.1718	291.00	2	2.000E-01	4.438E+03	0.1719	291.00
3	3.000E-01	4.424E+03	0.1720	291.00	4	5.000E-01	4.394E+03	0.1721	291.00
5	7.000E-01	4.362E+03	0.1723	291.00	6	1.000E+00	4.307E+03	0.1725	291.00
7	1.400E+00	4.228E+03	0.1729	291.00	8	1.900E+00	4.121E+03	0.1734	291.00
9	2.500E+00	3.990E+03	0.1741	291.00	10	3.300E+00	3.819E+03	0.1751	291.00
11	4.400E+00	3.607E+03	0.1763	291.00	12	5.700E+00	3.403E+03	0.1776	291.00
13	7.500E+00	3.189E+03	0.1791	291.00	14	9.900E+00	2.991E+03	0.1806	291.00
15	1.300E+01	2.815E+03	0.1821	291.00	16	1.500E+01	2.727E+03	0.1828	291.00
17	1.700E+01	2.653E+03	0.1835	291.00	18	1.900E+01	2.591E+03	0.1841	291.00
19	2.200E+01	2.513E+03	0.1849	291.00	20	2.500E+01	2.452E+03	0.1855	291.00
21	2.700E+01	2.419E+03	0.1858	291.00	22	2.850E+01	2.398E+03	0.1861	291.00
23	2.950E+01	2.386E+03	0.1862	291.00	24	3.000E+01	2.381E+03	0.1862	291.00
25	3.030E+01	2.378E+03	0.1863	291.00	26	3.040E+01	2.377E+03	0.1863	291.00
27	3.050E+01	2.376E+03	0.1863	291.00	28	3.060E+01	2.373E+03	0.1690	291.00
29	3.080E+01	2.357E+03	0.1693	291.00	30	3.110E+01	2.335E+03	0.1698	291.00
31	3.160E+01	2.307E+03	0.1704	291.00	32	3.240E+01	2.282E+03	0.1710	291.00
33	3.360E+01	2.281E+03	0.1710	291.00	34	3.540E+01	2.355E+03	0.1694	291.00
35	3.810E+01	2.659E+03	0.1634	291.00	36	4.120E+01	3.579E+03	0.1498	291.00
37	4.400E+01	6.673E+03	0.1259	291.00	38	4.700E+01	1.235E+04	0.1072	291.00
39	5.000E+01	1.408E+04	0.1038	291.00	40	5.500E+01	1.432E+04	0.1034	291.00
41	6.200E+01	1.440E+04	0.1032	291.00	42	7.200E+01	1.448E+04	0.1031	291.00
43	8.200E+01	1.469E+04	0.1027	291.00	44	9.200E+01	1.490E+04	0.1024	291.00
45	1.020E+02	1.496E+04	0.1023	291.00	46	1.067E+02	1.495E+04	0.1023	291.00

Initial Water Storage = 14.1918 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day =   1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.17290	0.10321	0.10228
Head (cm)	=	4.22963E+03	1.44039E+04	1.49481E+04
LiqWater Flow (cm)	=	-1.46232E-02	1.56955E-06	1.68360E-07
IsoVapor Flow (cm)	=	-4.99483E-06	3.19344E-07	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
14.1918	+	0.0000	+	0.0000	-	0.0143	-	0.0000	-	0.0000	=	14.1775	vs.	14.1657

```
 Mass Balance =  1.1779E-02 cm;  Time step attempts =  707 and successes =  648
   Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
 Transpiration:  Potential =  0.1290 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.22792     0.12315     0.10221
 Head (cm)          = 2.98478E+02 7.23662E+03 1.49912E+04
 LiqWater Flow (cm)=-2.18843E-01 3.69103E-04 1.66913E-07
 IsoVapor Flow (cm)=-6.34316E-08 2.95058E-05 0.00000E+00
 Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                              LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO    TRANS    DRAIN     NEWSTOR       STORAGE
  18.9536+ 0.0000+ 0.0000 - 0.2238- 0.0000-  0.0000 =   18.7298 vs.   18.7298

 Mass Balance = -3.4126E-06 cm;  Time step attempts = 1715 and successes = 1603
   Evaporation:  Potential =  0.2238 cm, Actual =  0.2238 cm
 Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.5985E+02     [cm]
 Potential Transpiration             =  1.4366E+02     [cm]
 Actual Transpiration                =  3.0498E+01     [cm]
 Potential Evaporation               =  1.6186E+01     [cm]
 Actual Evaporation                  =  9.7810E+00     [cm]
 Evaporation during Growth           =  9.7810E+00     [cm]
 Total Runoff                        =  6.9567E+01     [cm]
 Total Infiltration                  =  4.4835E+01     [cm]
 Total Basal Liquid Flux (drainage)  =  6.1334E-05     [cm]
 Total Basal Vapor Flux (temp-grad)  =  0.0000E+00     [cm]
 Total Applied Water                 =  1.1440E+02     [cm]
 Actual Rainfall                     =  1.1440E+02     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.8730E+01     [cm]
 Mass Balance Error                  =  1.7409E-02     [cm]
 Total Successful Time Steps         =   1467023
 Total Attempted Time Steps          =   1551999
 Total Time Step Reductions (DHMAX)  =         0
 Total Changes in Surface Boundary   =    374903
 Total Time Actually Simulated       =  3.6600E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

    DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	3.5054E+01	0.100	3.6425E+01	0.250	3.5972E+01
0.400	3.5645E+01	0.600	3.5261E+01	0.850	3.4906E+01
1.200	3.4486E+01	1.650	3.3990E+01	2.200	3.3419E+01
2.900	3.2716E+01	3.850	3.1808E+01	5.050	3.0682E+01
6.600	2.9257E+01	8.700	2.7413E+01	11.450	2.5122E+01
14.000	2.3116E+01	16.000	2.1600E+01	18.000	2.0142E+01
20.500	1.8387E+01	23.500	1.6401E+01	26.000	1.4837E+01
27.750	1.3781E+01	29.000	1.3046E+01	29.750	1.2613E+01
30.150	1.2383E+01	30.350	1.2269E+01	30.450	1.2212E+01
30.550	1.2156E+01	30.700	1.2062E+01	30.950	1.1901E+01
31.350	1.1645E+01	32.000	1.1230E+01	33.000	1.0599E+01
34.500	9.6746E+00	36.750	8.3476E+00	39.650	6.7683E+00
42.600	5.3313E+00	45.500	4.0426E+00	48.500	2.8608E+00
52.500	1.5442E+00	58.500	4.0761E-01	67.000	2.1891E-02
77.000	1.3215E-03	87.000	4.6954E-04	97.000	1.7811E-04
104.340	-7.2052E-05	106.680	6.1334E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2358E-01	0.300	1.2395E-01
0.500	1.6622E-01	0.700	2.0883E-01	1.000	2.9415E-01
1.400	3.8046E-01	1.900	4.6680E-01	2.500	5.9554E-01
3.300	8.0773E-01	4.400	1.0134E+00	5.700	1.2917E+00
7.500	1.7074E+00	9.900	2.1473E+00	13.000	1.8788E+00
15.000	1.4170E+00	17.000	1.3615E+00	19.000	1.6339E+00
22.000	1.8432E+00	25.000	1.4462E+00	27.000	9.7389E-01
28.500	6.7634E-01	29.500	3.9850E-01	30.000	2.1066E-01
30.300	1.0478E-01	30.400	5.2298E-02	30.500	5.2208E-02
30.600	8.0339E-02	30.800	1.3389E-01	31.100	2.1395E-01
31.600	3.4615E-01	32.400	5.2633E-01	33.600	7.6798E-01
35.400	1.0918E+00	38.100	1.2746E+00	41.200	1.1241E+00
44.000	9.4443E-01	47.000	8.0349E-01	50.000	8.3955E-01
55.000	7.2458E-01	62.000	2.2101E-01	72.000	2.1348E-02
82.000	5.6489E-03	92.000	1.9820E-03	102.000	7.3271E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2001.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	2.991E+02	0.2278	291.00	2	2.000E-01	2.985E+02	0.2279	291.00
3	3.000E-01	2.982E+02	0.2280	291.00	4	5.000E-01	2.975E+02	0.2280	291.00
5	7.000E-01	2.969E+02	0.2281	291.00	6	1.000E+00	2.960E+02	0.2282	291.00
7	1.400E+00	2.947E+02	0.2284	291.00	8	1.900E+00	2.932E+02	0.2285	291.00
9	2.500E+00	2.914E+02	0.2287	291.00	10	3.300E+00	2.891E+02	0.2290	291.00
11	4.400E+00	2.859E+02	0.2293	291.00	12	5.700E+00	2.822E+02	0.2296	291.00
13	7.500E+00	2.773E+02	0.2300	291.00	14	9.900E+00	2.709E+02	0.2305	291.00
15	1.300E+01	2.631E+02	0.2311	291.00	16	1.500E+01	2.584E+02	0.2313	291.00
17	1.700E+01	2.539E+02	0.2315	291.00	18	1.900E+01	2.496E+02	0.2318	291.00
19	2.200E+01	2.437E+02	0.2321	291.00	20	2.500E+01	2.385E+02	0.2324	291.00
21	2.700E+01	2.354E+02	0.2325	291.00	22	2.850E+01	2.332E+02	0.2326	291.00
23	2.950E+01	2.318E+02	0.2327	291.00	24	3.000E+01	2.311E+02	0.2327	291.00
25	3.030E+01	2.308E+02	0.2327	291.00	26	3.040E+01	2.306E+02	0.2328	291.00
27	3.050E+01	2.305E+02	0.2328	291.00	28	3.060E+01	2.303E+02	0.2745	291.00
29	3.080E+01	2.298E+02	0.2745	291.00	30	3.110E+01	2.292E+02	0.2746	291.00
31	3.160E+01	2.283E+02	0.2747	291.00	32	3.240E+01	2.276E+02	0.2747	291.00
33	3.360E+01	2.281E+02	0.2745	291.00	34	3.540E+01	2.327E+02	0.2734	291.00
35	3.810E+01	2.510E+02	0.2681	291.00	36	4.120E+01	3.034E+02	0.2554	291.00
37	4.400E+01	4.045E+02	0.2439	291.00	38	4.700E+01	5.873E+02	0.2325	291.00
39	5.000E+01	8.435E+02	0.2229	291.00	40	5.500E+01	2.240E+03	0.1719	291.00
41	6.200E+01	7.237E+03	0.1231	291.00	42	7.200E+01	1.437E+04	0.1033	291.00
43	8.200E+01	1.496E+04	0.1023	291.00	44	9.200E+01	1.499E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.499E+04	0.1022	291.00

Initial Water Storage = 18.7298 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22828	0.12391	0.10221
Head (cm) =	2.88865E+02	7.07266E+03	1.49912E+04
LiqWater Flow (cm) =	-1.44211E-02	3.87927E-04	1.66912E-07
IsoVapor Flow (cm) =	-1.12440E-08	2.99822E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
18.7298+	0.0000+	0.0000 -	0.0143-	0.0000-	0.0000 =	18.7155 vs.	18.7155

```
Mass Balance = -2.2816E-07 cm;  Time step attempts =  493 and successes =  443
  Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
Transpiration:  Potential =  0.1290 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number       =       2          41          46
Depth (cm)        =     0.20000    62.00000   106.68000
Water (cm3/cm3)   =     0.20298     0.13461     0.10237
Head (cm)         = 1.31965E+03 5.22579E+03 1.48965E+04
LiqWater Flow (cm)=-1.68555E-02 7.47705E-04 1.70108E-07
IsoVapor Flow (cm)=-1.26412E-07 3.08243E-05 0.00000E+00
Plant Sink (cm)   = 2.68834E-04 1.45765E-03 0.00000E+00

                                                LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 17.4377+ 0.0000+ 0.0000 - 0.0170- 0.0630-  0.0000 =   17.3577 vs.   17.3577

Mass Balance = -1.2186E-06 cm;  Time step attempts =  374 and successes =  318
  Evaporation:  Potential =  0.0170 cm, Actual =  0.0170 cm
Transpiration:  Potential =  0.1531 cm, Actual =  0.0630 cm
1
-------------------------------------------------------------------------------
                           UNSAT-H Version 3.01
                            SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:             =    1
Potential Evapotranspiration         =  1.4250E+02     [cm]
Potential Transpiration              =  1.2825E+02     [cm]
Actual Transpiration                 =  3.6827E+01     [cm]
Potential Evaporation                =  1.4250E+01     [cm]
Actual Evaporation                   =  9.8433E+00     [cm]
Evaporation during Growth            =  9.8433E+00     [cm]
Total Runoff                         =  5.7910E+01     [cm]
Total Infiltration                   =  4.5316E+01     [cm]
Total Basal Liquid Flux (drainage)   =  6.1410E-05     [cm]
Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
Total Applied Water                  =  1.0323E+02     [cm]
Actual Rainfall                      =  1.0323E+02     [cm]
Actual Irrigation                    =  0.0000E+00     [cm]
Total Final Moisture Storage         =  1.7358E+01     [cm]
Mass Balance Error                   =  1.7065E-02     [cm]
Total Successful Time Steps          =   1470982
Total Attempted Time Steps           =   1552182
Total Time Step Reductions (DHMAX)   =         0
Total Changes in Surface Boundary    =    278243
Total Time Actually Simulated        =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.5472E+01	0.100	3.7029E+01	0.250	3.6427E+01
0.400	3.6027E+01	0.600	3.5581E+01	0.850	3.5188E+01
1.200	3.4746E+01	1.650	3.4263E+01	2.200	3.3724E+01
2.900	3.3051E+01	3.850	3.2148E+01	5.050	3.1032E+01
6.600	2.9647E+01	8.700	2.7834E+01	11.450	2.5565E+01
14.000	2.3594E+01	16.000	2.2113E+01	18.000	2.0694E+01
20.500	1.8999E+01	23.500	1.7096E+01	26.000	1.5613E+01
27.750	1.4620E+01	29.000	1.3932E+01	29.750	1.3528E+01
30.150	1.3314E+01	30.350	1.3208E+01	30.450	1.3155E+01
30.550	1.3102E+01	30.700	1.3027E+01	30.950	1.2900E+01
31.350	1.2695E+01	32.000	1.2366E+01	33.000	1.1869E+01
34.500	1.1146E+01	36.750	1.0120E+01	39.650	8.9150E+00
42.600	7.8097E+00	45.500	6.8193E+00	48.500	5.8948E+00
52.500	4.7989E+00	58.500	3.2717E+00	67.000	1.6827E+00
77.000	5.2289E-01	87.000	5.9153E-02	97.000	4.0723E-03
104.340	3.5502E-04	106.680	6.1410E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3464E-01	0.300	1.3510E-01
0.500	1.8136E-01	0.700	2.2806E-01	1.000	3.2163E-01
1.400	4.1665E-01	1.900	5.1232E-01	2.500	6.5414E-01
3.300	8.8621E-01	4.400	1.1107E+00	5.700	1.4138E+00
7.500	1.8651E+00	9.900	2.3387E+00	13.000	2.0362E+00
15.000	1.5314E+00	17.000	1.4683E+00	19.000	1.7586E+00
22.000	1.9768E+00	25.000	1.5447E+00	27.000	1.0375E+00
28.500	7.1945E-01	29.500	4.2355E-01	30.000	2.2382E-01
30.300	1.1130E-01	30.400	5.5550E-02	30.500	5.5451E-02
30.600	8.6081E-02	30.800	1.4329E-01	31.100	2.2858E-01
31.600	3.6898E-01	32.400	5.5952E-01	33.600	8.1395E-01
35.400	1.1572E+00	38.100	1.3574E+00	41.200	1.2248E+00
44.000	1.0790E+00	47.000	9.9016E-01	50.000	1.1620E+00
55.000	1.3969E+00	62.000	1.4919E+00	72.000	1.1306E+00
82.000	4.4121E-01	92.000	5.1220E-02	102.000	3.2030E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2002.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.320E+03	0.2030	291.00	2	2.000E-01	1.320E+03	0.2030	291.00
3	3.000E-01	1.319E+03	0.2030	291.00	4	5.000E-01	1.319E+03	0.2030	291.00
5	7.000E-01	1.318E+03	0.2030	291.00	6	1.000E+00	1.317E+03	0.2030	291.00
7	1.400E+00	1.315E+03	0.2031	291.00	8	1.900E+00	1.313E+03	0.2031	291.00
9	2.500E+00	1.311E+03	0.2032	291.00	10	3.300E+00	1.307E+03	0.2033	291.00
11	4.400E+00	1.300E+03	0.2034	291.00	12	5.700E+00	1.292E+03	0.2036	291.00
13	7.500E+00	1.280E+03	0.2039	291.00	14	9.900E+00	1.262E+03	0.2044	291.00
15	1.300E+01	1.239E+03	0.2050	291.00	16	1.500E+01	1.225E+03	0.2053	291.00
17	1.700E+01	1.211E+03	0.2057	291.00	18	1.900E+01	1.199E+03	0.2060	291.00
19	2.200E+01	1.182E+03	0.2065	291.00	20	2.500E+01	1.166E+03	0.2069	291.00
21	2.700E+01	1.157E+03	0.2071	291.00	22	2.850E+01	1.151E+03	0.2073	291.00
23	2.950E+01	1.147E+03	0.2074	291.00	24	3.000E+01	1.145E+03	0.2075	291.00
25	3.030E+01	1.144E+03	0.2075	291.00	26	3.040E+01	1.144E+03	0.2075	291.00
27	3.050E+01	1.143E+03	0.2075	291.00	28	3.060E+01	1.142E+03	0.2102	291.00
29	3.080E+01	1.137E+03	0.2105	291.00	30	3.110E+01	1.129E+03	0.2109	291.00
31	3.160E+01	1.117E+03	0.2116	291.00	32	3.240E+01	1.101E+03	0.2125	291.00
33	3.360E+01	1.082E+03	0.2136	291.00	34	3.540E+01	1.064E+03	0.2147	291.00
35	3.810E+01	1.054E+03	0.2153	291.00	36	4.120E+01	1.062E+03	0.2148	291.00
37	4.400E+01	1.087E+03	0.2134	291.00	38	4.700E+01	1.137E+03	0.2105	291.00
39	5.000E+01	1.222E+03	0.2060	291.00	40	5.500E+01	1.506E+03	0.1935	291.00
41	6.200E+01	5.226E+03	0.1346	291.00	42	7.200E+01	1.288E+04	0.1061	291.00
43	8.200E+01	1.373E+04	0.1044	291.00	44	9.200E+01	1.454E+04	0.1030	291.00
45	1.020E+02	1.488E+04	0.1024	291.00	46	1.067E+02	1.490E+04	0.1024	291.00

Initial Water Storage = 17.3577 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.20288	0.13599	0.10237
Head (cm)	=	1.32387E+03	5.03801E+03	1.48963E+04
LiqWater Flow (cm)	=	-1.25698E-02	8.07142E-04	1.70113E-07
IsoVapor Flow (cm)	=	-1.03072E-07	3.13617E-05	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
17.3577	+	0.0000	+	0.0000	-	0.0125	-	0.0000	-	0.0000	=	17.3452	vs.	17.3302

```
Mass Balance =  1.4952E-02 cm;  Time step attempts =  275 and successes =  220
  Evaporation:  Potential =  0.0125 cm, Actual =  0.0125 cm
Transpiration:  Potential =  0.1128 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =       2          41          46
Depth (cm)         =     0.20000    62.00000   106.68000
Water (cm3/cm3)    =     0.22120     0.16467     0.10226
Head (cm)          = 5.20931E+02 2.59022E+03 1.49579E+04
LiqWater Flow (cm)=-1.26978E-02 3.00733E-03 1.68029E-07
IsoVapor Flow (cm)=-1.75201E-08 3.21049E-05 0.00000E+00
Plant Sink (cm)    = 4.22136E-04 3.14663E-03 0.00000E+00

                                                   LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO    TRANS     DRAIN     NEWSTOR       STORAGE
 18.4869+ 0.0000+ 0.0000 - 0.0188- 0.0872-   0.0000 =   18.3809 vs.   18.3809

Mass Balance = -1.6163E-06 cm;  Time step attempts = 1270 and successes = 1211
  Evaporation:  Potential =  0.0188 cm, Actual =  0.0188 cm
Transpiration:  Potential =  0.1692 cm, Actual =  0.0872 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:            =    1
Potential Evapotranspiration        =  1.2789E+02     [cm]
Potential Transpiration             =  1.1510E+02     [cm]
Actual Transpiration                =  3.2672E+01     [cm]
Potential Evaporation               =  1.2789E+01     [cm]
Actual Evaporation                  =  9.8431E+00     [cm]
Evaporation during Growth           =  9.8431E+00     [cm]
Total Runoff                        =  5.5094E+01     [cm]
Total Infiltration                  =  4.3560E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.1841E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                 =  9.8654E+01     [cm]
Actual Rainfall                     =  9.8654E+01     [cm]
Actual Irrigation                   =  0.0000E+00     [cm]
Total Final Moisture Storage        =  1.8381E+01     [cm]
Mass Balance Error                  =  2.1675E-02     [cm]
Total Successful Time Steps         =   1521795
Total Attempted Time Steps          =   1609825
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary   =    354661
Total Time Actually Simulated       =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.3717E+01	0.100	3.5066E+01	0.250	3.4578E+01
0.400	3.4243E+01	0.600	3.3861E+01	0.850	3.3495E+01
1.200	3.3050E+01	1.650	3.2531E+01	2.200	3.1961E+01
2.900	3.1290E+01	3.850	3.0430E+01	5.050	2.9368E+01
6.600	2.8016E+01	8.700	2.6232E+01	11.450	2.3995E+01
14.000	2.2042E+01	16.000	2.0572E+01	18.000	1.9162E+01
20.500	1.7473E+01	23.500	1.5576E+01	26.000	1.4092E+01
27.750	1.3094E+01	29.000	1.2403E+01	29.750	1.1996E+01
30.150	1.1781E+01	30.350	1.1674E+01	30.450	1.1620E+01
30.550	1.1567E+01	30.700	1.1484E+01	30.950	1.1344E+01
31.350	1.1122E+01	32.000	1.0765E+01	33.000	1.0226E+01
34.500	9.4457E+00	36.750	8.3413E+00	39.650	7.0462E+00
42.600	5.8717E+00	45.500	4.8309E+00	48.500	3.8712E+00
52.500	2.7596E+00	58.500	1.5359E+00	67.000	3.4643E-01
77.000	3.1972E-02	87.000	4.1967E-03	97.000	9.7227E-04
104.340	-1.2875E-04	106.680	6.1841E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2461E-01	0.300	1.2508E-01
0.500	1.6793E-01	0.700	2.1121E-01	1.000	2.9800E-01
1.400	3.8619E-01	1.900	4.7507E-01	2.500	6.0711E-01
3.300	8.2514E-01	4.400	1.0375E+00	5.700	1.3234E+00
7.500	1.7470E+00	9.900	2.1916E+00	13.000	1.9118E+00
15.000	1.4392E+00	17.000	1.3801E+00	19.000	1.6517E+00
22.000	1.8561E+00	25.000	1.4513E+00	27.000	9.7513E-01
28.500	6.7615E-01	29.500	3.9796E-01	30.000	2.1026E-01
30.300	1.0454E-01	30.400	5.2176E-02	30.500	5.2080E-02
30.600	7.9790E-02	30.800	1.3272E-01	31.100	2.1151E-01
31.600	3.4077E-01	32.400	5.1539E-01	33.600	7.5027E-01
35.400	1.0680E+00	38.100	1.2598E+00	41.200	1.1463E+00
44.000	1.0158E+00	47.000	9.3245E-01	50.000	1.0799E+00
55.000	1.1961E+00	62.000	9.3050E-01	72.000	2.7505E-01
82.000	4.6557E-02	92.000	1.0377E-02	102.000	2.3955E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2003.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	5.212E+02	0.2212	291.00	2	2.000E-01	5.209E+02	0.2212	291.00
3	3.000E-01	5.208E+02	0.2212	291.00	4	5.000E-01	5.205E+02	0.2212	291.00
5	7.000E-01	5.203E+02	0.2212	291.00	6	1.000E+00	5.199E+02	0.2212	291.00
7	1.400E+00	5.194E+02	0.2212	291.00	8	1.900E+00	5.188E+02	0.2212	291.00
9	2.500E+00	5.181E+02	0.2211	291.00	10	3.300E+00	5.172E+02	0.2210	291.00
11	4.400E+00	5.161E+02	0.2209	291.00	12	5.700E+00	5.150E+02	0.2207	291.00
13	7.500E+00	5.137E+02	0.2205	291.00	14	9.900E+00	5.125E+02	0.2204	291.00
15	1.300E+01	5.115E+02	0.2203	291.00	16	1.500E+01	5.114E+02	0.2202	291.00
17	1.700E+01	5.116E+02	0.2201	291.00	18	1.900E+01	5.121E+02	0.2200	291.00
19	2.200E+01	5.135E+02	0.2199	291.00	20	2.500E+01	5.158E+02	0.2196	291.00
21	2.700E+01	5.177E+02	0.2194	291.00	22	2.850E+01	5.194E+02	0.2193	291.00
23	2.950E+01	5.207E+02	0.2192	291.00	24	3.000E+01	5.214E+02	0.2192	291.00
25	3.030E+01	5.218E+02	0.2192	291.00	26	3.040E+01	5.219E+02	0.2192	291.00
27	3.050E+01	5.220E+02	0.2192	291.00	28	3.060E+01	5.226E+02	0.2380	291.00
29	3.080E+01	5.264E+02	0.2377	291.00	30	3.110E+01	5.323E+02	0.2371	291.00
31	3.160E+01	5.428E+02	0.2363	291.00	32	3.240E+01	5.612E+02	0.2350	291.00
33	3.360E+01	5.917E+02	0.2332	291.00	34	3.540E+01	6.418E+02	0.2307	291.00
35	3.810E+01	7.189E+02	0.2273	291.00	36	4.120E+01	8.043E+02	0.2242	291.00
37	4.400E+01	8.835E+02	0.2217	291.00	38	4.700E+01	9.751E+02	0.2193	291.00
39	5.000E+01	1.083E+03	0.2136	291.00	40	5.500E+01	1.403E+03	0.1977	291.00
41	6.200E+01	2.590E+03	0.1647	291.00	42	7.200E+01	1.101E+04	0.1103	291.00
43	8.200E+01	1.460E+04	0.1029	291.00	44	9.200E+01	1.492E+04	0.1023	291.00
45	1.020E+02	1.497E+04	0.1022	291.00	46	1.067E+02	1.496E+04	0.1023	291.00

Initial Water Storage = 18.3809 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.21911	0.16575	0.10226
Head (cm) =	6.00789E+02	2.53349E+03	1.49580E+04
LiqWater Flow (cm) =	-1.39044E-02	3.11869E-03	1.68025E-07
IsoVapor Flow (cm) =	-2.47233E-08	3.18115E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
18.3809+	0.0000+	0.0000 -	0.0143-	0.0000-	0.0000 =	18.3665 vs.	18.3460

```
 Mass Balance =  2.0542E-02 cm;  Time step attempts =  234 and successes =  191
   Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
 Transpiration:  Potential =  0.1290 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number         =       2          41          46
 Depth (cm)          =     0.20000    62.00000   106.68000
 Water (cm3/cm3)     =     0.14784     0.11055     0.10224
 Head (cm)           = 2.12434E+04 1.09352E+04 1.49719E+04
 LiqWater Flow (cm)=-1.88459E-02 7.35207E-05 1.67556E-07
 IsoVapor Flow (cm)=-1.74469E-03 9.56734E-06 0.00000E+00
 Plant Sink (cm)     = 9.63700E-06 5.25581E-04 0.00000E+00

                                                     LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO    TRANS     DRAIN      NEWSTOR        STORAGE
  13.7952+ 0.0000+ 0.0000 - 0.0233- 0.0237-  0.0000 =   13.7481 vs.    13.7481

 Mass Balance = -6.7793E-07 cm;  Time step attempts = 4541 and successes = 4303
   Evaporation:  Potential =  0.0233 cm, Actual =  0.0233 cm
 Transpiration:  Potential =  0.2095 cm, Actual =  0.0237 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.3744E+02     [cm]
 Potential Transpiration             =  1.2369E+02     [cm]
 Actual Transpiration                =  3.7623E+01     [cm]
 Potential Evaporation               =  1.3744E+01     [cm]
 Actual Evaporation                  =  1.1204E+01     [cm]
 Evaporation during Growth           =  1.1204E+01     [cm]
 Total Runoff                        =  3.5995E+01     [cm]
 Total Infiltration                  =  4.4218E+01     [cm]
 Total Basal Liquid Flux (drainage)  =  6.1213E-05     [cm]
 Total Basal Vapor Flux (temp-grad)  =  0.0000E+00     [cm]
 Total Applied Water                 =  8.0213E+01     [cm]
 Actual Rainfall                     =  8.0213E+01     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.3748E+01     [cm]
 Mass Balance Error                  =  2.4908E-02     [cm]
 Total Successful Time Steps         =   1613463
 Total Attempted Time Steps          =   1704938
 Total Time Step Reductions (DHMAX)  =         0
 Total Changes in Surface Boundary   =    309522
 Total Time Actually Simulated       =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	3.3015E+01	0.100	3.4491E+01	0.250	3.3893E+01
0.400	3.3532E+01	0.600	3.3139E+01	0.850	3.2760E+01
1.200	3.2295E+01	1.650	3.1758E+01	2.200	3.1172E+01
2.900	3.0500E+01	3.850	2.9618E+01	5.050	2.8512E+01
6.600	2.7100E+01	8.700	2.5235E+01	11.450	2.2894E+01
14.000	2.0854E+01	16.000	1.9321E+01	18.000	1.7852E+01
20.500	1.6096E+01	23.500	1.4127E+01	26.000	1.2596E+01
27.750	1.1572E+01	29.000	1.0865E+01	29.750	1.0450E+01
30.150	1.0231E+01	30.350	1.0122E+01	30.450	1.0068E+01
30.550	1.0014E+01	30.700	9.9386E+00	30.950	9.8127E+00
31.350	9.6124E+00	32.000	9.2900E+00	33.000	8.8042E+00
34.500	8.1022E+00	36.750	7.1142E+00	39.650	5.9638E+00
42.600	4.9414E+00	45.500	4.0697E+00	48.500	3.3098E+00
52.500	2.4597E+00	58.500	1.5176E+00	67.000	6.4225E-01
77.000	1.0000E-01	87.000	9.0482E-03	97.000	8.4481E-04
104.340	1.7905E-05	106.680	6.1213E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.4015E-01	0.300	1.4082E-01
0.500	1.8948E-01	0.700	2.3871E-01	1.000	3.3724E-01
1.400	4.3728E-01	1.900	5.3814E-01	2.500	6.8774E-01
3.300	9.3387E-01	4.400	1.1731E+00	5.700	1.4963E+00
7.500	1.9768E+00	9.900	2.4847E+00	13.000	2.1712E+00
15.000	1.6358E+00	17.000	1.5700E+00	19.000	1.8821E+00
22.000	2.1183E+00	25.000	1.6537E+00	27.000	1.1089E+00
28.500	7.6749E-01	29.500	4.5120E-01	30.000	2.3826E-01
30.300	1.1843E-01	30.400	5.9103E-02	30.500	5.8990E-02
30.600	9.0389E-02	30.800	1.5015E-01	31.100	2.3891E-01
31.600	3.8415E-01	32.400	5.7928E-01	33.600	8.4020E-01
35.400	1.1946E+00	38.100	1.4215E+00	41.200	1.3005E+00
44.000	1.1428E+00	47.000	1.0370E+00	50.000	1.2038E+00
55.000	1.4071E+00	62.000	1.3325E+00	72.000	5.8894E-01
82.000	9.2690E-02	92.000	9.1745E-03	102.000	1.1113E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2004.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	2.451E+04	0.1463	291.00	2	2.000E-01	2.124E+04	0.1478	291.00
3	3.000E-01	1.966E+04	0.1487	291.00	4	5.000E-01	1.692E+04	0.1505	291.00
5	7.000E-01	1.488E+04	0.1521	291.00	6	1.000E+00	1.273E+04	0.1541	291.00
7	1.400E+00	1.091E+04	0.1563	291.00	8	1.900E+00	9.513E+03	0.1584	291.00
9	2.500E+00	8.472E+03	0.1602	291.00	10	3.300E+00	7.616E+03	0.1619	291.00
11	4.400E+00	6.910E+03	0.1636	291.00	12	5.700E+00	6.401E+03	0.1649	291.00
13	7.500E+00	5.966E+03	0.1662	291.00	14	9.900E+00	5.623E+03	0.1673	291.00
15	1.300E+01	5.376E+03	0.1681	291.00	16	1.500E+01	5.265E+03	0.1685	291.00
17	1.700E+01	5.172E+03	0.1689	291.00	18	1.900E+01	5.086E+03	0.1692	291.00
19	2.200E+01	4.962E+03	0.1697	291.00	20	2.500E+01	4.844E+03	0.1701	291.00
21	2.700E+01	4.774E+03	0.1704	291.00	22	2.850E+01	4.726E+03	0.1706	291.00
23	2.950E+01	4.698E+03	0.1708	291.00	24	3.000E+01	4.685E+03	0.1708	291.00
25	3.030E+01	4.677E+03	0.1708	291.00	26	3.040E+01	4.675E+03	0.1708	291.00
27	3.050E+01	4.673E+03	0.1709	291.00	28	3.060E+01	4.665E+03	0.1390	291.00
29	3.080E+01	4.623E+03	0.1393	291.00	30	3.110E+01	4.569E+03	0.1398	291.00
31	3.160E+01	4.501E+03	0.1404	291.00	32	3.240E+01	4.449E+03	0.1408	291.00
33	3.360E+01	4.476E+03	0.1406	291.00	34	3.540E+01	4.710E+03	0.1386	291.00
35	3.810E+01	5.374E+03	0.1336	291.00	36	4.120E+01	5.995E+03	0.1296	291.00
37	4.400E+01	6.295E+03	0.1279	291.00	38	4.700E+01	6.546E+03	0.1265	291.00
39	5.000E+01	6.896E+03	0.1248	291.00	40	5.500E+01	7.979E+03	0.1200	291.00
41	6.200E+01	1.094E+04	0.1105	291.00	42	7.200E+01	1.319E+04	0.1055	291.00
43	8.200E+01	1.441E+04	0.1032	291.00	44	9.200E+01	1.488E+04	0.1024	291.00
45	1.020E+02	1.497E+04	0.1022	291.00	46	1.067E+02	1.497E+04	0.1022	291.00

Initial Water Storage = 13.7481 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.15852	0.11056	0.10224
Head (cm) =	9.41166E+03	1.09306E+04	1.49720E+04
LiqWater Flow (cm)=	1.71137E-02	7.34304E-05	1.67556E-07
IsoVapor Flow (cm)=	-1.24942E-04	9.56656E-06	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR		STORAGE
13.7481+	0.0508+	0.0000 -	0.0310-	0.0000-	0.0000 =	13.7679	vs.	13.7624

```
Mass Balance =  5.5021E-03 cm;  Time step attempts =11566 and successes =11105
  Evaporation:  Potential =  0.0313 cm, Actual =  0.0310 cm
Transpiration:  Potential =  0.2821 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
-------------
Node Number          =        2           41          46
Depth (cm)           =     0.20000     62.00000   106.68000
Water (cm3/cm3)      =     0.16496      0.18862     0.10221
Head (cm)            = 6.37892E+03 1.64119E+03 1.49878E+04
LiqWater Flow (cm)=-9.37935E-02 7.28095E-03 1.67025E-07
IsoVapor Flow (cm)=-9.60874E-05 2.22960E-05 0.00000E+00
Plant Sink (cm)      = 0.00000E+00 0.00000E+00 0.00000E+00

                                                 LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS     DRAIN     NEWSTOR        STORAGE
 17.2656+ 0.0000+ 0.0000 - 0.0993- 0.0000-   0.0000 =   17.1662 vs.   17.1662

Mass Balance = -1.4991E-06 cm;  Time step attempts = 7883 and successes = 7291
  Evaporation:  Potential =  0.2059 cm, Actual =  0.0993 cm
Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1
-------------------------------------------------------------------------------
                              UNSAT-H Version 3.01
                               SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:             =    1
Potential Evapotranspiration         =  1.3099E+02     [cm]
Potential Transpiration              =  1.1771E+02     [cm]
Actual Transpiration                 =  3.5909E+01     [cm]
Potential Evaporation                =  1.3284E+01     [cm]
Actual Evaporation                   =  1.0491E+01     [cm]
Evaporation during Growth            =  1.0491E+01     [cm]
Total Runoff                         =  7.7136E+01     [cm]
Total Infiltration                   =  4.9829E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.1250E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                  =  1.2697E+02     [cm]
Actual Rainfall                      =  1.2697E+02     [cm]
Actual Irrigation                    =  0.0000E+00     [cm]
Total Final Moisture Storage         =  1.7166E+01     [cm]
Mass Balance Error                   =  1.0387E-02     [cm]
Total Successful Time Steps          =   1529268
Total Attempted Time Steps           =   1614248
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary  =    365624
Total Time Actually Simulated        =  3.6600E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

   DEPTH          FLOW        DEPTH          FLOW        DEPTH          FLOW
  --------    -----------   --------    -----------   --------    -----------
```

0.000	3.9338E+01	0.100	4.0639E+01	0.250	4.0121E+01
0.400	3.9802E+01	0.600	3.9422E+01	0.850	3.9024E+01
1.200	3.8524E+01	1.650	3.7928E+01	2.200	3.7285E+01
2.900	3.6567E+01	3.850	3.5619E+01	5.050	3.4431E+01
6.600	3.2916E+01	8.700	3.0915E+01	11.450	2.8396E+01
14.000	2.6190E+01	16.000	2.4525E+01	18.000	2.2927E+01
20.500	2.1009E+01	23.500	1.8841E+01	26.000	1.7134E+01
27.750	1.5984E+01	29.000	1.5184E+01	29.750	1.4713E+01
30.150	1.4463E+01	30.350	1.4339E+01	30.450	1.4277E+01
30.550	1.4216E+01	30.700	1.4118E+01	30.950	1.3954E+01
31.350	1.3691E+01	32.000	1.3268E+01	33.000	1.2625E+01
34.500	1.1683E+01	36.750	1.0327E+01	39.650	8.7031E+00
42.600	7.2174E+00	45.500	5.9097E+00	48.500	4.7151E+00
52.500	3.3238E+00	58.500	1.7043E+00	67.000	2.9182E-01
77.000	1.4249E-02	87.000	1.7985E-03	97.000	3.5895E-04
104.340	1.2272E-05	106.680	6.1250E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.4371E-01	0.300	1.4411E-01
0.500	1.9316E-01	0.700	2.4246E-01	1.000	3.4099E-01
1.400	4.4005E-01	1.900	5.3924E-01	2.500	6.8665E-01
3.300	9.2946E-01	4.400	1.1653E+00	5.700	1.4848E+00
7.500	1.9594E+00	9.900	2.4609E+00	13.000	2.1502E+00
15.000	1.6192E+00	17.000	1.5525E+00	19.000	1.8598E+00
22.000	2.0978E+00	25.000	1.6467E+00	27.000	1.1088E+00
28.500	7.6978E-01	29.500	4.5335E-01	30.000	2.3957E-01
30.300	1.1913E-01	30.400	5.9457E-02	30.500	5.9350E-02
30.600	9.1598E-02	30.800	1.5241E-01	31.100	2.4300E-01
31.600	3.9169E-01	32.400	5.9249E-01	33.600	8.6207E-01
35.400	1.2245E+00	38.100	1.4313E+00	41.200	1.2713E+00
44.000	1.0893E+00	47.000	9.6456E-01	50.000	1.0815E+00
55.000	1.1459E+00	62.000	7.4709E-01	72.000	1.3298E-01
82.000	1.7940E-02	92.000	3.2227E-03	102.000	6.3461E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2005.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	6.910E+03	0.1636	291.00	2	2.000E-01	6.379E+03	0.1650	291.00
3	3.000E-01	6.148E+03	0.1656	291.00	4	5.000E-01	5.742E+03	0.1669	291.00
5	7.000E-01	5.396E+03	0.1680	291.00	6	1.000E+00	4.965E+03	0.1697	291.00
7	1.400E+00	4.512E+03	0.1716	291.00	8	1.900E+00	4.080E+03	0.1737	291.00
9	2.500E+00	3.694E+03	0.1758	291.00	10	3.300E+00	3.323E+03	0.1782	291.00
11	4.400E+00	2.972E+03	0.1808	291.00	12	5.700E+00	2.695E+03	0.1831	291.00
13	7.500E+00	2.445E+03	0.1856	291.00	14	9.900E+00	2.240E+03	0.1878	291.00
15	1.300E+01	2.081E+03	0.1898	291.00	16	1.500E+01	2.009E+03	0.1907	291.00
17	1.700E+01	1.952E+03	0.1915	291.00	18	1.900E+01	1.905E+03	0.1922	291.00
19	2.200E+01	1.848E+03	0.1931	291.00	20	2.500E+01	1.800E+03	0.1938	291.00
21	2.700E+01	1.772E+03	0.1942	291.00	22	2.850E+01	1.753E+03	0.1945	291.00
23	2.950E+01	1.741E+03	0.1947	291.00	24	3.000E+01	1.736E+03	0.1948	291.00
25	3.030E+01	1.732E+03	0.1949	291.00	26	3.040E+01	1.731E+03	0.1949	291.00
27	3.050E+01	1.730E+03	0.1949	291.00	28	3.060E+01	1.727E+03	0.1858	291.00
29	3.080E+01	1.707E+03	0.1864	291.00	30	3.110E+01	1.679E+03	0.1873	291.00
31	3.160E+01	1.637E+03	0.1887	291.00	32	3.240E+01	1.579E+03	0.1908	291.00
33	3.360E+01	1.508E+03	0.1935	291.00	34	3.540E+01	1.429E+03	0.1966	291.00
35	3.810E+01	1.353E+03	0.1999	291.00	36	4.120E+01	1.305E+03	0.2020	291.00
37	4.400E+01	1.286E+03	0.2029	291.00	38	4.700E+01	1.286E+03	0.2029	291.00
39	5.000E+01	1.305E+03	0.2020	291.00	40	5.500E+01	1.384E+03	0.1985	291.00
41	6.200E+01	1.641E+03	0.1886	291.00	42	7.200E+01	7.870E+03	0.1204	291.00
43	8.200E+01	1.460E+04	0.1029	291.00	44	9.200E+01	1.496E+04	0.1023	291.00
45	1.020E+02	1.499E+04	0.1022	291.00	46	1.067E+02	1.499E+04	0.1022	291.00

Initial Water Storage = 17.1662 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.17758	0.18842	0.10221
Head (cm) =	3.41057E+03	1.64678E+03	1.49879E+04
LiqWater Flow (cm) =	-1.94048E-02	7.27730E-03	1.67024E-07
IsoVapor Flow (cm) =	-5.39433E-06	2.16553E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
17.1662	+	0.0000	+	0.0000	-	0.0161	-	0.0000	-	0.0000	=	17.1501	vs.	17.1501

```
Mass Balance = -2.5390E-07 cm;  Time step attempts = 1226 and successes = 1166
  Evaporation:  Potential =  0.0161 cm, Actual =  0.0161 cm
Transpiration:  Potential =  0.1451 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =       2          41          46
Depth (cm)         =     0.20000    62.00000   106.68000
Water (cm3/cm3)    =     0.12711     0.10358     0.10227
Head (cm)          = 6.45803E+05 1.41938E+04 1.49567E+04
LiqWater Flow (cm)=-9.95351E-06-4.79071E-08 1.68068E-07
IsoVapor Flow (cm)=-9.40262E-03-5.35314E-08 0.00000E+00
Plant Sink (cm)    = 0.00000E+00 1.04229E-04 0.00000E+00

                                                 LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 12.6531+ 0.0000+ 0.0000 - 0.0093- 0.0064-  0.0000 =   12.6374 vs.   12.6374

Mass Balance = -1.7534E-07 cm;  Time step attempts =  502 and successes =  458
  Evaporation:  Potential =  0.0278 cm, Actual =  0.0093 cm
Transpiration:  Potential =  0.2498 cm, Actual =  0.0064 cm
1

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                           UNSAT-H Version 3.01
                            SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
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Transpiration Scheme is:            =    1
Potential Evapotranspiration        =  1.4977E+02     [cm]
Potential Transpiration             =  1.3479E+02     [cm]
Actual Transpiration                =  2.7384E+01     [cm]
Potential Evaporation               =  1.4977E+01     [cm]
Actual Evaporation                  =  9.6586E+00     [cm]
Evaporation during Growth           =  9.6586E+00     [cm]
Total Runoff                        =  2.6159E+01     [cm]
Total Infiltration                  =  3.2515E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.1183E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                 =  5.8674E+01     [cm]
Actual Rainfall                     =  5.8674E+01     [cm]
Actual Irrigation                   =  0.0000E+00     [cm]
Total Final Moisture Storage        =  1.2637E+01     [cm]
Mass Balance Error                  =  9.9856E-04     [cm]
Total Successful Time Steps         =   1838428
Total Attempted Time Steps          =   1942208
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary   =    319475
Total Time Actually Simulated       =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	2.2857E+01	0.100	2.5558E+01	0.250	2.4837E+01
0.400	2.4407E+01	0.600	2.3921E+01	0.850	2.3459E+01
1.200	2.2910E+01	1.650	2.2292E+01	2.200	2.1702E+01
2.900	2.1162E+01	3.850	2.0516E+01	5.050	1.9708E+01
6.600	1.8663E+01	8.700	1.7264E+01	11.450	1.5494E+01
14.000	1.3951E+01	16.000	1.2795E+01	18.000	1.1694E+01
20.500	1.0386E+01	23.500	8.9335E+00	26.000	7.8111E+00
27.750	7.0626E+00	29.000	6.5465E+00	29.750	6.2438E+00
30.150	6.0841E+00	30.350	6.0047E+00	30.450	5.9651E+00
30.550	5.9260E+00	30.700	5.8725E+00	30.950	5.7811E+00
31.350	5.6363E+00	32.000	5.4059E+00	33.000	5.0654E+00
34.500	4.5905E+00	36.750	3.9661E+00	39.650	3.3229E+00
42.600	2.8249E+00	45.500	2.4387E+00	48.500	2.1212E+00
52.500	1.7740E+00	58.500	1.3649E+00	67.000	9.2762E-01
77.000	2.4636E-01	87.000	2.4042E-02	97.000	1.9003E-03
104.340	1.5726E-04	106.680	6.1183E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	9.1061E-02	0.300	9.1787E-02
0.500	1.2433E-01	0.700	1.5767E-01	1.000	2.2469E-01
1.400	2.9421E-01	1.900	3.6621E-01	2.500	4.7399E-01
3.300	6.5344E-01	4.400	8.3735E-01	5.700	1.0876E+00
7.500	1.4596E+00	9.900	1.8535E+00	13.000	1.6244E+00
15.000	1.2216E+00	17.000	1.1689E+00	19.000	1.3958E+00
22.000	1.5616E+00	25.000	1.2165E+00	27.000	8.1555E-01
28.500	5.6452E-01	29.500	3.3196E-01	30.000	1.7533E-01
30.300	8.7169E-02	30.400	4.3503E-02	30.500	4.3422E-02
30.600	6.6189E-02	30.800	1.1003E-01	31.100	1.7502E-01
31.600	2.8060E-01	32.400	4.1994E-01	33.600	5.9821E-01
35.400	8.1862E-01	38.100	9.0932E-01	41.200	7.8185E-01
44.000	6.7165E-01	47.000	6.1499E-01	50.000	7.4135E-01
55.000	9.7948E-01	62.000	1.1590E+00	72.000	8.4504E-01
82.000	2.2243E-01	92.000	2.3230E-02	102.000	1.8005E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2006.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

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NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	7.308E+05	0.1268	291.00	2	2.000E-01	6.458E+05	0.1271	291.00
3	3.000E-01	6.041E+05	0.1273	291.00	4	5.000E-01	5.222E+05	0.1277	291.00
5	7.000E-01	4.421E+05	0.1283	291.00	6	1.000E+00	3.249E+05	0.1294	291.00
7	1.400E+00	1.756E+05	0.1320	291.00	8	1.900E+00	4.323E+04	0.1410	291.00
9	2.500E+00	2.336E+04	0.1468	291.00	10	3.300E+00	1.728E+04	0.1502	291.00
11	4.400E+00	1.406E+04	0.1528	291.00	12	5.700E+00	1.227E+04	0.1547	291.00
13	7.500E+00	1.101E+04	0.1562	291.00	14	9.900E+00	1.023E+04	0.1573	291.00
15	1.300E+01	9.911E+03	0.1577	291.00	16	1.500E+01	9.918E+03	0.1577	291.00
17	1.700E+01	1.004E+04	0.1575	291.00	18	1.900E+01	1.025E+04	0.1572	291.00
19	2.200E+01	1.066E+04	0.1567	291.00	20	2.500E+01	1.104E+04	0.1561	291.00
21	2.700E+01	1.121E+04	0.1559	291.00	22	2.850E+01	1.129E+04	0.1558	291.00
23	2.950E+01	1.131E+04	0.1558	291.00	24	3.000E+01	1.132E+04	0.1558	291.00
25	3.030E+01	1.131E+04	0.1558	291.00	26	3.040E+01	1.131E+04	0.1558	291.00
27	3.050E+01	1.131E+04	0.1558	291.00	28	3.060E+01	1.131E+04	0.1096	291.00
29	3.080E+01	1.129E+04	0.1097	291.00	30	3.110E+01	1.125E+04	0.1098	291.00
31	3.160E+01	1.117E+04	0.1099	291.00	32	3.240E+01	1.107E+04	0.1102	291.00
33	3.360E+01	1.100E+04	0.1104	291.00	34	3.540E+01	1.116E+04	0.1100	291.00
35	3.810E+01	1.189E+04	0.1082	291.00	36	4.120E+01	1.291E+04	0.1060	291.00
37	4.400E+01	1.358E+04	0.1047	291.00	38	4.700E+01	1.397E+04	0.1040	291.00
39	5.000E+01	1.415E+04	0.1037	291.00	40	5.500E+01	1.423E+04	0.1035	291.00
41	6.200E+01	1.419E+04	0.1036	291.00	42	7.200E+01	1.418E+04	0.1036	291.00
43	8.200E+01	1.449E+04	0.1031	291.00	44	9.200E+01	1.484E+04	0.1025	291.00
45	1.020E+02	1.496E+04	0.1023	291.00	46	1.067E+02	1.496E+04	0.1023	291.00

Initial Water Storage = 12.6374 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.12701	0.10358	0.10227
Head (cm)	=	6.68343E+05	1.41955E+04	1.49567E+04
LiqWater Flow (cm)	=	-8.87390E-06	-4.75516E-08	1.68067E-07
IsoVapor Flow (cm)	=	-8.67146E-03	-5.34642E-08	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
12.6374+	0.0000+	0.0000 -	0.0087-	0.0000-	0.0000 =	12.6287 vs.	12.6272

```
 Mass Balance =  1.4750E-03 cm;  Time step attempts =  455 and successes =  410
   Evaporation:  Potential =  0.0260 cm, Actual =  0.0087 cm
 Transpiration:  Potential =  0.2337 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.23501     0.10257     0.10221
 Head (cm)          = 1.92661E+02 1.47725E+04 1.49919E+04
 LiqWater Flow (cm)=-2.02867E-02 3.66158E-06 1.66890E-07
 IsoVapor Flow (cm)=-4.67474E-09 8.83501E-07 0.00000E+00
 Plant Sink (cm)    = 5.69310E-04 2.17336E-05 0.00000E+00

                                                     LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
  17.5205+ 0.0000+ 0.0000 - 0.0215- 0.1049-  0.0000 =   17.3942 vs.   17.3942

 Mass Balance = -1.9352E-06 cm;  Time step attempts = 1615 and successes = 1499
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.1049 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
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 Transpiration Scheme is:             =    1
 Potential Evapotranspiration         =  1.6966E+02     [cm]
 Potential Transpiration              =  1.5269E+02     [cm]
 Actual Transpiration                 =  2.5033E+01     [cm]
 Potential Evaporation                =  1.6966E+01     [cm]
 Actual Evaporation                   =  9.4997E+00     [cm]
 Evaporation during Growth            =  9.4997E+00     [cm]
 Total Runoff                         =  5.1970E+01     [cm]
 Total Infiltration                   =  3.9292E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.1130E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                  =  9.1262E+01     [cm]
 Actual Rainfall                      =  9.1262E+01     [cm]
 Actual Irrigation                    =  0.0000E+00     [cm]
 Total Final Moisture Storage         =  1.7394E+01     [cm]
 Mass Balance Error                   =  2.4151E-03     [cm]
 Total Successful Time Steps          =   1765717
 Total Attempted Time Steps           =   1867509
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary  =    346893
 Total Time Actually Simulated        =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	2.9792E+01	0.100	3.1889E+01	0.250	3.1299E+01
0.400	3.0954E+01	0.600	3.0530E+01	0.850	3.0103E+01
1.200	2.9622E+01	1.650	2.9071E+01	2.200	2.8432E+01
2.900	2.7696E+01	3.850	2.6800E+01	5.050	2.5773E+01
6.600	2.4491E+01	8.700	2.2777E+01	11.450	2.0583E+01
14.000	1.8630E+01	16.000	1.7145E+01	18.000	1.5710E+01
20.500	1.3981E+01	23.500	1.2012E+01	26.000	1.0456E+01
27.750	9.4035E+00	29.000	8.6711E+00	29.750	8.2389E+00
30.150	8.0103E+00	30.350	7.8965E+00	30.450	7.8397E+00
30.550	7.7834E+00	30.700	7.6850E+00	30.950	7.5184E+00
31.350	7.2534E+00	32.000	6.8286E+00	33.000	6.1935E+00
34.500	5.2913E+00	36.750	4.0654E+00	39.650	2.7414E+00
42.600	1.6838E+00	45.500	9.2705E-01	48.500	4.4791E-01
52.500	1.0662E-01	58.500	9.1535E-03	67.000	5.0304E-04
77.000	5.0261E-04	87.000	5.8309E-04	97.000	2.4548E-04
104.340	-4.7360E-05	106.680	6.1130E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	9.9460E-02	0.300	1.0010E-01
0.500	1.3516E-01	0.700	1.7085E-01	1.000	2.4275E-01
1.400	3.1728E-01	1.900	3.9430E-01	2.500	5.0932E-01
3.300	6.9970E-01	4.400	8.9067E-01	5.700	1.1512E+00
7.500	1.5459E+00	9.900	1.9773E+00	13.000	1.7539E+00
15.000	1.3285E+00	17.000	1.2780E+00	19.000	1.5328E+00
22.000	1.7303E+00	25.000	1.3575E+00	27.000	9.1245E-01
28.500	6.3261E-01	29.500	3.7231E-01	30.000	1.9672E-01
30.300	9.7822E-02	30.400	4.8823E-02	30.500	4.8736E-02
30.600	7.3926E-02	30.800	1.2302E-01	31.100	1.9589E-01
31.600	3.1420E-01	32.400	4.6896E-01	33.600	6.6176E-01
35.400	8.8335E-01	38.100	9.1901E-01	41.200	6.9202E-01
44.000	4.9189E-01	47.000	3.3284E-01	50.000	2.3249E-01
55.000	7.4305E-02	62.000	1.8924E-02	72.000	1.3736E-02
82.000	8.4440E-03	92.000	2.9738E-03	102.000	8.0525E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2007.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.929E+02	0.2350	291.00	2	2.000E-01	1.927E+02	0.2350	291.00
3	3.000E-01	1.926E+02	0.2350	291.00	4	5.000E-01	1.923E+02	0.2350	291.00
5	7.000E-01	1.921E+02	0.2350	291.00	6	1.000E+00	1.918E+02	0.2351	291.00
7	1.400E+00	1.914E+02	0.2351	291.00	8	1.900E+00	1.909E+02	0.2351	291.00
9	2.500E+00	1.903E+02	0.2352	291.00	10	3.300E+00	1.895E+02	0.2352	291.00
11	4.400E+00	1.884E+02	0.2353	291.00	12	5.700E+00	1.872E+02	0.2354	291.00
13	7.500E+00	1.856E+02	0.2354	291.00	14	9.900E+00	1.837E+02	0.2356	291.00
15	1.300E+01	1.814E+02	0.2357	291.00	16	1.500E+01	1.801E+02	0.2358	291.00
17	1.700E+01	1.790E+02	0.2358	291.00	18	1.900E+01	1.780E+02	0.2359	291.00
19	2.200E+01	1.768E+02	0.2359	291.00	20	2.500E+01	1.760E+02	0.2358	291.00
21	2.700E+01	1.756E+02	0.2357	291.00	22	2.850E+01	1.755E+02	0.2357	291.00
23	2.950E+01	1.755E+02	0.2356	291.00	24	3.000E+01	1.755E+02	0.2356	291.00
25	3.030E+01	1.755E+02	0.2355	291.00	26	3.040E+01	1.755E+02	0.2355	291.00
27	3.050E+01	1.755E+02	0.2355	291.00	28	3.060E+01	1.757E+02	0.2818	291.00
29	3.080E+01	1.768E+02	0.2813	291.00	30	3.110E+01	1.786E+02	0.2804	291.00
31	3.160E+01	1.821E+02	0.2788	291.00	32	3.240E+01	1.891E+02	0.2755	291.00
33	3.360E+01	2.042E+02	0.2697	291.00	34	3.540E+01	2.418E+02	0.2614	291.00
35	3.810E+01	3.561E+02	0.2474	291.00	36	4.120E+01	6.523E+02	0.2296	291.00
37	4.400E+01	1.448E+03	0.1958	291.00	38	4.700E+01	3.393E+03	0.1522	291.00
39	5.000E+01	5.730E+03	0.1312	291.00	40	5.500E+01	1.184E+04	0.1084	291.00
41	6.200E+01	1.477E+04	0.1026	291.00	42	7.200E+01	1.498E+04	0.1022	291.00
43	8.200E+01	1.499E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.499E+04	0.1022	291.00

Initial Water Storage = 17.3942 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.23203	0.10259	0.10221
Head (cm) =	2.44774E+02	1.47646E+04	1.49919E+04
LiqWater Flow (cm) =	-1.72962E-02	3.78276E-06	1.66889E-07
IsoVapor Flow (cm) =	-7.41656E-09	9.13447E-07	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
17.3942	+	0.0000	+	0.0000	-	0.0179	-	0.0000	-	0.0000	=	17.3763	vs.	17.3517

```
Mass Balance =  2.4555E-02 cm;  Time step attempts = 1086 and successes = 1018
  Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number         =       2          41          46
Depth (cm)          =     0.20000    62.00000   106.68000
Water (cm3/cm3)     =     0.19601     0.10985     0.10220
Head (cm)           = 1.66502E+03 1.12127E+04 1.49973E+04
LiqWater Flow (cm)=-2.15629E-02 7.37997E-05 1.66709E-07
IsoVapor Flow (cm)=-2.96675E-07 1.05726E-05 0.00000E+00
Plant Sink (cm)     = 3.10552E-04 4.63561E-04 0.00000E+00

                                                    LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 15.1921+ 0.0000+ 0.0000 - 0.0224- 0.0586-  0.0000 =   15.1112 vs.   15.1112

Mass Balance = -1.2252E-06 cm;  Time step attempts =  526 and successes =  466
  Evaporation:  Potential =  0.0224 cm, Actual =  0.0224 cm
Transpiration:  Potential =  0.2014 cm, Actual =  0.0586 cm
1
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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.3260E+02     [cm]
Potential Transpiration               =  1.1934E+02     [cm]
Actual Transpiration                  =  3.4056E+01     [cm]
Potential Evaporation                 =  1.3260E+01     [cm]
Actual Evaporation                    =  1.0577E+01     [cm]
Evaporation during Growth             =  1.0577E+01     [cm]
Total Runoff                          =  9.9711E+01     [cm]
Total Infiltration                    =  4.2376E+01     [cm]
Total Basal Liquid Flux (drainage)    =  6.0867E-05     [cm]
Total Basal Vapor Flux (temp-grad)    =  0.0000E+00     [cm]
Total Applied Water                   =  1.4209E+02     [cm]
Actual Rainfall                       =  1.4209E+02     [cm]
Actual Irrigation                     =  0.0000E+00     [cm]
Total Final Moisture Storage          =  1.5111E+01     [cm]
Mass Balance Error                    =  2.6137E-02     [cm]
Total Successful Time Steps           =   1677761
Total Attempted Time Steps            =   1771258
Total Time Step Reductions (DHMAX)    =         0
Total Changes in Surface Boundary     =    427057
Total Time Actually Simulated         =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------    -----------   --------    -----------   --------    -----------
```

0.000	3.1800E+01	0.100	3.3274E+01	0.250	3.2771E+01
0.400	3.2445E+01	0.600	3.2058E+01	0.850	3.1653E+01
1.200	3.1154E+01	1.650	3.0577E+01	2.200	2.9967E+01
2.900	2.9300E+01	3.850	2.8436E+01	5.050	2.7356E+01
6.600	2.5980E+01	8.700	2.4164E+01	11.450	2.1890E+01
14.000	1.9913E+01	16.000	1.8429E+01	18.000	1.7009E+01
20.500	1.5314E+01	23.500	1.3413E+01	26.000	1.1931E+01
27.750	1.0937E+01	29.000	1.0250E+01	29.750	9.8462E+00
30.150	9.6330E+00	30.350	9.5270E+00	30.450	9.4741E+00
30.550	9.4216E+00	30.700	9.3496E+00	30.950	9.2278E+00
31.350	9.0340E+00	32.000	8.7222E+00	33.000	8.2522E+00
34.500	7.5725E+00	36.750	6.6215E+00	39.650	5.5355E+00
42.600	4.5883E+00	45.500	3.7420E+00	48.500	2.9315E+00
52.500	1.9974E+00	58.500	9.0137E-01	67.000	1.3194E-01
77.000	1.0237E-02	87.000	8.3326E-04	97.000	1.1141E-04
104.340	4.4227E-05	106.680	6.0867E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3764E-01	0.300	1.3805E-01
0.500	1.8508E-01	0.700	2.3241E-01	1.000	3.2705E-01
1.400	4.2225E-01	1.900	5.1750E-01	2.500	6.5951E-01
3.300	8.9429E-01	4.400	1.1236E+00	5.700	1.4341E+00
7.500	1.8938E+00	9.900	2.3761E+00	13.000	2.0721E+00
15.000	1.5589E+00	17.000	1.4941E+00	19.000	1.7891E+00
22.000	2.0138E+00	25.000	1.5764E+00	27.000	1.0595E+00
28.500	7.3473E-01	29.500	4.3244E-01	30.000	2.2847E-01
30.300	1.1359E-01	30.400	5.6692E-02	30.500	5.6587E-02
30.600	8.6863E-02	30.800	1.4444E-01	31.100	2.3012E-01
31.600	3.7062E-01	32.400	5.5976E-01	33.600	8.1098E-01
35.400	1.1410E+00	38.100	1.3108E+00	41.200	1.1511E+00
44.000	9.8348E-01	47.000	8.7041E-01	50.000	9.8228E-01
55.000	1.0684E+00	62.000	7.0484E-01	72.000	1.0478E-01
82.000	7.9942E-03	92.000	5.9555E-04	102.000	1.0139E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2008.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.666E+03	0.1960	291.00	2	2.000E-01	1.665E+03	0.1960	291.00
3	3.000E-01	1.664E+03	0.1960	291.00	4	5.000E-01	1.663E+03	0.1960	291.00
5	7.000E-01	1.662E+03	0.1961	291.00	6	1.000E+00	1.660E+03	0.1961	291.00
7	1.400E+00	1.657E+03	0.1961	291.00	8	1.900E+00	1.654E+03	0.1962	291.00
9	2.500E+00	1.649E+03	0.1963	291.00	10	3.300E+00	1.642E+03	0.1964	291.00
11	4.400E+00	1.633E+03	0.1966	291.00	12	5.700E+00	1.621E+03	0.1968	291.00
13	7.500E+00	1.605E+03	0.1971	291.00	14	9.900E+00	1.587E+03	0.1974	291.00
15	1.300E+01	1.571E+03	0.1977	291.00	16	1.500E+01	1.565E+03	0.1978	291.00
17	1.700E+01	1.563E+03	0.1979	291.00	18	1.900E+01	1.563E+03	0.1979	291.00
19	2.200E+01	1.570E+03	0.1977	291.00	20	2.500E+01	1.580E+03	0.1975	291.00
21	2.700E+01	1.589E+03	0.1974	291.00	22	2.850E+01	1.597E+03	0.1972	291.00
23	2.950E+01	1.602E+03	0.1971	291.00	24	3.000E+01	1.605E+03	0.1971	291.00
25	3.030E+01	1.607E+03	0.1970	291.00	26	3.040E+01	1.607E+03	0.1970	291.00
27	3.050E+01	1.608E+03	0.1970	291.00	28	3.060E+01	1.610E+03	0.1897	291.00
29	3.080E+01	1.624E+03	0.1892	291.00	30	3.110E+01	1.645E+03	0.1885	291.00
31	3.160E+01	1.683E+03	0.1872	291.00	32	3.240E+01	1.752E+03	0.1850	291.00
33	3.360E+01	1.868E+03	0.1815	291.00	34	3.540E+01	2.059E+03	0.1762	291.00
35	3.810E+01	2.356E+03	0.1694	291.00	36	4.120E+01	2.857E+03	0.1600	291.00
37	4.400E+01	3.720E+03	0.1482	291.00	38	4.700E+01	5.598E+03	0.1321	291.00
39	5.000E+01	8.232E+03	0.1190	291.00	40	5.500E+01	1.017E+04	0.1126	291.00
41	6.200E+01	1.121E+04	0.1098	291.00	42	7.200E+01	1.369E+04	0.1045	291.00
43	8.200E+01	1.479E+04	0.1025	291.00	44	9.200E+01	1.498E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 15.1112 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.19447	0.10983	0.10220
Head (cm) =	1.75721E+03	1.12184E+04	1.49973E+04
LiqWater Flow (cm) =	-1.75968E-02	7.32882E-05	1.66709E-07
IsoVapor Flow (cm) =	-3.15567E-07	1.05216E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
15.1112	+	0.0000	+	0.0000	-	0.0179	-	0.0000	-	0.0000	=	15.0933	vs.	15.0796

```
Mass Balance =  1.3730E-02 cm;  Time step attempts =  396 and successes =  335
  Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
-------------
Node Number        =       2         41         46
Depth (cm)         =    0.20000   62.00000  106.68000
Water (cm3/cm3)    =    0.12676    0.10322    0.10220
Head (cm)          = 7.32941E+05 1.43994E+04 1.49982E+04
LiqWater Flow (cm)=-1.37875E-04 9.14368E-06 1.66678E-07
IsoVapor Flow (cm)=-2.41660E-02 2.16467E-06 0.00000E+00
Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                                LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 13.3023+ 0.0000+ 0.0000 - 0.0263- 0.0000-  0.0000 =  13.2760 vs.   13.2760

Mass Balance =  2.0935E-07 cm;  Time step attempts = 2814 and successes = 2704
  Evaporation:  Potential =  0.3313 cm, Actual =  0.0263 cm
Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1
-------------------------------------------------------------------------------
                         UNSAT-H Version 3.01
                          SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:             =    1
Potential Evapotranspiration         =  1.5467E+02     [cm]
Potential Transpiration              =  1.3891E+02     [cm]
Actual Transpiration                 =  2.7999E+01     [cm]
Potential Evaporation                =  1.5765E+01     [cm]
Actual Evaporation                   =  1.1119E+01     [cm]
Evaporation during Growth            =  1.1119E+01     [cm]
Total Runoff                         =  4.5305E+01     [cm]
Total Infiltration                   =  3.7296E+01     [cm]
Total Basal Liquid Flux (drainage) =  6.1018E-05     [cm]
Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
Total Applied Water                  =  8.2601E+01     [cm]
Actual Rainfall                      =  8.2601E+01     [cm]
Actual Irrigation                    =  0.0000E+00     [cm]
Total Final Moisture Storage         =  1.3276E+01     [cm]
Mass Balance Error                   =  1.3536E-02     [cm]
Total Successful Time Steps          =   1959205
Total Attempted Time Steps           =   2071818
Total Time Step Reductions (DHMAX) =         0
Total Changes in Surface Boundary  =    403210
Total Time Actually Simulated        =  3.6600E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

   DEPTH         FLOW       DEPTH        FLOW       DEPTH        FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	2.6177E+01	0.100	2.8501E+01	0.250	2.7769E+01
0.400	2.7297E+01	0.600	2.6752E+01	0.850	2.6264E+01
1.200	2.5762E+01	1.650	2.5272E+01	2.200	2.4746E+01
2.900	2.4137E+01	3.850	2.3358E+01	5.050	2.2391E+01
6.600	2.1150E+01	8.700	1.9500E+01	11.450	1.7418E+01
14.000	1.5604E+01	16.000	1.4242E+01	18.000	1.2944E+01
20.500	1.1401E+01	23.500	9.6866E+00	26.000	8.3641E+00
27.750	7.4832E+00	29.000	6.8761E+00	29.750	6.5201E+00
30.150	6.3323E+00	30.350	6.2391E+00	30.450	6.1926E+00
30.550	6.1464E+00	30.700	6.0812E+00	30.950	5.9716E+00
31.350	5.7980E+00	32.000	5.5214E+00	33.000	5.1111E+00
34.500	4.5301E+00	36.750	3.7316E+00	39.650	2.8375E+00
42.600	2.0886E+00	45.500	1.4793E+00	48.500	9.6776E-01
52.500	4.5687E-01	58.500	9.9173E-02	67.000	1.2653E-02
77.000	2.7752E-03	87.000	5.7230E-04	97.000	1.3260E-04
104.340	5.8103E-05	106.680	6.1018E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.1077E-01	0.300	1.1163E-01
0.500	1.5108E-01	0.700	1.9146E-01	1.000	2.7272E-01
1.400	3.5756E-01	1.900	4.4575E-01	2.500	5.7707E-01
3.300	7.9301E-01	4.400	1.0067E+00	5.700	1.2929E+00
7.500	1.7189E+00	9.900	2.1685E+00	13.000	1.8938E+00
15.000	1.4230E+00	17.000	1.3599E+00	19.000	1.6208E+00
22.000	1.8071E+00	25.000	1.4008E+00	27.000	9.3607E-01
28.500	6.4663E-01	29.500	3.7973E-01	30.000	2.0042E-01
30.300	9.9600E-02	30.400	4.9700E-02	30.500	4.9600E-02
30.600	7.5230E-02	30.800	1.2474E-01	31.100	1.9780E-01
31.600	3.1584E-01	32.400	4.7006E-01	33.600	6.6657E-01
35.400	9.1424E-01	38.100	1.0194E+00	41.200	8.4806E-01
44.000	6.7677E-01	47.000	5.3975E-01	50.000	5.1434E-01
55.000	3.8430E-01	62.000	1.4660E-01	72.000	3.2986E-02
82.000	5.8459E-03	92.000	8.5686E-04	102.000	1.1587E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2009.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.000E+06	0.1260	291.00	2	2.000E-01	7.329E+05	0.1268	291.00
3	3.000E-01	6.167E+05	0.1272	291.00	4	5.000E-01	4.097E+05	0.1285	291.00
5	7.000E-01	2.311E+05	0.1307	291.00	6	1.000E+00	4.217E+04	0.1412	291.00
7	1.400E+00	1.970E+04	0.1487	291.00	8	1.900E+00	1.436E+04	0.1525	291.00
9	2.500E+00	1.169E+04	0.1553	291.00	10	3.300E+00	9.873E+03	0.1578	291.00
11	4.400E+00	8.512E+03	0.1601	291.00	12	5.700E+00	7.585E+03	0.1620	291.00
13	7.500E+00	6.833E+03	0.1637	291.00	14	9.900E+00	6.279E+03	0.1652	291.00
15	1.300E+01	5.933E+03	0.1663	291.00	16	1.500E+01	5.831E+03	0.1666	291.00
17	1.700E+01	5.795E+03	0.1667	291.00	18	1.900E+01	5.809E+03	0.1667	291.00
19	2.200E+01	5.902E+03	0.1664	291.00	20	2.500E+01	6.047E+03	0.1659	291.00
21	2.700E+01	6.154E+03	0.1656	291.00	22	2.850E+01	6.233E+03	0.1654	291.00
23	2.950E+01	6.282E+03	0.1652	291.00	24	3.000E+01	6.305E+03	0.1652	291.00
25	3.030E+01	6.319E+03	0.1651	291.00	26	3.040E+01	6.323E+03	0.1651	291.00
27	3.050E+01	6.328E+03	0.1651	291.00	28	3.060E+01	6.342E+03	0.1276	291.00
29	3.080E+01	6.428E+03	0.1272	291.00	30	3.110E+01	6.555E+03	0.1265	291.00
31	3.160E+01	6.749E+03	0.1255	291.00	32	3.240E+01	6.986E+03	0.1243	291.00
33	3.360E+01	7.103E+03	0.1238	291.00	34	3.540E+01	6.928E+03	0.1246	291.00
35	3.810E+01	6.676E+03	0.1259	291.00	36	4.120E+01	6.683E+03	0.1258	291.00
37	4.400E+01	6.948E+03	0.1245	291.00	38	4.700E+01	7.541E+03	0.1218	291.00
39	5.000E+01	8.553E+03	0.1178	291.00	40	5.500E+01	1.178E+04	0.1085	291.00
41	6.200E+01	1.440E+04	0.1032	291.00	42	7.200E+01	1.490E+04	0.1024	291.00
43	8.200E+01	1.498E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 13.2760 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.12973	0.10323	0.10220
Head (cm) =	2.94107E+05	1.43927E+04	1.49982E+04
LiqWater Flow (cm) =	-4.20287E-05	9.26059E-06	1.66678E-07
IsoVapor Flow (cm) =	-1.20868E-02	2.19116E-06	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR		STORAGE
13.2760+	0.0000+	0.0000 -	0.0114-	0.0000-	0.0000 =	13.2647	vs.	13.2647

```
 Mass Balance = -4.8767E-07 cm;  Time step attempts = 1411 and successes = 1349
   Evaporation:  Potential =  0.0170 cm, Actual =  0.0114 cm
 Transpiration:  Potential =  0.1531 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.23017     0.18918     0.10220
 Head (cm)          = 2.81188E+02 1.62493E+03 1.49989E+04
 LiqWater Flow (cm)=-1.58048E-02 7.15440E-03 1.66656E-07
 IsoVapor Flow (cm)=-7.74833E-09 4.97336E-06 0.00000E+00
 Plant Sink (cm)    = 4.24217E-04 4.00124E-03 0.00000E+00

                                                  LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO   TRANS     DRAIN     NEWSTOR       STORAGE
  19.5351+ 0.0000+ 0.0000 - 0.0170- 0.0900-  0.0000 =   19.4281 vs.   19.4281

 Mass Balance = -1.6312E-06 cm;  Time step attempts =  635 and successes =  582
   Evaporation:  Potential =  0.0170 cm, Actual =  0.0170 cm
 Transpiration:  Potential =  0.1531 cm, Actual =  0.0900 cm
1
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                              UNSAT-H Version 3.01
                               SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

 Transpiration Scheme is:             =    1
 Potential Evapotranspiration         =  1.4942E+02     [cm]
 Potential Transpiration              =  1.3448E+02     [cm]
 Actual Transpiration                 =  3.9525E+01     [cm]
 Potential Evaporation                =  1.4942E+01     [cm]
 Actual Evaporation                   =  1.0955E+01     [cm]
 Evaporation during Growth            =  1.0955E+01     [cm]
 Total Runoff                         =  6.2104E+01     [cm]
 Total Infiltration                   =  5.6641E+01     [cm]
 Total Basal Liquid Flux (drainage)   =  6.0829E-05     [cm]
 Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
 Total Applied Water                  =  1.1875E+02     [cm]
 Actual Rainfall                      =  1.1875E+02     [cm]
 Actual Irrigation                    =  0.0000E+00     [cm]
 Total Final Moisture Storage         =  1.9428E+01     [cm]
 Mass Balance Error                   =  8.9309E-03     [cm]
 Total Successful Time Steps          =   1402278
 Total Attempted Time Steps           =   1483697
 Total Time Step Reductions (DHMAX)   =         0
 Total Changes in Surface Boundary    =    265050
 Total Time Actually Simulated        =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH          FLOW       DEPTH          FLOW       DEPTH          FLOW
   --------    -----------   --------    -----------   --------    -----------
```

0.000	4.5686E+01	0.100	4.6983E+01	0.250	4.6399E+01
0.400	4.6047E+01	0.600	4.5638E+01	0.850	4.5208E+01
1.200	4.4639E+01	1.650	4.3990E+01	2.200	4.3273E+01
2.900	4.2446E+01	3.850	4.1352E+01	5.050	3.9984E+01
6.600	3.8246E+01	8.700	3.5958E+01	11.450	3.3088E+01
14.000	3.0581E+01	16.000	2.8689E+01	18.000	2.6869E+01
20.500	2.4680E+01	23.500	2.2199E+01	26.000	2.0243E+01
27.750	1.8923E+01	29.000	1.8004E+01	29.750	1.7463E+01
30.150	1.7176E+01	30.350	1.7034E+01	30.450	1.6963E+01
30.550	1.6892E+01	30.700	1.6773E+01	30.950	1.6573E+01
31.350	1.6254E+01	32.000	1.5739E+01	33.000	1.4959E+01
34.500	1.3822E+01	36.750	1.2203E+01	39.650	1.0290E+01
42.600	8.5480E+00	45.500	7.0056E+00	48.500	5.6096E+00
52.500	4.0096E+00	58.500	2.2208E+00	67.000	7.5512E-01
77.000	7.2218E-02	87.000	1.8438E-03	97.000	1.0657E-04
104.340	5.8834E-05	106.680	6.0829E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.5701E-01	0.300	1.5749E-01
0.500	2.1126E-01	0.700	2.6543E-01	1.000	3.7374E-01
1.400	4.8291E-01	1.900	5.9227E-01	2.500	7.5478E-01
3.300	1.0223E+00	4.400	1.2814E+00	5.700	1.6307E+00
7.500	2.1468E+00	9.900	2.6892E+00	13.000	2.3438E+00
15.000	1.7647E+00	17.000	1.6940E+00	19.000	2.0333E+00
22.000	2.2964E+00	25.000	1.8025E+00	27.000	1.2133E+00
28.500	8.4203E-01	29.500	4.9584E-01	30.000	2.6203E-01
30.300	1.3030E-01	30.400	6.5034E-02	30.500	6.4917E-02
30.600	1.0060E-01	30.800	1.6745E-01	31.100	2.6712E-01
31.600	4.3106E-01	32.400	6.5326E-01	33.600	9.5107E-01
35.400	1.3570E+00	38.100	1.6032E+00	41.200	1.4525E+00
44.000	1.2700E+00	47.000	1.1268E+00	50.000	1.2410E+00
55.000	1.2347E+00	62.000	7.3623E-01	72.000	1.5040E-01
82.000	8.6773E-03	92.000	3.0446E-04	102.000	3.2497E-05
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2010.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	2.814E+02	0.2302	291.00	2	2.000E-01	2.812E+02	0.2302	291.00
3	3.000E-01	2.811E+02	0.2302	291.00	4	5.000E-01	2.809E+02	0.2302	291.00
5	7.000E-01	2.806E+02	0.2302	291.00	6	1.000E+00	2.803E+02	0.2302	291.00
7	1.400E+00	2.799E+02	0.2302	291.00	8	1.900E+00	2.794E+02	0.2302	291.00
9	2.500E+00	2.788E+02	0.2303	291.00	10	3.300E+00	2.780E+02	0.2303	291.00
11	4.400E+00	2.770E+02	0.2303	291.00	12	5.700E+00	2.759E+02	0.2303	291.00
13	7.500E+00	2.745E+02	0.2303	291.00	14	9.900E+00	2.730E+02	0.2303	291.00
15	1.300E+01	2.716E+02	0.2300	291.00	16	1.500E+01	2.711E+02	0.2297	291.00
17	1.700E+01	2.709E+02	0.2293	291.00	18	1.900E+01	2.711E+02	0.2288	291.00
19	2.200E+01	2.722E+02	0.2279	291.00	20	2.500E+01	2.745E+02	0.2271	291.00
21	2.700E+01	2.767E+02	0.2267	291.00	22	2.850E+01	2.787E+02	0.2265	291.00
23	2.950E+01	2.802E+02	0.2263	291.00	24	3.000E+01	2.810E+02	0.2262	291.00
25	3.030E+01	2.815E+02	0.2262	291.00	26	3.040E+01	2.816E+02	0.2262	291.00
27	3.050E+01	2.818E+02	0.2261	291.00	28	3.060E+01	2.824E+02	0.2567	291.00
29	3.080E+01	2.861E+02	0.2560	291.00	30	3.110E+01	2.920E+02	0.2550	291.00
31	3.160E+01	3.030E+02	0.2534	291.00	32	3.240E+01	3.233E+02	0.2510	291.00
33	3.360E+01	3.610E+02	0.2471	291.00	34	3.540E+01	4.365E+02	0.2412	291.00
35	3.810E+01	5.939E+02	0.2322	291.00	36	4.120E+01	8.095E+02	0.2239	291.00
37	4.400E+01	1.006E+03	0.2183	291.00	38	4.700E+01	1.123E+03	0.2113	291.00
39	5.000E+01	1.203E+03	0.2070	291.00	40	5.500E+01	1.337E+03	0.2006	291.00
41	6.200E+01	1.625E+03	0.1892	291.00	42	7.200E+01	3.123E+03	0.1559	291.00
43	8.200E+01	1.172E+04	0.1086	291.00	44	9.200E+01	1.489E+04	0.1024	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 19.4281 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22741	0.18904	0.10220
Head (cm) =	3.42000E+02	1.62885E+03	1.49989E+04
LiqWater Flow (cm) =	-1.73201E-02	7.02294E-03	1.66657E-07
IsoVapor Flow (cm) =	-1.19966E-08	4.87006E-06	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR		INFIL		RUNOFF		EVAPO		TRANS		LIQUID DRAIN		NEWSTOR		STORAGE
19.4281	+	0.0000	+	0.0000	-	0.0179	-	0.0000	-	0.0000	=	19.4102	vs.	19.3890

```
 Mass Balance =  2.1191E-02 cm;  Time step attempts =  333 and successes =  286
   Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
 Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

-------------------------------------------------------------------------------


 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number       =        2           41          46
 Depth (cm)        =     0.20000     62.00000   106.68000
 Water (cm3/cm3)   =     0.20783      0.10585     0.10231
 Head (cm)         = 1.13194E+03 1.29977E+04 1.49287E+04
 LiqWater Flow (cm)=-2.06033E-02 2.18228E-05 1.69015E-07
 IsoVapor Flow (cm)=-8.85726E-08 4.01316E-06 0.00000E+00
 Plant Sink (cm)   = 3.80356E-04 2.12231E-04 0.00000E+00

                                                 LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
  15.2015+ 0.0000+ 0.0000 - 0.0215- 0.0639-  0.0000 =   15.1161 vs.   15.1161

 Mass Balance = -1.3011E-06 cm;  Time step attempts = 1256 and successes = 1204
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.0639 cm
1

-------------------------------------------------------------------------------
                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

 Transpiration Scheme is:             =    1
 Potential Evapotranspiration         =  1.4631E+02     [cm]
 Potential Transpiration              =  1.3168E+02     [cm]
 Actual Transpiration                 =  3.4919E+01     [cm]
 Potential Evaporation                =  1.4631E+01     [cm]
 Actual Evaporation                   =  1.0290E+01     [cm]
 Evaporation during Growth            =  1.0290E+01     [cm]
 Total Runoff                         =  5.5293E+01     [cm]
 Total Infiltration                   =  4.0923E+01     [cm]
 Total Basal Liquid Flux (drainage)   =  6.1442E-05     [cm]
 Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
 Total Applied Water                  =  9.6215E+01     [cm]
 Actual Rainfall                      =  9.6215E+01     [cm]
 Actual Irrigation                    =  0.0000E+00     [cm]
 Total Final Moisture Storage         =  1.5116E+01     [cm]
 Mass Balance Error                   =  2.6081E-02     [cm]
 Total Successful Time Steps          =   1638259
 Total Attempted Time Steps           =   1733052
 Total Time Step Reductions (DHMAX)   =         0
 Total Changes in Surface Boundary    =    378944
 Total Time Actually Simulated        =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH          FLOW        DEPTH          FLOW        DEPTH          FLOW
  --------    -----------    --------    -----------    --------    -----------
```

0.000	3.0633E+01	0.100	3.2633E+01	0.250	3.1988E+01
0.400	3.1595E+01	0.600	3.1133E+01	0.850	3.0674E+01
1.200	3.0170E+01	1.650	2.9657E+01	2.200	2.9074E+01
2.900	2.8390E+01	3.850	2.7534E+01	5.050	2.6495E+01
6.600	2.5176E+01	8.700	2.3421E+01	11.450	2.1196E+01
14.000	1.9237E+01	16.000	1.7758E+01	18.000	1.6337E+01
20.500	1.4632E+01	23.500	1.2710E+01	26.000	1.1206E+01
27.750	1.0195E+01	29.000	9.4949E+00	29.750	9.0829E+00
30.150	8.8652E+00	30.350	8.7570E+00	30.450	8.7030E+00
30.550	8.6495E+00	30.700	8.5728E+00	30.950	8.4423E+00
31.350	8.2348E+00	32.000	7.9017E+00	33.000	7.4030E+00
34.500	6.6961E+00	36.750	5.7569E+00	39.650	4.6816E+00
42.600	3.7322E+00	45.500	2.9415E+00	48.500	2.2833E+00
52.500	1.6232E+00	58.500	1.0547E+00	67.000	6.2757E-01
77.000	2.8454E-01	87.000	3.9844E-02	97.000	3.4205E-03
104.340	2.7850E-04	106.680	6.1442E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2132E-01	0.300	1.2191E-01
0.500	1.6416E-01	0.700	2.0709E-01	1.000	2.9328E-01
1.400	3.8187E-01	1.900	4.7260E-01	2.500	6.0764E-01
3.300	8.3038E-01	4.400	1.0504E+00	5.700	1.3497E+00
7.500	1.7991E+00	9.900	2.2824E+00	13.000	2.0106E+00
15.000	1.5198E+00	17.000	1.4616E+00	19.000	1.7548E+00
22.000	1.9809E+00	25.000	1.5527E+00	27.000	1.0443E+00
28.500	7.2469E-01	29.500	4.2680E-01	30.000	2.2557E-01
30.300	1.1218E-01	30.400	5.5990E-02	30.500	5.5891E-02
30.600	8.5621E-02	30.800	1.4259E-01	31.100	2.2761E-01
31.600	3.6748E-01	32.400	5.5718E-01	33.600	8.1280E-01
35.400	1.1572E+00	38.100	1.3551E+00	41.200	1.2153E+00
44.000	1.0446E+00	47.000	9.1318E-01	50.000	1.0039E+00
55.000	1.0956E+00	62.000	1.1361E+00	72.000	8.5780E-01
82.000	2.9764E-01	92.000	3.8494E-02	102.000	3.1274E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

```
 Input File:   P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App
IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
 Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App
IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2011.res
 Date of Run:      19 Jul 2021
 Time of Run:      12:40:18.16
 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
```

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.132E+03	0.2078	291.00	2	2.000E-01	1.132E+03	0.2078	291.00
3	3.000E-01	1.132E+03	0.2078	291.00	4	5.000E-01	1.131E+03	0.2079	291.00
5	7.000E-01	1.131E+03	0.2079	291.00	6	1.000E+00	1.130E+03	0.2079	291.00
7	1.400E+00	1.129E+03	0.2079	291.00	8	1.900E+00	1.128E+03	0.2080	291.00
9	2.500E+00	1.126E+03	0.2080	291.00	10	3.300E+00	1.124E+03	0.2081	291.00
11	4.400E+00	1.121E+03	0.2081	291.00	12	5.700E+00	1.118E+03	0.2082	291.00
13	7.500E+00	1.114E+03	0.2084	291.00	14	9.900E+00	1.110E+03	0.2085	291.00
15	1.300E+01	1.107E+03	0.2086	291.00	16	1.500E+01	1.107E+03	0.2085	291.00
17	1.700E+01	1.110E+03	0.2085	291.00	18	1.900E+01	1.115E+03	0.2083	291.00
19	2.200E+01	1.127E+03	0.2080	291.00	20	2.500E+01	1.146E+03	0.2074	291.00
21	2.700E+01	1.162E+03	0.2070	291.00	22	2.850E+01	1.176E+03	0.2066	291.00
23	2.950E+01	1.187E+03	0.2063	291.00	24	3.000E+01	1.192E+03	0.2062	291.00
25	3.030E+01	1.196E+03	0.2061	291.00	26	3.040E+01	1.197E+03	0.2060	291.00
27	3.050E+01	1.198E+03	0.2060	291.00	28	3.060E+01	1.202E+03	0.2070	291.00
29	3.080E+01	1.229E+03	0.2057	291.00	30	3.110E+01	1.274E+03	0.2035	291.00
31	3.160E+01	1.363E+03	0.1994	291.00	32	3.240E+01	1.557E+03	0.1916	291.00
33	3.360E+01	2.070E+03	0.1760	291.00	34	3.540E+01	4.128E+03	0.1439	291.00
35	3.810E+01	5.125E+03	0.1353	291.00	36	4.120E+01	5.398E+03	0.1334	291.00
37	4.400E+01	5.868E+03	0.1304	291.00	38	4.700E+01	6.695E+03	0.1258	291.00
39	5.000E+01	7.849E+03	0.1205	291.00	40	5.500E+01	1.009E+04	0.1129	291.00
41	6.200E+01	1.300E+04	0.1059	291.00	42	7.200E+01	1.393E+04	0.1040	291.00
43	8.200E+01	1.435E+04	0.1033	291.00	44	9.200E+01	1.478E+04	0.1026	291.00
45	1.020E+02	1.493E+04	0.1023	291.00	46	1.067E+02	1.493E+04	0.1023	291.00

Initial Water Storage = 15.1161 cm

NOTE: There are no temperature data when plants are modelled.

```
 DAILY SUMMARY:  Day =    1, Simulated Time = 24.0000 hr
 -------------
 Node Number        =        2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.20568     0.10586     0.10231
 Head (cm)          = 1.21062E+03 1.29920E+04 1.49288E+04
 LiqWater Flow (cm)=-1.74616E-02 2.19098E-05 1.69013E-07
 IsoVapor Flow (cm)=-9.97210E-08 4.03022E-06 0.00000E+00
 Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                                LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO   TRANS     DRAIN      NEWSTOR       STORAGE
  15.1161+ 0.0000+ 0.0000 - 0.0179- 0.0000-  0.0000 =   15.0982 vs.   15.0833
```

```
 Mass Balance =  1.4935E-02 cm;  Time step attempts =  779 and successes =  721
   Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
 Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

--------------------------------------------------------------------------------


 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.20475     0.10346     0.10221
 Head (cm)          = 1.24692E+03 1.42622E+04 1.49876E+04
 LiqWater Flow (cm)=-2.11732E-02 1.19815E-05 1.67034E-07
 IsoVapor Flow (cm)=-1.29065E-07 2.84073E-06 0.00000E+00
 Plant Sink (cm)    = 3.53134E-04 6.81681E-05 0.00000E+00

                                                   LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO    TRANS     DRAIN     NEWSTOR       STORAGE
  16.7734+ 0.0000+ 0.0000 - 0.0215- 0.0764-   0.0000 =   16.6755 vs.   16.6755

 Mass Balance = -1.4916E-06 cm;  Time step attempts =  468 and successes =  411
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.0764 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.8074E+02     [cm]
 Potential Transpiration             =  1.6266E+02     [cm]
 Actual Transpiration                =  2.2320E+01     [cm]
 Potential Evaporation               =  1.8074E+01     [cm]
 Actual Evaporation                  =  8.3488E+00     [cm]
 Evaporation during Growth           =  8.3488E+00     [cm]
 Total Runoff                        =  3.2955E+01     [cm]
 Total Infiltration                  =  3.2246E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.1347E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                 =  6.5202E+01     [cm]
 Actual Rainfall                     =  6.5202E+01     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.6676E+01     [cm]
 Mass Balance Error                  =  1.7948E-02     [cm]
 Total Successful Time Steps         =   1431999
 Total Attempted Time Steps          =   1516772
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary   =    319286
 Total Time Actually Simulated       =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	2.3898E+01	0.100	2.6004E+01	0.250	2.5531E+01
0.400	2.5216E+01	0.600	2.4842E+01	0.850	2.4462E+01
1.200	2.4009E+01	1.650	2.3514E+01	2.200	2.2977E+01
2.900	2.2377E+01	3.850	2.1653E+01	5.050	2.0802E+01
6.600	1.9778E+01	8.700	1.8447E+01	11.450	1.6778E+01
14.000	1.5328E+01	16.000	1.4240E+01	18.000	1.3201E+01
20.500	1.1958E+01	23.500	1.0565E+01	26.000	9.4775E+00
27.750	8.7456E+00	29.000	8.2372E+00	29.750	7.9374E+00
30.150	7.7789E+00	30.350	7.7000E+00	30.450	7.6607E+00
30.550	7.6220E+00	30.700	7.5638E+00	30.950	7.4620E+00
31.350	7.2991E+00	32.000	7.0340E+00	33.000	6.6262E+00
34.500	6.0123E+00	36.750	5.0757E+00	39.650	3.9594E+00
42.600	2.9563E+00	45.500	2.0930E+00	48.500	1.3455E+00
52.500	5.5546E-01	58.500	6.8819E-02	67.000	5.9670E-03
77.000	1.1373E-03	87.000	8.1290E-04	97.000	3.3618E-04
104.340	-1.2071E-04	106.680	6.1347E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	8.9559E-02	0.300	8.9994E-02
0.500	1.2116E-01	0.700	1.5282E-01	1.000	2.1637E-01
1.400	2.8159E-01	1.900	3.4831E-01	2.500	4.4844E-01
3.300	6.1421E-01	4.400	7.7888E-01	5.700	9.9999E-01
7.500	1.3303E+00	9.900	1.6726E+00	13.000	1.4525E+00
15.000	1.0892E+00	17.000	1.0405E+00	19.000	1.2427E+00
22.000	1.3908E+00	25.000	1.0837E+00	27.000	7.2802E-01
28.500	5.0510E-01	29.500	2.9746E-01	30.000	1.5722E-01
30.300	7.8198E-02	30.400	3.9031E-02	30.500	3.8964E-02
30.600	5.9387E-02	30.800	9.8920E-02	31.100	1.5779E-01
31.600	2.5417E-01	32.400	3.8315E-01	33.600	5.5333E-01
35.400	7.7353E-01	38.100	8.8318E-01	41.200	7.6674E-01
44.000	6.3391E-01	47.000	5.1752E-01	50.000	5.0419E-01
55.000	3.1793E-01	62.000	8.8139E-02	72.000	2.3805E-02
82.000	1.1255E-02	92.000	4.2321E-03	102.000	1.2980E-03
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2012.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
		Initial Conditions					Initial Conditions		
1	0.000E+00	1.248E+03	0.2047	291.00	2	2.000E-01	1.247E+03	0.2047	291.00
3	3.000E-01	1.247E+03	0.2048	291.00	4	5.000E-01	1.246E+03	0.2048	291.00
5	7.000E-01	1.245E+03	0.2048	291.00	6	1.000E+00	1.244E+03	0.2048	291.00
7	1.400E+00	1.243E+03	0.2049	291.00	8	1.900E+00	1.241E+03	0.2049	291.00
9	2.500E+00	1.238E+03	0.2050	291.00	10	3.300E+00	1.234E+03	0.2051	291.00
11	4.400E+00	1.228E+03	0.2052	291.00	12	5.700E+00	1.220E+03	0.2054	291.00
13	7.500E+00	1.208E+03	0.2058	291.00	14	9.900E+00	1.191E+03	0.2062	291.00
15	1.300E+01	1.169E+03	0.2068	291.00	16	1.500E+01	1.156E+03	0.2072	291.00
17	1.700E+01	1.144E+03	0.2075	291.00	18	1.900E+01	1.132E+03	0.2078	291.00
19	2.200E+01	1.117E+03	0.2083	291.00	20	2.500E+01	1.104E+03	0.2086	291.00
21	2.700E+01	1.096E+03	0.2089	291.00	22	2.850E+01	1.091E+03	0.2090	291.00
23	2.950E+01	1.088E+03	0.2091	291.00	24	3.000E+01	1.086E+03	0.2092	291.00
25	3.030E+01	1.085E+03	0.2092	291.00	26	3.040E+01	1.085E+03	0.2092	291.00
27	3.050E+01	1.085E+03	0.2092	291.00	28	3.060E+01	1.084E+03	0.2135	291.00
29	3.080E+01	1.080E+03	0.2137	291.00	30	3.110E+01	1.075E+03	0.2141	291.00
31	3.160E+01	1.067E+03	0.2145	291.00	32	3.240E+01	1.056E+03	0.2152	291.00
33	3.360E+01	1.046E+03	0.2158	291.00	34	3.540E+01	1.040E+03	0.2162	291.00
35	3.810E+01	1.051E+03	0.2155	291.00	36	4.120E+01	1.093E+03	0.2130	291.00
37	4.400E+01	1.167E+03	0.2089	291.00	38	4.700E+01	1.306E+03	0.2020	291.00
39	5.000E+01	1.559E+03	0.1916	291.00	40	5.500E+01	4.419E+03	0.1411	291.00
41	6.200E+01	1.426E+04	0.1035	291.00	42	7.200E+01	1.497E+04	0.1022	291.00
43	8.200E+01	1.499E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.499E+04	0.1022	291.00	46	1.067E+02	1.499E+04	0.1022	291.00

Initial Water Storage = 16.6755 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.20419	0.10366	0.10221
Head (cm) =	1.26944E+03	1.41510E+04	1.49877E+04
LiqWater Flow (cm) =	-1.78538E-02	1.39849E-05	1.67031E-07
IsoVapor Flow (cm) =	-1.24544E-07	3.28508E-06	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR		STORAGE
16.6755+	0.0000+	0.0000 -	0.0179-	0.0000-	0.0000 =	16.6576	vs.	16.6396

```
 Mass Balance =  1.8043E-02 cm;  Time step attempts =  364 and successes =  307
   Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
 Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.17639     0.10262     0.10220
 Head (cm)          = 3.59556E+03 1.47479E+04 1.49984E+04
 LiqWater Flow (cm)=-1.23379E-01 2.92654E-06 1.66671E-07
 IsoVapor Flow (cm)=-3.05851E-05 6.89886E-07 0.00000E+00
 Plant Sink (cm)    = 0.00000E+00 0.00000E+00 0.00000E+00

                                                  LIQUID
  PRESTOR    INFIL  RUNOFF     EVAPO    TRANS     DRAIN      NEWSTOR       STORAGE
  14.2354+ 0.0000+ 0.0000 - 0.1285- 0.0000-   0.0000 =    14.1068 vs.   14.1068

 Mass Balance = -1.9504E-06 cm;  Time step attempts = 9234 and successes = 8524
   Evaporation:  Potential =  0.2149 cm, Actual =  0.1285 cm
 Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.6419E+02     [cm]
 Potential Transpiration             =  1.4758E+02     [cm]
 Actual Transpiration                =  2.7242E+01     [cm]
 Potential Evaporation               =  1.6612E+01     [cm]
 Actual Evaporation                  =  1.0340E+01     [cm]
 Evaporation during Growth           =  1.0340E+01     [cm]
 Total Runoff                        =  3.4437E+01     [cm]
 Total Infiltration                  =  3.5032E+01     [cm]
 Total Basal Liquid Flux (drainage)  =  6.1048E-05     [cm]
 Total Basal Vapor Flux (temp-grad)  =  0.0000E+00     [cm]
 Total Applied Water                 =  6.9469E+01     [cm]
 Actual Rainfall                     =  6.9469E+01     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.4107E+01     [cm]
 Mass Balance Error                  =  1.7950E-02     [cm]
 Total Successful Time Steps         =   1674878
 Total Attempted Time Steps          =   1774668
 Total Time Step Reductions (DHMAX)  =         0
 Total Changes in Surface Boundary   =    286011
 Total Time Actually Simulated       =  3.6600E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

    DEPTH          FLOW        DEPTH          FLOW        DEPTH          FLOW
  --------    -----------   --------    -----------   --------    -----------
```

0.000	2.4691E+01	0.100	2.6972E+01	0.250	2.6299E+01
0.400	2.5930E+01	0.600	2.5488E+01	0.850	2.5100E+01
1.200	2.4637E+01	1.650	2.4114E+01	2.200	2.3534E+01
2.900	2.2875E+01	3.850	2.2061E+01	5.050	2.1087E+01
6.600	1.9882E+01	8.700	1.8279E+01	11.450	1.6242E+01
14.000	1.4448E+01	16.000	1.3094E+01	18.000	1.1795E+01
20.500	1.0243E+01	23.500	8.5083E+00	26.000	7.1621E+00
27.750	6.2619E+00	29.000	5.6395E+00	29.750	5.2738E+00
30.150	5.0807E+00	30.350	4.9848E+00	30.450	4.9369E+00
30.550	4.8898E+00	30.700	4.8223E+00	30.950	4.7056E+00
31.350	4.5212E+00	32.000	4.2293E+00	33.000	3.8022E+00
34.500	3.2232E+00	36.750	2.5356E+00	39.650	1.8802E+00
42.600	1.4135E+00	45.500	1.0995E+00	48.500	8.8769E-01
52.500	6.9537E-01	58.500	3.4850E-01	67.000	4.0684E-02
77.000	2.9035E-03	87.000	2.7178E-04	97.000	6.8906E-05
104.340	2.7718E-05	106.680	6.1048E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.0221E-01	0.300	1.0314E-01
0.500	1.3995E-01	0.700	1.7761E-01	1.000	2.5344E-01
1.400	3.3236E-01	1.900	4.1391E-01	2.500	5.3547E-01
3.300	7.3708E-01	4.400	9.4027E-01	5.700	1.2166E+00
7.500	1.6306E+00	9.900	2.0711E+00	13.000	1.8235E+00
15.000	1.3767E+00	17.000	1.3216E+00	19.000	1.5807E+00
22.000	1.7710E+00	25.000	1.3783E+00	27.000	9.2381E-01
28.500	6.3988E-01	29.500	3.7646E-01	30.000	1.9888E-01
30.300	9.8881E-02	30.400	4.9349E-02	30.500	4.9258E-02
30.600	7.4379E-02	30.800	1.2365E-01	31.100	1.9664E-01
31.600	3.1482E-01	32.400	4.7018E-01	33.600	6.6620E-01
35.400	8.9339E-01	38.100	9.4372E-01	41.200	7.5687E-01
44.000	5.9510E-01	47.000	4.9403E-01	50.000	5.3927E-01
55.000	5.7216E-01	62.000	3.1561E-01	72.000	4.0416E-02
82.000	3.0622E-03	92.000	2.7512E-04	102.000	1.1575E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2013.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	3.688E+03	0.1758	291.00	2	2.000E-01	3.596E+03	0.1764	291.00
3	3.000E-01	3.550E+03	0.1767	291.00	4	5.000E-01	3.463E+03	0.1772	291.00
5	7.000E-01	3.378E+03	0.1778	291.00	6	1.000E+00	3.258E+03	0.1786	291.00
7	1.400E+00	3.110E+03	0.1797	291.00	8	1.900E+00	2.943E+03	0.1810	291.00
9	2.500E+00	2.769E+03	0.1825	291.00	10	3.300E+00	2.574E+03	0.1843	291.00
11	4.400E+00	2.363E+03	0.1864	291.00	12	5.700E+00	2.178E+03	0.1886	291.00
13	7.500E+00	1.999E+03	0.1909	291.00	14	9.900E+00	1.850E+03	0.1930	291.00
15	1.300E+01	1.743E+03	0.1947	291.00	16	1.500E+01	1.705E+03	0.1953	291.00
17	1.700E+01	1.683E+03	0.1957	291.00	18	1.900E+01	1.673E+03	0.1959	291.00
19	2.200E+01	1.677E+03	0.1958	291.00	20	2.500E+01	1.698E+03	0.1954	291.00
21	2.700E+01	1.720E+03	0.1951	291.00	22	2.850E+01	1.740E+03	0.1947	291.00
23	2.950E+01	1.756E+03	0.1945	291.00	24	3.000E+01	1.764E+03	0.1944	291.00
25	3.030E+01	1.769E+03	0.1943	291.00	26	3.040E+01	1.771E+03	0.1942	291.00
27	3.050E+01	1.773E+03	0.1942	291.00	28	3.060E+01	1.779E+03	0.1841	291.00
29	3.080E+01	1.818E+03	0.1829	291.00	30	3.110E+01	1.885E+03	0.1810	291.00
31	3.160E+01	2.017E+03	0.1773	291.00	32	3.240E+01	2.307E+03	0.1704	291.00
33	3.360E+01	3.082E+03	0.1565	291.00	34	3.540E+01	7.102E+03	0.1238	291.00
35	3.810E+01	9.225E+03	0.1155	291.00	36	4.120E+01	9.678E+03	0.1141	291.00
37	4.400E+01	1.050E+04	0.1117	291.00	38	4.700E+01	1.190E+04	0.1082	291.00
39	5.000E+01	1.342E+04	0.1050	291.00	40	5.500E+01	1.450E+04	0.1030	291.00
41	6.200E+01	1.475E+04	0.1026	291.00	42	7.200E+01	1.491E+04	0.1023	291.00
43	8.200E+01	1.498E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 14.1068 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.20066	0.10262	0.10220
Head (cm) =	1.42331E+03	1.47476E+04	1.49984E+04
LiqWater Flow (cm)=	1.79527E-01	2.92999E-06	1.66671E-07
IsoVapor Flow (cm)=	2.63362E-07	6.90719E-07	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
14.1068+	0.2032+	0.0000 -	0.0176-	0.0000-	0.0000 =	14.2925 vs.	14.2925

```
 Mass Balance =  2.7974E-06 cm;  Time step attempts = 7859 and successes = 7700
   Evaporation:  Potential =  0.0179 cm, Actual =  0.0176 cm
 Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number       =        2          41          46
 Depth (cm)        =     0.20000    62.00000   106.68000
 Water (cm3/cm3)   =     0.19723     0.10229     0.10219
 Head (cm)         = 1.59700E+03 1.49422E+04 1.49997E+04
 LiqWater Flow (cm)=-1.42253E-02 1.01399E-06 1.66628E-07
 IsoVapor Flow (cm)=-1.91491E-07 2.18217E-07 0.00000E+00
 Plant Sink (cm)   = 2.00222E-04 3.66794E-06 0.00000E+00

                                                    LIQUID
  PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
  15.4133+ 0.0000+ 0.0000 - 0.0143- 0.0398-  0.0000 =   15.3592 vs.   15.3592

 Mass Balance = -8.2442E-07 cm;  Time step attempts =  363 and successes =  307
   Evaporation:  Potential =  0.0143 cm, Actual =  0.0143 cm
 Transpiration:  Potential =  0.1290 cm, Actual =  0.0398 cm
1

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                              UNSAT-H Version 3.01
                               SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:             =    1
 Potential Evapotranspiration         =  1.6795E+02     [cm]
 Potential Transpiration              =  1.5116E+02     [cm]
 Actual Transpiration                 =  2.6354E+01     [cm]
 Potential Evaporation                =  1.6795E+01     [cm]
 Actual Evaporation                   =  1.0779E+01     [cm]
 Evaporation during Growth            =  1.0779E+01     [cm]
 Total Runoff                         =  4.6322E+01     [cm]
 Total Infiltration                   =  3.8387E+01     [cm]
 Total Basal Liquid Flux (drainage)   =  6.0826E-05     [cm]
 Total Basal Vapor Flux (temp-grad)   =  0.0000E+00     [cm]
 Total Applied Water                  =  8.4709E+01     [cm]
 Actual Rainfall                      =  8.4709E+01     [cm]
 Actual Irrigation                    =  0.0000E+00     [cm]
 Total Final Moisture Storage         =  1.5359E+01     [cm]
 Mass Balance Error                   =  6.4264E-04     [cm]
 Total Successful Time Steps          =   1966898
 Total Attempted Time Steps           =   2082458
 Total Time Step Reductions (DHMAX)   =         0
 Total Changes in Surface Boundary    =    484995
 Total Time Actually Simulated        =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW       DEPTH         FLOW       DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	2.7607E+01	0.100	2.9618E+01	0.250	2.8950E+01
0.400	2.8582E+01	0.600	2.8177E+01	0.850	2.7779E+01
1.200	2.7281E+01	1.650	2.6708E+01	2.200	2.6113E+01
2.900	2.5446E+01	3.850	2.4605E+01	5.050	2.3565E+01
6.600	2.2258E+01	8.700	2.0530E+01	11.450	1.8354E+01
14.000	1.6455E+01	16.000	1.5027E+01	18.000	1.3659E+01
20.500	1.2025E+01	23.500	1.0189E+01	26.000	8.7541E+00
27.750	7.7917E+00	29.000	7.1246E+00	29.750	6.7320E+00
30.150	6.5245E+00	30.350	6.4213E+00	30.450	6.3698E+00
30.550	6.3189E+00	30.700	6.2420E+00	30.950	6.1103E+00
31.350	5.9001E+00	32.000	5.5615E+00	33.000	5.0504E+00
34.500	4.3027E+00	36.750	3.2181E+00	39.650	2.0683E+00
42.600	1.2056E+00	45.500	6.1453E-01	48.500	2.5185E-01
52.500	5.4051E-02	58.500	6.8655E-03	67.000	7.4751E-04
77.000	2.0332E-04	87.000	9.6190E-05	97.000	6.6327E-05
104.340	5.6794E-05	106.680	6.0826E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.0863E-01	0.300	1.0982E-01
0.500	1.4926E-01	0.700	1.8962E-01	1.000	2.7057E-01
1.400	3.5453E-01	1.900	4.4104E-01	2.500	5.7001E-01
3.300	7.8361E-01	4.400	9.9743E-01	5.700	1.2855E+00
7.500	1.7113E+00	9.900	2.1589E+00	13.000	1.8869E+00
15.000	1.4193E+00	17.000	1.3584E+00	19.000	1.6230E+00
22.000	1.8219E+00	25.000	1.4205E+00	27.000	9.5171E-01
28.500	6.5883E-01	29.500	3.8750E-01	30.000	2.0469E-01
30.300	1.0177E-01	30.400	5.0789E-02	30.500	5.0696E-02
30.600	7.6572E-02	30.800	1.2729E-01	31.100	2.0242E-01
31.600	3.2387E-01	32.400	4.8174E-01	33.600	6.8345E-01
35.400	9.1863E-01	38.100	9.2715E-01	41.200	6.6042E-01
44.000	4.2540E-01	47.000	2.4622E-01	50.000	1.5162E-01
55.000	5.0407E-02	62.000	1.0245E-02	72.000	2.1035E-03
82.000	4.5949E-04	92.000	8.8372E-05	102.000	2.3044E-05
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2014.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.598E+03	0.1972	291.00	2	2.000E-01	1.597E+03	0.1972	291.00
3	3.000E-01	1.597E+03	0.1972	291.00	4	5.000E-01	1.596E+03	0.1973	291.00
5	7.000E-01	1.595E+03	0.1973	291.00	6	1.000E+00	1.593E+03	0.1973	291.00
7	1.400E+00	1.591E+03	0.1973	291.00	8	1.900E+00	1.588E+03	0.1974	291.00
9	2.500E+00	1.585E+03	0.1975	291.00	10	3.300E+00	1.579E+03	0.1976	291.00
11	4.400E+00	1.570E+03	0.1977	291.00	12	5.700E+00	1.558E+03	0.1980	291.00
13	7.500E+00	1.540E+03	0.1983	291.00	14	9.900E+00	1.516E+03	0.1988	291.00
15	1.300E+01	1.486E+03	0.1994	291.00	16	1.500E+01	1.468E+03	0.1997	291.00
17	1.700E+01	1.453E+03	0.2000	291.00	18	1.900E+01	1.439E+03	0.2003	291.00
19	2.200E+01	1.420E+03	0.2007	291.00	20	2.500E+01	1.406E+03	0.2010	291.00
21	2.700E+01	1.398E+03	0.2012	291.00	22	2.850E+01	1.393E+03	0.2013	291.00
23	2.950E+01	1.390E+03	0.2014	291.00	24	3.000E+01	1.388E+03	0.2014	291.00
25	3.030E+01	1.388E+03	0.2014	291.00	26	3.040E+01	1.387E+03	0.2014	291.00
27	3.050E+01	1.387E+03	0.2014	291.00	28	3.060E+01	1.387E+03	0.1984	291.00
29	3.080E+01	1.384E+03	0.1985	291.00	30	3.110E+01	1.381E+03	0.1986	291.00
31	3.160E+01	1.377E+03	0.1988	291.00	32	3.240E+01	1.376E+03	0.1988	291.00
33	3.360E+01	1.386E+03	0.1984	291.00	34	3.540E+01	1.426E+03	0.1967	291.00
35	3.810E+01	1.555E+03	0.1917	291.00	36	4.120E+01	1.861E+03	0.1816	291.00
37	4.400E+01	2.425E+03	0.1679	291.00	38	4.700E+01	3.859E+03	0.1466	291.00
39	5.000E+01	8.537E+03	0.1179	291.00	40	5.500E+01	1.429E+04	0.1034	291.00
41	6.200E+01	1.494E+04	0.1023	291.00	42	7.200E+01	1.499E+04	0.1022	291.00
43	8.200E+01	1.500E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 15.3592 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.19634	0.10229	0.10219
Head (cm) =	1.64623E+03	1.49408E+04	1.49997E+04
LiqWater Flow (cm)=	-1.77363E-02	1.03437E-06	1.66628E-07
IsoVapor Flow (cm)=	-2.69597E-07	2.23436E-07	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
15.3592+	0.0000+	0.0000 -	0.0179-	0.0000-	0.0000 =	15.3413 vs.	15.3319

```
 Mass Balance =  9.4310E-03 cm;  Time step attempts =  385 and successes =  325
   Evaporation:  Potential =  0.0179 cm, Actual =  0.0179 cm
 Transpiration:  Potential =  0.1612 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.20351     0.10245     0.10219
 Head (cm)          = 1.29738E+03 1.48436E+04 1.50000E+04
 LiqWater Flow (cm)=-2.10898E-02 2.49417E-06 1.66621E-07
 IsoVapor Flow (cm)=-1.42885E-07 5.92553E-07 0.00000E+00
 Plant Sink (cm)    = 3.45593E-04 1.50877E-05 0.00000E+00

                                                  LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO    TRANS       DRAIN     NEWSTOR       STORAGE
  15.5758+ 0.0000+ 0.0000 - 0.0215- 0.0656-    0.0000 =   15.4887 vs.    15.4887

 Mass Balance = -1.3249E-06 cm;  Time step attempts =  497 and successes =  440
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.0656 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
--------------------------------------------------------------------------------

 Transpiration Scheme is:            =    1
 Potential Evapotranspiration        =  1.5553E+02     [cm]
 Potential Transpiration             =  1.3998E+02     [cm]
 Actual Transpiration                =  2.6533E+01     [cm]
 Potential Evaporation               =  1.5553E+01     [cm]
 Actual Evaporation                  =  1.0532E+01     [cm]
 Evaporation during Growth           =  1.0532E+01     [cm]
 Total Runoff                        =  4.0698E+01     [cm]
 Total Infiltration                  =  3.7204E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.0817E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                 =  7.7902E+01     [cm]
 Actual Rainfall                     =  7.7902E+01     [cm]
 Actual Irrigation                   =  0.0000E+00     [cm]
 Total Final Moisture Storage        =  1.5489E+01     [cm]
 Mass Balance Error                  =  9.3693E-03     [cm]
 Total Successful Time Steps         =   1836501
 Total Attempted Time Steps          =   1942026
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary  =    330297
 Total Time Actually Simulated       =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	2.6672E+01	0.100	2.8996E+01	0.250	2.8239E+01
0.400	2.7822E+01	0.600	2.7364E+01	0.850	2.6932E+01
1.200	2.6424E+01	1.650	2.5858E+01	2.200	2.5274E+01
2.900	2.4632E+01	3.850	2.3820E+01	5.050	2.2842E+01
6.600	2.1588E+01	8.700	1.9911E+01	11.450	1.7785E+01
14.000	1.5914E+01	16.000	1.4501E+01	18.000	1.3146E+01
20.500	1.1524E+01	23.500	9.7010E+00	26.000	8.2737E+00
27.750	7.3137E+00	29.000	6.6477E+00	29.750	6.2557E+00
30.150	6.0485E+00	30.350	5.9455E+00	30.450	5.8941E+00
30.550	5.8432E+00	30.700	5.7664E+00	30.950	5.6356E+00
31.350	5.4275E+00	32.000	5.0939E+00	33.000	4.5932E+00
34.500	3.8814E+00	36.750	2.9206E+00	39.650	1.9182E+00
42.600	1.1734E+00	45.500	6.7969E-01	48.500	3.7506E-01
52.500	1.3408E-01	58.500	2.0925E-02	67.000	1.7193E-03
77.000	1.8146E-04	87.000	7.0352E-05	97.000	6.1509E-05
104.340	6.0156E-05	106.680	6.0817E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.0327E-01	0.300	1.0430E-01
0.500	1.4163E-01	0.700	1.7994E-01	1.000	2.5702E-01
1.400	3.3746E-01	1.900	4.2076E-01	2.500	5.4506E-01
3.300	7.5133E-01	4.400	9.5965E-01	5.700	1.2419E+00
7.500	1.6623E+00	9.900	2.1087E+00	13.000	1.8545E+00
15.000	1.4000E+00	17.000	1.3432E+00	19.000	1.6064E+00
22.000	1.8047E+00	25.000	1.4124E+00	27.000	9.4967E-01
28.500	6.5868E-01	29.500	3.8771E-01	30.000	2.0485E-01
30.300	1.0186E-01	30.400	5.0837E-02	30.500	5.0745E-02
30.600	7.6798E-02	30.800	1.2772E-01	31.100	2.0323E-01
31.600	3.2623E-01	32.400	4.9008E-01	33.600	6.9771E-01
35.400	9.4312E-01	38.100	9.8857E-01	41.200	7.4906E-01
44.000	5.2865E-01	47.000	3.5515E-01	50.000	2.6739E-01
55.000	1.1733E-01	62.000	2.1154E-02	72.000	1.7142E-03
82.000	1.2326E-04	92.000	1.1558E-05	102.000	3.0878E-06
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2015.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.298E+03	0.2035	291.00	2	2.000E-01	1.297E+03	0.2035	291.00
3	3.000E-01	1.297E+03	0.2035	291.00	4	5.000E-01	1.296E+03	0.2035	291.00
5	7.000E-01	1.296E+03	0.2035	291.00	6	1.000E+00	1.294E+03	0.2036	291.00
7	1.400E+00	1.293E+03	0.2036	291.00	8	1.900E+00	1.291E+03	0.2037	291.00
9	2.500E+00	1.288E+03	0.2037	291.00	10	3.300E+00	1.284E+03	0.2038	291.00
11	4.400E+00	1.277E+03	0.2040	291.00	12	5.700E+00	1.269E+03	0.2042	291.00
13	7.500E+00	1.257E+03	0.2045	291.00	14	9.900E+00	1.241E+03	0.2049	291.00
15	1.300E+01	1.220E+03	0.2054	291.00	16	1.500E+01	1.208E+03	0.2057	291.00
17	1.700E+01	1.198E+03	0.2060	291.00	18	1.900E+01	1.189E+03	0.2063	291.00
19	2.200E+01	1.177E+03	0.2066	291.00	20	2.500E+01	1.169E+03	0.2068	291.00
21	2.700E+01	1.165E+03	0.2069	291.00	22	2.850E+01	1.162E+03	0.2070	291.00
23	2.950E+01	1.161E+03	0.2070	291.00	24	3.000E+01	1.161E+03	0.2070	291.00
25	3.030E+01	1.161E+03	0.2070	291.00	26	3.040E+01	1.161E+03	0.2070	291.00
27	3.050E+01	1.160E+03	0.2070	291.00	28	3.060E+01	1.160E+03	0.2092	291.00
29	3.080E+01	1.161E+03	0.2092	291.00	30	3.110E+01	1.163E+03	0.2091	291.00
31	3.160E+01	1.167E+03	0.2089	291.00	32	3.240E+01	1.177E+03	0.2084	291.00
33	3.360E+01	1.202E+03	0.2070	291.00	34	3.540E+01	1.267E+03	0.2038	291.00
35	3.810E+01	1.451E+03	0.1957	291.00	36	4.120E+01	1.934E+03	0.1796	291.00
37	4.400E+01	3.173E+03	0.1552	291.00	38	4.700E+01	6.098E+03	0.1290	291.00
39	5.000E+01	1.063E+04	0.1114	291.00	40	5.500E+01	1.414E+04	0.1037	291.00
41	6.200E+01	1.484E+04	0.1025	291.00	42	7.200E+01	1.498E+04	0.1022	291.00
43	8.200E+01	1.500E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 15.4887 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22844	0.10246	0.10219
Head (cm) =	3.18089E+02	1.48424E+04	1.50000E+04
LiqWater Flow (cm)=	7.37528E-01	2.50570E-06	1.66621E-07
IsoVapor Flow (cm)=	3.97383E-08	5.95438E-07	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN		NEWSTOR		STORAGE
15.4887+	0.7796+	0.2872 -	0.0357-	0.0000-	0.0000	=	16.2326	vs.	16.2171

```
 Mass Balance =  1.5448E-02 cm;  Time step attempts = 9984 and successes = 9403
   Evaporation:  Potential =  0.0376 cm, Actual =  0.0357 cm
 Transpiration:  Potential =  0.3384 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =    0.20000    62.00000   106.68000
 Water (cm3/cm3)    =    0.22753     0.15060     0.10220
 Head (cm)          = 3.39205E+02 3.51740E+03 1.49968E+04
 LiqWater Flow (cm)=-1.81852E-02 1.71342E-03 1.66726E-07
 IsoVapor Flow (cm)=-1.14612E-08 3.44507E-05 0.00000E+00
 Plant Sink (cm)    = 4.48641E-04 2.45128E-03 0.00000E+00

                                                  LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
  18.2810+ 0.0000+ 0.0000 - 0.0188- 0.0908-  0.0000 =   18.1715 vs.   18.1715

 Mass Balance = -1.6698E-06 cm;  Time step attempts =  753 and successes =  700
   Evaporation:  Potential =  0.0188 cm, Actual =  0.0188 cm
 Transpiration:  Potential =  0.1692 cm, Actual =  0.0908 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
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 Transpiration Scheme is:              =    1
 Potential Evapotranspiration          =  1.7142E+02     [cm]
 Potential Transpiration               =  1.5428E+02     [cm]
 Actual Transpiration                  =  4.1688E+01     [cm]
 Potential Evaporation                 =  1.7142E+01     [cm]
 Actual Evaporation                    =  1.0194E+01     [cm]
 Evaporation during Growth             =  1.0194E+01     [cm]
 Total Runoff                          =  1.3040E+02     [cm]
 Total Infiltration                    =  5.4590E+01     [cm]
 Total Basal Liquid Flux (drainage)    =  6.0825E-05     [cm]
 Total Basal Vapor Flux (temp-grad)    =  0.0000E+00     [cm]
 Total Applied Water                   =  1.8499E+02     [cm]
 Actual Rainfall                       =  1.8499E+02     [cm]
 Actual Irrigation                     =  0.0000E+00     [cm]
 Total Final Moisture Storage          =  1.8171E+01     [cm]
 Mass Balance Error                    =  2.6068E-02     [cm]
 Total Successful Time Steps           =   1254497
 Total Attempted Time Steps            =   1328770
 Total Time Step Reductions (DHMAX)    =         0
 Total Changes in Surface Boundary     =    338701
 Total Time Actually Simulated         =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	4.4397E+01	0.100	4.5728E+01	0.250	4.5226E+01
0.400	4.4908E+01	0.600	4.4542E+01	0.850	4.4167E+01
1.200	4.3688E+01	1.650	4.3094E+01	2.200	4.2397E+01
2.900	4.1557E+01	3.850	4.0441E+01	5.050	3.9067E+01
6.600	3.7381E+01	8.700	3.5187E+01	11.450	3.2422E+01
14.000	2.9995E+01	16.000	2.8163E+01	18.000	2.6401E+01
20.500	2.4283E+01	23.500	2.1884E+01	26.000	2.0000E+01
27.750	1.8732E+01	29.000	1.7852E+01	29.750	1.7334E+01
30.150	1.7059E+01	30.350	1.6923E+01	30.450	1.6855E+01
30.550	1.6788E+01	30.700	1.6680E+01	30.950	1.6495E+01
31.350	1.6202E+01	32.000	1.5728E+01	33.000	1.5013E+01
34.500	1.3975E+01	36.750	1.2504E+01	39.650	1.0750E+01
42.600	9.0903E+00	45.500	7.5636E+00	48.500	6.1154E+00
52.500	4.3467E+00	58.500	2.2146E+00	67.000	4.7956E-01
77.000	3.4404E-02	87.000	1.9834E-03	97.000	1.7527E-04
104.340	7.0611E-05	106.680	6.0825E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.5620E-01	0.300	1.5662E-01
0.500	2.0989E-01	0.700	2.6353E-01	1.000	3.7076E-01
1.400	4.7872E-01	1.900	5.8642E-01	2.500	7.4633E-01
3.300	1.0100E+00	4.400	1.2662E+00	5.700	1.6149E+00
7.500	2.1376E+00	9.900	2.6978E+00	13.000	2.3667E+00
15.000	1.7855E+00	17.000	1.7163E+00	19.000	2.0620E+00
22.000	2.3331E+00	25.000	1.8303E+00	27.000	1.2311E+00
28.500	8.5422E-01	29.500	5.0308E-01	30.000	2.6590E-01
30.300	1.3225E-01	30.400	6.6007E-02	30.500	6.5892E-02
30.600	1.0271E-01	30.800	1.7110E-01	31.100	2.7319E-01
31.600	4.4110E-01	32.400	6.6850E-01	33.600	9.7227E-01
35.400	1.3814E+00	38.100	1.6429E+00	41.200	1.5286E+00
44.000	1.3764E+00	47.000	1.2702E+00	50.000	1.4910E+00
55.000	1.7084E+00	62.000	1.3252E+00	72.000	3.9587E-01
82.000	3.0077E-02	92.000	1.5253E-03	102.000	6.7930E-05
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2016.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	3.394E+02	0.2275	291.00	2	2.000E-01	3.392E+02	0.2275	291.00
3	3.000E-01	3.391E+02	0.2275	291.00	4	5.000E-01	3.389E+02	0.2275	291.00
5	7.000E-01	3.386E+02	0.2276	291.00	6	1.000E+00	3.383E+02	0.2276	291.00
7	1.400E+00	3.378E+02	0.2276	291.00	8	1.900E+00	3.372E+02	0.2276	291.00
9	2.500E+00	3.365E+02	0.2276	291.00	10	3.300E+00	3.356E+02	0.2277	291.00
11	4.400E+00	3.344E+02	0.2277	291.00	12	5.700E+00	3.330E+02	0.2278	291.00
13	7.500E+00	3.312E+02	0.2279	291.00	14	9.900E+00	3.289E+02	0.2279	291.00
15	1.300E+01	3.262E+02	0.2280	291.00	16	1.500E+01	3.246E+02	0.2280	291.00
17	1.700E+01	3.233E+02	0.2280	291.00	18	1.900E+01	3.222E+02	0.2280	291.00
19	2.200E+01	3.210E+02	0.2279	291.00	20	2.500E+01	3.204E+02	0.2278	291.00
21	2.700E+01	3.204E+02	0.2276	291.00	22	2.850E+01	3.206E+02	0.2275	291.00
23	2.950E+01	3.209E+02	0.2274	291.00	24	3.000E+01	3.210E+02	0.2274	291.00
25	3.030E+01	3.211E+02	0.2273	291.00	26	3.040E+01	3.212E+02	0.2273	291.00
27	3.050E+01	3.212E+02	0.2273	291.00	28	3.060E+01	3.215E+02	0.2598	291.00
29	3.080E+01	3.233E+02	0.2593	291.00	30	3.110E+01	3.262E+02	0.2584	291.00
31	3.160E+01	3.319E+02	0.2568	291.00	32	3.240E+01	3.431E+02	0.2540	291.00
33	3.360E+01	3.663E+02	0.2497	291.00	34	3.540E+01	4.197E+02	0.2432	291.00
35	3.810E+01	5.552E+02	0.2342	291.00	36	4.120E+01	8.109E+02	0.2239	291.00
37	4.400E+01	1.207E+03	0.2068	291.00	38	4.700E+01	1.662E+03	0.1879	291.00
39	5.000E+01	1.900E+03	0.1805	291.00	40	5.500E+01	2.160E+03	0.1738	291.00
41	6.200E+01	3.517E+03	0.1506	291.00	42	7.200E+01	1.226E+04	0.1074	291.00
43	8.200E+01	1.467E+04	0.1028	291.00	44	9.200E+01	1.496E+04	0.1023	291.00
45	1.020E+02	1.499E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 18.1715 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.22568	0.15091	0.10220
Head (cm) =	3.85181E+02	3.49239E+03	1.49967E+04
LiqWater Flow (cm) =	-1.21750E-02	1.73019E-03	1.66727E-07
IsoVapor Flow (cm) =	-1.26150E-08	3.42235E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
18.1715+	0.0000+	0.0000 -	0.0125-	0.0000-	0.0000 =	18.1589 vs.	18.1375

```
Mass Balance =  2.1403E-02 cm;  Time step attempts =  446 and successes =  418
  Evaporation:  Potential =  0.0125 cm, Actual =  0.0125 cm
Transpiration:  Potential =  0.1128 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
-------------
Node Number       =       2          41          46
Depth (cm)        =     0.20000    62.00000   106.68000
Water (cm3/cm3)   =     0.12787     0.10429     0.10220
Head (cm)         = 5.00555E+05 1.38024E+04 1.49963E+04
LiqWater Flow (cm)=-2.15274E-02 1.59693E-05 1.66742E-07
IsoVapor Flow (cm)=-2.43445E-02 3.46386E-06 0.00000E+00
Plant Sink (cm)   = 0.00000E+00 0.00000E+00 0.00000E+00

                                                 LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 14.5830+ 0.0000+ 0.0000 - 0.0552- 0.0000-   0.0000 =   14.5278 vs.   14.5278

Mass Balance = -4.8132E-07 cm;  Time step attempts = 5997 and successes = 5665
  Evaporation:  Potential =  0.1701 cm, Actual =  0.0552 cm
Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:                =    1
Potential Evapotranspiration            =  1.7971E+02     [cm]
Potential Transpiration                 =  1.6159E+02     [cm]
Actual Transpiration                    =  4.3126E+01     [cm]
Potential Evaporation                   =  1.8125E+01     [cm]
Actual Evaporation                      =  1.2052E+01     [cm]
Evaporation during Growth               =  1.2052E+01     [cm]
Total Runoff                            =  6.3168E+01     [cm]
Total Infiltration                      =  5.1564E+01     [cm]
Total Basal Liquid Flux (drainage)      =  6.1045E-05     [cm]
Total Basal Vapor Flux (temp-grad)      =  0.0000E+00     [cm]
Total Applied Water                     =  1.1473E+02     [cm]
Actual Rainfall                         =  1.1473E+02     [cm]
Actual Irrigation                       =  0.0000E+00     [cm]
Total Final Moisture Storage            =  1.4528E+01     [cm]
Mass Balance Error                      =  2.9763E-02     [cm]
Total Successful Time Steps             =   1537625
Total Attempted Time Steps              =   1626535
Total Time Step Reductions (DHMAX)      =         0
Total Changes in Surface Boundary       =    298120
Total Time Actually Simulated           =  3.6600E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.9513E+01	0.100	4.1039E+01	0.250	4.0456E+01
0.400	4.0108E+01	0.600	3.9673E+01	0.850	3.9240E+01
1.200	3.8713E+01	1.650	3.8062E+01	2.200	3.7321E+01
2.900	3.6470E+01	3.850	3.5389E+01	5.050	3.4043E+01
6.600	3.2328E+01	8.700	3.0075E+01	11.450	2.7250E+01
14.000	2.4784E+01	16.000	2.2931E+01	18.000	2.1156E+01
20.500	1.9033E+01	23.500	1.6643E+01	26.000	1.4775E+01
27.750	1.3520E+01	29.000	1.2649E+01	29.750	1.2136E+01
30.150	1.1865E+01	30.350	1.1730E+01	30.450	1.1663E+01
30.550	1.1596E+01	30.700	1.1503E+01	30.950	1.1343E+01
31.350	1.1087E+01	32.000	1.0670E+01	33.000	1.0033E+01
34.500	9.0986E+00	36.750	7.7627E+00	39.650	6.2053E+00
42.600	4.8384E+00	45.500	3.6796E+00	48.500	2.6835E+00
52.500	1.6360E+00	58.500	7.3083E-01	67.000	1.8215E-01
77.000	1.8646E-02	87.000	1.8529E-03	97.000	2.4731E-04
104.340	6.2451E-05	106.680	6.1045E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.6977E-01	0.300	1.7052E-01
0.500	2.2921E-01	0.700	2.8858E-01	1.000	4.0739E-01
1.400	5.2786E-01	1.900	6.4932E-01	2.500	8.2921E-01
3.300	1.1256E+00	4.400	1.4141E+00	5.700	1.8012E+00
7.500	2.3666E+00	9.900	2.9702E+00	13.000	2.5954E+00
15.000	1.9537E+00	17.000	1.8733E+00	19.000	2.2451E+00
22.000	2.5323E+00	25.000	1.9852E+00	27.000	1.3365E+00
28.500	9.2827E-01	29.500	5.4709E-01	30.000	2.8928E-01
30.300	1.4392E-01	30.400	7.1839E-02	30.500	7.1722E-02
30.600	1.1027E-01	30.800	1.8404E-01	31.100	2.9452E-01
31.600	4.7696E-01	32.400	7.2506E-01	33.600	1.0580E+00
35.400	1.5014E+00	38.100	1.7415E+00	41.200	1.5278E+00
44.000	1.2790E+00	47.000	1.0851E+00	50.000	1.1804E+00
55.000	1.2615E+00	62.000	9.3883E-01	72.000	2.1252E-01
82.000	2.3698E-02	92.000	2.4984E-03	102.000	2.5910E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.000E+06	0.1260	291.00	2	2.000E-01	5.006E+05	0.1279	291.00
3	3.000E-01	3.061E+05	0.1296	291.00	4	5.000E-01	3.305E+04	0.1433	291.00
5	7.000E-01	1.738E+04	0.1502	291.00	6	1.000E+00	1.220E+04	0.1547	291.00
7	1.400E+00	9.549E+03	0.1583	291.00	8	1.900E+00	7.930E+03	0.1612	291.00
9	2.500E+00	6.843E+03	0.1637	291.00	10	3.300E+00	5.982E+03	0.1661	291.00
11	4.400E+00	5.276E+03	0.1685	291.00	12	5.700E+00	4.764E+03	0.1705	291.00
13	7.500E+00	4.318E+03	0.1725	291.00	14	9.900E+00	3.945E+03	0.1744	291.00
15	1.300E+01	3.633E+03	0.1762	291.00	16	1.500E+01	3.485E+03	0.1771	291.00
17	1.700E+01	3.364E+03	0.1779	291.00	18	1.900E+01	3.262E+03	0.1786	291.00
19	2.200E+01	3.136E+03	0.1795	291.00	20	2.500E+01	3.034E+03	0.1803	291.00
21	2.700E+01	2.976E+03	0.1807	291.00	22	2.850E+01	2.937E+03	0.1810	291.00
23	2.950E+01	2.913E+03	0.1812	291.00	24	3.000E+01	2.902E+03	0.1813	291.00
25	3.030E+01	2.895E+03	0.1814	291.00	26	3.040E+01	2.893E+03	0.1814	291.00
27	3.050E+01	2.891E+03	0.1814	291.00	28	3.060E+01	2.884E+03	0.1595	291.00
29	3.080E+01	2.844E+03	0.1602	291.00	30	3.110E+01	2.789E+03	0.1611	291.00
31	3.160E+01	2.707E+03	0.1625	291.00	32	3.240E+01	2.599E+03	0.1645	291.00
33	3.360E+01	2.479E+03	0.1668	291.00	34	3.540E+01	2.369E+03	0.1691	291.00
35	3.810E+01	2.315E+03	0.1702	291.00	36	4.120E+01	2.385E+03	0.1687	291.00
37	4.400E+01	2.577E+03	0.1649	291.00	38	4.700E+01	2.990E+03	0.1579	291.00
39	5.000E+01	3.809E+03	0.1472	291.00	40	5.500E+01	9.596E+03	0.1143	291.00
41	6.200E+01	1.380E+04	0.1043	291.00	42	7.200E+01	1.461E+04	0.1028	291.00
43	8.200E+01	1.492E+04	0.1023	291.00	44	9.200E+01	1.499E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 14.5278 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.17691	0.10432	0.10220
Head (cm) =	3.51340E+03	1.37876E+04	1.49963E+04
LiqWater Flow (cm)=	9.60890E-02	1.62637E-05	1.66742E-07
IsoVapor Flow (cm)=	-8.40152E-04	3.52251E-06	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
14.5278+	0.1270+	0.0000 -	0.0193-	0.0000-	0.0000 =	14.6355 vs.	14.6355

```
Mass Balance =  1.2538E-06 cm;  Time step attempts =18062 and successes =17354
  Evaporation:  Potential =  0.0197 cm, Actual =  0.0193 cm
Transpiration:  Potential =  0.1773 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number       =        2          41          46
Depth (cm)        =     0.20000    62.00000   106.68000
Water (cm3/cm3)   =     0.19172     0.10241     0.10220
Head (cm)         = 1.93862E+03 1.48697E+04 1.49991E+04
LiqWater Flow (cm)=-2.09305E-02 1.79064E-06 1.66648E-07
IsoVapor Flow (cm)=-4.87860E-07 4.13730E-07 0.00000E+00
Plant Sink (cm)   = 2.65485E-04 1.25564E-05 0.00000E+00

                                                LIQUID
 PRESTOR    INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR        STORAGE
 14.6828+ 0.0000+ 0.0000 - 0.0215- 0.0498-  0.0000 =   14.6115 vs.   14.6115

Mass Balance = -1.0809E-06 cm;  Time step attempts =  552 and successes =  492
  Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
Transpiration:  Potential =  0.1934 cm, Actual =  0.0498 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
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Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.7260E+02     [cm]
Potential Transpiration               =  1.5534E+02     [cm]
Actual Transpiration                  =  3.0663E+01     [cm]
Potential Evaporation                 =  1.7260E+01     [cm]
Actual Evaporation                    =  1.1249E+01     [cm]
Evaporation during Growth             =  1.1249E+01     [cm]
Total Runoff                          =  3.5372E+01     [cm]
Total Infiltration                    =  4.1997E+01     [cm]
Total Basal Liquid Flux (drainage)    =  6.0844E-05     [cm]
Total Basal Vapor Flux (temp-grad)    =  0.0000E+00     [cm]
Total Applied Water                   =  7.7368E+01     [cm]
Actual Rainfall                       =  7.7368E+01     [cm]
Actual Irrigation                     =  0.0000E+00     [cm]
Total Final Moisture Storage          =  1.4612E+01     [cm]
Mass Balance Error                    =  1.2127E-03     [cm]
Total Successful Time Steps           =   1861862
Total Attempted Time Steps            =   1971171
Total Time Step Reductions (DHMAX)    =         0
Total Changes in Surface Boundary     =    315980
Total Time Actually Simulated         =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH          FLOW        DEPTH          FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.0748E+01	0.100	3.3091E+01	0.250	3.2243E+01
0.400	3.1814E+01	0.600	3.1344E+01	0.850	3.0915E+01
1.200	3.0385E+01	1.650	2.9761E+01	2.200	2.9081E+01
2.900	2.8306E+01	3.850	2.7331E+01	5.050	2.6143E+01
6.600	2.4650E+01	8.700	2.2661E+01	11.450	2.0143E+01
14.000	1.7941E+01	16.000	1.6288E+01	18.000	1.4713E+01
20.500	1.2842E+01	23.500	1.0759E+01	26.000	9.1457E+00
27.750	8.0688E+00	29.000	7.3251E+00	29.750	6.8883E+00
30.150	6.6578E+00	30.350	6.5432E+00	30.450	6.4860E+00
30.550	6.4293E+00	30.700	6.3425E+00	30.950	6.1954E+00
31.350	5.9627E+00	32.000	5.5926E+00	33.000	5.0469E+00
34.500	4.2793E+00	36.750	3.2485E+00	39.650	2.1927E+00
42.600	1.4736E+00	45.500	1.0147E+00	48.500	7.2139E-01
52.500	4.6255E-01	58.500	1.4402E-01	67.000	1.3578E-02
77.000	1.3715E-03	87.000	2.5489E-04	97.000	8.9356E-05
104.340	5.2204E-05	106.680	6.0844E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2046E-01	0.300	1.2175E-01
0.500	1.6556E-01	0.700	2.1068E-01	1.000	3.0142E-01
1.400	3.9605E-01	1.900	4.9371E-01	2.500	6.3898E-01
3.300	8.7978E-01	4.400	1.1224E+00	5.700	1.4514E+00
7.500	1.9428E+00	9.900	2.4636E+00	13.000	2.1550E+00
15.000	1.6166E+00	17.000	1.5399E+00	19.000	1.8291E+00
22.000	2.0342E+00	25.000	1.5740E+00	27.000	1.0504E+00
28.500	7.2515E-01	29.500	4.2578E-01	30.000	2.2475E-01
30.300	1.1171E-01	30.400	5.5744E-02	30.500	5.5636E-02
30.600	8.4167E-02	30.800	1.3970E-01	31.100	2.2170E-01
31.600	3.5393E-01	32.400	5.2442E-01	33.600	7.4403E-01
35.400	1.0151E+00	38.100	1.0850E+00	41.200	8.1713E-01
44.000	5.7876E-01	47.000	4.2059E-01	50.000	4.1615E-01
55.000	3.8299E-01	62.000	1.4966E-01	72.000	2.0107E-02
82.000	2.6572E-03	92.000	4.0933E-04	102.000	7.7473E-05
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2018.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.940E+03	0.1917	291.00	2	2.000E-01	1.939E+03	0.1917	291.00
3	3.000E-01	1.938E+03	0.1917	291.00	4	5.000E-01	1.936E+03	0.1918	291.00
5	7.000E-01	1.934E+03	0.1918	291.00	6	1.000E+00	1.931E+03	0.1918	291.00
7	1.400E+00	1.926E+03	0.1919	291.00	8	1.900E+00	1.920E+03	0.1920	291.00
9	2.500E+00	1.912E+03	0.1921	291.00	10	3.300E+00	1.900E+03	0.1923	291.00
11	4.400E+00	1.882E+03	0.1925	291.00	12	5.700E+00	1.859E+03	0.1929	291.00
13	7.500E+00	1.827E+03	0.1934	291.00	14	9.900E+00	1.788E+03	0.1940	291.00
15	1.300E+01	1.747E+03	0.1946	291.00	16	1.500E+01	1.727E+03	0.1950	291.00
17	1.700E+01	1.710E+03	0.1952	291.00	18	1.900E+01	1.697E+03	0.1955	291.00
19	2.200E+01	1.683E+03	0.1957	291.00	20	2.500E+01	1.675E+03	0.1958	291.00
21	2.700E+01	1.673E+03	0.1959	291.00	22	2.850E+01	1.672E+03	0.1959	291.00
23	2.950E+01	1.673E+03	0.1959	291.00	24	3.000E+01	1.673E+03	0.1959	291.00
25	3.030E+01	1.674E+03	0.1959	291.00	26	3.040E+01	1.674E+03	0.1959	291.00
27	3.050E+01	1.674E+03	0.1959	291.00	28	3.060E+01	1.675E+03	0.1875	291.00
29	3.080E+01	1.680E+03	0.1873	291.00	30	3.110E+01	1.690E+03	0.1870	291.00
31	3.160E+01	1.709E+03	0.1863	291.00	32	3.240E+01	1.752E+03	0.1850	291.00
33	3.360E+01	1.845E+03	0.1821	291.00	34	3.540E+01	2.080E+03	0.1757	291.00
35	3.810E+01	2.881E+03	0.1596	291.00	36	4.120E+01	5.233E+03	0.1346	291.00
37	4.400E+01	7.268E+03	0.1230	291.00	38	4.700E+01	9.120E+03	0.1158	291.00
39	5.000E+01	1.172E+04	0.1086	291.00	40	5.500E+01	1.433E+04	0.1033	291.00
41	6.200E+01	1.487E+04	0.1024	291.00	42	7.200E+01	1.497E+04	0.1023	291.00
43	8.200E+01	1.499E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 14.6115 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.19739	0.10241	0.10220
Head (cm) =	1.58795E+03	1.48689E+04	1.49991E+04
LiqWater Flow (cm)=	6.67366E-02	1.80023E-06	1.66648E-07
IsoVapor Flow (cm)=	1.36329E-07	4.16155E-07	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR		STORAGE
14.6115+	0.0762+	0.0000 -	0.0080-	0.0000-	0.0000 =	14.6798	vs.	14.6681

```
 Mass Balance =  1.1697E-02 cm;  Time step attempts = 3667 and successes = 3590
   Evaporation:  Potential =  0.0081 cm, Actual =  0.0080 cm
 Transpiration:  Potential =  0.0725 cm, Actual =  0.0000 cm

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 DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
 -------------
 Node Number        =       2          41          46
 Depth (cm)         =     0.20000    62.00000   106.68000
 Water (cm3/cm3)    =     0.24036     0.11933     0.10219
 Head (cm)          = 1.12938E+02 8.14355E+03 1.49999E+04
 LiqWater Flow (cm)= 9.76469E-01 2.76068E-04 1.66623E-07
 IsoVapor Flow (cm)= 9.09862E-09 2.68148E-05 0.00000E+00
 Plant Sink (cm)    = 2.41577E-04 3.91321E-04 0.00000E+00

                                                   LIQUID
  PRESTOR    INFIL  RUNOFF    EVAPO   TRANS     DRAIN     NEWSTOR        STORAGE
  17.2964+ 0.9898+ 0.4072 - 0.0085- 0.0453-  0.0000 =  18.2324 vs.   18.2324

 Mass Balance =  1.8714E-05 cm;  Time step attempts = 6422 and successes = 6194
   Evaporation:  Potential =  0.0215 cm, Actual =  0.0085 cm
 Transpiration:  Potential =  0.1934 cm, Actual =  0.0453 cm
1

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                             UNSAT-H Version 3.01
                              SIMULATION SUMMARY

 Title:
 Turkey Creek Landfill: 30 year run for ET alternative final cover
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 Transpiration Scheme is:              =    1
 Potential Evapotranspiration          =  1.7340E+02     [cm]
 Potential Transpiration               =  1.5606E+02     [cm]
 Actual Transpiration                  =  3.1567E+01     [cm]
 Potential Evaporation                 =  1.7340E+01     [cm]
 Actual Evaporation                    =  1.0671E+01     [cm]
 Evaporation during Growth             =  1.0671E+01     [cm]
 Total Runoff                          =  7.1399E+01     [cm]
 Total Infiltration                    =  4.5873E+01     [cm]
 Total Basal Liquid Flux (drainage) =  6.0821E-05     [cm]
 Total Basal Vapor Flux (temp-grad) =  0.0000E+00     [cm]
 Total Applied Water                   =  1.1727E+02     [cm]
 Actual Rainfall                       =  1.1727E+02     [cm]
 Actual Irrigation                     =  0.0000E+00     [cm]
 Total Final Moisture Storage          =  1.8232E+01     [cm]
 Mass Balance Error                    =  1.4105E-02     [cm]
 Total Successful Time Steps           =   1787212
 Total Attempted Time Steps            =   1889761
 Total Time Step Reductions (DHMAX) =         0
 Total Changes in Surface Boundary     =    392326
 Total Time Actually Simulated         =  3.6500E+02     [days]


 Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

    DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
   --------   -----------   --------   -----------   --------   -----------
```

0.000	3.5202E+01	0.100	3.7236E+01	0.250	3.6542E+01
0.400	3.6125E+01	0.600	3.5654E+01	0.850	3.5218E+01
1.200	3.4688E+01	1.650	3.4091E+01	2.200	3.3451E+01
2.900	3.2699E+01	3.850	3.1727E+01	5.050	3.0558E+01
6.600	2.9067E+01	8.700	2.7082E+01	11.450	2.4568E+01
14.000	2.2365E+01	16.000	2.0707E+01	18.000	1.9120E+01
20.500	1.7225E+01	23.500	1.5091E+01	26.000	1.3417E+01
27.750	1.2289E+01	29.000	1.1504E+01	29.750	1.1041E+01
30.150	1.0796E+01	30.350	1.0674E+01	30.450	1.0613E+01
30.550	1.0553E+01	30.700	1.0453E+01	30.950	1.0282E+01
31.350	1.0011E+01	32.000	9.5736E+00	33.000	8.9152E+00
34.500	7.9661E+00	36.750	6.6409E+00	39.650	5.1332E+00
42.600	3.7811E+00	45.500	2.6646E+00	48.500	1.7531E+00
52.500	8.6125E-01	58.500	2.0594E-01	67.000	9.2200E-03
77.000	3.5389E-04	87.000	8.2400E-05	97.000	6.3266E-05
104.340	5.8534E-05	106.680	6.0821E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.2251E-01	0.300	1.2346E-01
0.500	1.6704E-01	0.700	2.1151E-01	1.000	3.0095E-01
1.400	3.9343E-01	1.900	4.8850E-01	2.500	6.3008E-01
3.300	8.6444E-01	4.400	1.0984E+00	5.700	1.4140E+00
7.500	1.8839E+00	9.900	2.3827E+00	13.000	2.0842E+00
15.000	1.5652E+00	17.000	1.4940E+00	19.000	1.7809E+00
22.000	1.9980E+00	25.000	1.5619E+00	27.000	1.0503E+00
28.500	7.2932E-01	29.500	4.2974E-01	30.000	2.2719E-01
30.300	1.1301E-01	30.400	5.6410E-02	30.500	5.6314E-02
30.600	8.6269E-02	30.800	1.4381E-01	31.100	2.2959E-01
31.600	3.7015E-01	32.400	5.5926E-01	33.600	8.0828E-01
35.400	1.1280E+00	38.100	1.2723E+00	41.200	1.0930E+00
44.000	8.9071E-01	47.000	7.0878E-01	50.000	6.4063E-01
55.000	3.4612E-01	62.000	5.8917E-02	72.000	3.2346E-03
82.000	2.6959E-04	92.000	4.1121E-05	102.000	1.1774E-05
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2019.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

		Initial Conditions					Initial Conditions		
NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	1.131E+02	0.2403	291.00	2	2.000E-01	1.129E+02	0.2404	291.00
3	3.000E-01	1.128E+02	0.2404	291.00	4	5.000E-01	1.126E+02	0.2404	291.00
5	7.000E-01	1.124E+02	0.2404	291.00	6	1.000E+00	1.121E+02	0.2404	291.00
7	1.400E+00	1.117E+02	0.2404	291.00	8	1.900E+00	1.113E+02	0.2405	291.00
9	2.500E+00	1.107E+02	0.2405	291.00	10	3.300E+00	1.100E+02	0.2406	291.00
11	4.400E+00	1.090E+02	0.2406	291.00	12	5.700E+00	1.080E+02	0.2407	291.00
13	7.500E+00	1.066E+02	0.2408	291.00	14	9.900E+00	1.050E+02	0.2409	291.00
15	1.300E+01	1.034E+02	0.2410	291.00	16	1.500E+01	1.025E+02	0.2410	291.00
17	1.700E+01	1.018E+02	0.2410	291.00	18	1.900E+01	1.013E+02	0.2409	291.00
19	2.200E+01	1.009E+02	0.2407	291.00	20	2.500E+01	1.010E+02	0.2405	291.00
21	2.700E+01	1.014E+02	0.2402	291.00	22	2.850E+01	1.018E+02	0.2400	291.00
23	2.950E+01	1.022E+02	0.2399	291.00	24	3.000E+01	1.025E+02	0.2398	291.00
25	3.030E+01	1.026E+02	0.2397	291.00	26	3.040E+01	1.027E+02	0.2397	291.00
27	3.050E+01	1.027E+02	0.2397	291.00	28	3.060E+01	1.030E+02	0.2928	291.00
29	3.080E+01	1.046E+02	0.2920	291.00	30	3.110E+01	1.074E+02	0.2905	291.00
31	3.160E+01	1.127E+02	0.2879	291.00	32	3.240E+01	1.240E+02	0.2831	291.00
33	3.360E+01	1.496E+02	0.2752	291.00	34	3.540E+01	2.183E+02	0.2629	291.00
35	3.810E+01	4.472E+02	0.2404	291.00	36	4.120E+01	8.749E+02	0.2220	291.00
37	4.400E+01	1.341E+03	0.2004	291.00	38	4.700E+01	1.827E+03	0.1827	291.00
39	5.000E+01	2.297E+03	0.1706	291.00	40	5.500E+01	3.166E+03	0.1553	291.00
41	6.200E+01	8.144E+03	0.1193	291.00	42	7.200E+01	1.455E+04	0.1029	291.00
43	8.200E+01	1.499E+04	0.1022	291.00	44	9.200E+01	1.500E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 18.2324 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number =	2	41	46
Depth (cm) =	0.20000	62.00000	106.68000
Water (cm3/cm3) =	0.23558	0.11963	0.10219
Head (cm) =	1.83456E+02	8.06797E+03	1.49999E+04
LiqWater Flow (cm) =	-1.64880E-02	2.82637E-04	1.66623E-07
IsoVapor Flow (cm) =	-4.59469E-09	2.70342E-05	0.00000E+00
Plant Sink (cm) =	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
18.2324+	0.0000+	0.0000 -	0.0175-	0.0000-	0.0000 =	18.2148 vs.	18.1879

```
Mass Balance =  2.6961E-02 cm;  Time step attempts =  968 and successes =  903
  Evaporation:  Potential =  0.0175 cm, Actual =  0.0175 cm
Transpiration:  Potential =  0.1579 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 365, Simulated Time = 24.0000 hr
-------------
Node Number        =        2          41          46
Depth (cm)         =     0.20000    62.00000   106.68000
Water (cm3/cm3)    =     0.21223     0.10431     0.10220
Head (cm)          = 9.71538E+02 1.37936E+04 1.49973E+04
LiqWater Flow (cm)=-2.09041E-02 1.64300E-05 1.66710E-07
IsoVapor Flow (cm)=-5.97424E-08 3.56999E-06 0.00000E+00
Plant Sink (cm)    = 4.10489E-04 1.21497E-04 0.00000E+00

                                                LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS       DRAIN     NEWSTOR        STORAGE
 16.3130+ 0.0000+ 0.0000 - 0.0215- 0.0768-  0.0000 =   16.2147 vs.    16.2147

Mass Balance = -1.4914E-06 cm;  Time step attempts =  479 and successes =  432
  Evaporation:  Potential =  0.0215 cm, Actual =  0.0215 cm
Transpiration:  Potential =  0.1934 cm, Actual =  0.0768 cm
1

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                              UNSAT-H Version 3.01
                               SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.6543E+02     [cm]
Potential Transpiration               =  1.4889E+02     [cm]
Actual Transpiration                  =  3.7846E+01     [cm]
Potential Evaporation                 =  1.6543E+01     [cm]
Actual Evaporation                    =  1.1000E+01     [cm]
Evaporation during Growth             =  1.1000E+01     [cm]
Total Runoff                          =  3.3505E+01     [cm]
Total Infiltration                    =  4.6861E+01     [cm]
Total Basal Liquid Flux (drainage)    =  6.0833E-05     [cm]
Total Basal Vapor Flux (temp-grad)    =  0.0000E+00     [cm]
Total Applied Water                   =  8.0366E+01     [cm]
Actual Rainfall                       =  8.0366E+01     [cm]
Actual Irrigation                     =  0.0000E+00     [cm]
Total Final Moisture Storage          =  1.6215E+01     [cm]
Mass Balance Error                    =  3.1437E-02     [cm]
Total Successful Time Steps           =   1544661
Total Attempted Time Steps            =   1636691
Total Time Step Reductions (DHMAX)    =         0
Total Changes in Surface Boundary     =    317636
Total Time Actually Simulated         =  3.6500E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6500E+02 days:

   DEPTH         FLOW        DEPTH         FLOW       DEPTH         FLOW
  --------   -----------   --------   -----------   --------   -----------
```

0.000	3.5860E+01	0.100	3.7716E+01	0.250	3.7055E+01
0.400	3.6647E+01	0.600	3.6169E+01	0.850	3.5693E+01
1.200	3.5167E+01	1.650	3.4597E+01	2.200	3.3986E+01
2.900	3.3248E+01	3.850	3.2258E+01	5.050	3.1028E+01
6.600	2.9497E+01	8.700	2.7485E+01	11.450	2.4952E+01
14.000	2.2729E+01	16.000	2.1049E+01	18.000	1.9433E+01
20.500	1.7491E+01	23.500	1.5294E+01	26.000	1.3567E+01
27.750	1.2404E+01	29.000	1.1596E+01	29.750	1.1120E+01
30.150	1.0868E+01	30.350	1.0743E+01	30.450	1.0681E+01
30.550	1.0619E+01	30.700	1.0532E+01	30.950	1.0384E+01
31.350	1.0147E+01	32.000	9.7631E+00	33.000	9.1808E+00
34.500	8.3373E+00	36.750	7.1598E+00	39.650	5.8286E+00
42.600	4.6863E+00	45.500	3.6972E+00	48.500	2.8144E+00
52.500	1.8486E+00	58.500	9.8015E-01	67.000	2.5462E-01
77.000	2.3194E-02	87.000	1.7627E-03	97.000	1.8226E-04
104.340	6.8872E-05	106.680	6.0833E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.4323E-01	0.300	1.4392E-01
0.500	1.9372E-01	0.700	2.4425E-01	1.000	3.4544E-01
1.400	4.4929E-01	1.900	5.5505E-01	2.500	7.1237E-01
3.300	9.7135E-01	4.400	1.2241E+00	5.700	1.5627E+00
7.500	2.0674E+00	9.900	2.6080E+00	13.000	2.2932E+00
15.000	1.7346E+00	17.000	1.6710E+00	19.000	2.0110E+00
22.000	2.2796E+00	25.000	1.7956E+00	27.000	1.2113E+00
28.500	8.4202E-01	29.500	4.9630E-01	30.000	2.6238E-01
30.300	1.3051E-01	30.400	6.5143E-02	30.500	6.5031E-02
30.600	9.9509E-02	30.800	1.6581E-01	31.100	2.6476E-01
31.600	4.2729E-01	32.400	6.4561E-01	33.600	9.3212E-01
35.400	1.2994E+00	38.100	1.4670E+00	41.200	1.2627E+00
44.000	1.0654E+00	47.000	9.3039E-01	50.000	1.0221E+00
55.000	1.0747E+00	62.000	8.5098E-01	72.000	2.3521E-01
82.000	2.3054E-02	92.000	1.6871E-03	102.000	1.0548E-04
106.680	0.0000E+00				

UNSAT-H Version 3.01
INITIAL CONDITIONS

Input File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc.inp
Results File: P:\Solid waste\WC\Turkey Creek\Expansion 2021\Part III-SDP\App IIIJ\App IIIJ-C\App IIIJ-C-B\UNSAT-H\tc2020.res
Date of Run: 19 Jul 2021
Time of Run: 12:40:18.16
Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover

NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)	NODE	DEPTH (cm)	Initial Conditions HEAD (cm)	THETA (vol.)	TEMP (K)
1	0.000E+00	9.720E+02	0.2122	291.00	2	2.000E-01	9.715E+02	0.2122	291.00
3	3.000E-01	9.713E+02	0.2122	291.00	4	5.000E-01	9.709E+02	0.2122	291.00
5	7.000E-01	9.705E+02	0.2123	291.00	6	1.000E+00	9.699E+02	0.2123	291.00
7	1.400E+00	9.691E+02	0.2123	291.00	8	1.900E+00	9.681E+02	0.2123	291.00
9	2.500E+00	9.669E+02	0.2123	291.00	10	3.300E+00	9.652E+02	0.2124	291.00
11	4.400E+00	9.630E+02	0.2124	291.00	12	5.700E+00	9.604E+02	0.2124	291.00
13	7.500E+00	9.570E+02	0.2125	291.00	14	9.900E+00	9.529E+02	0.2125	291.00
15	1.300E+01	9.486E+02	0.2126	291.00	16	1.500E+01	9.464E+02	0.2126	291.00
17	1.700E+01	9.448E+02	0.2126	291.00	18	1.900E+01	9.439E+02	0.2125	291.00
19	2.200E+01	9.437E+02	0.2125	291.00	20	2.500E+01	9.450E+02	0.2124	291.00
21	2.700E+01	9.467E+02	0.2124	291.00	22	2.850E+01	9.483E+02	0.2124	291.00
23	2.950E+01	9.496E+02	0.2124	291.00	24	3.000E+01	9.504E+02	0.2124	291.00
25	3.030E+01	9.508E+02	0.2124	291.00	26	3.040E+01	9.510E+02	0.2124	291.00
27	3.050E+01	9.511E+02	0.2124	291.00	28	3.060E+01	9.518E+02	0.2199	291.00
29	3.080E+01	9.568E+02	0.2198	291.00	30	3.110E+01	9.647E+02	0.2196	291.00
31	3.160E+01	9.790E+02	0.2192	291.00	32	3.240E+01	1.004E+03	0.2184	291.00
33	3.360E+01	1.057E+03	0.2151	291.00	34	3.540E+01	1.185E+03	0.2079	291.00
35	3.810E+01	1.520E+03	0.1930	291.00	36	4.120E+01	1.892E+03	0.1808	291.00
37	4.400E+01	2.152E+03	0.1740	291.00	38	4.700E+01	2.499E+03	0.1664	291.00
39	5.000E+01	3.101E+03	0.1562	291.00	40	5.500E+01	7.773E+03	0.1208	291.00
41	6.200E+01	1.379E+04	0.1043	291.00	42	7.200E+01	1.463E+04	0.1028	291.00
43	8.200E+01	1.490E+04	0.1024	291.00	44	9.200E+01	1.498E+04	0.1022	291.00
45	1.020E+02	1.500E+04	0.1022	291.00	46	1.067E+02	1.500E+04	0.1022	291.00

Initial Water Storage = 16.2147 cm

NOTE: There are no temperature data when plants are modelled.

DAILY SUMMARY: Day = 1, Simulated Time = 24.0000 hr

Node Number	=	2	41	46
Depth (cm)	=	0.20000	62.00000	106.68000
Water (cm3/cm3)	=	0.21051	0.10436	0.10220
Head (cm)	=	1.04256E+03	1.37663E+04	1.49972E+04
LiqWater Flow (cm)	=	-1.32672E-02	1.69486E-05	1.66710E-07
IsoVapor Flow (cm)	=	-5.35742E-08	3.67440E-06	0.00000E+00
Plant Sink (cm)	=	0.00000E+00	0.00000E+00	0.00000E+00

PRESTOR	INFIL	RUNOFF	EVAPO	TRANS	LIQUID DRAIN	NEWSTOR	STORAGE
16.2147+	0.0000+	0.0000 -	0.0136-	0.0000-	0.0000 =	16.2011 vs.	16.1830

```
Mass Balance =  1.8067E-02 cm;  Time step attempts =  309 and successes =  261
  Evaporation:  Potential =  0.0136 cm, Actual =  0.0136 cm
Transpiration:  Potential =  0.1224 cm, Actual =  0.0000 cm

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DAILY SUMMARY:  Day = 366, Simulated Time = 24.0000 hr
-------------
Node Number       =       2          41          46
Depth (cm)        =     0.20000    62.00000   106.68000
Water (cm3/cm3)   =     0.19644     0.10525     0.10220
Head (cm)         = 1.64092E+03 1.32997E+04 1.49988E+04
LiqWater Flow (cm)= 1.39938E-01 3.04793E-05 1.66659E-07
IsoVapor Flow (cm)=-1.12558E-06 6.40776E-06 0.00000E+00
Plant Sink (cm)   = 0.00000E+00 0.00000E+00 0.00000E+00

                                                LIQUID
 PRESTOR   INFIL  RUNOFF    EVAPO   TRANS    DRAIN     NEWSTOR       STORAGE
 15.0999+ 0.2540+ 0.0000 - 0.1139- 0.0000-  0.0000 =   15.2400 vs.   15.2400

Mass Balance =  2.1161E-06 cm;  Time step attempts = 7239 and successes = 7027
  Evaporation:  Potential =  0.1174 cm, Actual =  0.1139 cm
Transpiration:  Potential =  0.0000 cm, Actual =  0.0000 cm
1

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                            UNSAT-H Version 3.01
                             SIMULATION SUMMARY

Title:
Turkey Creek Landfill: 30 year run for ET alternative final cover
-------------------------------------------------------------------------------

Transpiration Scheme is:              =    1
Potential Evapotranspiration          =  1.6984E+02     [cm]
Potential Transpiration               =  1.5275E+02     [cm]
Actual Transpiration                  =  3.5655E+01     [cm]
Potential Evaporation                 =  1.7089E+01     [cm]
Actual Evaporation                    =  1.0303E+01     [cm]
Evaporation during Growth             =  1.0303E+01     [cm]
Total Runoff                          =  4.3429E+01     [cm]
Total Infiltration                    =  4.5014E+01     [cm]
Total Basal Liquid Flux (drainage)    =  6.1012E-05     [cm]
Total Basal Vapor Flux (temp-grad)    =  0.0000E+00     [cm]
Total Applied Water                   =  8.8443E+01     [cm]
Actual Rainfall                       =  8.8443E+01     [cm]
Actual Irrigation                     =  0.0000E+00     [cm]
Total Final Moisture Storage          =  1.5240E+01     [cm]
Mass Balance Error                    =  3.0552E-02     [cm]
Total Successful Time Steps           =   1357022
Total Attempted Time Steps            =   1439908
Total Time Step Reductions (DHMAX)    =         0
Total Changes in Surface Boundary     =    340263
Total Time Actually Simulated         =  3.6600E+02     [days]


Total liquid water flow (cm) across different depths at the end of 3.6600E+02 days:

   DEPTH         FLOW        DEPTH         FLOW        DEPTH         FLOW
  --------    -----------   --------    -----------   --------    -----------
```

0.000	3.4710E+01	0.100	3.6200E+01	0.250	3.5646E+01
0.400	3.5344E+01	0.600	3.4990E+01	0.850	3.4627E+01
1.200	3.4183E+01	1.650	3.3657E+01	2.200	3.3039E+01
2.900	3.2298E+01	3.850	3.1366E+01	5.050	3.0213E+01
6.600	2.8755E+01	8.700	2.6851E+01	11.450	2.4449E+01
14.000	2.2333E+01	16.000	2.0733E+01	18.000	1.9192E+01
20.500	1.7339E+01	23.500	1.5241E+01	26.000	1.3590E+01
27.750	1.2477E+01	29.000	1.1703E+01	29.750	1.1246E+01
30.150	1.1005E+01	30.350	1.0885E+01	30.450	1.0825E+01
30.550	1.0766E+01	30.700	1.0680E+01	30.950	1.0531E+01
31.350	1.0293E+01	32.000	9.9067E+00	33.000	9.3153E+00
34.500	8.4412E+00	36.750	7.1753E+00	39.650	5.6547E+00
42.600	4.2908E+00	45.500	3.1506E+00	48.500	2.2074E+00
52.500	1.2587E+00	58.500	4.0836E-01	67.000	4.1522E-02
77.000	3.0390E-03	87.000	3.8536E-04	97.000	1.0579E-04
104.340	5.6243E-05	106.680	6.1012E-05		

Total plant water uptake (cm) at different depths:

DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE	DEPTH	WATER UPTAKE
0.000	0.0000E+00	0.200	1.3446E-01	0.300	1.3506E-01
0.500	1.8156E-01	0.700	2.2851E-01	1.000	3.2250E-01
1.400	4.1814E-01	1.900	5.1466E-01	2.500	6.5767E-01
3.300	8.9439E-01	4.400	1.1271E+00	5.700	1.4442E+00
7.500	1.9213E+00	9.900	2.4348E+00	13.000	2.1481E+00
15.000	1.6273E+00	17.000	1.5699E+00	19.000	1.8921E+00
22.000	2.1503E+00	25.000	1.6992E+00	27.000	1.1488E+00
28.500	7.9986E-01	29.500	4.7201E-01	30.000	2.4970E-01
30.300	1.2425E-01	30.400	6.2027E-02	30.500	6.1929E-02
30.600	9.4950E-02	30.800	1.5863E-01	31.100	2.5432E-01
31.600	4.1325E-01	32.400	6.3166E-01	33.600	9.2927E-01
35.400	1.3325E+00	38.100	1.5703E+00	41.200	1.3967E+00
44.000	1.1770E+00	47.000	9.9204E-01	50.000	1.0190E+00
55.000	8.5121E-01	62.000	3.6363E-01	72.000	4.5255E-02
82.000	4.4231E-03	92.000	5.7445E-04	102.000	8.8890E-05
106.680	0.0000E+00				

APPENDIX IIIJ-B-B

PRECIPITATION AND EVAPOTRANSPIRATION DATA SUMMARY

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Includes pages IIIJ-B-B-1 through IIIJ-B-B-176

SUMMARY

This appendix (Appendix IIIJ-B-B) includes the weather data used in the UNSAT-H model simulation presented in Appendix IIIJ-B. The weather data included in this appendix was taken from the NOAA Cleburne Weather Station, Burleson Weather Station, Whitney Dam Weather Station, and Benbrook Dam Weather Station due to their close proximity to the Turkey Creek landfill. Data from 1991 through 2020 was used in the modeling and was obtained from the National Climatic Data Center (NCDC) (http://www.ncdc.noaa.gov/oa/ncdc.html).

The hourly precipitation totals for each year from 1991 through 2020 are listed on pages IIIJ-B-B-3 through IIIJ-B-B-145. The data shown are in the format which the UNSAT-H program uses. For example, on page IIIJ-B-B-3, the number listed on the left side of the top line followed by a comma represents the number of days within the year that recorded a precipitation value. To the right on the top line, the specific year along with the total rainfall in centimeters for that year is listed in parentheses. After the top line, each set of three lines represent one water application event. On the first line of each set, the number to the left is the day on which it rained followed by the type of water application ("1" indicates a rainfall application), the number of times during the day that the water application rate changes (generally this will be 2 for each daily rainfall event to indicate the start and end of the rainfall event), and the efficiency of the rainfall scheme (i.e., how much of the water actually gets onto the soil surface). The second line of each set represents the starting hour it rained followed by the total amount of rainfall in centimeters. The third line of each set represents the ending hour followed by zero to indicate that the rainfall event is over for that day. The rest of the rainfall events are entered in the same manner.

Daily evapotranspiration totals have been generated using NCDC evaporation data. Daily evapotranspiration totals for each year from 1991 through 2020 are listed on pages IIIJ-B-B-147 through IIIJ-B-B-176 with the specific year listed on the top of the page for the beginning of each year of data. As shown on page IIIJ-B-B-147, the evapotranspiration total for the first day of the year is entered in the top left hand corner. The following days are input from left to right in 8 day rows. The evapotranspiration data for the rest of the years are input in the same manner. The files shown on pages IIIJ-B-B-147 through IIIJ-B-B-176 are the actual input files used in the UNSAT-H model with the header and page number added.

CLEBURNE AND BURLESON RAINFALL DATA

(1991 THROUGH 2020)

```
  98,                NWATER (Total for 1991 =  139.9032cm)
   2,    1,    2,1.000,
 0.0, 0.0508,
 1.0, 0.0000,
   4,    1,    2,1.000,
16.0, 0.0508,
17.0, 0.0000,
   5,    1,    2,1.000,
 4.0, 0.4318,
13.0, 0.0000,
  6,   1,   2,1.000,
 6.0, 0.8890,
21.0, 0.0000,
   9,    1,    2,1.000,
 8.0, 1.4732,
12.0, 0.0000,
  10,    1,    2,1.000,
11.0, 1.2954,
14.0, 0.0000,
  15,    1,    2,1.000,
16.0, 0.5334,
17.0, 0.0000,
  17,    1,    2,1.000,
 9.0, 0.2286,
10.0, 0.0000,
  18,    1,    2,1.000,
16.0, 3.2512,
18.0, 0.0000,
  19,    1,    2,1.000,
17.0, 0.7874,
18.0, 0.0000,
  24,    1,    2,1.000,
21.0, 0.5334,
22.0, 0.0000,
  30,    1,    2,1.000,
23.0, 0.4572,
24.0, 0.0000,
  35,    1,    2,1.000,
 9.0, 1.7272,
10.0, 0.0000,
  36,    1,    2,1.000,
 0.0, 0.5080,
 1.0, 0.0000,
  37,    1,    2,1.000,
 7.0, 0.0762,
 8.0, 0.0000,
  43,    1,    2,1.000,
10.0, 0.0508,
11.0, 0.0000,
  48,    1,    2,1.000,
 9.0, 0.1524,
10.0, 0.0000,
  52,    1,    2,1.000,
 7.0, 0.1778,
```

```
  9.0, 0.0000,
   53,    1,    2,1.000,
  8.0, 1.3970,
  9.0, 0.0000,
   60,    1,    2,1.000,
  7.0, 0.6604,
  8.0, 0.0000,
   61,    1,    2,1.000,
  6.0, 0.0254,
  7.0, 0.0000,
   74,    1,    2,1.000,
  9.0, 0.0762,
 10.0, 0.0000,
   75,    1,    2,1.000,
 15.0, 0.0762,
 16.0, 0.0000,
   76,    1,    2,1.000,
 14.0, 0.1778,
 15.0, 0.0000,
   81,    1,    2,1.000,
  2.0, 0.1016,
  3.0, 0.0000,
   86,    1,    2,1.000,
  3.0, 1.4478,
  4.0, 0.0000,
   94,    1,    2,1.000,
  8.0, 0.2286,
  9.0, 0.0000,
   97,    1,    2,1.000,
 10.0, 0.0254,
 11.0, 0.0000,
  101,    1,    2,1.000,
 21.0, 0.2540,
 22.0, 0.0000,
  103,    1,    2,1.000,
  5.0,16.3322,
 14.0, 0.0000,
  107,    1,    2,1.000,
 15.0, 1.9050,
 17.0, 0.0000,
  108,    1,    2,1.000,
 15.0, 0.0508,
 17.0, 0.0000,
  114,    1,    2,1.000,
 19.0, 2.1844,
 24.0, 0.0000,
  118,    1,    2,1.000,
 11.0, 1.8034,
 13.0, 0.0000,
  122,    1,    2,1.000,
 16.0, 0.3048,
 17.0, 0.0000,
  123,    1,    2,1.000,
  8.0, 0.1778,
```

```
  9.0, 0.0000,
  124,    1,    2,1.000,
 15.0, 0.7874,
 20.0, 0.0000,
  128,    1,    2,1.000,
  3.0, 4.1148,
  7.0, 0.0000,
  134,    1,    2,1.000,
 13.0, 1.4732,
 15.0, 0.0000,
  138,    1,    2,1.000,
 15.0, 2.3622,
 18.0, 0.0000,
  139,    1,    2,1.000,
  7.0, 0.0508,
  8.0, 0.0000,
  140,    1,    2,1.000,
 10.0, 0.2286,
 11.0, 0.0000,
  145,    1,    2,1.000,
  5.0, 2.8448,
  8.0, 0.0000,
  154,    1,    2,1.000,
 19.0, 5.2324,
 21.0, 0.0000,
  158,    1,    2,1.000,
  5.0, 0.7874,
  8.0, 0.0000,
  161,    1,    2,1.000,
  4.0, 0.0762,
  5.0, 0.0000,
  166,    1,    2,1.000,
  3.0, 0.9398,
 10.0, 0.0000,
  167,    1,    2,1.000,
 11.0, 1.0414,
 16.0, 0.0000,
  180,    1,    2,1.000,
 15.0, 0.0508,
 16.0, 0.0000,
  184,    1,    2,1.000,
 14.0, 0.0508,
 15.0, 0.0000,
  206,    1,    2,1.000,
  7.0, 0.1524,
  8.0, 0.0000,
  207,    1,    2,1.000,
  3.0, 0.1270,
  4.0, 0.0000,
  209,    1,    2,1.000,
 20.0, 2.6416,
 21.0, 0.0000,
  222,    1,    2,1.000,
 11.0, 1.0668,
```

```
12.0, 0.0000,
 223,   1,   2,1.000,
11.0, 0.9906,
12.0, 0.0000,
 224,   1,   2,1.000,
 4.0, 3.6576,
 6.0, 0.0000,
 225,   1,   2,1.000,
19.0, 0.1524,
21.0, 0.0000,
 226,   1,   2,1.000,
 5.0, 6.5786,
13.0, 0.0000,
 233,   1,   2,1.000,
 4.0, 0.1016,
 5.0, 0.0000,
 242,   1,   2,1.000,
 3.0, 1.0414,
 7.0, 0.0000,
 243,   1,   2,1.000,
15.0, 0.6096,
16.0, 0.0000,
 244,   1,   2,1.000,
12.0, 0.4064,
13.0, 0.0000,
 247,   1,   2,1.000,
13.0, 0.0762,
14.0, 0.0000,
 249,   1,   2,1.000,
19.0, 1.0668,
22.0, 0.0000,
 250,   1,   2,1.000,
16.0, 2.4384,
21.0, 0.0000,
 258,   1,   2,1.000,
16.0, 0.0254,
17.0, 0.0000,
 259,   1,   2,1.000,
16.0, 0.1524,
17.0, 0.0000,
 260,   1,   2,1.000,
12.0, 1.4224,
13.0, 0.0000,
 261,   1,   2,1.000,
12.0, 1.8796,
14.0, 0.0000,
 262,   1,   2,1.000,
13.0, 2.3114,
16.0, 0.0000,
 266,   1,   2,1.000,
 8.0, 0.0254,
 9.0, 0.0000,
 267,   1,   2,1.000,
 2.0, 0.1524,
```

```
  5.0, 0.0000,
  277,    1,    2,1.000,
  7.0, 0.0254,
  8.0, 0.0000,
  299,    1,    2,1.000,
  7.0, 4.3942,
 11.0, 0.0000,
  300,    1,    2,1.000,
  0.0, 4.3942,
  2.0, 0.0000,
  301,    1,    2,1.000,
  6.0, 5.1054,
 18.0, 0.0000,
  302,    1,    2,1.000,
  3.0, 6.8072,
 14.0, 0.0000,
  303,    1,    2,1.000,
  4.0, 0.3048,
  6.0, 0.0000,
  304,    1,    2,1.000,
  5.0, 1.8542,
 14.0, 0.0000,
  318,    1,    2,1.000,
 20.0, 0.0254,
 21.0, 0.0000,
  319,    1,    2,1.000,
 18.0, 0.0254,
 19.0, 0.0000,
  320,    1,    2,1.000,
 19.0, 0.3302,
 21.0, 0.0000,
  321,    1,    2,1.000,
  2.0, 1.3208,
 16.0, 0.0000,
  323,    1,    2,1.000,
  9.0, 1.9050,
 16.0, 0.0000,
  334,    1,    2,1.000,
 14.0, 0.0254,
 15.0, 0.0000,
  335,    1,    2,1.000,
  7.0, 0.2794,
  9.0, 0.0000,
  336,    1,    2,1.000,
 13.0, 1.2446,
 22.0, 0.0000,
  342,    1,    2,1.000,
 22.0, 0.1016,
 23.0, 0.0000,
  343,    1,    2,1.000,
  0.0, 2.5654,
 12.0, 0.0000,
  345,    1,    2,1.000,
 13.0, 1.0414,
```

```
19.0, 0.0000,
 346,   1,   2,1.000,
 7.0, 0.1270,
 8.0, 0.0000,
 352,   1,   2,1.000,
 8.0, 0.5588,
19.0, 0.0000,
 353,   1,   2,1.000,
 0.0, 2.5654,
18.0, 0.0000,
 354,   1,   2,1.000,
 7.0,12.7508,
24.0, 0.0000,
 355,   1,   2,1.000,
 5.0, 2.5908,
13.0, 0.0000,
 356,   1,   2,1.000,
 4.0, 0.5588,
13.0, 0.0000,
 360,   1,   2,1.000,
 7.0, 0.7874,
15.0, 0.0000,
 361,   1,   2,1.000,
 1.0, 0.2540,
 2.0, 0.0000,
```

```
   93,                NWATER (Total for 1992 = 92.6592 cm)
    1,    1,    2,1.000,
  3.0, 0.5334,
 10.0, 0.0000,
    2,    1,    2,1.000,
 18.0, 0.0254,
 19.0, 0.0000,
    5,    1,    2,1.000,
 17.0, 0.3302,
 19.0, 0.0000,
   7,    1,    2,1.000,
  8.0, 0.1778,
  9.0, 0.0000,
   11,    1,    2,1.000,
  6.0, 0.1778,
  7.0, 0.0000,
   12,    1,    2,1.000,
  4.0, 0.0762,
  5.0, 0.0000,
   13,    1,    2,1.000,
 14.0, 0.1778,
 15.0, 0.0000,
   17,    1,    2,1.000,
 17.0, 0.5080,
 24.0, 0.0000,
   18,    1,    2,1.000,
  1.0, 1.7018,
 14.0, 0.0000,
   21,    1,    2,1.000,
 17.0, 0.7366,
 23.0, 0.0000,
   22,    1,    2,1.000,
  2.0, 0.3556,
  4.0, 0.0000,
   26,    1,    2,1.000,
 16.0, 1.6002,
 24.0, 0.0000,
   27,    1,    2,1.000,
  0.0, 1.4986,
  6.0, 0.0000,
   28,    1,    2,1.000,
 11.0, 0.2286,
 12.0, 0.0000,
   34,    1,    2,1.000,
  3.0, 1.3970,
 17.0, 0.0000,
   35,    1,    2,1.000,
  2.0, 1.3716,
 14.0, 0.0000,
   42,    1,    2,1.000,
  5.0, 0.5588,
  9.0, 0.0000,
   43,    1,    2,1.000,
 23.0, 0.4318,
```

```
24.0, 0.0000,
  45,    1,    2,1.000,
 9.0, 0.1778,
10.0, 0.0000,
  53,    1,    2,1.000,
22.0, 0.8382,
24.0, 0.0000,
  55,    1,    2,1.000,
 3.0, 3.0988,
14.0, 0.0000,
  56,    1,    2,1.000,
 1.0, 1.8288,
 4.0, 0.0000,
  63,    1,    2,1.000,
22.0, 0.1016,
24.0, 0.0000,
  64,    1,    2,1.000,
 0.0, 3.0226,
18.0, 0.0000,
  69,    1,    2,1.000,
 2.0, 1.7526,
13.0, 0.0000,
  77,    1,    2,1.000,
23.0, 0.0762,
24.0, 0.0000,
  78,    1,    2,1.000,
 0.0, 0.0762,
 1.0, 0.0000,
  81,    1,    2,1.000,
 4.0, 0.0254,
 5.0, 0.0000,
  88,    1,    2,1.000,
16.0, 0.3556,
18.0, 0.0000,
  93,    1,    2,1.000,
 8.0, 0.7366,
12.0, 0.0000,
  97,    1,    2,1.000,
 0.0, 0.6350,
 7.0, 0.0000,
 108,    1,    2,1.000,
12.0, 0.1016,
13.0, 0.0000,
 110,    1,    2,1.000,
 7.0, 0.7620,
10.0, 0.0000,
 111,    1,    2,1.000,
 5.0, 0.1778,
 6.0, 0.0000,
 118,    1,    2,1.000,
20.0, 0.0762,
21.0, 0.0000,
 120,    1,    2,1.000,
 0.0, 1.2446,
```

```
  2.0, 0.0000,
  137,    1,    2,1.000,
  7.0, 2.1844,
 12.0, 0.0000,
  138,    1,    2,1.000,
 12.0, 1.2192,
 15.0, 0.0000,
  139,    1,    2,1.000,
  0.0, 0.6096,
  7.0, 0.0000,
  140,    1,    2,1.000,
  9.0, 0.8890,
 10.0, 0.0000,
  142,    1,    2,1.000,
 15.0, 2.5908,
 24.0, 0.0000,
  146,    1,    2,1.000,
  6.0, 3.4798,
 17.0, 0.0000,
  147,    1,    2,1.000,
  3.0, 0.0508,
  4.0, 0.0000,
  149,    1,    2,1.000,
  5.0, 1.9050,
 16.0, 0.0000,
  151,    1,    2,1.000,
  5.0, 0.0762,
  6.0, 0.0000,
  152,    1,    2,1.000,
 14.0, 0.1016,
 15.0, 0.0000,
  153,    1,    2,1.000,
 16.0, 0.2540,
 17.0, 0.0000,
  154,    1,    2,1.000,
  1.0, 6.1722,
 20.0, 0.0000,
  158,    1,    2,1.000,
  1.0, 0.9652,
  7.0, 0.0000,
  163,    1,    2,1.000,
  4.0, 2.2352,
 14.0, 0.0000,
  173,    1,    2,1.000,
  8.0, 1.9050,
 10.0, 0.0000,
  176,    1,    2,1.000,
 11.0, 0.4572,
 12.0, 0.0000,
  177,    1,    2,1.000,
 21.0, 0.0508,
 22.0, 0.0000,
  178,    1,    2,1.000,
  1.0, 1.5240,
```

```
  8.0, 0.0000,
  179,    1,   2,1.000,
 20.0, 0.1270,
 21.0, 0.0000,
  180,    1,   2,1.000,
  5.0, 2.1336,
 21.0, 0.0000,
  181,    1,   2,1.000,
  8.0, 1.9812,
 17.0, 0.0000,
  185,    1,   2,1.000,
  8.0, 0.1270,
  9.0, 0.0000,
  197,    1,   2,1.000,
 20.0, 0.3302,
 22.0, 0.0000,
  200,    1,   2,1.000,
 16.0, 0.2794,
 18.0, 0.0000,
  202,    1,   2,1.000,
  9.0, 3.4290,
 17.0, 0.0000,
  209,    1,   2,1.000,
 17.0, 0.1524,
 18.0, 0.0000,
  210,    1,   2,1.000,
  1.0, 0.9398,
  9.0, 0.0000,
  214,    1,   2,1.000,
 20.0, 0.0762,
 21.0, 0.0000,
  215,    1,   2,1.000,
 21.0, 0.5334,
 23.0, 0.0000,
  216,    1,   2,1.000,
  5.0, 0.4064,
  7.0, 0.0000,
  225,    1,   2,1.000,
 11.0, 0.5080,
 12.0, 0.0000,
  232,    1,   2,1.000,
  3.0, 2.2860,
 17.0, 0.0000,
  245,    1,   2,1.000,
  1.0, 1.1430,
 18.0, 0.0000,
  254,    1,   2,1.000,
 14.0, 0.7620,
 15.0, 0.0000,
  265,    1,   2,1.000,
  0.0, 0.0254,
  1.0, 0.0000,
  281,    1,   2,1.000,
 17.0, 0.5842,
```

```
19.0, 0.0000,
 300,   1,   2,1.000,
 0.0, 0.1016,
 1.0, 0.0000,
 304,   1,   2,1.000,
 2.0, 0.2794,
 4.0, 0.0000,
 306,   1,   2,1.000,
 1.0, 3.1242,
20.0, 0.0000,
 314,   1,   2,1.000,
 7.0, 0.1016,
 8.0, 0.0000,
 315,   1,   2,1.000,
15.0, 1.3208,
19.0, 0.0000,
 316,   1,   2,1.000,
11.0, 0.1270,
12.0, 0.0000,
 317,   1,   2,1.000,
14.0, 0.1524,
15.0, 0.0000,
 324,   1,   2,1.000,
 2.0, 3.0226,
20.0, 0.0000,
 325,   1,   2,1.000,
 4.0, 0.1270,
 5.0, 0.0000,
 326,   1,   2,1.000,
10.0, 0.9652,
13.0, 0.0000,
 327,   1,   2,1.000,
 7.0, 0.0508,
 8.0, 0.0000,
 329,   1,   2,1.000,
 6.0, 1.7526,
16.0, 0.0000,
 340,   1,   2,1.000,
 2.0, 0.1270,
 3.0, 0.0000,
 343,   1,   2,1.000,
13.0, 0.1524,
14.0, 0.0000,
 344,   1,   2,1.000,
 1.0, 0.9652,
15.0, 0.0000,
 348,   1,   2,1.000,
11.0, 0.9144,
20.0, 0.0000,
 349,   1,   2,1.000,
 0.0, 6.6294,
24.0, 0.0000,
 350,   1,   2,1.000,
 0.0, 2.8702,
```

```
12.0, 0.0000,
 352,    1,    2,1.000,
 5.0, 0.1778,
 6.0, 0.0000,
 355,    1,    2,1.000,
15.0, 0.2286,
16.0, 0.0000,
 364,    1,    2,1.000,
20.0, 0.0254,
21.0, 0.0000,
 366,    1,    2,1.000,
 4.0, 0.5080,
 5.0, 0.0000,
```

```
    79,                 NWATER (Total for 1993 =  79.0448 cm)
     1,    1,    2,1.000,
   5.0, 0.5080,
   6.0, 0.0000,
     2,    1,    2,1.000,
   6.0, 0.1270,
   7.0, 0.0000,
     3,    1,    2,1.000,
   4.0, 0.1016,
   5.0, 0.0000,
    4,    1,    2,1.000,
   9.0, 0.2032,
  10.0, 0.0000,
    6,    1,    2,1.000,
  14.0, 0.3556,
  16.0, 0.0000,
     7,    1,    2,1.000,
  17.0, 0.0762,
  18.0, 0.0000,
     9,    1,    2,1.000,
   2.0, 1.1938,
  12.0, 0.0000,
    11,    1,    2,1.000,
   8.0, 0.2540,
   9.0, 0.0000,
    12,    1,    2,1.000,
   4.0, 0.0508,
   5.0, 0.0000,
    19,    1,    2,1.000,
   6.0, 0.9652,
  20.0, 0.0000,
    20,    1,    2,1.000,
   9.0, 0.8382,
  13.0, 0.0000,
    23,    1,    2,1.000,
   9.0, 0.0508,
  10.0, 0.0000,
    28,    1,    2,1.000,
  16.0, 0.3810,
  18.0, 0.0000,
    29,    1,    2,1.000,
   1.0, 1.0922,
   9.0, 0.0000,
    34,    1,    2,1.000,
  12.0, 3.8100,
  24.0, 0.0000,
    35,    1,    2,1.000,
   0.0, 0.4318,
   2.0, 0.0000,
    41,    1,    2,1.000,
   3.0, 0.9144,
  11.0, 0.0000,
    45,    1,    2,1.000,
   4.0, 0.0762,
```

```
  5.0, 0.0000,
   46,    1,    2,1.000,
  5.0, 2.9718,
 14.0, 0.0000,
   55,    1,    2,1.000,
 14.0, 0.2032,
 15.0, 0.0000,
   56,    1,    2,1.000,
  0.0, 1.9050,
  3.0, 0.0000,
   59,    1,    2,1.000,
  9.0, 0.4064,
 14.0, 0.0000,
   60,    1,    2,1.000,
  6.0, 0.8890,
 12.0, 0.0000,
   70,    1,    2,1.000,
 19.0, 0.7874,
 23.0, 0.0000,
   71,    1,    2,1.000,
  0.0, 1.0414,
 20.0, 0.0000,
   74,    1,    2,1.000,
 14.0, 0.4572,
 17.0, 0.0000,
   78,    1,    2,1.000,
  9.0, 1.4986,
 15.0, 0.0000,
   81,    1,    2,1.000,
 17.0, 1.8796,
 22.0, 0.0000,
   87,    1,    2,1.000,
  7.0, 1.7272,
 13.0, 0.0000,
   94,    1,    2,1.000,
 15.0, 1.3462,
 20.0, 0.0000,
   97,    1,    2,1.000,
  9.0, 1.6510,
 12.0, 0.0000,
  104,    1,    2,1.000,
  5.0, 1.6510,
  9.0, 0.0000,
  107,    1,    2,1.000,
 16.0, 0.0254,
 17.0, 0.0000,
  119,    1,    2,1.000,
  2.0, 2.3876,
  6.0, 0.0000,
  122,    1,    2,1.000,
  0.0, 1.8796,
 19.0, 0.0000,
  125,    1,    2,1.000,
  7.0, 0.6604,
```

```
11.0, 0.0000,
 129,    1,    2,1.000,
13.0, 0.8382,
21.0, 0.0000,
 141,    1,    2,1.000,
 8.0, 0.0254,
 9.0, 0.0000,
 143,    1,    2,1.000,
13.0, 0.9652,
17.0, 0.0000,
 147,    1,    2,1.000,
 6.0, 0.3810,
 8.0, 0.0000,
 148,    1,    2,1.000,
 7.0, 1.6764,
22.0, 0.0000,
 161,    1,    2,1.000,
 0.0, 2.159,
 6.0, 0.0000,
 162,    1,    2,1.000,
 4.0, 0.0762,
 5.0, 0.0000,
 169,    1,    2,1.000,
17.0, 0.6350,
19.0, 0.0000,
 172,    1,    2,1.000,
 8.0, 0.0254,
 9.0, 0.0000,
 173,    1,    2,1.000,
16.0, 0.1270,
17.0, 0.0000,
 176,    1,    2,1.000,
18.0, 5.8166,
19.0, 0.0000,
 216,    1,    2,1.000,
16.0, 4.5212,
24.0, 0.0000,
 218,    1,    2,1.000,
 5.0, 0.2794,
 6.0, 0.0000,
 219,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 235,    1,    2,1.000,
22.0, 0.0254,
23.0, 0.0000,
 236,    1,    2,1.000,
 9.0, 0.0254,
10.0, 0.0000,
 246,    1,    2,1.000,
21.0, 0.0762,
22.0, 0.0000,
 256,    1,    2,1.000,
 5.0, 3.2512,
```

```
20.0, 0.0000,
 257,    1,   2,1.000,
 1.0, 1.0414,
 3.0, 0.0000,
 268,    1,   2,1.000,
16.0, 0.5588,
17.0, 0.0000,
 269,    1,   2,1.000,
 1.0, 1.8034,
10.0, 0.0000,
 275,    1,   2,1.000,
 4.0, 0.1524,
 5.0, 0.0000,
 276,    1,   2,1.000,
 2.0, 0.5842,
 3.0, 0.0000,
 281,    1,   2,1.000,
 6.0, 0.9398,
 8.0, 0.0000,
 285,    1,   2,1.000,
 3.0, 0.0254,
 4.0, 0.0000,
 286,    1,   2,1.000,
 1.0, 3.4036,
 9.0, 0.0000,
 290,    1,   2,1.000,
19.0, 0.5588,
22.0, 0.0000,
 291,    1,   2,1.000,
 9.0, 1.0668,
18.0, 0.0000,
 292,    1,   2,1.000,
 5.0, 0.8890,
 6.0, 0.0000,
 293,    1,   2,1.000,
 4.0, 2.1082,
10.0, 0.0000,
 302,    1,   2,1.000,
14.0, 0.4318,
16.0, 0.0000,
 306,    1,   2,1.000,
 5.0, 0.2032,
 6.0, 0.0000,
 313,    1,   2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 316,    1,   2,1.000,
 4.0, 0.1524,
 5.0, 0.0000,
 318,    1,   2,1.000,
 3.0, 1.8288,
 9.0, 0.0000,
 320,    1,   2,1.000,
 7.0, 1.6510,
```

```
14.0, 0.0000,
 329,    1,    2,1.000,
13.0, 1.0922,
19.0, 0.0000,
 336,    1,    2,1.000,
11.0, 0.1524,
12.0, 0.0000,
 337,    1,    2,1.000,
 0.0, 1.4224,
13.0, 0.0000,
 346,    1,    2,1.000,
15.0, 1.4478,
18.0, 0.0000,
 350,    1,    2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
 351,    1,    2,1.000,
 5.0, 0.0508,
 6.0, 0.0000,
 356,    1,    2,1.000,
 2.0, 1.6002,
15.0, 0.0000,
```

```
  94,                NWATER (Total for 1994 =  99.8982 cm)
  11,    1,    2,1.000,
 5.0, 0.1524,
 7.0, 0.0000,
  16,    1,    2,1.000,
 3.0, 0.1270,
 4.0, 0.0000,
  20,    1,    2,1.000,
16.0, 0.2540,
17.0, 0.0000,
  21,    1,    2,1.000,
 4.0, 0.6858,
 7.0, 0.0000,
  22,    1,    2,1.000,
10.0, 0.9144,
18.0, 0.0000,
  23,    1,    2,1.000,
11.0, 0.1016,
12.0, 0.0000,
  24,    1,    2,1.000,
 8.0, 0.3810,
10.0, 0.0000,
  26,    1,    2,1.000,
11.0, 0.1270,
13.0, 0.0000,
  27,    1,    2,1.000,
13.0, 0.2032,
14.0, 0.0000,
  40,    1,    2,1.000,
 8.0, 0.1270,
 9.0, 0.0000,
  41,    1,    2,1.000,
 3.0, 0.9398,
14.0, 0.0000,
  43,    1,    2,1.000,
17.0, 0.1524,
18.0, 0.0000,
  51,    1,    2,1.000,
 5.0, 3.6322,
19.0, 0.0000,
  52,    1,    2,1.000,
23.0, 0.0254,
24.0, 0.0000,
  53,    1,    2,1.000,
 0.0, 1.9050,
 7.0, 0.0000,
  59,    1,    2,1.000,
17.0, 0.7366,
18.0, 0.0000,
  60,    1,    2,1.000,
 7.0, 1.4986,
10.0, 0.0000,
  67,    1,    2,1.000,
11.0, 1.1938,
```

```
18.0, 0.0000,
  68,    1,   2,1.000,
18.0, 0.2794,
20.0, 0.0000,
  71,    1,   2,1.000,
20.0, 0.0762,
21.0, 0.0000,
  72,    1,   2,1.000,
 6.0, 0.6096,
13.0, 0.0000,
  83,    1,   2,1.000,
 5.0, 0.0762,
 6.0, 0.0000,
  85,    1,   2,1.000,
 9.0, 3.9116,
23.0, 0.0000,
  92,    1,   2,1.000,
19.0, 0.2794,
22.0, 0.0000,
 101,    1,   2,1.000,
 6.0, 0.2032,
 7.0, 0.0000,
 112,    1,   2,1.000,
 7.0, 0.2540,
 8.0, 0.0000,
 116,    1,   2,1.000,
21.0, 0.4064,
23.0, 0.0000,
 118,    1,   2,1.000,
 8.0, 0.3302,
 9.0, 0.0000,
 119,    1,   2,1.000,
 1.0, 3.5814,
 7.0, 0.0000,
 122,    1,   2,1.000,
 4.0, 0.9398,
18.0, 0.0000,
 129,    1,   2,1.000,
12.0, 2.3114,
22.0, 0.0000,
 130,    1,   2,1.000,
19.0, 1.0668,
23.0, 0.0000,
 132,    1,   2,1.000,
 1.0, 3.4036,
17.0, 0.0000,
 133,    1,   2,1.000,
 3.0, 1.9050,
17.0, 0.0000,
 136,    1,   2,1.000,
16.0, 2.7178,
22.0, 0.0000,
 145,    1,   2,1.000,
 1.0, 0.3302,
```

```
  3.0, 0.0000,
  146,    1,    2,1.000,
  1.0, 1.3462,
 16.0, 0.0000,
  147,    1,    2,1.000,
  5.0, 0.7366,
 12.0, 0.0000,
  149,    1,    2,1.000,
 18.0, 0.7112,
 22.0, 0.0000,
  162,    1,    2,1.000,
 14.0, 1.4478,
 24.0, 0.0000,
  166,    1,    2,1.000,
 10.0, 0.1270,
 11.0, 0.0000,
  169,    1,    2,1.000,
 15.0, 0.5588,
 16.0, 0.0000,
  180,    1,    2,1.000,
  2.0, 0.0508,
  3.0, 0.0000,
  181,    1,    2,1.000,
  4.0, 0.1016,
  5.0, 0.0000,
  183,    1,    2,1.000,
 10.0, 0.0762,
 11.0, 0.0000,
  187,    1,    2,1.000,
  6.0, 2.9210,
 21.0, 0.0000,
  191,    1,    2,1.000,
 22.0, 0.0762,
 23.0, 0.0000,
  195,    1,    2,1.000,
 13.0, 0.8382,
 15.0, 0.0000,
  211,    1,    2,1.000,
 10.0, 0.6350,
 16.0, 0.0000,
  217,    1,    2,1.000,
  3.0, 1.7526,
 12.0, 0.0000,
  229,    1,    2,1.000,
  6.0, 0.0254,
  7.0, 0.0000,
  232,    1,    2,1.000,
  3.0, 0.0762,
  4.0, 0.0000,
  233,    1,    2,1.000,
  1.0, 0.6858,
  4.0, 0.0000,
  244,    1,    2,1.000,
  0.0, 7.2898,
```

```
19.0, 0.0000,
 245,    1,    2,1.000,
13.0, 0.2032,
14.0, 0.0000,
 250,    1,    2,1.000,
11.0, 0.0508,
12.0, 0.0000,
 251,    1,    2,1.000,
 5.0, 0.6350,
 8.0, 0.0000,
 252,    1,    2,1.000,
 9.0, 0.0762,
10.0, 0.0000,
 265,    1,    2,1.000,
15.0, 0.2794,
16.0, 0.0000,
 276,    1,    2,1.000,
19.0, 0.2286,
20.0, 0.0000,
 277,    1,    2,1.000,
12.0, 0.1016,
13.0, 0.0000,
 280,    1,    2,1.000,
15.0, 1.0922,
16.0, 0.0000,
 281,    1,    2,1.000,
15.0, 0.4572,
18.0, 0.0000,
 288,    1,    2,1.000,
 0.0, 0.7874,
19.0, 0.0000,
 289,    1,    2,1.000,
17.0, 0.2794,
18.0, 0.0000,
 290,    1,    2,1.000,
 3.0, 0.1016,
 4.0, 0.0000,
 291,    1,    2,1.000,
 3.0, 6.0960,
17.0, 0.0000,
 293,    1,    2,1.000,
10.0, 5.7658,
22.0, 0.0000,
 294,    1,    2,1.000,
 9.0, 1.7780,
22.0, 0.0000,
 297,    1,    2,1.000,
 8.0, 0.4572,
11.0, 0.0000,
 298,    1,    2,1.000,
 3.0, 0.3556,
 5.0, 0.0000,
 307,    1,    2,1.000,
 3.0, 3.6068,
```

```
21.0, 0.0000,
 308,    1,    2,1.000,
21.0, 1.2446,
22.0, 0.0000,
 309,    1,    2,1.000,
 0.0, 4.7752,
21.0, 0.0000,
 313,    1,    2,1.000,
 7.0, 1.3208,
14.0, 0.0000,
 318,    1,    2,1.000,
10.0, 1.4732,
17.0, 0.0000,
 319,    1,    2,1.000,
 1.0, 2.3368,
22.0, 0.0000,
 322,    1,    2,1.000,
23.0, 0.0508,
24.0, 0.0000,
 323,    1,    2,1.000,
10.0, 1.4478,
16.0, 0.0000,
 324,    1,    2,1.000,
 3.0, 0.8128,
 7.0, 0.0000,
 327,    1,    2,1.000,
 7.0, 0.0508,
 8.0, 0.0000,
 328,    1,    2,1.000,
 2.0, 0.6604,
 6.0, 0.0000,
 329,    1,    2,1.000,
17.0, 0.0254,
18.0, 0.0000,
 336,    1,    2,1.000,
 6.0, 0.0762,
 7.0, 0.0000,
 337,    1,    2,1.000,
 2.0, 0.0254,
 3.0, 0.0000,
 342,    1,    2,1.000,
 7.0, 0.4064,
 8.0, 0.0000,
 343,    1,    2,1.000,
 9.0, 2.7432,
22.0, 0.0000,
 344,    1,    2,1.000,
 9.0, 0.8382,
15.0, 0.0000,
 348,    1,    2,1.000,
20.0, 0.7874,
23.0, 0.0000,
 349,    1,    2,1.000,
 3.0, 0.2794,
```

```
 5.0, 0.0000,
 350,   1,   2,1.000,
 1.0, 0.3048,
 2.0, 0.0000,
 362,   1,   2,1.000,
 9.0, 2.1082,
21.0, 0.0000,
 363,   1,   2,1.000,
 9.0, 0.2032,
10.0, 0.0000,
 365,   1,   2,1.000,
10.0, 0.2794,
11.0, 0.0000,
```

```
   87,                NWATER (Total for 1995 =  99.8474 cm)
    3,    1,    2,1.000,
  9.0, 0.4318,
 11.0, 0.0000,
    6,    1,    2,1.000,
 13.0, 0.1016,
 14.0, 0.0000,
   12,    1,    2,1.000,
  8.0, 0.3302,
 10.0, 0.0000,
   17,    1,    2,1.000,
  0.0, 0.2032,
  1.0, 0.0000,
   18,    1,    2,1.000,
  3.0, 1.8288,
 15.0, 0.0000,
   22,    1,    2,1.000,
  8.0, 0.2540,
  9.0, 0.0000,
   26,    1,    2,1.000,
  8.0, 0.9398,
 10.0, 0.0000,
   27,    1,    2,1.000,
  8.0, 0.0254,
  9.0, 0.0000,
   42,    1,    2,1.000,
  5.0, 0.2286,
  6.0, 0.0000,
   44,    1,    2,1.000,
 18.0, 0.1270,
 19.0, 0.0000,
   45,    1,    2,1.000,
 22.0, 0.1016,
 23.0, 0.0000,
   46,    1,    2,1.000,
  3.0, 0.0508,
  4.0, 0.0000,
   47,    1,    2,1.000,
  5.0, 0.2286,
  6.0, 0.0000,
   56,    1,    2,1.000,
  4.0, 0.1778,
  5.0, 0.0000,
   57,    1,    2,1.000,
  8.0, 0.2794,
  9.0, 0.0000,
   60,    1,    2,1.000,
 11.0, 0.0254,
 12.0, 0.0000,
   61,    1,    2,1.000,
  9.0, 0.2540,
 10.0, 0.0000,
   62,    1,    2,1.000,
 11.0, 0.1016,
```

```
12.0, 0.0000,
  64,    1,    2,1.000,
10.0, 0.0508,
11.0, 0.0000,
  65,    1,    2,1.000,
14.0, 0.0254,
15.0, 0.0000,
  66,    1,    2,1.000,
 0.0, 0.5334,
 2.0, 0.0000,
  71,    1,    2,1.000,
18.0, 1.6764,
24.0, 0.0000,
  72,    1,    2,1.000,
 0.0, 8.5090,
24.0, 0.0000,
  73,    1,    2,1.000,
 0.0, 0.4064,
 3.0, 0.0000,
  74,    1,    2,1.000,
 6.0, 0.3302,
13.0, 0.0000,
  84,    1,    2,1.000,
14.0, 2.2860,
19.0, 0.0000,
  85,    1,    2,1.000,
17.0, 0.0508,
18.0, 0.0000,
  87,    1,    2,1.000,
21.0, 0.6858,
24.0, 0.0000,
  88,    1,    2,1.000,
 5.0, 0.2286,
 6.0, 0.0000,
  94,    1,    2,1.000,
 0.0, 1.9812,
 4.0, 0.0000,
  95,    1,    2,1.000,
 3.0, 1.2700,
 6.0, 0.0000,
 100,    1,    2,1.000,
 9.0, 1.0160,
13.0, 0.0000,
 107,    1,    2,1.000,
12.0, 0.1016,
13.0, 0.0000,
 108,    1,    2,1.000,
 8.0, 1.4732,
14.0, 0.0000,
 109,    1,    2,1.000,
18.0, 3.4544,
24.0, 0.0000,
 110,    1,    2,1.000,
 0.0, 0.0508,
```

```
  3.0, 0.0000,
  112,    1,    2,1.000,
  5.0, 0.4064,
  8.0, 0.0000,
  119,    1,    2,1.000,
 23.0, 0.0508,
 24.0, 0.0000,
  123,    1,    2,1.000,
  4.0, 1.5494,
  7.0, 0.0000,
  124,    1,    2,1.000,
  4.0, 0.0762,
  5.0, 0.0000,
  125,    1,    2,1.000,
 17.0, 5.5118,
 24.0, 0.0000,
  128,    1,    2,1.000,
  0.0, 4.8006,
 13.0, 0.0000,
  131,    1,    2,1.000,
  6.0, 0.1016,
  7.0, 0.0000,
  137,    1,    2,1.000,
 15.0, 2.7686,
 23.0, 0.0000,
  144,    1,    2,1.000,
 15.0, 0.9652,
 19.0, 0.0000,
  145,    1,    2,1.000,
  9.0, 0.0508,
 10.0, 0.0000,
  147,    1,    2,1.000,
  0.0, 0.6350,
  2.0, 0.0000,
  149,    1,    2,1.000,
 22.0, 0.0508,
 23.0, 0.0000,
  150,    1,    2,1.000,
  8.0, 1.0160,
  9.0, 0.0000,
  151,    1,    2,1.000,
 15.0, 1.2954,
 20.0, 0.0000,
  152,    1,    2,1.000,
  8.0, 1.0668,
 12.0, 0.0000,
  157,    1,    2,1.000,
  8.0, 0.6350,
 12.0, 0.0000,
  161,    1,    2,1.000,
 13.0, 1.4986,
 21.0, 0.0000,
  162,    1,    2,1.000,
  0.0, 6.6802,
```

```
18.0, 0.0000,
 178,    1,    2,1.000,
15.0, 0.4572,
17.0, 0.0000,
 184,    1,    2,1.000,
13.0, 0.0508,
14.0, 0.0000,
 186,    1,    2,1.000,
 4.0, 2.2352,
10.0, 0.0000,
 194,    1,    2,1.000,
 6.0, 1.9304,
15.0, 0.0000,
 198,    1,    2,1.000,
 2.0, 1.1938,
 8.0, 0.0000,
 199,    1,    2,1.000,
15.0, 0.0508,
16.0, 0.0000,
 200,    1,    2,1.000,
11.0, 0.1270,
12.0, 0.0000,
 204,    1,    2,1.000,
 5.0, 0.3048,
 7.0, 0.0000,
 212,    1,    2,1.000,
 5.0, 8.5598,
21.0, 0.0000,
 213,    1,    2,1.000,
21.0, 0.7874,
24.0, 0.0000,
 214,    1,    2,1.000,
 3.0, 2.7432,
 9.0, 0.0000,
 215,    1,    2,1.000,
 3.0, 0.8382,
14.0, 0.0000,
 231,    1,    2,1.000,
16.0, 2.5908,
20.0, 0.0000,
 242,    1,    2,1.000,
18.0, 0.1016,
19.0, 0.0000,
 256,    1,    2,1.000,
 0.0, 3.6830,
 2.0, 0.0000,
 257,    1,    2,1.000,
18.0, 0.2540,
19.0, 0.0000,
 260,    1,    2,1.000,
15.0, 0.9652,
18.0, 0.0000,
 261,    1,    2,1.000,
18.0, 0.9652,
```

```
24.0, 0.0000,
 262,    1,    2,1.000,
14.0, 0.5842,
15.0, 0.0000,
 264,    1,    2,1.000,
 0.0, 2.5908,
 6.0, 0.0000,
 275,    1,    2,1.000,
 7.0, 0.5080,
 8.0, 0.0000,
 303,    1,    2,1.000,
 6.0, 0.1016,
 7.0, 0.0000,
 304,    1,    2,1.000,
22.0, 0.0254,
23.0, 0.0000,
 305,    1,    2,1.000,
 2.0, 2.5400,
 4.0, 0.0000,
 306,    1,    2,1.000,
 8.0, 0.0254,
 9.0, 0.0000,
 308,    1,    2,1.000,
 7.0, 0.3048,
 9.0, 0.0000,
 311,    1,    2,1.000,
16.0, 0.2286,
17.0, 0.0000,
 321,    1,    2,1.000,
19.0, 0.0762,
20.0, 0.0000,
 332,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 342,    1,    2,1.000,
 5.0, 1.8796,
12.0, 0.0000,
 351,    1,    2,1.000,
 0.0, 3.0226,
17.0, 0.0000,
 352,    1,    2,1.000,
 2.0, 0.9906,
 9.0, 0.0000,
 364,    1,    2,1.000,
 6.0, 0.0762,
 7.0, 0.0000,
```

```
   85,                NWATER (Total for 1996 =  88.7984 cm)
    1,    1,    2,1.000,
 12.0, 0.0762,
 13.0, 0.0000,
    2,    1,    2,1.000,
 10.0, 0.4826,
 13.0, 0.0000,
   17,    1,    2,1.000,
  7.0, 1.4478,
 24.0, 0.0000,
   22,    1,    2,1.000,
  5.0, 0.0508,
  6.0, 0.0000,
   33,    1,    2,1.000,
  1.0, 0.7366,
 11.0, 0.0000,
   34,    1,    2,1.000,
 13.0, 0.0508,
 14.0, 0.0000,
   41,    1,    2,1.000,
 10.0, 0.7112,
 12.0, 0.0000,
   58,    1,    2,1.000,
  8.0, 0.0254,
  9.0, 0.0000,
   59,    1,    2,1.000,
  2.0, 0.0762,
  3.0, 0.0000,
   64,    1,    2,1.000,
 22.0, 0.0508,
 23.0, 0.0000,
   77,    1,    2,1.000,
  1.0, 0.0254,
  2.0, 0.0000,
   78,    1,    2,1.000,
  3.0, 0.3302,
  4.0, 0.0000,
   86,    1,    2,1.000,
  9.0, 0.1524,
 10.0, 0.0000,
   87,    1,    2,1.000,
  5.0, 2.5400,
 17.0, 0.0000,
   88,    1,    2,1.000,
 13.0, 0.0508,
 14.0, 0.0000,
   95,    1,    2,1.000,
 22.0, 0.0254,
 23.0, 0.0000,
   96,    1,    2,1.000,
  0.0, 4.7244,
 13.0, 0.0000,
   97,    1,    2,1.000,
  5.0, 0.1524,
```

```
  6.0, 0.0000,
  103,    1,    2,1.000,
  9.0, 0.2286,
 10.0, 0.0000,
  104,    1,    2,1.000,
 13.0, 0.0762,
 14.0, 0.0000,
  113,    1,    2,1.000,
  7.0, 2.0828,
 12.0, 0.0000,
  120,    1,    2,1.000,
 12.0, 0.1270,
 13.0, 0.0000,
  127,    1,    2,1.000,
  4.0, 0.2540,
  5.0, 0.0000,
  149,    1,    2,1.000,
  4.0, 3.8608,
 16.0, 0.0000,
  151,    1,    2,1.000,
 21.0, 0.1016,
 22.0, 0.0000,
  152,    1,    2,1.000,
  0.0, 2.5400,
 17.0, 0.0000,
  154,    1,    2,1.000,
 11.0, 0.0254,
 12.0, 0.0000,
  156,    1,    2,1.000,
  1.0, 1.8034,
  5.0, 0.0000,
  159,    1,    2,1.000,
  3.0, 0.3048,
  5.0, 0.0000,
  162,    1,    2,1.000,
  7.0, 1.4732,
 20.0, 0.0000,
  164,    1,    2,1.000,
 15.0, 2.5400,
 23.0, 0.0000,
  165,    1,    2,1.000,
  7.0, 0.2540,
  8.0, 0.0000,
  169,    1,    2,1.000,
 17.0, 0.5080,
 19.0, 0.0000,
  192,    1,    2,1.000,
 12.0, 0.1524,
 14.0, 0.0000,
  193,    1,    2,1.000,
  0.0, 3.4290,
 20.0, 0.0000,
  194,    1,    2,1.000,
  7.0, 0.7366,
```

```
 10.0, 0.0000,
  195,    1,    2,1.000,
  9.0, 0.1524,
 10.0, 0.0000,
  196,    1,    2,1.000,
  6.0, 0.2032,
  7.0, 0.0000,
  197,    1,    2,1.000,
  5.0, 1.2954,
 17.0, 0.0000,
  198,    1,    2,1.000,
 10.0, 3.6068,
 24.0, 0.0000,
  205,    1,    2,1.000,
  7.0, 0.0762,
  8.0, 0.0000,
  209,    1,    2,1.000,
  0.0, 0.3302,
  1.0, 0.0000,
  221,    1,    2,1.000,
  3.0, 2.2098,
 11.0, 0.0000,
  222,    1,    2,1.000,
  13.0, 5.0800,
24.0, 0.0000,
  223,    1,    2,1.000,
  0.0, 0.5588,
 3.0, 0.0000,
  224,    1,    2,1.000,
  4.0, 0.7112,
 11.0, 0.0000,
  232,    1,    2,1.000,
 18.0, 0.0762,
 19.0, 0.0000,
  234,    1,    2,1.000,
  9.0, 0.1524,
 10.0, 0.0000,
  235,    1,    2,1.000,
  7.0, 0.0762,
  8.0, 0.0000,
  236,    1,    2,1.000,
  9.0, 1.1176,
 16.0, 0.0000,
  237,    1,    2,1.000,
 10.0, 0.5080,
 12.0, 0.0000,
  238,    1,    2,1.000,
  8.0, 0.0762,
  9.0, 0.0000,
  240,    1,    2,1.000,
 17.0, 0.5588,
 19.0, 0.0000,
  241,    1,    2,1.000,
  5.0, 0.9398,
```

```
  8.0, 0.0000,
  242,   1,   2,1.000,
  2.0, 5.0800,
 22.0, 0.0000,
  243,   1,   2,1.000,
  3.0, 7.6962,
 21.0, 0.0000,
  244,   1,   2,1.000,
 14.0, 1.1430,
 18.0, 0.0000,
  245,   1,   2,1.000,
 13.0, 0.0508,
 14.0, 0.0000,
  247,   1,   2,1.000,
  8.0, 0.5080,
 10.0, 0.0000,
  252,   1,   2,1.000,
  1.0, 0.1270,
  2.0, 0.0000,
  259,   1,   2,1.000,
  3.0, 2.3114,
 19.0, 0.0000,
  262,   1,   2,1.000,
  5.0, 0.3556,
  7.0, 0.0000,
  263,   1,   2,1.000,
 10.0, 1.9812,
 22.0, 0.0000,
  264,   1,   2,1.000,
 11.0, 0.6604,
 14.0, 0.0000,
  270,   1,   2,1.000,
 10.0, 0.7366,
 16.0, 0.0000,
  295,   1,   2,1.000,
  7.0, 0.7874,
  8.0, 0.0000,
  296,   1,   2,1.000,
  2.0, 0.6350,
  9.0, 0.0000,
  298,   1,   2,1.000,
  1.0, 0.0254,
  2.0, 0.0000,
  299,   1,   2,1.000,
  4.0, 0.0254,
  5.0, 0.0000,
  301,   1,   2,1.000,
 15.0, 5.3340,
 21.0, 0.0000,
  302,   1,   2,1.000,
  3.0, 0.9398,
 15.0, 0.0000,
  303,   1,   2,1.000,
  7.0, 0.1270,
```

```
  8.0, 0.0000,
  312,    1,   2,1.000,
  0.0, 1.9812,
  2.0, 0.0000,
  320,    1,   2,1.000,
 14.0, 0.6858,
 18.0, 0.0000,
  321,    1,   2,1.000,
  4.0, 0.0508,
  5.0, 0.0000,
  322,    1,   2,1.000,
  1.0, 1.0414,
  5.0, 0.0000,
  325,    1,   2,1.000,
 12.0, 0.0254,
 13.0, 0.0000,
  328,    1,   2,1.000,
 21.0, 0.4572,
 23.0, 0.0000,
  329,    1,   2,1.000,
  2.0, 1.1176,
  4.0, 0.0000,
  330,    1,   2,1.000,
 18.0, 0.2540,
 19.0, 0.0000,
  333,    1,   2,1.000,
  6.0, 0.0762,
  7.0, 0.0000,
  334,    1,   2,1.000,
  2.0, 1.7526,
 10.0, 0.0000,
  335,    1,   2,1.000,
  8.0, 0.7874,
 13.0, 0.0000,
  339,    1,   2,1.000,
 22.0, 0.2794,
 23.0, 0.0000,
  350,    1,   2,1.000,
  0.0, 1.2954,
 14.0, 0.0000,
  351,    1,   2,1.000,
 11.0, 0.6096,
 15.0, 0.0000,
```

```
   79,                 NWATER (Total for 1997 = 107.6198 cm)
    6,    1,    2,1.000,
  8.0, 1.0668,
 13.0, 0.0000,
    7,    1,    2,1.000,
 10.0, 0.9652,
 18.0, 0.0000,
    8,    1,    2,1.000,
  2.0, 1.3970,
 23.0, 0.0000,
   12,    1,    2,1.000,
 20.0, 0.0762,
 21.0, 0.0000,
   15,    1,    2,1.000,
  5.0, 0.0254,
  6.0, 0.0000,
   37,    1,    2,1.000,
  5.0, 1.9050,
 13.0, 0.0000,
   38,    1,    2,1.000,
  3.0, 0.6350,
 12.0, 0.0000,
   43,    1,    2,1.000,
  2.0, 7.6454,
 24.0, 0.0000,
   44,    1,    2,1.000,
 15.0, 1.4224,
 23.0, 0.0000,
   50,    1,    2,1.000,
  9.0, 2.2098,
 17.0, 0.0000,
   51,    1,    2,1.000,
  4.0, 2.4638,
 23.0, 0.0000,
   55,    1,    2,1.000,
 14.0, 1.4224,
 20.0, 0.0000,
   56,    1,    2,1.000,
  1.0, 0.7112,
 14.0, 0.0000,
   57,    1,    2,1.000,
  0.0, 0.7366,
  5.0, 0.0000,
   60,    1,    2,1.000,
  7.0, 0.0762,
  8.0, 0.0000,
   61,    1,    2,1.000,
  1.0, 2.8702,
 16.0, 0.0000,
   67,    1,    2,1.000,
  7.0, 0.0254,
  8.0, 0.0000,
   71,    1,    2,1.000,
  9.0, 1.6764,
```

```
14.0, 0.0000,
  72,    1,    2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
  75,    1,    2,1.000,
22.0, 0.0254,
23.0, 0.0000,
  84,    1,    2,1.000,
 4.0, 1.3462,
 7.0, 0.0000,
  88,    1,    2,1.000,
13.0, 0.2286,
14.0, 0.0000,
  91,    1,    2,1.000,
 3.0, 0.0254,
 4.0, 0.0000,
  93,    1,    2,1.000,
19.0, 0.4064,
22.0, 0.0000,
  94,    1,    2,1.000,
 5.0, 8.4582,
23.0, 0.0000,
  95,    1,    2,1.000,
 1.0, 0.5080,
 3.0, 0.0000,
  98,    1,    2,1.000,
23.0, 0.0254,
24.0, 0.0000,
  99,    1,    2,1.000,
 5.0, 0.2032,
 6.0, 0.0000,
 101,    1,    2,1.000,
 6.0, 1.2192,
 8.0, 0.0000,
 115,    1,    2,1.000,
 8.0, 3.8100,
14.0, 0.0000,
 116,    1,    2,1.000,
 7.0, 1.7272,
11.0, 0.0000,
 117,    1,    2,1.000,
 1.0, 0.1016,
 2.0, 0.0000,
 129,    1,    2,1.000,
 0.0, 2.0320,
 6.0, 0.0000,
 132,    1,    2,1.000,
14.0, 0.1270,
15.0, 0.0000,
 140,    1,    2,1.000,
 9.0, 0.1016,
10.0, 0.0000,
 141,    1,    2,1.000,
12.0, 0.7112,
```

```
17.0, 0.0000,
 143,    1,    2,1.000,
 7.0, 0.3048,
 8.0, 0.0000,
 144,    1,    2,1.000,
 3.0, 1.0414,
11.0, 0.0000,
 150,    1,    2,1.000,
 7.0, 1.4478,
21.0, 0.0000,
 159,    1,    2,1.000,
 4.0, 0.0508,
 5.0, 0.0000,
 160,    1,    2,1.000,
15.0, 0.1270,
16.0, 0.0000,
 161,    1,    2,1.000,
 0.0, 0.3810,
 6.0, 0.0000,
 166,    1,    2,1.000,
 0.0, 0.3810,
 1.0, 0.0000,
 168,    1,    2,1.000,
 6.0, 1.5494,
18.0, 0.0000,
 173,    1,    2,1.000,
 4.0, 4.3942,
21.0, 0.0000,
 174,    1,    2,1.000,
 1.0, 1.4224,
17.0, 0.0000,
 177,    1,    2,1.000,
 6.0, 0.1524,
 7.0, 0.0000,
 187,    1,    2,1.000,
 5.0, 0.9906,
10.0, 0.0000,
 196,    1,    2,1.000,
17.0, 1.2192,
22.0, 0.0000,
 219,    1,    2,1.000,
 2.0, 7.1374,
20.0, 0.0000,
 220,    1,    2,1.000,
 5.0, 0.5334,
 8.0, 0.0000,
 222,    1,    2,1.000,
10.0, 0.3556,
13.0, 0.0000,
 246,    1,    2,1.000,
19.0, 1.1938,
24.0, 0.0000,
 247,    1,    2,1.000,
 8.0, 0.0508,
```

```
 9.0, 0.0000,
 265,   1,   2,1.000,
 8.0, 0.7112,
12.0, 0.0000,
 279,   1,   2,1.000,
 6.0, 1.2954,
15.0, 0.0000,
 280,   1,   2,1.000,
 8.0, 0.9906,
14.0, 0.0000,
 281,   1,   2,1.000,
 6.0, 0.9906,
16.0, 0.0000,
 282,   1,   2,1.000,
14.0, 2.3622,
24.0, 0.0000,
 284,   1,   2,1.000,
13.0, 0.6858,
22.0, 0.0000,
 285,   1,   2,1.000,
 0.0, 2.5654,
20.0, 0.0000,
 286,   1,   2,1.000,
 2.0, 3.5560,
20.0, 0.0000,
 294,   1,   2,1.000,
11.0, 0.2794,
12.0, 0.0000,
 296,   1,   2,1.000,
 7.0, 5.2832,
22.0, 0.0000,
 303,   1,   2,1.000,
 4.0, 0.1524,
 5.0, 0.0000,
 313,   1,   2,1.000,
18.0, 0.0254,
19.0, 0.0000,
 314,   1,   2,1.000,
 1.0, 0.1778,
 2.0, 0.0000,
 316,   1,   2,1.000,
 2.0, 1.4224,
 9.0, 0.0000,
 317,   1,   2,1.000,
 0.0, 0.8890,
 6.0, 0.0000,
 318,   1,   2,1.000,
 1.0, 0.0762,
 2.0, 0.0000,
 319,   1,   2,1.000,
10.0, 0.3302,
12.0, 0.0000,
 332,   1,   2,1.000,
 8.0, 0.0762,
```

```
  9.0, 0.0000,
  336,    1,    2,1.000,
 12.0, 1.8288,
 18.0, 0.0000,
  341,    1,    2,1.000,
 12.0, 1.9812,
 16.0, 0.0000,
  342,    1,    2,1.000,
  6.0, 0.0508,
  7.0, 0.0000,
  354,    1,    2,1.000,
  3.0, 5.9944,
 19.0, 0.0000,
  355,    1,    2,1.000,
  0.0, 2.3114,
 13.0, 0.0000,
  357,    1,    2,1.000,
  8.0, 1.8034,
 21.0, 0.0000,
  360,    1,    2,1.000,
  7.0, 0.6350,
 15.0, 0.0000,
```

```
   85,                  NWATER (Total for 1998 =  93.0910 cm)
    2,    1,    2,1.000,
  5.0, 0.0762,
  6.0, 0.0000,
    4,    1,    2,1.000,
  1.0, 0.6350,
 20.0, 0.0000,
    5,    1,    2,1.000,
 21.0, 0.7620,
 22.0, 0.0000,
   6,    1,    2,1.000,
  1.0, 3.6830,
 23.0, 0.0000,
    7,    1,    2,1.000,
  5.0, 1.4732,
 14.0, 0.0000,
    8,    1,    2,1.000,
  8.0, 0.2286,
  9.0, 0.0000,
   11,    1,    2,1.000,
 12.0, 0.0508,
 13.0, 0.0000,
   12,    1,    2,1.000,
 13.0, 0.0762,
 14.0, 0.0000,
   14,    1,    2,1.000,
 12.0, 0.0508,
 13.0, 0.0000,
   21,    1,    2,1.000,
 12.0, 0.0508,
 13.0, 0.0000,
   31,    1,    2,1.000,
 12.0, 1.3462,
 22.0, 0.0000,
   36,    1,    2,1.000,
 11.0, 0.0254,
 12.0, 0.0000,
   41,    1,    2,1.000,
  9.0, 0.5588,
 11.0, 0.0000,
   43,    1,    2,1.000,
 15.0, 0.1270,
 16.0, 0.0000,
   44,    1,    2,1.000,
  9.0, 0.7112,
 18.0, 0.0000,
   47,    1,    2,1.000,
 18.0, 0.2794,
 19.0, 0.0000,
   48,    1,    2,1.000,
 11.0, 0.0508,
 12.0, 0.0000,
   49,    1,    2,1.000,
 18.0, 0.6858,
```

```
22.0, 0.0000,
  50,    1,   2,1.000,
10.0, 0.0762,
11.0, 0.0000,
  52,    1,   2,1.000,
18.0, 0.5080,
20.0, 0.0000,
  53,    1,   2,1.000,
 1.0, 2.1336,
12.0, 0.0000,
  56,    1,   2,1.000,
19.0, 4.2926,
24.0, 0.0000,
  65,    1,   2,1.000,
13.0, 0.3810,
15.0, 0.0000,
  66,    1,   2,1.000,
 9.0, 0.4064,
11.0, 0.0000,
  67,    1,   2,1.000,
 0.0, 0.1778,
 1.0, 0.0000,
  73,    1,   2,1.000,
19.0, 0.1778,
20.0, 0.0000,
  74,    1,   2,1.000,
 0.0, 1.1430,
22.0, 0.0000,
  75,    1,   2,1.000,
 1.0, 5.9944,
 8.0, 0.0000,
  77,    1,   2,1.000,
21.0, 0.0508,
22.0, 0.0000,
  78,    1,   2,1.000,
 0.0, 0.8128,
13.0, 0.0000,
  86,    1,   2,1.000,
 9.0, 0.3302,
10.0, 0.0000,
  89,    1,   2,1.000,
18.0, 0.3556,
20.0, 0.0000,
  98,    1,   2,1.000,
 7.0, 0.3810,
10.0, 0.0000,
 110,    1,   2,1.000,
15.0, 1.7780,
23.0, 0.0000,
 116,    1,   2,1.000,
11.0, 0.2794,
13.0, 0.0000,
 122,    1,   2,1.000,
22.0, 0.0254,
```

```
23.0, 0.0000,
 146,   1,   2,1.000,
20.0, 0.0254,
21.0, 0.0000,
 147,   1,   2,1.000,
 0.0, 3.2766,
 2.0, 0.0000,
 155,   1,   2,1.000,
12.0, 2.1336,
20.0, 0.0000,
 156,   1,   2,1.000,
 3.0, 1.1938,
13.0, 0.0000,
 161,   1,   2,1.000,
15.0, 1.8542,
22.0, 0.0000,
 162,   1,   2,1.000,
 3.0, 1.7780,
19.0, 0.0000,
 185,   1,   2,1.000,
21.0, 1.2954,
24.0, 0.0000,
 216,   1,   2,1.000,
 8.0, 1.1176,
15.0, 0.0000,
 217,   1,   2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 218,   1,   2,1.000,
18.0, 0.4318,
19.0, 0.0000,
 225,   1,   2,1.000,
 7.0, 0.5842,
10.0, 0.0000,
 226,   1,   2,1.000,
15.0, 0.3048,
17.0, 0.0000,
 231,   1,   2,1.000,
15.0, 0.1270,
16.0, 0.0000,
 254,   1,   2,1.000,
16.0, 0.9906,
19.0, 0.0000,
 255,   1,   2,1.000,
 0.0, 1.6764,
21.0, 0.0000,
 256,   1,   2,1.000,
 8.0, 0.8382,
18.0, 0.0000,
 257,   1,   2,1.000,
 7.0, 1.1938,
12.0, 0.0000,
 259,   1,   2,1.000,
 9.0, 0.7366,
```

```
15.0, 0.0000,
 260,   1,   2,1.000,
 6.0, 0.4318,
13.0, 0.0000,
 266,   1,   2,1.000,
 4.0, 0.0254,
 5.0, 0.0000,
 275,   1,   2,1.000,
10.0, 0.0254,
11.0, 0.0000,
 276,   1,   2,1.000,
10.0, 2.8194,
20.0, 0.0000,
 278,   1,   2,1.000,
16.0, 4.1402,
24.0, 0.0000,
 279,   1,   2,1.000,
 0.0, 1.4478,
 7.0, 0.0000,
 290,   1,   2,1.000,
10.0, 1.2954,
24.0, 0.0000,
 292,   1,   2,1.000,
 2.0, 0.0254,
 3.0, 0.0000,
 293,   1,   2,1.000,
 8.0, 1.0922,
22.0, 0.0000,
 294,   1,   2,1.000,
 0.0, 0.4826,
 7.0, 0.0000,
 305,   1,   2,1.000,
 4.0, 2.6924,
 8.0, 0.0000,
 310,   1,   2,1.000,
12.0, 0.3556,
14.0, 0.0000,
 311,   1,   2,1.000,
 5.0, 0.0762,
 6.0, 0.0000,
 312,   1,   2,1.000,
 0.0, 0.0254,
24.0, 0.0000,
 313,   1,   2,1.000,
23.0, 0.0762,
24.0, 0.0000,
 314,   1,   2,1.000,
 8.0, 1.1176,
14.0, 0.0000,
 316,   1,   2,1.000,
14.0, 2.8956,
21.0, 0.0000,
 317,   1,   2,1.000,
 0.0,11.1506,
```

```
22.0, 0.0000,
 318,   1,   2,1.000,
 9.0, 0.0762,
10.0, 0.0000,
 324,   1,   2,1.000,
 9.0, 0.1524,
10.0, 0.0000,
 333,   1,   2,1.000,
19.0, 2.7432,
24.0, 0.0000,
 337,   1,   2,1.000,
14.0, 1.7272,
24.0, 0.0000,
 338,   1,   2,1.000,
 2.0, 2.0828,
10.0, 0.0000,
 340,   1,   2,1.000,
 9.0, 0.0508,
10.0, 0.0000,
 341,   1,   2,1.000,
11.0, 0.3302,
12.0, 0.0000,
 344,   1,   2,1.000,
 5.0, 3.9370,
19.0, 0.0000,
 345,   1,   2,1.000,
10.0, 1.4478,
24.0, 0.0000,
 346,   1,   2,1.000,
13.0, 0.1524,
15.0, 0.0000,
 352,   1,   2,1.000,
11.0, 1.2954,
17.0, 0.0000,
 353,   1,   2,1.000,
 5.0, 0.0254,
 6.0, 0.0000,
 357,   1,   2,1.000,
15.0, 0.2032,
17.0, 0.0000,
```

```
   63,                NWATER (Total for 1999 =  50.2920 cm)
    1,    1,    2,1.000,
 21.0, 0.0508,
 22.0, 0.0000,
   28,    1,    2,1.000,
 17.0, 0.1270,
 18.0, 0.0000,
   29,    1,    2,1.000,
  1.0, 2.8194,
 21.0, 0.0000,
   30,    1,    2,1.000,
  6.0, 0.1524,
  7.0, 0.0000,
   42,    1,    2,1.000,
  8.0, 0.1016,
  9.0, 0.0000,
   51,    1,    2,1.000,
  4.0, 0.1270,
  5.0, 0.0000,
   67,    1,    2,1.000,
  5.0, 3.9878,
 14.0, 0.0000,
   70,    1,    2,1.000,
  5.0, 0.0508,
  6.0, 0.0000,
   71,    1,    2,1.000,
  3.0, 0.3556,
  6.0, 0.0000,
   72,    1,    2,1.000,
 14.0, 0.0762,
 15.0, 0.0000,
   77,    1,    2,1.000,
 15.0, 1.3970,
 24.0, 0.0000,
   78,    1,    2,1.000,
  7.0, 0.7874,
 13.0, 0.0000,
   84,    1,    2,1.000,
  8.0, 0.1016,
  9.0, 0.0000,
   86,    1,    2,1.000,
 18.0, 0.3810,
 20.0, 0.0000,
   87,    1,    2,1.000,
 18.0, 0.2286,
 19.0, 0.0000,
   88,    1,    2,1.000,
  9.0, 0.0762,
 10.0, 0.0000,
   90,    1,    2,1.000,
  2.0, 0.0254,
  3.0, 0.0000,
   93,    1,    2,1.000,
  4.0, 1.8034,
```

```
11.0, 0.0000,
 104,    1,    2,1.000,
 3.0, 1.0668,
 6.0, 0.0000,
 115,    1,    2,1.000,
16.0, 0.1270,
17.0, 0.0000,
 116,    1,    2,1.000,
 6.0, 3.0226,
15.0, 0.0000,
 121,    1,    2,1.000,
15.0, 0.0508,
16.0, 0.0000,
 122,    1,    2,1.000,
 7.0, 2.4638,
 9.0, 0.0000,
 123,    1,    2,1.000,
23.0, 0.1524,
24.0, 0.0000,
 124,    1,    2,1.000,
 0.0, 0.1778,
13.0, 0.0000,
 130,    1,    2,1.000,
 2.0, 1.7272,
14.0, 0.0000,
 137,    1,    2,1.000,
15.0, 3.2258,
20.0, 0.0000,
 145,    1,    2,1.000,
 5.0, 0.0254,
 6.0, 0.0000,
 146,    1,    2,1.000,
 4.0, 2.7940,
 7.0, 0.0000,
 147,    1,    2,1.000,
20.0, 0.2794,
21.0, 0.0000,
 148,    1,    2,1.000,
 7.0, 0.7112,
13.0, 0.0000,
 149,    1,    2,1.000,
16.0, 0.0254,
17.0, 0.0000,
 150,    1,    2,1.000,
 1.0, 0.9144,
 3.0, 0.0000,
 162,    1,    2,1.000,
 4.0, 2.3876,
12.0, 0.0000,
 163,    1,    2,1.000,
12.0, 0.0762,
13.0, 0.0000,
 167,    1,    2,1.000,
22.0, 0.2286,
```

```
23.0, 0.0000,
 168,    1,    2,1.000,
 8.0, 0.2032,
 9.0, 0.0000,
 172,    1,    2,1.000,
 9.0, 0.2794,
11.0, 0.0000,
 173,    1,    2,1.000,
11.0, 0.0762,
12.0, 0.0000,
 175,    1,    2,1.000,
22.0, 0.0508,
23.0, 0.0000,
 176,    1,    2,1.000,
 7.0, 1.4478,
17.0, 0.0000,
 186,    1,    2,1.000,
13.0, 0.0508,
14.0, 0.0000,
 191,    1,    2,1.000,
12.0, 0.2286,
13.0, 0.0000,
 192,    1,    2,1.000,
14.0, 0.3810,
15.0, 0.0000,
 201,    1,    2,1.000,
11.0, 0.6350,
16.0, 0.0000,
 225,    1,    2,1.000,
16.0, 0.3810,
17.0, 0.0000,
 246,    1,    2,1.000,
 6.0, 0.1016,
 7.0, 0.0000,
 248,    1,    2,1.000,
13.0, 1.7018,
15.0, 0.0000,
 249,    1,    2,1.000,
 9.0, 0.1016,
10.0, 0.0000,
 256,    1,    2,1.000,
 5.0, 0.8128,
 6.0, 0.0000,
 268,    1,    2,1.000,
19.0, 0.4318,
20.0, 0.0000,
 290,    1,    2,1.000,
 6.0, 0.9652,
14.0, 0.0000,
 291,    1,    2,1.000,
17.0, 0.6096,
19.0, 0.0000,
 303,    1,    2,1.000,
 2.0, 3.8354,
```

```
12.0, 0.0000,
 304,   1,   2,1.000,
 1.0, 0.3048,
 2.0, 0.0000,
 305,   1,   2,1.000,
 4.0, 0.0762,
 5.0, 0.0000,
 326,   1,   2,1.000,
19.0, 0.8382,
21.0, 0.0000,
 329,   1,   2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
 338,   1,   2,1.000,
 4.0, 0.1778,
 5.0, 0.0000,
 343,   1,   2,1.000,
 4.0, 0.9652,
 9.0, 0.0000,
 345,   1,   2,1.000,
13.0, 0.2540,
14.0, 0.0000,
 346,   1,   2,1.000,
 0.0, 3.2004,
11.0, 0.0000,
 352,   1,   2,1.000,
11.0, 0.0508,
12.0, 0.0000,
```

```
  74,                NWATER (Total for 2000 = 114.4016cm)
   3,    1,    2,1.000,
 3.0, 0.1016,
 4.0, 0.0000,
   7,    1,    2,1.000,
15.0, 2.4638,
24.0, 0.0000,
   8,    1,    2,1.000,
 0.0, 1.0668,
 7.0, 0.0000,
  27,    1,    2,1.000,
 3.0, 2.0320,
14.0, 0.0000,
  48,    1,    2,1.000,
 6.0, 0.0254,
 7.0, 0.0000,
  53,    1,    2,1.000,
19.0, 2.9718,
23.0, 0.0000,
  55,    1,    2,1.000,
 6.0, 0.0254,
 7.0, 0.0000,
  56,    1,    2,1.000,
 8.0, 0.5334,
10.0, 0.0000,
  62,    1,    2,1.000,
14.0, 0.2032,
15.0, 0.0000,
  67,    1,    2,1.000,
 8.0, 0.1016,
 9.0, 0.0000,
  70,    1,    2,1.000,
10.0, 2.4892,
21.0, 0.0000,
  76,    1,    2,1.000,
11.0, 0.0254,
12.0, 0.0000,
  81,    1,    2,1.000,
18.0, 0.9144,
24.0, 0.0000,
  82,    1,    2,1.000,
 2.0, 0.2032,
 3.0, 0.0000,
  83,    1,    2,1.000,
10.0, 0.3556,
12.0, 0.0000,
  85,    1,    2,1.000,
13.0, 4.2164,
24.0, 0.0000,
  86,    1,    2,1.000,
 1.0, 2.0066,
 9.0, 0.0000,
  92,    1,    2,1.000,
14.0, 0.5842,
```

```
16.0, 0.0000,
  93,    1,    2,1.000,
 8.0, 0.1016,
 9.0, 0.0000,
 102,    1,    2,1.000,
14.0, 4.0894,
24.0, 0.0000,
 103,    1,    2,1.000,
 1.0, 0.9398,
16.0, 0.0000,
 113,    1,    2,1.000,
18.0, 0.0254,
19.0, 0.0000,
 121,    1,    2,1.000,
22.0, 1.2700,
24.0, 0.0000,
 122,    1,    2,1.000,
 0.0, 0.7620,
 3.0, 0.0000,
 123,    1,    2,1.000,
19.0, 0.0254,
20.0, 0.0000,
 125,    1,    2,1.000,
10.0, 1.9304,
19.0, 0.0000,
 126,    1,    2,1.000,
15.0, 0.1778,
16.0, 0.0000,
 140,    1,    2,1.000,
 0.0, 7.1628,
24.0, 0.0000,
 148,    1,    2,1.000,
11.0, 0.1270,
12.0, 0.0000,
 155,    1,    2,1.000,
 1.0, 4.7244,
12.0, 0.0000,
 156,    1,    2,1.000,
 0.0,11.6078,
12.0, 0.0000,
 161,    1,    2,1.000,
13.0, 1.1176,
23.0, 0.0000,
 162,    1,    2,1.000,
 5.0, 5.1816,
23.0, 0.0000,
 163,    1,    2,1.000,
12.0, 0.1270,
13.0, 0.0000,
 166,    1,    2,1.000,
 3.0, 7.6200,
11.0, 0.0000,
 167,    1,    2,1.000,
 1.0, 6.5786,
```

```
18.0, 0.0000,
 169,   1,   2,1.000,
13.0, 0.3810,
14.0, 0.0000,
 170,   1,   2,1.000,
15.0, 0.3302,
17.0, 0.0000,
 179,   1,   2,1.000,
18.0, 1.1938,
24.0, 0.0000,
 195,   1,   2,1.000,
 5.0, 0.5080,
 7.0, 0.0000,
 211,   1,   2,1.000,
14.0, 1.1176,
19.0, 0.0000,
 268,   1,   2,1.000,
 8.0, 0.1016,
 9.0, 0.0000,
 280,   1,   2,1.000,
 5.0, 0.0254,
 6.0, 0.0000,
 281,   1,   2,1.000,
10.0, 0.0508,
11.0, 0.0000,
 289,   1,   2,1.000,
16.0, 3.4036,
19.0, 0.0000,
 290,   1,   2,1.000,
 3.0, 3.9370,
21.0, 0.0000,
 291,   1,   2,1.000,
 5.0, 0.0254,
 6.0, 0.0000,
 294,   1,   2,1.000,
16.0, 0.4064,
18.0, 0.0000,
 295,   1,   2,1.000,
18.0, 0.8128,
22.0, 0.0000,
 296,   1,   2,1.000,
 0.0, 2.9464,
 9.0, 0.0000,
 297,   1,   2,1.000,
15.0, 0.2794,
16.0, 0.0000,
 299,   1,   2,1.000,
 2.0, 0.0508,
 3.0, 0.0000,
 301,   1,   2,1.000,
17.0, 0.0762,
18.0, 0.0000,
 302,   1,   2,1.000,
23.0, 0.0254,
```

```
24.0, 0.0000,
 303,    1,    2,1.000,
 0.0, 4.2164,
16.0, 0.0000,
 306,    1,    2,1.000,
15.0, 0.5588,
17.0, 0.0000,
 307,    1,    2,1.000,
10.0, 0.3048,
12.0, 0.0000,
 308,    1,    2,1.000,
 6.0, 3.0480,
24.0, 0.0000,
 309,    1,    2,1.000,
15.0, 0.0508,
16.0, 0.0000,
 310,    1,    2,1.000,
13.0, 4.8768,
24.0, 0.0000,
 312,    1,    2,1.000,
 9.0, 0.2540,
10.0, 0.0000,
 313,    1,    2,1.000,
 3.0, 1.0414,
 9.0, 0.0000,
 321,    1,    2,1.000,
 2.0, 0.0762,
 3.0, 0.0000,
 323,    1,    2,1.000,
17.0, 0.1778,
18.0, 0.0000,
 327,    1,    2,1.000,
17.0, 0.2540,
18.0, 0.0000,
 328,    1,    2,1.000,
16.0, 1.0922,
24.0, 0.0000,
 329,    1,    2,1.000,
 5.0, 0.8382,
 8.0, 0.0000,
 341,    1,    2,1.000,
 3.0, 0.0254,
 4.0, 0.0000,
 347,    1,    2,1.000,
 2.0, 0.5588,
 5.0, 0.0000,
 348,    1,    2,1.000,
 0.0, 0.1778,
 1.0, 0.0000,
 360,    1,    2,1.000,
 5.0, 4.0132,
22.0, 0.0000,
 361,    1,    2,1.000,
 1.0, 1.7272,
```

```
16.0, 0.0000,
 362,    1,    2,1.000,
 7.0, 1.1684,
20.0, 0.0000,
 365,    1,    2,1.000,
22.0, 0.3810,
24.0, 0.0000,
```

```
   90,                  NWATER (Total for 2001 = 103.2256cm)
   10,    1,    2,1.000,
 14.0, 1.4986,
 21.0, 0.0000,
   11,    1,    2,1.000,
  9.0, 0.0254,
 10.0, 0.0000,
   13,    1,    2,1.000,
 10.0, 0.4318,
 13.0, 0.0000,
   16,    1,    2,1.000,
  8.0, 0.5842,
 13.0, 0.0000,
   17,    1,    2,1.000,
  2.0, 1.0414,
 10.0, 0.0000,
   18,    1,    2,1.000,
  9.0, 0.5588,
 11.0, 0.0000,
   27,    1,    2,1.000,
 19.0, 0.2540,
 20.0, 0.0000,
   28,    1,    2,1.000,
 12.0, 0.8890,
 20.0, 0.0000,
   29,    1,    2,1.000,
  0.0, 1.8034,
 12.0, 0.0000,
   40,    1,    2,1.000,
  2.0, 0.4572,
  3.0, 0.0000,
   42,    1,    2,1.000,
 11.0, 0.1778,
 12.0, 0.0000,
   43,    1,    2,1.000,
 14.0, 0.5334,
 16.0, 0.0000,
   44,    1,    2,1.000,
 12.0, 0.1524,
 14.0, 0.0000,
   45,    1,    2,1.000,
 15.0, 0.0762,
 16.0, 0.0000,
   46,    1,    2,1.000,
  7.0, 2.9718,
 18.0, 0.0000,
   47,    1,    2,1.000,
  1.0, 4.7498,
  7.0, 0.0000,
   54,    1,    2,1.000,
 20.0, 0.2794,
 21.0, 0.0000,
   55,    1,    2,1.000,
 11.0, 0.1778,
```

```
12.0, 0.0000,
  57,    1,    2,1.000,
19.0, 0.2286,
20.0, 0.0000,
  58,    1,    2,1.000,
 1.0, 4.9276,
23.0, 0.0000,
  59,    1,    2,1.000,
11.0, 0.7620,
22.0, 0.0000,
  60,    1,    2,1.000,
 5.0, 1.3462,
19.0, 0.0000,
  62,    1,    2,1.000,
 5.0, 0.8636,
17.0, 0.0000,
  67,    1,    2,1.000,
12.0, 2.5400,
17.0, 0.0000,
  70,    1,    2,1.000,
12.0, 2.1336,
24.0, 0.0000,
  71,    1,    2,1.000,
 8.0, 0.6350,
11.0, 0.0000,
  73,    1,    2,1.000,
11.0, 0.3302,
13.0, 0.0000,
  83,    1,    2,1.000,
 4.0, 3.2512,
19.0, 0.0000,
  85,    1,    2,1.000,
 2.0, 0.0508,
 3.0, 0.0000,
  86,    1,    2,1.000,
11.0, 1.8542,
21.0, 0.0000,
  87,    1,    2,1.000,
 0.0, 0.0762,
18.0, 0.0000,
  88,    1,    2,1.000,
 4.0, 0.0254,
 5.0, 0.0000,
  89,    1,    2,1.000,
10.0, 0.4318,
12.0, 0.0000,
  97,    1,    2,1.000,
 9.0, 0.1778,
10.0, 0.0000,
 101,    1,    2,1.000,
 3.0, 2.0066,
 8.0, 0.0000,
 102,    1,    2,1.000,
 6.0, 0.0254,
```

```
  7.0, 0.0000,
  113,    1,    2,1.000,
 17.0, 0.3302,
 19.0, 0.0000,
  123,    1,    2,1.000,
 16.0, 1.1430,
 23.0, 0.0000,
  124,    1,    2,1.000,
 18.0, 5.3086,
 24.0, 0.0000,
  125,    1,    2,1.000,
 17.0, 0.2540,
 18.0, 0.0000,
  126,    1,    2,1.000,
 16.0, 0.0508,
 17.0, 0.0000,
  127,    1,    2,1.000,
  4.0, 0.3810,
  6.0, 0.0000,
  132,    1,    2,1.000,
 22.0, 0.5080,
 23.0, 0.0000,
  146,    1,    2,1.000,
  7.0, 0.0762,
  8.0, 0.0000,
  147,    1,    2,1.000,
  9.0, 0.2032,
 10.0, 0.0000,
  148,    1,    2,1.000,
  1.0, 0.2540,
  2.0, 0.0000,
  151,    1,    2,1.000,
  0.0, 1.2954,
 13.0, 0.0000,
  159,    1,    2,1.000,
 18.0, 0.5334,
 22.0, 0.0000,
  165,    1,    2,1.000,
 20.0, 1.7780,
 24.0, 0.0000,
  172,    1,    2,1.000,
 15.0, 0.2286,
 16.0, 0.0000,
  181,    1,    2,1.000,
  7.0, 0.6604,
 10.0, 0.0000,
  182,    1,    2,1.000,
  6.0, 5.1816,
 23.0, 0.0000,
  195,    1,    2,1.000,
  6.0, 0.0254,
  7.0, 0.0000,
  228,    1,    2,1.000,
  8.0, 0.2032,
```

```
  9.0, 0.0000,
  229,   1,   2,1.000,
  6.0, 1.2700,
  9.0, 0.0000,
  238,   1,   2,1.000,
  7.0, 1.9812,
 21.0, 0.0000,
  239,   1,   2,1.000,
  6.0, 0.1270,
  7.0, 0.0000,
  240,   1,   2,1.000,
  8.0, 0.2032,
  9.0, 0.0000,
  241,   1,   2,1.000,
  2.0, 0.1270,
  3.0, 0.0000,
  242,   1,   2,1.000,
  2.0, 3.0480,
  8.0, 0.0000,
  243,   1,   2,1.000,
 11.0, 2.0828,
 13.0, 0.0000,
  244,   1,   2,1.000,
  6.0, 1.9558,
 15.0, 0.0000,
  246,   1,   2,1.000,
  1.0, 0.0254,
  2.0, 0.0000,
  247,   1,   2,1.000,
  6.0, 4.0132,
 17.0, 0.0000,
  248,   1,   2,1.000,
  8.0, 0.6858,
  9.0, 0.0000,
  251,   1,   2,1.000,
 20.0, 1.0160,
 24.0, 0.0000,
  252,   1,   2,1.000,
  1.0, 1.0668,
  7.0, 0.0000,
  264,   1,   2,1.000,
  0.0, 0.8636,
 11.0, 0.0000,
  278,   1,   2,1.000,
 10.0, 0.2540,
 11.0, 0.0000,
  284,   1,   2,1.000,
  1.0, 3.4290,
 12.0, 0.0000,
  285,   1,   2,1.000,
  9.0, 5.1054,
 23.0, 0.0000,
  286,   1,   2,1.000,
  4.0, 0.5588,
```

```
  8.0, 0.0000,
  313,    1,    2,1.000,
  9.0, 1.7526,
 18.0, 0.0000,
  315,    1,    2,1.000,
 12.0, 3.8354,
 22.0, 0.0000,
  316,    1,    2,1.000,
  6.0, 1.7780,
 18.0, 0.0000,
  317,    1,    2,1.000,
  3.0, 0.0254,
  4.0, 0.0000,
  319,    1,    2,1.000,
 15.0, 2.2860,
 21.0, 0.0000,
  321,    1,    2,1.000,
  1.0, 0.6858,
  6.0, 0.0000,
  323,    1,    2,1.000,
 18.0, 0.0254,
 19.0, 0.0000,
  331,    1,    2,1.000,
 21.0, 0.2540,
 22.0, 0.0000,
  332,    1,    2,1.000,
  5.0, 0.5842,
  7.0, 0.0000,
  333,    1,    2,1.000,
 12.0, 0.0508,
 13.0, 0.0000,
  337,    1,    2,1.000,
  6.0, 0.1270,
  8.0, 0.0000,
  340,    1,    2,1.000,
  4.0, 0.3302,
  6.0, 0.0000,
  345,    1,    2,1.000,
 11.0, 0.6858,
 19.0, 0.0000,
  346,    1,    2,1.000,
  8.0, 0.0254,
  9.0, 0.0000,
  347,    1,    2,1.000,
 11.0, 0.5588,
 12.0, 0.0000,
  349,    1,    2,1.000,
 15.0, 1.6764,
 24.0, 0.0000,
  350,    1,    2,1.000,
 19.0, 3.8862,
 24.0, 0.0000,
  351,    1,    2,1.000,
  0.0, 0.1016,
```

1.0, 0.0000,

```
      75,                 NWATER (Total for 2002 = 98.6536 cm)
       4,     1,     2,1.000,
     4.0, 0.0762,
     5.0, 0.0000,
       5,     1,     2,1.000,
    18.0, 0.0508,
    19.0, 0.0000,
      18,     1,     2,1.000,
    15.0, 0.0254,
    16.0, 0.0000,
      19,     1,     2,1.000,
     9.0, 0.0254,
    10.0, 0.0000,
      22,     1,     2,1.000,
    16.0, 0.0254,
    17.0, 0.0000,
      23,     1,     2,1.000,
    16.0, 0.2286,
    17.0, 0.0000,
      24,     1,     2,1.000,
     9.0, 1.6256,
    17.0, 0.0000,
      30,     1,     2,1.000,
    19.0, 0.4826,
    21.0, 0.0000,
      31,     1,     2,1.000,
     0.0, 6.4770,
     9.0, 0.0000,
      35,     1,     2,1.000,
     4.0, 0.3810,
     6.0, 0.0000,
      36,     1,     2,1.000,
     2.0, 3.3782,
    21.0, 0.0000,
      50,     1,     2,1.000,
     9.0, 0.0508,
    10.0, 0.0000,
      60,     1,     2,1.000,
     2.0, 0.0508,
     3.0, 0.0000,
      77,     1,     2,1.000,
     8.0, 0.7366,
     9.0, 0.0000,
      78,     1,     2,1.000,
     4.0, 8.5598,
    17.0, 0.0000,
      79,     1,     2,1.000,
    10.0, 0.3048,
    11.0, 0.0000,
      84,     1,     2,1.000,
     8.0, 0.0508,
     9.0, 0.0000,
      89,     1,     2,1.000,
     3.0, 5.3086,
```

```
21.0, 0.0000,
  96,    1,   2,1.000,
 9.0, 1.6002,
18.0, 0.0000,
  97,    1,   2,1.000,
 0.0, 5.3340,
22.0, 0.0000,
 103,    1,   2,1.000,
12.0, 0.7620,
13.0, 0.0000,
 106,    1,   2,1.000,
 6.0, 0.5588,
 8.0, 0.0000,
 116,    1,   2,1.000,
 1.0, 0.8128,
 3.0, 0.0000,
 123,    1,   2,1.000,
 4.0, 4.2164,
15.0, 0.0000,
 125,    1,   2,1.000,
 4.0, 2.2098,
 6.0, 0.0000,
 129,    1,   2,1.000,
20.0, 0.2794,
21.0, 0.0000,
 132,    1,   2,1.000,
23.0, 0.2540,
24.0, 0.0000,
 133,    1,   2,1.000,
 8.0, 0.1270,
 9.0, 0.0000,
 137,    1,   2,1.000,
 1.0, 0.8636,
 2.0, 0.0000,
 146,    1,   2,1.000,
 7.0, 0.3810,
 9.0, 0.0000,
 147,    1,   2,1.000,
 5.0, 7.1374,
20.0, 0.0000,
 148,    1,   2,1.000,
 7.0, 0.2794,
 8.0, 0.0000,
 149,    1,   2,1.000,
 7.0, 0.2032,
 8.0, 0.0000,
 156,    1,   2,1.000,
 9.0, 0.3302,
11.0, 0.0000,
 164,    1,   2,1.000,
15.0, 0.5588,
19.0, 0.0000,
 167,    1,   2,1.000,
 0.0, 1.3208,
```

```
  3.0, 0.0000,
  177,    1,    2,1.000,
 16.0, 1.3208,
 20.0, 0.0000,
  181,    1,    2,1.000,
 11.0, 4.5212,
 24.0, 0.0000,
  182,    1,    2,1.000,
  4.0, 0.5080,
 14.0, 0.0000,
  183,    1,    2,1.000,
  9.0, 0.4318,
 13.0, 0.0000,
  184,    1,    2,1.000,
  1.0, 3.2004,
 16.0, 0.0000,
  186,    1,    2,1.000,
 13.0, 0.0508,
 14.0, 0.0000,
  189,    1,    2,1.000,
  7.0, 0.0254,
  8.0, 0.0000,
  192,    1,    2,1.000,
 16.0, 0.4572,
 18.0, 0.0000,
  197,    1,    2,1.000,
  4.0, 0.9652,
  8.0, 0.0000,
  198,    1,    2,1.000,
 15.0, 0.6604,
 20.0, 0.0000,
  222,    1,    2,1.000,
 10.0, 1.4986,
 11.0, 0.0000,
  226,    1,    2,1.000,
 14.0, 2.2352,
 17.0, 0.0000,
  250,    1,    2,1.000,
  6.0, 0.3302,
  7.0, 0.0000,
  251,    1,    2,1.000,
  7.0, 0.5588,
  8.0, 0.0000,
  252,    1,    2,1.000,
  4.0, 1.0922,
  9.0, 0.0000,
  262,    1,    2,1.000,
  4.0, 1.3462,
 12.0, 0.0000,
  280,    1,    2,1.000,
  4.0, 0.1016,
  5.0, 0.0000,
  281,    1,    2,1.000,
  8.0, 1.6510,
```

```
18.0, 0.0000,
 282,    1,    2,1.000,
 0.0, 3.5306,
11.0, 0.0000,
 291,    1,    2,1.000,
10.0, 2.5400,
14.0, 0.0000,
 292,    1,    2,1.000,
 0.0, 2.1590,
24.0, 0.0000,
 294,    1,    2,1.000,
 8.0, 0.6858,
11.0, 0.0000,
 295,    1,    2,1.000,
 1.0, 0.7112,
11.0, 0.0000,
 296,    1,    2,1.000,
16.0, 0.1270,
17.0, 0.0000,
 297,    1,    2,1.000,
16.0, 0.4064,
18.0, 0.0000,
 298,    1,    2,1.000,
 8.0, 0.1270,
 9.0, 0.0000,
 300,    1,    2,1.000,
 5.0, 0.0762,
 6.0, 0.0000,
 301,    1,    2,1.000,
10.0, 0.2032,
11.0, 0.0000,
 305,    1,    2,1.000,
 3.0, 0.5334,
22.0, 0.0000,
 306,    1,    2,1.000,
17.0, 0.2286,
21.0, 0.0000,
 307,    1,    2,1.000,
 3.0, 0.2286,
 4.0, 0.0000,
 308,    1,    2,1.000,
18.0, 0.7620,
23.0, 0.0000,
 337,    1,    2,1.000,
 9.0, 3.5814,
23.0, 0.0000,
 338,    1,    2,1.000,
11.0, 0.1270,
12.0, 0.0000,
 342,    1,    2,1.000,
17.0, 1.3716,
24.0, 0.0000,
 343,    1,    2,1.000,
 0.0, 2.7686,
```

```
 7.0, 0.0000,
 346,   1,   2,1.000,
14.0, 0.1270,
15.0, 0.0000,
 357,   1,   2,1.000,
 1.0, 2.1336,
12.0, 0.0000,
 364,   1,   2,1.000,
23.0, 0.2032,
24.0, 0.0000,
```

```
  73               NWATER (Total for 2003 =  80.2132 cm)
  12,    1,    2,1.000,
 8.0, 1.3208,
21.0, 0.0000,
  25,    1,    2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
  26,    1,    2,1.000,
 9.0, 0.1016,
10.0, 0.0000,
  36,    1,    2,1.000,
19.0, 0.9144,
24.0, 0.0000,
  37,    1,    2,1.000,
 0.0, 0.7112,
10.0, 0.0000,
  40,    1,    2,1.000,
 5.0, 0.3048,
 6.0, 0.0000,
  44,    1,    2,1.000,
 0.0, 0.3810,
 4.0, 0.0000,
  45,    1,    2,1.000,
 5.0, 0.6350,
10.0, 0.0000,
  51,    1,    2,1.000,
 8.0, 2.0066,
23.0, 0.0000,
  52,    1,    2,1.000,
 6.0, 3.3020,
24.0, 0.0000,
  53,    1,    2,1.000,
 0.0, 0.1778,
 1.0, 0.0000,
  55,    1,    2,1.000,
18.0, 1.3208,
23.0, 0.0000,
  57,    1,    2,1.000,
13.0, 0.0762,
14.0, 0.0000,
  60,    1,    2,1.000,
 3.0, 0.0254,
 4.0, 0.0000,
  62,    1,    2,1.000,
 7.0, 0.5842,
 9.0, 0.0000,
  77,    1,    2,1.000,
 4.0, 1.4732,
 7.0, 0.0000,
  81,    1,    2,1.000,
13.0, 0.9652,
18.0, 0.0000,
  94,    1,    2,1.000,
 7.0, 0.6350,
```

```
  8.0, 0.0000,
  112,    1,    2,1.000,
 12.0, 0.2032,
 13.0, 0.0000,
  113,    1,    2,1.000,
 16.0, 4.3180,
 24.0, 0.0000,
  120,    1,    2,1.000,
  0.0, 0.4064,
  5.0, 0.0000,
  121,    1,    2,1.000,
 12.0, 0.9398,
 17.0, 0.0000,
  122,    1,    2,1.000,
 22.0, 0.2794,
 23.0, 0.0000,
  132,    1,    2,1.000,
 16.0, 0.2794,
 17.0, 0.0000,
  133,    1,    2,1.000,
  4.0, 1.4986,
 18.0, 0.0000,
  135,    1,    2,1.000,
  0.0, 2.1590,
 22.0, 0.0000,
  136,    1,    2,1.000,
  8.0, 0.1524,
  9.0, 0.0000,
  140,    1,    2,1.000,
 11.0, 1.4224,
 16.0, 0.0000,
  141,    1,    2,1.000,
 12.0, 1.0668,
 20.0, 0.0000,
  145,    1,    2,1.000,
  3.0, 1.2954,
  6.0, 0.0000,
  146,    1,    2,1.000,
 11.0, 0.7366,
 15.0, 0.0000,
  155,    1,    2,1.000,
 20.0, 0.3810,
 22.0, 0.0000,
  156,    1,    2,1.000,
  0.0, 3.2512,
 23.0, 0.0000,
  157,    1,    2,1.000,
  0.0, 1.0922,
 14.0, 0.0000,
  159,    1,    2,1.000,
  0.0, 1.4986,
  9.0, 0.0000,
  162,    1,    2,1.000,
 17.0, 0.0508,
```

```
18.0, 0.0000,
 163,    1,    2,1.000,
 9.0, 0.6604,
16.0, 0.0000,
 164,    1,    2,1.000,
 0.0, 1.3970,
11.0, 0.0000,
 166,    1,    2,1.000,
18.0, 1.1684,
22.0, 0.0000,
 177,    1,    2,1.000,
 0.0, 0.7366,
 2.0, 0.0000,
 185,    1,    2,1.000,
 9.0, 0.2032,
10.0, 0.0000,
 187,    1,    2,1.000,
20.0, 0.1778,
21.0, 0.0000,
 188,    1,    2,1.000,
19.0, 1.9812,
24.0, 0.0000,
 191,    1,    2,1.000,
 4.0, 0.5588,
 6.0, 0.0000,
 197,    1,    2,1.000,
 6.0, 0.0762,
 7.0, 0.0000,
 211,    1,    2,1.000,
15.0, 3.4290,
24.0, 0.0000,
 221,    1,    2,1.000,
 3.0, 3.4036,
12.0, 0.0000,
 223,    1,    2,1.000,
 8.0, 0.7620,
11.0, 0.0000,
 224,    1,    2,1.000,
 8.0, 1.5748,
12.0, 0.0000,
 225,    1,    2,1.000,
 8.0, 1.6764,
19.0, 0.0000,
 226,    1,    2,1.000,
 9.0, 0.5588,
10.0, 0.0000,
 234,    1,    2,1.000,
21.0, 0.4572,
23.0, 0.0000,
 238,    1,    2,1.000,
13.0, 0.2794,
14.0, 0.0000,
 242,    1,    2,1.000,
17.0, 1.2192,
```

```
22.0, 0.0000,
 243,    1,    2,1.000,
 9.0, 0.1778,
10.0, 0.0000,
 244,    1,    2,1.000,
 1.0, 0.5842,
 4.0, 0.0000,
 254,    1,    2,1.000,
 4.0, 3.6576,
14.0, 0.0000,
 255,    1,    2,1.000,
17.0, 0.3302,
19.0, 0.0000,
 257,    1,    2,1.000,
 8.0, 1.3716,
13.0, 0.0000,
 261,    1,    2,1.000,
 8.0, 1.6764,
13.0, 0.0000,
 278,    1,    2,1.000,
 0.0, 3.4036,
 6.0, 0.0000,
 279,    1,    2,1.000,
 4.0, 1.0414,
 7.0, 0.0000,
 281,    1,    2,1.000,
 9.0, 0.5334,
10.0, 0.0000,
 282,    1,    2,1.000,
13.0, 4.3434,
20.0, 0.0000,
 284,    1,    2,1.000,
18.0, 0.1270,
19.0, 0.0000,
 311,    1,    2,1.000,
 4.0, 0.5842,
 6.0, 0.0000,
 312,    1,    2,1.000,
 6.0, 0.1270,
 7.0, 0.0000,
 313,    1,    2,1.000,
 5.0, 0.1270,
 6.0, 0.0000,
 321,    1,    2,1.000,
12.0, 3.8100,
16.0, 0.0000,
 327,    1,    2,1.000,
 3.0, 0.0508,
 4.0, 0.0000,
 346,    1,    2,1.000,
11.0, 1.7526,
19.0, 0.0000,
 361,    1,    2,1.000,
22.0, 0.1524,
```

```
23.0, 0.0000,
 362,   1,   2,1.000,
 3.0, 0.0508,
 4.0, 0.0000,
```

```
  91,                 NWATER (Total for 2004 =  128.8796 cm)
   1,    1,    2,1.000,
 3.0, 0.0508,
 4.0, 0.0000,
   4,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
  15,    1,    2,1.000,
13.0, 0.2794,
14.0, 0.0000,
  16,    1,    2,1.000,
 1.0, 7.1882,
24.0, 0.0000,
  18,    1,    2,1.000,
 3.0, 0.2032,
 4.0, 0.0000,
  24,    1,    2,1.000,
12.0, 0.3556,
14.0, 0.0000,
  32,    1,    2,1.000,
 0.0, 1.3970,
11.0, 0.0000,
  35,    1,    2,1.000,
 3.0, 0.8890,
 7.0, 0.0000,
  36,    1,    2,1.000,
 8.0, 0.3810,
10.0, 0.0000,
  42,    1,    2,1.000,
 4.0, 1.9304,
20.0, 0.0000,
  45,    1,    2,1.000,
 3.0, 0.8890,
 6.0, 0.0000,
  54,    1,    2,1.000,
12.0, 0.0762,
13.0, 0.0000,
  55,    1,    2,1.000,
 0.0, 1.1176,
 6.0, 0.0000,
  56,    1,    2,1.000,
 8.0, 3.5560,
19.0, 0.0000,
  60,    1,    2,1.000,
 7.0, 1.2700,
13.0, 0.0000,
  62,    1,    2,1.000,
 7.0, 0.0508,
 8.0, 0.0000,
  63,    1,    2,1.000,
14.0, 0.2032,
15.0, 0.0000,
  64,    1,    2,1.000,
14.0, 1.8288,
```

```
16.0, 0.0000,
  72,    1,    2,1.000,
 5.0, 0.0508,
 6.0, 0.0000,
  73,    1,    2,1.000,
 5.0, 0.1524,
 6.0, 0.0000,
  74,    1,    2,1.000,
 3.0, 1.7272,
17.0, 0.0000,
  88,    1,    2,1.000,
 8.0, 0.6604,
12.0, 0.0000,
  97,    1,    2,1.000,
 3.0, 1.6002,
11.0, 0.0000,
  98,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 102,    1,    2,1.000,
18.0, 0.3048,
20.0, 0.0000,
 103,    1,    2,1.000,
19.0, 0.2540,
20.0, 0.0000,
 104,    1,    2,1.000,
12.0, 0.0762,
13.0, 0.0000,
 115,    1,    2,1.000,
 0.0, 8.9154,
17.0, 0.0000,
 116,    1,    2,1.000,
 0.0, 3.7846,
15.0, 0.0000,
 117,    1,    2,1.000,
17.0, 0.9652,
18.0, 0.0000,
 120,    1,    2,1.000,
 5.0, 0.1270,
 6.0, 0.0000,
 122,    1,    2,1.000,
 1.0, 4.1910,
20.0, 0.0000,
 130,    1,    2,1.000,
 8.0, 0.1270,
 9.0, 0.0000,
 133,    1,    2,1.000,
20.0, 0.0254,
21.0, 0.0000,
 135,    1,    2,1.000,
 5.0, 0.6350,
 8.0, 0.0000,
 149,    1,    2,1.000,
 9.0, 0.7620,
```

```
12.0, 0.0000,
 152,    1,    2,1.000,
23.0, 0.0254,
24.0, 0.0000,
 153,    1,    2,1.000,
 0.0, 0.7366,
22.0, 0.0000,
 154,    1,    2,1.000,
22.0, 0.1270,
23.0, 0.0000,
 155,    1,    2,1.000,
 0.0, 2.5908,
14.0, 0.0000,
 157,    1,    2,1.000,
 8.0, 0.1524,
 9.0, 0.0000,
 160,    1,    2,1.000,
 6.0, 0.5842,
 8.0, 0.0000,
 161,    1,    2,1.000,
 1.0, 5.4610,
19.0, 0.0000,
 162,    1,    2,1.000,
14.0, 3.6576,
20.0, 0.0000,
 168,    1,    2,1.000,
11.0, 0.0508,
12.0, 0.0000,
 179,    1,    2,1.000,
 8.0, 0.3810,
10.0, 0.0000,
 181,    1,    2,1.000,
12.0, 3.8354,
24.0, 0.0000,
 182,    1,    2,1.000,
 0.0, 4.1402,
12.0, 0.0000,
 183,    1,    2,1.000,
23.0, 0.2286,
24.0, 0.0000,
 207,    1,    2,1.000,
16.0, 0.0508,
17.0, 0.0000,
 211,    1,    2,1.000,
 1.0, 8.7630,
 5.0, 0.0000,
 212,    1,    2,1.000,
 9.0, 0.8636,
13.0, 0.0000,
 232,    1,    2,1.000,
 3.0, 1.6002,
 8.0, 0.0000,
 233,    1,    2,1.000,
 2.0, 9.7790,
```

```
21.0, 0.0000,
 234,   1,   2,1.000,
 5.0, 0.9652,
 8.0, 0.0000,
 235,   1,   2,1.000,
14.0, 0.1524,
15.0, 0.0000,
 236,   1,   2,1.000,
 6.0, 0.4572,
 8.0, 0.0000,
 242,   1,   2,1.000,
 8.0, 0.6604,
10.0, 0.0000,
 251,   1,   2,1.000,
10.0, 1.4732,
17.0, 0.0000,
 259,   1,   2,1.000,
 9.0, 0.2032,
10.0, 0.0000,
 262,   1,   2,1.000,
 8.0, 0.0508,
 9.0, 0.0000,
 276,   1,   2,1.000,
 4.0, 0.0508,
 5.0, 0.0000,
 278,   1,   2,1.000,
 2.0, 0.2540,
 3.0, 0.0000,
 279,   1,   2,1.000,
 7.0, 2.7940,
19.0, 0.0000,
 280,   1,   2,1.000,
 6.0, 0.1524,
 7.0, 0.0000,
 281,   1,   2,1.000,
 8.0, 0.1524,
 9.0, 0.0000,
 282,   1,   2,1.000,
 8.0, 0.1778,
 9.0, 0.0000,
 284,   1,   2,1.000,
 3.0, 0.5588,
16.0, 0.0000,
 288,   1,   2,1.000,
19.0, 0.0762,
20.0, 0.0000,
 297,   1,   2,1.000,
14.0, 0.7272,
18.0, 0.0000,
 299,   1,   2,1.000,
11.0, 2.0320,
15.0, 0.0000,
 300,   1,   2,1.000,
16.0, 1.6002,
```

```
19.0, 0.0000,
 302,    1,    2,1.000,
 4.0, 0.0762,
 5.0, 0.0000,
 304,    1,    2,1.000,
12.0, 0.1778,
13.0, 0.0000,
 306,    1,    2,1.000,
 0.0, 5.2832,
20.0, 0.0000,
 307,    1,    2,1.000,
18.0, 0.8128,
24.0, 0.0000,
 308,    1,    2,1.000,
16.0, 1.1430,
20.0, 0.0000,
 319,    1,    2,1.000,
 9.0, 0.3556,
15.0, 0.0000,
 320,    1,    2,1.000,
 0.0, 1.1176,
12.0, 0.0000,
 321,    1,    2,1.000,
 3.0, 0.2032,
 4.0, 0.0000,
 322,    1,    2,1.000,
 3.0, 1.2954,
10.0, 0.0000,
 323,    1,    2,1.000,
 8.0, 6.0452,
19.0, 0.0000,
 326,    1,    2,1.000,
 3.0, 0.2032,
 4.0, 0.0000,
 327,    1,    2,1.000,
 0.0, 0.2286,
 1.0, 0.0000,
 328,    1,    2,1.000,
 1.0, 4.3942,
14.0, 0.0000,
 329,    1,    2,1.000,
17.0, 0.7874,
22.0, 0.0000,
 334,    1,    2,1.000,
10.0, 0.0508,
11.0, 0.0000,
 335,    1,    2,1.000,
 0.0, 1.4732,
 9.0, 0.0000,
 340,    1,    2,1.000,
 7.0, 0.1270,
 8.0, 0.0000,
 342,    1,    2,1.000,
17.0, 1.3462,
```

```
18.0, 0.0000,
 357,   1,   2,1.000,
 7.0, 0.1016,
 8.0, 0.0000,
 358,   1,   2,1.000,
19.0, 0.9652,
22.0, 0.0000,
```

```
  73,                   NWATER (Total for 2005 =  58.6740 cm)
   3,    1,    2,1.000,
 5.0, 3.3020,
20.0, 0.0000,
   4,    1,    2,1.000,
13.0, 5.2070,
24.0, 0.0000,
   5,    1,    2,1.000,
12.0, 0.4318,
16.0, 0.0000,
   6,    1,    2,1.000,
 8.0, 0.3302,
10.0, 0.0000,
   7,    1,    2,1.000,
13.0, 0.0508,
14.0, 0.0000,
  13,    1,    2,1.000,
 8.0, 0.1270,
 9.0, 0.0000,
  28,    1,    2,1.000,
11.0, 2.1082,
24.0, 0.0000,
  29,    1,    2,1.000,
 3.0, 0.0508,
 4.0, 0.0000,
  31,    1,    2,1.000,
 4.0, 1.2446,
18.0, 0.0000,
  33,    1,    2,1.000,
 3.0, 1.1176,
17.0, 0.0000,
  37,    1,    2,1.000,
11.0, 0.2540,
12.0, 0.0000,
  38,    1,    2,1.000,
 9.0, 0.0254,
10.0, 0.0000,
  44,    1,    2,1.000,
 3.0, 0.5588,
 5.0, 0.0000,
  51,    1,    2,1.000,
 8.0, 0.0508,
 9.0, 0.0000,
  54,    1,    2,1.000,
 3.0, 2.4384,
15.0, 0.0000,
  55,    1,    2,1.000,
 3.0, 0.9144,
 8.0, 0.0000,
  58,    1,    2,1.000,
 3.0, 1.6256,
13.0, 0.0000,
  61,    1,    2,1.000,
20.0, 0.8890,
```

```
23.0, 0.0000,
  62,    1,    2,1.000,
 8.0, 0.0254,
 9.0, 0.0000,
  63,    1,    2,1.000,
 4.0, 0.2794,
 5.0, 0.0000,
  64,    1,    2,1.000,
 9.0, 0.0508,
10.0, 0.0000,
  68,    1,    2,1.000,
11.0, 0.0254,
12.0, 0.0000,
  75,    1,    2,1.000,
11.0, 0.0508,
12.0, 0.0000,
  79,    1,    2,1.000,
 4.0, 0.0254,
 5.0, 0.0000,
  80,    1,    2,1.000,
17.0, 0.3048,
19.0, 0.0000,
  81,    1,    2,1.000,
 8.0, 0.3048,
 9.0, 0.0000,
  85,    1,    2,1.000,
 5.0, 0.1778,
 6.0, 0.0000,
  86,    1,    2,1.000,
 2.0, 3.9878,
14.0, 0.0000,
  87,    1,    2,1.000,
 1.0, 0.3810,
 2.0, 0.0000,
 101,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
 115,    1,    2,1.000,
10.0, 0.0508,
11.0, 0.0000,
 120,    1,    2,1.000,
 5.0, 0.1270,
 6.0, 0.0000,
 124,    1,    2,1.000,
 1.0, 1.0922,
 5.0, 0.0000,
 125,    1,    2,1.000,
 1.0, 1.6510,
11.0, 0.0000,
 126,    1,    2,1.000,
 4.0, 0.0508,
 5.0, 0.0000,
 129,    1,    2,1.000,
 3.0, 0.3302,
```

```
  5.0, 0.0000,
  134,    1,    2,1.000,
  1.0, 2.2606,
  4.0, 0.0000,
  146,    1,    2,1.000,
 10.0, 0.1270,
 11.0, 0.0000,
  149,    1,    2,1.000,
  5.0, 1.6510,
 12.0, 0.0000,
  150,    1,    2,1.000,
  3.0, 0.0508,
  4.0, 0.0000,
  152,    1,    2,1.000,
  1.0, 1.6764,
 12.0, 0.0000,
  155,    1,    2,1.000,
  9.0, 1.6510,
 13.0, 0.0000,
  165,    1,    2,1.000,
 20.0, 0.7620,
 24.0, 0.0000,
  184,    1,    2,1.000,
 13.0, 0.0762,
 14.0, 0.0000,
  187,    1,    2,1.000,
 18.0, 0.0508,
 19.0, 0.0000,
  189,    1,    2,1.000,
  4.0, 0.0762,
  5.0, 0.0000,
  193,    1,    2,1.000,
 12.0, 0.9652,
 17.0, 0.0000,
  195,    1,    2,1.000,
  9.0, 2.9718,
 20.0, 0.0000,
  196,    1,    2,1.000,
  9.0, 0.4826,
 11.0, 0.0000,
  197,    1,    2,1.000,
  8.0, 0.3556,
  9.0, 0.0000,
  198,    1,    2,1.000,
  4.0, 0.5080,
  5.0, 0.0000,
  217,    1,    2,1.000,
 17.0, 0.2794,
 18.0, 0.0000,
  218,    1,    2,1.000,
  7.0, 0.2032,
  8.0, 0.0000,
  220,    1,    2,1.000,
 13.0, 0.0254,
```

```
14.0, 0.0000,
 221,    1,    2,1.000,
10.0, 0.0762,
11.0, 0.0000,
 223,    1,    2,1.000,
17.0, 0.0508,
18.0, 0.0000,
 228,    1,    2,1.000,
 6.0, 0.0254,
 7.0, 0.0000,
 229,    1,    2,1.000,
 8.0, 0.8636,
12.0, 0.0000,
 241,    1,    2,1.000,
 8.0, 4.9784,
18.0, 0.0000,
 259,    1,    2,1.000,
 0.0, 0.6350,
 3.0, 0.0000,
 260,    1,    2,1.000,
22.0, 0.0508,
23.0, 0.0000,
 272,    1,    2,1.000,
19.0, 3.7338,
24.0, 0.0000,
 280,    1,    2,1.000,
 5.0, 0.0762,
 6.0, 0.0000,
 281,    1,    2,1.000,
18.0, 0.1524,
19.0, 0.0000,
 283,    1,    2,1.000,
 5.0, 0.1524,
 6.0, 0.0000,
 285,    1,    2,1.000,
 9.0, 0.8636,
14.0, 0.0000,
 304,    1,    2,1.000,
11.0, 0.7366,
12.0, 0.0000,
 305,    1,    2,1.000,
13.0, 1.6256,
14.0, 0.0000,
 331,    1,    2,1.000,
 9.0, 0.1778,
10.0, 0.0000,
 342,    1,    2,1.000,
19.0, 0.2032,
20.0, 0.0000,
 348,    1,    2,1.000,
 9.0, 0.1270,
10.0, 0.0000,
 351,    1,    2,1.000,
 6.0, 0.1524,
```

```
 7.0, 0.0000,
 355,   1,   2,1.000,
 9.0, 0.1016,
10.0, 0.0000,
```

```
  60,               NWATER (Total for 2006 =  91.2622 cm)
  17,    1,    2,1.000,
 6.0, 0.0508,
 7.0, 0.0000,
  22,    1,    2,1.000,
 1.0, 0.6858,
 9.0, 0.0000,
  23,    1,    2,1.000,
 4.0, 0.8636,
 7.0, 0.0000,
  28,    1,    2,1.000,
 2.0, 4.0132,
 9.0, 0.0000,
  29,    1,    2,1.000,
 8.0, 2.2352,
12.0, 0.0000,
  33,    1,    2,1.000,
 2.0, 0.1778,
 3.0, 0.0000,
  35,    1,    2,1.000,
 6.0, 0.1270,
 7.0, 0.0000,
  41,    1,    2,1.000,
 8.0, 0.0508,
 9.0, 0.0000,
  42,    1,    2,1.000,
18.0, 0.0762,
19.0, 0.0000,
  50,    1,    2,1.000,
 3.0, 0.1524,
 4.0, 0.0000,
  52,    1,    2,1.000,
 5.0, 0.1270,
 6.0, 0.0000,
  53,    1,    2,1.000,
 8.0, 0.0762,
 9.0, 0.0000,
  56,    1,    2,1.000,
 0.0, 4.0386,
15.0, 0.0000,
  57,    1,    2,1.000,
 8.0, 1.0668,
11.0, 0.0000,
  68,    1,    2,1.000,
 9.0, 0.0254,
10.0, 0.0000,
  77,    1,    2,1.000,
 0.0, 0.1270,
 1.0, 0.0000,
  78,    1,    2,1.000,
 0.0, 6.7818,
13.0, 0.0000,
  79,    1,    2,1.000,
 6.0, 8.5344,
```

```
19.0, 0.0000,
  82,    1,    2,1.000,
 6.0, 0.1016,
 7.0, 0.0000,
  89,    1,    2,1.000,
 9.0, 0.0762,
10.0, 0.0000,
 110,    1,    2,1.000,
 6.0, 1.5240,
16.0, 0.0000,
 111,    1,    2,1.000,
 0.0, 1.0414,
 7.0, 0.0000,
 116,    1,    2,1.000,
16.0, 1.1430,
22.0, 0.0000,
 119,    1,    2,1.000,
 0.0, 1.3716,
 7.0, 0.0000,
 120,    1,    2,1.000,
 3.0, 0.0254,
 4.0, 0.0000,
 123,    1,    2,1.000,
15.0, 1.0922,
20.0, 0.0000,
 124,    1,    2,1.000,
 0.0, 0.7620,
 2.0, 0.0000,
 125,    1,    2,1.000,
 5.0, 2.2352,
13.0, 0.0000,
 126,    1,    2,1.000,
 8.0, 2.1082,
20.0, 0.0000,
 153,    1,    2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
 169,    1,    2,1.000,
 1.0, 4.3180,
15.0, 0.0000,
 176,    1,    2,1.000,
12.0, 0.4318,
15.0, 0.0000,
 184,    1,    2,1.000,
12.0, 0.2794,
13.0, 0.0000,
 185,    1,    2,1.000,
11.0, 0.1016,
12.0, 0.0000,
 186,    1,    2,1.000,
10.0, 4.1148,
22.0, 0.0000,
 187,    1,    2,1.000,
 9.0, 0.5334,
```

```
11.0, 0.0000,
 219,   1,   2,1.000,
 0.0, 1.8034,
 6.0, 0.0000,
 240,   1,   2,1.000,
 5.0, 0.3048,
 7.0, 0.0000,
 241,   1,   2,1.000,
 4.0, 3.0988,
 9.0, 0.0000,
 242,   1,   2,1.000,
 1.0, 0.7112,
13.0, 0.0000,
 248,   1,   2,1.000,
 1.0, 0.7620,
 3.0, 0.0000,
 255,   1,   2,1.000,
 8.0, 0.2032,
 9.0, 0.0000,
 261,   1,   2,1.000,
 8.0, 0.5080,
10.0, 0.0000,
 267,   1,   2,1.000,
20.0, 0.2794,
21.0, 0.0000,
 283,   1,   2,1.000,
 7.0, 1.9050,
11.0, 0.0000,
 284,   1,   2,1.000,
 7.0, 4.5466,
20.0, 0.0000,
 288,   1,   2,1.000,
12.0, 2.2606,
24.0, 0.0000,
 289,   1,   2,1.000,
 2.0, 2.7178,
 5.0, 0.0000,
 290,   1,   2,1.000,
13.0, 0.6096,
15.0, 0.0000,
 298,   1,   2,1.000,
 0.0, 0.4826,
10.0, 0.0000,
 299,   1,   2,1.000,
 8.0, 0.2286,
 9.0, 0.0000,
 310,   1,   2,1.000,
 3.0, 9.2710,
16.0, 0.0000,
 332,   1,   2,1.000,
 5.0, 0.2286,
 6.0, 0.0000,
 334,   1,   2,1.000,
15.0, 2.6670,
```

```
23.0, 0.0000,
 335,   1,   2,1.000,
 0.0, 0.2286,
 1.0, 0.0000,
 345,   1,   2,1.000,
 7.0, 0.0254,
 8.0, 0.0000,
 354,   1,   2,1.000,
 3.0, 0.2794,
 5.0, 0.0000,
 355,   1,   2,1.000,
 7.0, 1.3208,
19.0, 0.0000,
 359,   1,   2,1.000,
 7.0, 1.6256,
19.0, 0.0000,
 364,   1,   2,1.000,
 2.0, 4.6990,
16.0, 0.0000,
```

```
    92,                NWATER (Total for 2007 = 142.0876 cm)
     4,    1,    2,1.000,
  14.0, 3.1750,
  18.0, 0.0000,
     7,    1,    2,1.000,
   4.0, 0.0762,
   5.0, 0.0000,
    13,    1,    2,1.000,
   6.0, 4.9276,
  19.0, 0.0000,
    14,    1,    2,1.000,
  14.0, 1.0668,
  16.0, 0.0000,
    15,    1,    2,1.000,
   9.0, 2.0320,
  14.0, 0.0000,
    17,    1,    2,1.000,
   3.0, 0.5080,
   4.0, 0.0000,
    18,    1,    2,1.000,
   7.0, 0.1524,
   8.0, 0.0000,
    20,    1,    2,1.000,
   0.0, 0.7620,
   1.0, 0.0000,
    21,    1,    2,1.000,
  10.0, 1.0160,
  11.0, 0.0000,
    32,    1,    2,1.000,
  10.0, 0.7874,
  11.0, 0.0000,
    33,    1,    2,1.000,
  12.0, 1.5494,
  14.0, 0.0000,
    44,    1,    2,1.000,
   5.0, 0.2032,
   6.0, 0.0000,
    55,    1,    2,1.000,
   8.0, 0.0254,
   9.0, 0.0000,
    56,    1,    2,1.000,
   9.0, 0.0762,
  10.0, 0.0000,
    71,    1,    2,1.000,
  13.0, 2.7686,
  14.0, 0.0000,
    73,    1,    2,1.000,
  21.0, 0.6350,
  22.0, 0.0000,
    81,    1,    2,1.000,
   8.0, 0.0508,
   9.0, 0.0000,
    85,    1,    2,1.000,
   6.0, 0.0508,
```

```
  7.0, 0.0000,
   86,    1,    2,1.000,
 13.0, 2.5146,
 15.0, 0.0000,
   89,    1,    2,1.000,
 18.0, 4.7752,
 23.0, 0.0000,
   90,    1,    2,1.000,
  7.0,10.6680,
 17.0, 0.0000,
   94,    1,    2,1.000,
  9.0, 0.1016,
 10.0, 0.0000,
   98,    1,    2,1.000,
 10.0, 0.7620,
 12.0, 0.0000,
  101,    1,    2,1.000,
  9.0, 0.0508,
 10.0, 0.0000,
  104,    1,    2,1.000,
  9.0, 0.6604,
 12.0, 0.0000,
  108,    1,    2,1.000,
  9.0, 1.4732,
 12.0, 0.0000,
  115,    1,    2,1.000,
 14.0, 0.9398,
 15.0, 0.0000,
  121,    1,    2,1.000,
 10.0, 1.5748,
 18.0, 0.0000,
  122,    1,    2,1.000,
 18.0, 1.6510,
 19.0, 0.0000,
  123,    1,    2,1.000,
 17.0, 2.9210,
 24.0, 0.0000,
  124,    1,    2,1.000,
 15.0, 0.0508,
 16.0, 0.0000,
  129,    1,    2,1.000,
  7.0, 0.0508,
  8.0, 0.0000,
  133,    1,    2,1.000,
 19.0, 2.0828,
 21.0, 0.0000,
  134,    1,    2,1.000,
 15.0, 0.0508,
 16.0, 0.0000,
  135,    1,    2,1.000,
 10.0, 0.1016,
 11.0, 0.0000,
  145,    1,    2,1.000,
 16.0, 1.9050,
```

```
21.0, 0.0000,
 146,   1,   2,1.000,
 3.0, 8.3820,
 7.0, 0.0000,
 147,   1,   2,1.000,
 7.0, 4.5974,
 9.0, 0.0000,
 148,   1,   2,1.000,
16.0, 0.9144,
18.0, 0.0000,
 149,   1,   2,1.000,
 9.0, 0.0762,
10.0, 0.0000,
 150,   1,   2,1.000,
 7.0, 4.4450,
14.0, 0.0000,
 153,   1,   2,1.000,
 0.0, 1.7272,
 4.0, 0.0000,
 154,   1,   2,1.000,
 8.0, 0.1524,
 9.0, 0.0000,
 155,   1,   2,1.000,
 9.0, 1.8796,
12.0, 0.0000,
 166,   1,   2,1.000,
10.0, 0.5588,
13.0, 0.0000,
 167,   1,   2,1.000,
 3.0, 1.5748,
15.0, 0.0000,
 168,   1,   2,1.000,
 6.0, 3.6576,
13.0, 0.0000,
 169,   1,   2,1.000,
 6.0, 2.1590,
 7.0, 0.0000,
 171,   1,   2,1.000,
 5.0, 0.0508,
 6.0, 0.0000,
 173,   1,   2,1.000,
 6.0, 0.0508,
 7.0, 0.0000,
 174,   1,   2,1.000,
 8.0, 0.0508,
 9.0, 0.0000,
 177,   1,   2,1.000,
 1.0, 0.1270,
 2.0, 0.0000,
 178,   1,   2,1.000,
 3.0, 7.3406,
22.0, 0.0000,
 179,   1,   2,1.000,
 2.0, 1.8542,
```

```
10.0, 0.0000,
 180,    1,   2,1.000,
17.0, 1.7526,
23.0, 0.0000,
 181,    1,   2,1.000,
 1.0, 0.9652,
 2.0, 0.0000,
 182,    1,   2,1.000,
15.0, 1.9558,
17.0, 0.0000,
 184,    1,   2,1.000,
 8.0, 1.7018,
16.0, 0.0000,
 185,    1,   2,1.000,
14.0, 0.2794,
15.0, 0.0000,
 186,    1,   2,1.000,
 9.0, 0.4572,
11.0, 0.0000,
 187,    1,   2,1.000,
 6.0, 0.4064,
 8.0, 0.0000,
 188,    1,   2,1.000,
 2.0, 0.0254,
 3.0, 0.0000,
 190,    1,   2,1.000,
 7.0, 4.2418,
23.0, 0.0000,
 202,    1,   2,1.000,
13.0, 2.9972,
24.0, 0.0000,
 203,    1,   2,1.000,
 7.0, 0.1270,
19.0, 0.0000,
 205,    1,   2,1.000,
15.0, 1.2700,
17.0, 0.0000,
 208,    1,   2,1.000,
17.0, 0.2032,
18.0, 0.0000,
 214,    1,   2,1.000,
17.0, 3.3528,
18.0, 0.0000,
 215,    1,   2,1.000,
17.0, 1.4478,
18.0, 0.0000,
 229,    1,   2,1.000,
19.0, 0.2794,
20.0, 0.0000,
 230,    1,   2,1.000,
20.0, 1.6256,
22.0, 0.0000,
 246,    1,   2,1.000,
 9.0, 0.0762,
```

```
10.0, 0.0000,
 248,    1,   2,1.000,
 3.0, 10.668,
18.0, 0.0000,
 253,    1,   2,1.000,
 2.0, 0.0762,
 3.0, 0.0000,
 254,    1,   2,1.000,
 7.0, 0.0508,
 8.0, 0.0000,
 277,    1,   2,1.000,
19.0, 0.0254,
20.0, 0.0000,
 280,    1,   2,1.000,
 5.0, 0.5080,
 8.0, 0.0000,
 282,    1,   2,1.000,
 2.0, 0.0508,
 3.0, 0.0000,
 288,    1,   2,1.000,
 0.0, 3.0480,
12.0, 0.0000,
 289,    1,   2,1.000,
 8.0, 2.0320,
14.0, 0.0000,
 296,    1,   2,1.000,
 9.0, 1.6002,
11.0, 0.0000,
 321,    1,   2,1.000,
13.0, 0.0254,
14.0, 0.0000,
 327,    1,   2,1.000,
18.0, 0.0762,
19.0, 0.0000,
 328,    1,   2,1.000,
12.0, 0.5842,
15.0, 0.0000,
 329,    1,   2,1.000,
 2.0, 3.7338,
14.0, 0.0000,
 330,    1,   2,1.000,
 9.0, 0.2794,
10.0, 0.0000,
 344,    1,   2,1.000,
 4.0, 0.6350,
 5.0, 0.0000,
 346,    1,   2,1.000,
16.0, 0.5080,
18.0, 0.0000,
 347,    1,   2,1.000,
 1.0, 0.8890,
 2.0, 0.0000,
 349,    1,   2,1.000,
 8.0, 1.8034,
```

```
10.0, 0.0000,
 360,    1,    2,1.000,
22.0, 0.3048,
23.0, 0.0000,
 362,    1,    2,1.000,
 7.0, 0.2286,
 8.0, 0.0000,
```

```
  62,                NWATER (Total for 2008 = 82.6008 cm)
   22,    1,    2,1.000,
1.0, 0.1016,
24.0, 0.0000,
   25,    1,    2,1.000,
10.0, 0.6350,
16.0, 0.0000,
   26,    1,    2,1.000,
10.0, 1.0414,
16.0, 0.0000,
   43,    1,    2,1.000,
5.0, 2.5908,
12.0, 0.0000,
   47,    1,    2,1.000,
2.0, 0.8636,
16.0, 0.0000,
   48,    1,    2,1.000,
2.0, 0.9906,
16.0, 0.0000,
   52,    1,    2,1.000,
8.0, 0.1016,
9.0, 0.0000,
   63,    1,    2,1.000,
4.0, 2.1590,
19.0, 0.0000,
   64,    1,    2,1.000,
4.0, 0.5334,
19.0, 0.0000,
   67,    1,    2,1.000,
13.0, 1.6256,
18.0, 0.0000,
   70,    1,    2,1.000,
2.0, 1.2192,
11.0, 0.0000,
   79,    1,    2,1.000,
9.0, 6.5786,
21.0, 0.0000,
   83,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   89,    1,    2,1.000,
17.0, 0.0508,
18.0, 0.0000,
   91,    1,    2,1.000,
17.0, 3.2258,
24.0, 0.0000,
   95,    1,    2,1.000,
17.0, 1.6510,
24.0, 0.0000,
   101,    1,    2,1.000,
4.0, 2.2860,
8.0, 0.0000,
   109,    1,    2,1.000,
20.0, 1.8288,
```

```
24.0, 0.0000,
   115,    1,    2,1.000,
22.0, 5.8928,
24.0, 0.0000,
   118,    1,    2,1.000,
5.0, 2.9210,
14.0, 0.0000,
   127,    1,    2,1.000,
10.0, 0.5842,
12.0, 0.0000,
   128,    1,    2,1.000,
9.0, 0.1270,
13.0, 0.0000,
   135,    1,    2,1.000,
1.0, 1.8796,
5.0, 0.0000,
   136,    1,    2,1.000,
15.0, 0.0762,
16.0, 0.0000,
   149,    1,    2,1.000,
15.0, 1.2700,
19.0, 0.0000,
   158,    1,    2,1.000,
15.0, 0.1016,
19.0, 0.0000,
   171,    1,    2,1.000,
9.0, 3.3528,
14.0, 0.0000,
   172,    1,    2,1.000,
13.0, 0.1270,
15.0, 0.0000,
   178,    1,    2,1.000,
20.0, 2.1336,
24.0, 0.0000,
   191,    1,    2,1.000,
19.0, 1.9050,
22.0, 0.0000,
   196,    1,    2,1.000,
13.0, 0.0254,
14.0, 0.0000,
   197,    1,    2,1.000,
19.0, 0.9652,
22.0, 0.0000,
   198,    1,    2,1.000,
20.0, 0.3810,
22.0, 0.0000,
   207,    1,    2,1.000,
9.0, 0.0508,
10.0, 0.0000,
   213,    1,    2,1.000,
9.0, 0.2540,
10.0, 0.0000,
   214,    1,    2,1.000,
9.0, 0.2540,
```

```
10.0, 0.0000,
   219,   1,   2,1.000,
9.0, 0.2540,
10.0, 0.0000,
   224,   1,   2,1.000,
9.0, 0.0508,
10.0, 0.0000,
   228,   1,   2,1.000,
6.0, 3.8100,
13.0, 0.0000,
   229,   1,   2,1.000,
6.0, 1.7272,
13.0, 0.0000,
   231,   1,   2,1.000,
11.0, 0.1524,
17.0, 0.0000,
   232,   1,   2,1.000,
11.0, 7.0104,
17.0, 0.0000,
   233,   1,   2,1.000,
14.0, 1.7272,
19.0, 0.0000,
   247,   1,   2,1.000,
20.0, 0.1778,
21.0, 0.0000,
   253,   1,   2,1.000,
1.0, 3.9624,
15.0, 0.0000,
   254,   1,   2,1.000,
1.0, 0.9652,
15.0, 0.0000,
   255,   1,   2,1.000,
11.0, 1.4986,
15.0, 0.0000,
   258,   1,   2,1.000,
14.0, 0.9144,
17.0, 0.0000,
   269,   1,   2,1.000,
11.0, 0.2540,
12.0, 0.0000,
   280,   1,   2,1.000,
7.0, 3.2512,
15.0, 0.0000,
   281,   1,   2,1.000,
1.0, 1.6002,
5.0, 0.0000,
   290,   1,   2,1.000,
14.0, 3.5306,
18.0, 0.0000,
   297,   1,   2,1.000,
10.0, 0.1524,
11.0, 0.0000,
   311,   1,   2,1.000,
4.0, 0.6858,
```

```
5.0, 0.0000,
   333,   1,   2,1.000,
12.0, 0.0254,
13.0, 0.0000,
   344,   1,   2,1.000,
22.0, 0.2540,
24.0, 0.0000,
   345,   1,   2,1.000,
23.0, 0.0508,
24.0, 0.0000,
   351,   1,   2,1.000,
1.0, 0.1270,
24.0, 0.0000,
   352,   1,   2,1.000,
1.0, 0.1524,
24.0, 0.0000,
   353,   1,   2,1.000,
1.0, 0.1270,
24.0, 0.0000,
   354,   1,   2,1.000,
1.0, 0.1778,
24.0, 0.0000,
   358,   1,   2,1.000,
9.0, 0.0762,
10.0, 0.0000,
```

```
  82,                NWATER (Total for 2009 = 118.745 cm)
   3,    1,    2,1.000,
1.0, 0.0762,
24.0, 0.0000,
   5,    1,    2,1.000,
14.0, 0.1524,
19.0, 0.0000,
   6,    1,    2,1.000,
5.0, 2.6670,
23.0, 0.0000,
   27,    1,    2,1.000,
8.0, 0.3556,
11.0, 0.0000,
   28,    1,    2,1.000,
15.0, 0.5080,
20.0, 0.0000,
   40,    1,    2,1.000,
5.0, 1.3970,
24.0, 0.0000,
   42,    1,    2,1.000,
23.0, 0.8890,
24.0, 0.0000,
   48,    1,    2,1.000,
1.0, 0.0254,
2.0, 0.0000,
   70,    1,    2,1.000,
6.0, 2.2860,
23.0, 0.0000,
   71,    1,    2,1.000,
10.0, 4.5720,
24.0, 0.0000,
   72,    1,    2,1.000,
14.0, 4.9530,
24.0, 0.0000,
   73,    1,    2,1.000,
14.0, 3.3020,
24.0, 0.0000,
   85,    1,    2,1.000,
1.0, 1.6002,
24.0, 0.0000,
   90,    1,    2,1.000,
7.0, 0.6096,
13.0, 0.0000,
   92,    1,    2,1.000,
5.0, 0.2540,
11.0, 0.0000,
   102,    1,    2,1.000,
9.0, 1.5240,
24.0, 0.0000,
   107,    1,    2,1.000,
1.0, 0.1270,
24.0, 0.0000,
   108,    1,    2,1.000,
1.0, 2.7178,
```

```
24.0, 0.0000,
   117,   1,   2,1.000,
1.0, 1.4224,
24.0, 0.0000,
   118,   1,   2,1.000,
1.0, 1.3970,
24.0, 0.0000,
   119,   1,   2,1.000,
20.0, 0.5842,
21.0, 0.0000,
   123,   1,   2,1.000,
5.0, 0.8636,
10.0, 0.0000,
   131,   1,   2,1.000,
14.0, 0.0762,
15.0, 0.0000,
   134,   1,   2,1.000,
7.0, 0.6858,
9.0, 0.0000,
   136,   1,   2,1.000,
1.0, 0.1270,
5.0, 0.0000,
   137,   1,   2,1.000,
6.0, 1.1430,
24.0, 0.0000,
   144,   1,   2,1.000,
19.0, 1.2700,
24.0, 0.0000,
   145,   1,   2,1.000,
10.0, 1.3208,
24.0, 0.0000,
   147,   1,   2,1.000,
1.0, 2.6416,
18.0, 0.0000,
   153,   1,   2,1.000,
11.0, 0.3556,
15.0, 0.0000,
   154,   1,   2,1.000,
3.0, 0.5080,
8.0, 0.0000,
   162,   1,   2,1.000,
7.0, 1.1176,
24.0, 0.0000,
   164,   1,   2,1.000,
12.0, 2.4130,
24.0, 0.0000,
   187,   1,   2,1.000,
1.0, 0.4064,
24.0, 0.0000,
   198,   1,   2,1.000,
6.0, 0.4064,
13.0, 0.0000,
   202,   1,   2,1.000,
12.0, 1.0414,
```

```
24.0, 0.0000,
   203,   1,   2,1.000,
4.0, 0.1016,
11.0, 0.0000,
   208,   1,   2,1.000,
1.0, 0.2032,
2.0, 0.0000,
   209,   1,   2,1.000,
1.0, 2.0066,
24.0, 0.0000,
   211,   1,   2,1.000,
7.0, 2.4638,
20.0, 0.0000,
   213,   1,   2,1.000,
2.0, 0.5842,
19.0, 0.0000,
   214,   1,   2,1.000,
1.0, 2.4638,
24.0, 0.0000,
   226,   1,   2,1.000,
9.0, 0.3048,
11.0, 0.0000,
   227,   1,   2,1.000,
18.0, 1.6764,
24.0, 0.0000,
   240,   1,   2,1.000,
12.0, 0.2032,
13.0, 0.0000,
   247,   1,   2,1.000,
3.0, 3.9878,
16.0, 0.0000,
   248,   1,   2,1.000,
18.0, 0.1270,
21.0, 0.0000,
   254,   1,   2,1.000,
18.0, 0.8382,
24.0, 0.0000,
   255,   1,   2,1.000,
1.0, 7.3406,
23.0, 0.0000,
   256,   1,   2,1.000,
1.0, 10.2616,
24.0, 0.0000,
   257,   1,   2,1.000,
6.0, 1.0922,
19.0, 0.0000,
   258,   1,   2,1.000,
10.0, 1.7526,
15.0, 0.0000,
   265,   1,   2,1.000,
4.0, 3.5814,
24.0, 0.0000,
   266,   1,   2,1.000,
13.0, 0.2540,
```

```
15.0, 0.0000,
   275,   1,   2,1.000,
16.0, 0.2540,
23.0, 0.0000,
   277,   1,   2,1.000,
8.0, 1.7272,
16.0, 0.0000,
   278,   1,   2,1.000,
8.0, 0.5080,
12.0, 0.0000,
   279,   1,   2,1.000,
1.0, 0.0508,
2.0, 0.0000,
   282,   1,   2,1.000,
5.0, 3.5052,
17.0, 0.0000,
   287,   1,   2,1.000,
11.0, 0.6858,
16.0, 0.0000,
   288,   1,   2,1.000,
11.0, 0.0508,
12.0, 0.0000,
   294,   1,   2,1.000,
7.0, 1.0922,
22.0, 0.0000,
   295,   1,   2,1.000,
3.0, 11.2522,
23.0, 0.0000,
   296,   1,   2,1.000,
23.0, 0.1524,
24.0, 0.0000,
   299,   1,   2,1.000,
1.0, 3.1496,
8.0, 0.0000,
   300,   1,   2,1.000,
1.0, 0.8382,
8.0, 0.0000,
   302,   1,   2,1.000,
9.0, 0.0762,
10.0, 0.0000,
   303,   1,   2,1.000,
9.0, 0.3556,
14.0, 0.0000,
   304,   1,   2,1.000,
21.0, 0.0762,
22.0, 0.0000,
   320,   1,   2,1.000,
5.0, 0.0762,
13.0, 0.0000,
   324,   1,   2,1.000,
13.0, 4.0894,
22.0, 0.0000,
   325,   1,   2,1.000,
15.0, 1.0414,
```

```
18.0, 0.0000,
   334,   1,   2,1.000,
17.0, 0.1270,
18.0, 0.0000,
   336,   1,   2,1.000,
1.0, 1.8288,
13.0, 0.0000,
   337,   1,   2,1.000,
13.0, 0.2540,
15.0, 0.0000,
   341,   1,   2,1.000,
1.0, 0.1016,
2.0, 0.0000,
   342,   1,   2,1.000,
1.0, 0.1524,
2.0, 0.0000,
   346,   1,   2,1.000,
1.0, 0.2286,
2.0, 0.0000,
   347,   1,   2,1.000,
1.0, 0.0762,
2.0, 0.0000,
   348,   1,   2,1.000,
10.0, 0.0254,
11.0, 0.0000,
   358,   1,   2,1.000,
7.0, 0.9144,
13.0, 0.0000,
   364,   1,   2,1.000,
1.0, 1.0160,
12.0, 0.0000,
```

```
  65,                NWATER (Total for 2010 = 96.2152 cm)
   7,    1,    2,1.000,
11.0, 0.1016,
12.0, 0.0000,
   15,    1,    2,1.000,
18.0, 0.1270,
23.0, 0.0000,
   16,    1,    2,1.000,
11.0, 1.1430,
15.0, 0.0000,
   21,    1,    2,1.000,
15.0, 0.0762,
16.0, 0.0000,
   24,    1,    2,1.000,
15.0, 0.2794,
17.0, 0.0000,
   29,    1,    2,1.000,
14.0, 9.0678,
24.0, 0.0000,
   30,    1,    2,1.000,
1.0, 0.1524,
2.0, 0.0000,
   35,    1,    2,1.000,
2.0, 0.9144,
10.0, 0.0000,
   36,    1,    2,1.000,
11.0, 0.3302,
13.0, 0.0000,
   39,    1,    2,1.000,
11.0, 0.3810,
13.0, 0.0000,
   40,    1,    2,1.000,
10.0, 1.7780,
22.0, 0.0000,
   52,    1,    2,1.000,
13.0, 0.0254,
14.0, 0.0000,
   55,    1,    2,1.000,
10.0, 0.5842,
15.0, 0.0000,
   58,    1,    2,1.000,
17.0, 0.0762,
18.0, 0.0000,
   60,    1,    2,1.000,
6.0, 0.6604,
17.0, 0.0000,
   61,    1,    2,1.000,
12.0, 1.4224,
19.0, 0.0000,
   66,    1,    2,1.000,
11.0, 0.4064,
19.0, 0.0000,
   67,    1,    2,1.000,
11.0, 1.2700,
```

```
19.0, 0.0000,
   68,   1,   2,1.000,
11.0, 1.0668,
19.0, 0.0000,
   75,   1,   2,1.000,
6.0, 1.1430,
9.0, 0.0000,
   79,   1,   2,1.000,
6.0, 2.1590,
10.0, 0.0000,
   84,   1,   2,1.000,
18.0, 1.7780,
24.0, 0.0000,
   93,   1,   2,1.000,
5.0, 0.6350,
7.0, 0.0000,
   107,   1,   2,1.000,
10.0, 0.1270,
11.0, 0.0000,
   108,   1,   2,1.000,
1.0, 3.4798,
24.0, 0.0000,
   109,   1,   2,1.000,
13.0, 0.1270,
17.0, 0.0000,
   113,   1,   2,1.000,
12.0, 0.3302,
13.0, 0.0000,
   114,   1,   2,1.000,
3.0, 1.2192,
15.0, 0.0000,
   121,   1,   2,1.000,
12.0, 0.4572,
15.0, 0.0000,
   124,   1,   2,1.000,
12.0, 0.5080,
15.0, 0.0000,
   134,   1,   2,1.000,
16.0, 0.0508,
17.0, 0.0000,
   135,   1,   2,1.000,
15.0, 2.9210,
19.0, 0.0000,
   137,   1,   2,1.000,
19.0, 0.1524,
20.0, 0.0000,
   138,   1,   2,1.000,
9.0, 0.5334,
12.0, 0.0000,
   140,   1,   2,1.000,
5.0, 0.8382,
15.0, 0.0000,
   180,   1,   2,1.000,
1.0, 1.7780,
```

```
17.0, 0.0000,
   181,    1,    2,1.000,
1.0, 2.3622,
17.0, 0.0000,
   182,    1,    2,1.000,
1.0, 2.2860,
17.0, 0.0000,
   183,    1,    2,1.000,
14.0, 0.1270,
15.0, 0.0000,
   184,    1,    2,1.000,
15.0, 0.8890,
17.0, 0.0000,
   185,    1,    2,1.000,
15.0, 0.0762,
17.0, 0.0000,
   190,    1,    2,1.000,
14.0, 0.5080,
23.0, 0.0000,
   191,    1,    2,1.000,
9.0, 1.6002,
15.0, 0.0000,
   205,    1,    2,1.000,
12.0, 0.1270,
13.0, 0.0000,
   208,    1,    2,1.000,
16.0, 1.4732,
22.0, 0.0000,
   219,    1,    2,1.000,
18.0, 6.7056,
23.0, 0.0000,
   229,    1,    2,1.000,
17.0, 0.6604,
20.0, 0.0000,
   237,    1,    2,1.000,
13.0, 0.2540,
15.0, 0.0000,
   245,    1,    2,1.000,
1.0, 5.4864,
22.0, 0.0000,
   246,    1,    2,1.000,
6.0, 1.2954,
13.0, 0.0000,
   250,    1,    2,1.000,
19.0, 1.4224,
23.0, 0.0000,
   251,    1,    2,1.000,
2.0, 16.7640,
22.0, 0.0000,
   252,    1,    2,1.000,
3.0, 3.7592,
10.0, 0.0000,
   261,    1,    2,1.000,
23.0, 0.0508,
```

```
24.0, 0.0000,
   266,   1,   2,1.000,
23.0, 0.0762,
24.0, 0.0000,
   269,   1,   2,1.000,
20.0, 1.6764,
24.0, 0.0000,
   297,   1,   2,1.000,
15.0, 2.4384,
21.0, 0.0000,
   307,   1,   2,1.000,
14.0, 2.1844,
23.0, 0.0000,
   308,   1,   2,1.000,
1.0, 0.3810,
12.0, 0.0000,
   316,   1,   2,1.000,
16.0, 0.0508,
17.0, 0.0000,
   317,   1,   2,1.000,
16.0, 0.8890,
17.0, 0.0000,
   333,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   359,   1,   2,1.000,
1.0, 2.1082,
4.0, 0.0000,
   362,   1,   2,1.000,
23.0, 0.0762,
24.0, 0.0000,
   363,   1,   2,1.000,
1.0, 2.2352,
8.0, 0.0000,
```

```
  50,                 NWATER (Total for 2011 = 65.2018 cm)
   9,    1,    2,1.000,
6.0, 2.8956,
17.0, 0.0000,
   10,    1,    2,1.000,
20.0, 1.3208,
24.0, 0.0000,
   15,    1,    2,1.000,
6.0, 0.1270,
11.0, 0.0000,
   16,    1,    2,1.000,
14.0, 0.7874,
18.0, 0.0000,
   31,    1,    2,1.000,
14.0, 0.3302,
18.0, 0.0000,
   32,    1,    2,1.000,
6.0, 1.2700,
12.0, 0.0000,
   38,    1,    2,1.000,
10.0, 0.5588,
15.0, 0.0000,
   40,    1,    2,1.000,
5.0, 0.3556,
11.0, 0.0000,
   67,    1,    2,1.000,
12.0, 0.1524,
13.0, 0.0000,
   89,    1,    2,1.000,
5.0, 0.0762,
6.0, 0.0000,
   94,    1,    2,1.000,
7.0, 0.7112,
11.0, 0.0000,
   101,    1,    2,1.000,
3.0, 3.6830,
13.0, 0.0000,
   105,    1,    2,1.000,
13.0, 0.1778,
14.0, 0.0000,
   111,    1,    2,1.000,
18.0, 0.0762,
19.0, 0.0000,
   115,    1,    2,1.000,
18.0, 0.1270,
19.0, 0.0000,
   116,    1,    2,1.000,
1.0, 3.5052,
24.0, 0.0000,
   121,    1,    2,1.000,
1.0, 0.0508,
2.0, 0.0000,
   122,    1,    2,1.000,
1.0, 3.3020,
```

```
24.0, 0.0000,
   123,   1,   2,1.000,
5.0, 5.3848,
18.0, 0.0000,
   131,   1,   2,1.000,
23.0, 0.0762,
24.0, 0.0000,
   132,   1,   2,1.000,
1.0, 2.2098,
8.0, 0.0000,
   141,   1,   2,1.000,
2.0, 0.4064,
20.0, 0.0000,
   166,   1,   2,1.000,
21.0, 0.2032,
23.0, 0.0000,
   173,   1,   2,1.000,
21.0, 0.2540,
23.0, 0.0000,
   185,   1,   2,1.000,
1.0, 2.6162,
12.0, 0.0000,
   225,   1,   2,1.000,
9.0, 0.4064,
15.0, 0.0000,
   226,   1,   2,1.000,
12.0, 0.0508,
13.0, 0.0000,
   241,   1,   2,1.000,
20.0, 0.0254,
21.0, 0.0000,
   260,   1,   2,1.000,
20.0, 2.5400,
22.0, 0.0000,
   261,   1,   2,1.000,
7.0, 0.1524,
13.0, 0.0000,
   273,   1,   2,1.000,
21.0, 0.5588,
24.0, 0.0000,
   282,   1,   2,1.000,
2.0, 9.1440,
12.0, 0.0000,
   283,   1,   2,1.000,
2.0, 2.4384,
23.0, 0.0000,
   285,   1,   2,1.000,
2.0, 0.2540,
4.0, 0.0000,
   291,   1,   2,1.000,
2.0, 0.6858,
6.0, 0.0000,
   301,   1,   2,1.000,
1.0, 0.8382,
```

```
13.0, 0.0000,
   312,   1,   2,1.000,
13.0, 1.1430,
20.0, 0.0000,
   319,   1,   2,1.000,
4.0, 0.4572,
7.0, 0.0000,
   320,   1,   2,1.000,
12.0, 0.5080,
15.0, 0.0000,
   326,   1,   2,1.000,
11.0, 1.6764,
13.0, 0.0000,
   330,   1,   2,1.000,
15.0, 0.4064,
17.0, 0.0000,
   336,   1,   2,1.000,
12.0, 0.4572,
14.0, 0.0000,
   337,   1,   2,1.000,
11.0, 0.6096,
16.0, 0.0000,
   338,   1,   2,1.000,
2.0, 3.9624,
24.0, 0.0000,
   339,   1,   2,1.000,
1.0, 4.0132,
8.0, 0.0000,
   348,   1,   2,1.000,
3.0, 0.3048,
5.0, 0.0000,
   349,   1,   2,1.000,
1.0, 2.0320,
12.0, 0.0000,
   350,   1,   2,1.000,
1.0, 0.2032,
2.0, 0.0000,
   354,   1,   2,1.000,
20.0, 1.3208,
24.0, 0.0000,
   359,   1,   2,1.000,
1.0, 0.3556,
13.0, 0.0000,
```

```
  54,              NWATER (Total for 2012 = 69.4690 cm)
   10,    1,    2,1.000,
2.0, 2.5908,
24.0, 0.0000,
   26,    1,    2,1.000,
2.0, 2.2860,
6.0, 0.0000,
   34,    1,    2,1.000,
4.0, 0.0508,
6.0, 0.0000,
   35,    1,    2,1.000,
3.0, 0.1270,
4.0, 0.0000,
   41,    1,    2,1.000,
3.0, 0.2540,
5.0, 0.0000,
   44,    1,    2,1.000,
3.0, 0.6096,
8.0, 0.0000,
   45,    1,    2,1.000,
3.0, 0.0508,
4.0, 0.0000,
   46,    1,    2,1.000,
3.0, 0.1270,
4.0, 0.0000,
   49,    1,    2,1.000,
3.0, 5.7150,
20.0, 0.0000,
   69,    1,    2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   70,    1,    2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   71,    1,    2,1.000,
14.0, 3.9624,
24.0, 0.0000,
   72,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   80,    1,    2,1.000,
1.0, 10.0584,
24.0, 0.0000,
   82,    1,    2,1.000,
1.0, 0.1778,
2.0, 0.0000,
   94,    1,    2,1.000,
1.0, 0.1270,
2.0, 0.0000,
   95,    1,    2,1.000,
13.0, 0.6350,
15.0, 0.0000,
   106,    1,    2,1.000,
8.0, 0.0508,
```

```
10.0, 0.0000,
   107,    1,    2,1.000,
8.0, 0.5588,
10.0, 0.0000,
   111,    1,    2,1.000,
5.0, 0.1524,
13.0, 0.0000,
   126,    1,    2,1.000,
1.0, 2.7178,
10.0, 0.0000,
   129,    1,    2,1.000,
14.0, 0.6096,
18.0, 0.0000,
   132,    1,    2,1.000,
3.0, 0.3556,
15.0, 0.0000,
   133,    1,    2,1.000,
3.0, 1.4732,
15.0, 0.0000,
   150,    1,    2,1.000,
7.0, 0.5588,
12.0, 0.0000,
   151,    1,    2,1.000,
5.0, 2.5400,
9.0, 0.0000,
   152,    1,    2,1.000,
17.0, 0.5588,
23.0, 0.0000,
   153,    1,    2,1.000,
17.0, 0.5080,
23.0, 0.0000,
   159,    1,    2,1.000,
1.0, 3.0988,
7.0, 0.0000,
   160,    1,    2,1.000,
7.0, 0.1524,
8.0, 0.0000,
   165,    1,    2,1.000,
15.0, 3.7084,
17.0, 0.0000,
   167,    1,    2,1.000,
18.0, 0.1270,
19.0, 0.0000,
   170,    1,    2,1.000,
12.0, 0.2540,
24.0, 0.0000,
   190,    1,    2,1.000,
18.0, 0.9652,
24.0, 0.0000,
   192,    1,    2,1.000,
3.0, 0.9144,
10.0, 0.0000,
   193,    1,    2,1.000,
1.0, 0.1270,
```

```
2.0, 0.0000,
   198,    1,    2,1.000,
23.0, 0.2540,
24.0, 0.0000,
   199,    1,    2,1.000,
16.0, 0.8636,
22.0, 0.0000,
   232,    1,    2,1.000,
14.0, 1.0668,
22.0, 0.0000,
   234,    1,    2,1.000,
7.0, 0.2032,
13.0, 0.0000,
   235,    1,    2,1.000,
7.0, 2.6416,
13.0, 0.0000,
   238,    1,    2,1.000,
9.0, 0.1016,
10.0, 0.0000,
   240,    1,    2,1.000,
14.0, 0.3048,
15.0, 0.0000,
   258,    1,    2,1.000,
12.0, 1.6510,
20.0, 0.0000,
   259,    1,    2,1.000,
12.0, 0.2540,
13.0, 0.0000,
   260,    1,    2,1.000,
12.0, 0.3810,
13.0, 0.0000,
   261,    1,    2,1.000,
9.0, 0.5588,
16.0, 0.0000,
   273,    1,    2,1.000,
9.0, 0.8890,
16.0, 0.0000,
   274,    1,    2,1.000,
6.0, 7.5692,
23.0, 0.0000,
   288,    1,    2,1.000,
2.0, 1.1430,
3.0, 0.0000,
   317,    1,    2,1.000,
1.0, 0.1524,
2.0, 0.0000,
   350,    1,    2,1.000,
2.0, 0.6350,
5.0, 0.0000,
   360,    1,    2,1.000,
12.0, 1.0160,
21.0, 0.0000,
   361,    1,    2,1.000,
8.0, 2.2860,
```

13.0, 0.0000,

```
  63,                NWATER (Total for 2013 = 84.7090 cm)
   1,    1,    2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   4,    1,    2,1.000,
1.0, 0.1016,
2.0, 0.0000,
   9,    1,    2,1.000,
1.0, 7.7470,
17.0, 0.0000,
   10,    1,    2,1.000,
3.0, 1.7272,
10.0, 0.0000,
   30,    1,    2,1.000,
17.0, 0.5588,
18.0, 0.0000,
   35,    1,    2,1.000,
17.0, 0.6350,
20.0, 0.0000,
   41,    1,    2,1.000,
4.0, 1.6510,
5.0, 0.0000,
   43,    1,    2,1.000,
7.0, 0.5080,
9.0, 0.0000,
   51,    1,    2,1.000,
3.0, 0.1524,
11.0, 0.0000,
   52,    1,    2,1.000,
9.0, 1.1176,
15.0, 0.0000,
   68,    1,    2,1.000,
9.0, 0.1016,
10.0, 0.0000,
   69,    1,    2,1.000,
22.0, 3.5052,
24.0, 0.0000,
   82,    1,    2,1.000,
8.0, 0.0762,
9.0, 0.0000,
   89,    1,    2,1.000,
3.0, 1.9050,
9.0, 0.0000,
   92,    1,    2,1.000,
6.0, 0.1270,
16.0, 0.0000,
   93,    1,    2,1.000,
2.0, 4.1910,
19.0, 0.0000,
   94,    1,    2,1.000,
5.0, 0.4572,
7.0, 0.0000,
   101,    1,    2,1.000,
10.0, 0.7112,
```

```
13.0, 0.0000,
   108,    1,    2,1.000,
5.0, 2.4130,
12.0, 0.0000,
   117,    1,    2,1.000,
5.0, 0.1270,
6.0, 0.0000,
   130,    1,    2,1.000,
13.0, 1.0668,
15.0, 0.0000,
   131,    1,    2,1.000,
21.0, 0.4572,
22.0, 0.0000,
   145,    1,    2,1.000,
9.0, 3.9116,
21.0, 0.0000,
   146,    1,    2,1.000,
22.0, 0.3048,
24.0, 0.0000,
   150,    1,    2,1.000,
22.0, 0.5588,
24.0, 0.0000,
   157,    1,    2,1.000,
5.0, 1.6256,
6.0, 0.0000,
   160,    1,    2,1.000,
7.0, 0.5080,
8.0, 0.0000,
   169,    1,    2,1.000,
8.0, 1.6764,
9.0, 0.0000,
   171,    1,    2,1.000,
2.0, 2.3368,
10.0, 0.0000,
   193,    1,    2,1.000,
2.0, 0.3048,
5.0, 0.0000,
   195,    1,    2,1.000,
2.0, 0.3048,
5.0, 0.0000,
   196,    1,    2,1.000,
8.0, 7.4676,
24.0, 0.0000,
   197,    1,    2,1.000,
1.0, 2.3876,
22.0, 0.0000,
   198,    1,    2,1.000,
14.0, 0.1016,
18.0, 0.0000,
   199,    1,    2,1.000,
18.0, 0.3048,
20.0, 0.0000,
   202,    1,    2,1.000,
18.0, 0.1270,
```

```
19.0, 0.0000,
   224,   1,   2,1.000,
14.0, 1.0160,
15.0, 0.0000,
   226,   1,   2,1.000,
7.0, 0.1016,
8.0, 0.0000,
   229,   1,   2,1.000,
2.0, 0.1016,
3.0, 0.0000,
   239,   1,   2,1.000,
2.0, 0.0762,
3.0, 0.0000,
   263,   1,   2,1.000,
1.0, 10.2870,
15.0, 0.0000,
   264,   1,   2,1.000,
2.0, 0.5080,
5.0, 0.0000,
   272,   1,   2,1.000,
14.0, 2.4638,
17.0, 0.0000,
   279,   1,   2,1.000,
19.0, 0.3810,
23.0, 0.0000,
   286,   1,   2,1.000,
19.0, 0.2540,
23.0, 0.0000,
   287,   1,   2,1.000,
2.0, 3.5560,
10.0, 0.0000,
   288,   1,   2,1.000,
18.0, 0.4572,
21.0, 0.0000,
   289,   1,   2,1.000,
14.0, 4.3688,
24.0, 0.0000,
   290,   1,   2,1.000,
22.0, 0.1016,
23.0, 0.0000,
   292,   1,   2,1.000,
2.0, 0.1016,
4.0, 0.0000,
   300,   1,   2,1.000,
22.0, 0.9906,
24.0, 0.0000,
   303,   1,   2,1.000,
14.0, 0.1016,
15.0, 0.0000,
   304,   1,   2,1.000,
14.0, 0.2794,
16.0, 0.0000,
   309,   1,   2,1.000,
20.0, 1.3208,
```

```
24.0, 0.0000,
   310,   1,   2,1.000,
6.0, 0.0508,
7.0, 0.0000,
   326,   1,   2,1.000,
12.0, 1.0668,
14.0, 0.0000,
   327,   1,   2,1.000,
13.0, 0.5588,
15.0, 0.0000,
   328,   1,   2,1.000,
13.0, 0.4064,
15.0, 0.0000,
   329,   1,   2,1.000,
2.0, 1.5748,
8.0, 0.0000,
   330,   1,   2,1.000,
8.0, 0.2540,
10.0, 0.0000,
   340,   1,   2,1.000,
1.0, 0.8128,
9.0, 0.0000,
   348,   1,   2,1.000,
9.0, 0.1270,
11.0, 0.0000,
   355,   1,   2,1.000,
4.0, 1.9304,
15.0, 0.0000,
```

```
   56,              NWATER (Total for 2014 = 77.9018 cm)
    9,    1,    2,1.000,
1.0, 0.2032,
3.0, 0.0000,
    10,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    11,   1,    2,1.000,
1.0, 0.2540,
4.0, 0.0000,
    34,   1,    2,1.000,
1.0, 1.1684,
11.0, 0.0000,
    35,   1,    2,1.000,
1.0, 0.3556,
4.0, 0.0000,
    38,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    39,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    57,   1,    2,1.000,
1.0, 0.8636,
7.0, 0.0000,
    75,   1,    2,1.000,
1.0, 1.2192,
11.0, 0.0000,
    83,   1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
    86,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    88,   1,    2,1.000,
1.0, 0.6858,
7.0, 0.0000,
    93,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    94,   1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
    96,   1,    2,1.000,
1.0, 1.0160,
11.0, 0.0000,
    97,   1,    2,1.000,
1.0, 1.5748,
11.0, 0.0000,
    98,   1,    2,1.000,
1.0, 1.5748,
11.0, 0.0000,
    104,   1,    2,1.000,
1.0, 0.8128,
```

```
7.0, 0.0000,
   108,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   111,   1,   2,1.000,
1.0, 0.4064,
4.0, 0.0000,
   112,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   129,   1,   2,1.000,
1.0, 7.2136,
24.0, 0.0000,
   133,   1,   2,1.000,
1.0, 6.0452,
24.0, 0.0000,
   134,   1,   2,1.000,
1.0, 1.1684,
11.0, 0.0000,
   145,   1,   2,1.000,
1.0, 2.1844,
16.0, 0.0000,
   147,   1,   2,1.000,
1.0, 1.1176,
11.0, 0.0000,
   160,   1,   2,1.000,
1.0, 5.3848,
24.0, 0.0000,
   161,   1,   2,1.000,
1.0, 5.5880,
24.0, 0.0000,
   164,   1,   2,1.000,
1.0, 0.6604,
7.0, 0.0000,
   173,   1,   2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   174,   1,   2,1.000,
1.0, 8.1280,
24.0, 0.0000,
   175,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   176,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   177,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   196,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   198,   1,   2,1.000,
1.0, 0.0508,
```

```
3.0, 0.0000,
   199,   1,   2,1.000,
1.0, 2.1844,
16.0, 0.0000,
   229,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   230,   1,   2,1.000,
1.0, 6.1976,
24.0, 0.0000,
   241,   1,   2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   255,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   261,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   284,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   285,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   286,   1,   2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   309,   1,   2,1.000,
1.0, 3.3020,
16.0, 0.0000,
   310,   1,   2,1.000,
1.0, 0.8128,
7.0, 0.0000,
   320,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   326,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   327,   1,   2,1.000,
1.0, 2.0320,
16.0, 0.0000,
   339,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   346,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   352,   1,   2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   353,   1,   2,1.000,
1.0, 0.1524,
```

```
3.0, 0.0000,
   357,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   358,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
```

```
  81,                NWATER (Total for 2015 = 184.9882 cm)
   1,   1,   2,1.000,
1.0, 1.0668,
11.0, 0.0000,
   2,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   3,   1,   2,1.000,
1.0, 1.9304,
11.0, 0.0000,
   11,   1,   2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   12,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   13,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   22,   1,   2,1.000,
1.0, 3.7592,
16.0, 0.0000,
   23,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   32,   1,   2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   47,   1,   2,1.000,
1.0, 0.6858,
7.0, 0.0000,
   54,   1,   2,1.000,
1.0, 0.9652,
7.0, 0.0000,
   56,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   57,   1,   2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   58,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   61,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   62,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   63,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   67,   1,   2,1.000,
1.0, 0.1778,
```

```
3.0, 0.0000,
   68,   1,   2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   69,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   77,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   78,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   80,   1,   2,1.000,
1.0, 1.3716,
11.0, 0.0000,
   81,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   95,   1,   2,1.000,
1.0, 2.0320,
16.0, 0.0000,
   96,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   103,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   104,   1,   2,1.000,
1.0, 1.3208,
11.0, 0.0000,
   108,   1,   2,1.000,
1.0, 5.3340,
24.0, 0.0000,
   109,   1,   2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   113,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   114,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   115,   1,   2,1.000,
1.0, 2.6670,
16.0, 0.0000,
   117,   1,   2,1.000,
1.0, 12.9540,
24.0, 0.0000,
   118,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   126,   1,   2,1.000,
1.0, 1.4224,
```

```
11.0, 0.0000,
   128,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   130,   1,   2,1.000,
1.0, 3.9116,
16.0, 0.0000,
   131,   1,   2,1.000,
1.0, 4.0640,
16.0, 0.0000,
   134,   1,   2,1.000,
1.0, 4.5720,
16.0, 0.0000,
   137,   1,   2,1.000,
1.0, 4.3942,
16.0, 0.0000,
   140,   1,   2,1.000,
1.0, 1.0160,
11.0, 0.0000,
   141,   1,   2,1.000,
1.0, 1.9304,
11.0, 0.0000,
   142,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   143,   1,   2,1.000,
1.0, 0.0762,
3.0, 0.0000,
   144,   1,   2,1.000,
1.0, 6.4770,
24.0, 0.0000,
   145,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   146,   1,   2,1.000,
1.0, 1.1684,
11.0, 0.0000,
   147,   1,   2,1.000,
1.0, 4.1656,
16.0, 0.0000,
   149,   1,   2,1.000,
1.0, 11.2268,
24.0, 0.0000,
   150,   1,   2,1.000,
1.0, 3.7084,
16.0, 0.0000,
   166,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   168,   1,   2,1.000,
1.0, 6.0452,
24.0, 0.0000,
   169,   1,   2,1.000,
1.0, 1.2700,
```

```
11.0, 0.0000,
   178,    1,    2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   181,    1,    2,1.000,
1.0, 0.5080,
7.0, 0.0000,
   232,    1,    2,1.000,
1.0, 1.1430,
11.0, 0.0000,
   233,    1,    2,1.000,
1.0, 1.9812,
11.0, 0.0000,
   252,    1,    2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   295,    1,    2,1.000,
1.0, 9.8044,
24.0, 0.0000,
   296,    1,    2,1.000,
1.0, 9.8044,
24.0, 0.0000,
   297,    1,    2,1.000,
1.0, 9.6520,
24.0, 0.0000,
   298,    1,    2,1.000,
1.0, 1.2700,
11.0, 0.0000,
   303,    1,    2,1.000,
1.0, 1.0160,
11.0, 0.0000,
   304,    1,    2,1.000,
1.0, 11.2268,
24.0, 0.0000,
   305,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   306,    1,    2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   309,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   311,    1,    2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   315,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   320,    1,    2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   321,    1,    2,1.000,
1.0, 2.7940,
```

```
16.0, 0.0000,
   331,   1,   2,1.000,
1.0, 11.4300,
24.0, 0.0000,
   332,   1,   2,1.000,
1.0, 5.0800,
24.0, 0.0000,
   333,   1,   2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   334,   1,   2,1.000,
1.0, 2.2860,
16.0, 0.0000,
   335,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   350,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   361,   1,   2,1.000,
1.0, 2.7940,
16.0, 0.0000,
   362,   1,   2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   363,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
```

```
  84,                NWATER (Total for 2016 = 114.7318 cm)
   7,   1,   2,1.000,
1.0, 1.5748,
11.0, 0.0000,
   53,   1,   2,1.000,
1.0, 1.1176,
11.0, 0.0000,
   54,   1,   2,1.000,
1.0, 3.5560,
16.0, 0.0000,
   55,   1,   2,1.000,
1.0, 1.3208,
11.0, 0.0000,
   68,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   69,   1,   2,1.000,
1.0, 8.1280,
24.0, 0.0000,
   70,   1,   2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   71,   1,   2,1.000,
1.0, 0.6096,
7.0, 0.0000,
   72,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   73,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   79,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   84,   1,   2,1.000,
1.0, 1.0160,
11.0, 0.0000,
   90,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   91,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   101,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   107,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   108,   1,   2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   109,   1,   2,1.000,
1.0, 9.0170,
```

```
24.0, 0.0000,
   110,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   111,   1,   2,1.000,
1.0, 3.3020,
16.0, 0.0000,
   112,   1,   2,1.000,
1.0, 1.9812,
11.0, 0.0000,
   118,   1,   2,1.000,
1.0, 3.6068,
16.0, 0.0000,
   120,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   121,   1,   2,1.000,
1.0, 3.0988,
16.0, 0.0000,
   123,   1,   2,1.000,
1.0, 0.8128,
7.0, 0.0000,
   125,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   130,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   131,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   132,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   133,   1,   2,1.000,
1.0, 3.6576,
16.0, 0.0000,
   137,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   138,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   139,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   140,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   147,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   148,   1,   2,1.000,
1.0, 5.0800,
```

```
24.0, 0.0000,
   149,   1,   2,1.000,
1.0, 1.8288,
11.0, 0.0000,
   150,   1,   2,1.000,
1.0, 2.0320,
16.0, 0.0000,
   153,   1,   2,1.000,
1.0, 2.2860,
16.0, 0.0000,
   154,   1,   2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   155,   1,   2,1.000,
1.0, 6.7564,
24.0, 0.0000,
   156,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   165,   1,   2,1.000,
1.0, 3.9116,
16.0, 0.0000,
   166,   1,   2,1.000,
1.0, 2.2352,
16.0, 0.0000,
   180,   1,   2,1.000,
1.0, 0.4064,
4.0, 0.0000,
   181,   1,   2,1.000,
1.0, 2.9464,
16.0, 0.0000,
   186,   1,   2,1.000,
1.0, 5.7150,
24.0, 0.0000,
   187,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   192,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   210,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   211,   1,   2,1.000,
1.0, 0.8128,
7.0, 0.0000,
   226,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   228,   1,   2,1.000,
1.0, 1.1430,
11.0, 0.0000,
   230,   1,   2,1.000,
1.0, 0.5588,
```

```
7.0, 0.0000,
   232,   1,   2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   233,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   234,   1,   2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   236,   1,   2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   240,   1,   2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   243,   1,   2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   259,   1,   2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   269,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   270,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   271,   1,   2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   281,   1,   2,1.000,
1.0, 1.8796,
11.0, 0.0000,
   282,   1,   2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   288,   1,   2,1.000,
1.0, 1.1684,
11.0, 0.0000,
   289,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   294,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   307,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   308,   1,   2,1.000,
1.0, 2.6416,
16.0, 0.0000,
   309,   1,   2,1.000,
1.0, 0.2794,
```

```
4.0, 0.0000,
   310,   1,   2,1.000,
1.0, 1.7272,
11.0, 0.0000,
   311,   1,   2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   312,   1,   2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   314,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   331,   1,   2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   332,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   333,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   338,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   339,   1,   2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   341,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   358,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   361,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
```

```
  57,                NWATER (Total for 2017 = 77.3684 cm)
   1,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   2,   1,   2,1.000,
1.0, 1.1176,
11.0, 0.0000,
   3,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   14,   1,   2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   15,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   16,   1,   2,1.000,
1.0, 7.9248,
24.0, 0.0000,
   18,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   19,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   22,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   45,   1,   2,1.000,
1.0, 3.6830,
16.0, 0.0000,
   46,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   51,   1,   2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   71,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   88,   1,   2,1.000,
1.0, 2.3876,
16.0, 0.0000,
   137,   1,   2,1.000,
1.0, 1.4224,
11.0, 0.0000,
   140,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   141,   1,   2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   142,   1,   2,1.000,
1.0, 0.6350,
```

```
7.0, 0.0000,
   145,   1,   2,1.000,
1.0, 0.5842,
7.0, 0.0000,
   149,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   152,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   154,   1,   2,1.000,
1.0, 6.9850,
24.0, 0.0000,
   155,   1,   2,1.000,
1.0, 1.0668,
16.0, 0.0000,
   157,   1,   2,1.000,
1.0, 1.6002,
16.0, 0.0000,
   160,   1,   2,1.000,
1.0, 0.5080,
7.0, 0.0000,
   161,   1,   2,1.000,
1.0, 1.3208,
11.0, 0.0000,
   170,   1,   2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   171,   1,   2,1.000,
1.0, 0.6858,
7.0, 0.0000,
   175,   1,   2,1.000,
1.0, 2.7940,
16.0, 0.0000,
   176,   1,   2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   182,   1,   2,1.000,
1.0, 2.2860,
16.0, 0.0000,
   183,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   185,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   191,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   205,   1,   2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   214,   1,   2,1.000,
1.0, 0.4064,
```

```
7.0, 0.0000,
   215,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   219,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   225,   1,   2,1.000,
1.0, 1.4986,
11.0, 0.0000,
   229,   1,   2,1.000,
1.0, 0.6858,
7.0, 0.0000,
   230,   1,   2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   237,   1,   2,1.000,
1.0, 5.2070,
24.0, 0.0000,
   239,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   240,   1,   2,1.000,
1.0, 2.2860,
16.0, 0.0000,
   271,   1,   2,1.000,
1.0, 1.0668,
11.0, 0.0000,
   272,   1,   2,1.000,
1.0, 0.4064,
4.0, 0.0000,
   277,   1,   2,1.000,
1.0, 0.9652,
7.0, 0.0000,
   283,   1,   2,1.000,
1.0, 3.9370,
16.0, 0.0000,
   288,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   295,   1,   2,1.000,
1.0, 2.4130,
16.0, 0.0000,
   305,   1,   2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   313,   1,   2,1.000,
1.0, 4.1148,
16.0, 0.0000,
   316,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   339,   1,   2,1.000,
1.0, 0.0508,
```

```
3.0, 0.0000,
   351,    1,    2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   356,    1,    2,1.000,
1.0, 1.1430,
11.0, 0.0000,
   357,    1,    2,1.000,
1.0, 0.1778,
3.0, 0.0000,
```

```
  67,                NWATER (Total for 2018 = 117.2718 cm)
   1,    1,    2,1.000,
1.0, 0.0762,
3.0, 0.0000,
   8,    1,    2,1.000,
1.0, 0.0762,
3.0, 0.0000,
   26,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   27,    1,    2,1.000,
1.0, 0.3302,
4.0, 0.0000,
   38,    1,    2,1.000,
1.0, 1.0668,
11.0, 0.0000,
   45,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   50,    1,    2,1.000,
1.0, 1.5748,
11.0, 0.0000,
   52,    1,    2,1.000,
1.0, 4.8260,
16.0, 0.0000,
   53,    1,    2,1.000,
1.0, 3.8100,
16.0, 0.0000,
   54,    1,    2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   55,    1,    2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   56,    1,    2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   60,    1,    2,1.000,
1.0, 2.2860,
16.0, 0.0000,
   77,    1,    2,1.000,
1.0, 0.6858,
7.0, 0.0000,
   78,    1,    2,1.000,
1.0, 0.5080,
7.0, 0.0000,
   87,    1,    2,1.000,
1.0, 6.3500,
24.0, 0.0000,
   94,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   104,    1,    2,1.000,
1.0, 0.1270,
```

```
3.0, 0.0000,
   112,    1,    2,1.000,
1.0, 0.7112,
7.0, 0.0000,
   123,    1,    2,1.000,
1.0, 2.6670,
16.0, 0.0000,
   124,    1,    2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   125,    1,    2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   140,    1,    2,1.000,
1.0, 3.7592,
16.0, 0.0000,
   141,    1,    2,1.000,
1.0, 1.2192,
11.0, 0.0000,
   146,    1,    2,1.000,
1.0, 0.0762,
3.0, 0.0000,
   171,    1,    2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   172,    1,    2,1.000,
1.0, 3.6830,
16.0, 0.0000,
   188,    1,    2,1.000,
1.0, 0.6604,
7.0, 0.0000,
   192,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   212,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   222,    1,    2,1.000,
1.0, 6.2992,
24.0, 0.0000,
   223,    1,    2,1.000,
1.0, 7.3660,
24.0, 0.0000,
   224,    1,    2,1.000,
1.0, 2.1590,
16.0, 0.0000,
   225,    1,    2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   247,    1,    2,1.000,
1.0, 1.2192,
11.0, 0.0000,
   249,    1,    2,1.000,
1.0, 4.9276,
```

```
16.0, 0.0000,
   252,   1,   2,1.000,
1.0, 3.0480,
16.0, 0.0000,
   254,   1,   2,1.000,
1.0, 1.1430,
11.0, 0.0000,
   255,   1,   2,1.000,
1.0, 0.6096,
7.0, 0.0000,
   264,   1,   2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   266,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   267,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   269,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   271,   1,   2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   273,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   282,   1,   2,1.000,
1.0, 0.9652,
7.0, 0.0000,
   286,   1,   2,1.000,
1.0, 0.5080,
7.0, 0.0000,
   287,   1,   2,1.000,
1.0, 4.0640,
16.0, 0.0000,
   288,   1,   2,1.000,
1.0, 8.8900,
24.0, 0.0000,
   289,   1,   2,1.000,
1.0, 5.8420,
24.0, 0.0000,
   291,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   293,   1,   2,1.000,
1.0, 1.6510,
11.0, 0.0000,
   298,   1,   2,1.000,
1.0, 4.9530,
16.0, 0.0000,
   305,   1,   2,1.000,
1.0, 2.8448,
```

```
6.0, 0.0000,
   308,   1,   2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   313,   1,   2,1.000,
1.0, 2.4892,
16.0, 0.0000,
   316,   1,   2,1.000,
1.0, 2.2352,
16.0, 0.0000,
   329,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   335,   1,   2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   341,   1,   2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   342,   1,   2,1.000,
1.0, 2.5400,
16.0, 0.0000,
   343,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   347,   1,   2,1.000,
1.0, 0.3556,
4.0, 0.0000,
   348,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   353,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   361,   1,   2,1.000,
1.0, 5.9690,
24.0, 0.0000,
   365,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
```

```
   61,                NWATER (Total for 2019 = 80.3656 cm)
    2,    1,    2,1.000,
1.0, 1.0922,
11.0, 0.0000,
    3,    1,    2,1.000,
1.0, 2.2860,
17.0, 0.0000,
   11,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   12,    1,    2,1.000,
1.0, 0.5588,
7.0, 0.0000,
   19,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   32,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   35,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   38,    1,    2,1.000,
1.0, 0.2286,
3.0, 0.0000,
   40,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   41,    1,    2,1.000,
1.0, 0.6350,
7.0, 0.0000,
   42,    1,    2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   43,    1,    2,1.000,
1.0, 0.7112,
7.0, 0.0000,
   48,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   51,    1,    2,1.000,
1.0, 0.8890,
7.0, 0.0000,
   54,    1,    2,1.000,
1.0, 0.1524,
3.0, 0.0000,
   63,    1,    2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   68,    1,    2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   72,    1,    2,1.000,
1.0, 3.5052,
```

```
17.0, 0.0000,
   97,    1,    2,1.000,
1.0, 2.3876,
17.0, 0.0000,
   103,    1,    2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   104,    1,    2,1.000,
1.0, 3.0480,
17.0, 0.0000,
   108,    1,    2,1.000,
1.0, 2.2860,
17.0, 0.0000,
   114,    1,    2,1.000,
1.0, 5.2324,
24.0, 0.0000,
   115,    1,    2,1.000,
1.0, 1.2192,
11.0, 0.0000,
   118,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   128,    1,    2,1.000,
1.0, 1.7780,
11.0, 0.0000,
   129,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   131,    1,    2,1.000,
1.0, 8.4328,
24.0, 0.0000,
   138,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   149,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   153,    1,    2,1.000,
1.0, 4.6990,
17.0, 0.0000,
   156,    1,    2,1.000,
1.0, 0.4064,
4.0, 0.0000,
   157,    1,    2,1.000,
1.0, 1.0160,
11.0, 0.0000,
   161,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   168,    1,    2,1.000,
1.0, 1.6510,
11.0, 0.0000,
   170,    1,    2,1.000,
1.0, 0.6604,
```

```
7.0, 0.0000,
   175,    1,    2,1.000,
1.0, 5.7404,
24.0, 0.0000,
   188,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   192,    1,    2,1.000,
1.0, 2.9210,
17.0, 0.0000,
   204,    1,    2,1.000,
1.0, 1.0160,
11.0, 0.0000,
   215,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   216,    1,    2,1.000,
1.0, 2.1844,
17.0, 0.0000,
   226,    1,    2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   236,    1,    2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   240,    1,    2,1.000,
1.0, 4.0132,
17.0, 0.0000,
   243,    1,    2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   290,    1,    2,1.000,
1.0, 0.3048,
4.0, 0.0000,
   294,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   299,    1,    2,1.000,
1.0, 6.9596,
24.0, 0.0000,
   302,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   304,    1,    2,1.000,
1.0, 1.5240,
11.0, 0.0000,
   310,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   311,    1,    2,1.000,
1.0, 1.0668,
11.0, 0.0000,
   312,    1,    2,1.000,
1.0, 1.3208,
```

```
11.0, 0.0000,
   316,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   326,    1,    2,1.000,
1.0, 0.4572,
4.0, 0.0000,
   332,    1,    2,1.000,
1.0, 1.2700,
11.0, 0.0000,
   334,    1,    2,1.000,
1.0, 0.8636,
7.0, 0.0000,
   344,    1,    2,1.000,
1.0, 1.5240,
11.0, 0.0000,
   362,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   363,    1,    2,1.000,
1.0, 1.6510,
11.0, 0.0000,
```

```
  57,                NWATER (Total for 2020 = 88.4428 cm)
   10,    1,    2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   21,    1,    2,1.000,
1.0, 0.7874,
7.0, 0.0000,
   22,    1,    2,1.000,
1.0, 1.1176,
11.0, 0.0000,
   28,    1,    2,1.000,
1.0, 1.6764,
11.0, 0.0000,
   29,    1,    2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   36,    1,    2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   41,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   42,    1,    2,1.000,
1.0, 0.9144,
7.0, 0.0000,
   43,    1,    2,1.000,
1.0, 5.7912,
24.0, 0.0000,
   44,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   50,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   51,    1,    2,1.000,
1.0, 2.5908,
17.0, 0.0000,
   64,    1,    2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   65,    1,    2,1.000,
1.0, 2.2352,
17.0, 0.0000,
   74,    1,    2,1.000,
1.0, 0.7112,
7.0, 0.0000,
   80,    1,    2,1.000,
1.0, 0.2286,
3.0, 0.0000,
   83,    1,    2,1.000,
1.0, 1.7272,
11.0, 0.0000,
   89,    1,    2,1.000,
1.0, 0.4572,
```

```
4.0, 0.0000,
   94,   1,   2,1.000,
1.0, 0.2286,
4.0, 0.0000,
   96,   1,   2,1.000,
1.0, 0.2032,
3.0, 0.0000,
   98,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   103,   1,   2,1.000,
1.0, 1.3970,
11.0, 0.0000,
   110,   1,   2,1.000,
1.0, 0.0508,
3.0, 0.0000,
   120,   1,   2,1.000,
1.0, 5.8420,
24.0, 0.0000,
   126,   1,   2,1.000,
1.0, 0.1016,
3.0, 0.0000,
   137,   1,   2,1.000,
1.0, 5.0800,
24.0, 0.0000,
   138,   1,   2,1.000,
1.0, 8.6868,
24.0, 0.0000,
   143,   1,   2,1.000,
1.0, 0.1270,
3.0, 0.0000,
   146,   1,   2,1.000,
1.0, 1.2192,
11.0, 0.0000,
   147,   1,   2,1.000,
1.0, 4.2418,
17.0, 0.0000,
   172,   1,   2,1.000,
1.0, 6.9850,
24.0, 0.0000,
   175,   1,   2,1.000,
1.0, 2.7940,
17.0, 0.0000,
   179,   1,   2,1.000,
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3.0, 0.0000,
   185,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   188,   1,   2,1.000,
1.0, 0.7620,
7.0, 0.0000,
   189,   1,   2,1.000,
1.0, 0.4572,
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1.0, 0.1016,
3.0, 0.0000,
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1.0, 10.7950,
24.0, 0.0000,
   247,   1,   2,1.000,
1.0, 2.5400,
17.0, 0.0000,
   248,   1,   2,1.000,
1.0, 0.3302,
4.0, 0.0000,
   249,   1,   2,1.000,
1.0, 0.3810,
4.0, 0.0000,
   251,   1,   2,1.000,
1.0, 1.1430,
11.0, 0.0000,
   254,   1,   2,1.000,
1.0, 3.1750,
17.0, 0.0000,
   266,   1,   2,1.000,
1.0, 1.0414,
11.0, 0.0000,
   267,   1,   2,1.000,
1.0, 0.5334,
7.0, 0.0000,
   298,   1,   2,1.000,
1.0, 3.2258,
17.0, 0.0000,
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1.0, 0.2540,
4.0, 0.0000,
   301,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
   302,   1,   2,1.000,
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11.0, 0.0000,
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7.0, 0.0000,
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1.0, 0.0254,
3.0, 0.0000,
   330,   1,   2,1.000,
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7.0, 0.0000,
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11.0, 0.0000,
   347,   1,   2,1.000,
1.0, 0.2540,
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4.0, 0.0000,
   366,   1,   2,1.000,
1.0, 0.2540,
4.0, 0.0000,
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WHITNEY DAM AND BENBROOK DAM EVAPOTRANSPIRATION DATA

(1991 THROUGH 2020)

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1993 Evapotranspiration

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0.4119,0.5730,0.2865,0.6088,0.2597,0.5283,0.4566,0.6267
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0.3134,0.2674,0.4119,0.4298,0.3402,0.2597,0.2787,0.2093
0.2227,0.2608,0.2162,0.2776,0.3187,0.2028,0.1429,0.3783
0.2170,0.1970,0.2507,0.1744,0.3816,0.1540,0.4566,0.3223
0.0358,0.2652,0.4038,0.3704,0.1923,0.9043,0.1970,0.2955
0.1612,0.1925,0.1680,0.1678,0.2686,0.3581,0.1433,0.2597
0.2534,0.1989,0.1023,0.1119,0.3940,0.0895,0.0358,0.1164
0.1498,0.0903,0.1101,0.1863,0.1970,0.0961,0.2686,0.1732
0.2274,1.0158,0.2247,0.2036,0.1895,0.1174,

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIJ-C
TCEQ CLOSURE PLAN FOR MSW TYPE I LANDFILL UNITS AND FINAL FACILITY CLOSURE
(TCEQ – 20720, 09/27/21)

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Prepared by

Weaver Consultants Group, LLC
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Project No. 0771-368-11-123

Texas Commission on Environmental Quality

Closure Plan for Municipal Solid Waste Type I Landfill Units and Final Facility Closure

This form is for use by applicants or site operators of Municipal Solid Waste (MSW) Type I landfills to detail the plan for closure of a landfill unit, closure of associated storage or processing units, and final closure of the facility to meet the requirements in 30 TAC Chapter 330, §330.63(h) and 30 TAC Chapter 330 Subchapter K for a MSW Type I facility.

If you need assistance in completing this form, please contact the MSW Permits Section in the Waste Permits Division at (512) 239-2335.

I. General Information

Facility Name: Turkey Creek Landfill

MSW Permit No.: 1417D

Site Operator/Permittee Name: Texas Regional Landfill Company, LP

II. Landfill and Other Waste Management Units and Operations Requiring Closure at the Facility

A. Facility Units

Table 1. Description of Landfill Units.

Name or Descriptor of Unit	Operating Status of Unit	Type of Liner System Under Unit	Above Grade Class 1 Disposal Cells in this Unit	Below Grade Class 1 Disposal Cells in this Unit	Other Class 1 Disposal Cells in this Unit (describe)	Size of Unit's Waste Footprint (acres)	Maximum Inventory of Waste Ever in Unit (indicate cubic yards or tons)	Other Necessary Information that Pertains to the Unit
MSW Landfill	Active	Subtitle D and Pre-subtitle D with Overliner	☒	☐	☐	172.0	37,500,000	
			☐	☐	☐			
			☐	☐	☐			
			☐	☐	☐			
Totals						172.0	37,500,000	

Table 2. Description of Waste Storage or Processing Units or Operations Associated with this Permit.

Type of Storage or Processing Unit or Operation (individual units may be closed at any time prior to or during the final facility closure as described in this plan)	Operational Status of Unit	Size of the Area Used for the Storage or Processing Unit or Operation (Acres)	Maximum Inventory of Waste Ever in Storage or Processing Unit or Operation (indicate cubic yards or tons)	Other Information (enter other necessary information that pertains to the unit)
Liquid Waste Solidifcation Facility	Active	0.35	☒cubic yards ☐tons	Facility includes 3 mixing bins, each with an approx. capacity of 52 CY
Leachate Storage Tanks (min 100k gal)	Active	0.07	☒cubic yards ☐tons	Facility includes 2 storage tanks, each with a minimum capacity of 100,000 gallons
Citizens Convenience Center	Active	0.17	☒cubic yards ☐tons	1 roll-off container
			☐cubic yards ☐tons	
Totals		0.59	1198 CY	

B. Waste Inventory Summary

Table 3. Maximum Inventory of Wastes Ever On Site.

Item	Quantity (indicate cubic yards or tons)
Maximum inventory of waste in landfill units (total from Table 1)	37,500,000 ☒cubic yards or ☐tons
Maximum inventory of waste in storage or processing units or operations (total from Table 2)	1198 ☒cubic yards or ☐tons
Total Maximum Inventory of Wastes ever on site over the active life of the MSW facility (sum of totals from Tables 1 and 2)	37,501,198 ☒cubic yards or ☐tons

C. Drawings Showing Details of the Waste Management Units at Closure

Table 4. Location of the Drawings showing Details of the Waste Management Units at Closure (outlines, dimensions, maximum elevations of waste and final cover of landfill units, and waste storage or processing units or operations at closure of the facility).

Drawing Location in the SDP	Drawing Figure Number	Drawing Title	Waste Management Units Details Shown
Part I/II, App. I/IIA	A.1	General Site Plan	e.g., outlines , waste footprints, and dimensions of the landfill unit(s)
Part III, App. IIIA-A	A.1	Excavation Plan	e.g., maximum elevations of waste and final cover of the landfill unit(s)
Part III, App. IIIA-A	A.3	Completion Plan	e.g., outlines and dimensions of the storage and processing unit(s)
Part IV, App. IVE	3	Liquid Waste Solidification Facility Layout Plan	e.g., outlines and dimensions of the storage and processing unit(s)

III. Description of the Final Cover System Design

A. Types and Descriptions of the Final Cover Systems

Table 5. Types and Descriptions of the Final Cover Systems Permitted or Proposed for Closure of the Landfill Units.

Landfill Unit Name or Descriptor	Type of Final Cover System	Final Cover System Components Description	Other Information (Enter other information as applicable)
MSW Landfill	Composite low-permeability soil and geomembrane	As shown on Drawing A.17 (Part III, App. IIIA-A), the final cover is comprised of an 18" low permeadbility (1x10-5 cm/sec) soil infiltration layer, geomembrane (LDPE), geocomposite drainage layer (bi-planar/double-sided), and a 12" vegetated erosion layer	

Landfill Unit Name or Descriptor	Type of Final Cover System	Final Cover System Components Description	Other Information (Enter other information as applicable)

B. Design Details

Table 6. Design Details of the Final Cover Top and Side Slopes for the Landfill Units.

Landfill Unit Name or Descriptor	Maximum Final Elevation of Waste (feet above mean sea level [ft-msl])	Maximum Elevation of Top of Final Cover (ft-msl)	Minimum Grade of the Final Cover Top Slope (%)	Maximum Grade of the Final Cover Side Slope (%)	Other Information (enter other information as applicable, e.g. above-grade Class 1 Cell Dikes)
MSW Landfill	993	996	5	28.6	

C. Final Cover Drainage Features

Storm water drainage and erosion and sediment control features incorporated on the final cover of the landfill units to protect the integrity and effectiveness of the final cover system include *(please list and describe the drainage features to be installed on the final cover at or prior to closure for each landfill unit, or list the drainage features and provide cross references on the location(s) of the descriptive and details (drawing) information in other parts of the SDP)*:

Storm water drainage features incorporated into the project include vegetative cover on the landfill side and topslopes; sideslope drainage swales; reinforced downchutes; permitere ditches; and stormwater detention basins. Drainage feature design calculations are presented in Part III, Appendix IIIF – Surface Water Drainage Plan of the application.

D. Final Cover Vegetation or Other Ground Cover Material

The final cover will be seeded and/or sodded with native plants immediately following the application of the final cover in order to minimize erosion. Other materials, including **NA**, may be incorporated over the final cover soil surface to ensure sufficient coverage of the ground surface to minimize erosion. The estimated percent ground cover to minimize soil loss and maintain long-term erosional stability of the final cover top and side slopes is: **90**%. The minimum material specifications for other ground cover materials are summarized in the table below.

For a landfill with water balance final cover design, the percentage vegetation cover (excluding other ground cover types) will not be less than that assumed in the water balance final cover model.

Table 7. Minimum Specification for Ground Cover Materials Other Than Vegetation, if Applicable.

Other Ground Cover Material	Maximum Particle Size (inches)	Minimum Particle Size (inches)	Material Placement Method	Thickness of Layer (inches)	Percentage Coverage (%)	Other (specify)
NA						

E. Final Contour Map

Figure **A.3 (Part III, App. IIIA-A)**, a facility final contour map is attached. The map shows the final contours of the landfill units and the entire facility at closure.

Figures **B.1 through B.6 (Part III, App. IIIA-B)** showing the cross–sections of the landfill units at closure are also provided.

The facility final contour and cross-section maps/drawings depict the following information:

(1) Final constructed contours of the landfill at closure.

(2) Top slopes and side slopes of the landfill units.

(3) Surface drainage features.

(4) 100-year floodplain, as applicable.

(5) Constructed features providing protection of/from the 100-year floodplain.

(6) Other (specify):

IV. Description of the Final Cover System Installation Procedure

A. Mode of Installation

Table 8. Mode of Final Cover Installation on the Landfill Units.

Landfill Unit Name or Descriptor	Largest Area of Unit Ever Requiring Final Cover (Acres)	Check this Column if Final Cover will be Placed in Installments as Permitted Elevation is Reached	Check this Column if Final Cover will be Placed when Entire Unit Area Reaches Permitted Elevation	Final Cover Installation Status
MSW Landfill	172.0	☐	☒	Yet to be installed
		☐	☐	
		☐	☐	
		☐	☐	

B. Installation Drawings for Final Cover and Drainage Features

The following attached plan and cross-section drawings show the final cover design details, the largest area requiring final cover, details of the sequence of installation of the final cover system, and all drainage features.

Table 9. List of Attached Installation Drawings for Final Cover and Drainage Features.

Drawing No.	Drawing Title	Description of Information Contained in Drawing
Drawings B.1 through B.6 (Part III, Appendix IIIA-B)	Varies	(e.g., final cover cross section details with references to base drawings)
Drawing IIIL-1 (Part III, Appendix IIIL-Closure and Postclosure Care Cost Estimates)	Largest Area to Require Final Cover	(e.g., the largest area ever requiring final cover) Note that the largest area value will be adjusted periodically by permit modification during update/revision to the closure/postclosure care cost estimates and financial assurance demonstration.
NA		(e.g., details of the sequence final cover system installation)
		(e.g., details of all drainage features on the final cover)

Drawing No.	Drawing Title	Description of Information Contained in Drawing
Drawings IIIF.1 through IIIF.15 (Part III, Appendix IIIF-Surface Water Drainange Plan)	Varies	Other: describe as applicable

C. Final Cover Quality Control Plan

A final cover quality control plan (FCQCP), Attachment **Part III, Appendix IIIE**, is attached. The FCQCP describes the final cover system design, construction, and evaluation protocol and processes, including the personnel, materials, methods, sampling and testing standards, procedures, and practices to be used in procuring, handling, installing, and evaluating all elements of the final cover system. It establishes the material requirements; personnel qualifications and roles; installation requirements; quality control and quality assurance monitoring, testing, documentation, and reporting programs to be used during construction of each component of the final cover system to assure and to verify that the final cover system is constructed as designed and in accordance with applicable rules and technical standards.

D. Documentation and Reporting of Final Cover System Construction and Testing

The professional of record will document all aspects and stages of the final cover installation, including materials used, equipment and construction methods, and the type and rate of sampling and quality control testing performed. Following completion of construction of the final cover, the site operator/permittee will submit to the TCEQ executive director, a Final Cover System Evaluation Report (FCSER) for each landfill unit.

V. Closure Activities and Completion Schedules for Each Landfill Unit and for the Final Facility Closure

A. Closure of a Landfill Unit

The following activities will be conducted to satisfy the closure criteria for a landfill unit:

(1) Closure Notification to the TCEQ Executive Director:

The site operator will inform the executive director of the TCEQ, in writing, of the intent to close the unit no later than 45 days prior to the initiation of closure activities and place this notice of intent in the operating record.

(2) Stoppage of Waste Acceptance and Commencement of Other Closure Activities for the Unit:

The site operator will stop accepting waste upon receiving the known final receipt of waste. The site operator will ensure that the permitted top elevations of the in-place waste, as depicted in/derived from the unit's final contour map approved by the TCEQ executive director, are not exceeded at any section or part of the landfill unit. The site operator will begin closure activities for the unit no later than:

- Thirty days after the date on which the unit receives the known final receipt of wastes; or
- One year after the most recent receipt of wastes if the unit has remaining capacity and there is a reasonable likelihood that the unit will receive additional wastes.

(3) Request for Extension Beyond the 1-Year Deadline for Commencing Closure Activities for a Unit:

The site operator may submit a written request to the executive director of the TCEQ for review and approval for an extension beyond the one-year deadline for the initiation of closure. The request will include the following:

(a) All applicable documentation necessary to demonstrate that the unit has the capacity to receive additional waste; and

(b) All documentation necessary to demonstrate that the site operator has taken and will continue to take all steps necessary to prevent threats to human health and the environment from the MSW landfill unit.

(4) Construction of Final Cover:

The site operator will construct the permitted final cover over the waste mass utilizing methods, procedures, and specifications described in the FCQCP. The final constructed contours, elevations, and slopes of the installed final cover will match the permitted final cover contours, elevations, and slopes shown in closure drawings contained in this closure plan.

(5) Construction of Drainage Features:

The site operator will construct the drainage structures shown in drawings referenced or contained in this closure plan or in the facility surface water drainage report.

(6) Completion of Outstanding or Replacement of Damaged Groundwater or Landfill Gas Monitoring Components:

The site operator will complete installation of any outstanding or replacement of any damaged groundwater or landfill gas monitoring system components and landfill gas control systems as needed to maintain current and effective groundwater or landfill gas monitoring and control systems.

(7) Submittal of Final Cover System Evaluation Report (FCSER) to the TCEQ Executive Director:

Following completion of construction of the final cover for the subject landfill unit, the site operator will submit to the TCEQ executive director for review and acceptance, a FCSER for the unit.

(8) Completion of Closure Activities for the Landfill Unit:

The site operator will complete closure activities for the unit within 180 days following the start of closure activities, unless the executive director of the TCEQ grants an extension as described in Item V.A.8(a) below.

(a) Request for Extension of the Completion of Closure Activities for the Landfill Unit:

The site operator may submit a written request for an extension for the completion of closure activities to the TCEQ for review and approval. The extension request will include:

- All applicable documentation necessary to demonstrate that closure will, of necessity, take longer than 180 days; and
- All applicable documentation necessary to document that all steps have been taken and will continue to be taken to prevent threats to human health and the environment from the unclosed MSW landfill unit.

(9) Submittal of Engineer's Certification of Closure to the TCEQ Executive Director and Request of Closure Inspection to TCEQ Regional Office:

Following completion of all closure activities for the landfill unit, the site operator will submit:

(a) Closure Inspection

A written request to the local TCEQ regional office for a closure inspection of the unit.

(b) Closure Certification

A certification, signed by an independent licensed professional engineer, to the executive director of the TCEQ for review and approval verifying that closure has been completed in accordance with this closure plan. The site operator will submit the certification via registered mail, and the submittal will contain all applicable documentation necessary for certification of closure of the unit, including:

- A final cover system evaluation report (FCSER) documenting the installation of the final cover. The FCSER may be submitted as a separate document for review and approval following the completion of the final cover installation. In that case, the certification of closure will be submitted subsequently;

- A final contour map as described under Section III.E that includes the relevant unit; and
- Copy of the letter to the TCEQ regional office requesting a closure inspection of the relevant unit.

(10) TCEQ's Acknowledgement of Termination of Operation and Closure of a Unit:

Upon receipt, the TCEQ executive director will review the closure documents for completeness and accuracy; and following receipt of the closure inspection report from the agency's regional office verifying proper closure of the MSW landfill unit according to this closure plan, the executive director will, in writing, acknowledge the termination of operation and closure of the unit and deem it properly closed. Thereafter, the site operator will comply with the post-closure care requirements described in the post-closure care plan for the unit.

(11) Deed Recordation for Disposed Regulated Asbestos Containing Materials (RACM):

Upon closure of the unit that accepted RACM, the site operator will place a specific notation that the unit accepted RACM in the deed records for the facility with a diagram identifying the RACM disposal areas. Concurrently, the site operator will submit to the TCEQ executive director, a notice of the deed recordation and a copy of the diagram identifying the asbestos disposal areas.

(12) Placement of all Closure Documentation in the Site Operating Record:

Once approved, the closure certification and all other documentation of closure will be placed in the site operating record.

(13) Closure Schedule for the Landfill Unit:

A closure schedule, ~~Figure~~ Part III, Appendix IIIJ, Section 4.1, is attached. The schedule shows all the closure activities listed within Section V.A and the timelines for commencing and completing each activity. Also, the schedule shows that closure activities for the landfill unit will be completed within 180 days following the initiation of closure activities as required, unless an extension is granted by the TCEQ executive director.

(14) Other: (enter as applicable).

B. Closure of the Waste Storage or Processing Units or Operations

Closure of the waste storage or processing units or operations authorized under this permit will include removal of all waste, waste residues, and any recovered materials. The facility units and operations will either be dismantled and removed off-site or decontaminated. The site operator will dispose at the landfill or evacuate all materials (including feedstock, in process, and processed) to an authorized facility and disinfect all leachate handling units, tipping areas, processing areas, and post-processing areas. If there is evidence of a release from a unit or operation, the site operator will conduct an investigation, as approved by the TCEQ executive director, into the nature and extent of the release and an assessment of measures necessary to correct an impact to groundwater.

C. Final Closure of the Facility

In addition to the closure activities listed in Section V.A above for closing a landfill unit, the site operator will conduct the following activities for the closure of the entire facility:

(1) Publish Final Closure Notice and Place the closure Plan in a Public Place:

No later than 90 days prior to the initiation of the final facility closure, the site operator will:

(a) Publication of Notice:

The site operator will publish notice in the newspaper(s) of largest circulation in the vicinity of the facility to inform the public of the final closure of the facility. This notice will include:

- The name of the facility;
- The address, and physical location of the facility;
- The facility's permit number; and
- The last date of intended receipt of waste.

(b) Place Copies of the Closure Plan in a Public Place:

The site operator will also make available an adequate number of copies of the approved final closure and post-closure plans for public access and review at the Alvarado Public Library, 210 N. Baugh St., Alvarado, TX 76009 (state public place within the area, including address, where the plan will be available for public access and review).

(2) Submit Written Notice of "Intent to Close the Facility" to the TCEQ Executive Director:

The site operator will provide written notification to the TCEQ executive director of the intent to close the facility. This notice will be provided to the executive director no later than 90 days prior to the initiation of the final facility closure, and thereafter be placed in the site operating record.

(3) Post Signs and Install Barriers:

Upon notifying the executive director of the intent to close the facility and no later than 90 days prior to the initiation of final facility closure, the site operator will:

(a) Post Final Closure Signs:

The site operator will post a minimum of one sign at the main entrance and all other frequently used points of access for the facility notifying all persons who may utilize the facility of the date of closing for the entire facility and the prohibition against further receipt of waste materials after the stated date.

(b) Install Barriers:

Also, the site/operator will install suitable barriers at all gates or access points to adequately prevent the unauthorized dumping of solid waste at the closed facility.

(4) Filling of "Affidavit to the Public" and Performance of the Final Deed Recording:

Upon closure of all the landfill units or upon final closure of the facility, the site operator will:

(a) File Affidavit

File with the county deed records an "Affidavit to the Public" in a form provided by the TCEQ executive director that includes an updated metes and bounds description of the extent of the disposal areas at the facility and the restrictions to future use of the land in accordance with applicable provisions under 30 TAC Chapter 330, Subchapter T.

(b) Record a Notation on the Deed

Record a certified notation on the deed to the facility property, or on some other instrument that is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that the land has been used as a landfill facility and use of the land is restricted according to the provisions under 30 TAC Chapter 330, Subchapter T.

(c) Place Documents in the Operating Record

Place a copy of the "Affidavit to the Public" and a copy of the modified deed in the site operating record.

(5) Submittal of a Copy of the "Affidavit to the Public" and the "Modified Deed" to the TCEQ Executive Director:

Within ten days after completion of final closure activities of the facility, the site operator will submit the following to the TCEQ executive director by registered mail:

(a) A certified copy of the "Affidavit to the Public";

(b) A certified copy of the modified deed to the facility property; and

(c) A certification, signed by an independent licensed professional engineer, verifying that final facility closure has been completed in accordance with the approved closure plan. The submittal will contain all applicable documentation necessary for certification of final facility closure, including:

- Final Cover System Evaluation Report (FCSER) documenting the installation of the final cover. The FCSER may be submitted earlier as a separate document for review and approval following the completion of the final cover installation. In that case, the certification of closure will be submitted subsequently;
- A final contour map as described under Item III.G above;
- Copy of a letter to the TCEQ regional office requesting a final closure inspection of the facility; and
- Copies of documents verifying newspaper publication of the notice of the final facility closure.

(6) Other

Additional items relating to the schedule for final facility closure, and additional closure activities specific to the final closure of this facility include:
As described in above sections.

(7) TCEQ's Acceptance of Termination of Operation and Closure of a Landfill Facility:

Following the TCEQ executive director's receipt and completion of the review of the professional engineer's certification of the completion of facility closure and the final closure documents, and receipt of the inspection report from the agency's regional office verifying proper closure of the facility according to this closure plan, the executive director will, in writing, accept the termination of operation and closure of the facility and deem it properly closed. Thereafter, the site operator will comply with the post closure care requirements described in the post closure plan for the facility.

(8) Final Closure Schedule for the Facility:

The attached Figure IIIJ-3 (Part III, Appendix IIIJ), Final Closure Schedule, provides the closure schedule for the final facility closure. It incorporates the schedule for closure of a unit as discussed in Section V.A and also shows the commencement and completion timelines for the final closure activities listed within this Section.

VI. Summary of Attachments

A. Drawings and Maps

The following Drawings and Maps are attached as part of this plan.

- Figure Drawing A.3 (Part III, Appx. IIIA-A), Final Contour Map.
- Figures Drawings B.1-B.6 (Part III, Appendix IIIA-B), Cross-Section Drawings of the Landfill Units at Closure.
- Drawings IIIF.1 through IIIF.15 (Part III, Appendix IIIF)
- Other Drawings/Maps: Figures

B. Documents

- Attachment Part III, Appendix IIIE, Final Cover Quality Control Plan (FCQCP).
- Attachment IIIJ-3 (Part III, Appendix IIIJ), Landfill Unit Closure Schedule Chart.
- Attachment IIIJ-3 (Part III, Appendix IIIJ), Final Closure Schedule Chart.
- Other: Attachment

C. Additional Items Attached (enter as applicable)

VII. Professional Engineer's Statement, Seal, and Signature

Name: Nevzat Turan

Title: Principal

Date: 02/22/2022

Company Name: Weaver Consultants Group, LLC

Firm Registration Number: F-3727

Professional Engineer's Seal

STATE OF TEXAS
NEVZAT TURAN
84059
LICENSED
PROFESSIONAL ENGINEER

02/22/22

Signature

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIK
POSTCLOSURE CARE PLAN

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

Prepared for

Texas Regional Landfill Company, LP

February 2022

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
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817-735-9970

WCG Project No.0771-368-11-123

This document is intended for permitting purposes only.

CONTENTS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

1 INTRODUCTION

This Postclosure Care Plan has been prepared for the Turkey Creek Landfill consistent with Title 30 Texas Administrative Code (TAC) Section 330 Subchapter K. In accordance with Title 30 TAC §330.463(b)(3), a copy of the approved postclosure care plan will be placed in the site operating record prior to the initial receipt of waste. The landfill completion plan for this site consists of final contours and drainage features as depicted on Drawing I/IIA.8 – Landfill Completion Plan in Parts I/II.

This appendix addresses §330.463 and §330.465.

2 POSTCLOSURE ACTIVITIES

2.1 Monitoring and Maintenance

In accordance with Title 30 TAC §330.463(b)(1), postclosure care will commence after professional engineer certification of the completion of closure requirements for a municipal solid waste management unit as accepted by the Executive Director. There are no on-site permanent enclosed structures located within the limits of waste; therefore, the requirements in Title 30 TAC §330.957(m)(1)(D-F) do not apply. Postclosure care maintenance will continue for a period of 30 years unless the TCEQ approves a postclosure period of a different duration. Postclosure care maintenance will consist, at a minimum, of the following requirements carried out by Texas Regional Landfill Company, LP. The minimum frequencies for monitoring and maintenance activities will be consistent with Section 4.24 of Part IV – SOP, unless otherwise noted below.

- Retain the right of entry and maintain all rights-of-way to the closed landfill. Access controls will be inspected on a monthly basis.
- Conduct site inspections a minimum of semiannually after closure.
- Conduct maintenance and/or remediation activities, as needed, in order to maintain the integrity and effectiveness of the final cover, site vegetation, and drainage control systems. Vegetation shall be maintained on the final cover to provide a minimum of 90 percent coverage.
- Manage surface run-on and run-off, as needed, in order to minimize the erosion of the final cover system.
- Conduct inspections for seeps from final cover. Seepage will be controlled by placement of soil berms, diverted to a contaminated water collection area and treated in accordance with Section 4.2 of Appendix IIIC until the final cover can be repaired.
- The outlets of the final cover drainage pipes will be inspected. During wet weather conditions when flow is expected, the pipe outlets will be inspected to verify that flow is occurring. If there is no flow, the pipe will be checked for clogging and flushed or replaced as necessary. Inspections will occur semi-annually after closure. Refer to Drawing A.17 in Appendix IIIA-A for daylighting of drainage pipe, and refer to Sheet IIIE-A-A-14 for drainage pipe layout.

- Correct the effects of settlement, subsidence, ponded water, erosion, or other events or failures, as needed, in-as-much as these situations are detrimental to the integrity of the closed landfill. In addition, the Class 1 above-grade area will be a focus of the inspection. The Class 1 waste area will be inspected for differential settlement, particularly in the areas where a Class 1 waste disposal area transitions to a MSW disposal area. Any necessary corrections will be made to ensure the integrity of the final cover system.

- Maintain and operate the leachate collection system in accordance with Title 30 TAC §330.331 and §330.333 and the EPA's Design Criteria (i.e., less than 1 foot of leachate over the liner, or approved equivalent design). During postclosure, leachate collection sump levels will be measured on a quarterly basis. Site personnel will verify that the leachate level is maintained within the sump as discussed in Appendix IIIC, Table 3-5. The leachate collection system will be operated consistent with Appendix IIIC – Leachate and Contaminated Water Management Plan, which includes procedures for the operation of the leachate collection sump, storage tanks, and the disposal of leachate. Texas Regional Landfill Company, LP may submit a demonstration to the TCEQ that leachate will no longer pose a threat to human health and the environment. If the demonstration is approved by the TCEQ, Texas Regional Landfill Company, LP will be allowed to discontinue the maintenance and operation of the leachate collection system. Alternatively, if there is a significant increase in leachate generation, inspection frequency will be increased to ensure compliance. Refer to Section 3.4 of Appendix IIIJ for the procedures to decommission the leachate storage tank and piping.

- Maintain the groundwater monitoring system in accordance with Subchapter J of Title 30 TAC and monitor groundwater in accordance with an approved Groundwater Sampling and Analysis Plan (refer to Appendix IIIH for the minimum monitoring frequency requirements). However, Texas Regional Landfill Company, LP may request TCEQ approval of (1) an alternative monitoring frequency, and/or (2) an alternative list of parameters to be monitored.

- Maintain and operate the perimeter landfill gas monitoring system in accordance with Subchapter I of Title 30 TAC. In accordance with Title 30 TAC §330.371(b)(2), the minimum monitoring frequency will be quarterly. However, Texas Regional Landfill Company, LP may request TCEQ approval of an alternate monitoring frequency.

- Maintain and operate the landfill gas collection and/or control system in accordance with applicable regulations.

2.2 Decreasing Postclosure Period

The length of the postclosure care maintenance period may be decreased by the TCEQ if Texas Regional Landfill Company, LP submits a documented certification signed by an independent licensed professional engineer and if the documented certification is approved by the TCEQ. The certification will include all applicable documentation demonstrating that the reduced period is sufficient to protect human health and the environment. Applicable documentation may include data from monitoring of groundwater, surface water, leachate levels, and landfill gas.

2.3 Increasing Postclosure Period

The length of the postclosure care maintenance period may be increased by the TCEQ if it is determined that the increased duration is necessary to protect human health and the environment.

2.4 Completion of Postclosure Period

Upon completion of the postclosure care maintenance period, Texas Regional Landfill Company, LP will submit to the TCEQ documented certification, signed by an independent licensed professional engineer, verifying that postclosure care maintenance has been completed in accordance with the approved Postclosure Plan. The submittal will include all documentation necessary for certification of completion of postclosure care maintenance. The certification will be placed in the Site Operating Record upon approval. In addition, Texas Regional Landfill Company, LP will submit to the Executive Director a request for voluntary revocation of the facility permit. Approval of voluntary revocation will be placed in the Site Operating Record.

3 PERSON RESPONSIBLE FOR CONDUCTING POSTCLOSURE ACTIVITIES

At the time of development of this document, the following position will be responsible for overseeing and/or conducting postclosure care activities at this landfill.

Region Engineer
Texas Regional Landfill Company, LP
3 Waterway Square Place Suite 550
The Woodlands, TX 77380
(832) 442-2920

The position responsible for conducting postclosure activities is subject to change. However, as part of the closure notification to TCEQ, as required by Title 30 TAC §330.463(b)(3)(B), Texas Regional Landfill Company, LP will notify the TCEQ regarding the responsible position.

4 POSTCLOSURE LAND USE

4.1 Intended Use

There are no current planned uses for the Turkey Creek Landfill after closure. Should use of the closed landfill be considered, plans will be prepared and submitted to the TCEQ for review and approval.

4.2 Constraints on Postclosure Construction

There are no current plans to construct buildings or other structures on the closed Turkey Creek Landfill. Nevertheless, any future construction activities on the closed landfill will be subject to the provisions of Title 30 TAC §330.955(b), §330.957(b)(2)(A-D), §330.957(d-e), and §330.957(m)(l)(D-F), which require, among other things, prior approval of the TCEQ.

5 POSTCLOSURE COST ESTIMATE

A detailed written cost estimate, in current dollars, of the cost of hiring a third party to conduct postclosure care activities for the municipal solid waste unit, in accordance with the Postclosure Care Plan, is provided in Appendix IIIL – Cost Estimate for Closure and Postclosure Care. The estimated postclosure care cost estimate presented in Appendix L will be updated as needed to ensure continued compliance with the financial assurance requirement.

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIK-A
TCEQ POST-CLOSURE CARE PLAN
FOR MSW TYPE I LANDFILL UNITS AND FACILITIES
(TCEQ – 20722, 09/27/21)

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9970

WCG Project No.0771-368-11-123

This document is intended for permitting purposes only.

Texas Commission on Environmental Quality

Post-Closure Care Plan for Municipal Solid Waste Type I Landfill Units and Facilities

This form is for use by applicants or site operators of Municipal Solid Waste (MSW) Type I landfills to provide landfill unit or final facility post-closure care closure plans to meet the requirements in 30 TAC Chapter 330, §330.63(h) and as set out under 30 TAC Chapter 330 Subchapter K for a MSW Type I facility.

If you need assistance in completing this form, please contact the MSW Permits Section in the Waste Permits Division at (512) 239-2335.

I. General Information

Facility Name: Turkey Creek Landfill

MSW Permit No.: 1417D

Site Operator/Permittee Name: Texas Regional Landfill Company, LP

II. Party Responsible for Overseeing and Conducting Post Closure Care Activities

Name (Person or Office Responsible): Gary Bartels

Position or Title: Southern Region Engineer

Mailing Address: 3 Waterway Square Place Suite 550

City: The Woodlands

State: Texas

Zip Code: 77380

Telephone Number: (832) 442-2920

III. Post-Closure Care Status of Landfill Units at the Facility

Check the applicable box for the post-closure care status of the units at the facility and complete the applicable tables as indicated:

A. ☒ No landfill unit is in post-closure care in this facility at the time this application is submitted (skip Table 1 and complete Table 2 below if you check this item)

B. ☐ This facility includes landfill units currently in post-closure care and landfill units that are not yet in post-closure care (complete Tables 1 and 2 below if you check this item).

C. ☐ This facility contains only landfill units currently in post-closure care (complete Table 1 below if you check this item; do not complete Table 2).

Table 1: Landfill Units Currently in Post-Closure Care

Landfill Unit Name	Drawing Number Showing the Landfill Unit	Date TCEQ Acknowledged Closure of Unit	Date Post-Closure Care Commenced	Projected Date of End of Post-Closure Care

Table 2: Landfill Units Not yet in Post-Closure Care

Category of Landfill Unit (Regarding Status of Waste Receipt)	Landfill Unit Names or Descriptors	Site Development Plan Drawing Titles and Numbers Showing the Units
Stopped Receiving Waste Prior to October 9, 1993		
Received Waste on or after October 9, 1993	MSW Landfill (includes both current areas of filling and future expansion areas)	Part III, Appendix IIIA-A, Drawing A.1 – Excavation Plan
Proposed to be Constructed	MSW Landfill (includes both current areas of filling and future expansion areas)	Part III, Appendix IIIA-A, Drawing A.1 – Excavation Plan

Post-Closure Care Plan for Type I Landfill Units and Facility
Facility Name: Turkey Creek Landfill Revision No.: 0
Permit No: 1417D Date: February 2022

Category of Landfill Unit (Regarding Status of Waste Receipt)	Landfill Unit Names or Descriptors	Site Development Plan Drawing Titles and Numbers Showing the Units
Other (enter as applicable)		

IV. Post-Closure Care Maintenance Requirements and Activities to be Conducted

A. Categories of Landfill Units and Applicable Post-Closure Care Maintenance Requirements and Activities

Check the appropriate boxes to indicate the categories of landfill units at the facility and complete the applicable section of the post-closure care maintenance requirements and activities below.

This facility includes landfill units that:

☐ Stopped receiving waste prior to October 9, 1993

If you check this item, complete the post-closure care maintenance requirements and activities specified in Subsection IV.B below. Skip Subsection IV.B if this item does not apply to your facility.

☒ Received waste on or after October 9, 1993

If you check this item, complete the post-closure care maintenance requirements and activities specified in Subsection IV.C below. Skip Subsection IV.C if this item does not apply to your facility.

☒ Are proposed to be constructed

If you check this item, complete the post-closure care maintenance requirements and activities specified in Subsection IV.C below. Skip Subsection IV.B, unless your facility also contains units that stopped receiving waste prior to October 9, 1993.

B. Post-Closure Care Maintenance Requirements and Activities for the Landfill Units that Stopped Receiving Waste Prior to October 9, 1993

The site operator will commence and conduct post-closure care maintenance of the units that stopped receiving waste prior to October 9, 1993 for a minimum of the first **five years** following commencement of post-closure care as specified below and in accordance with applicable rules under 30 TAC §330.463(a). Post-closure care maintenance will start on the date the professional engineer's certification of the completion of closure is accepted in writing by the TCEQ executive director and the site operator will carry out the following activities and operations during the period.

1. Maintenance of Right of Entry and Rights of Way

The site operator will retain the right of entry to and maintain all rights-of-way of the closed units in order to conduct periodic inspections of the units throughout the post-closure care period. TCEQ staff will have access to the site to conduct inspection or investigation that may be necessary during the period.

2. Inspection Activities and Correction of Problems

The site operator will conduct inspection of the closed landfill units at the frequencies indicated in Table 3 below, utilizing the inspection protocol maintained in the site operating record, and will correct all identified problems as needed.

Table 3: Inspection Activities Schedule

Post-Closure Care Inspection Item	Frequency of Inspection	Types of Deficiency Conditions to be looked for during Inspection
Final Cover Condition	N/A	
Vegetation	N/A	
Leachate Management Systems	N/A	
Landfill Gas Monitoring and Control Systems	N/A	

Post-Closure Care Inspection Item	Frequency of Inspection	Types of Deficiency Conditions to be looked for during Inspection
Groundwater Monitoring Systems	N/A	
Drainage Structures	N/A	
Ponding of Water	N/A	
Other:		

3. Continuation of Monitoring Programs during Post-Closure Care Period

The site operator will continue the monitoring programs listed in Table 4 during the post-closure care period. The monitoring programs will be conducted as specified in the applicable section of the facility's Site Development Plan and applicable rules.

Table 4: Monitoring and Reporting Schedule

Monitoring Program	Frequency of Monitoring	Frequency of Reporting of Results
Groundwater monitoring	N/A	
Landfill gas monitoring	N/A	
Other:		

4. Detection of a Release, Nature and Extent Investigation, and Corrective Action to Address Release from the MSW Unit

Upon detection of any evidence of a release from the landfill or other associated waste management units at the facility, the site operator will:

- Notify the executive director of the TCEQ of the condition detected;

- Investigate, if so directed by the executive director of the TCEQ, whether a release from the landfill or other associated waste management units at the facility has occurred;
- Investigate the nature and extent of the release, if a release is confirmed;
- Assess measures necessary to correct any impact to groundwater;
- Submit a corrective action plan via a permit modification for TCEQ executive director's review and approval; and
- Conduct corrective action as approved by the TCEQ executive director.

5. Extension of Post-Closure Care Period

If any of the problems listed in Table 3 occurs, or corrective action as indicated in Subsection IV.B.4 above continues, after the end of the five-year post-closure care period or persists for longer than the first five years of post-closure care, the site operator will be responsible for their correction and will continue to conduct post-closure care maintenance until the TCEQ executive director determines that all problems have been adequately resolved.

6. Reduction of Post-Closure Care Period

The site operator may request in writing for the TCEQ executive director to reduce the post-closure care period for the units if all wastes and waste residues have been removed during closure and any new or on-going corrective action to address confirmed releases from the landfill have been completed as acknowledged in writing by the executive director.

C. Post-Closure Care Requirements and Activities for Municipal Solid Waste Landfill Units that Receive Waste on or after October 9, 1993 and for New Units

The site operator will commence and conduct post-closure care maintenance of the units that receive waste on or after October 9, 1993 and new units constructed under this permit as follows and in accordance with applicable rules under 30 TAC §330.463.

1. Commencement of Post-Closure Care

Post-closure care maintenance will start on the date the professional engineer's certification of the completion of closure is accepted in writing by the TCEQ executive director and the site operator will carry out the following activities and operations during the period.

2. Period of Post-Closure Care

The site operator will conduct post-closure care for the landfill units for a period of **30 years**, unless this time period is increased or reduced by the executive director as discussed in Subsection IV.C.11.

3. Maintenance of Right of Entry and Rights of Way

The site operator will retain the right of entry to the closed units and the facility and will maintain all rights-of-way of the closed units in order to conduct periodic inspection and maintenance of the closed units until the end of the post-closure care period.

4. Inspection Activities

The site operator will conduct periodic inspection of the closed units to identify and document deficiency conditions and conduct maintenance and corrective action to maintain compliance. Sections IV.C. 8.(a)-(c) provide information on the inspection items and deficiency conditions that the site operator will look for during inspection of the major components of the landfill and the site during the post-closure care period. Other inspection and maintenance provisions that apply during the post-closure care period as specified in the facility's site operating plan, site development plan, or applicable rules will remain in effect.

5. Documentation of Inspection

The site operator will document and maintain records of the post-closure care inspections in the site operating record. The records will include:

- The date of inspection;
- Components and items inspected;
- Problems detected or observed; and
- The name of the personnel who conducted the inspection.

6. Corrective Actions

Based on the results of the inspection activities, the site operator will conduct needed restoration and remediation actions on the closed unit no later than the next scheduled inspection event. Also, the site operator will conduct maintenance action on regular periodic schedule in order to:

- Maintain the integrity and effectiveness of all final cover, facility vegetation, and drainage control systems;
- Correct any effects of settlement, subsidence, ponded water, erosion, or other events or failures detrimental to the integrity of the closed unit; and
- Prevent any surface run-on and run-off from eroding or otherwise damaging the final cover system during the post-closure care period.

7. Documentation of Corrective Actions

The site operator will document and maintain, in the facility's site operating record, records of the restoration, remediation, and maintenance activities performed, including the date of completion of the activities.

8. Inspection Activities Schedules

(a) Final Cover Inspection

Inspection Frequency: Semiannually

Other Inspection Occasions/Events:

Table 5: Final Cover Inspection Items

Inspection Item	Types of Deficiency Conditions to be looked for during Inspection
Vegetation and other Ground Cover Materials	Distressed vegetation, erosion areas, stressed or over-vegetated areas
Settlement	Areas of excessive settlement (overall settlement sufficient to pond water, or disrupt drainage features requiring repair), identify repair methods
Subsidence	Areas of excessive subsidence (localized settlement sufficient to pond water, or disrupt drainage features), identify repair methods
Ponded Water	Identified by ponding of final cover. Determine limits, approximate depth of fill soil, and regrading required to reduce or eliminate ponding

Inspection Item	Types of Deficiency Conditions to be looked for during Inspection
Erosion	Identified by surface erosion damage or filling of final cover, and reviewing conditions that may be contributing to erosion (grading or blockage of sideslope swales, settlement causing surface flow concentration)
Other (enter other events or failures detrimental to the integrity and effectiveness of the final cover):	Animal burrows, surface cracks, slope reversals, vegetation die-out or over-vegetation
Other (enter other events or failures detrimental to the integrity and effectiveness of the final cover):	

(b) *Drainage Control System Inspection*

Inspection Frequency: Semiannually (concurrent with final cover inspection)

Other Inspection Occasions/Events:

Table 6: Drainage Control System Inspection Items

Inspection Item	Types of Deficiency Conditions to be looked for during Inspection
Vegetation within Drainage Control Structures	Distressed vegetation, erosion areas, stressed or over-vegetated areas
Component Failures	Damage to sideslopes, swales or letdown structures, undercutting, piping, overtopping, or excessive sediment deposition
Wash Outs	Washouts in sideslope swales
Sediment Build Up	Sediment deposition sufficient to pond water, reverse or impede drainage in sideslope swales, or letdown structures
Other (enter other events or failures detrimental to the integrity and effectiveness of drainage structures):	Cracking, settlement, or distress of drainage control structures, culvert headwalls, or other hard-armored features

(c) *Access and Rights-of-Way*

Inspection Frequency: Semiannually (concurrent with final cover inspection)

Other Inspection Occasions/Events:

Table 7: Access and Rights of Way Inspection Items

Inspection Item	Types of Deficiency Conditions to be looked for During Inspection
Gates, Gate Locks and Barriers	Broken or damaged locks, chains, gates, or cattle guards (if installed)
Fence and other Access Control Barriers	Damaged or missing fencing, stretched or damaged barbed wire fencing
Vegetation Control in Areas of the Facility other than the Final Cover	General maintenance of facility vegetation, disease or pests that might affect final cover if unchecked
Other (enter other access control and rights-of-way inspection items):	General site security, site signage, perimeter road access

9. Continuation of Operation and Maintenance of the Leachate Collection and Removal Systems (LCRS)

The site operator will continue the operation and maintenance of the LCRS and disposal of leachate during the post-closure care period in accordance with the facility's leachate management plan found in Attachment/Appendix/Section (enter location of the leachate management plan) of the Site Development Plan and consistent with applicable provisions under 30 TAC Sections 330.331 and 330.333.

(a) Performance Monitoring and Inspection of the LCRS

During the post-closure care period, the site operator will monitor the performance of the LCRS on a (enter frequency) basis to assure continuous compliance with the design criteria and inspect the LCRS components on a (enter frequency) basis, at a minimum, to determine the need for repair or maintenance. Inspection and monitoring will follow the procedure described in the facility's leachate management plan found in Attachment/Appendix/Section (enter location of the leachate management plan) of the Site Development Plan or in the written inspection protocol maintained in the facility's site operating record. Results of the monitoring and inspection activities will be documented in the site operating record. The items and components of the leachate collection and removal system to be inspected will include but are not limited to the items in Table 8 below.

Table 8: Leachate Collection and Removal System Inspection

Inspection Item/Component	Types of Deficiency Conditions to be looked for during Inspection
Pumps, piping, and controls	Broken or inoperable pumps, distressed or damaged piping, flow gages, or control panels
Ground condition in vicinity of leachate systems	Localized subsidence, erosion, or animal burrowing
System leakage	Straining (on equipment or ground), wet areas, or vegetation distress

(b) LCR Maintenance and Repairs

During the post-closure care period, the site operator will perform routine and needed maintenance or repairs of the LCRS items and components based on the monitoring and inspection results. Maintenance and repair will be completed prior to the next scheduled monitoring event and documented within the site operating record.

(c) Discontinuation of Leachate Management

The site operator may submit data and information from the closed units to the TCEQ executive director to demonstrate that leachate no longer poses a threat to human health and the environment. Upon the executive director's approval of the demonstration, the site operator will be allowed to stop managing leachate at the closed unit.

10. Continuation of Monitoring Systems Operation and Maintenance:

The site operator will continue to conduct monitoring systems operation and maintenance activities to ensure the integrity of the containment system and to promptly detect and control releases to the environment during the post-closure care period as follows.

(a) Groundwater Monitoring System

The site operator will continue groundwater monitoring activities (including sampling, analysis, reporting, etc.) in accordance with the approved site-specific Groundwater Sampling and Analysis Plan (GWSAP) found in (enter location of the GWSAP) of the Site Development Plan, the Groundwater Monitoring System Design found in (enter location of the Groundwater Monitoring System Design) of the Site Development Plan and consistent with the provisions under 30 TAC Chapter 330 Subchapter J. Groundwater monitoring will be conducted semiannually or as otherwise approved by the TCEQ executive director during the post-closure care period.

i. Inspection of the Groundwater Monitoring System

During each groundwater monitoring event, the site operator will perform inspection of all the groundwater monitoring wells that are part of the groundwater monitoring system and other items discussed in the GWSAP or the Groundwater Monitoring System Design. The items and components of the groundwater monitoring system to be inspected are included in Table 9:

Table 9: Groundwater Monitoring Systems Inspection

Inspection Item/Component	Types of Deficiency Conditions to be looked for during Inspection
Monitoring Well	During each monitoring event, every gauged well and its surface completion will be visually examined for anything unusual. This includes examination of the well casing, well head, protective cover, locking device, concrete pad, labels, etc.

ii. Maintenance and Repair of the Groundwater Monitoring System

The site operator will perform needed maintenance and/or repairs of the groundwater monitoring system items and components based on the inspection results. Maintenance and/or repairs will be performed no later than the next scheduled monitoring event.

iii. Documentation of Inspection, Maintenance, and Repairs

The site operator will document and discuss the results of the groundwater monitoring system inspection, maintenance, and repair activities in the groundwater monitoring report submitted to the TCEQ executive director, and maintain the documents in the site operating record.

(b) Landfill Gas Management System

During the post-closure care, the site operator will continue landfill gas monitoring operations and activities, documentation, and reporting in accordance with the facility's landfill gas management plan and consistent with the requirements under 30 TAC Chapter 330, Subchapter I.

i. LFG Monitoring and Monitoring System Inspection

All structures and perimeter gas monitoring probes will be sampled quarterly or more frequently as approved by the TCEQ executive director. The site operator will conduct routine inspections of the landfill gas management system components as provided in the landfill gas management plan during the post-closure care period. The items and components to be inspected are included in Table 10.

Table 10: Landfill Gas Management System Inspection

Inspection Item/Component	Types of Deficiency Conditions to be looked for during Inspection
Gas Monitoring Well	During each monitoring event, every gauged well and its surface completion will be visually examined for anything unusual. This includes examination of the well casing, well head, protective cover, locking device, concrete pad, labels, etc.

ii. LFG Management System Maintenance

The site operator will perform routine and needed maintenance of the landfill gas management system including calibration of the monitoring equipment. Needed maintenance and/or repair work will be performed based on the inspection and monitoring results no later than the next scheduled monitoring event.

(c) Continuation of Earth Electrical Resistivity Survey

The site operator will, if applicable, continue earth electrical resistivity surveys as applicable at the frequency stated in the approved site development plan or as otherwise approved by the TCEQ executive director.

11. Detection of a Release, Nature and Extent Investigation, and Corrective Action to Address Release from the MSW Unit

If there is evidence of a release from the landfill or other associated waste management units at the facility, the site operator will:

- Notify the executive director of the TCEQ of the condition detected;
- Investigate, if so directed by the executive director of the TCEQ, whether a release from the landfill or other associated waste management units at the facility has occurred;

- Investigate the nature and extent of the release, if a release is confirmed;
- Assess measures necessary to correct any impact to groundwater;
- Submit a corrective action plan via a permit modification for TCEQ executive director's review and approval; and
- Conduct corrective action as approved by the TCEQ executive director.

12. Revision of the Length of Post-Closure Care Period

(a) The Post-Closure Care Period May Be Decreased

The length of the post-closure care period may be decreased by the TCEQ executive director if the site operator submits a documented certification signed by a licensed professional engineer and including all applicable supporting documentation that demonstrates that the reduced period is sufficient to protect human health and the environment, and the executive director approves the decrease in writing after review.

(b) The Post-Closure Care Period May be Increased

The length of the post-closure care period may be increased by the TCEQ executive director if it is determined that the longer period is necessary to protect human health and the environment.

V. Recordkeeping

The site operator will place a copy of this post-closure plan in the facility's site operating record by the initial receipt of waste at the units proposed at the time of this application. Also, the site operator will document and maintain records of all inspection, monitoring, maintenance, repair, or remediation activities, and detail the results of any inspection and schedules of any other actions to be taken to maintain compliance, in the site operating record.

VI. Planned Use of the Land during and after the Post-Closure Care Period

Post-closure use of the property will not disturb the final cover, liners, or other containment or monitoring systems unless such disturbance is necessary for the proposed use or to protect human health and the environment and is authorized by the TCEQ executive director consistent with provisions under 30 TAC Chapter 330 Subchapter T.

Description of the Planned Use of the Land during or after the Post-Closure Care Period *(describe the planned use of the land during or after the post-closure care period; if not known at this time, enter "NOT KNOWN")*:

Not known

VII. Post-Closure Care and Corrective Action Cost Estimates

A detailed written cost estimate in current dollars for conducting post closure care is provided in *(enter location of the post-closure care cost estimate in the application/permit document)*:

Part III, Appendix IIIL – Cost Estimate for Closure and Postclosure Care

The cost estimate for corrective action will be provided as needed, via a permit modification, during the life and/or post-closure care period of the unit or facility.

VIII. Certification of Completion of Post-Closure Care

Upon completion of the post-closure care maintenance period for each municipal solid waste landfill unit, the site operator will submit to the TCEQ executive director for review and approval a certification, signed by an independent licensed professional engineer, verifying that post-closure care has been completed in accordance with the approved post-closure plan. The submittal to the executive director shall include all applicable documentation necessary for the certification of completion of post-closure care. These will include information relating to the condition and status of:

- The final cover integrity and stability, including the condition of the soil, vegetation, drainage structures, etc.
- Groundwater quality at the site, as determined from on-going groundwater detection or assessment monitoring or corrective measures data during the period.
- Landfill gas (methane) migration, as determined from on-going landfill gas monitoring and remediation data during the period.
- Leachate generation rate and quantity as determined from on-going leachate management data over the period.
- The surface water management system.
- Access control structures.

The engineer's certification of post-closure will show that, based on a summary of monitoring and inspection results, the final cover system continues to maintain its integrity, stability, and function; groundwater remains uncontaminated and monitoring is no longer required; landfill gas is not migrating beyond the facility boundary or accumulating in structures at action levels and monitoring is no longer required; leachate generation rate and quantity will not result in greater than 12 inches of head above the liner, no breakouts have occurred, and all slopes remain as approved and leachate management is no longer required; the surface water management system continues to function as designed; and the access control structures remain intact.

Documentation supporting the professional engineer's certification will be furnished to the TCEQ executive director upon request and will be maintained in the site operating record until the executive director acknowledges termination of post-closure in writing.

IX. Voluntary Revocation Request

Upon completion of the post-closure care period for the final unit at the facility, the site operator will submit to the executive director a request for voluntary revocation of the facility permit.

X. Attachments

The following figures and documents are attached as part of this post-closure care plan:

XI. Engineer's Seal and Signature

Name: Charles R. Marsh   Title: Project Director

Date: February 22, 2022

Company Name: Weaver Consultants Group, LLC   Firm Registration Number: F-3727

Professional Engineer's Seal

Signature 2-22-22

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIL
COST ESTIMATE FOR CLOSURE
AND POSTCLOSURE CARE

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

Prepared by

Weaver Consultants Group, LLC
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WCG Project No. 0771-368-11-123

This document intended for permitting purposes only.

CONTENTS

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

1 INTRODUCTION

This Cost Estimate for Closure and Postclosure Care has been prepared consistent with Title 30 Texas Administrative Code (TAC) Chapter 330. This appendix addresses Title 30 TAC §330.63(j), §330.501, §330.503, §330.505 and §330.507. Cost estimates are required for solid waste landfill facilities whose debts and liabilities could become the debts and liabilities of a state or the United States (i.e., in the event of forced closure, which occurs when an operational municipal solid waste landfill facility can no longer operate because of an inability to manage the incurred debts and liabilities). At such time, the responsibility for closure would be assumed by the TCEQ.

2 CLOSURE COST ESTIMATE

This cost estimate shows the cost of hiring a third party to close the largest area ever requiring closure at any time during the active life of the landfill. The closure cost estimate includes: (1) engineering costs required to administratively close the facility; (2) construction costs involved with the construction of the final cover system, landfill gas system, and other activities required to close the facility; and (3) contingencies and other administrative costs that may be incurred during closure activities. A summary of closure cost estimate is presented in Table 1. A summary of closure costs for the liquid waste solidification facility is provided in Table 1A.

An assessment will be completed each year to verify that the closure cost estimate shown in Table 1 is consistent with the current permit conditions and the projected permit conditions for the upcoming 12-month period. The assessment will verify that the closure costs are based on the current active and inactive areas and that all other permit conditions are addressed by the closure cost estimate (e.g., the number of groundwater monitor wells and landfill gas probes in the estimate match the wells and probes that are either in-place or need to be installed to match the number of wells and probes listed in the permit for the current phase of development).

The estimates will be updated, as needed, consistent with the procedures noted in Section 4. Continuous financial assurance coverage for closure of the facility will be provided until the facility reaches postclosure status and the requirements of the facility's final closure plan have been approved by the Executive Director. Approval documentation will be placed in the Site Operating Record. Additional information regarding the closure cost estimate is summarized below.

2.1 Engineering Costs

The existing costs are based on closing the largest area scheduled to receive final cover, which is 138.4 acres. A boundary survey will be required for the filing of the affidavit of closure, deed recording of any area of the site that has received waste, and publishing the public notice of closure activities. A topographic survey will be required to determine the existing height and top slope of the landfill so that permit compliance can be evaluated and the final closure system, drainage system, and final grading can be engineered. An inspection of the site is included to identify any disposal areas requiring closure, drainage and erosion protection improvements, and identify any potential regulatory deficiencies. The engineering costs include the cost to develop construction plans and closure schedules, closure testing and inspections, and permit document preparation. In addition, administration costs (i.e., for construction contracts) have also been included.

2.2 Construction Costs

Construction costs include construction of final cover system, site grading/drainage improvements and sedimentation controls, and completion of the landfill gas extraction wells for 138.4-acre area. Figure IIIL-1 portrays conditions for the largest area to receive final cover, along with required landfill gas extraction system installation of extending 282 existing gas wells above the top of final cover and installation of 12 new gas wells.

TABLE 1
TURKEY CREEK LANDFILL - CLOSURE COST

Area Requiring Final Cover	138.4 ac		MSW Sector Infilltration Layer Thickness	1.5 ft
Subitle D MSW Sector Area	97.2 ac		MSW Sector Erosion Layer Thickness	1.0 ft
Class 1 Waste Sector Area	25.5 ac		Class 1 Waste Sector Infilltration Layer Thickness	4.0 ft
Composite Topslope Area	31.9 ac		Class 1 Waste Sector Erosion Layer Thickness	1.5 ft
Composite Sideslope Area	90.8 ac			
Pre Subtitle D Area	15.8 ac			
Permit Boundary Area	219.6 ac			

Description	Quantity	Unit[1]	Unit Unit Cost[2]	Proposed Total Cost (2022)
1.0 ENGINEERING				
1.1 Topographic Survey	1	LS	$2,759	$2,759
1.2 Boundary Survey for Affidavit	219.6	AC	$50	$10,980
1.3 Site Evaluation	219.6	AC	$585	$128,466
1.4 Development of Plans	138.4	AC	$493	$68,231
Subtotal				$210,436
1.5 Contract Administration		5%		$10,522
1.6 Admin. Cost for Certification of Final Cover and Affidavit to the Public		5%		$10,522
1.7 Closure Inspection	138.4	AC	$1,131	$156,530
1.8 Permits	1	LS	$5,518	$5,518
ENGINEERING TOTAL				**$393,528**
2.0 CONSTRUCTION				
2.1 Final Cover System				
2.1.1a Infiltration Layer - MSW Sectors	273,387	CY	$4.83	$1,320,461
2.1.1b Infiltration Layer - Class 1 Sectors	164,560	CY	$4.83	$794,825
2.1.2a Erosion Layer - MSW Sectors	182,258	CY	$3.09	$563,178
2.1.2b Erosion Layer - Class 1 Sectors	61,710	CY	$3.09	$190,684
2.1.3 Flexible Membrane Cover	5,341,763	SF	$0.37	$1,976,452
2.1.4 Geocomposite (Topslopes)	1,388,048	SF	$0.20	$277,610
2.1.5 Geocomposite (Sideslopes)	3,956,764	SF	$0.66	$2,611,464
2.1.6 Completion of Existing Gas Wells [3]	282	WELLS	$656	$184,992
2.1.7 LFG Extraction Well Installation [4]	12	WELLS	$19,661	$235,932
2.2 Revegetation	138.4	AC	$828	$114,595
2.3 Site Grading and Drainage	138.4	AC	$1,379	$190,854
CONSTRUCTION TOTAL				**$8,461,047**
ENGINEERING & CONSTRUCTION SUBTOTAL				**$8,854,575**
CONTINGENCY			10%	**$885,458**
CONTRACT PERFORMANCE BOND			2%	**$177,092**
LEGAL FEES			15%	**$1,328,186**
TCEQ ADMINISTRATION OF CONTRACTS			5%	**$442,729**
TOTAL LANDFILL CLOSURE COST				**$11,688,039**
LIQUID WASTE SOLIDIFICATION FACILITY CLOSURE COST (FROM TABLE 1A)				**$37,316**
TOTAL CLOSURE COST				**$11,725,355**

[1]LS = Lump Sum, AC = acres, CY = cubic yards, SF = square feet.
[2]Unit costs are in 2022 dollars. Unit costs are based on current market conditions, typical engineering costs, and industry standards related to construction and reflect input from Texas Regional Landfill Company, LP, Waste Connections, Inc., and Weaver Consultants Group, LLC.
[3]Landfill gas extraction wells to be extended above final cover
[4]Additional gas extraction wells are required for coverage.

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER
2-22-22

TABLE 1A

TURKEY CREEK LANDFILL

LIQUID WASTE SOLIDIFICATION FACILITY CLOSURE COST ESTIMATE

Item No.	Description	Unit	Quantity[2]	Unit Cost	Proposed Total Cost (2022)
1.0	**ENGINEERING**				
1.2	Contract Administration, Bidding and Award	LS	1	$3,534	$3,534
1.3	Administrative Costs	LS	1	$2,356	$2,356
	ENGINEERING TOTAL				**$5,890**
2.0	**CLOSURE CONSTRUCTION (WASTE SOLIDIFICATION AND DISPOSAL, DECON, BASIN REMOVAL/IN-PLACE CLOSURE**				
2.1	Mobilization & Demobilization (local Contractor)	LS	1	$6,480	$6,480
2.2	Processing (Solidification) of Remaining Liquid Waste	LS	1	$3,482	$3,482
2.3	Disposal of Waste Once Solidified	CY	771	$3.13	$2,413
2.4	Wash Fixed Facility Area and Remove Remaining Solidifying Agents from All Areas of Site	LS	1	$3,534	$3,534
2.5	Fixed Facility: Basin In-place Closure	CY	1952	$3.13	$6,110
2.6	Revegetate Disturbed Area	AC	0.43	$838	$360
	CONSTRUCTION TOTAL				**$22,379**
	ENGINEERING AND CONSTRUCTION TOTAL				**$28,269**
3.0	**CONTINGENCY, CONTRACT LEGAL**				
3.1	Contingency (10% of Eng and Construction)		10%		$2,827
3.2	Contract Performance Bond (1% of Eng and Construction)		2%		$565
3.3	Legal Fees (15% of Eng and Construction)		15%		$4,240
3.4	TCEQ Administration Cost (5% of Eng and Construction)		5%		$1,413
	CONTINGENCY, CONTRACT, LEGAL TOTAL				**$9,046**
	TOTAL LIQUID WASTE SOLIDIFICATION AREA CLOSURE COST				**$37,316**

STATE OF TEXAS
CHARLES R. MARSH
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LICENSED PROFESSIONAL ENGINEER
2-22-22

1 Table 1A unit costs above are in 2022 dollars. Liquid Waste Solidification Facility Closure Cost on this Table shall be added to the other facility Closure Costs reflected on Table 1.

2 Assumptions and Cost Backup:

Closure is "premature" (i.e., unplanned) which is most expensive [because under routine planned final closure at the end of the facility life, the facility operations will cease accepting liquid and solidify the remaining waste before the start of closure].

The most costly closure of the Portable/Moveable Facility is when it is located on future waste footprint (not located on top of waste), because it will require full removal of the basins and underlying containment, and restoration of the disturbed area.

Maximum inventory of wastes assumed as follows:

From Section 3.2 of LWSP, Expected rate of liquid receipt = 39,000 gal/day (not a limiting parameter, but serves as the basis/rationale for this estimate). Since up to 72 hours (3 days) of temporary storage of liquid waste is allowed, the maximum inventory of liquid waste awaiting solidification at the time of closure is 39,000 x 3=117,000 gallons.

Consistent with Section 1.2.1 of the LWSP, assume the solidification process bulks the liquid volume by 33%. Thus, there are 117,000 gallons x 1.33 = 155,610 gallons (771 cubic yards) of solidified material to be disposed.

Item 2.2 Time to solidify 117,000 gallons of liquid waste = 2 hrs/basin x 4 basins = 8 hrs. Equipment needs = 1 Loader + 1 Excavator. Use site soil as reagent - need approx 200 CY at $2.66/CY - round up to $600. From RS Means 2011, typical heavy equipment operator rate = $350/day. 3 CY Loader = $380/day. 3 CY capacity excavator = $1275/day. Total Solidification Cost = $600 material + (2 operators x $350) + $380 + $1275 = $2955. Cost adjusted to represent 2022 costs.

Item 2.3 From footnotes above, there are 771 cubic yards of solidified material in the basins, requiring disposal. Excavate and haul to landfill working face. Unit rate obtained from 2011 cost of Item 2.1.2 of Closure Costs Estimate (consistent equipment and methods of excavation/hauling/unloading/spreading).

Item 2.4 Pressure washing of four basins @ 3120 square feet (S.F.) each. Plus wash slab (10,200 S.F.) 22680 S.F. total x Unit Rate $0.04/S.F. [RS Means 2011 Item 05 01 10 51] = $907. Disposal of 5,000 gallons wash water (one tanker truck) @ $0.30/gal = $ 1500. Total $2407. Reagent likely has market value and can be re-sold. Conservatively add $500 for incidental reagent removal costs to round total up to $3,000. The values were originally established using 2011 dollars and have been adjusted.

Item 2.5 In-place closure; fill basins with clean, inert material from on-site borrow. Fill quantity = 4 basins @ 488 C.Y. each = 1952 C.Y. Use same unit rate as 2011 cost of Item 2.1.2 of Closure Cost Estimate (consistent equipment and methods of excavation/hauling/unloading/spreading). The values were originally established using 2011 dollars and have been adjusted.

Item 2.6 Revegetation rate from Table 1 of Closure Cost Estimate.

LEGEND

LANDFILL PERMIT BOUNDARY

LIMITS OF WASTE

700 EXISTING CONTOUR

N 6816000 STATE PLANE COORDINATE

32° 21' 20" GEODETIC COORDINATE

SECTOR BOUNDARY

EW-A9 EXISTING LFG EXTRACTION WELL

EXISTING LFG COLLECTION PIPING

MW-7 EXISTING GROUNDWATER MONITORING WELL

GMP-12 EXISTING GAS MONITORING PROBE

AREA REQUIRING FINAL COVER

EXISTING LFG EXTRACTION WELL

PROPOSED LFG EXTRACTION WELL

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

☐ DRAFT
☒ FOR PERMITTING PURPOSES ONLY
☐ ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: IIIL-1 FC AREA.DWG

DRAWN BY: SRF
DESIGN BY: JBP
REVIEWED BY: CRM

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
LARGEST AREA TO REQUIRE
FINAL COVER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIL-1

O:\0771\368\EXPANSION 2021\PART III\IIIL-1-LARGEST AREA TO REQUIRE FC.dwg, sford, 1:2

3 POSTCLOSURE CARE COST ESTIMATE

The postclosure care period has been established by TCEQ regulations to be 30 years. During this period, continuous maintenance must be ongoing to assure the integrity and effectiveness of the final cover system, monitoring systems, leachate collection system, drainage system, and landfill gas system. A summary of postclosure costs is presented in Table 2. The costs will be adjusted annually as indicated in Section 4.

Engineering postclosure estimates include the cost of annual site inspections, corrective plans and specifications, and site compliance monitoring. Site inspections will be performed annually and will include identification of areas experiencing settlement or subsidence, identification of erosion or other drainage-related problems, and inspection of the leachate collection system, gas control and monitoring system, and the groundwater monitoring system. Correctional plans and specifications include the costs for an engineering consultant to prepare construction plans and specifications to correct problems identified during the site inspections. Gas monitoring and groundwater sampling and analysis will be performed as outlined in the postclosure plan.

Postclosure construction/maintenance estimates include the costs to correct problems identified during the engineering site inspections and as specified by the engineer's correctional plans and specifications. These costs will also include any ongoing site maintenance that is needed throughout the postclosure period. These costs include cover and drainage maintenance and annual seeding and mowing costs. The leachate disposal costs include trucking, treatment and disposal costs from areas contributing to leachate generation (approximately 122.6 acres).

3.1 Engineering Costs

As shown on Table 2, engineering postclosure estimates include the cost of annual site inspections, corrective plans and specifications, and site compliance monitoring. The estimates are based on the largest area with waste in-place which is 138.4 acres. Site inspections will be performed annually and will include identification of areas experiencing settlement or subsidence, identification of erosion or other drainage-related problems, and inspection of the leachate collection system, gas control and monitoring system, and the groundwater monitoring system. Correctional plans and specifications include the costs for an engineering consultant to prepare construction plans and specifications to correct problems identified during the site inspections. Gas monitoring and groundwater sampling and analysis will be performed as outlined in the Postclosure Care Plan (Appendix IIIK).

3.2 Construction Costs

Postclosure construction/maintenance estimates include the costs to correct problems determined by the engineering site inspections and as specified by the engineer's correctional plans and specifications. These costs will also include any ongoing site maintenance that is needed throughout the postclosure period. These costs include cover and drainage maintenance, as well as annual seeding and mowing costs. The leachate disposal costs include leachate removal from the area with a leachate collection system (122.6 acres). Postclosure landfill gas control system O&M costs includes regular calibration and maintenance of regulatory equipment, such as valves and flow meters, associated system components of the active collection system and condensate disposal for the completely developed site.

A justification for the postclosure landfill gas (LFG) system operation and maintenance (O&M) cost estimate provided in Table 2 is discussed below. The following summary information can be found in Tables IIIL-2, IIIL-3, and IIIL-4.

- Table IIIL-2 – Estimated Routine O&M Costs. This table estimates the annual and 30-year cost for the routine O&M activities.
- Table IIIL-3 – Estimated Non-Routine O&M Costs. This table presents a summary of non-routine tasks and their associated costs. The estimates are based on the tasks required to replace or repair components on the flare/blower system.
- Table IIIL-4 – Summary of Estimated O&M Costs. This table provides a summary of the information listed in Tables IIIL-2 and IIIL-3.

TABLE 2
TURKEY CREEK LANDFILL - POSTCLOSURE CARE COST

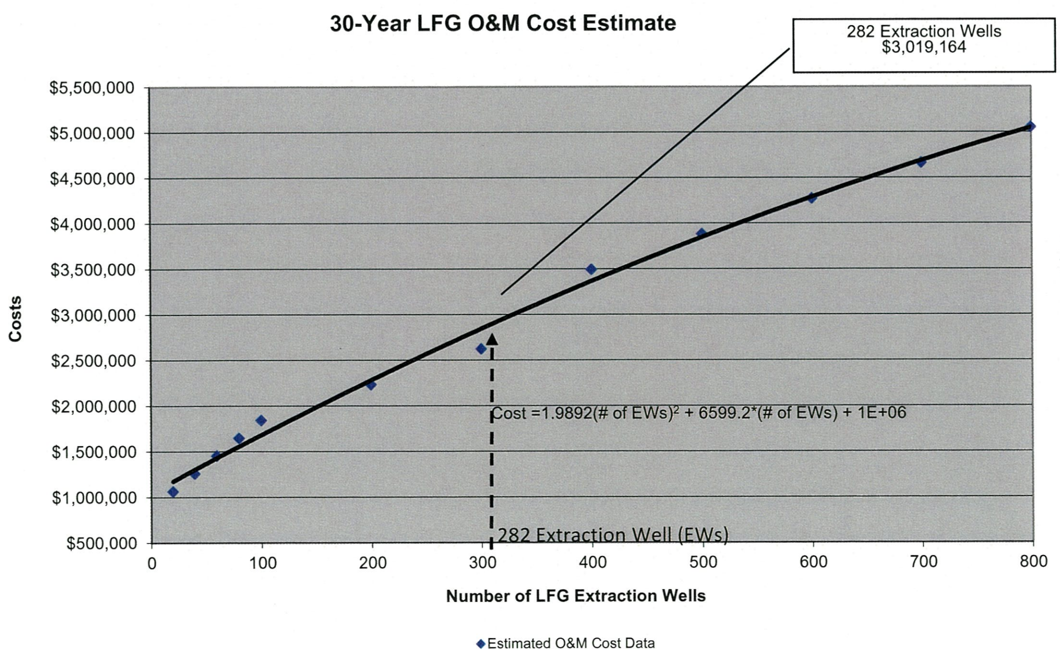
Area with Waste In-place	138.4	ac	Post Closure Care Period	30	yrs
Pre_Subtitle D Area	15.8	ac	LFG Extraction Wells	282	wells
Area with leachate collection system	122.6	ac	Gas Montoring Events	4	/yr
Groundwater Monitoring Wells	20	wells	GW Monitoring Events	2	/yr
Gas Probes	14	wells	Leachate Generation	3,650	gal/ac/yr
Area to be administratively closed	219.6	ac			

Description	Quantity	Unit[1]	Unit Cost[2]	Annual Cost	Proposed Total Cost (2022)
1.0 ENGINEERING					
1.1 Postclosure Care Plan	N/A				
1.2 Site Inspection and Recordkeeping (annual)	219.6	AC	$8.43	$1,851	$55,537
1.3 Correctional Plans and Specifications (annual)	138.4	AC	$11.59	$1,604	$48,122
1.4 Site Monitoring					
1.4.1 Groundwater Monitoring (semiannual)	20	WELLS	$1,143	$45,720	$1,371,600
1.4.2 Gas Monitoring (quarterly)	4	EVENTS	$1,485	$5,940	$178,200
ENGINEERING SUBTOTAL					$1,653,459
2.0 CONSTRUCTION / MAINTENANCE	138.4	AC	$300	$41,520	$1,245,600
3.0 LEACHATE DISPOSAL	122.6	AC	$0.04	$20,112	$603,360
4.0 LFG SYSTEM OPERATION & MAINTENANCE[3]	1	LS			$3,019,164
SUBTOTAL					$6,521,582
CONTINGENCY		10%			$652,158
SUBTOTAL					$7,173,740
TCEQ CONTRACT ADMINISTRATION		10%			$717,374
TOTAL POSTCLOSURE CARE COST					$7,891,114

[1]AC = acres, LS = lump sum, YR = Year..

[2]Unit costs are in 2022 dollars.

[3]Refer to the Figure shown below for additional information regarding how the LFG System Maintenance costs are estimated.



4 COST ESTIMATE ADJUSTMENTS

During the active life of the site, Texas Regional Landfill Company, LP will annually adjust the cost estimates for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s). The adjustment will be made by recalculating the maximum costs of closure and postclosure in current dollars using Annual Inflation Factors published by the TCEQ, or by using an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product published by the United States Department of Commence in its Survey of Current Business. The inflation factor is the result of dividing the latest published annual deflator by the deflator for the previous year. The first adjustment is made by multiplying the closure and postclosure cost estimates by the inflation factor. The result is the adjusted closure and postclosure cost estimates. Subsequent adjustments are made by multiplying the latest adjusted closure and postclosure estimates by the latest inflation factor.

An increase in the closure or postclosure cost estimate and the amount of financial assurance will be made if changes to the final closure or postclosure care plan or the landfill conditions increase the maximum cost. If the only area requiring closure changes (i.e., increases due to liner construction), then financial assurance will be adjusted within 60 days prior to the anniversary date of the establishment of the financial assurance (a permit modification will be approved by the TCEQ prior to making the adjustment.)

A reduction in the closure or postclosure care cost estimate and the amount of financial assurance may be submitted if the cost estimate exceeds the maximum costs of closure at any time during the remaining life of the unit or postclosure care remaining over the postclosure care period. Texas Regional Landfill Company, LP will submit written notice to the executive director of the detailed justification for the reduction of the cost estimates and the amount of financial assurance. A reduction in the cost estimate and financial assurance will be considered a permit modification.

In the event that the facility were to enter into corrective action during the postclosure period, Southwest Landfill TX, LP will submit a corrective action cost estimate to the TCEQ in accordance with Title 30 TAC §330.509.

In accordance with Title 30 TAC §330.503(a) and §330.463(b)(3)(D), evidence of any additional financial assurance resulting from the annual revision of cost estimates will be provided to the TCEQ within 30 days after the annual anniversary date.

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIL-A
TCEQ CLOSURE COST ESTIMATE FORM
FOR MSW TYPE I LANDFILLS (TCEQ – 20721, 09/27/21)

Prepared for

Texas Regional Landfill Company, LP

February 2022

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER
2-22-22

Prepared by

Weaver Consultants Group, LLC
TPBE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0771-368-11-123

This document intended for permitting purposes only

Texas Commission on Environmental Quality

Closure Cost Estimate Form for Municipal Solid Waste Type I Landfills

This form is for use by applicants or site operators to provide cost estimates for closure of MSW Type I landfills to meet the requirements in 30 Texas Administrative Code (TAC) Chapter 330, Section 330.63(j) and 30 TAC Chapter 330 Subchapter L. The costs to be provided herein are cost estimates for hiring a third party to close the largest waste fill area that could potentially be open in the year to follow and those areas that have not received final cover. If you need assistance in completing this form, please contact the MSW Permits Section in the Waste Permits Division at (512) 239-2335.

Facility Name: Turkey Creek Landfill

MSW Permit No.: 1417D

Site Operator/Permittee Name and Mailing Address: Texas Regional Landfill Company, LP
3 Waterway Square Place, Suite 550, The Woodlands, Texas 77380

Total Closure Cost Estimate (2022 Dollar Amount): $11,636,526

I. Professional Engineer's Statement, Seal, and Signature

I am a licensed professional engineer in the State of Texas. To the best of my knowledge, this Closure Cost Estimate has been completed in substantial conformance with the facility Closure Plan and, in my professional opinion, is in compliance with Title 30 of the Texas Administrative Code, Chapter 330.

Name: Charles R. Marsh, P.E. Title: Project Director

Date: 02/22/2022

Company Name: Weaver Consultants Group, LLC Firm Registration Number: F-3727

Professional Engineer's Seal

Professional Engineer's Signature

II. Annual Review of Permit Conditions, Cost Estimates, Inflation Factor, and Financial Assurance

The permittee/site operator acknowledges that he/she will:

(1) Review the facility's permit conditions on an annual basis and verify that the current active and inactive waste fill areas of the landfill match the areas on which closure cost estimates are based.

(2) Request in writing via a permit modification application for an increase in the closure cost estimate and the amount of financial assurance provided if changes to the closure plan or the landfill conditions increase the maximum cost of closure at any time during the remaining active life of the landfill.

(3) Request in writing via a permit modification application for a reduction in the cost estimate and the amount of financial assurance provided if the cost estimate exceeds the maximum cost of closure at any time during the remaining active life of the landfill. The permit modification application will include a description of the situation and a detailed justification for the reduction of the closure cost estimate and the amount of financial assurance.

(4) Establish financial assurance for closure of the unit in an amount no less than the current closure cost estimate in accordance with 30 TAC Chapter 37, Subchapter R.

(5) Adjust the current cost estimate for inflation within 60 days prior to the anniversary date of the first establishment of the financial assurance mechanism.

(6) Provide annual inflation adjustments to the closure costs and financial assurance during the active life of the facility, until the facility is officially placed under the post closure care period and all requirements of the final closure plan have been approved in writing by the TCEQ executive director. The adjustment will be made using an inflation factor derived from the most recent annual Implicit Price Deflator for Gross National Product published by the United States Department of Commerce in its Survey of Current Business, as specified in paragraphs (1) and (2) of 30 TAC §37.131. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year.

(7) Provide continuous financial assurance coverage for closure until the facility is officially placed under the post-closure care period.

III. Description of the Closure Cost Estimates Worksheet

The following descriptions of the items on the closure cost estimates worksheet provide guidance for identifying the minimum work or cost elements and estimating the unit or lump sum cost of each item as applicable. Enter additional detail for each item in the field following the item as necessary and as site-specific condition warrants. The cost items are grouped under closure costs for engineering, construction, and storage and processing units. Include attachments to detail any additional work and associated costs necessary to close the site that is not already included as a line item on the worksheet. Reference the attachments and list the work or cost items in the fields under "Additional Engineering Cost Items Not Listed on the Worksheet," "Additional Construction Cost Items Not Listed on the Worksheet," or "Additional Storage and Processing Units Items Not Listed on the Worksheet" as applicable. Provide the total cost of the additional work or cost items in each cost category on the worksheet line that precedes the cost subtotal for each cost group.

1. Engineering Costs

The engineering tasks have been subdivided into seven items and are described below. Other related costs may be added as site-specific issues warrant.

1.1. Topographic Survey

A topographic survey will be required to verify the existing elevation and slopes of the landfill to ensure conformance with the final cover system, drainage system, and final grading designs.

Enter additional topographic survey work or cost element details as site-specific conditions warrant: $2,759

1.2. Boundary Survey

The metes and bounds description is required for filing of the affidavit of closure and deed recording of any area of the site which has received waste. Other activities to be included here are publication of the public notice of closing activities.

Enter additional boundary survey work or cost element details as site-specific conditions warrant: $10,980

1.3. Site Evaluation

The evaluation includes a site inspection to identify waste disposal areas, analyze drainage and erosion protection needs, and to determine other site operational features that are not in compliance with the permit. The site evaluation also includes verifying the need for new or relocation of existing groundwater monitoring wells and landfill gas monitoring probes, analysis of groundwater samples, and review of site operating record. The third party consultant who performed the site evaluation will prepare and submit an engineering report to the executive director to document the status of the site.

The report will identify all areas of work and the associated implementation costs necessary to safely close the landfill operations with recommendations on how to fulfill these needs.

Enter additional site evaluation work or cost element details as site-specific conditions warrant: $128,466

1.4. Development of Plans

The final closure, plan the final cover system design and specifications, grading and drainage plans, specification for revegetation, design of any other improvements to bring the site into compliance with the permit, the closure schedule, and coordination with the TCEQ and provision of closure notice to the public.

Enter additional development of plans work or cost element details as site-specific conditions warrant: $68,231

1.5. Contract Administration (bidding and award)

The third-party consultant will advertise the project, receive the bids, evaluate the bids, award the closure construction contract and administer the contract during construction.

Enter additional contract administration work or cost element details as site-specific conditions warrant: $10,522

1.6. Closure Inspection and Testing

The professional of record will observe closure construction, perform cover thickness and permeability verification, and prepare an evaluation report upon completion of closure.

Enter additional closure inspection or testing work or cost element details as site-specific conditions warrant: $156,530

1.7. TPDES and other Permits

The third-party consultant will prepare plans, specifications, and other documents necessary for compliance with applicable federal and state laws and requirements, including the Clean Water Act, for the proper closure of the site.

Enter additional TPES or other permits work or cost element details as site-specific conditions warrant: $5,518

1.8. Additional Engineering Cost Items Not Listed on the Worksheet

List the Attachment(s) detailing any additional engineering cost items necessary to close the site that is not already included as a line item on the worksheet: $10,522 for an affidavit to the public. Also, reference these Attachments in the

"Units" column on this line of the worksheet. Provide the total cost of all additional engineering cost items in the "Cost" column.

1.9. Engineering Costs Subtotal: $393,528

1.9.1. Enter the sum of engineering costs in Items 1.1 through 1.8.

2. Construction Costs

Closure construction costs include those for construction of the final cover system, site grading, and drainage improvements. Other costs may be added as site-specific issues warrant.

2.1. Mobilization

2.1.1. Mobilization of Personnel and Equipment

The cost of mobilizing personnel and construction heavy equipment must be included as part of the construction costs.

Enter additional work or cost element details for mobilization of personnel and equipment as site-specific conditions warrant:

Included in overall cost of construction work.

2.2. Final Cover System

The owner or operator must install a final cover system that is designed to minimize infiltration and erosion. The final cover system is subdivided into the sideslope cover and cap cover with their associated components to facilitate cost calculations. If an alternative final cover is proposed, the closure cost estimate will still be based on a design that utilizes the conventional composite cover system.

Enter additional final cover system work or cost element details as site-specific conditions warrant: $7,734,674

2.2.1. Side Slope Cover

Enter information for Items 2.2.1a through 2.2.1h.

2.2.2. Top Slope Cover

Enter information for Items 2.2.2a through 2.2.2h.

2.2.3. Cells for Class 1 Nonhazardous Industrial Waste

2.3. Site Grading

Site grading includes the final grading of the site, including the landfill cap and sideslopes.

Enter additional site grading work or cost element details as site-specific conditions warrant: $190,854

2.4. Site Fencing and Security

Site fencing and security must be included for the area which has received waste and have no existing approved fencing.

Enter additional site fencing and security work or cost element details as site-specific conditions warrant: N/A

2.5. Landfill Gas Monitoring and Control Systems

Enter information for Items 2.5.1 through 2.5.6.

Final installation of the landfill gas monitoring and control systems must include the installation costs of pipes and appurtenances. In the event of a forced closure, the systems may not have been completed, thus, the estimated costs to complete the landfill gas monitoring and control system must be provided.

Enter additional landfill gas monitoring and control systems work or cost element details as site-specific conditions warrant: $420,924

2.6. Groundwater Monitoring System

2.6.1. Monitor Well Installation

Upon closure of the site, it may be necessary to relocate the compliance boundary. This requires the installation of new monitor wells.

Enter additional groundwater monitoring system work or cost element details as site-specific conditions warrant: N/A

2.6.2. Piezometer and Monitor Well Plugging and Abandonment

Piezometer or monitor well abandonment is the cost of abandoning (plugging) piezometers or monitor wells that are no longer needed. Determine the number of piezometers or monitor wells to be abandoned and include the total cost.

Enter additional plugging and abandonment work or cost element details as site-specific conditions warrant: N/A

2.7. Leachate Management

2.7.1. Completion of Existing Leachate Collection System

In the event of a forced closure, there may be circumstances where the leachate collection system has not been completed. In this event, the leachate collection system must be closed with a permanent outfalls and permanent cleanouts installed.

Enter additional leachate management work or cost element details as site-specific conditions warrant: N/A

2.8. Stormwater Management

2.8.1. Stormwater Drainage Management System

To reduce the potential long-term impacts of the landfill on surface water quality, drainage features must be incorporated into the final cover design to direct runoff, minimize erosion, control sediments, and avoid ponding of stormwater. The drainage system construction costs must be included.

Enter additional stormwater drainage management work or cost element details as site-specific conditions warrant: Included in site grading.

2.9. Additional Construction Cost Items Not Listed on Worksheet

List the Attachments detailing any additional construction cost items necessary to close the site that is not already included as a line item on the worksheet: $114,595 for revegetation. Also, reference these Attachments in the "Units" column on this line of the worksheet. Provide the total cost of all additional construction cost items in the "Cost" column.

2.10. Construction Costs Subtotal: $8,461,047

2.10.1. Enter the sum of construction costs in Items 2.1 through 2.9.

3. Storage and Processing Unit Closure Costs

For landfills that incorporate storage and/or processing operations that are not separately authorized, all waste and processed and unprocessed materials associated with storage and/or processing units must be removed during the closure process.

3.1. Waste Disposal

The cost of disposal of waste at an authorized facility. *Enter additional waste disposal work or cost element information as necessary.*

$2,413

3.2. Material Removal and Disinfection

The cost of removal, including transportation, of any remaining processed and unprocessed materials to an authorized off-site location. *Enter additional material removal and disinfection work or cost element information as necessary.*

$3,534

3.3. Demolition and Disposal

The cost of dismantling and/or disinfection of storage and/or processing units and disposal, as applicable. *Enter additional demolition and disposal work or cost element information as necessary.*

$6,110

3.4. Additional Storage and Processing Unit Closure Cost Items Not Listed in Worksheet

List the Attachments detailing any additional storage and processing unit closure cost items necessary to close the site that is not already included as a line item on the worksheet. $16,212: $6,480 for mobilization and demobilization, $3,482 for processing (solidification) or remaining liquid waste, $360 for revegetating disturbed area, $3,534 for bidding and award, and $2,356 for administrative costs. Also, reference these Attachments in the "Units" column on this line of the worksheet.

Provide the total cost of all additional storage and processing unit closure cost items in the "Cost" column.

3.5. Storage and Processing Unit Closure Costs Subtotal: $28,269

4. Sum of Cost Subtotals: $8,882,844

4.1. Enter the sum of engineering, construction, and storage and processing unit closure cost subtotals from lines 1.9.1, 2.10.1, and 3.5.1.

5. Contingency: $888,288 (includes portion from engineering cost)

5.1. Add an amount equal to at least 10 percent of the sum of cost subtotals to cover unanticipated events during implementation of closure activities.

6. Contract Performance Bond: $177,657 (2% is used)

6.1. Add an amount equal to at least 2 percent of the sum of cost subtotals for purchase of a surety bond to guarantee satisfactory completion of the closure activities.

7. Third Party Administration and Project Management Costs: $1,770,915 (includes legal fees)

7.1. Add an amount equal to at least 2.5 percent of the sum of cost subtotals to cover the cost for a third party hired by TCEQ to administer the closure activities.

8. Total Closure Cost: $11,725,355

8.1. Enter the sum of the amounts on lines 4.1, 5.1, 6.1, and 7.1.

IV. Closure Cost Estimates Worksheet

A. Landfill Data

Total Permitted Waste Disposal Area: 146.4 acres

Largest Area Requiring Final Cover in the year to follow: 138.4 acres

Total Filled Area with Constructed Final Cover: 0.0 acres

Total Area Certified Closed: 0.0 acres

Number of Monitor Wells to be Installed for Closure: N/A

Number of Gas Probes to be Installed for Closure: N/A

Total Acreage Needing LFG Collection and Control System: 138.4 acres

The unit or lump sum cost for each item is based on the work items and cost elements described in Section III of this Closure Cost Estimate document:

Yes ☒ No ☐ Partially ☐

(if "No" or "Partially" is checked, please include attachments describing the additional work items and detailing the unit, quantities, and costs for the additional items)

B. Facility Drawings and Financial Assurance Documentation

- Facility drawings
  - Attach facility drawings showing the closure areas to which the closure cost estimates apply.(Refer to Figure IIIL-1 in Appendix L)
- Financial assurance documentation
  - For an existing facility, attach a copy of the documentation required to demonstrate financial assurance as specified in 30 TAC Chapter 37, Subchapter R. (Attached)
  - For a new facility, a copy of the required documentation shall be submitted 60 days prior to the initial receipt of waste.

C. Attachments

- Additional Engineering, Construction, and Storage and Processing Units Cost Items Details

Closure Cost Estimate for MSW Type I Landfill

Facility Name: Turkey Creek Landill Revision No.: 0

Permit No: 1417D Date: 02/22/2022

D. Closure Cost Estimates Worksheet

If any item listed in this worksheet is not applicable to the subject facility, enter "NA" (Not Applicable) in the affected field.

Table 1. Closure Cost Estimates Worksheet.

Item No.	Item Description	Units[1]	Quantity	Unit Cost	Cost	Source of Unit Cost Estimate[2]
1. Engineering Costs						
1.1	Topographic Survey	specify	1	$2,759	$2,759	WCG routinely provides this service
1.2	Boundary Survey	specify	219.6	$50	$10,980	WCG routinely provides this service
1.3	Site Evaluation	Acres	219.6	$585	$128,466	WCG routinely provides this service
1.4	Development of Plans	Lump Sum	NA	NA	$68,231	WCG routinely provides this service
1.5	Contract Administration (bidding and award)	Lump Sum	NA	NA	$10,522	WCG routinely provides this service
1.6	Closure Inspection and Testing	specify	138.4	$1,131	$156,530	WCG routinely provides this service
1.7	TPDES and other Permits	Lump Sum	NA	NA	$5,518	WCG routinely provides this service
1.8	Additional Engineering Cost Items (describe in attachments)	Affidavit to Public	NA	NA	$10,522	NA
1.9 Engineering Costs Subtotal						
1.9.1	Engineering Costs Subtotal	NA	NA	NA	$393,528	NA

Closure Cost Estimate for MSW Type I Landfill

Facility Name: Turkey Creek Landill

Permit No: 1417D

Revision No.: 0

Date: 02/22/2022

Item No.	Item Description	Units[1]	Quantity	Unit Cost	Cost	Source of Unit Cost Estimate[2]
2. Construction Costs						
2.1 Mobilization						
2.1.1	Mobilization of Personnel and Equipment	Lump Sum	NA	NA	NA	NA
2.2 Final Cover System						
2.2.1 Side Slope Cover						
2.2.1a	Infiltration Layer – Compacted Clay	Cubic Yards	437,947	$4.83	$2,115,286	Recent Construction Projects
2.2.1b	Infiltration Layer – Geosynthetic Clay Liner	Square Feet	NA	NA	NA	NA
2.2.1c	Flexible Membrane Cover – HDPE	Square Feet	NA	NA	NA	NA
2.2.1d	Flexible Membrane Cover – LLDPE	Square Feet	5,341,763	0.37	$1,976,452	Recent Construction Projects
2.2.1e	Drainage Layer – Aggregate	Cubic Yards	NA	NA	NA	NA
2.2.1f	Drainage Layer – Drainage Geocomposite Material	Square Feet	3,956,764	$0.66	$2,611,464	Recent Construction Projects
2.2.1g	Erosion Layer	Cubic Yards	243,968	$3.09	$753,862	Recent Construction Projects
2.2.1h	Vegetation	Acres	138.4	$82.8	$114,595	Recent Construction Projects
2.2.2 Top Slope Cover						
2.2.2a	Infiltration Layer – Compacted Clay	Cubic Yards	Included in Sideslope	Included in Sideslope	Included in Sideslope	Included in Sideslope
2.2.2b	Infiltration Layer – Geosynthetic Clay Liner	Square Feet	NA	NA	NA	NA
2.2.2c	Flexible Membrane Cover – HDPE	Square Feet	NA	NA	NA	NA
2.2.2d	Flexible Membrane Cover – LLDPE	Square Feet	Square Ft. included in sideslope	Square Ft. included in sideslope	Square Ft. included in sideslope	Square Ft. included in sideslope

Item No.	Item Description	Units[1]	Quantity	Unit Cost	Cost	Source of Unit Cost Estimate[2]
2.2.2d	Flexible Membrane Cover – LLDPE	Square Feet	Square Ft. included in sideslope	Square Ft. included in sideslope	Square Ft. included in sideslope	Square Ft. included in sideslope
2.2.2e	Drainage Layer – Aggregate	Cubic Yards	NA	NA	NA	NA
2.2.2f	Drainage Layer – Drainage Geocomposite Material	Square Feet	1,388,048	$0.20	$277,610	Recent Construction Projects
2.2.2g	Erosion Layer	Cubic Yards	Included in Sideslope	Included in Sideslope	Included in Sideslope	Included in Sideslope
2.2.2h	Vegetation	Acres	Included in Sideslope	Included in Sideslope	Included in Sideslope	Included in Sideslope
2.2.3 Cells for Class 1 Nonhazardous Industrial Waste						
2.2.3a	Dike Construction	specify	NA	NA	NA	NA
2.3 Site Grading						
2.3.1	Site Grading	Acres	138.4	$1,379	$190,854	Recent Construction Projects
2.4 Site Fencing and Security						
2.4.1	Site Fencing and Security	specify	NA	NA	NA	NA
2.5 Landfill Gas Monitoring and Control System						
2.5.1	Gas Control Wells	specify	12	$19,661	$235,932	Recent Construction Projects
2.5.2	Gas Header Piping	specify	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1
2.5.3	Gas Lateral Piping	specify	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1
2.5.4	Flare Station	Lump Sum	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1
2.5.5	Condensate Sumps	specify	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1
2.5.6	Completion of LFG Monitoring System	specify	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1	Included in 2.5.1
2.6 Groundwater Monitoring System						

Closure Cost Estimate for MSW Type I Landfill

Facility Name: Turkey Creek Landill — Revision No.: 0

Permit No: 1417D — Date: 02/22/2022

Item No.	Item Description	Units[1]	Quantity	Unit Cost	Cost	Source of Unit Cost Estimate[2]
2.6.2	Piezometer and Monitor Well Plugging and Abandonment	Each	NA	NA	NA	NA
2.7 Leachate Management						
2.7.1	Completion of Leachate Management System	specify	NA	NA	NA	NA
2.8 Stormwater Management						
2.8.1	Stormwater Drainage Management System	specify	NA	NA	NA	NA
2.9 Other Cost Items						
2.9.1	Additional Construction Cost Items (describe in attachments)	identify attach-ments	NA	NA	NA	NA
2.10 Construction Costs Subtotal						
2.10.1	Construction Costs Subtotal	NA	NA	NA	NA	NA
3. Storage and Processing Unit Closure Costs						
3.1	Waste Disposal	☐ Tons ☒ Cubic Yards	771	$3.13	$2,413	Recent Construction Projects
3.2	Material Removal and Disinfection	specify	1	$3,482	$3,482	Recent Construction Projects
3.3	Demolition and Disposal Units	specify	1	$3,534	$3,534	Recent Construction Projects
3.4	Additional Storage and Processing Unit Closure Cost Items (describe in attachments)	identify attach-ments	NA	NA	$16,212	NA
3.5 Storage and Processing Unit Closure Costs Subtotal						
3.5.1	Storage and Processing Unit Closure Costs Subtotal	NA	NA	NA	$28,269	NA
4. Sum of Engineering, Construction, and Storage and Processing Unit Closure Costs						
4.1	Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals	NA	NA	NA	$8,882,844	NA

Closure Cost Estimate for MSW Type I Landfill

Facility Name: Turkey Creek Landill | Revision No.: 0

Permit No: 1417D | Date: 02/22/2022

Item No.	Item Description	Units[1]	Quantity	Unit Cost	Cost	Source of Unit Cost Estimate[2]
5. Contingency						
5.1	Contingency (10% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals)	NA	NA	NA	$177,657	NA
6. Contract Performance Bond						
6.1	Contract Performance Bond (2% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals)	NA	NA	NA	$88,828	NA
7. Third Party Administration and Project Management Costs						
7.1	Third Party Administration and Project Management Costs (2.5% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals)	NA	NA	NA	$1,770,915	NA
8. Total Closure Costs						
8.1	Total Closure Costs (sum of amounts in Sections 4, 5, 6, and 7)	NA	NA	NA	$11,725,355	NA

[1] For items marked "specify," the responsible professional engineer will enter appropriate unit of measurement

[2] Sources of Unit Costs for Cost Estimates table may include:

(1) Published Cost Estimator Manuals (e.g., RS Means);
(2) Third Party Quotes (e.g., Environmental Field Services Contractors);
(3) Verifiable Data based on Actual Operations; or
(4) Other sources of cost acceptable to the executive director of the TCEQ.

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

MAJOR PERMIT AMENDMENT APPLICATION

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIL-B
TCEQ POST-CLOSURE COST ESTIMATE FORM FOR MSW TYPE I LANDFILLS
(TCEQ – 20723, 09/27/21)

Prepared for

Texas Regional Landfill Company, LP

February 2022

Prepared by

Weaver Consultants Group, LLC
TPBE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9770

WCG Project No. 0771-368-11-123

This document intended for permitting purposes only

Texas Commission on Environmental Quality

Post-Closure Care Cost Estimate Form for Municipal Solid Waste Type I Landfills

This form is for use by applicants or site operators to provide post-closure care cost estimates for post-closure care of MSW Type I landfills to meet the requirements in 30 Texas Administrative Code (TAC) Chapter 330, Section 330.63(j) and 30 TAC Chapter 330 Subchapter L. The costs to be provided herein are cost estimates for hiring a third party to conduct post-closure care of the largest waste fill area that has been certified closed in writing by the TCEQ executive director.

If you need assistance in completing this form, please contact the MSW Permits Section in the Waste Permits Division at (512) 239-2335.

I. General Information

Facility Name: Turkey Creek Landfill

MSW Permit No.: 1417D

Date: 02/22/2022

Revision Number: 0

Site Operator/Permittee Name and Mailing Address: Texas Regional Landfill Company, LP
3 Waterway Square Place, Suite 550, The Woodlands, Texas 77380

Total Post-Closure Care Cost Estimate (2022 Dollar Amount): $7,891,114

II. Professional Engineer's Statement, Seal, and Signature

I am a licensed professional engineer in the State of Texas. To the best of my knowledge, this Post- Closure Care Cost Estimate has been completed in substantial conformance with the facility Post-Closure Care Plan and, in my professional opinion, is in compliance with Title 30 of the Texas Administrative Code, Chapter 330.

Name: Charles R. Marsh Title: Project Director

Date: 02/22/2022

Company Name: Weaver Consultants Group, LLC Firm Registration Number: F-3727

Professional Engineer's Seal

STATE OF TEXAS
CHARLES R. MARSH
105073
LICENSED
PROFESSIONAL ENGINEER

2-22-22

Signature

III. Annual Review of Permit Conditions, Cost Estimates, Adjustments for Inflation, and Financial Assurance

The site operator/permittee acknowledges that he/she will:

1. Revise and increase the post-closure care cost estimate and the amount of financial assurance provided whenever changes in the post-closure care plan or the landfill conditions increase the maximum cost of post-closure care at any time during the remaining active life of the landfill and until the facility is officially released from the post-closure care period in writing by the executive director.
2. Request a reduction in the post-closure care cost estimate and the amount of financial assurance as a permit modification whenever the post-closure care cost estimate exceeds the maximum cost of post-closure care remaining over the post-closure period. The permit modification will include a detailed justification for the reduction of the post-closure care cost estimate and the amount of financial assurance.
3. Establish financial assurance for post-closure care of the unit in an amount no less than the current post-closure care cost estimate in accordance with 30 TAC Chapter 37
4. Adjust the current post-closure care cost estimate for inflation within 60 days prior to the anniversary date of the first establishment of the financial assurance mechanism.
5. Provide annual inflation adjustments to the post-closure care costs and financial assurance during the active life of the facility and during the post closure care period. The adjustment will be made using an inflation factor derived from the most recent annual Implicit Price Deflator for Gross National Product published by the United States Department of Commerce in its Survey of Current Business, as specified in 30 TAC Chapter 37. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year.
6. Provide continuous financial assurance coverage for post-closure care until the facility is officially released in writing by the executive director from the post-closure care period in accordance with all requirements of the post-closure care plan.

IV. Description of Worksheet Items of the Post-Closure Care Cost Estimates

The following descriptions of the worksheet items provide guidance for identifying the minimum work or cost elements for estimating the unit or lump sum cost of each item as applicable. Enter additional detail for each item in the field following the item as necessary and as site-specific conditions warrant. The cost items are grouped under post-closure care costs for engineering, construction, and leachate management. Include attachments to detail any additional work and associated costs necessary for the post-closure care of the unit or facility that is not already included as a line item on the worksheet. Reference the attachments and list the work or cost items in the fields under "Additional Engineering Cost Items Not Listed on the Worksheet," "Additional Construction Cost Items Not Listed on the Worksheet," or Additional Leachate Management Costs Not Listed on the Worksheet" as applicable. Provide the total cost of additional work or cost items in each cost category on the worksheet line that precedes the cost subtotal for each cost group.

1. Engineering Costs

1.1. Site Inspection and Recordkeeping

Regularly scheduled and event-driven site inspection must be performed to identify areas experiencing settlement, subsidence, erosion, or other drainage related problems, and note the conditions of the environmental control and monitoring systems, including leachate collection, groundwater monitoring, and landfill gas monitoring systems. *Enter additional site inspection and recordkeeping work or cost element detail as site-specific conditions warrant.*

$1,851

1.2. Correctional Plans and Specifications

The cost for an engineering consultant to prepare corrective measure construction plans and specifications to correct problems identified during site inspections. *Enter additional work or cost element details for correctional plans and specifications as site-specific conditions warrant.*

$1,604

1.3. Site Monitoring

The cost of performing semiannual groundwater (including costs for sampling and analyzing parameters, and assessment and reporting) and quarterly landfill gas monitoring (including costs for sampling and reporting) and the monitoring of other site-specific systems at the landfill during the post-closure period. *Enter additional site monitoring work or cost element details as site-specific conditions warrant.*

$51,660

1.4. Additional Engineering Cost Items Not Listed on the Worksheet

List the Attachments detailing additional post-closure care engineering cost items not already included as a line item on the worksheet. (Also, reference these Attachments in the "Units" column of this line of the worksheet. Provide the total cost of all additional engineering cost items in the "Cost" column).

NA

2. Construction Costs

2.1. Cap and Sideslopes Repairs and Revegetation

The cost of repair of the cap and cap drainage control structures due to erosion or structural integrity failures and maintaining final cover vegetation to minimize erosion. *Enter additional cap and sideslopes repair and revegetation work or cost element details as site-specific conditions warrant.*

$41,520

2.2. Mowing and Vegetation Control

The cost of controlling vegetation growth on the final cover and other areas of the landfill. *Enter additional mowing and vegetation control work or cost element details as site-specific conditions warrant.*

Included in Item 2 on Table 2

2.3. Groundwater Monitoring System Maintenance

The cost of repairs/replacement and routine maintenance. *Enter additional groundwater monitoring system maintenance work or cost element details as site-specific conditions warrant.*

Included in Item 2 on Table 2

2.4. LFG Monitoring Probes Maintenance

The cost of repairs/replacement and routine maintenance. Enter additional LFG monitoring probes maintenance work or cost element details as site-specific conditions warrant.

Included in Item 2 on Table 2

2.5. LFG Collection System Maintenance

The cost of repairs and routine maintenance. *Enter additional LFG collection system maintenance work or cost element details as site-specific conditions warrant.*

$100,639

2.6. Perimeter Fence and Gates Maintenance

The cost of maintaining perimeter fence and gates to restrict unauthorized access to the closed landfill. *Enter additional perimeter fence and gates maintenance work or cost element details as site-specific conditions warrant.*

Included in Item 2 on Table 2

2.7. Access and Rights of Way Maintenance

The cost of maintaining the access roads and other rights of way to the closed landfill to conduct inspections, environmental sampling, routing maintenance and other post-closure activities. *Enter additional access and rights of way maintenance work or cost element details as site-specific conditions warrant.*

Included in Item 2 on Table 2

2.8. Drainage System Cleanout and Repairs

The cost to include costs for maintaining and repairing ditches, conveyance structures, and ponds/basins. *Enter additional drainage system cleanout and repairs work or cost element details as site-specific conditions warrant.*

Included in Item 2 on Table 2

2.9. Additional Construction and Maintenance Cost Items Not Listed on the Worksheet

List the Attachments detailing any additional construction and maintenance cost items necessary for post-closure care that are not already covered on the worksheet. (Also, reference these Attachments in the "Units" column on this line of the worksheet. Provide the total cost of all additional construction and maintenance cost items in the "Cost" column.)

NA

3. Leachate Management Costs

3.1. Leachate Collection and Removal System Operation and Maintenance

The cost of operation, routine maintenance and repairs. *Enter additional work or cost element details for leachate collection and removal system operation and maintenance as site-specific conditions warrant.*

NA

3.2. Leachate Disposal

The cost of leachate disposal off-site. *Enter additional work or cost element details for leachate disposal as site-specific conditions warrant.*

$20,112

3.3. Additional leachate management cost items not listed on the worksheet.

List the Attachments detailing any additional leachate management cost items necessary for post-closure care that are not already covered on the worksheet. (Also, reference these Attachments in the "Units" column on this line of the worksheet. Provide the total cost of all additional leachate management cost items in the "Cost" column.)

NA

4. Sum of Cost Subtotals

Enter the sum of engineering, construction, and storage and leachate management post-closure care cost subtotals from lines 1.5.1, 2.10.1, and 3.5.1. $6,521,582

5. Contingency

The cost added to cover unanticipated events during implementation of post-closure activities. (Enter additional work or cost element information as necessary)

$652,158

6. Third Party Administration and Project Management Costs

The cost for the third party hired by TCEQ to administer the post-closure activities. (Enter additional work or cost element information as necessary)

$717,374

V. Post-Closure Care Cost Estimates Worksheet

Post-Closure Care Period – 30 years

Total Permitted Acreage: 219.6 acres

Total Permitted Waste Footprint: 172 acres

Number of Groundwater Monitoring Wells: 20

Number of GW Monitoring Events: 2/year

Number of Gas Probes: 14

Number of LFG Monitoring Events: 4/year

The unit or lump sum cost for each item is based on the work items and cost elements described in Section III of this Post-Closure Cost Estimate document:

Yes ☒ No ☐ Partially ☐

If "No" or "Partially" is checked, please attach a written description of work items and cost elements which form the bases of unit or lump sum cost for the affected items.

(NOTE: If any item listed in this worksheet is not applicable to the subject facility, enter Not Applicable (N/A) in the affected fields)

Attachments

Additional Engineering, Construction, and Leachate Management Cost Items Details.

Post-Closure Care Cost Estimate for MSW Type I Landfills
Facility Name: Turkey Creek Landfill
Permit No: 1417D

Revision No.: 0
Date: 02/22/2022

Table 1: Post-Closure Care Cost Estimates

Item No.	Item Description	Units	Annual Qty.	Unit Cost	Annual Cost	Source of Unit Cost Estimate[i]
1.0 Engineering Costs						
1.1	Site Inspection and Recordkeeping[ii]	specify	219.6	$8.43	$1,851	WCG routinely provides this service.
1.2	Correctional Plans and Specifications	specify	138.4	$11.59	$1,604	WCG routinely provides this service.
1.3 Site Monitoring						
1.3.1 Groundwater Monitoring System						
1.3.1 (a)	Sampling and Analysis of GW Monitoring Wells (Quantity = 2 x Number of wells)	Wells	20	$1,143	$45,720	WCG routinely provides this service.
1.3.1 (b)	Piezometers/Well Abandonment	Each	NA	NA	NA	NA
1.3.2 LFG Monitoring System						
1.3.2 (a)	LFG Quarterly Monitoring (Quarterly)	Each	4	$1,485	$5,940	WCG routinely provides this service.
1.3.2 (b)	LFG Probe Plugging and Abandonment	Each	NA	NA	NA	NA
1.4 Additional Engineering Cost Items (Detail in Attachments)						
1.4.1	Additional Engineering Cost Items (describe in attachments)	Identify attachments	NA	NA	NA	NA
1.5 Engineering Costs Subtotal						
1.5.1	Engineering Costs Subtotal	NA	NA	NA	$55,115	NA

Post-Closure Care Cost Estimate for MSW Type I Landfills

Facility Name: Turkey Creek Landfill
Permit No: 1417D

Revision No.: 0
Date: 02/22/2022

Item No.	Item Description	Units	Annual Qty.	Unit Cost	Annual Cost	Source of Unit Cost Estimate[i]
2.0 Construction and Maintenance Costs						
2.1	Cap and Sideslopes Repairs and Revegetation	Acres	138.4	$300	$41,520	Ongoing postclosure maintenance projects
2.2	Mowing and Vegetation Management	Acres	Included in 2.1	Included in 2.1	Included in 2.1	Included in 2.1
2.3	Groundwater Monitoring System Maintenance	specify	Included in monitoring	Included in monitori ng	Included in monitori ng	Included in monitoring
2.4	LFG Monitoring Probes Maintenance	specify	Included in monitoring	Included in monitori ng	Included in monitori ng	Included in monitoring
2.5	LFG Collection System Maintenance	specify	138.4	$727.16	$100,63 9	Ongoing postclosure maintenance projects
2.6	Perimeter Fence and Gates Maintenance	specify	NA	NA	NA	NA
2.7	Access Roads Maintenance	specify	NA	NA	NA	NA
2.8	Drainage System Cleanout/Repairs	specify	NA	NA	NA	NA
2.9 Additional Construction and Maintenance Cost Items (Details in Attachments)						
2.9.1	Additional Construction and Maintenance Cost Items (details in attachments)	Identify attachme nts	NA	NA	NA	NA
2.10 Construction and Maintenance Costs Subtotal						
2.10. 1	Construction and Maintenance Costs Subtotal	NA	NA	NA	$142,15 9	NA

Post-Closure Care Cost Estimate for MSW Type I Landfills

Facility Name: Turkey Creek Landfill

Permit No: 1417D

Revision No.: 0

Date: 02/22/2022

Item No.	Item Description	Units	Annual Qty.	Unit Cost	Annual Cost	Source of Unit Cost Estimate[i]
3.0 Leachate Management						
3.1	Leachate Management System Operation and Maintenance	specify	NA	NA	NA	NA
3.2	Leachate Disposal	Gals	502,800	$0.04	$20,112	
3.3 Additional Leachate Management Cost Items (Details in Attachments)						
3.4	Additional Leachate Management Cost Items (details in attachments)	Identify attachments	NA	NA	Table 2 IIIL-8	
3.5 Leachate Management Costs Subtotal						
3.5.1	Leachate Management Costs Subtotal	NA	NA	NA	$20,112	NA
4.0 Sum of Engineering, Construction, and Leachate Management Costs						
4.1	Sum of Engineering, Construction, and Leachate Management Cost Subtotals	NA	NA	NA	$217,386	NA
5.0 Contingency						
5.1	Contingency (10% of Sum of Engineering, Construction, and Leachate Management Cost Subtotals)	NA	NA	NA	$21,738	NA
6.0 Third Party Administration and Project Management Costs						
6.1	Third Party Administration and Project Management Costs (2.5% of Sum of Engineering, Construction, and Leachate Management Cost Subtotals)	NA	NA	NA	$5,434	NA

Post-Closure Care Cost Estimate for MSW Type I Landfills

Facility Name: Turkey Creek Landfill
Permit No: 1417D

Revision No.: 0
Date: 02/22/2022

Item No.	Item Description	Units	Annual Qty.	Unit Cost	Annual Cost	Source of Unit Cost Estimate[i]
7. Total Post-Closure Cost						
7.1	Total Annual Post-Closure Cost (Sum of amounts in Sections 4, 5, and 6)	NA	NA	NA	$263,077	NA
7.2	30 Year Post-Closure Costs (Total Annual Post-Closure Cost x 30)	NA	NA	NA	$7,891,114	NA

---

[i] Sources of Unit Cost Estimates may include:
(1) Published Cost Estimator Manuals (e.g., RS Means);
(2) Third Party Quotes (e.g., Environmental Field Services Contractors); or
(3) Verifiable Data based on Actual Operations

[ii] Example Description for Item No. 1.1 – "Includes costs for site inspection performed at least annually for identification of areas experiencing settlement or subsidence, erosion or other drainage-related problems, inspection of the leachate collection system, gas monitoring system and LFG monitoring system."