

PREPARED FOR:

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**SKINQUARTER LAND CONSTRUCTION, DEMOLITION,
AND DEBRIS LANDFILL, PERMIT NO. 604**

**PART B PERMIT DOCUMENTATION
CLOSURE PLAN**

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TABLE OF CONTENTS

I. CLOSURE PLAN	1
A. CLOSURE ACTIVITIES	1
1. CLOSURE PLAN TIME-FRAMES	1
2. CLOSURE PERFORMANCE STANDARD	2
a. Post-Closure Maintenance	2
b. Control of Waste Decomposition Products.....	2
c. Control of Surface Runoff	3
3. INVENTORY REMOVAL AND DISPOSAL	3
4. CLOSURE OF DISPOSAL UNITS.....	3
a. Closure of Surface Impoundments.....	3
b. Cover Design	3
(1.) Plan Sheets, Drawings and Details	3
(2.) Description of Final Cover.....	3
(3.) Final Slopes.....	5
(4.) Cover Crop.....	5
c. Maintenance Needs	5
d. Erosion & Sediment Control.....	5
e. Settlement, Subsidence, and Displacement	5
f. Freeze/Thaw Effects	6
5. GROUNDWATER MONITORING SYSTEM.....	6
6. LEACHATE COLLECTION SYSTEM.....	6
7. LANDFILL GAS VENTING AND MONITORING SYSTEM.....	6
8. SCHEDULE FOR CLOSURE.....	6
9. POSTING.....	7
10. NOTIFICATION.....	7
11. CERTIFICATION.....	7
B. POST-CLOSURE CARE PLAN.....	8
1. CONTACT.....	8
2. SECURITY	8
3. MAINTENANCE PLAN.....	8
a. Security Control Devices	8
b. Erosion Control Damage.....	8
c. Correction of Settlement, Subsidence, and Settlement.....	9
d. Run-on and Run-off Controls	9
e. Leachate Collection System.....	9
f. Landfill Gas Monitoring System.....	9
g. Groundwater Monitoring Wells.....	10
h. Vegetative Cover.....	10
4. INSPECTION PLAN	10

**TABLE OF CONTENTS
(CONTINUE)**

5. MONITORING PLAN.....	11
a. Groundwater Monitoring	11
b. Leachate Collection and Disposal.....	11
c. Landfill Gas Collection and Venting	11
6. POST-CLOSURE LAND USE.....	11
7. TRAINING	12
II. CLOSURE AND POST-CLOSURE COST ESTIMATE AND FINANCIAL ASSURANCE.....	12

LIST OF APPENDICES

Appendix I	Post-Closure Inspection Form
Appendix II	Closure and Post-Closure Care Cost Estimates
Appendix III.....	Sample Deed Language and Sample Certification Letter
Appendix IV.....	Anticipated Closure Sequencing Exhibit

The Technical Specifications listed below are pertinent to the work described in this plan. These technical specifications are included in Attachment 3 to the Design Report.

DIVISION 2 - SITE WORK

Section 02100 -	Site Preparation and Restoration
Section 02200 -	Earthwork
Section 02210 -	Compacted Soil Liner/Cap
Section 02212 -	Amended Soil Liner/Cap
Section 02218 -	Test Pad
Section 02225 -	Trenching and Backfilling
Section 02275 -	Rip-Rap
Section 02420 -	Run-on and Run-off Control Systems
Section 02480 -	Revegetation and Restoration

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13302 -	Geocomposite
Section 13310 -	Geotextiles
Section 13320 -	Geomembranes
Section 13900 -	LFG Migration Monitoring Probe (Boundary Probe)
Section 13910 -	Passive LFG Vent

CLOSURE PLAN

I. CLOSURE PLAN

Pursuant to the Virginia Solid Waste Management Regulations (VSWMR), Amendment 5 this Closure Plan is submitted for the Skinquarter Land CDD Landfill, Virginia Department of Environmental Quality (DEQ) Permit Number 604.

This Closure Plan is being submitted in conjunction with a Part B Permit Application. Any revisions to the closure plan will be made by the facility and the amended closure plan placed in the "Operating Record" of the facility.

A. Closure Activities

The facility will be closed in accordance with the requirements of VSWMR 9 VAC 20-80-260 E.

1. Closure Plan Time-Frames

Prior to the closure of the facility, and the initiation of closure activities (solicitation of bids for construction), the DEQ will be notified of the intent to close. Closure activities shall begin no later than 30 days after the date on which the facility receives the final load of waste. Closure of the facility will be completed in accordance with the Final Closure Plan and within six months after initiation of the closure construction activities unless seasonal construction conditions dictate a longer period. In this case, the Director of DEQ will be petitioned to extend the closure construction time frame.

Table 1

Closure Sequence	Description	Timeframe
C1	First Progressive Closure Phase, Close portions of Cells 1 - 3	~6.5 years after opening cell 1 and also after cell 4 has been opened and can receive waste
C2	Second Progressive Closure Phase, Close portions of Cells 4 - 6	~17 years after opening cell 1 when elevations of the disposal area are at ~410 ft
C3	Final Closure Phase, Close balance of Cells 1-6	To be completed within 180 days after final receipt of waste

*See Appendix IV for an exhibit showing the anticipated closure sequencing.

2. Closure Performance Standard

Closure of the facility will be conducted in a manner that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of uncontrolled leachate, surface runoff, or waste decomposition products to the groundwater, surface water, or the atmosphere.

a. Post-Closure Maintenance

Post-closure maintenance and monitoring shall be performed at the facility for a period of 10 years after final closure, unless modified by a variance, for as long as leachate is generated, or as long as monitoring conditions dictate. The final cover system consisting of a vegetated soil layer with run-on and run-off controls will minimize the need for post-closure maintenance. A hardy stand of vegetation will be established along with diversion berms and storm water conveyance channels to prevent erosion from developing on the final cover system. Periodic maintenance of these systems will be performed to ensure final cover integrity is preserved.

Maintenance activities resulting from the monitoring program will be initiated as soon as possible, and in no case, later than 30 days after discovery. Necessary resources for the performance of maintenance will be available from the owner/operator of the facility. Performance of unusual or extreme maintenance resulting from calamities or vandalism shall be conducted according to emergency contract service procedures established by the facility Owner, as incorporated in the Final Closure Plan.

b. Control of Waste Decomposition Products

A final cover system will be constructed that minimizes infiltration of rainfall into the lined waste cells. By minimizing infiltration, the final cover will immediately reduce the quantity of leachate generated at the facility.

A landfill gas management system will be installed. Monitoring of on-site structures will also be conducted to determine if landfill gas migration is a problem. Refer to the Landfill Gas Management Plan for more details.

Groundwater monitoring wells located around the perimeter of the closed area will provide monitoring points for determining the presence of groundwater contamination.

Monitoring, assessment activities, and remedial/corrective actions, if necessary, will be performed according to Sections 260.D and 310 of the VSWMR. Refer to the Groundwater Monitoring Plan for more details.

c. Control of Surface Runoff

The final slopes of the landfill will promote runoff. Vegetative cover will minimize erosion of the closure cap system. Surface runoff from the areas will be controlled by diversion berms. Diversion berms will direct surface runoff into slope drains and stormwater conveyance channels, which will carry the water to the existing stormwater collection channels that surround the landfill area. The diversion berms, slope drains, drop inlet, culvert pipes and conveyance channels have been designed to carry the peak flow from a 25-year, 24-hour storm event.

3. Inventory Removal and Disposal

All solid waste remaining will be disposed at the site prior to final closure. No solid waste will be removed from the site.

4. Closure of Disposal Units

Waste that has been deposited in the disposal areas of the facility will remain in place after closure. As described in Section I.A.2., closure of the facility will be accomplished by construction of a final cover system over the waste disposal areas.

a. Closure of Surface Impoundments

There are no surface waste impoundments as described in 9 VAC 20-80-380 of the VSWMR, at the facility.

b. Cover Design

The final cover, built on a 3:1 (Horizontal:Vertical) slope and, meeting requirements of the VSWMR, will be placed over all waste as described in the following sections.

(1.) *Plan Sheets, Drawings and Details*

Closure design plans and details are included as part of the Part B Permit Application Drawings.

(2.) *Description of Final Cover*

The final cover for the facility will consist of the following components (listed bottom to top) for use over FML liner:

Geomembrane Final Cover (for use with both geomembrane liner and soil liner):

- 1.0-ft of intermediate cover (soil);
- a geocomposite drainage layer (geonet drainage media),
- 60-mil HDPE geomembrane (or equivalent);
- a geocomposite drainage layer (geonet drainage media), and
- 2.0-ft vegetative soil layer.

Soil Final Cover (For use with soil liner only):

- 1.0-ft of intermediate cover (soil);
- 1.5-ft soil infiltration layer, and
- 1.0-ft vegetative soil layer.

Installation of the material will be in accordance with the provisions of the Construction Quality Assurance (CQA) Plan and the applicable Technical Specifications submitted as part of this Part B Permit Application. The drainage media above the geomembrane will daylight (discharge) into the diversion berms or stormwater conveyance channels.

Seeding will be in accordance with the "Virginia Erosion and Sediment Control Handbook," and recommendations from the local extension office. Seeding and mulch will be applied in accordance with Section 02480, Revegetation, of the Technical Specifications to establish vegetative growth and to prevent erosion.

Erosion will be minimized by seeding in a timely manner on slopes that are no greater than 33 percent. Vegetative cover will be inspected monthly. If vegetative cover is found to be inadequate, affected areas will be re-vegetated within a reasonable period of time. If re-seeding cannot be accomplished because of weather conditions, exposed areas will be appropriately treated to prevent erosion.

In addition, the final cover has been designed with a series of diversion berms and down pipes. These devices will minimize erosion on the landfill side slopes. The locations of these devices are shown on the Part B Permit Application Drawings.

(3.) *Final Slopes*

The final slopes of the landfill will be constructed to be no steeper than 33 percent and at a minimum of five percent.

(4.) *Cover Crop*

The cover crop will be chosen in accordance with the requirements of Section 02480, Revegetation, contained in the Technical Specifications. Fertilizer, lime, and mulch will also be included in the preparation of the cover crop in accordance with this specification.

c. *Maintenance Needs*

Good competent stands of vegetation, along with functional run-on and run-off control structures, will minimize erosion and sediment problems. Once a good stand of grass is established, minimal maintenance is required. To ensure the cover system functions effectively, maintenance such as mowing of the vegetation when necessary, removing unwanted vegetation such as trees, and removing silt from drainage structures will be performed.

d. *Erosion & Sediment Control*

Drainage and erosion will be controlled by a combination of stormwater collection devices, drainage ditches, diversion berms, slope drains, vegetation and construction practices to enhance the operation and maintenance of the erosion and sediment control system. A separate Erosion and Sediment Control Plan has been developed as part of the Part B Permit Application Documents. Construction and design will be in accordance with the applicable sections of the "Virginia Department of Transportation Drainage Manual," "Virginia Erosion and Sediment Control Handbook," and "United States Department of Agriculture Technical Release 55."

e. *Settlement, Subsidence, and Displacement*

Non-uniform settlement is not expected to occur. The primary mechanism of settlement anticipated is waste consolidation due to waste decomposition. Due to the nature of CDD wastes, very little settlement is anticipated. Given the expected life of the cell and the type of waste being placed in the cell, the majority of settlement is expected prior to construction of the cap. Thus, closure slopes will be constructed to minimize settlement and provide for as uniform settlement as possible.

Monthly inspection of the final cover will reveal any substantial displacement of the cap. Should these inspections indicate ponding, deep cracks, etc., then repairs will be initiated. The intended function of the cap is to reduce infiltration. This function is not expected to deteriorate significantly over the post-closure period.

Final cover system stability in static and seismic loading conditions was evaluated as part of the design. Slope stability calculations are included in Attachment 1 of the Design Report.

f. Freeze/Thaw Effects

Based on published frost depths throughout the United States and information provided by the County Agricultural Extension Office, the anticipated maximum depth of freeze/thaw effects on the site is three inches. Since more than three inches of final cover soil is proposed, which will not be relied upon to reduce infiltration, the effects of freeze/thaw cycles on the closure cap system should not be detrimental to its overall function.

5. Groundwater Monitoring System

A groundwater monitoring program has been developed in accordance with § 260.D of the VSWMR. Details of the groundwater monitoring program are contained in the Groundwater Monitoring Plan.

6. Leachate Management

A Leachate Management and Contingency Plan has been developed for the facility and is included as a part of the Part B Permit Application Documents.

7. Landfill Gas Venting and Monitoring System

A Landfill Gas Management Plan has been developed for the facility and is included as part of the Part B Permit Application Documents.

8. Schedule for Closure

Closure activities are expected to begin with 30 days after the final receipt of waste and to be completed within six months. A likely schedule for construction is as follows:

<u>Month</u>	<u>Event</u>
0	Mobilization of Contractor.
0 - 1	Grading/preparation of intermediate cover for final cover system.
1 - 4	Placement of geosynthetics, infiltration and vegetative support layers.
4 - 5	Installation of diversion berms and slope drains.
6	Seed, fertilizer and mulch.

9. Posting of Entrance

At least one sign will be posted at the entrance to the facility notifying all persons of the facility closing and prohibiting further receipt of waste materials. Additionally, a public notice will be posted in the local newspaper to notify the public the landfill is closed. Site access will be secured through the use of gates equipped with locks, fencing and natural barriers.

10. Notification

Upon completion of closure, a notation will be recorded on the deed to the facility property to notify any potential purchaser of the property that the land has been used to manage solid waste. A copy of the deed notation as recorded will be forwarded to the Virginia Department of Environmental Quality for its records.

Within 90 days after closure is completed, the facility will submit a survey plat prepared by a professional land surveyor registered in the Commonwealth of Virginia indicating the approximate limits of waste and monitoring locations identified by number. The plat shall contain a note which identifies the facility's future obligation to restrict disturbance of the site.

Sample deed language is included in Appendix III of this plan.

11. Certification

Upon completion of the closure of the site, a Certification of Closure signed and sealed by a Professional Engineer registered in the Commonwealth of Virginia will be forwarded to the Virginia Department of Environmental Quality. This Certification will state, that to the best of the engineer's knowledge, the site was closed in accordance with the Final Closure Plan and the requirements of the VSWMR.

A sample certification letter is included in Appendix III of this plan.

B. Post-Closure Care Plan

1. Contact

Questions and/or problems which may occur during the post-closure period will be handled by the Skinquarter Land, LLC.

Skinquarter Land CDD Landfill
20701 Hull Street
Moseley, Virginia 23120
Principal Contact
W.L. (Bill) Stinson
804-763-4763-Office
804-763-1386-Fax

2. Security

Access to the site will be controlled by use of barriers and/or gates at the entrance roads to the property.

All barriers and gates will be clearly marked with signs stating the name of the facility, that solid waste was disposed of on this site and that the site is no longer in use for disposal purposes.

No solid waste will be left exposed after completion of the landfill closure. Therefore, this facility should not pose a health hazard to the public.

3. Maintenance Plan

Post-closure maintenance will consist of the following preventive and corrective maintenance activities:

a. Security Control Devices

Security control devices include gates and posted signs at all roads to the property. The gate and signs will be inspected monthly and any damages recorded. Any damage which would interfere with the function of the devices will be corrected as soon as possible.

b. Erosion Control Damage

The landfill will be inspected quarterly and after every major storm event for signs of erosion damage. Areas to be inspected will include diversion berms, conveyance channels, slope drains, culverts, and slopes. Any erosion gullies 6 inches or deeper will be repaired by filling with compacted soil and

reseeded as necessary. Channels, culverts, and slope drains filled with sediment will be cleaned as needed.

c. Correction of Settlement, Subsidence, and Settlement

The landfill cover will be inspected quarterly. It is not expected that the landfill will experience significant settlement. However, if any areas appear to have settled and standing water is observed, these areas will be regraded to promote positive drainage and will be reseeded.

d. Run-on and Run-off Controls

These structures, including diversion berms, slope drains, conveyance channels, and culverts shall be inspected quarterly as discussed in Section 3.b. above.

e. Leachate Collection System

The leachate collection system will be inspected monthly. Leachate management will continue throughout the post-closure care period of the site. Inspections will be made monthly to insure the safe operation of the facility and to maintain the collection throughout the post-closure period. Repairs to the system will be completed as necessary to maintain the leachate management system.

Site inspections will be performed to detect any problems from leachate seeps. Any surface seeps will be carefully investigated before excavating and repairing the final cover in the area of the seeps. Visual inspections shall be conducted in the near vicinity of the seeps to determine if additional control or remedial actions are necessary.

Additional information regarding leachate management, including the management of leachate seeps, is available in the facility's Leachate Management and Contingency Plan, included in the Part B Permit Documents.

f. Landfill Gas Monitoring System

The landfill gas management system for this site will consist of landfill gas boundary probes and vertical extraction wells covering the surface of the landfill, as described in the facility's Landfill Gas Management Plan.

Gas monitoring at the site will occur as specified in the facility's Landfill Gas Management Plan.

g. Groundwater Monitoring Wells

Groundwater monitoring wells will be inspected quarterly. Any signs of damage or contamination will be recorded. Minor damages shall be repaired immediately. If major damage or contamination is suspected, a professional geologist will be retained to evaluate the condition of the well. If the well must be replaced, the old well will be abandoned in accordance with the facility's Groundwater Monitoring Plan. New well construction shall be in accordance with the Groundwater Monitoring Plan.

h. Vegetative Cover

Post-closure maintenance will include mowing of the grass cover as necessary. This will be done to improve the stand of grass being developed on the landfill cap. During the normal post-closure period, the site will be mowed as needed (typically twice per year) to maintain the grass cover.

In addition to mowing operations, post-closure activities will include a program of annual seeding. In the fall of the year, the vegetative cover will be evaluated, in accordance with Specification Section 2930 - Revegetation. A plan for reseeding will be developed based on the needs of the site during that year. The necessary seeding will be applied during the fall planting season.

4. Inspection Plan

An inspection program will be conducted throughout the post-closure care period for the site. If problems arise, the inspections will be made more frequently and the interval will depend upon the severity of the problem. The potential effect to the public and environment will be a factor in determining the inspection interval.

Areas to be included in the monthly inspection would be as follows:

- Access and security control
- Posting and signs
- Leachate collection system

Areas to be included in the quarterly inspection would be as follows:

- Access and security control
- Posting and signs
- Erosion/sediment damage
- Final cover settlement, subsidence and displacement
- Vegetative cover
- Integrity of surface water drainage ways and impoundments
- Groundwater monitoring system
- Integrity of site benchmarks

Inspection logs will be developed and completed for each inspection. Copies of the inspections will be kept by the facility and will be available to the Virginia Department of Environmental Quality for their review.

5. Monitoring Plan

a. Groundwater Monitoring

Groundwater monitoring will continue at the facility throughout the duration of the post-closure care period in accordance with Section 260.D of the VSWMR. All groundwater monitoring wells will be maintained.

b. Leachate Collection and Disposal

Leachate management will continue throughout the post-closure care period of the site. Inspections will be made monthly to insure the safe operation of the facility and to maintain the collection system throughout the post-closure care period. Site inspections will be performed to detect any problems from leachate seeps. Any surface seeps will be carefully investigated before excavating and repairing the final cover in the area of the seeps. Visual inspections shall be conducted in the near vicinity of the seeps to determine if additional control or remedial actions are necessary.

The integrity of the leachate collection tank will be carefully monitored. Please refer to the Leachate Management Plan for more information.

Leachate generation calculations included in the Design Report were performed to determine the required leachate storage volume and the anticipated design flows for the leachate pumps. These calculations were performed using the HELP Model (v. 3.07) to determine anticipated leachate flows for active, intermediate, and closed conditions.

c. Landfill Gas Collection and Venting

Landfill gas management and monitoring at the site will occur as specified in Section II.C of the facility's Landfill Gas Management Plan.

6. Post-Closure Land Use

The primary land use expected for the site after the closure of the landfill will be as open dormant land. If, during the post-closure period, this is to change, DEQ will be notified of the proposed land use.

7. Training

Personnel responsible for performing site inspections and maintaining the site will be competent individuals trained in the skills necessary to perform their job. Personnel will continue to receive training as new programs become available. Groundwater and surface water monitoring will be performed by a qualified firm and laboratory analyses will be performed by a certified water testing laboratory. Landfill Gas Monitoring of probes and structures will be performed by trained personnel or a qualified firm. If major problems arise, competent engineering and construction firms will be engaged to assess the situation and recommend ways to alleviate the problems.

II. CLOSURE AND POST-CLOSURE COST ESTIMATE AND FINANCIAL ASSURANCE

The facility will provide financial assurance to cover closure and post-closure care activities at this site. The opinion of probable cost for the closure and post-closure care for Cell 1 of the facility is included in Appendix II of this Plan. The financial assurance instrument will be revised prior to receiving the certificate to operate each subsequent cell.

END OF CLOSURE PLAN

APPENDIX I

Post-Closure Inspection Form

**SKINQUARTER LAND CDD LANDFILL
POST-CLOSURE INSPECTION FORM**

SYSTEM	COMPONENTS	FREQUENCY	TYPE OF INSPECTION
Final Cover System	<i>Seeding and Vegetative Growth</i>	<i>Quarterly</i>	<i>Visual</i>
	<i>Integrity of Cover</i>	<i>Quarterly</i>	<i>Visual</i>
Security Control System	<i>Fencing and Access Gates</i>	<i>Monthly</i>	<i>Visual</i>
	<i>Posted Signs</i>	<i>Monthly</i>	<i>Visual</i>
Drainage and Erosion Control Systems	<i>Basins</i>	<i>Quarterly</i>	<i>Visual</i>
	<i>Ditches, Channels, and Piping</i>	<i>Quarterly</i>	<i>Visual</i>
	<i>Culverts</i>	<i>Quarterly</i>	<i>Visual</i>
	<i>Discharge Outlets and Spillways</i>	<i>Quarterly</i>	<i>Visual</i>
	<i>Slopes and Terraces</i>	<i>Quarterly</i>	<i>Visual</i>
Groundwater Monitoring System	<i>Monitoring Wells</i>	<i>Quarterly</i>	<i>Visual / Mechanical</i>
	<i>Benchmarks</i>	<i>Quarterly / Annually</i>	<i>Visual / Instrument</i>
Leachate Collection System	<i>Leachate Storage Tank</i>	<i>Monthly</i>	<i>Visual</i>
	<i>Pumps and Force main</i>	<i>Monthly</i>	<i>Visual</i>
	<i>Cleanouts and Piping</i>	<i>Monthly</i>	<i>Visual</i>