SECTION 2.4

STORMWATER MANAGEMENT PLAN
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Introduction

The Stormwater Management Plan (Plan) for the Peoria City/County Landfill No. 3 has been designed to collect, route, and detain stormwater runoff from the facility in an environmentally sound manner. The Plan for the Landfill No. 3 contains design features that meet or exceed the regulations applicable to stormwater management, including 35 Ill. Admin. Code, Section 811.103, 35 Ill. Admin. Code, Part 304 and Stormwater NPDES Permitting Requirements.

The proposed stormwater management system has been designed to manage stormwater in the area of the landfill with respect to water quality concerns, consideration of upstream and downstream neighbors, and respect to the existing site hydrology. The measures outlined in this plan will reduce the flooding potential of downstream areas, discharge water responsibly, and maintain necessary stormwater inflow to wetland areas. As the proposed development is a landfill, it should be noted that stormwater will be directed away from the landfill waste boundary. Stormwater which contacts waste will be contained and treated as leachate and will not discharge to off-site waterways.

All stormwater controls for Landfill No. 3 have been sized to handle 100-year storm events. This significantly exceeds applicable stormwater regulations, which generally require sizing for 25-year storm events.

Overview of Landfill Expansion

Landfill No. 3 is generally located to the east of Landfill No. 2 and to the north of Landfill No. 1. The topography in this area generally exhibits high topographic relief with several steeply sloped piles of mine spoil, road cuts and embankments, and steeply sloped ravines. A localized topographic divide runs through the area such that the northern portion drains to Warsaw Run, a tributary to Kickapoo Creek, whereas water in the southern areas drains to Coal Hollow Run. Coal Hollow Run in turn drains to Warsaw Run downstream from the site. All stormwater that lands on the area of Landfill No. 3 is located within the Kickapoo Creek Watershed.

Approximately 71.5 acres of the Landfill No. 1 (northern area) discharge into Coal Hollow Run. Therefore, these areas of Landfill No. 1 are considered in the stormwater analyses. Landfill No. 2 does not discharge into Landfill No. 3 area and is therefore not considered in stormwater analyses.

Highlights of Proposed Design Stormwater Management Features

Stormwater will be directed through a series of controls to ensure that the water is collected in a systematic and appropriate manner. In general, once stormwater falls on the landfill, it will be directed along terrace berms to downslope ditches. The downslope ditches will then convey stormwater into perimeter ditches located at the toe of the side-slopes. The stormwater ditches will be gently sloped toward stormwater detention basins that will collect the stormwater and foster sedimentation prior to discharge. The detention basins will allow the controlled and gradual release of stormwater to offsite drainage areas designed to be lower than existing discharge rates.
Stormwater controls have also considered inflows from areas outside of the proposed development area, such as Landfill No. 1. The stormwater discharge from Landfill No. 1, which currently discharges into Coal Hollow Run, will be rerouted into a bioswale that will convey its flow around the Landfill No. 3 area. The vegetated bioswale will promote increased filtering of sediments and improve water quality prior to discharging into the Coal Hollow wetland. Letdown structure(s) (armored downslope ditch or letdown pipe) and energy dissipator(s) will be used to ensure that stormwater discharging into the Coal Hollow wetland does not cause erosion or scour.

An overview of the proposed stormwater management system is shown on Drawing No. D10. Please note that multiple design elements are shown on the drawings that are described in further detail in Appendix M. A summary of the major stormwater management features are listed below:

1. **Terrace Berms.** Terrace berms have been incorporated into the final cover to intercept stormwater flow down the slope in order to reduce flow speed. This reduction in flow speed minimizes the potential for erosion or scour. The terrace berms have been designed to convey the 100-year 1-hour storm events without overtopping or eroding. The 100-year, 1-hour storm event was used because this event produces the highest discharge rate of modeled storm events.

2. **Downslope Ditches and Letdown Pipes.** The terrace berms discharge into downslope ditches or letdown pipes. The downslope ditches/letdown pipes will convey stormwater down the slope of the landfill in a controlled manner and have been sized to pass the peak discharge generated by the 100-year, 1-hour storm event. The downslope ditches will be lined with riprap or other erosion control material to minimize the potential for erosion or scour. Energy dissipators will be positioned where the letdown pipes discharge into the perimeter ditches.

3. **Stormwater Ditches.** Ditches around the perimeter of the waste boundary have been designed to pass the peak discharge generated by the 100-year, 1-hour storm event. These perimeter ditches will be vegetated, lined with riprap, or lined with other erosion control material (ECM) to minimize the potential for scour. The perimeter ditches are designed to exceed the requirements contained in 35 Ill Admin. Code, Section 811.103.

   The perimeter stormwater ditches collect non-contact runoff from the landfill, as well as runoff from the landfill perimeter access road, leachate storage areas, and the proposed landfill gas management area. These ditches have been designed to convey stormwater to sedimentation basins prior to flowing off-site.

4. **Detention Basins.** The detention basins for Landfill No. 3 have been designed to detain and control both the release of the 100-year, 24-hour storm event. Detention basins have been sized with less than 50 acre-feet of storage per basin, yet provide sufficient volume to maintain a minimum of one foot of freeboard below the bottom of the spillway during
storm events with a recurrence frequency less than 100 years. Detention volume and basin design principles exceed IEPA requirements.

The stormwater basins are designed to improve water quality prior to discharge by facilitating sedimentation and supporting aquatic vegetation. All newly constructed basins utilize a sedimentation trap/stilling area within the basin that will minimize particulate matter from migrating to the basin outlets. When determining high water elevations for each storm event, the volume in these stilling areas has been conservatively subtracted from the total storage volume of the basin to ensure appropriate detention volume is provided.

5. **Perforated Outlet Structures.** The detention basins have been designed to pass the 100-year 24-hour storm event. This storm event was selected for analysis because it produces the highest volume of stormwater that will pass through the perforated outlet structures. Stormwater will be enter into perforated standpipe that will provide a controlled release rate from the basins.

All newly constructed stormwater basins will include a discharge valve to control stormwater discharge. It is intended that the valve will remain closed during routine stormwater runoff events to allow additional time for the settlement of particulates in stormwater prior to discharge, improving water quality.

6. **Spillways.** In the unlikely event that the staged outlet structures become clogged, and to account for storm events with a recurrence interval greater than 100 years, the basins are designed with emergency spillways to protect the integrity of the basins. It is noted that the base of the spillways are located above the highest elevation determined for each basin for all modeled storm events.

7. **Bioswale Discharge Filtering.** Discharge from Landfill No. 1 currently exits into Coal Hollow Run. As part of the Landfill No. 3 design, the Landfill No. 1 Detention Basin will be enhanced through regrading and the installation of a new discharge structure. Stormwater from Landfill No. 1 will be redirected through a vegetated bioswale channel that has been designed with a minimal 0.5% slope. The regraded basin, redesigned discharge structure, and bioswale vegetation will promote sedimentation, thus improving stormwater quality before discharging into the Coal Hollow Run.

8. **Isolation of Stormwater From Waste.** All stormwater runoff will be diverted around the active landfill areas and, after final closure, from the final landform. The stormwater management system will prevent ponding of water on the final landform, thereby minimizing the possibility for surface water to migrate through the cover and create leachate. All drainage ditches and stormwater detention basins are located outside the waste footprint to reduce the possibility of surface water infiltrating the final cover and becoming leachate.
9. **Discharge Rates.** The peak stormwater discharge from the Landfill No. 3 design will be less than pre-development peak discharges for all modeled storm events, reducing the potential for downstream flooding.

**Stormwater Requirements**

This Plan was developed to meet or exceed the runoff requirements of the Illinois Environmental Protection Agency.

The applicable state regulations regarding surface water drainage include:


Title 35 Ill. Admin. Code, Section 811.103 establishes several requirements for stormwater runoff from disturbed areas.

- Runoff from disturbed areas during a 25-year, 24-hour storm or smaller is subject to the water quality standards contained in 35 Ill. Admin. Code, Part 304.
- All discharges from disturbed areas are subject to the permitting requirements within 35 Ill. Admin. Code, Part 309.
- All discharge structures must be designed to have flow velocities that will not cause erosion and scouring of the natural or constructed lining.
- All treatment facilities must be equipped with bypass outlets to safely pass the 100-year, 24-hour storm event.

This same section also outlines requirements for the diversion of runoff from undisturbed areas.

- Diversion facilities must be designed to prevent runoff from the 25-year, 24-hour storm from entering disturbed areas to the extent practical.
- The diversion structures must be designed to have flow velocities that will not cause erosion and scouring of the natural or constructed channel lining.

Title 35 Ill. Admin Code, Section 812.110 outlines the specific details that need to be included in the permit application, including a map of the location of structures affected by stormwater runoff from disturbed areas and detailed designs of structures to be constructed. These are included as Drawing Nos. D10, D19, D20, and Appendix M, respectively.
Overview of Existing Conditions

Physiography and Topography

Landfill No. 3 is situated to the east of the existing Landfill No. 2 and north of the existing Landfill No. 1. Most of the landfill expansion property was previously strip mined for coal. This mined property has not been reclaimed for any use, with the exception of a small portion which serves as a source of material for the existing landfill. The area to be disturbed as part of Landfill No. 3 consists of rolling topography with areas of steeply piled mine spoil, surface depressions and ponds, and forested areas.

The existing topography for Landfill No. 3 area includes a localized topographic divide. The northern portion of Landfill No. 3 area drains directly to Warsaw Run. The southern portion of the Landfill No. 3 area drains to Coal Hollow Run, which in turn drains into Warsaw Run. Approximately 71.5 acres of Landfill No. 1 also discharges into Coal Hollow Run. All stormwater from the Landfill No. 3 area ultimately drains to the Kickapoo Creek. The existing conditions for Landfill No. 3 are shown on Figure 2.4-1.

On-Site Wetland

A 4.2 acre wetland is located within Coal Hollow Run, of which approximately 1.6 acres will be disturbed as part of the Landfill No. 3 design. The disturbed wetland will be mitigated in conformance with Federal laws and regulations. Additional area may be temporarily impacted as part of site construction activities. Wetland that is temporarily impacted will be restored to pre-construction condition, and seeded with an appropriate native plant mix. A map of the on-site wetland location, the Wetland Assessment and Determination Report, and the United States Army Corps of Engineers (USACE) concurrence letter, are provided in Appendix F.

It is noted that the stormwater discharge from the existing Landfill No. 1 Detention Basin currently discharges to this wetland. As previously noted, a vegetated bioswale will be used to reroute the Landfill No. 1 stormwater discharge around the Landfill No. 3 footprint. Although the stormwater will be redirected, it will continue to discharge into the portion of the wetland that will remain in Coal Hollow Run.

FEMA Regulatory 100-Year Floodplain Limits

No area of the facility is located within a 100-year floodplain, as defined by the Federal Emergency Management Agency (FEMA). Please refer to Appendix F.2 which illustrates all identified floodplains within 1.5 miles of the Proposed Facility Boundary, as shown on Flood Insurance Rate Map (FIRM) rate maps for Peoria County published by FEMA.

Field Drain Tiles

Field tiles are not anticipated to be encountered at the proposed facility due to previous strip mining activity, lack of subsequent development activity, and high topographic relief. In the unlikely event that a field drain tile is encountered, it will be managed to ensure proper drainage and discharge so as not to adversely impact nearby property owners.
Relationship to Landfill Nos. 1 and 2 Stormwater Controls

The Landfill No. 3 design has been developed to manage all stormwater from the expansion area, as well as all water that drains to the Landfill No. 3 area under existing conditions. Notably, the northern portion of Landfill No. 1 discharges stormwater through the proposed development area of Landfill No. 3. The proposed Stormwater Management System for Landfill No. 3 will function independently of the Landfill No. 2 Stormwater Management System.

Overview of Proposed Stormwater Management Features

The Landfill No. 3 design will utilize 4H:1V sideslopes and 10H:1V plateau slopes. Landfill No. 3 will have a maximum elevation of approximately 804 feet MSL. The proposed stormwater features of Landfill No. 3 are shown in Figures 2.4-2.

Terrain Berms

Terrace berms will be used to intercept stormwater sheet flow, collect runoff, and control erosion along the sideslopes of the landfill final cover. The terrace berms will be constructed as part of the closure of the landfill in the approximate locations shown on Drawing No. D10. Terrace berms are typically located approximately every 30 vertical feet. Refer to Drawing No. D19 for a typical terrace berm detail.

The terrace berms have been sized to accommodate the peak runoff flow rate from the 100-year, 1-hour storm event. Appendix M presents design parameters associated with the proposed terrace berms, including the modeled 100-year, 1-hour storm event flow values used to determine the adequacy of the terrace berm dimensions.

Downslope Ditches and Letdown Pipes

Downslope ditches and/or letdown pipes will be constructed to convey the stormwater collected by the terrace berms down the slope of the landfill into the perimeter ditches. The downslope ditches will be lined with riprap or other ECM, and energy dissipators will be installed at the outlets of the letdown pipes to minimize scour. The downslope ditches and letdown pipes are designed to adequately handle runoff flow rates from the peak 100-year 1-hour storm event. The locations of the downslope ditches are shown on Drawing No D10. The design parameters for the downslope ditches and calculations demonstrating that the downslope ditches and letdown pipes will provide adequate stormwater control are sufficiently sized are presented in Appendix M.

Ditches and Culverts

As shown on Drawing No. D10, ditches are positioned around the landfill expansion unit perimeter. These ditches are used to convey non-contact stormwater runoff from the landfill, landfill perimeter access road, leachate storage tank areas, and proposed landfill gas management area to the basins. All ditches have been designed with excess capacity to convey the flow rates of the 100-year storm events. Therefore, the design exceeds the requirements contained within 35 Ill. Admin. Code, Section 811.103, which requires that all ditches pass the 25-year, 24-hour, storm event.
Ditch bottoms will be vegetated, lined with riprap, or lined with or other erosion control material to minimize scour. The perimeter ditches are designed with side slopes no steeper than 3H:1V, and a bottom width between 0 (v-notch) and 10 feet. Design parameters for the ditches and calculations demonstrating that the perimeter ditches to sufficiently manage the stormwater run-off are presented in Appendix M.

Culverts that are in-line with stormwater ditches are sized to handle the 100-year storm events, which is equal to the 100-year discharge rate in the perimeter ditch at that location. Culverts will be constructed of corrugated polyethylene piping, concrete, or other suitable material. Sizing calculations have been based on polyethylene piping with smooth-walled interiors. The design parameters for the culverts and demonstration that the culverts will safely convey stormwater are provided in Appendix M.

**Detention Basins**

The Landfill No. 3 design will utilize detention basins to collect stormwater and discharge water in a controlled manner, thereby improving water quality. Landfill No. 3 utilizes two stormwater detention basins as shown on Figure 2.4-2. These basins are the Northeast Detention Basin and the Southeast Detention Basin.

Proposed detention basins to be constructed will feature sedimentation trap/stilling areas at the “upstream” side of the basin that will reduce particulate matter from migrating to the basin outlets. These areas will provide sufficient sediment capacity, and are conveniently located to facilitate routine sediment removal. The sedimentation trap/stilling areas of the stormwater will control water quality prior to discharging off-site and minimize the potential for sediment to enter the Coal Hollow wetland proffer.

The basins have been designed with excess capacity to safely detain and release the 100-year, 24-hour storm event. In fact, the settlement areas of the detention basins are subtracted from the storage area of the basins when determining the peak volume and stormwater elevations of each storm event. This conservative approach assures that the basins are more than adequately sized to detain the 100-year, 24-hour storm event.

The sediment will be removed from the detention basin as part of routine site maintenance. For the purposes of stormwater modeling, the available storage volume for sediment accumulation has been evaluated and found to be sufficient. Please see Appendix M.

**Outlet Structures**

All new stormwater detention basins will contain outlet structures that will facilitate the controlled release of stormwater. The outlet structures will include a vertical standpipe with a series of orifices. A gravel envelope is placed around the vertical standpipe to provide additional filtration of stormwater prior to offsite discharge and to protect the riser from ice loads. The vertical risers will connect to a discharge pipe that will route the stormwater to the selected discharge locations. Riprap or other erosion control material will be placed at the discharge locations to minimize the potential for erosion and scour. Refer to Drawing No. D20 for details of the outlet structure design.
All new stormwater basins will include a discharge valve to control discharge. It is intended that the valve will remain closed during routine stormwater runoff events. This will allow additional time for the settlement of particulates in stormwater prior to discharge, improving water quality.

The outlet structures will be designed so that the total release rates from the proposed design for the modeled storm events are less than the corresponding discharge rates for the pre-project conditions.

**Bioswale**

As shown on Drawing No. D10, discharge from the Landfill No. 1 Detention Basin will pass through a vegetated bioswale designed with minimal slopes to foster sedimentation and controlled release rates prior to entering into the wetland, thereby improving water quality and wetland stormwater inflow. Design parameters for the bioswale and calculations demonstrating that the bioswale can safely manage stormwater runoff are presented in Appendix M. The bioswale will discharge into the Coal Hollow Run wetland, which is at the base of an approximately 50-foot high 3H:1V slope. The downslope channel conveying the bioswale discharge will be lined with fabric-formed concrete or similar materials. Energy dissipators will be installed in the channel at its discharge location to control erosion and to protect the wetland.

**Hydrologic Analysis**

Hydrologic analyses for Landfill No. 3 were performed to evaluate the effectiveness of the proposed stormwater management features. The computer model HydroCAD was used to develop discharges for various storm events for each stormwater feature described in this Plan. Runoff was evaluated for 1-hour and 24-hour durations and for the 100, 25, and 2-year storm frequencies. This analysis meets or exceeds local, state, and federal requirements for landfills.

Both 1-hour and 24-hour durations were analyzed to determine which storm duration produces the larger peak discharge and detention requirements. Results of the hydrologic analysis indicate that the 1-hour duration produces a larger peak discharge rate. Therefore, all stormwater structures were designed to adequately handle the peak 100-year, 1-hour storm event. The detention basins, however, were sized to handle the 100-year, 24-hour storm event because this storm produces the greatest stormwater volume.

First, a hydrologic model of the existing site conditions was prepared for Landfill No. 3. Subcatchment areas for the existing conditions were delineated as shown in Figure 2.4-1. For each subcatchment area, the area, curve number, and time of concentration parameters (flow lengths, types, slopes, and Manning's coefficient) were determined and entered into HydroCAD. Additional information is provided in Appendix M.

Each surficial soil type within the subareas was identified and classified as one of four hydrologic soil groups, based on maps from the Soil Survey of Peoria County, Illinois, published by the United States Department of Agriculture - Natural Resources Conservation Service, 1992. Based on the hydrologic soil group and land use, each soil was assigned a curve number, in accordance with methods presented in the SCS Technical Release (TR-55), Urban Hydrology for Small Watersheds. A forested land use was assumed for the existing conditions. A very conservative curve number of 89 was
selected for the analysis to ensure that the proposed facilities will adequately manage stormwater runoff.

For the analysis of the proposed landfill expansion, the study area was subdivided into multiple subcatchment areas. For each subcatchment area, the area, curve number, and time of concentration parameters (flow lengths, types, slopes, and Manning's coefficient) were entered into HydroCAD. Figure 2.4-2 shows the proposed subcatchment areas used in the analysis.

For the analyses of the downslope ditches, letdown pipes, perimeter ditches, and bioswale, the geometry (including slope), length, and Manning's coefficient were entered into HydroCAD. The detention basins have been modeled by entering the area at each minor contour interval to determine incremental detention volumes. The volume of the sedimentation/stilling area of each new detention basin was not included to be conservative. Please note, however, that the detention basin was analyzed in Appendix M.10 to ensure that it was adequately sized with capacity for one-year of sediment accumulation. The normal water elevation was also specified.

The outlet structures are modeled by inputting the standpipe diameter, orifice elevations, number or orifices at each elevation, outlet slope, head loss, and Manning's coefficient for the pipe material. The outlets are inputted in order that stormwater will flow so the program can determine which element controls the flow based on sequence and element restrictions.

**Hydrologic Results**

All stormwater controls were found to be appropriately sized to convey the 100-year storm events, surpassing local, state, and federal requirements. Key findings include the following:

1) All terrace berms are appropriately sized to pass the peak discharge of the 100-year, 1-hour storm event without overtopping. Additionally, they will be grass-lined, and are not anticipated to experience erosion or scour, as peak velocities are below 5 ft/sec. (See Appendix M)

2) Downslope ditches and/or letdown pipes can safely convey the 100-year, 1-hour storm event without overtopping. Downslope ditches will be armoured with riprap or other equivalent erosion control material, and energy dissipaters will be installed at letdown pipe discharge locations to control erosion and scour (See Appendix M).

3) All stormwater ditches are appropriately sized to convey the 100-year, 1-hour storm event without overtopping. All stormwater ditches will be vegetated, lined with riprap, or lined with other erosion control material to minimize the potential for erosion or scour. (See Appendix M).

4) The bioswale is appropriately sized to convey the 100-year 1-hour storm event without overtopping. The bioswale may be lined with vegetation selected for its biofiltration characteristics. Erosion and scour is not anticipated within the bioswale because discharge velocities are less than 5 ft/sec. (See Appendix M).
5) All culverts are appropriately sized to convey stormwater within the perimeter ditches and bioswale for the 100-year storm events. The culverts will not lead to overtopping conditions within the stormwater ditches, bioswale, or other locations. Armoring of the downslope channel to the Coal Hollow Run wetland and energy dissipators will control erosion and scour of the wetland. (See Appendix M).

6) Landfill No. 3 detention basins are sufficiently sized to detain the 100-year, 24-hour storm event while maintaining a minimum 1 feet freeboard between the high water level and the base of the emergency spillway. Sufficient sediment storage will be provided in the sediment trap/stilling basins without impeding basin performance. (See Appendix M).

7) Peak runoff discharge rates from the proposed expanded facility will be less than pre-development peak runoff discharge (See Appendix M).

**TABLE 2.4-1**

Peoria City/County Landfill Expansion Discharge Rate Comparison

<table>
<thead>
<tr>
<th>Storm Event</th>
<th>Existing Discharge Rate (CFS)</th>
<th>Proposed Discharge Rate (CFS)</th>
<th>Proposed &lt; Existing? (YES/NO)</th>
</tr>
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<td>36.59</td>
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<td>YES</td>
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<td>25-Year</td>
<td>78.96</td>
<td>43.26</td>
<td>YES</td>
</tr>
<tr>
<td>100-Year</td>
<td>135.49</td>
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<td>YES</td>
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<tr>
<td>1-Hr Storm Events</td>
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</tr>
<tr>
<td>2-Year</td>
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<td>21.32</td>
<td>YES</td>
</tr>
<tr>
<td>25-Year</td>
<td>163.25</td>
<td>50.81</td>
<td>YES</td>
</tr>
<tr>
<td>100-Year</td>
<td>235.49</td>
<td>69.84</td>
<td>YES</td>
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</table>

**Stormwater Controls During Cell Development**

The development of the perimeter ditches and detention basins will be phased to correspond with development of either expansion design. The construction phasing will begin in the southeast section of the facility. The Southeast Detention Basin will be constructed as part of the first phase of construction, and will be operational prior to accepting waste. Runoff from disturbed areas will be directed to the developed basins or temporary stormwater management structures prior to discharge. In addition, temporary
berming and ditching may be incorporated to divert stormwater runoff from undeveloped areas.

No landfill areas will be developed without appropriate/adequate stormwater management controls. It is noted that because the stormwater controls have been designed to accommodate the entire fully developed landfill assuming that the landfill cover is entirely unvegetated (which is very unlikely as the final cover will be constructed and vegetated in stages as landfilling progresses), they are also sufficiently sized to handle interim conditions.

During cell construction and filling, additional temporary measures will be incorporated to divert stormwater away from active landfilling and liner construction areas. Prior to the start of liner construction, diversion berms and drainage ditches will be developed to prevent runoff from impacting construction areas. These perimeter features will intercept the runoff from undisturbed areas before it reaches the construction areas (disturbed areas), and the runoff will be conveyed to the landfill perimeter as practical. Any stormwater that collects within the landfill excavation will be routed to temporary stormwater collection sumps. Similarly, any rainfall which ponds on the liner and leachate collection system prior to the placement of waste will be pumped into the stormwater management system.

Once landfilling begins within a new cell, stormwater which contacts waste or collects within the leachate collection system will be treated as leachate, in accordance with the leachate management section of this Application (Section 2.6). However, temporary diversion berms will be constructed around the active landfilling areas to the extent practical in order to divert stormwater from adjacent daily, intermediate and final cover slopes before it contacts any waste, thereby preventing it from coming into contact with waste. These temporary berms will divert stormwater runoff to the perimeter collection ditches or to below grade stormwater collection sumps located within the excavation. The temporary berms will complement the permanent perimeter trenches and berms which surround the active cell and prevent excavation side slope runoff from entering the active landfilling area.

**Erosion Control Permitting**

A National Pollutant Discharge Elimination System (NPDES) permit shall be required prior to the commencement of any construction activities which disturb more than one acre.

**Final Grading**

The final slopes are designed at a grade capable of supporting vegetation to minimize erosion. The final landfill slopes shall be constructed to be no flatter than approximately ten percent and no steeper than approximately 25 percent. These slopes will drain runoff from the cover and prevent ponding. Vegetation will be promoted on all reconstructed surfaces to minimize wind and water erosion of the final protective cover. In addition, terrace berms will be constructed on the final landform to collect runoff and control erosion along the slopes of the landfill as shown on Drawing No. D10.
Vegetative Soil Stabilization

A grass seed mixture will be incorporated into the upper surface of the protective soil layer. The mixture selected will be amenable to the soil quality/thickness, slopes and moisture/climatological conditions that exist to minimized the need for maintenance and to minimize the potential for root penetration into the subsurface drainage layer.

Landscaping or seeding professionals knowledgeable of Peoria's soil and climatological conditions will be consulted in determining the specific seed mixtures, necessary soil amendments and application rates based upon specific seasonal conditions at the time of closure. As a guide, the design procedures and specifications presented in the handbook Procedures and Standards for Urban Soil Erosion and Sediment Control in Illinois may be utilized. It is anticipated that the seed mix will be similar to the currently operated Landfill No. 2, which uses a seed mix of tall fescue (15 lb/acre), red top (3 lb/acre), and lespedeza (20 lb/acre).

Application rates for lime, fertilizer and any other necessary soil amendments shall be determined from composite soil tests from the area to be seeded or experienced professional judgment. Mulch consisting of straw, jute, wood excelsior, etc. shall be used as necessary to hold the seed in place and conserve moisture. All finalized areas of the landfill will be seeded as soon as practical, with seeding usually conducted in the spring or fall.

Access Roads

Access roads leading to the active waste disposal area and other frequently graveled onsite roads will either be paved or surfaced with a suitable thickness of aggregate. Traffic areas will be maintained to prevent tracking of mud from the active face in order to improve stormwater quality and to control dust.

Erosion and Sediment Control

Erosion control techniques will be used in addition to the foregoing to minimize the generation of sediment in the runoff from disturbed areas. These techniques will not only minimize sediment erosion but will improve the water quality of the stormwater runoff. These may include, but not be limited to:

1. **Barrier Filters.** Barrier filters, e.g. silt fences, waddles, rock checks, etc., are intended to filter sediment from runoff in areas where runoff is not routed into a detention basin or sediment trap. Barrier filters will be used for both sheet and channel flow. Barrier filters will be used at a minimum along the entire length of all disturbed slopes that are being directly discharged off-site until permanent vegetation has been established and sediment control is no longer necessary. Barrier filters placed within channels will be spaced at approximately 300-foot intervals.

Barrier filters placed on slopes shall be installed parallel to the contours. When used around inlets, as much filter area as possible will be provided. For channel flow application, the barrier shall be extended to such a length that the ends of the barrier are higher in elevation than the top of the expected flows. Barrier filters will be routinely inspected in
accompanying with the stormwater pollution prevention plan and best management practices.

2. Vegetative Filter. Vegetative filters provide biological filtration to improve water quality where concentrations of sediment are high and flow velocities are relatively low. Vegetative filters may be used along drainageways or property lines. Vegetative filters may also be used on the side slopes of the detention basin to filter sediment from overland flow.

3. Terrace Berming. Terrace berms will be constructed along the landfill side slopes and perimeter fill slopes that are greater than 30-feet high to intercept sheet runoff and direct it into downslope ditches or letdown pipes. Terrace berms will be installed at locations selected by the site engineer.

4. Sedimentation Basins. Stormwater runoff from disturbed areas typically contains sediment. The sediment includes soil that erodes off of earth surfaces and aggregates that accumulate on paved surfaces. Stormwater runoff from the landfill expansion will be directed to stormwater detention basins with sedimentation areas to improve stormwater discharge quality.

The three major factors considered when estimating sediment removal are particle fall velocity (particle size and weight), rate of flow through the reservoir, and period of retention. The proposed stormwater detention basins have been designed to have a slow rate of flow through the basin and a long period of retention. The period of retention is the time it takes for water flowing into the basin to reach the outflow. The inflow and outflow have been located on opposite ends of the basin. Elongated basins have been proposed to maximize the distance between the inflow and outflow. Water flowing into the basins will displace existing water before flowing out. The use of elongated stormwater detention basins with inflow and outflow structures separated by a great distance will provide effective sediment removal conditions. The proposed detention basins additionally utilize a sedimentation trap that minimizes particulate matter from migrating to the basin outlets.

5. Energy Dissipators. Energy dissipators will be used along steep downslope ditches and letdown pipes as required to prevent erosion and scouring. Energy dissipators routinely include baffles, concrete blocks, and/or large riprap.

Sedimentation Basin Design

The stormwater detention basins serve as sedimentation basins. They have been designed to provide significant detention times for a variety of storm flows, in order to provide sedimentation of the stormwater runoff from the landfill prior to discharge. The basins have been designed to provide sedimentation for the 100-year 24-hour storm and also the smaller, more frequent storms. As previously mentioned, all proposed detention
basins serving Landfill No. 3 will have sufficient storage capacity to accommodate the expected sediment loading that will occur between routine sediment removal activities.

They are generally rectangular in shape, with the inlet located at the opposite end of the outlet to allow for longer flow lengths and thus longer detention times. This allows for the stormwater spending the greatest time possible in the basins and for sediment to settle to the bottom. The incorporation of a discharge valve in the outlet works to provide additional water quality control, as it allows water that drains into the basin during routine runoff events to be retained for a sufficient period of time to clear prior to being discharged.

**Inspection and Maintenance**

All temporary and permanent erosion and sediment control measures will be maintained and repaired as needed to assure continued performance of their intended function. This program will include performance checks of facilities and grades, remedial grading, sediment removal, vegetative care and maintenance. Inspections will address points of scour, slope failure, breaching or settling. Inspections will be performed once every 3 months and after significant storm events. Maintenance includes clearing of sediment from barriers and the basins. Sediments will be dredged from the detention basins when the sedimentation level is within one foot from the invert of the outlet structure. Sediment removed from the barriers and the detention basins will not be placed in floodplain areas or in areas without adequate BMPs in-place. As necessary, runoff collection features will be cleaned, regraded, relined, rip-rapped, etc., to restore design capacities and correct problem areas. A written record of all inspections and maintenance will be prepared and placed in the facility Stormwater Pollution Prevention Plan (SWPPP), which will be kept at the site.

Erosion and sediment controls will be maintained for a minimum of 30 years after certified closure of the landfill as outlined in the Closure and Post-Closure Care Plan (Appendix U). This exceeds the requirements outlined in 35 Ill. Admin. Section 811.103(a)(4) and (b)(5). Interim construction, erosion, and sediment controls will be installed prior to disturbing one acre or more, and will be maintained until the disturbed areas are stabilized or runoff is routed to a detention basin.

**Conclusion**

The stormwater management system has been designed and is proposed to be operated in a manner that protects the public health, safety and welfare. The discharge rates will be controlled to facilitate sedimentation and prevent flooding, and will not alter the drainage conditions of off-site areas located upstream or downstream of the facility. All stormwater will be controlled to prevent contact with waste, and any stormwater which contacts waste will be contained and treated as leachate.