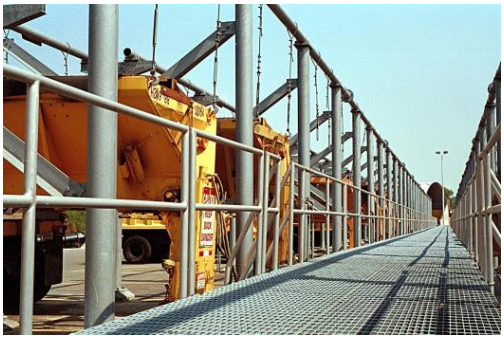
SYOSSET LANDFILL

2017 ANNUAL POST-CLOSURE SUMMARY REPORT

Volume 1 of 1



TOWN OF OYSTER BAY

DEPARTMENT OF PUBLIC WORKS
SYOSSET, NEW YORK 11791

June 2018

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SYOSSET LANDFILL
2017 ANNUAL POST-CLOSURE
SUMMARY REPORT

Volume 1 of 1

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BACKGROUND

The remediation of the former Syosset Landfill was performed under two separate operable units. The First Operable Unit (OU1) addressed the on-site remediation while the Second Operable Unit (OU2) addressed potential off-site impacts from the Landfill.

The OU1 Remedial Action design and construction were carried out by the Town of Oyster Bay (Town) in accordance with the requirements of a 1990 Consent Decree entered into between the Town and the United States Environmental Protection Agency (USEPA) to implement the selected remedy in the USEPA's OU1 Record of Decision (ROD) for the site. The USEPA's selected remedy was based on an evaluation of the conclusions in the OU1 Remedial Investigation and Feasibility Study prepared in accordance with a 1986 Consent Order between the Town and the USEPA, as well as the results of the USEPA Final Health and Endangerment Assessment for the site.

The OU1 Remedial Action construction consisted of implementing the New York State landfill closure regulations codified at 6NYCRR Part 360, which included the construction of a geosynthetic membrane cap on top of the landfill surface, a perimeter stormwater drainage system and a passive gas venting system. The OU1 ROD further required long-term maintenance of the landfill capping and closure systems, including routine inspection and repair as well as long-term groundwater quality and perimeter gas monitoring in accordance with the New York State landfill closure regulations.

The OU2 remediation program was carried out under the 1986 Consent Order between the Town and the USEPA. The OU2 remediation program consisted of a Remedial Investigation to determine the landfill's potential off-site impacts to groundwater and subsurface gas. The data from the OU2 Remedial Investigation Report (1996) was utilized by the USEPA to develop a Final Human Health Risk Assessment for the Second Operable Unit. Based on the findings in these reports, the USEPA published the OU2 remediation program ROD in March 1996 that stipulated the following conclusions and requirements for a "No Further Action Remedy":

- Site-related groundwater contamination is very limited in extent and does not pose any significant risk to human health and the environment;
- Implementation of the OU1 Remedial Action (Capping and Closure Program) will address potential future impacts from the site.

Furthermore, the environmental monitoring program performed as part of the OU1 remedy (which includes groundwater monitoring at selected on-site and off-site groundwater monitoring wells) will further ensure that the OU1 and OU2 remedies remain protective of human health and the environment.

Therefore, the post-closure monitoring and maintenance program for the OU1 Remediation Capping and Closure Program fulfills the monitoring and maintenance requirements for both Operable Units as stipulated in the OU1 and OU2 RODs.

INTRODUCTION

The Post-Closure Monitoring and Maintenance Operations Manual (O&M Manual) for the Syosset Landfill (LKB, 2003) prepared in conformance with the OU1 and OU2 RODs and the New York State landfill closure regulations identifies the inspection, monitoring and maintenance tasks for the various components of the capping and closure system which are performed on a regular basis throughout the post-closure period. The results of the monitoring and maintenance tasks performed each year are summarized in an Annual Summary Report that is submitted to the USEPA (lead agency) and the New York State Department of Environmental Conservation (NYSDEC) in conformance with the provisions of New York State landfill closure regulations.

In addition to reviewing the site's Annual Summary Reports, once every five years, the USEPA as lead agency, in consultation with the NYSDEC, evaluates the implementation and performance of the remedy in order to determine if the remedy is and will continue to be protective of human health and the environment per the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121. The methods, findings, and conclusions of reviews are documented in Five-Year Review Reports which identify issues found during the review, if any, and document recommendations to address them. The first Five-Year Review Report was published in November 2001.

In 2005, the USEPA delisted the Syosset Landfill from the Superfund National Priorities List (NPL). The site had previously been placed on the NPL in 1983. In addition, in 2015, the NYSDEC reclassified the Syosset Landfill from a Class 2 Site on the Registry of Inactive Hazardous Waste Disposal Sites to a Class 4 Site indicating the site had been properly closed, but requires continued site management consisting of operation, maintenance and/or monitoring.

The USEPA's Fourth Five-Year Review Report was published in February 2017 and is discussed in Section 5 of this Report. The USEPA concluded that the remedies implemented for the site are protective of human health and the environment. In addition, the USEPA granted a reduction in the post-closure inspection and monitoring frequency as follows:

- Landfill cover system inspections from quarterly to semi-annually;
- Landfill drainage system inspections from quarterly to semi-annually;

- Landfill gas venting system inspections and monitoring from quarterly to semi-annually; and
- Ground water-level monitoring and ground water-quality monitoring at the post-closure ground water-monitoring well network from annually to once every fifth quarter enabling the monitoring of groundwater once in each quarter during a Five-Year Review period.

In addition, the landfill cover system and drainage system are to be inspected following a major rainfall event designated as a 5-year, 24-hour storm event.

Commencing in 2017, the revised inspection and monitoring frequencies were implemented. Two rounds of semi-annual inspections were performed for the landfill cover system, drainage system and landfill gas venting system. The perimeter and property line gas vent wells were also monitored semi-annually. Since the 2016 groundwater monitoring event was performed in the fourth quarter, the next groundwater monitoring event will be conducted five quarters later which will be during the first quarter of 2018. Therefore, no groundwater monitoring was performed in 2017.

The results of the inspection, monitoring, and maintenance tasks completed during 2017 for the components of the capping and closure system are discussed in the following sections. Summary tables and pictures of typical conditions taken during the inspections are provided in Appendices A through C.

Since there was no groundwater monitoring event required to be performed in 2017, there is no separate report on groundwater monitoring for this reporting period. The next groundwater monitoring event will be performed in the first quarter of 2018 and will be reported in the 2018 Annual Summary Report.

1.0 COVER SYSTEM

The cover system was constructed in accordance with 6 NYCRR Part 360 provisions to minimize stormwater infiltration, vent landfill gases passively, provide a permanent barrier between the site's fill material and the land surface, and provide surface cover material compatible with future site uses. These uses include vehicle parking, highway yard operations, sanitation yard operations, equipment/material storage and other municipal uses.

Three types of surface treatments were designated for use in particular areas of the site based on the anticipated future site uses. The site was divided into five different facilities as shown on Figure 1, Syosset Landfill Cover System Location Plan. The recycled concrete surface treatment was utilized in both the Highway Department's Material Storage Facility and the Miscellaneous Equipment Storage Facility (Areas A and B, respectively, on Figure 1). The asphalt concrete surface treatment was utilized in the Highway Department's Salt Storage Facility and Vehicle Parking Facility as well as the Sanitation Division Vehicle Parking Facility (Areas C, D and E, respectively, on Figure 1). The vegetative cover surface treatment was utilized in a buffer area along the northern property line in Areas A, B and C.

The capping system consists of three types of cap surface treatments over a 60-mil High Density Polyethylene (HDPE) geomembrane and gas venting layer. Specifically, the cap system contains the following layers (from top to bottom).

- 24-inch barrier protection layer
  - 2" asphalt concrete top course
  - 5" asphalt concrete base course
  - 17" clean fill

    Or
  - 6" recycled concrete
  - 18" clean fill

    Or
  - 6" topsoil with a vegetative cover
  - 18" clean fill

- 60-mil HDPE geomembrane
- 12-inch gas venting layer
- Geotextile filter fabric

During this reporting period, the landfill cover system was inspected semi-annually for asphalt pavement cracks, surface material erosion, insufficient vegetative cover growth, erosion of vegetative cover and areas of surface settlement, as appropriate for each area. There were no 5-year, 24-hour storm events during 2017. The results of the inspections are discussed in Sections 1.1 through 1.7 of this Report. The defect descriptions and observed causes are

identified in Appendix A, Tables A1-1 and A2-1, with their locations referenced to the areas designated on Figure 1. Pictures of typical defects are also included in Appendix A following each of the Inspection Report Tables. Where applicable, defects that may remain from the previous year have been identified and further information can be found in the previous Annual Report.

The following paragraphs discuss the conditions found in 2017.

1.1 Pavement and Surface Cracks

The condition of the concrete and asphalt pavement located in the Highway Department's Salt Storage Facility and Vehicle Parking Facility (Areas C & D) as well as the TOBDPW Sanitation Division's Vehicle Parking Facility (Area E), in general, continues to be good. Routine fracturing of pavement cracks occurs at construction joint locations and is likely occurring due to weathering. Minor cracks are inherent in these types of pavement materials. Some irregularly shaped pavement cracks also exist in Area E and are likely occurring due to a minor amount of settlement in the subsurface material in those areas. Their locations have been monitored/maintained throughout the post-closure period, the minor amount of settlement has not increased and is not necessarily attributable to the Landfill.

It is recommended that these areas continue to be repaired on a regular basis as part of routine yard maintenance. The joints should be cleaned and sealed to prevent further weathering damage in accordance with the New York State Department of Transportation (NYSDOT) Standard Specifications, Construction and Materials, Section 633-3.02, "Cleaning, Sealing and Filling Joints and Cracks". It is recommended that the cracks in the asphalt pavement be cleaned and sealed as per the NYSDOT Pay Item for Cleaning and Sealing Cracks in Hot Mix Asphalt Pavement using Hot Applied Sealant, ITEM 402.7602 08. Cracks in the concrete pavement should be cleaned and sealed as per the NYSDOT Pay Item for Crack Repair by Epoxy Injection (Restoration), ITEM 01555.8002 M.

While routine maintenance and repair of the pavement is recommended, these conditions do not have an adverse impact on the condition of the landfill geomembrane cap located 24 inches below the pavement surface. In fact, the asphalt and concrete pavement surface treatment provide increased protection of the geomembrane cap in comparison to the standard vegetative cover required under the New York State landfill closure regulations.

However, should these cracks worsen due to landfill related impacts in the future, they should be addressed further in the Inspection Reports for these areas.

1.2 Recycled Concrete Aggregate Surface Material Erosion

Areas of surface material erosion (i.e., ruts) in the recycled concrete aggregate (RCA) were noticeable in the Highway Department Material Storage Facility (Area A) and the Miscellaneous Equipment Storage Facility (Area B) during both rounds of inspections.

It is recommended that the ruts in the surface be filled with RCA material to prevent further erosion and to re-grade any uneven areas to maintain designed surface slopes. In addition, it is recommended that stockpiles be placed in configurations that are perpendicular to the perimeter ditches (i.e., parallel to the surface slope) with sufficient space in between piles so that stormwater can flow unimpeded to the perimeter drainage ditches.

1.3 Vegetative Cover Surface Material Erosion

Areas of surface material erosion (i.e., ruts) were found in the vegetative cover buffer area of the Miscellaneous Equipment Storage Facility (Area B) and the Salt Storage Facility (Area C) during both rounds of inspections. These Areas are sloped toward the perimeter drainage ditches. The vegetative cover buffer area therefore receives runoff from both RCA and paved areas. Ruts form as a result of continued erosion of the surface material from stormwater runoff.

It is recommended that ruts in the surface material be repaired by removing silt, filling/regrading the surface area to remove the ruts, replacing topsoil that may have eroded away and reseeding this area during the planting season to prevent further erosion problems.

1.4 Vegetative Growth

In Areas B and C there were locations within the vegetative buffer that experienced erosion and lacked vegetative growth in both inspection rounds.

It is recommended that the topsoil be replaced in eroded areas and reseeding be performed during the planting season to prevent further erosion problems. It is also recommended that perimeter vegetation located around the property line gas vent wells and along the property line in general should be trimmed and maintained to a manageable level.

1.5 Settlement

There is one site location remaining where measurable potential settlement has occurred. As reported in the previous Annual Reports, it is

located along the west face of the Salt Storage Facility (Area C). This area remains a minor 2-inch depression for which no other potential cause could be identified. There has been no measureable additional settlement of this area during this reporting period.

The level of settlement is lower than the amount identified in the O&M Manual which would trigger a major repair (i.e., 16 inches). Therefore, in accordance with the requirements of the O&M Manual, it is recommended that the asphalt surface course in the remaining area be restored to its original surface slope as part of routine pavement repairs in the Salt Storage Facility to promote stormwater runoff. The location should continue to be monitored for future settlement. The pavement restoration work should be performed in accordance with the details and specifications for the Capping and Closure Program.

1.6 Ponding Areas

Minor ponding areas were observed in the paved areas within Area E during the first round of inspections during this reporting period due to uneven pavement and potholes. During the second round of inspections minor ponding areas were also observed in the RCA within Area A due to uneven grading and the pavement in Area C due to uneven pavement.

It is recommended that surface grading within the RCA material in Area A should be routinely adjusted to remove low points that occur. The asphalt section in Areas C and E experiencing ponding should be restored in accordance with the original Capping Contract specifications as discussed in Section 1.5 when routine pavement repairs are performed in the future in these areas.

1.7 Burrowing Animals

There was no evidence of burrowing animals on the cap surface.

2.0 DRAINAGE SYSTEM

The stormwater drainage system consists of toe of slope perimeter drainage ditches which collect the site's stormwater runoff and convey it to storm drains that discharge into three Nassau County recharge basins. Two of the recharge basins (RB No. 284 and RB No. 571) are adjacent to the site, while the third basin (RB No. 358) is located approximately one-quarter mile west of the site.

The perimeter drainage ditches are composed of rip-rap lined and asphalt-lined perimeter collection ditches that intercept runoff along the toe of the landfill slopes. The ditches are trapezoidal in cross-section with a depth of 1.5 feet and an overall width of 10 feet. The majority of the ditches have a base width of four feet with a side slope of 2:1. The remaining ditches have a base width of 5.5 feet with 1-1/2:1 side slopes. The rip-rap lined ditches utilize 2"-4" stone with an overall depth of 6 inches overlying filter fabric. The asphalt-lined ditches have an asphalt top course depth of 3 inches over an asphalt base course depth of 3 inches.

The drainage ditches convey stormwater to catch basins (Nassau County Type IIIC-modified) connected to reinforced concrete storm drains which discharge through headwalls into the Nassau County Recharge Basins Nos. 284, 358 and 571.

During this reporting period, the drainage system throughout the landfill was inspected semi-annually. There were no 5-year, 24-hour storm events during 2017. The ditch sections, catch basins, storm drainage pipes, manholes and recharge basin headwalls were inspected for defects. The defects encountered are identified on Tables B1-1 and B2-1, in Appendix B and their locations are identified by drainage ditch section number or drainage structure number on Figure 2, Drainage System Location Plan. Pictures of typical defects follow the tables for each round of inspections.

The following paragraphs discuss the conditions found in 2017.

2.1 Ditch Sections

Varying amounts of siltation and vegetative growth occurs over time in the majority of the rip rap lined drainage ditches onsite. However, the total length of the drainage ditches that are impacted in each designated ditch section also varies. Drainage Ditch Sections #1 through #6 contained moderate silting during the first inspection round of 2017 leading to vegetation growth in the rip rap lined ditch sections in the second inspection round.

The drainage ditches should receive routine maintenance to prevent future sediment accumulation and vegetation growth conditions. The apparent

cause of most of the ditch siltation appears to be from the erosion of materials stored in stockpiles onsite. Erosion control techniques should be implemented around the material stockpiles to prevent the transport of silt and sediment from the piles to the drainage ditches. However, only erosion control devices that can installed on the ground surface or anchored safely above the cap elevation should be utilized.

In 2016, a combination of hay bales and silt fence with shallow depth stakes were employed to minimize sediment transport to Ditch Section #6. These erosion control devices should continue to be maintained and replaced as necessary. Also in 2016, hay bales were placed along a portion of Ditch Section #3 and around the catch basin inlets at the downstream end of the perimeter drainage ditches to prevent sediment transport into the subsurface drainage system. The hay bales that have deteriorated should be replaced on a regular basis.

2.2 Catch Basins

All of the catch basins onsite were inspected. During 2017, silting was detected at Catch Basins #4 and #5 during the first round inspection and at Catch Basins #2 through #5 during the second round inspection.

It is recommended that the silt and sediment be removed on a regular basis from catch basins and the area in the vicinity of the catch basin inlets and drainage ditches. The hay bales previously installed at the catch basin inlets should be replaced. The erosion control measures recommended in Section 2.1 should be implemented onsite to minimize the silt and sediment transport to the catch basin locations.

2.3 Storm Drainage Pipes

The storm drainage pipes were inspected at the drainage structure locations and only minimal sedimentation and some vegetative growth were noted at the entrance to the end section located adjacent to the Animal Shelter (ES #1, see Figure 2) during the 2017 reporting period.

2.4 Recharge Basin Headwalls

All four recharge basin headwalls discharging site stormwater runoff to three Nassau County Recharge Basins (#284, #358 and #571) were inspected and are operational. Each of the headwalls contain minor amounts of siltation and varying amounts of vegetation during the growing season in 2017.

Although the silt/sediment deposits and vegetation are not impacting the performance of the headwalls, it is recommended that they be routinely removed. Routine maintenance of these Nassau County Basins is performed by Nassau County.

3.0 GAS VENTING SYSTEM

The landfill gas venting system consists of 38 property line gas vent wells, 16 perimeter gas vent wells and 26 landfill ridge gas vent wells as shown on Figure 3. Eight gas monitoring cluster wells and a gas venting trench located along the property line adjacent to the South Grove Elementary School were installed during previous work performed at the site. In addition, four six inch diameter PVC gas vent wells were installed over a gas venting trench during the Preload Program within the landfill limits in an area northeast of the Salt Storage Sheds. The vent wells were installed to allow the trench to continue venting, if necessary, following the placement of the cap and an earthen berm over the trench.

The perimeter gas vent wells are six-inch diameter PVC wells extending 52 feet below grade with a screen length of 40 feet. The landfill ridge gas vent wells are six-inch diameter PVC wells, extending 32 feet below the landfill cap surface with a screen length of 30 feet.

The Landfill Gas Venting System including the property line gas vent wells, the perimeter gas vent wells and the ridge vent wells were inspected and the property line wells, perimeter wells and Animal Shelter building were monitored for methane gas semi-annually in 2017, as approved by the USEPA and NYSDEC. The results of the inspections and monitoring are discussed in the following sections for both rounds performed in 2017.

Section 3.1 discusses the gas vent well defects found during the two rounds of inspections performed in 2017. The defects are identified by gas vent well number. The defect descriptions and observed causes are identified in Appendix C in the “Gas Venting System Inspection Report” Table’s C1-1 and C2-1 for the first and second round inspections, respectively. When defects are noted, typical pictures are included in Appendix C following the Inspection Report Tables. Where defects are the same as those identified in previous inspection reports, they are so noted. Pictures of these defects can be found in those reports.

Section 3.2 discusses the results of the two rounds of gas monitoring events. Table’s C1-2 and C2-2 tabulate the percent methane in air detected in the designated post-closure gas monitoring well network and the Animal Shelter building.

The following paragraphs discuss the conditions found in 2017.

3.1 Inspection

Inspection of each gas vent well was performed prior to each round of gas monitoring. Of the 54 property line and perimeter gas vent wells inspected in the first and second inspection rounds, only NE-16, NW-3, and SW-6 were damaged (the upper sections of the gas vent wells were detached from the well casing pipes at grade) during this reporting period. The three wells are secured with a temporary protective cover to prevent debris from entering the wells. Machinery used in this area combined with overgrown vegetation may have been the cause of the damage. During the post-closure period to date, methane has not been detected at Well NE-16, and has only been detected twice at Well NW-3 and four times at Well SW-6. However, these detections were all below the 6NYCRR Part 360 regulatory limit of 5% and no detections at these wells have occurred since the second quarter of 2013. While Well NE-16, NW-3, and SW-6 are still capable of venting and being monitored in their current condition, when necessary, it is recommended that the upper section of the casing pipe be reattached and the wells restored to their original configuration during the next well repair contract. It is recommended that vegetation near the gas vent wells be carefully maintained on a regular basis to improve visibility and help prevent damage to vent wells in the future.

The twenty-six ridge vent wells onsite were inspected for damage before each of the two gas monitoring rounds. Each ridge vent is protected by either an eight or ten foot diameter concrete leaching ring. Eight foot diameter rings were installed at Vent Wells R-13 through R-26 located in the Highway Department's Salt Storage Area and Vehicle Storage Area. Ten foot diameter rings were installed at Vent Wells R-1 through R-12 located in the Highway Department's Material Storage Area. These protective concrete rings were replaced last in 2011 and remain intact with the exception of the rings at Vent Wells R-1, R-8 and R-9 which have been replaced with smaller eight foot diameter rings which were stockpiled onsite.

The 2017 ridge vent well inspections conducted during the first and second inspection rounds showed only damage to the Well R-6 and the Well R-26 ten foot diameter concrete ring. It is recommended that the damaged concrete rings be replaced with ten foot diameter concrete rings. Historically, the leading cause of damage to the ridge vent well casings and protective concrete rings has been attributed to impact with trucks or other vehicles used onsite. It is recommended that stockpiles not be placed within 25 feet of the ridge vent wells to prevent trucks from damaging the wells in the future.

It should be noted that the site's passive gas venting system continues to operate properly preventing off-site gas migration at the property line as evidenced by the gas monitoring results discussed in Section 3.2 below.

3.2 Monitoring

The property line gas vent wells, perimeter vent wells and Animal Shelter building were monitored for methane gas over two rounds during falling barometric conditions, to determine compliance with 6 NYCRR Part 360 provisions for levels of combustible gas. Monitoring for methane was performed using a Combustible Gas Indicator.

The O&M Manual stipulates that if monitoring indicates the existence of combustible gas in excess the 6NYCRR Part 360 regulatory limit of the lower explosive limit (i.e., 5% gas-in-air) within the property line gas vent wells, subsurface bar-hole monitoring for Methane must be conducted at the property line. The bar-hole monitoring should be performed along the adjacent site fence line, perpendicular to the vent well in question. If gas concentrations of 5% or greater are encountered, multiple bar-holes should be employed in order to define the lateral extent of gas detected.

During the 2017 Gas Monitoring Program, property line Gas Vent Wells NE-1 to NE-23, SW-1 to SW-9 and NW-1 to NW-6 and perimeter Gas Vent Wells SE-1 to SE-9 and AS-1 to AS-7 were monitored in accordance with the requirements of the O&M Manual. No methane was detected during the first round monitoring event of 2017. During the second round, methane readings were detected at property line Gas Vent Wells NE-6 (3.0%), SW-5 (1.5%), and SW-7 (1.5%). The concentrations did not exceed the 6NYCRR Part 360 regulatory limit.

The Animal Shelter was monitored for methane gas in six separate locations of the building and no methane was detected during the monitoring events performed in both rounds of 2017. These results are also tabulated on Tables C1-2 and C2-2 in Appendix C.

In summary, based on the gas monitoring performed at the site to date:

- The gas monitoring events conducted in 2017 indicate that the site is continuing to meet the regulatory requirements for levels of gas at the property line.

- Since 2011, there have been no exceedances of the 6NYCRR Part 360 regulatory limit during any monitoring event at the perimeter and property line gas vent wells.

- Between 2005 and 2010, levels of methane in excess of the LEL (i.e., the 6NYCRR Part 360 regulatory limit) were only encountered once in Wells NE-7, AS-1 and AS-3; three times in Well AS-2; and seven times in Well AS-4. The magnitudes of these exceedances were relatively low and concurrent bar-hole testing between these wells and the property line indicated 0% gas.

In conclusion, the passive gas venting system at the site is operating successfully to prevent off-site gas migration. Low levels of landfill gas production at the site are consistent with a landfill that accepted waste between 42 and 84 years ago. It is anticipated that landfill gas concentrations will continue to decrease over time as the waste in the landfill continues to age.

4.0 GROUND WATER-MONITORING PROGRAM

Commencing in 2017, the revised inspection and monitoring frequencies approved by the USEPA and the NYSDEC were implemented. The frequency of ground water-level monitoring and ground water-quality monitoring at the post-closure ground water-monitoring well network was revised from annually to once every fifth quarter enabling the monitoring of groundwater once in each quarter during a Five-Year Review period.

Since the 2016 groundwater monitoring event was performed in the fourth quarter, the next groundwater monitoring event will be conducted five quarters later which will be during the first quarter of 2018. Therefore, no groundwater monitoring was performed in 2017 and there is no separate report on groundwater monitoring for this reporting period. The next groundwater monitoring event will be performed in the first quarter of 2018 and will be reported in the 2018 Annual Summary Report.

5.0 USEPA FIVE-YEAR REVIEW REPORT

The USEPA conducted their most recent site inspection for a Five-Year Review in 2016 and issued their Five-Year Review Report in February 2017. The Report's Protectiveness Determination/Statement since the previous 2012 Five-Year Review Report stated:

> "The implemented remedy for the Syosset Landfill Superfund Site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none are expected, as long as the Site use does not change and the implemented engineered and institutional controls are properly operated, monitored and maintained."

Section VI, Issues/Recommendations, of the USEPA Five-Year Review Report (February 2017) stated the following:

> "This report did not identify any issue or make any recommendation for the protection of public health or the environment which was not included or anticipated by the site decision documents. However, this report includes suggestions for improving, modifying, and/or adjusting some of these activities (see Other Findings, below).
>
> OTHER FINDINGS
>
> The Town submitted a letter to EPA and NYDEC requesting reductions in the frequencies of the post-closure inspection and monitoring. The following are recommendations that were identified during the FYR and may improve management of O&M activities, but do not affect current and/or future protectiveness:
>
> - Groundwater sampling and water level measurements will be performed every fifth quarter, instead of annually, which will provide monitoring once in each season/quarter during the Five-Year Review period;
> - Landfill cover systems inspection will be reduced from quarterly to semi-annually;
> - Landfill drainage system inspection will be reduced from quarterly to semi-annually, with one inspection after a significant rainfall event (i.e., five-year frequency);
> - Landfill gas venting system inspection and perimeter/property line gas vent wells monitoring will be reduced from quarterly to semi-annually; and
> - O&M activities results will continue to be summarized and submitted in annual reports.
>
> As documented in the Annual Post-Closure Summary Reports, the landfill cover system over time can develop asphalt pavement cracks, surface

material erosion, insufficient vegetative cover growth, erosion of vegetative cover and areas of surface settlement. In addition, varying amounts of siltation and vegetative growth occurs over time in the majority of the rip rap lined drainage ditches. The following are additional recommendations that may improve management of the cover system and the drainage system, respectively, but do not affect current and/or future protectiveness:

- Pavement cracks and ruts caused by erosion should be periodically sealed and filled;
- Uneven areas should be re-graded to maintain designed surface slopes;
- Landfill surface slope should be maintained to promote stormwater runoff;
- Erosion control techniques should be implemented around the material stockpiles to prevent the transport of silt and sediment from the piles to the drainage ditches; and
- Silt and vegetation that accumulates in drainage ditches and other portions of the drainage system should be periodically removed"

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The monitoring data collected during the 2017 reporting period for landfill gas and the monitoring data collected to date for ground water, indicate that the implemented remedy at the Syosset Landfill remains protective of public health and the environment.

More specifically, the post-closure monitoring of landfill gas during 2017 in the perimeter and property line gas vent wells continues to meet the requirements of 6NYCRR Part 360, confirming that the existing site-wide passive gas venting system continues to prevent off-site gas migration. The low levels of landfill gas production at the site are consistent with a landfill that accepted waste between 42 and 84 years ago. It is anticipated that landfill gas concentrations will continue to decrease over time as the waste in the landfill continues to age.

In addition, the most recent ground water-monitoring data collected in 2016 compared to the data collected during the 1993 OU2 RI, and the 2003 and 2005 through 2015 ground water-monitoring events indicate that there have been no significant changes in ground-water flow or ground-water quality attributable to the Landfill.

These conclusions are consistent with those contained in the USEPA's Fourth Five-Year Review Report published in February 2017.

6.2 Recommendations

Detailed recommendations for continued post-closure maintenance and repairs are provided for each of the landfill capping and closure system elements in the previous sections of this Report.

In general, recommended routine maintenance, inspection and monitoring for each of these systems will include:

Cover System:

- Periodically seal pavement cracks, fill ruts caused by erosion, properly orient stockpiles, implement stockpile erosion control features, maintain landfill surface slope to promote stormwater runoff.

Drainage System:

- Periodically remove silt and vegetation that accumulates in drainage ditches and other portions of the drainage system.

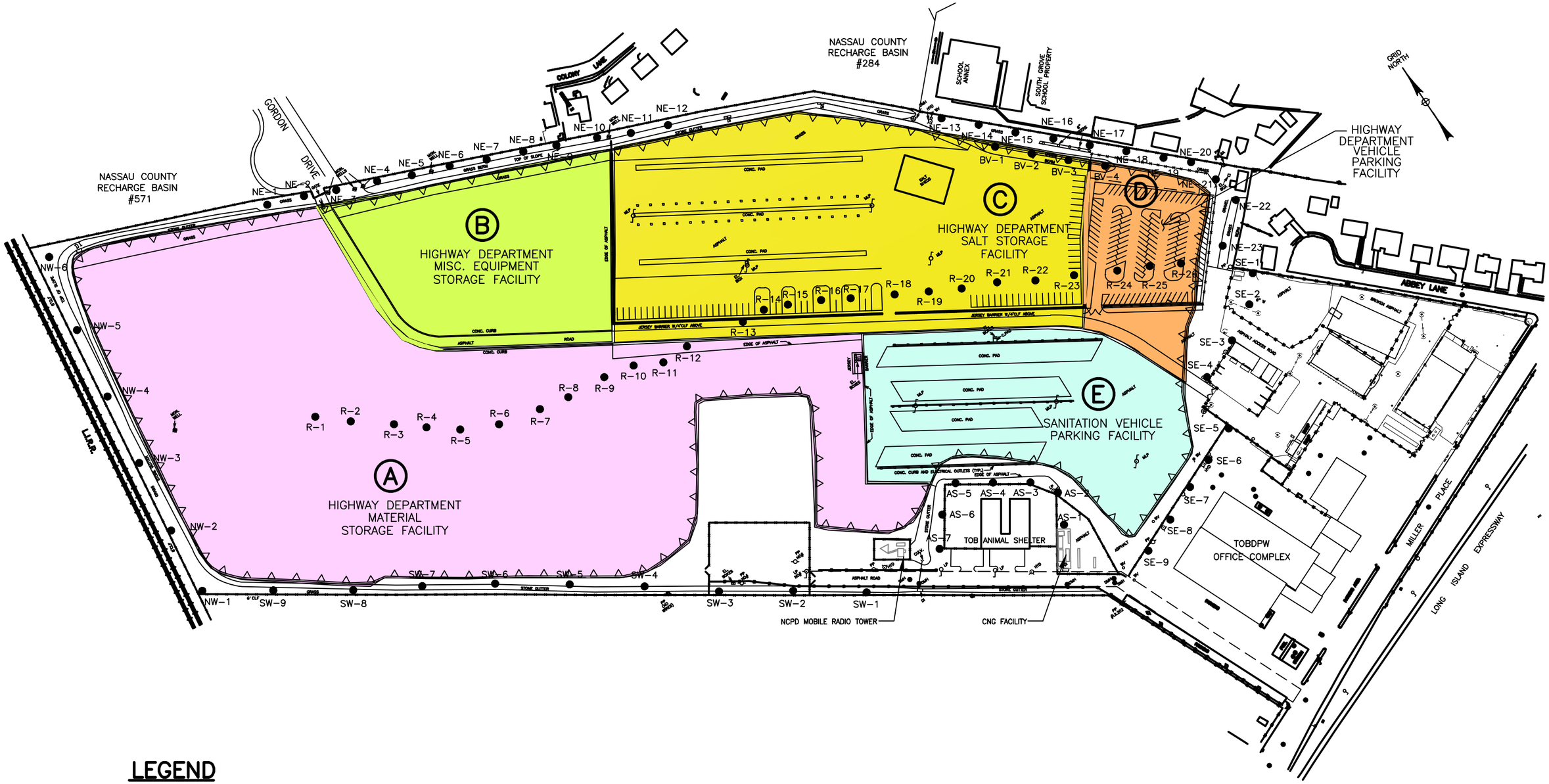
- Maintain/replace hay bales and other erosion control features along the ditch sections and at the catch basins.

Gas Venting System:

- Recommended that stockpiles not be placed within 25 feet of the ridge vent wells to prevent trucks from damaging the wells in the future.
- Wells NE-16, SW-6, and NW-3 should be repaired during the next well repair contract.
- The damaged protective concrete rings at Ridge Vents R-6 and R-26 should be replaced.

Ground Water-Monitoring System:

- The most recent recommendations for the Ground Water-Monitoring Program are contained in Volume 2, Appendix D, of the 2016 Annual Summary Report.



LEGEND

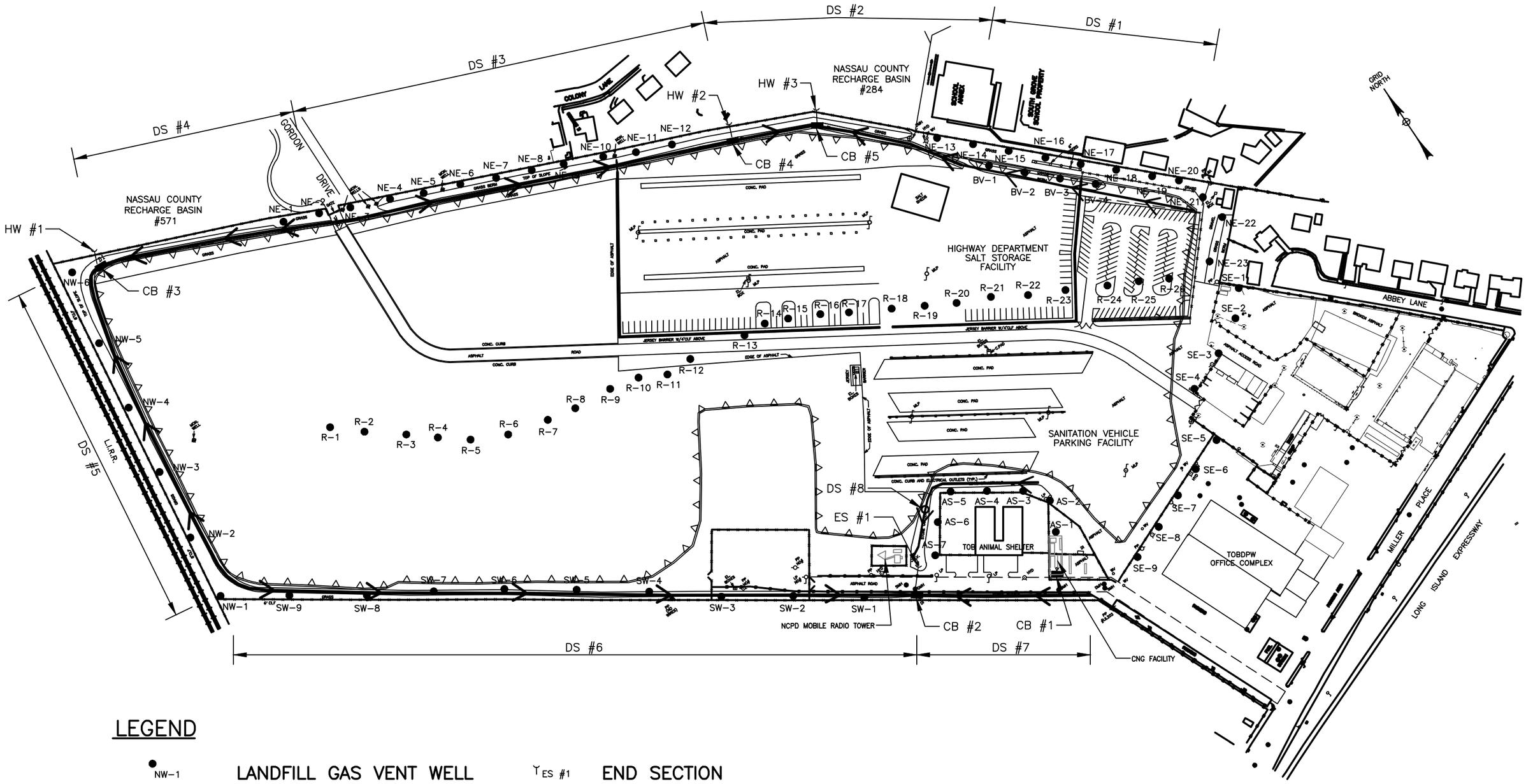
Ⓐ COVER SYSTEM AREA DESIGNATION

LANDFILL CAP LIMIT

FIGURE 1

SYOSSET LANDFILL
COVER SYSTEM LOCATION PLAN

LKB



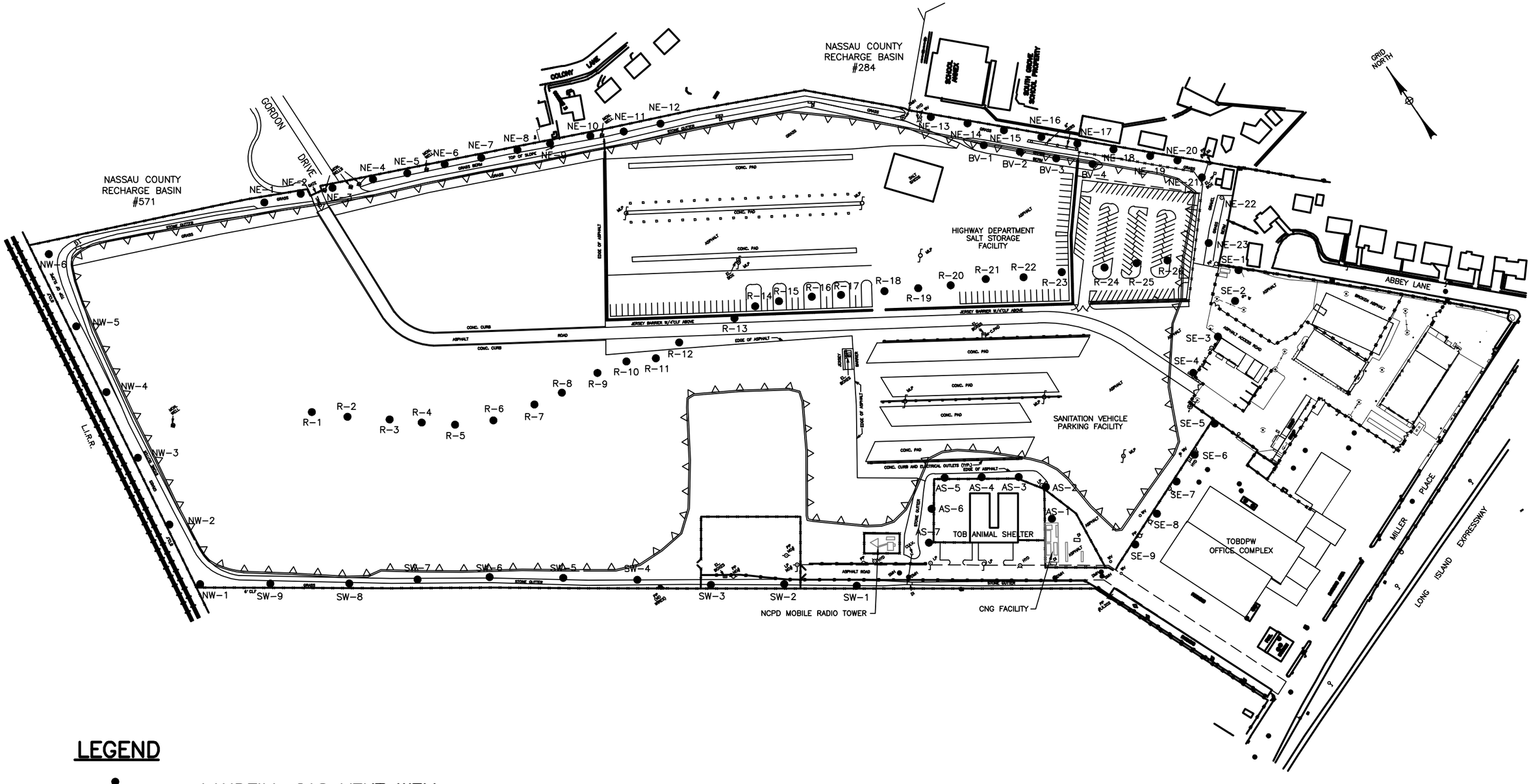
LEGEND

- NW-1 — LANDFILL GAS VENT WELL
- LANDFILL CAP LIMIT
- CB #1 — CATCH BASIN
- HW #1 — HEAD WALL
- ES #1 — END SECTION
- RIP RAP LINED DRAINAGE DITCH
- ASPHALT LINED DRAINAGE DITCH
- DS #1 — DRAINAGE DITCH SECTION DESIGNATION

FIGURE 2

SYOSSET LANDFILL
DRAINAGE SYSTEM LOCATION PLAN

LKB



LEGEND

NW-1 — LANDFILL GAS VENT WELL

LANDFILL CAP LIMIT

0 100 200 400

SCALE IN FEET

FIGURE 3

SYOSSET LANDFILL
GAS VENTING SYSTEM LOCATION PLAN

LKB

APPENDIX A

COVER SYSTEM

- **INSPECTION REPORTS**
- **PICTURES**

TABLE A1-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

COVER SYSTEM INSPECTION REPORT

Inspection Date: 4/11/17
Inspection Frequency:
☒ Semi-Annual
☐ Following 5-year Rainfall Event

Inspection Personnel:
Rex Chen, Joe Maggio

ITEM	DEFECT INFORMATION[1]		
	LOCATION	DESCRIPTION	OBSERVED CAUSE
1. Surface Cracks (Asphalt/Concrete)	Area C, D, E	Minor asphalt surface cracks	Weathering
2. Surface Material Erosion (Recycled Concrete)	Area A, B	Along Perimeters	Stormwater runoff
3. Surface Material Erosion (Vegetative Cover)	Area B, C	Erosion adjacent to Swale	Stormwater runoff
4. Vegetation Growth	Area B, C	Lack of vegetation in eroded areas	Stormwater runoff
5. Settlement	Area C	Minor settlement at low point on west face of Salt Shed Area C[2]	Differential Settlement
6. Ponding Areas	Area E	Minor ponding [2]	Uneven pavement, potholes
7. Burrowing Animals	None		

(1) - Defect locations are designated by Cover System Areas A through E identified on Figure 1 (scale: 1"=200'). If no defects are found, list “None” in the Location column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.

(2) – See previous report

Cover System Inspection

Asphalt Surface Cracks in in Area C

Surface Material Erosion in Area C

Minor Ponding in Area E

TABLE A2-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

COVER SYSTEM INSPECTION REPORT

Inspection Date: 11/16/17
Inspection Frequency:
☒ Semi-Annual
☐ Following 5-year Rainfall Event

Inspection Personnel:
Rex Chen

ITEM	DEFECT INFORMATION[1]		
	LOCATION	DESCRIPTION	OBSERVED CAUSE
1. Surface Cracks (Asphalt/Concrete)	Area C, D, E	Minor asphalt surface cracks[2]	Weathering
2. Surface Material Erosion (Recycled Concrete)	Area A, B	Along Perimeters[2]	Stormwater runoff
3. Surface Material Erosion (Vegetative Cover)	Area B, C	Erosion adjacent to Swale[2]	Stormwater runoff
4. Vegetation Growth	Area B, C	Lack of vegetation in eroded areas[2]	Stormwater runoff
5. Settlement	Area C	Minor settlement at low point on west face of Salt Shed Area C[2]	Differential Settlement
6. Ponding Areas	Area A, C, E Area A/C Border	Minor ponding[2]	Uneven grading/ pavement, potholes
7. Burrowing Animals	None		

(1) - Defect locations are designated by Cover System Areas A through E identified on Figure 1 (scale: 1"=200'). If no defects are found, list “None” in the Location column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.

(2) – See previous report

Ponding in Area A/C Border

Asphalt Surface Cracks Area C

Vegetative Cover Erosion in Area C

APPENDIX B

DRAINAGE SYSTEM

- **INSPECTION REPORTS**
- **PICTURES**

TABLE B1-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

DRAINAGE SYSTEM INSPECTION REPORT

Inspection Date 4/11/2017
Inspection Frequency:
☒ Semi-Annual
☐ Following 5-year Rainfall Event

Inspection Personnel:
Rex Chen, Joe Maggio

ITEM	DEFECT INFORMATION[1]		
	LOCATION	DESCRIPTION	OBSERVED CAUSE
1. Ditch Section	DS #1,2,3,4,5,6	Varying amounts of siltation in the ditch sections	Stormwater runoff/ Sedimentation
	DS #7	Vegetative growth	Vegetation
2. Catch Basins (Indicate Catch Basin #)	CB #3	Debris	Stormwater runoff/ Sedimentation
	CB #4,5	Siltation [2]	Sedimentation
3. Storm Drainage Pipes	ES #1	Some siltation	Sedimentation
4. Recharge Basin Headwalls (Indicate Basin #)	RB #284	Minor siltation[2]	Sedimentation
	RB #358	Minor siltation[2]	Sedimentation
	RB #571	Minor siltation[2]	Sedimentation

(1) - Defect locations (by Ditch Section #, Catch Basin # and Recharge Basin #) are identified on Figure 2 (scale: 1"=200'). If no defects are found, list “None” in the Location column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.
(2) – See previous report

Drainage System Inspection

Siltation – DS#3

Vegetative Growth – DS#7

Siltation – Catch Basin #5

Minor Siltation – RB #284 (HW #3)

TABLE B2-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

DRAINAGE SYSTEM INSPECTION REPORT

Inspection Date 11/16/2017
Inspection Frequency:
☒ Semi-Annual
☐ Following 5-year Rainfall Event

Inspection Personnel:
Rex Chen

ITEM	DEFECT INFORMATION[1]		
	LOCATION	DESCRIPTION	OBSERVED CAUSE
1. Ditch Section			
	DS #1,2,3,4,5,6,8	Varying amounts of siltation in the ditch sections	Stormwater runoff/ Sedimentation
	DS #8	Debris	Stormwater runoff/ Sedimentation
	DS #3,4,5,6,7,8	Vegetative growth	Vegetation
2. Catch Basins (Indicate Catch Basin #)	CB #2,3,4,5	Siltation [2]	Sedimentation
3. Storm Drainage Pipes	ES #1	Some siltation and vegetative growth[2]	Sedimentation
4. Recharge Basin Headwalls (Indicate Basin #)	RB #284	Minor siltation[2]	Sedimentation
	RB #358	Minor siltation[2] /debris	Sedimentation
	RB #571	Minor siltation and vegetative growth[2]	Sedimentation

(1) - Defect locations (by Ditch Section #, Catch Basin # and Recharge Basin #) are identified on Figure 2 (scale: 1"=200'). If no defects are found, list “None” in the Location column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.
(2) – See previous report

Drainage System Inspection

Vegetative Growth – DS#4

Some Siltation and Vegetative Growth – ES#1 (DS#8)

Drainage System Inspection

Siltation/Debris – Catch Basin #2

Minor Siltation/Debris – RB #358 (HW #4)

APPENDIX C

GAS VENTING SYSTEM

- **INSPECTION REPORTS**
- **MONITORING DATA**
- **PICTURES**

TABLE C1-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

GAS VENTING SYSTEM
INSPECTION REPORT

Inspection Date: 4/11/2017 and 5/12/2017
Inspection Frequency

☒ Semi-Annual
☐ Annually

Inspection Personnel:
Joe Maggio, Rex Chen

ITEM	DEFECT INFORMATION[1]		
	WELL No.	DESCRIPTION	OBSERVED CAUSE
1. Property Line Gas Vent Wells	NE-16	Well casing broken at grade	Possibly hit
2. Perimeter Gas Vent Wells	None		
3. Ridge Gas Vent Wells	R-6, R-26	Broken Ring	Possibly hit
4. Cluster Monitoring Wells	None		

(1) - Defect locations (by well number) are identified on Figure 3 (scale: 1"=200'). If no defects are found, shade “None” in the Well No. column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.

(2) – See previous report

TABLE C1-2
SYOSSET LANDFILL QUARTERLY GAS MONITORING DATA

Date: 5/12/2017
Time: 11:30-15:30
Personnel: Joe Maggio, Rex Chen

Temperature: 57 ^{0}F
Barometric Pressure: 30.01 F
Wind Speed: 1 mph
Wind Direction: SE
Humidity: 54 %
Weather Data Measured at: Farmingdale NY

Property Line Gas Monitoring Data

Vent Number	Methane (% gas)	Notes	Vent Number	Methane (% gas)	Notes
NE1	0%		NE20	0%	
NE2	0%		NE21	0%	
NE3	0%		NE22	0%	
NE4	0%		NE23	0%	
NE5	0%		SW1	0%	
NE6	0%		SW2	0%	
NE7	0%		SW3	0%	
NE8	0%		SW4	0%	
NE9	0%		SW5	0%	
NE10	0%		SW6	0%	
NE11	0%		SW7	0%	
NE12	0%		SW8	0%	
NE13	0%		SW9	0%	
NE14	0%		NW1	0%	
NE15	0%		NW2	0%	
NE16	0%	Well casing broken at grade	NW3	0%	
NE17	0%		NW4	0%	
NE18	0%		NW5	0%	
NE19	0%		NW6	0%	

Perimeter Gas Monitoring Data

Vent Number	Methane (% gas)	Notes	Vent Number	Methane (% gas)	Notes
SE1	0%		SE9	0%	
SE2	0%		AS1	0%	
SE3	0%		AS2	0%	
SE4	0%		AS3	0%	
SE5	0%		AS4	0%	
SE6	0%		AS5	0%	
SE7	0%		AS6	0%	
SE8	0%		AS7	0%	

Animal Shelter Monitoring Data

Bldg. Location	Methane (% gas)	Notes	Bldg. Location	Methane (% gas)	Notes
1	0%		4	0%	
2	0%		5	0%	
3	0%		6	0%	

Gas Venting System Inspection

Well Casing Broken at Grade – NE-16

Ridge Gas Vent Well Broken Ring – R-26

TABLE C2-1

SYOSSET LANDFILL
POST-CLOSURE MONITORING AND MAINTENANCE PROGRAM

GAS VENTING SYSTEM
INSPECTION REPORT

Inspection Date: 11/16/2017
Inspection Frequency

Inspection Personnel:
Rex Chen

☒ Semi-Annual
☐ Annually

ITEM	DEFECT INFORMATION[1]		
	WELL No.	DESCRIPTION	OBSERVED CAUSE
1. Property Line Gas Vent Wells	NE-16, NW-3, SW-6	Well casing broken at grade	Possibly hit
2. Perimeter Gas Vent Wells	None		
3. Ridge Gas Vent Wells	R-6, R-26	Broken Ring	Possibly hit
4. Cluster Monitoring Wells	None		

(1) - Defect locations (by well number) are identified on Figure 3 (scale: 1"=200'). If no defects are found, shade "None" in the Well No. column. Utilize a separate sheet, if necessary, to further describe defects and observations of causes.

(2) – See previous report

TABLE C2-2
SYOSSET LANDFILL QUARTERLY GAS MONITORING DATA

Date: 10/23/2017
Time: 10:15-15:15
Personnel: Joe Maggio, Rex Chen

Temperature: 68 ^{0}F
Barometric Pressure: 30.24 in Hg
Wind Speed: 2 mph
Wind Direction: SSE
Humidity: 83 %
Weather Data Measured at: Farmingdale NY

Property Line Gas Monitoring Data

Vent Number	Methane (% gas)	Notes	Vent Number	Methane (% gas)	Notes
NE1	0%		NE20	0%	
NE2	0%		NE21	0%	
NE3	0%		NE22	0%	
NE4	0%		NE23	0%	
NE5	0%		SW1	0%	
NE6	3.0%		SW2	0%	
NE7	0%		SW3	0%	
NE8	0%		SW4	0%	
NE9	0%		SW5	1.5%	
NE10	0%		SW6	0%	Well casing broken at grade
NE11	0%		SW7	1.5%	
NE12	0%		SW8	0%	
NE13	0%		SW9	0%	
NE14	0%		NW1	0%	
NE15	0%		NW2	0%	
NE16	0%	Well casing broken at grade	NW3	0%	Well casing broken at grade
NE17	0%		NW4	0%	
NE18	0%		NW5	0%	
NE19	0%		NW6	0%	

Perimeter Gas Monitoring Data

Vent Number	Methane (% gas)	Notes	Vent Number	Methane (% gas)	Notes
SE1	0%		SE9	0%	
SE2	0%		AS1	0%	
SE3	0%		AS2	0%	
SE4	0%		AS3	0%	
SE5	0%		AS4	0%	
SE6	0%		AS5	0%	
SE7	0%		AS6	0%	
SE8	0%		AS7	0%	

Animal Shelter Monitoring Data

Bldg. Location	Methane (% gas)	Notes	Bldg. Location	Methane (% gas)	Notes
1	0%		4	0%	
2	0%		5	0%	
3	0%		6	0%	

Well Casing Broken at Grade – NW-3

Well Casing Broken at Grade – SW-6

Ridge Gas Vent Well Broken Ring – R-6

Ridge Gas Vent Well Broken Ring – R-26

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