MAJOR PERMIT MODIFICATION
PHASE III SITE DEVELOPMENT
FEBRUARY 2014

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

KEYSTONE SANITARY LANDFILL, INC.
BOROUGH OF DUNMORE/BOROUGH OF THROOP, LACKAWANNA COUNTY
MAJOR PERMIT MODIFICATION DOCUMENTS

ENVIRONMENTAL ASSESSMENT REVIEW I
OCTOBER 13, 2015 LETTER
VOLUME 2

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Harms:

1. Property Value

HARMS

C1 **Property Values: (SE)** KSL has identified and public comment indicates that potential harm to the value of properties is a concern of those living in the vicinity of the landfill.

Proposed mitigation: KSL identifies the project area as properly zoned and that the landfill has been operating since the 1960's. KSL concludes that due to the historical usage of the KSL property along with no lateral expansion of the landfill, it is unlikely that the continued operation of the landfill will result in a decrease in property values.

DEP Review: KSL concluded that there is no potential harm to property values and proposed no mitigation measures. No factual information was provided to support this conclusion. Property devaluation is difficult to prove because of the many factors that affect the value of a property, perception being one of those factors. It is clear that there is a widespread belief among local residents that property values would decrease if the landfill were expanded; however, as described above, the landfill has been in existence since the 1960's. Much of the residential development around the landfill has occurred despite the presence of the landfill, demonstrating that the landfill did not deter the sale of existing homes, or the construction of new residential development nearby. Because the landfill is proposed to be significantly higher and that the lateral extent of expanded height will be closer and more visible to some residences in nearby developments, the expansion may impact property values. KSL must consider and define the potential impact that the increased visibility of the operation and expansion of active operations into previously closed portions of the site may have on property values and propose appropriate mitigation measures if necessary.

C1 **Property Values Response Narrative**

Exhibit C1.1 contains an extensive "Market Analysis on Real Estate Values due to a Municipal Solid Waste (MSW) Capacity increase". This analysis was performed by John McChesney, MAI, Pennsylvania General Real Estate Appraisers, GA-1266-R. The report evaluates the performance of real estate markets in the vicinity of KSL from 1998 to date within the identified neighborhoods in close proximity to KSL operations for the impact on property use, utility and value.

The central value component used in the report is the effect on property values as a consequence of a (MSW) Capacity increase. Because KSL received the Phase II Major Permit Modification in 1997, 1998 was selected as the base year to track any adjustment in surrounding residential property values resulting from the increase in municipal waste disposal capacity at KSL.
The central tendency analysis was made by using property locations within one, three and five mile radius of KSL and those within Lackawanna County

since 1998. In addition, market comparisons of similar property use, proximity and value impacts were tested using three other municipal waste landfills in Pennsylvania, i.e., Alliance, Grows, and Chrin that were subject to an increase in municipal solid waste disposal capacity. The communities' values were tracked to show the relative impact from one neighborhood to the next as a result of a change or perceived potential loss of property values due to the proximity of a sanitary landfill that was permitted for MSW capacity increase.

Mr. McChesney reached the below listed conclusions upon completion of his analysis:

- **The residential property values within 1, 3 & 5 miles of KSL had price appreciation factors in excess of the surrounding communities and the entire Lackawanna County.**
- **Commercial, office, retail and industrial use property values maintained comparable price changes over the study period, indicating no value impact.**
- **No conclusive evidence exists to support a negative location adjustment in property values related to the proximity to KSL, the viewshed of KSL to adjacent residences, or loss of use and utility of the real estate in surrounding areas.**

The facts analyzed and conclusions reached by Mr. McChesney through this site specific study, firmly establish that proximity to KSL has not diminished the residential property values in the surrounding neighborhoods. Proof of this fact is that since the 1970's when KSL commenced MSW disposal activities, over 269 homes were built in the Swinick Development, which is the closest residential development and 390 new housing units were constructed within one (1) mile of KSL. Based on the historical trend of property values, changes and trends resulting from the prior KSL Phase II Site Development, and the lack of site specific data supporting any claim that the Phase III Site Development would reverse this trend, there is no substantial credible evidence to establish that the positive trend in residential property values will change in the future. However, recognizing the future residential property value and/or perceived property values still may be classified as a potential harm, KSL herein commits to implement the below described Property Value Protection Plan (PVPP), upon issuance, by PaDEP, of the Phase III Permit Modification for the proposed site life.

Property Value Protection Plan (PVPP)

- **All residential properties within one half mile of the KSL property boundary are eligible for participation in the PVPP. The location limits of eligibility are established in Exhibit C1.2.**
- **After a property owner has listed their residence on the regional real estate market for a period of 120 days, upon the property owner providing written notice to KSL that they desire to sell their residence, three Pennsylvania**

certified residential appraisers will be retained, within 30 days, to value the subject property using industry accepted standards.

- **Each party will select a certified appraiser, with a neutral appraiser selected thru mutual agreement of the respective party's appraisers.**
- **All three appraisals shall be submitted to KSL and the residential property owner within 30 days of the selection of the neutral appraiser.**
- **Each party will pay the fees and expenses of their selected certified appraiser and 50% of the neutral appraiser's fees and expenses.**
- **The residential property owner shall be responsible to pay all costs associated with retaining a Pennsylvania certified professional to conduct a physical and environmental inspection of the property and prepare a certification of a clear title. This documentation is to be provided by the residential property owner to the retained appraisers a minimum of 5 days prior to the completion of their property value reports.**
- **Within a 60 day period after receipt of the three residential appraisals, KSL will purchase the residential property based upon the numerical average of the values contained in the respective appraisals, upon the property owners written notification that they will accept the amount established therein.**
- **At the closing, each party will be responsible to pay for their attorney's and filing fees along with the prorated closing costs related to taxes, insurance, utility bills, etc.**
- **The property owner will be responsible to pay all real estate brokers fees and expenses encountered during the original effort to sell the residential property.**

The institution of the PVPP combined with the reduction in the originally proposed maximum elevation of the Phase III MSW site disposal area to the maximum elevation approved in the Phase II 1997 Permit Modification, mitigates any future potential harms related to the reduction of residential property values adjacent to KSL, which the data demonstrates, has not occured and will not occur.

EXHIBIT C1.1

MARKET ANALYSIS ON REAL ESTATE VALUES DUE TO LANDFILL EXPANSION

Swift Real Estate Solutions, LLC
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June 29, 2015

Keystone Sanitary Landfill
c/o AJ Magnotta
CECO Associates, Inc.
507 Linden Street, 2nd Floor
Scranton, PA 18503

Subject; Market Impact on Real Estate Values due to a Landfill Expansion
Keystone Sanitary Landfill, Dunmore PA
Property analysis radius impact and comparisons
Dunmore, PA

Dear: Mr. Magnotta;

This report is outlining my efforts to determine if an expansion of a sanitary landfill from 36.6 million cubic yards to 145 million cubic yards has any measurable temporary or permanent detrimental impact on real estate values in the surrounding suburban type settings. The following reporting evaluates the performance of real estate markets in and around the subject property from the period 1998 to current within identified neighborhoods in close proximity to landfill operations with a potential for impacting use, utility and values.

In this report I reviewed market resources within Lackawanna County and those surrounding the subject landfill operations during periods of change in capacity levels to determine price change and impact identified by proximity. The central value component used is the effects from the introduction of landfill expansion. The Keystone Sanitary Landfill experienced an expansion of facility capacity in 1998. The central tendency analysis was made using locations within a one, three and five mile radius to the subject site, and those within the Lackawanna County area of Pennsylvania since 1998. The results as reported in the following analysis evaluated value year over year from a reported date of change in a sanitary landfill capacity and its impact on surrounding property use.

Market comparisons of similar property use, proximity and value impact were tested on three other sanitary landfill operations within Pennsylvania. Sanitary landfills were selected based on their size, surrounding development characteristics and the timing of an expansion of operations. The sanitary landfill facilities were evaluated using the same criteria of surrounding value impact one, three and five miles, as well as the performance of the county for which they are located in.

Each of the comparisons used represent typical broader market influences and compares them to an expansion of use characteristics that would presumably impact the surrounding use and utility of the neighborhood and districts. The community's values were tracked to show relative impact from one neighborhood to the next as a result of a change, or perceived potential loss due to proximity of a sanitary landfill capacity increase. Sale price change basis is examined for each of the comparative analysis on the same one, three, five mile and the respective county same as the value change outlined for the Keystone Sanitary Landfill analysis.

The conclusions of the analysis central assumptions indicate the following:

Keystone Sanitary Landfill 1998-2015				
Cummulative Change in Conditions				
	1 Mile	3 Mile	5 Mile	County
Population	-5.7%	-1.3%	-0.7%	0.2%
Housing Units	2.7%	-2.4%	-1.0%	2.4%
Average Dwelling Built	1955	1940	1940	1950
Change in Income	59.4%	62.0%	62.0%	62.0%
Change in Value	51.0%	54.0%	72.0%	56.0%
Alliance Sanitary Landfill 1998-2015				
Cummulative Change in Conditions				
	1 Mile	3 Mile	5 Mile	County
Population	-2.4%	-0.3%	-0.8%	-0.3%
Housing Units	0.0%	1.0%	0.7%	0.9%
Average Dwelling Built	1971	1940	1940	1950
Change in Income	13.2%	13.2%	13.2%	13.2%
Change in Value	6.2%	-5.8%	-1.5%	5.4%
GROWS Sanitary Landfill 1998-2015				
Cummulative Change in Conditions				
	1 Mile	3 Mile	5 Mile	County
Population	-10.5%	-0.1%	-0.8%	-0.3%
Housing Units	0.0%	1.0%	0.7%	0.9%
Average Dwelling Built	1978	1955	1953	1972
Change in Income	5.2%	5.2%	5.2%	5.2%
Change in Value	-18.2%	-7.3%	-9.9%	-4.4%
Chrin Sanitary Landfill 1998-2015				
Cummulative Change in Conditions				
	1 Mile	3 Mile	5 Mile	County
Population	1.8%	0.1%	-0.8%	-0.3%
Housing Units	0.0%	1.8%	1.3%	0.9%
Average Dwelling Built	1940	1942	1958	1972
Change in Income	13.6%	13.6%	13.6%	13.6%
Change in Value	7.9%	-3.0%	-9.2%	-8.2%

The client and user of this report, Keystone Sanitary Landfill herein referred to as "the client", will evaluate the content to test value impact potential on surrounding real estate use in a suburban location within one mile radius to the Keystone Sanitary Landfill. The report use is to present a qualified professional opinion of the value impact potential, and to have the report submitted in support of regulatory agencies and governing jurisdictions decisions regarding the expansion of the Keystone Sanitary Landfill application. Reliance is placed on information provided by the client regarding environmental impact, line of site, property history and anticipated intensity of continued use.

I have been professionally active in the real estate market inclusive of the Dunmore PA community for 30 years, and physically inspected the subject and surrounding neighborhoods April 8, 2015 in preparation of this analysis. The findings of the analysis do not support the notion that any measurable negative market impact on value has occurred as a result of the planned expansion of the landfill under the assumption that environmental conditions are contained.

Comparisons taken from throughout the state show that where environmental conditions are properly addressed there is no serious or long term market value damage. Information and reporting on environmental impact has been stated by the client to have had no history, and efforts in place for the expansion are presumed to follow the same level of impact mitigation. The Keystone Sanitary Landfill is reported to be in compliance with permitting, and my assumption is the operation will remain compliant for the planned expansion of the landfill including all environmental mitigation and control efforts to address containment.

Under the assumption that professional engineering and environmental reports are correct concerning no negative environmental impact, the planned expansion does not rise to a level of detrimental impact on value in any measurable manner. Market comparisons of similar events show the resilience of communities and general market appeal that works through temporary setbacks. The sanitary landfill expansion event of the subject community itself was subject to a change from a 25.4 million cubic yard capacity to 36.6 million tons, permitting a peak elevation of 1,595 feet. This change occurred on an effective date of 10-Jun-97 when permitting was finalized. The proposed expansion is to 145 million cubic yards and a peak elevation of 1,750 feet. Average daily volume rose over the period to the current levels of 7,250 tons.

An observation made was that residential property values within one mile of the Keystone Sanitary Landfill had price appreciation factors in excess of surrounding three mile, five mile and Lackawanna County regions. Commercial office, retail and industrial use property values maintained comparable price changes over the same period indicating no impact also. There is no conclusive evidence to support a negative location adjustment for proximity to the client, view of facilities or loss of use and utility of the real estate in surrounding areas.

According to the Uniform Standards of Professional Appraisal Practice, it is the appraiser's responsibility to determine the appropriate scope of work. USPAP defines the scope of work as:

Report Type:

Given value may be discussed; this report is an Appraisal Report in summary format. Depth of analysis is intended for the use and users to understand the rationale and logic for conclusions reached. Discussion and determination of value is not property specific, but intended to identify neighborhood market impact potential for real estate as categorized and discussed in details defined later to include residential, retail, office and industrial.

USPAP Reporting Type Description:

This Standards Rule 1 & 2 reporting is intended to present a scope of data, reasoning, and analysis utilized in the process that developed indexes and market comparisons of detrimental conditions, market impact and market recovery. Supporting documentation concerning the data, reasoning, and analysis utilized are in the files maintained by Swift Real Estate Solutions, LLC.

The depth of discussion contained in this report is specific to the client and the intended use stated.

Inspection:

A physical inspection of the subject and surrounding neighborhoods was performed April 8, 2015. Communities in the immediate proximity of the Keystone Sanitary Landfill (One Mile Radius) reviewed included;

North	Properties along Marshwood Road, Underwood Road and Stanton Road
South	Residential neighborhood commonly known as the Swinnick development West of East Drinker Street, and North of Chestnut Street, as well those properties along North Blakely Street
East	South and east of the Keystone Sanitary Landfill including, but not limited to Tigue Street and Erie Street
West	Real estate along North Blakely Street and residential streets within Throop off North Blakely south of Valley Avenue.

A general review of neighborhoods within three and five miles were also included in the assessment on April 8, 2015. Communities in the wider area surveyed included most of Scranton, Dunmore, Throop, Dickson City, Olyphant and Blakely.

Market Analysis and Market Conditions:

Market analysis was conducted by investigating regional influences and property sales within one mile, three miles and five miles radius and County of facilities with comparable intensity of use, with a focus on those landfills having recent increases in capacity. Investigation required reviews of public documents and private multiple listing services throughout Pennsylvania. Indexing position is based on the evaluation of various market trends reported in the regional systems.

All information pertinent to the index analysis has been considered, and no specific valuation process is implied with this report. In compliance with USPAP disclosure requirements, and in performing the assigned task, the following conditions were necessary to apply:

- Hypothetical conditions[1]: Is a condition that is contrary to what exists but is supposed for the purpose of analysis. I make the following hypothetical conditions a part of this report:
    - None
- Extraordinary assumptions[2]: Is an assumption, directly related to a specific assignment, which, if found to be false, could alter the appraiser's opinions or conclusions. I make the following extraordinary assumptions:

[1] USPAP 2014-15
[2] USPAP 2014-15

- The reader of the report understands it is not intended to develop a fully considered and reconciled market conclusion on individual property, but only intended to communicate probable impact from expansion of a sanitary landfill event on nearby real estate values and utility.

- Engineering and professional reports were used for line of site and environmental impact description. I make no conclusion regarding report findings outside of the market impact potential the physical characteristics of described events could have had on a community relative to value of real estate.

- Keystone Sanitary Landfill was reported to not have any significant environmental incidents over the years, and has no adverse impact on surrounding communities.

- I assume no change to Average Daily Volume, or Truck Traffic as a result of the planned changes.

- No assumptions are made relative to legal description or title of a specific property evaluated with this index.

Specific analysis has been used on property use classifications identified within a three mile radius of the subject to include apartments, industrial, office, retail and single family residential housing in suburban market locations. I trust you find the enclosed informative and helpful.

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Subject Property

View from Route 6

Location Information

Census Tract:	1120.00	MSA:	42540
Traffic Count:	Low	Market Area Type:	Medium Density

Entity Description:

Keystone Sanitary Landfill is a for profit association organized for the purpose of providing sanitary disposal services in support of regional populations. The facility has been in existence under the current ownership since 31-Jan-72 with multiple assemblage of land now consisting of approximately 713.19 Acres of land according to public records. Prior ownership and use date back to the mid 1940's.

Acquisition of the site began in 31-Jan-72, with multiple purchases to assemble the current land area from 1974 through to the final consolidation of land area in 1987. Since the introduction of the landfills current operation and ownership there have been two prior expansions dated 31-Mar-82 to 25.4 million cubic yards and 10-June-97 to 36.6 million cubic yards. The 1997 permitting occurred where the average daily volume was increased from 3,600 to the current 7,250 tons.

Relatively speaking the 1998 event is comparable in many ways to the current expansion request, and possibly more significant in that the truck traffic count increased affecting local traffic patterns as well having additional environmental concerns affecting the entire community.

The planned expansion for which this analysis is evaluating possible impact intends to raise peak elevation an additional 165 feet from existing elevations, and to fill in valley areas. According to line of site analysis there will be an eventual visual impact of the skyline of some sections of the southern residential communities.

Truck traffic was indicated by property ownership representatives as having no increase anticipated.

Zoning	
Zoning Code	M-1
Zoning Description	Manufacturing
Permitted Uses/District Focus	Single family residential housing is permitted as a pre-existing condition.

Land Information	
Gross Land Area:	713.19 acres Source: Per Public Records
Description:	The land areas of the Keystone Sanitary Landfill is a large section of land (greater than one square mile) north and west of Route 6. The peak elevation permitted is at a maximum 1,585 feet. Requested change in peak elevation is to 1,750 feet. There are a number of improvements on the subject site to support landfill operations including offices, material and waste processing plants, scales, methane pumping operations, heavy vehicle weight scales and generators. Interior roads are dirt and gravel maintained by ownership. Road conditions are fair, but adequate to service the intended use. The subject and surrounding properties in the area are serviced by public water and sewer systems for water sources and waste water disposal.
Shape:	Irregular Topography: Rolling
In Flood Plain:	No
Encumbrance/Easement	Typical Utility including water, sewer, electric, gas, telephone and cable
Surplus Land Area(SF):	None Excess Land Area(SF): None
Environmental Issue:	None Known
Environmental Desc:	No environmental conditions were known or reported. Reliance on this condition is assumed to be true. In the event conditions have not been reported or disclosed, this analysis could potentially have a different outcome.

Subject Photographs

View toward peak

View eastern area of property looking west

View from southwestern area looking northeast

View from scales looking toward current peak elevations

View from northwest area looking southwest

View from peak of original landfill

View from original landfill peak to northeast

View from original landfill peak looking south toward Dunmore

View from industrial use toward Keystone Sanitary Landfill from west

View from North Blakely toward Keystone Sanitary Landfill from west

View from Troon area north toward Keystone Sanitary Landfill

View from Swinnick Drive looking north toward Keystone Sanitary Landfill

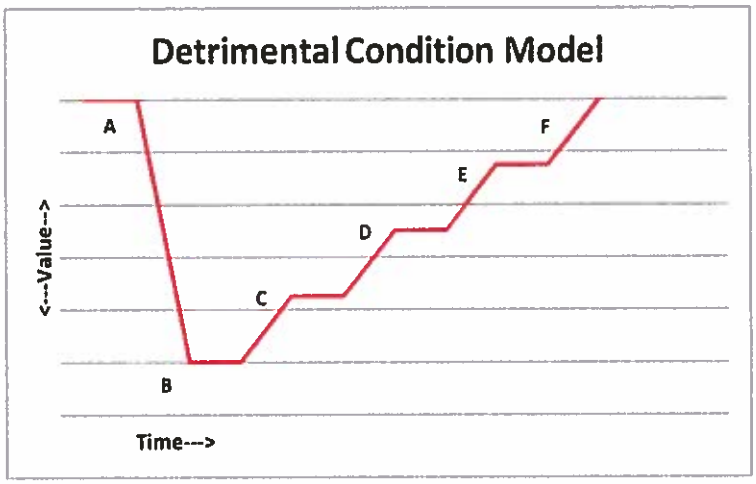
View from East Swinnick Drive looking north toward Keystone Sanitary Landfill

View from Route 6 looking west toward Keystone Sanitary Landfill

Analysis

"Detrimental Condition" (DC), which is defined as a condition **"that affect property values range from temporary conditions and market perceptions to construction defects, environmental contamination, and geotechnical issues"**[3]. The sanitary landfill expansion such as Keystone Sanitary Landfill falls under a Class VIII detrimental condition; Environmental Conditions; *"Soil Contamination, Building Contamination, Hydrocarbons, Metals, Solvents, Asbestos, Radioactive, Ground Water, Landfill, LUST geotechnical/construction"* issue identified specifically as a known detrimental condition from a valuation perspective in real estate appraisal work. Determining if, or to what extent a diminution in property value brought about by a DC requires the application of specialized methods, procedures, and formulas.

All DCs involve some or all of six basic elements that lead to an understanding of: the costs or losses associated with the assessment of the condition, the repair or remediation costs, any ongoing conditions, and any residual market resistance to the condition. The DC Model[4] illustrates the costs before, during, and after the actual remediation. These costs are shown as A or the value as if unaffected by the DC; B, the value upon the realization that a DC exists; C, the value upon assessment of the situation; D, the value upon repair or otherwise resolved; E, the value upon the consideration of any ongoing costs; and F, the impact of any market resistance[5].



There are hundreds of Detrimental Conditions (DCs) that may impact property values. The analysis of property damages starts with the DC Model, which illustrates the array of related issues. All six elements of the DC Model should be considered in every analysis. This can yield a variety of valuation patterns based upon the inclusion, exclusion and timing of each event.

Damages are benchmarked against the Unimpaired Value. In determining the impact on value, it is critical that a distinction be made between the DC and unrelated issues. For example, market conditions may be responsible for a change in value that is unrelated to the condition being studied.

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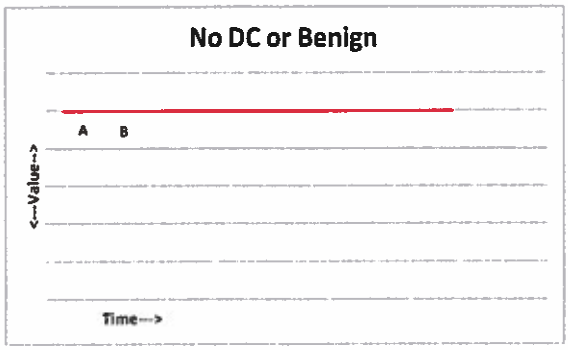
[3] Randall Bell, "The Ten Standard Categories of Detrimental Conditions," Right of Way (July 1996): 14-16

[4] Randall Bell, "Quantifying Diminution in Value Due to Detrimental Conditions: An Application to Environmentally Contaminated Properties," Environmental Claims Journal (October 1996): 135.

[5] The Bell Chart: 10 Classifications of Detrimental Conditions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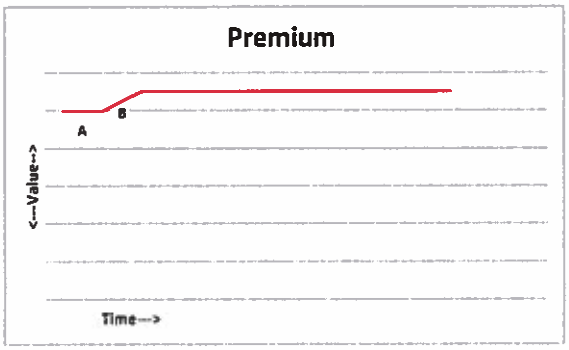
Premium
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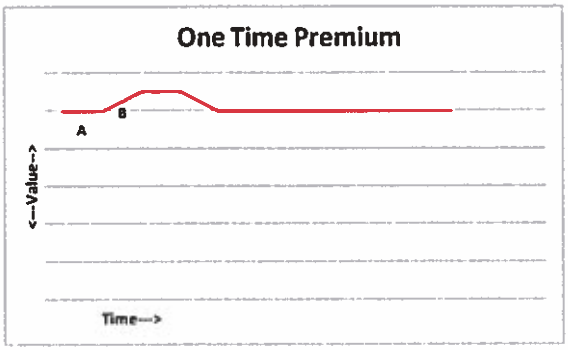
One Time Premium
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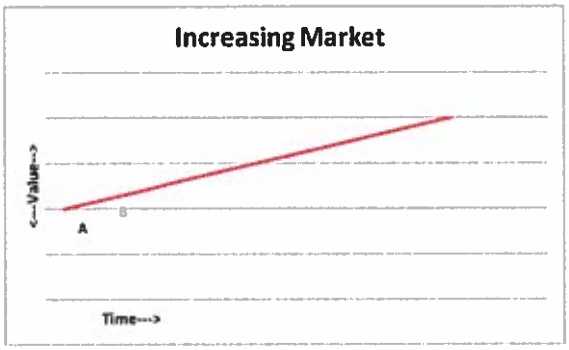
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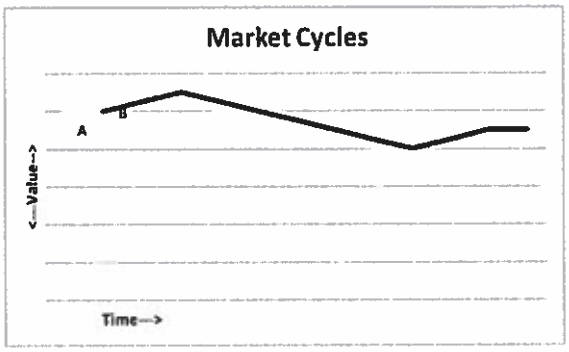
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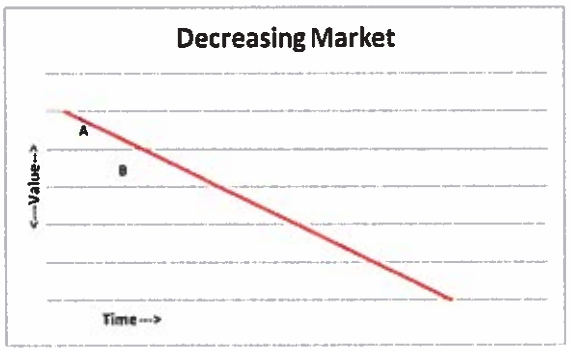
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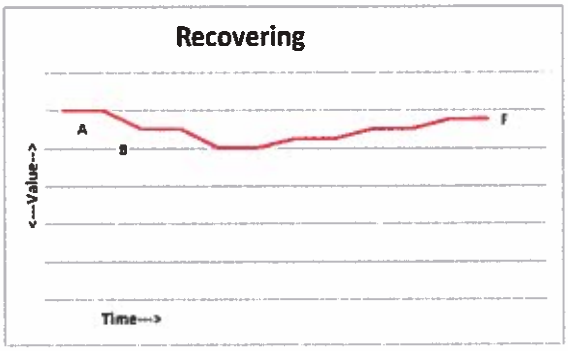
Recovering
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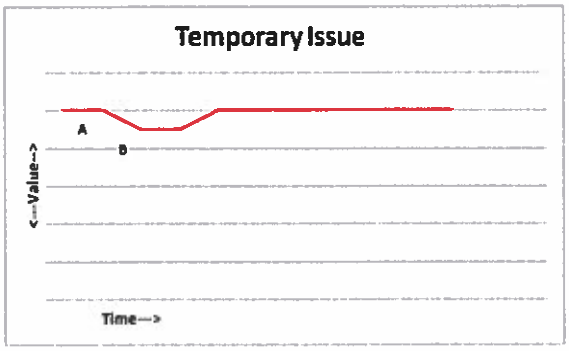
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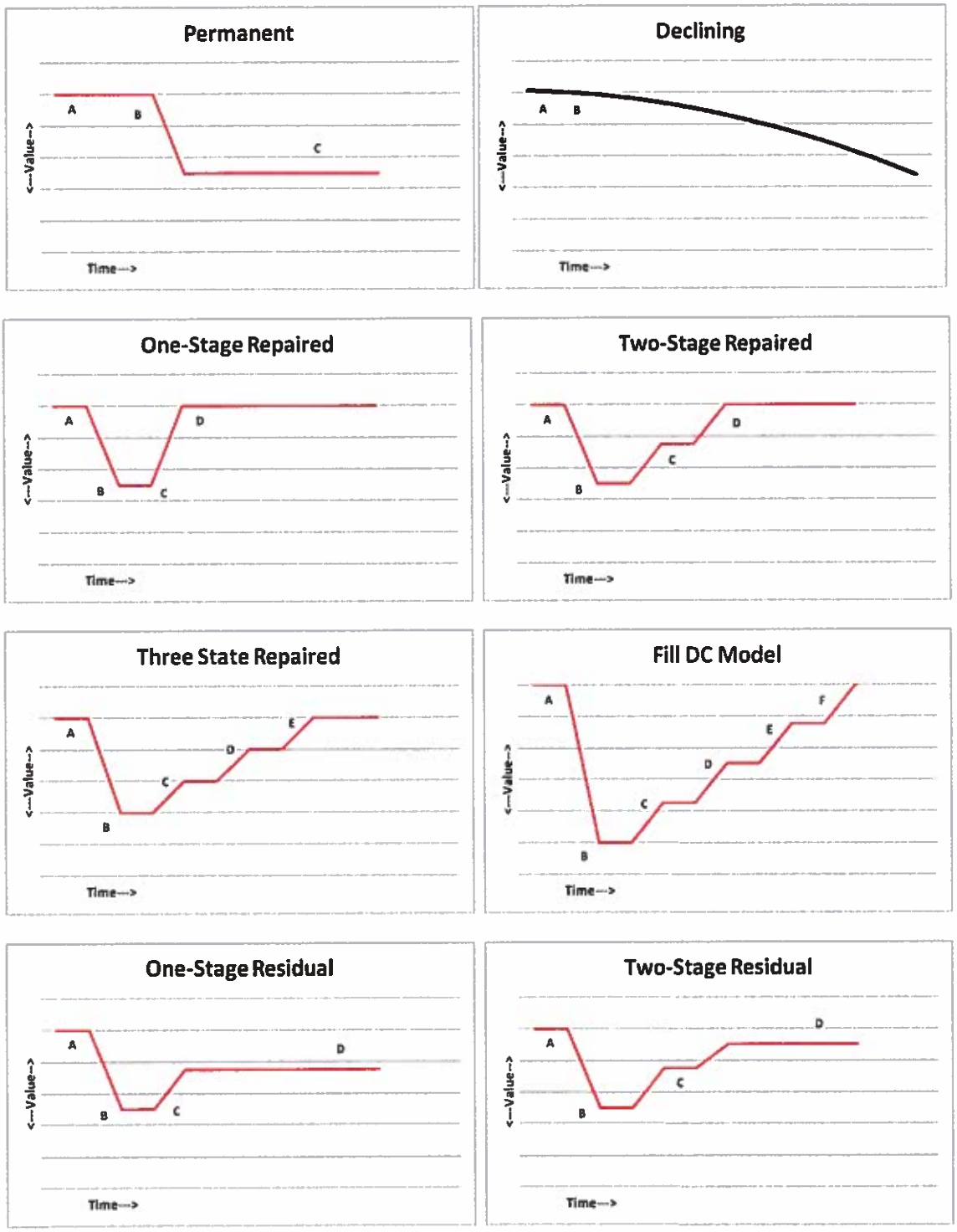
Permanent
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B
C
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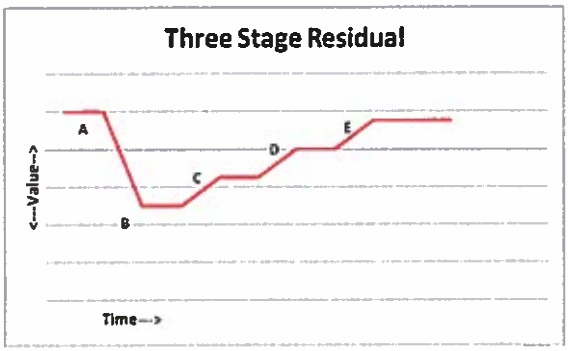
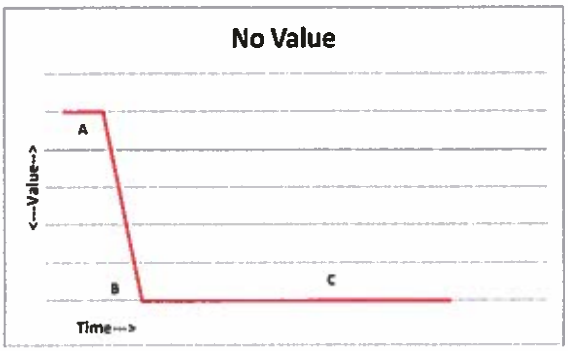




Traditionally the impact of the DCs on property values is ultimately an empirical question that requires the application of one or more of the three traditional approaches to value:

1. The sales comparison approach utilizing market data with and without the DC.

2. The income capitalization approach utilizing income and risk factors with and without the DC

3. The cost approach utilizing data with and without the DC

The DC Model, coupled with the three approaches to value (anyone or all) provides the fundamental framework for the analysis of DCs.

The value patterns of any DC will involve some or all of these six basic elements. For example, Classes III through VI generally utilizes only components of this model, as might Classes VI and IX although they may have all the elements of the model. The point is that all elements must be considered in any DC assignment.

I have approached this study from two directions. My first analysis approach was to identify change in value conditions from 1998 to 2015 of the broader Lackawanna County and Scranton markets relative to the performance within three miles from the Keystone Sanitary Landfill. I broke down the analysis further by eliminating the activity within three miles from the larger Scranton market, and prepared a specific neighborhood analysis of the closest residential community to the Keystone Sanitary Landfill. In the second analysis approach I evaluated the performance of real estate markets surrounding a comparable landfill operation that experienced an expansion permit within the last few years. The evaluation will look at the change in value of communities from 1997 through to the current period up to April 2015 based on the last expansion of the facility.

What is notable in the analysis of the impact surrounding the Keystone Sanitary Landfill is that the condition is a preexisting use. Market impact by the current use on surrounding property would typically be measured by truck traffic on local roads, diminished views and market perception of adverse environmental impact. These conditions existed when most current residents within the areas impacted took title to their property.

The planned increase in capacity of the Keystone Sanitary Landfill will not result in an increase of average daily volume, and will not measurably change average daily traffic counts. Environmental mitigation has been reported to have been engineered to address adverse impact providing the same level of protection as had been provided prior to the expansion. Any potential

concern or market impact from adverse environmental perception is a condition that has existed, and will likely continue to exist beyond the operating life of the landfill.

Typical market concerns with proximity to sanitary landfills and environmental concerns have been in existence. Impact by market participants has presumably already addressed the current use characteristics. Market measurements and impact must be measured as the change in value as a result of facility and operation expansion, which is different from the introduction of a landfill to a community.

Conditions Prior to Discovery

The subject landfill was originally built as a community resource around the time of the end of WWII. Most housing developed within the three mile radius of the landfill did not occur until after current ownership and consolidation of the property. The total number of housing units within one mile of the Keystone Sanitary Landfill is 1,577 units, with the average year built at 1955. Since the licensing of the landfill initially in 1979 over 390 housing units have been built, with 113 units put up over the period since 2000. Using the complete operating history of the site the landfill is older than over 61% of all housing within one mile.

The Wyoming Valley is a historic industrialized region of northeastern Pennsylvania once famous for fueling the industrial revolution in the United States with its many anthracite coal mines. As a metropolitan area, it is also known as the Scranton/Wilkes-Barre area, it is the 95th largest metropolitan area in the United States. It is called the "Scranton/Wilkes-Barre Metropolitan Area" after its principal cities, Scranton and Wilkes-Barre, and make up its own unique physiographic province, the Anthracite Valley in the Geology of Pennsylvania.

Conditions prior to the 1998 expansion indicated the average sale price of a residential dwelling was as follows:

	1-Mile
1998	$84,042

Market conditions overall in Lackawanna County, Greater Scranton area were in a state of recovery from a market adjustment period that began in 2008 as a result of over supply conditions and financial market corrections. The region saw market conditions and value change from annualized appreciation from 1998 to 2007 to declining values beginning in 2008. Market conditions have stabilized, and in a number of areas show improvement. The areas surrounding the Keystone Sanitary Landfill area has experienced overall better conditions relative to broad market and economic influences.

Detrimental Condition Occurs

The specific date selected for the event is the effective date of this report April 15, 2015 to anchor this analysis for index purposes. Current plans call for an increase in capacity of 108,429,209 cubic yards permitted air space, a peak elevation of 1,750 feet and an average daily volume of 7,250 tons.

The prior expansion of the Keystone Sanitary Landfill evaluated by this report occurred 1998 increasing permitted air space to increase from 25,369,295 to 36,570,791 cubic yards, the peak

elevation from 1,310 feet to 1,585 and the average daily volume from 4,750 to 7,750. The condition analysis year evaluating market impact on properties surrounding the subject is 1998, which represents the first full year of operation after the expansion.

Upon realization of the impact of the change in facility capacity the Keystone Sanitary Landfill will be able to increase the total tons permitted at the facility up to 145 million cubic yards from the current 40 million, as well as raise the height an additional 165 feet above the current peak. No change in average daily volume levels or truck traffic increases were indicated as anticipated in the change.

Discovery of the condition, or presence of a landfill, pre-exist most housing in the one mile radius of the Keystone Sanitary Landfill. The landfill at its current permitted capacity has been operating since 1998. The analysis of discovery is an expansion of existing operations to the overall capacity of the facility and peak elevation. No change is anticipated for average daily volume. Since the Keystone Sanitary Landfill was expected to operate for at least an additional 5-year period from the current period there is no evidence the market was gearing up for that eventuality. The landfill has been evident in the market, and given no anticipated changes in facility intensity of use, will continue to act at the same measure as before.

Assessment Stage

The Keystone Sanitary Landfill has been used for the same purpose by local municipalities since the 1940's, with the current operations and ownership in place since 1977. All properties of the Keystone Sanitary Landfill were eventually assembled by 1988 to the current physical acreage.

Most of the surrounding residential communities have been introduced after the landfill operations originally began back in the 1940's. Since 2000 there were over 113 housing units built within one mile of the subject.

The intensity of the current use as measured by truck traffic and average daily volume will not change. Total elevation of the existing landfill will be increased 165 feet above the current peak, with additional areas filled in over the life of the facility. Facility capacity increase planned is to 145,000,000 cubic yards from the current 40,000,000 cubic yards permitted.

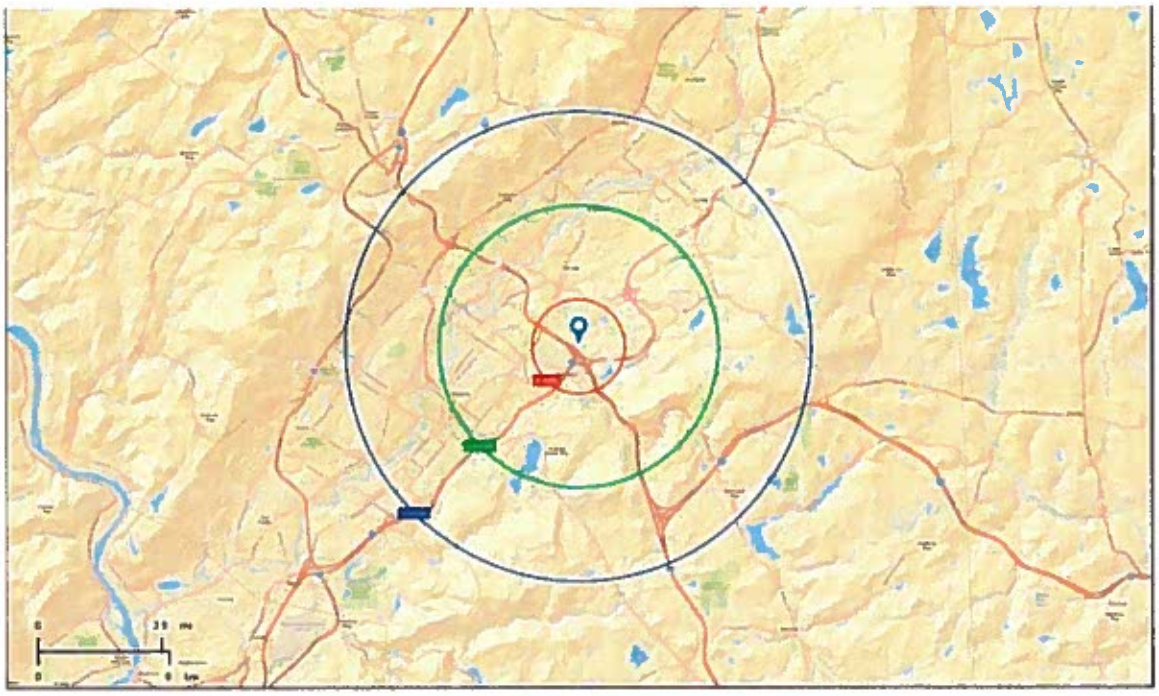
Repair Stage

The client is reported to have implemented all necessary environmental mitigation precautions. No repairs or special mitigation efforts are anticipated.

On-Going Stage

Monitoring of the Keystone Sanitary Landfill is required under PADEP rules, and in the latest report is shown to have passed necessary inspections to allow continuation of the resource for neighborhood and community use.

Market Resistance – Keystone Sanitary Landfill



One Mile Market Radius;

In the 2000 census closest to the 1998 date, the population within one mile of the Keystone Sanitary Landfill was 4,015. Current population estimate for 2015 is 3,785, or a decline of 5.7%. Overage household size in 2000 was 2.35, with current estimates at 2.21.

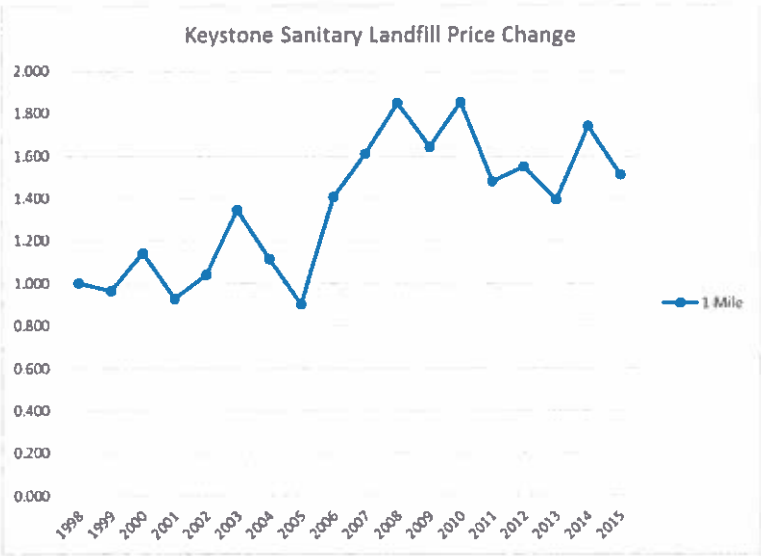
The number of housing units within one mile of the subject according to the 2000 census information was 1,685. Current 2015 estimates of housing units within one mile are 1,730, or a 2.7% increase over 2000 census.

Current average household income estimates are $62,615 in 2015, which are up from the 1998 estimates of $38,643.

Average housing year built within the one mile radius is 1955, significantly younger than the broader three and five mile radius (1940). Change in price overall since 1998 within one mile of the Keystone Sanitary Landfill has been at an annual rate of 2.5%. The levels of appreciation within the one mile radius of the facility has been in line all other markets evaluated (three, five and Lackawanna County).

Multiple listing records of sale transactions within one mile of the subject have the average dwelling value in 1998 at $84,042. In the most recent period measured up to the end of March 2015 the average dwelling value was $126,930.

Cummulative indexing shows the area within one mile of the subject steadily increasing from the 1998 change event analyzed. The average dwelling price has increased by over 51% since 1998. There were a few market retractions that occurred in 2001 and 2005, but otherwise pricing has been overall increasing.



Three Mile Market Radius;

In the 2000 census, which is the census closest to the 1998 date, the population within three miles of the Keystone Sanitary Landfill was 56,308. Current population estimate for 2015 is 55,568, or an decrease of 1.3%. Overall household size in 2000 was 2.27, with current estimates at 2.26.

The number of housing units within three miles of the subject according to the 2000 census information was 25,504. Current 2015 estimates of housing units within three miles are 24,902, or a 2.4% decline over 2000 census.

Current average household income estimates are $51,288 in 2015, which are up from the 1998 estimates of $31,652.

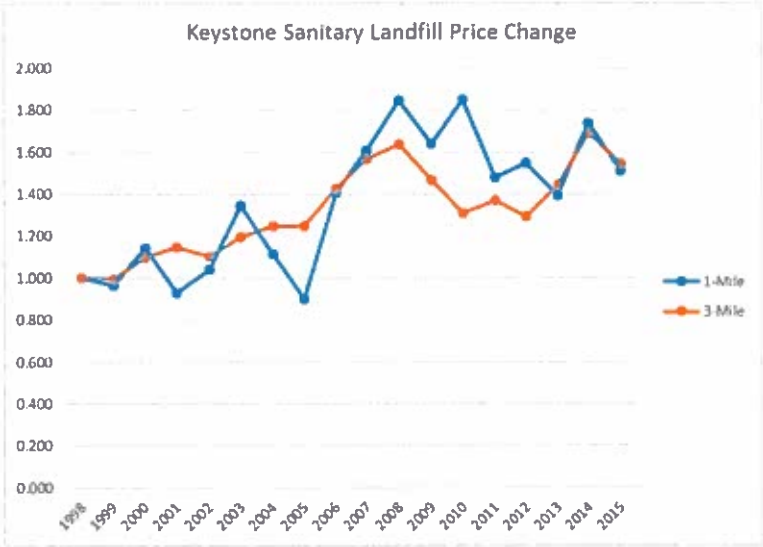
Average housing year built within the three mile radius is 1940. Since 2000 there have been 997 housing units built within three miles of the subject including thosebuilt within one mile. The percentage of newer stock housing since 2000 is 4.4% with the three mile radius.

Change in price overall since 1998 within three miles of the Keystone Sanitary Landfill has been 2.6% annually. The levels of appreciation within the three mile radius of the facility is in line with markets within one mile, five mile and Lackawanna County overall in that all locations registered appreciating value positions in real estate.

The average dwelling value for locations within the one mile and three miles radius were as follows:

	1-Mile	3-Mile
1998	$84,042	$66,617
2015	$126,930	$102,857

Cummulative indexing shows the area within one and three miles of the subject steadily increasing from the 1998 change event analyzed. The average dwelling price has increased by over 54% since 1998.



Five Mile Market Radius;

In the 2000 census, which is the census closest to the 1998 date, the population within five miles of the Keystone Sanitary Landfill was 119,129. Current population estimate for 2015 is 118,278, or a decline of 0.7%. Average household size in 2000 was 2.29, with current estimates at 2.30.

The number of housing units within five miles of the subject according to the 2000 census information was 54,764. Current 2015 estimates of housing units within five miles are 54,226, or a 1.0% decline over 2000 census.

Current average household income estimates are $50,824 in 2015, which are up from the 1998 estimates of $31,366.

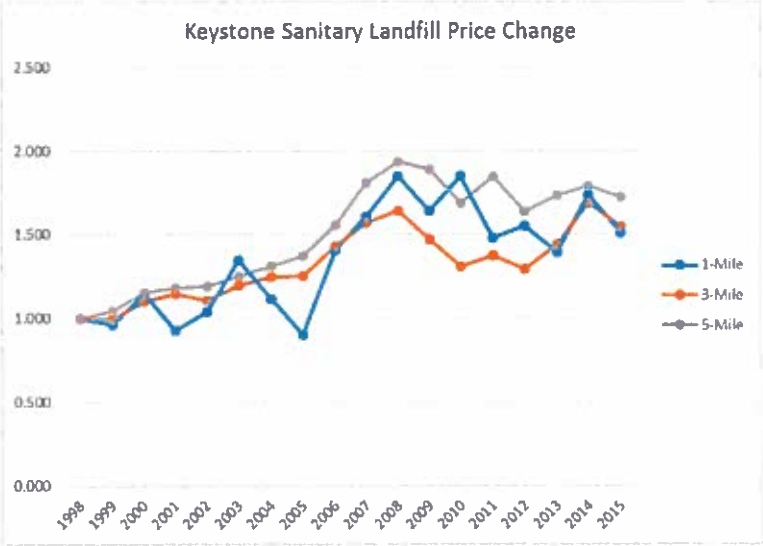
Average housing year built within the five mile radius is 1940. Since 2000, 1,909 housing units have been built within five miles of the subject including those built within one and three miles. The percentage of newer stock housing since 2000 is 3.7% within five miles.

Change in price overall since 1998 within five miles of the Keystone Sanitary Landfill has been 3.3%. The levels of appreciation within the five mile radius of the facility is in the upper range of expectations of the other markets evaluated (one mile, three mile & Lackawanna County).

The average dwelling value for locations within one, three and five miles were as follows:

	1-Mile	3-Mile	5-Mile
1998	$84,042	$66,617	$64,749
2015	$126,930	$102,857	$111,639

Cummulative indexing shows the area within five mile of the subject steadily increasing from the 1998 change event analyzed. The average dwelling price has increased by over 72% since 1998.



Lackawanna County;

In the 2000 census, which is the census closest to the 1998 date, the population within Lackawanna County was 213,341. Current population estimate for 2015 is 213,895, or an increase of 0.2%. Average household size in 2000 was 2.38, with current estimates at 2.36.

The number of housing units within Lackawanna County according to the 2000 census information was 95,382. Current 2015 estimates of housing units within Lackawanna County are 97,665, or a 2.4% increase over 2000 census.

Current average household income estimates are $60,909 in 2015, which are up from the 1998 estimates of $37,590.

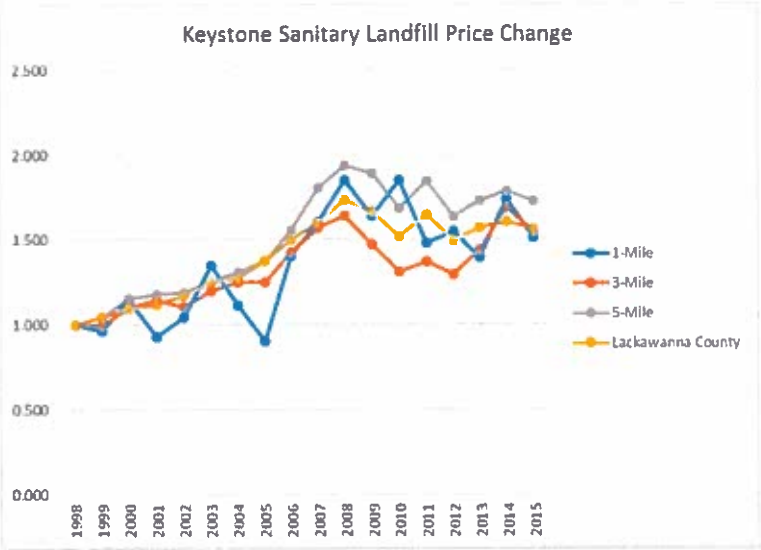
Average housing year built within Lackawanna County is 1950. Since 2000, 5,767 housing units have been built within Lackawanna County including units built within one, three and five miles. The percentage of newer stock housing since 2000 is 5.9% in Lackawanna County.

Change in price overall since 1998 within Lackawanna County has been 2.7%. The levels of appreciation within Lackawanna County is in line with the three and five mile radius.

The average dwelling value for locations were as follows:

	1-Mile	3-Mile	5-Mile	Lackawanna County
1998	$84,042	$66,617	$64,749	$89,876
2015	$126,930	$102,857	$111,639	$140,329

Cummulative indexing shows the area within Lackawanna County steadily increasing from the 1998 change event analyzed. The average dwelling price in Lackawanna County has increased by over 56% since 1998.



Analysis – Alliance Sanitary Landfill

Conditions Prior to Discovery

Waste Management's Alliance Landfill is a municipal solid waste landfill operating under the regulations of the Pennsylvania Department of Environmental Protection (PADEP) and the US Environmental Protection Agency. It began operating as a modern, lined and capped landfill in 1987. The landfill is permitted to accept non-hazardous household, commercial and industrial waste, including special wastes. Alliance does not accept infectious, hazardous, radioactive, unprocessed medical, or liquid wastes.

Early in the 1950s, the property was used as an unregulated dump operated by local municipalities. Refuse was dumped into unlined mine pits. Dumping operations on the site ceased and the mine spoils and waste pits were left alone and became overgrown. Construction of the current landfill began in 1986. Alliance Landfill was purchased from its private developer in 1996 and became a part of Waste Management during a 1998 merger of USA Waste and Waste Management.

Alliance Sanitary Landfill is constructed with a double-liner system. The liner system is equipped with a wastewater collection system. In addition, a gas collection system removes landfill gas that is produced by the decomposition of the waste.

Alliance Landfill's property includes more than 700 acres in Taylor Borough, Ransom Township and Old Forge, Lackawanna County. Alliance is or has completed building its landfill on about 150 acres and has been granted state permission to continue landfill operations on 87 additional acres in Taylor and Ransom in October 2010.

Currently Alliance Sanitary Landfill has an ADV of 3,000 tons, with a permitted maximum ADV of 5,500 tons. The facility receives approximately 150 vehicles daily. The expansion increased capacity of the facility by an additional 30.5 million cubic yards, with a 17-year anticipated operating life. Expansion plans for the remaining acreage have not been determined or reported.

Real Estate market conditions overall in Lackawanna County, Greater Scranton area were in a state of recovery from a market adjustment period that began in 2008 as a result of over supply conditions and financial market corrections. The region saw declining values beginning in 2008. Market conditions have stabilized, and in a number of areas show improvement. The areas surrounding the Alliance Sanitary Landfill area has experienced overall better conditions relative to broad market and economic influences.

Most of the surrounding residential communities within one mile have been introduced after the landfill operations originally began, with the average home built in 1971. Since the expansion there have been no new homes built within one mile. Baseline for income and housing value in 2010 within one mile of the Alliance Sanitary Landfill were $44,368 income and $142,127 dwelling value.

Detrimental Condition Occurs

The specific date selected for the event is October 2010 to anchor this analysis for index purposes. The date is selected given Alliance Sanitary Landfill was permitted to increase capacity into an additional 87 acres and increase the average daily volume permitted.

Upon realization of the impact of the change in facility capacity the Alliance Sanitary Landfill was able to increase the total tons permitted at the facility an additional 30.5 million cubic tons, and add an additional 17 years operating life.

Average daily volume was increased to 3,000 tons from the 2,000 ton previous limit. The permit also allows the average daily volume to be increased to 5,500 tons under compliance requirements set in the agreement. Levels or truck traffic increases were indicated as anticipated in the change.

Discovery of the condition preexists most housing in the one mile radius of the Alliance Sanitary Landfill. The landfill had been operating since 1988 at the 2,000 ton average daily volume prior to the increase. The analysis of discovery is an expansion of existing operations to the overall capacity of the facility including an increase of truck traffic on local road, an additional 1,000 tons of volume, with a possible 5,500 tons average daily volume permit and an increase in the landfill capacity of 30.5 million tons.

Since the Alliance Sanitary Landfill was expected to operate for at least an additional 5-year period there is no evidence the market was gearing up for that eventuallity. The landfill has been evident in the market, and given no anticipated changes in facility intensity of use, will continue to act at the same measure as before. This most recent expansion represents 21% of the total area under control of Waste Management.

Assessment Stage

The Alliance Sanitary Landfill has been used for the same purpose by local municipalities since the 1950's, with the current operations and ownership in place since 1988. The property has been expanded to a total of 700 acres, with 240 acres (including expansion) processing and accepting municipal and public waste.

The intensity of the current use as measured by truck traffic and average daily volume is anticipated to increase according to the planned change. Given the average daily volume change the number of trucks on the local roads is expected to increase by an additional 50 trucks per day to 150. Total height of the existing landfill peak was not indicated to have been a factor in the change.

Upon realization of the sanitary landfill expansion occurance the facility took steps to mitigate environmental concerns. The Alliance Sanitary Landfill is expecting additional truck traffic along local roads as a result of the increased average daily volume. Additional efforts were made to clean up the old unlined operation and move waste to new sections of the site.

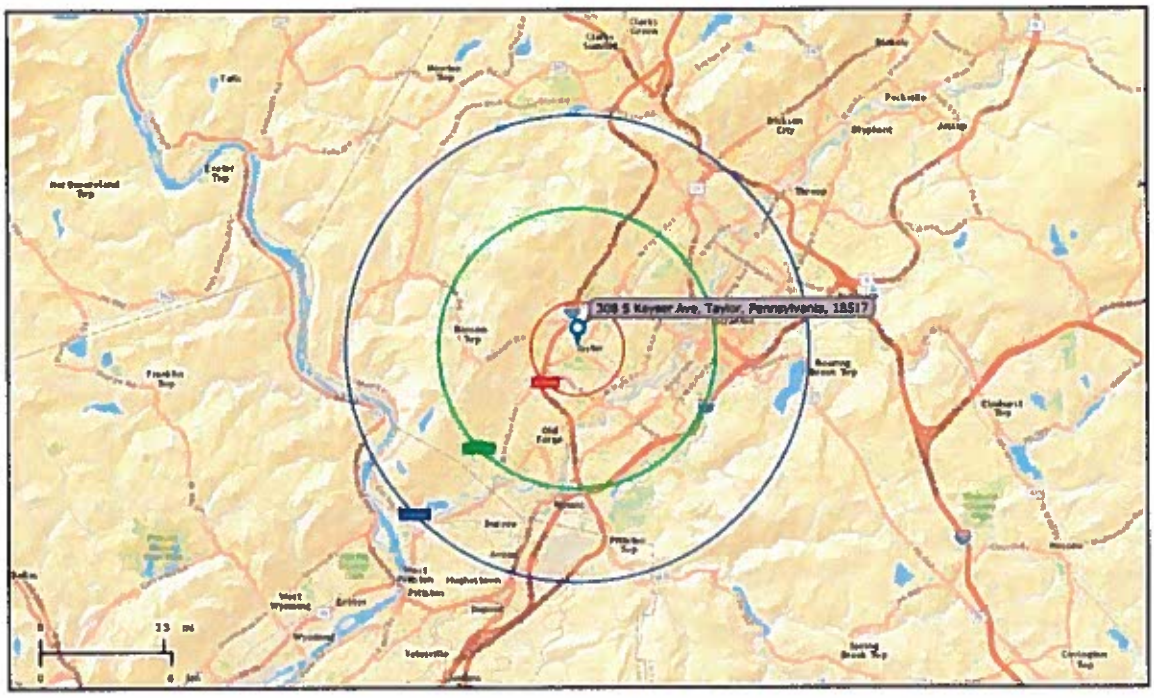
Repair Stage

The landfill ownership is reported to have implemented all necessary environmental mitigation precautions. No repairs or special mitigation efforts are anticipated.

On-Going Stage

Monitoring of the Alliance Sanitary Landfill is required under PADEP rules, and in the latest report is shown to have passed necessary inspections to allow continuation of the resource for neighborhood and community use.

Market Resistance



One Mile Market Radius;

In the 2010 census, the population within one mile of the Alliance Sanitary Landfill was 4,523. Current population estimate for 2015 is 4,414, or a decline of 2.4%. Overall household size in 2000 was 2.38, with current estimates at 2.37.

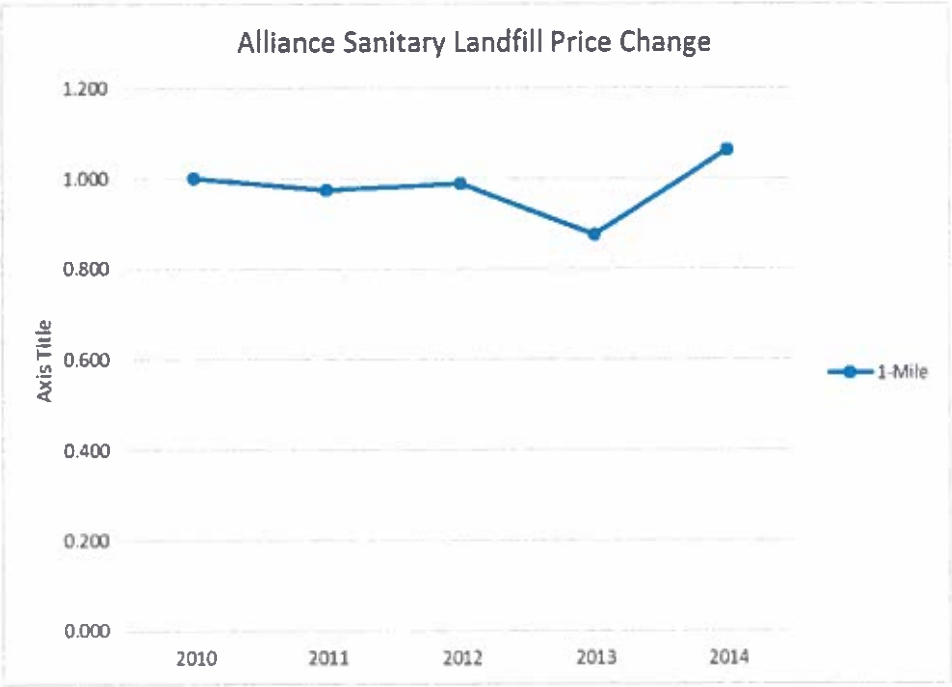
The number of housing units within one mile of the Alliance Sanitary Landfill according to the 2010 census information was 2,009. Current 2015 estimates of housing units within one mile show no change at 2,009.

Current average household income estimates are $50,230 in 2015, which are up from the 2010 estimates of $44,368.

Average housing year built within the one mile radius is 1971, significantly younger than the broader three and five mile radius (1940). Change in price overall since 2010 within one mile of the Alliance Sanitary Landfill has been an annual increase of 1.8%. The levels of change within the one mile radius are greater than those within three, five and Lackawanna County overall.

Since 2010 there have been no new housing units built within one mile of the Alliance Sanitary Landfill.

The average dwelling value in 2010 within one mile was $142,127. In the most recent period measured for 2014 the average dwelling value was $151,008. Cummulative indexing shows the area within one mile of the Alliance Sanitary Landfill shows changing dynamics, but an overall positive trend of 6.2%.



Three Mile Market Radius;

In the 2010 census, the population within three miles of the Alliance Sanitary Landfill was 54,953. Current population estimate for 2015 is 54,788, or a decline of 0.3%. Overall household size in 2000 was 2.33, with current estimates at 2.32.

The number of housing units within three miles of the Alliance Sanitary Landfill according to the 2010 census information was 25,547. Current 2015 estimates of housing units within three miles are 25,796, or a 1.0% increase over 2010 census.

Current average household income estimates are $49,476 in 2015, which are up from the 2010 estimates of $43,702.

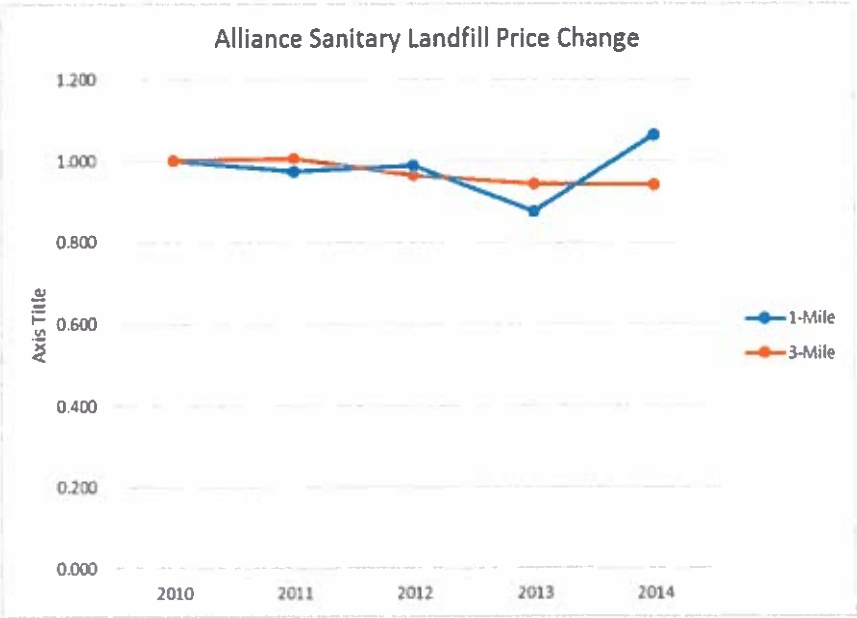
Average housing year built within the three mile radius is 1940. Since 2010 there have been 19 housing units built within three miles of the Alliance Sanitary Landfill. The percentage of newer stock housing since 2010 is 0.1%.

Change in price overall since 2010 within three miles of the Alliance Sanitary Landfill has been down 1.2% annualized overall. The levels of decline within the three mile radius of the facility is greater than markets within one mile, five miles and Lackawanna County overall.

The average dwelling value for locations within one and three miles were as follows:

	1-Mile	3-Mile
2010	$142,127	$108,885
2014	$151,008	$102,491

Cummulative indexing shows the area within three miles of the Alliance Sanitary Landfill increasing from the 2010 change event analyzed. The average dwelling price has declined by 5.8% since 2010 within three miles of the landfill.



Five Mile Market Radius;

In the 2010 census, the population within five miles of the Alliance Sanitary Landfill was 116,169. Current population estimate for 2015 is 115,216, or a decline of 0.8%. Overall household size in 2010 was 2.33, with current estimates at 2.32.

The number of housing units within five miles of the Alliance Sanitary Landfill according to the 2010 census information was 52,179. Current 2015 estimates of housing units within five miles are 52,548, or a 0.7% increase over 2010 census.

Current average household income estimates are $52,079 in 2015, which are up from the 2010 estimates of $46,002.

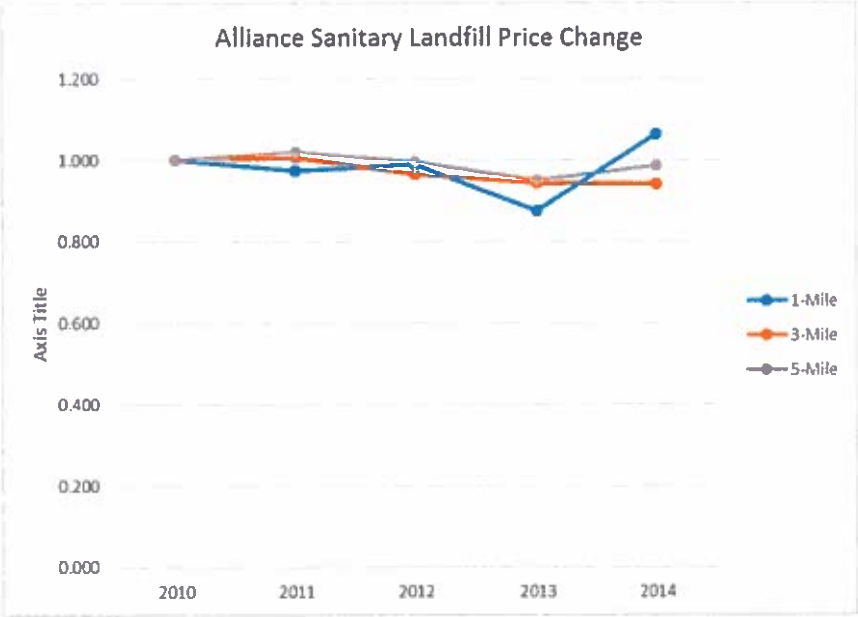
Average housing year built within the five mile radius is 1940. Since 2010, 42 housing units have been built within five miles of the Alliance Sanitary Landfill including the new units within three miles. The percentage of newer stock housing since 2010 is 0.1%.

Change in price overall since 2010 within five miles of the Alliance Sanitary Landfill has shown a decline of 0.3% annually.

The average dwelling value for locations within one, three and five miles were as follows:

	1-Mile	3-Mile	5-Mile
2010	$142,127	$108,885	$107,729
2014	$151,008	$102,491	$106,148

Cummulative indexing shows the area within five miles of the landfill declining from the 2010 change event analyzed by 1.5%.



Lackawanna County;

In the 2010 census, the population within Lackawanna County was 214,437. Current population estimate for 2015 is 213,895, or a decline of 0.3%. Overall household size in 2010 was 2.37, with current estimates at 2.36

The number of housing units within Lackawanna County according to the 2010 census information was 96,832. Current 2015 estimates of housing units within Lackawanna Countyare 97,665, or a 0.9% increase over 2010 census.

Current average household income estimates are $60,909 in 2015, which are up from the 2010 estimates of $53,801.

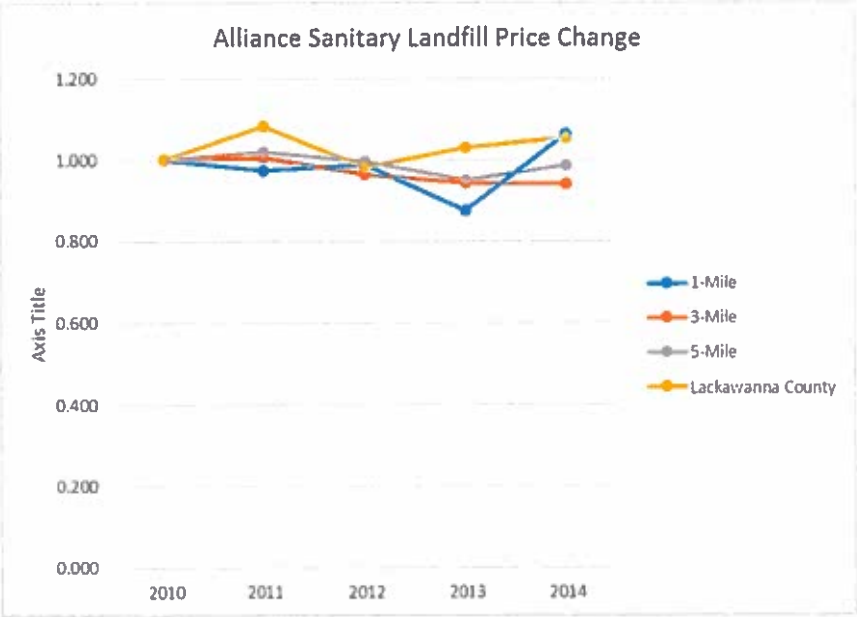
Average housing year built within Lackawanna County is 1950. Since 2010, 123 housing units have been built within Lackawanna County including the new units built within five miles. The percentage of newer stock housing since 2010 is 0.1%.

Change in price overall since 2010 within Lackawanna County has been 1.2%. The levels of appreciation within Lackawanna County is greater than the three and five mile radius, but less than that experienced by housing within one mile of the Alliance Sanitary Landfill.

The average dwelling value for locations were as follows:

	1-Mile	3-Mile	5-Mile	Lackawanna County
2010	$142,127	$108,885	$107,729	$136,706
2014	$151,008	$102,491	$106,148	$144,127

Cummulative indexing shows the area within Lackawanna County increasing from the 2010 change event analyzed by 5.4%.



Analysis – GROWS Sanitary Landfill

Conditions Prior to Discovery

GROWS Sanitary Landfill is a municipal solid waste landfill operating under the regulations of the Pennsylvania Department of Environmental Protection (PADEP) and the US Environmental Protection Agency. It began operating as a modern, lined and capped landfill in 1970. The landfill is permitted to accept non-hazardous household, commercial and industrial waste, including special wastes. GROWS has accepted all forms of waste including infectious, hazardous, radioactive, unprocessed medical, and liquid wastes in the past.

The GROWS Sanitary Landfill was one of the first lined modern systems. In 1988 the Tullytown landfill operation opened on 124 acres. GROWS Landfill is constructed with a double-liner system. The liner system is equipped with a wastewater collection system. In addition, a gas collection system removes landfill gas that is produced by the decomposition of the waste.

GROWS Landfill's property includes almost 6,000 acres in Falls Township and Tullytown, Bucks County. GROWS is or has additional permitting planned for 35 acres, and an option to purchase 252 acres from the former American Steel Industrial Complex.

Currently GROWS Sanitary Landfill has an ADV of 7,750 tons, with a permitted maximum ADV of 10,000 tons. The facility receives approximately 650 vehicles daily. The expansion increased capacity of the facility by an additional 25.0 million cubic yards, permitting operations through to the end of 2015. Expansion plans for the remaining acreage are in process.

Market conditions overall in Bucks County area were in a state of recovery from a market adjustment period that began in 2008 as a result of over supply conditions and financial market corrections. The region saw market conditions and value change from annualized appreciation from 1998 to 2007 to declining values beginning in 2008. Market conditions have stabilized, and in a number of areas show improvement. The areas surrounding the GROWS Sanitary Landfill experienced conditions in line with broader market and economic influences.

Most of the surrounding residential communities have been introduced after the landfill operations originally began, with the average home built in 1955. There are few developments surrounding the GROWS facility due to the physical location of the landfill on a pinnisula separated from other land areas by the US Steel Industrial Park and Delaware River on the east, and Van Sciver Lake to the west. The pinnisula development is dominated by the landfill and the abandoned US Steel Industrial Park.

A total of 95 housing units were identified as within one mile of the GROWS facility, which is a very small sampling. Current household income estimates are $55,731 in 2015, average housing year built within the one mile radius is 1978 and the average dwelling value in 2008 within one mile was $155,298.

Detrimental Condition Occurs

The specific date selected for the event is April 2008 to anchor this analysis for index purposes, which was an expansion of operations permitted. The date is based on when GROWS Sanitary Landfill was permitted to increase capacity into an additional 124 acres.

Upon realization of the impact of the change in facility capacity, the GROWS Sanitary Landfill was able to increase the total tons permitted at the facility an additional 25.0 million cubic tons, and add an additional 7 years operating life.

Average daily volume remained the same at 7,750 tons. The permit also allows the average daily volume to be increased to 10,000 tons under compliance requirements set in the agreement. Levels or truck traffic increases were not indicated as anticipated in the change.

Discovery of the initial condition pre-exist most housing in the one mile radius of the GROWS Sanitary Landfill. The landfill had been operating since 1970. The analysis of current discovery is an expansion of existing operations to the overall capacity of the facility. No additional increase of truck traffic on local road or average daily volume with the expansion was anticipated, only the increase in the landfill capacity an additional 25.0 million tons.

The GROWS Sanitary Landfill was expected to close in 2008, though additional capacity to operate has been planned all along. The landfill has been evident in the market, and given no anticipated changes in facility intensity of use, will continue to act at the same measure as before.

Assessment Stage

The GROWS Sanitary Landfill has been used for the same purpose by local municipalities since the 1970's, with the current operation intensity in place since 1988. The property has been expanded to a total of 6,000 acres, with 35 acres considered for the expansion plan intended for processing and accepting municipal and public waste.

No changes are expected in the intensity of the current use as measured by truck traffic or average daily volume. There were no indications that a peak elevation increase was approved.

Upon realization of the sanitary landfill expansion occurance the facility took steps to mitigate environmental concerns, and has not adversely impacted locations with no additional truck traffic.

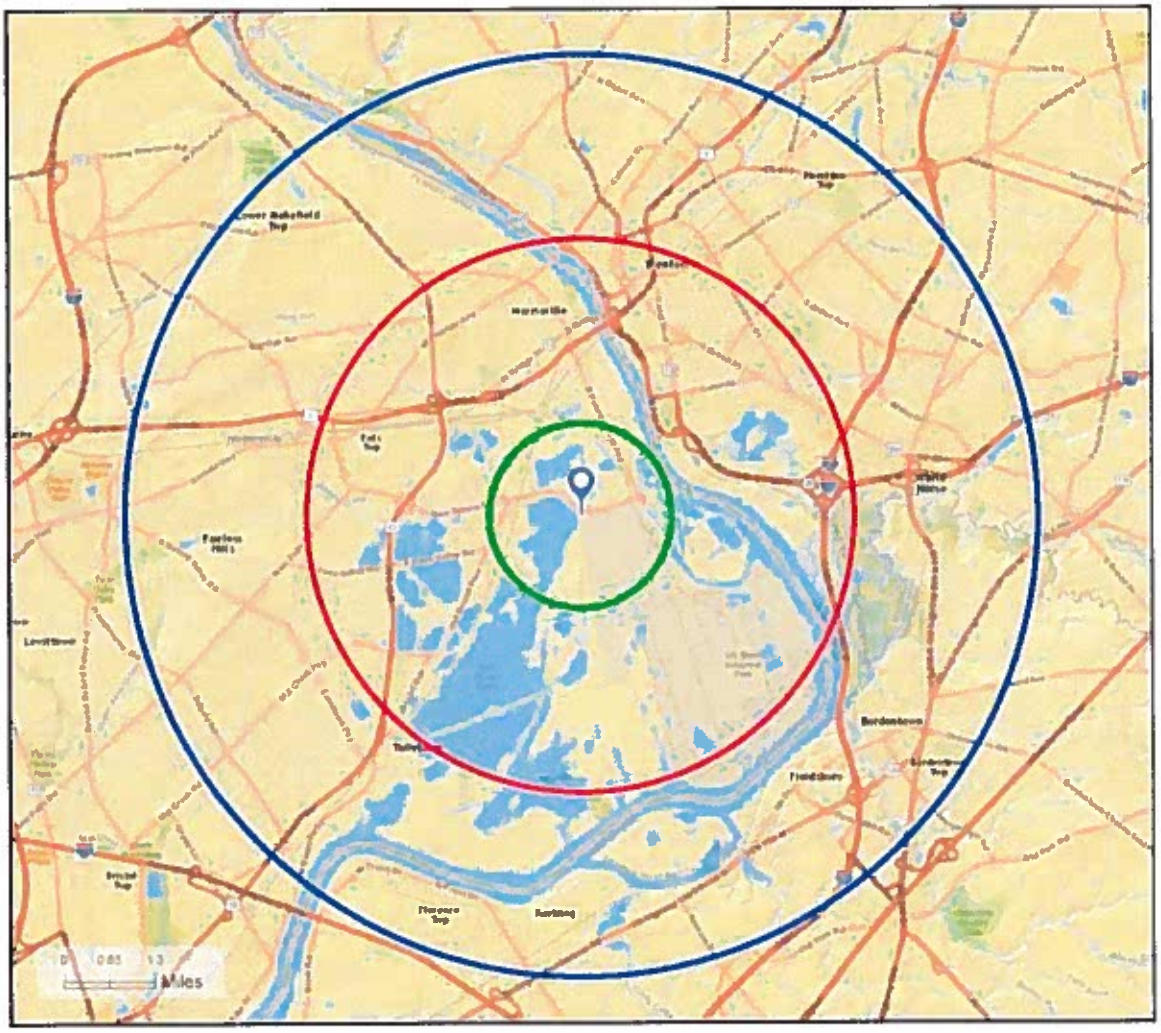
Repair Stage

The landfill ownership is reported to have implemented all necessary environmental mitigation precautions. No repairs or special mitigation efforts are anticipated.

On-Going Stage

Monitoring of the GROWS Sanitary Landfill is required under PADEP rules, and in the latest report is shown to have passed necessary inspections to allow continuation of the resource for neighborhood and community use.

Market Resistance



One Mile Market Radius;

In the 2010 census closest to the 2008 change, the population within one mile of the GROWS Sanitary Landfill was 142. Current population estimate for 2015 is 127, or a decline of 10.5%. Overall household size in 2010 was 2.04, with current estimates at 2.02.

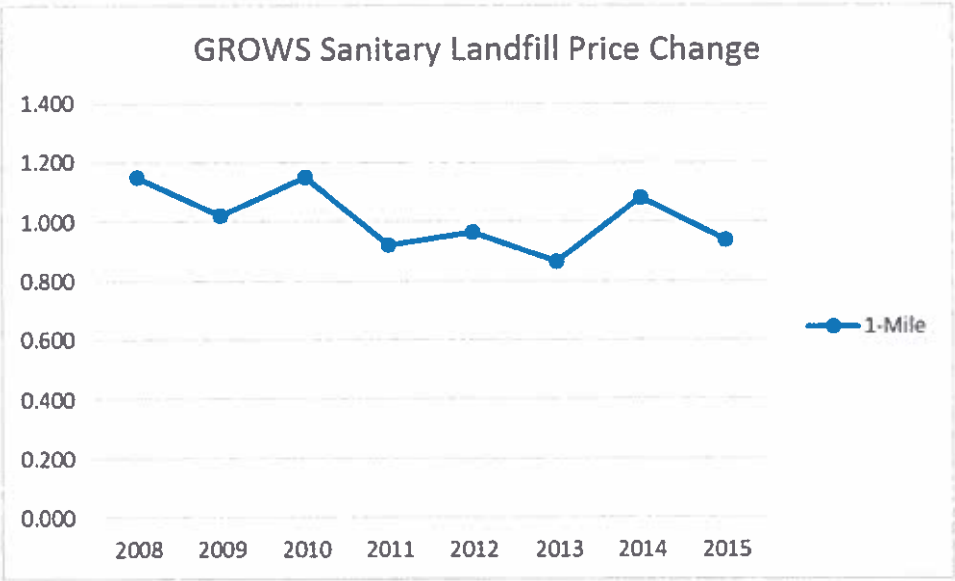
The number of housing units within one mile of the GROWS Sanitary Landfill according to the 2010 census information was 95. Current 2015 estimates of housing units within one mile show no change at 95. This is a very small sampling relative to establishing market trending.

Current average household income estimates are $55,731 in 2015, which are up from the 2008 estimates of $52,966.

Average housing year built within the one mile radius is 1978, significantly younger than the broader three, five mile and Bucks County market (early 1950's). Change in price overall since 2008 within one mile of the GROWS Sanitary Landfill has been an annual decline of 2.3%. The levels of change within the one mile radius are greater than those within three mile, five mile and Bucks County overall.

Since 2008 there have been no new housing units built within one mile of the GROWS Sanitary Landfill.

The average dwelling value in 2008 within one mile was $155,298. In the most recent period measured for 2015 the average dwelling value was $126,930. Cummulative indexing shows the area within one mile of the GROWS Landfill declining by 18.2%. The decline rate was skewed by the low volume in the one mile market sampling and the general market decline.



Three Mile Market Radius;

In the 2010 census the population within three mile of the GROWS Sanitary Landfill was 75,249. Current population estimate for 2015 is 74,212, or a decline of 0.1%. Overall household size in 2010 was 2.75, with current estimates at 2.77.

The number of housing units within three miles of the GROWS Sanitary Landfill according to the 2010 census information was 28,988. Current 2015 estimates of housing units within three miles are 29,292, or a 1.0% increase over 2010 census.

Current average household income estimates are $64,951 in 2015, which are up from the 2008 estimates of $61,729.

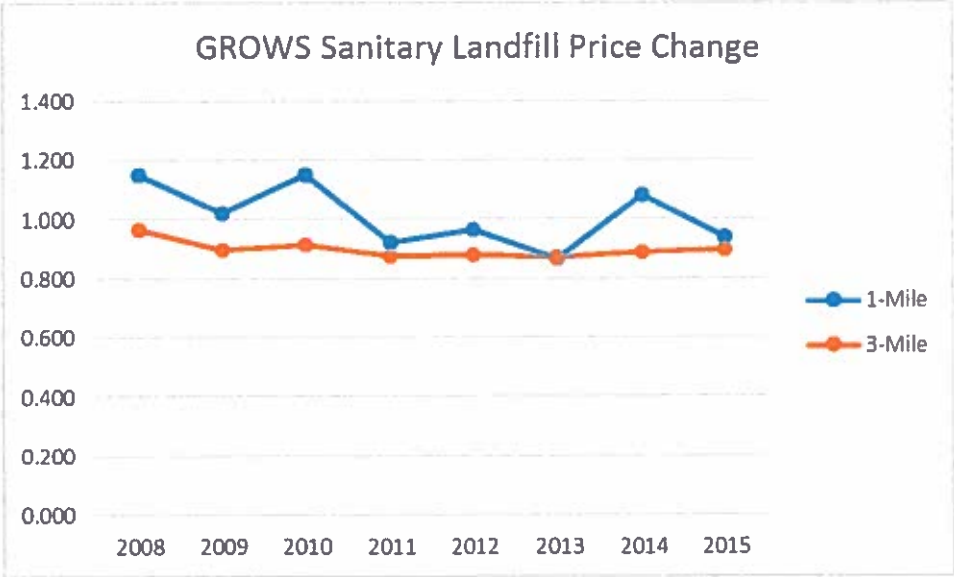
Average housing year built within the three mile radius is 1955. Since 2010 there have been 87 housing units built within three miles of the GROWS Sanitary Landfill. The percentage of newer stock housing since 2010 is 0.3%.

Change in price overall since 2008 within three miles of the GROWS Sanitary Landfill has been down 1.0% annualized overall. The levels of decline within the three mile radius of the facility is less than those experienced within one mile.

The average dwelling value for locations within one and three miles were as follows:

	1-Mile	3-Mile
2008	$155,298	$312,642
2015	$126,930	$289,785

Cummulative indexing shows the area within three miles of the GROWS Sanitary Landfill declining from the 2008 change event analyzed. The average dwelling price has declined by 7.3% since 2008.



Five Mile Market Radius;

In the 2010, census the population within five miles of the GROWS Sanitary Landfill was 116,169. Current population estimate for 2015 is 115,216, or a decline of 0.8%. Overall household size in 2010 was 2.333, with current estimates at 2.32.

The number of housing units within five miles of the GROWS Sanitary Landfill according to the 2010 census information was 52,179. Current 2015 estimates of housing units within five mile are 52,548, or a 0.7% increase over 2010 census.

Current average household income estimates are $72,304 in 2015, which are up from the 2008 estimates of $68,717.

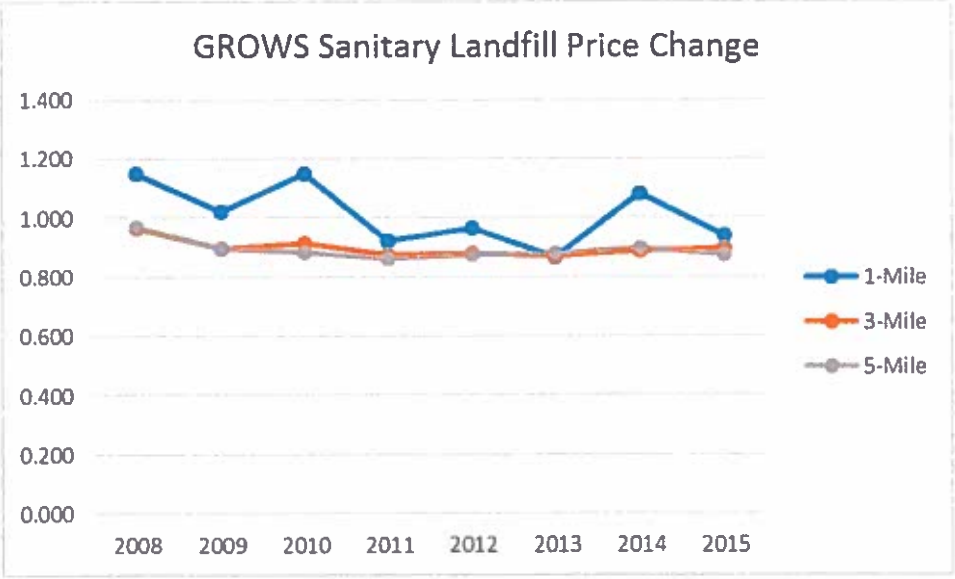
Average housing year built within the five mile radius is 1953. Since 2010, 119 housing units have been built within five miles of the GROWS Sanitary Landfill in addition to the 87 units within three miles. The percentage of newer stock housing since 2010 is 0.2%.

Change in price overall since 2010 within five miles of the GROWS Sanitary Landfill has shown a decline of 1.2% annually.

The average dwelling value for locations within one, three and five mile were as follows:

	1-Mile	3-Mile	5-Mile
2008	$155,298	$312,642	$259,078
2015	$126,930	$289,785	$233,383

Cummulative indexing shows the area within five mile of the GROWS Sanitary Landfill declining from the 2008 change event analyzed at a rate of 9.9%.



Bucks County;

In the 2010 census, the population within Bucks County was 214,437. Current population estimate for 2015 is 213,895, or a decline of 0.3%. Overall household size in 2010 was 2.37, with current estimates at 2.36

The number of housing units within Bucks County according to the 2010 census information was 96,832. Current 2015 estimates of housing units within one mile are 97,665, or a 0.9% increase over 2010 census.

Current average household income estimates are $60,909 in 2015, which are up from the 2010 estimates of $53,801.

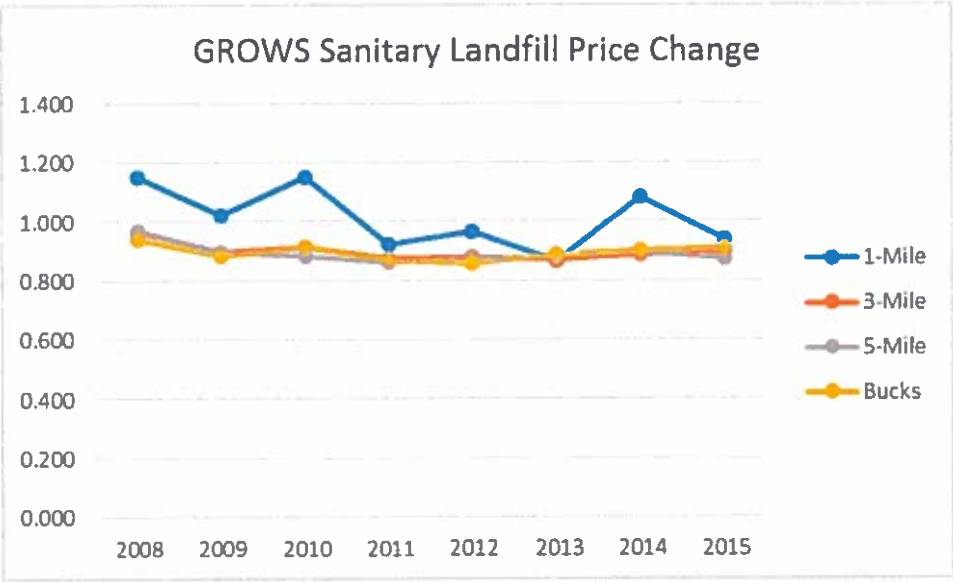
Average housing year built within Bucks County is 1972. Since 2010, 837 housing units have been built within Bucks County addition to the 206 units built within five miles. The percentage of newer stock housing since 2010 is 0.4%.

Change in price overall since 2008 within Bucks County has been in an annual decline at a rate of 0.6%. The levels of depreciation within Bucks County is less than the one, three and five mile radius.

The average dwelling value for locations were as follows:

	1-Mile	3-Mile	5-Mile	Bucks
2008	$155,298	$312,642	$259,078	$341,119
2015	$126,930	$289,785	$233,383	$326,066

Cummulative indexing shows the area within Bucks County declined from the 2008 change event analyzed at a rate of 4.4%.



Analysis – Chrin Sanitary Landfill

Conditions Prior to Discovery

Chrin Sanitary Landfill is a former municipal owned solid waste landfill operating under the regulations of the Pennsylvania Department of Environmental Protection (PADEP) and the US Environmental Protection Agency. It began operating as a landfill in 1961. The landfill is permitted to accept non-hazardous household, commercial and industrial waste, including special wastes. Chrin does not accept infectious, hazardous, radioactive, unprocessed medical, or liquid wastes.

The Chrin Sanitary Landfill operation opened on 108 acres. In 2009 an additional 22 acre expansion was granted. Chrin Landfill is constructed with a double-liner system. The liner system is equipped with a wastewater collection system. In addition, a gas collection system removes landfill gas that is produced by the decomposition of the waste. An expansion permit was granted in January 2009.

Currently Chrin Sanitary Landfill has an ADV of 1,500 tons, with a permitted maximum ADV of 2,000 tons. The facility receives approximately 125 vehicles daily. The expansion increased capacity of the facility by an additional 5.0 million cubic yards, permitting operations through to the end of 2020.

Most of the surrounding residential communities have been in place long before the landfill operations originally began, with the average home built in 1940. In the 2010 census closest to the 2009 change date, the population within one mile of the Chrin Sanitary Landfill was 7,270, and household size was 2.59. Average household income estimates $54,536. Average housing year built within the one mile radius is 1940. The average dwelling value in 2009 within one mile was $113,000.

Market conditions overall in Northampton County, Easton area were in a state of recovery from a market adjustment period that began in 2008 as a result of over supply conditions and financial market corrections. The region saw market conditions and value change from annualized appreciation from 1998 to 2007 to declining values beginning in 2008. Market conditions have stabilized, and in a number of areas show improvement. The areas surrounding the Chrin Sanitary Landfill area has experienced overall better conditions relative to broad market and economic influences.

Detrimental Condition Occurs

The specific date selected for the event is the permited expansion date in January 2009 to anchor this analysis for index purposes. The date is selected given Chrin Sanitary Landfill was permitted to increase capacity into an additional 22 acres.

Upon realization of the impact of the change in facility capacity, the Chrin Sanitary Landfill was able to increase the total tons permitted at the facility an additional 5.0 million cubic tons, and add an additional 10 years operating life. The licensing period approved was 10 years.

Average daily volume was 1,500 tons. The permit also allows the average daily volume to be increased to 2,000 tons under compliance requirements set in the agreement. Levels or truck traffic increases were indicated as anticipated in the change.

Discovery of the initial condition pre-exist most housing in the one mile radius of the Chrin Sanitary Landfill. The landfill had been operating since 1961. The analysis of current discovery is an expansion of existing operations to the overall capacity of the facility. Additional increase of truck traffic on local road or average daily volume with the expansion was anticipated.

Since the Chrin Sanitary Landfill was expected to close in 2020, though additional capacity to operate has been planned all along. The landfill has been evident in the market, and given no anticipated changes in facility intensity of use, will continue to act at the same measure as before.

Assessment Stage

The Chrin Sanitary Landfill has been used for the same purpose since 1961. The property has been expanded to a total of 130 acres, with 85 acres (including expansion) processing and accepting municipal and public waste.

The intensity of the current use as measured by truck traffic and average daily volume is anticipated to increase according to the plans change. Total permitted elevation of the existing landfill was not indicated to have been a factor in the change.

Upon realization of the sanitary landfill expansion occurance the facility took steps to mitigate environmental concerns, and has not adversely impacted locations with additional truck traffic. Additional efforts were made to clean up the old unlined operation and move waste to new sections of the site.

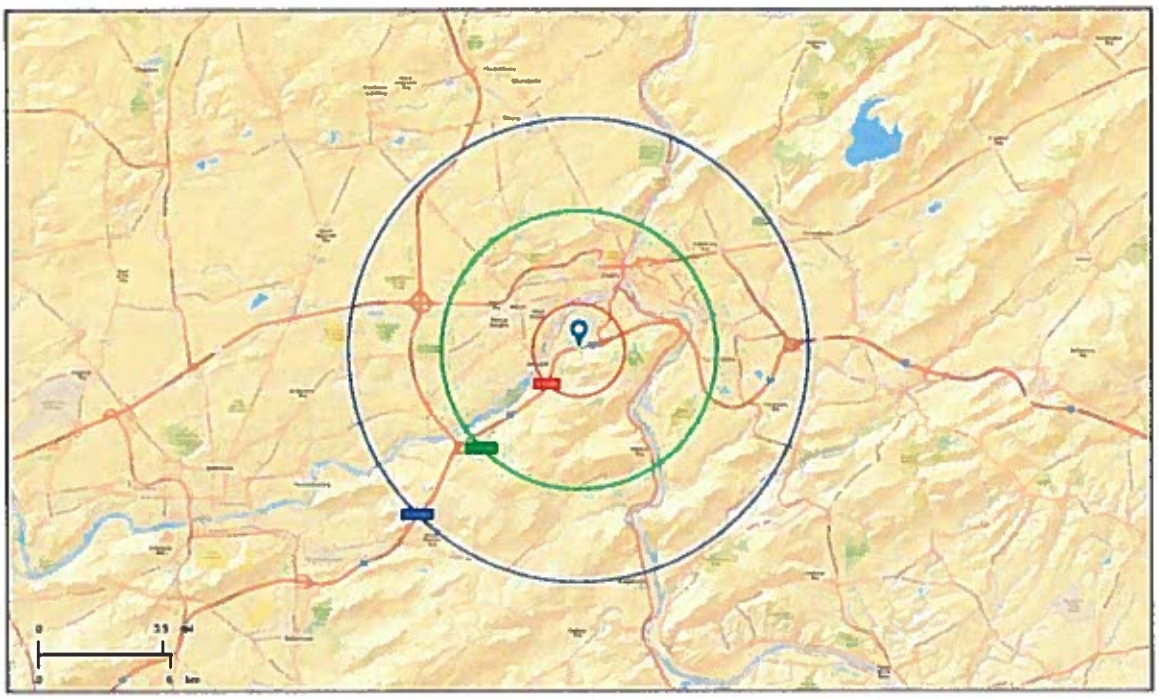
Repair Stage

The landfill ownership is reported to have implemented all necessary environmental mitigation precautions. No repairs or special mitigation efforts are anticipated.

On-Going Stage

Monitoring of the Chrin Sanitary Landfill is required under PADEP rules, and in the latest report is shown to have passed necessary inspections to allow continuation of the resource for neighborhood and community use.

Market Resistance



One Mile Market Radius;

In the 2010 census closest to the 2009 change date, the population within one mile of the Chrin Sanitary Landfill was 7,270. Current population estimate for 2015 is 7,407, or an increase of 1.8%. Overall household size in 2010 was 2.59, with current estimates at 2.58.

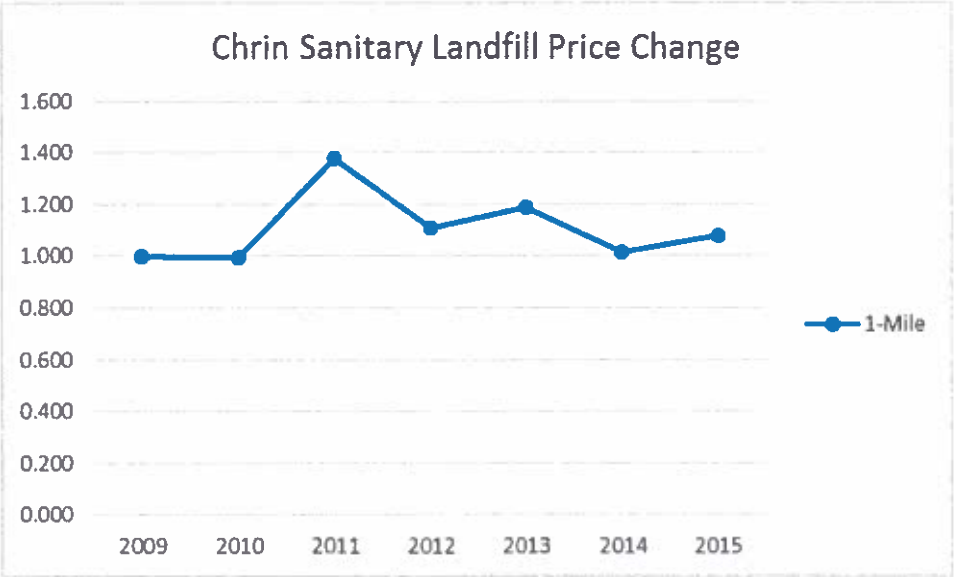
The number of housing units within one mile of the Chrins Sanitary Landfill according to the 2010 census information was 3,005. Current 2015 estimates of housing units within one mile show no change at 3,005.

Current average household income estimates are $61,975 in 2015, which are up from the 2009 estimates of $54,536.

Average housing year built within the one mile radius is 1940, older than the broader three and five mile radius. Change in price overall since 2009 within one mile of the Chrin Sanitary Landfill has been an annual increase of 1.1%. The levels of change within the one mile radius are greater than those within 3, 5 and Northampton County overall.

Since 2009 there have been 21 new housing units built within one mile of the Chrin Sanitary Landfill.

The average dwelling value in 2009 within one mile was $113,000. In the most recent period measured for 2015 the average dwelling value was $121,884. Cummulative indexing shows the area within one mile of the Chrins Sanitary Landfill increasing at a rate of 7.9%.



Three Mile Market Radius;

In the 2010 census closest to the 2009 change date, the population within three miles of the Chrin Sanitary Landfill was 70,645. Current population estimate for 2015 is 71,479, or an increase of 0.1%. Overall household size in 2010 was 2.51, with current estimates at 2.52.

The number of housing units within three miles of the Chrins Sanitary Landfill according to the 2010 census information was 29,087. Current 2015 estimates of housing units within three miles are 29,619, or a 1.8% increase over 2010 census.

Current average household income estimates are $67,005 in 2015, which are up from the 2009 estimates of $58,965.

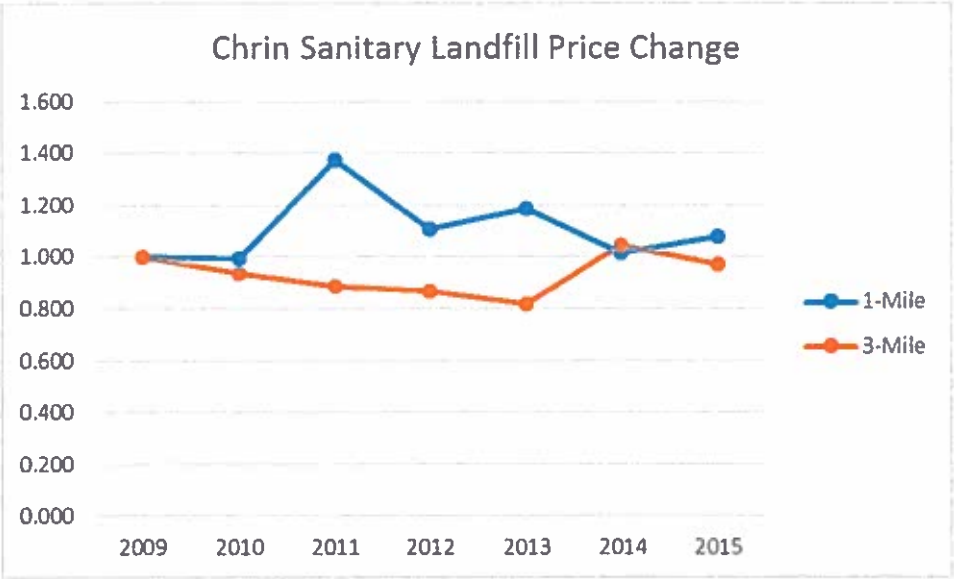
Average housing year built within the three mile radius is 1942. Since 2010 there have been 218 housing units built within three miles of the Chrin Sanitary Landfill. The percentage of newer stock housing since 2010 is 0.7%.

Change in price overall since 2010 within three miles of the Chrin Sanitary Landfill has been down 0.4% annualized overall. The levels of decline within the three mile radius of the facility is less than the 5 mile and Northampton County overall.

The average dwelling value for locations within one and three miles were as follows:

	1-Mile	3-Mile
2009	$113,000	$199,862
2015	$121,884	$193,785

Cummulative indexing shows the area within three mile of the Chrins Sanitary Landfill show a slight decrease from the 2009 change event analyzed. The average dwelling price has declined by 3.04% since 2009.



Five Mile Market Radius;

In the 2010 census closest to the 2009 change date, the population within five miles of the Chrin Sanitary Landfill was 116,169. Current population estimate for 2015 is 115,216, or a decline of 0.8%. Overall household size in 2010 was 2.7, with current estimates at 2.6.

The number of housing units within five miles of the Chrins Sanitary Landfill according to the 2010 census information was 43,686. Current 2015 estimates of housing units within five miles are 44,288, or a 1.3% increase over 2010 census.

Current average household income estimates are $80,735 in 2015, which are up from the 2009 estimates of $71,048.

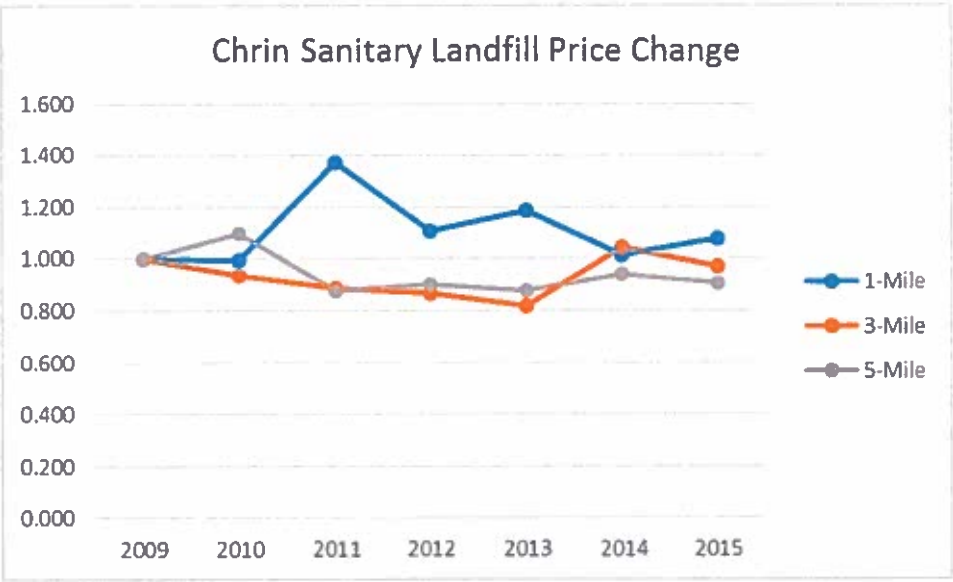
Average housing year built within the five mile radius is 1958. Since 2010 there have been 288 housing units built within five miles of the Chrin Sanitary Landfill. The percentage of newer stock housing since 2010 is 0.6%.

Change in price overall since 2010 within five miles of the Chrin Sanitary Landfill has shown a decline of 1.5% annually.

The average dwelling value for locations within one, three and five miles were as follows:

	1-Mile	3-Mile	5-Mile
2009	$113,000	$199,862	$250,840
2015	$121,884	$193,785	$227,642

Cummulative indexing shows the area within five miles of the Chrin Sanitary Landfill declining from the 2009 change event analyzed at a rate of 9.2%.



Northampton County;

In the 2010 census closest to the 2009 change date, the population within Northampton County was 214,437. Current population estimate for 2015 is 213,895, or a decline of 0.3%. Overall household size in 2010 was 2.37, with current estimates at 2.36

The number of housing units within Northampton County according to the 2010 census information was 96,832. Current 2015 estimates of housing units within Northampton County are 97,665, or a 0.9% increase over 2010 census.

Current average household income estimates are $60,909 in 2015, which are up from the 2010 estimates of $53,801.

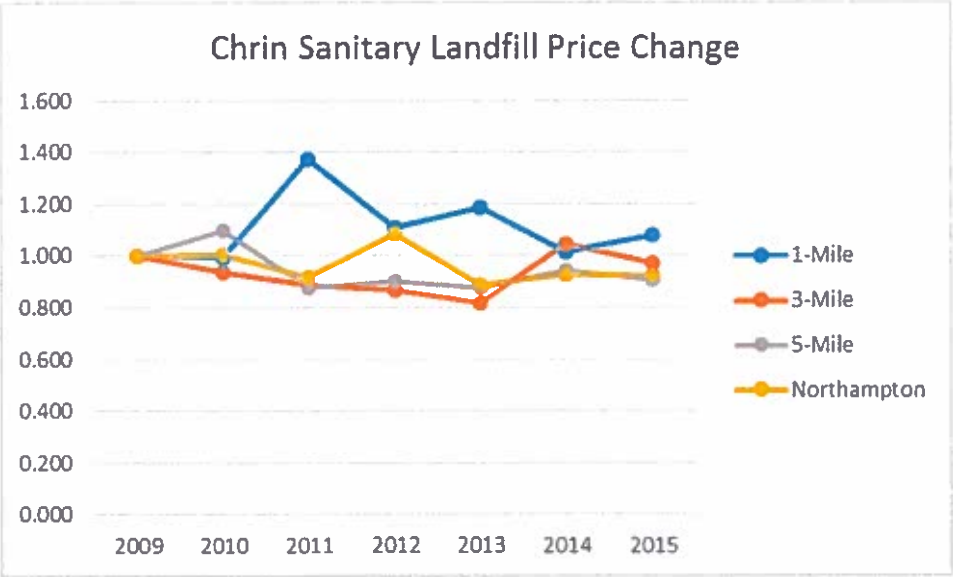
Average housing year built within the three mile radius is 1972. Since 2010, 1,043 housing units have been built within Northampton County including those built within five miles. The percentage of newer stock housing since 2010 is 0.4%.

Change in price overall since 2009 within Northampton County has been in an annual decline at a rate of 1.2%. The levels of depreciation within Northampton County is less than the five mile radius, but greater than those within one and three mile change.

The average dwelling value for locations were as follows:

	1-Mile	3-Mile	5-Mile	Northampton
2009	$113,000	$199,862	$250,840	$271,388
2015	$121,884	$193,785	$227,642	$249,260

Cummulative indexing shows the area within Northampton Countydeclining from the 2009 change event analyzed at a rate of 8.2%.



Reconciliation and Conclusions

Keystone Sanitary Landfill market considerations indicate a conclusion of benign impact from the planned expansion of the Keystone Sanitary Landfill. All conditions of economic change indicate properties and populations within the closer proximity factors of one mile performed better than the larger market location. Population decline is measured throughout the area, but those locations closer to the landfill declined at a slower pace. Housing stock is generally younger than the surrounding regions, and pricing has appreciated within one mile in comparison to mixed results in the larger regional analysis. Over the period measured since the 1998 capacity increase, value has increased in line or greater than markets at three miles, five miles and Lackawanna County overall.

Alliance Sanitary Landfill market is in close proximity to the Keystone Sanitary Landfill. Alliance is a smaller operation, but the change noted includes capacity and average daily volume having a more physical impact on surrounding communities. Market conditions within the areas of influence surrounding the Alliance Sanitary Landfill have been mixed. Property value condition within one mile of the Alliance Sanitary Landfill along with the greater Lackawanna County area have increased, while conditions within a three and five mile radius have declined. Part of the measurement disparity is the housing stock age within one mile and the greater Lackawanna County region are younger than the older stock within the three and five mile radius. The analysis of conditions surrounding the Alliance Sanitary Landfill support a conclusion that the expansion had no impact on value conditions of surrounding properties.

GROWS Sanitary Landfill is one of the largest landfills within Pennsylvania. Comparative characteristics to the Keystone Sanitary Landfill include size, intensity of current use and the expansion plan having no other environmental impact other than the increased size (same intensity of use and average daily volume). Differences of the facilities include the general lack of development other than commercial and industrial use within one mile of the GROWS Sanitary landfill making it difficult to assess changes from period to period due to the small samplings available. Market conditions within the areas of influence surrounding the GROWS Sanitary Landfill have all measured in decline. Comparative analysis suggest property value within one mile of the facility declined at a greater rate than wider market locations, though a direct correlation is difficult due the small sampling of housing within one mile available.

Chrin Sanitary Landfill is located in the immediate proximity of a population center (Easton City). Chrin is different then the Keystone, Alliance and GROWS Landfill markets in that the dominant housing and property age preexisted the landfill. The Chrin Landfill is also much smaller than the other comparisons and Keystone. Characteristics of the Chrin Sanitary Landfill warranting comparison was the consideration that truck traffic and capacity would increase having a more visible impact potential on surrounding property use. This additional physical change aspect is used to show the resilience of communities to aspects increasing a facilities intensity of use. Economic comparative conditions have not changed since the introduction of the landfill in 1961 relative to population, housing and income. Since the most recent capacity increase permitted in 2009 at the Chrin Sanitary Landfill general real estate market and value conditions have been measurably better than conditions at three miles, five miles and those within Northampton County overall. The improved conditions closer to the landfill cannot be connected with the landfill operation, but they also support the conclusion that an expansion of an existing operation size and daily capacity has no impact on surrounding property value.

In the assessment I evaluated housing market pricing and activity in a one, three and five mile radius, as well as analysis of Lackawanna County overall to observe market change characteristics period to period. I also conducted analysis of a neighborhood just south of the Keystone Sanitary Landfill commonly known as the Swinnick Community of Dunmore. I selected this community due to its proximity, concentration of housing units and the additional potential detrimental conditions of a confluence of US Route 6 and Interstate Highways 81, 84 and State Route 380. Interstate Highway 81 and US Route 6 are within a few hundred feet of a number of streets in the location, with backyards having large privacy and sound barrier walls to limit noise and site conditions of the roadways.

The boundaires used in this location analysis is a more focused index analysis. I used North Blakely to East Drinker Street forming the western and southern limit, and Interstate Highway 81 forming the east and north limits. Within this more narrowly defined neighborhood section I found price change over the period 1998 through to the effective date of this report to have appreciated at a much faster pace than all other areas measured.

The average dwelling year built within community as defined above heavily influenced a neighborhood known as the Swinnick Community is 1956. Since 1998 there have been 159 units built representing 13.5% of the total housing stock. Population has declined within the Swinnick Community since 1995 by 6.5%, with the average household going from 2.32 to the current 2.20 persons. Average household income within the Swinnick Community is currently $62,144, up from $38,726 in 1998.

Change in price overall since 1998 within the Swinnick and the noted sections of Dunmore has been 3.5%, which are greater than all other measures. Average dwelling price within the neighborhood defined above and heavily influenced by the Swinnick section of Dunmore was measured at $86,955 in 1998 and at $141,803 in 2015 relative to the other areas surrounding the Keystone Sanitary Landfill as restated below:

	Average Sale Price			
	1-Mile	3-Mile	5-Mile	Lackawanna County
1998	$84,042	$66,617	$64,749	$89,876
2015	$126,930	$102,857	$111,639	$140,329

The analysis is used to determine market comparative data of the actual experience surrounding the Keystone Sanitary Landfill to determine if the communities in closer proximity to the facility acted any differently then those areas more distant, and the broader Lackawanna County.

The markets within the one, three and five mile radius of the Keystone Sanitary Landfill have shown there is no negative impact over time where an existing facility is given an increase in capacity permitting. There was no no dicernable negative market impact from an existing facility being granted additional capacity limits.

Market comparative analysis of pricing used, as impacted by an adverse environmental affect, suggest no negative impact. Market resilience within communities is evident. Values in areas surrounding the Keystone Sanitary Landfill, Alliance Sanitary Landfill, GROWS Sanitary Landfill and Chrin Sanitary Landfill did not show any measurable negative deviation from the

larger markets as a result of expansions. Furthermore, there is no market evidence to support any negative impact on real estate value as a result of the planned expansion.

Certification Statement

I certify that, to the best of my knowledge and belief:

- the statements of fact contained in this report are true and correct.
- the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analyses, opinions, conclusions, and recommendations.
- I have no present or prospective interest in the property that is the subject of this report, and I have no personal interest with respect to the parties involved.
- I have no bias with respect to any property that is the subject of this report or to the parties involved with this assignment.
- my engagement in this assignment was not contingent upon developing or reporting predetermined results.
- my compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice*.
- I have made a personal inspection of the Keystone Sanitary Landfill and surrounding neighborhoods that are the subject of this report.
- no one provided significant real property appraisal or appraisal consulting assistance to the person signing this certification.
- use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.
- my analyses, opinions and conclusions were developed and this report was prepared in conformity with the requirements of the Code of Professional Ethics and the Standards of Professional Practice of the Appraisal Institute;
- I have not had any other dealings with this property in the previous three years.
- I am current in my continuing education requirements of the Appraisal Institute.
- I am competent to evaluate the subject property type based on experience and training.

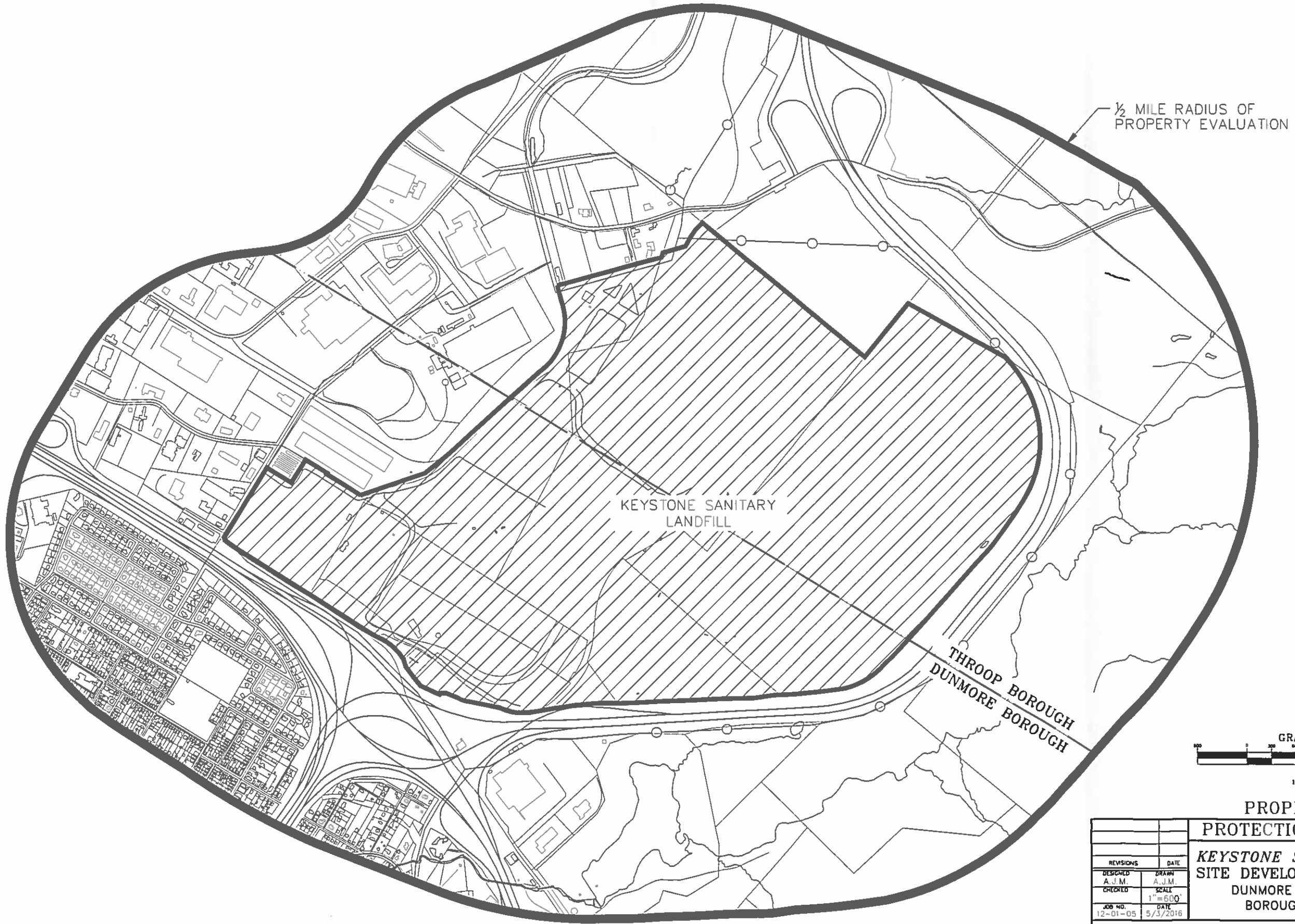
The concluded opinion of this report is that there is no measurable permanent detrimental market value condition directly related to the sanitary landfill expansion events that occurred as a result of the increased capacity permitting on the surrounding real estate and in particular the residential use neighbors in the areas referred to in this report as the Keystone Sanitary Landfill.

Best regards,

John McChesney, MAI
Pennsylvania General Real Estate Appraiser
GA-1266-R
Owner, Swift Real Estate Solutions, LLC

EXHIBIT C1.2

LOCATION LIMITS



GRAPHIC SCALE

(IN FEET)
1 inch = 600 ft.

PROPERTY VALUE PROTECTION PLAN (PVPP)

REVISIONS	DATE

DESIGNED A.J.M.	DRAWN A.J.M.
CHECKED	SCALE 1"=600'
JOB NO. 12-01-05	DATE 5/3/2016

KEYSTONE SANITARY LANDFILL
SITE DEVELOPMENT – PHASE III
DUNMORE BOROUGH , THROOP BOROUGH PENNSYLVANIA

CONSULTING ENGINEERS
507 LINDEN STREET, SUITE 200
SCRANTON, PA 18503
www.labellapc.com

LABELLA Associates

EXHIBIT C1.2

File name: Z:\2012 Projects\12-01-05 Keystone Landfill Phase III\PaDEP Permit Application\Maps-Benefits Response Plans\Property Value Protection Plan.dwg May 03, 2016-11:25am jeisenberger

507 Linden Street, Suite 200 | Scranton, PA 18501 | p 570.342.3101 | f 570.342.3940 | www.labellapc.com

Harms:

2. Visual

C2 **Visual: (SE)** KSL has identified visual impacts as a potential harm and public comment indicates that those surrounding the landfill are particularly sensitive to the visual impact of the proposed Phase III expansion. The issue is not just the increased height but the horizontal extent of the increased height that extends to the southwest of the permitted Phase II development. The proposed expansion will be 165 feet higher than the final elevation of the currently permitted landfill, but the expansion to the southwest of Phase II calls for an increase in height of approximately 100 feet over existing final grades in presently closed areas of the site. In this area, the daily landfill operations will be readily visible to some of the closes residents to the landfill (Swinick development).

Proposed mitigation: KSL puts forth that the proposed expansion will not be significantly more visible than the currently permitted Phase II development. KSL plans to maintain and enhance its current program of vegetative plantings along public roadways contiguous to the site to minimize visual impacts. KSL states that if approved by DEP in the closure plan, KSL will plant shallow root trees and plantings along the top and berms of the site. KSL concludes that the visual impact will not be a significant harm when compared to the final elevation of Phase II.

DEP review: Although KSL plans to continue current mitigation practices, they have not implemented or proposed measures to mitigate the future visual impacts related to the height of the landfill. Plantings along adjacent roadways will do little to screen the operation of the landfill from the view of those not driving on those roadways. The additional height and widening of the landfill will make it 40-231 feet higher than five of the six mountains within 2 miles of the facility and may block the view of the natural horizon in some locations. Aesthetic impacts, particularly visibility of the expansion have been a concern to many surrounding residents.

KSL states that "if approved by DEP in the closure plan, they will plant shallow root trees and plantings along the top and berms of the site" however, this conflicts with the Form H- revegetation and the Form 28 – Closure/Post-Closure Land Use. This mitigation would only address the engineered appearance of the landfill once completed, but not address its prominence in the landscape or obstruction of the views. No construction sequence has been provided beyond the first 10 years of the project therefore it is impossible to determine if the construction sequence minimizes the visibility of working face or landfill operations. Accelerated capping, vegetation or details on other measures to minimize the view of the operations are not provided. A landscaping plan showing plantings existing and proposed that are intended to buffer the operation should be provided. KSL has not proposed mitigation to address the visual impacts of the landfill for the elevation that is proposed which will affect a greater number of people than those driving on the adjacent roads.

C2 Visual Response Narrative

KSL has always maintained a sensitivity to the concerns of residents and, therefore, has employed numerous operational practices to minimize nuisances and/or perceived harmful effects from the landfill, such as its perceived visibility. Consequently, and based on comments received through the PaDEP and comments received through the public meeting and public hearing process, KSL has given further consideration to the proposed Phase III Site Development design with respect to the landfill elevation. Accordingly, in addition to maintaining and enhancing its current program of installing vegetative buffers, KSL has proposed to substantially mitigate perceived future visual impacts related to the "height" of the landfill by lowering the proposed Phase III peak elevation by 165 feet as discussed in the Narrative Response to GC (2). The lowered Phase III peak elevation coincides with the previously-approved and permitted Phase II peak elevation (i.e., no increase in peak elevation will occur). KSL has modified the Phase III design plans and forms to reflect a maximum elevation of 1,585 feet amsl, consistent with the maximum elevation established in the previously-approved 1997 Phase II Permit Modification. Although the proposed peak elevation will not be increased over the already-permitted elevation, KSL recognizes that the widening of the landfill will make the landfill more visible in the area surrounding the site. To quantify the potential visual impacts within a 3-mile radius of the landfill's peak, KSL retained ARM Group Inc. (ARM) to prepare a Line-of-Sight (LOS) study, dated January 2016, which is attached to this response Exhibit C2.1.

The purpose of the LOS study is to determine the potential visual impacts of the Phase III Site Development. Two versions of the LOS study have been prepared. The original February 2015 LOS study determined the visual impacts from raising the peak of the landfill from the currently permitted elevation of 1,585 feet above mean sea level (amsl) to an elevation of 1,750 feet (amsl) (i.e., an increase of 165 feet), and widening the landfill per the grading plan design. The modified January 2016 LOS study determined the visual impacts from the modified Phase III Site Development (i.e., peak elevation lowered to 1,585 feet amsl) and widening the landfill per the revised grading plan design. In calculating the statistics derived from these studies, the locations of the currently permitted Phase II, the originally proposed Phase III Site Development, and the modified Phase III Site Development peaks were estimated to roughly coincide with each other to enable the line-of-sight profiles to remain in a radial orientation (i.e., 3-mile radius circle) and, thus, enable consistent comparisons among one another. Analyses were performed in a "leaf-off" scenario (i.e., during winter months, with leaves not present) to represent a "worst case" scenario.

ARM determined the areas from where the currently permitted Phase II peak is projected to be visible as well as the areas from where the original and modified Phase III Site Development grades are projected to be visible. These areas were compared to determine the potential changes to visual impacts associated with the proposed Site Development and to determine the degree to which the potential visual impacts have been mitigated by lowering the Phase III peak elevation. In addition to determining the amount of area from which the currently permitted Phase II, the original Phase III Site Development, and the modified Phase III Site Development will be seen, ARM also estimated the number of individuals with normal visual acuity who would potentially be able to see the landfill. Based upon the LOS studies, potential visual impacts due to construction of the Site Development are described as follows:

Increase in Total Area from which the Proposed Site Development will be Visible

ARM analyzed the percent increase in area from which the landfill will be visible when it reaches its currently permitted Phase II final grade versus the modified Phase III Site Development final grade. While both grading plans have the same peak elevation, the modified Phase III Site Development broadens the landfill, slightly increasing the area from which the landfill will or may be visible. According to ARM's analysis, the permitted KSL landfill will be seen by approximately 8.2 percent of the area, and the modified Phase III Site Development will be seen by approximately 10.3 percent of the area within a 3-mile radius of the landfill peak, excluding the area occupied by KSL's property. The originally proposed Phase III Site Development was visible to 11.5 percent of the area within a 3-mile radius of the landfill peak.

Increase in Area of Municipalities from which the Proposed Landfill Site Development will be Visible

ARM analyzed the increase in area within each municipality from which the landfill will be visible when it reaches its currently permitted Phase II final grade versus the originally proposed Phase III Site Development final grade and the modified Phase III Site Development final grade. The summary table below shows the increase in area for each respective municipality from which the landfill will be visible within a 3-mile radius of the landfill peak. All areas cited below are based on the respective municipality area within the 3-mile radial study area. On an area basis, the increase in visible area for the original Phase III Site Development equates to 0.883 square miles within the 3-mile radial study area, and the increase in visible area for the modified Phase III Site Development equates to 0.571 square miles within the 3-mile study area.

Description of Statistic	Total Municipal Area	Area within 3-mile Radius of Landfill Peak Visible From Permitted Phase II	Area within 3-mile Radius of Landfill Peak Visible From Originally Proposed Phase III	Area within 3-mile Radius of Landfill Peak Visible From Modified Proposed Phase III (lower peak)	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Proposed Phase III Visible Compared to Permitted Phase II	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Proposed Phase III is Visible Compared to Originally Proposed Phase III
Units	square miles	square miles	square miles	square miles	square miles	square miles
Dickson City Borough	4.70	0.000	0.000	0.000	0.000	0.000
Dunmore Borough	8.16	1.273	1.516	1.483	0.210	-0.033
Jefferson Township	33.95	0.000	0.150	0.003	0.003	-0.147
Jessup Borough	6.80	0.000	0.277	0.147	0.147	-0.130
Olyphant Borough	5.47	0.194	0.234	0.234	0.040	0.000
Roaring Brook Twp.	22.23	0.034	0.034	0.034	0.000	0.000
Scranton City	25.44	0.005	0.005	0.005	0.000	0.000
Throop Borough	4.33	0.694	0.867	0.865	0.171	-0.002

The table below displays the percentage of visible area within a 3-mile radius of the landfill to the total municipality area. Although the landfill may be visible beyond the 3-mile radius, precedent indicates that the visual impacts beyond a 3-mile radius from the landfill peak are considered far less significant due to the perspective resulting from a 15,840-foot distance and, thus, should be excluded from the study area. Therefore, the statistics below show what percentage of each municipality is visually impacted by the landfill. Furthermore, when considering the entire 3-mile radial study area, the currently-permitted KSL will be seen by approximately 2.0 percent of the total area of the eight municipalities affected, and the modified Phase III Site Development will be seen by approximately 2.5 percent of the total area of the eight municipalities affected, excluding the area occupied by KSL's property. The originally proposed Phase III Site Development would have been visible to approximately 2.8 percent of the total area of the eight municipalities affected. These percentages reflect the area within a 3-mile radius from which the landfill could potentially be seen relative to the entire municipality area.

Description of Statistic	Percentage of Total Municipal Area from which the Permitted Phase II is Visible	Percentage of Total Municipal Area from which the Original Phase III is Visible	Percentage of Total Municipal Area from which the Modified Phase III is Visible
Units	percentage	percentage	percentage
Dickson City Borough	0.0%	0.0%	0.0%
Dunmore Borough	15.6%	18.6%	18.2%
Jefferson Township	0.0%	0.4%	0.0%
Jessup Borough	0.0%	4.1%	2.2%
Olyphant Borough	3.5%	4.3%	4.3%
Roaring Brook Twp.	0.2%	0.2%	0.2%
Scranton City	0.0%	0.0%	0.0%
Throop Borough	16.0%	20.0%	20.0%

The visual impacts associated with the proposed Site Development will occur over an approximately 40-year period; therefore, the visual impacts will be very gradual. Overall, the increase in area from which the landfill could potentially be visible due to the modified Phase III Site Development is relatively minor (0.571 square miles). Similarly, the increase in individuals who could potentially see the proposed Site Development is relatively minor (1,377 individuals, or 1.2% of the eight-municipality population) considering the densely populated areas adjacent to the landfill. Additionally, because the proposed peak elevation has been lowered and will not exceed the currently permitted peak elevation, the visible area of the Phase III Site Development has been reduced by 0.312 square miles, and the intensity of the visual impacts to the surrounding community has been significantly reduced (in comparison to the originally proposed Phase III Site Development) due to the shape change of the top of the landfill resulting from the truncation and lowering of the maximum elevation.

The attached LOS study contains a summary of the statistical analysis used to quantify the visual impact due to the proposed Site Development. Both the original LOS and the modified LOS are attached. Furthermore, an LOS drawing set is included and displays the areas from which the landfill will be visible, radial profiles, and renderings of the proposed Site Development.

The modified Phase III design plans and supporting documentation provide construction sequencing for the entire site life. Also, included in these documents is an aggressive closure capping and revegetation program.

In addition to the seeding specifications contained in the PaDEP Municipal Solid Waste Regulations, Exhibit C2.2 contains landscaping options (i.e., growing shrubs, along with incorporation of a highway perennial flower seeding) for PaDEP review and approval. The modified maximum elevation for the Phase III Site Development (i.e., 1,585 feet amsl) is approximately 535 feet lower than the adjacent Moosic Mountain. The incorporation of an aggressive capping and revegetation program will result in a blending with the natural background.

Visual impacts during construction and daily MSW placement are temporary and short term in nature and will be consistent with current operations being performed at KSL, since no change would occur from a visible operation perspective in conjunction with the PaDEP approval of the Phase III Permit Modification Application. The fact that the vast majority of MSW disposal will be placed in the valley between the existing Logan, Tabor and Phase II disposal areas also mitigates the harm and/or potential harm related to increased visibility for the majority of the facility's extended site life. KSL's Nuisance Mitigation Control Plan contained in Exhibit C2.3 details the procedures that are and will be implemented in the future to minimize visual degradation (i.e., maintain a limited working face, dust, odor and litter controls, temporary methane gas collection wells and intermediate revegetation measures). A phased site development and capping plan has been submitted, which illustrates that the majority of construction and operation will be in the valley between the existing MSW disposal areas. Thus, visual impact to the adjacent residential neighborhood will be minimized.

The reduction in the proposed Phase III maximum elevations to the previously-approved Phase II levels, combined with the operational programs described above that KSL implements as part of operating procedures, mitigates any additional harms and potential harms relating to aesthetic visibility in connection with the approval of the proposed Phase III Site Development.

EXHIBIT C2.1

LINE-OF-SIGHT ANALYSIS

LINE OF SIGHT STUDY

KEYSTONE SANITARY LANDFILL
PHASE III SITE DEVELOPMENT

Prepared for:

Keystone Sanitary Landfill
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Scranton, PA 18512

By:

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January 2016

ARM Project 14411

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LINE-OF-SIGHT ANALYSIS
PROPOSED EXPANSION
KEYSTONE SANITARY LANDFILL
Permit Number 101247

ARM Project 14411
January 2016

Introduction

The Keystone Sanitary Landfill (KSL) (Pennsylvania Department of Environmental Protection [PADEP] Permit No. 101247) retained ARM Group Inc. (ARM) to prepare a Line-of-Sight (LOS) Study to determine the potential visual impacts created by the construction of the proposed Phase III landfill expansion (the Expansion) at KSL. The maximum permitted elevation for the KSL is currently 1,585 feet above mean sea level (ft amsl), per the previously permitted Phase II landfill expansion. KSL originally proposed to expand the landfill footprint and "piggy-back" onto the existing landfill, which would have increased the peak elevation of the landfill by 165 feet to an elevation of 1,750 ft amsl. However, to reduce potential visual impacts due to the Phase III Expansion, KSL has decided to lower the proposed Phase III peak elevation to 1,585 ft amsl, the same elevation as the permitted final elevation of the Phase II landfill, resulting in no increase in the maximum permitted elevation. ARM initially completed the LOS Study in February 2015 for the Phase III Expansion with a peak elevation of 1,750 ft amsl, referred to herein as the "original Phase III Expansion," in connection with preparation for a zoning hearing (Dunmore Zoning Hearing Board, 2015). ARM has subsequently updated the LOS Study to reflect the proposed lowered peak associated with the Phase III Expansion, herein referred to as the "modified Phase III Expansion". Estimated potential visual impacts from the existing Phase II permit, the original Phase III Expansion, and the modified Phase III Expansion are described and quantified herein.

Although the peak elevation of the landfill is not increasing with the modified Phase III Expansion grading plan, the breadth of the "plateau" at the top of the landfill will expand, making the landfill slightly more visible to the surrounding area compared to the currently permitted Phase II landfill expansion. In order to evaluate the specific changes in visibility of the landfill, this LOS Study was prepared. It is understood that, among the potential effects that the proposed Expansion project may have on the surrounding area, the PADEP and the community may be concerned about the potential visual impact of the expanded landfill.

LOS Study Overview

In order to evaluate the visibility of the proposed Expansion, 21 line-of-sight profiles, 25 photographs, and 18 different renderings of the currently permitted and proposed landfill surfaces were created and examined and are subsequently discussed and presented later in this report. Based on these illustrations, and the mitigating conditions discussed below, the increase

in the potential visual impacts to the surrounding area associated with the Expansion will be minimal:

- The permitted KSL is currently visible in selected locations from a distance of 3 miles or more given the landfill's location at a topographic high point, although there are many areas where topography and surrounding trees obscure view of the landfill from 3 miles and from closer locations. Areas from which the KSL is currently visible are shown on LOS Sheets 3a and 4a, attached, as depicted by the yellow shading. These shaded areas also represent the locations from which the Expansion will also be visible. Areas shaded in green on Sheets 3b and 4b represent the areas within a 3-mile radius from which the original Phase III Expansion would have been visible. Areas shaded in red on Sheets 3c and 4c represent the areas within a 3-mile radius from which the modified Phase III Expansion will be visible.

- Based on the visibility areas presented on Sheets 3a and 4a, the existing permitted KSL (when the currently permitted final grade is reached) will be visible from approximately 8.2 percent (2.200 square miles) of the 3-mile radial area examined as part of this LOS. The original Phase III Expansion would have been visible from approximately 11.5 percent (3.083 square miles) of the 3-mile radial area as shown on Sheets 3b and 4b. Sheets 3c and 4c show the visibility of the modified Phase III Expansions, which is 10.3 percent (2.771 square miles) of the 3-mile radial area. Note: the KSL property (1.42 square miles) within the 3-mile radial area is excluded from the total area.

KSL will take on-going steps to mitigate detrimental visual impacts of the facility and account for the specific terrain and line-of-sight characteristics of the area. KSL has already decided to lower the peak elevation of the proposed Expansion, reducing the area that can see the landfill within a 3-mile radius by 0.312 square miles. Furthermore, KSL is an enduring business and physical feature within the Lackawanna County community. Therefore, KSL has given considerable thought and attention to developing the Expansion design, cell sequence, and landfilling progression to limit and mitigate any harm to the host communities and to provide the greatest degree of host community benefits with minimal environmental and visual impact.

Analysis

On behalf of KSL, ARM prepared a line-of-sight analysis within a 3-mile radius of the highest future landfill elevation of the Expansion. As stated previously, the currently permitted KSL peak and the modified Phase III Expansion peak are at an elevation of 1,585 feet amsl. The originally proposed Phase III Expansion peak was at 1,750 feet amsl, which represented an increase of 165 feet. For the purposes of this study, the locations of the currently permitted KSL and the original and modified proposed Phase III Expansion peaks were estimated to roughly coincide with each other; however, the permitted and proposed grading plans were utilitzed in preparation of cross-sections and to generate the shading shown on Sheets 3a/4a, 3b/4b, 3c/4c, and 4c/4d. The 3-mile radial area (28.3 square miles) of study considered as part of the LOS is depicted and labeled on the attached topographic map (Sheet 1) and aerial photograph map (Sheet 2).

Using digital elevation models (DEM) from the United States Geological Survey (USGS) for the Scranton (dated 1994) and Olyphant (1999), Pennsylvania 7.5 minute quadrangle maps, ARM created topographic surfaces in AutoCAD to generate radial profiles from the future highest point of the Expansion. The radial profiles extend outward for 3 miles. A single plan-view map is used for this LOS study since, as stated above, the landfill peak locations for the currently permitted KSL and the Expansion are roughly the same. The currently permitted and proposed peak landfill elevation center and radial profile lines are shown on Sheets 1 (topographic map) and 2 (aerial map).

The existing permitted KSL and the Expansion visibility conditions were examined with 21 line-of-sight profiles extending radially from the permitted landfill. Information derived from radial profile lines was subsequently used to generate the plan view shading depicting existing and proposed landfill visibility areas. The line-of-sight profiles are shown on Sheets 5 through 14 for the already-permitted conditions and proposed Expansion conditions.

By inspection of the profiles, it is evident where the view of the landfill is obscured by terrain and obscured by wooded areas, even when leaves are absent. The tree density and length/width of the wooded areas provide complete visual screening because only substantial stands of trees were accounted for in determining visibility obstructions. Also, the average tree height used for the analysis was 50 feet. The actual tree height in areas where trees are the predominant factor in obscuring the view are sometimes considerably higher (i.e., 80 feet or more). Thus, visibility is generally overestimated due to the conservative tree height used in the analysis. Visual screening by wooded areas was projected from the aerial photographs (Sheet 2) that were taken in 2013.

By combining the topographic mapping and aerial photographs, it is further evident where the landfill is obscured by topographic barriers and wooded buffers. However, without adjusting for the presence of structural features, these illustrations would not account for residential, commercial, and industrial buildings that obscure the view of the landfill. To account for these effects in populated areas, numerous photographs were taken from areas where the largest concentrations of buildings are present. These photographs were taken on January 8, 2015 and January 23, 2015 and, therefore, represent winter conditions (i.e., worst-case, no leaves present). Photograph vantage points and corresponding photograph numbers are shown on Sheet 15. Photographs (i.e., view from the corresponding vantage points) are provided on Sheets 16 through 26. Therefore, with the addition of the photographic inspection, the line-of-sight profiles and resultant areas highlighting where the landfill is visible attempt to account for most visual buffers. However, small clusters of trees, road cuts (embankments), isolated single family dwellings, and other landscape features that obscure the view of the landfill were neglected, thus, again, the projected visibility is estimated with conservatism.

The highlighted areas where the landfill is visible, according to this analysis and based on photographic documentation, are illustrated on Sheets 3a through 4d. It is important to note that some minor inferences were made in assembling the visibility area highlighting because it was developed, in part, based on integrating the profiles to create an area-based visibility pattern. It should be noted that due to urban development in the areas adjacent to the KSL, the visibility of the landfill is partially (or fully) obstructed by buildings and houses in many places. The LOS

plan-view drawings show many of these areas as locations from where the landfill is or will be "visible;" however, in many places, the landfill will only be visible in the area between buildings and houses. Therefore, the area from which the landfill is visible, as depicted on Sheets 3a through 4d, is likely overstated, especially when compared to the line-of-sight profiles on Sheets 5 through 14, which account for wooded and topographic buffers.

In any case, based on this conservative portrayal, it appears that the existing permitted KSL Phase II landfill unit (when the currently permitted final grade is reached) will be visible from approximately 8.2 percent of the 3-mile radial area, the original Phase III Expansion would have been visible from approximately 11.5 percent of the 3-mile radial area, and the modified Phase III Expansion will be visible from approximately 10.3 percent of the 3-mile radial area. Therefore, based upon the modified Phase III Expansion, there will be a 2.1 percent increase (based on the total 3-mile radial area) in visibility of the landfill with the development of the Expansion. Stated in other terms, there is an estimated increase in area of 0.571 square miles from where the landfill will be visible due to the modified Phase III Expansion, which is a 26% change (2.200 square miles to 2.771 square miles). The KSL property (1.42 square miles) is excluded from the total of the 3-mile radial study area.

To determine the number of and locations of residential dwellings within the study area, building information was obtained from PAMAP – a digital base map of Pennsylvania provided by the Pennsylvania Department of Conservation and Natural Resources (PA DCNR). The data in PAMAP includes all buildings (e.g., industrial, businesses, residential homes, sheds, garages, etc.) and was developed in 2007. ARM reviewed the data provided from PAMAP in Geographic Information Systems (GIS) software and removed the points depicting obvious industrial structures, businesses, and out-buildings (i.e., sheds or garages). Inevitably, a small number of these points may have been missed or not identified based on aerial images. In addition to removing points that did not represent residential dwellings, ARM added points for any residential dwellings constructed since 2007 based on a 2011 aerial image. In total, ARM estimates that 12,138 residential dwellings (i.e., housing units) are within a 3-mile radius of the peak of the proposed Expansion.

ARM also obtained population information from the 2010 U.S. Census for the municipalities within the 3-mile radial study area. Both the average household size and the total municipality population were determined from the 2010 U.S. Census information. The census information was used in conjunction with the residential dwelling location information to determine how many residential units and individuals would be able to see the currently permitted KSL and the proposed Expansion. The results for both the original and modified Phase III Expansion indicated that the change in visibility to the surrounding population is estimated to be only 1.19 percent (1,377 additional individuals) of the total population of the municipalities (115,769 individuals) that have borders or portions of their borders within a 3-mile radius of the landfill peak.

To further evaluate the visibility of the proposed increase in elevation of the landfill, a statistical comparison to the currently permitted elevation was conducted to determine the visibility change to the residents of Dickson City Borough, Dunmore Borough, Jefferson Township, Jessup

Borough, Olyphant Borough, Roaring Brook Township, Scranton City, and Throop Borough. The results are summarized as follows:

Increase in Total Area from which the Proposed Landfill Expansion will be Visible

ARM analyzed the percent increase in area from which the landfill will be visible when it reaches its currently permitted Phase II final grade versus the modified Phase III Expansion final grade. While both grading plans have the same peak elevation, the modified Phase III Expansion broadens the plateau of the landfill, slightly increasing the area from which the landfill will or may be visible. According to ARM's analysis, the permitted KSL landfill will be seen by approximately 8.2 percent of the area, and the modified Phase III Expansion will be seen by approximately 10.3 percent of the area within a 3-mile radius of the landfill peak, excluding the area occupied by KSL's property. The increase in area from which the landfill will be visible within a 3-mile radius of the landfill peak is 2.1 percent with the modified (i.e., lowered) Phase III Expansion peak elevation. The originally proposed Phase III Expansion was visible to 11.5 percent of the area within a 3-mile radius of the landfill peak; therefore, lowering the peak elevation reduced the percentage of visible area by 1.2 percent.

Increase in Area of Municipalities from which the Proposed Landfill Expansion will be Visible

ARM analyzed the increase in area within each municipality from which the landfill will be visible when it reaches its currently permitted Phase II final grade versus the originally proposed Phase III Expansion final grade and the modified Phase III Expansion final grade. The summary table below shows the increase in area for each respective municipality from which the landfill will be visible within a 3-mile radius of the landfill peak. All areas cited below are based on the respective municipality area within the 3-mile radial study area. On an area basis, the increase in visible area for the Phase III Expansion equates to 0.883 square miles within the 3-mile radial study area, and the modified Phase III Expansion equates to 0.571 square miles within the 3-mile study area.

Description of Statistic	Area within 3-mile Radius of Landfill Peak Visible From Permitted Phase II	Area within 3-mile Radius of Landfill Peak Visible From Originally Proposed Phase III	Area within 3-mile Radius of Landfill Peak Visible From Modified Proposed Phase III	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible Compared to Permitted Phase II	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible Compared to Originally Proposed Phase III
Units	square miles	square miles	square miles	square miles	square miles
Dickson City Borough	0.000	0.000	0.000	0.000	0.000
Dunmore Borough	1.273	1.516	1.483	0.210	-0.033
Jefferson Township	0.000	0.150	0.003	0.003	-0.147

Description of Statistic	Area within 3-mile Radius of Landfill Peak Visible From Permitted Phase II	Area within 3-mile Radius of Landfill Peak Visible From Originally Proposed Phase III	Area within 3-mile Radius of Landfill Peak Visible From Modified Proposed Phase III	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible Compared to Permitted Phase II	Change in Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible Compared to Originally Proposed Phase III
Units	square miles	square miles	square miles	square miles	square miles
Jessup Borough	0.000	0.277	0.147	0.147	-0.130
Olyphant Borough	0.194	0.234	0.234	0.040	0.000
Roaring Brook Twp.	0.034	0.034	0.034	0.000	0.000
Scranton City	0.005	0.005	0.005	0.000	0.000
Throop Borough	0.694	0.867	0.865	0.171	-0.002

The table below displays the percentage of visible area within a 3-mile radius of the landfill to the total municipality area. Although the landfill may be visible beyond the 3-mile radius, precedent indicates that the visual impacts beyond a 3-mile radius from the landfill peak are considered far less significant due to the perspective resulting from a 15,840-foot distance and, thus, should be excluded from the study area. Therefore, the statistics below show what percentage of each municipality is visually impacted by the landfill. Furthermore, when considering the entire 3-mile radial study area, the currently-permitted KSL will be seen by approximately 2.0 percent of the total area of the eight municipalities affected, and the modified Phase III Expansion will be seen by approximately 2.5 percent of the total area of the eight municipalities affected, excluding the area occupied by KSL's property. The originally proposed Phase III Expansion would have been visible to approximately 2.8 percent of the total area of the eight municipalities affected. These percentages reflect the area within a 3-mile radius from which the landfill could potentially be seen relative to the entire municipality area.

Description of Statistic	Percentage of Total Municipal Area from which the Permitted Phase II is Visible	Percentage of Total Municipal Area from which the Original Phase III is Visible	Percentage of Total Municipal Area from which the Modified Phase III is Visible
Units	percentage	percentage	percentage
Dickson City Borough	0.0%	0.0%	0.0%
Dunmore Borough	15.6%	18.6%	18.2%
Jefferson Township	0.0%	0.4%	0.0%
Jessup Borough	0.0%	4.1%	2.2%

Description of Statistic	Percentage of Total Municipal Area from which the Permitted Phase II is Visible	Percentage of Total Municipal Area from which the Original Phase III is Visible	Percentage of Total Municipal Area from which the Modified Phase III is Visible
Units	percentage	percentage	percentage
Olyphant Borough	3.5%	4.3%	4.3%
Roaring Brook Twp.	0.2%	0.2%	0.2%
Scranton City	0.0%	0.0%	0.0%
Throop Borough	16.0%	20.0%	20.0%

Population Affected in each Township/Borough

The residential population, as determined by dwelling counts and average household size, visually impacted by the Phase III Expansion does not differ when comparing the originally proposed Phase III Expansion to the modified Phase III Expansion. In both cases, the additional population that would potentially be visually impacted by the Expansion is estimated to be 1,377 individuals. Although the visible area decreases by lowering the elevation of the Phase III Expansion peak elevation, the Expansion will still be visible in populated areas surrounding the site, such as Dunmore Borough, Olyphant Borough, and Throop Borough. The reduction in visible area is primarily located to the south and east of the site in areas where residential dwellings are not present. While residential dwellings are not present in the reduced visible areas, recreational facilities are located within these areas that would have been able to see the Phase III Expansion but would no longer be able to see the modified Phase III Expansion. Furthermore, it should be noted that in the areas from which the landfill will be visible, the intensity of the visual impacts have been decreased by lowering the peak elevation.

Description of Statistic	Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak
Units	# individuals
Dickson City Borough	0
Dunmore Borough	704
Jefferson Township	0
Jessup Borough	0
Olyphant Borough	22
Roaring Brook Township	0
Scranton City	0
Throop Borough	651

TOTAL:	1,377

According to U.S. Census Bureau data (US Census, 2010 estimate), the combined population of the eight municipalities that have borders within or partly within a 3-mile radius of the landfill is estimated to be 115,769. Of this population, approximately 3,464 people will be able to see the currently-permitted KSL peak and approximately 4,841 people will be able to see the Expansion. The number of people that will be able to see the Expansion represents 4.2 percent of the total population of the municipalities. The table above displays the estimated increases in population affected by the visibility of the Expansion, per each municipality within a 3-mile radius of the landfill peak.

In January of 2015, ARM took 25 photographs from prominent locations in the community throughout the 3-mile radial area of the landfill. The photo locations are indicated on Sheet 15. The photographs are provided on Sheets 16 through 26, and each photograph includes a description of the vantage point and view. As evident from the photographs, the leaves are off of the trees, representing the time of year when the least amount of obstructions are present. These photographs were taken to assist in determining where the landfill is visible and where structures obscure landfill visibility. The photographs are also used to verify and enhance ARM's interpretation of visibility patterns indicated by topographic and forest buffers on the mapping (Sheets 1 and 2), and to provide a basis for computer renderings to show what the expanded landfill would look like when viewed from various locations where the largest number of people could potentially view the landfill (i.e., primary travel corridors, highest concentration of housing and businesses, schools, parks, playgrounds, and churches).

ARM identified these prominent and sensitive areas (e.g., developments, churches, cemeteries, and recreational areas/parks, etc.) within the 3-mile radial area and included photographs from each area. Based on the photos, the landfill can already be seen (in its existing condition) from a majority of these locations. The proposed condition will not change this statistic. Below is a list of the locations from which photos were taken. ARM prepared renderings for each of the locations from which the Expansion will be visible. Each rendering depicts the current, permitted, and proposed landfill conditions. These photographs were taken from the following locations noted in the table below and shown on Sheet 15.

Photo #	Description
1	1241 December Drive on Mt. Margaret
2	Nay Aug Park above the Wildlife Center
3	St. Anthony's Memorial Park directly above I-81
4	Hematology & Oncology Associates on Meade Street
5	East Drinker Street on the west end of the I-81 overpass
6	Shirley Lane at East Swinick Drive
7	Sherwood Avenue at Sherwood Park
8	Schautz Stadium
9	Monroe Field behind the Dunmore Community Center
10	Blakely Street at East Drinker Street

Photo #	Description
11	Dunmore High School
12	100 Swinick Drive
13	521 Shirley Lane
14	500 Reeves Street
15	Greater Scranton YMCA
16	O'Neil Highway at Dunmore Shopping Center
17	Penn State Worthington Campus Parking Lot 1
18	Throop Borough Office
19	Gertrude Hawk store
20	Westbound US-6 off ramp to Marshwood Road
21	Mid-Valley High School
22	End of Martarano Drive
23	Academy Lane
24	Melissa Drive at Washington Avenue
25	Marywood University visitor's parking lot

The selected locations are the most obvious locations from which residents could potentially see the proposed Expansion and were used for renderings to illustrate the "worst-case" scenario. In many cases, if an observer moves to the right or left of the photographed location, the visibility of the landfill will likely be partially obscured by structures. Additionally, it is worth noting that the renderings represent final grades of the permitted KSL (expected to reach capacity in or around 2022) and the proposed final grading plan for the Expansion (expected to reach capacity in or around 2062). Therefore, the renderings represent conditions that span 40 years. Thus, the changes from the permitted KSL to the Expansion will occur gradually over the life of the project. Hence, the visibility change will not be abrupt, and it will be barely detectable from year to year.

Conclusions

ARM performed a thorough line-of-sight analysis of the landfill, incorporating the proposed landfill expansion area, to determine the potential visibility of the landfill to surrounding townships/boroughs and populated areas within a 3-mile radius. These analyses include: Increase in Area from which the Proposed Landfill Expansion will be Visible; Increase in Area of Township/Borough from which the Proposed Landfill Expansion will be Visible; and Populations Affected in each Township/Borough.

In addition to the factors discussed above, the long development period of the expansion will greatly limit its visual impact. Approximately 40 years will be required to develop the expansion with only a small section of the total landfill active in any given year. The active disposal area will be minimized. The rest of the landfill will consist of grassy slopes. Any visual impacts will be gradual and will occur over a 40-year period. Furthermore, KSL has attempted to mitigate the visual impacts by reducing the peak elevation of the Phase III Expansion to the currently permitted peak elevation (i.e., no increase in peak elevation).

As presented in the analysis, above, and Table 1 referenced therein, the population to which the proposed Expansion will be visible is approximately 4,841 within a 3-mile radius of the landfill peak. This population represents approximately 4.2 percent of the total population of the municipalities (pop. 115,769) that have borders within or partly within a 3-mile radial area of the landfill. Of this population, it is estimated that the majority of those within a 3-mile radius that will be able to see the Expansion would already have had visibility of the existing permitted KSL.

In addition, the shape of the completed landfill, as depicted in the proposed final grading plan, is a grass-covered ridge that is compatible and in harmony with the neighboring landscape to the south and east. Finally, the ability to actually see landfill features at a distance of 2 to 3 miles can be limited by weather conditions, visual acuity, and other factors, further lessening the potential visual impacts of the expansion.

It is well established within the engineering and regulatory communities that landfills, which are crucial to solid waste management practice in the United States, are most appropriately located on or near topographical high points. These locations generally offer flood protection, sufficient isolation distance from the regional groundwater table, and sound geologic characteristics (i.e., not sinkhole-prone carbonate formations that are prevalent in the valleys of central and eastern Pennsylvania). Consequently, the prominent visibility of landfills is fairly common throughout the country. Furthermore, the alternative of locating a landfill at a different site does little to mitigate the visual impacts to the community considering that the landfill is already present at this location. Ultimately, the majority of the landfill is and will continue to be a vegetated hill when it reaches the proposed final elevation.

Supporting documentation is attached to this report and includes: a statistical analysis of visible areas (see Table 1); Line-of-Sight Drawings (plan views, profiles, and renderings); and the previously completed (February 2015) Line-of-Sight Report that was completed for a zoning hearing and was based on the original Phase III Expansion, which proposed an increased peak elevation of 1,750 ft amsl.

ATTACHMENT 1

Line-of-Sight Statistics
(Table 1)

Table 1
Line of Sight Analysis Statistics

Keystone Sanitary Landfill Expansion
Dunmore Borough & Throop Borough, Lackawanna County, PA

Description of Condition Evaluated	Description of Statistic	Units	Dickson City Borough	Dunmore Borough	Jefferson Township	Jessup Borough	Olyphant Borough	Roaring Brook Township	Scranton City	Throop Borough	TOTAL
Background Data	Municipality Population (See Note 3)	# of individuals	6,070	14,057	3,731	4,676	5,151	1,907	76,089	4,088	115,769
	Average Household Size (See Note 3)	# of individuals	2.24	2.18	2.56	2.33	2.22	2.61	2.35	2.30	-
	Total Number of Housing Units within the Municipality (See Note 3)	# of homes	2,703	5,999	1,460	2,007	2,324	728	30,069	1,778	47,068
	Number of Housing Units within a 3-Mile Radius of KSL Peaks	# of homes	891	5,574	0	160	1,487	56	1,513	2,457	12,138
	Municipality Population within a 3-Mile Radius of KSL Peaks	# of individuals	1,996	12,151	0	373	3,301	146	3,556	5,651	27,174
	Total Municipality Area	square miles	4.70	8.16	33.95	6.80	5.47	22.23	25.44	4.33	111.08
	Municipality Area within a 3-mile Radius of KSL Peaks	square miles	0.44	8.00	0.49	2.27	4.94	5.00	1.37	4.32	26.84
	KSL Property within Municipality	square miles	0	0.69	0	0	0	0	0	0.73	1.42
Existing Permitted Phase II Keystone Sanitary Landfill	Municipality Area within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	square miles	0.000	1.273	0.000	0.000	0.194	0.034	0.005	0.694	2.200
	Percent of Municipality Areas within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	percentage	0.0%	15.9%	0.0%	0.0%	3.9%	0.7%	0.4%	16.1%	-
	Percent of Municipality Area within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	percentage	-	-	-	-	-	-	-	-	8.2%
	Percentage of Total Municipality Areas from which the Existing KSL is Visible (within a 3-mile Radius of Landfill Peak)	percentage	0.0%	15.6%	0.0%	0.0%	3.5%	0.2%	0.0%	16.0%	-
	Percentage of Total Municipality Area from which the Existing KSL is Visible (within a 3-mile Radius of Landfill Peak)	percentage	-	-	-	-	-	-	-	-	2.0%
	Number of Housing Units within a 3-Mile Radius of Existing KSL Peak from which the Landfill is Visible	# of units	0	542	0	0	275	0	0	727	1,544
	Estimated Population from which the Landfill is Visible within a 3-mile Radius of Existing KSL Landfill Peak (See Note 4)	# individuals	0	1182	0	0	611	0	0	1,672	3,464
Originally Proposed Phase III Keystone Sanitary Landfill Expansion	Municipality Area within a 3-mile Radius of the Landfill Peak from which the Proposed Expansion is Visible	square miles	0.000	1.516	0.150	0.277	0.234	0.034	0.005	0.867	3.083
	Percent of Municipality Areas within a 3-mile Radius of the Landfill Peak from which the Original Expansion is Visible	percentage	0.0%	19.0%	30.4%	12.2%	4.7%	0.7%	0.4%	20.1%	-
	Percent of Municipality Area within a 3-mile Radius of the Landfill Peak from which the Original Expansion is Visible	percentage	-	-	-	-	-	-	-	-	11.5%
	Percentage of Total Municipality Areas from which Original Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	0.0%	18.6%	0.4%	4.1%	4.3%	0.2%	0.0%	20.0%	-
	Percentage of Total Municipality Area from which Original Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	-	-	-	-	-	-	-	-	2.8%
	Number of Housing Units within a 3-Mile Radius of the Original Expansion Peak from which the Landfill is Visible	# of units	0	865	0	0	285	0	0	1,010	2,160
	Estimated Population from which the Original Expansion is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	1,886	0	0	633	0	0	2,323	4,841
Modified Proposed Phase III Keystone Sanitary Landfill Expansion (Lower Peak)	Municipality Area within a 3-mile Radius of the Landfill Peak from which the Modified Expansion is Visible	square miles	0.000	1.483	0.003	0.147	0.234	0.034	0.005	0.865	2.771
	Percent of Municipality Areas within a 3-mile Radius of the Landfill Peak from which the Modified Expansion is Visible	percentage	0.0%	18.5%	0.6%	6.5%	4.7%	0.7%	0.4%	20.0%	-
	Percent of Municipality Area within a 3-mile Radius of the Landfill Peak from which the Modified Expansion is Visible	percentage	-	-	-	-	-	-	-	-	10.3%
	Percentage of Total Municipality Areas from which Modified Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	0.0%	18.2%	0.0%	2.2%	4.3%	0.2%	0.0%	20.0%	-
	Percentage of Total Municipality Area from which Modified Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	-	-	-	-	-	-	-	-	2.5%
	Number of Housing Units within a 3-Mile Radius of the Modified Expansion Peak from which the Landfill is Visible	# of units	0	865	0	0	285	0	0	1,010	2,160
	Estimated Population from which the Modified Expansion is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	1,886	0	0	633	0	0	2,323	4,841

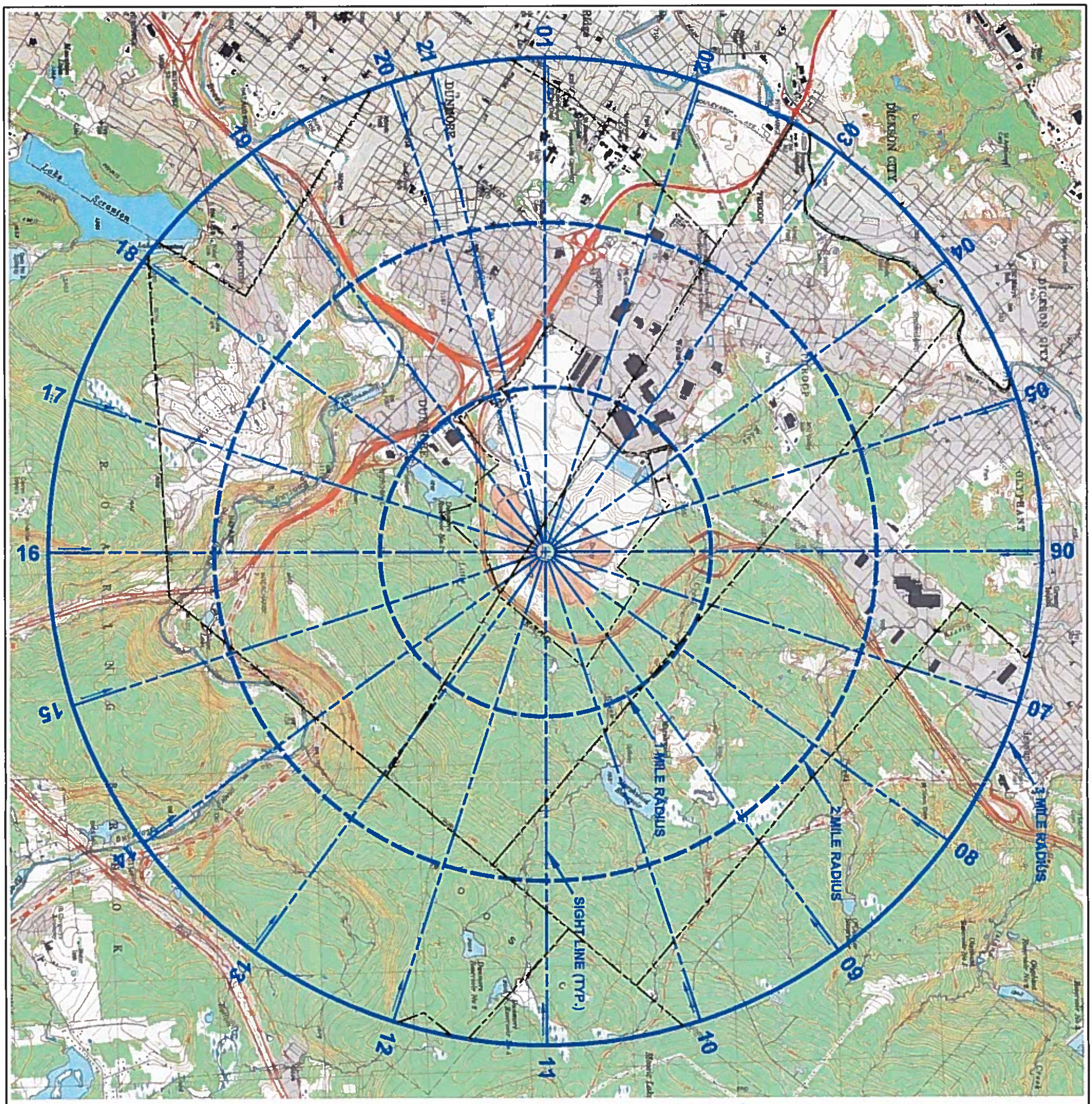
Description of Condition Evaluated	Description of Statistic	Units	Dickson City Borough	Dunmore Borough	Jefferson Township	Jessup Borough	Olyphant Borough	Roaring Brook Township	Scranton City	Throop Borough	TOTAL
Comparison of Currently Permitted Phase II to Originally Proposed Phase III Expansion	Change in Municipality Area from which Landfill is Visible within a 3-mile Radius of Landfill Peaks	square miles	0.000	0.243	0.150	0.277	0.040	0.000	0.000	0.173	0.883
	Change in Percentage of Municipality Areas within a 3-mile Radius of Landfill Peak from which the Original Expansion is Visible	percentage	0.0%	3.0%	30.4%	12.2%	0.8%	0.0%	0.0%	4.0%	-
	Change in Percentage of Municipality Area within a 3-mile Radius of Landfill Peak from which the Original Expansion is Visible	percentage	-	-	-	-	-	-	-	-	3.3%
	Change in Percentage of Total Municipality Areas from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	0.0%	3.0%	0.4%	4.1%	0.7%	0.0%	0.0%	4.0%	-
	Change in Percentage of Total Municipality Area from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	-	-	-	-	-	-	-	-	0.8%
	Change in Number of Housing Units within a 3-Mile Radius of the Original Expansion Peak from which the Landfill is Visible	# of units	0	323	0	0	10	0	0	283	616
	Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	704	0	0	22	0	0	651	1,377
Comparison of Currently Permitted Phase II to Modified Proposed Phase III Expansion (Lower Peak)	Change in Municipality Area from which Landfill is Visible within a 3-mile Radius of Landfill Peaks	square miles	0.000	0.210	0.003	0.147	0.040	0.000	0.000	0.171	0.571
	Change in Percentage of Municipality Areas within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible	percentage	0.0%	2.6%	0.6%	6.5%	0.8%	0.0%	0.0%	4.0%	-
	Change in Percentage of Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible	percentage	-	-	-	-	-	-	-	-	2.1%
	Change in Percentage of Total Municipality Areas from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	0.0%	2.6%	0.0%	2.2%	0.7%	0.0%	0.0%	4.0%	-
	Change in Percentage of Total Municipality Area from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	-	-	-	-	-	-	-	-	0.5%
	Change in Number of Housing Units within a 3-Mile Radius of the Modified Expansion Peak from which the Landfill is Visible	# of units	0	323	0	0	10	0	0	283	616
	Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	704	0	0	22	0	0	651	1,377
Comparison of Originally Proposed Phase III Expansion to Modified Proposed Phase III Expansion (Lower Peak)	Change in Municipality Area from which Landfill is Visible within a 3-mile Radius of Landfill Peaks	square miles	0.000	-0.033	-0.147	-0.130	0.000	0.000	0.000	-0.002	-0.312
	Change in Percentage of Municipality Areas within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible	percentage	0.0%	-0.4%	-29.8%	-5.7%	0.0%	0.0%	0.0%	0.0%	-
	Change in Percentage of Municipality Area within a 3-mile Radius of Landfill Peak from which the Modified Expansion is Visible	percentage	-	-	-	-	-	-	-	-	-1.2%
	Change in Percentage of Total Municipality Areas from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	0.0%	-0.4%	-0.4%	-1.9%	0.0%	0.0%	0.0%	0.0%	-
	Change in Percentage of Total Municipality Area from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	-	-	-	-	-	-	-	-	-0.3%
	Change in Number of Housing Units within a 3-Mile Radius of the Modified Expansion Peak from which the Landfill is Visible	# of units	0	0	0	0	0	0	0	0	0
	Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	0	0	0	0	0	0	0	0

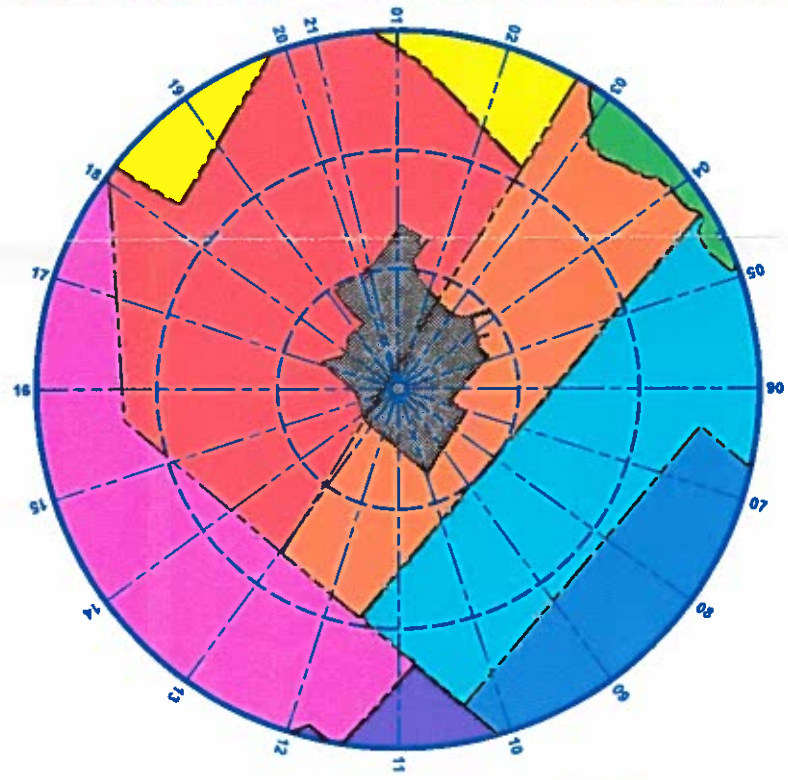
Notes:

1. KSL's property occupies approximately 1.42 square milesof the 28.27 square mile area occupied by a 3-mile radius circle.
2. Percentages of area from which landfill is visible excludes KSL property.
3. Population data and household size based on 2010 estimates from U.S. Census Bureau.
4. Building locations from PAMAP were manually adjusted to reflect only residential dwellings using a 2011 aerial map to determine the number of housing units within a 3-mile radius of the landfill peak. Data for number of individuals per household (from the 2010 U.S. Census) was used to determine the number of individuals based on residential dwelling counts.

ATTACHMENT 2

Line-of-Sight Drawings





LEGEND
(% OF STUDY AREA)

KEYSTONE SANITARY LANDFILL	5%
DUNMORE	28%
THROOP	15%
SCRANTON	5%
DICKSON CITY	2%
OLYPHANT	17%
JESSUP	8%
JEFFERSON TOWNSHIP	2%
ROARING BROOK TOWNSHIP	18%

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

Sheet					
1	STUDY AREA	ARM	1" = 1500'		
		WST	01/22/2016		
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	SEH	14411		
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET			

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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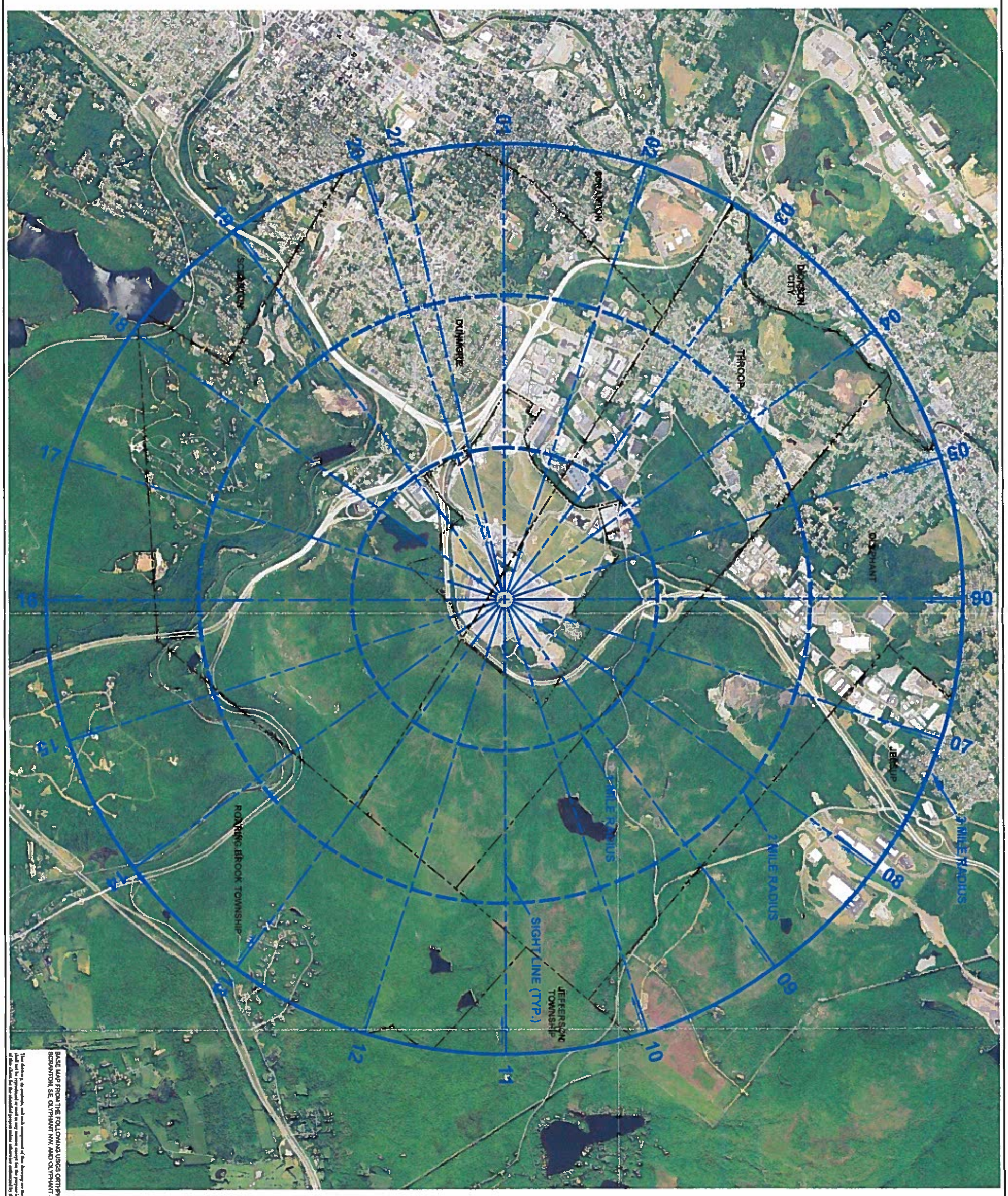

BASE MAP FROM THE FOLLOWING USGS ORTHOPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Sheet	Drawing title		Drawn	Scale
2	AERIAL PHOTOGRAPH		ARM	1" = 1500'
			WST	01/22/2016
			SEH	14411
	Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	Graphic scale: 0 1500 3000 4500 SCALE IN FEET	

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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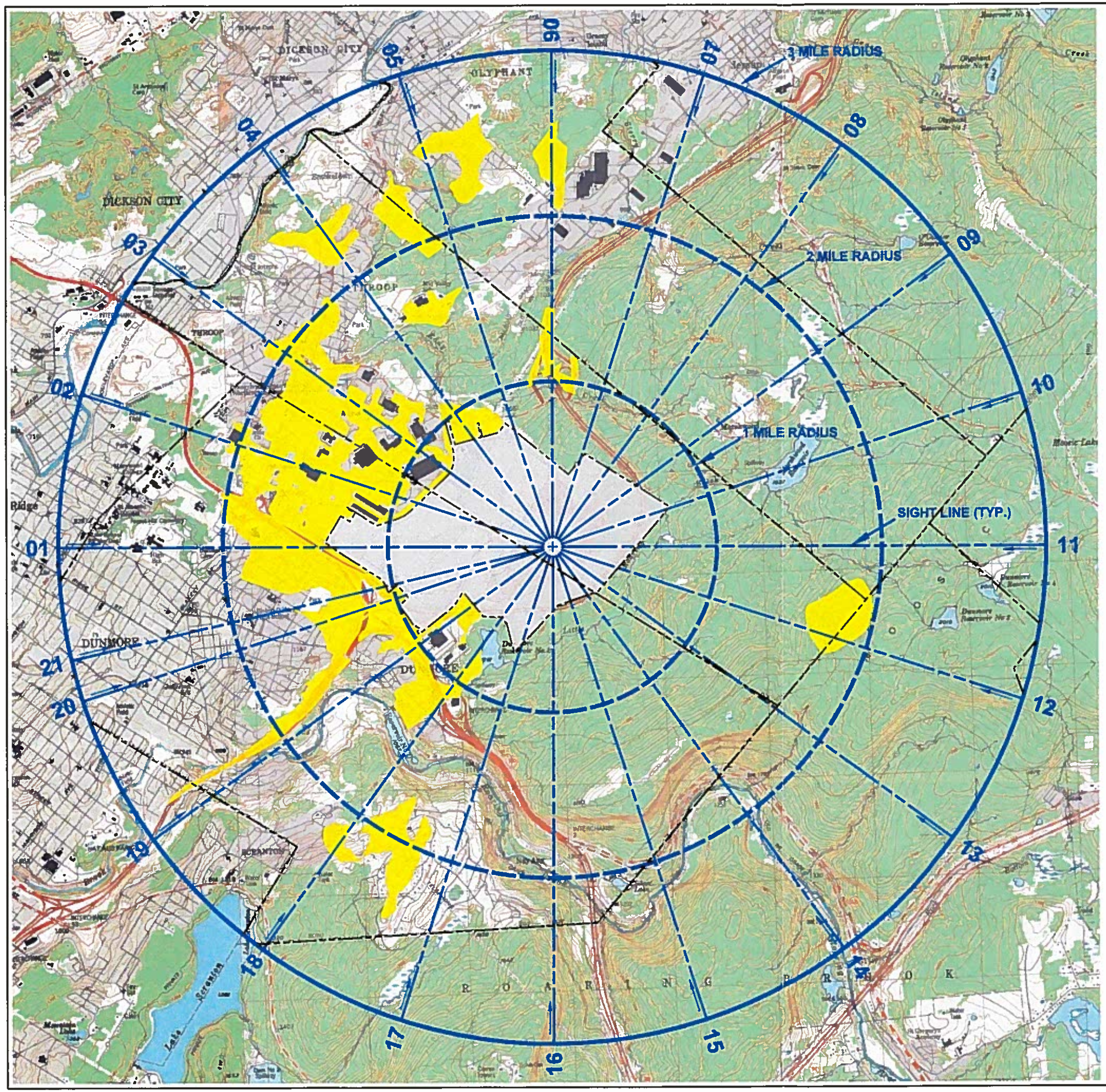
P:\Schuylkill\1441 Keystone Landfill\Dwg\Production\Phase 1 Delineation\Site Sketch.dwg Plotted: January 25, 2016



KEYSTONE SANITARY LANDFILL PERMITTED PHASE II EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	Within the 3-Mile Study Radius: (B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	4.70	0.44	0.00	-	-	-
Dunmore	8.16	8.00	1.27	15.9	4.7	15.6
Jefferson Township	33.95	0.49	0.00	-	-	-
Jessup	6.80	2.27	0.00	-	-	-
Keystone Sanitary Landfill*	-	1.42	-	-	-	-
Olyphant	5.47	4.94	0.19	3.9	0.7	3.5
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.69	16.0	2.6	16.0
Total Area of 3-Mile Radius Study		28.26	2.20		8.2	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase II expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase II landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE II LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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No.	Revisions	Date	By
0	ISSUED FOR REVIEW	10/22/16	BAKE

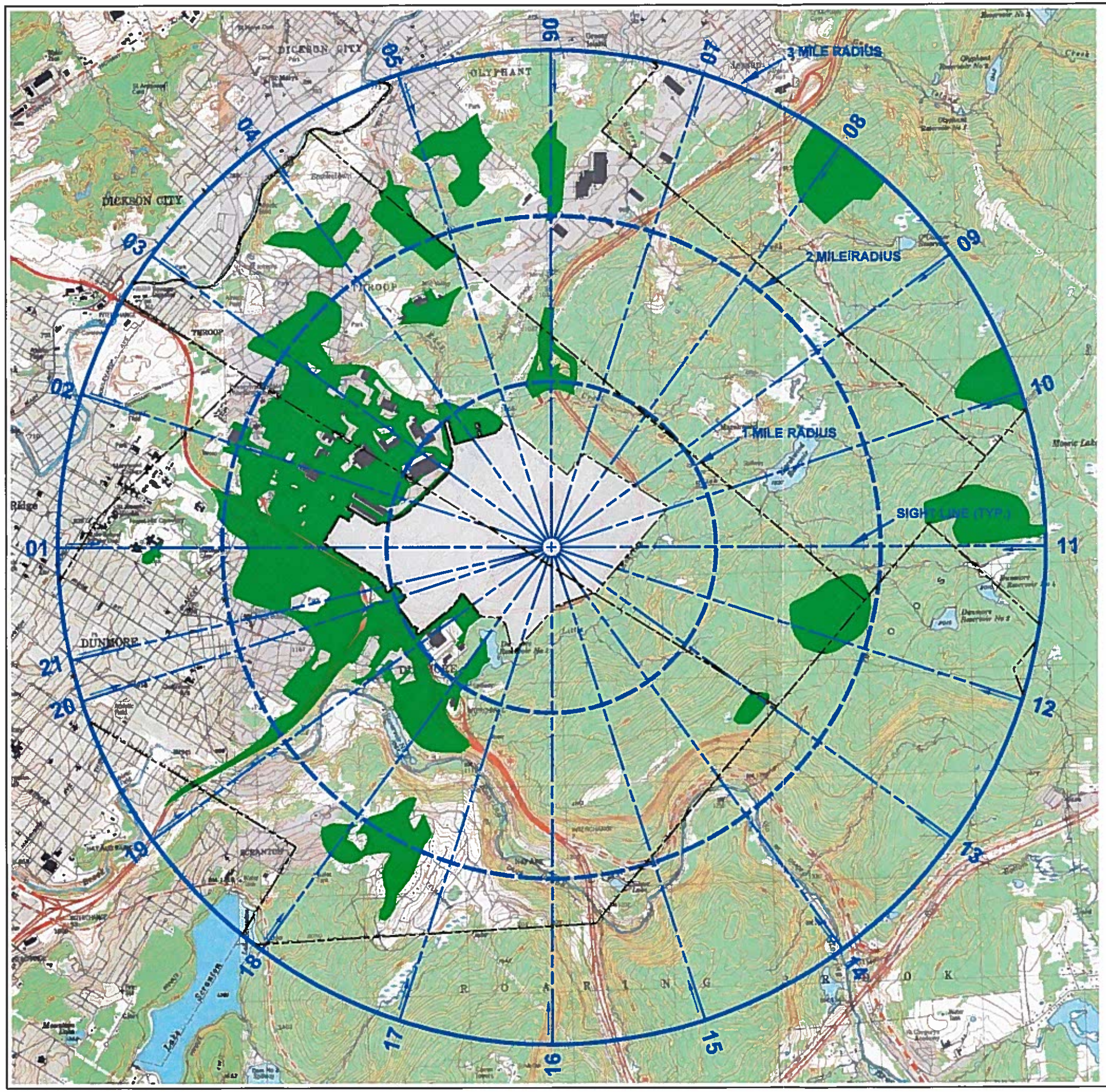
SCALE 1" = 1500'
DATE 01/22/2016
PROJECT NO. 14411
DRAWN ARM
CHECKED WST
APPROVED SEH

PHASE II VISIBLE AREAS OVERLAID ON USGS QUADS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

Sheet 3a



KEYSTONE SANITARY LANDFILL ORIGINAL PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	Within the 3-Mile Study Radius (B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	4.70	0.44	0.00	-	-	-
Dunmore	8.16	8.00	1.52	19.0	5.6	18.6
Jefferson Township	33.95	0.49	0.15	30.4	0.6	0.4
Jessup	6.80	2.27	0.28	12.2	1.0	4.1
Keystone Sanitary Landfill*	-	1.42	-	-	-	-
Olyphant	5.47	4.94	0.23	4.7	0.9	4.3
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.87	20.1	3.2	20.1
Total Area of 3-Mile Radius Study		28.26	3.08		11.5	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF ORIGINAL PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

Designed	ARM
Checked	WST
Drawn	SEH
Scale	1" = 1500'
Date	01/22/2016
Project No.	14411

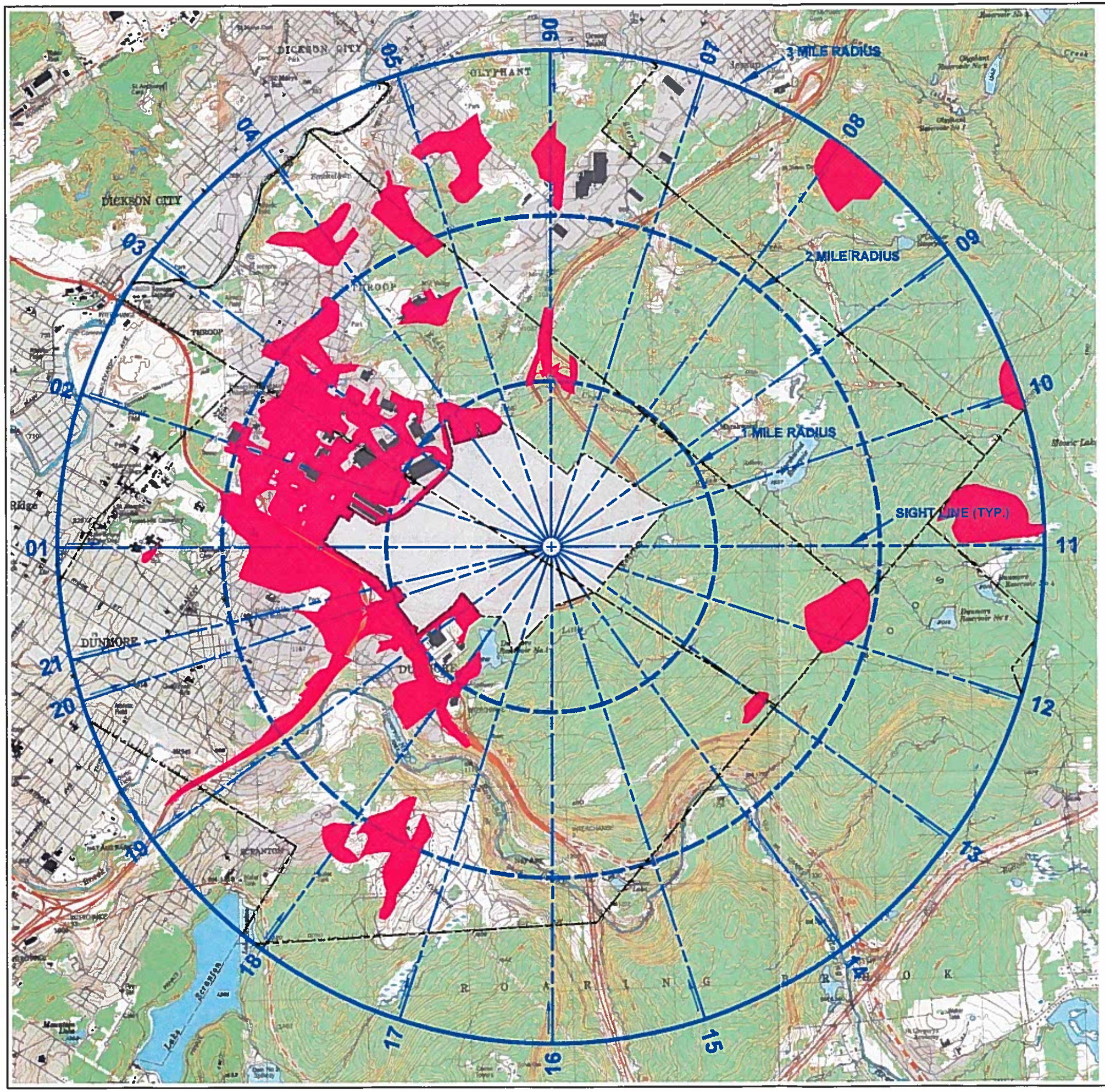
SCALE IN FEET

ORIGINAL PHASE III VISIBLE AREAS OVERLAID ON USGS QUADS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

Sheet 3b



KEYSTONE SANITARY LANDFILL MODIFIED PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	Within the 3-Mile Study Radius (B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	4.70	0.44	0.00	-	-	-
Dunmore	8.16	8.00	1.48	18.5	5.5	18.2
Jefferson Township	33.95	0.49	0.00	0.5	0.0	0.0
Jessup	6.80	2.27	0.15	6.4	0.6	2.2
Keystone Sanitary Landfill*	-	1.42	-	-	-	-
Olyphant	5.47	4.94	0.23	4.7	0.9	4.3
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.87	20.0	3.2	20.0
Total Area of 3-Mile Radius Study		28.26	2.77		10.3	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF MODIFIED PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

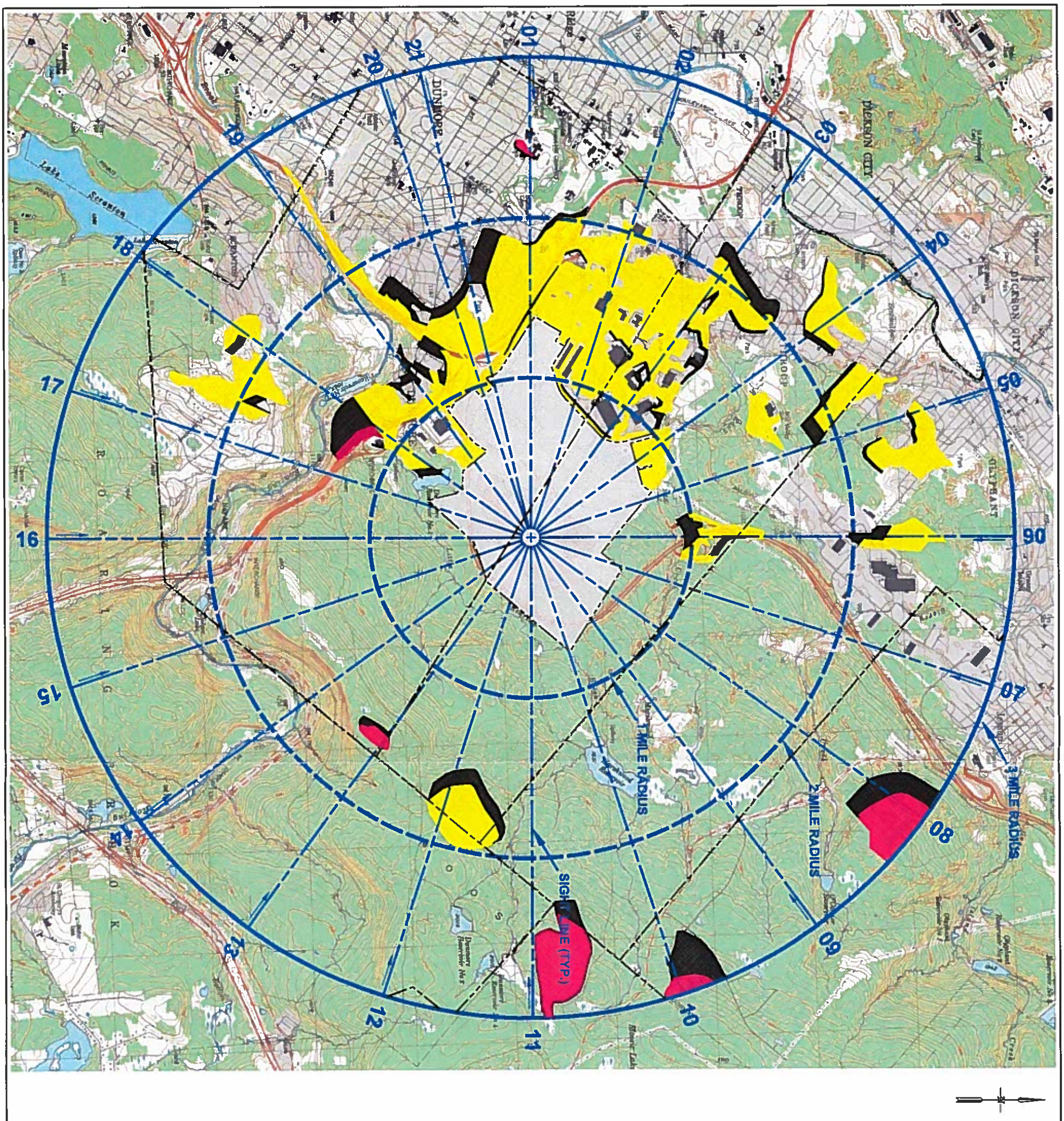
Scale: 1" = 1500'
Date: 01/22/2016
Project No: 14411
Drawn: ARM
Checked: WST
Approved: SEH

MODIFIED PHASE III VISIBLE AREAS OVERLAID ON USGS QUADS

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 3c



LEGEND

- PROBABLE AREA OF PHASE II LANDFILL VISIBILITY
- ORIGINAL PHASE III ELEVATION PROPOSED AREA OF CHANGE (INCREASE) IN LANDFILL VISIBILITY
- MODIFIED PHASE III ELEVATION PROPOSED REDUCED LIMITS OF ANTICIPATED LANDFILL VISIBILITY REPRESENTS A DECREASE IN VISIBILITY FROM PHASE III ELEVATIONS PREVIOUSLY PROPOSED
- AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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Sheet	AREAS OF CHANGE (INCREASE) OF VISIBLILITY OVERLAID ON USGS QUADS		ARM	1" = 1500'
3d	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	WST	01/22/2016
			SEH	14411

SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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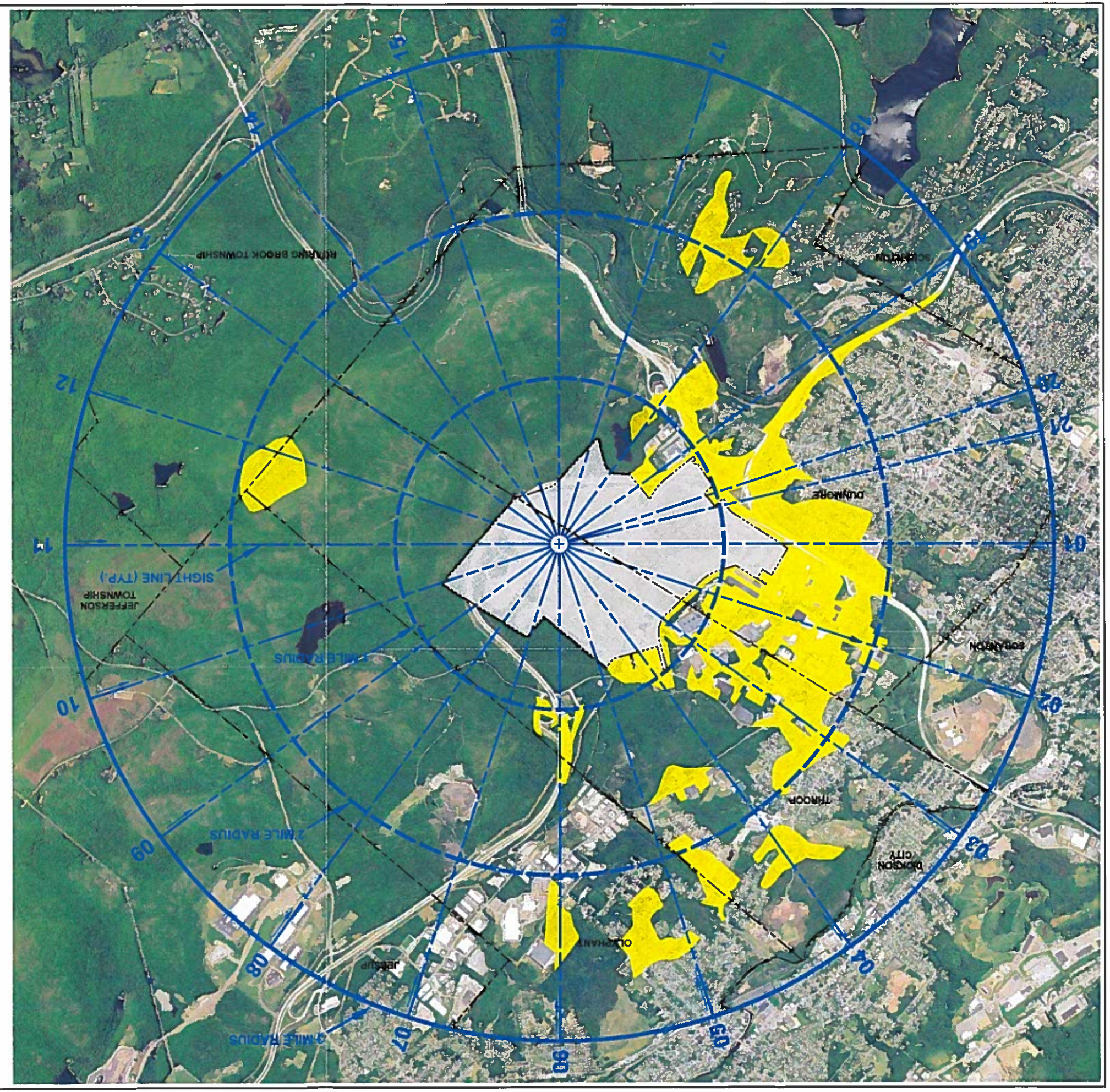

KEYSTONE SANITARY LANDFILL PERMITTED PHASE II EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	(B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
		Within the 3-Mile Study Radius				
Dickson City	4.70	0.44	0.00	-	-	-
Dunmore	8.16	8.00	1.27	15.9	4.7	15.6
Jefferson Township	33.95	0.49	0.00	-	-	-
Jessup	6.80	2.27	0.00	-	-	-
Keystone Sanitary Landfill*	-	1.42	-	-	-	-
Olyphant	5.47	4.94	0.19	3.9	0.7	3.5
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.69	16.0	2.6	16.0
Total Area of 3-Mile Radius Study		28.26	2.20		8.2	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase II expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase II landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE II LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Sheet 4a

PHASE II VISIBLE AREAS OVERLAID ON AERIAL PHOTOGRAPHS

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Drawn	ARM
Checked	WST
Date	SEH
Scale	1" = 1500'
Date	01/22/2016
Project	14411

ISSUED FOR REVIEW

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

KEYSTONE SANITARY LANDFILL ORIGINAL PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	Within the 3-Mile Study Radius (B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	4.70	0.44	0.00	–	–	–
Dunmore	8.16	8.00	1.52	19.0	5.6	18.6
Jefferson Township	33.95	0.49	0.15	30.4	0.6	0.4
Jessup	6.80	2.27	0.28	12.2	1.0	4.1
Keystone Sanitary Landfill*	–	1.42	–	–	–	–
Olyphant	5.47	4.94	0.23	4.7	0.9	4.3
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.87	20.1	3.2	20.1
Total Area of 3-Mile Radius Study		28.26	3.08		11.5	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF ORIGINAL PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

Designed: ARM
Checked: WST
Drawn: SEH
Scale: 1" = 1500'
Date: 01/22/2016
Project No: 14411

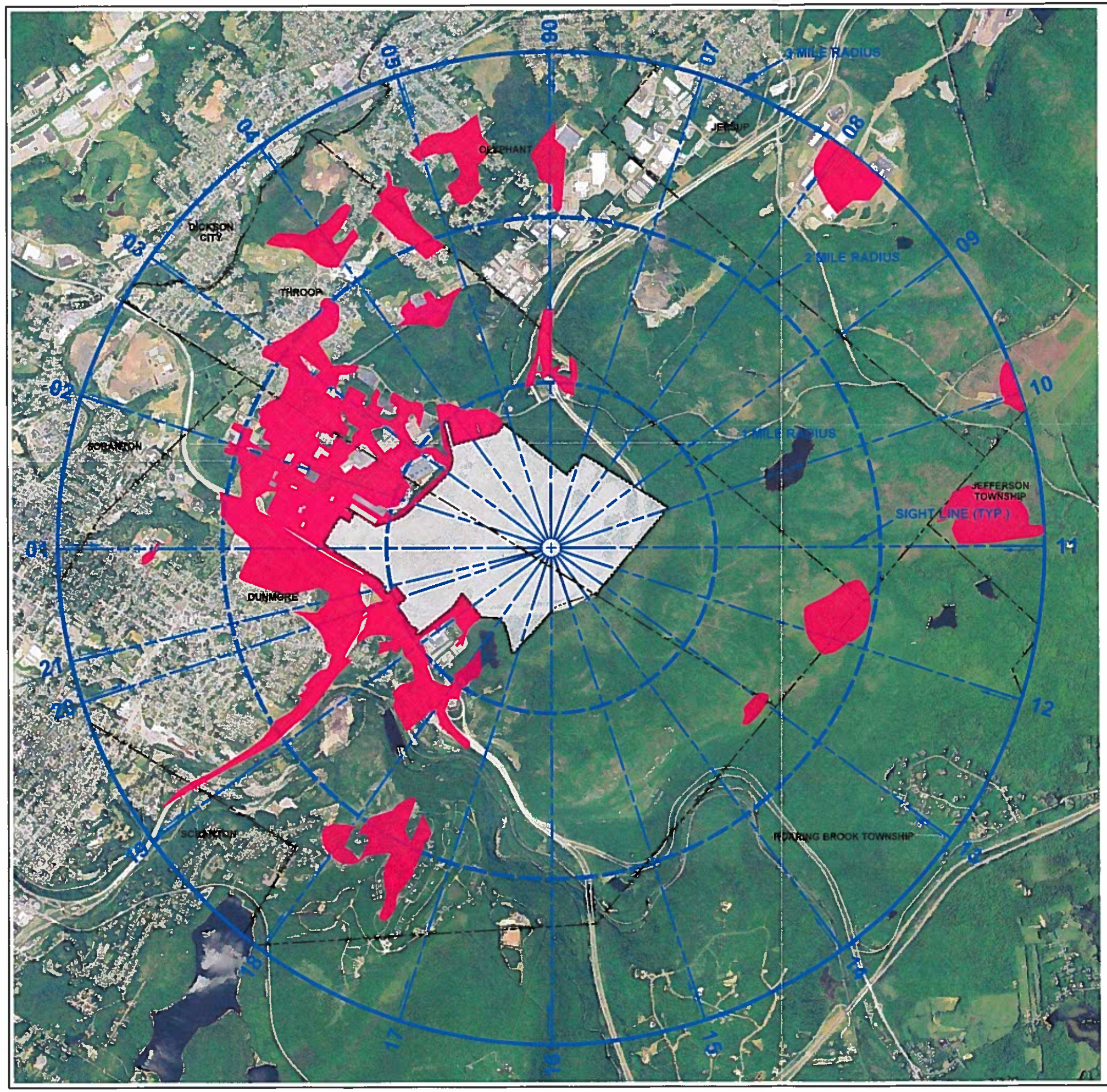
SCALE IN FEET

PHASE III VISIBLE AREAS OVERLAID ON AERIAL PHOTOGRAPHS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

Sheet 4b



KEYSTONE SANITARY LANDFILL MODIFIED PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Sq. Miles)	Within the 3-Mile Study Radius (B) 3-Mile Area (Sq. Miles)	(C) Visible Area (Sq. Miles)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	4.70	0.44	0.00	-	-	-
Dunmore	8.16	8.00	1.48	18.5	5.5	18.2
Jefferson Township	33.95	0.49	0.00	0.5	0.0	0.0
Jessup	6.80	2.27	0.15	6.4	0.6	2.2
Keystone Sanitary Landfill*	-	1.42	-	-	-	-
Olyphant	5.47	4.94	0.23	4.7	0.9	4.3
Roaring Brook Township	22.23	5.00	0.03	0.7	0.1	0.2
Scranton	25.44	1.37	0.00	0.3	0.0	0.0
Throop	4.33	4.32	0.87	20.0	3.2	20.0
Total Area of 3-Mile Radius Study		28.26	2.77		10.3	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF MODIFIED PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Rev.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

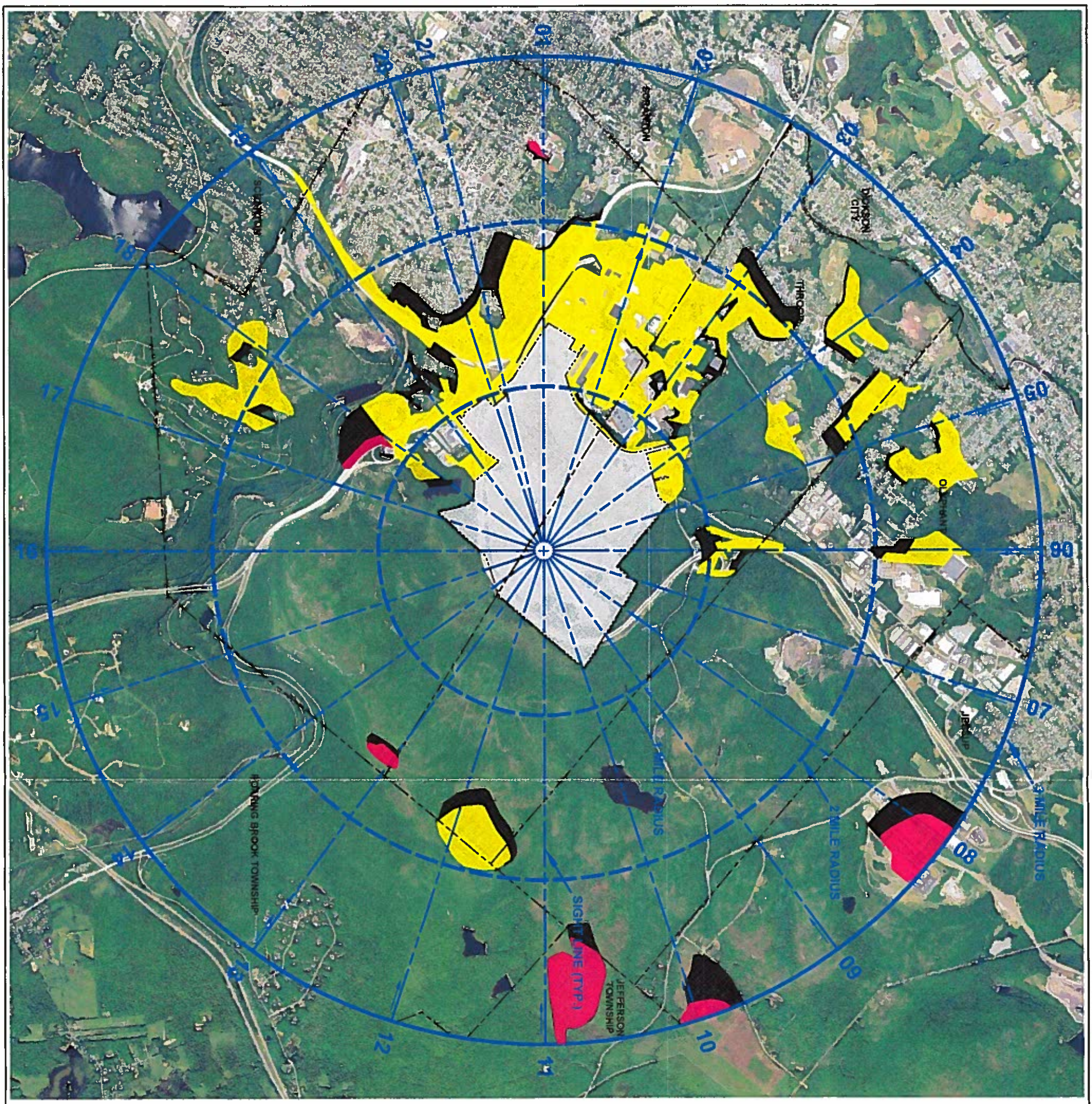
Scale: 1" = 1500'
Date: 01/22/2016
Project No: 14411
Drawn: ARM
Checked: WST
Approved: SEH
Scale in Feet: 0 1500 3000 6000

MODIFIED PHASE III VISIBLE AREAS OVERLAID ON AERIAL PHOTOGRAPHS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

Sheet 4c



LEGEND

- PROBABLE AREA OF PHASE III LANDFILL VISIBILITY
- ORIGINAL PHASE III ELEVATION PROPOSED AREA OF CHANGE (INCREASE) IN LANDFILL VISIBILITY
- MODIFIED PHASE III ELEVATION PROPOSED REDUCED LIMITS OF ANTICIPATED LANDFILL VISIBILITY REPRESENTS A DECREASE IN VISIBILITY FROM PHASE III ELEVATIONS PREVIOUSLY PROPOSED
- AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHOPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Sheet 4d

AREAS OF CHANGE (INCREASE) OF VISIBLILITY ON AERIAL PHOTOGRAPHS

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

Designed	ARM	Scale	1" = 1500'
Checked	WST	Date	01/22/2016
Drawn	SEH	Project No.	14411

SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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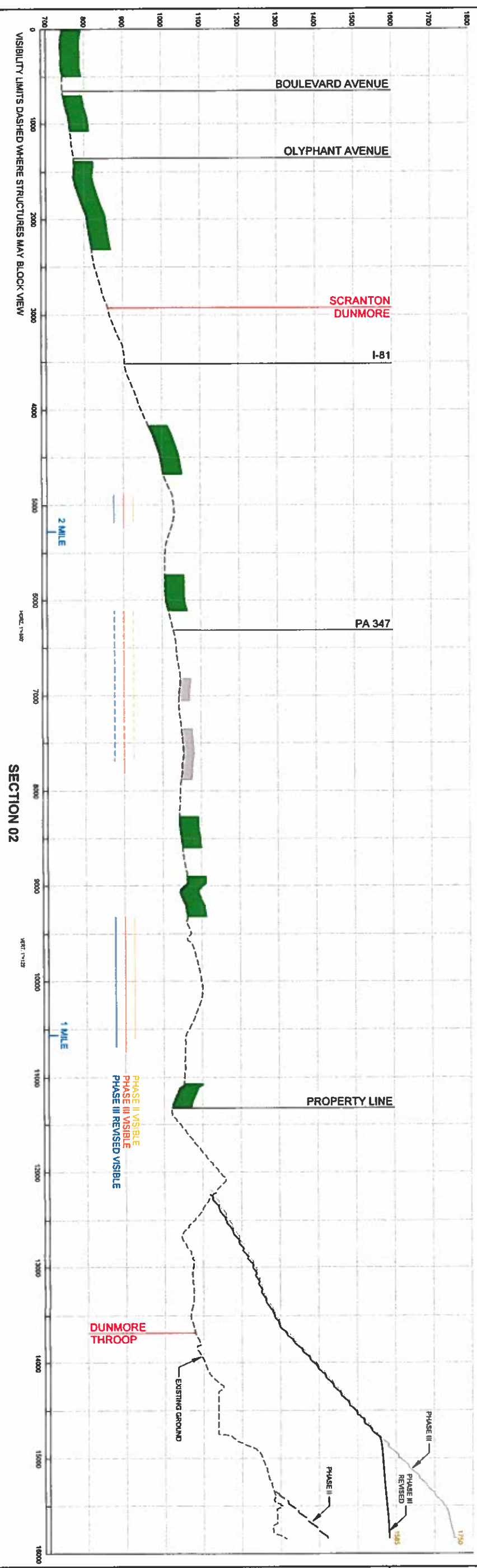

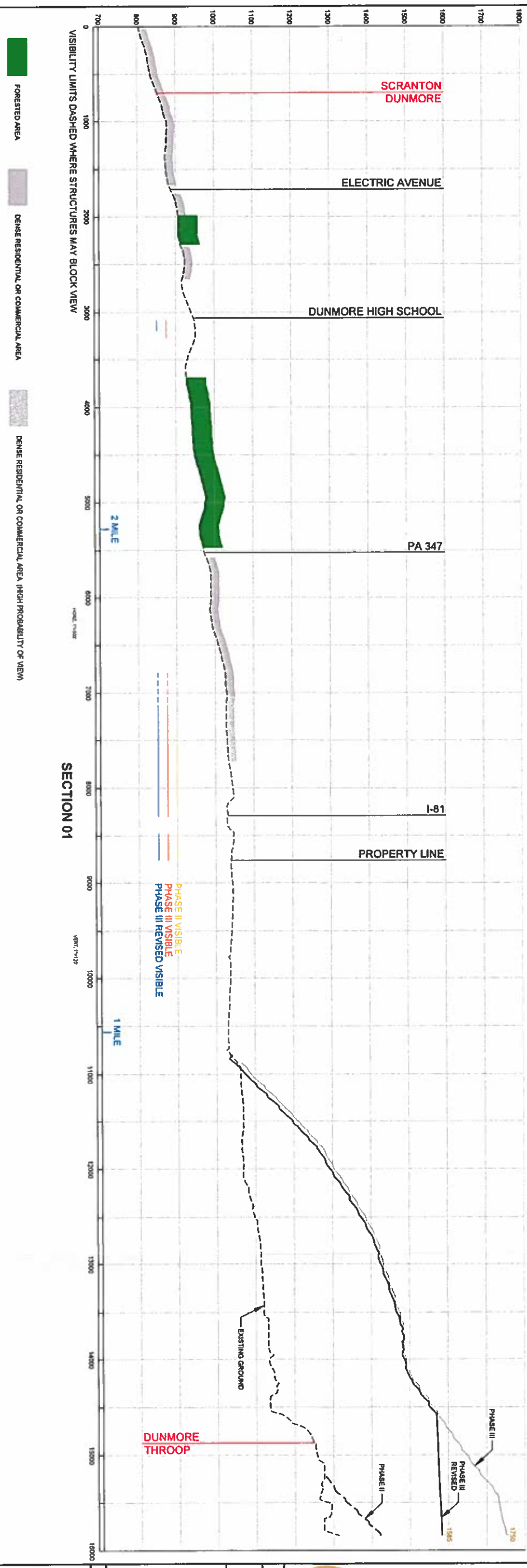

FORESTED AREA

DENSE RESIDENTIAL OR COMMERCIAL AREA

DENSE RESIDENTIAL OR COMMERCIAL AREA (HIGH PROBABILITY OF VIEW)

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Sheet 5	PROFILE SECTIONS 01-02	ARM	1" = 500'
		WST	01/22/2016
		SEH	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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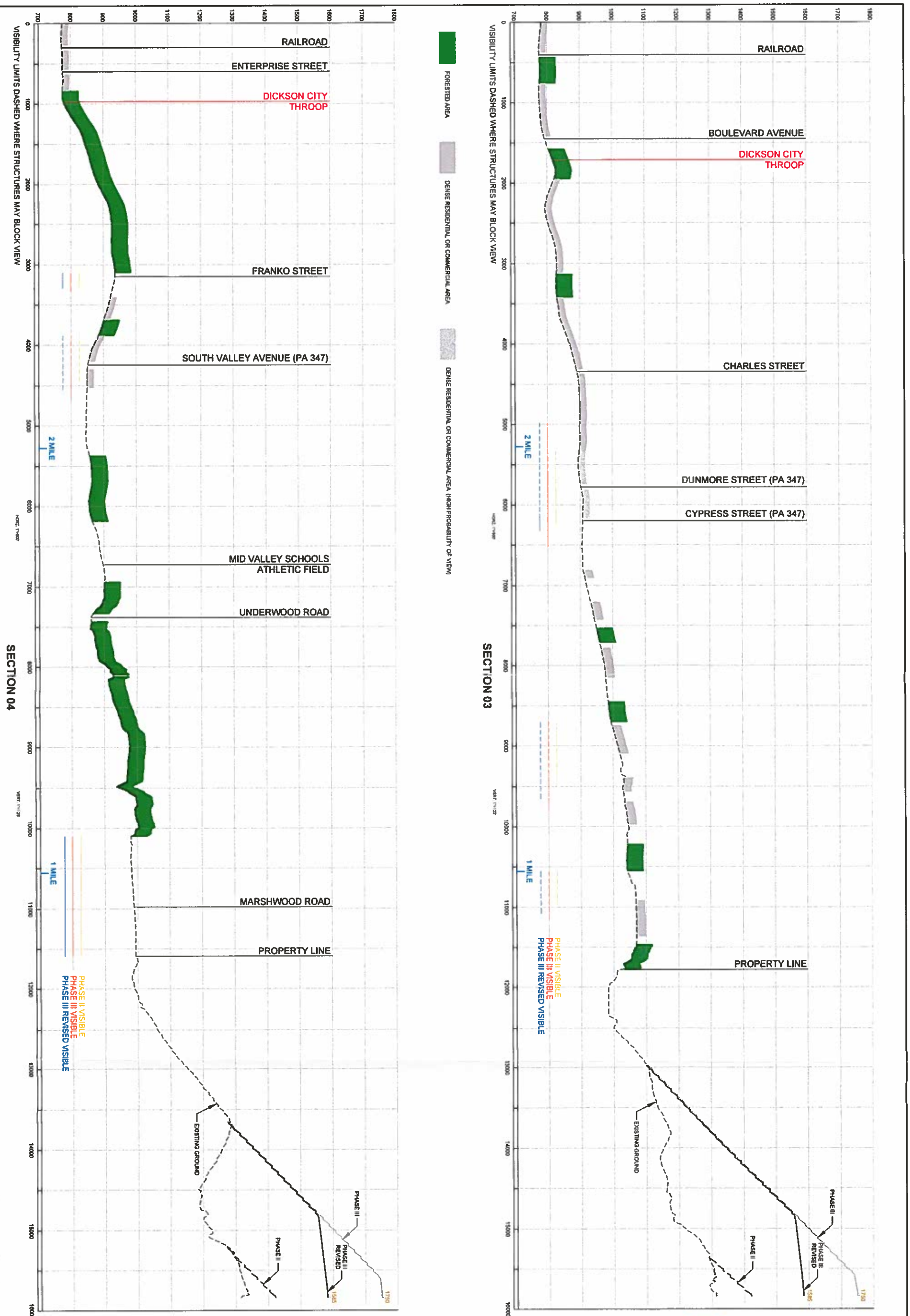

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Sheet 6	PROFILE SECTIONS 03-04	ARM	1" = 500'
		WST	01/22/2016
		SEH	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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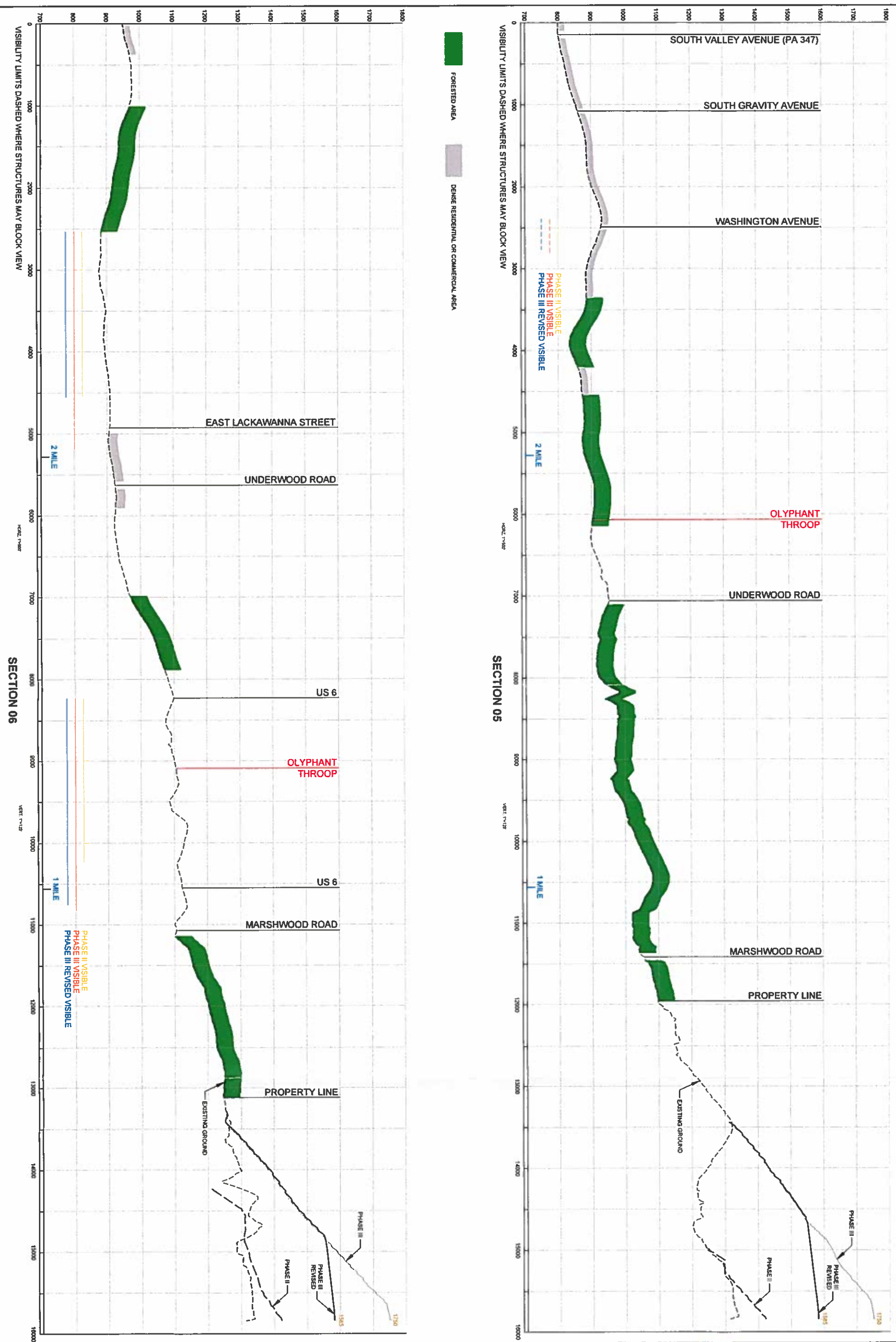

Sheet	Drawing title				
7	PROFILE SECTIONS 05-06		ARM	1" = 500'	
			WST	01/22/2016	
			SEH	14411	
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET		

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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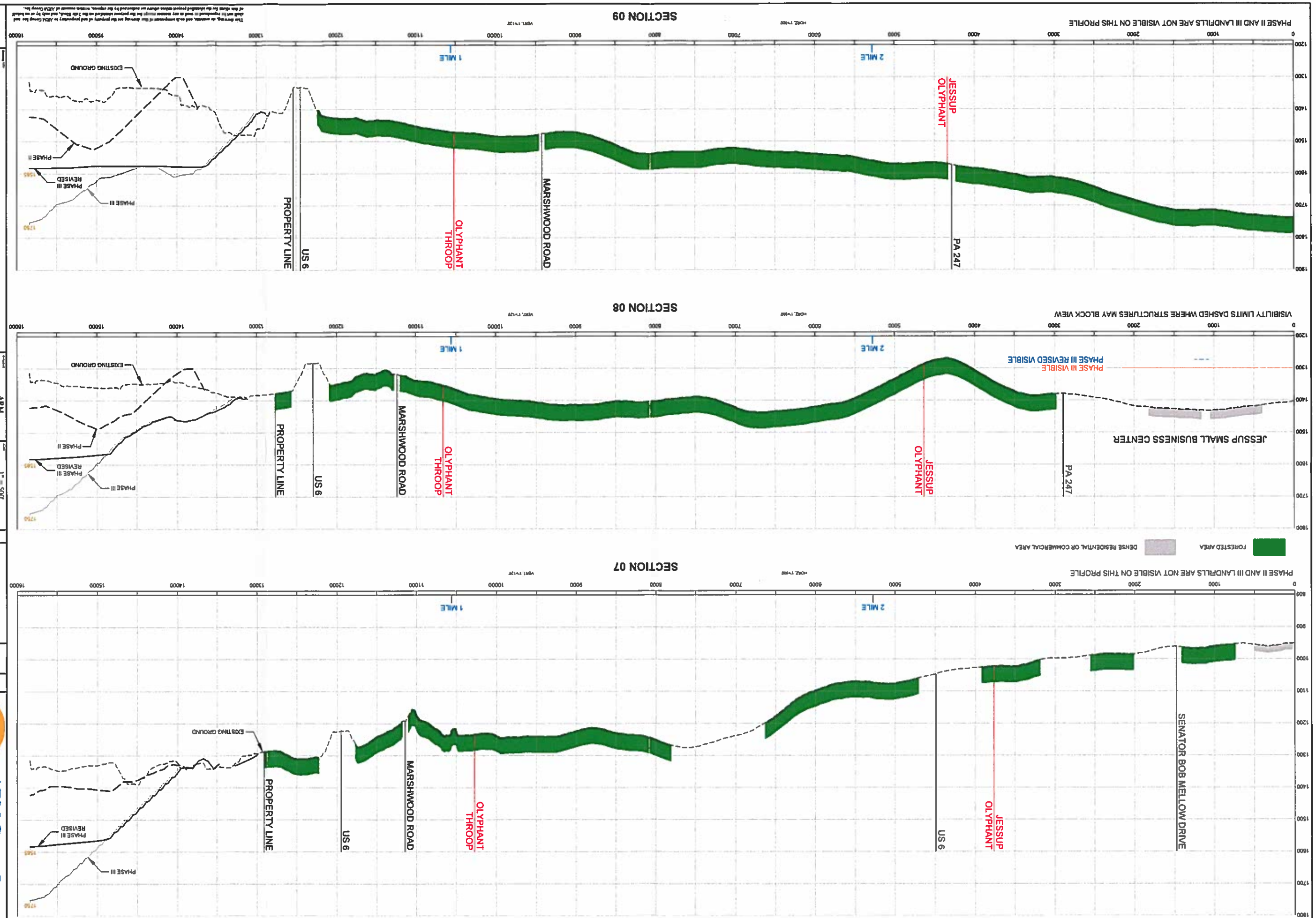

Sheet 8

PROFILE SECTIONS 07-09

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

ARM	1" = 500'
WST	01/22/2016
SEH	14411

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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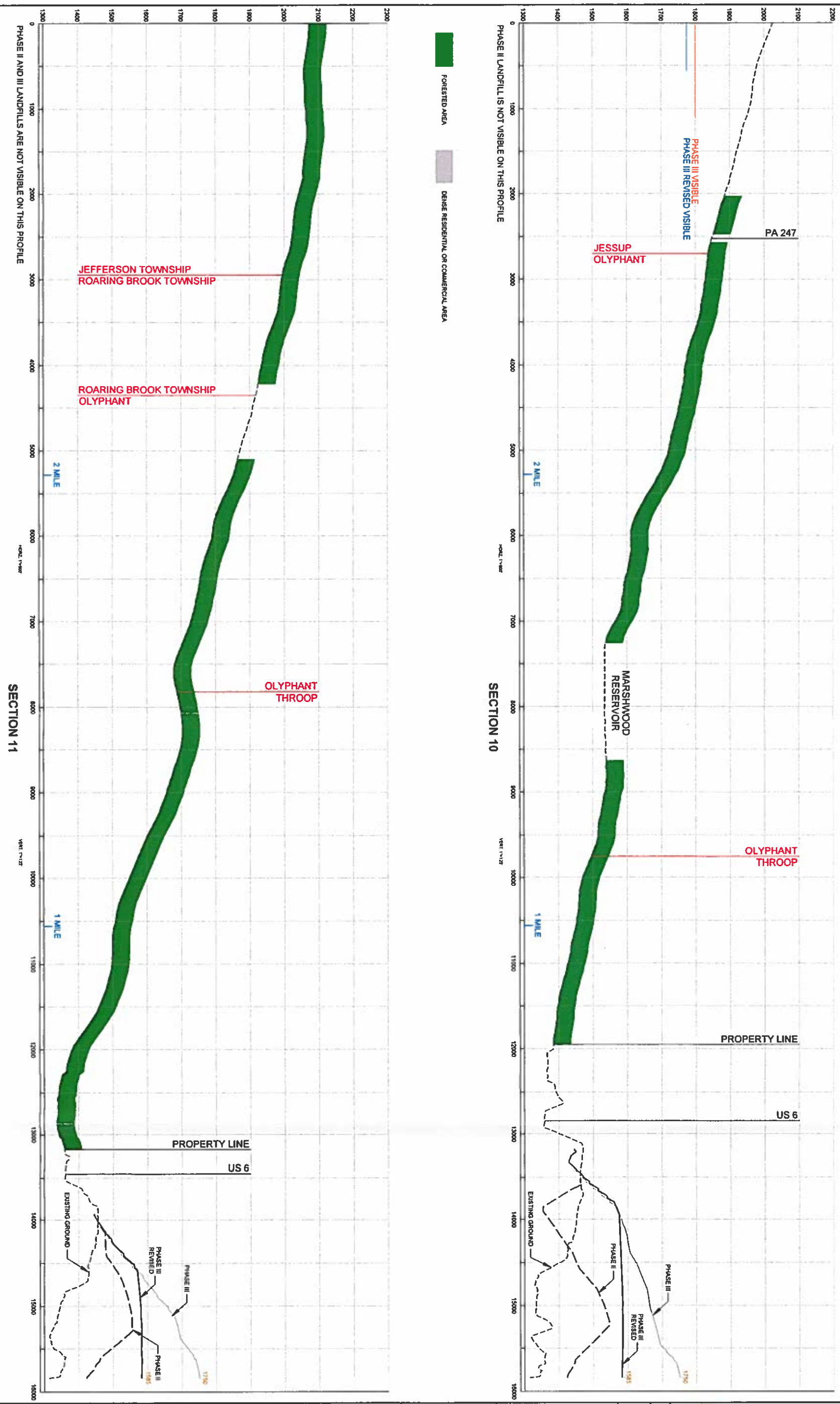

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Sheet				
9	PROFILE SECTIONS 10-11	ARM	1" = 500'	
		WST	01/22/2016	
		SEH	14411	
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA		

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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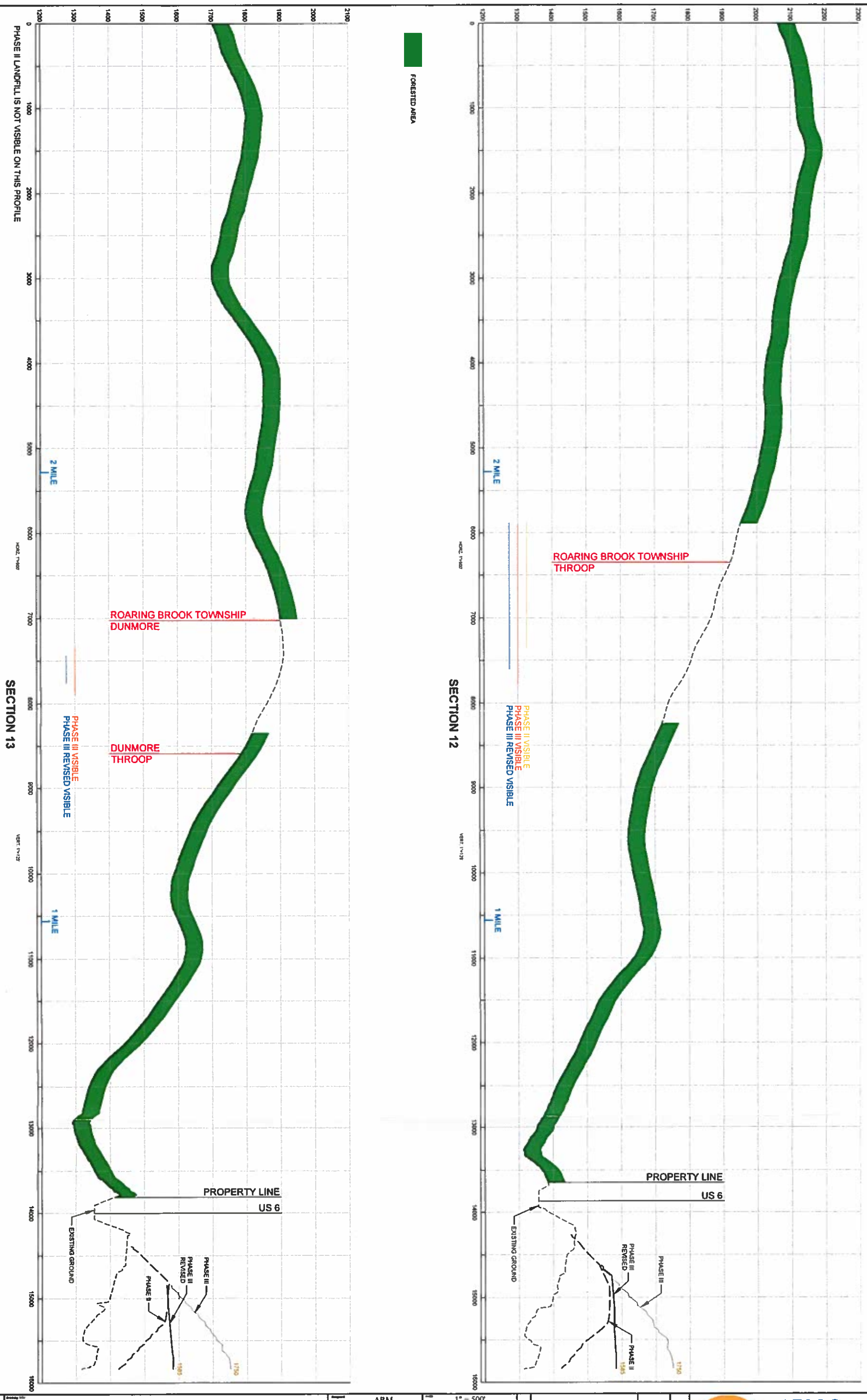

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Sheet	Drawing title					
10	PROFILE SECTIONS 12-13		ARM	1" = 500'		
			WST	01/22/2016		
			SEH	14411		
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA			P	ISSUED FOR REVIEW
					No.	Revision

SCALE IN FEET

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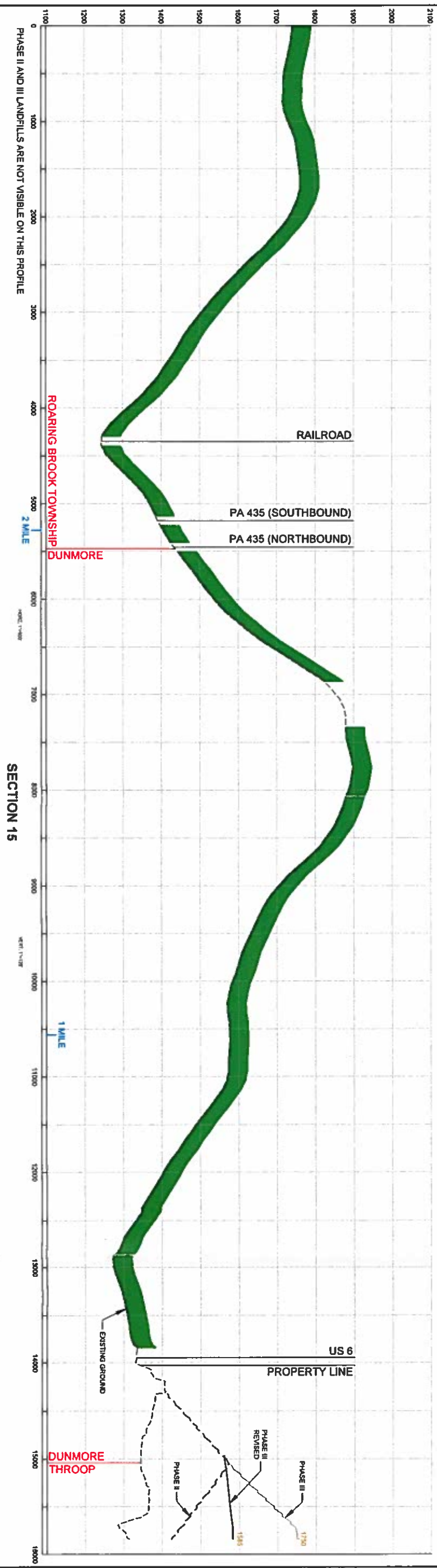

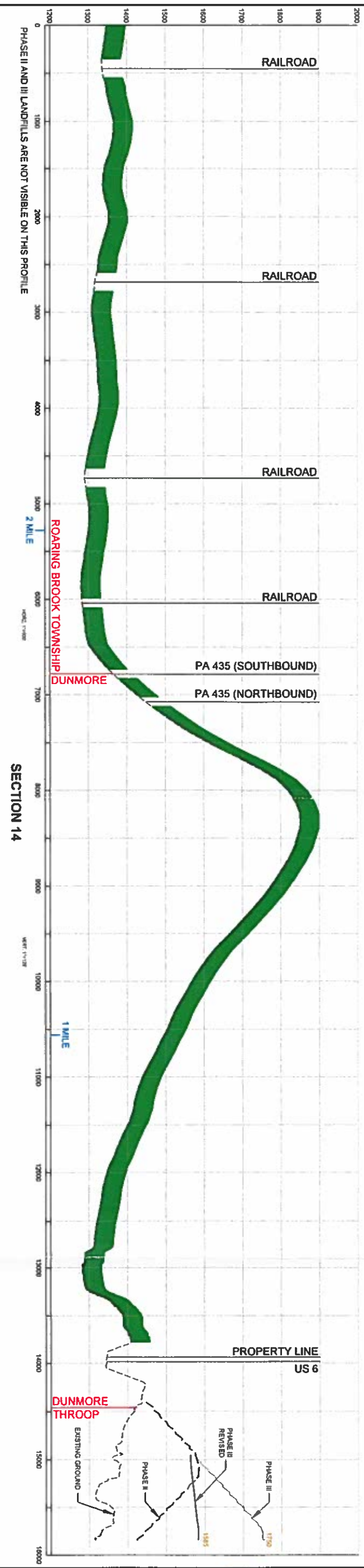

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Sheet	Drawing title				
11	PROFILE SECTIONS 14-15	designed ARM	scale 1" = 500'		
		checked WST	date 01/22/2016		
	Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	drawn SEH	project no. 14411		
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	graphic scale 0 500 1000 1500 SCALE IN FEET			

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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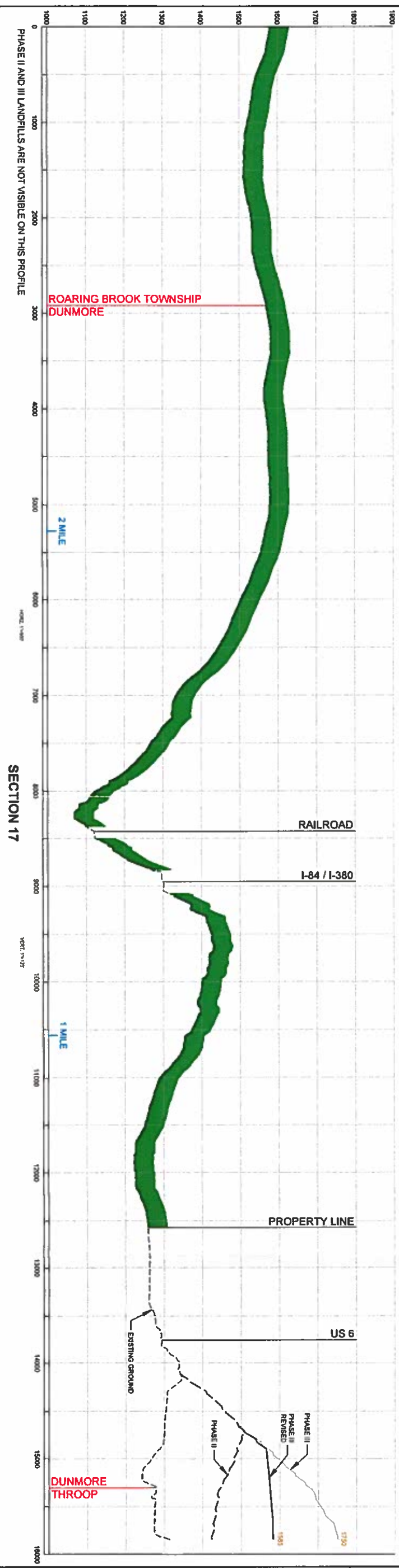

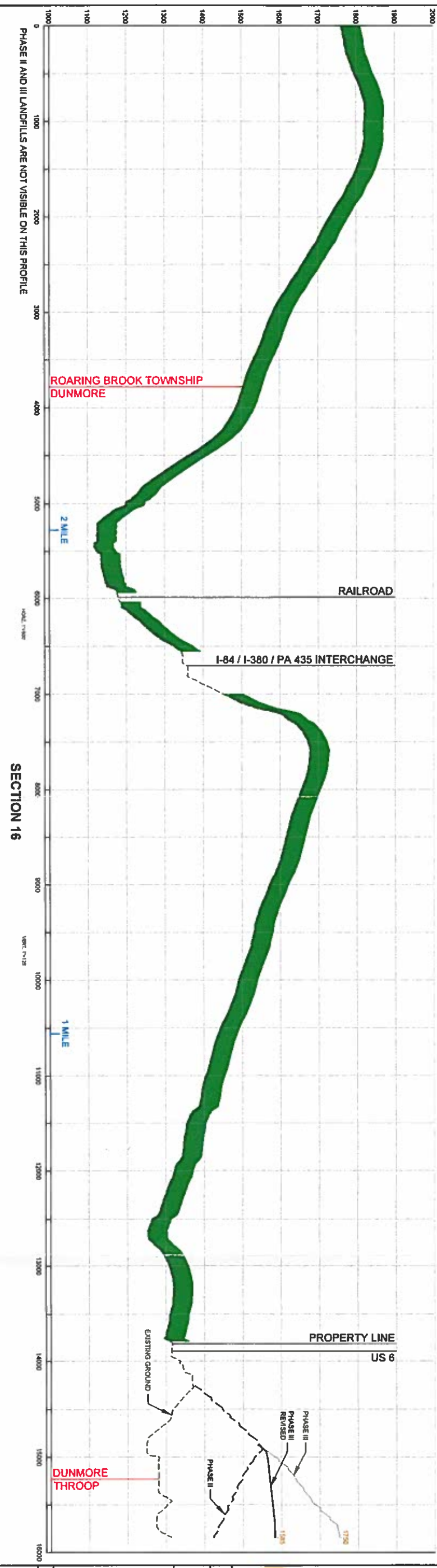

FORESTED AREA

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Sheet	Drawing title					
12	PROFILE SECTIONS 16-17		Designed ARM	scale 1" = 500'		
			checked WST	date 01/22/2016		
	project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	drawn SEH	project no. 14411		
			graphic scale 0 500 1000 1500 SCALE IN FEET			

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/22/16	ARM

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P:\Dwg\pdf\14411 Keystone Landfill\Proposed\Phase 3 Contours\Profile.dwg Plotted: January 25, 2016

Sheet					
13	PROFILE SECTIONS 18-19	ARM	1" = 500'		
		WST	01/22/2016		
		SEH	14411		
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET	ISSUED FOR REVIEW	01/22/16 ARM
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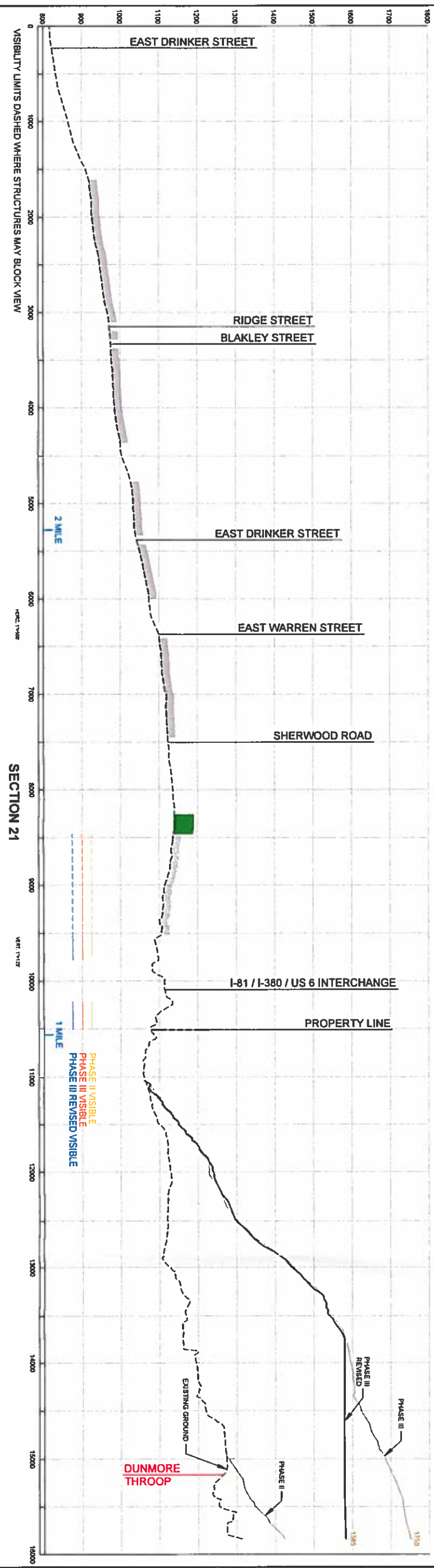

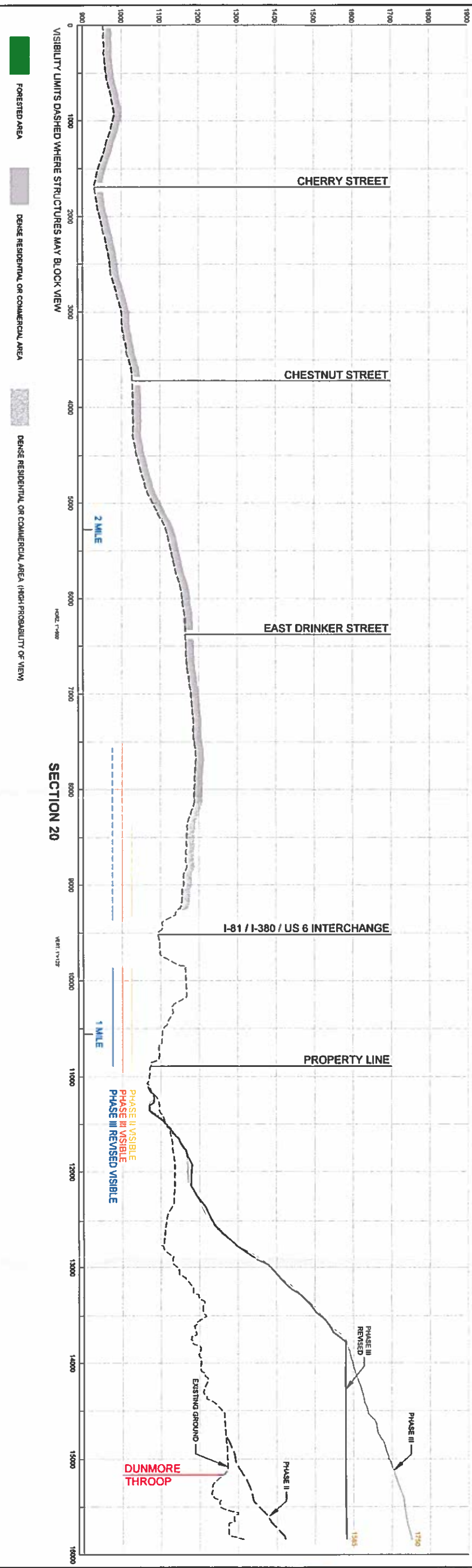

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	Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	Checked: WST	Date: 01/22/2016	
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			Profile Scale: 0 500 1000 1500 SCALE IN FEET		

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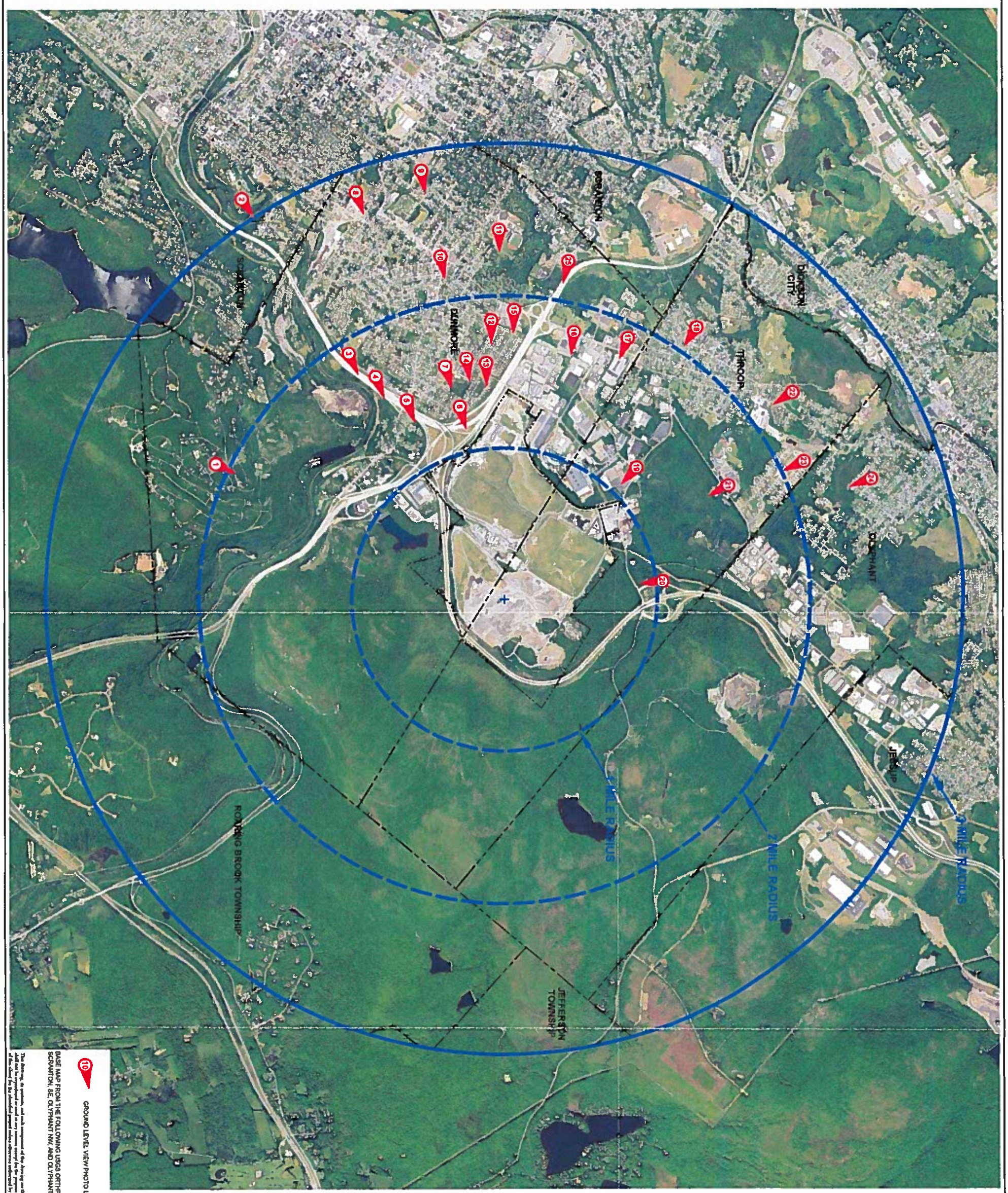

BASE MAP FROM THE FOLLOWING USGS ORTHIPHOTOS DATED 2013: SCRANTON NE, SE, OLYPHANT NW, AND OLYPHANT SW.

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Photo 01

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - 1241 December Drive, on Mt. Margaret

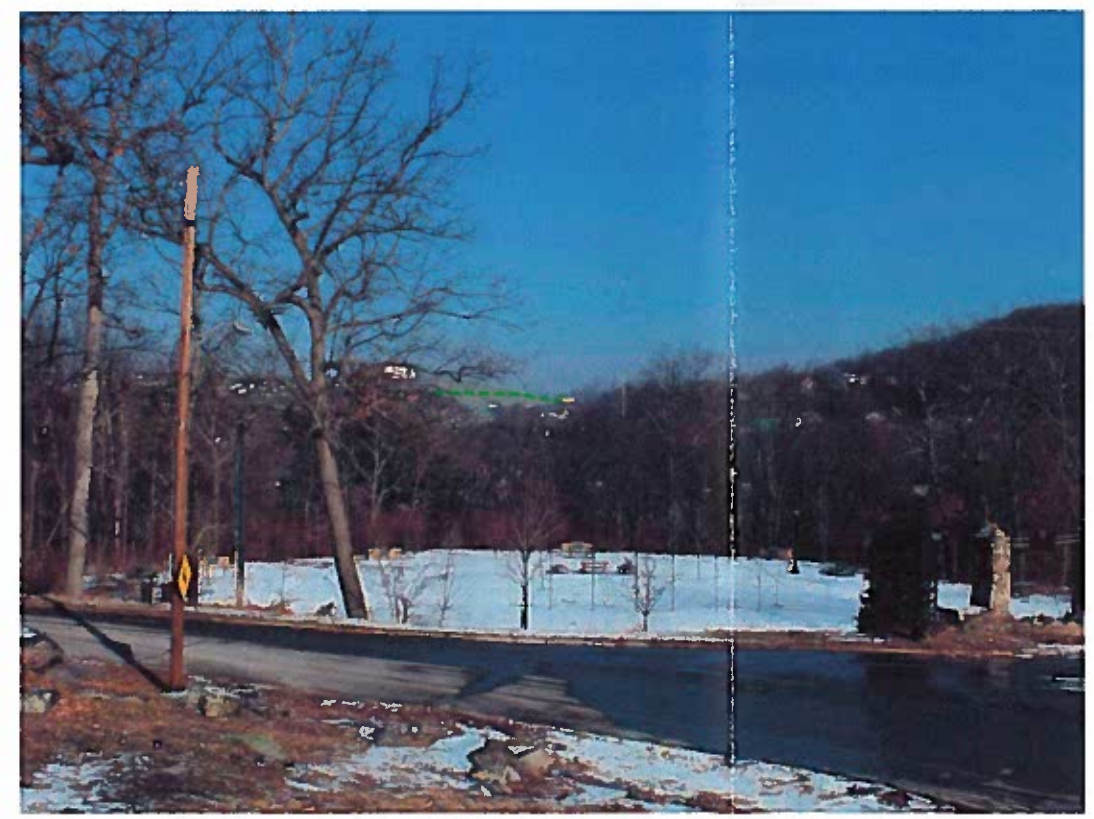
Photo 02

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Nay Aug Park above the Wildlife Center

LEGEND

- - - - - - - - - - - - MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III Expansion with Modified Phase III Grading Projection - 1241 December Drive, on Mt. Margaret



Proposed Phase III Expansion with Modified Phase III Grading Projection - Nay Aug Park above the Wildlife Center

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Project No.: 14411

Designed: ARM
Drawn: WST
Reviewed: SEH

Drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 01-02

Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 16

Photo 03

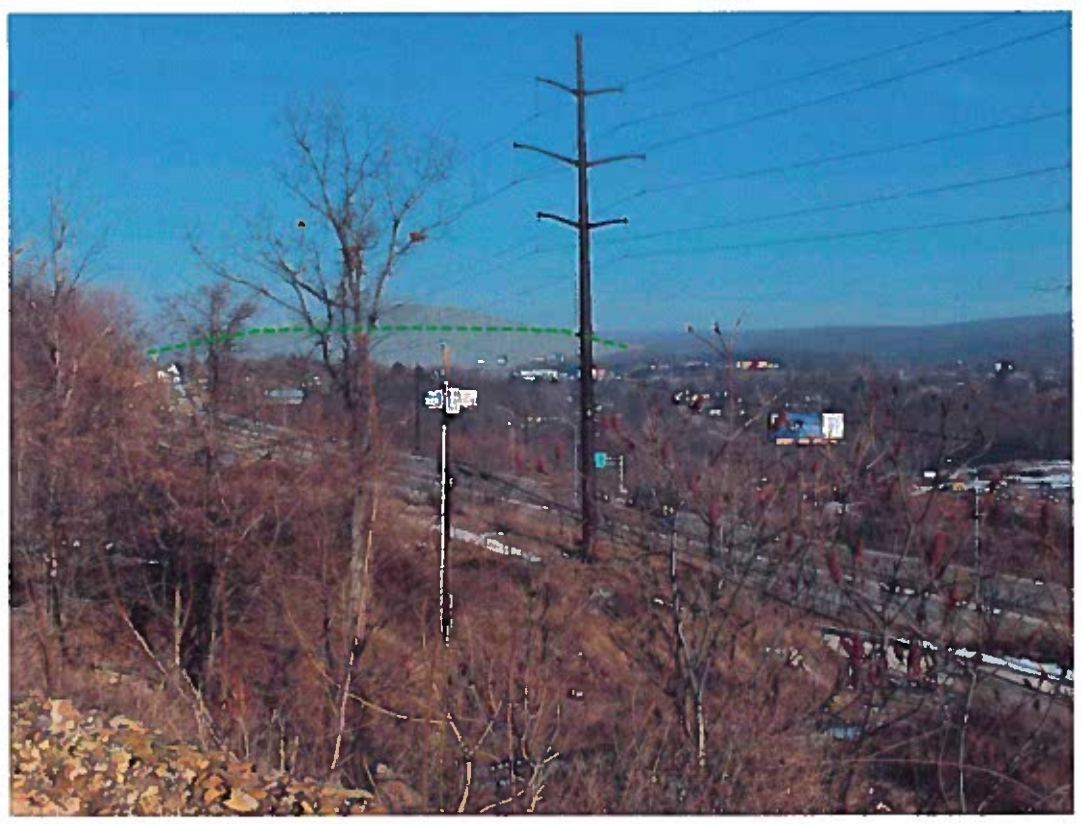
Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - St. Anthony's Memorial Park directly above I-81

Photo 04

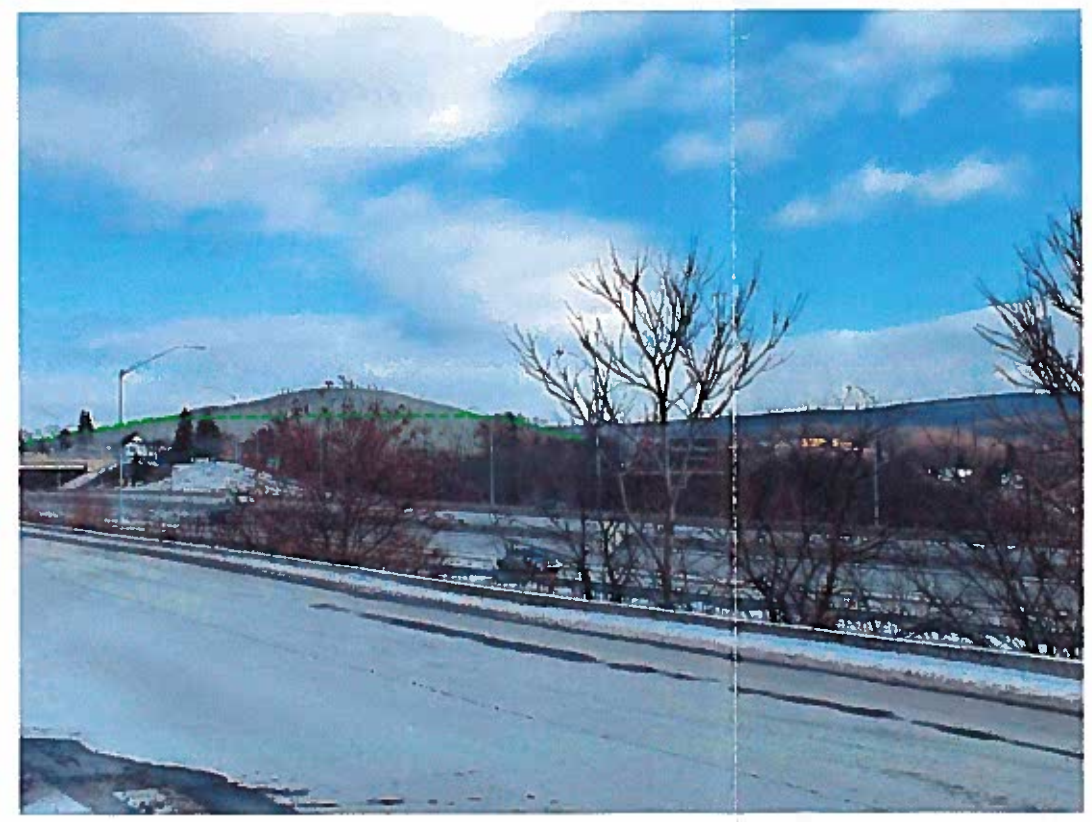
Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Hematology & Oncology Associates on Meade Street

LEGEND

MODIFIED PHASE III GRADING PROJECTION



Proposed Phase III Expansion with Modified Phase III Grading Projection - St. Anthony's Memorial Park directly above I-81



Proposed Phase III Expansion with Modified Phase III Grading Projection - Hematology & Oncology Associates on Meade Street

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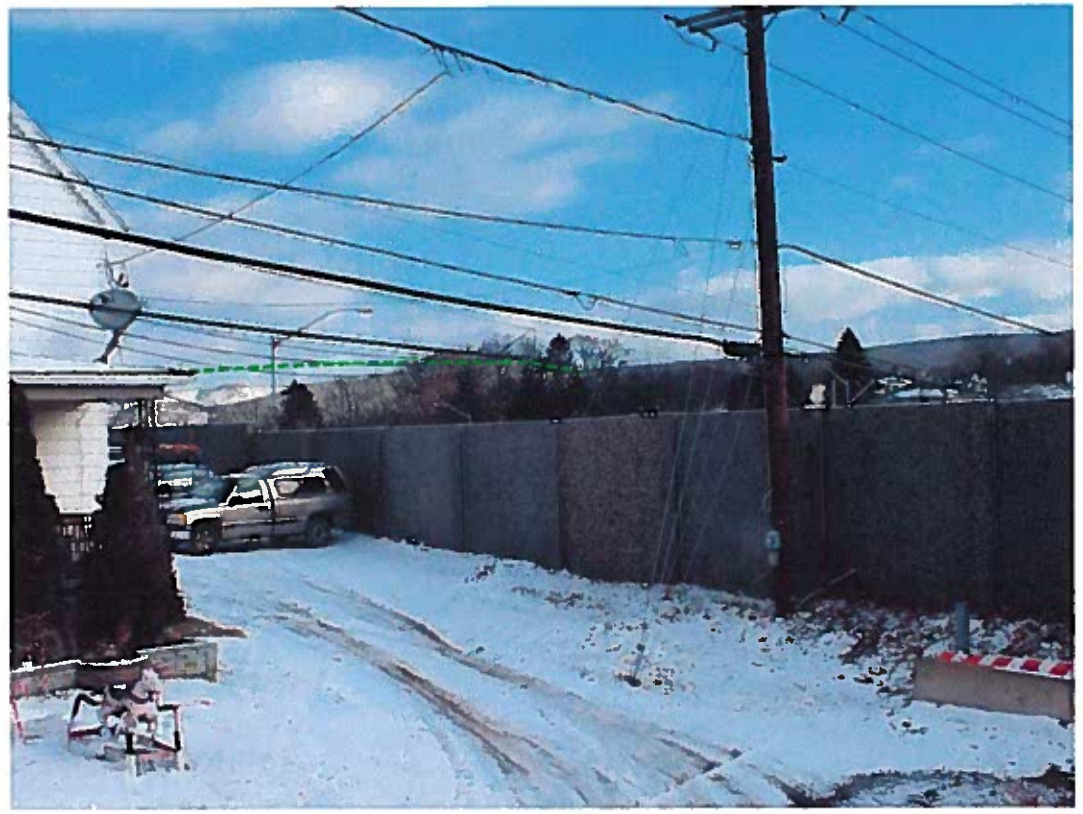
GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 03-04

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

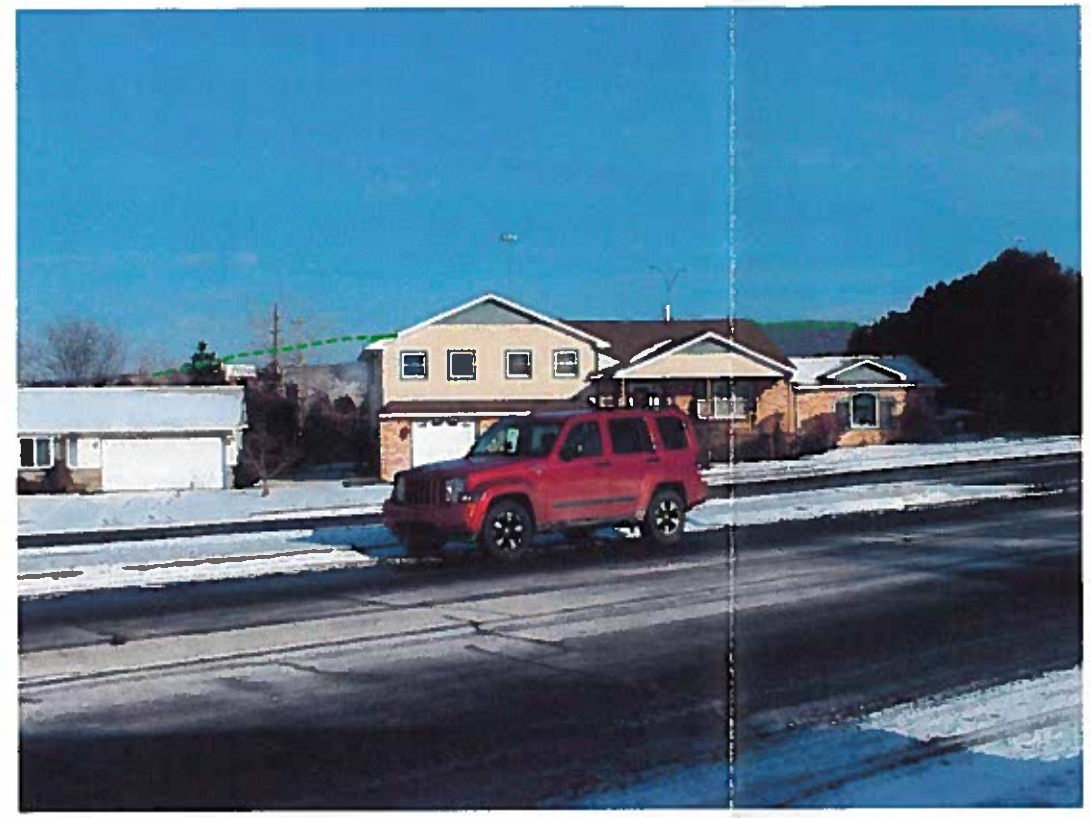
Sheet 17

Photo 05



Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - East Drinker Street on the west end of the I-81 overpass

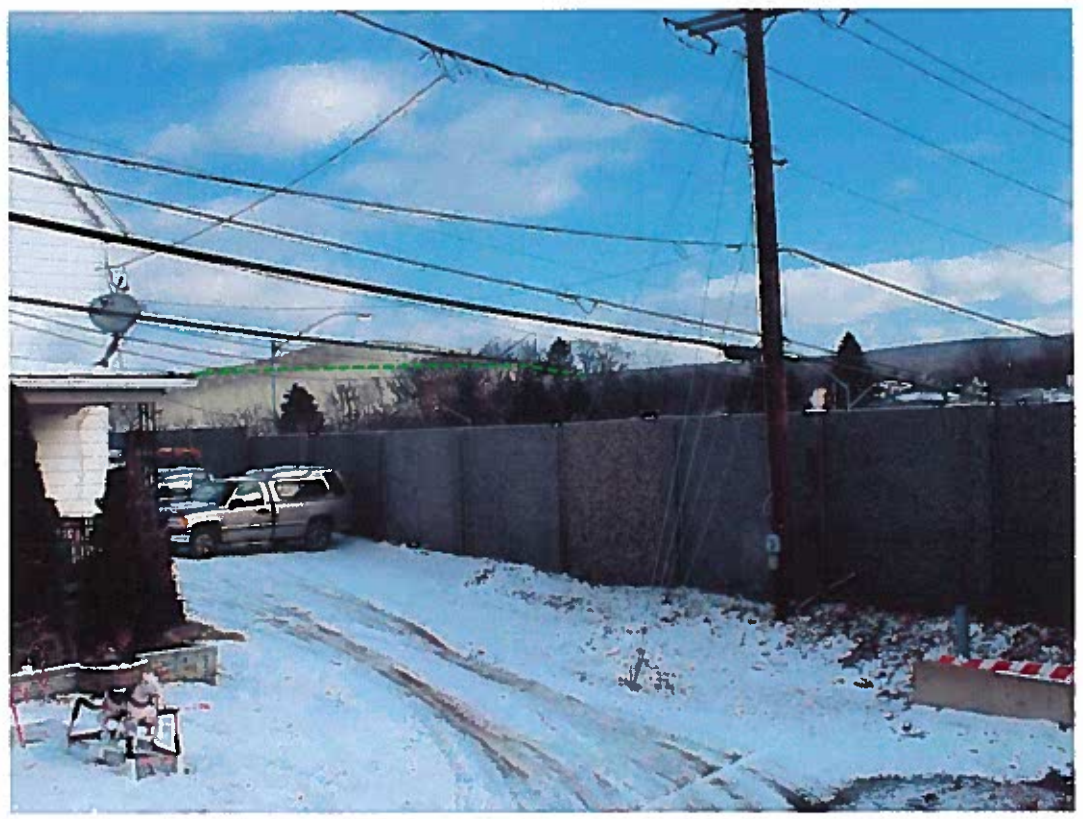
Photo 06



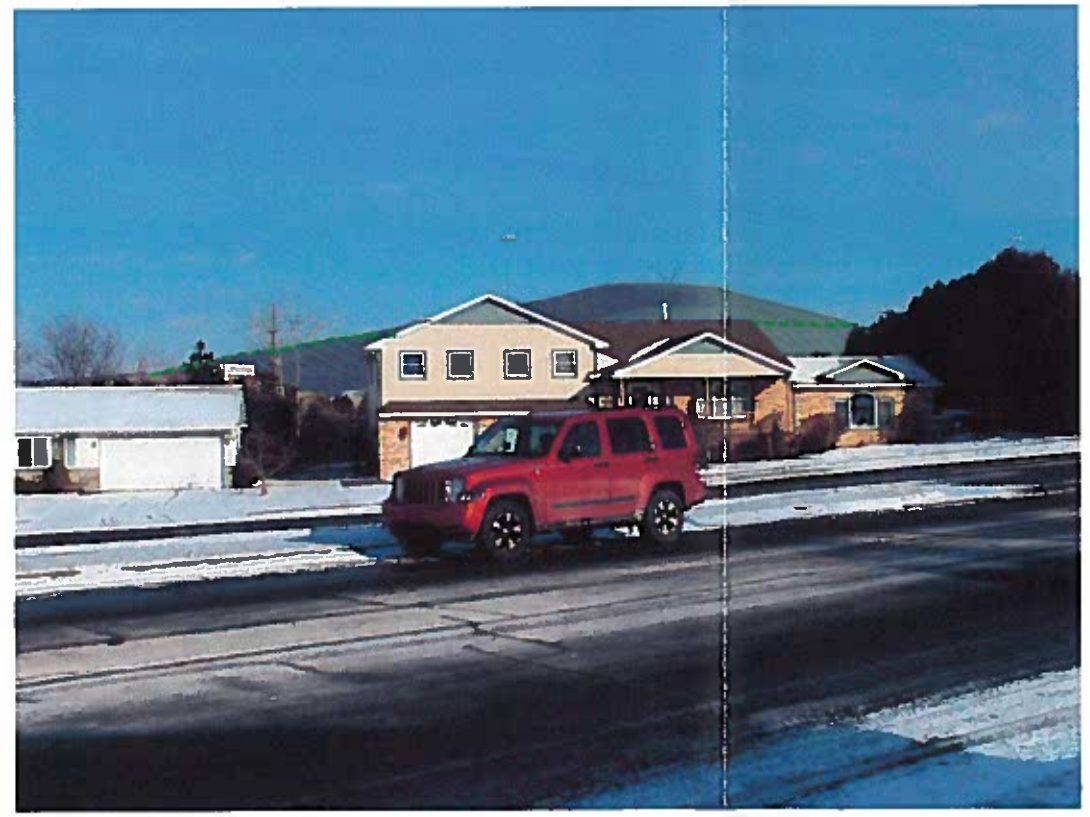
Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Shirley Lane at East Swinick Drive

LEGEND

- - - - - - - - - - - - MODIFIED PHASE III GRADING PROJECTION



Proposed Phase III Expansion with Modified Phase III Grading Projection - East Drinker Street on the west end of the I-81 overpass



Proposed Phase III Expansion with Modified Phase III Grading Projection - Shirley Lane at East Swinick Drive

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Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 05-06

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 18

Photo 07

Proposed Phase III expansion - Sherwood Avenue at Sherwood Park (existing permitted landfill is not visible from this location)

Photo 08

Schautz Stadium (landfill is not visible from this location)

Photo 09

Monroe Field behind the Dunmore Community Center (landfill is not visible from this location)

Photo 10

Blakely Street at East Drinker Street (landfill is not visible from this location)

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Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 07-10

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 19

Photo 11

Proposed Phase III expansion - Dunmore High School (existing permitted landfill and modified phase III are not visible from this location)

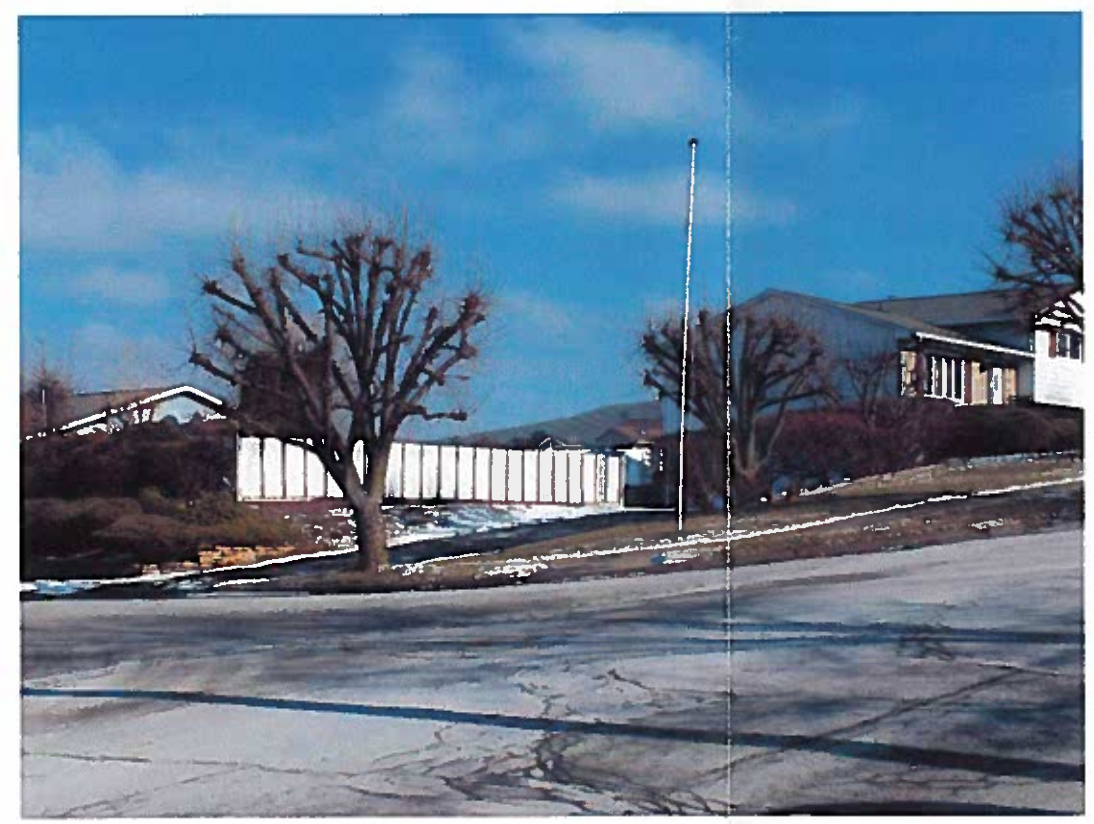
Photo 12

100 Swinick Drive (landfill is not visible from this location)

Photo 13

521 Shirley Lane (existing permitted landfill is not visible from this location)

Photo 13a



520 Shirley Lane (existing permitted landfill is not visible from this location)

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Drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 11-13

Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 20

Photo 14

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - 500 Reeves Street

Photo 15

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Greater Scranton YMCA

LEGEND

MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III Expansion with Modified Phase III Grading Projection - 500 Reeves Street

Proposed Phase III Expansion with Modified Phase III Grading Projection - Greater Scranton YMCA

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Project No.: 14411

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Drafted: WST
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Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 14-15

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

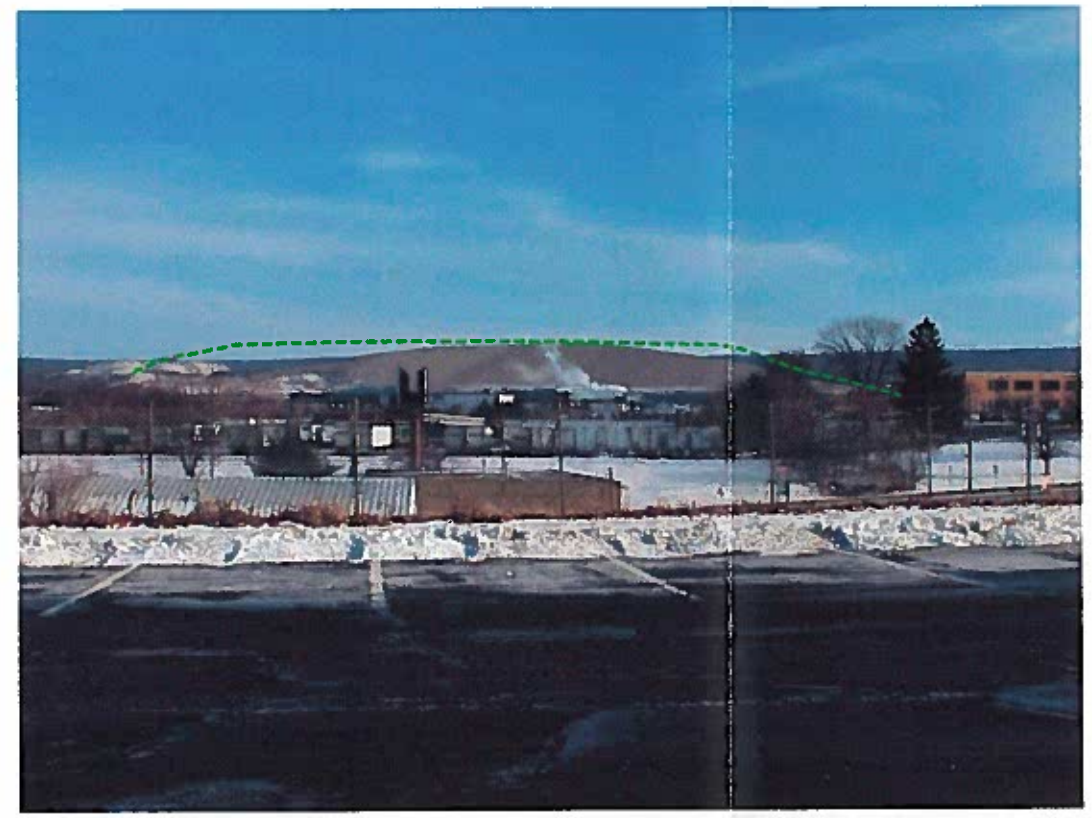
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 21

Photo 16

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - O'Neil Highway at Dunmore Shopping Center

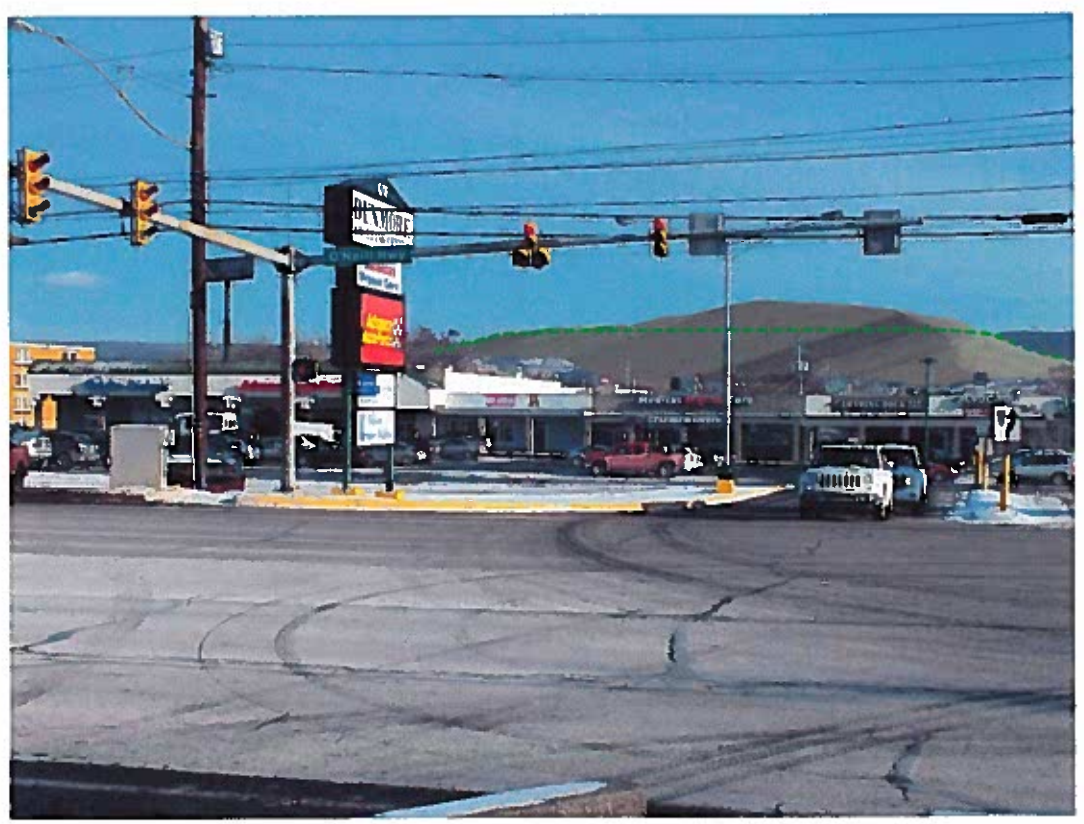
Photo 17



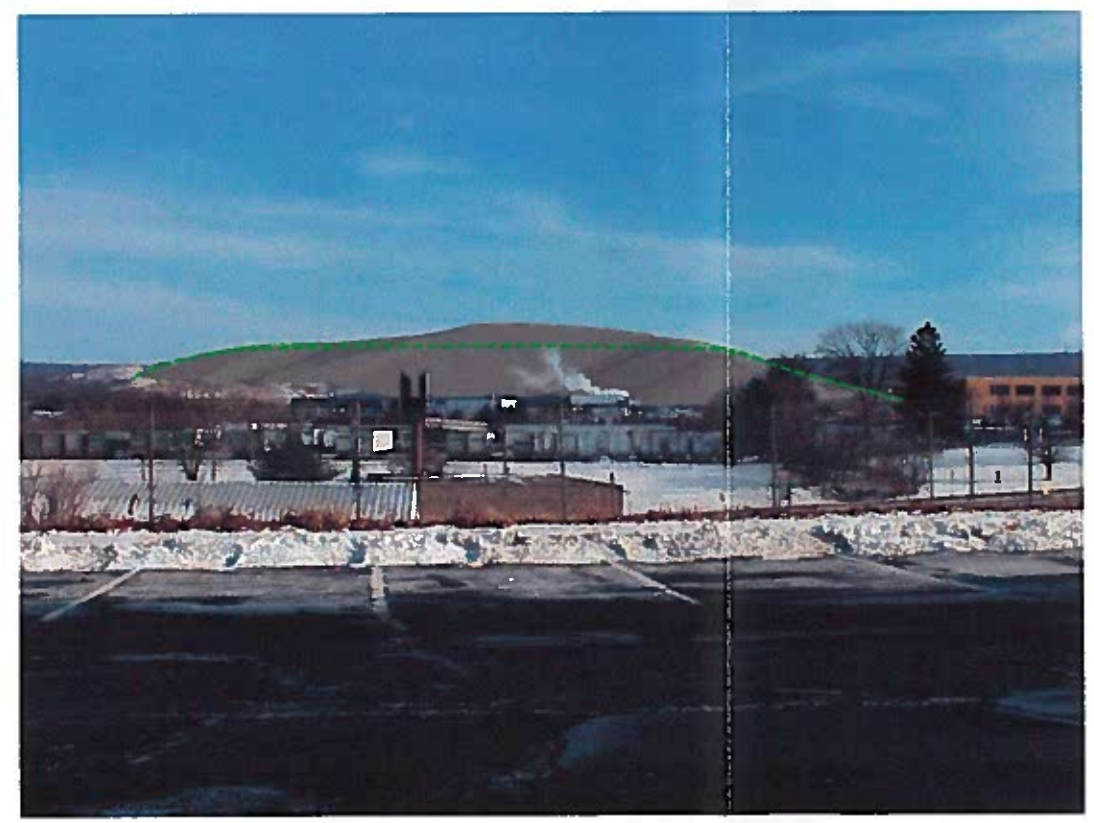
Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Penn State Worthington Campus Parking Lot 1

LEGEND

MODIFIED PHASE III GRADING PROJECTION



Proposed Phase III Expansion with Modified Phase III Grading Projection - O'Neil Highway at Dunmore Shopping Center



Proposed Phase III Expansion with Modified Phase III Grading Projection - Penn State Worthington Campus Parking Lot 1

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GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 16-17

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 22

Photo 18

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Throop Borough Office

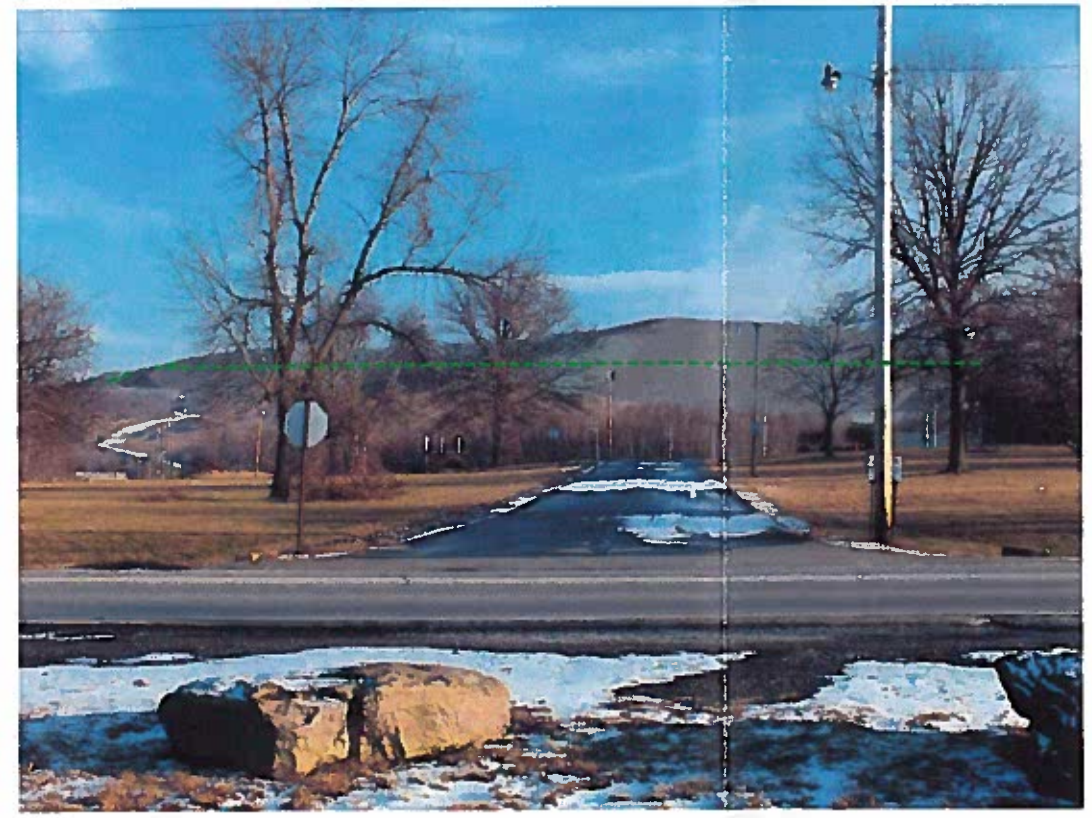
Photo 19

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Gertrude Hawk store

LEGEND

- - - - - - - - - - MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III Expansion with Modified Phase III Grading Projection - Throop Borough Office



Proposed Phase III Expansion with Modified Phase III Grading Projection - Gertrude Hawk store

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designed	ARM
drawn	WST
checked	SEH

GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 18-19

project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

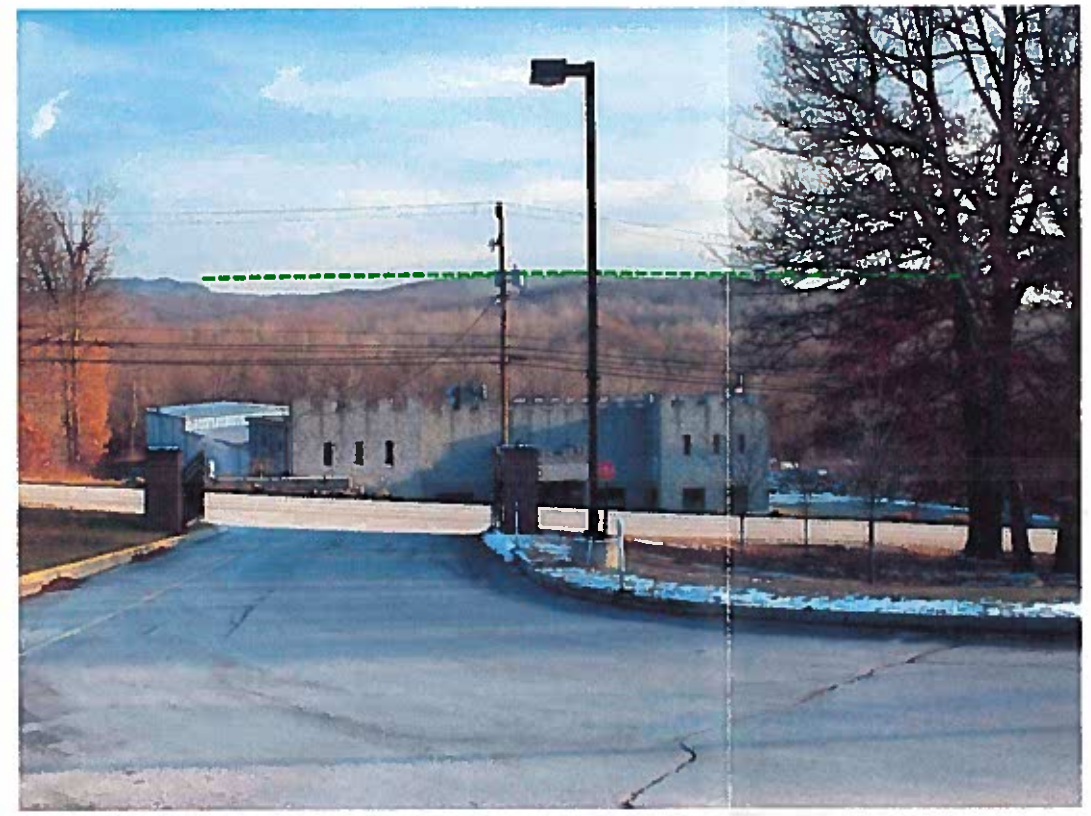
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 23

Photo 20

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Westbound US-6 off ramp to Marshwood Road

Photo 21

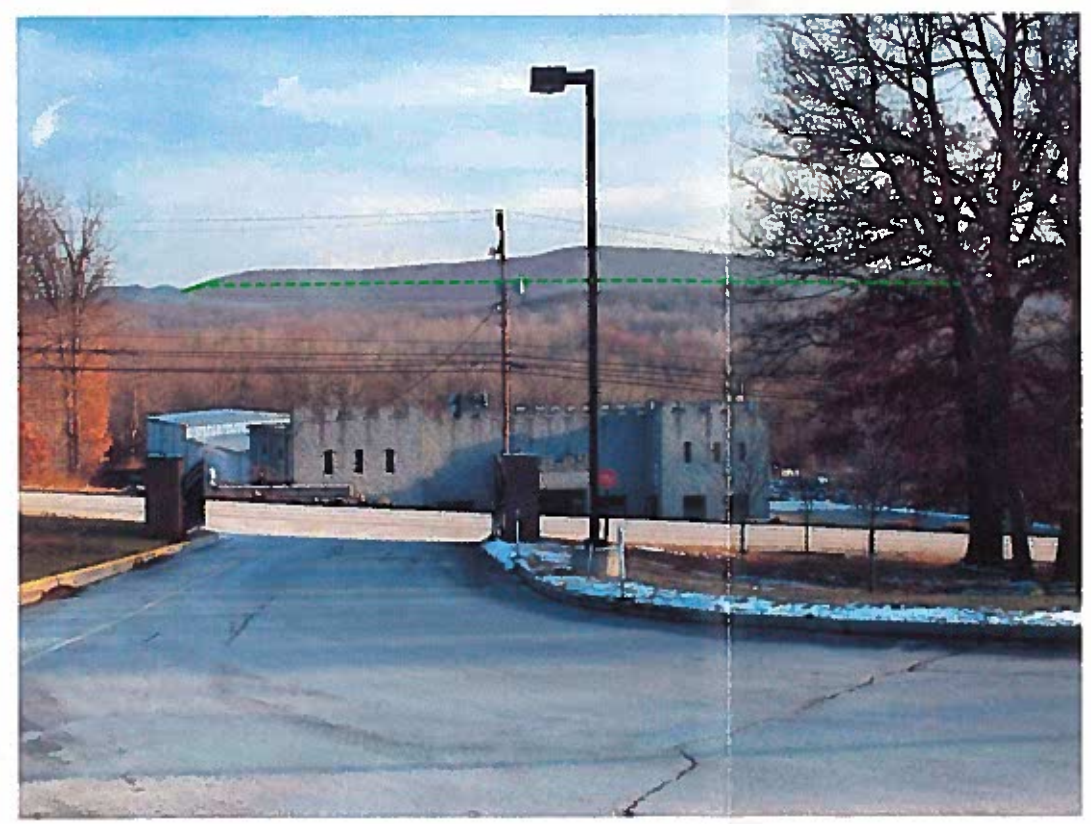


Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Mid-Valley High School

LEGEND

- - - - - - - - - - MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III Expansion with Modified Phase III Grading Projection - Westbound US-6 off ramp to Marshwood Road



Proposed Phase III Expansion with Modified Phase III Grading Projection - Mid-Valley High School

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Drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 20-21

Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

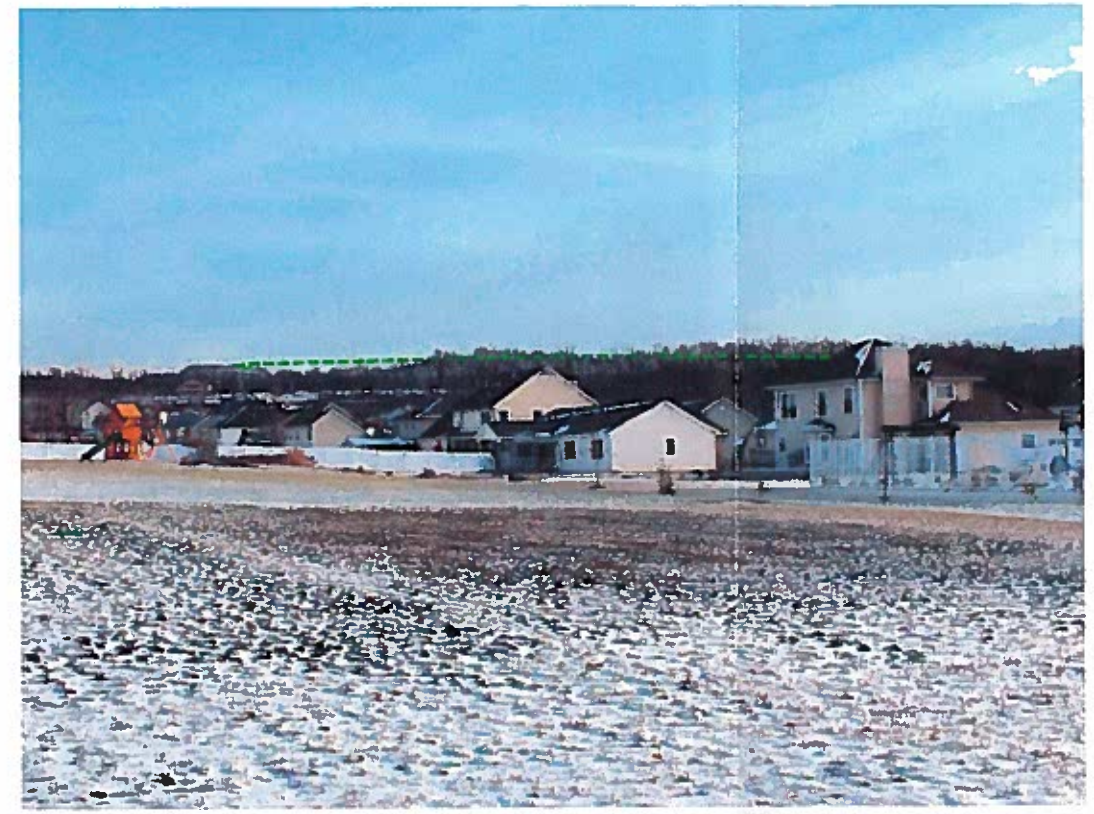
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 24

Photo 22

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - End of Martarano Drive

Photo 23

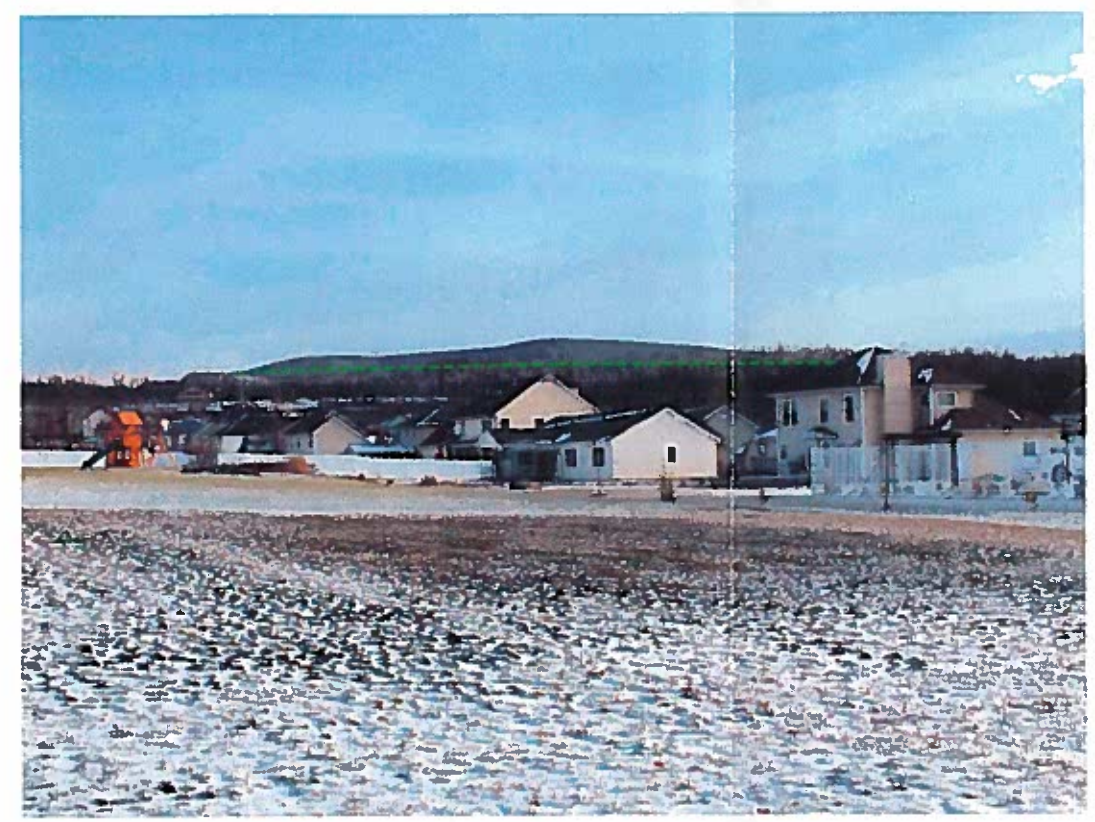


Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Academy Lane

LEGEND

- - - - - - - - - - MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III expansion with Modified Phase III Grading Projection - End of Martarano Drive



Proposed Phase III expansion with Modified Phase III Grading Projection - Academy Lane

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Prepared	ARM
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GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 22-23

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 25

Photo 24

Existing Permitted Landfill Rendering with Modified Phase III Grading Projection - Melissa Drive at Washington Avenue

Photo 25

Marywood University visitor's parking lot (landfill is not visible from this location)

LEGEND

MODIFIED PHASE III GRADING PROJECTION

Proposed Phase III expansion with Modified Phase III Grading Projection - Melissa Drive at Washington Avenue

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GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 24-25

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 26

ATTACHMENT 3

Original Line-of-Sight Report
(February 2015)

LINE-OF-SIGHT ANALYSIS
PROPOSED EXPANSION
KEYSTONE SANITARY LANDFILL
Permit Number 101247

ARM Project 14411
February 2015

Introduction

The Keystone Sanitary Landfill (KSL) (Pennsylvania Department of Environmental Protection [PADEP] Permit No. 101247) retained ARM Group Inc. (ARM) to prepare a Line-of-Sight (LOS) Study to determine the potential visual impacts created by the construction of the proposed Phase III landfill expansion (the Expansion) at KSL. The maximum permitted elevation for the KSL is currently 1,585 feet above mean sea level (ft amsl), per the previously permitted Phase II landfill expansion. KSL is proposing to expand the landfill footprint and "piggy-back" onto the existing landfill, which will increase the peak elevation of the landfill by 165 feet. The "piggy-back" area enables a vertical expansion and integration of the waste footprint areas of the landfill, which will optimize the operational area within the existing permitted landfill area and, thus, limit the lateral expansion area.

The proposed final elevation of the Expansion is 1,750 feet amsl; this represents a 165-foot increase above the currently permitted KSL peak. Since the peak of the landfill will increase with the proposed project, an increase in the visibility of the landfill is anticipated. In order to evaluate the specific changes in visibility of the landfill, this LOS Study was prepared. It is understood that, among the potential effects that the proposed Expansion project may have on the surrounding area, the PADEP and the community may be concerned about the potential visual impact of the expanded landfill.

LOS Study Overview

In order to evaluate the visibility of the proposed Expansion, 20 line-of-sight profiles, 25 photographs, and 18 different renderings of the currently permitted and proposed landfill surfaces were created and examined and are subsequently discussed and presented later in this report. Based on these illustrations, and the mitigating conditions discussed below, the increase in the potential visual impacts to the surrounding area associated with the Expansion will be minimal:

- The permitted KSL is currently visible in selected locations from a distance of 3 miles or more given the landfill's location at a topographic high point, although there are many areas where topography and surrounding trees obscure view of the landfill from 3 miles and from closer locations. Areas from which the KSL is currently visible are shown on LOS Sheets 3a and 4a, attached, as depicted by the yellow shading. These shaded areas also represent the locations from which the Expansion will also be visible. Areas shaded in green on

Sheets 3b and 4b represent the additional areas within a 3-mile radius from which the Expansion will be visible.

- Based on the visibility areas presented on Sheets 3a and 4a, the existing permitted KSL (when the currently permitted final grade is reached) will be visible from approximately 8.2 percent (2.200 square miles) of the 3-mile radial area examined as part of this LOS, and the Expansion will be visible from approximately 11.5 percent (3.083 square miles) of the 3-mile radial area. Note: the KSL property (1.42 square miles) within the 3-mile radial area is excluded from the total area.

KSL will take on-going steps to mitigate detrimental visual impacts of the facility and account for the specific terrain and line-of-sight characteristics of the area. KSL is an enduring business and physical feature within the Lackawanna County community. Therefore, KSL has given considerable thought and attention to developing the Expansion design, cell sequence, and landfilling progression to limit and mitigate any harm to the host communities and to provide the greatest degree of host community benefits with minimal environmental and visual impact.

Analysis

On behalf of KSL, ARM prepared a line-of-sight analysis within a 3-mile radius of the highest future landfill elevation of the Expansion. As stated previously, the currently permitted KSL peak is at an elevation of 1,585 feet amsl. The proposed FFVE peak will reach 1,750 feet amsl, which represents an increase of 165 feet. For the purposes of this study, the locations of the currently permitted KSL and proposed Expansion peaks were estimated to roughly coincide with each other. The 3-mile radius area (28.3 square miles) of study considered as part of the LOS is depicted and labeled on the attached topographic map (Sheet 1) and aerial photograph map (Sheet 2).

Using digital elevation models (DEM) from the United States Geological Survey (USGS) for the Scranton (dated 1994) and Olyphant (1999), Pennsylvania 7.5 minute quadrangle maps, ARM created topographic surfaces in AutoCAD to generate radial profiles from the future highest point of the Expansion. The radial profiles extend outward for 3 miles. A single plan-view map is used for this LOS study since, as stated above, the landfill peak locations for the currently permitted KSL and the Expansion are roughly the same. The currently permitted and proposed peak landfill elevation center and radial profile lines are shown on Sheets 1 (topographic map) and 2 (aerial map).

The existing permitted KSL and the Expansion visibility conditions were examined with 20 line-of-sight profiles extending radially from the permitted landfill. Information derived from radial profile lines was subsequently used to generate the plan view shading depicting existing and proposed landfill visibility areas. The line-of-sight profiles are shown on Sheets 5 through 14 for the already-permitted conditions and proposed Expansion conditions.

By inspection of the profiles, it is evident where the view of the landfill is obscured by terrain and obscured by wooded areas, even when leaves are absent. The tree density and length/width

of the wooded areas provide complete visual screening because only substantial stands of trees were accounted for in determining visibility obstructions. Also, the average tree height used for the analysis was 50 feet. The actual tree height in areas where trees are the predominant factor in obscuring the view are sometimes considerably higher (i.e., 80 feet or more). Thus, visibility is generally overestimated due to the conservative tree height used in the analysis. It is also important to note that visual screening by wooded areas was projected from the aerial photographs (Sheet 2) that were taken in 2013.

By combining the topographic mapping and aerial photographs, it is further evident where the landfill is obscured by topographic barriers and wooded buffers. However, without adjusting for the presence of structural features, these illustrations would not account for residential, commercial, and industrial buildings that obscure the view of the landfill. To account for these effects in populated areas, numerous photographs were taken from areas where the largest concentrations of buildings are present. These photographs were taken on January 8, 2015 and January 23, 2015 and, therefore, represent winter conditions (i.e., worst-case, no leaves present). Photograph vantage points and corresponding photograph numbers are shown on Sheet 15. Photographs (i.e., view from the corresponding vantage points) are provided on Sheets 16 through 26. Therefore, with the addition of the photographic inspection, the line-of-sight profiles and resultant areas highlighting where the landfill is visible attempt to account for most visual buffers. However, small clusters of trees, road cuts (embankments), isolated single family dwellings, and other landscape features that obscure the view of the landfill were neglected. It should be noted that due to urban development in the areas adjacent to the KSL, the visibility of the landfill is partially (or fully) obstructed by buildings and houses in many places. The LOS drawings show many of these areas as "visible;" however, in many places, the landfill will only be visible in the area between buildings and houses. Therefore, the area from which the landfill is visible, as depicted on Sheets 3a through 4b, is likely overstated.

The highlighted areas where the landfill is visible, according to this analysis and based on photographic documentation, are illustrated on Sheets 3a through 4b. It is important to note that some inferences were made in assembling the visibility area highlighting because it was developed, in part, based on integrating the profiles to create an area-based line-of-sight from a linear interpretation. In any case, based on this conservative portrayal, it appears that the existing permitted KSL (when the currently permitted final grade is reached) will be visible from approximately 8.2 percent of the 3-mile radial area, and the proposed Expansion will be visible from approximately 11.5 percent of the 3-mile radial area. Therefore, there will be a 3.3 percent increase in visibility of the landfill with the development of the Expansion. The KSL property (1.42 square miles) is excluded from the total of the 3-mile radial study area.

To determine the number of and location of residential dwellings within the study area, building information was obtained from PAMAP – a digital base map of Pennsylvania provided by the Pennsylvania Department of Conservation and Natural Resources (PA DCNR). The data in PAMAP includes all buildings (e.g., industrial, businesses, residential homes, sheds, garages, etc.) and was developed in 2007. ARM reviewed the data provided from PAMAP in Geographic Information Systems (GIS) software and removed the points depicting obvious industrial structures, businesses, and out-buildings (i.e., sheds or garages). Inevitably, some of these points may have been missed or not identified based on aerial images. In addition to removing points

that did not represent residential dwellings, ARM added points for any residential dwellings constructed since 2007 based on a 2011 aerial image. In total, ARM estimates that 12,138 residential dwellings (i.e., housing units) are within a 3-mile radius of the peak of the proposed Expansion.

ARM also obtained population information from the 2010 U.S. Census for the municipalities within the 3-mile radial study area. Both the average household size and the total municipality population were determined from the 2010 U.S. Census information. The census information was used in conjunction with the residential dwelling location information to determine how many residential units and individuals would be able to see the currently permitted KSL and the proposed Expansion. The results indicated that the change in visibility to additional population is estimated to be only 1.19 percent (1,377 additional individuals) of the total population of the municipalities that have borders or portions of their borders within a 3-mile radius of the landfill peak.

To further evaluate the visibility of the proposed increase in elevation of the landfill, a statistical comparison to the currently permitted elevation was conducted to determine the visibility change to the residents of Dickson City Borough, Dunmore Borough, Jefferson Township, Jessup Borough, Olyphant Borough, Roaring Brook Township, Scranton City, and Throop Borough. The results are summarized as follows:

Increase in Total Area from which the Proposed Landfill Expansion will be Visible

ARM analyzed the percent increase in area from which the landfill will be visible when it reaches its currently permitted KSL peak elevation versus the proposed Expansion elevation. As shown in Table 1, the increase in area from which the landfill will be visible within a 3-mile radius of the landfill peak is 3.3 percent. According to ARM's analysis, the permitted KSL landfill will be seen by approximately 8.2 percent of the area and the proposed Expansion will be seen by approximately 11.5 percent of the area within a 3-mile radius, excluding the area occupied by KSL's property.

Increase in Area of Municipalities from which the Proposed Landfill Expansion will be Visible

ARM analyzed the percent increase in area within each municipality from which the landfill will be visible when it reaches its currently permitted peak elevation versus its proposed elevation. The summary table below, which is also included in Table 1 (following narrative), shows the increase in area for each respective municipality from which the landfill will be visible within a 3-mile radius of the landfill peak. All percentages below are based on the respective municipality area within the 3-mile radial study area. On an area basis, the increase in visible area equates to 0.883 square miles within the 3-mile radial study area.

Description of Statistic	Change in Municipality Area from which Landfill is Visible within a 3-mile Radius of Landfill Peaks	Municipality Area within a 3-mile Radius of KSL Peaks	Total Municipality Area	Change in Percentage of Municipality Areas within a 3-mile Radius of Landfill Peak from which the Proposed Expansion is Visible
Units	square miles	square miles	square miles	percentage
Dickson City Borough	0.000	0.44	4.70	0.0%
Dunmore Borough	0.243	8.00	8.16	3.0%
Jefferson Township	0.150	0.49	33.95	30.4%
Jessup Borough	0.277	2.27	6.80	12.2%
Olyphant Borough	0.040	4.94	5.47	0.8%
Roaring Brook Township	0.000	5.00	22.23	0.0%
Scranton City	0.000	1.37	25.44	0.0%
Throop Borough	0.173	4.32	4.33	4.0%
TOTAL	0.883	26.84	111.08	3.3%

Note: Total Area excludes KSL Property.

According to ARM's analysis, the 3-mile radial area from which the currently-permitted KSL will be seen is approximately 2.0 percent of the total area of the eight municipalities affected, and the proposed Expansion is approximately 2.8 percent of the total area of the eight municipalities affected, excluding the area occupied by KSL's property.

Population Affected in each Township/Borough

ARM's opinion is that it is important to emphasize that the proposed expansion of the landfill has little increased visibility relative to the total population of the surrounding townships and borough. ARM analyzed the percent increase in population from which the landfill will be visible when it reaches its currently permitted peak elevation versus its proposed elevation. As shown in Table 1, the estimated increase in population from which the landfill will be visible within a 3-mile radius of the landfill peak is a total of 1,377 people. This value was determined by counting dwellings within the areas that will only be able to see the Expansion (i.e., will not see currently permitted KSL peak) and multiplying the dwelling counts by the average household size for each respective municipality per the 2010 U.S. Census estimates. Dwelling counts were completed with GIS software, utilizing information from PAMAP in combination with information from aerial photographs. Detailed data concerning housing counts in each municipality and persons per dwelling are shown on Table 1.

According to U.S. Census Bureau data (US Census, 2010 estimate), the combined population of the eight municipalities that have borders within or partly within a 3-mile radius of the landfill is estimated to be 115,769. Of this population, approximately 3,464 people will be able to see the currently-permitted KSL peak and approximately 4,841 people will be able to see the Expansion. The number of people that will be able to see the Expansion represents 4.2 percent of the total population of the municipalities. The table below displays the estimated increases in population affected by the visibility of the expansion, per each municipality within a 3-mile radius of the landfill peak.

Description of Statistic	**Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak**
Units	**# individuals**
Dickson City Borough	0
Dunmore Borough	704
Jefferson Township	0
Jessup Borough	0
Olyphant Borough	22
Roaring Brook Township	0
Scranton City	0
Throop Borough	651
TOTAL:	1,377

In January of 2015, ARM took 25 photographs from prominent locations in the community throughout the 3-mile radial area of the landfill. The photo locations are indicated on Sheet 15. The photographs are provided on Sheets 16 through 26, and each photograph includes a description of the vantage point and view. As evident from the photographs, the leaves are off of the trees, representing the time of year when the least amount of obstructions are present. These photographs were taken to assist in determining where the landfill is visible and where structures obscure landfill visibility. The photographs are also used to verify and enhance ARM's interpretation of visibility patterns indicated by topographic and forest buffers on the mapping (Sheets 1 and 2), and to provide a basis for computer renderings to show what the expanded landfill would look like when viewed from various locations where the largest number of people could potentially view the landfill (i.e., primary travel corridors, highest concentration of housing and businesses, schools, parks, playgrounds, and churches).

ARM identified these prominent and sensitive areas (e.g., developments, churches, cemeteries, and recreational areas/parks, etc.) within the 3-mile radial area and included photographs from each area. Based on the photos, the landfill can already be seen (in its existing condition) from a majority of these locations. The proposed condition will not change this statistic. Below is a list of the locations from which photos were taken. ARM prepared renderings for each of the locations from which the Expansion will be visible. Each rendering depicts the current, permitted, and proposed landfill conditions. These photographs were taken from the following locations noted in the table below and shown on Sheet 15.

Photo #	Description
1	1241 December Drive on Mt. Margaret
2	Nay Aug Park above the Wildlife Center
3	St. Anthony's Memorial Park directly above I-81
4	Hematology & Oncology Associates on Meade Street
5	East Drinker Street on the west end of the I-81 overpass
6	Shirley Lane at East Swinick Drive
7	Sherwood Avenue at Sherwood Park
8	Schautz Stadium
9	Monroe Field behind the Dunmore Community Center
10	Blakely Street at East Drinker Street
11	Dunmore High School
12	100 Swinick Drive
13	521 Shirley Lane
14	500 Reeves Street
15	Greater Scranton YMCA
16	O'Neil Highway at Dunmore Shopping Center
17	Penn State Worthington Campus Parking Lot 1
18	Throop Borough Office
19	Gertrude Hawk store
20	Westbound US-6 off ramp to Marshwood Road
21	Mid-Valley High School
22	End of Martarano Drive
23	Academy Lane
24	Melissa Drive at Washington Avenue
25	Marywood University visitor's parking lot

The selected locations are the most obvious locations that could potentially see the proposed Expansion and were used for renderings to illustrate the "worst-case" scenario. In many cases, if an observer moves to the right or left of the photographed location, the visibility of the landfill will likely be partially obscured by structures. Additionally, it is worth noting that the renderings represent final grades of the permitted KSL (expected to reach capacity in or around 2022) and the proposed final grading plan for the Expansion (expected to reach capacity in or around 2062).

Therefore, the renderings represent conditions 40 years apart. The changes from the permitted KSL to the Expansion will occur gradually over the life of the project. Hence, the visibility change will not be abrupt, and it will be barely detectable from year to year.

Conclusions

ARM performed a thorough line-of-sight analysis of the landfill, incorporating the proposed landfill expansion area, to determine the visibility of the landfill to surrounding townships/boroughs and populated areas within a 3-mile radius. These analyses include: Increase in Area from which the Proposed Landfill Expansion will be Visible; Increase in Area of Township/Borough from which the Proposed Landfill Expansion will be Visible; and Populations Affected in each Township/Borough.

In addition to the factors discussed above, the long development period of the expansion will greatly limit its visual impact. Approximately 40 years will be required to develop the expansion with only a small section of the total landfill active in any given year. The active disposal area will be minimized. The rest of the landfill will consist of grassy slopes. Any visual impacts will be gradual and will occur over a 40-year period.

As presented in the analysis, above, and Table 1 referenced therein, the population to which the proposed Expansion will be visible is approximately 4,841 within a 3-mile radius of the landfill peak. This population represents approximately 4.2 percent of the total population of the municipalities (pop. 115,769) that have borders within or partly within a 3-mile radial area of the landfill. Of this population, it is estimated that the majority of those within a 3-mile radius that will be able to see the Expansion would already have had visibility of the existing permitted KSL.

In addition, the shape of the completed landfill, as depicted in the proposed final grading plan, is a grass-covered ridge that is compatible and in harmony with the neighboring landscape to the south and east. Finally, the ability to actually see landfill features at a distance of 2 to 3 miles can be limited by weather conditions, visual acuity, and other factors, further lessening the potential visual impacts of the expansion.

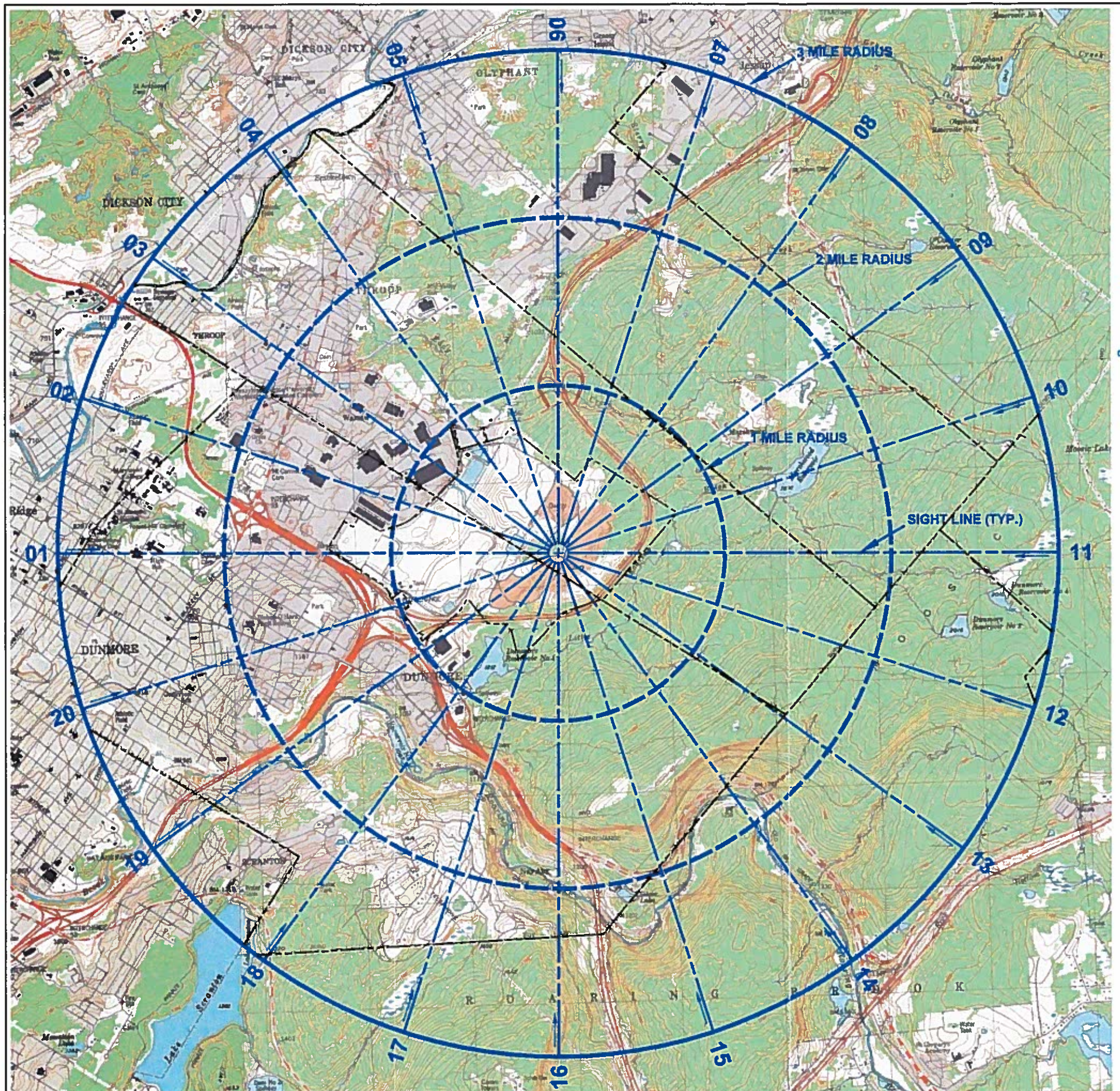
It is well established within the engineering and regulatory communities that landfills, which are crucial to solid waste management practice in the United States, are most appropriately located on or near topographical high points. These locations generally offer flood protection, sufficient isolation distance from the regional groundwater table, and sound geologic characteristics (i.e., not sinkhole-prone carbonate formations that are prevalent in the valleys of central and eastern Pennsylvania). Consequently, the prominent visibility of landfills is fairly common throughout the country. Furthermore, the alternative of locating a landfill at a different site does little to mitigate the visual impacts to the community considering that the landfill is already present at this location. Ultimately, the majority of the landfill is and will continue to be a vegetated hill when it reaches the proposed final elevation.

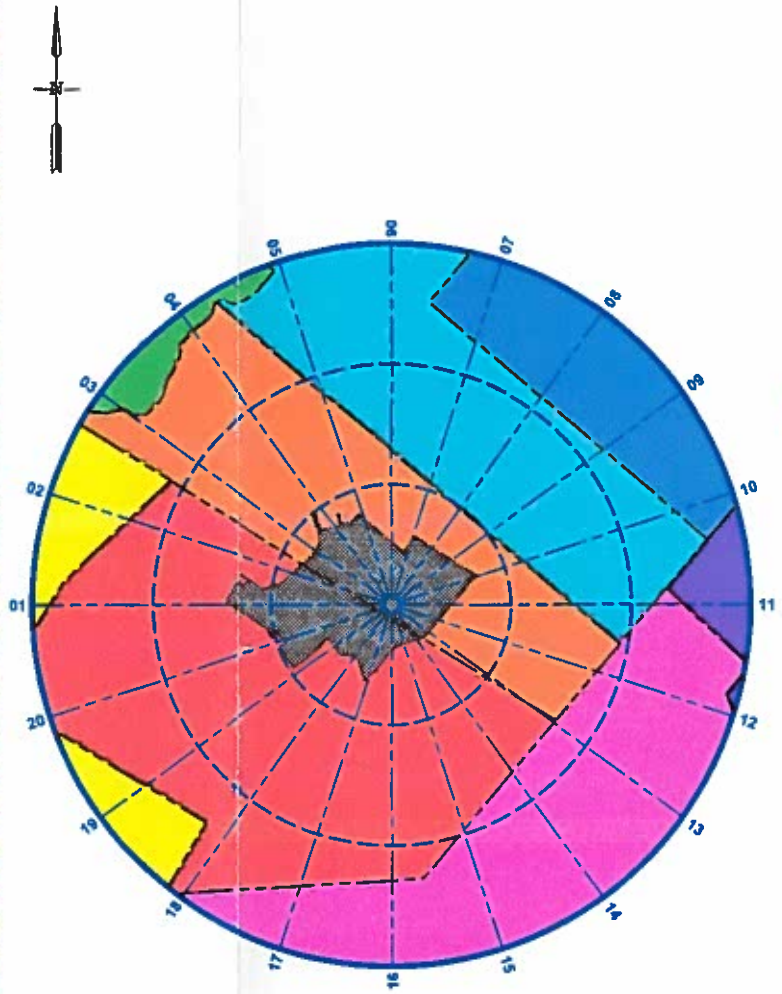
Table 1
Line of Sight Analysis Statistics

Keystone Sanitary Landfill Expansion
Dunmore Borough & Throop Borough, Lackawanna County, PA

Description of Condition Evaluated	Description of Statistic	Units	Dickson City Borough	Dunmore Borough	Jefferson Township	Jessup Borough	Olyphant Borough	Roaring Brook Township	Scranton City	Throop Borough	TOTAL
Background Data	Municipality Population (See Note 3)	# of individuals	6,070	14,057	3,731	4,676	5,151	1,907	76,089	4,088	115,769
	Average Household Size (See Note 3)	# of individuals	2.24	2.18	2.56	2.33	2.22	2.61	2.35	2.30	-
	Total Number of Housing Units within the Municipality (See Note 3)	# of homes	2,703	5,999	1,460	2,007	2,324	728	30,069	1,778	47,068
	Number of Housing Units within a 3-Mile Radius of KSL Peaks	# of homes	891	5,574	0	160	1,487	56	1,513	2,457	12,138
	Municipality Population within a 3-Mile Radius of KSL Peaks	# of individuals	1,996	12,151	0	373	3,301	146	3,556	5,651	27,174
	Total Municipality Area	square miles	4.70	8.16	33.95	6.80	5.47	22.23	25.44	4.33	111.08
	Municipality Area within a 3-mile Radius of KSL Peaks	square miles	0.44	8.00	0.49	2.27	4.94	5.00	1.37	4.32	26.84
	KSL Property within Municipality	square miles	0	0.69	0	0	0	0	0	0.73	1.42
Existing Permitted Keystone Sanitary Landfill	Municipality Area within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	square miles	0.000	1.273	0.000	0.000	0.194	0.034	0.005	0.694	2.200
	Percent of Municipality Areas within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	percentage	0.0%	15.9%	0.0%	0.0%	3.9%	0.7%	0.4%	16.1%	-
	Percent of Municipality Area within a 3-mile Radius of the Landfill Peak from which the Existing KSL is Visible	percentage	-	-	-	-	-	-	-	-	8.2%
	Percentage of Total Municipality Areas from which the Existing KSL is Visible (within a 3-mile Radius of Landfill Peak)	percentage	0.0%	15.6%	0.0%	0.0%	3.5%	0.2%	0.0%	16.0%	-
	Percentage of Total Municipality Area from which the Existing KSL is Visible (within a 3-mile Radius of Landfill Peak)	percentage	-	-	-	-	-	-	-	-	2.0%
	Number of Housing Units within a 3-Mile Radius of Existing KSL Peak from which the Landfill is Visible	# of units	0	542	0	0	275	0	0	727	1,544
	Estimated Population from which the Landfill is Visible within a 3-mile Radius of Existing KSL Landfill Peak (See Note 4)	# individuals	0	1182	0	0	611	0	0	1,672	3,464
Proposed Keystone Sanitary Landfill Expansion	Municipality Area within a 3-mile Radius of the Landfill Peak from which the Proposed Expansion is Visible	square miles	0.000	1.516	0.150	0.277	0.234	0.034	0.005	0.867	3.083
	Percent of Municipality Areas within a 3-mile Radius of the Landfill Peak from which the Proposed Expansion is Visible	percentage	0.0%	19.0%	30.4%	12.2%	4.7%	0.7%	0.4%	20.1%	-
	Percent of Municipality Area within a 3-mile Radius of the Landfill Peak from which the Proposed Expansion is Visible	percentage	-	-	-	-	-	-	-	-	11.5%
	Percentage of Total Municipality Areas from which Proposed Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	0.0%	18.6%	0.4%	4.1%	4.3%	0.2%	0.0%	20.0%	-
	Percentage of Total Municipality Area from which Proposed Expansion is Visible (within a 3-mile Radius of Landfill Peak)	percentage	-	-	-	-	-	-	-	-	2.8%
	Number of Housing Units within a 3-Mile Radius of the Proposed Expansion Peak from which the Landfill is Visible	# of units	0	865	0	0	285	0	0	1,010	2,160
	Estimated Population from which the Proposed Expansion is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	1,886	0	0	633	0	0	2,323	4,841
Comparison	Change in Municipality Area from which Landfill is Visible within a 3-mile Radius of Landfill Peaks	square miles	0.000	0.243	0.150	0.277	0.040	0.000	0.000	0.173	0.883
	Change in Percentage of Municipality Areas within a 3-mile Radius of Landfill Peak from which the Proposed Expansion is Visible	percentage	0.0%	3.0%	30.4%	12.2%	0.8%	0.0%	0.0%	4.0%	-
	Change in Percentage of Municipality Area within a 3-mile Radius of Landfill Peak from which the Proposed Expansion is Visible	percentage	-	-	-	-	-	-	-	-	3.3%
	Change in Percentage of Total Municipality Areas from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	0.0%	3.0%	0.4%	4.1%	0.7%	0.0%	0.0%	4.0%	-
	Change in Percentage of Total Municipality Area from which Landfill is Visible (within a 3-mile Radius of Landfill Peaks)	percentage	-	-	-	-	-	-	-	-	0.8%
	Change in Number of Housing Units within a 3-Mile Radius of the Proposed Expansion Peak from which the Landfill is Visible	# of units	0	323	0	0	10	0	0	283	616
	Change in Population from which the Landfill is Visible within a 3-mile Radius of Landfill Peak (See Note 4)	# individuals	0	704	0	0	22	0	0	651	1,377

Notes:
1. KSL's property occupies approximately 1.42 square milesof the 28.27 square mile area occupied by a 3-mile radius circle.
2. Percentages of area from which landfill is visible excludes KSL property.
3. Population data and household size based on 2010 estimates from U.S. Census Bureau.
4. Building locations from PAMAP were manually adjusted to reflect only residential dwellings using a 2011 aerial map to determine the number of housing units within a 3-mile radius of the landfill peak. Data for number of individuals per household (from the 2010 U.S. Census) was used to determine the number of individuals based on residential dwelling counts.





LEGEND
(% AREA WITHIN STUDY LIMITS)

KEYSTONE SANITARY LANDFILL	5%
DUNMORE	28%
THROOP	15%
SCRANTON	5%
DICKSON CITY	2%
OLYPHANT	17%
JESSUP	8%
JEFFERSON TOWNSHIP	2%
ROARING BROOK TOWNSHIP	18%

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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#	Description	Date	By
0	ISSUED FOR REVIEW	01/30/15	RGK

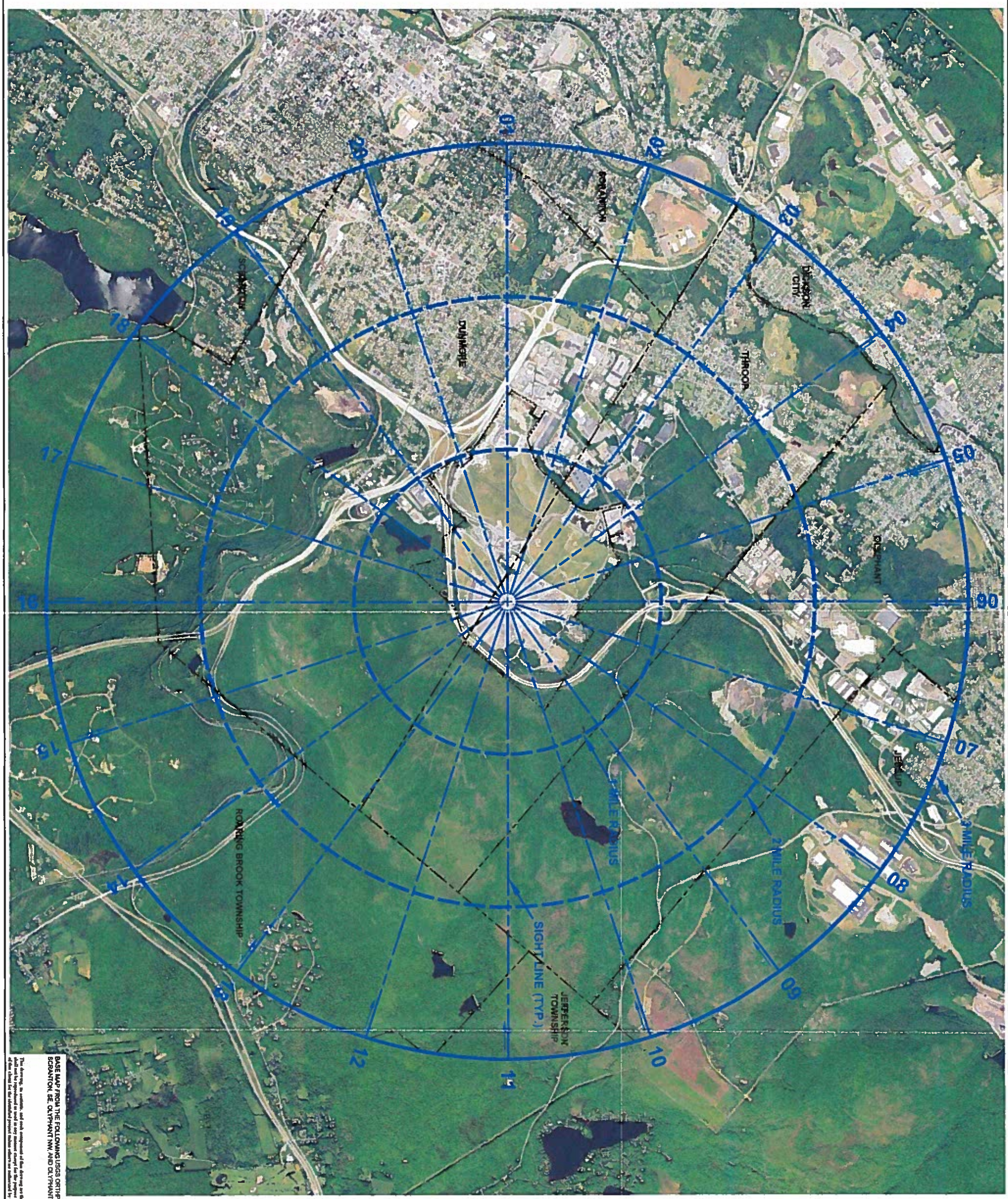
Designed	RGK
Drawn	WST
Reviewed	RGK
Scale	1" = 1500'
Date	01/30/2015
Project No.	14411

STUDY AREA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

Sheet 1



BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013. SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Sheet	Drawing title						
2	AERIAL PHOTOGRAPH	designed RGK	scale 1" = 1500'				
		drawn WST	date 01/30/2015				
		checked RGK	project no 14411				
	project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	graphic scale 0 1500 3000 4500 SCALE IN FEET	0	ISSUED FOR REVIEW	01/30/15	ARM
				No.	Revision	Date	By

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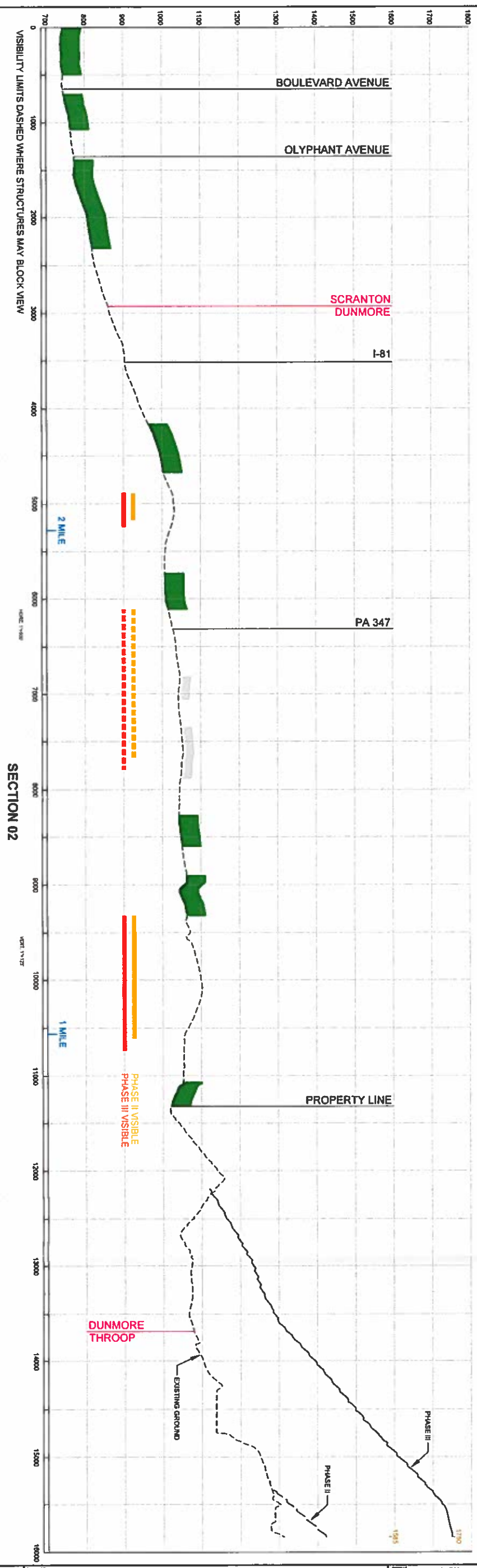

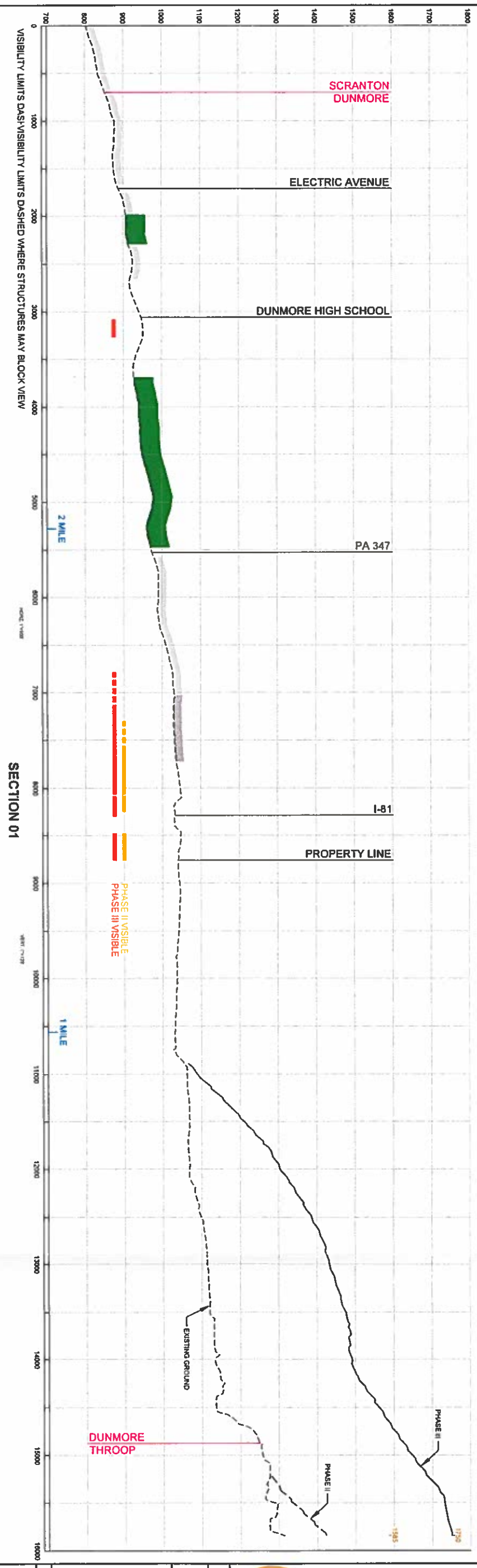

FORESTED AREA

DENSE RESIDENTIAL OR COMMERCIAL AREA

DENSE RESIDENTIAL OR COMMERCIAL AREA (HIGH PROBABILITY OF VIEW)

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Sheet	Drawing title					
5	PROFILE SECTIONS 01-02	designed RGK	scale 1" = 500'			
		drawn WST	date 01/30/2015			
		checked RGK	project no. 14411			
	Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA		0	ISSUED FOR REVIEW	01/30/15	AZM
				No.	Revision	Date	By

SCALE IN FEET

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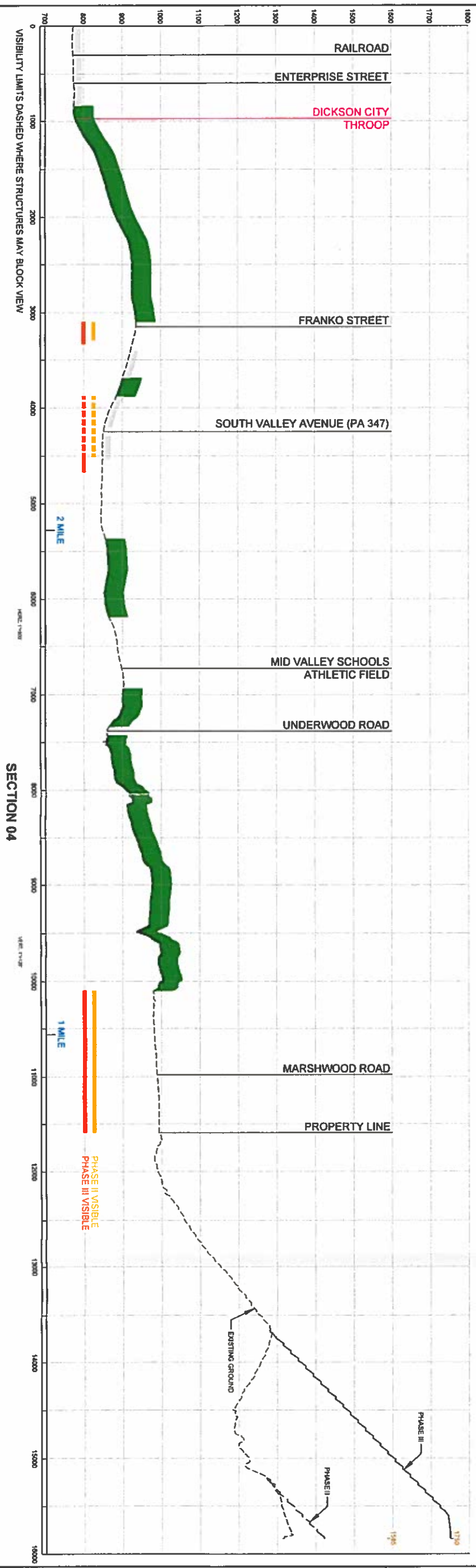

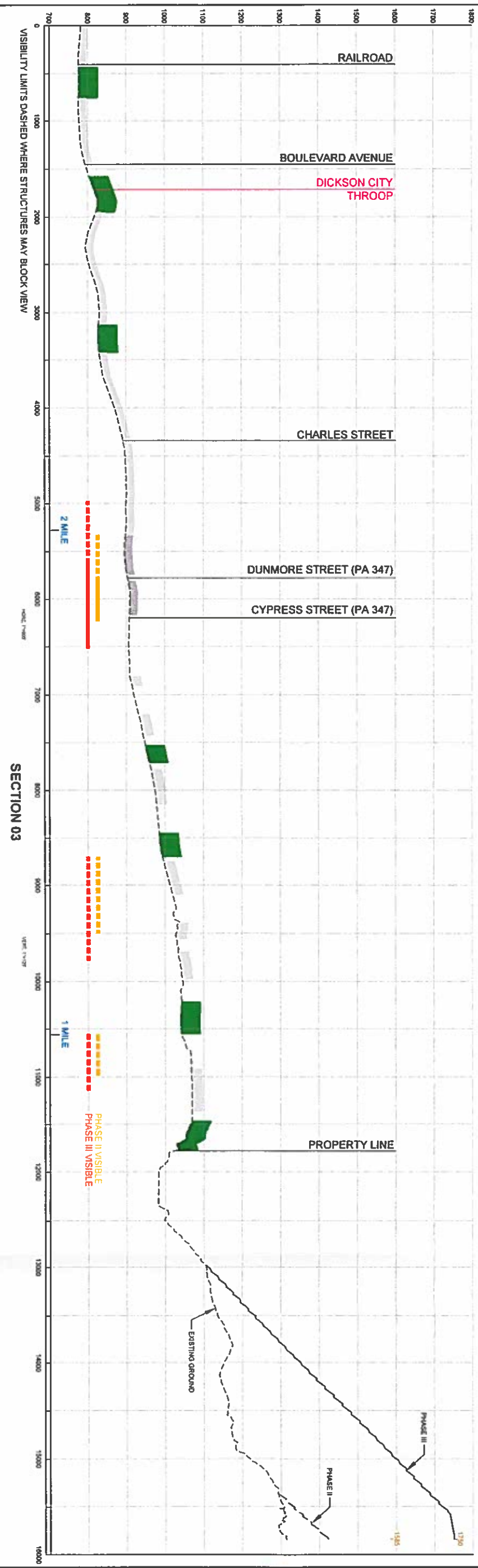

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Sheet 6

PROFILE SECTIONS 03-04

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

RGK	1" = 500'
WST	01/30/2015
RGK	14411

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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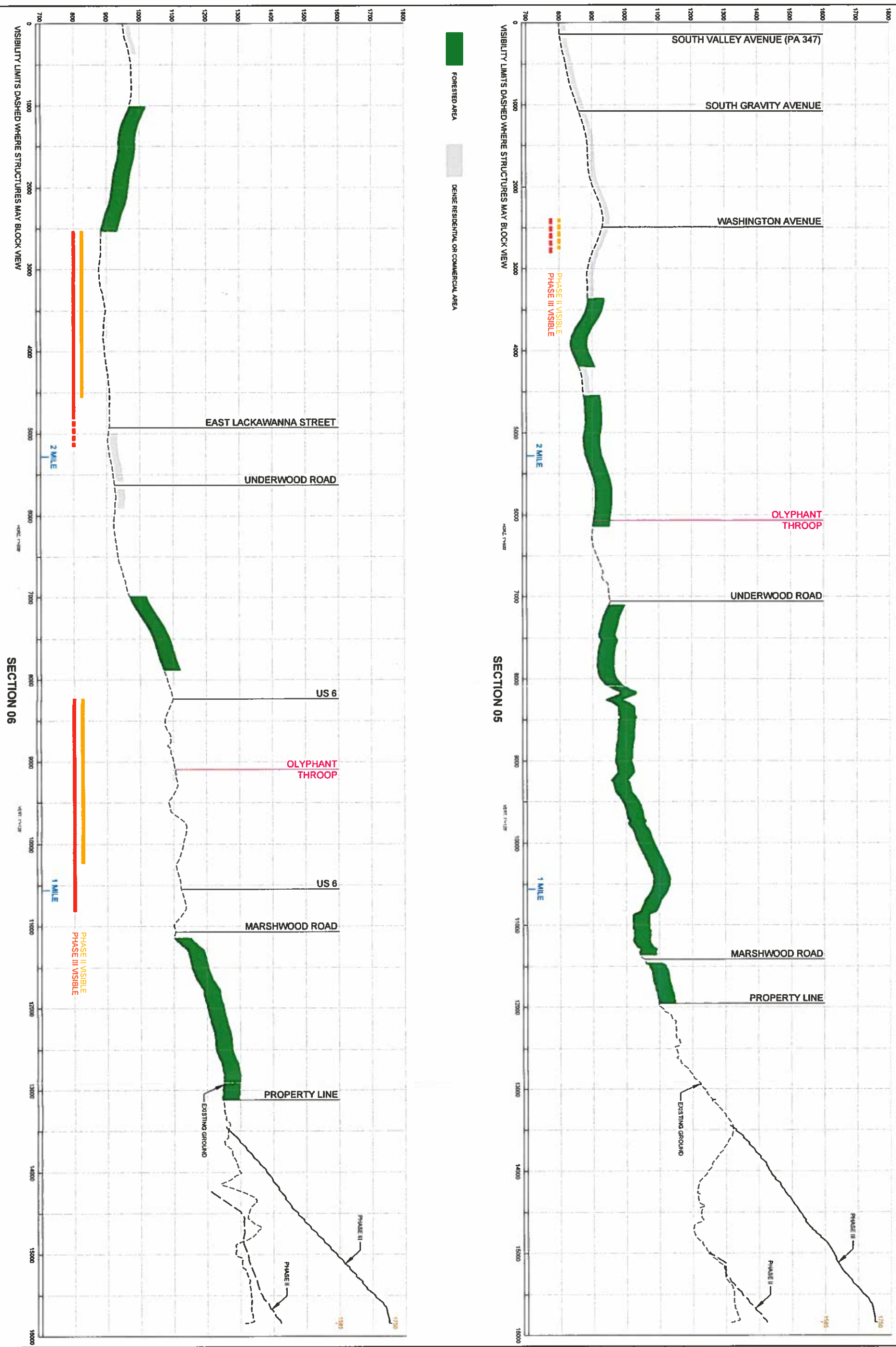

Sheet 7	PROFILE SECTIONS 05-06	RGK	1" = 500'
		WST	01/30/2015
		RGK	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET

No.	Revisions	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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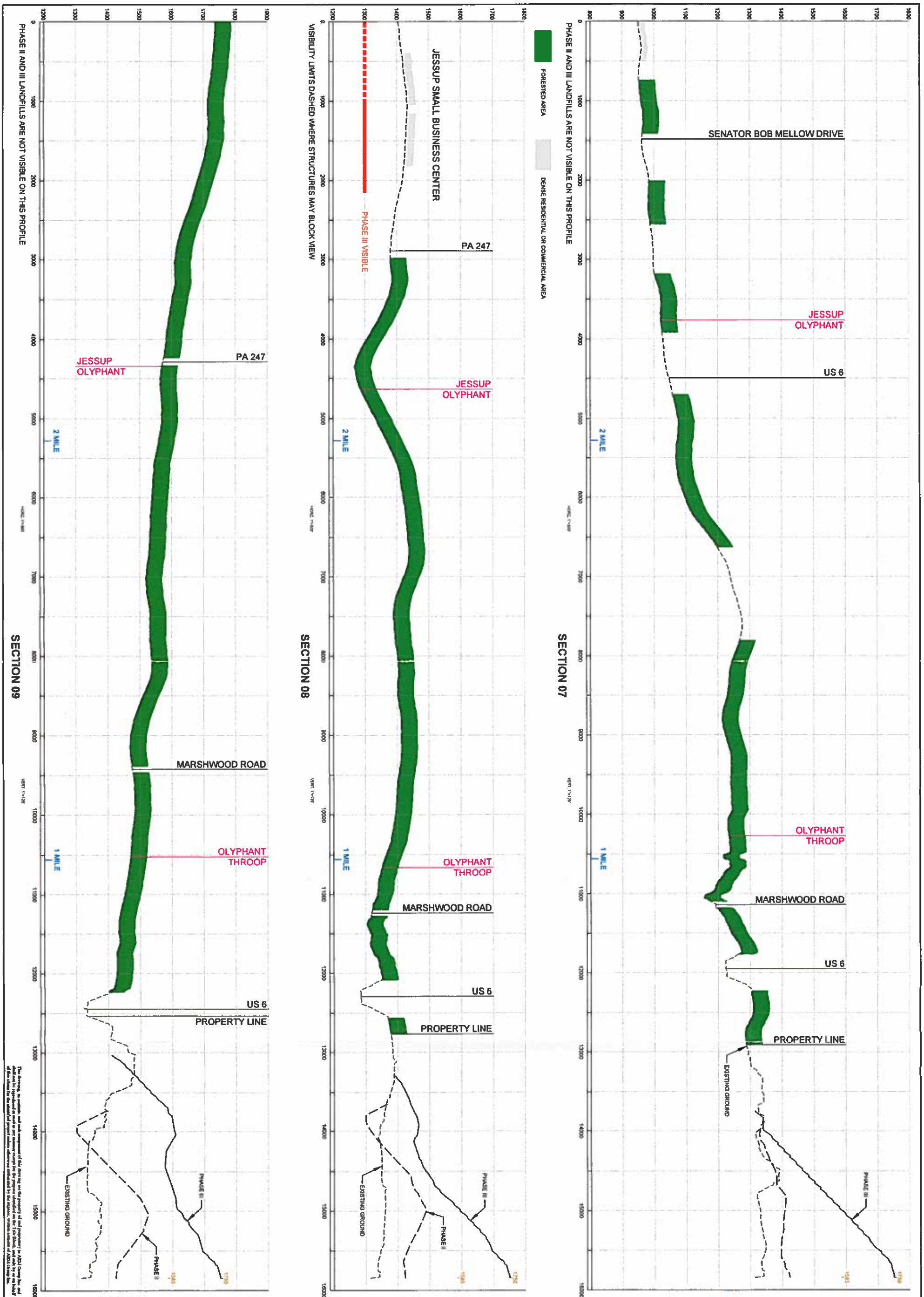

Sheet 8

PROFILE SECTIONS 07-09

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

RGK	1" = 500'		
WST	01/30/2015		
RGK	14411		
0	ISSUED FOR REVIEW	01/30/15	ARM
No.	Revision	Date	By

SCALE IN FEET

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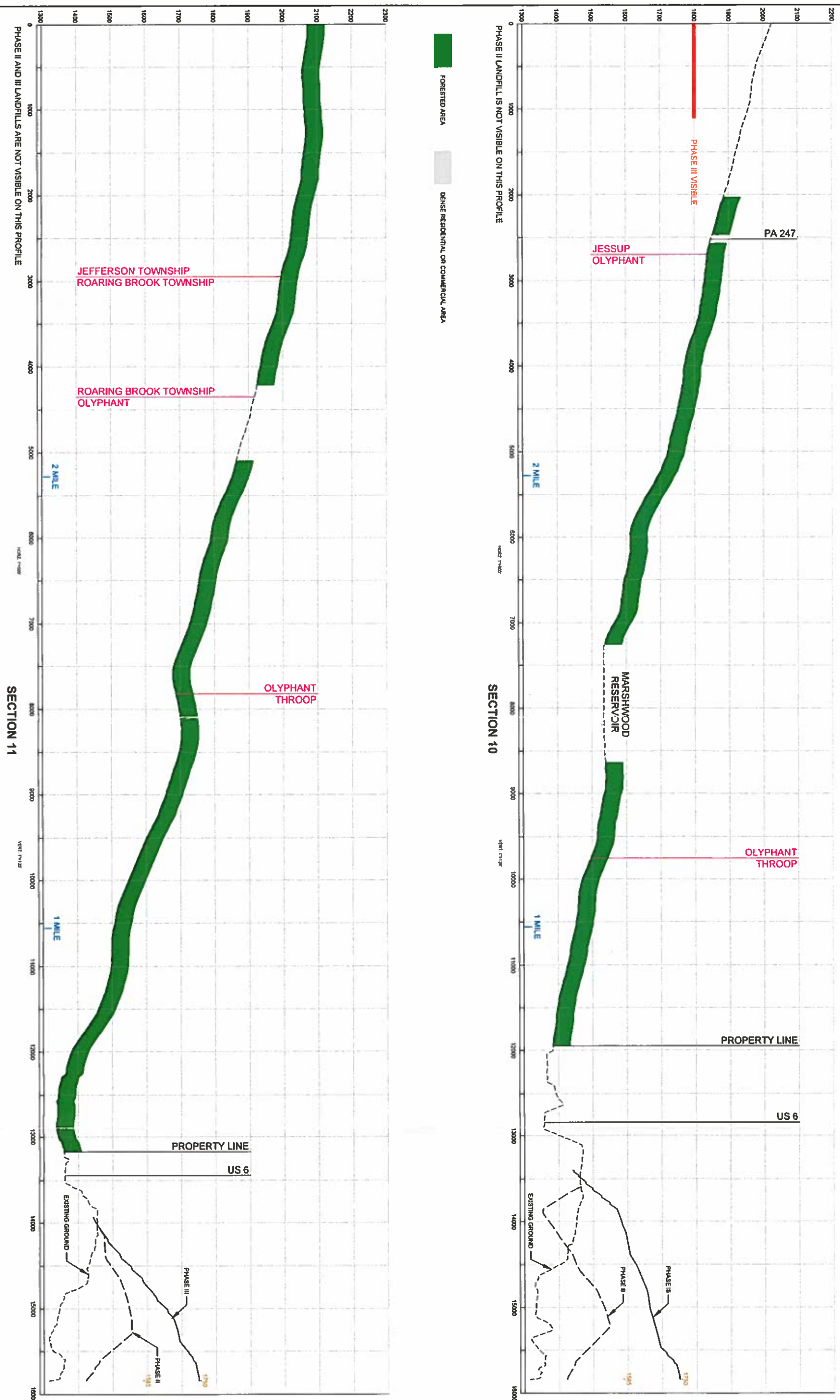

Sheet 9	PROFILE SECTIONS 10-11	RGK	1" = 500'
		WST	01/30/2015
		RGK	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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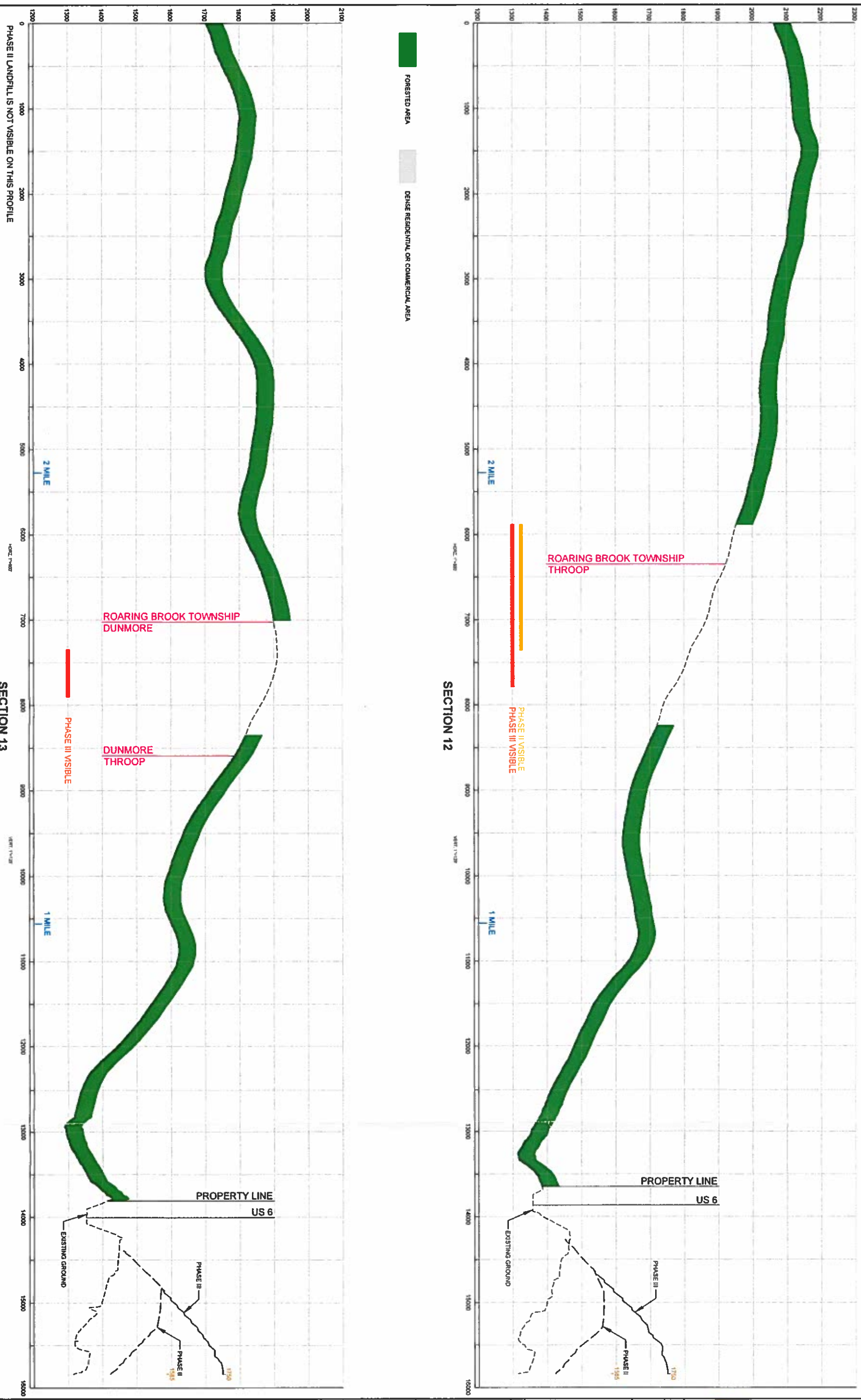

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Sheet 10	PROFILE SECTIONS 12-13	RGK	1" = 500'
		WST	01/30/2015
		RGK	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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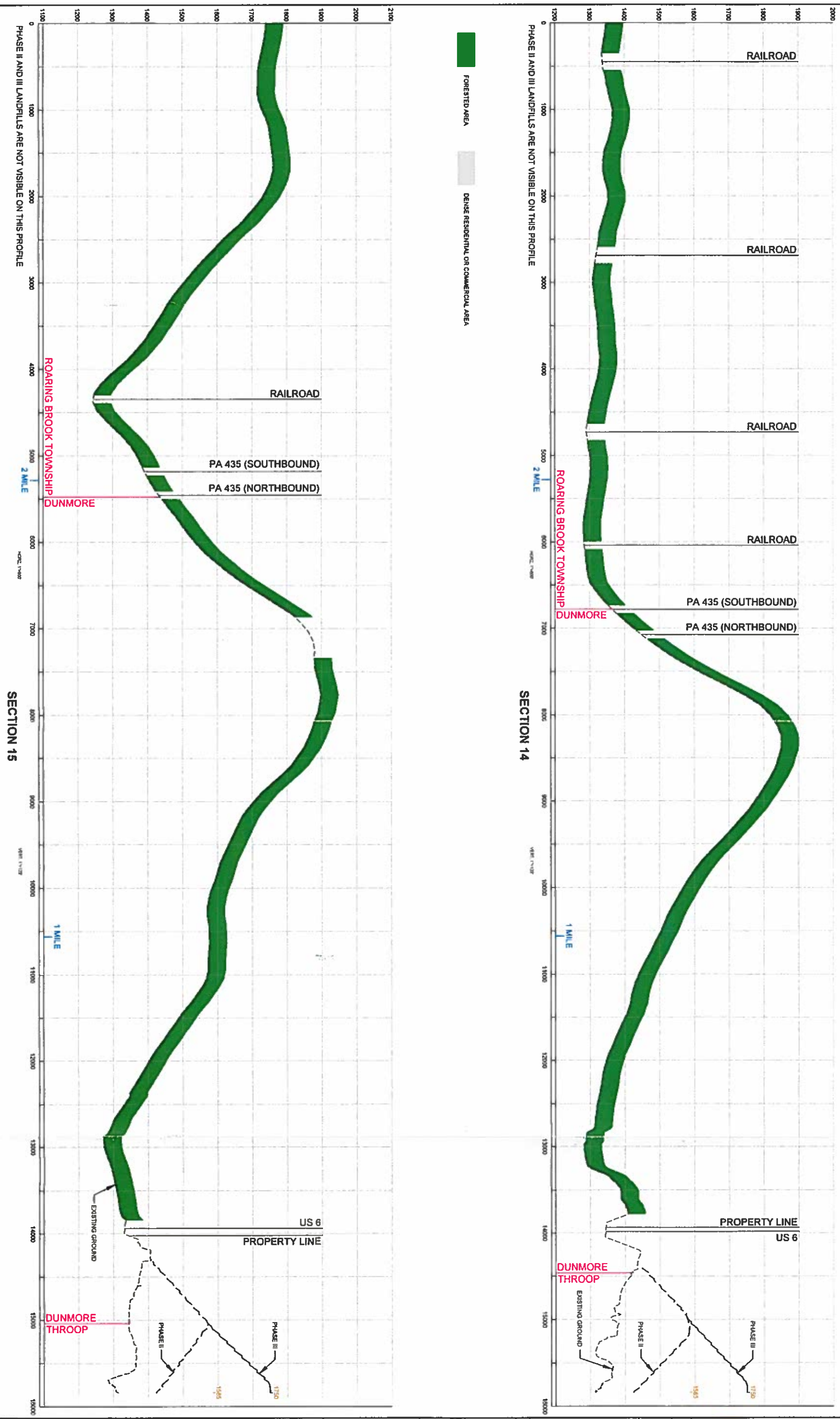

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Sheet	PROFILE SECTIONS 14-15	RGK	1" = 500'
11	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	WST	01/30/2015
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	RGK	14411

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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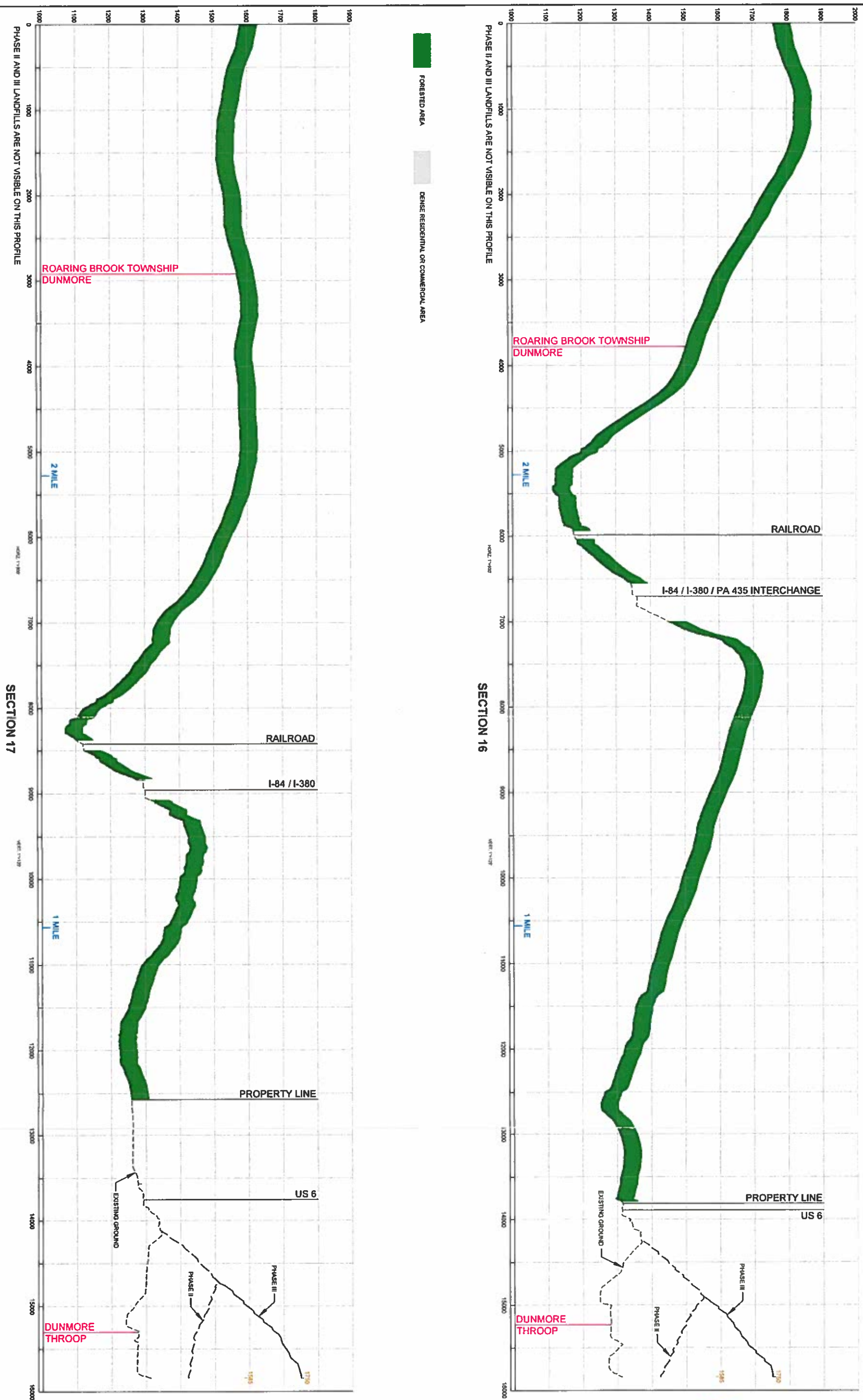

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Sheet					
12	PROFILE SECTIONS 16-17	designed RGK	scale 1" = 500'		
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	drawn WST	date 01/30/2015		
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	checked RGK	project no. 14411		
		SCALE IN FEET		0	ISSUED FOR REVIEW
				No.	Revision

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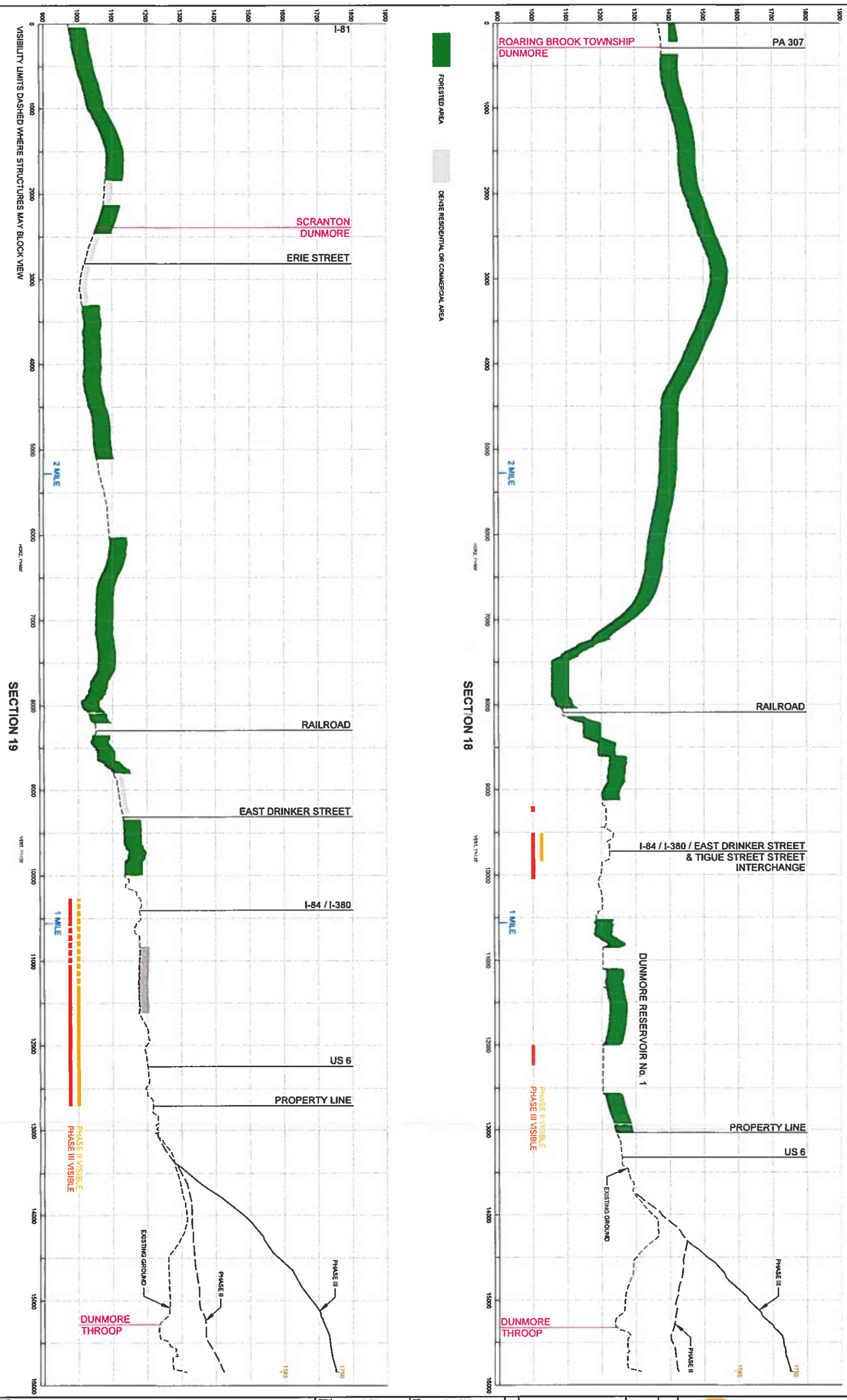

Sheet			
13	PROFILE SECTIONS 18-19	RGK	1" = 500'
		WST	01/30/2015
		RGK	14411
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	DUNMORE & THROOP LACKAWANNA COUNTY, PA	

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	AEM

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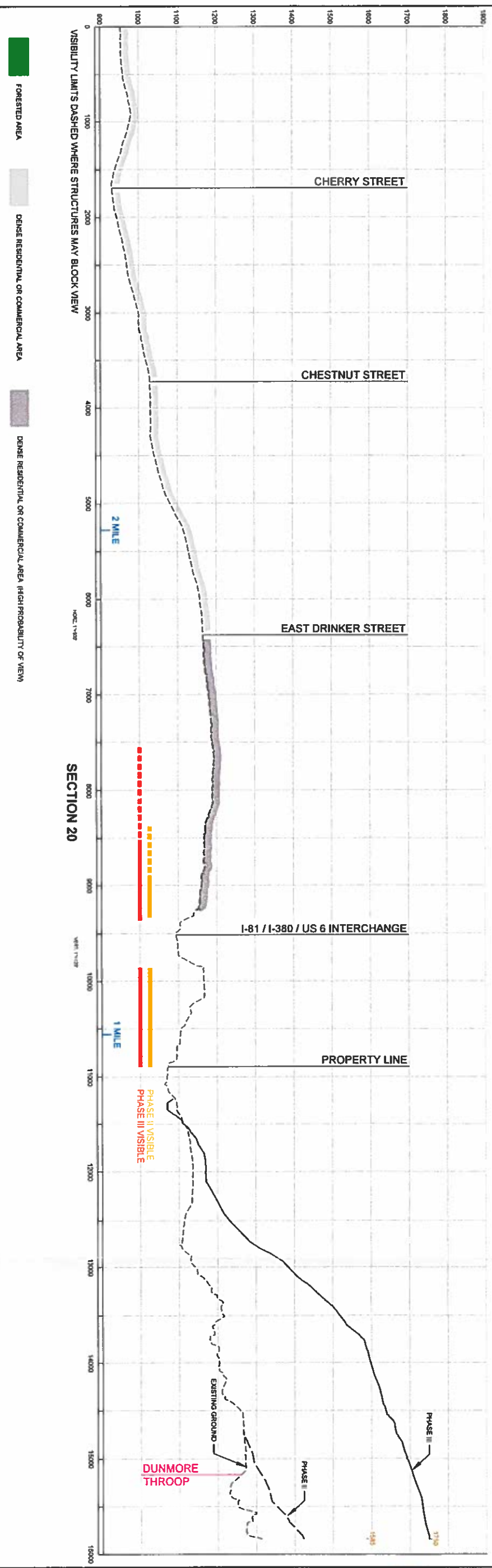

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Sheet	PROFILE SECTIONS 18-19	RGK	1" = 500'
14	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	WST	01/30/2015
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	RGK	14411

SCALE IN FEET

No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

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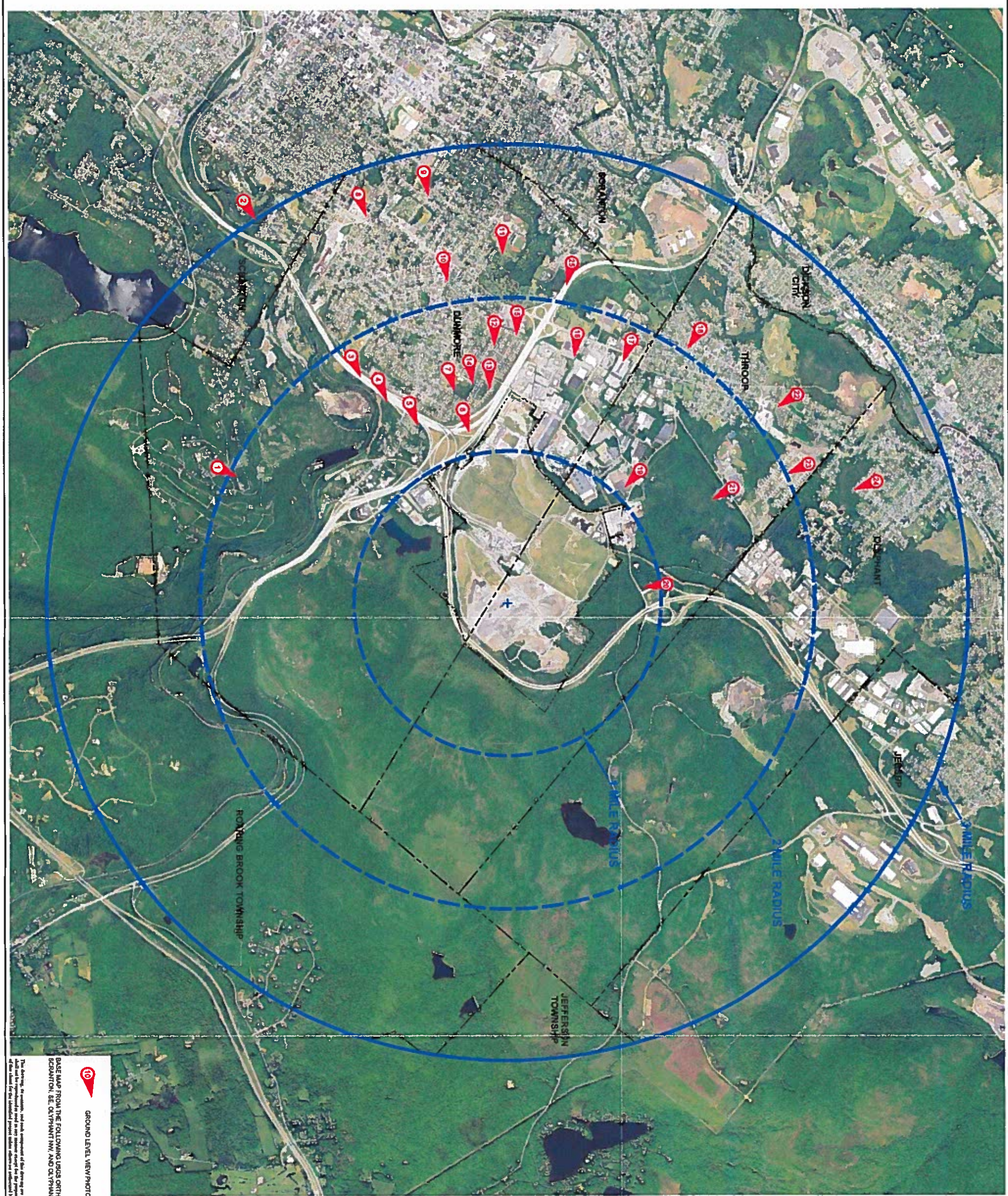

GROUND LEVEL VIEW PHOTO LOCATION AND VIEW DIRECTION

BASE MAP FROM THE FOLLOWING USGS ORTHOPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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Sheet 15	GROUND LEVEL VIEW PHOTO LOCATIONS	designed RGK	scale 1" = 1500'				
		checked WST	date 01/30/2015				
	KEYSTONE SANITARY LANDFILL VISIBILITY STUDY	drawn RGK	project no. 14411				
	DUNMORE & THROOP LACKAWANNA COUNTY, PA	graphic scale 0 1500 3000 4500 SCALE IN FEET		0	ISSUED FOR REVIEW	01/30/15	ARM
				No.	Revision	Date	By

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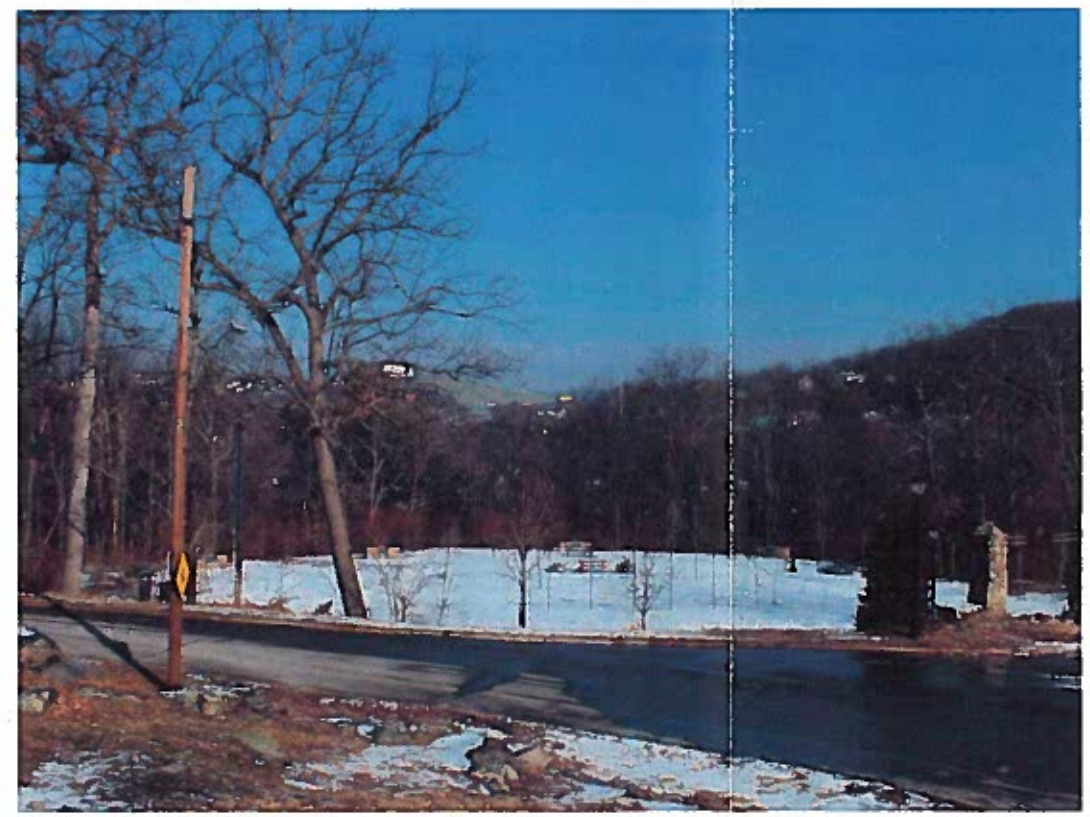
Photo 01

Existing permitted landfill - 1241 December Drive, on Mt. Margaret

Photo 02

Existing permitted landfill - Nay Aug Park above the Wildlife Center

Proposed Phase III expansion - 1241 December Drive, on Mt. Margaret



Proposed Phase III expansion - Nay Aug Park above the Wildlife Center

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No.	Description	Date	By
0	ISSUED FOR REVIEW	01/30/15	

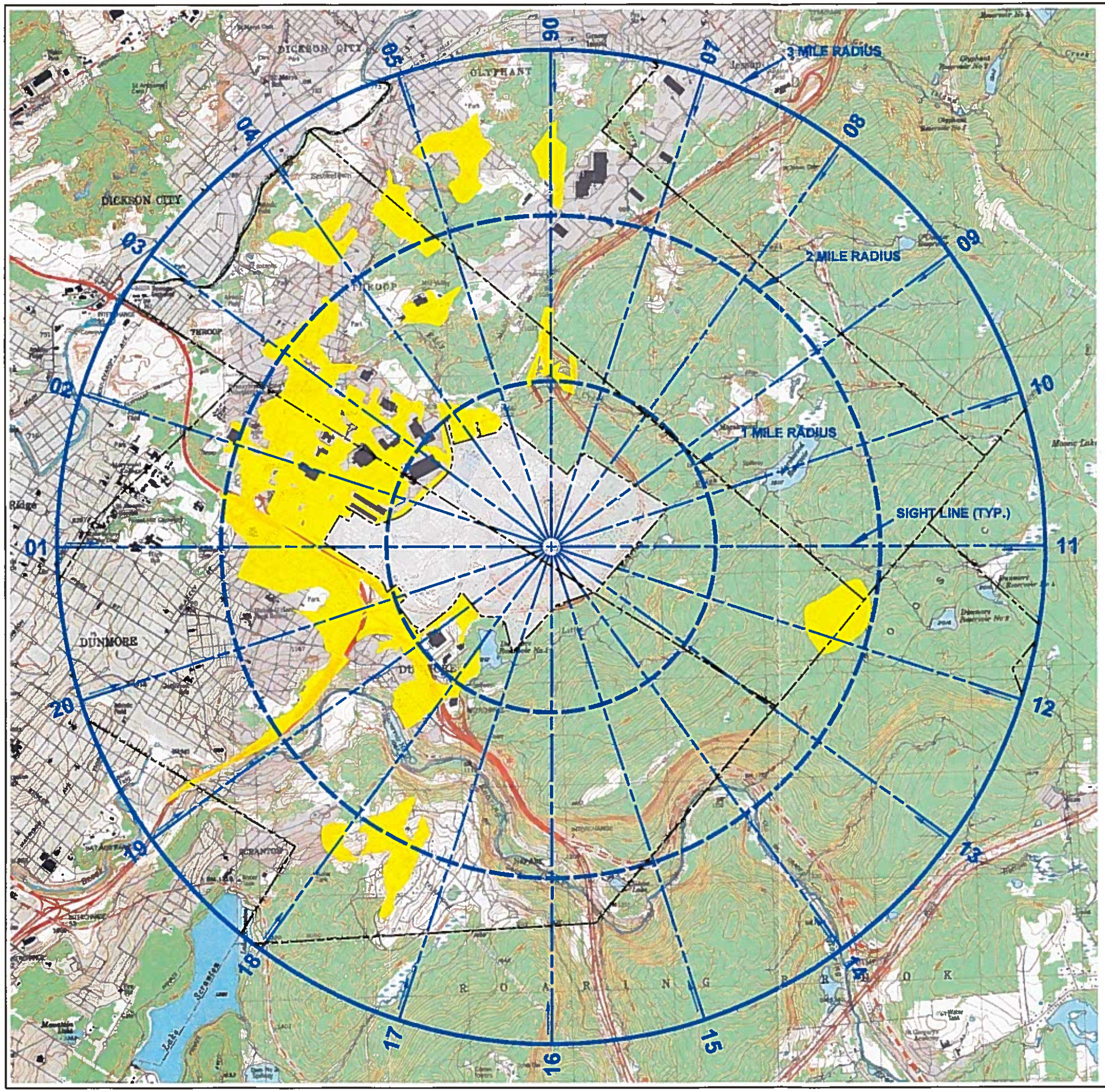
Scale	NO SCALE
Date	01/30/2015
Project No.	14411
Drawn by	RGK
Checked	WST
Approved	RGK

Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 01-02

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

Sheet 16



KEYSTONE SANITARY LANDFILL PERMITTED PHASE II EXPANSION VISIBILITY

Municipality	(A) Total Area (Acres)	Within the 3-Mile Study Radius: (B) 3-Mile Area (Acres)	(C) Visible Area (Acres)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	3,007	284	0	–	–	–
Dunmore	5,224	5,117	815	15.93	4.74	15.60
Jefferson Township	21,731	316	0	–	–	–
Jessup	4,350	1,455	0	–	–	–
Keystone Sanitary Landfill*	–	911	–	–	–	–
Olyphant	3,498	3,160	124	3.92	0.72	3.54
Roaring Brook Township	14,226	3,200	22	0.69	0.13	0.15
Scranton	16,284	878	3	0.34	0.02	0.02
Throop	2,768	2,767	444	16.05	2.58	16.04
Total Area of 3-Mile Radius Study		18,088	1,408		8.20	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase II expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase II landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE II LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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No.	Revision	By	Date
1	ISSUED FOR REVIEW		03/30/15

Drawn by	RGK	
Checked by	WST	
Approved by	RGK	
Scale	1" = 1500'	
Date	01/30/2015	
Project No.	14411	

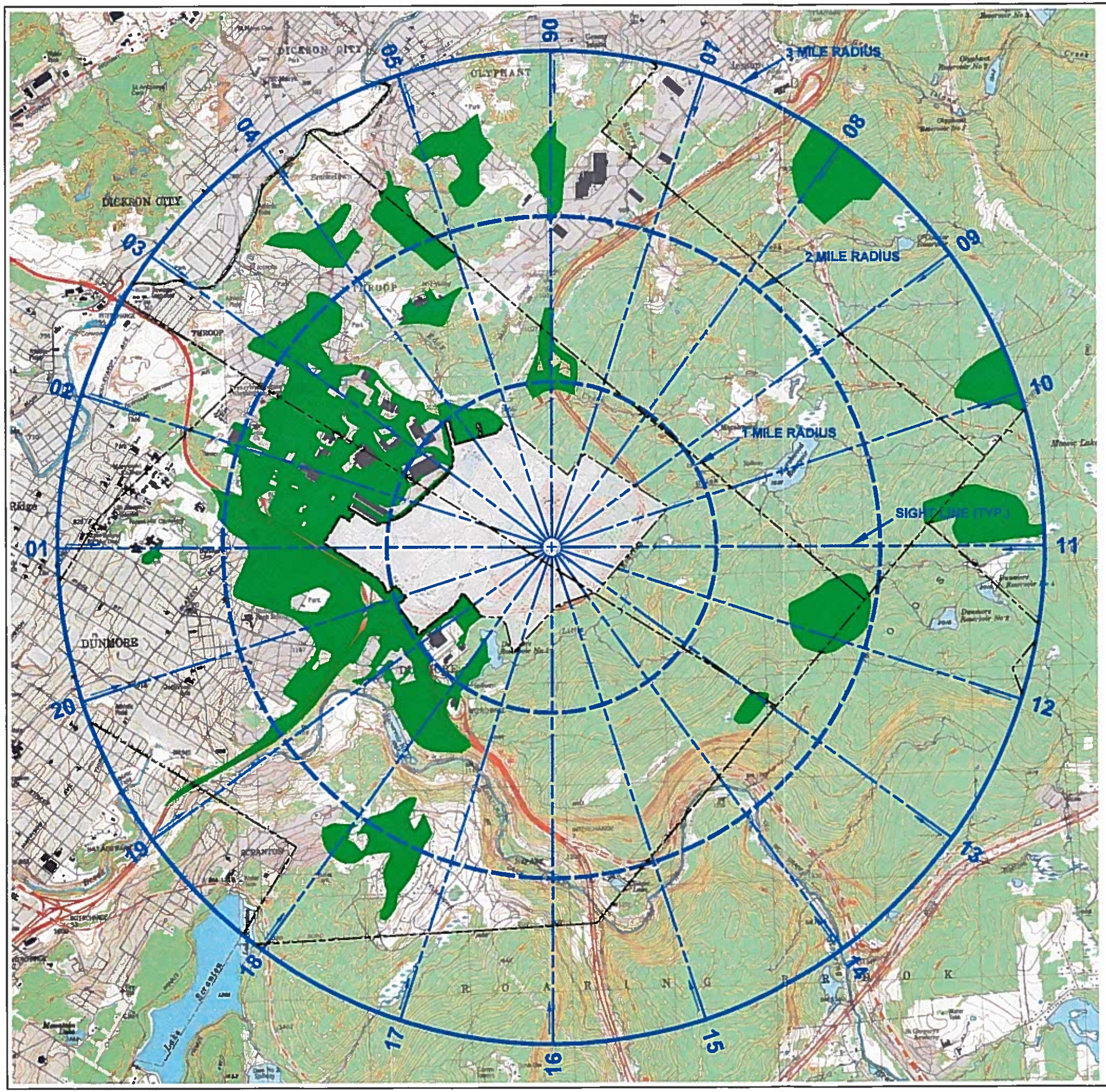
SCALE IN FEET

PHASE II VISIBLE AREAS OVERLAID ON USGS QUADS

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP LACKAWANNA COUNTY, PA

Sheet 3a



KEYSTONE SANITARY LANDFILL PROPOSED PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Acres)	Within the 3-Mile Study Radius (B) 3-Mile Area (Acres)	(C) Visible Area (Acres)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	3,007	284	0	-	-	-
Dunmore	5,224	5,117	970	18.96	5.65	18.57
Jefferson Township	21,731	316	96	30.38	0.56	0.44
Jessup	4,350	1,455	177	12.16	1.03	4.07
Keystone Sanitary Landfill*	-	911	-	-	-	-
Olyphant	3,498	3,160	150	4.75	0.84	4.29
Roaring Brook Township	14,226	3,200	22	0.69	0.13	0.15
Scranton	16,284	878	3	0.34	0.02	0.02
Throop	2,768	2,767	555	20.06	3.23	20.05
Total Area of 3-Mile Radius Study		18,088	1,973		11.49	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM SCRANTON USGS QUAD DATED 1994 AND OLYPHANT USGS QUAD DATED 1999

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

Designed	RGK	Scale 1" = 1500'
Checked	WST	Date 01/30/2015
Drawn	RGK	Project No. 14411

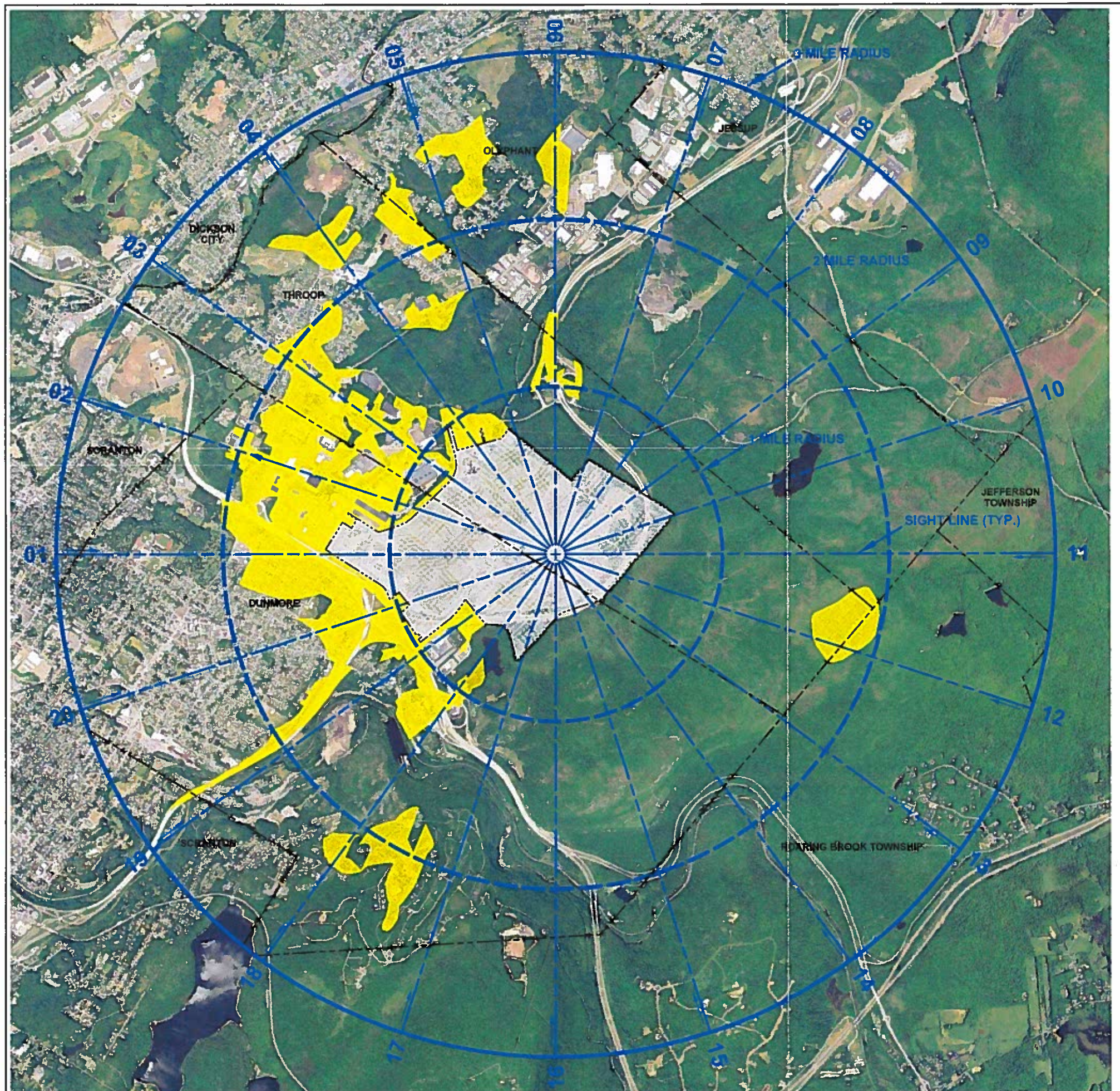
SCALE IN FEET 0 1000 2000 4000

PHASE III VISIBLE AREAS OVERLAID ON USGS QUADS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

Sheet 3b



KEYSTONE SANITARY LANDFILL PERMITTED PHASE II EXPANSION VISIBILITY

Municipality	(A) Total Area (Acres)	Within the 3-Mile Study Radius (B) 3-Mile Area (Acres)	(C) Visible Area (Acres)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	3,007	284	0	-	-	-
Dunmore	5,224	5,117	815	15.93	4.74	15.60
Jefferson Township	21,731	316	0	-	-	-
Jessup	4,350	1,455	0	-	-	-
Keystone Sanitary Landfill*	-	911	-	-	-	-
Olyphant	3,498	3,160	124	3.92	0.72	3.54
Roaring Brook Township	14,226	3,200	22	0.69	0.13	0.15
Scranton	16,284	878	3	0.34	0.02	0.02
Throop	2,768	2,767	444	16.05	2.58	16.04
Total Area of 3-Mile Radius Study		18,088	1,408		8.20	

*Area of the existing landfill property is excluded from these computations.

(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase II expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase II landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase II landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE II LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

Designed RGK | Scale 1" = 1500'
Checked WST | Date 01/30/2015
Drawn RGK | Project No. 14411

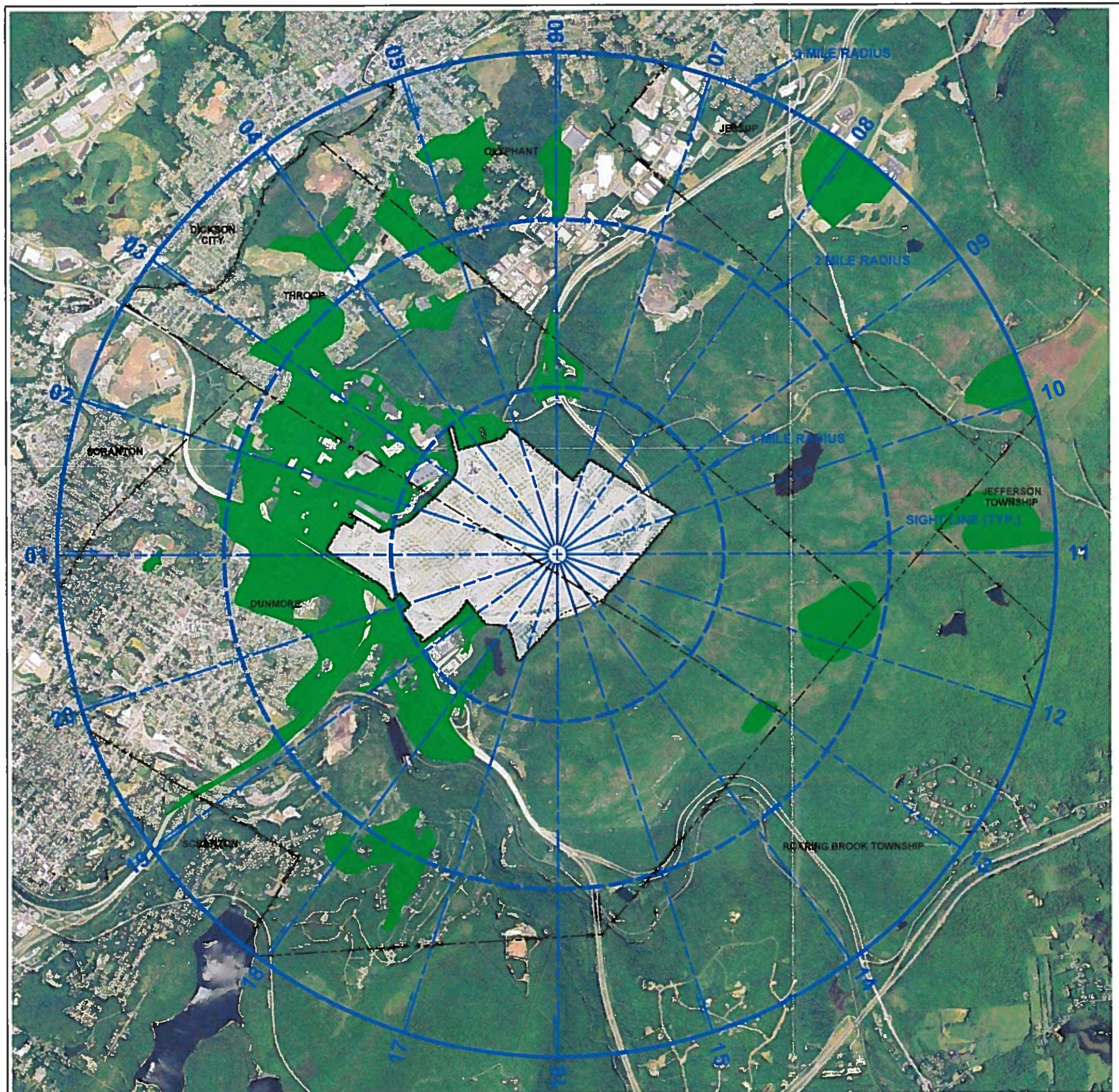
SCALE IN FEET

PHASE II VISIBLE AREAS OVERLAID ON AERIAL PHOTOGRAPHS

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

Sheet 4a



KEYSTONE SANITARY LANDFILL PROPOSED PHASE III EXPANSION VISIBILITY

Municipality	(A) Total Area (Acres)	Within the 3-Mile Study Radius (B) 3-Mile Area (Acres)	(C) Visible Area (Acres)	(D) % Visible 3-Mile Municipality	(E) % Visible 3-Mile Study	(F) % Affecting Entire Municipality
Dickson City	3,007	284	0	-	-	-
Dunmore	5,224	5,117	970	18.96	5.65	18.57
Jefferson Township	21,731	316	96	30.38	0.56	0.44
Jessup	4,350	1,455	177	12.16	1.03	4.07
Keystone Sanitary Landfill*	-	911	-	-	-	-
Olyphant	3,498	3,160	150	4.75	0.84	4.29
Roaring Brook Township	14,226	3,200	22	0.69	0.13	0.15
Scranton	16,284	878	3	0.34	0.02	0.02
Throop	2,768	2,767	555	20.06	3.23	20.05
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(A) Total municipality area, excluding the existing landfill property.
(B) Total municipality area within the 3-mile study radius, excluding the existing landfill property.
(C) Total municipality area where the Phase III expansion will be visible within the 3-mile study radius.
(D) Percent of municipality within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/(B)]
(E) Percent of the municipality area within the 3-mile study radius where the Phase III landfill expansion will be visible. [(C)/Total Study Area]
(F) Percent of municipality where the Phase III landfill expansion will be visible within the 3-mile study radius compared to the area of the entire municipality. [(C)/(A)]

LEGEND

PROBABLE AREA OF PHASE III LANDFILL VISIBILITY

AREA WITHIN THE PROPERTY BOUNDARY OF THE KEYSTONE SANITARY LANDFILL - EXCLUDED FROM CONSIDERATION IN THIS STUDY

BASE MAP FROM THE FOLLOWING USGS ORTHPHOTOS DATED 2013: SCRANTON NE, SCRANTON, SE, OLYPHANT NW, AND OLYPHANT SW.

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No.	Revision	Date	By
0	ISSUED FOR REVIEW	01/30/15	ARM

Designed	RGK
Drawn	WST
Checked	RGK
Scale	1" = 1500'
Date	01/30/2015
Project No.	14411

SCALE IN FEET

PHASE III VISIBLE AREAS OVERLAID ON AERIAL PHOTOGRAPHS

KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

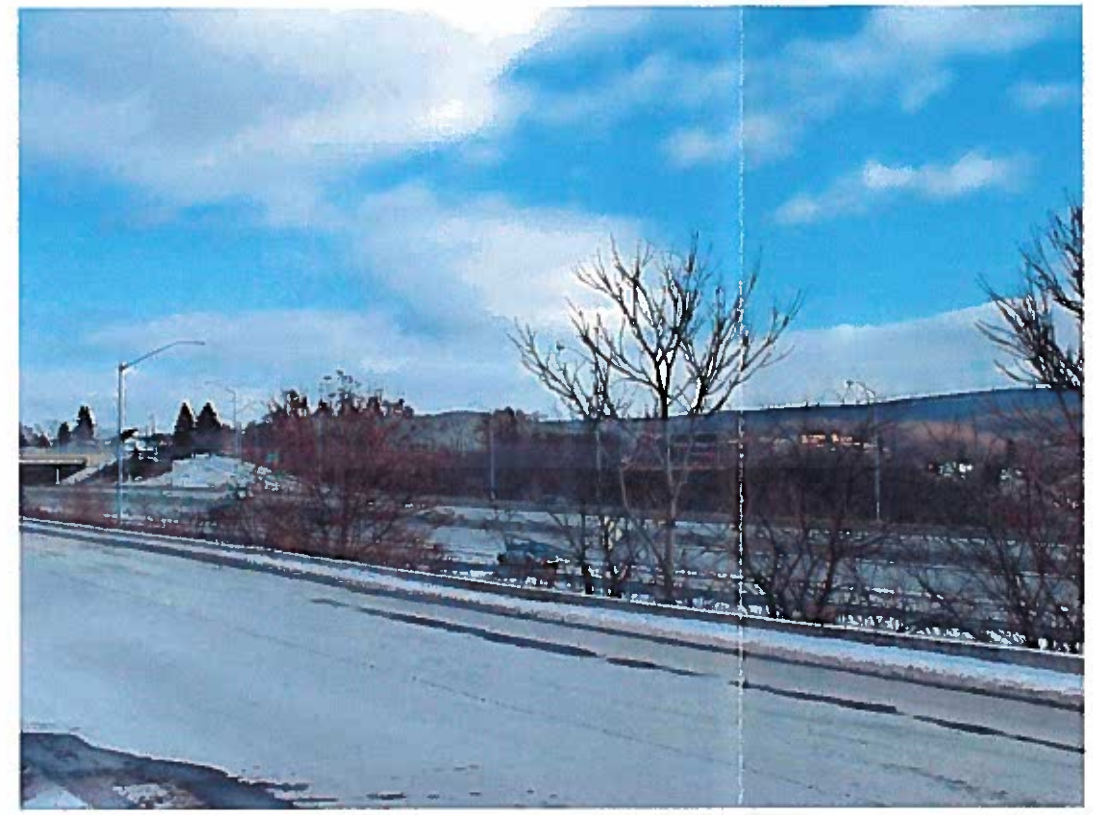
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 4b

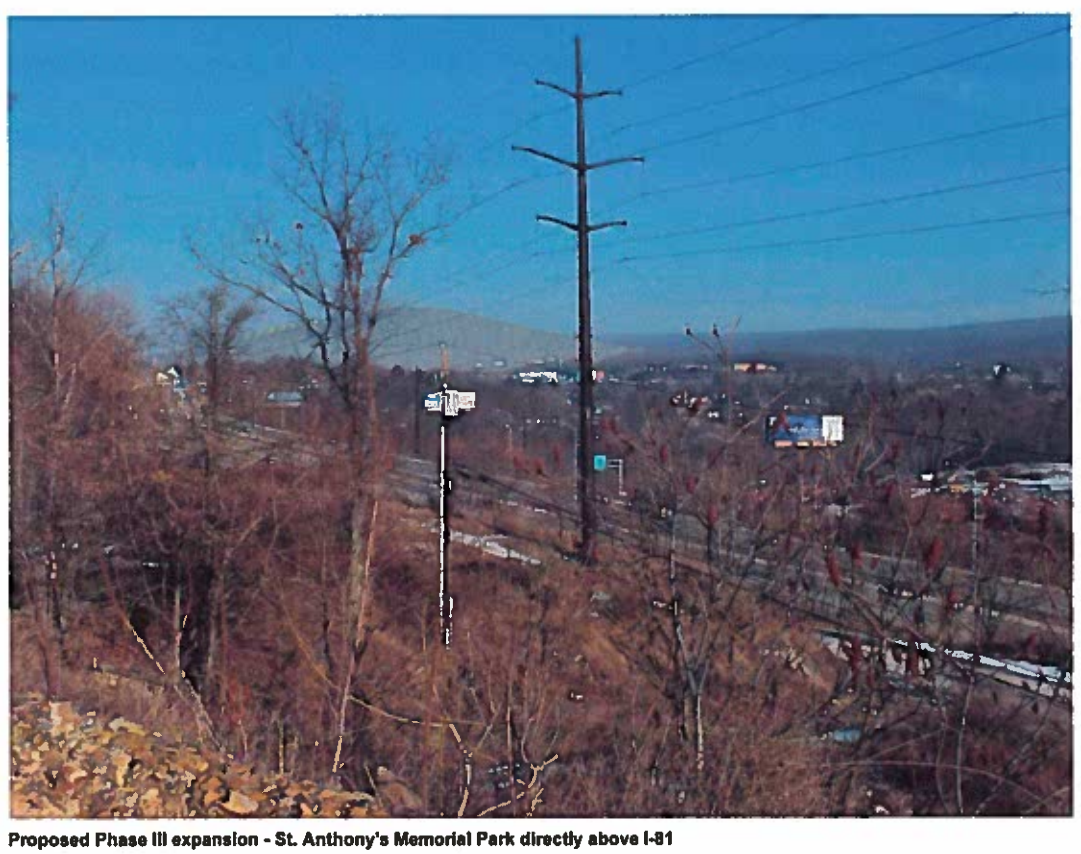
Photo 03

Existing permitted landfill - St. Anthony's Memorial Park directly above I-81

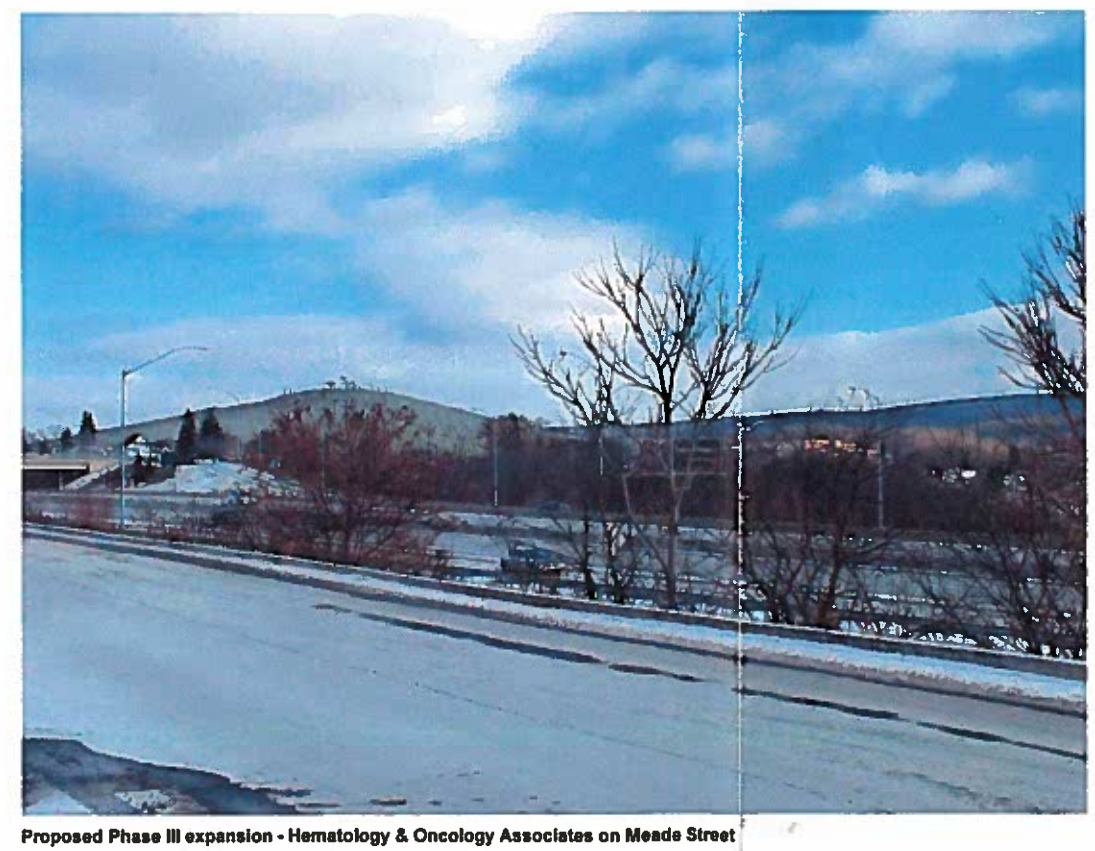
Photo 04



Existing permitted landfill - Hematology & Oncology Associates on Meade Street



Proposed Phase III expansion - St. Anthony's Memorial Park directly above I-81



Proposed Phase III expansion - Hematology & Oncology Associates on Meade Street

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No.	Revisions	Date	By
0	ISSUED FOR REVIEW	01/30/15	AMH

scale	NO SCALE	
date	01/30/2015	
project no.	14411	
designed	RGK	
checked	WST	
drawn	RGK	

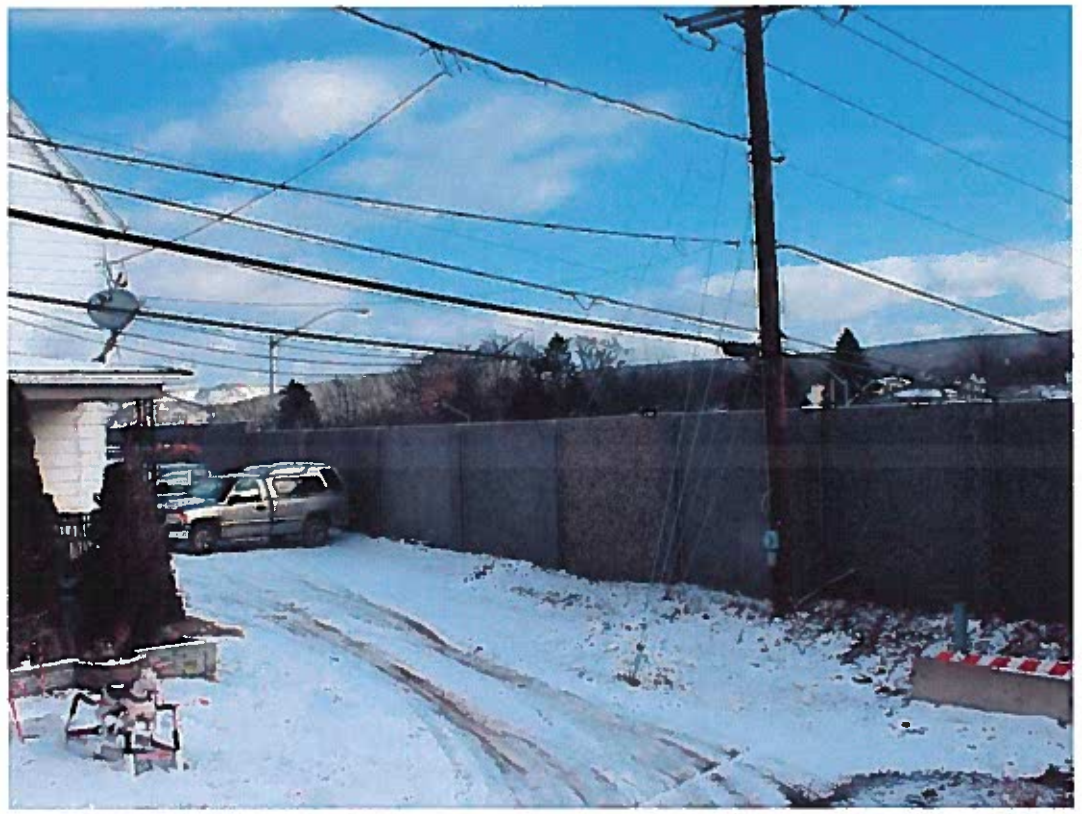
drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 03-04

project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

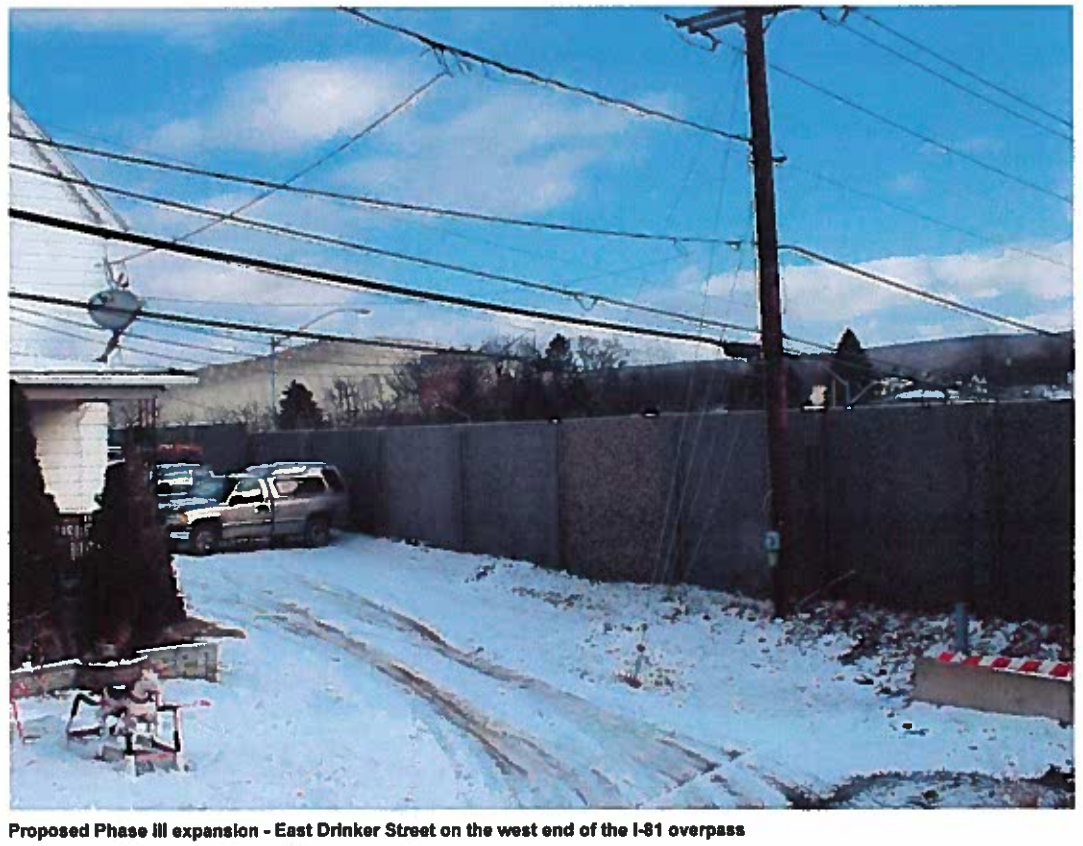
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 17

Photo 05



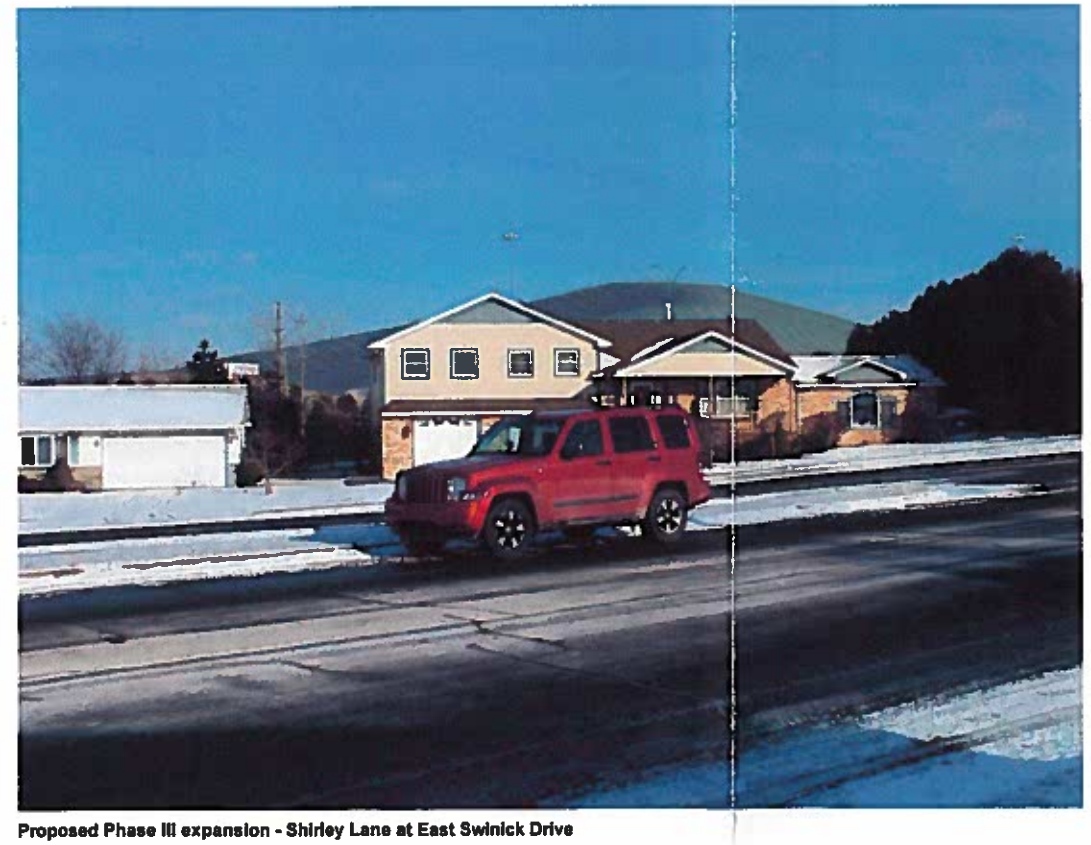
Existing permitted landfill - East Drinker Street on the west end of the I-81 overpass



Proposed Phase III expansion - East Drinker Street on the west end of the I-81 overpass

Photo 06

Existing permitted landfill - Shirley Lane at East Swinick Drive



Proposed Phase III expansion - Shirley Lane at East Swinick Drive

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#	Revisions	Date	By
0	ISSUED FOR REVIEW	01/30/15	RGK

Designed	RGK	Scale NO SCALE
Drawn	WST	Date 01/30/2015
Checked	RGK	Project No. 14411

GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 05-06

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 18

Photo 07

Proposed Phase III expansion - Sherwood Avenue at Sherwood Park (existing permitted landfill is not visible from this location)

Photo 08

Schautz Stadium (landfill is not visible from this location)

Photo 09

Monroe Field behind the Dunmore Community Center (landfill is not visible from this location)

Photo 10

Blakely Street at East Drinker Street (landfill is not visible from this location)

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0	ISSUED FOR REVIEW	01/30/15	ADJ

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Project No.	14411	Approved	RGK

GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 07-10

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 19

EXHIBIT C2.2

LANDSCAPING OPTIONS

Photo 11

Proposed Phase III expansion - Dunmore High School (existing permitted landfill is not visible from this location)

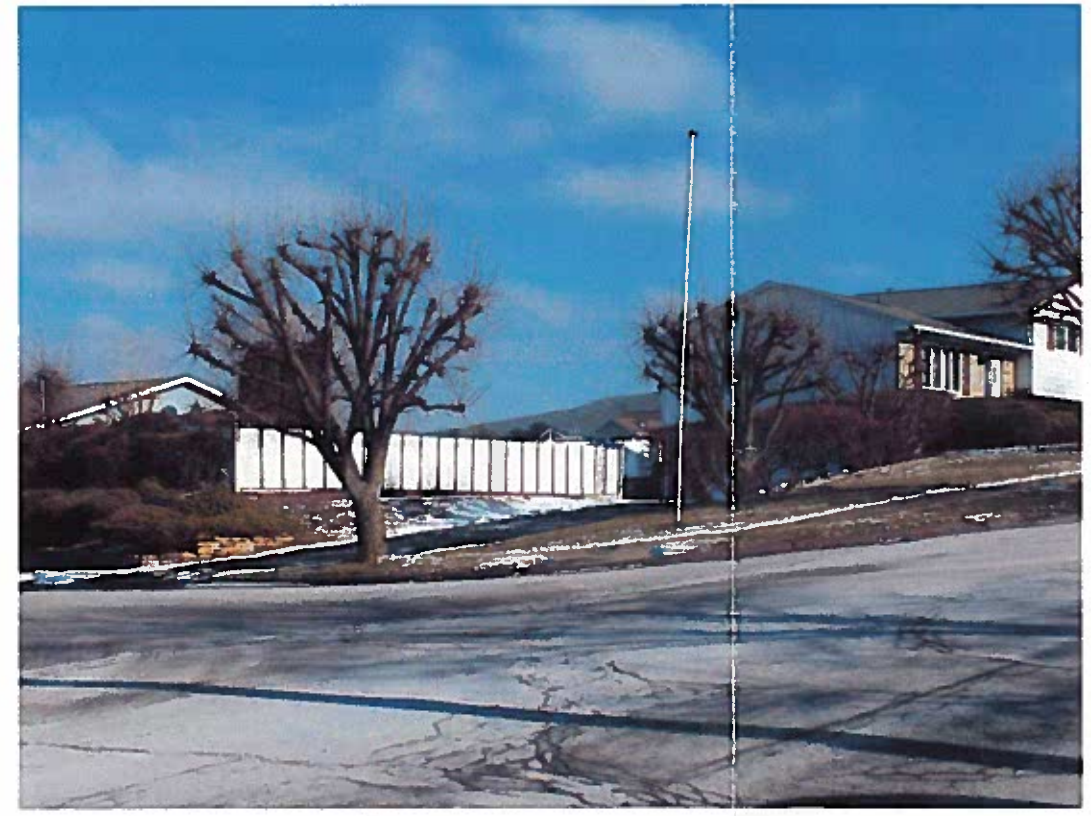
Photo 12

100 Swinick Drive (landfill is not visible from this location)

Photo 13

521 Shirley Lane (existing permitted landfill is not visible from this location)

Photo 13a



520 Shirley Lane (existing permitted landfill is not visible from this location)

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drawn	WST	
checked	RGK	
scale	NO SCALE	
date	01/30/2015	
project no.	14411	

drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 11-13

project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 20

Photo 14

Existing permitted landfill - 500 Reeves Street

Photo 15

Existing permitted landfill - Greater Scranton YMCA

Proposed Phase III expansion - 500 Reeves Street

Proposed Phase III expansion - Greater Scranton YMCA

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Drawn: WST
Reviewed: RGK

Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 14-15

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

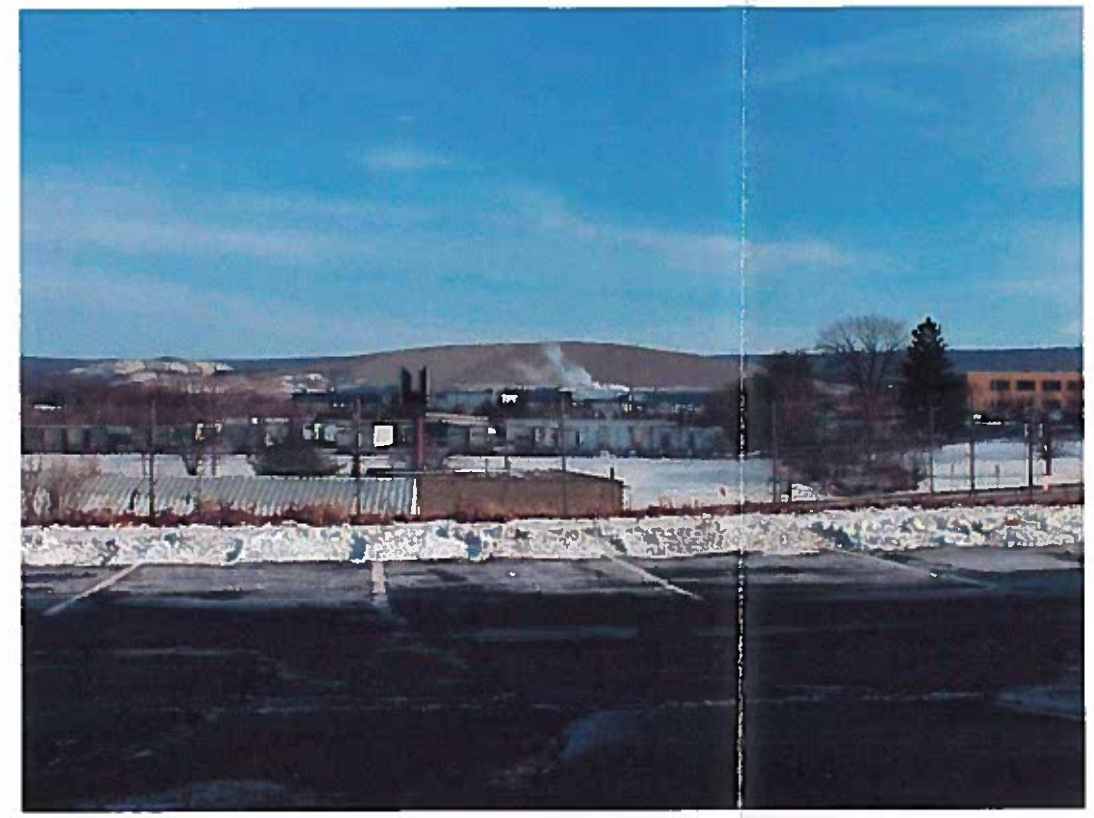
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 21

Photo 16

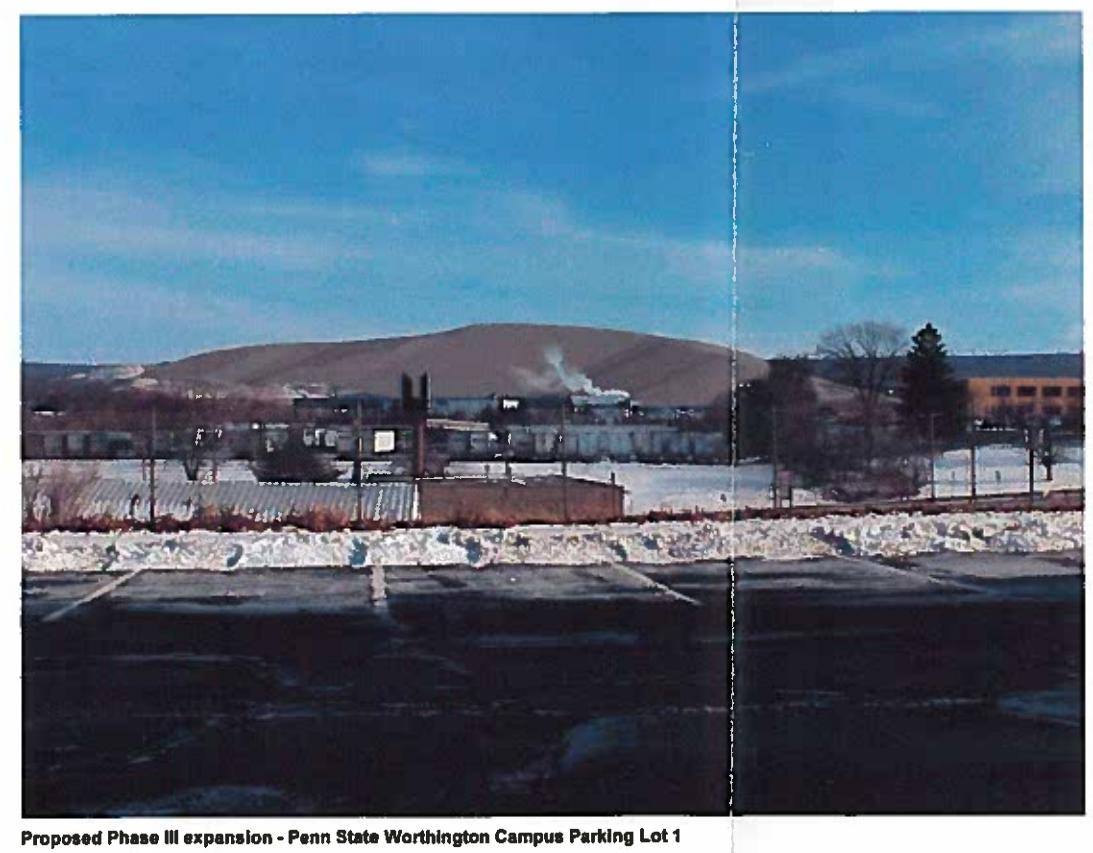
Existing permitted landfill - O'Neil Highway at Dunmore Shopping Center

Photo 17



Existing permitted landfill - Penn State Worthington Campus Parking Lot 1

Proposed Phase III expansion - O'Neil Highway at Dunmore Shopping Center



Proposed Phase III expansion - Penn State Worthington Campus Parking Lot 1

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Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 22

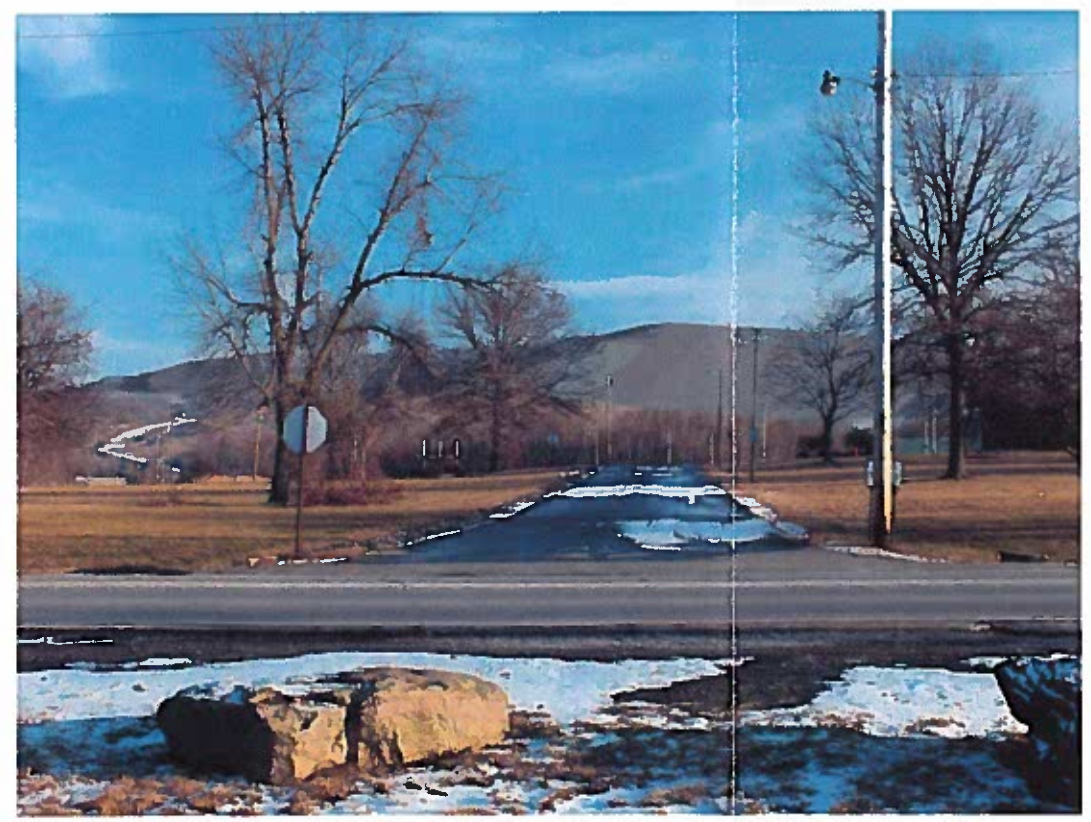
Photo 18

Existing permitted landfill - Throop Borough Office

Photo 19

Existing permitted landfill - Gertrude Hawk store

Proposed Phase III expansion - Throop Borough Office



Proposed Phase III expansion - Gertrude Hawk store

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drawn	RGK
scale	NO SCALE
date	01/30/2015
project no.	14411

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project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

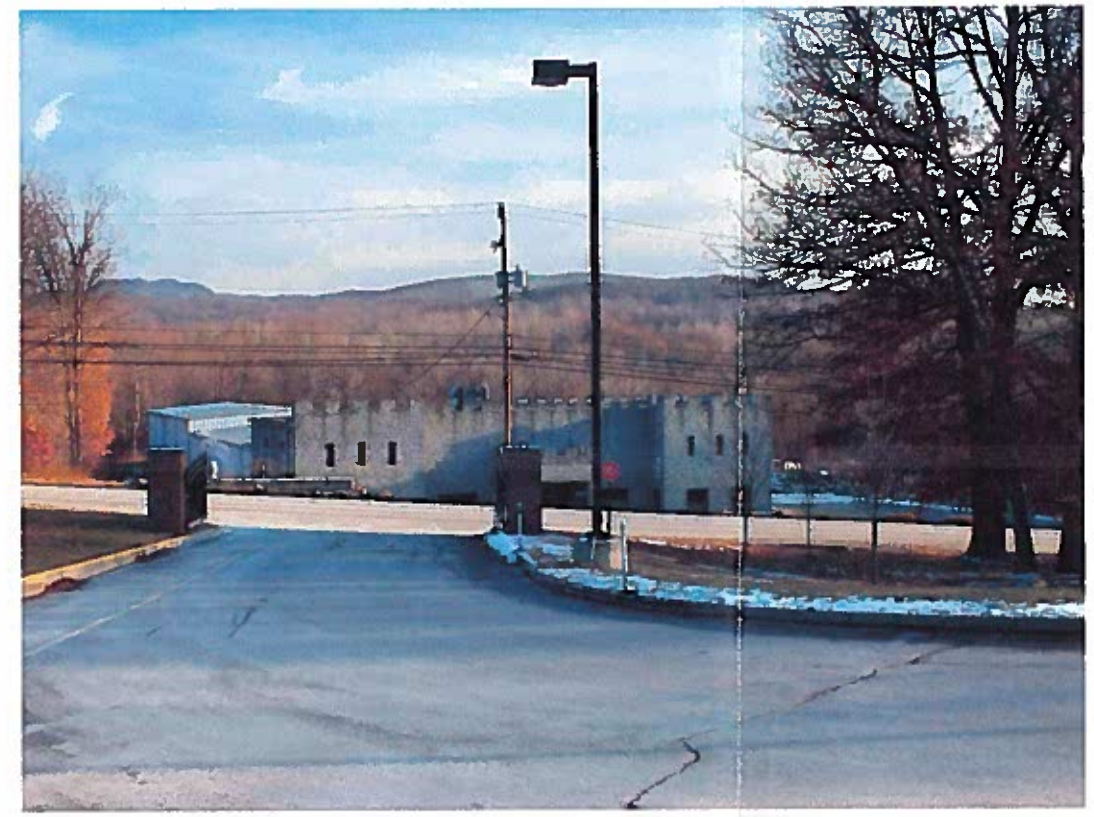
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 23

Photo 20

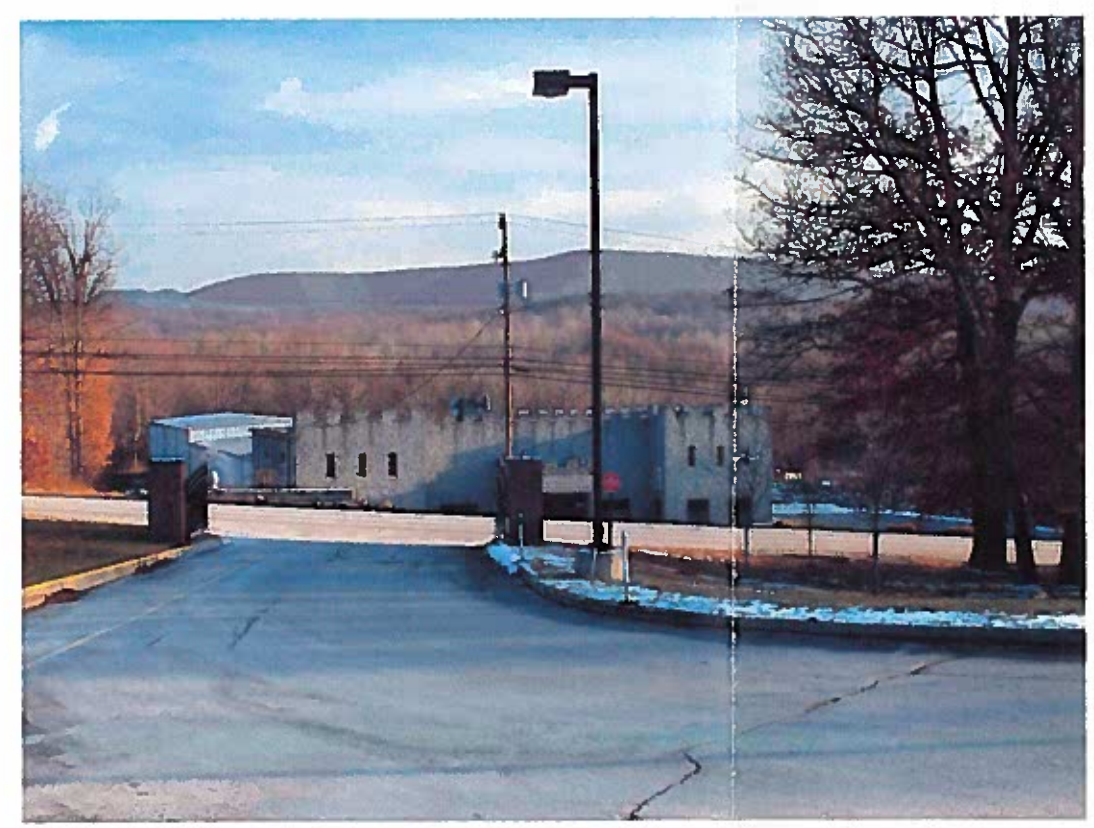
Existing permitted landfill - Westbound US-6 off ramp to Marshwood Road

Photo 21



Existing permitted landfill - Mid-Valley High School

Proposed Phase III expansion - Westbound US-6 off ramp to Marshwood Road



Proposed Phase III expansion - Mid-Valley High School

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Scale	NO SCALE	
Date	01/30/2015	
Project No.	14411	
Designed	RGK	
Checked	WST	
Drawn	RGK	

GROUND LEVEL VIEW RENDERINGS
PHOTOGRAPHS 20-21

KEYSTONE SANITARY LANDFILL
VISIBILITY STUDY

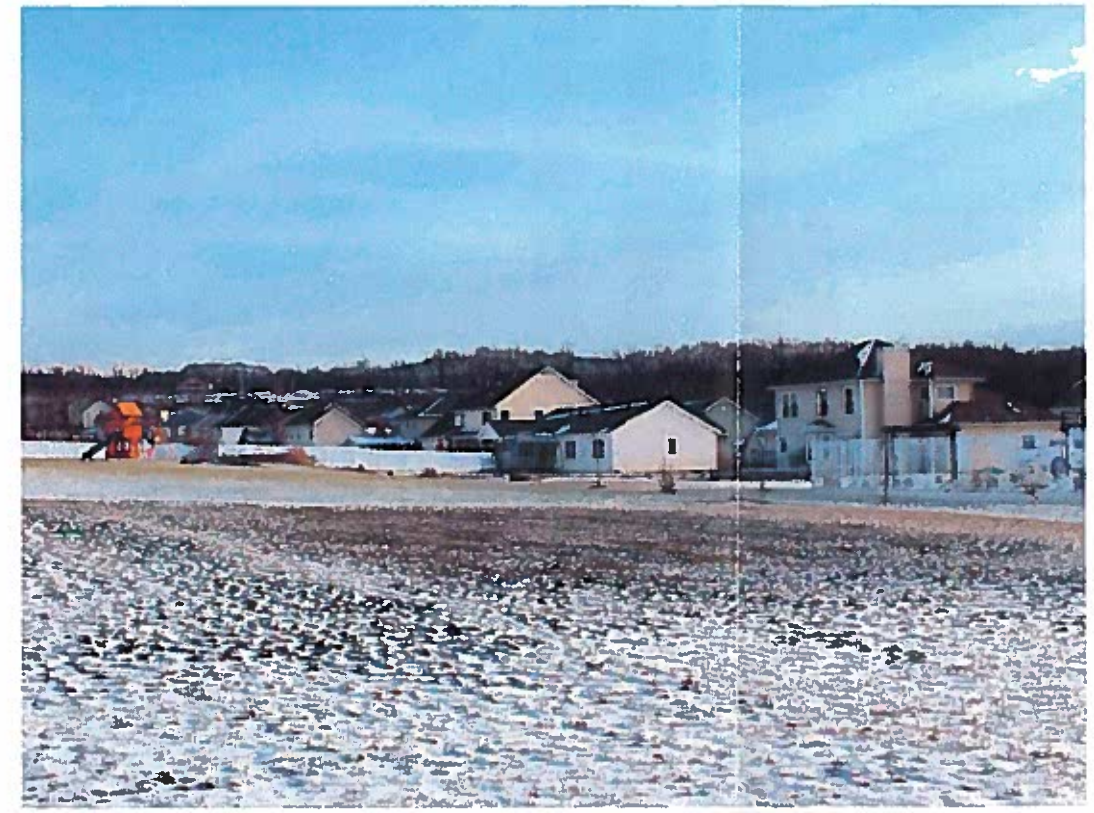
DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 24

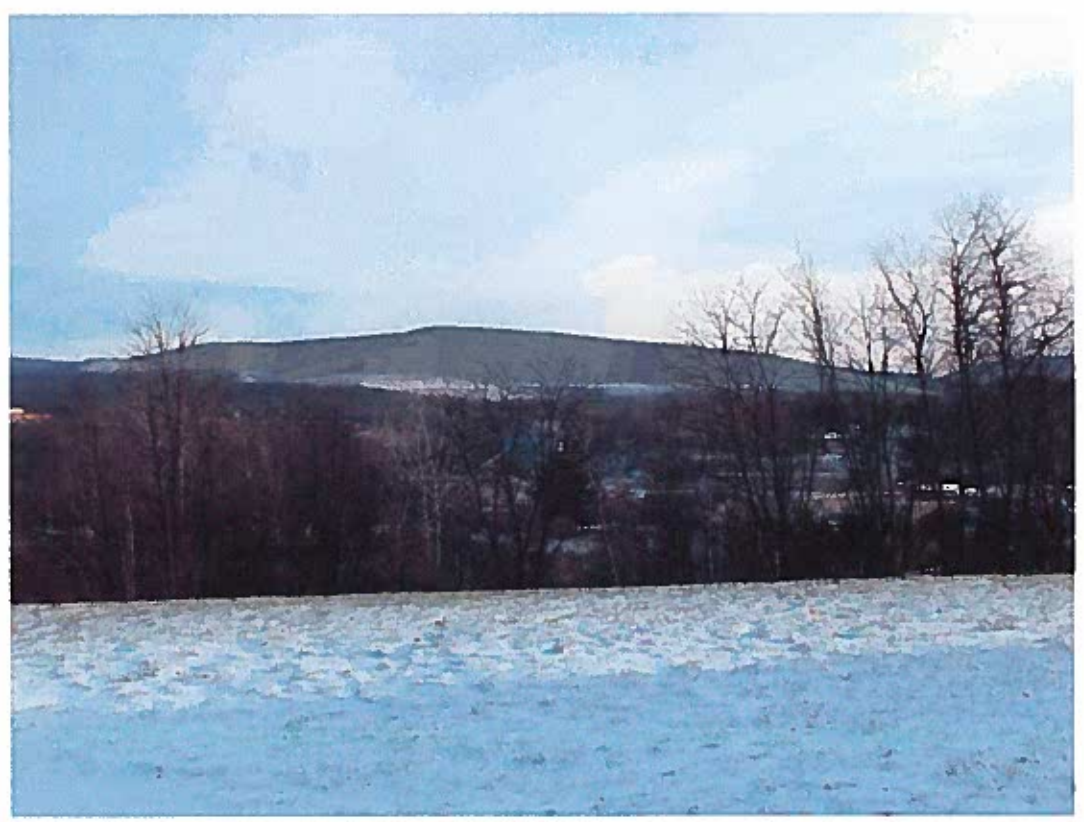
Photo 22

Existing permitted landfill - End of Martarano Drive

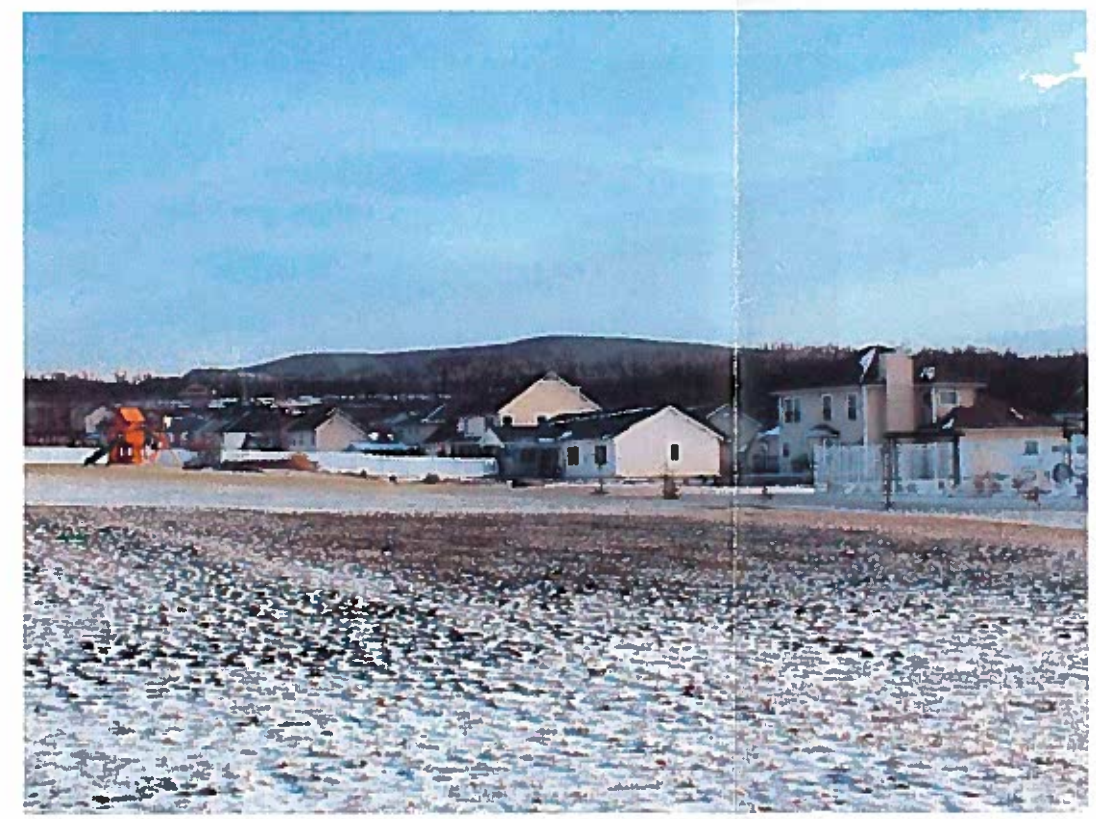
Photo 23



Existing permitted landfill - Academy Lane



Proposed Phase III expansion - End of Martarano Drive



Proposed Phase III expansion - Academy Lane

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Scale: NO SCALE
Date: 01/30/2015
Project No.: 14411

Drawn by: RGK
Checked by: WST
Designed by: RGK

Drawing Title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 22-23

Project Title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 25

Photo 24

Existing permitted landfill - Melissa Drive at Washington Avenue

Photo 25

Marywood University visitor's parking lot (landfill is not visible from this location)

Proposed Phase III expansion - Melissa Drive at Washington Avenue

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0	ISSUED FOR REVIEW	01/30/15	ARM

Scale	NO SCALE
Date	01/30/2015
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Checked	WST
Drawn	RGK

Drawing title: GROUND LEVEL VIEW RENDERINGS PHOTOGRAPHS 24-25

Project title: KEYSTONE SANITARY LANDFILL VISIBILITY STUDY

DUNMORE & THROOP
LACKAWANNA COUNTY, PA

Sheet 26

LEGEND:

- STORMWATER BASIN
- LAGOON
- PHASES I & II PERMANENT VEGETATION
- PHASES III PERMANENT VEGETATION
- EXISTING TREE COVER
- EXISTING ACCESS ROADS

NOTE:

ALL PERMANENT SLOPE VEGETATION SHALL CONFORM WITH CATEGORY E SEED SPECIFICATION FOR PERENNIAL WILDFLOWER MIX, AS PER PENNDOT PUBLICATION 461, LATEST EDITION

REVISIONS	DATE

DESIGNED A.J.M.	DRAWN A.J.M.
CHECKED	SCALE 1"=400'
JOB NO. 12-01-05	DATE 5/1/2016

SITE LANDSCAPING PLAN

KEYSTONE SANITARY LANDFILL

SITE DEVELOPMENT – PHASE III

DUNMORE BOROUGH , THROOP BOROUGH PENNSYLVANIA

CONSULTING ENGINEERS
507 LINDEN STREET, SUITE 200
SCRANTON, PA 18503
www.labellapc.com

LABELLA Associates

SHEET NO L-1

File name: Z:\2012\12-01-05 Keystone Landfill Phase III\PaDEP Permit Application\Norms-Benefits Response Plans\LandscapePlans\VSL Phase I Land... Plan.dwg May 03, 2016-10:59am amagnotta

Roadside Planting Guidebook

Pub 461 - June 2003 Edition

PENNDOT

Category B: Small Trees

Many of these primarily deciduous trees are highly valued for their flowers, fall color and growth habits. They vary from 15 to 25 ft. in height and from 8 to 35 ft. in spread. Weeping varieties are also prized in this category, however, this growth habit is not prevalent in highway plantings.

Category C: Large Shrubs

Several popular species of broadleaf evergreen fall into this category, which also includes multi-stemmed varieties of small tree species. Flowers, fall color, and growth habit are considerations for use in plantings. They vary in height from 6 to 15 ft. and spread from three ft. for columnar varieties to 15 ft. for upright/spreading varieties.

Category D: Small Shrubs

Many of this category may attain heights and widths of only 3-4 ft., however, at the upper end of their sizes they may be considered large shrubs. As with the large shrubs, flowers, fall color, and growth habit are valued attributes. Many needle-bearing evergreens are included in this category.

Category E: Perennials

The primary consideration in perennials is flower color and period, but fall color and foliage texture is prominent in many common species, also. Perennials typically grow no taller than 30 in.

Category F: Ground Cover, Vines

The plants in this category are commonly less than one foot in height. They are prized for their flowers, foliage and ability to form dense growth patterns, resulting in near complete coverage of an area.

Plant Tolerance Categories

Plants Tolerant of Dry, Poor Soils

Note: spp. refers to all plant species in that genus and cvs. refers to cultivars or varieties of that species.

TREES
Carpinus spp. and cvs.
Crataegus spp. and cvs.
Fraxinus spp. and cvs.
Gleditsia triacanthos inermis cvs.
Sophora japonica and cvs.
Pinus spp. and cvs.
Ulmus parvifolia

PERENNIALS
Achillea spp. and cvs.
Aegopodium podagraria 'variegata'
Coreopsis spp. and cvs.
Echinacea purpurea and cvs.
Geranium spp.
Hemerocallis cvs.
Liatris spicata cvs.
Oenothera spp.

SHRUBS
Aronia spp. and cvs.
Berberis thunbergii and cvs.
Cornus racemosa
Diervilla lonicera
Hamamelis spp. and cvs.
Itea virginica
Juniperus spp. and cvs.
Kerria japonica
Myrica Pensylvanica
Potentilla spp. and cvs.
Viburnum prunifolium and cvs.
Yucca filamentosa and cvs.

PERENNIALS, Cont.
Rudbeckia fulgida speciosa 'Goldstrum'
Salvia spp.
Sedium spp. and cvs.

ORNAMENTAL GRASSES
Elymus arenaria
Panicum virgatum cvs
Pennisetum spp. and cvs.

Plants Tolerant of Moist Soils

Plants with an * can be used in wet soils but not in standing water.

TREES
* Acer rubrum and cvs.
* Amelanchier spp. and cvs.
* Betula nigra and cvs.
Carpinus betulus
Fraxinus americana and cvs.
* Fraxinus pennsylvania and cvs.
Gleditsia triacanthos inermis and cvs.
* Liquidambar styracifula and cvs.
Nyssa sylvatica
Platanus acerifolia cvs.
Quercus bicolor
Quercus palustris

SHRUBS
* Aronia arbutifolia and cvs.
Aronia melanocarpa and cvs.
Calycanthus floridus
Chaenomeles spp.
Clethra alnifolia and cvs.
* Cornus alba and cvs.
* Cornus racemosa
* Cornus sericea and cvs.
Deutzia gracillis and cvs.
Hamamelis spp.
* Ilex verticillata and cvs.

PERENNIALS
* Aegopodium podagraria 'Variegata'
* Hermerocallis spp.
* Hibiscus moscheutos
Monarda didyma and cvs.

ORNAMENTAL GRASSES
Calamagrostic acutifolia 'Karl foerster'
Deschampsia caespitosa 'Goldstaub'
* Glyceria maxima 'Variegata'
Imperata cylindrical 'Red Baron'
* Panicum virgatum and cvs.
Pennisetum alopecuroides and cvs.
* Phalaris arundinacea 'Picta'

SHRUBS, Cont.
* Itea virginica
Leucothoe spp.
* Lindera benzoin
Myrica pensylvanica
* Viburnum dentatum
Viburnum opulis and cvs.
* Viburnum prunifolium
Viburnum trilobum and cvs.

Plants Tolerant of Shade

SHRUBS
Aronia arbutifolia cvs.
Aronia melanocarpa
Berberis spp.
Calycanthus floridus
Clethra alnifolia
SHRUBS, Cont.
Cornus racemosa
Cornus sericea and cvs.
Diervilla lonicera
Fothergilla major
Hamamelis and cvs.
Ilex crenata cvs.
Itea virginica
Kerria japonica
Leucothoe spp.
L.indera benzoin
Taxus spp.
Viburnum dentatum
Viburnum opulus cvs

PERENNIALS
Aegopodium podagraria 'Variegata'
Aquilegia spp. and cvs.
Monarda didyma

TREES
Amelanchier spp.
Cercis Canadensis
Chionanthus virginicus
Cornus florida
Cornus kousa and cvs
Nyssa sylvatica
Stewardia pseudocamellia
Styrax japonica

Plants Tolerant of Salt (salt spray)

T – Tolerant I – Intermediate or Moderately Tolerant S – Sensitive

This list should be used only as a guideline. Plants should be kept as far away from the edge of the highway pavement as possible to ensure less adverse impact from salt spray. Variable tolerance to salt spray may exist within plant species making classification of salt tolerance a relative judgment. Some plants have not been researched for salt spray tolerance. The list represents a compilation of salt tolerant reports published by various organizations on aerial salt spray damage. This plant list is derived from the Plant Category Lists in this document and is not a complete listing of all known salt tolerant plants. Plants listed in the Plant Categories and not listed here should be considered sensitive to salt spray damage.

SHRUBS

T, I	Aronia spp.
I, S	Berberis (most)
T, I	Clethra alnifolia and cvs.
I, S	Cornus racemosa
I, S	Cornus sericea and cvs.
I	Forsythia intermedia and cvs.
T, I	Hamamelis spp.
T	Hibiscus syriaca and cvs.
I, S	Ilex (broadleaf evergreen type)
T	Ilex (deciduous types)
T	Ilex glabra and cvs.
I	Ilex verticillata

TREES

T, I	Acer freemanii 'Celebration'
T	Acer platanoides cvs.
I, S	Acer rubrum and cvs.
I, T	Amelanchier spp and cvs.
T	Amelanchier canadensis and cvs.
T, I	Cornus florida and cvs.
T, I	Crataegus spp. and cvs.
T	Fraxinus americana and cvs.
T, I	Fraxinus pennsylvanica and cvs.
T	Fraxinus pennsylvanica 'Cimmaron'
T	Ginkgo biloba and cvs.
T	Gleditsia tricanthos inermis and cvs.

SHRUBS, Cont.

T, I	Juniperus spp. and cvs.
T	Juniperus conferta 'Irozama'
I	Leucothoe (most)
T, I	Myrica pensylvanica
T	Pinus mugo pumilio (small types)
T	Potentilla (most)
T	Prunus cistena
I, S	Spiraea (most)
I	Viburnum carlesi
I, S	Viburnum dentatum
I, S	Viburnum opulus and cvs.
T	Viburnum prunifolium
I	Viburnum trilobum
I	Weigela florida and cvs.
T	Yucca filamentosa and cvs.

TREES, Cont.

T	Magnolia (most)
I, S	Malus spp. and cvs.
T	Nyssa sylvatica
T	Picea pungens
I	Picea glauca
T	Pinus thunbergi
I	Pyrus calleryana and cvs.
T, I	Quercus spp.
T, I	Quercus rubra (borealis)
I, S	Quercus palustris
I	Sophora japonica and cvs.
I	Syringa reticulata 'Ivory Silk'
I, S	Tilia cordata and cvs.
I	Ulmus spp. and cvs.
I	Zelkova serrata and cvs.

PERENNIALS

I	Artemisia schmidtiana
T, I	Hemerocallis cvs.
I	Sedum spectabile 'Autumn Joy'

ORNAMENTAL GRASSES

T	Calmagrostis acutifolia 'Karl Foerster'
T	Pennisetum alopecuroides cvs.

Plants Tolerant of Urban Conditions

SHRUBS

Aronia arbutifolia and cvs.
Berberis thunbergi and cvs.
Chionanthus virginicus
Clethra spp
Forsythia spp. and cvs.
Hamamelis spp. and cvs.
Hibiscus syriacus and cvs.
Ilex crenata and cvs.
Ilex glabra and cvs
Ilex meserveae and cvs.
Itea spp.
Juniperus spp. and cvs.
Leucothoe spp. and cvs.
Lindera benzoin
Magnolia stellata
Myrica pensylvanica
Potentilla spp. and cvs.
Spiraea spp. and cvs.
Taxus spp. and vs.
Viburnum (most)
Weigela spp. and cvs.
Yucca filamentosa and cvs.

TREES

Acer freemanii 'Celebration'
Acer platanoides cvs.
Carpinus spp. and cvs.
Cornus mas
Crataegus spp. and cvs.
Fraxinus pennsylvanica and cvs.
Ginkgo biloba and cvs.
Gleditsia triacanthos inermis and cvs.
Liquidambar styraciflua and cvs.
Maackia amurensis
Malus spp. and cvs.
Nyssa sylvatica
Platanus spp. and cvs.
Pyrus calleryana and cvs.
Sophora japonica and cvs.
Tilia spp. and cvs.
Ulmus cvs.
Zelkova serrata and cvs.

Category E Perennials

Yarrow

Name	Native	Height	Spread	Shape
Achillea x Coronation Gold Coronation Gold Yarrow	NO	24"		
Achillea x Fireland Fireland Yarrow	NO	24"-36"		
Achillea x Terra Cotta Terra Cotta Yarrow	NO	24"-36"		
Aegopodium pod. Variegated Variegated Bishop s Weed	NO	12"		
Agastache x Blue Fortune Blue Fortune Hyssop	NO	24"-36"		
Agastache rupestris Sunset Hyssop	YES	24"-36"		
Alchemilla mollis Auslese Lady s Mantle	NO	18"		
Amsonia hubrichtii Threadleaf Blue Star	YES	30"-36"		
Amsonia tabernaemontana Blue Star	YES	36"-42"		
Aquilegia canadensis Wild Columbine	YES	1'-3'		
Artemisia schmidtiana Silver Mound	NO	8"-10"		
Asarum canadense Wild Ginger	YES	< 1'		
Aster divaricata White Wood Aster	YES	24"-36"		
Aster x frikartii Monch Frikart s Aster	NO	24"-36"		
Aster novae-angliae New England Aster	YES	24"-36"		
Aster novi belgii Hybrid New York Aster	YES	15"-15"		

Blue Star

Salt Spray	Fall Color	Flower	Zone	Attributes/Requirements/Drawbacks
		Gold/Yel	4	Herbaceous perennial with fern-like foliage. Golden-yellow flowers in June.
		Red	3	Sturdy grower with brick red flowers.
		Salmon	3	Silvery foliage & flowers that start out salmon turning to a terra cotta.
			3	Green & white foliage, grows well in sun or shade. Aggressive ground cover.
		Blue	5	Long lasting blue flower spikes on 2-3' stems from July to September. Needs dry, well drained, sunny location.
		Pink	5	Pink flower spikes from June until frost. Needs a dry, well drained, sunny location. Adapts well to poor soils.
		Yellowish	3	Small yellowish flowers in May-June. Rounded, kidney-shaped leaves make a good ground cover in partial shade.
	Gold	Blue	4	Blue flowers in May & June. Foliage turns golden in the fall. Full sun or partial shade.
	Gold/Yel	Blue	3	Pale blue star flowers on willow-like leaves. Foliage turns golden yellow in fall. Moist soil.
		Red/Yel	5	Commonly cultivated; spreads by seed; hummingbirds. Prefers moist soil & medium light to shade.
			5	Fine textured perennial with silvery foliage.
		Maroon	5	Edible & herbal uses. Prefers moist soil & shade.
		White	4	Good naturalizer under trees or at the edge of woods. Partial to shade. Small white daisies bloom September & October. Shiny, deep purple stems.
		Blue	5	Daisy-like blue flowers bloom August to frost. Stout upright habit. Light shade, best in full sun.
		Purple	4	Useful in the perennial border & for naturalizing.
		Varied	4	Dwarf Asters bloom continuously from mid-August until the end of October.

Category E Continued

Name	Native	Height	Spread	Shape
Baptisia australis Blue False Indigo	YES	48"-60"		
Bergenia cordifolia Winterglut Winterglut Bergenia	NO	10"		
Boltonia asteroides Snowbank Snowbank Bolton s Aster	YES	48"		
Caltha palustris Marsh Marigold	YES	12"-18"		
Cerastium tomentosum Snow-in-Summer	NO	6"-8"		
Chelone glabra Turtlehead	YES	1'-3'		
Chelone lyonii Hot Lips Hot Lips Turtlehead	YES	24"-36"		
Chrysanthemum x rub. C. Curtis Clara Curtis Chrysanthemum	NO	24"		
Chrysanthemum x superbum Shasta Daisy	NO	Various		
Coreopsis grand. Early Sunris Early Sunrise Coreopsis	YES	18"-24"		
Coreopsis verti. Moonbeam Moonbeam Coreopsis	YES	18"		
Coreopsis verticillata Zagreb Zagreb Coreopsis	YES	8"-12"		
Crocosmia masonarum Crocosmia	NO	24"-36"		
Echinacea Hybrids Cone Flower	YES	24"-36"		
Eupatorium fistulosum Select Joe Pye Weed	YES	5'		
Euphorbia dulcis Chameleon Purple Spurge	NO	12"-18"		

Blue False Indigo

Marsh Marigold

Coreopsis

Aster

Cone Flower

Joe Pye Weed

Perennials

Salt Spray	Fall Color	Flower	Zone	Attributes/Requirements/Drawbacks
		Blue	3	Excellent back of the border plant. Intense blue spikes of pea-shaped flowers on 3-4' stems. Sun or partial shade.
		Red	3	Evergreen heart-shaped leaves. Red flowers & ruby-red winter foliage. Sun or shade.
		White	3	Daisy-like flowers in late summer through fall with blue-green foliage. Sun
		Yellow	3	Large bright yellow flowers above deep green leaves in early spring. Best in boggy soil or shallow water.
		White	3	Covers itself with masses of white flowers in late spring in early summer. Spreader makes a good ground cover. Needs well-drained sunny location.
		Whitish	5	Tolerates wet; strong grower; herbal uses; hummingbirds. Will do well in sun, shade or in between.
		Pink	3	Clusters of large pink flowers in late summer & early fall. Good in average to moist soil. Sun or shade.
		Pink	3	Hardy, well branched mum. Mounded form covered with salmon-pink flowers in August-September. Tolerates light shade.
		White	5	Height is dependent on the cultivars. Blooms June to September. Full sun & well-drained soil.
		Gold	3	Double form blooms gold all summer over dark green mounded foliage. Compact.
		Yellow	3	Creamy yellow flowers produced throughout the summer against a background of light textured foliage.
		Yellow	3	Deep yellow flowers against fern-like foliage July through frost. Great for massed color. Sun
			5	Spikes of long lasting flowers are displayed in late summer above sword- shaped leaves. Full sun in well drained soil.
		Pink/Red	4	Upright stems topped with daisy-like flowers. Blooms July to September. Sun or partial shade.
		Drk Pink	3	Large, graceful, dark pinkish / red flower heads. Profuse bloomer during late summer until fall. Tolerates moist situations. Full sun to light shade.
		Yellow	4	Purple foliage is arranged in whorls. Lime-yellow belllike flowers in early summer. Sun or part shade.

Lipstick Strawberry

Geranium

Daylily

Category E Continued

Name	Native	Height	Spread	Shape
Fragaria vesca Lipstick Lipstick Strawberry	NO	6"-8"		
Gaura lind. Siskiyou Pink Siskiyou Wand Flower	YES	24"-30"		
Geranium maculatum Wood Geranium	YES	1'-2'		
Geranium x Brookside Brookside Geranium	NO	18"-20"		
Geranium x Johnson Blue Johnson Blue Geranium	NO	12"-15"		
Helianthus ang. Gold Lace Gold Lace Sunflower	NO	5		
Heliopsis heli. Prairie Sunset Prairie Sunset False Sunflower	YES	4 -5'		
Hemerocallis - Diploid Hybrids Daylilies	NO	Various		
Hemerocallis - Tetraploid Hybrid Daylilies	NO	Various		
Heuchera micrantha Palace Pur. Palace Purple Coral Bells	NO	12"		
Hibiscus moscheutos Giant Hibiscus	YES	3'-5'		
Iberis sempervirens Snowflake Candytuft	NO	8"-10"		
Liatris spicata Blazing star	YES	24"-36"		
Lobelia cardinalis Red Cardinal Flower	YES	24"-28"		
Macleaya cordata Plume Poppy	NO	7'-8'		

Sunflower

Perennials

Salt Spray	Fall Color	Flower	Zone	Attributes/Requirements/Drawbacks
		Red	4	Red flowers with yellow centers bloom through summer. Semi-evergreen leaves. Useful as ground cover. Sun or partal shade.
		Pink	5	Impressive pink flowers June to September. Sun, well drained soil.
		Rose	5	Adaptable plant; long bloom time; spreader; herbal uses. Prefers moist soil. Will do well in sun, shade or partial shade.
		Blue	3	Large cup-shaped blue flowers with white centers bloom for a long period of time during the summer. Vigorous plant.
		Blue	4	Blue flowers held above compact plants. Does well in sun or light shade.
			5	Attractive deep green leathery foliage, turns golden in September & October. Sun
		Yellow	4	Daisy-like yellow flowers with red centers bloom from June until late fall. Purplish-green foliage. More compact habit than the species.
		Varies	4	Hardy perennials for mass plantings or borders. Mid-summer beauty. Many cultivars available by color.
		Varies	4	Tetraploid plants produce more abundant, large blooms. Many cultivars available by color.
		White	4	Foliage is red above & below. White flowers appear mid- summer.
		Varies	5	Plants with impressive large flowers. Useful in mass, as a hedge & in water up to 6" deep. Hybrids of native eastern U.S. species.
		White	3	White blooms on low mound of evergreen foliage. Useful for front of border of rock garden. Sun to partial shade.
		Lavender	3	Spikes of lavender flowers appear mid to late summer. Nice in the tall border. Sun.
		Red	3	Bright red flowers on 3' stems above dark green foliage in late summer. Prefer moist soils or water to 4" deep in sun or shade.
		White	3	Tall stems have well spaced, wide, heart-shaped leaves with silvery undersides. Allow room in the landscape. Sun to light shade.

Category E Continued

Sage

Sedum

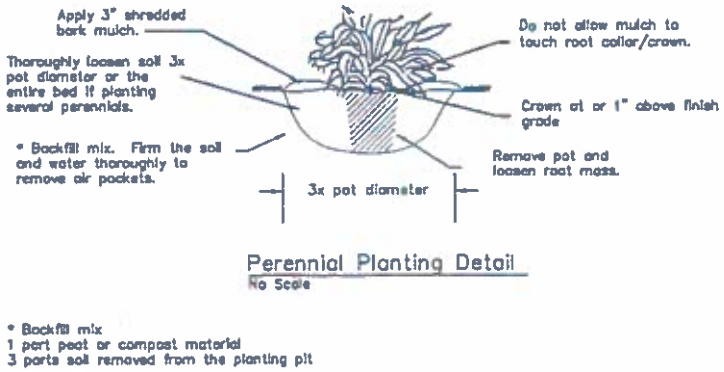
Speedwell

Name	Native	Height	Spread	Shape
Monarda didyma Bee-Balm	YES	24"-48"		
Nepeta x faassenii Dropmore Dropmore Catmint	NO	12"-15"		
Oenothrera perennis Sundrops	YES	1'-2'		
Origanum laev. Herrenhausen Ornamental Oregano	NO	18"-24"		
Rudbeckia fulg. var. sull. Golds Black-eyed Susan	NO	24"		
Rudbeckia hirta Black-eyed Susan	YES	2'-3'		
Rudbeckia lacianata Cutleaf Coneflower	YES	2'-6'		
Salvia Hybrids Meadow Sage	NO	Various		
Sedum spectabile Autumn Joy Autumn Joy Sedum	NO	18"-24"		
Tiarella cordifolia Foamflower	YES	<1'		
Veronica spicata Speedwell	NO	18"		
Veronica x Sunny Border Blue Sunny Border Blue Speedwell	NO	18"		

Salt Spray	Fall Color	Flower	Zone	Attributes/Requirements/Drawbacks
		Varies	3	Pink to red flowers by cultivar. Naturalize in sunny wild garden or use grouped in the border.
		Lavender	3	Fragrant gray-green foliage and spikes of lavender flowers. Useful for edging & massing in sunny dry conditions.
		Yellow	5	Bright flowers; long bloom time. Needs dry to moist soil & sun.
		Red/Pur	5	A dense mound of dark foliage with reddish purple flowers in late summer. Drought tolerant, sun-lover that attracts butterflies.
		Yellow	3	Large, deep yellow flowers with black centers, Bloom abundantly from July to September.
		Orange	5	Bright daisy-like flowers; long bloom time; many cultivars. Needs dry to moist soil & will grow in any light situation.
		Yellow	5	Tall daisy; tolerates wet soil; herbal. Sun to partial shade.
		Varies	5	Beautiful flowers with showy fragrant foliage. Compact habit.
		Lt Pink	3	Large light pink flower heads start in September. Succulent green leaves all summer.
		White		Attractive, long-blooming flower; many cultivars. Prefers moist soil & partial to full shade.
		Varies	3	Flowers with 2" serrated glossy leaves are held above 1 - 3' spike-like racemes.
		Dk Blue	3	Dark blue flowers from mid summer to fall. Requires sun & well drained soils.

4. Remove the container or burlap around the root ball and ALL string or cord. If there is a web of compacted roots visible on the outside of the root ball, gently loosen these to encourage them to spread.

5. Place the ball in the hole gently, do not drop it. Position the shrub so that the crown is just at or one (1) inch above soil level.



6. Fill the space around the ball with the excavated soil mixed 3:1 with peat moss or compost. You might also add a small amount slow release fertilizer, per the manufacturer's instructions. Firm the soil and add water to remove air spaces.

7. After planting, cover the entire bed with three (3) inches of shredded bark mulch or compost. Form a "dish" around each shrub to hold moisture over the root zone. Do not allow mulch to touch the stem.

8. Water shrubs well after planting.

Perennials & Grasses

1. Container grown perennials and ornamental grasses are sized by the container capacity, ie, 1-quart, 2-gallons, or smaller peat pot sizes in inches.

a. The best time to plant perennials/grasses is in the early spring, when the weather is cool and moisture plentiful.

b. Plant perennials as follows. Dig a hole to the depth of the pot or 12 inches, whichever is greater, and three times as big around as the pot. Where several perennials are planted together, loosen the soil in the entire bed area.

c. Remove the pot. If there is a web of compacted roots visible on the outside of the root ball, gently loosen these to encourage them to spread.

d. Place the plant so that the crown is about an inch above soil level. It will sink slightly when watered. Fill the space around the plant with the excavated soil mixed 3:1 with peat moss or compost. You might also add a small amount slow release fertilizer, per the manufacturer's instructions. Press the soil down and add water to remove air spaces.

e. After planting, cover the entire bed with 2-3 in. of shredded bark mulch or compost. Keep mulch three (3) in. away from the crown of the plant.

f. Water the plants well after planting, and, if possible continue to supply the equivalent of one (1) in. of water per week through the first growing season.

2. Plugs or small divisions are usually sold in quantities by the number in a flat.

a. Prepare the planting beds as for perennials.

b. Plant plugs or divisions with the crown just at soil level. Spread the roots so that they all will contact soil. Press the soil firmly around each plant.

c. Mulch and water as for perennials.

d. Annuals are usually sold in small containers made from various materials.

3. Prepare the planting beds as for perennials, digging only 6-8 inches deep.

4. Remove the container, even peat pots intended to be put in the ground. These do not always decompose well.

5. Firm the soil around each plant, water and mulch as for perennials.

General Comments

1. Before you dig be sure to call 1-800-242-1776, PA One Call, to locate underground utilities.

2. Buy plants from a reputable and knowledgeable nursery or garden center.

3. Buy only healthy plants that have been well cared for.

4. Inspect plants for any damage or defects before accepting or planting.

PA Plant Hardiness Zones Map

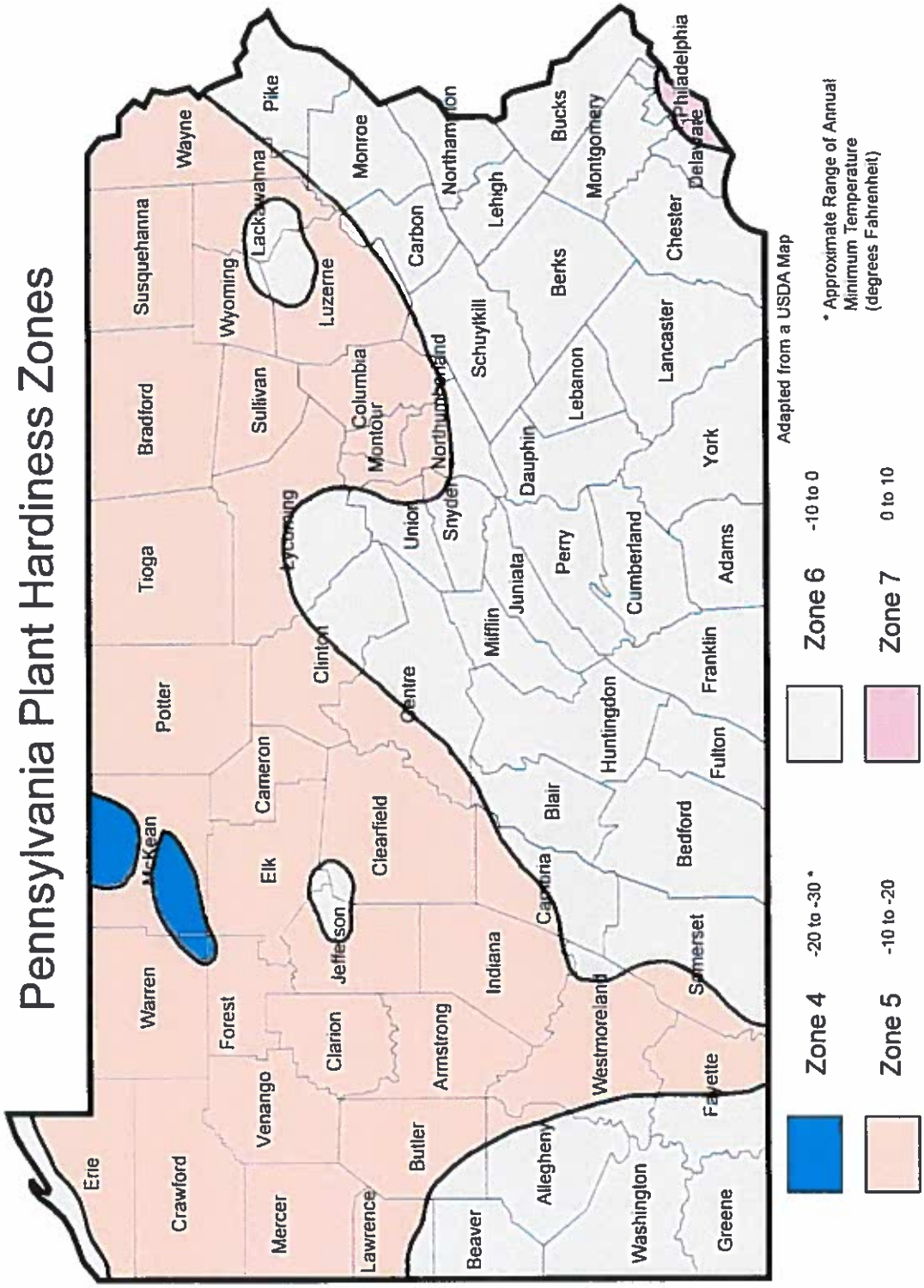


EXHIBIT C2.3

KEYSTONE'S NUISANCE MITIGATION CONTROL PLAN

KEYSTONE SANITARY LANDFILL

NUISANCE MINIMIZATION AND CONTROL PLAN

KEYSTONE SANITARY LANDFILL
249 DUNHAM DRIVE
DUNMORE, PA 18512

REVISED: 4/28/2016

Keystone has established a Nuisance Minimization and Control Plan in accordance with 25PA Code 273.136 and 273.218 to address known and potential nuisances that may arise from the handling and disposal of solid waste, collection and treatment of leachate, the generation, collection and distribution of methane gas and site quarry operations. This plan outlines Keystone's measures to prevent and mitigate conditions that may cause a nuisance to neighbors and surrounding communities.

KEYSTONE ORGANIZATIONAL CHART

Contact Name	Position	Office Number	Cell Number
Dan O'Brien	Business Manager	570-343-5782	570-499-9906
Dominick DeNaples	Assistant Site Manager	570-343-5782	570-840-0713
Brooke Reynolds	Environmental Manager	570-343-5782	570-840-2084
Mike Bair	Gas Compliance Manager	570-343-5782	
Jim Eiden	Compliance Manager	570-343-5782	570-840-9418

External notifications will be made based on specific circumstances to the following:

Pennsylvania Department of Environmental Protection (Wilkes-Barre)	570-826-2511
PADEP (Statewide Number)	800-541-2050
Lackawanna County Emergency Management Agency	570-961-5511
Luzerne County Emergency Management Agency	570-820-4400
US EPA	215-814-9016
National Response Center	800-424-8802
PA State Police Dunmore	570-963-3156
PA Fish & Boat Commission	570-477-5717
PA Game Commission	800-228-0789
PA Department of Transportation District 4-0 Dunmore	570-963-4061
Dunmore Police Department	570-343-0851
Dunmore Fire Department	570-348-1750
Throop Police Department	570-489-0211
Throop Fire Department	570-489-4767

Dunmore Borough
Borough Manager 570-344-4590

Throop Borough
Borough Manager 570-489-8311

Lackawanna County
570-963-6868

NUISANCE CONTROL INVENTORY MAP

Keystone has developed a Nuisance Control Inventory Map to assist in nuisance control planning and execution. The map will be updated as conditions change and as the landfill and support activities develop and relocate. The map will depict the following features that are located within a one (1) mile radius of the facility:

- Site weather station.
- Predominant wind direction.
- Truck staging areas.
- Radiation staging area.
- Major leachate management system components (i.e. pump house(s), lagoons, treatment facility etc.).
- Key landfill gas management system components (enclosed ground flares, landfill gas to energy facilities, etc.).
- Drill cutting stabilization area.
- Disposal area.
- Areas planned for new pad construction and capping.
- Locations of potential residential nuisance receptors, based on the depicted landfill activities/conditions.
- External third party operations (permanent and temporary) that may result in a nuisance unrelated to landfill activities.

The Nuisance Control Inventory Map will be utilized as a tool to plan specific nuisance control activities that will be undertaken to address conditions that are anticipated in the current and future phases of landfill development. The map will be maintained at the site and provided to key Keystone personnel.

WEATHER MONITORING PROGRAM

To ensure Keystone is aware of and prepared for changing weather conditions that can have an effect on site operations or cause a public nuisance, a weather-monitoring program has been developed and implemented. This procedure outlines Keystone's weather monitoring, actions and response to adverse conditions.

Equipment

Keystone has two weather stations. One is located on the roof of the administration building to monitor and record wind speed and direction, temperature, relative humidity, barometric pressure, and precipitation. A similar unit is deployed on top of a telephone pole on the east side of Phase II. This location exposes the system to unobstructed wind patterns experienced on site. The information is transferred from the sensors to a controller and recorded on a PC. The data is stored several times daily and saved on the network computer.

Keystone reviews the weather screen on the PC at least daily to ensure data collection and proper system function.

Daily Weather Monitoring

Daily weather forecasts are obtained from local weather stations, newspapers and internet-provided weather media. The assistant site manager conveys known or potential adverse weather conditions to site employees during daily morning meetings.

During perimeter nuisance inspections Keystone personnel will observe weather patterns for that time and location. Wind direction may be conveyed to the appropriate managers and supervisors, so actions can be taken to prevent nuisances such as odors and litter.

Should Keystone experience a problem with its weather monitoring equipment, every effort will be made to minimize downtime for maintenance and repair.

Wind Direction

Local wind direction is typically from the southwest; however, there is some seasonal variation. Nuisance receptors located to the northeast of the landfill are the most likely to be affected by landfilling operations. The predominant wind direction is indicated and shown on the Nuisance Control Inventory Map attached to this plan.

When wind speeds are elevated, site personnel will evaluate deployment of portable litter fences and/or wet the disposed waste in the active disposal area to prevent offsite litter migration.

All weather data is made available to PADEP upon request.

TRAFFIC

Keystone is located at the junction of Interstate 81 and 380 in Dunmore PA, off exit # 1 of Interstate 380. The facility is on the southern edge of the Keystone Industrial Park at 249 Dunham Drive. This location grants Keystone customers easy access to the facility by way of highways limiting the amount of residential exposure. The main entrance is located on Dunham Drive, which is used by other industrial and commercial industries located in the Keystone Industrial Park.

Truck traffic is directed into the facility through the main gate and staged in a parking area on site. The site parking area has the capacity to stage 50 to 60 tractor-trailers and the disposal area is capable of handling 40 to 50 trucks every half hour. The main access road on site is 1.3 miles long and can be used to stage waste hauling vehicles should the need arise.

If Keystone personnel witness any customer vehicles parked along the public roads adjacent to or leading to the facility, the driver is requested to move or return to the facility to correct any problems or conduct any maintenance needed.

Keystone uses one main access road on site to direct waste haulers to the disposal area. This allows Keystone to monitor truck movement and reduce the amount of road maintenance. The speed limit on site is 5 MPH and is strictly enforced. The speed limit, combined with street sweeping of paved roads as discussed in the Dust Control section of this plan, provides control mechanisms to minimize the potential for dust associated with traffic.

Keystone conducts onsite waste hauler inspections that include safety items as well as driver conduct. Act 90 sticker compliance is verified at the scalehouse. Should a driver be observed operating his vehicle recklessly, whether on site or off, the company will be notified and the driver may lose disposal privileges at Keystone.

NOISE CONTROL

Keystone Sanitary Landfill and Keystone Quarry are located in an area with a significant buffer between site operations and its surrounding neighbors. Site heavy equipment operates at a distance from the general public that cannot be heard and the quarry crushers and conveyors are located away from the site perimeter.

Keystone does not want "Jake Brakes" used by its customers on perimeter public roads and interior access roads unless absolutely necessary. Keystone monitors this on a daily basis and drivers who do not comply may lose disposal privileges at Keystone.

VECTOR AND BIRD CONTROL

Keystone's waste acceptance procedures and disposal face operations help to deter the attraction of vectors. Keystone monitors the acceptance of wastewater sludge closely to ensure it meets the acceptance criteria established in 25 PA Code 271.933 for Vector Attraction Reduction. Keystone believes that by ensuring the material is treated properly through monitoring and review of analytical results the attraction for vectors at the facility is reduced. Keystone routinely stops accepting this waste stream at least 2 hours before the end of the day. By prohibiting wastewater sludge from being disposed of near closing time allows sufficient cover of the material by other wastes and as such, preventing easy access to this material by vectors.

All waste is compacted and covered at the end of each day with either soil, approved foam, or alternative daily cover. Soils are rolled into place sealing the waste underneath and preventing odors from escaping that would attract birds, rodents, and other vectors.

Keystone does have options available should the birds become a problem or nuisance. Keystone may employ decoy predatory birds to discourage bird congregation on site. These decoys are placed around the working face or in potential problem areas. The use of kites with noise making attachments has been investigated as well as spraying the working face with a non-toxic, environmentally safe agent that repels birds from scavenging.

Keystone remains open to new technology in this area as long as it does not harm the birds or the environment.

The attraction and presence of rodents has not been a significant nuisance concern. Upon discovery of rodents, Keystone will employ a licensed animal removal service to complete the nuisance removal measure.

Keystone personnel will monitor the facility and surrounding areas for particular problems involving vectors as they conduct their routine monitoring activities.

DUST CONTROL

Quarry Dust Control

Keystone removes rock and dirt from future disposal areas and processes it through our state-of-the-art crushing system. The rock and dirt are broken up using a contractor to blast the bedrock. Keystone uses water from tank trucks to wet down the excavation site during dry conditions. Drillers use a portable water tank on the drill rig to add water to the drill bit to reduce dust emissions.

Rock is loaded into haul trucks and dumped into the crusher hoppers or at a pre-designated stockpile. The haul roads are wet down with water from 1 of 3 onsite water trucks. The water trucks are assigned haul roads and the haul drivers are informed of which haul roads to use for the day. This prevents trucks from traveling on roads that are not maintained. In extremely dry conditions the number of water trucks used to wet haul roads is increased.

The crusher is equipped with spray nozzles on all hoppers and transfer points to reduce or eliminate emissions. If the main stockpiles become dusty the water trucks will hose them down prior to processing. Keystone maintains additional nozzles on site for replacement should they become inoperable or damaged. Keystone also inspects the crushing system on a daily basis for opacity and fugitive emission. Should the emissions become excessive or opacity reach 10%, the source will be wetted using the water truck and the spray bars pressure and GPM increased.

A trained visible emissions and opacity technician documents findings in a daily opacity log.

Landfill Dust Control

Generally waste loads do not contain a great deal of dust, however, some demolition materials and residual wastes can generate dust when discharged from a waste-hauling vehicle. If a residual waste is known to be dusty or may cause dust that can become airborne, the load is disposed of immediately and covered with municipal waste to prevent dispersion. If a demolition load is observed to contain materials that will create an emission the load will be wet down with water from the water truck. All residual wastes that contain dust or fine materials are communicated to the disposal area personnel to ensure proper handling is completed. If a waste stream is too dusty to handle in the manner described above, additional measures may be taken such as requiring the generator to place the material in plastic bags or sacks before disposal. If this is required the load will be placed in a pre-dug hole and covered immediately to prevent the bag from being ruptured.

The primary site entrance and scale house area are paved. Water trucks are available on site and used as necessary based on weather conditions, to control dust along all site roads. The water truck travels the waste and construction vehicle traffic haul routes to wet the surface for dust suppression. A street sweeper is also utilized to clean the paved private and public roads leading to and from the landfill.

Keystone personnel monitor the facility access routes for the potential dust generation due to traffic. In addition, equipment operators may notify the supervisors of work area conditions and the potential for dust generation.

ODOR CONTROL

Keystone takes odor control very seriously and has implemented measures to identify them at the source and address malodors before they become a nuisance. The procedure implemented starts with on and off site inspections to monitor operations for fugitive malodors.

Keystone understands that fugitive emissions off-site are possible and to minimize this as much as possible, frequent on-site inspections are conducted daily to investigate possible sources of odor.

Keystone Landfill personnel inspect the site perimeter public roads several times in a 24hr period to identify errant odors. These odor patrols are to include the Casey Highway, Marshwood Road, Underwood Road, Schoolside Estates Development, Tigue Street, Drinker Street, Swinick Development, Reeves Street, O'Neill Highway and Dunham Drive. These inspections may increase or decrease in frequency upon evaluation of patrol results. The site maintains a log of these inspections and notes the location traveled and any observations. Should an odor be observed one or more of the following may be applied:

- Portable neutralizer misters turned on.
- Portable misters moved to the source of the odor and also placed directly around the working face.
- The working face sprayed with an odor neutralizer.
- Access roads sprayed with an odor neutralizer.
- Daily cover placement started over the odorous wastes.
- Trucks halted from discharging their loads until the odor has dissipated or remediated.

Odor control starts when the waste-hauling vehicle enters the site. If the guard or scale personnel identify a truck with a load that is abnormally odorous or has a sharp or distinct odor the truck contents will be verified. The landfill supervisor will be notified of the load. When the load reaches the disposal area it will be taken before all other waste haulers and the load quickly buried or covered.

Keystone monitors the acceptance of wastewater sludge closely. Keystone generally stops accepting this waste stream at least 2 hours before the end of the day. The reason for this is to ensure that this odorous type of waste is not placed close to the final daily cover and that there is enough material to sufficiently cover the sludge. Typically this waste is placed in a prepared location of the working face and covered immediately with refuse once discharged. If wastewater sludge is observed to be extremely odorous the Compliance Manager or assistant will contact the generator and verify their treatment process meets the regulatory requirements.

At the end of each working day the landfill crew covers all waste with either soil, approved foam, or approved alternative daily cover. The front gate guard will periodically inspect the disposal face cover during non-working hours, holidays and weekends. If the cover material has been affected, he will notify the business manager and personnel will be

called in to apply additional cover, if needed.

Potential odors from landfill gas are primarily controlled through a network of gas extraction devices that are maintained under vacuum. The number of gas wells and the collection-piping network will continue to expand as the landfill mass increases to ensure proper capture of landfill gas and control potential odors.

Keystone also contracts third party to manage the gas well field which includes monthly field balancing with a GEM 2000 and GEM 5000, and quarterly surface monitoring with a TVA 1000. Keystone possesses their own GEM 5000 and TVA 1000 to perform independent spot checks and evaluate problem areas that could contribute to odor issues.

Surface Monitoring Spot Checks will be conducted by our landfill gas technician in areas that are not already monitored during the quarterly surface monitoring events. Corrective actions will be taken on areas that exceed 500ppm. Corrective actions taken may include placement of additional cover, installation of larger diameter flow control devices on surrounding LFG wells, construction of shallow horizontal surface collectors, or drilling of additional temporary wells.

In the event of a power outage, backup generators will be utilized to supply temporary power to the gas collection and control system. Landfill gas is currently sold to end-users as a primary means for destruction with excess gas flared onsite. Should this end-user experience a malfunction or shutdown, gas flow normally received by PEI is diverted and burned in the enclosed flares.

Keystone has modified its wastewater treatment plant to improve the process and reduce odorous emission. Keystone uses a combination of moving bed biofilm reactor (MBBR) treatment in conjunction with an ammonia stripper to pre-treat leachate thereby removing potentially odorous emissions before discharging to the Scranton Sewer Authority for tertiary treatment.

Raw leachate is stored in two 5.5 million gallon lagoons located adjacent to the treatment plant. The use of aerators in the lagoon prevents anaerobic reactions in the lagoon which can result in septicity and potential odors. Should the raw leachate emit any noticeable odors, additional aerators will be used. Should any odor be identified in and around the lagoon, a portable mister will be used for distribution of odor neutralizer.

LITTER CONTROL

Keystone uses 10-foot high portable litter fencing around the working face to control wind-blown trash. Keystone employees construct and maintain these fences on site. Keystone uses 60 to 80 litter fences at any given time and is capable on manufacturing additional fences if and when needed. A 50-foot permanent litter fence was installed along the east side of the Phase II area to prevent any litter from leaving the site.

The landfill supervisor observes the wind direction and weather forecast at the start of each day so the portable litter fencing is placed in the best locations to collect wind-blown trash. The fences are moved if the wind direction changes.

Incoming waste hauling vehicles must be tarped and remain tarped until they reach the disposal area. A staging area is established by enclosing the working face with litter fences to prevent litter during the untarping process. Once a waste truck is unloaded the driver must ensure all waste has been discharged. He is required to sweep out all remaining waste at the working face before leaving the area. At the end of each day landfill personnel will collect all papers off the portable litter fencing as well as the permanent fencing. This is done using a "Madvac" or by hand. The litter is placed in garbage bags and disposed of at the working face.

Perimeter roads are monitored daily for litter and picked as necessary. The litter crews are to collect any paper or waste found on the inside access roads and on Dunham Drive. The crews collect the litter in garbage bags and dispose of them at the working face.
Should a wind event occur that deposits papers on or off site, the site manager will organize additional crews who will be deployed to the affected area.

Keystone inspects the site and site perimeter public roads several times a day. If litter is observed, the labor foreman will be contacted and have a crew dispatched to the area. If a customer truck is observed causing litter on site or on public roads the driver is stopped if possible, and the litter collected. The owner / operator will be contacted about the incident and informed of his responsibilities to prevent litter. If a driver or customer is a habitual offender, disposal privileges may be suspended or revoked.

If a high wind event occurs, Keystone will evaluate the facility conditions and make the necessary operational changes to control blowing debris. It is not anticipated that the facility will close on high wind days. However, Keystone will notify the Department if and when a weather related shutdown occurs.

TRANSPORTATION COMPLIANCE AND VEHICLE SAFETY ACTION PLAN

Keystone has developed and implemented a comprehensive Transportation Compliance Plan to promote vehicle safety and environmental compliance.

Policy

Keystone has developed and implemented the following plan in recognition of accepting its responsibility to promote and support all measures designed to enhance overall vehicle safety and abide by the recommendations outlined in the Waste Transportation Initiative. As a landfill, we are presented with opportunities on a daily basis to promote vehicle safety and inform and educate all those who use our services regarding rules and regulations governing the waste hauling industry.

With this in mind, it is the intention of the facility to adhere to this policy, continuously communicate our expectations and requirements and to institute a series of penalties for noncompliance.

Compliance Checks

On site, formal compliance checks will be scheduled at least every twelve months. This inspection will be coordinated with local and/or state police with prior notification to PADEP. These scheduled compliance checks will cover the following seven areas identified by the Initiative:

1) Overweight Trucks
2) Tarps
3) Leaky Loads
4) Signage
5) Fire Extinguishers
6) Daily Log
7) Contingency Plans for Residual Waste Haulers

All waste hauling vehicles will be inspected for ACT 90 compliance. Any noncompliance identified during these checks will be recorded. The appropriate authority will issue any formal violations observed during this compliance check as they find necessary.

Any waste hauler not in compliance with the Act 90 requirements will not be allowed to dispose waste at the facility until the deficiency is corrected. The Compliance Manager will record the name of the company, truck and trailer information and date and time of the compliance check that identified the deficiency. The waste hauler's information may be forwarded to PADEP should a request be made.

Repeat offenders or haulers who appear to ignore regulations or violation notification, or do not take measures to correct observed violations will have disposal privileges suspended or revoked.

Daily Operations and In-House Training

In addition to the proactive measures identified above, the landfill monitors each vehicle that enters the facility. This monitoring starts at the guard shack and continues until discharge at the working face. The guard and weigh master observe the vehicle for the items identified in the Initiative. Should any deficiency be identified, the vehicle will be pulled over and the Compliance Manager notified. The working face inspectors monitor the vehicles for the same items as well as residual waste approval and acceptable municipal wastes. Should a waste be unacceptable, the compliance manager will be notified. The waste may be refused and reloaded into the vehicle. If this occurs an incident report is generated and maintained on file.

Keystone provides in-house training to employees who have direct contact with waste acceptance. At least once a year employees are refreshed in waste acceptance procedures, vehicle safety and an overview of regulatory requirements.

Overweight Trucks

As required, KSL will record weights and registration information on each waste hauling vehicle that exceeds 73,280 and combinations that exceeds 80,000 gross vehicle weights. Waste vehicles which are identified as over the aforementioned weight limits will be addressed by KSL as follows:

- In the event a waste hauling truck exceeds its legal gross vehicle weight by 3% (i.e. 75,460lbs. or 82,400 for combinations), KSL will provide an overweight notification form as well as a warning to the driver that a continued disregard of weight limitations will jeopardize their waste hauler authorization status at KSL. In addition to the driver's notification, a copy will be provided by KSL to the owner of the truck, the waste generator and the customer. The overweight notification event will be maintained and monitored in KSL's database;

- If waste hauling driver exceeds the gross weight by 3% a second time within 60 days of the first infraction, KSL will delay the driver for two hours and the driver's information will again be entered into the KSL database. The driver of the overweight vehicle, truck owner, generator and customer will also be provided with a second overweight notification form;

- If a waste hauling driver exceeds the gross vehicle weight by 3% a third time within 60 days of the first infraction, the driver will be banned from entering KSL for 60 days.

A record concerning the details of all overweight vehicles identified at the site, including date, times, name, etc. will continue to be provided to the PADEP as part of the Quarterly and Annual Operations Report.

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Harms:

3. Odors

C3 **Odors: (E)** The potential for off-site odors is a known potential harm of a landfill Operation. Public comment indicates that this is an issue/concern for those in the area of the landfill. Public comments state that there are daily or frequent odors.

Proposed mitigation: KSL will continue to follow their Nuisance Minimization and Control Plan (NMCP) to address the potential for odors including employing the following: odor patrols, gas detection equipment, odor neutralizers, portable flares, horizontal gas collectors, temporary gas wells, stone columns to promote leachate drainage, temporary liner, vacuum equipment installation, limiting size of the working face, immediate disposal of odorous waste, daily monitoring of gas collection system, and aeration systems within leachate lagoons. KSL also indicates that the protocols in place from the landfill's ISO 14001 certification aid in the mitigation of off-site odor concerns and reduce potential by maximizing awareness among employees and establishing procedures for monitoring the landfill in this regard.

DEP review: Odors are potential harm for any landfill facility, particularly where the landfill is situated in close proximity to residential areas. DEP's experience based on inspections and complaint investigations at KSL is that the proposed mitigation has generally been successful; however, there have been occasions when there were odors. DEP staff has noted odors when in the vicinity of the landfill. Public comment indicates that there are frequent, even daily odors; however, the DEP has not received odor complaints as would be expected if the landfill had off-site odors on such a daily basis.

In 2012-13, odors were occurring as KSL increased their average daily volume from 5,000 tons per day (tpd) to 7,500 tpd and KSL made significant adjustments to their gas controls and monitoring protocols. Since that time, DEP finds that the adjustments and current operational controls have been adequate to minimize odors from the landfill. According to DEP's records, there were 75 odor complaints in 2011, 158 in 2012, 37 in 2013, 6 in 2014 and 16 in 2015 (as of September 18, 2015). The potential for odors will remain for the life of the facility and into the post-closure period however; DEP will not be able to fully assess this potential until the full design and construction sequence of the proposed expansion is reviewed.

C3 **Odors Response Narrative**

The full proposed adjusted Phase III site life design and construction sequences are provided with this document. The reduction in the originally proposed maximum Phase III elevation to the previously approved Phase II elevation will eliminate any issues regarding the Department's concern that as the elevation increased it would increase the potential for additional on and offsite odors, as there is no longer an elevation increase proposed.

Both the ISO14001 performance quality assurance program and the beneficial use of methane gas were not accepted as Phase III benefits by the PaDEP in their correspondence of October 13, 2015. However, we believe that both of these programs contribute significantly to the mitigation of the harms and potential harms associated with on and off site odor.

The ISO14001 Environmental Management Program combined with the Nuisance and Minimization Control Plan require daily monitoring for wind speed and direction, temperature, humidity and daily inspection patrols to the working face, the site perimeter and adjacent roadways and neighborhoods. The ISO14001 compliance officer is authorized to institute necessary corrective measures i.e. reduce the working face area, implement additional mister dispersion systems, etc. upon discovering a potential odor issue.

The new metrological station installed on the top of a secondary litter fence pole paralleling the Lackawanna Valley Industrial Highway (LVIH), provides the ISO compliance officer with supplemental data upon which operational activities can be modified to minimize any potential odor issues. Details of this metrological station can be found in Harms Benefit Response Narrative (C4) Litter and Exhibit C4.1. The beneficial use of landfill gas (LFG) program also contributes to the KSL odor minimization program. In order to make it financially feasible to expend the significant capital costs needed for and the operation and maintenance costs required for various LFG beneficial use processes, it is imperative that the quality and quantity of the LFG remain within narrowly scoped parameters.

The LFG generated at the facility is controlled using the following onsite enclosed and open flares, which serve as the primary control devices under the federal New Source Performance Standards (NSPS) for the destruction of landfill gas.

Enclosed Flare 2	**5,000 scfm**
Enclosed Flare 3	**5,000 scfm**
Enclosed Flare 5	**5,000 scfm**
Enclosed Flare 4	**4,000 scfm (portable)**
Enclosed Flare 800	**800 scfm (portable)**
Open Flare – Oklahoma	**500 scfm (portable)**
Open Flare – Hegins	**500 scfm (portable)**
Open Flare – Keystone	**500 scfm (portable)**
Current Total Capacity	**21,300 scfm**

The landfill also sends LFG to two (2) third-party end users, Keystone Recovery (KRI) and PEI – Archibald (PEI), for offsite use. KRI utilizes approximately 2,100 scfm of treated LFG as fuel for seven (7) Caterpillar 3516 SITA engine gensets for the generation of electrical power. PEI utilizes approximately 4,200 scfm of treated LFG as fuel for a boiler and turbines for the generation of electric power. Both KRI and PEI maintain separate air

permits for their operations to combust the LFG. Although PEI and KRI are not considered primary NSPS control devices for KSL, they currently provide additional control capacity of approximately 6,300 scfm when in operation. Therefore, the current combined capacity of the onsite flares and the third-party end-users is 27,600 scfm. In the event that the Landfill Gas to Energy (LGTE) Facility is off-line, LFG is routed to the enclosed flares for LFG destruction.

The enclosed flares at KSL will be capable of handling all projected landfill gas generated at the site and are designed to reduce the concentration of the Non-Methane Organic Compounds (NMOCs) present in the LFG by at least 98 percent by weight or reduce outlet NMOC emissions to less than 20 ppmv (dry basis) as hexane, in accordance with 40 CFR §60.752(b)(2)(iii)(B).

Per 40 CFR 60.752(b)(2)(iii)(B) and (C), the enclosed flares and LFG treatment system will be operated within the parameter ranges established by the respective manufacturers of the facilities. The devices will be operated in such a manner as to meet the emission requirements of the NSPS. In accordance with §60.756 of the NSPS, the temperatures and LFG flow rate are monitored continuously and recorded at each LFG control device, when they are in operation to demonstrate compliance.

Flares are operated in accordance with TVOP conditions including the NSPS Subpart WWW and NESHAP Subpart AAAA requirements for landfills. Flare requirements under the TVOP include monitoring and recording of stack operating temperature, flow rate, and opacity (visible emissions). Please note that there are no odor monitoring requirements under the TVOP. Flares are operated and maintained in accordance with manufacturer's specifications. NMOC destruction efficiency of the enclosed flares was demonstrated during the initial emissions performance testing conducted on each flare.

The site prepares monthly collection efficiency recordkeeping, and submits quarterly collection efficiency reports to demonstrate compliance with TVOP requirements. The site submits Semiannual Monitoring and Deviations Reports as well as NSPS Subpart WWW and NESHAP Subpart AAAA Semiannual Reports that include any instances of deviations from monitoring and recordkeeping requirements for the wellfield and the control devices.

In order to achieve these required quality and quantity standards, it is essential that the LFG collection wells, transfer piping, blowers and compressors be monitored on a daily basis for non-performance and leakage to the atmosphere. The landfill gas monitoring wells are tested on a daily basis with a portable Gas Analyzing meter, and this data is submitted to PaDEP on a monthly basis. Also, as required by the PaDEP regulations all LFG captured that is not incorporated for beneficial use must be processed thru flare equipment before being dispersed to the atmosphere. It is also required by the regulations that KSL, in case the facilities converting the

LFG to energy go off line in an emergency or shut down due to a major maintenance activity, have on site and in operation destructive flaring equipment that has a total capacity to remove all compounds from the total volume of LFG generated at KSL that pose a potential health hazard prior to atmosphere release. These activities are currently performed at KSL and will continue thru the site life duration of Phase III Site Development.

The success of the above described mitigation measures in controlling on and off site odors is evidenced by the fact that KSL thru over 25 years of operation and regulatory oversite has consistently achieved the required standards for LFG collection and destruction efficiencies, on and offsite LFG monitoring results. Evidence of KSL odor mitigation program is that only four odor citations have been verified by the Department in the last 25 years of KSL operation.

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Harms:

4. Litter

C4 **LITTER: (E)** The potential for on and off-site litter is a known potential harm of a landfill operation.

Proposed mitigation: KSL follows their litter control plan that includes: vehicles are tarped and swept out, portable litter fencing, prompt compaction of waste and application of daily cover, placement of top liner within 1 year, limit size of working face, litter collection crews, permanent litter fence along the Casey Highway, daily monitoring, monitoring weather conditions and adjusting operation accordingly.

DEP review: The proposed mitigation is to follow current mitigation plans; however there appears to be no consideration of potential conditions that may exist as the height of the landfill increases. Litter does not appear to be a significant issue based on current operations; however, Phase II has not reached its final permitted height. KSL does not define the weather conditions that trigger operational adjustments or what those adjustments are. For example, will the permanent litter fence along the Casey Highway be effective once the landfill reaches its permitted height or the proposed height? Similarly, KSL should include alternative mitigation plans in the event that current mitigation measurers are ineffective at higher elevations and define the weather conditions that require adjusted operations. KSL should provide an evaluation of the effectiveness of the proposed mitigation measures as the elevation of the landfill increases.

C4 **Litter Response Narrative**

The reduction in the originally proposed maximum Phase III Site Development elevation eliminates the Department's concerns regarding the need to provide additional control measures at higher elevations of the landfill. Thus, the necessity to develop alternate mitigation plans to address potential problems that may potentially occur as the elevation of the landfill increases, is no longer applicable.

KSL has installed a second meteorological station on a secondary litter fence pole adjacent to the Lackawanna Valley Industrial Highway (LVIH) between Pads 6 & 7 of Phase II. The wind speed and direction from the second station will be automatically relayed to the instrumentation which records the weather conditions from the existing meteorological station atop the KSL Administration Building. This data is analyzed at the daily start up staff meeting by the Compliance Officer who is authorized to direct the field superintendent to adjust the orientation and or increase the number of portable primary litter fences in the vicinity of the working face and to assign the daily full time litter clean up crew to the downwind perimeter of the KSL site. In addition, if the Compliance Officer determines that a litter issue exists during their daily tour of the site and adjacent roadways, an additional litter clean up crew will be assigned to these areas. Finally, if extreme wind

conditions prevail, the compliance officer will suspend MSW disposal operations at the higher elevation and relocate it to the valley locations.

A copy of the specifications for the meteorological unit located on the LVIH litter fence is located in Exhibit C4.1 and Sample Data from both the new Metrological Station and the existing one at the Administration Building, can be found in Exhibits B11.4 and B11.5.

Thus, the daily implementation of the operating procedures detailed herein, and the compliance record compiled by KSL over the past 25 year operating history when coupled with the fact that the vast majority of construction and waste disposal operations will be conducted in the valley between the existing permitted MSW disposal areas, demonstrate that adequate mitigation for controlling harms and potential harms for increased litter is provided.

EXHIBIT C4.1

METROLOGICAL STATION

Contacting Davis Technical Support

For questions about installing or operating your Solar Power Kit, please contact Davis Technical Support. We'll be glad to help.

Online	**www.davisnet.com** See the Weather Support section for copies of user manuals, product specifications, application notes, software updates, and more.
E-mail	**support@davisnet.com**
Telephone	(510) 732-7814 Monday - Friday, 7:00 a.m. - 5:30 p.m. Pacific Time.

Note: Please do not return your unit for repair without prior authorization.

Specifications

Operating Temperature	-40° to +149°F (-40° to +65°C)
Wind Direction	
Display Resolution	16 points (22.5°) on compass rose, 1° in numeric display
Accuracy	±3°
Wind Speed	
Range	1 - 200 mph, 1 -322 kph, 1-173 knots, 0.5 - 89 m/s
Accuracy	±2 mph (3 kph, 2 kts, 1 m/s) or ± 5%, whichever is greater

FlipUP #4 Switch

Anemometer for Vantage Pro2

Product Numbers 6410

Document Number: 07395.277 Rev. A, February 1, 2013

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Harms:

5. Noise

C5 **Noise: (E)** The potential for off-site noise is a known potential harm of a landfill operation.

Proposed mitigation: KSL has identified that the use of existing horizontal buffers such as nearby limited access highways, the industrial park, and forested areas will maintain the horizontal separation of over ¼ mile from the closest residential area. KSL indicates that it will maintain and enhance vegetative planting along public roadways. KSL also employs the following measures to control potential off-site noise: prohibit use of "jake brakes", vegetative plantings, and annual noise monitoring inspections.

DEP review: A landscaping plan showing existing and proposed plantings intended to buffer the operation should be provided by KSL. DEP would expect as active operations move closer to populated area and increase in height that off-site noise may become more discernable by the public. KSL should describe their annual noise monitoring inspection and what measures would be undertaken if noise becomes an issue as the height of the landfill exceeds the height of the above mentioned buffers.

C5 **Noise Response Narrative**

KSL retained ARM Group Inc. (ARM) to prepare an independent Noise Impact Assessment, relative to KSL's proposed Phase III Site Development, to determine if operational noise from KSL could contribute to ambient noise levels at off-site receptor locations, and if so, to what extent. A complete copy of the Assessment is in Exhibit C5.1.

Sound emissions were monitored atop the active landfill face during operations, outside the landfill limit during operations, and outside the landfill limit after operations had ceased to establish a set of baseline data from which noise levels that could potentially be attributed to landfill activity could be calculated. The data collected were used to establish the existing acoustic environment, predict sound emissions expected to be produced by the proposed Phase III Site Development, conduct predictive modeling to determine noise levels at receptor locations outside of the landfill, and assess the significance of any predicted increases in noise levels. The results were also evaluated relative to the noise ordinance established by Dunmore Borough, and applicable state and federal safety guidelines referenced by the Borough of Throop.

Noise can be described as "unwanted" sound, and the terms noise and sound are often used interchangeably. Ambient noise includes noise from all sources audible at a given location. Sound volumes are expressed on a logarithmic scale, in units called decibels (dB). Since the scale is logarithmic, the sound pressure level from two equal sources is 3 dB greater than the sound pressure level of just one source. Therefore, two engines producing 70 dB each will

combine to produce 73 dB, not 140 dB. Studies have shown that a 3 dB increase is barely detectable by the human ear. In addition, sounds also have varying frequency, and the human ear does not respond to all frequencies in the same way. Mid-range frequency noises are most readily detected by the human ear, while low and high frequency noises are harder to hear. Environmental noise levels are usually presented as "A-weighted" decibels (or dBA), which best approximates the frequency response of the human ear. This is the unit used in this assessment. On this scale, the range of average human hearing extends from approximately 0 to 120 dBA.

The assessment of potential effects of the landfill on noise levels focused on incremental changes in a key sound indicator; the equivalent A-weighted sound level (LAeq). The LAeq is a logarithmic average of sounds over a given period of time. This type of average is commonly used in an environmental (outdoor) context as it takes into account the natural fluctuations in sound, yet contains the same amount of acoustic energy as the actual time-varying, A-weighted sound level measurement for the specified period.

There are a number of factors that can mitigate noise in the environment. These mitigating factors are referred to as noise attenuation. The most important of these is the distance between the source and the receiver. As distance increases, noise levels decrease. A doubling of the distance from a source results in a 6 dBA reduction in the noise levels. In addition to distance, a number of other environmental factors will result in attenuation of emitted sounds, including the absorption of sound energy by air, the effect of barriers or hills on noise levels, and the effect of the groundcover on the emitted sounds. These effects are considered to be "excess attenuation."

Barriers and hills can provide excess attenuation of sound in the environment. As the sound waves "bend" around obstructions, they lose a great deal of energy. This phenomenon explains the use of barriers along major highways in urban areas. Another form of environmental attenuation deals with the interaction of sounds with the ground (absorption). Noise levels decrease at a different rate depending upon whether they are transmitted over "hard" surfaces or "soft" surfaces. Hard surfaces include materials such as gravel, paving, and concrete, which absorb less sound energy, while soft surfaces include vegetated areas and bare earth, may absorb more of the sound energy. The degree of attenuation varies with the weather conditions and type of vegetation (or lack of) covering the ground. In addition to environmental attenuation from distance, atmosphere, groundcover, obstructions, and other natural features, man-made features can also reduce sound levels. Buildings, weather enclosures, sound walls, exhaust mufflers and other similar components reduce the amount of noise from facilities. No excess attenuation factors were considered in this study due to the anticipated changes of the active landfill face location and elevation, as well as the probable changes in the surrounding environment outside of the landfill over the life of the proposed landfill expansion. Any excess attenuation would further reduce the

calculated noise impacts from the landfill. As a result, the predicted noise impacts are conservative (i.e., overestimated) and the actual change in noise levels is expected to be less than that indicated in this report.

Field Investigation

The study area for the assessment of noise from both current and future landfill limits was chosen to ensure that nearby homes and businesses which could potentially be affected by noise were included in the study. Potential sensitive noise receptors were identified using a USGS topographic map in conjunction with detailed aerial imagery, as well as field reconnaissance in the vicinity (up to 10,000 feet) of the landfill: Mid Valley Elementary Center and Secondary Center Schools, Sherwood Park – residential area, Flynn Street - residential area, East Swinick Drive - residential area, Sleep Inn & Suites Hotel - commercial area, and Dunmore No.1 Reservoir–natural area. In addition to these sensitive receptors, two noise source locations assessed during the study were identified through field reconnaissance at the landfill. The first is the working face of the landfill, where daily activities include the deposition and containment of refuse. This location will gradually shift though out the life span of the landfill as capacity is reached. The second source is the flare station, utilized for regulated control of excess methane gas from the landfill.

A Casella CEL-633C real time logging environmental noise analyzer was used to collect the data for this study (ANSI 1983). The CEL-633C noise analyzer has an accuracy of +-1 dBA, and was set for a Leq detection range of 0 to 140 dBA. The instrument was calibrated prior to use in the field using a single calibration point at 114 dB, utilizing calibration equipment supplied by the manufacturer. The meter logged the LAeq average noise levels once per minute during the monitoring period, and the data was subsequently downloaded for analysis.

The baseline sound sampling consisted of a 2-hour continuous reading at each off-site receptor location both during and after landfill operating hours was completed. Source readings were taken of various time lengths at the landfill in order to determine noise level changes during start-up and shutdown of operation as well as during operations. A 2-hour continuous reading was also performed at the landfill flare site as it's a continuously active operation that is situated away from the active face of the landfill. Activities and sound sources observed outside the landfill area were highway traffic, local residential traffic and natural influences such as wind, animals and vegetation movement. Field observations indicate that highway traffic was the dominant noise source, especially during braking and deceleration of heavy trucks.

Noise Modeling

To determine the total noise level at each monitoring location, the distance between that receptor and each of the specific landfill activities was measured, and the sound contribution from each sound source was calculated (which accounts only for attenuation due to hemispherical spreading, without consideration for excess attenuation). The contribution from each sound source was then added to the measured background noise level to determine the total predicted noise level using the following equation. Noise emissions from the landfill sources were also attenuated at the Dunmore Borough ordinance-specified octave band frequencies to determine whether the Phase III Site Development related noise levels will still be within regulatory limits for each octave band. The Borough of Throop does not have specific noise ordinance limits, but instead references state and federal safety guidelines on noise. PaDEP requires that a waste facility provide provisions to mitigate noise emitted from the facility but does not provide any numerical limits other than prohibiting injury to public health (25 PA. Code Chapter 273.136 & 273.218(c)). Therefore, the Dunmore ordinance was used as the standard for this study (Ordinance 6.430 Noise, Table III & Table IV).

Impact Summary and Conclusions

Current sound levels being emitted from the landfill are not significantly affecting noise levels at the nearest receptor sites. The primary contributor to noise levels noted during baseline measurements at all of the receptor locations was traffic from the highways and roads in the area. No noise from the landfill was distinguishable during the baseline measurements. The greatest calculated impact on existing noise levels that may be attributed to the landfill was a 1.35 dBA contribution at the location closest to the working face, the Dunmore No.1 Reservoir Trail; no other existing noise contributions were calculated to be above 1 dBA. As stated previously, a difference of less than 3 dBA is not generally perceptible to the human ear. The calculated noise contribution from the existing landfill sources in this assessment is not corrected for excess attenuation from the atmosphere, ground cover, or vegetative and manmade barriers which would only serve to lessen the estimated minor contribution from the landfill on existing noise levels.

Noise studies have shown that a 3 dBA increase is barely detectable by the human ear (USDOT 1995). The maximum calculated contribution from the Phase III Site Development to the noise levels at the off-site receptor locations was less than 1.5 dBA, with the one exception being the maximum 4.66 dBA change calculated at the Dunmore No.1 Reservoir (Location H) trail receptor location. This represents the worst case potential change during peak operations at the Site Development location closest to the receptor, actual sound levels are expected to be less due to additional attenuation sources noted previously (e.g., topography), and the impact of traffic noise generated by the intervening SR 0006 highway. Most often, landfill operations will occur further from the Dunmore No.1 Reservoir Trail location, and after landfill operating hours,

the contribution falls below 1 dBA (due to the continuous operation of the landfill flare station). As detailed herein, the noise contribution from KSL is well within the limits established in the Dunmore Borough Ordinance.

This 2016 Noise Study will be used as the baseline to determine if operation at increased heights alter the sound contribution from KSL. A Noise Study will be performed annually during the Phase III operations, using the same parameters of the 2016 Noise Study. Any variations from the noise levels in the 2016 Study, attributable to KSL, will be included in the PaDEP Annual Operations Report along with the details of the mitigation program instituted by KSL.

EXHIBIT C5.1

NOISE IMPACT ASSESSMENT

NOISE IMPACT ASSESSMENT

KEYSTONE SANITARY LANDFILL
PROPOSED PHASE III EXPANSION

Prepared For:

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1.0 OVERVIEW

Activities associated with landfill operations may generate sound that could potentially affect noise levels surrounding the site. The intent of the study was to determine if operational noise from Keystone Sanitary Landfill (KSL) could contribute to ambient noise levels at off-site receptor locations, and if so, to what extent. Sound emissions were monitored atop the active landfill face during operations, outside the landfill limit during operations, and outside the landfill limit after operations had ceased to establish a set of baseline data from which noise levels that could potentially be attributed to landfill activity could be calculated. The data collected was used to establish the existing acoustic environment, predict sound emissions expected to be produced by the proposed landfill expansion, conduct predictive modeling to determine noise levels at receptor locations outside of the landfill, and assess the significance of any predicted increases in noise levels. The results were also evaluated relative to the noise ordinance established by Dunmore Borough, and applicable state and federal safety guidelines referenced by the Borough of Throop.

Noise can be described as "unwanted" sound, and the terms noise and sound are often used interchangeably. However, while all noises are a form of sound, not all sounds are unwanted. Therefore, the term sound will be used most often in this assessment to describe emissions, while noise will be used to describe ambient levels or levels heard by off-site receivers. Ambient noise includes noise from all sources audible at a given location.

Sound volumes are expressed on a logarithmic scale, in units called decibels (dB). Since the scale is logarithmic, the sound pressure level from two equal sources is 3 dB greater than the sound pressure level of just one source. Therefore, two engines producing 70 dB each will combine to produce 73 dB, not 140 dB. This means that a doubling of the noise source produces only a 3 dB increase in the sound pressure level. When the emissions from a third 70 dB engine are added, the noise level increases to 74.8 dB. Studies have shown that a 3 dB increase is barely detectable by the human ear. When an increase or decrease of 10 dB occurs, it will be perceived by an observer to be a doubling or halving of the sound. This means that a decrease in sound from 70 dB to 60 dB will sounds half as loud.

Since sound levels are measured on a logarithmic scale, the combined effect of multiple sources is calculated accordingly using the following formula:

$$dBA = 10 \times \log\left(10^{\frac{dBA_1}{10}} + 10^{\frac{dBA_2}{10}} + 10^{\frac{dBA_3}{10}} + \ldots + 10^{\frac{dBA_n}{10}}\right)$$

In addition, sounds also have varying frequency, and the human ear does not respond to all frequencies in the same way. Mid-range frequency noises are most readily detected by the human ear, while low and high frequency noises are harder to hear. Environmental noise levels are usually presented as "A-weighted" decibels (or dBA), which best approximates the frequency

response of the human ear. This is the unit used in this assessment. On this scale, the range of average human hearing extends from approximately 0 to 120 dBA (USDOT 1995).

Table 1 lists sound levels associated with common sources that will provide the reader with references when comparing the noise levels observed from activities associated with the landfill's current operations and predicted levels during expansion. The levels listed in the tables represent average values and could vary from one situation to the next.

Activity	Sound Level [dBA]
Lawnmower	95
Loud shout	90
Motorcycle passing 50 ft. away	85
Car traveling 60 miles per hour passing 50 ft. away	80
Vacuum cleaner	75
Faucet	62
Normal conversation	60
Moderate rainfall	50
Bird singing	50
Quiet living room	40
Whispered speech	40
Average rural sound level at night	35

Table 1: Summary of Sound Levels Associated with Common Activities.

The assessment of potential effects of the landfill on noise levels focused on incremental changes in a key sound indicator; the equivalent A-weighted sound level (LAeq). The LAeq is a logarithmic average of sounds over a given period of time. This type of average is commonly used in an environmental (outdoor) context as it takes into account the natural fluctuations in sound, yet contains the same amount of acoustic energy as the actual time-varying, A-weighted sound level measurement for the specified period. This indicator will address continuous and regular short-term noise generated by landfill operations, current and proposed. The A-weighting filter covers the full audio frequency range – 12.5 Hz to 20 kHz and the shape is similar to the response of the human ear as described above.

There are a number of factors that can mitigate noise in the environment. These mitigating factors are referred to as noise attenuation. The most important of these is the distance between the source and the receiver. As distance increases, noise levels decrease. A doubling of the distance from a source results in a 6 dBA reduction in the noise levels. Therefore, increasing the distance from 500 to 1,000 feet will drop the noise level from 40 to 34 dBA. Increasing the distance another 500 feet from 1,000 to 1,500 feet would decrease the noise level from 34 to 30.5 dBA. At the distances considered for most rural development projects, facilities act like point sources, and the noise levels at increased distances can be calculated using the following formula (Cowan 1994):

$$dBA_{(X_i)} = dBA_{(X_{ref})} - 20 \times \log\left(\frac{X_i}{X_{ref}}\right) - excess\ attenuation$$

In addition to distance, a number of other environmental factors will result in attenuation of emitted sounds. These include the absorption of sound energy by air, the effect of barriers or hills on noise levels, and the effect of the groundcover on the emitted sounds. These effects are represented in the equation above as "excess attenuation."

As sound passes through the atmosphere, it collides with air molecules, converting some of the energy into heat. This atmospheric absorption of energy results in a decrease in the sound energy. The amount of energy that the atmosphere absorbs varies with weather conditions and the frequency of sound. Low frequency sounds (those not readily detected by the human ear) are relatively unaffected by the atmosphere. The mid-range frequency sounds, which are most readily detected by the human ear, can lose significant energy to the atmosphere. The atmosphere can reduce sounds in the optimal frequencies by as much as 3 dBA for every 100 feet, given the right weather conditions.

Barriers and hills can also attenuate sound in the environment. As the sound waves "bend" around obstructions, they lose a great deal of energy. This phenomenon explains the use of barriers along major highways in urban areas. This also explains why people do not usually hear sounds from sources that are behind hills. The amount of attenuation afforded by an obstruction is a function of the amount of bending of the sound waves. Therefore, the attenuation is greatest close to the source, and is less effective at greater distances. This attenuation has not been incorporated into the formulas used to model KSL noise levels because both the proposed landfill height and working face location and elevation will be changing throughout the life of the landfill.

Another form of environmental attenuation deals with the interaction of sounds with the ground (absorption). Noise levels decrease at a different rate depending upon whether they are transmitted over "hard" surfaces or "soft" surfaces. Hard surfaces include materials such as gravel, paving, and concrete, which absorb less sound energy, while soft surfaces include vegetated areas and bare earth, may absorb more of the sound energy. The degree of attenuation varies with the weather conditions and type of vegetation (or lack of) covering the ground. This attenuation has not been incorporated into the formulas used to model KSL noise levels because changes in the surrounding environment outside of the landfill are probable over the life of the proposed landfill expansion.

In addition to environmental attenuation from distance, atmosphere, groundcover, obstructions, and other natural features, man-made features can also reduce sound levels. Buildings, weather enclosures, sound walls, exhaust mufflers and other similar components reduce the amount of noise from facilities. Noise-reducing components can be designed (e.g., by adding extra insulation) to reduce noise emissions. These types of features already exist both at the landfill

and near several of the off-site monitoring locations. Sound walls to deal with highway noise are already present between several monitoring locations and source location. This excess attenuation has not been incorporated into the formulas used to model KSL noise levels. Any excess attenuation would further reduce the calculated noise impacts from the landfill. As a result, the predicted noise impacts are conservative (i.e., overestimated) and the actual change in noise levels is expected to be less than that indicated in this report.

2.0 BASELINE NOISE LEVELS

The study area (**Figure 1 United States Geological Survey [USGS] 7.5 minute quadrangle, Olyphant, PA**) for the assessment of noise from both current and future landfill limits was chosen to ensure that nearby homes and businesses which could potentially be affected by noise were included in the study. Potential sensitive noise receptors were identified using a USGS topographic map in conjunction with detailed aerial imagery, as well as field reconnaissance in the vicinity (up to 10,000 feet) of the landfill; Mid Valley Elementary Center and Secondary Center Schools, Sherwood Park – residential area, Flynn Street - residential area, East Swinick Drive - residential area, Sleep Inn & Suites Hotel - commercial area, and Dunmore Reservoir Number 1 – natural area. In addition to these sensitive receptors, two noise source locations assessed during the study were identified through field reconnaissance at the landfill. The first is the working face of the landfill, where daily activities include the deposition and containment of refuse. This location will gradually shift though out the life span of the landfill as capacity is reached. The second source is the flare station, utilized for regulated control of excess methane gas from the landfill.

A Casella CEL-633C real time logging environmental noise analyzer was used to collect the data for this study (ANSI 1983). The CEL-633C noise analyzer has an accuracy of +-1 dBA, and was set for a Leq detection range of 0 to 140 dBA. The instrument was calibrated prior to use in the field using a single calibration point at 114 dB, utilizing calibration equipment supplied by the manufacturer. The CEL-633C performs the calculations for three dosimeters operating simultaneously in one instrument. The meter logged the LAeq average noise levels once per minute during the monitoring period, and the data was subsequently downloaded for analysis and is presented in **Table 2**. The locations selected for monitoring are described in greater detail below.

Table 2 - Field Monitoring LAeq Data by Session for Each Location.

Map Location	Receptor Location (Landfill Operation Status)	Start Time	Finish Time	Date	Measured LAeq (A-weighted) (dBA) [1,2]
A	Landfill Active Face (Landfill Open) [1,3]	2:59 PM 5:40 AM	4:30 PM 6:30 AM	12/15/15 12/16/15	72.8
A	Landfill Active Face (Landfill Closed) [1,3]	4:30 PM 5:14 AM	4:50 PM 5:40 AM	12/15/15 12/16/15	66.4
B	Landfill Flare Station (Landfill Open)	7:15 AM	9:15 AM	12/16/15	74.4
C	Flynn Street (Open) [1]	3:00 PM	4:30 PM	12/15/15	62.4
C	Flynn Street (Closed) [1]	4:30 PM	5:06 PM	12/15/15	60.9
D	E Swinick Drive (Landfill Open)[1,3]	5:30 AM 10:08 AM	6:52 AM 12:09 PM	12/16/15 12/18/15	56.2
D	E Swinick Drive (Landfill Closed)[1,3]	4:51 AM 8:00 PM	5:30 AM 10:02 PM	12/16/15 12/17/15	52.9
E	Sherwood Park (Landfill Open)	2:48 PM	5:00 PM	12/16/15	56
E	Sherwood Park (Landfill Closed)	5:55 PM	8:01 PM	12/15/15	51.5
F	School (Landfill Open)	9:47 AM	11:48 AM	12/16/15	61.7
F	School (Landfill Closed)	12:55 AM	3:03 AM	12/16/15	50.1
G	Hotel (Landfill Open)	12:27 PM	2:28 PM	12/16/15	61.4
G	Hotel (Landfill Closed)	9:55 PM	12:02 AM	12/15/15	55.7
H	Reservoir Trail (Landfill Open)	2:25 PM	4:30 PM	1/13/16	55.5
H	Reservoir Trail (Landfill Closed)	5:00 PM	7:01 PM	1/13/16	54.6

1. Excluded Pre- and Post-Operations Periods to provide LAeq during operations .
2. A-weighted decibels are an expression of the relative loudness of sounds in air as perceived by the human ear.
3. Two separate monitoring events were combined to obtain an average LAeq.

2.1 Field Investigation Methods

The baseline sound sampling consisted of a 2-hour continuous reading at each off-site receptor location both during and after landfill operating hours was completed. Source readings were taken of various time lengths at the landfill in order to determine noise level changes during start-up and shutdown of operation as well as during operations. A 2-hour continuous reading was also performed at the landfill flare site as it's a continuously active operation that is situated

away from the active face of the landfill. Weather during the investigation period ranged in temperature from 40°F to 50°F and wind speed varied between 5mph and 15 mph (NOAA, 2016). Conditions remained overcast throughout the investigation; a light rain developed at the hotel location during the landfill closed monitoring event.

The CEL-633C noise analyzer was deployed in a vertical orientation at a 5-foot elevation and protected by a windscreen. The microphone was calibrated before and after each sampling event using the manufacturer's calibration device. Each site was monitored during daily landfill operations and after operations had ceased. Sounds levels were recorded in both cumulative LAeq and 1/3 octave formats for increased resolution of noise emittance.

Activities and sound sources observed outside the landfill area were highway traffic, local residential traffic and natural influences such as wind, animals and vegetation movement. Field observations indicate that highway traffic was the dominant noise source, especially during braking and deceleration of heavy trucks.

2.2 Monitoring Locations

The potential receptors included a combination of residential, industrial, and commercial properties situated in the general vicinity of the landfill. The selected monitoring locations were along the north, west, and south edges of the landfill property, as near as practical to identified receptors. Final monitoring site selection was made during the survey once site conditions were established and are presented on the attached **Sheet 1**. Also surrounding the northeastern, eastern, southern, and southwestern sides of the site are major highways including Interstate 81 (I-81), Interstate 84 (I-84), and Governor Robert P. Casey Highway (State Route 6). Both I-81 and I-84 feature highway sound walls within Dunmore Borough, as well as elevated superstructures (e.g., over-passes, bridges, and exit ramps). The highways were constructed along the local landscape and in the case of the State Route 6 (SR 6), cut through the surrounding hilly terrain. Elevations in the area range from 900 feet above mean sea level (amsl) to 1500 feet amsl, with the highest point being at the landfill itself. The flare station at the landfill sits at approximately 1000 feet amsl, and the highest pre-expansion elevation on the landfill is the current working face at approximately 1500 feet amsl.

Monitoring was conducted between December 15, 2015 and December 18, 2015 at seven locations identified below as Location A though G, chosen to monitor existing sounds, including potential sensitive receptors to the south, southwest, west, and northwest of the proposed landfill. In addition, two source locations inside the landfill boundary were monitored for existing sound levels. An eighth potential sensitive receptor location, identified below as Location H, was monitored on January 13, 2016. A brief description of each location is provided below.

- Location A was chosen to measure the sound emitted at the current working face of the landfill. This is where waste is unloaded and integrated into the landfill unit, and is the primary noise source at the landfill. The sound meter was located approximately 30 feet

south and east of the closest dominant sound emitting operation, the ingress/egress trucking route. The furthest dominant sound emitting operation was located approximately 370 feet northeast of the sound meter in the tri-axle waste disposal area. A third dominant sound emitting operation approximately 100 feet east of the sound meter was identified as the waste compaction area, where heavy equipment and waste trucks were continuously operating. The distances from each of these three dominant sound emitting operations were normalized to establish a final sampling distance of 167 feet. Two monitoring events were conducted at this location, the first at the end of operations on December 15, 2015, and the second at the beginning of operations on December 16, 2015. Only periods of active landfill operation were used when calculating the LAeq. At the time of sampling, the sound meter was located at GPS location 41.424304, -75.586921, at an approximate altitude of 1,493 feet amsl. The noise levels measured at this location are representative of the typical daily noise output for the working face of the landfill.

- Location B was chosen to measure the sound emitted at the flare station located in the northern region of the landfill. The landfill flare station is a continuously active operation that collects and consumes excess landfill gases utilizing several large circulator pumps and up to three flare stacks. The noise produced by this processes was measured during a two-hour period on the morning of December 16, 2015. The sound meter was located approximately 120 feet northwest of the flare station facilities. Because the flare station operates continuously, noise generated here was always included when calculating the LAeq's for the surrounding receptors. At the time of sampling the sound meter was located at GPS location 41.436165, -75.595102, at an approximate altitude of 996 feet amsl. The noise levels measured at this location are representative of the typical daily noise output for the flare station at the landfill.

- Location C was approximately 5,260 feet west of the landfill's working face on Winton Street (Flynn), a residential area in Dunmore Borough. This location is approximately 200 feet southwest of the I-81 South, I-84 West interchange. The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

- Location D was approximately 6,180 feet west of the landfill's working face on East Swinick Drive, a residential area in Dunmore Borough. This location is approximately 210 feet west of the I-81 South, SR 6 East interchange. The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

- Location E, Sherwood Park, was approximately 7,350 feet west of the landfill's working face. Sherwood Park is located in a residential neighborhood just west of Location D, and contains two baseball fields, a large playground and several multipurpose areas. The sample was collected near the Park's entrance at the intersection of Jessup Street and

Barnard Street, approximately 1,300 feet west of the I-81 South, SR 6 East interchange. The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

- Location F was approximately 9,010 feet north of the landfill's working face, and 4,500 feet north of the flare station on Underwood Road in the Borough of Throop. Both the Mid Valley Elementary and Secondary Schools are located adjacent to the monitoring site. The nearest highway, SR 6 is located approximately 3,700 feet to the east. Location F is was only sensitive receptor identified with a large margin of wooded acreage between itself and the landfill (over 2,500 wooded linear feet). The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

- Location G was approximately 8,700 feet west of the landfill's working face and 6,800 feet west of the flare station in a commercial area on Monahan Street. The sample location was in the Sleep Inn & Suites parking lot, approximately 420 feet from the I-81 North, SR 347 interchange. The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

- Location H was approximately 2,500 southwest of the landfill's working face in a natural area surrounding the Dunmore Reservoir Number 1. The noise sample was collected at the northern end of the reservoir along an existing hiking trail just east of the Keystone Industrial Park, and approximately 350 feet south of SR 6, near the interchange with I-84 East. A small wooded buffer was present between the sample location and SR 6. The location was monitored during the landfill's operating hours and after operations had ceased, to establish baseline ambient noise levels at this location.

Observations made during the baseline noise level monitoring indicated that the existing background noise levels were elevated due to traffic noise from multiple highway and local roads in the vicinity of KSL. Highway traffic sound was the dominant noise present at all monitoring locations with the exception of Location F, where the dominant noise present during monitoring was local traffic.

3.0 IMPACT ASSESSMENT

3.1 Existing Landfill Sound Emissions

The two landfill activities considered as potential noise sources for this assessment were the working face of the landfill and the flare station with associated blowers. The working face measurement includes daily operating activities in the area of active waste disposal: compaction and earth moving equipment; waste trucks; equipment used for onsite waste movement; and back-up alarms. The location of this activity shifts through the lifetime of the landfill expansion

as the landfill working face will migrate within the proposed expansion boundary as illustrated on **Sheet 1**. The flare station is a fixed facility that is not anticipated to require relocation for the landfill expansion.

Because the existing landfill permit and operational procedures address impacts including noise, and the planned expansion does not propose any increase in average daily volume, traffic patterns are not expected to change. Therefore, on-site and off-site traffic noise beyond the landfill's working face was not applicable in this assessment.

3.2 Noise Modeling

To determine the total noise level at each monitoring location, the distance between that receptor and each of the specific landfill activities was measured, and the sound contribution from each sound source was calculated using the following formula (which accounts only for attenuation due to hemispherical spreading, without consideration for excess attenuation). The contribution from each sound source was then added to the measured background noise level to determine the total predicted noise level using the following equation. Noise emissions from the landfill sources were also attenuated at the Dunmore Borough ordinance-specified octave band frequencies to determine whether the expansion-related noise levels will still be within regulatory limits for each octave band. The Borough of Throop does not have specific noise ordinance limits, but instead references state and federal safety guidelines on noise. Pennsylvania DEP requires that a waste facility provide provisions to mitigate noise emitted from the facility but does not provide any numerical limits other than prohibiting injury to public health (25 PA. Code Chapter 273.136 & 273.218(c)) (PADEP, 2015). Therefore, the Dunmore ordinance was used as the standard for this study (See attached **Appendix A**, Dunmore Ordinance 6.430 Noise, Table III & Table IV).

$$dBA_{(X_i)} = dBA_{(X_{ref})} - 20 \times \log\left(\frac{X_i}{X_{ref}}\right)$$

3.3 Impact Summary

The attached **Table 3** summarizes the current noise levels at each of the selected monitoring locations and the impact that current the landfill activities have at each location. As presented in the table, the current noise level associated primarily with existing traffic from the locations previously mentioned remains the dominant source of noise at the receiver locations. Using the measured LAeq generated at the landfill (including both the working face and flare station) and correcting for distance attenuation only, a conservative estimate of the amount of noise being generated by landfill activities was calculated. This was then combined with the measured LAeq for each receptor to determine the landfill's noise contribution at the receptor. The same calculation was also shown for all receptor locations while the landfill was not operating. In both cases the maximum calculated contribution from the landfill to the noise levels at the off-

site receptor locations was less than one dBA with the exception of Location H which resulted in a slightly higher 1.35 dBA increase.

Table 4, attached, summarizes the predicted maximum changes in noise levels attributed to the landfill. Because the working face of the landfill shifts over the lifetime of the project, the exact location of the noise source will vary as the operation continues. **Sheet 1** illustrates the proposed boundary of the landfill expansion; areas within the boundary may at some point be the location of the working face sound emittance. Therefore modeling was conducted assuming the distance between the receptor locations and the nearest expansion limit as a worst case (maximum) noise level prediction. Using the results in **Table 3** the background noise level, excluding the landfill contribution at each receptor was calculated. The background noise was then compared to the calculated worst case noise level at each receptor location to predict the worst case total noise level associated with the landfill expansion.

Noise studies have shown that a 3 dBA increase is barely detectable by the human ear (USDOT 1995). The maximum calculated contribution from the landfill expansion to the noise levels at the off-site receptor locations was less than 1.5 dBA, with the one exception being the maximum 4.66 dBA change calculated at the Dunmore Reservoir #1 (Location H) trail receptor location. This represents the worst case potential change during peak operations at the expansion location closest to the receptor, actual sound levels are expected to be less due to additional attenuation sources noted previously (e.g., topography), and the impact of traffic noise generated by the intervening SR 6 highway. Most often, landfill operations will occur further from the Dunmore Reservoir #1 Trail location, and after landfill operating hours, the contribution falls below 1 dBA (due to the continuous operation of the landfill flare station). As illustrated in **Table 6** and discussed below, no landfill noise contributions result in a violation of the Dunmore ordinance.

Tables 5.1 through 5.8 illustrate the breakdown of sound measured in 1/3 octave bands at the landfill sources and the receptor locations that best correspond to the Dunmore ordinance frequency ranges (**Appendix A, Table III**). Using an ordinance-recommended sound pressure meter to monitor standard octave band sound pressure levels, a 1/3 octave band measurement provides the closest corresponding data that can be combined into the referenced frequency ranges. As a result the 1/3 octave band measurements were divided into the corresponding ordinance frequency ranges and the worst case total calculated landfill contribution was calculated to determine if the landfill's proposed expansion would cause an exceedance at any receptor location for any of the eight frequency ranges indicated by the ordinance. **Tables 5.1 through 5.8** present the conservative, worst-case total predicted noise level at each receptor location and the associated landfill contribution (i.e. Expansion Worst-Case Calculated Landfill Contribution at Receptor). The noise impacts are subsequently compared to the Dunmore ordinance in **Table 6**.

Table 6 summarizes the above mentioned results as compared to the allowable limits for each frequency range (**Appendix A, Table III**) after applying the correction factors shown in **Appendix A, Table IV**. The frequency range limits were applied according to a the residential

or non-residential land use at each receptor location and the correction factors were applied based on the applicable scenarios defined in **Table IV** of the ordinance. The lone receptor located in the Borough of Throop (Mid Valley School District) was also compared to the Dunmore ordinance limits since the Throop ordinance does not specify numerical limits as noted previously.

4.0 CONCLUSIONS

Current sound levels being emitted from the landfill are not significantly affecting noise levels at the nearest receptor sites **(Table 3)**. The primary contributor to noise levels noted during baseline measurements at all of the receptor locations was traffic from the highways and roads in the area. No noise from the landfill was distinguishable during the baseline measurements. The greatest calculated impact on existing noise levels that may be attributed to the landfill was a 1.35 dBA contribution at the location closest to the working face, the Dunmore Reservoir #1 Trail; no other existing noise contributions were calculated to be above 1 dBA. As stated previously, a difference of less than 3 dBA is not generally perceptible to the human ear. The calculated noise contribution from the existing landfill sources in this assessment is not corrected for excess attenuation from the atmosphere, ground cover, or vegetative and manmade barriers which would only serve to lessen the estimated minor contribution from the landfill on existing noise levels.

When assessing the potential noise impacts for the KSL expansion, the worst case scenario was assumed by relocating the working face of the landfill to the point within the permit boundary closest to each receptor so its impact to each receptor was maximized. This conservative approach still results in a barely audible effect at the chosen receptor locations based on distance-attenuated calculations only **(Table 4)**. The one possible exception is a 4.66 dBA increase calculated at the Dunmore Reservoir #1 Trail during the worst case working face location scenario using the conservative calculations methods described above (e.g., distance and topographic attenuation, absorption). When the 4.66 dBA increase is added to the estimated ambient background noise of 54.15 dBA, a resulting 58.81 dBA total ambient noise level would be expected at the receptor location. This means the worst case noise levels expected at the Dunmore Reservoir #1 Trail would fall between the existing measured Flynn Street LAeq of 62.4 dBA and the existing measured East Swinick Drive LAeq of 56.2 dBA. Both of which are residential receptors that have a barely audible impact from existing landfill operations. As with **Table 3**, none of this data is corrected for excess attenuation and the existing tree cover would be expected to reduce the predicted noise impact for the Dunmore Reservoir #1 Trail receptor location.

As presented in Table 6, the predicted noise contributions from the landfill expansion are well below the allowable levels established in the Dunmore ordinance for each of the specified frequency ranges. It is apparent that the expansion at the landfill will not directly result in a

violation of the Dunmore noise ordinance, and does not and has not been a cause for concern in the Borough of Throop.

5.0 REFERENCES

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TABLES

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 3
TOTAL EXISTING A-WEIGHTED NOISE ANALYSIS

ARM Project 14411

			Landfill Contribution					
			Working Face		Flare Station		Total Landfill Sources (Working Face & Flare Station)	
Map Location	Receptor Location	Measured LAeq (A-weighted) (dBA) [1,2]	Distance from Receptor (ft)	Calculated Noise Contribution at Receptor (dBA) [2,3]	Distance from Receptor (ft)	Calculated Noise Contribution at Receptor (dBA) [2,3]	Total Calculated Landfill Contribution at Receptor (dBA) [2,3]	Amount of Total Measured Noise Level Associated with Landfill Contribution at Receptor (dBA) [2,4]
A	Landfill Active Location (Landfill Open) [1,5]	72.8	Source	Source	4,869	42.23	NA	NA
A	Landfill Active Location (Landfill Closed) [1,5]	66.4	Source	Source	4,869	42.23	NA	NA
B	Landfill Flare Station (Landfill Open)	74.4	4,869	43.51	Source	Source	NA	NA
C	Flynn Street (Landfill Open) [1]	62.4	5,466	42.50	6,932	39.17	44.16	0.07
C	Flynn Street (Landfill Closed) [1]	60.9	5,466	36.10	6,932	39.17	40.91	0.04
D	E Swinick Drive (Landfill Open) [1,5]	56.2	6,759	40.66	6,361	39.91	43.31	0.23
D	E Swinick Drive (Landfill Closed) [1,5]	52.9	NA	NA	6,361	39.91	39.91	0.22
E	Sherwood Park (Landfill Open)	56	7,946	39.25	7,408	38.59	41.94	0.17
E	Sherwood Park (Landfill Closed)	51.5	NA	NA	7,408	38.59	38.59	0.23
F	School (Landfill Open)	61.7	9,465	37.73	4,623	42.69	43.89	0.07
F	School (Landfill Closed)	50.1	NA	NA	4,623	42.69	42.69	0.87
G	Hotel (Landfill Open)	61.4	9,167	38.01	6,775	39.37	41.75	0.05
G	Hotel (Landfill Closed)	55.7	NA	NA	6,775	39.37	39.37	0.10
H	Reservoir Trail (Landfill Open)	55.5	2,527	49.20	5,822	40.68	49.77	1.35
H	Reservoir Trail (Landfill Closed)	54.6	NA	NA	5,822	40.68	40.68	0.18

General Notes:
1. NA - Not Applicable.
2. LAeq noise levels are logarithmic (dBA) values and cannot be added directly.
3. LAeq describes sound levels that vary over time, resulting in a single decibel value which takes into account the total sound energy over the period of time of interest.

Notes:
1. Excluded Pre & Post Ops Periods to provide LAeq (equivalent continuous noise level) during operations
2. A-weighted decibels (dBA) are an expression of the relative loudness of sounds in air as perceived by the human ear.
3. Calculated noise contribution at receptor is noise level that would be present, only when attenuated by distance, without external blocking (e.g., sound barriers, topography, etc.) or the addition of other noise contributions (e.g., traffic, highways, other industry).
4. Comparing the Measured LAeq to the Total Calculated Noise Contribution at Receptor noise levels, the calculated is less than actual measured values, due to other, external noise sources (e.g., highways, other traffic, unrelated industry). If the landfill were not operating, the measured noise levels at the receptor locations only decrease by the value calculated in this column.
5. Two separate monitoring events were combined to obtain an average LAeq.

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 4
PREDICTED (WITH EXPANSION) TOTAL A-WEIGHTED NOISE ANALYSIS

ARM Project 14411

				Expansion - Worst Case Landfill Contribution						
				Working Face		Flare Station		Net Landfill Sources (Working Face & Flare Station)		
Map Location	Receptor Location	Measured LAeq (A-weighted) (dBA) [1,2]	Background excluding calculated Landfill Contribution	Expansion - Worst Case Distance from Receptor (ft)	Calculated Noise Contribution at Receptor (dBA) [3]	Expansion - Worst Case Distance from Receptor (ft)	Calculated Noise Contribution at Receptor (dBA) [3]	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dBA) [3]	Estimated Worst-Case Total Ambient Noise Level at Receptor	Expansion - Worst Case Amount of Total Measured Noise Level Associated with Landfill Contribution at Receptor (dBA) [4,5]
A	Landfill Active Location (Landfill Open) [1,5]	72.8	NA	Source	Source	4.869	42.23	NA	NA	NA
A	Landfill Active Location (Landfill Closed) [1,5]	66.4	NA	Source	Source	4.869	42.23	NA	NA	NA
B	Landfill Flare Station (Landfill Open)	74.4	NA	4.869	43.51	Source	Source	NA	NA	NA
C	Flynn Street (Landfill Open) [1]	62.4	62.33	1.057	52.67	6.932	39.17	53.05	62.82	0.48
C	Flynn Street (Landfill Closed) [1]	60.9	60.86	NA	NA	6.932	39.17	39.17	60.89	0.03
D	E Switack Drive (Landfill Open) [1,5]	56.2	55.97	1.966	51.38	6.363	39.91	51.68	57.35	1.37
D	E Switack Drive (Landfill Closed) [1,5]	52.9	52.68	NA	NA	6.363	39.91	39.91	52.90	0.22
E	Sherwood Park (Landfill Open)	56	55.83	3.172	47.23	7.410	38.59	47.78	56.46	0.63
E	Sherwood Park (Landfill Closed)	51.5	51.27	NA	NA	7.410	38.59	38.59	51.50	0.23
F	School (Landfill Open)	61.7	61.63	6.050	41.87	4.622	42.69	45.20	61.73	0.10
F	School (Landfill Closed)	50.1	49.23	NA	NA	4.622	42.69	42.69	50.10	0.87
G	Hotel (Landfill Open)	61.4	61.35	4.000	45.00	6.778	39.36	46.05	61.48	0.13
G	Hotel (Landfill Closed)	55.7	55.60	NA	NA	6.778	39.36	39.36	55.70	0.10
H	Reservoir Trail (Landfill Open) [1]	55.5	54.15	1.043	56.89	5.821	40.68	58.99	58.81	4.66
H	Reservoir Trail (Landfill Closed) [1]	54.6	54.42	NA	NA	5.821	40.68	40.68	54.60	0.18

General Notes:
1. NA - Not Applicable
2. LAeq noise levels are logarithmic (dBA) values and cannot be added directly.
3. LAeq describes sound levels that vary over time, resulting in a single decibel value which takes into account the total sound energy over the period of time of interest.

Notes:
1. Excluded Pre & Post Ops Periods to provide LAeq (equivalent continuous noise level) during operations.
2. A-weighted decibels (dBA) are an expression of the relative loudness of sounds in air as perceived by the human ear.
3. Calculated noise contribution at receptor is noise level that would be present, only when attenuated by distance, without external blocking (e.g., sound barriers, topography, etc.) or the addition of other noise contributions (e.g., traffic, highways, other industry).
4. Comparing the Measured LAeq to the Total Calculated Noise Contribution at Receptor noise levels, the calculated is less than actual measured values, due to other, external noise sources (e.g., highways, other traffic, unrelated industry). If the landfill were not operating, the measured noise levels at the receptor locations only decrease by the value calculated in this column.
5. Two separate monitoring events were combined to obtain an average LAeq.

TABLE 5.1
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDNANCE TABLE IN RANGE: 20 HZ - 75 HZ

ARM Project 1A411

Map Location	Receptor Location	MEASURED (dB) 20HZ	25HZ	32HZ	40HZ	50HZ	63HZ	TOTAL (dB) Lmb 20-63 HZ	Current - Average of Total Measured Noise Level Attributed only to Receptor (dB)	Background Ambient Noise Contribution (dB)	Current - Difference from Receptor (%)	Expansion - Noise Level Increase from Receptor (%)	Current - Noise Contribution Contribution Receptor (dB)	Expansion - Additional Noise Contribution at Receptor (dB)	Current / Expansion Difference from Receptor (%)	Current / Expansion Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Lmb(20) Contribution at Receptor (dB)	Expansion - Total Calculated Lmb(20) Contribution at Receptor (dB)	Expansion - Noise Level Increase at Receptor (dB)
A	Landfill Active Location (Closed)[1,3]	52.5	50.2	50	51.6	51.7	57.6	70.2	n/a	n/a	Source	Source	Source	Source	4.959	29.3	n/a	n/a	n/a
A	Landfill Active Location (Closed)[1,4]	48.2	49	52.1	56.7	57.5	64.6	69.6	n/a	n/a	Source	Source	Source	Source	4.959	29.3	n/a	n/a	n/a
B	Landfill Pave Station (Landfill Open)[1,4]	39.2	39.8	49	54.2	50.4	52.2	57.7	n/a	n/a	4.959	4.959	40.9	40.9	Source	Source	n/a	n/a	n/a
C	Front Street (Landfill Open)[1,3]	50.3	50.8	51.3	52.5	53.4	55.5	69.6	0.0	50.4	9.959	1.497	39.9	50.2	9.932	22.5	39.9	50.2	50.8
C	Front Street (Landfill Open)[1,4]	55.9	54	49.6	53.1	52.8	55.8	61.7	0.0	61.7	9.959	n/a	n/a	n/a	9.932	22.5	22.5	22.9	61.7
D	E. Belfast Drive (Landfill Open)[1,3]	41.8	49.1	42.2	43.6	48.7	47.1	53.7	0.1	53.6	8.758	1.996	38.0	46.7	9.993	23.2	38.2	48.1	54.8
D	E. Belfast Drive (Landfill Open)[1,4]	47	49.8	41.3	47.1	48.1	47.1	53.6	0.0	53.6	n/a	n/a	n/a	n/a	9.993	23.2	23.2	23.2	53.6
E	Sherwood Park (Landfill Open)[1,3]	39.5	49.4	43.6	42.7	43.7	49.7	51.1	0.2	50.9	7.940	3.172	38.9	44.9	7.410	21.9	38.8	44.6	51.8
E	Sherwood Park (Landfill Open)[1,4]	37.1	54.5	53.9	50.5	52.4	51.7	51.9	0.0	51.8	n/a	n/a	n/a	n/a	7.410	21.9	21.9	21.9	51.8
F	School (Landfill Open)[1,3]	34.1	37.5	40.9	42.1	47.7	49.6	51.5	0.1	51.4	9.409	0.746	39.1	39.8	6.972	20.0	39.0	39.2	51.9
F	School (Landfill Open)[1,4]	54.7	53.9	46.7	50.6	54.3	50.1	51.6	0.0	51.6	n/a	n/a	n/a	n/a	6.972	20.0	20.0	20.0	51.6
G	Hotel (Landfill Open)[1,3]	41.8	43.9	47.5	47.9	48.7	52.4	58.2	0.0	58.2	8.167	6.099	39.4	42.4	9.779	22.7	39.0	42.4	58.4
G	Hotel (Landfill Open)[1,4]	56.7	54.1	48.4	50.9	53.7	51.0	51.0	0.0	51.0	n/a	n/a	n/a	n/a	9.779	22.7	22.7	22.7	51.0
H	Reservoir (Landfill Open)[1,3]	42.7	53.4	41.8	44.6	44.7	49.9	52.2	1.4	50.9	7.927	1.043	40.0	54.2	5.821	24.0	40.0	54.2	56.2
H	Reservoir (Landfill Open)[1,4]	41.5	41.6	47.1	41.9	42.4	44.2	50.1	0.0	50.1	n/a	n/a	n/a	n/a	5.821	24.0	24.0	24.0	50.1

Notes
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Tarasp
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 5.2
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 75 HZ - 150 HZ

ARM Project 1441

		MS ABUND O (dB)			TOTAL (dB)			Landfill Working Face				Landfill Flare Station		Landfill Active Area (Total Noise)		
Map Location	Receptor Location	80HZ	100HZ	125HZ	Lmax 80-125 HZ	Current - Amount of Total Structural Noise Level Associated with Current Conditions at Receptor (dB)	Background Including Landfill (dB)	Current - Distance from Receptor (ft)	Expansion - Vector from Operations Point Receptor (ft)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current (Expansion) Distance from Receptor (ft)	Current (Expansion) Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Noise Level at Receptor (dB)
A	Landfill Active Location (Down)[1,4]	95.9	95.4	89.8	75.7	NA	NA	Source	Source	Source	Source	4 999	30.5	NA	NA	NA
A	Landfill Active Location (Closed)[1,4]	96.6	96.2	93.2	69.9	NA	NA	Source	Source	Source	Source	4 999	30.5	NA	NA	NA
B	Landfill Flare Station (Landfill Open)[1,3]	90.1	97.6	93.9	67.7	NA	NA	4 999	4 999	41.4	41.4	Source	Source	NA	NA	NA
C	Farm Street (Landfill Open)[2,3]	99	94.8	94.5	80.0	0.1	98.9	9 499	1 957	40.4	50.9	9 932	27.4	40.5	50.9	50.4
C	Farm Street (Landfill Closed)[2,3]	98.3	95.1	93.4	80.4	0.0	80.4	9 499	NA	NA	NA	9 932	27.4	27.4	27.4	80.4
D	E. Spring Drive (Landfill Open)[1,3]	48.8	47.4	48.1	52.4	0.2	52.7	6 798	1 968	36.6	48.3	6 393	28.2	36.9	48.3	54.0
D	E. Spring Drive (Landfill Closed)[1,3]	47.5	48.1	48.2	51.1	0.0	51.1	NA	NA	NA	NA	6 393	28.2	28.2	28.2	51.1
E	Sharpnoot Park (Landfill Open)[1,3]	48	47.6	47.8	52.4	0.1	52.3	7 948	3 172	37.1	45.1	7 410	28.8	37.5	45.1	53.0
E	Sharpnoot Park (Landfill Closed)[1,3]	48.8	48	47	52.7	0.0	52.7	NA	NA	NA	NA	7 410	28.8	28.8	28.8	52.7
F	School (Landfill Open)[1,4]	47	48.1	47.7	51.8	0.1	51.8	9 479	6 992	36.6	38.5	4 872	30.9	36.8	38.5	51.8
F	School (Landfill Closed)[1,4]	46.7	46.7	50.2	52.3	0.0	52.3	NA	NA	NA	NA	4 872	30.9	30.9	30.9	52.3
G	Hotel (Landfill Open)[1,4]	52.6	50.8	50.2	58.1	0.0	58.0	8 167	4 998	35.9	42.6	6 770	27.6	36.5	43.0	58.3
G	Hotel (Landfill Closed)[1,4]	48.3	47.8	46.8	53.6	0.0	53.6	NA	NA	NA	NA	6 770	27.6	27.6	27.6	53.6
H	Reservoir (Landfill Open)[1,4]	44.7	42	40.4	47.9	11.2	36.3	2 527	1 043	47.1	54.9	9 871	28.8	47.2	54.9	54.8
H	Reservoir (Landfill Closed)[1,4]	43.9	41.8	40.2	47.9	0.1	48.0	NA	NA	NA	NA	9 871	28.8	28.9	28.9	47.9

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 5.3
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 150 HZ - 300 HZ

ARM Project 14411

		MEASURED (dB)			TOTAL (dB)												
Site Location	Receptor Location	160HZ	200HZ	250HZ	Leq 150-250 HZ	Current - Total Measured Noise Level Attributed to the Landfill Contribution at Receptor (dB)	Expansion - Total Measured Noise Level Attributed to the Landfill Contribution at Receptor (dB)	Current - Distance from Receptor (ft)	Expansion - Worst Case Distance from Receptor (ft)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current - Distance from Receptor (ft)	Expansion - Worst Case Distance from Receptor (ft)	Current - Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Noise Level at Receptor (dB)
A	Landfill Active Location (Open) [1, 4]	62.9	60.4	59.9	66.0	NA	NA	Source	Source	Source	Source	4 999	27.4	NA	NA	NA
A	Landfill Active Location (Closed) [1, 4]	58.1	54.9	54.9	60.0	NA	NA	Source	Source	Source	Source	4 999	27.4	NA	NA	NA
B	Landfill Pump Station (Landfill Open) [1, 4]	55	53.2	53.9	58.0	NA	NA	4 999	4 999	39.7	39.7	Source	Source	NA	NA	NA
C	Flynn Street (Landfill Open) [1, 3]	53.1	52.0	50.0	57.0	0.0	57.0	5 466	1 057	39.7	49.9	6 932	24.4	38.0	48.3	57.3
C	Flynn Street (Landfill Closed) [1, 3]	54.9	53.0	52.0	58.9	0.0	58.9	5 466	NA	NA	NA	6 932	24.4	24.4	24.4	58.9
D	E. Spruce Drive (Landfill Open) [1, 3]	46.6	42.6	41.6	48.3	0.2	48.1	6 796	1 000	33.8	44.6	6 393	26.1	34.4	44.6	48.7
D	E. Spruce Drive (Landfill Closed) [1, 3]	42.6	41.5	40.3	46.4	0.0	46.4	NA	NA	NA	NA	6 393	26.1	22.1	26.1	46.4
E	Sherwood Park (Landfill Open) [1, 3]	46.1	44.8	43.9	48.0	0.1	48.7	7 948	3 173	32.4	40.4	7 410	23.9	33.0	40.5	50.7
E	Sherwood Park (Landfill Closed) [1, 3]	44.2	42.7	41.0	47.7	0.0	47.7	NA	NA	NA	NA	7 410	23.9	23.9	23.9	47.7
F	School (Landfill Open) [1, 4]	43.8	42.9	44.1	48.4	0.1	48.2	9 493	6 050	30.9	34.8	4 622	27.8	32.7	32.7	49.5
F	School (Landfill Closed) [1, 4]	43.0	38.7	37.9	46.6	0.1	45.9	NA	NA	NA	NA	4 622	27.8	27.9	27.9	45.9
G	Motel (Landfill Open) [1, 4]	48.7	48.9	48.9	53.0	0.0	53.0	9 187	4 099	31.2	39.2	6 779	24.6	32.9	39.4	54.0
G	Motel (Landfill Closed) [1, 4]	49.2	44.3	42.7	48.9	0.0	48.8	NA	NA	NA	NA	6 779	24.6	24.6	24.6	48.8
H	Residence (Landfill Open) [1, 4]	40.3	41.6	44	47.1	1.6	45.2	2 527	1 043	42.4	50.1	8 621	25.9	42.9	50.1	51.3
H	Residence (Landfill Closed) [1, 4]	39.8	41.2	47.6	49.6	0.0	49.6	NA	NA	NA	NA	8 621	25.9	25.9	25.9	49.6

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 8.4
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE - RANGE: 300 HZ - 600 HZ

ARM Project 16411

		MEASURED (dB)					TOTAL (dB)			Landfill Working Face				Landfill Pump Noise		Street Lamp/Residential Lighting Noise		
Site Location	Receptor Location	315HZ	400HZ	500HZ	630HZ	800HZ	Leq 315-800 HZ	Current - Difference from Receptor (dB)	Background Ordinance Calculation at Receptor (dB)	Current - Difference from Receptor (dB)	Expansion - Direct Line of Sight to Source Receptor (dB)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current - Difference from Receptor (dB)	Current - Calculated Noise Contribution at Receptor (dB)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Direct Line of Sight - Calculated Noise Contribution at Receptor (dB)	Expansion - Direct Line of Sight - Calculated Noise Contribution at Receptor (dB)
A	Landfill Active Location (Open)[1,2]	56.2	56	56.9	55	55.1	59.4	NA	NA	Source	Source	Source	Source	4.999	36.9	NA	NA	NA
A	Landfill Active Location (Closed)[1,2]	56.5	55.5	52.8	53.1	53.5	59.1	NA	NA	Source	Source	Source	Source	4.999	36.9	NA	NA	NA
B	Landfill Gas Station (Landfill Open)[1,2]	61.4	60.5	64.3	63	58.7	66.8	NA	NA	4.999	4.999	37.1	37.1	Source	Source	NA	NA	NA
C	Farm Street (Landfill Open)[1,2]	48.8	50.5	53.4	52.1	54.9	59.3	0.0	56.4	3.499	1.007	38.1	49.3	6.002	33.9	36.1	49	56.1
C	Farm Street (Landfill Closed)[1,2]	51.5	51.8	53.8	52.8	52.5	59.1	0.0	56.3	3.499	NA	NA	NA	6.002	33.9	33.9	33.9	56.3
D	E Bunnell Drive (Landfill Open)[1,2]	42.8	41.5	43.2	42.1	44.4	49.8	0.0	49.5	6.799	1.998	34.3	49.8	6.002	34.3	37.3	49.8	49.8
D	E Bunnell Drive (Landfill Closed)[1,2]	39.5	40.9	42.5	42.9	43.9	49.1	0.1	48.8	NA	NA	NA	NA	6.002	34.3	34.3	34.3	48.8
E	Shenwood Park (Landfill Open)[1,2]	42.5	42.4	44.7	46.9	48.1	52.1	0.1	51.4	7.998	3.172	32.9	49.9	7.410	33.0	35.8	49	51.9
E	Shenwood Park (Landfill Closed)[1,2]	41.2	40.9	42.6	42.3	43	49.7	0.1	49.5	NA	NA	NA	NA	7.410	33.0	33.0	33.0	49.1
F	School (Landfill Open)[1,2]	44.3	44.7	46.9	49.5	50	53.7	0.1	51.8	9.496	6.000	31.6	50.2	8.502	31.7	36.1	50	51.1
F	School (Landfill Closed)[1,2]	39.9	39.5	40.5	39	38.3	46.8	0.1	44.9	NA	NA	NA	NA	8.502	31.7	31.7	31.7	45.9
G	Hotel (Landfill Open)[1,2]	47.3	48	50.3	50.7	53.2	57.4	0.0	57.4	9.197	4.000	31.6	49.0	9.779	33.7	39.8	49	57.4
G	Hotel (Landfill Closed)[1,2]	41.9	46	50.7	54	49.2	55.4	0.1	55.3	NA	NA	NA	NA	9.779	33.7	33.7	33.7	55.1
H	Reservoir (Landfill Open)[1,2]	46.7	46.3	47.5	47.1	46.4	54.1	0.0	53.7	2.517	1.000	52.8	53.8	6.817	36.1	43.9	54	54.1
H	Reservoir (Landfill Closed)[1,2]	44.8	46.2	49.1	49.8	47.4	53.2	0.1	53.2	NA	NA	NA	NA	6.817	36	36	36	53.2

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 6.5
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 800 HZ - 1200 HZ

ARM Project 14011

		MEASURED (dB)	TOTAL (dB)			Landfill Working Face				Landfill Plant Station		Total Current Calculated Landfill Contribution		
Map Location	Receptor Location	1k HZ	Leq 1000 HZ	Current - Amount of Total Measured Noise Level Attributed with Landfill Contribution at Receptor (dB)	Background Ambient Calculation (amount Over Ambient) (dB)	Current - Distance from Receptor (ft)	Expansion - Worst Case Location from Receptor (ft)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current - Expansion Distance from Receptor (ft)	Current / Expansion Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst-Case Total Ambient Noise Level at Receptor (dB)
A	Landfill Active Location (Open)[1, 4]	60.9	60.9	NA	NA	Source	Source	Source	Source	4 969	29.4	NA	NA	NA
A	Landfill Active Location (Closed)[1, 4]	59.1	59.1	NA	NA	Source	Source	Source	Source	4 969	29.0	NA	NA	NA
B	Landfill Pump Station (Landfill Open)[1, 4]	59	59.0	NA	NA	4 969	4 969	31.2	31.2	Source	Source	NA	NA	NA
C	Pyrm Street (Landfill Open)[1, 3]	54.2	54.2	0.0	54.2	5 469	1 957	30.7	40.8	6 932	27.9	31.1	40.8	54.2
C	Pyrm Street (Landfill Closed)[1, 3]	51	51.0	0.0	51.0	5 469	NA	NA	NA	6 932	27.9	27.9	27.9	51.0
D	2 Sawyers Drive (Landfill Open)[1, 3]	49.2	49.2	0.1	49.1	9 798	1 866	28.4	39.1	6 363	26.9	28.9	39.2	49.2
D	2 Sawyers Drive (Landfill Closed)[1, 3]	44.9	44.9	0.0	44.9	NA	NA	NA	NA	6 363	26.9	26.9	26.9	44.9
E	Sherwood Park (Landfill Open)[1, 3]	47.9	47.9	0.1	47.8	7 946	3 172	27.0	34.9	7 410	23.2	28.9	35.2	47.8
E	Sherwood Park (Landfill Closed)[1, 3]	43	43.0	0.0	43.0	NA	NA	NA	NA	7 410	23.2	23.2	23.2	43.0
F	School (Landfill Open)[1, 3]	47.7	47.7	0.1	47.6	9 485	6 050	26.4	29.3	4 622	27.3	28.8	31.4	47.7
F	School (Landfill Closed)[1, 3]	35.8	35.8	0.7	34.9	NA	NA	NA	NA	4 622	27.3	27.3	27.3	35.8
G	Hotel (Landfill Open)[1, 4]	54.2	54.2	0.0	54.2	9 187	4 009	25.7	32.7	6 770	24.0	27.0	33.7	54.2
G	Hotel (Landfill Closed)[1, 4]	46.9	46.9	0.0	46.9	NA	NA	NA	NA	6 770	24.0	24.0	24.0	46.9
H	Reservoir (Landfill Open)[1, 3]	47.8	47.8	0.4	47.2	2 527	1 043	36.0	44.6	9 871	20.3	37.2	44.8	47.8
H	Reservoir (Landfill Closed)[1, 3]	46.4	46.4	0.0	46.4	NA	NA	NA	NA	9 871	20.3	20.3	20.3	46.4

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

A R M G r o u p I n c .

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 5.8
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 1200 HZ - 2400 HZ

ARM Project 14411

		MEASURED (dB)			TOTAL (dB)			Landfill Working Face				Landfill Flare Station		[illegible]		
Sep Location	Receptor Location	1.25KHZ	1.6KHZ	2KHZ	Lat 1200-2000 HZ	Current - Actual or Total Measured Noise Level Associated with Landfill Contribution at Receptor (dB)	Background Including Contribution Landfill Contribution (dB)	Current - Distance from Receptor (ft)	Expansion - Worst Case Distance from Receptor (ft)	Current - Calculated Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current / Expansion Distance from Receptor (ft)	Revised / Expansion Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Noise Level at Receptor (dB)
A	Landfill Active Location (Open)[1,4]	61.9	61.9	59.6	65.6	NA	NA	Source	Source	Source	Source	4,600	34.0	NA	NA	NA
A	Landfill Active Location (Closed)[1,4]	55.6	57.5	53.4	60.0	NA	NA	Source	Source	Source	Source	4,600	34.0	NA	NA	NA
B	Landfill Flare Station (Landfill Open)[1,4]	58.9	61.7	62.3	66.2	NA	NA	4,600	4,600	36.6	36.6	Source	Source	NA	NA	NA
C	Flynn Street (Landfill Open)[1,4]	52.3	50.9	48.2	55.5	0.1	55.5	5,400	1,657	36.6	45.6	8,932	31.0	36.6	45.6	50.0
C	Flynn Street (Landfill Closed)[1,4]	46.7	47.5	45.8	52.3	0.0	52.2	5,400	NA	NA	NA	8,932	31.0	31.0	31.0	52.3
D	F Sherrick Drive (Landfill Open)[1,3]	44.2	42.0	39.2	47.0	0.3	46.7	6,750	1,000	33.6	44.3	8,383	31.7	35.8	44.5	46.8
D	F Sherrick Drive (Landfill Closed)[1,3]	43.3	41	39.1	46.1	0.2	45.9	NA	NA	NA	NA	8,383	31.7	31.7	31.7	46.1
E	Sherwood Park (Landfill Open)[1,3]	40.2	44.5	40.8	48.1	0.1	48.0	7,940	3,172	32.2	40.2	7,410	30.4	34.4	40.6	48.6
E	Sherwood Park (Landfill Closed)[1,3]	40.3	37.3	33.2	42.6	0.3	42.3	NA	NA	NA	NA	7,410	30.4	30.4	30.4	42.6
F	School (Landfill Open)[1,3]	46.7	48.1	43.6	50.1	0.2	49.9	8,465	6,050	30.7	34.6	4,822	34.9	36.0	37.8	50.2
F	School (Landfill Closed)[1,3]	34.7	34.1	37.3	40.4	1.3	39.1	NA	NA	NA	NA	4,822	34.9	34.9	34.9	40.4
G	Hotel (Landfill Open)[1,3]	52.4	50.2	47.7	55.3	0.0	55.2	8,167	4,099	31.0	36.0	6,779	31.1	34.1	35.6	55.3
G	Hotel (Landfill Closed)[1,3]	43.9	40.5	37.2	48.1	0.1	48.0	NA	NA	NA	NA	6,779	31.1	31.1	31.1	48.1
H	Reservoir (Landfill Open)[1,3]	45.7	45.1	40.4	48.1	1.1	47.0	2,527	1,043	42.2	48.9	5,821	32.5	42.9	49.0	52.1
H	Reservoir (Landfill Closed)[1,3]	44.8	44.1	39.2	48.1	0.1	48.0	NA	NA	NA	NA	5,821	32.5	32.5	32.5	48.1

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 5.7
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 2400 HZ - 4800 HZ

ARM Project 14411

		MEASURED (dB)			TOTAL (dB)			Landfill Working Face				Landfill Non-Noise		Landfill Working Face Total Noise Level		
Step Location	Receptor Location	2.5kHZ	3.2kHZ	4kHZ	Leq 2400-4000 HZ	Current / Adjacent or Total Measured Noise Level As calculated with Landfill Contribution at Receptor (dB)	Background excluding Landfill Contribution (dB)	Current - Distance to Noise Receptor (ft)	Expansion - Noise Distance from Receptor (ft)	Current / Distance Noise Contribution at Receptor (dB)	Expansion - Calculated Noise Contribution at Receptor (dB)	Current / Expansion Distance from Receptor (ft)	Current / Expansion Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Calculated Landfill Contribution at Receptor (dB)	Expansion - Worst Case Total Ambient Noise Level at Receptor (dB)
A	Landfill Active Location (Open)[1,4]	58.5	56.7	54.8	61.7	NA	NA	Source	Source	Source	Source	4,849	32.6	NA	NA	NA
A	Landfill Active Location (Closed)[1,4]	52.6	51	49.0	55.6	NA	NA	Source	Source	Source	Source	4,849	32.6	NA	NA	NA
B	Landfill Pump Station (Landfill Open)[1,4]	67	57.9	55.5	64.7	NA	NA	4,969	4,969	32.4	32.4	Source	Source	NA	NA	NA
C	Flynn Street (Landfill Open)[1,3]	44.7	41.2	38.0	47.0	8.2	46.7	6,486	1,657	31.4	41.9	6,832	29.5	34.2	42.0	48.0
C	Flynn Street (Landfill Closed)[1,3]	42.0	40.4	38.1	46.0	8.1	45.5	6,486	NA	NA	NA	6,832	29.5	28.8	42.0	46.0
D	E. Spruce Drive (Landfill Open)[1,3]	35.0	32.3	29.1	38.9	2.1	36.8	6,756	1,998	29.6	40.3	6,363	30.7	33.6	40.7	41.0
D	E. Spruce Drive (Landfill Closed)[1,3]	34.0	31.7	28.9	38.8	1.1	35.8	NA	NA	NA	NA	6,363	30.7	30.2	30.2	36.9
E	Sherwood Park (Landfill Open)[1,2]	37	33.8	32.6	39.7	0.9	38.7	7,646	3,172	28.1	38.1	7,410	29.9	32.4	38.8	40.6
E	Sherwood Park (Landfill Closed)[1,2]	28.1	26.4	24.4	31.8	3.1	28.7	NA	NA	NA	NA	7,410	29.9	28.8	28.7	31.5
F	School (Landfill Open)[1,4]	38.5	38.1	34.5	42.9	1.0	41.9	9,469	6,000	26.4	36.5	4,872	33.0	36.1	34.5	42.0
F	School (Landfill Closed)[1,4]	26.3	22.7	21.6	29.1	2.2	26.8	NA	NA	NA	NA	4,872	33.0	33.0	31.8	33.8
G	Hotel (Landfill Open)[1,4]	44.9	40.9	37.9	48.5	8.2	46.4	3,167	4,009	29.9	31.9	6,179	29.7	32.5	38.3	40.8
G	Hotel (Landfill Closed)[1,4]	36.0	33.7	30.3	38.8	0.8	37.8	NA	NA	NA	NA	6,179	29.7	29.7	29.7	36.5
H	Rosemyre (Landfill Open)[1,4]	34.0	30.3	27.3	36.7	3.7	33.0	2,927	1,043	30.1	46.8	5,821	31.0	36.1	46.9	46.1
H	Rosemyre (Landfill Closed)[1,4]	33.8	29.1	26.7	35.9	1.9	33.7	NA	NA	NA	NA	5,821	31.0	31.0	31.0	35.6

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located in the Borough of Throop
3 Receptor Located in a Residential Area
4 Receptor Located in a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 5.8
PREDICTED CORRESPONDING 1/3 OCTAVE NOISE ANALYSIS (CURRENT & EXPANSION) FOR DUNMORE ORDINANCE TABLE III RANGE: 4800+ HZ

ARM Project 14411

Map Location	Receptor Location	Min Adj Pt (Lwb)							TOTAL (dB)	Current - Amount of Total Mechanical Noise Level Added (dB)	Background Listening Condition (dB)	Current - Distance from Receptor (ft)	Expansion - Effect on Distance from Receptor (ft)	Current - Contribution to Receptor (dB)	Expansion Calculated Noise Contribution at Receptor (dB)	Current / Expansion Distance from Receptor (ft)	Current / Expansion Calculated Noise Contribution at Receptor (dB)	Current - Total Calculated Length Contribution at Receptor (dB)	Expansion - Total Calculated Length Contribution at Receptor (dB)	Expansion - Total Noise Level at Receptor (dB)
		5HZ	6.3HZ	8HZ	10HZ	12.5HZ	16HZ	20HZ	Log 6.3HZ-20.3HZ											
A	Landfill Active Location (Closed)[2,4]	42.9	46.7	44.4	38.3	34.9	30.2	26.8	54.6	n/a	n/a	Source	Source	Source	Source	4.8mb	29.9	n/a	n/a	n/a
A	Landfill Active Location (Closed)[2,4]	46.4	42.8	38.9	32.2	27.5	24 +	21.7	49.5	n/a	n/a	Source	Source	Source	Source	4.8mb	22.9	n/a	n/a	n/a
B	Landfill Pump Station (Landfill Closed)[2,3]	53.2	49.6	46.8	40.1	33.2	27.6	12.8	55.0	n/a	n/a	4.8mb	4.8mb	25.2	25.2	Source	Source	n/a	n/a	n/a
C	Fairview Street (Landfill Closed)[2,4]	38	32	28.7	21.9	18.1	15.0	13.0	38.1	0.4	28.2	5.6mb	1.8kf	34.2	34.6	6.6k2	30.9	28.8	34.6	38.1
C	Fairview Street (Landfill Closed)[2,4]	31.6	28.4	23.0	18.4	15.7	14	12.2	35.2	5.2	25.0	5.6mb	n/a	n/a	n/a	6.6k2	30.5	30.5	30.5	35.2
D	E. Swetzer Drive (Landfill Closed)[2,3]	25.8	24 +	17.7	14.3	10.7	9.8	6.8	27.7	1.2	24.5	6.7kb	1.8mb	22.4	23.1	6.3k2	31.3	34.9	33.1	35.9
D	E. Swetzer Drive (Landfill Closed)[2,3]	25.8	20.9	17.0	14.0	10.7	8.2	5.8	27.2	1.3	24.0	n/a	n/a	n/a	n/a	6.3k2	31.3	31.3	31.3	37.1
E	Stonewall Park (Landfill Closed)[2,3]	31.1	26.7	22.9	19.1	14.9	11.6	9.2	33.0	0.5	32.5	7.6mb	3.172	21.0	29.0	7.4k2	19.9	22.9	30.8	34.2
E	Stonewall Park (Landfill Closed)[2,3]	27.2	20.2	19	17.3	15.9	13.9	12.9	28.3	1.1	25.2	n/a	n/a	n/a	n/a	7.4k2	19.9	19.9	19.9	29.3
F	School (Landfill Closed)[2,4]	30.4	29.5	27.9	19.1	15.9	11.8	8.4	32.5	0.9	31.6	6.4mb	6.0mb	19.9	21.4	4.8k2	24.8	24.8	25.3	32.5
F	School (Landfill Closed)[2,4]	17.9	15	13	11.9	9.9	8.4	6.9	21.7	2.2	19.8	n/a	n/a	n/a	n/a	4.8k2	24.9	24.9	24.9	29.0
G	Hotel (Landfill Closed)[2,4]	36.9	31.7	29.0	22.1	18.3	12.9	8.7	37.6	0.2	37.4	9.1k7	-4.0mb	19.7	20.7	6.7k2	26.7	23.3	23.7	37.6
G	Hotel (Landfill Closed)[2,4]	27.4	24.7	22.9	20.9	17.4	14.9	12.1	30.5	0.9	30 +	n/a	n/a	n/a	n/a	6.7k2	26.7	20.7	20.7	30.9
H	Reservoir (Landfill Closed)[2,4]	34.9	21.5	19.5	19.5	17.3	8.9	6.1	37.2	2.1	25.2	2.5k7	1.0mb	30.9	30.9	5.6k1	22.9	31.9	30.9	36.2
H	Reservoir (Landfill Closed)[2,4]	23.9	21.1	19.2	16.4	17.2	9.7	8	29.7	1.9	24.9	n/a	n/a	n/a	n/a	5.6k1	22.9	22.9	22.9	29.7

Notes:
1 Receptor Located in the Borough of Dunmore
2 Receptor Located on the Borough of Throop
3 Receptor Located on a Residential Area
4 Receptor Located on a Non-Residential Area

KEYSTONE SANITARY LANDFILL
THROOP AND DUNMORE BOROUGHS, LACKAWANNA COUNTY, PA

TABLE 6
PREDICTED (WITH EXPANSION) TOTAL CALCULATED CORRESPONDING 1/3 OCTAVE NOISE LEVEL COMPLIANCE ANALYSIS (DUNMORE ORDINANCE 8.438 NOISE)

ARM Project 144

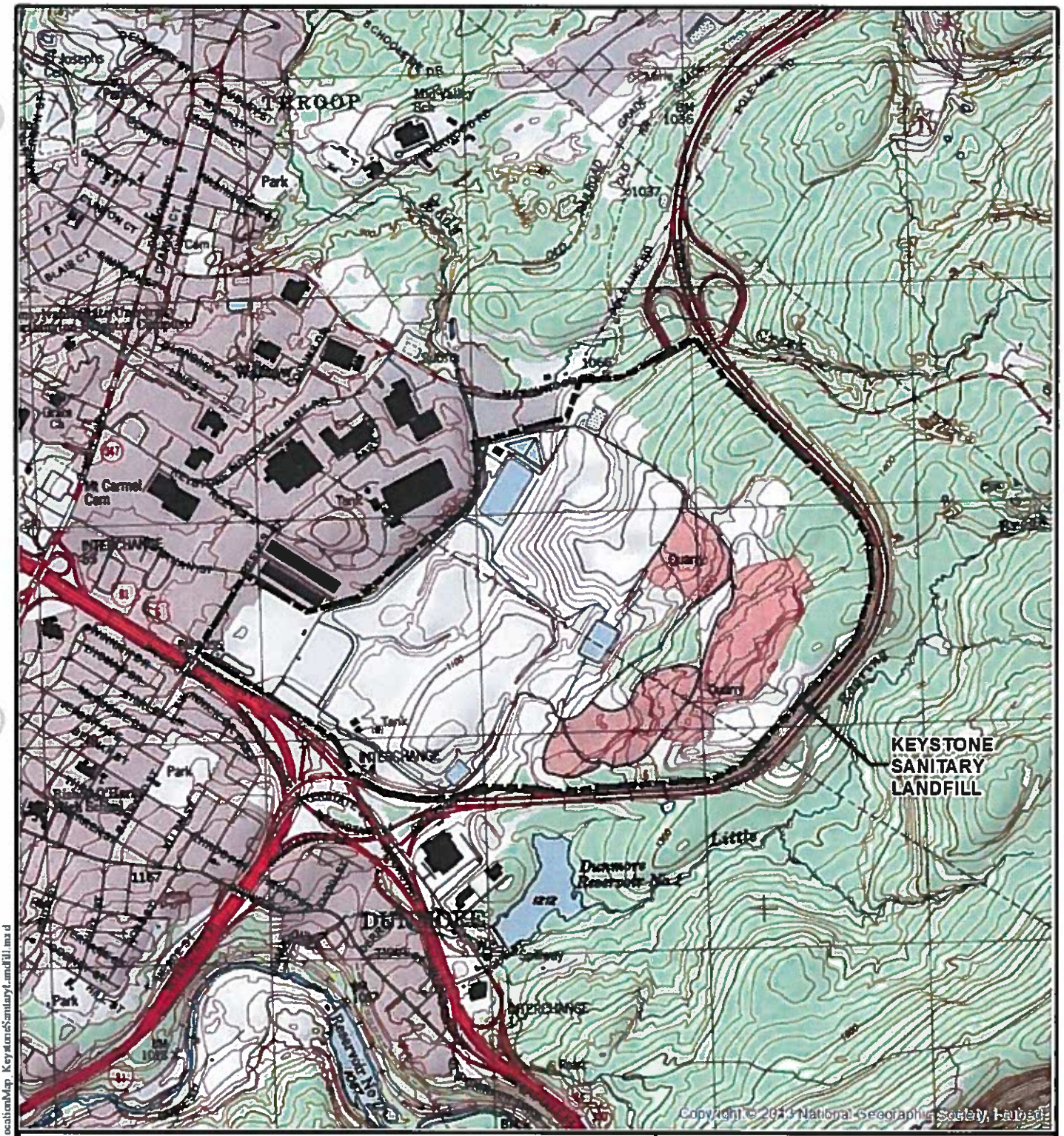
Map Location	Receptor Location[1]	Ordinance Range 20 - 75 Hz (Corresponding 1/3 Octave Range 20 - 80 Hz)		Ordinance Range 75 - 150 Hz (Corresponding 1/3 Octave Range 80 - 160 Hz)		Ordinance Range 150 - 300 Hz (Corresponding 1/3 Octave Range 160 - 315 Hz)		Ordinance Range 300 - 600 Hz (Corresponding 1/3 Octave Range 315 - 630 Hz)		Ordinance Range 600 - 1200 Hz (Corresponding 1/3 Octave Range 630 Hz)		Ordinance Range 1200 - 2400 Hz (Corresponding 1/3 Octave Range 1250 - 2500 Hz)		Ordinance Range 2400 - 4800 Hz (Corresponding 1/3 Octave Range 2500 - 5000 Hz)		Ordinance Range 4800 + Hz (Corresponding 1/3 Octave Range 5000 - 20000 Hz)	
		Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]	Expansion - Worst Case Total Calculated Leq(dB) Contribution at Receptor (dB)	Ordinance Limit (dB) With Correction Factors[4]
C	Flynn Street (Landfill Open)[2]	50.7	87[5]	56.6	82[5]	48.1	74[5]	46.7	67[5]	46.7	61[5]	40.0	55[5]	42.0	49[5]	34.8	47[5]
C	Flynn Street (Landfill Closed)[2]	72.5	87[5]	77.4	82[5]	74.4	74[5]	72.6	67[5]	72.8	61[5]	71.0	55[5]	70.5	49[5]	70.9	47[5]
D	E Bennett Drive (Landfill Open)[2]	48.9	87[5]	49.3	82[5]	44.9	74[5]	46.4	67[5]	39.2	61[5]	44.0	55[5]	40.7	49[5]	33.4	47[5]
D	E Bennett Drive (Landfill Closed)[2]	73.2	87[5]	79.7	82[5]	75.1	74[5]	74.3	67[5]	74.9	61[5]	71.7	55[5]	69.2	49[5]	71.3	47[5]
E	Sherwood Park (Landfill Open)[2]	44.0	87[5]	46.7	82[5]	46.6	74[5]	41.9	67[5]	39.2	61[5]	40.0	55[5]	39.0	49[5]	29.5	47[5]
E	Sherwood Park (Landfill Closed)[2]	71.0	87[5]	70.0	82[5]	73.0	74[5]	73.0	67[5]	73.2	61[5]	70.0	55[5]	70.0	49[5]	70.0	47[5]
F	School (Landfill Open)[2]	38.7	84[4]	40.1	79[4]	35.0	71[4]	38.3	64[4]	31.4	58[4]	37.5	52[4]	34.0	46[4]	28.7	44[4]
F	School (Landfill Closed)[2]	70.0	84[4]	70.0	79[4]	77.0	71[4]	37.4	64[4]	37.3	58[4]	34.5	52[4]	33.0	46[4]	24.0	44[4]
G	Hotel (Landfill Open)[2]	42.4	84[4]	43.0	99[4]	38.4	81[4]	39.6	74[4]	33.2	68[4]	38.0	62[4]	35.3	56[4]	27.7	54[4]
G	Hotel (Landfill Closed)[2]	72.7	84[4]	77.0	99[4]	74.0	81[4]	33.7	74[4]	34.0	68[4]	31.1	62[4]	29.1	56[4]	20.7	54[4]
H	Reservoir (Landfill Open)[2]	54.2	84[4]	54.0	99[4]	50.1	81[4]	48.0	74[4]	44.0	68[4]	48.0	62[4]	46.0	56[4]	38.7	54[4]
H	Reservoir (Landfill Closed)[2]	74.0	84[4]	79.0	99[4]	79.0	81[4]	38.1	74[4]	39.3	68[4]	32.5	62[4]	31.0	56[4]	27.0	54[4]

Notes
1 Residential Ordinance Applies
2 Non-Residential Ordinance Applies
3 Receptor located in the Borough of Throop
4 A correction factor of 5 was applied to the Dunmore Borough Ordinance Table III ordinance limit per Table IV correction numbers 4 and 5
5 A correction factor of 10 was applied to the Dunmore Borough Ordinance Table III ordinance limit per Table IV correction numbers 1 and 5
6 A summary of the correction factors in Notes 4 and 5, with reference to the Dunmore Borough Ordinance limits presented below

Calculating Factor Applied per Dunmore Ordinance Table IV	Correction Factor
1 Daytime Overnight Only	5
4 Noise of periodic character hum, screech, etc	-5
5 Property located in an M District a red within 500 feet measured horizontally or vertically of any "R" district	10

Ordinance Limitations & Map Limits		
20 - 75 Hz	72	76
75-150 Hz	67	74
150-300 Hz	58	68
300-600 Hz	52	60
600-1200 Hz	46	53
1200-2400 Hz	40	47
2400-4800 Hz	34	41
4800 + Hz	32	38

FIGURES



REF: Base map from ESRI USA Topo Maps. Refer to USGS 7.5 minute Quad Olyphant, PA.

LEGEND

KEYSTONE SANITARY LANDFILL

0 2,000 4,000 6,000

SCALE IN FEET

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Site Location Map

Keystone Sanitary Landfill
Dunmore and Throop Boroughs,
Lackawanna County, Pennsylvania

January 2016	Scale: 1" = 2,000'	14411

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

Figure 1

I:\DeNaples\14411 Keystone Landfill\GIS\Figure1 SiteLocationMap_KeystoneSanitaryLandfill.mxd

Sheet
1
NOISE MONITORING LOCATIONS
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APPENDIX A

ARTICLE 6

PERFORMANCE STANDARDS

6.430 Noise

At the points of measurement specified in Section 6.320, the maximum sound pressure level radiated in each standard octave band by any use or facility (other than transportation facilities or temporary construction work) shall not exceed the values for octave bands lying within the several frequency limits given in Table III after applying the corrections shown in Table IV. The sound pressure level shall be measured with a Sound Level Meter and associated Octave Band Analyzer conforming to standards prescribed by the American Standards Association.

(American Standard Sound Level Meters for Measurement of Noise and Other Sounds, Z24.3-1944, American Standards Association, Inc., New York, N.Y., and American Standard Specification for an Octave-Band Filter Set for the Analysis of Noise and Other Sounds Z24.10-1953, or latest approved revision thereof, American Standards Associated, Inc., New York, N.Y., shall be used.)

TABLE III

Octave Band Frequency (Hz) >	≤	Residential District (Decibels)	Non-Residential (Decibels)
20	75	72	79
75	150	67	74
150	300	59	66
300	800	52	59
800	1200	46	53
1200	2400	40	47
2400	4800	34	41
4800	-	32	39

If the noise is not smooth and continuous and is not radiated between the hours of 10 P.M. and 7 A.M. one or more of the corrections in Table IV shall be applied to the octave band levels given in Table III.

TABLE IV

Type or Location of Operations or Character of Noise	Correction in Decibels
1. Daytime operation only	5
2. Noise source operates less than*	
a. 20% of any one-hour period	5
b. 5% of any one-hour period	10
3. Noise of impulsive character, hammering, etc.	-5
4. Noise of periodic character, hum, screech, etc..	-5
5. Property is located in an "M" District and is not within 500 feet measured horizontally or vertically of any R District	10

* Apply one of these corrections only.

507 Linden Street, Suite 200 | Scranton, PA 18501 | p 570.342.3101 | f 570.342.3940 | www.labellapc.com

Harms:

6. Vectors/Birds

C6 **Vectors/Birds: (E)** The potential for attraction of vectors and birds is a known potential harm of a landfill operation. Public comments indicate that there is a concern about birds that visit the landfill contaminating the Dunmore No. 1 reservoir.

Proposed mitigation: KSL's vector controls include: compact and cover waste daily; limit the acceptance of wastewater sludge to certain times to limit attraction of insects; limit size of working face; maintain a compact working face to disrupt congregation of birds; use of decoys or noisemakers to limit attraction of birds; and retaining outside vector control professionals as needed. KSL indicates that they will utilize daily monitoring to determine if their current mitigation measures are adequate or if KSL needs to employ additional vector controls.

DEP review: DEP has observed populations of birds frequenting the landfill. In addition to gulls, DEP has received comment about black birds and turkey vultures also frequenting the landfill. DEP is aware that KSL has consulted with an outside professional regarding this issue and should provide more information.

PA American Water tests the Dunmore No. 1 reservoir periodically for the bacterial contaminants that would likely be caused by bird or other feces in the reservoir, PA American Water has not seen any results with the quality of the water in the Dunmore No. 1 reservoir that would suggest that there is a contamination problem.

C6 **Vectors and Birds Response Narrative**

On January 12, 2015 KSL executed an agreement with the U.S. Department of Agriculture (USDA), APHS Wildlife Services, PA that includes the below listed scope of work:

- **Design and implement a base line survey to determine the population estimates of gulls and other species of wildlife at the KSL site and adjacent water bodies and monitor the efficiency of various control management programs.**
- **Conduct non-lethal harassment of gulls and other wildlife. Types of non-lethal harassment include pyrotechnic cartridges, paintball markers, laser, remote control vehicles and propane canons.**
- **Conduct limited lethal control when gulls display habituation to non lethal harassment.**
- **Provide monthly summary of all work activities, attend meeting with KSL staff to discuss the efficiency of the integrated wildlife damage management plan.**
- **Plan assistance, regarding wildlife conflicts and management issues to residents of communities surrounding KSL.**

Copies of the USDA/KSL Agreement and the USDA Reports to date are contained in Exhibit C6.1.

Gulls and other bird species are attracted to a MSW disposal area, during the daylight hours between October and March because it is a source of food and water.

Passive Habitat Management measures are focused on eliminating one or more of the gulls, and other birds, survival requirements i.e.

a. Feeding/water source
b. Nighttime roosting areas
c. Nesting areas
d. Loafing areas

Daily activities performed by KSL, such as minimization of the working face surface area and daily cover also contribute to detour the wildlife population. Because gulls prefer large open areas with closely cut vegetation, vegetated areas are limited to grow to a height of 10 inches. Vegetation cuttings are to be performed in the late spring.

Please note that KSL has never received a notice from the Federal Aviation Administration or PennDOT Bureau of Aviation during its last 25 years of operation, of a bird or wildlife incident with air traffic departures or arrivals at the Scranton Wilkes Barre International Airport.

KSL will continue to contract with the USDA and perform their Habitat Management Program for the duration of the site life of Phase III Site Development. This action serves to mitigate the perceived harm and potential harms to the environment and public from vectors and birds.

EXHIBIT C6.1

USDA/KEYSTONE AGREEMENT AND

THE USDA REPORTS

USDA

In States
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.gri ure

.nimal and
'lant Health
ıspection
ervice

Vildlife Services
311 Airport Road
.llentown, PA
8109

'hone:
10-231-3134

:mail:
:arey.A.Furlo@
.phis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Dr.
Dunmore, PA 18512

January 7, 2015

Dear Mr. Eiden:

It was a pleasure meeting with you yesterday to discuss the current issue Keystone Sanitary Landfill, Inc. (KSLCO) is experiencing with gulls. As discussed during the meeting, KSLCO should consider the development and implementation of an integrated wildlife damage management plan (IWDMP) to address long-term management of gulls on and off of the landfill. IWDMP's in general contain the following management actions; the modification of existing attractants and habitat management to the greatest extent possible, behavioral modification (harassment), and population management (lethal removal). Because of the nature of your business, complete removal of attractants is not possible or desirable; however some actions could be implemented. As a result, other management actions are relied upon to assist with management of the issue. In this case, KSLCO should implement behavioral modification to the greatest extent possible, with the use of lethal removal to reinforce that harassment as needed.

In addition to the implementation of the above mentioned management actions, wildlife surveys could be implemented to determine baseline numbers of gulls and other wildlife using KSLCO and the surrounding area. The surveys may also be used to monitor the efficacy of chosen management actions and, in some instances, used to justify the use of lethal removal if or when it is needed. They may also be used to validate, or invalidate, claims made against the landfill from surrounding communities regarding wildlife conflicts in those areas. Although your problem with gulls in concentrated around the months of October through March, these surveys should be conducted for at least one consecutive year to determine the baseline estimates of abundance for all wildlife at KSLCO. They could be continued after the initial year to provide the same benefits as described above. Surveys could target current problems areas in the surrounding community, and could also monitor other habitats highly attractive to gulls (large reservoirs) in the area. If implemented, surveys would only be conducted in those locations with the approval of your office and the property owner/manager.

As a result of our discussions, you requested estimates for services as described above. Cost breakdowns are included in the attached pages for each estimate. All estimates include surveys that would be conducted for at least one full year.

Estimate one includes one wildlife technician for year round coverage (40 hours per week) to implement management actions that would address issues with the gulls, or other wildlife if requested, conduct surveys, provide routine reports, and provide

assistance dealing with complaints or inquiries from the surrounding community regarding wildlife conflicts.

Estimate two includes one wildlife technician for daily coverage (40 hours per week) up to six months (October through March) to implement management actions that would address issues with the gulls, or other wildlife if requested, conduct surveys, provide routine reports, and provide assistance dealing with complaints or inquiries from the surrounding community regarding wildlife conflicts. Wildlife Surveys would continue outside of the primary timeframe.

Estimate three includes one wildlife technician for coverage up to six months (October through March) on up to three days per week (24 hours per week) to implement management actions that would address issues with the gulls, or other wildlife if requested, conduct surveys, provide routine reports, and provide assistance dealing with complaints or inquiries from the surrounding community regarding wildlife conflicts. Wildlife surveys would continue outside of the primary timeframe.

Services provided in the above estimates differ only in the amount of time a wildlife technician would be available to KSLCO to conduct management activities. Based upon observations conducted during my visit, estimate three represents the minimum amount of service that could be provided to work towards management of the gulls at KSLCO.

Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA

Estimate One

Line Item	CSA Amount
Personnel	$ 72,218.75
Vehicle Use	$ 4,200.00
Supplies/Equipment	$ 5,615.00
Lodging & Per Diem	$ 0.00
Sub Total	**$ 82,033.75**
Pooled Job Costs	$ 9,023.71
Indirect Costs	$ 13,248.45
Total	**$104,305.91**

Estimate Two

Line Item	CSA Amount
Personnel	$ 43,344.87
Vehicle Use	$ 2,520.00
Supplies/Equipment	$ 4,615.00
Lodging & Per Diem	$ 0.00
Sub Total	**$ 50,479.87**
Pooled Job Costs	$ 5,552.79
Indirect Costs	$ 8,152.50
Total	**$64,185.16**

Estimate Three

Line Item	CSA Amount
Personnel	$ 29,287.08
Vehicle Use	$ 1,680.00
Supplies/Equipment	$ 4,615.00
Lodging & Per Diem	$ 0.00
Sub Total	**$ 35,582.08**
Pooled Job Costs	$ 3,914.03
Indirect Costs	$ 5,746.51
Total	**$ 45,242.61**

Agreement No:
Accounting Code:
WBS:

COOPERATIVE SERVICE AGREEMENT
between
KEYSTONE SANITARY LANDFILL, INC. (KSLI)
and
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)
WILDLIFE SERVICES (WS)

ARTICLE 1

The purpose of this Cooperative Service Agreement is to cooperate in a wildlife damage management project, as described in the attached Work Plan.

ARTICLE 2

APHIS WS has statutory authority under the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C.426-426b) as amended, and the Act of December 22, 1987 (101Stat. 1329-331, 7 U.S.C. 426c), to cooperate with States, local jurisdictions, individuals, public and private agencies, organizations, and institutions while conducting a program of wildlife services involving mammal and bird species that are reservoirs for zoonotic diseases, or animal species that are injurious and/or a nuisance to, among other things, agriculture, horticulture, forestry, animal husbandry, wildlife, and human health and safety.

ARTICLE 3

APHIS WS and KSLI mutually agree:

1. The parties' authorized representatives who shall be responsible for carrying out the provisions of this Agreement shall be:

   KSLI: Dan O'Brien, Business Manager
   249 Dunham Dr.
   Dunmore, PA 18512

   APHIS WS: Harris Glass, State Director
   USDA, APHIS, WS
   PO Box 60827
   Harrisburg, PA 17106-0827

2. To meet as determined necessary by either party to discuss mutual program interests, accomplishments, needs, technology, and procedures to maintain or amend the Work Plan (Attachment A). Personnel authorized to attend meetings under this Agreement shall be Dan O'Brien or his/her designee, the State Director

or his/her designee, and/or those additional persons authorized and approved by the Dan O'Brien and the State Director.

3. APHIS WS shall perform services more fully set forth in the Work Plan, which is attached hereto and made a part hereof. The parties may mutually agree in writing, at any time during the term of this Agreement, to amend, modify, add or delete services from the Work Plan.

ARTICLE 4

KSLI agrees:

1. To authorize APHIS WS to conduct direct control activities to reduce human health and safety risks and property damage associated with mutually agreed upon wildlife species. These activities are defined in the Work Plan. APHIS WS will be considered an invitee on the lands controlled by KSLI. KSLI will be required to exercise reasonable care to warn APHIS WS as to dangerous conditions or activities in the project areas.

2. To reimburse APHIS WS for costs of services provided under this Agreement up to but not exceeding the amount specified in the Financial Plan (Attachment B). KSLI will begin processing for payment invoices submitted by APHIS WS within 30 days of receipt. The KSLI ensures and certifies that it is not currently debarred or suspended and is free of delinquent Federal debt.

3. To designate to APHIS WS the KSLI authorized individual whose responsibility shall be the coordination and administration of activities conducted pursuant to this Agreement.

4. To notify APHIS WS verbally or in writing as far in advance as practical of the date and time of any proposed meeting related to the program.

5. APHIS WS shall be responsible for administration and supervision of the program.

6. There will be no equipment with a procurement price of $5,000 or more per unit purchased directly with funds from the cooperator for use solely on this project. All other equipment purchased for the program is and will remain the property of APHIS WS.

7. To coordinate with APHIS WS before responding to all media requests.

8. To obtain the appropriate permits for removal activities for species to be determined and list USDA, APHIS, Wildlife Services as subpermitees.

9. To provide an indoor working space to complete necessary paperwork if requested.

ARTICLE 5

APHIS WS Agrees:

1. To conduct activities at KSLI as described in the Work and Financial Plans.

2. Designate to KSLI the authorized APHIS WS individual who shall be responsible for the joint administration of the activities conducted pursuant to this Agreement.

3. To bill KSLI for actual costs incurred by APHIS WS during the performance of services agreed upon and specified in the Work Plan. APHIS WS shall keep records and receipts of all reimbursable expenditures hereunder for a period of not less than one year from the date of completion of the services provided under this Agreement and KSLI shall have the right to inspect and audit such records.

4. To coordinate with KSLI before responding to all media requests.

ARTICLE 6

This Agreement is contingent upon the passage by Congress of an appropriation from which expenditures may be legally met and shall not obligate APHIS WS upon failure of Congress to so appropriate. This Agreement may also be reduced or terminated if Congress only provides APHIS WS funds for a finite period under a Continuing Resolution.

ARTICLE 7

APHIS WS assumes no liability for any actions or activities conducted under this Cooperative Service Agreement except to the extent that recourse or remedies are provided by Congress under the Federal Tort Claims Act (28 U.S.C. 1346(b), 2401(b), and 2671-2680).

ARTICLE 8

Pursuant to Section 22, Title 41, United States Code, no member of or delegate to Congress shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom.

ARTICLE 9

Nothing in this Agreement shall prevent APHIS WS from entering into separate agreements with any other organization or individual for the purpose of providing wildlife damage management services exclusive of those provided for under this agreement.

ARTICLE 10

KSLI certifies that APHIS WS has advised the KSLI that there may be private sector service providers available to provide wildlife management services that the KSLI is seeking from APHIS WS.

ARTICLE 11

The performance of wildlife damage management actions by APHIS WS under this agreement is contingent upon a determination by APHIS WS that such actions are in compliance with the National Environmental Policy Act, Endangered Species Act, and any other applicable environmental statutes. APHIS WS will not make a final decision to conduct requested wildlife damage management actions until it has made the determination of such compliance.

ARTICLE 12

This Cooperative Service Agreement may be amended at any time by mutual agreement of the parties in writing. Also, this Agreement may be terminated at any time by mutual agreement of the parties in writing, or by one party provided that party notifies the other in writing at least 120 days prior to effecting such action. Further, in the event the KSLI does not provide necessary funds, APHIS WS is relieved of the obligation to provide services under this agreement.

In accordance with the Debt Collection Improvement Act of 1996, the Department of Treasury requires a **Taxpayer Identification Number** for individuals or businesses conducting business with the agency.

KSLI Taxpayer Identification Number (TIN) 23-2632846

KEYSTONE SANITARY LANDFILL, INC.

BY: Dan O'Brien _____ January 12, 2015
Dan O'Brien, Business Manager — Date
249 Dunham Drive
Dunmore, PA 18512

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

BY: _____ _____
Harris Glass, State Director — Date
USDA, APHIS, WS
PO Box 60827
Harrisburg, PA 17106-0827

BY: _____ _____
Charles S. Brown — Date
Director, Eastern Region
USDA, APHIS, WS
920 Main Campus Drive; Suite 200
Raleigh, NC 27606

ATTACHMENT A
WORK PLAN

Introduction

The U.S. Department of Agriculture (USDA) is authorized to protect American agriculture and other resources from damage associated with wildlife. The primary authority for APHIS WS is the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C.426-426b) as amended, and the Act of December 22, 1987 (101Stat. 1329-331, 7 U.S.C. 426c). Wildlife Services activities are conducted in cooperation with other Federal, State and local agencies; private organizations and individuals.

The APHIS WS program uses an Integrated Wildlife Damage Management (IWDM) approach (sometimes referred to as IPM or "Integrated Pest Management") in which a series of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1, 1-7 of the Animal Damage Control Program Final Environmental Impact Statement (USDA, 1994). These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. However, controlling wildlife damage may require that the offending animal(s) are killed or that the populations of the offending species be reduced.

Purpose: Assist KSLI with the implementation of an integrated wildlife damage management plan focused on several species of gulls to alleviate damage and associated risks as a result of their current abundance on the landfill.

Location

Dunmore, Dunmore Borough, Lackawanna County, PA

Location type (circle): Rural or Urban

Planned APHIS WS Activities

The goal of APHIS WS is to manage the damage caused by wildlife by implementing integrated wildlife damage management programs. APHIS WS professionals will conduct an integrated wildlife damage management program to reduce and prevent damages caused by gull species, and/or other species if requested.

1. APHIS WS will design and implement a survey to determine baseline population estimates of gulls and other species of wildlife on and around the landfill, and to monitor the efficacy of chosen management actions. Surveys will be conducted at a rate of two surveys per month. One survey consists of morning, afternoon, and evening survey periods. At the request of KSLI, APHIS WS will determine suitable areas outside of the landfill to conduct surveys to determine potential relationship/interactions with wildlife utilizing the landfill and surrounding areas. Surveys will commence as soon as practical

after initiation of this agreement and will continue for one consecutive year after the start date. A detailed report will be provided after completion of all surveys.

2. APHIS WS will conduct non-lethal harassment of gulls as soon as practical after execution of this agreement. Harassment will primarily be conducted through the use of pyrotechnic cartridges designed specifically for bird harassment. Other methods including paintball markers, laser, remote controlled vehicle, and propane canons may also be used depending on the response to initial harassment with pyrotechnics. Harassment will be focused on several gull species utilizing the landfill, but most harassment methods employed will also affect the behavior and presence of other wildlife species on and around the landfill. Those species include any birds and potentially large mammals. Activities as defined above will conclude on March 31, 2015, and commence again on October 1, 2015, and will continue up to December 31, 2015.

3. APHIS WS will conduct limited lethal control when gulls display habituation to non-lethal harassment. Lethal control will be limited to targeted gull species unless the landfill formally requests assistance with other species. Lethal control will be conducted in a safe manner with use of air rifles, small caliber rifles, shotgun, and/or through the use of trapping (air or canon nets). APHIS WS staff responsible for implementing lethal control will follow all guidance and directives from APHIS WS, and will have completed firearms safety training and demonstrated their ability to use firearms safely in the work setting. APHIS WS will make the final determination on the safety of shooting when on site. Activities as defined above will conclude on March 31, 2015, and commence again on October 1, 2015, and will continue up to December 31, 2015.

4. APHIS WS will provide summary reports of all work activities as requested by KSLI. APHIS WS will partake in scheduled meetings to discuss the efficacy of the integrated wildlife damage management plan, and will prepare information to be presented in public meetings if requested. APHIS WS requests to be notified of any meeting dates with KSLI, or the public, as far in advance as possible to have sufficient time to summarize work activities and prepare materials or presentations.

5. APHIS WS will provide recommendations regarding habitat management or modifications as needed during the covered period to assist with reduction of conflicts with gull species on or off the landfill. APHIS WS will also be available to provide technical assistance at the request of KSLI regarding gull species, or any other wildlife species, at any time.

6. APHIS WS will provide assistance with other wildlife species if requested by KSLI.

7. APHIS WS will provide assistance, regarding wildlife conflicts and management issues, to the residents of townships and boroughs surrounding KSLI, when requested by KSLI management.

8. APHIS WS will complete all necessary training required by KSLI in advance of conducting work activities, and abide by safety requirements/protocols as appropriate.

Effective Dates

The Cooperative Service Agreement shall commence on January26, 2015 and shall expire on December 31, 2015 or when funding expires.

ATTACHMENT B
FINANCIAL PLAN

Personnel Costs	$29,287.07
Travel	$0.00
Vehicle Fuel and Maintenance	$1,680.00
Supplies & Equipment	$4,615.00
Subtotal (Direct Costs)	$35,582.07
Pooled Job Costs	$3,914.03
Indirect Costs	$5,746.51
TOTAL	$45,242.61

The distribution of the budget from this Financial Plan may vary as necessary to accomplish the purpose of this agreement, but may not exceed $45,242.61.

Beginning October 1, 2012 USDA APHIS WS implemented a new financial management system. This system will automatically process and forward invoices to the cooperator for payment. The cooperator will have 2 options for billing frequency: monthly or quarterly. Please CIRCLE your desired billing option below:

MONTHLY BILLING **QUARTERLY BILLING**

Please note that invoices will be processed at the above selected frequency and will include all expenses that have posted to the system at that time. It is possible that these invoices may vary significantly depending upon what expenses are listed when the invoice is processed.

Financial Point of Contact

KSLI: Dan O'Brien — 570-343-5782
Business Manager — Phone

APHIS WS: Daisy Marrero — 717-236-9451
Budget Analyst — Phone

United States
Department of
Agriculture

Animal and
Plant Health
Inspection
Service

Wildlife Services
3311 Airport Road
Allentown, PA
18109

Phone:
610-231-3134

Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

April 9, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) from initiation of the Cooperative Service Agreement through the end of March 2015.

As a result of our initial meetings in January 2015, your office requested a Cooperative Service Agreement (CSA) with WS for the purposes of conducting gull damage management activities on the landfill, and also requested that WS initiate a one year study of the landfill and the surrounding area to monitor the gull activity, and track efficacy of the harassment program.

WS met with your office in January to look at chosen survey locations, and further discuss wildlife damage management options. Survey points were adjusted to account for obstructions on the ground from initial points. Survey points on the landfill were finalized after that meeting. The same points will be used for a one year study that is scheduled to commence during April 2015. Throughout February and March 2015, WS met with several property owners surrounding the landfill. All properties contacted had bodies of water on them. Contact was made with Pennsylvania American Water, Moosic Lakes Club, and Clayton Park Recreational Area to discuss the possibility of including their properties on the surveys of the area surrounding the landfill. All of the contacted property managers/owners agreed to allow WS to conduct surveys and subsequently signed a WS Form 12A to formally agree to those surveys. The last WS Form 12A was received on April 5, 2015. Surveys are scheduled to commence during April 2015 and will continue through March of 2016.

Initial plans included the commencement of harassment activities during February 2015. The gulls vacated the area during February and did not return until mid-March 2015. WS initiated harassment of the gulls during March 2015. While on site, WS recorded the number of gull species harassed, as well as other species affected by the harassment events. WS was on site for 22.5 hours, discharged 65 pyrotechnics to harass 390 ring-billed gulls, 80 American crows, 1,400 European starlings, and 15 turkey vultures (Table 1).

WS will provide detailed monthly summary reports moving forward. If a greater level of information is needed, on either the harassment effort or survey results, once initiated, please feel free to request that information.

Table 1. Species and number affected as a result of harassment efforts by USDA APHIS Wildlife Services at Keystone Sanitary Landfill during March 2015.

Species	Number Harassed
Ring-billed Gull	390
American Crows	80
European Starlings	1400
Turkey Vultures	15

Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
3311 Airport Road
Allentown, PA
18109

Phone:
610-231-3134

Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

May 14, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during April 2015.

As a result of our initial meetings in January 2015, your office requested a Cooperative Service Agreement (CSA) with WS for the purposes of conducting gull damage management activities on the landfill, and also requested that WS initiate a one year study of the landfill and the surrounding area to monitor the gull activity, and track efficacy of the harassment program.

WS initiated surveys both on and off of the landfill at points previously chosen. Six survey points are included on the landfill. Points were chosen to observe as much of the landfill as possible during surveys. These surveys are a sampling of wildlife observed to be using the area at the time of the surveys, and should not be considered a complete count. Eight properties that contain large bodies of water are included for the off landfill surveys. Surveys are conducted on and off the landfill on up to two survey days. One survey day consists of three sets of survey periods including a morning, afternoon, and evening. The morning survey commences at one half to one hour after sunrise. The afternoon survey commences around noon, and the evening at two to three hours before sunset. Each point is visited one time during each survey period. Wildlife is observed and recorded during three minutes at each point. Observations are recorded with a handheld Trimble unit using Arcpad software, and a form that was developed for the project by WS. The form captures the date, time, survey point number, species, number, activity, cover, and direction of flight.

During April 2015, surveys were conducted on the 22nd and 29th. Fifteen species were recorded on the landfill during 69 observations, totaling 498 individual birds. Two gull species were recorded during six observations, totaling 48 individuals. Herring gulls were recorded during two observations (Figure 1), with seven total observed, and ring-billed gulls were recorded during four observations (Figure 1), with 41 total observed. Thirty-two gulls were observed on the active face, and the remaining 16 were observed in short grass adjacent to the active face.

Eighteen species were recorded off of the landfill during 108 observations, totaling 1,591 individual birds. Ring-billed gulls were recorded during seven observations, totaling 24 individual birds. Those included five observations totaling 19 gulls at Lake Scranton, one observation totaling one gull was made at Lake Griffin, and one observation totaling four gulls was made at Moosic Lake (Figure 2).

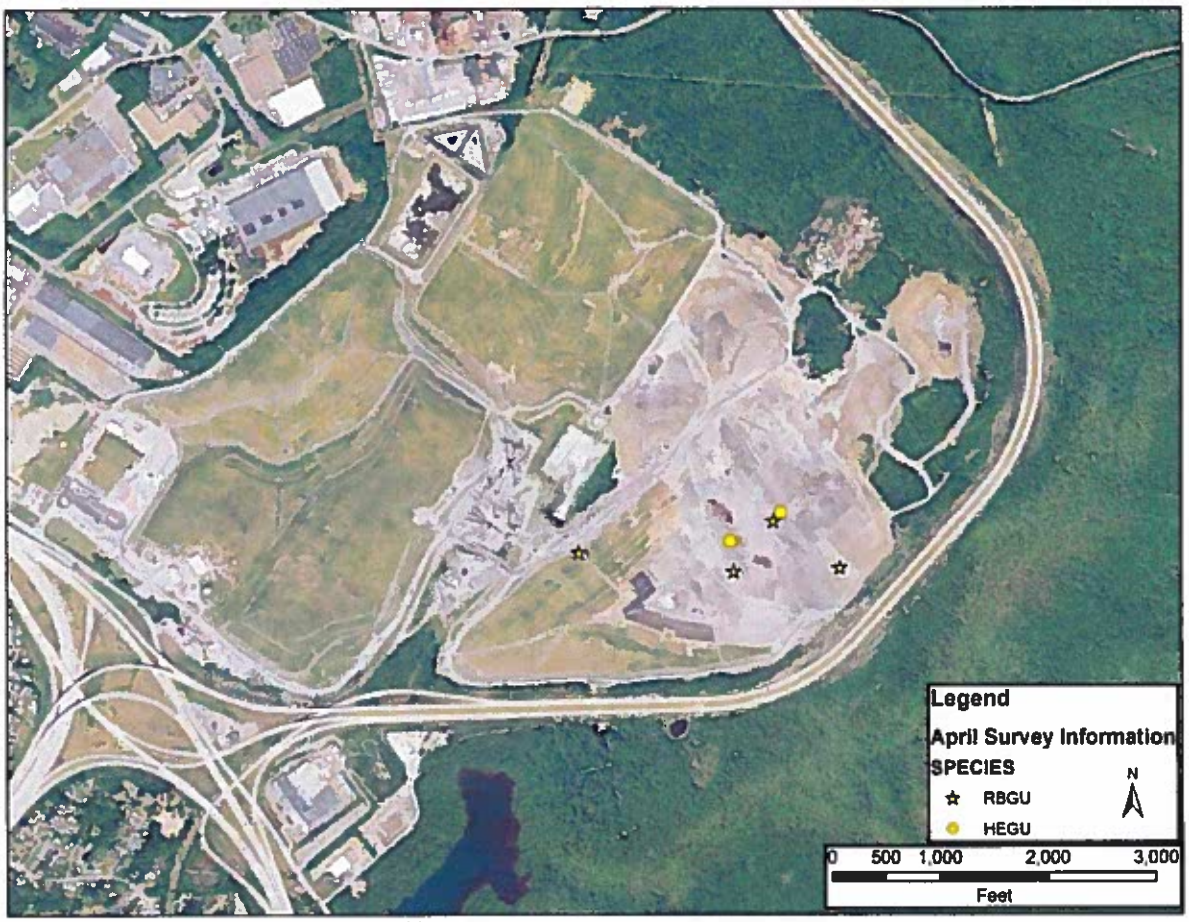

Figure 1. Locations of gull observations at Keystone Sanitary Landfill during surveys conducted in April 2015 by USDA APHIS Wildlife Services.

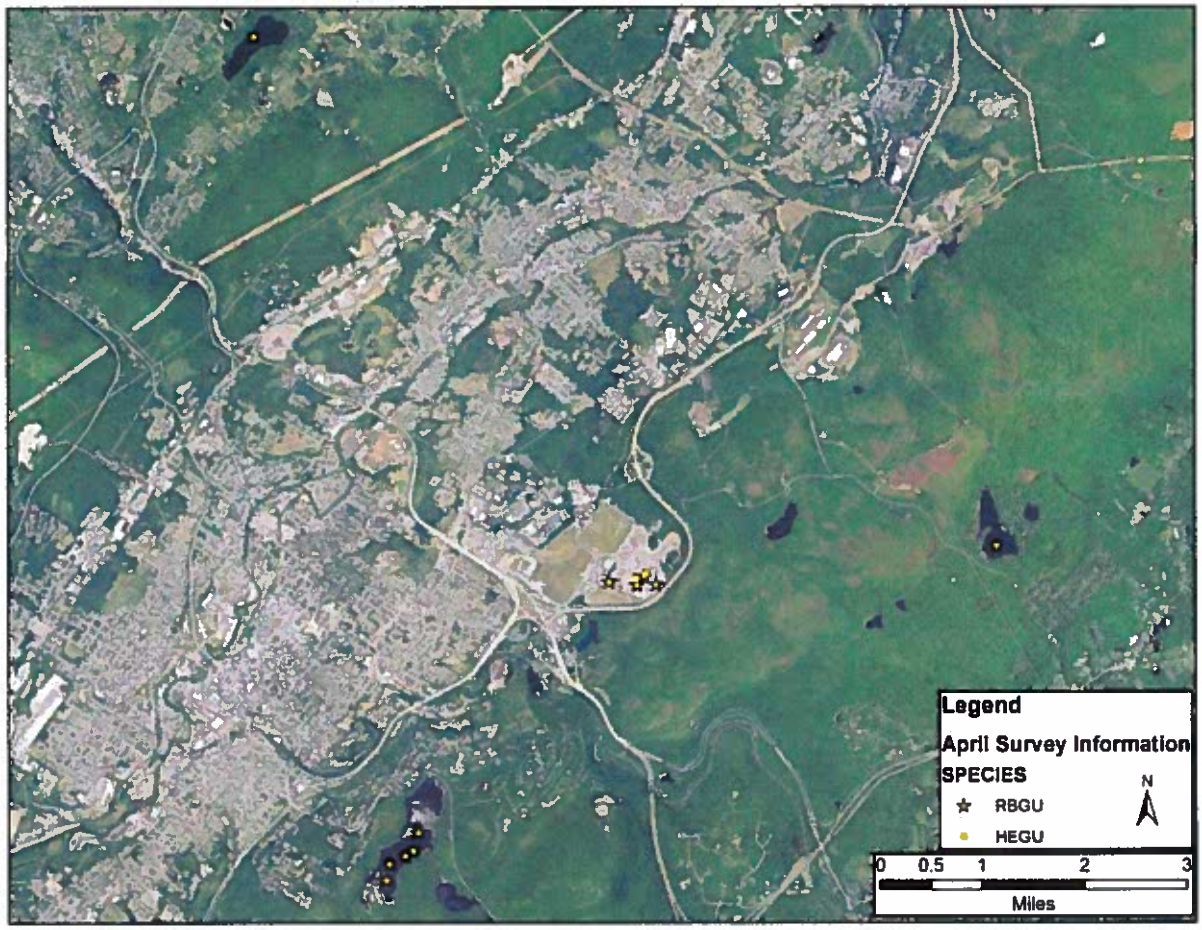

Figure 2. Locations of gull observations at chosen survey points off of Keystone Sanitary Landfill during surveys conducted in April 2015 by USDA APHIS Wildlife Services.

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
3311 Airport Road
Allentown, PA
18109

Phone:
610-231-3134

Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

June 17, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during May 2015.

During May 2015, surveys were conducted on the 13th and 27th. Eleven species were recorded on the landfill during 42 observations, totaling 331 individual birds. Ring-billed gulls were recorded during three observations, totaling five individuals (Figure 1). Four gulls were observed on the active face, and one was observed on asphalt adjacent to the office.

Twelve species were recorded off of the landfill during 47 observations, totaling 1,560 individual birds. No gull species were observed off of the landfill during the month of May.

Figure 1. Locations of gull observations at Keystone Sanitary Landfill during surveys conducted in May 2015 by USDA APHIS Wildlife Services.

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested.

Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA

United States Department of Agriculture

Animal and Plant Health Inspection Service

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3311 Airport Road
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Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

July 6, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during June 2015.

During June 2015, surveys were conducted on the 10th and 18th. Eight species were recorded on the landfill during 55 observations, totaling 919 individual birds. Ring-billed gulls were not recorded during surveys in June. Thirteen species were recorded off of the landfill during 51 observations, totaling 523 individual birds. No gull species were observed off of the landfill during the month of June.

You requested further assistance with turkey vultures on the landfill in an email to my office on June 26, 2015. During June surveys, 360 total vultures were observed on all surveys (Figure 1). Fifteen observations were recorded on, or from, the landfill which totaled 351 vultures, for an average of 23.4 vultures per observation. Observations were recorded during all survey periods; however the Midday and Evening periods recorded seven observations each. The evening period accounted for 90% of vultures observed on the landfill with an average of 45 vultures per observations. Vultures were observed on seven different habitat/cover types including the active face, cover fill, and uncovered liners. An integrated approach to managing the damage caused by vultures is recommended. Similar actions that are, or will be, used for gulls can be implemented. Mr. Willy Wenner will contact you during July to further discuss vulture damage management actions.

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested.

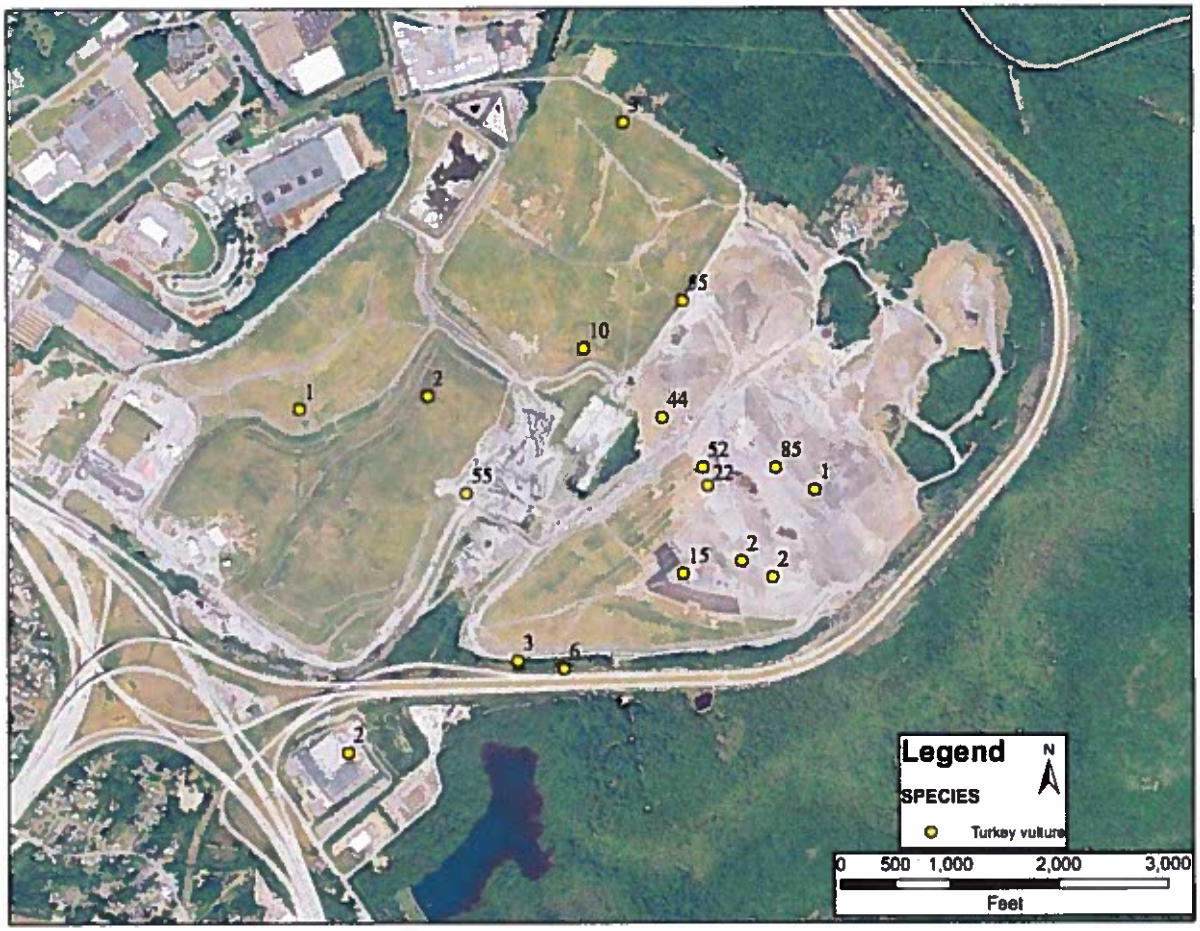
Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA

Figure 1. Locations of vulture observations at Keystone Sanitary Landfill during surveys conducted in June 2015 by USDA APHIS Wildlife Services. The number of vultures observed at each recorded location/observation is noted next to the point.



USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
3311 Airport Road
Allentown, PA
18109

Phone:
610-231-3134

Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

August 13, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during July 2015.

During July 2015, surveys were conducted on the 16th, 22nd, and 28th. Eleven species were recorded on the landfill during 75 observations, totaling 1,022 individual birds. Ring-billed gulls were not recorded during surveys in July. Twelve species were recorded off of the landfill during 51 observations, totaling 454 individual birds. No gull species were observed off of the landfill during the month of July.

The most numerous birds observed on the landfill were European starlings (421, Figure 1), turkey vultures (410, Figure 2), and American crows (123, Figure 3). The total observed for these three species represented 93% of all birds observed on the landfill. European starlings were observed 19 times with an average of 22.2 per observation, and were most commonly observed on/over short grass or the active face during morning surveys. Turkey vultures were observed 17 times with an average of 24.1 per observation, and were most commonly observed on/over the active face during evening surveys. American crows were observed 19 times with an average of 6.5 per observation, and were most commonly observed on/over the active face during afternoon and evening surveys. In addition to several gull species, the three species discussed above are commonly managed at other landfill or transfer facilities in Pennsylvania to reduce damages caused by them. The most numerous birds observed off of the landfill were Canada geese (248), European starlings (150), and American crow (20).

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA

Figure 1. Locations of European starling observations at Keystone Sanitary Landfill during surveys conducted in July 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

Figure 1. Locations of turkey vulture observations at Keystone Sanitary Landfill during surveys conducted in July 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

Figure 1. Locations of American crow observations at Keystone Sanitary Landfill during surveys conducted in July 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

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Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

September 18, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during August 2015.

During August 2015, surveys were conducted on the 12th, 13th, 25th and 26th. Seven species were recorded on the landfill during 54 observations, totaling 1,538 individual birds. Eight individual ring-billed gulls were recorded during two observations in August (Figure 1). Nine species were recorded off of the landfill during 33 observations, totaling 148 individual birds. Eleven ring-billed gulls were observed during one observation off of the landfill at Lake Scranton.

The most numerous birds observed on the landfill were European starlings (953, Figure 2), turkey vultures (239, Figure 3), and American crows (273, Figure 4). The total observed for these three species represented 95% of all birds observed on the landfill. European starlings were observed eight times with an average of 119.1 per observation, and were most commonly observed on/over the active face during evening surveys. Turkey vultures were observed 19 times with an average of 12.6 per observation, and were most commonly observed on/over the active face during evening surveys. American crows were observed 13 times with an average of 21.0 per observation, and were most commonly observed on/over the active face during evening surveys. In addition to several gull species, the three species discussed above are commonly managed at other landfill or transfer facilities in Pennsylvania to reduce damages caused by them. The most numerous birds observed off of the landfill were turkey vultures (71), Canada goose (31), and mallard ducks (12).

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA
Nokota Harpster, Wildlife Technician, USDA APHIS Wildlife Services-PA

Figure 1. Locations of ring-billed gull observations at Keystone Sanitary Landfill, and off of landfill property, during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

Figure 2. Locations of European starling observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

Figure 3. Locations of turkey vulture observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

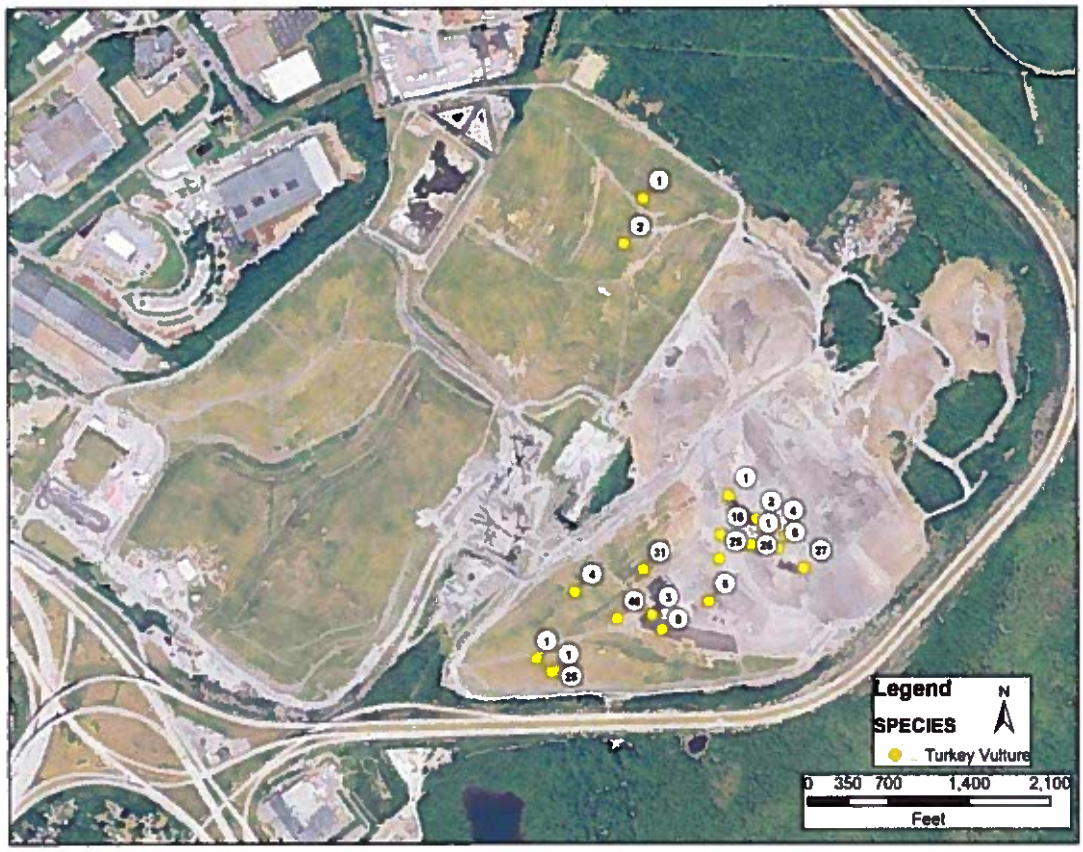
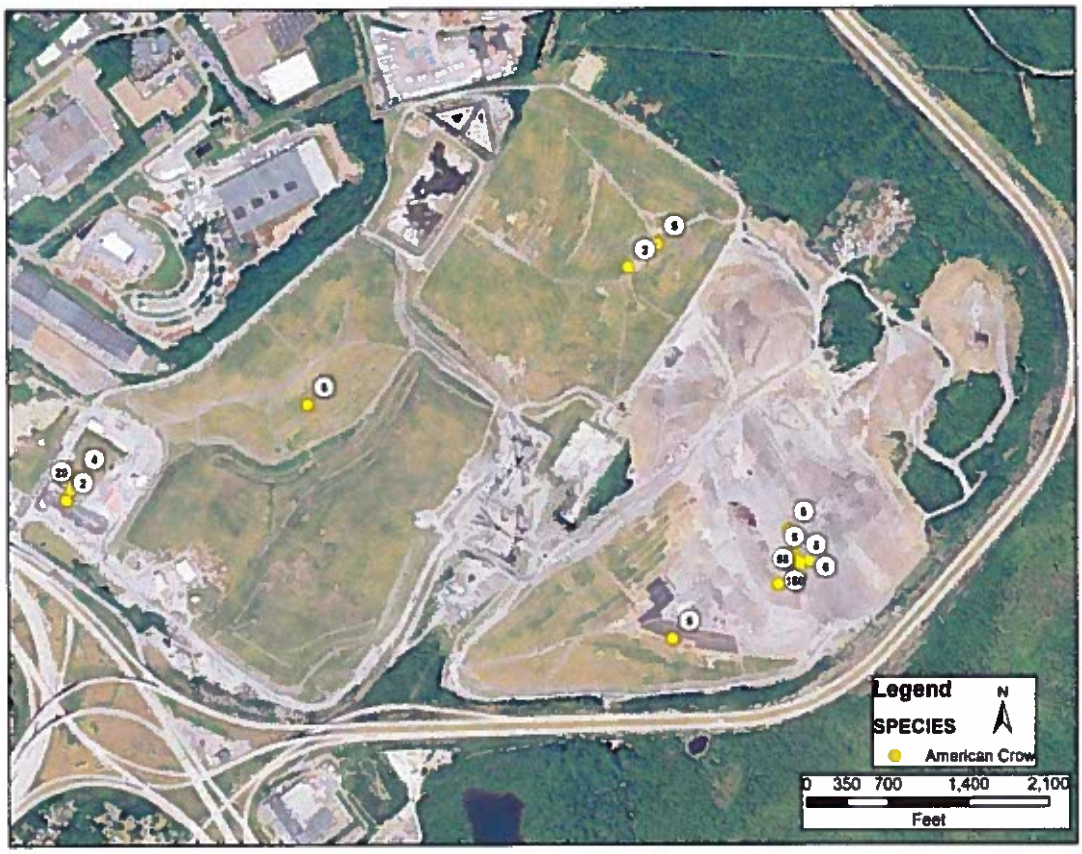


Figure 4. Locations of American crow observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.



USDA

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
3311 Airport Road
Allentown, PA
18109

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610-231-3134

Email:
Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

October 20, 2015

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) during September 2015.

During September 2015, surveys were conducted on the 15th, 16th, 29th and 30th. Ten species were recorded on the landfill during 63 observations, totaling 1,996 individuals. A total of 383 individual ring-billed gulls were recorded during nine observations and 21 herring gulls were observed during three observations in September surveys (Figure 1). Sixteen species were recorded off of the landfill during 41 observations, totaling 270 individuals. Seven ring-billed gulls were observed during one observation off of the landfill at Lake Scranton.

The most numerous birds observed on the landfill were European starlings (1,097, Figure 2), ring-billed gulls (383, Figure 1), turkey vultures (320, Figure 3), and American crows (130, Figure 4). The total observed for these species represented 97% of all birds observed on the landfill. European starlings were observed 13 times with an average of 84.38 per observation, and were most commonly observed on/over the active face and structures during evening and midday surveys. Ring-billed gulls were observed nine times with an average of 42.56 per observation, and were most commonly observed over/on the active face and gravel during morning and midday surveys. Turkey vultures were observed 14 times with an average of 22.86 per observation, and were most commonly observed on/over the active face during evening surveys. American crows were observed 10 times with an average of 13.00 per observation, and were most commonly observed on/over the active face during evening surveys. The most numerous birds observed off of the landfill were turkey vultures (95), Canada goose (65), and common merganser (31). No herring gulls were observed off of the landfill.

The information above is a brief summary of surveys. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA
Nokota Harpster, Wildlife Technician, USDA APHIS Wildlife Services-PA

Figure 1. Locations of ring-billed and herring gull observations at Keystone Sanitary Landfill during surveys conducted in September 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

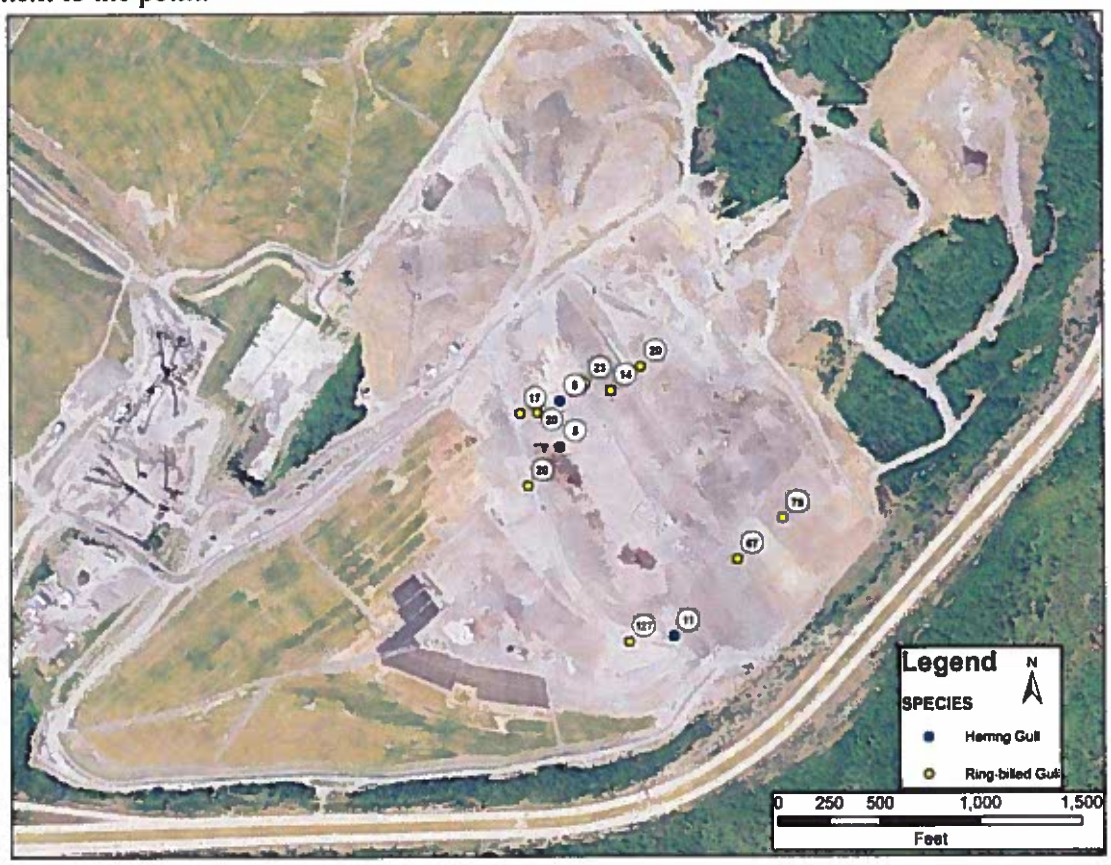

Figure 2. Locations of European starling observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

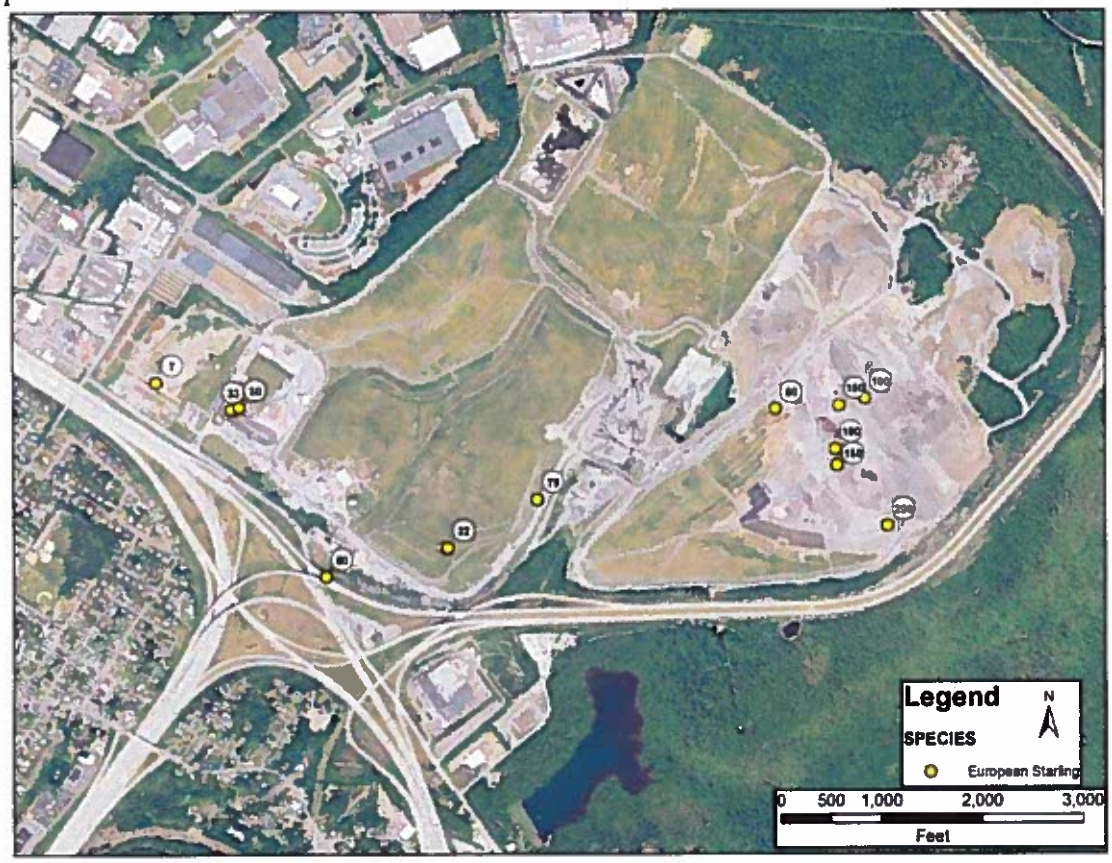

Figure 3. Locations of turkey vulture observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point. Four observations included in this figure were from a point adjacent to, but off of the landfill. The vultures were observed on the landfill from the point.

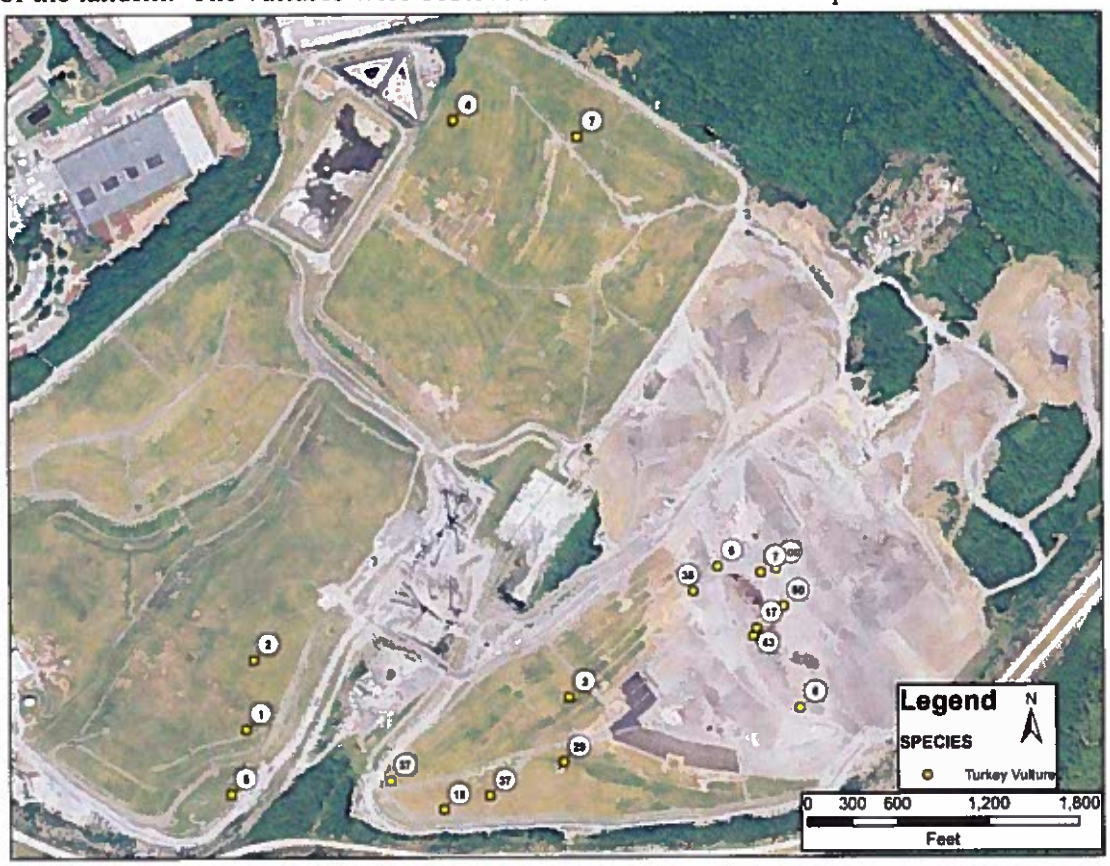

Figure 4. Locations of American crow observations at Keystone Sanitary Landfill during surveys conducted in August 2015 by USDA APHIS Wildlife Services. The number of birds observed at each recorded location/observation is noted next to the point.

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
3311 Airport Road
Allentown, PA 18109

Phone:
610-231-3134

Email:
Carey.A.Furlo@Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

January 28, 2016

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) from October through December 2015.

Surveys were conducted at a rate of two per month, both inside and out of the landfill property. Eight species were recorded from survey points on the landfill during 117 observations, totaling 20,933 individuals. A total of 11,558 individual ring-billed gulls were recorded during 54 observations and 1,139 herring gulls were observed during 16 observations during the period (Figure 1). Seventeen species were recorded at survey points off of the landfill during 130 observations, totaling 3,729 individuals. Ring-billed gulls were observed at all survey points off of the landfill during 38 observations, totaling 2,637 individuals.

The most numerous birds observed from landfill survey points were ring-billed gulls (11,588, Figure 1), European starlings (7,761, Figure 2), herring gulls (1,139, Figure 1), and American crows (406, Figure 3). The total observed for these species represented 99.81% of all birds observed from the landfill. Ring-billed gulls were observed 54 times with an average of 214.59 per observation, and were most commonly observed during morning surveys on/over the active face. European starlings were observed 17 times with an average of 456.53 per observation, and were most commonly observed during the afternoon survey on asphalt. Herring gulls were observed 16 times with an average of 71.19 per observation, and were commonly observed on/over the active face during morning and afternoon surveys. American crows were observed 21 times with an average of 19.33 per observation, and were commonly observed during afternoon and evening surveys on/over the active face. The most numerous bird observed from survey points off of the landfill was ring-billed gulls (2,637), Canada geese (519), and herring gulls (242).

In addition to the surveys, WS was on site to conduct harassment and removal operations. Please see Table 1 for the results of those operations.

Table 1. Number of ring-billed and herring gulls harassed or removed from Keystone Sanitary Landfill from October through December 2015.

	Ring-billed Gulls		Herring Gulls	
Month	Harassed	Killed	Harassed	Killed
October	3,524	31	2,072	18
November	4,770	52	2,733	7
December	10,517	80	5,860	6

The information above is a brief summary of surveys and control activities. A more detailed report will be provided at the conclusion of all surveys. Information on other species observed during surveys can be provided at any time if requested. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA
Nokota Harpster, Wildlife Technician, USDA APHIS Wildlife Services-PA

Figure 1. Locations of ring-billed and herring gull observations at Keystone Sanitary Landfill during surveys conducted during October through December 2015 by USDA APHIS Wildlife Services.

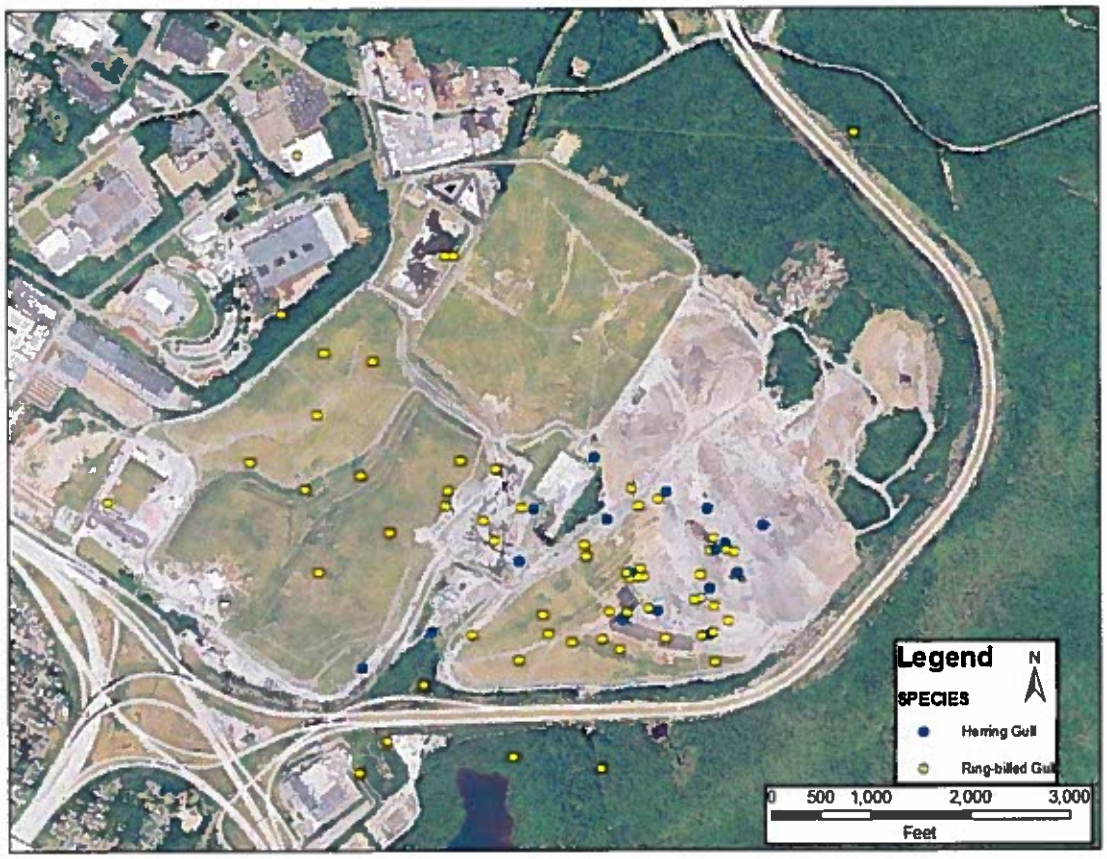

Figure 2. Locations of European starling observations at Keystone Sanitary Landfill during surveys conducted from October through December 2015 by USDA APHIS Wildlife Services.

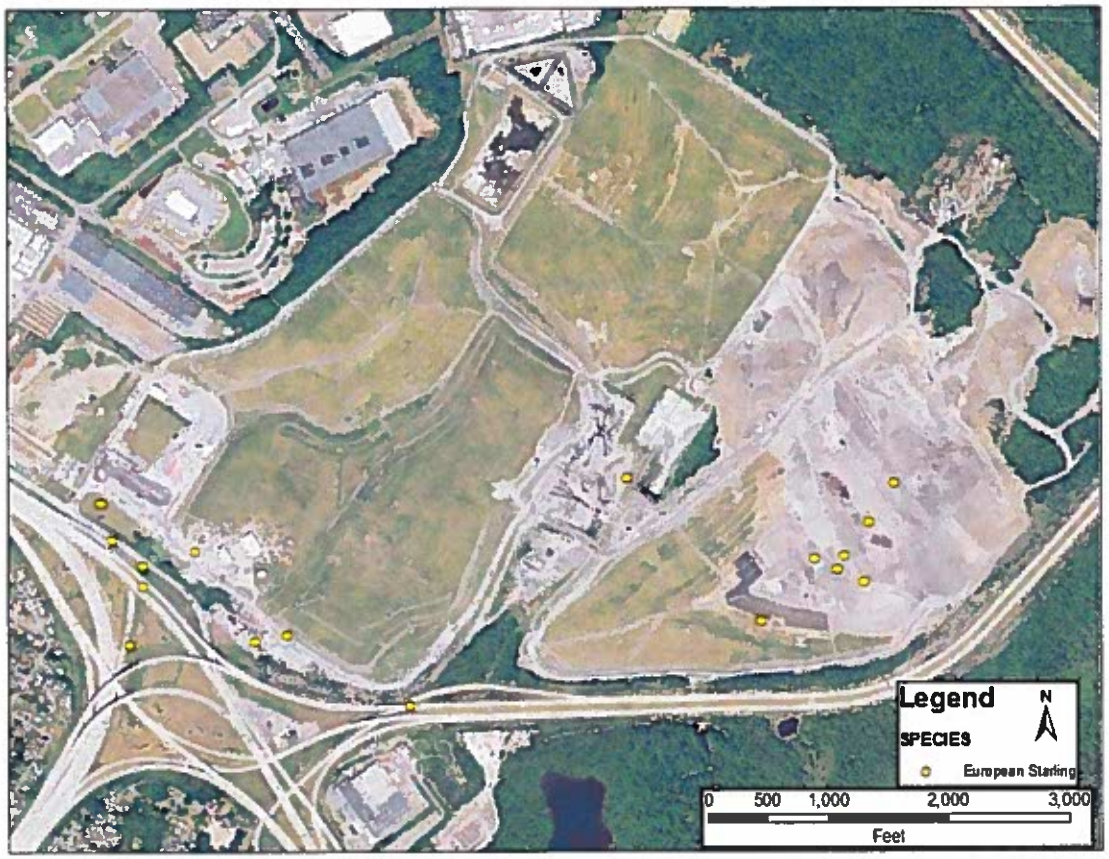

Figure 3. Locations of American crow observations at Keystone Sanitary Landfill during surveys conducted October through December 2015 by USDA APHIS Wildlife Services.

United States Department of Agriculture

Animal and Plant Health Inspection Service

Wildlife Services
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Allentown, PA
18109

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Carey.A.Furlo@
Aphis.usda.gov

James F. Eiden
Compliance Manager
Keystone Sanitary Landfill, Inc.
249 Dunham Drive
Dunmore, PA 18512

May 2, 2016

Mr. Eiden:

This letter is being provided at your request to summarize USDA APHIS Wildlife Services (WS) activities at Keystone Sanitary Landfill (KSL) from January through March 2016.

Surveys were conducted at a rate of two per month, both inside and out of the landfill property. Seven species were recorded from survey points on the landfill during 108 observations, totaling 14,076 individuals. A total of 5,341 individual ring-billed gulls were recorded during 36 observations and no herring gulls were observed during the period on the landfill (Figure 1). Twelve species were recorded at survey points off of the landfill during 80 observations, totaling 1,625 individuals. Ring-billed gulls were observed at survey points off of the landfill during 13 observations, totaling 517individuals.

The most numerous birds observed from landfill survey points were ring-billed gulls (5,341, Figure 1), European starlings (6,987, Figure 2), and American crows (1,721, Figure 3). The total observed for these species represented 99.81% of all birds observed from the landfill. Ring-billed gulls were observed 36 times with an average of 148.36 per observation, and were evenly observed during all surveys with a majority of observations on/over the active face. European starlings were observed 16 times with an average of 436.69 per observation, and were most commonly observed during the morning and afternoon surveys on the active face. American crows were observed 48 times with an average of 35.85 per observation, and were commonly observed during afternoon and evening surveys on/over the active face. The most numerous birds observed from survey points off of the landfill were European starlings (605), ring-billed gulls (517), and American crow (307).

The information above is a brief summary of surveys conducted for the first quarter of 2016. A full summary report of all surveys conducted from April 2015-March 2016 is currently being drafted and will be provided upon its completion. Information on other species observed during surveys can be provided at any time if requested. Please do not hesitate to contact me in my office at any time if you have any questions, comments or concerns regarding this letter, or have any other concerns.

Sincerely,

Carey A. Furlo
Wildlife Biologist
USDA APHIS Wildlife Services-PA

cc: Jason Wood, Eastern District Supervisor, USDA APHIS Wildlife Services-PA
Willy Wenner, Wildlife Biologist, USDA APHIS Wildlife Services-PA
Nokota Harpster, Wildlife Technician, USDA APHIS Wildlife Services-PA

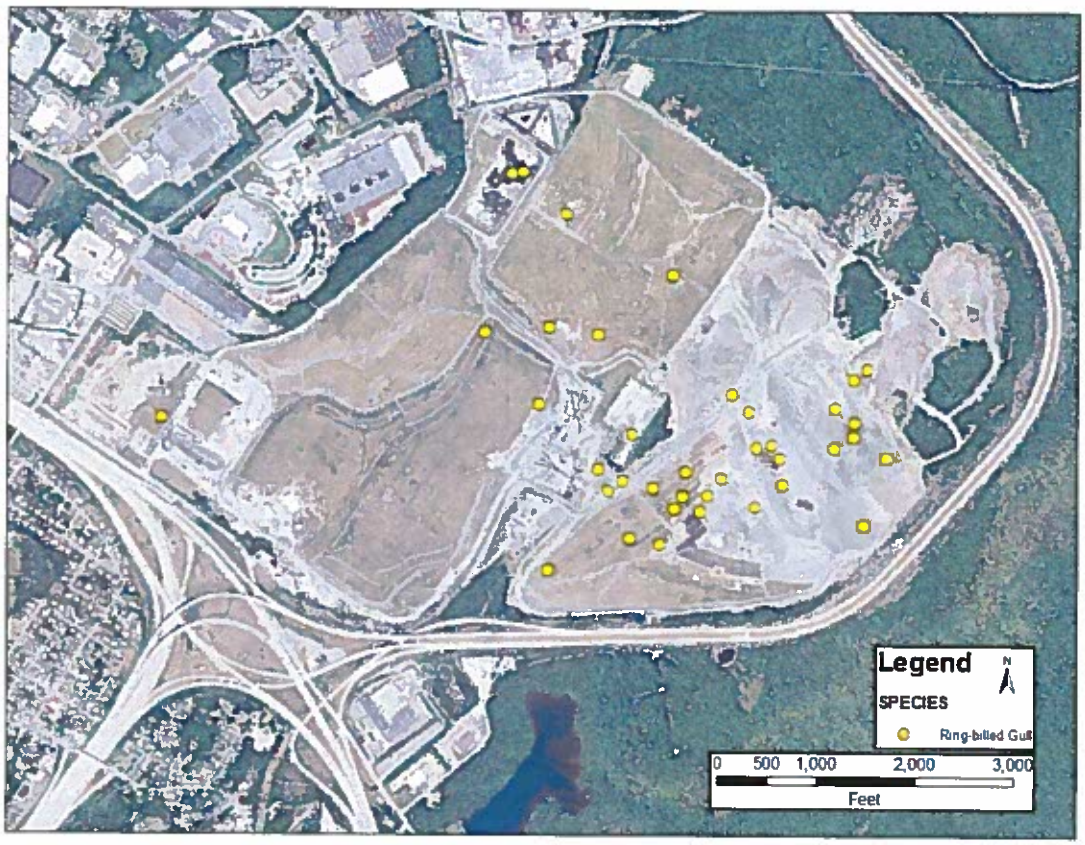

Figure 1. Locations of ring-billed gull observations at Keystone Sanitary Landfill during surveys conducted during January through March 2016 by USDA APHIS Wildlife Services.

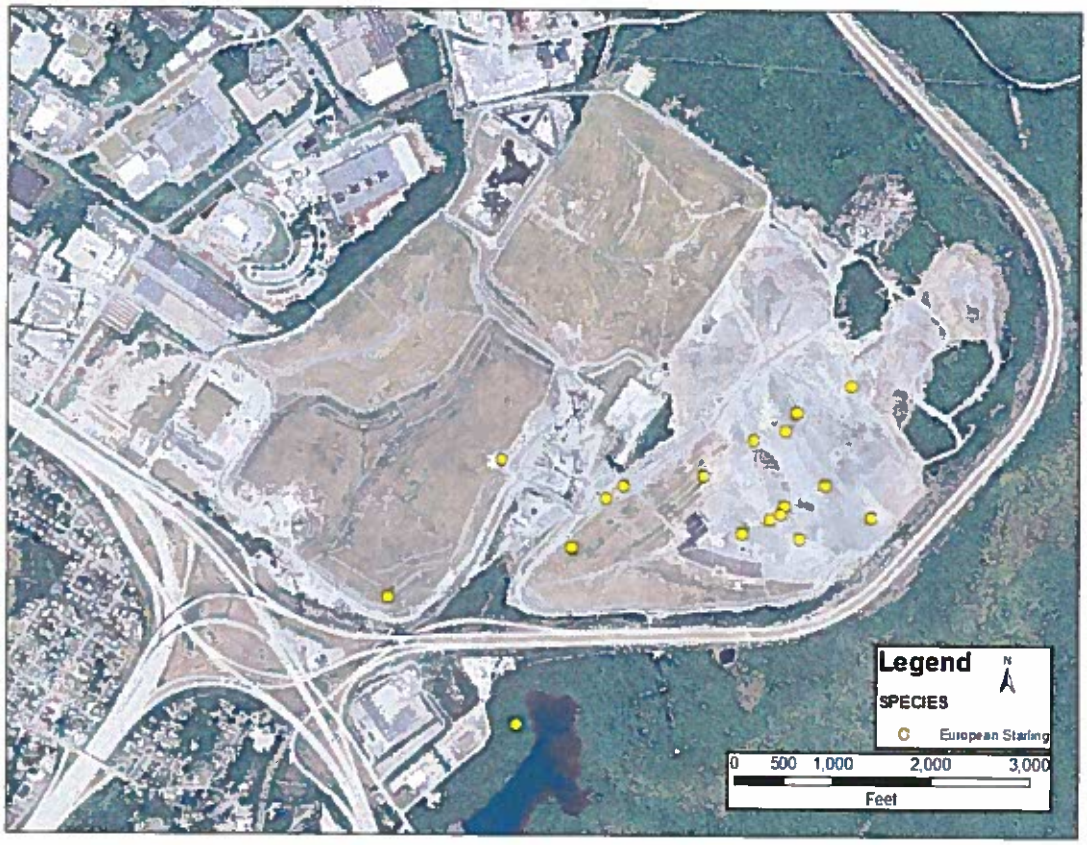

Figure 2. Locations of European starling observations at Keystone Sanitary Landfill during surveys conducted from January through March 2016 by USDA APHIS Wildlife Services.

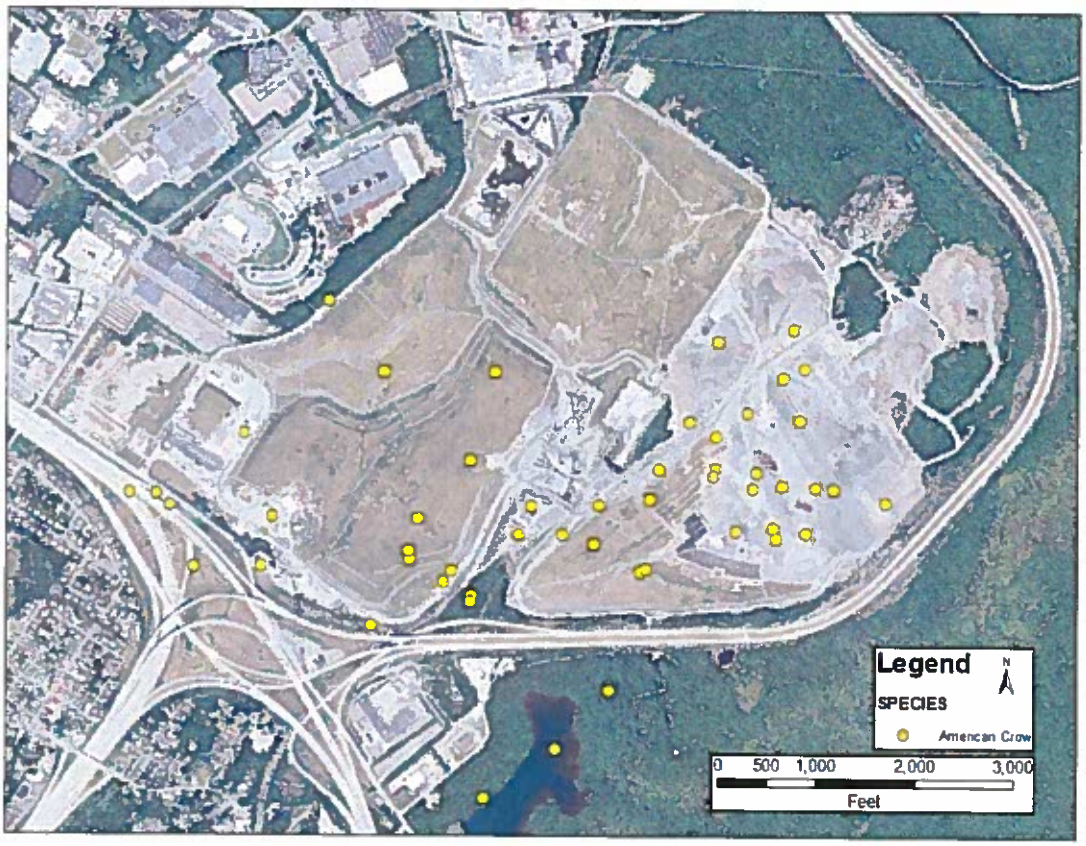

Figure 3. Locations of American crow observations at Keystone Sanitary Landfill during surveys conducted January through March 2016 by USDA APHIS Wildlife Services.

507 Linden Street, Suite 200 | Scranton, PA 18501 | p 570.342.3101 | f 570.342.3940 | www.labellapc.com

Harms:

7. Unsafe Vehicles

C7 **Unsafe Vehicles: (SE)** The potential for unsafe vehicles is a known potential harm of a landfill operation.

Proposed mitigation: KSL will continue to implement their Transportation Compliance and Vehicle Safety Action Plan which incorporates six formal compliance checks per year on vehicles accessing the site in conjunction with State or local police. These compliance checks include: inspection of tarps, leaking loads, signage, fire extinguishers, daily logs, weight and presence of radioactive materials and contingency plans for residual waste haulers, gamma radiation detection monitoring devices and Radiation Action Plan (RAP).

DEP review: Even without a proposed increase in daily tonnage, a large number of vehicles access the site daily increasing the likelihood of unsafe vehicles using the landfill. DEP has observed that KSL's implementation of the Transportation Compliance and Vehicle Safety Action Plan has been generally successful.

During the most recent DEP unannounced Waste Hauler Inspection Program inspection on May 9, 2105, the DEP found that 10 of the 293 trucks had a total of 12 violations. Of those, none were related to vehicle safety, 2 were related to the Waste Transportation Safety Act, Act 90 of 2002 (Act 90), 3 were related to signage, 2 were for discharged fire extinguishers, 1 for lack of Pollution Prevention and Contingency (PPC) plan, and 4 were related to tarps or improper enclosure. DEP believes that KSL's Transportation Compliance and Vehicle Safety Action Plan has been effective at minimizing the number of unsafe vehicles that come to the site and ensuing the drivers are in compliance with applicable rules and regulations.

PA State Police periodically inspect vehicles entering KSL. A DEP review of the results of these inspections indicates that KSL's mitigation has been effective to limit the number of unsafe vehicles.

C7 **Unsafe Vehicles Response Narrative**

KSL will continue to implement their Transportation Compliance and Vehicle Safety Action Plan during the proposed Phase III Site Development operations. On a regular basis KSL will review this plan and modify/make improvements as necessary.

A sample copy of KSL Vehicle Inspections that are conducted are contained in Exhibit C7.1.

EXHIBIT C7.1

VEHICLE INSPECTIONS

TST Consulting
Andy Wascura
516 Wedge Dr.
Dickson City, PA 18519
570-383-2211

Service to Individuals, Businesses, Law Enforcement Personnel & Criminal Justice Students

KEYSTONE Sanitary Landfill Inc.
P.O. Box 249, Dunham drive, Dunmore, Pa. 18512

Landfill Safety Inspection Worksheet Date 06-04-15

Report # A6715 Time 10:30 AM Interstate or Intrastate Transportation

Carrier Name BUNNELL WASTE REMOVAL
Address 267 TRYON ST, HONESDALE, PA. 1843

Driver's Name GREGORY G. HARRIS
Address 1137 SHADY LANE, HONESDALE, PA. 18431
Operator # 28827142 Class license B State PA

Medical Card (Y N) Vehicle Inspection Report for last duty day (Y N)
Shipping Paper # [illegible] Gross Weight 45[illegible] Origin Honesdale

Driver Duty Status Record Required (Y N) 100 miles exemption apply (Y N)
Log Violations noted: n/a

	Vehicle Type	Make/Color	Company #	Registration Plate #	State
#1	TK	Volvo	17	AF38731	PA
#2					

Municipal Waste Transportation Daily Operational Record Current (Y N)

Equipment and Operator Violations Noted:

NO VIOLATIONS

NOTE: Refer to landfill compliance worksheet (reverse side) for violations of emergency equipment, leaky load, signage, tarp, and Contingency Plan.

Inspector's Signature Andrew Wascura
Andrew Wascura

State & Federal Motor Carrier Safety Regulations | Hazardous Materials Regulations | OSHA Training | Safety & Audit Readiness | Private Investigations

Inspection Item	New	Adequate	Current	Complete	Available	Poor	Incomplete	Unacceptable
TARP		X						
DRIVER LOG N/A								
SIGNAGE			X					
LEAKY LOAD N/A								
FIRE EXTINGUISHER					X			
CONTINGENCY PLAN								
TRUCK WEIGHT	Acceptable 45320		Over Weight		Actual			

X No violations were found during this inspection Thank You for your Cooperation

_____ During this inspection, 1 or more areas have been identified as needing attention. Please make sure you address these findings as soon as possible to avoid any further actions.

Inspectors Signature

04/05/2010 06:30 FAX 0005/0007

TST Consulting
Andy Wascura
516 Wedge Dr.
Dickson City, PA 18519
570-383-2211

Service to Individuals, Businesses, Law Enforcement Personnel & Criminal Justice Students

KEYSTONE Sanitary Landfill Inc.
P.O. Box 249, Dunham drive, Dunmore, Pa. 18512

Landfill Safety Inspection Worksheet Date 06-04-15

Report # A6H15 Time 9:15 A.M. Interstate or (Intrastate) Transportation

Carrier Name ARTISTIC EXCAVATING INC.
Address 116 Memorial Ave. Dunmore, PA.

Driver's Name RAYMOND JOSEPH BERGERON
Address 8 CHAPEL ST., PITTSTON, PA. 18640
Operator # 28900594 Class license A-N State PA

Medical Card (Y N) Vehicle Inspection Report for last duty day (Y N)
Shipping Paper # 0190893 Gross Weight 53,120 Origin EASTON, PA

Driver Duty Status Record Required (Y (N)) 100 miles exemption apply (Y N)
Log Violations noted: N/A

	Vehicle Type	Make/Color	Company #	Registration Plate #	State
#1	TK Tater	BLK/BLU	106	ZGD1562	PA
#2					

Municipal Waste Transportation Daily Operational Record Current (Y N)

Equipment and Operator Violations Noted:
TK HEAD LIGHT - HIGH BEAM RIGHT SIDE FLICKERING & DIM

NOTE: Refer to landfill compliance worksheet (reverse side) for violations of emergency equipment, leaky load, signage, tarp, and Contingency Plan.

Inspector's Signature [signature]
Andrew Wascura

Inspection Item	New	Adequate	Current	Complete	Available	Poor	Incomplet	Unacceptable
TARP		X						
DRIVER LOG N/A								
SIGNAGE			X					
LEAKY LOAD N/A								
FIRE EXTINGUISHER					X			
CONTINGENCY PLAN								
TRUCK WEIGHT	Acceptable 53,120		Over Weight		Actual			

_____ No violations were found during this inspection Thank You for your Cooperation

X During this inspection, 1 or more areas have been identified as needing attention. Please make sure you address these findings as soon as possible to avoid any further actions.

Inspectors Signature

TST Consulting
Andy Wascura
516 Wedge Dr.
Dickson City, PA 18519
570-383-2211

Service to Individuals, Businesses, Law Enforcement Personnel & Criminal Justice Students

KEYSTONE Sanitary Landfill Inc.
P.O. Box 249, Dunham drive, Dunmore, Pa. 18512

Landfill Safety Inspection Worksheet

Date 06-04-15

Report # A6515 Time 9:35 AM Interstate or Intrastate Transportation

Carrier Name KING CRAWFORD TRANSPORT CORP
Address 20 BELMONT AVE., Jersey City, N.J. 07304

Driver's Name LONNIE WILLIAMS
Address 63 LARAMIE RD., PLAINFIELD, N.J. 07060
Operator # W436548300 07472 Class license A State N.J.

Medical Card (Y N) Vehicle Inspection Report for last duty day (Y N)
Shipping Paper # 83854 Gross Weight 80,640 Origin NEWARK, N.J.

Driver Duty Status Record Required (Y N) 100 miles exemption apply (Y N)
Log Violations noted: NONE

	Vehicle Type	Make/Color	Company #	Registration Plate #	State
#1	TT	FREIGHTLINER WHITE	010	AP-898V	N.J.
#2	ST	TITAN Silver	0029	TNP35G	N.J.

Municipal Waste Transportation Daily Operational Record Current (Y N)

Equipment and Operator Violations Noted:
ST RIGHT TURN SIGNAL INOPERABLE
NOTE: REPAIRED BY DRIVER
AT INSPECTION SITE.

NOTE: Refer to landfill compliance worksheet (reverse side) for violations of emergency equipment, leaky load, signage, tarp, and Contingency Plan.

Inspector's Signature [signature]
Andrew Wascura

State & Federal Motor Carrier Safety Regulations | Hazardous Materials Regulations | OSHA Training | Safety & Audit Readiness | Private Investigations

04/05/2016 08:30 FAX 0006/0007

Inspection Item	New	Adequate	Current	Complete	Available	Poor	Incomplete	Unacceptable
TARP		X						
DRIVER LOG			X					
SIGNAGE			X					
LEAKY LOAD N/A								
FIRE EXTINGUISHER					X			
CONTINGENCY PLAN								
TRUCK WEIGHT LEAVING NEWAY	Acceptable 79,600		Over Weight		Actual			

ABL LEAVING 80,640 (FUEL)

_____ No violations were found during this inspection Thank You for your Cooperation

X During this inspection, 1 or more areas have been identified as needing attention. Please make sure you address these findings as soon as possible to avoid any further actions.

Inspectors Signature

507 Linden Street, Suite 200 | Scranton, PA 18501 | p 570.342.3101 | f 570.342.3940 | www.labellapc.com

Harms:

8. Overweight Vehicles

C8 **Overweight Vehicles: (SE)** The potential for overweight vehicles is a known potential harm of a landfill operation.

Proposed mitigation: KSL's Transportation Compliance and Vehicle Safety Action Plan includes a notification and warning, delay the driver, and a 60 day ban from the site for overweight vehicles/repeat offender. Keystone tracks all overweight vehicles and provides this information to DEP.

DEP review: Based on DEP's review of KSL's records, KSL's mitigation has been effective at reducing the number of significantly overweight trucks that arrive at the site; however, there are still a number of trucks that are moderately overweight. KSL should propose additional measures to reduce the number of overweight trucks.

C8 **Overweight Vehicles Response Narrative**

On site, formal compliance is scheduled at least once every twelve months. This inspection will be coordinated with local and/or state police with prior notification to PaDEP. These scheduled compliance checks will cover the following seven areas identified by the Initiative:

1) **Overweight Trucks**
2) **Tarps**
3) **Leaky Loads**
4) **Signage**
5) **Fire Extinguishers**
6) **Daily Log**
7) **Contingency Plans for Residual Waste Haulers**

Internal on site formal compliance checks are scheduled at least once every twelve months and are coordinated with local and/or state police. Records are available for review.

All waste hauling vehicles are inspected for ACT 90 compliance. Any noncompliance identified during these checks will be recorded. The appropriate authority will issue any formal violations observed during this compliance check as they find necessary.

Any waste hauler not in compliance with the Act 90 requirements will not be allowed to dispose of waste at the facility until the deficiency is corrected. The Compliance Manager will record the name of the company, truck and trailer information and date and time of the compliance check that identified the deficiency. The waste hauler's information may be forwarded to PaDEP should a request be made.

All vehicles are inspected for Act 90 compliance. If a vehicle is not in compliance, the vehicle will be directed to contact the PADEP for an exemption. If the exemption is issued and sent to KSL we will allow the vehicle to dump. If an exemption is not provided the vehicle is turned away and recorded on the Supplemental Waste Tracking Form.

<u>Overweight Trucks</u>
As required, KSL records weights and registration information on each waste hauling vehicle that exceeds 73,280 and combinations that exceeds 80,000 gross vehicle weights.

In accordance with the plan, all weights are recorded and penalties issued as needed.

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Harms:

9. Dirt/Mud

C9 **Dirt/Mud: (E)** The potential for tracking dirt and mud off-site is a known potential harm of a landfill operation. Public comment indicates that use of water trucks to wash the roads does not eliminate the problem.

Proposed mitigation: KSL proposes current practices of using water trucks to wash down roadways of accumulated dirt and mud from waste hauling vehicles, inspections, focused site access roadway usage plan, on-site speed limit, water application during waste unloading (residual or construction and demolition waste) as needed. The KSL NMCP states "Keystone uses a 5000-gallon water truck on a continuous cycle to clean the site entrance road to ensure no mud or dirt leaves the site."

DEP review: It is DEP's observation that dirt and mud is not prevented from leaving the site by the current mitigation measures. KSL's mitigation, rather than preventing the tracking of dirt and mud off-site is to wash it from the roads once it has been tracked off-site. DEP has received comment about the dirt and mud on local roads. For these reasons, KSL should propose mitigation measures that will prevent the tracking of dirt and mud off-site. Dust is addressed below under Air Quality impacts.

C9 **Dirt/Mud Response Narrative**

The mitigation of the harm or potential harm for mud accumulating on Dunham Drive and adjacent Dunmore Borough roadways is a major element in Keystone's Nuisance Minimization Control Program (NMCP). A copy of the NMCP is contained in Exhibit C2.3.

On non rain days during operating hours, water trucks continuously apply a water spray to all interior roadways, transport vehicle transition areas, and Dunham Drive. The internal roadways are all constructed with PennDOT approved aggregate. Thus, the water spray and vehicle tire/aggregate friction combine to alleviate the majority of the dirt and mud from leaving the site.

In 2015, Keystone completed a bituminous pavement project of approximately 137,037 square feet in the vehicle hauling transition area. Also in 2015, PaDEP approved a Minor Permit Modification that permits KSL to expand the vehicle hauling transition and staging area, by approximately 42,416 square feet of bituminous pavement. This transition paved area and the New Site entrance which was part of the Minor Permit Modification provides a bituminous surface area and a paved travel way of 1,506 feet from the outgoing weigh station to the site exit which serves as additional mitigation measures to ensure that dirt and mud does not leave the KSL site and accumulate on the public roadway system. The paved transition area also serves as an inspection location where all transport vehicles entering or exiting KSL, on which dirt and mud is observed by the staff are directed to a location to be cleaned by a portable power washing unit.

The dust/mud collected in the bituminous areas is directed to collection locations and removed via a street sweeper unit and conveyed to the working face daily. A similar procedure is conducted on Dunham Drive, and is applied to adjacent public streets used as an access roadway to KSL upon a request from the Borough of Dunmore.

KSL has recently acquired a new Elgin Eagle F Street Sweeper, which is much more efficient than the current model, See Exhibit C9.1 for specifications. The previously described dirt/mud mitigation measures are incorporated into the Keystone's Nuisance Mitigation Control Program are currently being implemented. The mitigation programs described herein have been effective and will eliminate any increase harms and potential harms related to dust/mud associated with the PaDEP approval of the Phase III Site Development.

EXHIBIT C9.1

ELGIN SERIES F SWEEPER

HISTORY OF SWEEPING
PRINCIPLES OF OPERATION

WHY SWEEP?

Street sweeping is an essential part of sanitation. In health, ecology and aesthetics, the community benefits from clean streets. Clean streets reduce dust and dust-borne contaminants, bacteria from decomposition of organic matter, pollutants entering stormwater systems and accidents due to debris in the roadway. Community pride is enhanced by a clean environment. People are less likely to litter in a clean area. Tourists have a positive first impression of the community, which may encourage them to stay longer and return more often.

HISTORY OF SWEEPING

At the turn of the century, streets were in terrible condition. Most were unpaved, creating dust in dry seasons and mud in rainy seasons and harboring disease-producing bacteria. Gradually streets were paved with cobblestones and bricks. This decreased, but did not eliminate dust and mud. Droppings from horses, garbage, paper and other litter also needed to be removed. As populations grew, so did this problem. By 1914 motorized vehicles were becoming more popular, displacing horse-drawn vehicles and replacing one set of problems with

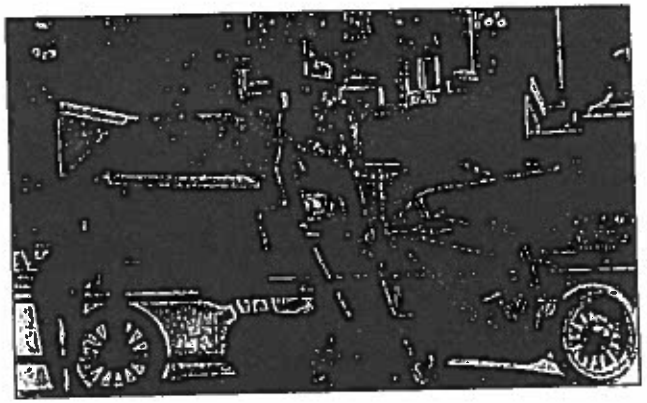

Figure D-1
1914 Elgin Sweeper in Boise, Idaho

another. That year Boise, Idaho received the first motorized street sweeper (Figure D-1), manufactured by Elgin Sweeper.

As society changed, the demands on sweepers also changed. Litter, dust, leaves and grass still remain. Add to that sand and salt from the winter's snow removal and metal and rubber from cars and trucks. Airport runways must be kept immaculate; a small piece of metal on a runway can cause havoc with a jet engine. Parking lots and garages have replaced stables. Environmental concerns mean not only cleaning the streets, but keeping the collected debris out of the air and waterways.

In 1964 Elgin introduced the most popular sweeper ever, the Pelican, a mechanical sweeper. Elgin's first vacuum sweeper, the Whirlwind, entered the market in 1969 and in 1983 the Crosswind, a recirculating air sweeper joined the ranks of Elgin street sweepers. Next, in 1988 came the Eagle, a four-wheel mechanical sweeper that can be driven at highway speeds. The year 1996 saw the addition of the Fast Sweeping Crosswind FSX and the GeoVac to the product line.These sweepers answer the needs of the modern community.

The acquisition of Vactor Manufacturing by Federal Signal Corporation, Elgin Sweeper's parent company, added the vacuum sweeper, Sunvac III, to the Elgin product line in 1994.

MECHANICAL/BROOM SWEEPERS

Mechanical, or broom, sweepers remove debris by sweeping it onto a conveyor. The conveyor carries the debris to a hopper. The No-Jam™ hopper conveyor of Elgin Eagle was originally patented. This revolutionary design sweeps debris up onto the conveyor, eliminating the problems of jamming.

EAGLE

The Eagle offers the patented No-Jam ™ conveyor of the world's most popular sweeper, the Elgin Pelican, in a 4-wheel sweeper capable of travelling at highway speeds between sweep locations. The Eagle picks up large objects, such as branches, hub

caps and bottles. When the debris hopper is full, the Eagle hopper dumps onto the ground or at a variable height up to 9.5 ft. (2895 mm) with Series F Eagle.

WATER SPRAY

A water spray system controls dust during sweeping. Three nozzles at the front edge of each side broom and three more at the main broom spray water to moisten the dust being swept by the brooms.

Figure D-2
Water tank (One of two)

The Elgin-designed centrifugal water pump can run-dry without damage.

The amount of water is adjustable through use of a switch inside the cab. Large 280-gallon (1060 L) polyethylene water tank (Figure F-2) capacity is standard on the Eagle.

BROOMS

Hydraulically-driven brooms sweep the debris on the street onto the conveyor. The main broom is located behind the lower edge of the conveyor and directs the debris toward the conveyor.

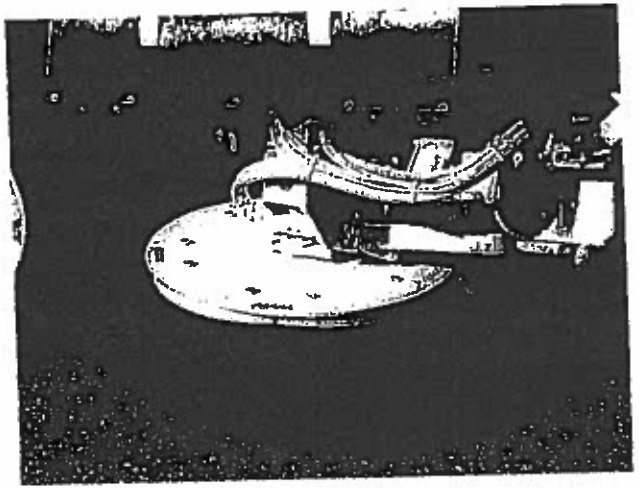

Figure D-3
Side broom

Large 42 in. (1.1 m) side brooms (Figure D-3) are available on both the right and left sides. For sweeping these are lowered and rotated to move gutter debris to the conveyor. Speed of the brooms is controlled in-cab, independently of the truck engine speed.

Digging pressure on all brooms is controlled from the cab. The pattern that the brooms produce when the sweeper is stationary is a tool to evaluate the most efficient positioning and pressure of the brooms. The brooms can be adjusted to produce the best pattern and the best result.

CONVEYOR

The heavy-duty, No Jam™ debris conveyor (Figure D-4) transports debris deposited on it by the main broom to the hopper. The high-strength belt-type conveyor conveys bulky items to the hopper without jamming.

Conveyor speed is controlled from in-cab and can reverse without reversing the brooms.Conveyor speed is independent of the truck engine speed.

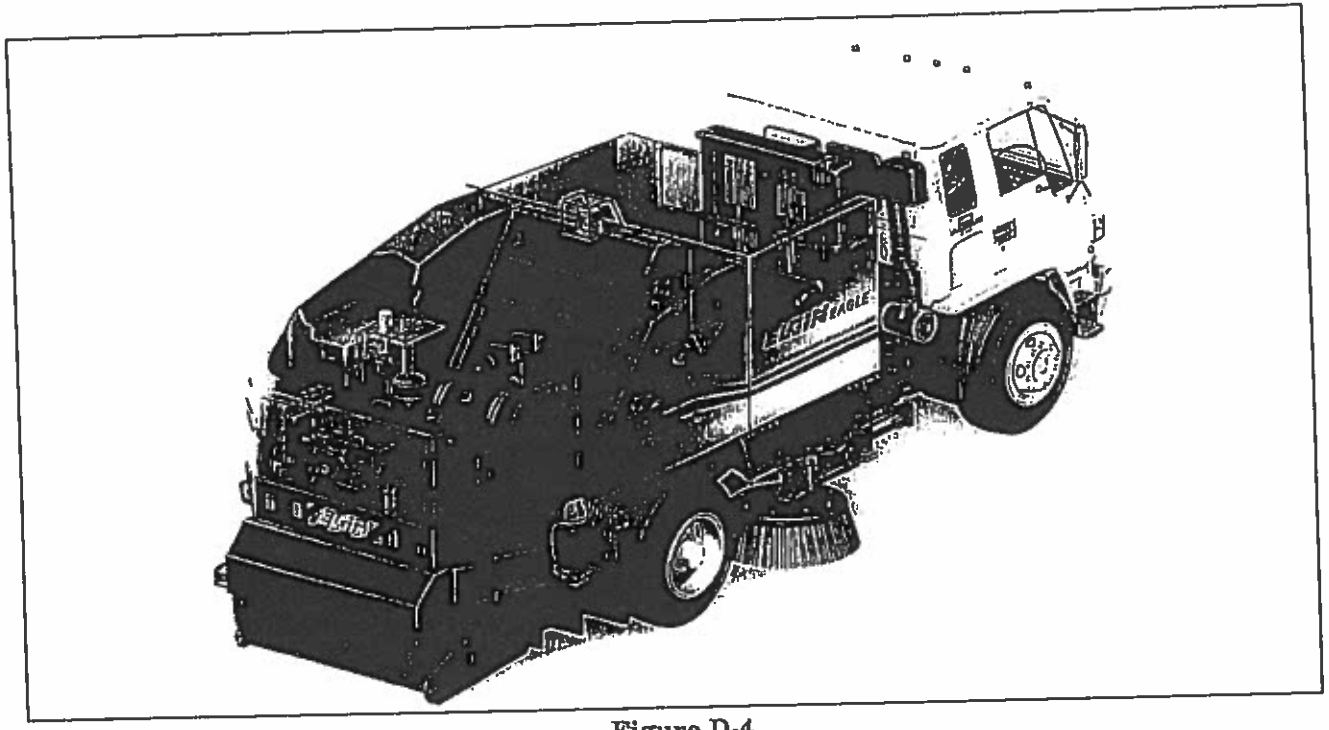

Figure D-4
Eagle cross section showing conveyor and hopper

Pavement contact is maintained by rubber dirt shoes on the sides and rubber deflectors under the chassis. Optional carbide dirt shoes are available.

HOPPER

The side dump hopper (Figure D-4) is center-mounted for the best possible stability. With a volumetric capacity of 5.5 cu. yd. (4.2 cu.m) the Eagle Series E debris hopper can handle a material volume of 4.5 cu. yd. (3.4 cu. m.) to be dumped at hopper height.

The Eagle series F hopper can hold a volumetric capacity of 4.12 cu. yd. (3.2 cu.m) for a material volume of 3 cu. yd. (2.3 cu.m) to be dumped at a variable dump height of 9.5 ft (2.9 m) when measured at the bottom of the discharge door.

After dumping the hopper should be washed down for maximum efficiency and long life.

AIR BAG SUSPENSION

Self-leveling air bags and shocks (Figure D-5) located on the rear axle provide a solid rear axle suspension to ensure stability while dumping and superior sweeping performance.

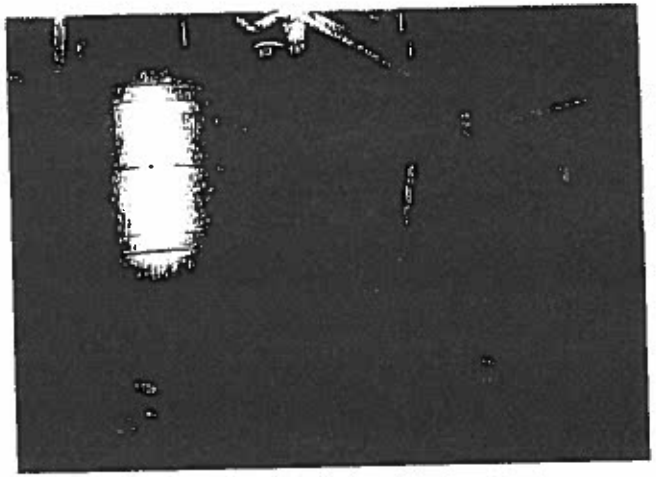

Figure D-5
Suspension air bags

Operator comfort is improved by this suspension due to the minimizing of rough road conditions. The sweeper remains level, regardless of the load.

CONTROLS

Controls for all sweeping functions, including brooms and hopper, are powered through in-cab controls (Figure D-5), located comfortably within reach.

For a complete description of all controls, see the Operation Section.

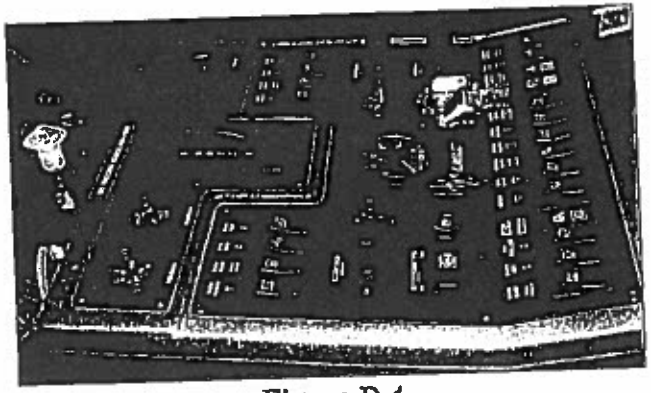

Figure D-4
Eagle in-cab controls

GENERAL DATA

Sweeping paths
- One side broom .....7.5 ft (2286 mm)
- Two Side brooms ..... 10 ft (3048 mm)

Water system
- Tank capacity.....280 gal (1060 L)
- Filter.....100 mesh screen
- Spray nozzles.....3 per gutter broom
  3 at main broom
- Fill hose length .....16 ft 8 in (5.1 m) with NST coupling
- Washdown .....Integral cascade hopper /conveyor wash
- Pump.....Centrifugal, 5 gpm @ 40 psi

Hydraulic system
- Pump .....Three section gear drive with dual inlet
- Capacity ..... 23 GPM (82 L) @1800 RPM
- Return filter .....10 micron, full-flow with bypass
- Breather ..... 10 micron, spin-on
- Inlet strainer..... 100 mesh
- Reservoir capacity .....20 gal (76 L)

Electrical system
- Alternator .....95 amp standard
- Battery .....12 volt

Brooms
- Side broom diameter .....42 in (1100 mm)
- Main broom diameter .....35 in (889 mm)
- Main broom length.....60 in (1524 mm)

Conveyor
- Type .....Multiple ply reinforced rubber belt
- Speed.....Variable/forward & reverse, independent of brooms
- Flexibility.....9 in oscillation for large object passage
- Lift control .....Pneumatic

Debris Hopper - SERIES F

Maximum dump height (Bottom of discharge door).....Up to 9 ft 6 in (2895 mm)
Design lift capacity .....9,000 lbs (4,080 kg)
Volumetric capacity ..... 4.12 yd^3 (3.2 m^3)
Material volume.....3 yd^3 (2.3 m^3)
Maximum hopper dump angle ..... 45°
Lifting method ..... Single cylinder, triple stage mast

Debris Hopper - SERIES E

Maximum dump height (Bottom of discharge door).....26 in (70 mm)
Design lift capacity .....13,500 lbs (6,124 kg)
Volumetric capacity ..... 5.5 yd^3 (4.2 m^3)
Material volume.....4.5 yd^3 (3.4 m^3)
Maximum hopper dump angle ..... 50°

Fuel tank capacity

Standard ..... common 50 gal (190 L)

Auxiliary Engine

Isuzu Diesel Model C-240

Cylinders .....4, in-line
Displacement .....144 CID (2.3 L)
Horsepower .....49 HP (40 kW) governed @ 2500 RPM
Torque..... 115 lb-ft (156 Nm) @ 2000 RPM
Compression Ratio 20:1
Bore..... 3.39 in (86 mm)
Stroke..... 4.02 in (102 mm)

Refill capacities

Engine crankcase with filter .....13.5 qt (13 L)
Hydraulic system .....140 qt (135.2 L)

NOTICE

Elgin Sweeper Company recommends Texaco Rando HDZ 68 or equivalent hydraulic oil.. Use of any fluid not approved by Elgin Sweeper Company can void all hydraulic component warranties.

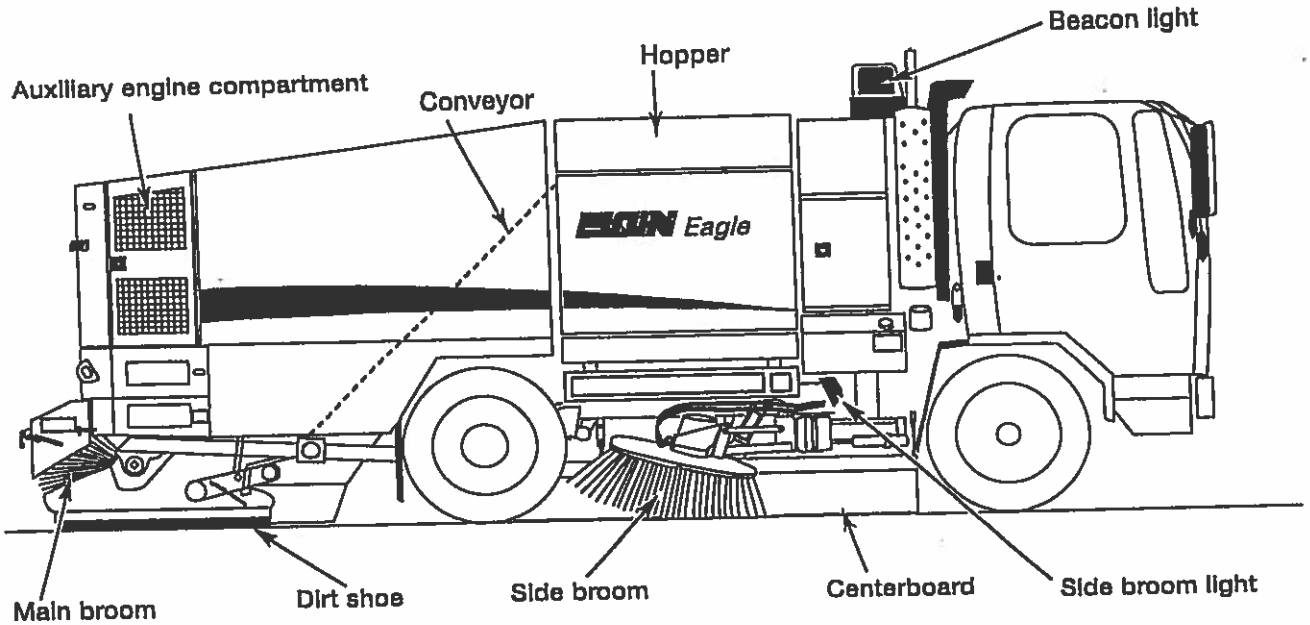

Figure D-7
Eagle F Side View

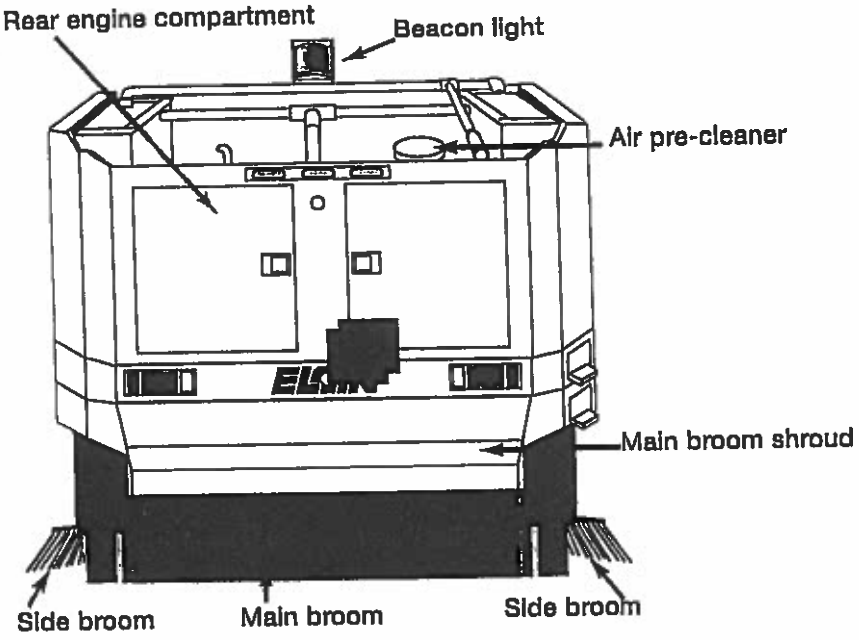

Figure D-9
Eagle F Rear View

DISTRIBUTION

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Harms:

11. Environmental Justice Community Impacts

C10 **Environmental Justice Community Impacts:** KSL has identified impacts to Environmental Justice (EJ) communities as a potential harm of the proposed expansion.

Proposed mitigation: KSL's proposed mitigation is to minimize traffic impacts, create a trust fund for Dunmore for road repair, provide the host municipality fees, and maintain over ¼ mile separation from the disposal area to the closest homes.

DEP review: According to DEP's EJ Policy a portion of Dunmore Borough is designated as an EJ community. The fact that a portion of Dunmore is an EJ community is not a "harm" in and of itself. The EJ designation is an internal DEP policy to address education of these communities about pending projects in their vicinity. DEP followed its policy by conducting additional outreach and public meetings. Potential impacts from the landfill are discussed individually.

C10 **Environmental Justice Community Impacts Response Narrative**

NO RESPONSE REQUIRED

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Harms:

12. Local Economy

C11 **Uncompensated losses to local government: (SE)** KSL identified that the landfill operation may cause a portion of Dunham Drive and Tigue Street to require more frequent paving due to traffic accessing the landfill.

Proposed mitigation: KSL has committed to establishing a trust fund dedicated to pay for necessary improvements to Dunham Drive and Tigue Street.

DEP review: DEP has no information to evaluate the adequacy of the proposed mitigation, KSL should provide the frequency and scope of work/repair that the Dunmore Borough must undertake to maintain these two roads and the cost of this maintenance.

C11 Uncompensated losses to local Government Response Narrative

KSL is committed to maintaining Dunham Drive and Tigue Street. These Roadways will be inspected annually and necessary repairs/improvements made in accordance with the attached Roadway Inspection Program Exhibit C11.1. The program format is similar to the program required by PennDOT for all State Roadways being utilized by the Marcellus Shale Industry and includes the following scope:

- **Inspection of Roadways**
- **Typical Repair Sections and Details**
- **Standards to be Utilized**
- **Quality Control Plan**

EXHIBIT C11.1

KEYSTONE SANITARY LANDFILL

ROADWAY MAINTENANCE PLAN

Keystone Sanitary Landfill
Roadway Maintenance Plan

- **Inspection of Roadways**
- **Typical Repair Section & Details**
- **Standards to be Utilized**
- **Quality Control Plan**

April 2016

Inspection of Roadways

Keystone Sanitary Landfills consultant will conduct periodic Inspections of Dunham Drive and Tigue Street on an annual basis. The intent of these inspections is to:

- Ensure that Pavements are Maintained to pre-existing conditions
- Ensure no Deterioration of Paved Surfaces
- Maintain Safe and Passable Road Conditions
- Prevent Negative Environmental Impacts

An Inspection Report will be prepared and recommendations made for any repairs or Improvements that may be required.

The recommendations will be in accordance with the Typical Repair Sections and Details contained in this Plan.

Typical Repair Sections & Details

Roadway Repair Strategies

- The Plan to respond to critical road repairs within 24 hours will be as follows: The roadway will be evaluated and a determination of the type of repair necessary will be verbally discussed with the Borough of Dunmore. Upon agreement as to the necessary repairs, the work shall be performed using the required Traffic Control as per Publication 213, Work Zone Traffic Control Guidelines.

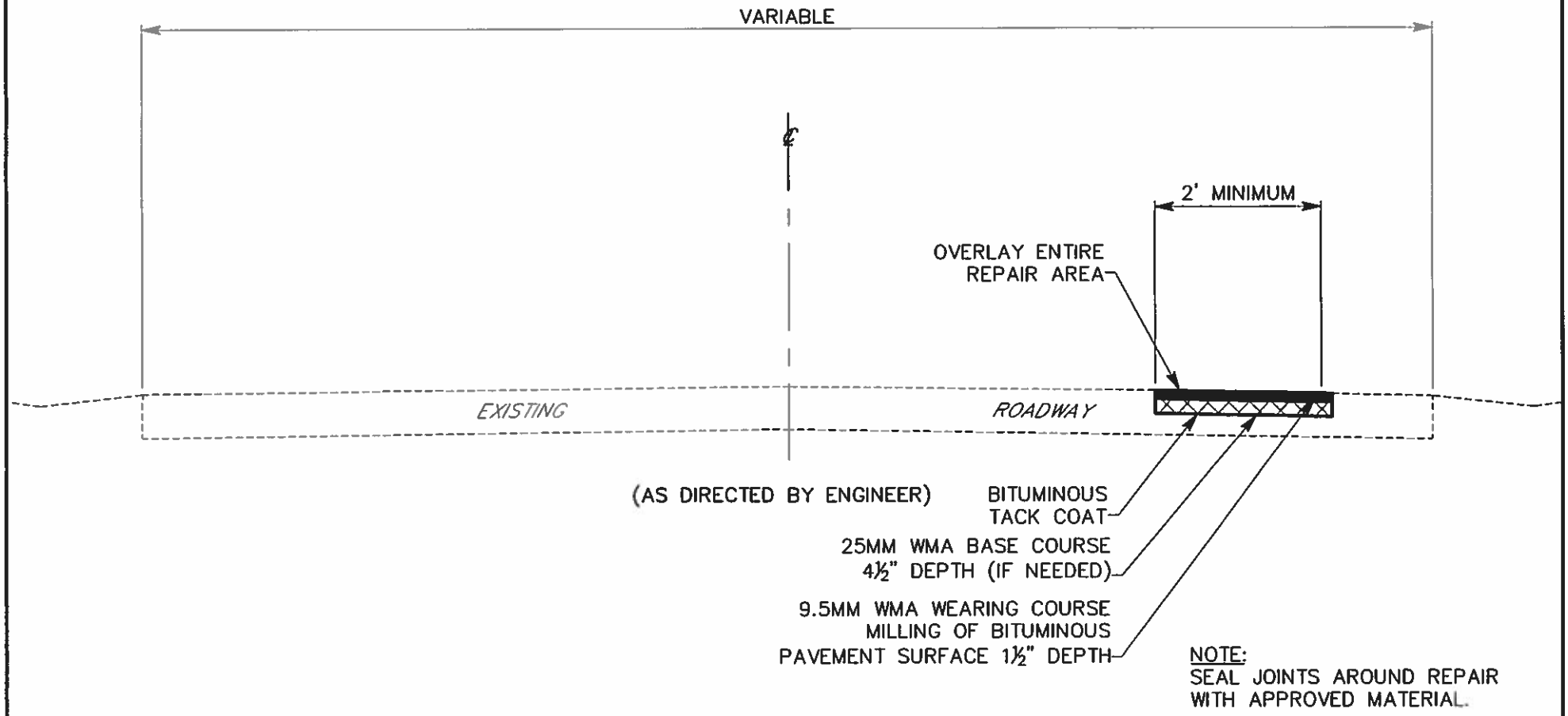
- Typical Section- The typical sections for Mill and Fill's, Base Repair, and Roadway reclamation are attached.

- Winter Roadway Repairs- KSL will repair roadways using local asphalt suppliers according to the road repair details supplied in this maintenance plan.

- The temperature and roadway condition will determine whether or not hot mix asphalt can be used.

- If it is necessary to use "out of spec" or temporary bituminous material, it shall be removed and replaced as soon as possible, but no later than June 30 following the winter.

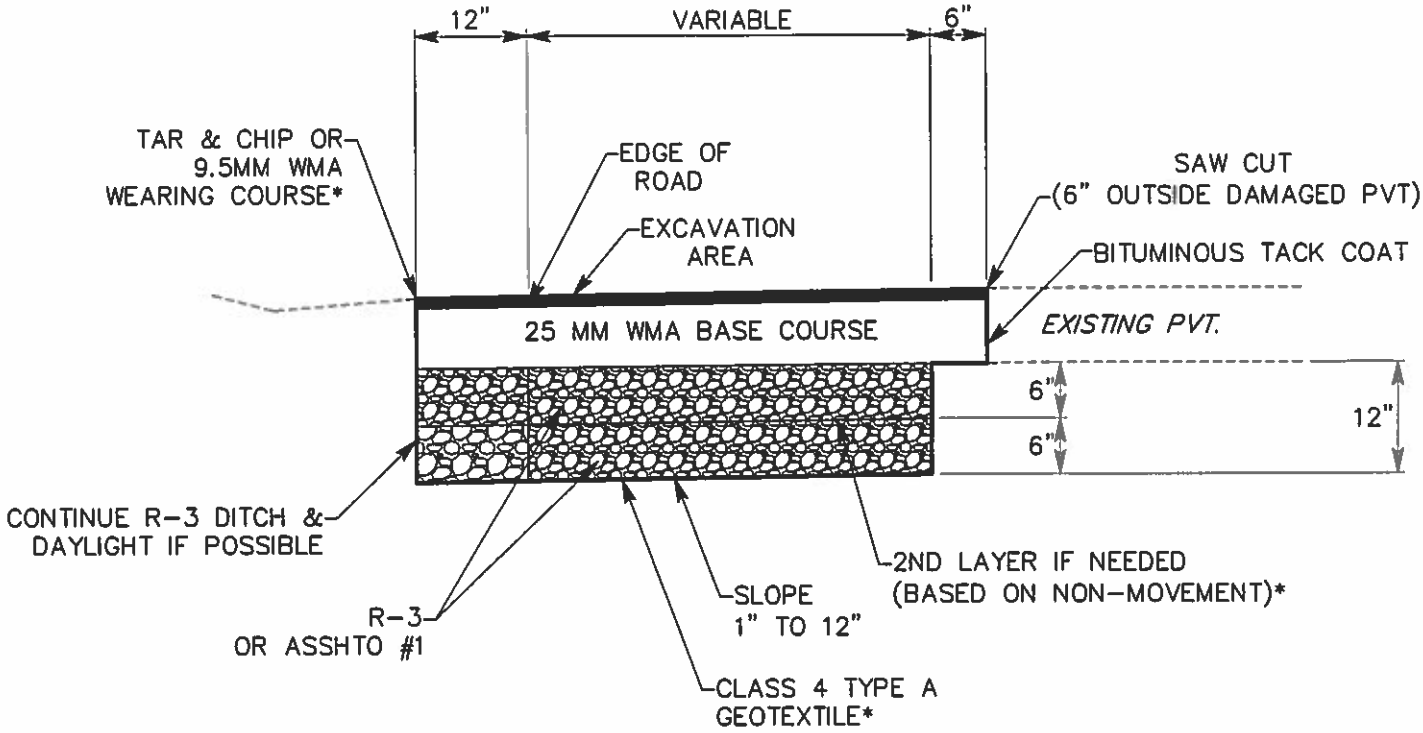
- Drainage-Current or potential drainage issues shall be identified and discussed verbally with the Borough of Dunmore.



NOTE:
SEAL JOINTS AROUND REPAIR
WITH APPROVED MATERIAL.

MILL & FILL DETAIL

LABELLA
Associates



*AS DIRECTED BY ENGINEER

NOTE:
SEAL JOINTS AROUND REPAIR
WITH APPROVED MATERIAL.

BASE REPAIR TYPICAL DETAIL

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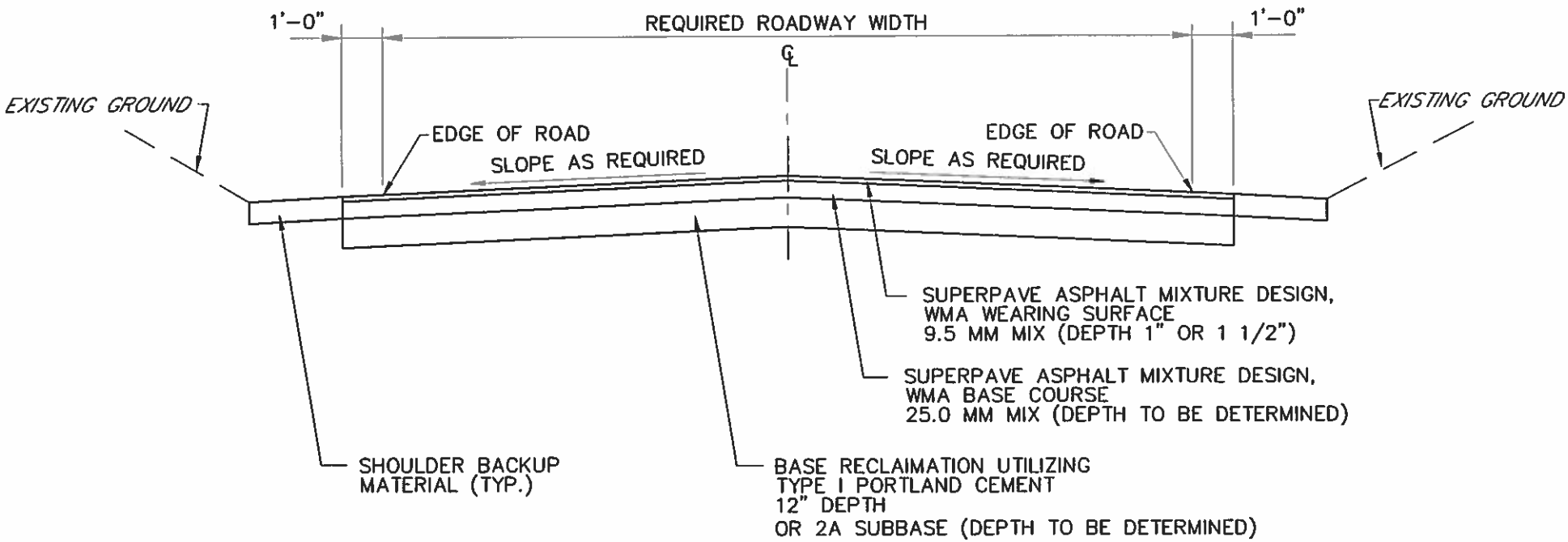
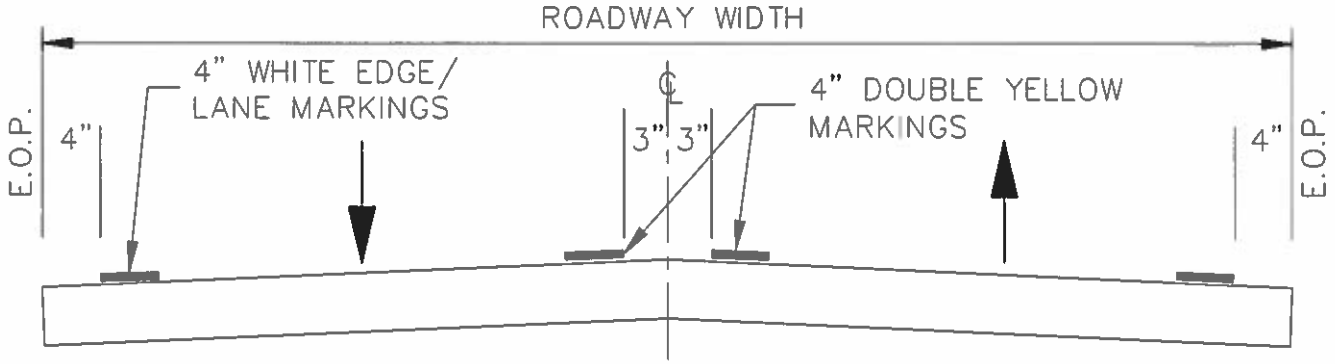


FULL DEPTH RECLAMATION

NOT TO SCALE

TYPICAL SECTION – FULL DEPTH RECLAMATION

LABELLA Associates



TYPICAL SECTION
(WHERE APPLICABLE)
N.T.S.

NOTE:
ALSO REFER TO
PADOT PUB. 111
TC-8600

STANDARD PAVEMENT MARKING-DETAILS

SK-1of1

LABELLA
Associates

STANDARDS TO BE UTILIZED

Construction Specifications & Reference Manuals:

Informational Publications

- Publication 4 – Conducting Business with the Pennsylvania Department of Transportation
- Publication 8 – Construction Manual
- Publication 23 – Bureau of Maintenance and Operations Manual
- Publication 33 – Shoulder and Guide Rail Condition
- Publication 46 – Traffic Engineering Manual
- Publication 73 – Drainage Condition Survey Field Manual
- Publication 111M – Traffic Control Pavement Markings & Signing Standards-TC 8600 & 8700
- Publication 148 – Traffic Standards (TC-7800 Series) Signals
- Publication 213 – Temporary Traffic Control Guidelines
- Publication 336 – Automated Pavement Conditions Surveying Field Manual
- Publication 343 – CRC and Unpaved Roads Condition Surveying Field Manual
- Publication 447 – Approved Products for Lower Volume Local Roads
- Publication 464 – Maintenance Field Reference for Erosion and Sedimentation Controls

Design

- Publication 13M – Design Manual Part 2: Highway Design
- Publication 14M – Design Manual Part 3: Plans Presentation
- Publication 15M – Design Manual Part 4: Structures
- Publication 16M – Design Manual Part 5: Utility Relocation
- Publication 212 – Official Traffic Control Devices
- Publication 213 – Work Zone Traffic Control Guidelines – Supplementing FHWA's Manual on Uniform Traffic Control Devices
- Publication 218M – Standards for Bridge Design – BD-600
- Publication 236M – Handbook of Approved Signs
- Publication 242 – Pavement Policy Manual
- Publication 282 – Highway Occupancy Permit Guidelines
- Publication 584 – PennDOT Drainage Manual

Construction / Inspection

- Publication 2 – Project Office Manual
- Publication 8 – Construction Manual

- Publication 19 – Pennsylvania Test Methods (PTM's)
- Publication 27 – Specifications – Bituminous Materials (Bulletin 27)
- Publication 35 – Approved Construction Materials (Bulletin 15)
- Publication 37 – Specifications – Bituminous Materials (Bulletin 25)
- Publication 72M – Roadway Construction Standards
- Publication 219M – Standards for Bridge Construction – BC-700
- Publication 234 – Flagging Handbook
- Publication 408 – Highway Specifications

CS-401 (1-02)
Reproduce Locally
Fillable Fields/Print

QUALITY CONTROL PLAN
BITUMINOUS PAVING OPERATION
(Attach additional sheets as necessary)

State Route (S.R.) _____, Section _____, County _____

I. ORGANIZATIONAL CHART

Personnel	Full Name	Responsibilities
A. Superintendent	_____	Oversees paving operations.
B. Paving Foreman	_____	Oversees placement of material and related operations.
C. Certified Field Technician	_____	Develops roller pattern and compaction data and acts as a point of contact for PennDOT personnel for all field testing and sampling.
D. Certified Plant Technician	_____	Oversees quality control and testing at plant.

Bituminous Concrete Mix Designs

A. List Designs (e.g. BCBC, ID-2 Binder (Heavy Duty), ID-2 Wearing (Heavy Duty) SRL-"E")
1. 9.5 MM 3 to < 30 ESALS PG 64-22
2. 25 MM 3 to < 30 ESALS PG 64-22
3. _____
4. _____
5. _____

(If more than five designs, attach additional sheets as necessary)

Equipment List	Quantity
A. Distributer Truck	_____
B. Paver	_____
C. Breakdown Roller	_____
D. Intermediate Roller	_____
E. Pneumatic Roller	_____
F. Finish Roller	_____
G. Material Transfer Vehicle (As specified)	_____

TESTING PLAN

A. Depth Control
   1. Depth will be controlled in accordance with Section 401.3(m)
   2. Any significant changes will be documented and reported to the inspector.

B. Compaction Control
   1. Compaction will be controlled in accordance with Section 401.3(h) and by a minimum of (3) three nuclear density tests per day or (1) one nuclear density test every 181.44 tonnes (200 tons) of material.

C. Temperature Control
   1. Temperature will be controlled in accordance with Section 401.3(g) and by checking the first truck load and a minimum of 5 truck loads daily.
   2. The plant will be contacted when any single check reaches the mix range limits or when multiple checks reach within 5 degrees of the limits, and the testing frequency will be increased until uniformity is established.

D. Segregation (plant and field)
   1. Segregation will be controlled in accordance with Section 401.3(g)2.

E. Test Section (Section 402 Only)
   1. A test section will be constructed in accordance with Section 402.3(w) prior to the start of the main line paving.
   2. Roller patterns and the number of passes for each roller will be provided to the Inspector.

MIX DELIVERY

A. Trucks will be clean of all foreign materials.
B. No petroleum oils, solvents, or other materials will be used as a release agent in the haul vehicles. The release agent used will be supplied by _____ having a trade name of _____.
C. Trucks will be handled in such a manner to help prevent segregation.
D. Material will be protected in accordance with 401.3(c).
E. Material will be released for the day's operation according to the details developed with the on site Inspector.
F. An adequate number of trucks will be utilized to facilitate paving continuity.

IV. SURFACE PREPARATION

A. All areas will be cleaned of surface debris.
B. Vertical and horizontal surfaces will be treated according to 401.3(f)1., or contract requirement.
C. Certification of bituminous materials will be provided as specified.
D. AET tack coat will be used in accordance with contract requirements.

V. MIX PLACEMENT

A. Pavers will be used in accordance with Section 401.3(d).
B. Electronic grade and shape controls will be used in accordance with Section 401.3(d).
C. At the start of each day, a joint will be prepared in accordance with Section 401.3(j).

VI. COMPACTION

A. A sufficient quantity and type of rollers will be used in accordance with Sections 401.3(e) and 401.3(h).

B. Joints will be constructed in accordance with Section 401.3(j)

1. Joints will be compacted by: _____
_____
_____.

VII. SPECIAL PAVING CONDITIONS

A. Method of placement and traffic control for intersections and other incidental work will be discussed and agreed upon by the Inspector and paving foreman prior to the work.

1. List those work items as discussed (Attach as a separate sheet).

VIII. PROTECTION OF THE COURSES

A. Traffic will not be placed on fresh material unless the temperature is 60° C (140 °F) or lower, as determined by surface thermometers.

IX. AMENDMENTS

If at any time during the course of the project a change to this quality control plan is agreed necessary by Company Representative (_____) and the Project Inspector, it can be amended by strike out and replacement followed by signatures in initial form and must be reported to the Project Engineer. A description of the change and reason for amendment should be noted in the Inspector's field diary for confirmation.

X. PROBLEM RESOLUTION

Any problems relating to paving equipment, techniques, or depth control, should be directed to the Paving Foreman (_____). If results are not satisfactory, the next responsible person would be the Project Superintendent (_____). Any problems still not resolved should then be directed to the Company Representative (_____).

Any problems relating to mat texture or testing should be directed to the Field Technician (_____) and the Paving Foreman (_____). Any problems still unanswered should be directed to the Materials Engineer (_____) and the Project Superintendent (_____). If results are not satisfactory, contact the Company Representative (_____).

Any problems related to Department requests or procedures including deficiencies or variances either from contract specifications or conditions that may have a detrimental effect on the life of the pavement should be reported to the Inspector for notation in the project diary and should be relayed to the Assistant Construction Engineer for action or future reference if premature failure occurs.

Submitted By: _____ **Date:** _____

Reviewed By: _____ **Date:** _____

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Harms:

12. Local Economy

C12 **Local Economy: (SE)** KSL identified impacts to the local economy as a potential harm. Public comment indicates the belief that the landfill has already had a negative impact on the local economy and has highlighted vacancies within the Keystone Industrial Park as an example of this impact.

Proposed mitigation: KSL states that the approval of the Phase III will not result in economic harm to the local economy. KSL states that the Phase III modification will result in the continuation and increase in waste disposal fees and continued and increased employment, wage, sales and real estate taxes, and substantial purchases from local vendors.

DEP review: KSL's application is confusing in that it says there will be no economic harm from the proposed expansion but then appears to describe mitigation in the form of continuation and increase in waste disposal fees, continued and increased employment, wage, sales and real estate taxes, and substantial purchases from local vendors. KSL must clarify if economic harms will be realized as a result of the expansion or not. If harms are identified KSL must define the harms and describe how those harms will be mitigated.

C12 **Local Economy Response Narrative**

KSL's application clearly stated "Continued operation of the KSL through approval of the Phase III permit modification will not result in any potential economic harm to the local economy" and offered comment regarding economic benefits, not as mitigation but, rather, as reflection of the fact that KSL adds to the economy rather than detracts from it.

That KSL does not harm the local economy is evidenced from several facts, beginning with the growth in overall economic activity in recent years in sharp contrast to Pennsylvania as a whole. A comparison of US Economic Census data for 2002 and 2012 demonstrates this. The data for Dunmore and Throop Boroughs, both of which are recognized by the Census Bureau as "Economic Places" is summarized below along with a comparison to Pennsylvania as a whole:

Dunmore and Throop Borough Industrial Growth, 2002-2012

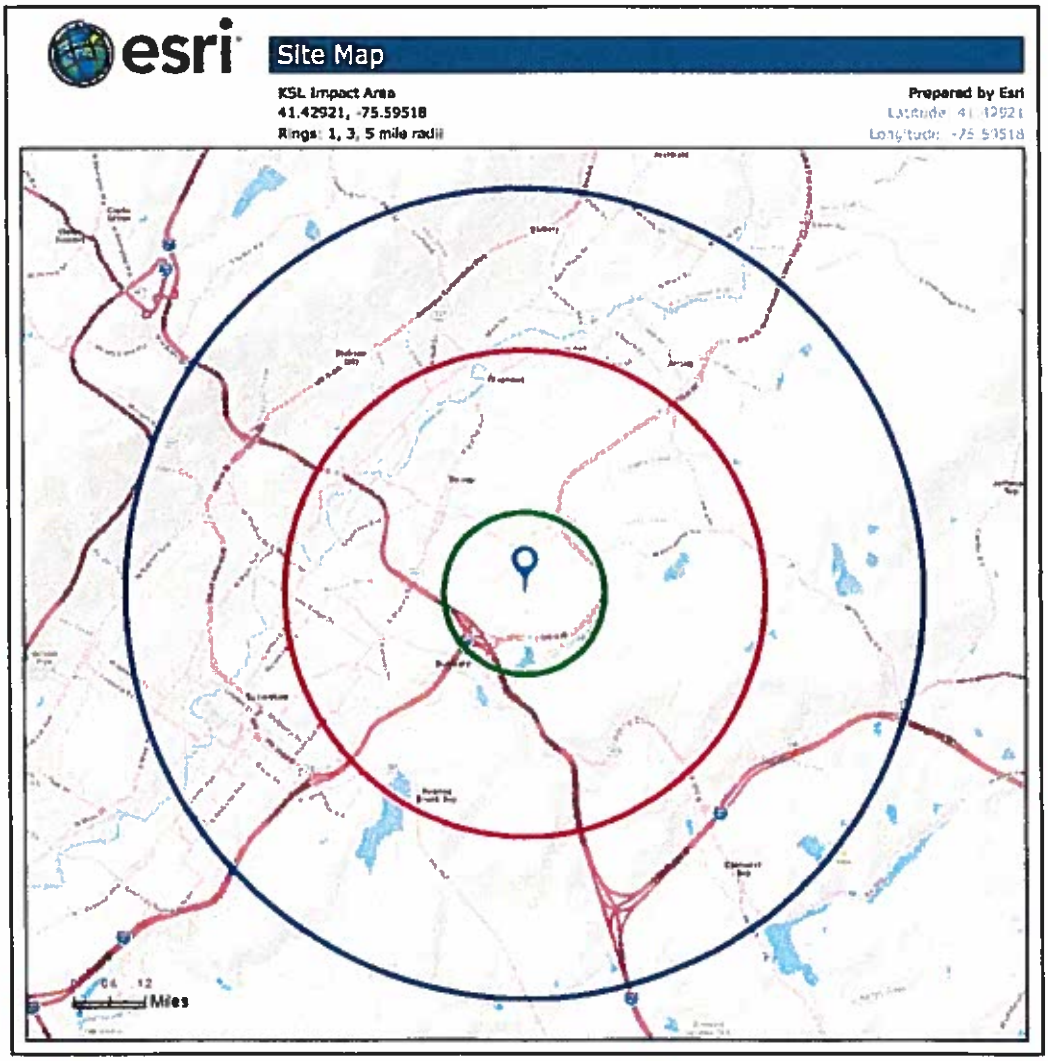
Source: US Economic Census, 2002 and 2012

Place	NAICS Classification	Description	Census Year	No. of Businesses	Revenue	Payroll	Employees
Dunmore	31-33	Manufacturing	2002	16	$153,286,000	$30,502	983
Dunmore	42	Wholesale trade	2002	24	$136,017,000	$13,655	345
Throop	42	Wholesale trade	2002	6	$51,237,000	$6,136	141
Totals, 2002				**46**	**$340,540,000**	**$50,293**	**1,469**
Dunmore borough, Pennsylvania	31-33	Manufacturing	2012	14	$144,494,000	$24,656	601
Dunmore borough, Pennsylvania	42	Wholesale trade	2012	25	$418,428,000	$22,232	515
Throop borough, Pennsylvania	31-33	Manufacturing	2012	9	N/A	$19,168	500
Throop borough, Pennsylvania	42	Wholesale trade	2012	8	$46,980,000	$8,137	173
Totals, 2012				**56**	**$609,902,000**	**$74,193**	**1,789**
Dunmore/Throop Change, 2002-2012				**10**	**$269,362,000**	**$23,900**	**320**
Dunmore/Throop Percent Change, 2002-2012				**22%**	**79%**	**48%**	**22%**
Pennsylvania Percent Change, 2002-2012				**-11%**	**44%**	**14%**	**-17%**

Note: *Throop revenue for 2012 not revealed so as to not identify company. Also, employees listed as a range with a minimum of 500.*

The data reveals industrial activity in the two boroughs, reflected in data for manufacturing and wholesale trade sectors responsible for filling the adjoining Keystone Industrial Park, enjoyed growth even during a period characterized by a steep economic recession in which Pennsylvania as a whole lost businesses in these sectors and saw major job losses (17%). Dunmore and Throop Borough industrial enterprises, by contrast, saw across-the-board growth above the Pennsylvania trend without counting some of the most recent activity in Throop (see chart note). Businesses increased by 22%, revenue (sales, receipts, etc.) grew by 79%, payroll jumped by 48% and more than 300 employees were added. KSL, which is located in the midst of this activity did nothing to harm the local economy. Indeed, the local economy prospered when others faltered.

Further evidence of this is supplied by ESRI, a premier source of market data used for business and economic development planning purposes. Market areas of 1 mile, 3 miles and 5 miles from KSL were defined for purposes of collecting some indication of whether the local economy might have been impacted by KSL. More than half of Lackawanna County's population lives within 5 miles of KSL.



Lackawanna County's employment statistics are, therefore, very relevant to the question of impact on the economy and the trend has been an upward one, not only recently, but over time. Lackawanna County employment, in fact, reached it's highest level in the last 25 years in October, 2015 with some 103,585 persons having jobs. That was 6,109 or 6.3% higher than 1990 employment, even though the county population then was 4,602 persons higher. With more than half the county within 5 miles of KSL it's again apparent it's not harmed the local economy.

There are various demographic factors indicating there has been no harm to the local economy. These include the following:

KSL Market Areas, Demographic Indicators

Source: ESRI Business Analyst

Criteria	1 Mile	3 Miles	5 Miles
Median Housing Value	$175,000	$143,524	$123,474
Median Rent	$856	$541	$545
Median Year Home Built	1978	1940	1940
Average Net Worth	$364,244	$303,108	$286,678
Employees Per Resident	9.93	0.71	0.75
Employees Per Business	23.87	13.69	3.49

Median housing values within 1 mile of KSL are $31,476 or 22% higher than those within 3 miles and $51,526 or 42% higher than those within 5 miles. Likewise, median rents are $315 or 58% higher than rents within 3 miles and $311 or 57% higher the rents within 5 miles. This indicates housing values, which indicate the overall health of a local economy, are also not being harmed by KSL, as they decrease as one moves away from it.

There are also newer houses with the median year of construction being some 38 years higher than those within either 3 miles or 5 miles. KSL has existed for over 45 years and, therefore, the bulk of this was constructed after it was established, an indication of no harm to the construction sector of the economy as well as another demonstration of the health of the local economy.

Households within the market area are also wealthier than those outside it, with a median net worth of $364,244 within 1 mile as contrasted to $303,108 within 3 miles and $286,678, the advantage nearer KSL ranging from 20-27%, showing there has been no negative impacts on incomes or wealth from KSL.

Finally, it's important to note the intensity of economic activity near KSL as compared to other areas as one moves away from it. The ratio of employees to residents within 1 mile of KSL is 9.93 to 1, whereas it less than one job per resident moving away from it. Likewise, employees per business average 23.87 within 1 mile, only 13.69 within 3 miles and but 3.49 within 5 miles. These are strong indications of a vibrant local economy unharmed in any way by KSL.

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Harms:

13. Stormwater/Surface Water Runoff

C13 Stormwater/surface water run off: (E) KSL identified that the continued construction and operation of KSL will require the disturbance of earthen materials which has the potential to result in release of sediment laden stormwater.

Proposed mitigation: KSL will continue to design, install and maintain E&S controls in accordance with DEP Chapter 102 regulations. KSL addressed the potential for an increase in stormwater runoff, by increasing the surface water runoff time of concentration by constructing terraces on disposal areas. The sedimentation/detention basins will control the rate of stormwater release in order to ensure post-development flows from the project will not exceed pre-development flows. Stormwater controls have been designed for a 100 year storm event.

DEP review: It appears that the application does not address the volume increases and water quality impacts that may be encountered as a result of the proposed landfill expansion. A volume control requirement is essential to mitigate the consequences of increased stormwater runoff.

KSL should provide PCSM BMPs to mitigate potential volume and water quality impacts consistent with the requirements of DEP's Chapter 102 regulations. The PCSM plan must be accompanied with a schedule to install any post construction stormwater BMPs.

C13 Stormwater/surface water run off Response Narrative

The Stormwater Management Plan has been completely updated to address comments from the third party independent review. In addition, the plan has been updated to sequence in the BMP's for the proposed site life of the Phase III Site Development. One of the major components of the updated plan was to include measures for Volume Control which was not part of the original plan. The revised Stormwater Management Plan can be found on Sheets 70 to 80, and the Post Construction Stormwater Management Plan is on Sheets 81 to 84. The PCSM Plan identifies a schedule for installation of all BMP's and a detailed Maintenance Schedule.

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Harms:

14. Air Quality

C14 **Air Quality: (E)** KSL has identified migration of particulate matter and methane gas as a potential harm. Public comment indicates that air quality is an important issue to those in the vicinity of the landfill.

Proposed mitigation: KSL's proposed mitigation includes continued expansion of the landfill gas control system, final liner capping within one year of any pad or segments of any pad achieving final elevation, use of water trucks to control dust, enforce site speed limit, and to apply water to certain residual wastes or construction and demolition waste to minimize dust. KSL is actively seeking to beneficially use all methane gas generated on site.

DEP review: The proposed mitigation does not define or address potential migration of particulate matter from the landfill operation or how the potential may change with the height of the landfill. The PA Department of Health and Agency for Toxic Substances and Disease Registry (ATSDR) are in the process of conducting a study that may identify if particulates are currently migrating from the landfill operation. KSL should evaluate the potential for off-site migration of particulate matter from the working face of the landfill. KSL should quantify the air emissions from the leachate lagoon and determine any increase in air emissions from additional leachate production from the proposed Phase III expansion.

C14 **Air Quality Response Narrative**

Evaluation of potential offsite migration of particulate matter from the working face is discussed in the Response to Comment B11 of this document. As discussed previously, the model demonstrates that (1) the maximum ground level concentration occurs at or near the source and decreases exponentially with distance as the receptor location gets further from the source, and (2) that there is no impact of changing the elevation of the landfill working face. Based on these model results and since the final Phase III Site Development elevation will be at the same maximum elevation of the previously approved Phase II elevation, the potential for offsite particulate matter emissions from operations will not increase with the Phase III Site Development. See the attached discussion of the model and results Exhibit C14.1. KSL will review the results of the PA Department of Health study when available and determine if further evaluation is necessary.

Emissions from the lagoon were estimated using US EPA Water9, Version 3.0 wastewater treatment model for a wastewater lagoon. Although the facility's anticipated leachate generation rate increased, no changes have been proposed to the existing lagoon capacity or surface area. Emissions at the flowrate of 75,000 gallons per day (GPD) are estimated to be 1.20 tons per year (tpy) (1.09 Mg/yr) of volatile organic compounds (VOCs) and 0.28 tpy (0.25 Mg/yr) of hazardous air pollutants (HAPs). Emissions at the increased flowrate of 150,000 GPD are estimated to be 1.40 tpy (1.27 Mg/yr) of VOCs and 0.53 tpy (0.48 Mg/yr) of HAPs. The VOC emissions from the lagoon are calculated to

increase by 0.20 tpy due to the increase in flowrate. Therefore, there is no significant increase in emissions at the lagoon associated with the increased leachate production rate. The WATER9 emission calculations are attached, as Exhibit C14.1.

EXHIBIT C14.1

LAGOON EMISSION CALCULATIONS

Keystone Sanitary Landfill
Phase III Expansion
Lagoon Emission Calculations

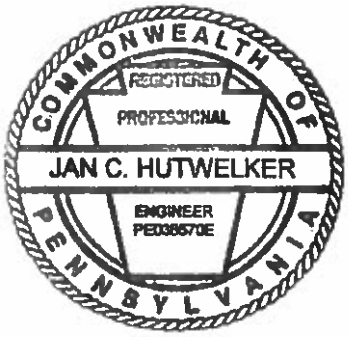
INTRODUCTION

As part of the Leachate Treatment Plant (LTP) expansion, the facility's anticipated leachate generation increased from 75,000 gallons per day (GPD) to 150,000 GPD. No changes were made to the existing lagoon capacity or dimensions as part of the expansion.

LAGOON EMISSION CALCULATIONS

Emissions from the lagoon were estimated using US EPA Water9, Version 3.0 wastewater treatment model for a wastewater lagoon. Emissions were calculated at the prior flow rate of 75,000 GPD and the increased flow rate of 150,000 GPD. Pollutant concentrations for volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) were obtained from 4th Quarter 2013 raw leachate (influent) sampling data provided by the facility.

Although the flow rate has increased, no changes have been proposed to the existing lagoon capacity or surface area. Emissions at a flow rate of 75,000 GPD are estimated to be 1.20 tons per year (tpy) (1.09 Megagrams per year (Mg/yr)) of VOCs and 0.28 tpy (0.25 Mg/yr) of HAPs. Emissions at the increased flow rate of 150,000 GPD are estimated to be 1.40 tpy (1.27 Mg/yr) of VOCs and 0.53 tpy (0.48 Mg/yr) of HAPs. The VOC emissions from the lagoon are calculated to increase by 0.20 tpy due to the increase in flow rate. Therefore, there is no significant increase in emissions at the lagoon associated with the increased leachate production rate. The WATER9 emission calculations are attached.



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ENGINEERING AND SCIENCE

Lagoon Emission Calculations

75,000 GPD Capacity

US EPA WATER9, Version 3.0

WASTEWATER TREATMENT SUMMARY II 04-04-2016 17:48:07
Keystone Sanitary Landfill Lagoon Calculations
VOC Emission Estimates, Existing LTP Capacity at 75,000 GPD

Project C:\Program Files\EPA Water 9\KSL Lagoon EPAWater9 Draft1_VOCs, 75 GPD 3/24/2016 7:41:48 PM

Compound	Rate (g/s)	Fraction Air	Rate (lb/day)	Loading (ppmv)
PROPENAL (acrolein)	7.46E-03	0.24304	1.41946	9.3
ACRYLONITRILE	1.55E-05	0.12021	0.00294	0.039
BENZENE	4.78E-06	0.06589	0.00091	0.022
BROMODICHLOROMETHANE	7.18E-05	0.9885	0.01366	0.022
BROMOFORM (tribromomethane)	5.83E-06	0.08029	0.00111	0.022
BROMOMETHANE	4.62E-05	0.23727	0.00879	0.059
CARBON TETRACHLORIDE	4.15E-06	0.05716	0.00079	0.022
CHLOROBENZENE	8.14E-07	0.01121	0.00015	0.022
CHLOROETHANE (ethyl chloride)	1.16E-05	0.18448	0.0022	0.019
2 CHLOROETHYLVINYLETHER	1.89E-04	0.98928	0.03603	0.058
CHLOROETHYLENE (vinyl chloride)	5.34E-05	0.43732	0.01016	0.037
CHLOROFORM	2.48E-05	0.11059	0.00472	0.068
DIBROMOCHLOROMETHANE	7.17E-05	0.98796	0.01365	0.022
1,2 DICHLOROBENZENE (-o)	9.07E-06	0.12492	0.00173	0.022
1,3 DICHLOROBENZENE (-m)	2.54E-06	0.03505	0.00048	0.022
1,4 DICHLOROBENZENE (-p)	4.29E-06	0.03517	0.00082	0.037
DICHLOROETHANE(1,1) ethylidenedichlori	3.05E-06	0.04197	0.00058	0.022
DICHLOROETHANE(1,2)	6.48E-06	0.08926	0.00123	0.022
1,1 DICHLOROETHENE vinylidene chlorid	1.09E-05	0.10029	0.00208	0.033
1,2 DICHLOROETHENE trans	2.21E-05	0.1811	0.00421	0.037
DICHLOROPROPANE 1,2	4.34E-06	0.05983	0.00083	0.022
1,3 DICHLOROPROPENE	1.62E-05	0.1119	0.00309	0.044
ETHYLBENZENE	6.96E-06	0.03834	0.00132	0.055
CHLOROMETHANE (methylchloride)	1.35E-05	0.09264	0.00256	0.044
TOLUENE	9.51E-06	0.03558	0.00181	0.081
1,1,2 TRICHLOROETHANE	7.73E-06	0.10646	0.00147	0.022
TRICHLOROETHYLENE	6.87E-06	0.09465	0.00131	0.022
XYLENE	2.96E-05	0.05032	0.00563	0.178
Petroleum Hydrocarbons (as Distillate	2.65E-02	0.86415	5.04715	9.3
TETRACHLOROETHANE(1,1,2,2)	7.65E-06	0.10537	0.00146	0.022

TOTAL EMISSIONS ALL COMPOUNDS	3.46E-02 g/s air emissions
TOTAL EMISSIONS ALL COMPOUNDS	1.09 Mg/yr air emissions
TOTAL LOADING	2.05 Mg/yr in waste
TOTAL WATER FLOW	3.3 L/s

WASTEWATER TREATMENT SUMMARY II 04-04-2016 17:41:19
Keystone Sanitary Landfill Lagoon Calculations
HAP Emission Estimates, Existing LTP Capacity at 75,000 GPD

Project C:\Program Files\EPA Water 9\KSL Lagoon EPAWater9 Draft1_HAPs, 75 GPD 3/24/2016 8:01:49 PM

Compound	Rate (g/s)	Fraction Air	Rate (lb/day)	Loading (ppmv)
PROPENAL (acrolein)	7.46E-03	0.24304	1.41946	9.3
ACRYLONITRILE	1.55E-05	0.12021	0.00294	0.039
BENZENE	4.78E-06	0.06589	0.00091	0.022
BROMOFORM (tribromomethane)	5.83E-06	0.08029	0.00111	0.022
BROMOMETHANE	4.62E-05	0.23727	0.00879	0.059
CARBON TETRACHLORIDE	4.15E-06	0.05716	0.00079	0.022
CHLOROBENZENE	8.14E-07	0.01121	0.00015	0.022
CHLOROETHANE (ethyl chloride)	1.16E-05	0.18448	0.0022	0.019
CHLOROETHYLENE (vinyl chloride)	5.34E-05	0.43732	0.01016	0.037
CHLOROFORM	2.48E-05	0.11059	0.00472	0.068
1,4 DICHLOROBENZENE (-p)	4.29E-06	0.03517	0.00082	0.037
DICHLOROETHANE(1,1) ethylidenedichlori	3.05E-06	0.04197	0.00058	0.022
DICHLOROETHANE(1,2)	6.48E-06	0.08926	0.00123	0.022
1,1 DICHLOROETHENE vinylidene chlorid	1.09E-05	0.10029	0.00208	0.033
DICHLOROPROPANE 1,2	4.34E-06	0.05983	0.00083	0.022
1,3 DICHLOROPROPENE	1.62E-05	0.1119	0.00309	0.044
ETHYLBENZENE	6.96E-06	0.03834	0.00132	0.055
CHLOROMETHANE (methylchloride)	1.35E-05	0.09264	0.00256	0.044
TOLUENE	9.51E-06	0.03558	0.00181	0.081
1,1,2 TRICHLOROETHANE	7.73E-06	0.10646	0.00147	0.022
TRICHLOROETHYLENE	6.87E-06	0.09465	0.00131	0.022
XYLENE	2.96E-05	0.05032	0.00563	0.178
TETRACHLOROETHANE(1,1,2,2)	7.65E-06	0.10537	0.00146	0.022
METHYLENE CHLORIDE, dichloromethane	1.81E-05	0.21137	0.00345	0.026
TETRACHLOROETHENE	8.14E-06	0.11219	0.00155	0.022
TRICHLOROETHANE 1,1,1 methyl chlorofor	7.88E-06	0.10852	0.0015	0.022

TOTAL EMISSIONS ALL COMPOUNDS	7.79E-03 g/s air emissions
TOTAL EMISSIONS ALL COMPOUNDS	0.25 Mg/yr air emissions
TOTAL LOADING	1.07 Mg/yr in waste
TOTAL WATER FLOW	3.3 L/s

SPECIFIED UNIT PROPERTIES 04-05-2016
Keystone Sanitary Landfill Lagoon Calculations
Lagoon Unit, Existing LTP Capacity at 75,000 GPD

Project C:\Program Files\EPA Water 9\KSL Lagoon EPAWater9 Draft1_HAPs, 75 GPD 3/24/2016 8:01:49 PM 09:47:22

General System Specifications.....

1 Total water added at the unit (l/s)	0	3.3
2 Area of openings at unit (cm2)		200
3 Radius of drop pipe (cm)		8
4 Drop length to conduit (cm)		150
5 Humidity of inlet air (%)		65
6 Temperature of air (C)		11
7 Drain air velocity (ft/min)		84
8 manhole air velocity (ft/min)		128
9 Conduit air velocity (ft/min)		66
10 Wind speed (cm/s at 10 m)		310
11 distance to next unit (cm)		500
12 slope of underflow conduit		0.015
13 friction factor liquid		0.016
14 friction factor gas		0.006
15 radius of underflow conduit (cm)		8
16 Underflow T (C)		18.33
17 oscillation cycle time (min)		5
18 design collection velocities (ft/s)		2
19 design branch line fraction full		0.4
20 fraction of wind speed on open drains		0

Type of unit is lagoon

1 101 Description of unit	2 KSL Lagoon	
2 2 Wastewater temperature (C)		18.33
3 67 Length of impoundment (m)		94
4 68 Depth of impoundment (m)		3
5 71 Width of impoundment (m)		94
6 70 active biomass, impoundment (g/l)		0.05
7 72 if there is plug flow, enter 1		0
8 76 time for emissions in lagoon (months)		3
9 75 Overall biorate (mg/g bio-hr)		19
10 278 sorption flag for solids settling =1		0

waste 1 added to system at unit 1
waste 2 added to system at unit 0
waste 3 added to system at unit 0

Lagoon Emission Calculations

150,000 GPD Capacity

US EPA WATER9, Version 3.0

WASTEWATER TREATMENT SUMMARY II 04-04-2016 17:49:43
Keystone Sanitary Landfill Lagoon Calculations
VOC Emission Estimates, Proposed LTP Capacity at 150,000 GPD

Project C:\Program Files\EPA Water 9\KSL Lagoon EPAWater9 Draft1_VOCs, 150 GPD 3/24/2016 7:17:20 PM

Compound	Rate (g/s)	Fraction Air	Rate (lb/day)	Loading (ppmv)
PROPENAL (acrolein)	1.46E-02	0.23747	2.77388	9.3
ACRYLONITRILE	3.03E-05	0.11753	0.00576	0.039
BENZENE	9.31E-06	0.06414	0.00177	0.022
BROMODICHLOROMETHANE	1.15E-04	0.78929	0.02181	0.022
BROMOFORM (tribromomethane)	1.14E-05	0.07847	0.00217	0.022
BROMOMETHANE	8.99E-05	0.23095	0.01711	0.059
CARBON TETRACHLORIDE	8.08E-06	0.05564	0.00154	0.022
CHLOROBENZENE	1.58E-06	0.01091	0.0003	0.022
CHLOROETHANE (ethyl chloride)	2.25E-05	0.17955	0.00429	0.019
2 CHLOROETHYLVINYLETHER	3.20E-04	0.8353	0.06085	0.058
CHLOROETHYLENE (vinyl chloride)	1.03E-04	0.42329	0.01967	0.037
CHLOROFORM	4.83E-05	0.10765	0.00919	0.068
DIBROMOCHLOROMETHANE	1.12E-04	0.7715	0.02132	0.022
1,2 DICHLOROBENZENE (-o)	1.77E-05	0.12165	0.00336	0.022
1,3 DICHLOROBENZENE (-m)	4.95E-06	0.03412	0.00094	0.022
1,4 DICHLOROBENZENE (-p)	8.36E-06	0.03424	0.00159	0.037
DICHLOROETHANE(1,1) ethylidenedichlori	5.93E-06	0.04086	0.00113	0.022
DICHLOROETHANE(1,2)	1.26E-05	0.08692	0.0024	0.022
1,1 DICHLOROETHENE vinylidene chlorid	2.13E-05	0.09761	0.00405	0.033
1,2 DICHLOROETHENE trans	4.30E-05	0.17628	0.00819	0.037
DICHLOROPROPANE 1,2	8.46E-06	0.05825	0.00161	0.022
1,3 DICHLOROPROPENE	3.16E-05	0.10898	0.00602	0.044
ETHYLBENZENE	1.35E-05	0.03732	0.00258	0.055
CHLOROMETHANE (methylchloride)	2.62E-05	0.09017	0.00498	0.044
TOLUENE	1.85E-05	0.03464	0.00352	0.081
1,1,2 TRICHLOROETHANE	1.51E-05	0.1037	0.00287	0.022
TRICHLOROETHYLENE	1.34E-05	0.09213	0.00255	0.022
XYLENE	5.76E-05	0.04906	0.01097	0.178
Petroleum Hydrocarbons (as Distillate	2.44E-02	0.39722	4.63997	9.3
TETRACHLOROETHANE(1,1,2,2)	1.49E-05	0.10272	0.00284	0.022

TOTAL EMISSIONS ALL COMPOUNDS	4.01E-02 g/s air emissions
TOTAL EMISSIONS ALL COMPOUNDS	1.27 Mg/yr air emissions
TOTAL LOADING	4.1 Mg/yr in waste
TOTAL WATER FLOW	6.6 L/s

WASTEWATER TREATMENT SUMMARY II 04-04-2016 17:51:23
Keystone Sanitary Landfill Lagoon Calculations
HAP Emission Estimates, Proposed LTP Capacity at 150,000 GPD

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Compound	Rate (g/s)	Fraction Air	Rate (lb/day)	Loading (ppmv)
PROPENAL (acrolein)	1.46E-02	0.23747	2.77388	9.3
ACRYLONITRILE	3.03E-05	0.11753	0.00576	0.039
BENZENE	9.31E-06	0.06414	0.00177	0.022
BROMOFORM (tribromomethane)	1.14E-05	0.07847	0.00217	0.022
BROMOMETHANE	8.99E-05	0.23095	0.01711	0.059
CARBON TETRACHLORIDE	8.08E-06	0.05564	0.00154	0.022
CHLOROBENZENE	1.58E-06	0.01091	0.0003	0.022
CHLOROETHANE (ethyl chloride)	2.25E-05	0.17955	0.00429	0.019
CHLOROETHYLENE (vinyl chloride)	1.03E-04	0.42329	0.01967	0.037
CHLOROFORM	4.83E-05	0.10765	0.00919	0.068
1,4 DICHLOROBENZENE (-p)	8.36E-06	0.03424	0.00159	0.037
DICHLOROETHANE(1,1) ethylidenedichlori	5.93E-06	0.04086	0.00113	0.022
DICHLOROETHANE(1,2)	1.26E-05	0.08692	0.0024	0.022
1,1 DICHLOROETHENE vinylidene chlorid	2.13E-05	0.09761	0.00405	0.033
DICHLOROPROPANE 1,2	8.46E-06	0.05825	0.00161	0.022
1,3 DICHLOROPROPENE	3.16E-05	0.10898	0.00602	0.044
ETHYLBENZENE	1.35E-05	0.03732	0.00258	0.055
CHLOROMETHANE (methylchloride)	2.62E-05	0.09017	0.00498	0.044
TOLUENE	1.85E-05	0.03464	0.00352	0.081
1,1,2 TRICHLOROETHANE	1.51E-05	0.1037	0.00287	0.022
TRICHLOROETHYLENE	1.34E-05	0.09213	0.00255	0.022
XYLENE	5.76E-05	0.04906	0.01097	0.178
TETRACHLOROETHANE(1,1,2,2)	1.49E-05	0.10272	0.00284	0.022
METHYLENE CHLORIDE, dichloromethane	3.53E-05	0.20577	0.00672	0.026
TETRACHLOROETHENE	1.59E-05	0.1092	0.00302	0.022
TRICHLOROETHANE 1,1,1 methyl chlorofor	1.53E-05	0.10563	0.00292	0.022

TOTAL EMISSIONS ALL COMPOUNDS	1.52E-02 g/s air emissions
TOTAL EMISSIONS ALL COMPOUNDS	0.48 Mg/yr air emissions
TOTAL LOADING	2.14 Mg/yr in waste
TOTAL WATER FLOW	6.6 L/s

SPECIFIED UNIT PROPERTIES 04-05-2016
Keystone Sanitary Landfill Lagoon Calculations
Lagoon Unit, Proposed LTP Capacity at 150,000 GPD

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General System Specifications.....

1 Total water added at the unit (l/s) 0		6.6
2 Area of openings at unit (cm2)		200
3 Radius of drop pipe (cm)		8
4 Drop length to conduit (cm)		150
5 Humidity of inlet air (%)		65
6 Temperature of air (C)		11
7 Drain air velocity (ft/min)		84
8 manhole air velocity (ft/min)		128
9 Conduit air velocity (ft/min)		66
10 Wind speed (cm/s at 10 m)		310
11 distance to next unit (cm)		500
12 slope of underflow conduit		0.015
13 friction factor liquid		0.016
14 friction factor gas		0.006
15 radius of underflow conduit (cm)		8
16 Underflow T (C)		18.33
17 oscillation cycle time (min)		5
18 design collection velocities (ft/s)		2
19 design branch line fraction full		0.4
20 fraction of wind speed on open drains		0

Type of unit is lagoon

1 101 Description of unit	1 KSL Lagoon	
2 2 Wastewater temperature (C)		18.33
3 67 Length of impoundment (m)		86
4 68 Depth of impoundment (m)		3
5 71 Width of impoundment (m)		50
6 70 active biomass, impoundment (g/l)		0.05
7 72 if there is plug flow, enter 1		0
8 76 time for emissions in lagoon (months)		0.75
9 75 Overall biorate (mg/g bio-hr)		19
10 278 sorption flag for solids settling =1		0

waste 1 added to system at unit 1
waste 2 added to system at unit 0
waste 3 added to system at unit 0

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Harms:

15. Groundwater Impact

C15 **Groundwater Impacts: (E)** KSL has identified groundwater impacts as a potential harm. Public comment indicates that groundwater impacts are a concern of those living in the vicinity of the landfill. Currently there are impacts seen in MW-15, which is a well that monitors a low volume of drainage in the Dunmore#3 coal vein. The parameters that are elevated in this well indicate that there may have been a release of treated leachate.

Proposed mitigation: The Phase III expansion will be a double lined landfill that will contain waste and waste constituents within the landfill. KSL states that they have 6 up gradient and 27 down gradient monitoring wells that show that the liner system is effective at preventing release of contaminants into the groundwater. KSL will continue to pretreat leachate from the landfill prior to discharge to the Scranton Sewer Authority for final treatment. KSL is in the process of replacing their leachate treatment plant with a new facility capable of treating 150,000 gallons per day to the effluent limits required by the Scranton Sewer Authority. KSL states they will promptly install their liner cap system in a phased approach which will aid in reducing the potential development of leachate.

DEP review: MW-15A ground water issues began in August 2002 with increases in the indicator parameters. Assessment was required in July 2003. Cracks in the treatment plant's concrete floor were identified as a likely source. During the investigation it was discovered that during process tank/equipment repairs tank (s) were drained to the floor and material was allowed to flow to the floor drains within the building. Repairs were made around the tank base, although cracks remain in the building. Interior soil samples, dye tracing (no determination), drain line televising and smoke testing investigations were also performed in this phase. In subsequent years additional or new potential sources occurred; clogged/broken sewer with overflowing manhole (December 2004), leachate outbreak on the down ditch from Tabor (June 2005), manhole overflow in 2010. The lagoon liner was patched in 2007 and replaced in 2010. Tank leakage continued to occur sporadically. The 2011 record rainfall and 2012 hurricane event were thought to increase flushing with the soil overburden; however increases continued to be shown. KSL is continuing to investigate possible causes and the extent of the groundwater impacts. KSL needs to describe the historic/ongoing problems with the leachate management system (groundwater impacts to MW-15A) and KSL's ongoing mitigation efforts.

KSL is not proposing to remove all of the waste in the unlined Keystone/Dunmore area. Although approximately 8 million tons is to be removed, approximately 2 million cubic yards of waste will remain in pits of unknown depth.

The potential for unknown waste constituents to cause ground water contamination with the compaction of this waste and construction of Phase III on top of it will not be eliminated. KSL should define the potential for leachate to be expelled from the remaining waste and address how they will mitigate the potential for contamination of groundwater.

C15 Groundwater Impacts Response Narrative

BACKGROUND

Mine drainage quality data from monitoring well MW-15A, a downgradient mine drainage monitoring well located near the Keystone Sanitary Landfill (KSL) Treatment Plant, has been the focus of recent attention due to increases in monitored parameters, notably nitrate-nitrogen. By design, MW-15A and other mine drainage monitoring wells on site are used to monitor the quality of subsurface drainage along the floors of historically-mined coal seams present beneath much of the landfill site and adjacent lands. These wells do not monitor the quality of the regional 'mine-pools' located along the axis of the Lackawanna Basin a few miles west of the property, but rather monitor infiltrating waters passing from the surface down through any near-surface fill material, glacial deposits, mine spoils and overburden rock units of the Llewellyn Formation (Fm.).

The Llewellyn Fm. contains the three (3) major coal seams historically mined on site the Dunmore Nos. 1, 2, and 3. As a result of historical mining practices, the Llewellyn Fm. is no longer considered a viable aquifer throughout most of the valley. Surface mining activities and historic deep/underground mining practices have eliminated the natural hydrologic properties of the Llewellyn Fm. through both the removal of overburden and/or the fracturing of overlying rock units above the coal seams following nearly complete deep mining extraction of the seams present. As a result, surface water rapidly infiltrates the overlying material above the mined coal seams, often migrating to the lowest mined seam (the Dunmore No. 3), then drains along the floor of the lowest seam down-dip structurally until it encounters one of the valley's major (regional) mine pools or mine water discharge features. Thus, mine drainage wells at KSL (such as MW-15A) were drilled and constructed to intercept and sample these relatively shallow infiltrating waters as they flow along the floors of the previously mined seams. While some of the infiltrating waters originate throughout the landfill site, others originate on neighboring properties, nearby roadways (such as the Lackawanna Valley Industrial Highway [LVIH]), and other commercial/industrial facilities also underlain by the Llewellyn Fm.

The mine drainage wells serve as an early warning system of any degradation of the underground hydrologic system potentially resultant from landfill practices. However, the mine drainage monitored is not considered a drinking water source due to its impaired quality from mining.

The Susquehanna River Basin Commission and the Pennsylvania Topographic and Geologic Survey consider the quality of water within, or in close proximity to, the mines too poor for most uses (Water Resources Reports 41 & 58). In addition to these 'mine drainage' monitoring wells, KSL also monitors several Lower Aquifer System/Regional Water Table (LAS) wells that, by design, only draw their water from deeper, regional groundwater flows/geologic formations. These deeper flows

and the containing rock units extend to various depths below the landfill and most of the Lackawanna Valley. Overall, these deeper water supplies can be considered more potable than the mine drainage units above; however, they too are often naturally impacted with high concentration of metals (such as iron) and other inorganics (such as sulfur), which require significant treatment to be made potable for human consumption. None of the aforesaid impacts are the result of KSL landfilling activities, as these impacts pre-date landfilling. In general, most of the potable water consumed in the Lackawanna Valley comes from surface water impoundments or reservoirs, which derive their waters from mountain streams/watersheds up gradient from the coal-bearing rock units found in the valley. In addition, most municipalities within the coal mining areas limit the use of mine impacted waters to non-potable/industrial uses and required hook-ups to municipal supplies wherever feasible (Throop and Dunmore Boroughs Subdivision and Land Development Ordinances). These municipal supplies are from surface water sources upgradient and/or hydraulically isolated from the KSL. (See attached KSL Mine Drainage Intercept Plan for location of Dunmore No. 1 Reservoir in relation to KSL site and subsurface drainage features. Exhibit C15.5).

MW-15A MINE DRAINAGE QUALITY/INVESTIGATION

Monitoring well MW-15A was originally constructed in 1987 and was incorporated into the landfill's permanent monitoring program shortly after construction. The well was drilled to a total depth of 109 feet below the surface, through approximately 55 feet of unconsolidated sand and glacial till extending from the ground surface to the broken/fractured bedrock above the Dunmore No. 3 seam. The location of the wellhead borders a rock-lined surface water drainage ditch, two (2) lined landfill lagoons, and the landfill's treatment plant building. The same unconsolidated sand/till materials and coal seams penetrated by MW-15A also underlie the lined lagoons, treatment plant, and drainage ditch.

Starting in 2003, routine quarterly analyses (PADEP Form 19) of samples indicated elevated levels of nitrates and other indicator inorganic constituents in the mine drainage associated with MW-15A. This prompted several investigative efforts and remedial measures over the past 13 years to find and arrest the source of the MW-15A variants.

In 2003, shallow soil samples were collected outside the nearby treatment plant building, while inside the plant, several drain lines were inspected via camera, smoke and dyes. Shallow soil samples were obtained below a few floor cracks in the plant, but none displayed high levels of any of the constituents found in MW-15A. All of the floor cracks were subsequently sealed and additional drain lines were installed to help alleviate any ponding on the treatment plant floor.

During the period of 2003 through 2012, nitrate levels in MW-15A averaged 30.6 mg/l (with the minimum, 22.6 mg/l, noted in 2010 and the maximum, 39.8 mg/l, noted in 2006). In 2013, the average nitrate level increased to 76.9 mg/l (151% increase), followed by further increases in 2014 to 114.4 mg/l (49% increase) and in

2015 to 123.9 mg/l (an 8% increase). Recent data indicates the concentration has "leveled-off" to approximately the 2015 value.

Between 2004 and 2007, monitoring of the chemistry of MW-15A continued. Dye testing of the influent wet well was performed, but the dye was not detected in MW-15A. A well "flushing" program also occurred whereby clean "city water" was injected into MW-15A to help remove any remnant materials that may have built up around the well bore/mine working. During this period, other underground lines around the Treatment Plant, including the sewer line from the nearby OWT landfill gas facility, were tested as possible sources. Following an evaluation of the lagoons, patch repairs were made to portions of the lagoon liners in 2007, and subsequently, in 2010, the primary liners of the two (2) lagoons were replaced. Following the 2007 repairs to the lagoon liners, nitrate concentration in the MW-15A mine drainage appeared to be decreasing; however, by late-2012, nitrate levels were again on the rise in MW-15A. Increased monitoring continued until 2014 when landfill personnel discovered a leak in a drain line from the treatment plant to the Wet Well. The nature of this leak was such that only during peak levels in the lagoons did the leakage occur. Upon this discovery in late-2014, landfill personnel excavated the area, replaced the piping, and sealed the Wet Well vault.

In January 2015, a new downgradient monitoring well (MW-43D) was installed just west of the Treatment Plant to determine if the elevated nitrate concentrations found in MW-15A were present beyond that well. MW-43D was drilled and constructed in an identical manner as MW-15A and fitted with a dedicated sampling pump that draws samples from the same mine drainage system as MW-15A. Since installation, approximately forty (40) samples have been obtained from MW-43D. None of the samples show any similarities to the elevated nitrate concentrations found in MW-15A with all results indicated as "not detected" (with a reporting detection limit of 0.5 mg/l). While nitrate levels in the treated wastewater have been "not detected" since 2014 (with a 5.0 mg/l reported detection limit), sufficient ammonia-nitrogen levels are present to support nitrification. Given the presence of dissolved oxygen in the lagoons from the aerators used for mixing leachate prior to treatment, and alkalinity levels high enough to support nitrification, it is feasible that aerobic microbes have been established in the underlying soils to convert ammonia-nitrogen to nitrate.

In April and August 2015, two (2) separate soil boring investigations using a GeoProbe and air rotary drilling equipment were employed to characterize the shallow subsurface materials around the Wet Well and the underground piping leading toward the rear of the Treatment Plant near MW-15A and MW-43D. Subsurface conditions found near the Wet Well within the first soil boring required the use of an air rotary rig to penetrate the surface materials to approximately 30 feet before the sandy/silty soils below could be penetrated and sampled with a GeoProbe unit. None of the soil samples displayed any elevated nitrate concentrations that could be tied to the leak at the Wet Well and the MW-15A chemistry. Downhole permeability testing of the sands and silts encountered in

these borings indicated relatively "tight" (i.e., low hydraulic conductivity) conditions which would greatly restrict any vertical movement of the Wet Well leakage to the underground mine working.

In August 2015, additional borings, referred to as "Holes A through D," were sited in close proximity to the Wet Well and drilled with an air rotary rig to depths where refusal was encountered during the April 2015 Geoprobe boring event (generally 33 – 37 feet from the surface). Holes A and B were drilled to 37 and 35 feet from the surface, respectively, with an air rotary rig and 6-inch steel casing was installed to prevent collapse throughout the air rotary depths; both encountered cloudy, perched water and both had blown yields in excess of 3-5 gallons per minute following cleanout of the steel casing. Due to the presence of the perched water, no further Geoprobe extension of these two holes was attempted. Slotted PVC pipe was added to facilitate installation of a submersible pump in Hole B, which had the best blown yield of the two holes. Similarly, Holes C and D were drilled initially 35.5 and 33 feet, respectively, with 6-inch steel casing installed to those same depths. A Geoprobe rig was subsequently used to deepen Holes C and D to their final total depths of 47 and 50.5 feet, respectively. Both Holes C and D did not encounter any significant quantity of perched water prior to installing the steel casing and were dry (no static water) after completion of the Geoprobe drilling/sampling.

Although the exact source of this impacted perched water could not be determined, a purge pump was placed in the more productive Hole B and began pumping the water back into the east leachate lagoon at a rate of approximately 10 gallon per minute. (*Note*: The water level in the Hole A responded to the pumping of Hole B; however, the yield of Hole A is very small compared to Hole B.) This pumping process began in August 2015 with water level measurements and water sampling occurring regularly; however, the dry, late summer weather was often prohibitive to pumping of this perched water as water levels in Hole B fell below the pump intake due to the lack of recharge. This observation helps confirm the small aerial extent of this perched water zone and its dependence on recharge from the surface. As with MW-43D, nitrate levels in samples taken from both Hole A and Hole B are all "not detected," again indicating no similarities with monitoring well MW-15A chemistry.

On December 7, 2015, another attempt was made to locate a possible source of the impacted mine drainage found in MW-15A. A temporary monitoring well (MW-44DT) was installed near the Wet Well in an area where the Dunmore No. 2 and No. 3 coal seams had been previously determined to be absent. The temporary well was drilled to 140 feet but did not encounter any water/flow zones at depth and, to date, remains dry. (See attached Leachate Lagoon Layout Sheet: C-1 for locations of monitoring wells, soil borings, and other site features near the KSL Treatment Plant and lagoons. Exhibit C15.1)

Additional source identification efforts around the treatment plant and lagoons are continuing. Video inspection, pressure testing and cleaning of the various pipes leading to and from the lagoons has been ongoing, with equipment assistance from

the Scranton Sewer Authority (SSA). Additional mapping updates are also being used to identify various underground lines which can be removed.

Overall, groundwater quality data from MW-15A and all other site monitoring wells have regularly been compared to existing medium-specific concentrations (MSC) established by Pennsylvania's Land Recycling and Environmental Remediation Standards Act (Act 2) and its implementing regulations 25 Pa. Code Ch. 250. To be conservative, established concentrations listed for Non-Residential/Used Aquifer conditions were often reviewed, although the mine water is not considered potable, and does not mix with the deeper regional aquifer system (LAS). In nearly all cases, the established MSC's in the Act far exceed the concentrations in the on-site monitoring wells often by several orders of magnitude. Nitrate concentrations in MW-15A currently average between 120 and 130 mg/l, the Non-Residential/Non-Use MSC is 10,000 mg/l. MW-15A collects mine drainage from the floor of the Dunmore No. 3 coal seam within the "sump" constructed into the floor of the seam within the well. Since 2014, impacted mine drainage from that well has been regularly purged and put into the nearby wastewater lagoons at a rate of between 75 and 100 gallons per day (the maximum yield for the well). Any drainage not captured by MW-15A must travel downdip to the regional mine pool where it mixes with several billion gallons of mine impacted water which again is not used for human consumption. The movement of the regional mine pool water is ultimately controlled by its primary discharge point at the Old Forge Borehole, several miles downgradient of the KSL. The Old Forge Borehole, which discharges at an average rate of approximately 60.7 million gallons per day to the Lackawanna River, was installed by the Commonwealth to help alleviate basement and low land flooding. Any groundwater traveling from the KSL site to the regional mine pool is diluted with several billion gallons of mine pool water prior to discharge. Thus, although KSL's first priority is to mitigate the source of the nitrates found in MW-15A, they are currently pumping most of the impacted mine drainage back into the wastewater lagoons. Any quantity of impacted mine drainage not currently captured by MW-15A is insignificant compared to the total regional mine pool volume and discharge to the Lackawanna River and poses no risk to any downstream users.

GEOPHYSICAL SURVEY

On March 9 and 10, 2016 a geophysical survey was employed in the vicinity of the lagoons and MW-15A. The geophysical survey utilized electric resistivity (ER) techniques in an attempt to identify electrically conductive (i.e., low electrical resistivity) materials in the subsurface strata that may be associated with the presence of leachate. The results from the geophysical survey indicate the presence of localized occurrences of relatively low resistivity materials in the subsurface between 7.5 feet below ground surface (bgs) to 40 feet bgs, and in deeper intervals. The low resistivity materials in the subsurface are present along the southern edge of the west lagoon and in the vicinity of MW-15A. Higher resistivity materials are present elsewhere at this site including the area north of the west lagoon and around

MW-16A indicating relatively dry natural conditions in those areas. (See attached Summary Sheet of ER Survey in Exhibit C15.4).

The localized occurrences of low resistivity materials revealed by the Geophysical Survey suggest that aerated leachate is present in the subsurface strata along the southern edge of the west lagoon and in the vicinity of MW-15A.

CONCLUSIONS

As of the date of this writing, the extensive effort to find and arrest the source of impacted mine drainage in MW-15A has resulted in actionable findings but continues as described below. From the available data, it has been concluded:

- **Starting in 2003, routine analyses of samples from MW-15A indicated degradation of the mine drainage quality, limited to that monitoring location only. Neither the adjacent monitoring wells nor the recently-installed (2015) additional borings/holes have witnessed an increase of nitrate levels, further indicating a highly localized source.**

- **The drain line/Wet Well leakage discovered in 2014 likely impacted the shallow soils around the Wet Well with aerated leachate components. Based on the investigations, the impacted area is limited to the permeable fill materials and low permeability sand and silts near the Wet Well, but does not include MW-15A.**

- **The results of the intensive investigation conducted by KSL, described above to locate the source and scope of the condition that have resulted in an increase in inorganic compounds at MW-15A, indicate that there may be a minor penetration of the lagoon liner and/or seam separation and/or a failure of the lagoon detection piping.**

- **The volume of liquid flowing to MW-15A is limited in area and volume; it is composed of non-organic compounds and does not reach the regional groundwater table or surface water reservoirs, used for potable water supplies. Thus it is not a hazard to the public health and safety.**

- **An evaluation of the data from the Geophysical Survey performed in March 2016 indicates the potential for liner leakage and/or pipe boot penetration leakage and/or pipe leakage, but, in any case, such leakage is localized, small in terms of flow/volume, and within or very proximal to the lagoon footprint to be affecting water quality in MW-15A. The volume of any such leakage has been estimated to be less than 100 gallons per day. This estimated volume of leakage represents a *de minimis* fraction of the natural daily flow of mine drainage in the Llewellyn Fm.**

- **During the period of 2003 through 2012, nitrate levels in MW-15A averaged 30.6 mg/l (with the minimum, 22.6 mg/l, noted in 2010 and the maximum, 39.8 mg/l,**

noted in 2006). In 2013, the average nitrate level increased to 76.9 mg/l (151% increase), followed by further increases in 2014 to 114.4 mg/l (49% increase) and in 2015 to 123.9 mg/l (an 8% increase). Recent data indicates the concentration has "leveled-off" to approximately the 2015 value.

- While nitrate levels in the treated wastewater have been "not detected" since 2014 (with a 5.0 mg/l reported detection limit), sufficient ammonia-nitrogen levels are present to support nitrification. Given the presence of dissolved oxygen in the lagoons from the aerators used for mixing leachate prior to treatment, and alkalinity levels high enough to support nitrification, it is feasible that aerobic microbes have been established in soils to convert ammonia-nitrogen to nitrate.

- Based on investigations and analyses performed to date, the source of the increased nitrate levels in MW-15A is attributable to liner leakage and/or pipe boot penetration leakage and/or aerator support boot penetration leakage and/or lagoon pipe leakage from the primary and/or leak detection pipes. Such leakage is localized, small in terms of flow/volume, and within or very proximal to the lagoon footprint.

REMEDIAL RECOMMENDATIONS

Review of the construction and as-built drawings for the lagoons [CECO Associates Sheets 16 (1/95), 16A (4/89), 17 (6/88); and Keystone Sanitary Landfill Sheets C-1 and C-2 (1/11/2016)], indicates that there are penetrations through the primary lagoon liner for the effluent discharge. The aerators are also supported by pipe structures within the lagoon footprint. KSL proposes to expose the existing effluent discharge and leak detection pipes, and abandon these pipes, in place along the entire pipe run by means of grouting. In reconstructing the lagoon liner systems, the entire primary and secondary liner would be replaced in the lagoons, and/or a new liner system will be placed on the existing rehabilitated liners with detection piping unless inspection determines that any of the geomembranes are salvageable without compromise to function. The leak detection zone will be modified to be fitted with a sideslope riser pump with pressure transducer, alarms, and automated pumping protocols should any liquid be detected in the reconstructed system.

The repair measures are consistent with KSL's plans to completely decommission the effluent discharge pipes, the leachate detection gravity pipes, and all penetrations below the maximum level of the lagoon liner system. The existing gravity effluent system will be replaced by an exterior pump station to convey leachate from the lagoons to the treatment plant. The leak detection pumping apparatus proposed herein will be integrated with the new effluent pump station. KSL plans to integrate output data from the pumps and monitoring systems with its SCADA system at the treatment plant.

KSL proposes to complete these improvements first to the West Lagoon, and subsequently to the East Lagoon, such that one of the two lagoons remains active during the work. The existing equalization pipes connecting the East and West

Lagoons will be replaced with a lined equalization spillway, without liner penetrations. Replacement of the aerator system in both lagoons will utilize float rings and cable stays fastened to the perimeter berm to avoid pipe supports and penetrations within the liner system. A conceptual plan drawing (Sheet 1) and associated details (Sheet 2) of the proposed lagoon improvements are attached hereto. (See Exhibit C15.3)

Design drawings and specifications for the proposed remedial work outlined above will be submitted to PADEP by 5/20/16 for review and approval via A Minor Modification Application. In selecting geosynthetic materials for the lagoon re-lining installation, KSL will evaluate the merits of employing electrostatic non-destructive leak detection surveys of both the primary and secondary liner system panels, in addition to conventional methods of non-destructive seam testing (e.g., vacuum-box and air channel testing).

Ongoing monitoring will be maintained after the repairs have been completed to observe any subsequent trends in the mine drainage quality within MW-15A. Within approximately 5 years of completion of the lagoon improvements, KSL will perform a follow-up geophysical survey on the same (March 2016) area of investigation to document improvements in the mine drainage quality.

<u>Remedial Measures Keystone/Dunmore Waste Relocation</u>
Mine drainage associated with the historically mined Dunmore coal seams beneath KSL contribute various quantities of naturally impacted, non-potable waters to the vast regional mine pool located along the axis of the Lackawanna Valley over a mile west of the KSL property. Currently, KSL has in place fifteen (15) mine drainage wells to regularly monitor the quality of the mine drainage leaving the site and to serve as an early warning against any impacts to the drainage from landfilling activities. As part of KSL's Phase III planning, two or more existing or newly constructed "Mine Drainage Interceptor Wells" will be used to collect and treat mine drainage before leaving the western limits of the property where a local structural low within the Dunmore No.3 coal seam causes some of the mine drainage to "pool" on site before draining to the regional mine pool in the valley. (See the attached Mine Drainage Interceptor Plan Drawing for an overview of the mine drainage flow from the site and two (2) possible existing wells with good yields within the localized "pool"). Capturing and treating the mine drainage in the area should prove beneficial to the overall quality of the regional mine pool in the valley while also serving to monitor and capture any surface waters infiltrating the mine drainage system during the initial waste recovery/waste relocation efforts within the Keystone-Dunmore portion of the site.

Exhibit C15.2, contains a detail "Waste Relocation Plan" which details the program that KSL will implement during the removal of the waste mass in the former K/D site, relocation of the waste to double lined portions of the KSL site, and installation of the double liner systems in the former K/D site with respect to elimination of surface run on and during the operations from entering the waste mass planned to

remain in place. The following specific activities are detailed in the Waste Relocation Plan as described herein:

During excavation, surface runoff above the active area of excavation (i.e., non-contact water) will be conveyed by a series of diversion ditches or swales to the existing perimeter stormwater management facilities.

Excavation of the K/D wastes will progress in an upgradient manner, starting at a low point within the proposed grades, and to construct the temporary dewatering sumps at commencement of waste excavation. As previously noted, at no point in the excavation, shall the active area be greater than five-acres. Progression of the work will require relocation of the temporary sump as waste excavation progresses across each five-acre increment. A diversion berm will be installed upgradient of the active waste excavation areas to divert runoff away from the active excavation area, thus minimizing the volume of leachate or contact water generated during significant rain events. The details of the temporary diversion berms are shown on Sheet 12 of the MPM. All stormwater downgradient of the cut off berm will be conveyed via the existing drainage ditch network to Detention Basin #4, located at the northern limit of the existing KSL permit boundary.

As waste excavation progressed and a five-acre boundary has been excavated to the proposed grades, intermediate cover or sand mound soils will be installed to prepare the surface for installation of 60-mil high density polyethylene (HDPE) geomembrane; the geomembrane is also supplemented by uniaxial geogrid at locations where sand mounds are present to account for future settlement anticipated. In instances where a five-acre limit of completed waste excavation has not yet had the geomembrane installed, a separate temporary sump will be established upgradient of the completed subcell to facilitate subsequent waste excavation activities, yet the five-acre exposed waste limits can be maintained to the extent possible.

Moreover, remaining area will not be disturbed until the waste excavation activity reaches those areas, and then only after the preceding excavations have been stabilized. As such, the planned E&S measures for this project shall include the following:

- **Construction Entrance to minimize the potential tracking of dirt outside of the work area or onto public roads. Light-weight equipment will be utilized as necessary to minimize disturbance to and rutting of the soil cover areas and for stability on waste excavation.**

- **Perimeter Drainage Channels will be implemented to direct overland flow away from open excavations.**

- **Rock Filters will be used to control the runoff within the perimeter drainage channels leading off of the site, by reducing the sediment transport and runoff velocity. The rock filters will be implemented until permanent**

stabilization of the site is completed. If necessary, silt fence will be used in conjunction with rock filters if velocity reduction and sediment transport prevention is required due to sequencing of the waste excavation activities.

- **Silt Fence or Compost Filter/Silt Sock will be used as necessary during the excavation and backfilling operations, and will be installed downgradient of all disturbed and unstabilized areas at the site. The silt fence/silt sock will minimize erosion and control sediment-laden surface-water runoff, until substantial stabilization of the site has occurred. Silt fence/silt sock will also be placed on the downslope side of all topsoil stockpile areas. If necessary, straw bales will be used in conjunction with slit fencing to control surface erosion and sediment transport.**

- **Slope Tracking will be used to the extent possible to temporarily finish the surface of backfill areas. Slope tracking will be accomplished by running tracked machinery up and down the fill slopes, leaving track-tread marks parallel to the slope contours (i.e. perpendicular to flow direction).**

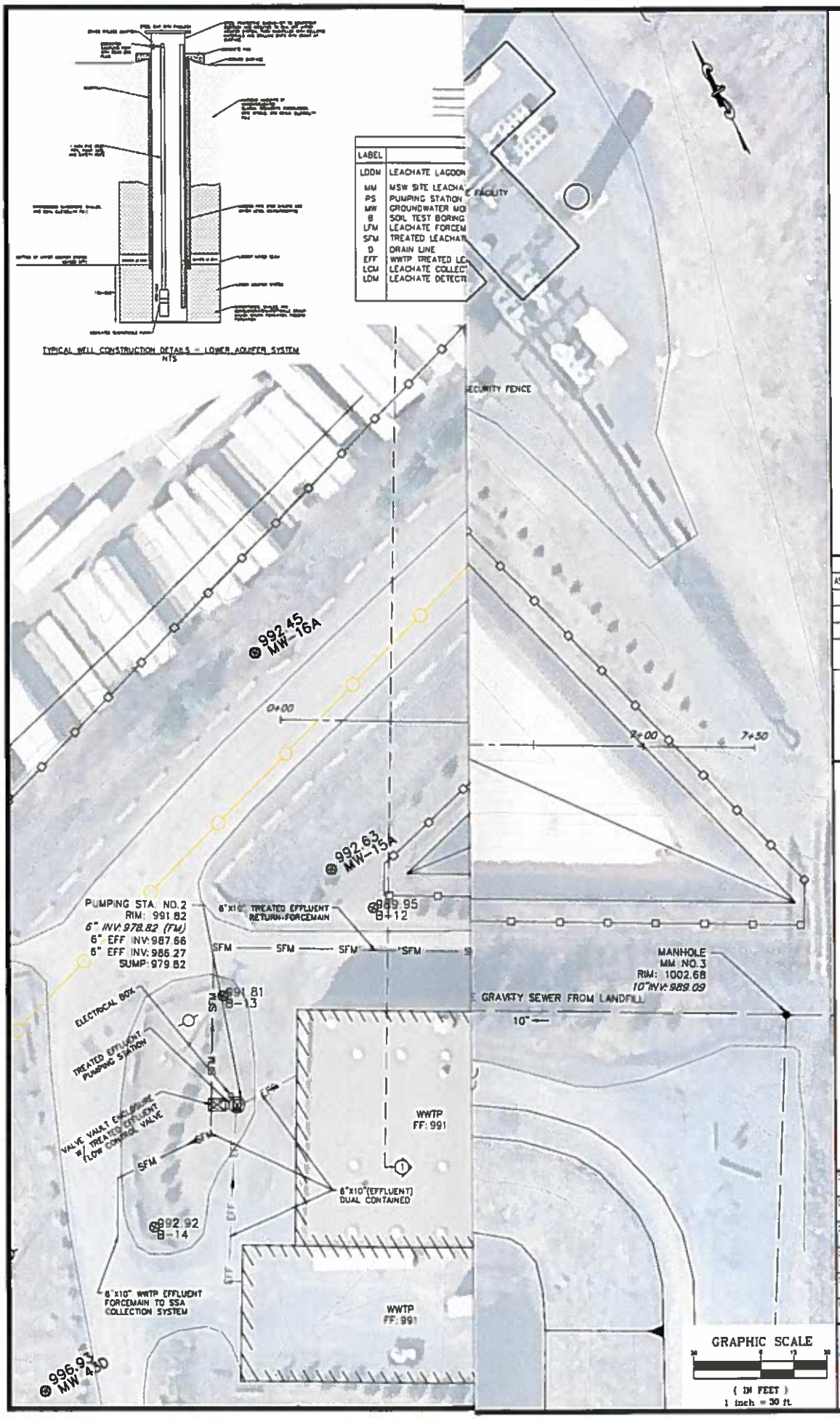
- **Erosion Control Matting will be used, following seeding and mulching with the permanent control seed mixture, to prevent loss of re-vegetation efforts. Upon completion of any temporary or permanent drainage channel sections, erosion control matting will also be installed to protect re-vegetation measures in the channel.**

<u>Attachments</u>:

- **Leachate Lagoon Layout (Exhibit C15.1)**
- **Waste Relocation Plan (Exhibit C15.2)**
- **Proposed Lagoon Improvements – Sheets 1 and 2 (Exhibit C15.3)**
- **Geophysical Survey Results (Exhibit C15.4)**
- **Mine Drainage Intercept Plan (Sheet Nos. HGS7 and HGS8) (Exhibit C15.5)**

EXHIBIT C15.1

LEACHATE LAGOON LAYOUT



LEACHATE LAGOON LAYOUT

KEYSTONE SANITARY LANDFILL
PA DEP PERMIT NO. 101247
WASTEWATER TREATMENT FACILITY
DUNMORE BOROUGH , THROOP BOROUGH PENNSYLVANIA

REVISION	DATE
AS-BUILT SURVEY	4/14/15

Keystone
Sanitary Landfill, Inc

DATE	1/11/2016
DESIGNED	A.J.M
DRAWN	A.J.M.
CHECKED	
SCALE	1"=30'
PROJECT NUMBER	15-01-01
THE SCALE BAR SHOWN BELOW MEASURES ON INCH LONG ON THE ORIGINAL DRAWING	SHEET NO C-1

File name Z:\2015 Projects\15-01-01 Keystone Landfill General\WWTP Well Monitoring\20160217-KSL-LagoonMap.dwg Mar 08, 2016-1 11pm ajmagnotta

EXHIBIT C15.2

WASTE RELOCATION PLAN

WASTE RELOCATION PLAN

WASTE REMOVAL ACTIVITIES
KEYSTONE/DUNMORE LANDFILL
DUNMORE, PENNSYLVANIA

Prepared for:

Keystone Sanitary Landfill, Inc.
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February 2016

ARM Project 14411

Respectfully submitted,

William S. Tafuto, P.E.
President, Chief Engineer

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Senior Engineer

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ATTACHMENTS:

A. Site Specific Health and Safety Plan (HASP)
B. K/D Waste Relocation, Minor Permit Modification (MPM), and Related Documentation
C. PADEP MPM Approval Letter
D. KSL Asbestos Waste Handling Plan
E. KSL Radiation Action Plan

1.0 INTRODUCTION

1.1 Background

As described in Form 14 of the Minor Permit Modification (MPM) submitted for the Keystone Sanitary Landfill (KSL) Keystone/Dunmore (K/D) landfill unit, and as approved by the Pennsylvania Department of Environmental Protection (PADEP) on January 13, 2014, waste materials contained within the existing K/D landfill are proposed to be relocated as part of the Phase III KSL Landfill Expansion project. On March 20, 2014, a Major Permit Modification Application (PMA) was submitted to the PADEP for the proposed Phase III Expansion of KSL. A drawing set comprised of 37 drawings (Sheets 1-35, C-01, and C-02) was submitted as part of the MPM, and supplementary drawings that illustrate the proposed waste relocation activity with the Phase III Expansion PMA include Sheets 22, 23, and 43 of the PMA. With reference to the proposed relocation effort, the wastes and cap system, contaminated soil, and containment structures will be excavated and transported to the active landfill units.

The remedial actions required to eliminate or minimize environmental exposure pathways and to achieve the designed waste excavation grades include the following:

- Establish site boundary as follows: existing K/D waste excavation and proposed Phase III Expansion limits per the MPM and PMA drawings referenced above;
- Implementation of appropriate environmental controls and safeguards as needed to support the proposed waste removal and related remedial actions;
- Backfilling and compaction of backfilled soils placed into excavations made to remove waste materials; and
- Site re-grading, re-vegetation, closure, or liner installation, as appropriate, to accomplish required design grade elevations.

This document is a supplement to the Keystone/Dunmore Waste Relocation Narrative that was provided with Form 14 of the MPM and the drawings of the PMA. As such, this document has been identified as the Waste Relocation Plan (WRP). The WRP has been developed to supplement the response to Comment No. 15 of PADEP's Technical Review letter of October 13, 2015; an excerpt from PADEP's Comment No. 15 is recited as follows:

KSL is not proposing to remove all of the waste in the unlined Keystone/Dunmore area. Although approximately 8 million tons is to be removed, approximately 2 million cubic yards of waste will remain in pits of unknown depth. The potential for unknown waste constituents to cause groundwater contamination with the compaction of this waste and construction of Phase III on top of it will not be eliminated. KSL should define the potential for leachate to be expelled from the remaining waste and address how they will mitigate the potential for contamination of groundwater.

This WRP has been prepared to address the DEP's request for the Applicant (Keystone Sanitary Landfill) to address how it will mitigate the potential for contamination of groundwater and environmental exposure pathways during implementation of the waste relocation activities. This document is intended to describe the process for determination of the specific hazards that may

be associated with relocation of the waste materials. Thus, the WRP includes the following supplemental information:

- Identification of potential environmental exposure pathways that may arise in association with the plans to relocate the wastes. Media of concern include: soil, air, groundwater and surface water; exposure concerns include: dermal contact, ingestion, and inhalation pathways; and, the exposure concerns address potential contact by site workers and nearby residents;
- Identification of project control measures and monitoring procedures that KSL and its contractors will employ to eliminate environmental exposure pathways, or to otherwise reduce exposures to concentrations that do not pose an unacceptable human health exposure risk, based upon established regulatory standards or other applicable guidance; and,
- Description of the proposed methods of waste excavation, transport, handling, and relocation.

This WRP is not a formal project-specific Health and Safety Plan (HASP), but rather a document to describe logistical and engineering measures and controls to facilitate the project, to minimize environmental impacts, and to minimize nuisances to surrounding communities. A site-specific HASP has also been developed for waste excavation and handling, consistent with KSL's proposed construction and operating procedures, and in compliance with applicable Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and PADEP standards.

1.2 Project Overview

The K/D waste relocation project includes the excavation, transport, and disposal of approximately 8,800,000 tons of municipal solid waste (MSW) from the existing unlined and inactive Keystone and Dunmore landfill sites. This material will be transported to the active waste disposal limits, which is constructed of a Subtitle D, double-layer synthetic liner system with leachate collection system.

In the MPM application package submitted on September 23, 2013 and approved by the PADEP on January 13, 2014, KSL performed a hydraulic analysis of the potential leachate generated during MSW excavation activities within the Keystone and Dunmore landfill site was performed, to ensure that the process capacity of the existing onsite leachate pretreatment plant was not exceeded. In sequencing the waste relocation activities and the active area of waste excavation will be limited to a maximum five-acre exposure of MSW at all times during the relocation operation. To achieve this goal, wastes will be excavated to the proposed grades and intermediate cover soils will be installed promptly to ensure that exposed waste is not permitted to continue production of contact water during precipitation events.

1.3 Waste Composition

Waste disposed on the subject site consisted of broad range of MSW and residual waste; the full composition of waste within this disposal unit is not known.

2.0 INITIAL PLANNING AND SITE PREPARATION

2.1 Site Access

Access to the site will be restricted to only those personnel involved in the waste removal activities. No unauthorized person will be allowed to enter the project site and any active work areas. Unauthorized personnel are those not pre-approved by the Project Manager and Site Health and Safety Officer (SHSO). All personnel not directly involved with the Work performed at the site shall pre-arrange and pre-approve with the SHSO or Project Manager their need for meetings with project personnel or presence on site. Waste excavation access will be limited to the hours of 6:00 a.m. to 10:00 p.m. on Monday through Saturday; with no construction work permitted on Sundays.

2.2 Engineering Controls

Engineering controls that will be employed include:

- perimeter and work zone mister and soaker systems to be employed, as necessary, to control and eliminate work zone dust exposures and to prevent off-site migration of dust originating from the excavation, backfilling, compaction, and waste hauling activities; and
- water pumping systems to dewater excavations that fill (excessively) with precipitation, snowmelt, or stormwater.

Pumped water will be discharged directly to the onsite leachate pretreatment plant through the nearest (proximal to an active excavation subcell) sewer manhole.

Haul route (site gravel roadways) dust control will be accomplished by the periodic application of calcium dust suppressant or use of a water truck as appropriate to limit the off-site migration of roadway-generated dust.

2.3 Site Preparation

Prior to opening the existing K/D landfill, the following temporary site features will be established and/or constructed in order to prepare the site for handling the subcelled wastes:

- Dedicated haul roads will be constructed from each active five-acre waste excavation area (henceforth referenced as subcells) to the active landfill units at KSL. These roads will be installed using the shortest practical route from each of the subcells to the proposed disposal area.
- A temporary truck decontamination area will be established within the waste excavation subcells, and used to decontaminate truck tires and outer truck body that come in contact with any wastes not suitable for disposal within the active KSL, or to otherwise remove debris or waste fragments from the trucks prior to transport to the active disposal area. Runoff from the decontamination area will drain to the temporary leachate collection

sump that serves the waste excavation subcell, thereby assuring complete liquids containment. Clean water will be used for decontamination purposes.

- A worker decontamination area for the removal of personal protective equipment and for personal hygiene (hand and face wash station) will be installed on the periphery of each excavation subcell to allow personal protective equipment to be cleaned, or removed and disposed, and to remove dust and dirt from exposed skin, according to the provisions of the site-specific HASP.
- Surface water diversion berms will be installed up-gradient and/or side-gradient, as applicable, of the excavations to divert surface water away from the waste removal excavations. The area of excavation will be restricted to a maximum area of five acres, so as to exclude runoff quantities in excess of direct precipitation.
- Portable dust control misters will be set-up on the periphery of the proposed excavation area, to be deployed as necessary to eliminate dust emissions from the excavations. Likewise, the site water truck will be prioritized for use to keep the dedicated haul road(s) wetted down so that dust due to vehicular trafficking is eliminated or otherwise kept to a minimum. Clean water will be used for dust control purposes.

On-site portable litter fences, sized approximately 20 feet wide by 14 feet tall will be staged for use during daily excavation activities. Litter fences will subsequently be positioned and adjusted periodically to eliminate litter dispersal at the working face from shifting wind directions during excavation.

2.4 Odor Control

Odor control practices at KSL will be implemented as part of the K/D waste relocation activity. The site currently implements a variety of monitoring, preventative, and mitigation measures to eliminate malodors before they escape the site and become a public nuisance. As described in the "Nuisance Minimization and Control Plan" included as Exhibit 14.L.2 of Form 14 in the Phase III PMA, the following are possible action steps to take in the event that odors are encountered:

- Neutralizing agent misters turned on;
- Misters turned on and additional neutralizing agent added to the 55-gallon drums (normally the ratio of liquid in the misters is 1-2 gallons of masking agent to 55 gallons of water;
- Additional 55-gallon drums moved to the source if the odor and/or placed directly around the active face;
- Spray the working with an odor neutralizer when large odorous areas are encounters or spread a granular neutralizer (e.g., Scatter Granular Odor Counteractant, etc.) for smaller localized odor sources;
- Prioritize daily cover placement over the source of the odorous wastes. All daily cover placed will be compacted with a roller;
- Halt trucks from dumping waste until the odor has dissipated or has been remediated.

In addition to the action steps above, KSL will implement interim landfill gas (LFG) collection and control measures, these measures are described in Section 4.1.2.2 below. In general, KSL will control odors according to the currently approved plan for the site.

2.5 Equipment and Supply Staging

There will be at least two primary equipment and supply staging areas. One will be situated adjacent to the active waste excavation subcell within the K/D limits, and the other will be situated within the active disposal area. These will serve as vehicle parking, and as truck, equipment, and material staging areas. Likewise, these areas will provide a location for one or more site job trailers and/or sanitary facilities. These areas may also serve as designated storage locations for salvage materials (i.e., scrap metals, iron, steel, etc.). Finally, these areas may also include locations for the storage of one or more watertight roll-off style dumpsters, reserved for the temporary storage of any special management wastes that may be discovered and removed in association with the waste removal actions. KSL will utilize any existing secondary holding areas for special wastes management, or establish temporary limits for secondary holding areas if applicable relative to the location of waste relocation activities. Materials that may be encountered that are considered special management wastes could include friable asbestos-containing materials (ACMs) and overpacked drums (if encountered). KSL will implement provisions of the existing Asbestos Waste Handling Plan for all ACM removal activities within the limits of the K/D waste relocation.

2.6 Storm Water Management

During excavation, surface runoff above the active area of excavation (i.e., non-contact water) will be conveyed by a series of diversion ditches or swales to the existing perimeter stormwater management facilities.

Excavation of the K/D wastes will progress in an upgradient manner, starting at a low point within the proposed grades, and to construct the temporary dewatering sumps at commencement of waste excavation. As previously noted, at no point in the excavation, shall the active area be greater than five-acres. Progression of the work will require relocation of the temporary sump as waste excavation progresses across each five-acre increment. A diversion berm will be installed upgradient of the active waste excavation areas to divert runoff away from the active excavation area, thus minimizing the volume of leachate or contact water generated during significant rain events. The details of the temporary diversion berms are shown on Sheet 12 of the MPM. All stormwater downgradient of the cut off berm will be conveyed via the existing drainage ditch network to Detention Basin #4, located at the northern limit of the existing KSL permit boundary.

As waste excavation progressed and a five-acre boundary has been excavated to the proposed grades, intermediate cover or sand mound soils will be installed to prepare the surface for installation of 60-mil high density polyethylene (HDPE) geomembrane; the geomembrane is also supplemented by uniaxial geogrid at locations where sand mounds are present to account for future settlement anticipated. In instances where a five-acre limit of completed waste excavation has not yet had the geomembrane installed, a separate temporary sump will be established upgradient of the completed subcell to facilitate subsequent waste excavation activities, yet the five-acre exposed waste limits can be maintained to the extent possible.

Moreover, remaining areas will not be disturbed until the waste excavation activity reaches those areas, and then only after the preceding excavations have been stabilized. As such, the planned E&S measures for this project are shall include the following:

- **Construction Entrance** to minimize the potential tracking of dirt outside of the work area or onto public roads. Light-weight equipment will be utilized as necessary to minimize disturbance to and rutting of the soil cover areas and for stability on waste excavations.
- **Perimeter Drainage Channels** will be implemented to direct overland flow away from open excavations.
- **Rock Filters** will be used to control the runoff within the perimeter drainage channels leading off of the site, by reducing the sediment transport and runoff velocity. The rock filters will be implemented until permanent stabilization of the site is completed. If necessary, silt fence will be used in conjunction with rock filters if velocity reduction and sediment transport prevention is required due to sequencing of the waste excavation activities.
- **Silt Fence or Compost Filter/Silt Sock** will be used as necessary during the excavation and backfilling operations, and will be installed downgradient of all disturbed and unstabilized areas at the site. The silt fence/silt sock will minimize erosion and control sediment-laden surface-water runoff, until substantial stabilization of the site has occurred. Silt fence/silt sock will also be placed on the downslope side of all topsoil stockpile areas. If necessary, straw bales will be used in conjunction with silt fencing to control surface erosion and sediment transport.
- **Slope Tracking** will be used to the extent possible to temporarily finish the surface of backfill areas. Slope tracking will be accomplished by running tracked machinery up and down the fill slopes, leaving track-tread marks parallel to the slope contours (i.e. perpendicular to flow direction).
- **Erosion Control Matting** will be used, following seeding and mulching with the permanent control seed mixture, to prevent loss of re-vegetation efforts. Upon completion of any temporary or permanent drainage channel sections, erosion control matting will also be installed to protect re-vegetation measures in the channel.

3.0 WASTE EXCAVATION

3.1 Pre-Construction Job Conference

Prior to initiating site grading, waste excavating and other such disturbance activities, the project (field work) will commence with a Pre-Construction Job Conference with representatives of: Owner; Engineer; PADEP; site monitors; fire, emergency and haz-mat responders; Dunmore Borough; Throop Borough; and community representatives. The job conference will review the project specifications and general procedures, present the proposed project schedule, and will answer questions and address comments provided by attendees. The purpose of the conference will be to reduce or eliminate any uncertainty as to the scope of work, work sequence, work procedures, communication requirements, contingency plans and the like.

3.2 Project Stake-Out

Following the pre-construction job conference, additional project stake-out will occur, to:

- define the boundaries of the waste excavation limits and initial subcell;
- locate the position(s) of planned air monitoring stations, and other control points, as necessary; and
- locate the positions of the proposed temporary and permanent stormwater management features.

3.3 Survey Control and Measurement

As initial site disturbance begins and as waste excavation, subgrade elevation control and backfill procedures are implemented, appropriate site survey controls will be implemented to ensure that project execution follows the prescribed specifications, to document final Subgrade elevations, and to measure quantities of removed and backfilled materials.

3.4 K/D Waste Uncapping

The K/D site was capped with a 40-mil HDPE geomembrane and geocomposite final cover system with an active landfill gas (LFG) collection system in 1992. Based on the above description, numerous layers of soil and synthetic material will need to be removed prior to the opening of any given 5-acre subcell. The existing soils and/or final cover materials above the geomembrane supporting present vegetative stabilization will be stripped incrementally and stockpiled for reuse elsewhere at the landfill by KSL. All geosynthetics removed from the existing final cover system will be used as temporary excavated waste material cover, and ultimately be disposed of in the active landfill. During removal of the soil and geosynthetic cap material on top of the K/D subcells, dust control measures (as detailed more fully in later sections of this document) will be implemented, and preliminary air monitoring will be performed to assess the composition and concentration of dust and particulate matter within the active work area and at the boundary of the work area, in order to assure the adequacy of the proposed HASP, particularly the prescribed personal protective equipment (PPE) and engineering controls. Depending upon the results of the preliminary air monitoring, planned PPE measures and engineering controls may be modified, as appropriate.

3.5 Waste Excavation

When the final cover system of the K/D subcells has been removed, and the wastes are exposed, wastes may be pre-wetted before any excavation takes place, subject to the determination of the onsite Resident Project Representative (RPR) or KSL Project Manager, and relative to the existing level of moisture within the waste or intermingling of soil that will assist is dust control and vector transport. In addition, during loading of the wastes a portable mister system, of adequate capacity and supplied by a clean, pressurized water supply, will be implemented to ensure dust suppression. In all dust control efforts, care will be taken to ensure that dust and airborne particulates are eliminated, to the extent practicable, or otherwise fully controlled. However, the amount of water used for dust control will be minimized in order to limit the amount of water that comes into contact with the wastes. Note that all contractor actions will be conducted in accordance with the provisions of the site-specific HASP, and the SHSO shall have full authority to direct the health and safety operations of the KSL construction crew and the overall waste relocation operations, including the authority to suspend work or to order work plan modifications in order to assure that exposure pathways are either eliminated or maintained in accordance with applicable regulatory standards or other applicable guidance (e.g., OSHA, NIOSH, EPA, DEP's Chapter 250 regulations, etc.).

No excavation and waste relocation will occur during times of inclement weather if such activity would pose a safety concern. Work will be permitted only in dry weather and in a manner that does not generate any free liquids. Until removed by pumping, any free liquids shall remain within the subcell in established, temporary sumps, and no subcell waste excavations are permitted except at times when free liquid is entirely absent from the excavation. KSL will employ all necessary methods to maintain the temporary sump(s) in a dry condition by pumping liquid accumulations to the nearest available connection to the landfill's leachate collection system (piping, clean-outs, manholes, etc.). Liquid transfers from the excavation area and beyond internal surface water containment shall be made either by tanker transfer or by means of a secure pipeline, consisting of dedicated synthetic piping and protected from disturbance. As such, any accumulations of free liquids will flow to the on-site leachate treatment plant for equalization and treatment, prior to being discharged from the treatment plant.

All waste materials will be removed from the subcells using an excavator, and will be placed directly into offroad dump trucks that are staged within the subcell to allow direct drainage of runoff into the waste excavation (subcell area). Transport trucks departing the loading site and traveling from the subcell to the active disposal area will have waste thoroughly wetted (but not saturated).. Waste transfers will occur only in dry weather, and excavation, transfer, disposal and spreading/compaction efforts will not be conducted in inclement weather. At the conclusion of each day's efforts in the active disposal area, suitable daily cover will be deployed or installed, and in accordance with the established procedures of the KSL Permit or Form U provisions for alternative daily cover (ADC) installation. The exposed waste materials within the subcells will be covered with a daily cover material consistent with approved measures on the active KSL landfill, generally anticipated to consist of foam cover application during the week and soil cover installation for weekends or periods of longer (i.e., more than overnight hour) inactivity. At the conclusion of each day, the perimeter of the excavation subcell will be secured with portable fencing and construction fence or safety drums fitted with flashing lights to preclude personnel access (trespassing) after-hours.

At any time that the subcell excavator (trackhoe) will be leaving the subcell area or if the trackhoe is being utilized for removal of special or prohibited wastes (i.e., wastes that are not permitted for disposal in the active KSL area and subject to removal and offsite disposal) from within the excavation, the excavator shall undergo complete decontamination (pressure wash and rinse) within the subcell. Runoff liquids shall be directed to the temporary subcell sump and handled like other liquids accumulations as described in Section 2.6 hereof.

Following the removal of the waste materials to the proposed grades within the K/D limits (see Sheet 11 of the MPM), the waste excavation limit, intermediate cover soil installation or sand mound installation, as detailed on Sheet 12 of the MPM or Sheet 43 of the PMA, respectively, will be installed and compacted to minimize settlement potential.

3.6 Waste Transport and Placement in Active Disposal Area

When a dump truck is fully loaded, its waste content shall be thoroughly wetted and will travel directly to the active disposal area via the designated on-site haul route. There, the truck will remove its tarp and then slowly tip its load, slowly advancing forward so as to prevent waste material from contacting the truck tires, continuing until the contents have been entirely emptied. In the event that the truck will be leaving the site or leaving the designated haul road (to the subcell area) for any reason, the truck shall undergo full external decontamination. Piles of K/D waste placed in the active landfill (still moist from the misting operation conducted in the waste relocation subcell area) will be promptly spread and compacted with a dedicated appropriate heavy equipment. Portable misters shall be set-up and available for discretionary use at the active disposal area to eliminate or minimize dust generation due to the spreading and compaction activity. The site HSO shall exercise judgment as to whether working face misters shall operate for dust control purposes.

At the conclusion of each day's efforts in the disposal area, suitable daily cover material will be placed on top of the relocated waste materials as noted above.

3.7 Radioactive Waste Monitoring/Handling

All wastes excavated from the K/D limits and transported to the active disposal area of KSL will be subjected to the same radioactivity limits of any outside waste delivered to the site, and restricted from disposal within the active cell if radiation detection limits exceeding dosage rate of 10 microroentgens/hour above background levels are recorded.

All vehicles hauling waste from the K/D waste relocation area to the active landfill face will be required to pass through a radioactive monitoring checkpoint, prior to transporting waste to the active KSL disposal area. The monitoring checkpoint will include semi-permanent monitoring equipment and personnel equipped with monitoring equipment comparable to that kept at the main entrance scales at the site. In the event that a radiation alarm is activated by the waste excavated during K/D relocation activity, the same protocols will be followed as set forth in the approved Radiation Action Plan (revised January 23, 2013).

A temporary HDPE geomembrane liner system, sized to accommodate a working area of approximately 5,000 ft^2 will be installed adjacent to the active K/D waste excavation area or the active disposal area to allow sorting or staging of any materials exhibiting radiological

characteristics the would preclude disposal at KSL and require special handing and offsite disposal.

3.8 Special Wastes Handling / Contingency Procedures

In the event that waste materials are encountered that pose a unique management or regulatory challenge, or cannot otherwise be accepted and disposed of at KSL (e.g., flammable, explosive, hazardous, free-liquid products, etc.), the WRP provides for special waste handling and management procedures. If any uncertainty exists in the opinion of the KSL Compliance Manager or the full-time SHSO, the material will be segregated until a determination can be received from the PADEP, on a case-by-case basis, in accordance with procedures outlined in the above-referenced MPM. For example, if friable ACM is encountered, appropriate procedures will be employed in accordance with the existing Asbestos Waste Handling Plan to segregate these materials and to manage them according to the existing permit conditions of KSL and applicable regulations. Likewise, in the event that chemical liquids are encountered or spilled as part of the excavation effort, and under applicable provisions of the site-specific HASP, these materials will be either drummed or stored in dedicated, waterproof roll-off containers and subsequently sampled and analyzed for disposition purposes. In the case where damaged or intact drums (e.g., 55-gallon) are discovered, they will be immediately overpacked and staged for sampling, chemical analysis, and subsequent disposition. In the case where metal tanks are encountered, liquids will be removed from them and transferred to storage drums for subsequent sampling, analysis and disposal. Recoverable/recyclable metals will be stockpiled on site and later taken to a licensed recycler for beneficial re-use.

In the event that circumstances arise which exceed the capability of site personnel, the haz-mat response team will be contacted for immediate assistance. The haz-mat team is a state-permitted facility, experienced in sampling, analysis, and disposition of special, residuals, and both non-hazardous and hazardous wastes. Contact information for the haz-mat and special wastes handling team for the K/D Waste Relocation Project are:

Waste Recovery Solutions, Inc.	or	Datom Products
343 King Street		113 Monahan Avenue
Myerstown, PA 17067		Dunmore, PA 18512
Phone: (717) 866-9955		Phone: (570) 343-2878

3.9 Final Grading and Site Stabilization

Once rough grade has been established by planned backfill and compaction efforts, final site grading and top soil cover will be placed on the site to achieve final grade and final site restoration. The restored final grade will be promptly stabilized first with mulching, according to the approved E&S plan for the site and the project. Subsequently, and seasonally-dependent, the final grade will be hydro-seeded with approved seed mix to achieve temporary vegetative cover.

3.10 Project Close-Out

Upon completion of site stabilization, incremental (i.e., as waste excavation subcells are completed and Phase III development ensues) project close-out documentation will be assembled for incorporation into the Final Report and submitted to the PADEP via a Form 37 Certification of Facility Construction Activity. This documentation will include records of:

- all waste volumes, and characteristics;
- special waste volumes, characteristics and disposition;
- daily activity logs;
- site-specific HASP monitoring;
- air monitoring;
- sub-grade elevation;
- survey controls;
- compaction records; and
- on-site water management disposal.

This information will be made available to PADEP in the Final Report and to the Owner and successors as may be need to guide the re-use of this site.

4.0 EXPOSURE PATHWAY ANALYSIS

4.1 Potential Human Health Exposures

The primary human health exposure concerns for site workers and for nearby residents with respect to the proposed waste removal project include the following:

- Dermal contact with wastes and contaminated soil and water containing residual concentrations of heavy metals.
- Inhalation of dust generated by waste excavation, loading, transport, or disposal activities, with the subject dust potentially containing elevated concentrations of heavy metals and asbestos.
- Inhalation of chemical vapors (volatile organic compounds [VOCs]) emanating from the waste.

The following text will describe the potential human health hazards presented by each of the above-listed potential exposures. Subsequent sections of this plan will discuss protective measures to be employed by KSL and project personnel to either eliminate or to safely control these potential exposures.

4.1.1 Direct Contact

As the waste materials are excavated, workers who are involved with the waste excavation, transport, or disposal would have the potential to come into direct contact with the wastes or other contaminated materials. Likewise, there is also the potential that workers may be exposed to contaminated water (free liquids) that occur within the planned excavations. Direct contact exposure potential includes both dermal and accidental ingestion.

For the K/D waste excavation activities, KSL will implement procedures consistent with its approved, established waste handling procedures. To prevent direct contact with any wastes that may adhere to the outer clothing worn by site workers, personnel decontamination and PPE change and disposal facilities will be established as prescribed in Section 2.3 hereof. Access to the excavation as required for purposes of pumping and managing water shall also be by remote means (use of portable pumps and discharge piping or hoses) to the extent possible. Potential dermal contact exposures that may arise with respect to the commissioning and decommissioning of various control measures and equipment will be prevented and avoided by the use of personnel wearing dermal gloves and splash suits, pursuant to the requirements of the site-specific HASP.

However, given the potential toxicity of the waste material, measures must be taken to prevent, or otherwise to minimize, direct contact between humans and the wastes. Combined with effective dust control measures (proposed misting operations), the use of the prescribed PPE by any personnel working within: a) the area of waste excavation; b) areas immediately surrounding the waste excavation subcell; c) the waste decontamination pad/station; and d) the working face of the active landfill will effectively (safely) reduce or eliminate the potential for direct contact exposure. Personnel working in these specific areas will don fully protective clothing, including

Tyvek suits, nitrile gloves, hard hat, steel-toed safety shoes, and full-face cartridge (dust) respirators (with eye protection), following the provisions of the site-specific HASP.

Stormwater that enters the subcell excavation (minimized by the peripheral diversion berms) will accumulate within one or more temporary sumps established by KSL. As set forth in Section 2.6 hereof, the contractor shall employ all necessary methods to maintain the temporary sump(s) in a dry condition by pumping liquid accumulations to the nearest available connection to the landfill's leachate collection system (piping, clean-outs, manholes, or pump stations).

In order to prevent off-site migration of excavated wastes or other related contaminated materials, all excavated materials will be loaded and transferred promptly to the active landfill face for immediate disposal. There will be no interim staging of waste materials, and all operations will be conducted under strict health and safety protocols with effective dust control and prescribed personal and equipment decontamination procedures. These measures will prevent potential blowing of waste-bearing dust and the trafficking of waste materials to offsite locations.

Direct contact exposures to the wastes (and other sorts of physical hazards) from off-site persons shall be prevented by establishing site perimeter access control (fence), and barricades, posts, placards, and exclusionary zone tape that precludes entry to open excavations, exposed waste materials, standing water, stockpiled materials, and other staged supplies.

4.1.2 Inhalation

4.1.2.1 Dust

During excavation of the waste materials and contaminated soils, dust containing heavy metals and asbestos may be generated. The information collected during initial monitoring conducted concurrent with the cover material removal and initial waste excavations will be used to refine dust control measures and work procedures to ensure that the dust levels remain at or below permissible exposure levels (PELs).

According to 29 CFR 1926 Safety and Health Regulations for Construction, the PELs of airborne (dust) contaminants for construction are as follows:

- Lead – 0.05 milligrams per cubic meter (mg/m3) of air (29 CFR 1926.62).
- Asbestos – 0.10 fibers per cubic centimeter (on-site); and 0.01 fibers per cubic centimeter (off-site) (29 CFR 1926.1101).
- Chromium (VI) compounds – no TLV See 1926.1126
- Cadmium (as Cd) – no TLV See 1926.1127
- Dust/particulate matter – 15 milligrams per cubic meter (mg/m3) of air (29 CFR 1926.55)

In addition, during excavation of the wastes, dust filter samples will be taken at the edge of the work zones. The dust samples will be analyzed for mass dust concentrations and for total lead and asbestos fibers. In addition, the following controls will be implemented to minimize dust generation, to control dust that is produced, and to minimize or eliminate potential exposures:

- Keeping the waste moist using a portable water misting system in the waste excavation areas and in association with procedures used to load wastes into the waste trucks;
- Pre-wetting the exposed waste materials before excavation occurs;
- Using supplemental soaker units (pressurized water hose system) to supplement portable misters and pre-wetting procedures;
- Limiting the area of waste being excavated to not more than five acres at any one time;
- Operation of work space and perimeter air monitoring systems to monitor compliance with specified dust standards;
- Limiting excavation and waste placement/disposal to days when wind speed remains at less than 20 miles per hour (mph), or as modified by the SHSO.

The dust control water supply may be obtained from one or more of the sources listed below. Temporary tanks will be set up adjacent to and uphill from the excavation area to supply as a water reservoir for dust control.

- PA American Water Co. service provided to the landfill;
- One of two on-site non-potable production wells (Quarry Well No. 1 and Quarry Well No. 2);
- Storm water derived from the site's sediment basins; or
- Other clean water supplies, including treated wastewater, subject to PADEP approval.

Wind data for the site indicate that the prevailing wind direction is from the west. As such, during the waste removal project, the potential would exist for dust emissions to be blown from the excavation area to the east. In order to monitor and confirm the effectiveness of proposed on-site dust control procedures and to evaluate this potential exposure pathway, perimeter air monitoring will be performed as described herein to collect dust samples for analysis and for compliance demonstration.

If air monitoring indicates the exceedance of any air quality PELs within or adjacent to the work zone, additional corrective measures will be taken. The types of corrective actions that will be necessary will vary depending upon the nature and extent of the concerns identified and the potential receptors that may be exposed. The typical corrective actions that may be employed to mitigate concerns regarding airborne emissions during the excavation of waste materials include additional dust control measures (use of additional moisture), decreased rate of waste disturbance and transfer, use of blower systems, revised work schedules to take advantage of reduced wind speeds and more favorable wind direction, and other engineering controls.

4.1.2.2 Chemical Vapors and Methane

The K/D site presently has an active LFG collection system within the waste mass, and KSL anticipates that LFG will be present to some extent during the waste excavation and relocation activities. Additionally, interim LFG control and collection measures have been outlined in Sheets C-01 and C-02 of the MPM, and will be implemented during all waste relocation activities. These temporary provisions generally include the maintenance of active vacuum on the existing waste mass, as facilitated by a temporary cap system on waste excavation cut slopes; vacuum extraction points for LFG within the waste mass will move incrementally with the

progression of waste relocation activities. LFG collection at the active landfill disposal area will be completed in accordance with the approved established procedures at KSL.

According to 29 CFR 1926 Safety and Health Regulations for Construction, the PELs of chemical vapor concentrations for construction are as follows:

- Benzene – 1.0 parts per million (ppm) of air (29 CFR 1926.1128).
- Acrolein – 0.1 parts per million (ppm) of air (29 CFR 1926.55).
- Naphthalene – 10 parts per million (ppm) of air (29 CFR 1926.55).
- Trichloroethene – 100 parts per million (ppm) of air (29 CFR 1926.55).
- Tetrachloroethene – 100 parts per million (ppm) of air (29 CFR 1926.55).
- Vinyl chloride – 1.0 parts per million (ppm) of air (29 CFR 1926.1117).
- Methane – 10,000 ppm (20% of the lower explosive limit) (29 CFR 1926.55)
- Hydrogen Sulfide – 10 ppm of air (29 CFR 1926.55)

Monitoring of methane will be accomplished at the excavation work zone by use of a calibrated methane gas meter (explosimeter) and in accordance with the provisions of the approved Gas Management Plan at KSL. Similarly, chemical vapor concentration monitoring will be performed with a photoionization detector (PID). The action levels set for these devices are as follows: 10,000 ppm of methane, and 10 ppm of total ionizable vapors measured by the PID (10.4eV sensitivity bulb).

If air monitoring indicates the exceedance of any of the prescribed air quality standards (chemical vapors and methane) within or adjacent to the work zone, additional corrective measures will be taken. The types of corrective actions that will be necessary will vary depending upon the nature and extent of the concerns identified and the potential receptors that may be exposed. The typical corrective actions that may be employed to mitigate concerns regarding methane and vapor concentrations during the excavation and loading of waste materials include brief work suspension; additional/enhanced misting controls; decreased rate of waste disturbance and loading, use of portable blower systems, revised work schedules to take advantage of cooler temperatures; and respiratory protection for site workers within affected work areas.

4.2 Potential Environmental Impacts

The environmental impacts that have the potential to occur as a result of the exhumation of the wastes are summarized as follows:

- Infiltration of storm water or dust control water that contains significant concentrations of dissolved metals; and
- Degradation of the site soils along the excavation area periphery and along the route of loading and hauling to the active landfill disposal area due to dust accumulations or spills of waste materials that occur in association with waste excavating, loading and hauling procedures.

4.2.1 Potential Groundwater Impacts

During the waste removal activities it is possible that the infiltration of stormwater or dust control water containing significant concentrations of dissolved metals could impact the groundwater beneath the site. To address these concerns this waste removal plan prescribes a set of strict procedures concerning site preparation, site operations, personal protection, and environmental protection that will be strictly followed and enforced.

In order to prevent contact of stormwater with the wastes, engineering controls will be put in place to route stormwater and drainage away from the subcell areas during excavation. With regard to the direct contact of precipitation with exposed waste materials, KSL will establish one or more temporary sumps in each waste subcell (during the period when the subcells are open and exposed to weather). KSL, by a combination of manual and automatic controls, will remove accumulations of sump water by pumping it to the nearest available connection to the landfill's leachate collection system (piping, clean-outs, manholes, etc.).

4.2.2 Soil

As described above, during excavation of the wastes and related materials, it is possible that a "collateral" effect will occur – namely the potential degradation of site soils along the excavation area periphery and along the route of loading and hauling to the active disposal area due to dust accumulations or spills of waste materials (in association with waste excavating, loading and hauling procedures). This WRP prescribes a set of strict procedures concerning site preparation, site operations, personnel protection, and environmental protection that will be strictly followed and enforced. These procedures will effectively minimize the risk of collateral contamination of peripheral soils as described herein. Nevertheless, this WRP also prescribes procedures that will be employed to clean-up spills of any waste materials and dust accumulations that occur outside of the excavation and disposal areas.

In this regard, and as set forth in Section 2.3 and 3.5 of this Plan, all waste materials excavated from the K/D limits will be placed directly into dump trucks that are staged within the excavation area and set on a grade to allow direct drainage of runoff into the waste excavation. When any waste materials or contaminated media spills from the excavator bucket or from the trucks being loaded, cleanup will be accomplished as soon as the loaded truck departs for the active landfill disposal area. Transport trucks departing the loading site and traveling from the waste excavation area to the active landfill will be securely tarped. At the conclusion of each day's efforts in the active disposal area, suitable daily cover material or a tarp will be placed on top of the relocated waste materials, in accordance with the procedures for all wastes disposed of at KSL.

During the waste removal activities engineering controls such as perimeter and work zone mister and soaker systems to be employed, as necessary, to control and eliminate work zone dust exposures and to prevent off-site migration of dust originating from the excavation, backfilling, compaction, and waste hauling activities. Thus, as described herein, the WRP prescribes procedures that will be employed by KSL and its contractors to minimize the risk of collateral contamination of adjacent soils.

5.0 PROJECT MANAGEMENT

5.1 Project Administration

ARM Group Inc. will serve as the owner's representative and as the Engineer-of-Record. In this capacity, ARM will be responsible for the management of the project and the contracted activities (work) of the contractor

5.2 Project Quality Control/Quality Assurance

The project specifications include one or more sections that prescribe various quality control and inspection and testing requirements to be conducted by KSL. Quality control performance standards set forth in the site documents and MPM include: personnel qualifications; OSHA compliance (current certifications, etc.); GPS calibration for grading and excavation control; measurement methods and standards; compaction standards; equipment standards; and others as appropriate. Project construction-phase quality assurance services will be provided by ARM, with project oversight and quality assurance provided by one or more ARM engineers or scientists that also meet competent person standards with respect to OSHA inspection and compliance requirements. As-built measurements and related documentation shall be prepared by KSL's site surveyor and independently produced and validated by ARM's quality assurance inspector.

5.3 Environmental Documentation

Project documentation collected and recorded during the project that relates to environmental characteristics and conditions of the site will include: descriptions of waste materials encountered and removed; quantities of materials that are beneficially recycled; volume calculations; location of encountered materials; PID readings; explosimeter readings (methane gas concentrations); air monitoring data; weather conditions (temperature and precipitation records); site photographs; sampling and laboratory analysis records for special wastes; and environmental controls maintenance and monitoring records.

5.4 Geotechnical Documentation

Project documentation collected and recorded during the project that relates to geotechnical conditions of the site will include: descriptions of the Subgrade; evidence, if any, of solution features in exposed bedrock; soil characteristics; backfilling procedures; compaction procedures; records of compaction (density testing records); and measured final grade elevations.

6.0 CONCLUSION

Based on the nature of waste relocation activities, some human health and environmental exposure pathways may exist during the relocation of the Keystone/Dunmore Landfill wastes into the active KSL. The primary human health exposure concern relates to inhalation of airborne metals through dust, and the primary environmental concern relates to the potential for elevated levels of sediment and metals to enter groundwater. As described in this plan, considerable planning has been taken into account to control and either eliminate or mitigate the potential harms that could occur to human health and the environment as a result of the relocation. Sections 2 and 3 of this WRP prescribe a set of strict procedures concerning site preparation, site operations, personnel protection, and environmental protection that will be strictly followed and enforced. These procedures will effectively minimize impacts to personnel (on-site workers and off-site residents) and to the environment, consistent with applicable environmental and industrial hygiene standards and guidance. Moreover, this WRP proposes a set of monitoring actions that are designed to ensure and confirm compliance with the applicable environmental and industrial hygiene standards. A site-specific HASP has been developed based on the evaluation of human health hazards, and as such, the general objectives and procedures of the monitoring and control measures presented in this plan will remain the same, but specific materials, instrumentation, and steps will be modified based on actual site conditions and other circumstances that are encountered during the waste excavation, relocation, and related construction activities.

ATTACHMENT A

Site Specific Health and Safety Plan (HASP)

SITE-SPECIFIC HEALTH & SAFETY PLAN (HASP)
Keystone/Dunmore Landfill Waste Removal Activities
Dunmore, Pennsylvania
February 2016

ARM Group Inc. Project 14411

Location Name: Keystone Sanitary Landfill, Inc.
Site Address: 249 Dunham Drive, Dunmore, PA 18512
Municipality: Dunmore and Throop Boroughs, Lackawanna County, PA

EMERGENCY PHONE NUMBERS

Local Police 911 (Lackawanna County 911 Center)
Local Fire 911 (Lackawanna County 911 Center)
Local Rescue 911 (Lackawanna County 911 Center)

Local Hospitals: Regional (Mercy) Hospital of Scranton
746 Jefferson Avenue, Scranton, PA 18510
Phone # (570) 348-7100

Geisinger-Community Medical Center
1800 Mulberry Street, Scranton, PA 18510
Phone # (570) 703-8000

Directions & Map to Hospitals (see Appendix A)

- **National Response Center (NRC): 1-800-424-8802**

  The NRC should be contacted in the event of a significant chemical release. Once notified, the NRC will activate a federal response to the spill.

- **Poison Control Center: 1-800-222-1222**

  The Poison Control Center should be contacted in the event of accidental poisoning. They will provide information on immediate treatment for the poisoning.

Project Organization - Contact Names, Job Titles, Phone #'s:

ARM Group Inc.	General Phone:	(717) 533-8600
Daniel Fellon, P.E.	Cell Phone:	(717) 503-8129
Senior Engineer; Project Manager	Office Phone:	(717) 508-0538
Kim Nelson, P.E.	Cell Phone:	(814) 404-3594
Vice President, Senior Engineer *ARM Corporate Health and Safety Officer*	Office Phone:	(814) 272-0455 x2204
Brooke Reynolds	Phone:	(570) 343-5782
Site Health and Safety Officer, Air Quality Supervisor		
George O'Hara	Cell Phone:	(717) 395-5800
ARM Health & Safety Professional	Home Phone:	(717) 566-5433

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared to address health and safety requirements for personnel involved in waste removal, relocation, and related activities at the Keystone Sanitary Landfill, Inc. (KSL) Keystone/Dunmore (K/D) Landfill, located in Dunmore and Throop Boroughs, Lackawanna County, Pennsylvania, including but not limited to: Owner's (KSL's) employees and representatives; employees of ARM Group Inc. (ARM); visitors, including but not limited to regulatory agency and municipality personnel; vendors with and on-site presence; and on-site contractors and subcontractors.

Each contractor and subcontractor is required to have its own HASP that provides a level of protection equivalent to or greater than this HASP.

Adopted by references made within this HASP are all applicable requirements of the U.S. Department of Labor- Occupational Safety and Health Administration (OSHA Construction Industry Safety Standards (29 CFR 1926, Safety and Health Regulations for Construction) along with referenced General Industry Standards (29 CPR 1910). Likewise, adopted by reference within this HASP are all applicable requirements of the U. S. Environmental Protection Agency's National Emission Standards for Hazardous Air Pollutants, particularly the provisions of 40 CFR Part 61, Subpart M (National Emission Standard for Asbestos [Asbestos NESHAP]).

The effectiveness and adequacy of this HASP will be checked routinely by the Site Health and Safety Officer (SHSO). Any deficiencies of the HASP as may be identified with respect to compliance with applicable regulations, designated performance monitoring standards, and with respect to protection of site workers and the surrounding community will be immediately reported to the Owner and Project Manager.

No unauthorized person will be allowed to enter the project site and any active work areas. Unauthorized personnel are those not pre-approved by the Project Manager and SHSO. All personnel not directly involved with the Work performed at the site shall pre-arrange and pre-approve with the SHSO or Project Manager their need for meetings with project personnel or presence on site.

2.0 SITE DESCRIPTION

Site Name: Keystone/Dunmore Landfill (owned and operated by Keystone Sanitary Landfill, Inc. [KSL])

Site Location: Dunmore and Throop Boroughs, Lackawanna County, Pennsylvania

General Description of the Site:

The subject parcel consists of 107 acres, more or less; the parcel is approximately 3,000 feet in length and about 2,200 feet in width (see Figure 1). It is bordered to the south by Interstates I-81 and I-380, PA Route 6, existing Sedimentation/Retention Basin #1; to the west by a pugmill

facility; to the east by an aggregate crusher and existing Sedimentation/Retention Basin #3; and to the north by the existing, closed Logan Landfill unit.

The K/D Landfill is an inactive, unlined solid waste disposal unit that received municipal solid waste (MSW) prior to its closure in 1992. The K/D landfill was operated as a natural attenuation landfill from approximately 1973 until the mid-1980s. Waste disposed on the subject site consisted of broad range of MSW and industrial waste; the full composition of waste within this disposal unit is not known.

***Site Hazards*:**

Based on materials generally disposed of within regional MSW facilities during the 1970s and 1980s, the substances of concern for the site with respect to potential exposures associated with the planned waste removal activities are listed below on Table 1. Criteria used to select these substances were those that had the potential to produce work zone air quality concentrations potentially exceeding an established permissible exposure level (PEL) within the work zone(s) or on the site perimeter.

Table 1 **Potentially-Present Substances of Concern**
Asbestos
Lead
Benzene
Cadmium
Chromium (VI)
Chlorobenzene
Ethylbenzene
Methylene Chloride
Naphthalene
Toluene
Tetrachloroethene
Trichloroethene
Vinyl chloride
Bis – (2-ethyl hexyl) phthalate
Hydrogen Sulfide
Methane

Table 2 presents the OSHA permissible exposure limits (PELs), OSHA short-term exposure limits (STELs), EPA's NESHAP standard for asbestos emissions, and OSHA action levels for each of the hazardous substances identified on Table 1. It should be noted that the primary exposure pathway of greatest concern is via inhalation / ingestion and therefore, the PELs, STELs, and action levels for each of the hazardous substances of concern have been established to address these pathways. However, it should be noted that although specific limits have not been established for dermal contact for these substances, both NIOSH and OSHA state that skin and eye contact should be prevented.

Substance	OSHA PEL	STEL/OSHA/EPA Action Level
Asbestos	0.1 f/cm^3	1.0 f/cm^3 (OSHA 30 minute STEL); No visible emissions (NESHAP-Asbestos)
Lead	0.05 mg/m^3	0.03 mg/m^3 (OSHA Action Level)
Cadmium	5 ug/m^3 (8 hour TWA)	-
Chromium (VI)	5 ug/m^3 (8 hour TWA)	2.5 ug/m^3 (8 hour TWA)
Benzene	3.19 mg/m^3 Or 1 ppm	1 ppm (NIOSH STEL) 5 ppm (OSHA STEL)
Naphthalene	50 mg/ m^3 Or 10 ppm	15 ppm (NIOSH STEL)
Chlorobenzene	350 mg/m^3 Or 75 ppm	1,000 ppm (IDLH)
Ethylbenzene	435 mg/m^3 Or 100 ppm	125 ppm (NIOSH STEL) 800 ppm (10% LEL)
Toluene	754 mg/m^3 Or 200 ppm	150 ppm (NIOSH STEL) 500 ppm (IDLH)
Trichloroethene	537 mg/m^3 Or 100 ppm	200 ppm ceiling with an acceptable peak concentration of 300 ppm for five minutes in any two hours (OSHA)
Tetrachloroethene	678 mg/m^3 Or 100 ppm	200 ppm ceiling with an acceptable peak concentration of 300 ppm for five minutes in any two hours (OSHA)
Methylene Chloride	87 mg/m^3 Or 25 ppm	125 ppm (OSHA STEL)
Vinyl Chloride	2.56 mg/m^3 Or 1 ppm	5 ppm ceiling for fifteen minutes max (OSHA)

Substance	OSHA PEL	STEL/OSHA/EPA Action Level
Bis – (2-ethyl hexyl) phthalate	5 mg/m^3	10 mg/m^3 (NIOSH STEL)
Hydrogen Sulfide	15,000 ug/m^3 or 10 ppm (8 hour TWA)	50 ppm (10-minute max) 100 ppm IDLH
Methane	None Established	None Established

Notes: f/cm^3 = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
ppm = parts per million

Table 3 presents the toxicological information for each of the hazardous substances identified on Table 1.

Table 3
Site Hazardous Substance Toxicological Information

Hazardous Substance	Routes of Entry	Symptoms	First Aid
Asbestos	Eye, inhalation	Asbestosis (chronic exposure); dyspnea (breathing difficulty); interstitial fibrosis; restricted pulmonary function; finger clubbing; irritated eyes; (potential occupational carcinogen)	Irrigate immediately; fresh air
Lead	Eye, skin, inhalation, ingestion	Weak, lassitude (weakness, exhaustion), insomnia, facial pallor, pal eye, anorexia, low weight, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis or wrist, ankles, encephalopathy, kidney disease, irritated eyes, hypotension	Irrigate immediately; soap wash; respiratory support; medical attention immediately

Table 3
Site Hazardous Substance Toxicological Information

Hazardous Substance	Routes of Entry	Symptoms	First Aid
Cadmium	Eye, Inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; (potential occupational carcinogen)	Irrigate immediately; soap wash promptly; respiratory support; medical attention immediately
Chromium (VI)	Blood, respiratory system, liver, kidneys, eyes, skin	Irritation of respiratory system; bronchitis, asthma, nosebleeds, nasal septum ulceration and perforation; liver, kidney damage; leukocytosis (increased blood leukocytes), leukopenia (reduced blood leukocytes), eosinophilia; eye injury, conjunctivitis; skin ulcer, irritant and allergic contact dermatitis; [potential occupational carcinogen]	Lung cancer; Asthma; Nasal perforation, ulceration; dermatitis
Benzene	Eye, skin, inhalation, ingestion	Irritated eyes, skin, nose, respiratory system; giddiness; headache; nausea; staggered gait; fatigue; anorexia; lassitude (weakness, exhaustion); dermatitis; bone marrow depressant/depression; (potential occupational carcinogen)	Irrigate immediately; soap wash immediately; respiratory support; medical attention immediately
Naphthalene	Eye, skin, inhalation, ingestion	Irritated eyes, headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweating, jaundice, hematuria, hemoglobinuria, renal shutdown, dermatitis, optical neuritis, corneal damage	Irrigate immediately; soap wash; respiratory support; medical attention immediately
Chlorobenzene	Eye, skin, inhalation, ingestion	Irritated eyes, skin, and nose; drowsiness, incoordination; CNS depressant; liver, lung, and kidney injury in animals	Irrigate immediately; soap wash; respiratory support; medical attention immediately

Table 3
Site Hazardous Substance Toxicological Information

Hazardous Substance	Routes of Entry	Symptoms	First Aid
Ethylbenzene	Eye, skin, inhalation, ingestion	Irritated eyes, skin, mucus membrane; headache; dermatitis; narcosis; coma	Irrigate immediately; water flush promptly; respiratory support; medical attention immediately
Toluene	Eye, skin, inhalation, ingestion	Irritated eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils,, lacrimation; nervousness; muscle fatigue; insomnia; paresthesia; dermatitis; liver, kidney damage	Irrigate immediately; soap wash promptly; respiratory support; medical attention immediately
Tetrachloroethene	Eye, skin, inhalation, ingestion	Irritated eyes, nose, throat, nausea, flush face, neck, vertigo, dizziness, incoordination, headache, somnolence, skin erythema, liver damage, (potential occupational carcinogen)	Irrigate immediately; soap wash; respiratory support; medical attention immediately
Trichloroethene	Eye, skin, inhalation, ingestion	Irritated eyes, skin, headache, vertigo, visual disturbance, fatigue, giddiness, tremor, somnolence, nausea, vomiting, dermatitis, cardiac arrhythmias, parathesia, liver injury, (potential occupational carcinogen)	Irrigate immediately; soap wash; respiratory support; medical attention immediately
Methylene Chloride	Eye, skin, inhalation, ingestion	Irritated eyes, skin; fatigue, weakness, drowsiness, lightheadedness; numb, tingling limbs; nausea (potential occupational carcinogen)	Irrigate immediately; soap wash promptly; respiratory support; medical attention immediately
Vinyl Chloride	Eye, skin, inhalation	Weakness; abdominal pain; GI bleeding; enlarged liver; pallor or cyanosis of extremities; frostbite from liquid form (potential occupational carcinogen)	Frostbite of the eyes or skin; respiratory support; medical attention immediately
Bis- (2 ethyl-hexyl) phthalate	Eye, inhalation, ingestion	Irritated eyes, mucus membrane, in animals: liver damage, terato effects, (potential occupational carcinogen)	Irrigate immediately; respiratory support; medical attention immediately

Table 3
Site Hazardous Substance Toxicological Information

Hazardous Substance	Routes of Entry	Symptoms	First Aid
Hydrogen Sulfide	Respiratory system, eyes	Apnea; coma; convulsions; irritated eyes, conjunctivitis pain, lacrimation, photophobia, corneal vesiculation; respiratory system irritation; dizziness; headaches; fatigue; insomnia; GI disturbances	Acute systemic toxicity; CNS effects; Irritation-Eye, (Conjunctivitis), Lungs---Moderate
Methane	Skin (contact with liquid form)	Drowsiness; unconsciousness; frostbite (from liquid form).	Simple asphyxiant; Explosive

Table 4 presents the physical hazards that are anticipated to be encountered at the site during the waste removal activities.

Table 4
Site Physical Hazards

Hazard	From	Comment
Temperature Extreme (Cold Stress / Heat Stress)	Ambient Conditions	Seasonal Only
Heavy Equipment	Excavation Activities	Entrapment or collapse hazard
Noise	Sound pressure levels from heavy machinery	Sound pressure levels from excavation equipment
Automotive/Traffic	On-site Haul Roads	Traffic control during excavation activities
Dusts (nuisance and respirable) possibly containing ACM fibers and metals	Excavation and Relocation Activities	There will be a zero tolerance policy for visible dust in effect for the waste area excavation
Landfill Gas (Methane)	Excavation Activities	The K/D currently is managed by an active LFG extraction system

3.0 OBJECTIVES

In particular, the overall objective of this HASP is to provide specific safeguards and monitoring procedures that are in compliance with applicable regulations and adequately protective of site workers and nearby residents with respect to the following concerns and related potential exposures (e.g., airborne, dermal contact, and/or ingestion):

- waste contact;
- construction/excavation procedures;
- vehicle safety;
- cold weather;
- dust and dust constituents such as lead particulates and asbestos fibers;
- landfill gases (i.e., methane);
- asbestos-containing material (ACM);
- heavy metals; and
- volatile organic compounds (VOCs).

4.0 ON-SITE ORGANIZATION

Compliance with this HASP is required of all workers who are involved with the waste removal and relocation operations and related activities at the site, and, as applicable, all other personnel present on site. All such operations and activities shall be performed under the guidance of the SHSO. The SHSO will implement levels of personal protection required as defined in Section 6 (Personal Protective Equipment), ensure that established safety guidelines are implemented, and record all information relevant to the project (including, but not limited to, analytical data, worker exposure, and personal protective equipment).

Table 5 identifies project personnel designated to carry out the stated job functions on-site (Note: one person may carry out more than one job function).

Table 5 Project Personnel		
ARM Corporate Health and Safety Officer (HSO)	Kim Nelson, P.E., ARM Group Inc.	(814) 272-0455 x2204 (814) 404-3594 (Cell)
Contingent Corp. HSO	George O'Hara, ARM Group Inc.	(717) 395-5800 (Cell)
Project Manager	Daniel Fellon, P.E., ARM Group Inc.	(717) 508-0538 (717) 503-8129 (Cell)
Site Health and Safety Manager	Brooke Reynolds, Keystone Sanitary Landfill	(570) 343-5782
Project Engineer	Matthew Curry, P.E., ARM Group Inc.	(570) 235-1310
Contingent Project Engineer	William Prendeville, E.I.T., ARM Group Inc.	(717) 508-0570 (717) 982-3299 (Cell)

All persons, including federal, state, and local agency representatives arriving or departing the site, will be met by the SHSO, or the Project Engineer, or the Project Manager prior to entering the site, to ensure that all requirements of this HASP, including its initial safety briefing requirements, are met. The Project Manager must be made aware of and provide advance approval of the initiation of all planned work activities, and any changes to the project work. The SHSO will maintain a job log and a log of the entry of all persons onto the site. In the event that the SHSO is not present on-site, no persons will be granted access to the site except those that have been pre-qualified for site entry by the SHSO, based on requirements listed in this HASP, or as may be otherwise granted access by the Project Engineer or the Project Manager.

5.0 ON-SITE CONTROL

No unauthorized person will be allowed to enter the project site and any active work areas. Unauthorized personnel are those not pre-approved by the Project Manager and SHSO. All personnel not directly involved with the Work performed at the site shall pre-arrange and pre-approve with the SHSO or Project Manager their need for meetings with project personnel or presence on site.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The following sections describe the pre-established personal protective equipment (PPE) requirements for the planned waste removal operations and related activities.

6.1 Minimum PPE

The following PPE shall be available at all times (Level "D"):

- Coveralls or long pants with work shirt.
- Steel toe/guarded boots/shoes which meet the ASTM F-2412 standard. Steel toe guards on boots will not be permitted.
- Head protection (ANSI Z-89.1, 1986/1997/2003) is also required.
- Safety glasses, with side shields that, as a minimum, are ANSI Z-87.1 1968 through 2003, certified. Prescription eyewear with plastic side shields will not be permitted.
- Sturdy work gloves, (as appropriate).
- ANSI 8.3.19 (1974) or approved equivalent certified hearing protection, as required by the SHSO.
- Reflective Class III high visibility safety vests (ANSI 107) will also be required for work around excavation equipment and along the on-site haul road.

6.2 Additional PPE (Modified Level "C")

Should the SHSO determine that there is a need for additional PPE, such as modified Level "C" respiratory protection and upgraded dermal protection, at a minimum the following will be required of site personnel directly involved with a work zone where a work zone PEL exceedance would dictate a modified Level "C" respiratory protection requirement, or where a work zone physical contact with a dermal exposure risk may arise:

- Full body covering (Tyvek QC or approved equal).
- Full face or half-face, negative pressure cartridge respirator (HEPA filter), used in compliance with applicable OSHA regulations, including an established employer's Respirator Program, and meeting manufacturer's certification criteria, and respective NIOSH certification.
- Minimum 17 mil Neoprene glove (or approved equal) with disposable nitrile liner/inner gloves (minimum 2 mil). Hand protection shall meet 29 CFR 1910.138 regulatory standards.

Only individuals that have been medically cleared to wear respiratory protection, can demonstrate currently valid training, and that have been satisfactorily fit tested are permitted to use a respirator for any work assignments extending for a duration of more than 10 minutes where the work zone may be characterized by hazardous substance concentrations in excess of the designated work zone PEL(s).

6.3 PPE Upgrade Levels

All activities conducted during the waste removal activities will be completed under Level "D" respiratory and dermal protection standards. Dedicated efforts by all site personnel shall be made at all times to minimize dust generation during excavation activities, but should dust generation within a work zone become problematic, such as exceeding the prescribed dust/particulate PEL (dust level ≥ 15 ppm) or asbestos fiber standard (PEL = 0.1 f/cc) for a duration of more than 10 minutes, the SHSO will upgrade the level of respiratory protection to modified Level "C". An upgrade in the protective standard (and related PPE) from Level "D" as specified above to modified Level "C" is pre-approved. If conditions are encountered that require an upgrade to Level "B" or Level "A", all work activities will cease immediately and this HASP will be reevaluated and/or revised as necessary. All PPE downgrades will require submission of a written request by the SHSO to the Project Health and Safety Manager for approval prior to initiating downgrade actions. Table 6 presents the levels at which a Level "D" and related PPE upgrade would be required.

Table 6
Site PPE Upgrade Criteria

Substance	Upgrade Threshold	Action
Dust/Airborne Particulates	15 mg/m^3	Upgrade: Level C
Asbestos	0.1 f/cm^3	Upgrade: Level C
Lead	0.05 mg/m^3	Upgrade: Level C
Cadmium	2.5 ug/m^3 (8 hour TWA) 5 ug/m^3 (8 hour TWA)	Collect Daily Samples Upgrade: Level C
Chromium (VI)	2.5 ug/m^3 (8 hour TWA) 5 ug/m^3 (8 hour TWA)	Collect Daily Samples Upgrade: Level C
Benzene	1.0 ppm	Upgrade: Level C
Naphthalene	10 ppm	Upgrade: Level C
Chlorobenzene	75 ppm	Upgrade: Level C
Ethylbenzene	100 ppm	Upgrade: Level C
Toluene	200 ppm	Upgrade: Level C
Tetrachloroethene	10 ppm	Upgrade: Level C
Trichloroethene	10 ppm	Upgrade: Level C
Methylene Chloride	25 ppm	Upgrade: Level C
Vinyl Chloride	1 ppm	Upgrade: Level C
Bis – (2-ethyl hexyl) phthalate	5 mg/m^3 or 1.0 ppm	Upgrade: Level C
Hydrogen Sulfide	10 ppm	Stop Work
Methane	10% or 10,000 ppm	Stop Work

7.0 COMMUNICATION PROCEDURES

Communications on-site may be maintained by means of verbal communications, hand signals, and portable radios. The following standard hand signals will be used in case of failure of radio communications:

- Hand gripping throat - Out of air or can't breathe: provide immediate rescue.
- Grip partner's wrist - Leave area immediately.
- Hands on top of head - Need assistance.
- Thumbs up – Yes, OK, I'm all right, I understand.
- Thumbs down - No, negative

An air horn (or vehicle horn) sounding three blasts is the emergency signal to indicate that all personnel should immediately leave the work area or stop activities and report to the support area. This signal will be continuously repeated by the SHSO until all personnel have left the work area.

Site telephone communication will be via cell phones. Emergency contact information will be posted at the project site, both on the outside and also inside of the project job trailer, to be situated in the adjacent project support area.

8.0 SITE-SPECIFIC HEALTH AND SAFETY PROCEDURES

The SHSO is directly responsible to the Project Manager for implementing and directing the prescribed health and safety procedures and related recommendations on-site. This individual is authorized to and is required to suspend all activities in the event that immediately dangerous to life and health (IDLH) situations or conditions are observed. IDLH situations are defined as those which may cause irreversible harm within thirty minutes of exposure to workers, or may prohibit immediate exit from the site. This may include prohibition of work during severe weather events. All necessary OSHA certifications, including a record of currently-valid annual updates, as described below, will be provided to the SHSO for each site worker prior to the commencement of work on-site by any such worker.

8.1 Emergency Medical Care

The SHSO(s) is certified in First Aid/CPR and will be present on-site for the duration of all work, including all related environmental monitoring activities. The closest medical facility (3.2 miles from the site) meeting required minimum emergency medical treatment capabilities is Regional Hospital of Scranton; Geisinger-Community Medical Center (3.4 miles from the site) also meets the minimum medical treatment requirements and is a Level II Trauma Center. Hospital addresses are listed as follows, with locations shown on the maps provided within Appendix A hereof:

Regional (Mercy) Hospital of Scranton
746 Jefferson Avenue
Scranton, PA 18510
Phone # (570) 348-7100

Geisinger-Community Medical Center
1800 Mulberry Street
Scranton, PA 18510
Phone # (570) 703-8000

A map depicting the hospital routes are provided in Appendix A.

The following person(s) have been briefed on the site conditions, the potential exposure hazards and the hazardous substances that may be involved with the project work:

Lackawanna County Emergency Management Agency
Rich Barbolish, ENP
Deputy Director of Emergency Management
Lackawanna County Center for Public Safety
30 Valley View Drive
Jessup, PA 18434
Phone: 570-307-7304

PA Ambulance
Ken Caines, Director of Operations
1000 Dunham Drive
Dunmore, PA 18512
Phone: 570-348-1738

8.2 Medical Surveillance

Medical surveillance is required for all workers entering the site who will be assigned to work that is required to be conducted under modified Level "C" respiratory protection as prescribed in this HASP. Compliance with this medical surveillance standard will be confirmed by the SHSO prior to permitting personnel to gain access to work zones where modified Level C protection is required. Contractor(s) proof of employee medical surveillance and clearance documentation is to be added as an addendum to this HASP. In addition, individuals who, in the judgment of either the individual or the SHSO, exhibit signs or symptoms of exposure to site related hazardous substances will be immediately subjected to a medical examination by a licensed physician and then to the medical surveillance program requirements as set forth herein.

Medical surveillance services, when provided, shall meet the requirements of 29 CFR 1926.65(f) – OSHA Hazardous Waste Operations and Emergency Response, Medical Surveillance requirements – and shall be provided by a Pennsylvania licensed (or other appropriately licensed) physician, or physician-supervised licensed health care provider. Medical surveillance shall document the approved status of site workers to conduct work according to the modified

Level "C" protection standard and correspondingly permitted to use specified Level "C" PPE. At a minimum, the medical surveillance requirements shall include the following:

1. Medical and occupational history
2. Thorough physical examination (including blood pressure measurement and evaluation of major organ systems' function)
3. Electrocardiogram
4. Biological blood profile (SMAC-21 or equivalent)
5. CBC
6. Chest x-ray (performed no more frequently than every four years, except when otherwise indicated)
7. Pulmonary function testing (FVC and FEV[1])
8. Urinalysis with microscopic examination
9. Fit test certification (i.e., clearance to wear respirator)
10. Visual acuity
11. Audiometric testing

For this project, individuals assigned to the removal of friable asbestos (a waste classification to be made by the SHSO, a licensed asbestos inspector, or by another SHSO-delegated and designated licensed asbestos inspector) or to work where airborne asbestos fiber exposures are expected to exceed the work zone PEL shall be subject to the medical surveillance requirements identified in 29 CFR 1926.1101 (m) – OSHA Safety and Health Regulations – Asbestos – Medical Surveillance, at the commencement and completion of friable asbestos removal activities. These medical surveillance requirements generally consist of the following:

1. Medical and occupational history/questionnaire
2. General physical examination (including evaluation of major organ system)
3. Chest x-ray (performed no more frequently than every four years, except when otherwise indicated)
4. Pulmonary function testing (FVC and FEV[1])
5. Any other examinations deemed necessary by the examining physician

In order to be assigned to work involving the removal of friable asbestos or to work where airborne asbestos fiber exposures are expected to exceed the work zone PEL, such individuals shall also complete an asbestos history questionnaire.

In addition, individuals working with airborne lead (dust) concentrations that are expected to exceed the prescribed OSHA Action Level shall meet the medical surveillance requirements identified in 29 CFR 1926.62 (j) – OSHA Hazardous Waste Operations and Emergency Response – Lead – Medical Surveillance. In this case, the minimum medical surveillance requirements shall include:

1. Medical and occupational history/questionnaire
2. Thorough physical examination
3. Blood pressure measurement
4. Blood sample and analyses, including blood lead (BL) and zinc protoporphyrin (ZPP) levels
5. Urinalysis
6. Any other examinations deemed necessary by the examining physician

Thereafter, additional BL and ZPP monitoring must occur every two months until the end of the project. Full medical examination [per 29 CFR 1926.62(j)(3)] will be repeated for these individuals if BLs are at or above 40 ug/dl, or if an individual demonstrates signs or symptoms of lead exposure, or as may be otherwise medically appropriate. In compliance with 29 CFR 1926.62(k), employees with BLs at or above 50 ug/dl for two consecutive samples shall be removed from duty and shall remain ineligible to return to duty for the duration of this project. Temporary removal from duty will occur following a single discovery of a BL result that is equal to or greater than a BL = 50 ug/dl; in such case, duty reinstatement shall occur only after a subsequent sample shows BL = 40 ug/dl or less.

8.3 Training

In advance of a work assignment, the SHSO shall provide site- and project-specific health and safety training and informational briefings to all individuals assigned to work on-site. This training will include the review of all information provided within this HASP, and also Asbestos Awareness training, according to the provisions of 29 CFR 1926.1101(k)(9)(viii). Proof of currently valid and required certification(s) of qualified workers is to be provided in the form of complete documentation to be added as an addendum to this HASP. All on-site workers (exclusive of truck drivers assigned strictly to soil and waste transportation) shall at a minimum provide documentation that they have received their HAZWOPER: 40 hour certification (29 CFR 1926.65(e)), and their annual 8-hour updates (i.e., current status), as required.

During the waste excavation and removal process, the CHSO and SHSO may make the determination that the following additional training shall be required of contractor personnel such as equipment operators and laborers:

- Lead hygiene/compliance training as per 29 CFR 1926.62(l) if exposures at or above the OSHA action level (30 ug/m^3) are anticipated.
- 40 hour asbestos supervisor training/certification (Pennsylvania Department of Labor and Industry [PADOLI] Licensed) per 29 CFR 1926.1101 and 40 CFR Part 763.

Such training or certification, if required, shall be confirmed by the CHSO and SHSO prior to permitting such contractor personnel to gain site entry. Such a determination will be made by the CHSO and SHSO if significant quantities of friable asbestos or lead solids are encountered, according to the requirements of 29 CFR 1926 (Safety and Health Regulations for Construction) and its relevant provisions. In addition, the SHSO will be trained in first aid/CPR and the use of fire extinguishers.

8.4 Environmental Monitoring

The following environmental monitoring instruments shall be used on-site by the designated SHSO at the specified intervals. All equipment shall be calibrated prior to use as required by manufacturer's specifications. Calibration shall also be documented by the SHSO.

Table 7 **Health and Safety Instrumentation, Methods and Monitoring Frequency**	
Combustible Gas Indicator (CGI)	Prior to, initially (1st hour), then continuously; during all excavation activities
Photoionization Detector (PID)	Prior to, initially (1st hour), then continuously; during all excavation activities
Integrating Sound Level Meter	Prior to, initially (1st hour), then continuously; during all excavation activities
Ambient Dust Monitor and Fiber Analysis Meter (FAM)	Prior to, initially (1st hour), then periodically; during all excavation activities
Direct reading length of stain indicator tubes (Draeger) for volatile and semi-volatile organic chemicals as listed on Table 1 - and others as deemed necessary	Prior to, initially, and twice daily in each area where >10 ppm organic vapors above background are detected in breathing zones.
X-Ray Fluorescence Analyzer (XRF)	At the discretion of the Project Manager, SHSO, or Project Engineer to measure lead concentrations in dust or dust wipe samples, as appropriate
Laboratory Analysis (Various)	At the discretion of the Project Manager, SHSO, or Project Engineer, and as otherwise prescribed in the HASP
• Dust Samples: NIOSH Method 0500 • Asbestos Air Samples: NIOSH Method 7400 • Lead Air Samples: NIOSH Method 7082 • Cadmium Air Samples: NIOSH Method 7300 • Chromium (VI) Air Samples: OSHA Method ID 215	At the discretion of the Project Manager, SHSO, or Project Engineer, and as otherwise prescribed in the HASP

8.5 Work Procedures

8.5.1 Direct Contact Exposures

Workers who are involved with waste excavation, waste transport or waste disposal activities have the potential to come into direct contact with the wastes or contaminated soils. Likewise, there is also the potential that workers may be exposed to contaminated water or other liquids that occur within wastes or are otherwise associated with the planned excavations, such as perched water, groundwater, seepage, and stormwater. Direct contact exposure potential includes both dermal and accidental ingestion.

During the excavation of the wastes, workers will not be permitted to have access to the excavations; moreover, this project will involve no confined space entries. Access to the excavations shall be exclusively limited to the use of excavating equipment (trackhoes, excavators, loaders, and the like). Access to the excavation as required for purposes of pumping and managing water shall be by remote means (use of portable pumps and discharge piping or hoses). Potential dermal contact exposures that may arise with respect to the waste inspections, or the commissioning and decommissioning of various control measures and equipment will be prevented and avoided by the use of personnel wearing dermal gloves and splash suits, pursuant to the requirements of this HASP (Level D PPE).

Direct contact exposures to the wastes (and other sorts of physical hazards) by other (non-project) personnel shall be prevented by establishing site perimeter access control (fence), and other measures such as barricades, posts, placards, or exclusionary zone tape that precludes entry to open excavations, exposed waste materials, standing water, stockpiled materials, and other staged supplies.

8.5.2 Dust Inhalation

During excavation of the waste materials and contaminated soils, dust containing lead, metals, and asbestos may be generated. The information collected during initial monitoring conducted concurrent with the cover material removal and initial waste excavations will be used to refine dust control measures and work procedures to ensure that the dust levels remain below permissible exposure levels (PELs).

According to 29 CFR 1926 Safety and Health Regulations for Construction, the applicable PELs of airborne (dust) contaminants for construction for this project are as follows:

- Lead – 0.05 milligrams per cubic meter (mg/m3) of air (29 CFR 1926.62).
- Asbestos – 0.10 fibers per cubic centimeter (on-site); and 0.01 fibers per cubic centimeter (off-site) (29 CFR 1926.1101).
- Chromium (VI) compounds – no TLV See 1926.1126
- Cadmium (as Cd) – no TLV See 1926.1127
- Dust/particulate matter – 15 milligrams per cubic meter (mg/m3) of air (29 CFR 1926.55)

During excavation of the wastes, the following controls will be routinely implemented, depending upon site conditions and as appropriate according to the discretion of the SHSO, to minimize dust generation, to control dust that is produced, and to minimize or eliminate potential dust exposures:

- Keeping the waste moist or wet, and keeping dust to a minimum by using a portable water misting system in the waste excavation areas and in association with procedures used to load wastes into the waste trucks or waste roll-off containers;
- Pre-wetting the exposed waste materials before excavation occurs;
- Using supplemental soaker units (pressurized water hose system) to supplement portable misters to achieve adequate wetting;
- Limiting the area of waste being excavated (i.e., area open and exposed at any one time) to no more than 5 acres; and,

- Tarping of the truck beds immediately upon completion of loading and during waste transportation.

The dust control water supply may be obtained from one or more of the sources listed below. Temporary water supply (e.g. tanks or other utility services) will be set up adjacent to and uphill from the excavation area to supply a water reservoir for dust control.

- PA American Water Co. service provided to the landfill;
- One of two on-site non-potable production wells (Quarry Well No. 1 and Quarry Well No. 2); or
- Other clean water supplies derived from off-site sources.

Wind data for the site indicate that the prevailing wind direction is from the west. As such, during the waste removal project, the potential would exist for dust emissions to be blown from the excavation area to the east. In order to monitor and confirm the effectiveness of proposed on-site dust control procedures and to evaluate this potential exposure pathway, work zone and perimeter air monitoring will be performed daily to measure concentrations (analyte-specific) with respect to compliance with designated air quality standards for dust (particulates), metals, and asbestos fibers. Planned work zone, perimeter, and personal air quality monitoring procedures are detailed below in Sections 8.6, 8.7 and 8.8, hereof.

If air monitoring indicates the exceedance of any air quality PELs within or adjacent to the work zone or at the downwind property boundary, additional corrective measures will be taken. The types of corrective actions that will be necessary will vary depending upon the nature and extent of the concerns identified and the potential receptors that may be exposed. The typical corrective actions that may be employed to mitigate concerns regarding airborne emissions during the excavation of waste materials include: brief work suspensions, additional dust control measures (use of additional moisture), decreased rate of waste disturbance and transfer, use of blower systems to control and direct air flow patterns, revised work schedules to take advantage of reduced wind speeds and more favorable wind direction, and other engineering controls.

8.5.3 Chemical Vapors

Monitoring of methane and chemical vapor concentrations in air will be accomplished at the excavation work zone by the SHSO by use of a calibrated combustible gas indicator (CGI) and a photoionization detector (PID). The action levels set for these devices are as follows: 10,000 ppm of methane, and 10 ppm of total ionizable vapors (sustained for a minimum of 6 minutes) measured by the PID (10.4eV sensitivity bulb). If any chemical vapors are detected with the PID in excess of background, colorimetric tubes (Draeger or equivalent) will be used to further characterize such detected vapors.

If air monitoring indicates the exceedance of any of the prescribed air quality standards (chemical vapors and methane) within or adjacent to the work zone, additional corrective measures will be taken. The types of corrective actions that will be necessary will vary depending upon the nature and extent of the concerns identified and the potential receptors that may be exposed. The typical corrective actions that may be employed to mitigate concerns regarding methane and vapor concentrations during the excavation and loading of waste

materials include: brief work suspension; additional/enhanced misting controls; decreased rate of waste disturbance and loading, use of portable blower systems to control and direct air flow patterns, revised work schedules to take advantage of cooler temperatures; and respiratory protection for site workers within affected work areas.

8.5.4 Noise From Heavy Equipment

It is unlikely that heavy equipment operations on this project will exceed 90 decibels (dBA) over an 8 hour time weighted average (TWA8). However, subject to the judgment of the SHSO, individuals working in the vicinity of heavy equipment may be required to wear hearing protection, depending upon work circumstances. The applicable noise standards for this project are those as set forth in 29 CFR 1926.52 concerning occupational noise exposure. By means of site noise measurements, the SHSO will monitor the work of the Contractor with an integrating sound level (noise) meter (OSHA Integrating Sound Level Meter Model CR 720B, or equivalent) and use these results to reasonably ensure (or otherwise issue directives as necessary) Contractor compliance with these standards. The applicable standards for noise are set forth as follows:

PERMISSIBLE NOISE EXPOSURES

8 hours = 90dBa
4 hours = 95dBa
2 hours = 100dBa
1 hours = 105dBa
½ hours = 110dBa
¼ hour or less = 115dBa

8.5.5 Cold Stress Monitoring

Cold Stress Monitoring is required for work in air temperatures below 30.2^0 F. This monitoring will include wind and speed (wind chill) factoring, as specified in: 2002: Threshold Limit Values and Biological Exposure; American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio: Thermal Stresses.

Table 8 presents the Equivalent Chill Temperature (ECT) calculation chart.

Table 8
Equivalent Chill Temperature Calculations Chart

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect)	LITTLE DANGER In <hr with dry skin Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute				GREAT DANGER Flesh may freeze within 30 seconds			
	Trenchfoot and immersion foot may occur at any point on this chart											

Note: Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F) per cold stress TLV.

For work continuously performed below an ECT of 19.4 °F, the SHSO will determine appropriate warming requirements, based on the above referenced document. Briefing sessions will be held daily by the SHSO at these temperatures with respect to: re-evaluating proper clothing practices; review of warming procedures; review of eating and drinking habits affecting work at cold temperatures; signs and symptoms of hypothermia; and safe work practices in cold weather. Besides these procedures, the following guidance shall apply:

- No work in unheated or unshielded space will be performed below an ECT of -25 °F; and
- Additional work/warming regimens may be developed for work activities performed below an ECT of 19.5 °F.

8.5.6 Special Wastes

In the event that waste materials are encountered that pose a unique management or regulatory challenge, or cannot otherwise be accepted and disposed of at KSL (e.g., flammable, explosive, hazardous, free-liquid products, etc.), work will immediately cease and the SHSO, Project Manager, and the CHSO will be notified immediately. Prior to resuming work, the waste will be

assessed and if necessary, special provisions will be developed for handling the wastes, as further detailed in the Waste Relocation Plan (WRP). Current plans provide for the sampling of such liquids by the SHSO to determine the nature of the liquids (water, petroleum, lubricants, or other). Subsequently, the SHSO will coordinate with the Contractor for either the transfer of such liquids to intact drums for temporary on-site storage, or the over-packing of existing drums deemed by the SHSO to have adequate integrity, in general. Later, in coordination with the Contractor, such drummed liquids will be transferred off-site for off-site disposal at a commercial disposal facility, according to applicable regulations.

In the event that special wastes such as friable ACMs are encountered during the waste removal activities – a determination to be made by the SHSO (a licensed asbestos inspector) – work will temporarily cease at that location until the SHSO makes a determination as to the most appropriate method of waste handling and transportation for disposal in the active landfill. For bulky or more substantial quantities of friable ACMs, they will be wetted and then removed while wet and placed in an impermeable container (e.g., watertight roll off container), for subsequent transport to and disposal at the active face of the KSL.

The SHSO will be a PADOLI-licensed asbestos supervisor and a licensed asbestos inspector, and this person will oversee and direct all procedures involving removal, handling, management and disposal of such special wastes, including the identification and classification of friable ACMs.

8.6 Perimeter Air Monitoring

Site perimeter ambient air monitoring stations will be established by the SHSO in association with active excavation subcells. These monitoring stations (total of two) will be established upwind (typically west) and downwind (typically east) of the excavation. In general, as activities progress from southwest to northeast, the monitoring stations will be repositioned accordingly to characterize air quality associated with active waste excavation and loading operations along the property boundary. Monitoring will be accomplished for dust (particulates), metals, and asbestos fibers, as described below.

Particulate (dust) monitoring, conducted by the SHSO at the designated upwind and downwind perimeter monitoring locations, will be accomplished periodically via direct reading analysis using an MIE Model DR 1000 ambient dust monitor or equivalent capable of 0.005 mg/m^3 resolution. Using this hand-held instrument, the SHSO will conduct daily, periodic monitoring throughout the course of the project at times when waste or soil handling operations are occurring or otherwise corresponding to times when dust in air is observed within active work areas. Action criteria (dictating increased dust control/dust abatement measures) will be established as any reading in excess of 15 mg/m^3 measured at a downwind location.

Particulate (dust) monitoring will also be accomplished by means of stationary aerosol sampling filters positioned at the designated upwind and downwind perimeter monitoring locations. These will be collected daily and analyzed by a certified testing laboratory in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method 0500. Results of these tests will be used to confirm and validate the results of the real-time measurements made with the MIE Model DR 1000 (or equivalent) dust monitor. This monitoring regimen will performed over the first 20 consecutive work days (i.e., days when waste or soil handling operations are

occurring) to establish a site-specific dust emissions standard. If the laboratory analyses of the daily samples provide reliable confirmation of the results of the daily hand-held instrumentation, then the stationary aerosol monitoring procedure will be relaxed to a frequency of one day per two weeks for the duration of the project. Analytical results obtained from the aerosol monitoring procedure (filters) will be used to modify the action criteria as described above, to ensure that the reliance upon the hand-held instrument remains appropriate with respect to compliance with the PEL for dust of 15 mg/m^3 and the site-specific limit that triggers increased dust control/abatement measures. If the laboratory analyses of the daily samples do not confirm the ability of the project team to rely upon the results (scaleable or otherwise) of the daily hand-held instrumentation, then the stationary aerosol monitoring procedure as prescribed herein for the first 20 days will be repeated until hand-held instrumentation establishes consistency with the laboratory data.

Heavy metal particulates (aerosols containing elemental metals) in air monitoring will also be conducted by the SHSO at the designated upwind and downwind perimeter monitoring locations, accomplished on a once per day basis (when waste handling operations are occurring), after collection of aerosol samples according to the same method as prescribed above for dust sampling. These two-hour duration samples will be tested on site with a DELTA Environmental Handheld X-Ray fluorescence analyzer (XRF instrument), or equivalent, for total lead, cadmium, and chromium concentrations (i.e., heavy metals). This testing will determine if heavy metal dust is being generated and the need for the operation of the misting system to effectively maintain compliance with the established PEL for lead dust concentrations. Use of the XRF instrument will also be employed, at the discretion of the SHSO, when the SHSO makes a visual determination (or suspicion) that metals-bearing waste materials may have been encountered by the waste excavation. The SHSO may choose to conduct this type of monitoring at times when dust in air is observed within active work areas. Action criteria (dictating increased dust control/dust abatement measures) will be established as any reading in excess of the OSHA PELs at a downwind location.

Concurrent with the dust monitoring as described above, the SHSO will also conduct metals-in-air sample collection and analysis via NIOSH Method 7082 (or Methods 7105 or 7300; or OHSA Method ID 215), using dedicated aerosol samplers. This monitoring regimen will be continued for 20 consecutive work days (i.e., days when waste handling operations are occurring). If the laboratory analyses of the daily samples provide reliable (scaleable or otherwise) confirmation of the results of the daily XRF analyses, then the stationary aerosol monitoring procedure (for metals-in-air) will be relaxed to a frequency of one day per two weeks for the duration of the project. Analytical results obtained from the aerosol monitoring procedure (filters) will be used to modify the action criteria as described above, to ensure that the reliance upon the XRF instrument remains appropriate with respect to compliance with the PEL for metals and the triggering of increased dust control/abatement measures. If the laboratory analyses of the daily samples do not confirm the ability of the project team to rely upon the results of the XRF instrument, then the stationary aerosol monitoring procedure for metals-in-air testing will be repeated until hand-held instrumentation establishes consistency with the laboratory data.

The SHSO will also implement a similar asbestos fibers-in-air sampling and analysis program due to potential presence of asbestos containing material (ACM) within waste materials. The

SHSO will also conduct sampling and analysis for asbestos fibers in air via NIOSH Method 7400 (Phase Contrast Microscopy) at the upwind and downwind monitoring stations at a frequency of once per week for 20 consecutive work days to establish baseline criteria. Upon achievement of consistent baseline monitoring data, the stationary aerosol monitoring procedure will be relaxed to a frequency of one day per two weeks for the duration of the project. Analytical results obtained from the aerosol monitoring procedure (filters) will be used to modify the action criteria as described above, to ensure compliance with the PEL for asbestos fibers of 0.01 f/cm^3 at the downwind site boundary. In the event that friable ACMs are identified by the SHSO, then the prescribed daily perimeter monitoring will be reestablished for a minimum period of five (5) consecutive days following the last date (if any) when the SHSO has identified friable ACMs in waste materials being handled on the site.

Pursuant to the air quality control and impact mitigation strategy described in this HASP, the SHSO will prescribe and the Contractor will take actions to maintain compliance with applicable air quality criteria.

8.7 Work Zone Air Monitoring

In addition to the site perimeter ambient air monitoring program (Section 8.6, above), work zone ambient air monitoring stations will also be established per set of active excavation subcells (reference site excavation plan). These monitoring stations will be established immediately adjacent to and along the down-wind edge of the active excavation area, to include air quality monitoring for particulates (dust), heavy metals, and asbestos fibers.

Particulate monitoring at the work zone monitoring station will be evaluated via direct reading analysis using an MIE Model DR 1000 or equivalent capable of 0.001 mg/m^3 resolution. Monitoring will occur throughout the project and the readings will be compared to the applicable OSHA Permissible Exposure Level (PEL) of 15 milligrams per cubic meter (mg/m^3) averaged over an 8-hour work shift for the work zone area.

Heavy metals in air monitoring at the work zone will be evaluated by the collection of aerosol samples for analysis for lead in air with an DELTA Environmental Handheld X-Ray fluorescence analyzer (XRF instrument), or equivalent) for total metals concentrations. This testing will determine if heavy metals dust is being generated and the need for the operation of the misting system to effectively maintain compliance with the established PEL for lead dust concentrations. The frequency of this type of testing with the XRF instrument will be determined on-site by the SHSO, based upon the SHSO's observations as to dust generation conditions, and/or a visual determination (or suspicion) made by the SHSO that heavy metals-bearing waste materials may have been encountered by the waste excavation. The SHSO will determine the appropriate frequency for this type of monitoring. Action criteria (dictating increased dust control/dust abatement measures) for the work zone will be established as any reading in excess of the OSHA PELs.

Asbestos fibers in air monitoring at the work zone will be evaluated by collecting aerosol samples for laboratory analysis for asbestos fibers in air via NIOSH Method 7400 (Phase Contrast Microscopy). This monitoring regimen will be performed over the first 20 consecutive work days (i.e., days when waste handling operations involving floor tile materials are

occurring). Upon achievement of consistent baseline monitoring data, the stationary asbestos aerosol monitoring procedure in this circumstance will be relaxed to a frequency of one day per two weeks for the duration of the project. Analytical results obtained from the aerosol monitoring procedure will be used to modify the action criteria as described above, to ensure compliance with the PEL for asbestos fibers of 0.1 f/cm^3 and the STEL of 1.0 f/cm^3 and the triggering of increased dust control/abatement measures. Pursuant to the air quality control and impact mitigation strategy described in this HASP, the SHSO will prescribe and the Contractor will take actions such as increased misting and soaking and other measures, as appropriate, to eliminate dust-related exposures of asbestos fibers and to maintain compliance with applicable air quality criteria.

The SHSO will monitor methane and chemical vapor concentrations at the excavation work zone by the use of a calibrated combustible (methane) gas meter and a photoionization detector (PID). The action levels set for these devices are as follows: 10,000 ppm of methane, and 10 ppm of total ionizable vapors (sustained for a minimum of 6 minutes) measured by the PID (10.4eV sensitivity bulb). If any chemical vapors are detected with the PID, colorimetric tubes (Draeger or equivalent) will be used to further characterize such detected vapors. The combustible gas meter will be the CGS Landtec GEM Model 2000 combustible gas meter, or an equivalent. The PID instrument will be an HNU Model 101, or equivalent, with a 10.4 ev bulb. These instruments and methods will be used to measure concentrations of methane gas and chemical vapors relative to the established PELs as listed on Table 2 hereof, and to dictate the need for respiratory upgrades as listed on Table 6, or the need to accomplish supplemental ventilation of the work zone with portable blower systems to maintain methane concentrations below 10,000 ppm.

8.8 Personal Air Monitoring

In addition to the site perimeter ambient air monitoring program and the work zone air monitoring program, personal air samples will be collected at the start of the excavation activities. The personal air samples will include outfitting applicable personnel directly involved with the waste excavation activities (i.e., equipment operators and site laborers) with personal air sampling devices. The purpose of the personal air monitoring is to determine individual exposures via the OSHA criteria for Initial and Negative Exposure Assessments for lead (29 CFR 1926.62), and asbestos (29 CFR 1926.1101). The personal air samples will be collected over an 8-hour work shift (full shift) for asbestos and lead; in addition, the SHSO will direct the collection of a 30 minute short term exposure sample for asbestos during the first day of this type of excavation activity for equipment operators and site laborers.

The personal air samples will be sent to the laboratory for lead in air analysis via the NIOSH Method 7082, or equivalent, and asbestos fibers in air analysis via NIOSH Method 7400. The laboratory results will be compared to the applicable OSHA PELs (0.05 mg/m^3 for lead and 0.1 f/cm^3 for asbestos) and OSHA Action Levels or Short Term Exposure Levels (STEL) (0.03 mg/m^3 for lead and 1.0 f/cm^3 for asbestos, respectively).

If laboratory results indicate concentrations of asbestos and lead below the applicable OSHA PELs, STELs, or action levels, then no additional samples will be collected, unless determined to

be necessary by the SHSO. If concentrations exceed the applicable OSHA PELs, then the corresponding provisions of 29 CFR 1926.62 and 29 CFR 1926.1101 will be implemented.

8.9 Emergency Procedures and Emergency Action Plan:

As a minimum, two, 2A:40B: C-rated fire extinguishers will be maintained on-site by the SHSO. All equipment, including trucks used in excavation and transportation of wastes and/or soil, will be equipped with a fire extinguisher. Additional extinguishers with a minimum 10B rating will be placed at locations where flammable liquids are used, as appropriate.

A first aid kit/eye wash station will be maintained on-site by the site SHSO; this shall meet the requirements of ASTM-F-30 (first aid kits) and ANSI Z358 (eye wash stations). Fire extinguishers and first aid equipment shall be inspected daily for readiness by the site SHSO.

The Project Health and Safety Manager will contact and brief the following emergency agencies concerning the project prior to the initiation of site activities:

Lackawanna County Emergency Management Agency
Rich Barbolish, ENP
Deputy Director of Emergency Management
Lackawanna County Center for Public Safety
30 Valley View Drive
Jessup, PA 18434
Phone: 570-307-7304

PA Ambulance
Ken Caines, Director of Operations
1000 Dunham Drive
Dunmore, PA 18512
Phone: 570348-1738

Any other necessary emergency phone numbers will be added to this HASP as an addendum.

The following standard emergency procedures will be used by on-site personnel. The SHSO shall be immediately notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed. The location of the on-site ambulance meeting point (site entrance security gate) is presented on Figure 2.

8.9.1 Personnel Injury:

Upon notification of any personal injury, the Project Manager and SHSO will assess the nature of the injury. If the cause of the injury or loss of the injured person from duty does not affect the performance of site personnel, operations may continue. The on-site qualified First Aid/CPR person(s) shall initiate the appropriate first aid and contact should be made for an ambulance and with the designated medical facility (if required). If the cause of the injury increases the risk to others, the designated emergency signal of three horn blasts shall be sounded and all site personnel shall move to the support area for further instructions. Activities on-site will stop until

the circumstance or condition that was the source of the injury is removed, rectified, or adequately minimized, and will resume only when approval to restart work is authorized by the Project Manager and SHSO.

8.9.2 Fire/Explosion:

In the event of a fire or explosion on-site, the designated emergency signal of three horn blasts shall be sounded and all site personnel shall immediately stop work and assemble at the Support Area. The fire department shall be alerted, by means of a 911-call, and all personnel moved to a safe distance from the involved area.

8.9.3 Equipment Failure:

If any equipment (including health and safety monitoring instruments) on-site fails to operate properly, the Project Manager and/or SHSO shall be notified and determine the effect of this failure on the safety of continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the active work, all personnel shall leave the Work Area until the equipment problem is evaluated and rectified.

8.9.4 Work Zone Re-Entry After On-Site Emergency:

In all situations, when an on-site emergency results in evacuation of the Work Area or a Work Area, personnel shall not reenter the subject Work Area until:

1. The conditions resulting in the emergency have been corrected;
2. The hazards have been reassessed;
3. The HASP has been reviewed and updated, if appropriate;
4. Site personnel have been briefed on any changes in the HASP; and
5. Restart has been authorized by the Project Manager and SHSO.

8.10 Site Safety Rules

- Site workers (excluding truck drivers exclusively assigned to trucking duties only) are required to have received 40 hours of safety training and an annual 8-hour refresher under the requirements of OSHA 29 CFR 1910.120.
- All site workers are required to have received the appropriate on-site MSHA training, under the requirements of Federal Mine Safety & Health Act of 1977, Public Law 91-173, as amended by Public Law 95-164.
- No smoking is permitted in the active Work Areas.
- In the event that modified Level C respiratory protection is required, excessive facial hair that interferes with the satisfactory adjustment of the respirator must be removed, and appropriate prescription lenses shall be worn with the respirator.
- All personnel are required to read and at all times comply with the provisions of this HASP. No person will be admitted to the site for a work assignment that has not fulfilled this requirement.

8.11 Personal Monitoring Results

All personal health and safety monitoring results from site monitoring and testing shall be considered personal medical records and the SHSO shall provide such records to the affected site employer (i.e., contractor) in compliance with the requirements of 29 CFR 1910.1020 Medical Recordkeeping Policy.

8.12 Waste Management Plan

Portable toilet service will be used for on-site sanitary purposes. All other wastes, including personal protective equipment and other hazardous/non-hazardous waste will be disposed of in approved on-site waste containers.

8.13 Inspection /Audit Program

To assist in identifying potentially hazardous conditions, deviations from the HASP, and any other conditions which may compromise site safety, the following procedures will occur:

The CHSO and Project Health and Safety Manager will:

- Perform periodic site safety inspections; and
- Insure the site SHSO and all site personnel understand the provisions of the HASP.

The SHSO will:

- Perform site safety inspections as appropriate and document the findings of the inspections; and
- Review findings and potential corrective actions with the Project Manager, the CHSO, and the Project Health and Safety Manager.

8.14 Recordkeeping and Reporting

The SHSO will maintain documentation relative to personnel access, safety and health training, instrument calibration, sample results, and inspection reports.

8.15 Decontamination Procedures

8.15.1 Personnel Decontamination

The following procedure shall be utilized for decontamination of personnel that come into dermal contact (directly or indirectly) with waste materials such as special wastes (e.g., unknown liquids, hazardous waste, or friable ACMs). In general, dermal contact with these types of waste materials should not occur. However, in the event that such contact inadvertently or necessarily occurs, and when appropriate, personnel decontamination, as directed by the SHSO, shall consist of wet and dry decon methods utilizing controlled doffing procedures. These procedures are detailed as follows:

1. Remove respirator (if applicable).
2. Step onto decon poly pad.
3. Remove gross debris.
4. Decon boots using wet brush cleaning methods.
5. Remove outer gloves and boots (if appropriate, based on the level of protection currently in use).
6. Remove outer body covering inside out (if appropriate).
7. Remove inner gloves.
8. Don a fresh change of outer clothing.
9. Place body covering, gloves, etc., in sealed marked/dated container for disposal, or laundering, if to be reused. Commercial laundries that decontaminate PPE shall be informed of the types of hazardous substances (if any) that may be present on the subject laundry.
10. Clean respirator according to manufacturer's instructions.
11. Wash hands prior to eating, drinking, smoking or application of cosmetics.
12. Shower at remote facilities (e.g., home).

8.15.2 Equipment Decontamination

Equipment decontamination shall consist of a primary removal of gross debris, on-site, followed by a high pressure wash with clean water as necessary.

8.15.3 Emergency Decontamination

Emergency decontamination (prompted by direct dermal contact with hazardous liquids or semi-solids) will consist of a single procedure: immediate flushing of affected personnel or equipment with fresh water. Emergency decontamination shall occur as close as possible to the area of emergency occurrence. Emergency decon water (5 gallons of potable water, minimum) shall be kept on-site at all times in containers ready for application (e.g. decon pump sprayers). Emergency decon water shall be kept adjacent to areas where excavation activities are occurring. Emergency decontamination will be employed in the event of any symptomatic exposures; or in the event of other emergencies requiring rapid removal of personnel due to hazardous substance exposure.

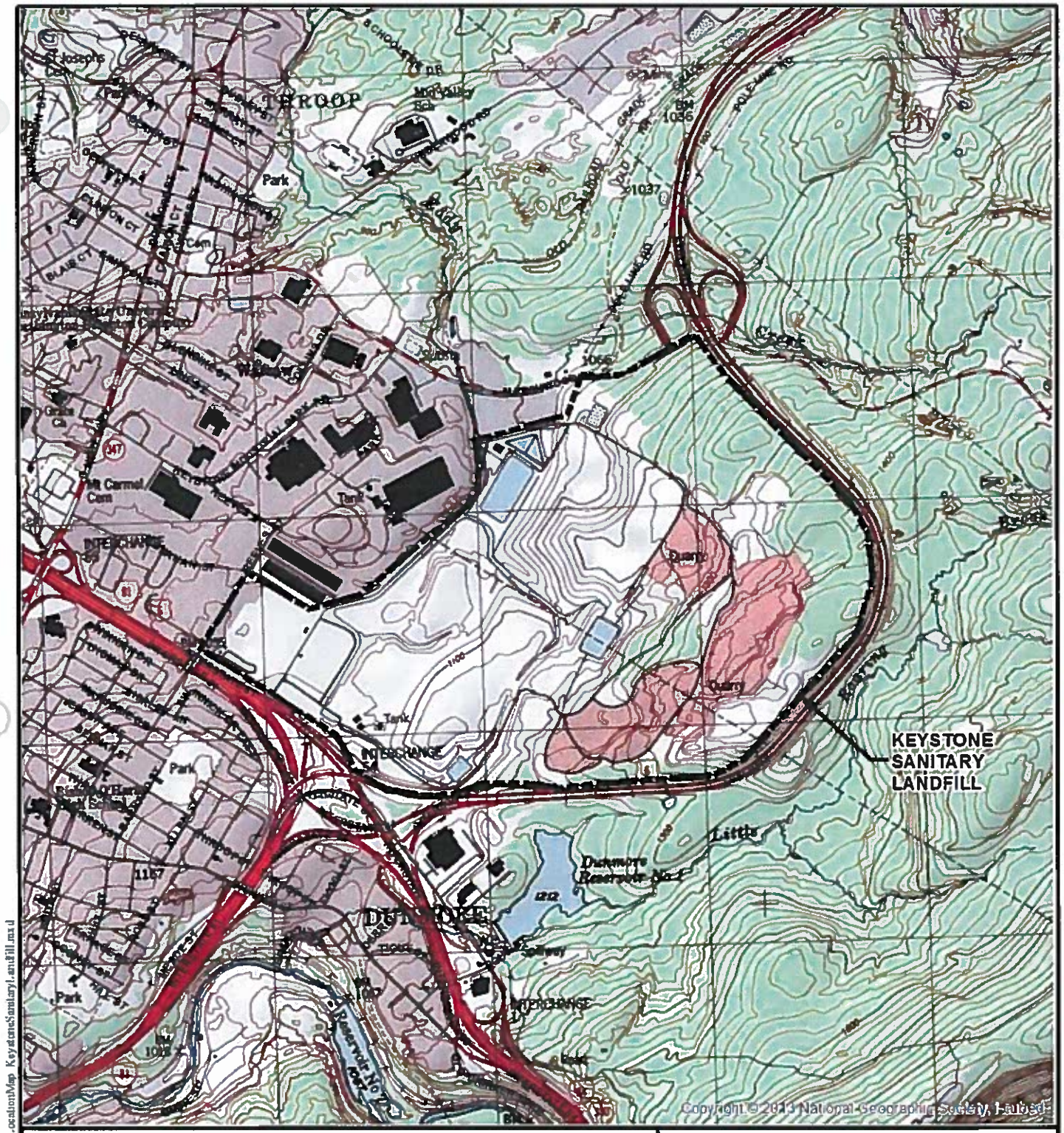
9.0 ACKNOWLEDGEMENT OF PLAN

In advance of being assigned to this Project and initiating work on this site, all site personnel are required to read and comply with the HASP. The following safety compliance affidavit shall be signed and dated by each person authorized and intending to work on-site.

I have read the HASP for the Keystone/Dunmore Landfill Waste Relocation Project, and agree to conduct all on-site work in conformity with the requirements of the HASP. I acknowledge that failure to comply with the designated procedures in the HASP may lead to my removal from the site, and appropriate disciplinary actions taken by my employer. I certify that I meet the applicable requirements of OSHA 29 CFR 1910.120 for 40-hour safety training and 8-hour annual refresher *(certificates should be supplied, added to this HASP as an addendum and kept on file).*

Title and Company	Name	Signature	Date
Project Manager - ARM			
SHSO			
CHSO-ARM			
Other Site Personnel-ARM			
Other Site Personnel-ARM			
Other Site Personnel-ARM			

FIGURES



REF: Base map from ESRI USA Topo Maps. Refer to USGS 7.5 minute Quad Olyphant, PA.

LEGEND

KEYSTONE SANITARY LANDFILL

0 2,000 4,000 6,000

SCALE IN FEET

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Site Location Map

Keystone/Dunmore Waste Relocation
Keystone Sanitary Landfill

August, 2015	Scale: 1" = 2,000'	14411

ARM Group Inc.
Earth Resource Engineers and Consultants
www.armgroup.net

Figure 1

P:\DeNaples\14411 Keystone Landfill\GIS\Figure1_SiteLocationMap_KeystoneSanitaryLandfill.mxd

0 1/4 1/3 3/4

SCALE IN MILES

N

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Ambulance Meeting Location

Keystone/Dunmore Waste Relocation
Keystone Sanitary Landfill

February 2016	Scale 1" = 1/4 Mile	14411

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Figure 2

P:\DeNaples\14-11 Keystone Landfill\Drwg\Production\Site Location Map.dwg Plotted February 25, 2016

APPENDIX A

Hospital Directions and Maps

APPENDIX A

DIRECTIONS FROM THE SITE TO REGIONAL HOSPITAL OF SCRANTON

746 JEFFERSON AVENUE, SCRANTON, PA

1. Depart site, turning right (R) onto Dunham Drive.
2. Turn Left (L) onto Reeves Street
3. Turn left (L) onto Jessup Avenue; Jessup becomes Barnard Street
4. Turn right (R) onto East Drinker Street
5. Turn left (L) onto South Blakely Street
6. Slight left (L) onto Clay Street
7. Turn right (R) onto Poplar Street
8. Take first left (L) onto Quincy Avenue
9. Turn right (R) onto Myrtle Street
10. Turn left (L) onto Jefferson Avenue; hospital will be on the left.

Total Time: 11 minutes; 3.2 miles.

DIRECTIONS FROM THE SITE TO GEISINGER-COMMUNITY MEDICAL CENTER

1800 MULBERRY STREET, SCRANTON, PA

1. Depart site, turning left (L) onto Dunham Drive.
2. Take the ramp onto I-380 N/I-84
3. Merge onto I-81 South
4. Take Exit 184 for PA-307/Moosic Street (turn right)
5. Turn right onto Crown Ave; Crown Ave becomes Harrison Ave/Harrison Ave Bridge
6. Continue to follow Harrison Ave
7. Turn right onto Mulberry Street; hospital will be on the right

Total Time: 11 minutes; 5.8 miles.

APPENDIX B

Certifications and Credentials for On-site Workers

(to be updated prior to commencement of waste relocation activities)

APPENDIX C

Monitoring and Inspection Logs

INSTRUMENT CALIBRATION LOG

DATE	INSTRUMENT	CHALLENGE AGENT	KNOWN CONCENTRATI ON	READING	ADJUSTED?	SIGNATURE
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	
					YES NO	

PAGE _____

PROJECT NAME: _____

PROJECT NUMBER: _____

DATE OF SAMPLING: _____

RESULTS OF ON-SITE MONITORING

TIME	MONITORING DEVICE	CALIBRATION	O_2/CGI		RADIATION MONITOR READING	OTHER	LOCATION	PURPOSE	INITIALS
			% LEL	% O_2	mR/hr				

PROJECT NAME: _____

PROJECT NUMBER: _____

DATE: _____

ON-SITE SAMPLE COLLECTION LOG

TIME (START/STOP, IF APPROPRIATE)	SAMPLE NUMBER	COLLECTION PROCEDURE	COLLECTION DEVICE	CALIBRATION	LOCATION	ANALYZED BY AND DATE

ATTACHMENT B

K/D Waste Relocation, Minor Permit Modification (MPM), and Related Documentation

2540-PM-BWM0357 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Coordination #

FORM A
APPLICATION FOR MUNICIPAL OR RESIDUAL WASTE PERMIT

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided herein. Replacement/substitution of or attachment to this form is prohibited. Improperly completed forms may be rejected by the Department, may be considered to be violations of the Department's Rules and Regulations, and may result in assessment of fines and penalties.

SECTION A. APPLICANT IDENTIFIER (Check one of the boxes and identify both)

☒ Owner	Name: Keystone Sanitary Landfill, Inc.	Phone #: 570-343-5782
	Address: 249 Dunham Drive, Dunmore, PA 18512-0249	Email: ksl@epix.net
☒ Operator	Name: Keystone Sanitary Landfill, Inc.	Phone #: 570-343-5782
	Address: 249 Dunham Drive, Dunmore, PA 18512-0249	Email: ksl@epix.net

SECTION B. TYPE OF FACILITY

- Municipal Waste Landfill ☒
- Construction/Demolition Waste Landfill ☐
- Municipal Waste Composting Facility ☐
- Municipal Waste Incinerator or Resource Recovery Facility ☐
- Municipal Waste Demonstration Facility ☐
- Municipal Waste Transfer Facility ☐
- Municipal Waste Processing Facility ☐
- Other, Specify ☐

- Residual Waste Landfill ☐
  - Class I ☐
  - Class II ☐
  - Class III ☐
- Residual Waste Disposal Impoundment
  - Class I ☐
  - Class II ☐
- Residual Waste Composting Facility ☐
- Residual Waste Demonstration Facility ☐
- Residual Waste Transfer Facility ☐
- Residual Waste Incinerator or Other Processing Facility ☐
- Residual Waste Agricultural Utilization ☐
- Residual Waste Land Reclamation ☐
- Other, Specify ☐

SECTION C. MAP LOCATION

U.S.G.S. Map Location of Facility (attach the map and identify location on the USGS map)

7.5" Map Name Olyphant, 1994

Center of Facility:

Latitude 41 ° 26 ' 7 " Longitude 75 ° 35 ' 49 "

SECTION D. GENERAL INFORMATION

Number of New Acres Proposed for Permit (Issued) 0 • 0

Number of Acres Proposed for Permit (New) 0 • 0

Total Acres of the Property 714 •

Number of Previously Permitted Acres 714 •

Current Permit ID Number(s) 101247

SECTION E. AFFIDAVIT

COMMONWEALTH/STATE OF Pennsylvania
ss:
COUNTY OF Lackawanna

NOTARIAL SEAL
PATRICIA TOOLAN
Notary Public
DUNMORE BORO., LACKAWANNA COUNTY
My Commission Expires Sep 23, 2016

Sworn and subscribed to before me this 20TH day of SEPTEMBER ~~19~~ 2013

Patricia Toolan
NOTARY PUBLIC

My Commission Expires
SEPTEMBER 23 2016

Print or type name to be Signed: Louis A. DeNaples Date 9/20/2013

Date: 9/20/2013

I, _____ do hereby certify pursuant to the penalties of 18 Pa. C.S.A.
(Signature of Applicant)

Section 4904 to the best of my knowledge, information, and belief that the information contained in this application is true and correct and is in conformance with 25 PA. Code Chapters 271 or 287, whichever is applicable, of the rules and regulations of the Department of Environmental Protection.

SECTION F. APPLICATION FEE

A. Municipal Facilities

i. Application for new permit, or repermitting. (ref. 271.128)

- ☐ $18,500 – Municipal Waste Landfill
- ☐ $19,250 – Construction/Demolition Waste Landfill
- ☐ $4,400 – Transfer Facility
- ☐ $1,900 – Incinerator or Resource Recovery Facility
- ☐ $4,000 – Other Municipal Waste Processing Facility, including Composting Facility
- ☐ $17,300 – Demonstration Facility

ii. Application for a major permit modification.

- ☐ $300 – Addition of types of waste not approved in the permit
- ☐ $7,800 – Municipal Waste Landfill and Construction/Demolition Waste Landfill
- ☐ $700 – Transfer Facility
- ☐ $1,500 – Incinerator or Resource Recovery Facility
- ☐ $700 – Other Municipal Waste Processing Facility, including Composting Facility
- ☐ $6,700 – Demonstration Facility

iii. ☐ $300 – Permit Reissuance

iv. ☐ $300 – Permit Renewal

v. ☒ $300 – Minor Permit Modification

SECTION F. APPLICATION FEE (Continued)

A. Residual Facilities

i. Application for new permit, or repermitting. (ref. 287.141)

- ☐ $25,900 – Residual Waste Landfill
- ☐ $8,500 – Residual Waste Disposal Impoundment
- ☐ $5,200 – Residual Waste Transfer Facility
- ☐ $8,300 – Residual Waste Noncaptive Incinerator
- ☐ $2,200 – Residual Waste Captive Incinerator
- ☐ $5,200 – Other Waste Processing Facility, including Composting Facility
- ☐ $8,500 – Residual Waste Demonstration Facility
- ☐ $5,100 – Residual Waste Land Reclamation
- ☐ $5,100 – Residual Waste Agricultural Utilization

ii. Application for a major permit modification.

- ☐ $600 – Addition of types of waste not approved in the permit
- ☐ $7,800 – Residual Waste Landfill
- ☐ $600 – Residual Waste Agricultural Utilization
- ☐ $1,900 – Residual Waste Land Reclamation
- ☐ $1,500 – Residual Waste Incinerator Facility
- ☐ $700 – Residual Waste Transfer or Other Processing Facility, including Composting Facility
- ☐ $5,800 – Residual Waste Demonstration Facility
- ☐ $4,600 – Residual Waste Disposal Impoundment

iii. ☐ $400 – Residual Waste Permit Reissuance

iv. ☐ $300 – Residual Waste Permit Renewal

v. ☐ $300 – Residual Waste Minor Permit Modification

SECTION G. PUBLIC NOTICE - SECTION 271.141 (MUNICIPAL), 287.151 (RESIDUAL)

For a new permit, major permit modification, permit renewal, permit reissuance, and submission of a closure plan, attach the proof of public notice for each of the following:

1. Newspaper - Attach the name of the newspaper, circulation location, copies of the notice, and dates of publication.
2. Municipality - Attach copies of the written notices sent to the host township and host county, and copies of the returned certified mail signature cards.
3. Contiguous Landowners - Attach copies of the written notice(s) sent to each landowner and copies of the returned certified mail signature cards.

SECTION H. MUNICIPAL WASTE MANAGEMENT PLANS AND PERMITS

For a new permit, major permit modification, permit renewal, or permit reissuance of a municipal waste landfill or resource recovery facility permit, is the proposed facility located in a county that has an approved municipal waste management plan that complies with Section 513 of Act 101? Yes ☐ No ☐

If the above answer is "yes", the applicant must complete form 46 - Relationship between Municipal Waste Management Plans and Permits.

NOTE: For each permit application, please submit the original (mark as such) and additional copies as requested by the Department's regional office.

ATTACHMENT C

PADEP MPM Approval Letter

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE

January 13, 2014

Keystone Sanitary Landfill, Inc.
c/o Mr. Joseph Dexter, P.E.
249 Dunham Drive
Dunmore, PA 18512

RE: Minor Permit Modification – Keystone/Dunmore Relocation
Keystone Sanitary Landfill, Inc.
Dunmore & Throop Boroughs, Lackawanna County
Facility I.D. # 101247
APS #824744, AUTH ID 996206

Dear Mr. Dexter:

Your application for a minor permit modification to relocate municipal solid waste from the Keystone and Dunmore landfill sites to the Phase II disposal area is hereby approved. This approval is based on information in the application entitled "Minor Permit Modification – Keystone/Dunmore Relocation" received by the Department on September 30, 2013, and prepared by CECO Associates, Inc.

Enclosed as part of this approval is a permit modification Form 13-A. Any conditions stated on the Form 13-A modify and replace conditions regarding your operating permit. All other items and conditions from your permit shall remain in force and effect.

Any person aggrieved by this action may appeal, pursuant to Section 4 of the Environmental Hearing Board Act, 35 P.S. Section 7514, and the Administrative Agency Law, 2 Pa.C.S. Chapter 5A, to the Environmental Hearing Board, Second Floor, Rachel Carson State Office Building, 400 Market Street, P.O. Box 8457, Harrisburg, PA 17105-8457, 717-787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, 800-654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in Braille or on audiotape from the Secretary to the Board at 717-787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

IF YOU WANT TO CHALLENGE THIS ACTION, YOUR APPEAL MUST REACH THE BOARD WITHIN 30 DAYS. YOU DO NOT NEED A LAWYER TO FILE AN APPEAL WITH THE BOARD.

RECEIVED
JAN 15 2014
BY:

IMPORTANT LEGAL RIGHTS ARE AT STAKE, HOWEVER, SO YOU SHOULD SHOW THIS DOCUMENT TO A LAWYER AT ONCE. IF YOU CANNOT AFFORD A LAWYER, YOU MAY QUALIFY FOR FREE PRO BONO REPRESENTATION. CALL THE SECRETARY TO THE BOARD (717-787-3483) FOR MORE INFORMATION.

If you have any questions, please contact Jeffrey Spaide at (570) 830-3111.

Sincerely,

William Tomayko
Environmental Program Manager
Waste Management Program

Enclosure

Cc: Dunmore Borough (w/enclosure)
Throop Borough (w/enclosure)
Lackawanna County (w/enclosure)
David J. Osborne, P.E., CECO Associates, Inc. (w/enclosure)

ER-WM-38; Rev. 8/86

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

FORM NO. 13-A
MODIFICATION TO SOLID WASTE DISPOSAL AND/OR PROCESSING PERMIT

Under the provisions of Act 97, the Solid Waste Management Act of July 7, 1980, Solid Waste Permit Number 101247 issued on (date original permit was issued) May 23, 1990 to
(permittee) Keystone Sanitary Landfill, Inc.
(address) 249 Dunham Drive
Dunmore, PA 18512

is hereby modified as follows:

1. This permit modification is being issued pursuant to the Pennsylvania Solid Waste Management Act of July 7, 1980 and the Municipal Waste Management Regulations effective September 14, 2002.

2. This permit modification is issued to Keystone Sanitary Landfill, Inc. to relocate municipal solid waste from the existing Keystone and Dunmore landfill sites to the Phase II disposal area. The modification is based on the information in the application package received by the Department on September 30, 2013 entitled "Minor Permit Modification – Keystone/Dunmore Relocation". This minor permit modification application was prepared by CECO Associates, Inc. The application included the following documents:

   A) Checklist - Minor modification to a municipal waste landfill permit
   B) GIF - General information form
   C) Form A - Application for a municipal or residual waste permit
   D) Form B - Professional certification
   E) Form B1 - Application form certification
   F) Form C1 - Compliance history certification
   G) Form G(A) - Air resources protection dust emissions estimate and control plan
   H) Form G(B) - Air resources protection NMOC emissions estimate and control plan
   I) Form H - Revegetation
   J) Form I – Soil erosion and sedimentation controls
   K) Form 14 - Operations plan
   L) Form K - Gas management
   M) Form L – Contingency plan for emergency procedures
   N) Form 25 - Leachate management
   O) Appendix A - Volume calculations
   P) Appendix B - Geo-science settlement study

This modification shall be attached to the existing Solid Waste Permit described above and shall become a part thereof effective on (date) January 13, 2014.

William Tomayko

FOR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Q) Keystone/Dunmore Sanitary Landfill Relocation plans, consisting of sheets 1 through 35, prepared by CECO Associates, Inc. and sheets C-01 and C-02 prepared by EarthRes Group, Inc.

3. The remaining airspace in the Phase II area as of August 31, 2013 was 19,346,395 tons. Keystone Sanitary Landfill shall reserve 8,805,451 tons of this remaining airspace for the approved waste relocation project. Any proposal to use this reserved airspace for disposal of incoming waste to the landfill will require submission of an application for permit modification to the Department for approval.

4. Going forward, annual reports submitted to the Department shall include the 8,805,451 tons of airspace reserved for the waste relocation project. Annual reports shall include a calculation of the remaining airspace in the Phase II area which is available for disposal of incoming waste and a calculation of the amount of waste relocated to the Phase II area under the waste relocation project.

5. Keystone Sanitary Landfill shall notify the Department at least 30 days prior to starting waste relocation work and shall provide a detailed construction schedule outlining the phase of the waste relocation project which includes storm water controls, grading plans of the phase and timeframes to complete the relocation of waste within the phase.

6. Keystone Sanitary Landfill shall implement the established nuisance minimization control plan during the waste relocation project.

7. Keystone Sanitary Landfill shall minimize the size of the working face during waste relocation and shall promptly take measures to correct any source of odor.

8. Keystone Sanitary Landfill shall phase waste relocation operations in increments no larger than 5 acres to control leachate and manage storm water.

9. Relocated waste shall be promptly transported and incorporated into the active disposal operations in the Phase II area. Daily cover shall be applied to the waste exposed as part of the waste relocation project at the end of each working day.

ATTACHMENT D

KSL Asbestos Waste Handling Plan

Asbestos Waste Acceptance and Disposal Procedures

All Asbestos Containing Material (ACM) must be approved for disposal through the Air Quality Manager and/or Compliance Manager. The Air Quality Manager or designee will review the approval procedures with the generator of the waste and provide them with the necessary paperwork. Asbestos generated at a commercial, industrial or institutional facility requires a Form U approval through PaDEP and asbestos generated from a homeowner or contractor working for a homeowner requires a site Asbestos Containing Waste Manifest.

All asbestos waste must be scheduled through the Air Quality Manager for disposal at both KSL and CES.

Acceptance

All haulers of ACM must notify the weigh master that his load contains ACM when he arrives on site. The weigh master will notify the Air Quality Manager or designee of the arrival. The hauler will be instructed to proceed to the working face where he will be met by the trained special waste handling personnel.

When the load has been properly discharged, the hauler will return to the scale and weigh out. Once the weigh ticket has been generated, the total tonnage will be recorded on the asbestos containing waste manifest and the compliance manager or designee will sign the manifest. A copy of the manifest is provided to the compliance manager and filed.

Hauler Requirements

All haulers of Asbestos Containing Waste must have the load tarped at all times. Friable asbestos must be wet and placed in doubled Contractor's bags with the end taped closed. Contactor's bags that are 10 mils thick plastic bags designed for asbestos removal. Non-friable asbestos needs to be tarped.

The grid location for the asbestos waste will not change unless that area has been filled to capacity. The grid location will be conveyed to the Air Quality Manager and any subsequent changes to that location.

ATTACHMENT E

KSL Radiation Action Plan

RADIATION ACTION PLAN

KEYSTONE SANITARY LANDFILL, INC.

PERMIT # 101247

KEYSTONE SANITARY LANDFILL, INC.
249 DUNHAM DRIVE
DUNMORE, PA 18512

September 2004
Current Revision January 23, 2013

KEYSTONE SANITARY LANDFILL, INC

RADIATION PROTECTION ACTION PLAN

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DRAWINGS

1 Site Plan

NARRATIVE

KEYSTONE SANITARY LANDFILL, INC.

RADIATION PROTECTION ACTION PLAN

1.0 INTRODUCTION

The purpose of this Radiation Protection Action Plan is to fulfill the requirements of 25 PA Code 273.223 (Radiation Monitoring and Response) for Keystone Sanitary Landfill, Inc. This regulation requires Keystone to monitor and respond to radioactive material entering the landfill as well as performing related procedures for training, notification, and record keeping and reporting. This plan was prepared in accordance with the Pennsylvania Department of Environmental Protection's "Guidance Document for Radioactivity Monitoring at Solid Waste Processing and Disposal Facilities", Document 250-3100-001. Excerpts from this document are enclosed under Attachment A of this Plan.

2.0 EQUIPMENT

Keystone initially installed a radiation monitoring system at the landfill scale in 2000. In conjunction with the construction of a new scale house, a new stationary radiation monitoring system was installed. A detailed discussion on each of Keystone's radiation monitoring components along with an evaluation on their ability to satisfy the PADEP regulatory requirements is discussed within this section.

2.1 Stationary Equipment

The stationary monitoring systems currently in place at Keystone are the Rad Comm Systems Corp. Model RC/100 and the Model RC/2069, which were manufactured by RadComm Systems Corp., 2921 Portland Drive, Oakville, Ontario, Canada, L6H 5S4.

A. Model RC/100

This system consists of two stationary RCD / 1 portal monitors mounted on each side of the inbound truck scale to check for the presence of radioactive materials. The RCD / 1 portal monitors are connected to a RC / 100 control system mounted on the wall of the scale house.

The location of the RCD / 1 portal monitors provides for adequate inspection of each incoming truckload of waste as it passes over the scale. Specifically, the monitors are located 155 inches apart so that the distance between the monitor

and the side of the vehicle is 1-2 feet, for optimum coverage area and sensitivity. The primary coverage area for each monitor is from ground level to a height of 165 inches and 36 inches horizontally on either side of the monitor. Refer to the attached site drawing for location of the RCD / 1 portal monitors.

Each of the two monitors contain an infrared vehicle presence detector. The radiation measuring cycle is initiated by the RCD / 100 control when a vehicle blocks the infrared beams between the monitors. Because the waste-hauling vehicle must stop before proceeding onto the scale, it assures the truck will maintain a slow speed while it passes between the monitors and is scanned.

The radiation detector in each portal monitor is a 2,108 in^3 PVT (polyvinyl toluene) scintillator inside a 90" high by 18" wide by 8" deep waterproof housing. The monitors scintillators are both capable of detecting gamma radiation with an energy of 50 keV or greater. Both monitors are powered by low voltage DC provided by the RC /100 control panel.

An indicator panel on each monitor contains a green light to indicate the monitor is operating, a red alarm light illuminates when the monitor is in alarm mode and an audible alarm (2200 Hz, 90 dB at 3 feet). Once activated, the visible and audible alarms remain on until reset from the RC / 100 control panel. Also, the visible and audible alarms will activate for 25 seconds when the system is turned on. This activation checks that the alarms are functional each time the system is activated and also insures the operator is aware of power interruptions to the system.

The control panel is located inside the scale house in the weighmaster's area. The weighmasters and personnel are trained to respond to any alarm. The RC /100 performs a diagnostic check on the stationary monitors on a continuous basis to insure it is operational. It stores alarm data and provides a printed copy of the data on demand. The main display for the console is a 40 line, 40-character liquid crystal screen. A numerical keypad is used to choose the display options and set the system parameters through various menus. The control console contains a green "monitor on" indicator lamp to indicate that the portal monitors are operating and a red alarm lamp. There is also an orange "operator attention" lamp that flashes when the internal microprocessor senses a system fault. Alarms can be reset by a key or by entering a code into the keypad.

B. Model RC2069

There is a model RC2069 located at the main scale house and also at the administration building.
The system consists of two main components – The detector(s) and the PC console. The detector is not radioactive and contains two separate compartments; one that contains the PVT scintillation and the second contains the electronics.

The plastic scintillator is made of polyvinyl toluene (PVT), which reacts with ionizing radiation by emitting small light flashes. The PVT is specially wrapped with light tight material to protect against light and encased in special material to protect against shocks and extreme weather conditions. The electronics include low noise / high gain photomultiplier tube (PMT), analog/digital circuitry, and high voltage power supply. The PMT converts the light flashes from the PVT to electrical pulses that are then transmitted to the pc console. The PMT assembly consists of the photomultiplier tube, voltage divider, and preamplifier circuitry. The high voltage supplied to this PMT assembly is on the pulse analyzer board. The analog signal from the preamplifier is fed into the pulse analyzer board to be analyzed and converted to digital signal and transferred to the concentrator board. The concentrator board gathers the information from the detectors and sends the data packet via the RS422 port to the power junction box. This packet can also be sent via the wireless or fiber optic converter. In typical installation, the network CAT5 cable is used. The power junction box contains two main components: the AC/DC power supply that takes the AC power and converts to 24 VDC and supplies the power to the detectors via a twisted pair cable, and the RS422/232 converter that converts the RS422 signal from the concentrator board to RS232 and feeds into the PC COM port. Typically, there are two pairs of optical sensors installed in each system. A pair of sensors consists of one transmitter and one receiver unit. The transmitter has one green LED and the receiver has one green LED and yellow LED. These sensors are also powered by the same 24 VDC supplied by the power junction box. The signals of these sensors are connected to the input (J11) of the concentrator. The primary functions of the sensors are to detect the vehicle presence as well as to calculate the vehicle speed. The software analysis in the pc controls the sampling of the incoming measured signal for the purpose of establishing a continuous running average of the ambient background radiation level. This average will then be used for establishing several alarm threshold levels.

These alarm levels are set in two ways, Out Alarm and In Alarm. The Out Alarm threshold levels closely track the average background level on a continuous basis whether a vehicle is present or not. The In Alarm is an alarm threshold level that is controlled by vehicle presence sensor system. When a vehicle passes between detection units the infrared beam will be interrupted signaling the presence of a vehicle is being scanned and the data is being analyzed. During normal operation of the system, the detector boxes on display of the pc console will be green with the message showing "System is ready". In the event of an alarm condition, the operator will be alerted by the audio from the pc console and the detector box (s) on the display will turn red with a warning message. The alarm will have to be reset by the operator. If the alarm has not been reset in three minutes, the unit will automatically reset itself and begin scanning again. The alarm information will be stored in the system for retrieval. The software in the pc console has many additional features other than alarm data retrieval such as time/date, scan number, radiation measured levels, power outages information, system configuration adjustments, system testing without a radioactive source. But many features are

protected by a security code entry. A copy of the initial calibration certificate can be found in Attachment D.

2.2 Current Portable Equipment

Keystone has purchased a Field SPEC, manufactured by Bicron, to perform gamma spectroscopy. The Field SPEC contains a 1" by 2" NaI scintillation detector and high-dose GM tube. It has a dose range of 1 microrem per hour to 100 rems per hour for the energy range 25-2500 keV for the NaI detector and 60-200 keV for the GM tube. The identification of radioisotopes can be determined with the internal library of the Bicron Field SPEC or from print spectrums.

In addition to the Field SPEC, the RC / 100 monitoring system also includes a Model RC / 2 portable radiation detector. The RC / 2 detector can be used to check for radiation emitted from a vehicle's waste load, cab or driver. The primary purpose of this unit is to confirm the alarm of the RC / 1 and RC / 100. This unit may also be used to check and verify wipes and smears taken from the exterior surface of a hauling vehicle to check for transferable radioactive contamination.

The RC / 2 detector is a 32 in^3 plastic scintillator to provide for the required sensitivity without the large energy dependence of inorganic scintillators. The scintillator can detect gamma radiation with an energy of 50 KeV or greater and is powered by a rechargeable battery. The RC /2 instrument is contained in a weather resistant housing and contains a liquid crystal display indicating readout in counts per second. The operation of the instrument is automatic and is controlled by a single on / off switch. Once activated, an internal microprocessor continually checks the operation of the instrument. The response of the instrument to 137 Cs gamma rays is about 20,000 counts per second in a 10 μsievert/hour (1 milliroentgen/hr) field, and the maximum count rate is 120,000 counts per second.

Keystone has also purchased a RAD-D portable radiation detection instrument in the event the stationary monitors are inoperable, down for maintenance or traffic patterns have been re-routed over the opposite scale. The RAD-D consists of a contained unit that is 17" in length and 5" in diameter. This section is mounted on a portable tripod that can be placed along the inbound or outbound scale, the unit controlled by an Alarm Display Panel which operates on 110 / v power source. The detector and the panel are connected by a 100' communication cable with quick disconnects on both ends. The control panel utilized a gamma alarm both audible and visual. A LED display window provides the reading in counts per second. This unit will be primarily used as a back up to the RC / 1 units and will only be utilized to alert the APS and weighmasters that a vehicle and its load may contain radioactive materials.

2.3 Calibration & Testing

Gamma ray calibration of the RCD / 1 portal monitors will be performed using a 137 Cs source with known or calculated intensity of gamma ray field at a given distance. The source activity or exposure rate will be NIST (National Institute of Science and Technology) traceable. The portal monitors have a response of about 60,000 counts per second with part of the detector in a µsievert / hr (1 milliroentgen/hr) 137 Cs gamma ray field. The conversion factor for counts per second with the detector in a uniform gamma field will be determined by the calibration. Calibration of the portal monitors will be completed before the instrument is placed in service and annually thereafter. The instrument will also be calibrated after repair or replacement of the scintillator, photo multiplier tube or associated electronic circuits that could affect calibration. The portal monitors have a built in light source to make the daily response check to ensure the instrument is operational.

Portable equipment will be calibrated annually and checked daily to verify the instrument is operational. The Field SPEC and Identifinder have a built in 137 Cs source and performs a calibration check every time the units are activated. The RC / 2 has an internal light source in the scintillator that can be used for the daily check.

2.4 Evaluation of Existing Equipment

The stationary portal monitoring system has the sensitivity to detect gamma radiation levels of 10 microroetgens/hr above background and meets the PADEP requirements.

The RC / 2 does not meet the requirement to be able to measure a 50 milliroetgens/hr gamma exposure rate. The Field SPEC will be used to perform radiation surveys on all vehicles that alarm the portal monitors. This instrument is capable of measuring 137 Cs gamma ray exposure rates at a range of at least 0.01 – 100 milliroentgens/hr. The FieldSPEC also meets the PADEP requirements of portable monitors to be capable of measuring ranges greater than 500 µsievert/hr (50 milliroentgens/hr) in order to determine whether Action Level Two conditions are present.

In addition the Bicron Field SPEC will also perform gamma ray spectroscopy. The Field SPEC contains a 1" by 2" NaI detector and 60-200 Kev for the GM tube. Vehicles that have an external exposure rate that exceeds the Action Level One must be characterized. The identification of the radioisotopes will be determined by using the internal library of the Field SPEC, reference manuals of gamma ray spectrums and energies and comparison to known gamma ray energy

spectrums. The characterization will be performed by the APS or by a radiation safety consultant.

3.0 BACKGROUND RADIATION LEVEL

The background radiation level at the facility was checked on May 1, 2001 by Roger Granlund using a pancake type GM survey meter operated in the scaiar mode with a conversion factor of 0.29μr/hr per cpm for 137 Cs gamma rays. The measurement was necessary to determine the minimum alarm level at which the portal monitoring equipment can be set. The count rate indicated a background if 11 microroentgen/hr at the location of the portal monitors. The estimated uncertainty of the GM survey measurement is approximately +/- 20%.

Although the background measurement was slightly higher than the minimum monitoring requirement established by the PADEP (10 microroentgen/hr) it should be noted that the GM measurement was completed under ambient conditions. Because the RCD / 1 portal monitor housings are constructed of one inch thick steel on all sides, a reduction in the background radiation sensed by the portal monitors can be anticipated. Therefore, it is not expected that the RC / 100 system (if set to 10 microroentgen/hr above background) will give false alarms during the waste vehicle scanning process.

4.0 ACTION PLAN SUPERVISORS

The Action Plan Supervisor (APS) will be required to implement this plan when site monitoring equipment indicates that alarm radiation levels have been exceeded. Each of the APS will receive training according to the requirements established within Section 8.0 (Training) of this plan. At a minimum, one APS will be available at the site at all times when waste vehicles are entering the landfill facility. The APS currently designated for Keystone Sanitary Landfill are:

- James Eiden
- Dominick DeNaples Jr.
- Leonard Insalaco
- Dan O'Brien
- Christopher Consalvo
- Brooke Reynolds
- Charles Mecca

Additional contact information for the APS is presented in Section B of this plan.

5.0 RESPONSES TO ALARM

This section outlines the response procedures conducted for each of the Action Levels specified in the PADEP's Technical Guidance Document 250-3100-001. Written alarm procedures can be found in the administration building and are available to facility personnel performing waste monitoring. Alarm procedures will also be posted where drivers entering the landfill can access them and a sign is posted notifying them that monitoring is being conducted. All drivers will be made aware if they take a vehicle that has alarmed the monitoring system off the facility property without a Department of Transportation Exemption Form, the State Police will be notified. Keystone will notify their customers of any changes to this procedure.

5.1 Action Level One Alarm

An Action Level One response will be initiated whenever the portal monitors indicate the presence of radiation emanating from the waste hauling vehicle. The following are the steps to be taken by Keystone personnel after the alarm has been activated.

The portal monitor alarms.

A. If the stationary monitor indicates an Action Level One alarm (10 microroentgen/hr above background on the vehicle surface), the weighmaster will notify an APS. The APS may want to verify the alarm by resetting the RC / 100 and have the vehicle pass between the portal monitors a second time.
A SECOND SCAN/ATTEMPT WOULD BE MORE ACCURATE THAT THE FIRST BECAUSE THE MONITORS ARE DESIGNED TO ALARM IF A VEHICLE PASSES THROUGH THE DETECTORS AT A RATE OF SPEED HIGHER THAN DESIGNED FOR THE SYSTEM. A SECOND SCAN/ATTEMPT WOULD ALLOW FOR THE ACTION PLAN SUPERVISOR TO DIRECT THE TRUCK THROUGH THE MONITORS AT THE APPROPRIATE RATE OF SPEED INDICATING IF THE INITIAL ALARM WAS FALSE DUE TO EXCESSIVE SPEED.
If this is done and the portal monitors do not alarm, the APS can allow the vehicle to proceed to the disposal area without any further action. If the alarm is activated a second time the APS will continue with the survey.

B. The APS or the weighmaster will direct the vehicle to the primary staging area. (DA-1 on the attached site map)

C. If a driver takes the vehicle that has triggered the alarm off site before the APS can conduct a survey and without a DOT Exemption form, the State Police will be notified. Keystone will provide the State Police with the vehicle make, model, color, company name, driver name, license plate number and any other pertinent information. Keystone will also notify PADEP Solid Waste, Radiation Protection and the area Health Physicist.

D. The APS will conduct a survey using the portable monitor (Field SPEC) on the vehicle in the primary staging area. The vehicle will be scanned with the Field SPEC to locate the area of the truck where the radiation is most prominent. Once the location is established, the APS will characterize the radioisotope using the hand held meter and obtain a spectrum of the isotope. The Field SPEC will also provide a probability of its accuracy in determining the isotope.

E. If the identification of the isotope proves to be a short lived isotope generally used in medical treatment and diagnosis, a Naturally Occurring Radioactive Material (NORM), low energy Technically Enhanced NORM, or it is determined that the source is the driver, the APS will record all information on the vehicle and load and will allow the load to be disposed .
AS PROVIDED IN GUIDANCE DOCUMENT 250-3100-001: IF THE GAMMA SPECTROSCOPY OR OTHER MEASUREMENT INDICATES THE RADIATION IS NORM OR TENORM WE WILL DETERMINE THE ORIGIN OF THE WASTE. IF THE RADIATION SOURCE IS DETERMINED TO BE FROM THE UNDISTRUBED NATURAL ENVIRONMENT OF THE COMMONWEALTH (e.g. COVER MATERIAL SOIL OR ROCK WITH ELEVATED NORM LEVELS) THERE ARE NO DISPOSAL RESTRICTIONS AND THE MATERIAL CAN BE ACCEPTED AT THE FACILITY. SIMILARLY, IF THE SOURCE IS TO BE DETERMINED TO BE POTASSIUM OR ANY RELATED COMPOUND (e.g. POTASSIUM PERMANGANATE USED FOR ODOR CONTROL), WITH A NATURAL ABUNDANCE K-40 THERE ARE NO PROCESSING OR DISPOSAL RESTRICTIONS. IN THE CASE WHERE PROCESS KNOWLEDGE WOULD ELIMINATE THE ABOVE CONDITIONS THE MATERIALS WOULD INDICATE THE PRESENCE OF TENORM. THE TENORM WOULDTHEN BE DISPOSED OF THROUGH THE CURRENT SPECIFIC DISPOSAL AUTHORIZATION OBTAINED FROM THE DEPARTMENT- A BLANKET AUTHORIZATION APPROVAL, UNTIL THE DEPARTMENT PROVIDES ADDITIONAL INFORMATION, AND DOCUMENTED IN THE

TENORM TRACKING SPREADSHEET PROVIDED BY THE DEPARTMENT.
If the survey indicates that energy is above 50 mrem/h or the isotope has a half-life of greater than 65 days, the APS will move to Action Level 2.

F. Keystone will maintain a record of all alarms initiated at the facility. The records will be the main source of information regarding any alarm. Keystone will provide PADEP (Solid Waste) with a fax at the end of each day there is an alarm. The fax will contain the name of the waste hauler, date and time of alarm, drivers name, where the waste load originated, the APS who conducted the survey, the results of the survey and the disposition of the load and radioactive isotope. Keystone will also keep a copy of this notification on file.

G. Keystone will compile an annual report of all alarms received at the facility. This report will be submitted to PADEP along with the Annual Operation Report for the facility, unless directed to provide it at a different time.

5.2 Action Level Two Alarm

If radiation levels on the exterior of the vehicle hauling the waste equals or exceeds 50 milliroentgen/hr or 2 milliroentgen/hr in the vehicles cab, or if the contamination is found on the outside of the vehicle or leaking from the vehicle, or an isotope with a half-life of greater than 65 days is identified, an Action Level Two response will be followed.

A. When Keystone has determined that an Action Level Two alarm has occurred, the vehicle will be isolated in the secondary staging area if moving the vehicle does not pose a risk to the driver and the contamination is not leaking from the vehicle. If the load is leaking or can not be safely transported to the secondary staging area, it will be isolated in the primary staging area and all access will be restricted. The driver will be removed from the vehicle and a locking device placed on the vehicle to prohibit movement. The driver will be escorted to the administration building where he/she will remain until the situation has been resolved.

B. Keystone will immediately notify PADEP Solid Waste and Radiation Protection of the Level Two Alarm and complete the DOT Exemption Report and fax to Radiation Protection. Keystone will include a copy of the internal investigation form when sending the fax. Keystone also has the capability of e-mailing a graph of the isotope's spectrum to PADEP Radiation Protection.

C. If not completed during the initial survey, a smear test may be performed on the exterior of the vehicle if it is suspected to have contamination on the exterior. If the vehicle does not have a radiation level above 50 milliroentgen/hr and there is no exterior contamination, the vehicle will be moved to the secondary staging area.

D. If there is contamination on the exterior of the vehicle or it is leaking, the vehicle will be isolated and not moved and Keystone will attempt to collect and contain all leaking materials in a container or absorbent spill material. The collected material will accompany the load to its final destination.

E. If the driver attempts to take a vehicle that has been involved in a Action Level Two alarm from the facility without the written DOT Exemption form, Keystone will notify the State Police and provide them with the company name, vehicle color, make and model, license plate number, time and direction it left the site and its destination if known. Keystone will also notify PADEP and the area Health Physicist of the incident.

F. All loads that are rejected at Keystone will be returned to the originator or an approved disposal facility. If a load is acceptable, Keystone prefers to dispose of it immediately. If a load or isotope cannot be disposed of readily, or arrangements made to have it disposed of properly, Keystone will store it in the secondary staging area in approved DOT metal containers until the paperwork can be processed and removal by an authorized company or person is scheduled. PADEP will be notified of all items stored in the secondary staging area and when they are removed.

6.0 CHARACTERIZATION

This section of the plan describes designated areas, the procedure for identifying the radioactive isotope in the waste and the ultimate resolution of the radioactive waste materials.

6.1 Designated Areas

Keystone uses designated areas to segregate waste vehicles from the operation to allow further inspection. Keystone has established two areas of the site for completing surveys and staging vehicles and materials. These areas are listed as DA-1 and DA-2. DA-1 is located approximately 150 feet east of the Scalehouse. It consists of an area approximately 50 feet by 120 feet and is to the right of the inbound lanes. Level One Alarms will be placed here and surveys will be conducted at this location. DA-2 is an isolated area located approximately 1 mile from the Administration Building and 1,000 feet Northeast of thee Tabor limits. This area is generally flat and covers an area of

approximately 5,600 sq. feet. Access to DA-2 is limited to site personnel and is far removed from general work and traffic. This area will be used for Action Level Two Alarm materials and temporary storage of radioactive materials that will be returned to the originator. The area will also be utilized for storing radioactive wastes allowed to further decay. Keystone will restrict access to DA-2 when any material is stored there and will post warning signs.

6.2 Surveys

Keystone will perform a survey on all vehicles that initiate an Action Level Alarm. This will be performed by the APS using the listed portable monitoring equipment to identify the location, energy and radioactive isotope so the proper safety and disposal steps can be followed. The APS will follow the steps outlined below:

A. The APS will review any print out for any pertinent information.

B. The driver will be removed from the cab. He/she will be asked where the load originated and if there was any known generators that may be responsible for producing or disposing of radioactive materials. These generators may be hospitals, medical facilities, laboratories, educational institutions, or research facilities.

C. The APS will then survey the vehicle using the Field SPEC. He will start at the cab and walk down the side of the vehicle around the back, up the opposite side returning to the cab. While walking the APS will pick no less than 5 areas on each side of the vehicle. The APS will locate the area with the highest reading and mark the spot. Once the entire vehicle has been surveyed, the APS will initiate the identification process on the Field SPEC at the location that produced the highest reading. The monitor will be held approximately 2 inches from the side of the vehicle in the spot where the highest reading was observed and allowed to scan for a period of at least 30 seconds. It may be necessary to use a longer sample time if the results are not clear or a better spectrum is needed.

D. Once the APS has obtained a possible identification from the Field SPEC, he will review the spectrum produced by the radioactive material and compare it to known isotope spectrums. He will review all the data available and obtained before making a determination as to the isotope involved. If it is determined that the radioactive isotope involved in the alarm is of a medical origin with a half-life of 65 days or less, as required by regulations, the load will be allowed to proceed to the disposal face and discharge. At that point the APS will complete all required paperwork for the incident. The paperwork will be

maintained on site and a notice faxed to PADEP Solid Waste at the end of the workday.

E. If the isotope is identified to be a NORM or TENORM, Keystone will follow the recording and notification procedures listed in the previous paragraph.

F. If it is determined that the isotope has a half-life greater than the 65 days or the spectrum can not be accurately compared to a known spectrum, the APS will contact Radiation Protection and hold the vehicle in the primary staging area. The APS will forward via e-mail or fax, a copy of all information obtained from the survey and the driver to PADEP Radiation Protection for assistance. The APS will follow all directions provided by the radiation specialists and will also notify PADEP Solid Waste of the incident. If Radiation Protection determines the isotope cannot be disposed of in the landfill, the APS will request a DOT Exemption Form. Once the form is received at the facility, the APS will provide a copy to the driver and instruct him/her to return directly to the originator of the load. The APS will complete all necessary paperwork.

G. If Radiation Protection determines the isotope meets the regulations for on-site disposal, the APS will direct the vehicle to the working face and discharge the load. The APS will complete all paperwork and notices.

H. It may be necessary to unload the waste to identify or retrieve the radioactive material if the load cannot be returned to its origin or the origin location cannot support the safe storage and handling of the radioactive material. The APS will notify PADEP Radiation Protection and PADEP Solid Waste of the need to further investigate the radiation. The APS will contact the owner or person responsible for the waste load and inform them of the situation. The owner / responsible party will need to secure a certified recovery contractor or health physicist to inspect and recover the material. Keystone will store the vehicle in the secondary staging area until the recovery contractor has scheduled a day and time for the extraction. The APS will notify PADEP Radiation Protection and Solid Waste of the contractor hired, day and time the load will be inspected.

I. Keystone will follow the direction of Radiation Protection once the radioactive material has been identified and extracted. The ultimate responsibility for proper disposal of radioactive materials that cannot be disposed of at the landfill will be the owner or generator.

6.3 Contamination Survey

If there is removable contamination on the exterior of the vehicle, the vehicle will not be moved. If the material is leaking, it will not be moved and all available actions to stop the leak will be made. The APS and other employees will attempt to catch any material leaking from the vehicle in a container with absorbent material. The APS will notify PADEP immediately of any load that has exterior contamination or is leaking.

7.0 RECORDS / REPORTING

Each radiation alarm and response will be recorded and filed as part of the daily operational records and will be included in the Annual Operations Report to PADEP. The incident reports will contain a brief narrative of the incident including a description of the Radioactive Material (RAM) involved, where it was identified, what the background reading was, hauler name, location of origin, time of day and final disposition of the material. The daily operational information will contain all pertinent information regarding the incident and parties involved.

8.0 TRAINING

This section describes what will be covered in Keystones training program for radiation monitoring at the facility. A qualified organization or staff member who is knowledgeable of the specific regulations, equipment used and basic radiation safety will conduct all radiation monitoring and response training. GUIDANCE DOCUMENT 250-3100-001 DOES NOT SPECIFY TRAINER QUALIFICATIONS FOR IMPLEMENTATION OF THE ACTION PLAN. HOWEVER, IT IS KEYSTONE'S PRACTICE THAT ALL PERSONNEL RESPONSIBLE FOR TRAINING AND IMPLEMENTING THE PLAN WILL MEET THE SAME REQUIREMENTS AS THOSE PREPARING THE PLAN. Refresher training will be conducted when a large turn over of employees or staff occurs. All replacement or additional APS will receive this training.

8.1 Action Plan Supervisor Training

Keystone will conduct an eight-hour training course for all APS that will cover the fundamentals of radiation safety and detection as well as an overview of the established radiation regulations established for monitoring radiation in solid waste. In addition, an overview of Keystone's Radiation Action Plan procedures and information will be discussed. The new APS will be provided with a review of the possible RAM that may be encountered as well as types of waste streams that characteristically may contain waste. The trainee will be provided with a practicum section of the training to cover the use of the stationary, hand-held and mobile equipment. The trainee will have the opportunity to operate each piece of

equipment and perform a mock survey. Keystone may implement an examination, written or oral, to determine if the APS has the skills needed to correctly identify various RAM and well as the ability to operate the equipment successfully.

8.2 Staff / Employee Training

If the employee is assigned duties that involve or may involve interacting with the radiation equipment or the Action Plan, additional training will be provided.

9.0 PERSONNEL SAFETY REQUIREMENTS

The annual TEDE (total effective dose equivalent) limits are given in the Guidance Document:

ANNUAL DOSE LIMITS FOR PUBLIC AND WORKERS

Facility Staff	5,000 mrem (if considered occupationally exposed)
Facility Staff	100 mrem (if considered a member of the public)
Vehicle Driver	100 mrem (if considered a member if the public)
General Public	4 mrem (for the drinking water pathway)
General Public	10 mrem (for air pathway)
General Public	25 mrem (all pathways combined)

It is unlikely that any facility personnel will receive annual radiation dose in excess of 100 millirem. However, persons that are likely to exceed an annual TEDE of 100 millirem from occupational exposure will be subject to the following dose limits:

ANNUAL DOSE LIMIT FOR OCCUPATIONALLY EXPOSED PERSONS

Total Effective Dose Limit	5,000 mrem (50 millisievert)
Individual Organs	50,000 mrem (500 millisievert)
Lens of the Eye	15, 000 mrem (150 millisievert)
Skin or Extremities	50,000 mrem (500 millisievert)
Embryo / Fetus of Declared Pregnant	500 mrem (5 millisievert)
Minors	10 % of adult limits

Any employee or staff member whose dose exceeds or is likely to exceed 10% of the occupational dose limits or who's exposure exceeds or is likely to exceed 100 mrem (1 millisievert) will be monitored using one of the following options:

A. Calculation of personnel doses by a Radiation Consultant using radiation survey measurements and exposure time. This method will

be used, if the frequency of alarm events is small and the doses are low so the individual personnel monitoring instruments are unnecessary or impractical.

B. Electronic personnel dosimeters to supplement individual passive dosimeters or to be used alone, if the frequency of alarms does not justify a subscription to a passive dosimetry service. Annual calibration of this equipment will be required.

C. Passive personnel dosimeters (film or solid state dosimeters) obtained from a NVLAP (National Voluntary Laboratory Accreditation Program) certified vendor on a subscription basis for the individuals who are occupationally exposed.

D. The determination of internal doses may be made by measurements of the concentration of radioactive material in the air, the qualities of radionuclides in the body, the quantities of radionuclides excreted from the body, or a combination of these methods.

E. Records of the dose measurements for individuals that are occupationally exposed will be made available to those individuals on request and a written summary will be provided to the individual annually.

All persons that are considered to be occupationally exposed will complete the same training as the APS. In addition to monitoring employee exposure times, personnel safety equipment will be maintained by Keystone to protect employees during radiation surveys. A list of safety equipment and supplies that Keystone will maintain at the facility is presented in Attachment C. This list may change as experience indicates the need for additional items or that some items can be deleted.

In all cases all operations are to be conducted so that radiation doses to Keystone personnel and the public and any releases of radioactive material are as low as reasonably achievable (ALARA).

Additionally, ALL ISOTOPES ACCEPTABLE FOR DISPOSAL (half-life of 65 days or less) COULD BE INCLUDED IN STORAGE FOR EMPLOYEES SAFETY. IF KEYSTONE FEELS THAT DOSE RATES FROM THE ACCEPTABLE ISOTOPES WOULD BE UNSAFE TO THE EMPLOYEES IT WOULD BE STORED FOR DECAY. THIS COULD OCCUR IF THE WORKING FACE COVERS A SMALL AREA AND LANDFILL PERSONNEL ARE WITHIN CLOSE PROXIMITY TO WHERE THE LOAD CONTAINING THE ACCEPTABLE ISOTOPE WOULD BE OFFLOADING. KEYSTONE HAS AN ACTION LEVEL 2 STAGING AREA THAT INCLUDES A STORAGE AREA WITH A PADLOCK AND IS ONLY ACCESSIBLE WITH KEY ACCESS.

10.0 PLAN REVISION

This Action Plan will be reviewed and updated periodically by Keystone Sanitary Landfill in accordance with PADEP Technical Guidance Document 250-3100-001 and in the event of the following:

- Revision of applicable PADEP Regulations
- Failure of current Action Plan during incident
- Action Plan Supervisor changes
- Monitoring equipment changes or additions
- Designated areas are moved
- Facility changes that would interfere with the implementation of the Action Plan as it currently states
- As otherwise required by PADEP

Should any of the above referenced events occur, a copy will be provided to PADEP for review and approval prior to implementation.

11.0 ON-SITE DISPOSAL

Keystone Sanitary Landfill intends on disposing of radiation sources that meet the 65-day half-life requirement. However, no disposal of radioactive material will be completed until Keystone has confidently identified and characterized the radiation source. A summary of the radiation sources that Keystone seeks approval to dispose at the landfill are presented below:

1. Medical waste in amounts not exceeding the activity that can be retained in patients that are released from medical facilities and have a half-life of less than 65-days. The radioisotopes and activities are listed in Table 1, which was taken from the Nuclear Regulatory Commission Regulatory Guide 8.39, Release of Patients Administered Radioactive Materials. Placing that amount of activity directly in the landfill where it could potentially enter the leachate collection system and be discharged to the Scranton Sewer Authority's waste treatment facility does not present a greater risk to the public than the patient discharging the radioactive material directly into the waste treatment facility by way of excreta to sanitary sewer.

2. Individual consumer products containing radioactive material such as smoke detectors, glassware or glazed ceramics containing uranium, thorium-metal alloys or welding rods, or luminous instrument dials. These items have been judged to be safe for use in homes of consumers without the need for specific licenses or disposal restrictions. The facility will not dispose of aggregate

quantities of the exempt consumer product without written approval from PADEP.

3. With Naturally Occurring Radioactive Material (NORM) or low energy Technically Enhanced NORM (TENORM), the APS will record all information on the vehicle and allow load to be disposed if the survey indicates that energy is below 50 urem/h. AS PROVIDED IN GUIDANCE DOCUMENT 250-3100-001: IF THE GAMMA SPECTROSCOPY OR OTHER MEASUREMENT INDICATES THE RADIATION IS NORM OR TENORM WE WILL DETERMINE THE ORIGIN OF THE WASTE. IF THE RADIATION SOURCE IS DETERMINED TO BE FROM THE UNDISTRUBED NATURAL ENVIRONMENT OF THE COMMONWEALTH (e.g. COVER MATERIAL SOIL OR ROCK WITH ELEVATED NORM LEVELS) THERE ARE NO DISPOSAL RESTRICTIONS AND THE MATERIAL CAN BE ACCEPTED AT THE FACILITY. SIMILARLY, IF THE SOURCE IS TO BE DETERMINED TO BE POTASSIUM OR ANY RELATED COMPOUND (e.g. POTASSIUM PERMANGANATE USED FOR ODOR CONTROL), WITH A NATURAL ABUNDANCE K-40 THERE ARE NO PROCESSING OR DISPOSAL RESTRICTIONS.
IN THE CASE WHERE PROCESS KNOWLEDGE WOULD ELIMINATE THE ABOVE CONDITIONS THE MATERIALS WOULD INDICATE THE PRESENCE OF TENORM. THE TENORM WOULDTHEN BE DISPOSED OF THROUGH THE CURRENT SPECIFIC DISPOSAL AUTHORIZATION OBTAINED FROM THE DEPARTMENT- A BLANKET AUTHORIZATION APPROVAL, UNTIL THE DEPARTMENT PROVIDES ADDITIONAL INFORMATION, AND DOCUMENTED IN THE TENORM TRACKING SPREADSHEET PROVIDED BY THE DEPARTMENT.

4. Waste in which the radiation is 40 K can be disposed of in the landfill without restriction. This radionuclide is naturally occurring and is a small fraction of all potassium atoms. It is a normally present in the body and in the equilibrium concentrations of potassium and is a normal part of diet. The presence of potassium in soil, rock, chemicals or fertilizers might cause a Level 1 Alarm, but the concentration of 40 K, even in pure potassium, is too low to produce significant external radiation hazards to personnel. Ingestion or inhalation of additional amounts will not significantly change the normal equilibrium concentration of potassium and will have little effect on the dose normally received by the body from this isotope.

12.0 QUALIFICATIONS

The original Radiation Action Plan was prepared by Blazosky Associates Inc. in accordance with PADEP Technical Guidance Document 250-3100-001. All revisions from the original submission were completed and reviewed by Keystone's qualified personnel and internally approved by the Site Manager, Joseph E. Dexter P.E. All revisions comply with the applicable regulations and were implemented by Keystone once PADEP received and approved the additions or changes. Listed below are the qualifications for personnel directly involved with the development and implementation of the Radiation Action Plan.

1. Two years of on-the-job training in health physics; or one year of on-the-job training in health physics plus one year of formal college level study in health physics, physics, chemistry, biology, engineering or radiation science.

2. Experience with radiation detection equipment and measurement or in developing health and safety procedures and plans.

Note: Comprehensive certification by the American Board of Health Physics satisfies both 1 and 2.

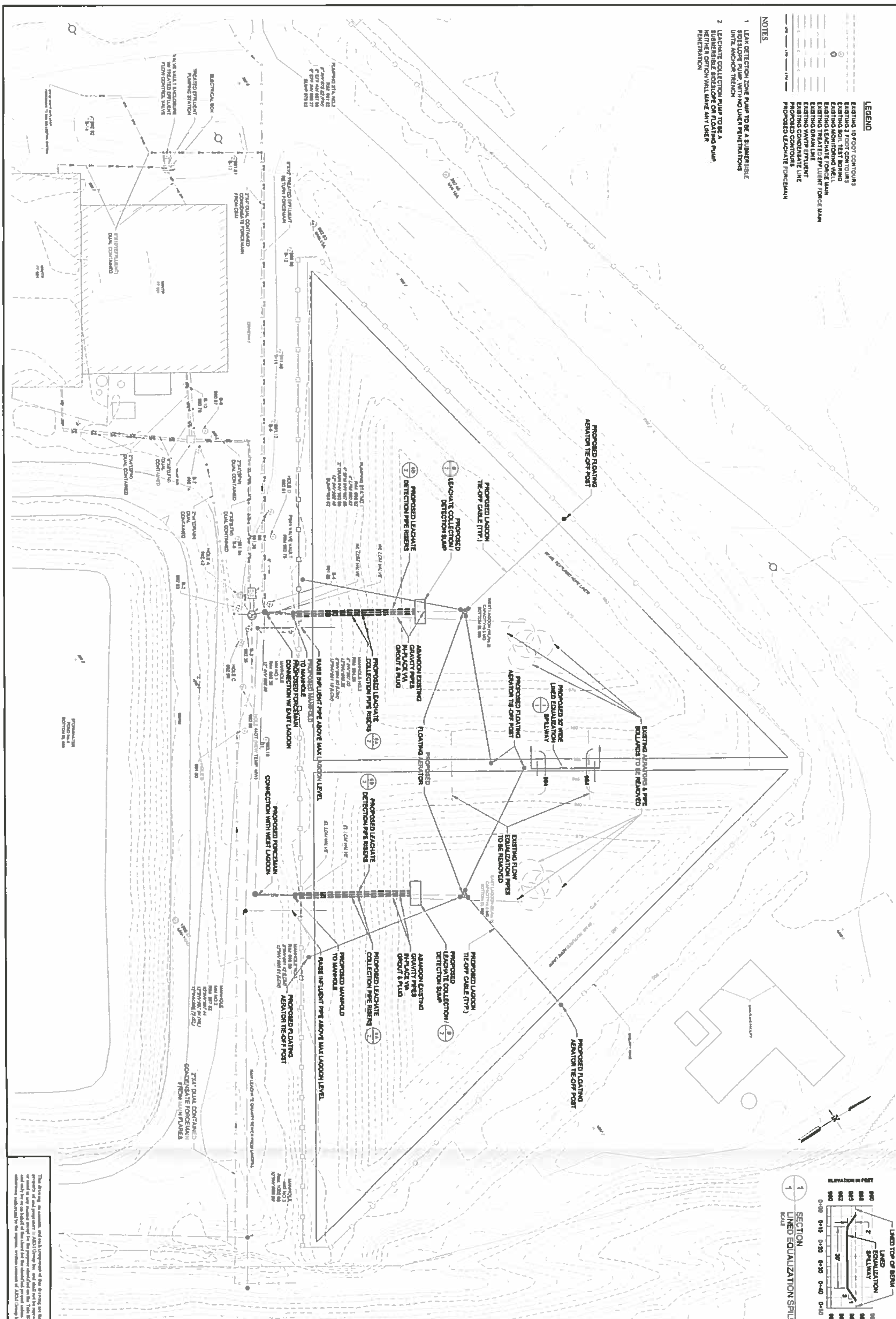
The original Radiation Action Plan was developed under the assistance of Mr. Roger Granlund CHP. Mr. Granlund has over 40 years of experience in the radiation safety field and has served as the University Health Physicist at Pennsylvania State University for 37 years.

DRAWINGS

SITE PLAN

EXHIBIT C15.3

PROPOSED LAGOON IMPROVEMENTS



Sheet 1	SITE PLAN	ARM	1" = 30'
	LAGOON IMPROVEMENTS KEYSTONE SANITARY LANDFILL	ARM	04/14/2016
	DUNMORE BOROUGH THROOP BOROUGH, PA	SEH	14441

SCALE IN FEET

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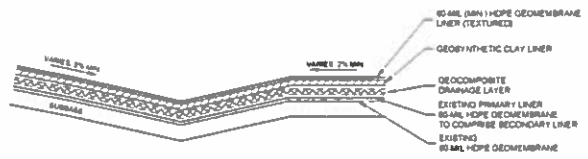
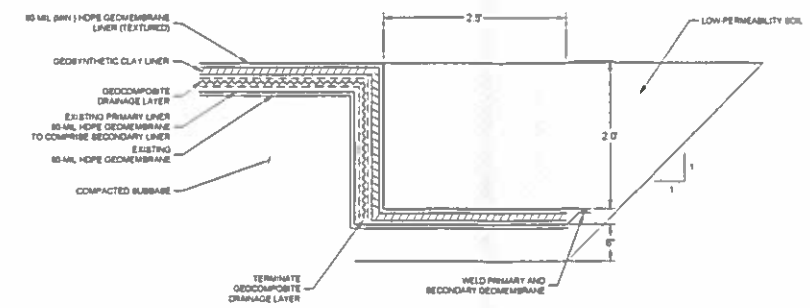
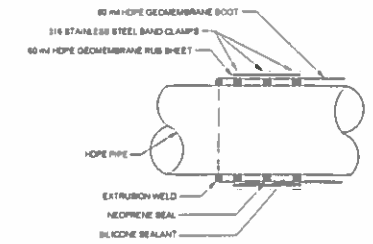


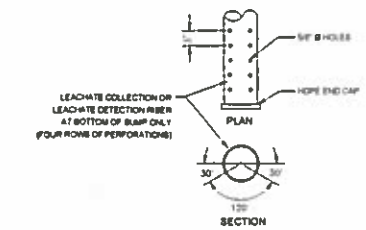
1/2 DETAIL
LINER SYSTEM
SCALE 1" = 1'



2/2 DETAIL
ANCHOR TRENCH
SCALE 1" = 1'



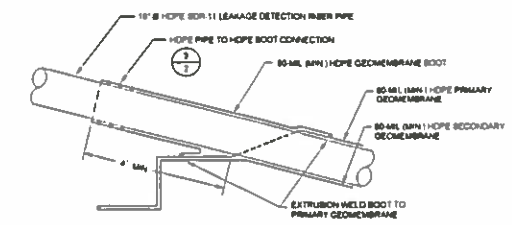
3/2 DETAIL
HDPE PIPE TO HDPE BOOT CONNECTION
SCALE 1" = 1'



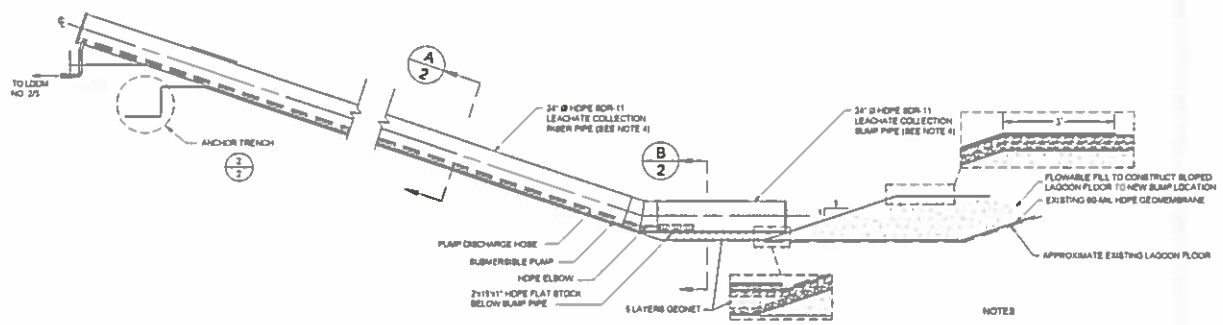
4/2 DETAIL
LEACHATE COLLECTION/DETECTION SUMP PIPE PERFORATION
SCALE 1" = 2'

GEOSYNTHETIC LEGEND

- GEOCOMPOSITE DRAINAGE LAYER
- HDPE GEOMEMBRANE (TEXTURED)
- GEOTEXTILE CUSHION
- GEOTEXTILE FILTER / SEPARATOR
- GEOSYNTHETIC CLAY LINER (GCL)
- GEONET
- EXISTING HDPE GEOMEMBRANE



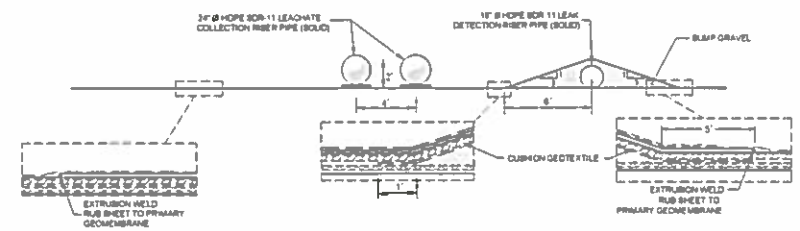
5/2 DETAIL
PENETRATION OF LEACHATE DETECTION RISER PIPE THROUGH PRIMARY LINER
SCALE 1" = 2'



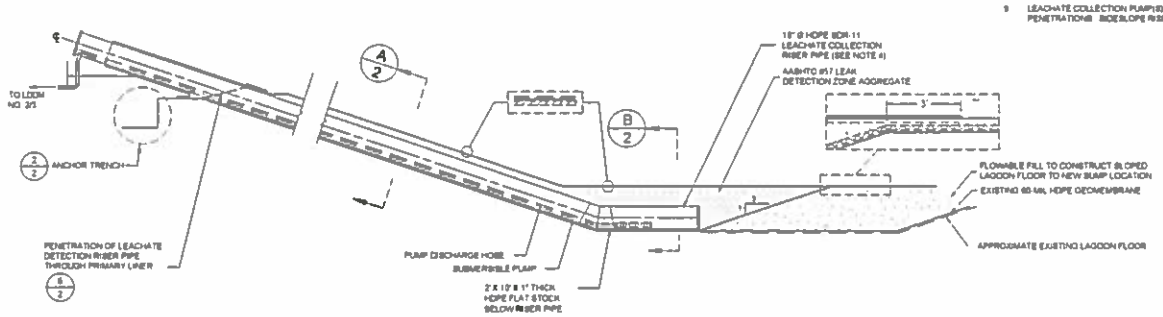
6A/1 DETAIL
LEACHATE COLLECTION SUMP AND RISER
SCALE 1" = 5'

NOTES

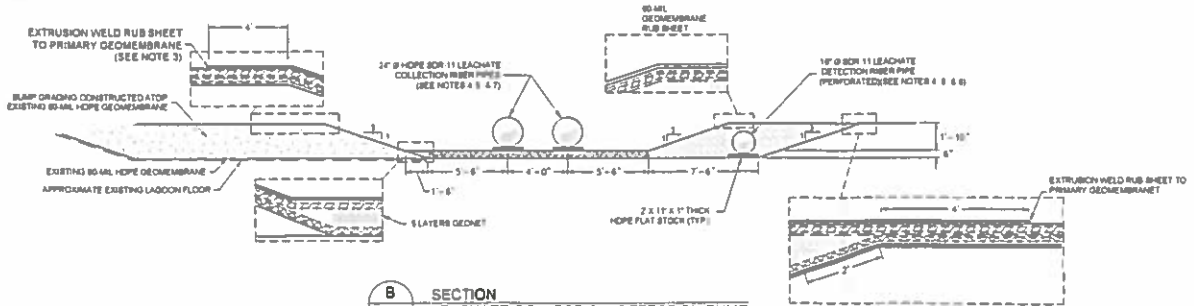
1. DETAILS ARE SHOWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS, WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY
2. TYPICAL GEOSYNTHETIC CROSS SECTIONS ARE SHOWN IN ENLARGED BOXES. GEOSYNTHETIC COMPONENTS ARE NOT INDIVIDUALLY LABELED AFTER THE FIRST PRESENTATION OF A TYPICAL CROSS SECTION. ALL VARIATIONS FROM THE TYPICAL CROSS SECTION ARE SHOWN IN ENLARGED BOXES
3. ALL PIPE PENETRATIONS IN EXISTING PRIMARY LINER TO BE REMOVED AND ASSOCIATED PIPING TO BE ABANDONED
4. LAGOON & LEAK DETECTION SUMPS TO BE CONSTRUCTED OF PUMPED FLOWABLE FILL ATOP EXISTING PRIMARY LINER SYSTEM AFTER PENETRATIONS CLOSED. AFTER REPAIRS ARE COMPLETED REPLACEMENT LINER TO COVER SUMP GRADING MATERIAL TO COMPRISE FULL SECONDARY LINER. A REPLACEMENT PRIMARY LINER TO BE INSTALLED ACROSS ENTIRE LAGOON FOOTPRINT
5. TEXTURED HDPE GEOMEMBRANE RUBSHEET WILL BE USED IN THE SUMP AND WILL EXTEND A MINIMUM OF 1 FT BEYOND THE LIMITS OF THE SUMP UNLESS OTHERWISE SPECIFIED
6. LEACHATE RISER PIPES SHALL BE PERFORATED FOR THE PORTIONS OF THE PIPE ON THE BOTTOM OF THE LANDFILL CELL. THE PORTIONS ON THE CELL SIDESLOPES AND ELBOWS BETWEEN THE FLAT PORTIONS AND SIDESLOPES PORTIONS OF THE PIPE SHALL BE SOLID
7. DIMENSIONS NOTED ARE NOMINAL. PUMP SIZING, QUANTITY, DIMENSIONS AND FLOW REQUIREMENTS TO BE DETERMINED DURING MINOR PERMITTING MODIFICATION DESIGN
8. LEAK DETECTION ZONE PUMP TO BE A SIDESLOPE RISER PUMP
9. LEACHATE COLLECTION PUMP(S) TO BE EITHER SIDESLOPE RISER OR FLOATION PUMPS WITHOUT LINER PENETRATIONS. SIDESLOPE RISER PIPES TO BE SUFFICIENTLY BALLASTED AGAINST FLOTATION



A/2 SECTION
LEACHATE COLLECTION /DETECTION RISER
SCALE 1" = 5'
(SEE NOTE 1)



6B/1 DETAIL
LEACHATE DETECTION SUMP AND RISER
SCALE 1" = 5'



B/2 SECTION
LEACHATE COLLECTION /DETECTION SUMP
SCALE 1" = 5'

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No.	Revision	Date	By
1	REVISED PER SEIL COMMENTS	04/13/2016	BDK

Scale: AS NOTED
Date: 04/13/2016
Project No.: 14441

Designed: ARM
Drawn: ARM
Reviewed: SEIL

DETAILS

Project title: LAGOON IMPROVEMENTS
KEYSTONE SANITARY LANDFILL
DUNMORE BOROUGH
THROOP BOROUGH, PA

Sheet 2

EXHIBIT C15.4

GEOPHYSICAL SURVEY RESULTS

ARM Group Inc.
Earth Resource Engineers and Consultants

April 13, 2016

Re: Geophysical Survey Services
Keystone Sanitary Landfill
ARM Project 14411-9

GEOPHYSICAL SURVEY

ARM Group Inc. (ARM) has completed a geophysical survey at the Keystone Sanitary Landfill (KSL) site in Dunmore, Pennsylvania. The purpose of this work is to provide a preliminary determination of potential source(s) of certain anomalous water quality parameters measured in MW-15A during the period from 2011 to spring 2016.

Geophysical Survey Parameters

A total of 3,800 feet of electric resistivity (ER) field data were collected on March 9 and 10, 2016 in the vicinity of the West Lagoon and MW-15A. The geophysical survey utilized pole-dipole array techniques with electrode spacings varying from approximately 15 feet to 20 feet. A computerized 8-channel resistivity meter collected high-quality data throughout the duration of the survey. Three ER lines were collected along the southern and western sides of the West Lagoon (er1, er2, er3); two ER lines were collected along the western and northern sides of the West Lagoon (er4, er5). Three-dimensional (3D) ER data was collected between lines er1 and er2 and also between er3 and er4. The 3D data collected for er3 and er4 included measurements across and below the West Lagoon. All ER field data was processed together as a 3D dataset using the computer application "Res3Dinv" (Loke 2016) with the results presented on Sheet 1.

Geophysical Survey Results

Resistivity values are color-contoured and presented in plan view as constant-depth "slices" below ground level (e.g., the map in the upper left-hand corner of Sheet 1 titled "Level: 7-foot bgs" is a map of the electrical resistivity along a depth slice that is 7 feet below the ground surface).

Resistivity values in each of the depth slices vary from approximately 20 ohm-feet to over 20,000 ohm-feet. For this geophysical survey the lower resistivity values (20 to ~ 1,200 ohm-feet) generally represent saturated soils, saturated unconsolidated subsurface materials, or electrically conductive fluids whereas higher resistivity values (> ~ 1,200 ohm-feet) represent dry soils, dry weathered bedrock, or massive bedrock.

The low resistivity values present in the area of the West Lagoon at levels 7.5, 12.5, 17.5, 22.5 and 30 feet bgs are interpreted as low resistivity fluids within the lagoon and along the northern and southern edges of the lagoon in unconsolidated soil materials. Lower resistivity values at

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voice: (717) 533 – 8600 • fax: (717) 533 – 8605 • www.armgroup.net

levels 40, 60, and 90 feet bgs are interpreted as indications of groundwater below the lagoon in unconsolidated subsurface materials, fractured bedrock, or coal mine void space.

The patterns of low resistivity illustrated in Sheet 1, particularly between 12.5 feet bgs and 30 feet bgs suggest that the existing liner in the West Lagoon is porous allowing the passage of electrical current and fluids. The resistivity distribution in the vicinity of MW-15A from the 7.5 foot level to the 90-foot level suggests that low resistivity fluids from the West Lagoon are moving into the surrounding soils along a discrete pathway from the northwest side of the lagoon to MW-15A. Other low resistivity zones are present along the south side of the lagoon at all levels. Higher resistivity materials are present elsewhere at this site including the area north of the west lagoon and around MW-16A indicating relatively dry conditions in those areas.

Survey Limitations

By their inherent capabilities and limitations, geophysical surveys are not 100-percent accurate, nor can they completely define subsurface conditions. ARM will not accept responsibility for inherent technique limitations, survey limitations, potentially foreseen or unforeseen site-specific conditions, or alleged operator error. The Client, Owner, and all persons in any way using or relying on the information collected from this survey will accept all liability for the use, reliance, and actions taken based on the information collected in the survey and contained in the report, and shall hold ARM harmless for any and all damages allegedly resulting from or actually resulting from the information collected from the survey.

CLOSING

Thank you for the opportunity to conduct this work. If you have any questions regarding this project please contact me at your earliest convenience (717-508-0535). We look forward to answering any inquiries that you may have about this site. Again, thank you very much for considering ARM for this project.

Respectfully submitted,
ARM Group Inc.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WILLIAM JOSEPH SEATON
GEOLOGIST
PG004777

William Seaton, Ph.D.
Senior Geologist/Program Manager

Attachments: Sheet 1- Summary Sheet of ER Survey Results 36" x 24"

Bibliography

Loke, M.H., 2016, Tutorial: 2-D and 3-D electrical imaging surveys, www.geotomosoft.com

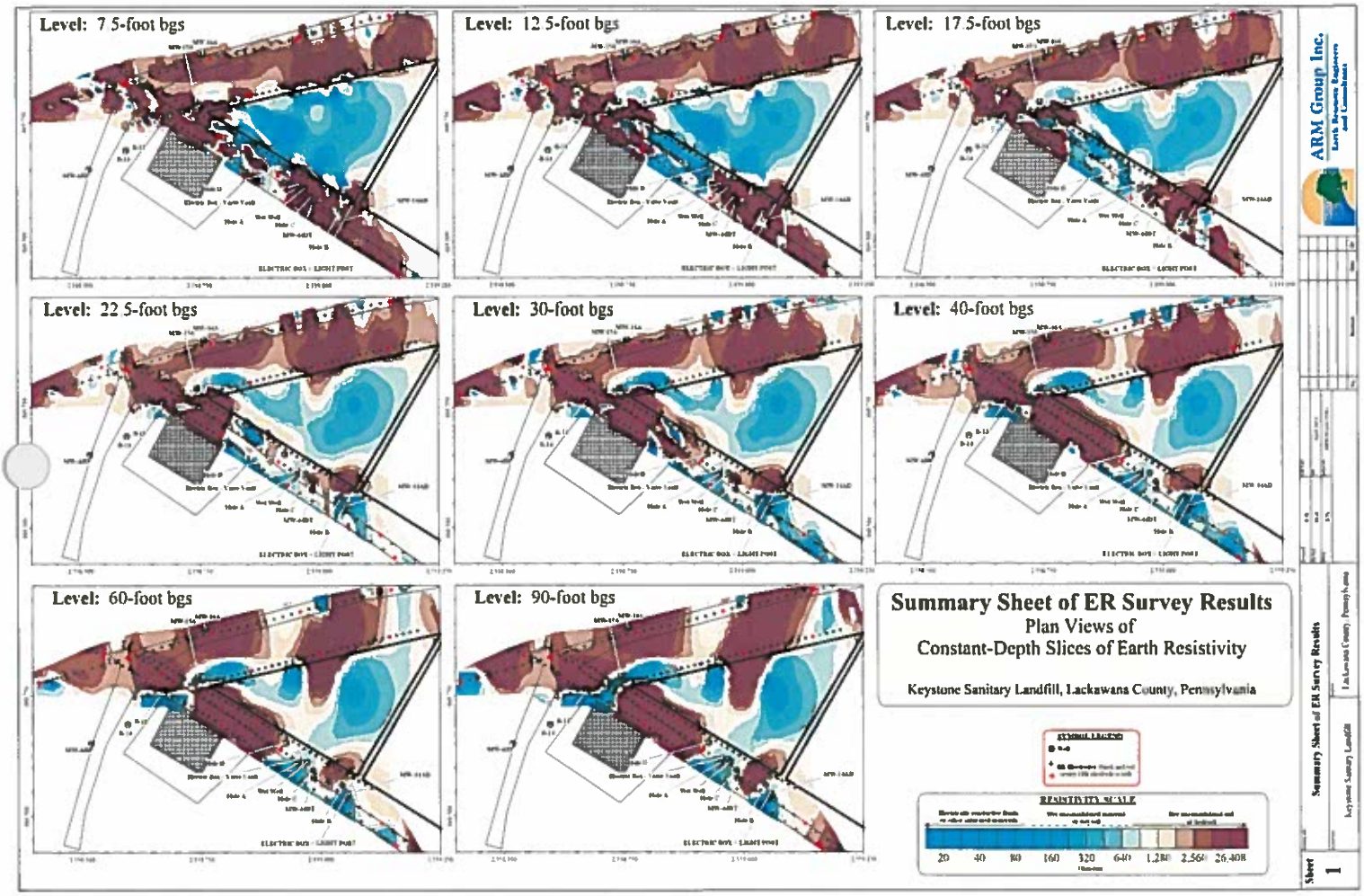
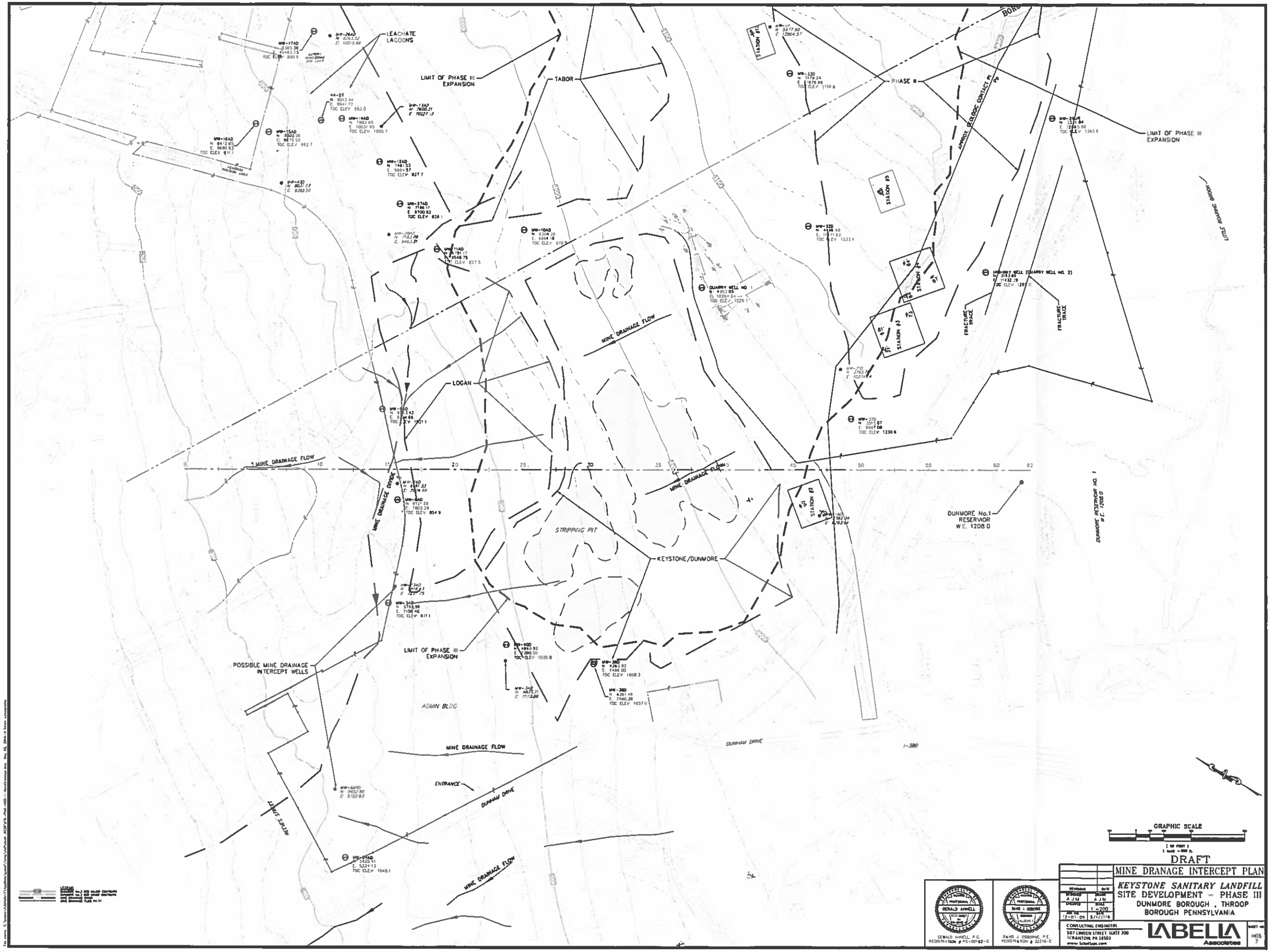

Level: 7.5-foot bgs
Level: 12.5-foot bgs
Level: 17.5-foot bgs
Level: 22.5-foot bgs
Level: 30-foot bgs
Level: 40-foot bgs
Level: 60-foot bgs
Level: 90-foot bgs
Summary Sheet of ER Survey Results
Plan Views of
Constant-Depth Slices of Earth Resistivity
Keystone Sanitary Landfill, Lackawana County, Pennsylvania
RESISTIVITY SCALE
20
40
80
160
320
640
1,280
2,560
26,408
ARM Group Inc.
Sheet
1

EXHIBIT C15.5

MINE DRAINAGE INTERCEPT PLAN


LEACHATE LAGOONS
LIMIT OF PHASE III EXPANSION
TABOR
PHASE II
LIMIT OF PHASE III EXPANSION
APPROX. GEOLOGIC CONTACT PT
STATION #1
STATION #2
STATION #3
STATION #4
STATION #5
QUARRY WELL NO. 1
MINE DRAINAGE FLOW
LOGAN
MINE DRAINAGE DIVIDE
STRIPPING PIT
KEYSTONE/DUNMORE
DUNMORE No.1 RESERVOIR W.E. 1208.0
DUNMORE RESERVOIR NO. 1 W.E. 1208.0
LITTLE ROARING BROOK
FRACTURE TRACE
POSSIBLE MINE DRAINAGE INTERCEPT WELLS
LIMIT OF PHASE III EXPANSION
ADMIN BLDG
DUNHAM DRIVE
I-380
ENTRANCE
REEVES STREET
GRAPHIC SCALE
DRAFT
MINE DRANAGE INTERCEPT PLAN
KEYSTONE SANITARY LANDFILL
SITE DEVELOPMENT - PHASE III
DUNMORE BOROUGH , THROOP
BOROUGH PENNSYLVANIA
GERALD AMHELL, P.G.
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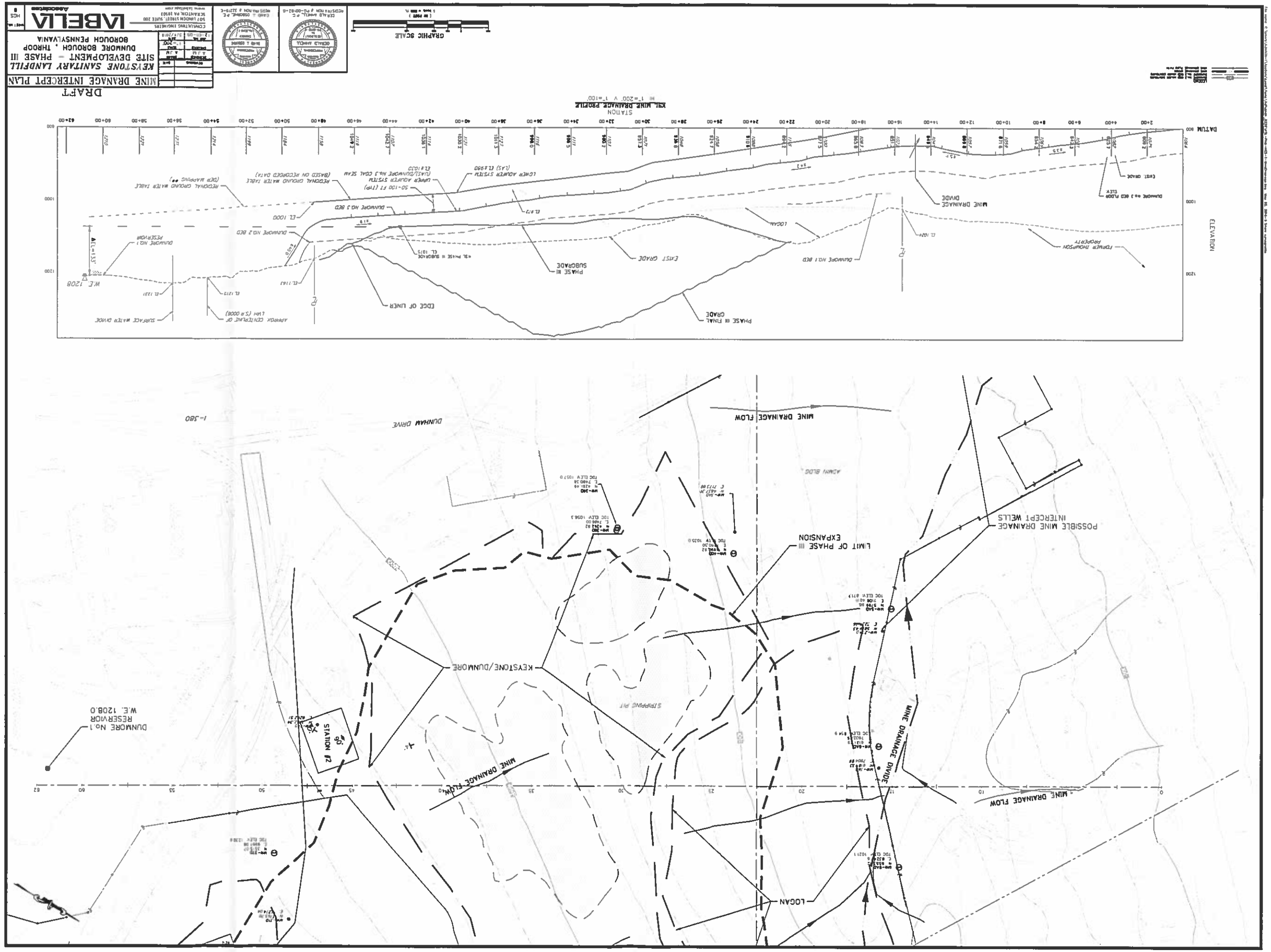
www.labellapc.com
LABELLA Associates
SHEET NO.
HDS
7



DRAFT
MINE DRAINAGE INTERCEPT PLAN
KEYSTONE SANITARY LANDFILL
SITE DEVELOPMENT – PHASE III
DUNMORE BOROUGH , THROOP
BOROUGH PENNSYLVANIA
LABELLA
Associates
GRAPHIC SCALE
KSL MINE DRAINAGE PROFILE
STATION
ELEVATION
DATUM
MINE DRAINAGE DIVIDE
EXIST GRADE
PHASE III SUBGRADE
PHASE III FINAL GRADE
EDGE OF LINER
LOGAN
DUNMORE NO.1 BED
DUNMORE NO.2 BED
DUNMORE NO.3 BED
DUNMORE NO.1 RESERVOIR
W.E. 1208
SURFACE WATER DIVIDE
FORMER THOMPSON PROPERTY
MINE DRAINAGE FLOW
DUNHAM DRIVE
I-380
POSSIBLE MINE DRAINAGE INTERCEPT WELLS
LIMIT OF PHASE III EXPANSION
KEYSTONE/DUNMORE
STRIPPING PIT
STATION #2
DUNMORE No.1 RESERVOIR W.E. 1208.0