BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PETITION OF THE VILLAGE OF	)	AS 05-02
BENSENVILLE FOR AN ADJUSTED	)	(Adjusted Standard – Water)
STANDARD FROM	)	
35 ILL. ADM. CODE 620.410	)	
REGARDING CHLORIDE AND LEAD	)	

NOTICE OF FILING

To: Illinois Environmental Protection Agency
Attn: Melanie Jarvis
Division of Legal Counsel
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

PLEASE TAKE NOTICE that today I have filed with the Office of the Clerk of the Pollution Control Board **SECOND AMENDED PETITION FOR ADJUSTED STANDARD FROM GROUNDWATER QUALITY STANDARDS FOR CHLORIDE** in the above titled matter. Copies of these documents are hereby served upon you.

VILLAGE OF BENSENVILLE

By: ______________________
One of its Attorneys

DATED: June 3, 2005

MCGUIREWOODS LLP
David L. Rieser
77 West Wacker Drive, Suite 4100
Chicago, Illinois 60601
(312) 849-8100

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REGARDING CHLORIDE AND LEAD	)	

PROOF OF SERVICE

I, David L. Rieser, an attorney, hereby certify that I caused the attached pleadings to be served upon all parties listed on the attached Notice of Filing via first class U.S. mail from 77 West Wacker Drive, Chicago, IL, on June 4, 2005.

David L. Rieser

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STATE OF ILLINOIS
Pollution Control Board

BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

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PETITION OF THE VILLAGE OF	)	AS 05-02
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STANDARD FROM	)	
35 ILL. ADM. CODE 620.410	)	
REGARDING CHLORIDE	)	

SECOND AMENDED PETITION FOR ADJUSTED STANDARD FROM GROUNDWATER QUALITY STANDARDS FOR CHLORIDE AT THE VILLAGE OF BENSENVILLE LANDFILL

The Village of Bensenville ("Bensenville"), by and through its attorneys McGuireWoods, LLP, submits this second amended petition to the Illinois Pollution Control Board ("PCB") for adjusted groundwater standards for dissolved chloride at the Village of Bensenville Landfill located in Bensenville, Illinois. Bensenville submits this petition pursuant to Section 28.1 of the Illinois Environmental Protection Act (415 ILCS 5/28.1) and 35 Ill. Adm. Code 104, Subpart D. These amendments are in response to the PCB's order dated January 20, 2005 requesting additional information. These amendments also respond to certain questions submitted by the Illinois Environmental Protection Agency ("IEPA") after the filing of the original and the amended petition. A redlined copy of this Second Amended Petition, identifying the changes from the Amended Petition is attached hereto and incorporated herein as Exhibit 13.

The most significant of these changes is the withdrawal of Bensenville's request for an adjusted standard related to lead. At the time Bensenville filed its original petition current groundwater sampling data indicated that the groundwater quality standard for lead was not being exceeded. Because of past exceedences, Bensenville included relief for lead solely to provide additional support for its request for certification of release from post closure care as described below. Yet after further review of the data, Bensenville determined that regulatory relief regarding lead is not necessary and that the request for this relief complicated its petition regarding chloride. For that reason, Bensenville submits this revised petition. Consistent with these revisions, and as discussed below, Bensenville submits revised Exhibits 1 and 6 and withdraws Exhibit 10.

I. INTRODUCTION

Bensenville seeks this relief for the Village of Bensenville Landfill ("Site") located at the northwest corner of Grand Avenue and County Line Road. Bensenville acquired the Site, which was closed in 1989, from John Sexton Filling and Grading Contractors Corporation ("Sexton") in 1997. Since 1997, Bensenville has worked with the IEPA to gain release from post closure care. As will be described below, Bensenville has resolved all groundwater-related issues with the IEPA except for the current presence of elevated concentrations of dissolved chloride. Bensenville maintains and has demonstrated that the elevated levels of chloride are anthropogenic but not related to landfill impacts. The IEPA has taken the position that it cannot certify completion of post closure care for the Site when groundwater on the Site exceeds the PCB's groundwater quality standards. Bensenville seeks this relief in order to obtain its certification of completion of post closure care. As stated in this Petition, Bensenville believes this relief is justified because the conditions are different than those contemplated by the Groundwater Quality Regulations, because compliance is not economically reasonable and because the conditions create no impact to human health or the environment.

II. DESCRIPTION OF RELIEF

A. Standard from Which Adjusted Standard is Sought. (35 Ill. Adm. Code 104.406(a)).

Bensenville seeks relief from 35 Ill. Adm. Code 620.410(a) solely as it sets out a standard for chloride. This regulation became effective November 25, 1991.

B. Statute Which Regulation is Intended to Implement. (35 Ill. Adm. Code 104.406(b)).

The PCB adopted this regulation pursuant to the Illinois Groundwater Protection Act, 415 ILCS 55/1 et seq. and not to implement the requirements of the statutes listed at 35 Ill. Adm. Code 104.406(b).

C. Level of Justification. (35 Ill. Adm. Code 104.406(c)).

The Groundwater Quality Regulations do not specify a level of justification for seeking an adjusted standard of an individual groundwater quality standard, although they do specify a standard for seeking the reclassification of a given groundwater. 35 Ill. Adm. Codes 620.450. PCB regulations applicable to landfills which continued to be in operation after 1990 (and not applicable to the Site) contain justification for adjusted groundwater standards at 35 Ill. Adm. Code 811.320(b)(4). Although the Part 811 standards do not apply to this Site, the regulations for adjusting groundwater quality standards provide a useful framework for justifying this relief.

III. DESCRIPTION OF PETITIONER'S ACTIVITY
(35 Ill. Adm. Code 104.406(d))

Bensenville attaches and incorporates as Exhibit 1 Groundwater Summary Report prepared by Environmental Information Logistics, LLC (EIL), Bensenville's environmental consultant[1]. The Site description and environmental information included in this Petition is taken from that document and its attachments.

A. Location of Site.

The Site is located in the Village of Bensenville in DuPage County at the northwest corner of Grand Avenue and County Line Road. The landfill covers 53 acres, 41 of which are filled. The landfill is bordered by the River Forest Golf Club to the west, Grand Avenue and the Mount Emblem Cemetery to the south (City of Elmhurst), County Line Road and Interstate 294 to the east (City of Northlake), and a residential area to the north (Village of Bensenville). A map showing the location of the Site is attached hereto and incorporated herein as Exhibit 2. The area east of County Line Road and Interstate 294 is industrial and is located in the City of Northlake within Cook County. There are no schools, hospitals, or churches located within the residential area north of the landfill. The Village is served by a municipal drinking water supply that obtains water from Lake Michigan.

B. Past Operations.

Prior to operation as a landfill, the Site, owned by John Sexton Filling & Grading Contractors Corp. (Sexton), was used as a borrow pit for materials utilized in the construction of Interstate 294. From May 31, 1973 through July 24, 1987, Sexton operated the Site as a landfill, accepting demolition debris, concrete rubble, foundry

[1] A revised version of the narrative portion of this report is attached hereto and should be substituted for the original narrative section of Exhibit 1.

sands, and logs, brush, and debris generally derived from the landscaping industry. To the best of Bensenville's knowledge, Sexton did not design or construct any features such as a liner, leachate collection system, or landfill gas control system but simply used the existing borrow pit to dispose of the construction, demolition, and landscaping debris. The Site also accepted ash generated by an on-Site, permitted air curtain destructor (ACD) that operated intermittently from March 1974 to October 1985. The ACD consisted of a subsurface rectangular structure with concrete walls used to burn landscaping debris. At no time was the Site authorized to accept either hazardous or general domestic wastes.

C. Closure/Post-Closure Care History

Sexton completed closure activities, including the decommissioning of the ACD, on October 4, 1989. Sexton submitted documentation of these activities to the IEPA on October 30, 1989. On January 29, 1990, the IEPA issued Supplemental Permit No. 1989-305-SP beginning the required five-year minimum post-closure care period. On March 27, 1997, Sexton submitted a supplemental permit application (SPA) (IEPA Log No. 1997-116) demonstrating that the post closure care requirements for the facility had been met. Due to the then pending transfer of the property to Bensenville, however, Sexton requested that this SPA be withdrawn in a letter received by the IEPA November 25, 1997.

The permit was transferred from Sexton to Bensenville by the IEPA on December 23, 1997. Bensenville acquired the Site with a grant provided by the IEPA. Bensenville sought the Site to develop it for use as open space. In accordance with the

IEPA's grant, and consistent with its post-closure care permit, the Village constructed a golf course, which was opened to the public in the spring of 2003.

As stated above, Sexton did not install any pollution control equipment to control leachate or landfill gas. With respect to leachate control, pursuant to its post-closure care permit, Sexton constructed a landfill cap consisting of two feet of clay and six-inches of topsoil, with additional soil and vegetation installed by Bensenville above the cap in order to support the golf course. With respect to landfill gas, Bensenville submitted a plan to investigate landfill gas in August, 1998 and the Agency accepted the plan in October of 1998. In June, 1999, Bensenville submitted its report documenting that landfill gas was not being generated in sufficient quantities to cause concern with regard to landfill gas migration, greenhouse gas issues, or impacts to human health and the environment. During a meeting with Bensenville on February 17, 2000 the IEPA agreed that the landfill gas concerns were satisfactorily addressed by the report. A copy of this report is attached hereto and incorporated herein as Exhibit 8.

The IEPA issued Supplemental Permit 1998-166-SP on June 12, 1998 in response to a SPA requesting placement of soils on the cap and that the landfill's name be changed from the "County Line Landfill" to the "Village of Bensenville Landfill." Bensenville's consultant, EIL, prepared and submitted a SPA on August 31, 2000 to satisfy the IEPA's request for further Site groundwater assessment. After EIL responded to a draft denial, the IEPA issued Supplemental Permit No. 2000-321-SP on February 13, 2001 approving the scope of the groundwater assessment monitoring plan.

EIL conducted the groundwater investigation and submitted the results to the IEPA as a SPA (Log No. 2001-174) on May 1, 2001, as required. The results of the investigation indicated that there were no organic compounds in Site groundwater. The results also indicated that there were some inorganic constituents in Site groundwater, including chloride, but at concentrations that were below permit-specified criteria or were attributable to background or non-landfill anthropogenic conditions (see discussion at pages 13-15). The conclusion presented in the SPA, therefore, was that the landfill had not caused any impacts to groundwater beneath the Site. On this basis Bensenville again requested that the IEPA release the Site from post-closure care.

From October, 2001, through September, 2004, Bensenville and the IEPA exchanged correspondence regarding the completion of post closure care for the Site. The IEPA submitted several draft denial letters and Bensenville answered the IEPA's concerns until the only remaining issues were the current presence of chloride in the Site groundwater at concentrations exceeding its respective Illinois Class I groundwater quality standards and not attributable to naturally occurring conditions. No other constituent concentration in Site groundwater currently exceeds Illinois Class I groundwater quality standards.

Messrs. Michael Hirt and Jay Corgiat of EIL met with Mr. Paul Eisenbrandt and Ms. Gwenyth Thompson of IEPA on June 9, 2003 to discuss the May 9, 2003 IEPA draft denial letter and the IEPA's concern regarding the elevated chloride concentrations. During the meeting EIL summarized the previously submitted documentation that suggested an off-Site source of chloride (e.g., road salt) and presented the results of new evidence (comparison of sodium to chloride molar ratios in groundwater and leachate) that further strengthened the non-landfill chloride source argument.

The IEPA responded that because the sources of chloride are believed to be anthropogenic, non-landfill sources and not due to naturally occurring, background variability, and because the current chloride concentrations in Site groundwater exceeded Illinois groundwater standards, the Village would have to obtain a Site-specific adjusted standard for dissolved chloride from the PCB before the IEPA will agree to release Bensenville from the requirements of post-closure care at the Site. As a result, Bensenville submitted this Petition in order to obtain this release.

IV. DESCRIPTION OF GROUNDWATER CONDITIONS AND LACK OF ENVIRONMENTAL IMPACT
(35 Ill. Adm. Code 104.406(g))

A. Geology

The near surface geology of this area is generally characterized by a varying thickness of glacially-derived soils overlying Silurian Age dolomite bedrock. Based on the findings of investigations conducted when the facility closed, the glacially-derived soils at the Site range in thickness from approximately 55 feet, below Addison Creek, to over 70 feet. These consist of, in descending order, an upper silty clay unit (5 to 25 feet thick), an upper water bearing unit comprised of silty sands (10 feet thick), a middle unit consisting of clayey till (5 to 20 feet thick), a lower water bearing unit consisting of silty sand (<5 to 20 feet thick), and at some locations a lower silt and clay unit (5 to 15 feet thick). The lower water bearing unit is commonly referred to as a basal outwash, a term that is based on its physical connection with the underlying Silurian Age dolomite bedrock. This basal outwash is the only water-bearing unit at the Site that the IEPA requires to be monitored. The results of more recent investigations suggest that the glacially-derived soils overlying bedrock may be less than 60 feet thick outside the perimeter of the landfill. These glacially-derived soils tend to vary significantly in thickness, texture, and continuity in northern Illinois. In fact, the glacially-derived soils completely "pinch out" approximately four miles to the southeast at the former Hillside rock quarry and approximately two miles to the southwest at the current Elmhurst rock quarry (Piskin, K, 1975, Illinois State Geological Survey Circular 490, *Glacial Drift in Illinois: Thickness and Character*), both of which were/are used to mine Silurian Age dolomite bedrock where it essentially outcrops at the ground surface (i.e., where there is no glacially-derived soil overburden material). Based on regional information, the Silurian Age dolomite bedrock under the Site may be greater than 200 feet thick and contains a relatively large amount of fissures, fractures, and solution cavities.

B. Hydrogeology

Groundwater in the upper and lower water bearing units generally occurs as a function of recharge derived from vertical infiltration of runoff and precipitation from the surface through the glacial deposits. The upper water bearing unit is highly discontinuous and heterogeneous across the Site based on existing borehole information. As such, it yields minimal amounts of groundwater. The IEPA previously allowed groundwater monitoring in the upper water bearing unit to be discontinued.

On a regional basis, the lower water bearing unit is discontinuous and is entirely absent a few miles downgradient of the Site (Piskin, K, 1975, Illinois State Geological Survey Circular 490, *Glacial Drift in Illinois: Thickness and Character*). Groundwater yield in the lower water bearing unit is generally related to the degree of connectivity with the underlying Silurian Age dolomite bedrock. The yield potentials tend to be much higher at locations where the lower water bearing unit is in direct hydraulic connection with the underlying Silurian Age dolomite bedrock (ISWS Circular 149, 1981).

The lower water bearing unit, or basal outwash, has been monitored during the post closure care period since 1990 via a network of six monitoring wells. Of these, one well (G114) is located hydraulically upgradient of the Site. The remaining five wells (G115/R115, G116, G117, G118/R118, and G117/R117) are located downgradient of the landfill. Depths to groundwater in the lower water bearing zone currently range from approximately 20 feet to 35 feet below ground surface. Horizontal groundwater flow in the lower water bearing unit at the Site has been consistently from northwest to southeast. Unretarded, horizontal groundwater flow rates are on the order of approximately four meters per year, based on a calculated gradient of 0.003 feet per feet (EIL, 2004, *Annual Assessment of Groundwater Flow and Hydraulic Gradients*), an estimated hydraulic conductivity of 1×10^{-3} cm/sec (Fetter, C., 1980, *Applied Hydrogeology*), and an assumed porosity of 0.25 (Fetter, C., 1980, *Applied Hydrogeology*).[2]

Chloride is a conservative constituent in terms of its mobility in groundwater, meaning that it generally travels unretarded in groundwater and, therefore, horizontal travel times for chloride would be expected to be on the order of four meters per year, or 1300 feet per 100 years.

Groundwater in the Silurian Age dolomite bedrock occurs in joints, fissures, and solution cavities. The groundwater yield within the bedrock varies considerably based on the distribution and connectivity of the joints, fissures, and solution cavities, but tends to be most productive in the upper portion of the bedrock where it is more densely fractured.

[2] EIL believes that these values are conservative based on field experience, including the generally slow recovery rate of the monitoring wells (four of the six wells, including G114, G116, G117, and R121 are typically bailed dry prior to sampling).

The Silurian Age dolomite bedrock is recharged directly from the overlying glacial deposits, or directly from precipitation where the bedrock is exposed at the surface. In general, the Silurian Age dolomite bedrock is capable of yielding significant volumes of water compared to the lower water bearing unit. For example, based on a 1981 Illinois State Water Survey report (ISWS Circular 149, 1981), "Groundwater withdrawals from the shallow aquifers in DuPage County averaged 36.7 mgd [million gallons per day] during the past 13 years; 34.3 mgd was from the [Silurian Age] dolomite and 2.4 mgd was from the sand and gravel." As such, less than 10 percent of the DuPage County groundwater budget was historically (from the late 1960s through the early 1980s) provided by the unconsolidated glacially-derived units. These numbers have likely decreased in recent years with the increased availability of municipally-supplied Lake Michigan water.

Groundwater flow within the Silurian Age dolomite bedrock is generally from west to east. However, this flow is significantly affected on a local basis by dewatering activities associated with numerous local rock quarries. There is no Site-specific groundwater flow information in the Silurian Age dolomite bedrock.

C. Groundwater Quality – Silurian Age Dolomite Bedrock

Groundwater quality in the Silurian Age dolomite bedrock near the Site and elsewhere in the region is well documented and is known to be high in chloride and other inorganic constituents (ISWS Circular 149, 1981). In general, concentrations of total dissolved solids (TDS), hardness (as CaCO3), sulfate, chloride, sodium, and total iron are high and, in many cases, several times higher than applicable drinking water standards. The greatest concentrations of these constituents tend to be found in areas that are more densely developed by human activity, such as near the Site (ISWS Circular 149, 1981). These constituents include the highest total dissolved solid concentrations in the LaGrange-McCook and the Elmhurst-Bensenville-Northlake areas, the highest chloride concentrations in the Elmhurst-Berkley-Bensenville area, and the highest sodium concentrations in the Elmhurst-Berkley-Bensenville and the Burr Ridge-Hinsdale areas. Concentration contour maps of chloride in the Silurian Age dolomite bedrock from ISWS Circular 149 are included as Exhibit 3. Revised contour maps showing the location of the Site, Interstate 294, and O'Hare airport are attached as Exhibit 9. In fact, chloride concentrations in the Silurian Age dolomite bedrock near the Site were observed to be similar to those observed in Site groundwater collected from the lower water bearing unit.

The Illinois State Water Survey attributed the high chloride concentrations in the Silurian Age dolomite bedrock to heavy road salt applications along major roads, including Interstate 294 (ISWS Circular 149, 1981), that infiltrates through the overlying glacial units, including the lower water bearing unit. Based on information provided by the Illinois State Toll Highway Authority (http://www.illinoistollway.com/portal/page?_pageid=135,41314&_dad=portal&_schema=PORTAL), the Authority applied an average of 56,665 tons of salt annually during the past eight years to their 274 miles of toll roads. This is equivalent to 207 tons of salt per mile of road per year, or 34.5 tons of salt per lane-mile for a six lane highway. As previously indicated, Interstate 294 runs north-south adjacent to the east boundary of the Site. In addition, Grand Avenue and County Line Road (which border the Site to the south and east, respectively) are also salted during the winter months by both Bensenville and DuPage County road crews.

In addition to surface infiltration of contaminants, significant dewatering activities, such as those associated with nearby rock quarries in Elmhurst (two miles to the southwest) and Hillside (four miles to the southeast), have changed the redox conditions in the Silurian Age dolomite bedrock, resulting in increased concentrations of some dissolved constituents (ISWS Circular 149, 1981).

D. Groundwater Quality – Lower Water Bearing Unit

Groundwater quality in the lower water bearing unit at the Site is well documented on the basis of nearly 14 years of quarterly post closure care monitoring and statistical reporting. During the 14-year time period there have been no confirmed detections of organic compounds in Site groundwater.

Based on the information collected at the Site and on the regional information regarding the Silurian Age Dolomite bedrock, Bensenville can document that the groundwater quality issues observed in the lower water bearing unit for which this petition seeks relief are not landfill related.[3] With respect to chloride, as discussed above, the 1981 ISWS Circular identified regional chloride impacts in the Silurian Age dolomite which are consistent with the impacts in the lower water bearing unit with which it is connected at the Site. Groundwater investigations at the Site indicated generally higher chloride concentrations further from the landfill waste boundary, adjacent to the roadways. This is not consistent with a possible leachate release.

[3] Bensenville acknowledges that this conclusion has been the subject of extensive discussion with the IEPA. While Bensenville asserts it can fully document and support its position, it also notes that the Board can grant this relief without resolving this debate. As is demonstrated below, identified control measures would be economically unreasonable and there is no environmental impact associated with the relief.

E. Groundwater Usage

In order to evaluate the impact of the proposed change, EIL evaluated groundwater usage and monitoring wells within one half-mile of the Site. Bensenville previously obtained all of its water from deep wells (ISWS Circular 149, 1981), and currently obtains its water from Lake Michigan. Bensenville also maintains a private well use restriction (Bensenville Municipal Code 8-7-23), included as Exhibit 4, that states:

> *"From and after July 6, 1984, it shall be unlawful for any person to install a well, cistern, or other groundwater collection device to be used to supply any water supply system if a water main constituting a part of the Village's public water supply system is within two hundred feet (200') of the nearest property line of the property upon which the well, cistern, or other groundwater collection device would be drilled or connected."*

Based on communications with personnel in the Bensenville public works department and DuPage County Public Health Department, well database information obtained from the Illinois State Geological Survey (ISGS) and the Illinois State Water Survey (ISWS), and a reconnaissance performed on December 2, 2004, there are no known private wells or monitoring wells in Bensenville located within one half-mile of the Site that are screened in the lower water bearing unit, with the exception of the Site monitoring wells.

Based on that same reconnaissance, there are no wells screened in the lower water bearing unit in the City of Northlake located adjacent to and east (downgradient) of the Site. Northlake, as shown in the map in Exhibit 5, does not currently maintain a private well use restriction. The majority of properties located within one half-mile of the Site are industrial/commercial in nature. In addition, there is a small residential area located due east of and within one half-mile of the Site. Based on discussions with the Northlake public works department, Cook County Public Health Department, and a number of residents in the residential area, well database information obtained from ISGS and ISWS, and a reconnaissance performed on December 2, 2004, the various industries/commercial operations within one half-mile downgradient of the Site obtain their water from either deep bedrock wells or from Lake Michigan. The homeowners within the small residential area are connected to the Northlake municipal water supply that is sourced from Lake Michigan and there are no known private wells or monitoring wells located in Northlake within one half-mile downgradient of the Site that are screened in the lower water bearing unit.

There were, however, a few monitoring wells previously located within one half-mile of the Site associated with a former Leaking Underground Storage Tank (LUST) site (Leon Parent Trucking, LUST incident number 961459). Those monitoring wells were abandoned based on discussions with the property owner and field observations during the December 2, 2004 reconnaissance. There was also a private well previously located east of the Site on what is now property owned by National Trucking. Based on ISGS well records, the well was screened in the underlying Silurian Dolomite bedrock. Company representatives of National Trucking indicated that the well was previously abandoned. The abandonment was evident during the December 2, 2004 field reconnaissance.

The City of Elmhurst, located adjacent to and south (downgradient) of the Site, maintains an ordinance (Elmhurst Municipal Code MCO-1-2003), included in Exhibit 4, that prohibits the use of groundwater for potable use within the city limits except via well points operated by a city, those private wells in existence prior to the ordinance date (not including those in need of repair), and private irrigation wells equipped with a backflow prevention device. The ordinance was approved subject to a memorandum of understanding (MOU) between Elmhurst and the IEPA. The MOU was completed on December 4, 2003. Elmhurst provides municipal water service sourced from Lake Michigan to its residents.

Mt. Emblem Cemetery is the only property in Elmhurst that is located within one half-mile downgradient (south to southeast) of the Site, as shown on the map included as Exhibit 5. There are no other industrial/commercial facilities or residential areas located in Elmhurst within one half-mile downgradient of the Site. Based on communications with personnel in the Elmhurst public works department, Mt. Emblem Cemetery, and DuPage County Public Health Department, well database information obtained from the ISGS and ISWS, and a reconnaissance performed on December 2, 2004, there are no known private wells or monitoring wells in Elmhurst located within one half-mile downgradient of the Site that are screened in the lower water bearing unit.

There were, however, a number of monitoring wells previously installed in Mt. Emblem Cemetery that were associated with a LUST incident (LUST incident number 913205). These wells have since been abandoned based on discussions with the Mt. Emblem Cemetery property manager and observations during the December 2, 2004 reconnaissance. In addition, there were a number of private wells that were located approximately one half-mile south of the Site, likely within the confines of the cemetery. However, based on well records obtained from the ISWS and ISGS, these wells were screened in the underlying Silurian Age dolomite bedrock. The Mt. Cemetery property manager had no knowledge of the existence of these wells and there was no evidence that they are still in existence based on the December 2, 2004 reconnaissance.

In summary, based on discussions with the public works departments of Bensenville, Northlake, including some local residents, and Elmhurst, including personnel at Mt. Emblem Cemetery, and with the DuPage and Cook County Public Health Departments, well database information obtained from the ISGS and ISWS, and a reconnaissance of the area within a one half-mile downgradient of the Site, there is no evidence to suggest that the lower water bearing zone is used as a source of drinking water in Bensenville downgradient of the Site, or the adjacent (downgradient) communities of Northlake and Elmhurst within one half-mile of the Site. These communities obtain their public drinking water supplies primarily, or solely, from Lake Michigan. Some deep wells were identified from well logs as screened in the Cambrian-Ordovician aquifers underlying the Maquoketa Formation that, in turn, underlies the Silurian Age dolomite bedrock. It is not known whether these wells are currently in use. In any event, the Cambrian-Ordovician aquifers are physically and hydraulically isolated from the Silurian Age dolomite bedrock.

V. DESCRIPTION OF COMPLIANCE EFFORTS AND IMPACT OF EFFORTS TO COMPLY

(35 Ill. Adm. Code 104.406(e))

Bensenville evaluated the estimated costs for actions necessary to bring the groundwater into compliance with the Board's standards. While it is not clear that any action would achieve compliance with the Board regulation, a basic approach would be to construct a cut-off wall around the lower water bearing unit, to isolate Addison Creek (which receives wastewater treatment plant and other discharges), to pump groundwater with elevated chloride from the lower water bearing unit, and to treat this groundwater in an on-Site treatment unit. The costs, including hydraulic isolation of the lower water bearing unit around the Site, hydraulic isolation of Addison Creek where it crosses the Site, groundwater extraction, and construction of an on-Site reverse osmosis treatment facility to treat the affected groundwater would be on the order of **$14,144,000**. These costs are summarized in Exhibit 6[4] and are discussed below.

The costs assume that hydraulic isolation of the lower water bearing unit would be achieved through the installation of a bentonite-soil slurry wall with "leap-frogging" overlapping panels 2.4 meters in width. The length of the wall would be 6,100 feet, the approximate perimeter length of the property. The depth of the wall is assumed to be 75 feet, 60 feet in soil overburden material and an additional 15 feet in the underlying fractured Silurian dolomite bedrock to minimize potential seepage. The depth estimates are based on current site information. The estimated cost of the slurry wall would be $10,350,000 based on discussions with Layne GeoConstruction out of Butler, Pennsylvania, a qualified contractor with experience in the construction of slurry cut-off wall systems.

The bottom of Addison Creek, a possible source of contaminants, is separated from the top of the lower water bearing unit by approximately 25 feet of soil material. Contaminants in Addison Creek could potentially migrate through these soil materials and impact the lower water bearing unit. Therefore, the cost estimate includes hydraulic isolation of Addison Creek via a concrete bed liner along the approximately 1,600 length

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[4] A revised version of Exhibit 6 is attached hereto and should be substituted for the Exhibit 6 attached to the original petition.

of creek-bed across the Site. The concrete bed liner would be six-inches thick and an average of 25 thick wide, based on the current configuration of the creek. The estimated cost of the creek bed liner would be $200,300 based on the calculated volume of concrete and estimated installation costs.

Groundwater extraction would be achieved via a series of twenty extraction wells installed on 300-foot centers and connected via a pipeline. Each well would be installed to an approximate depth of 65 feet and would be fitted with a submersible pump. An additional well pair would be installed adjacent to each extraction well, one inside the cut-off wall and one outside the cut-off wall. The purpose of the well-pairs would be to monitor the performance of the cut-off wall. The total estimated cost of the extraction system is $854,000, $625,000 of which represents well installation costs.

Bensenville recognizes that the estimated number of wells is based on the assumed hydraulic properties of the lower water bearing unit, specifically a hydraulic conductivity of 1×10^{-3} cm/sec and a porosity of 0.25. Fetter (*Applied Hydrogeology*, 1980) estimates hydraulic conductivity for silty and fine sands to range from 1×10^{-3} cm/sec to 1×10^{-5} cm/sec. The calculated horizontal flow velocity was based on an assumed conservative hydraulic conductivity of 1×10^{-3} cm/sec. That is, the highest potential contaminant migration rate was assumed.

This hydraulic conductivity is a conservative assumption because four of the six Site monitoring wells routinely draw down when manually purged with a bailer. It is highly unlikely that a well could be bailed dry with a hydraulic conductivity around the well screen of 1×10^{-3} cm/sec. Given the relatively fine grained nature of the lower water bearing unit, it is more likely that the actual hydraulic conductivity would be in the

1 x 10^{-4} cm/sec to 1 x 10^{-5} cm/sec range. Such hydraulic conductivities are also consistent with a well that can be bailed dry manually. These lower hydraulic conductivities would result in calculated horizontal flow velocities of ten to one hundred times *slower* than the currently assumed value of 4 meters per year, or 0.4 to 0.04 meters per year. As such, the number of required extraction wells and, therefore, the total cost of the extraction system would increase.

Fetter (*Applied Hydrogeology*, 1980) estimates porosity for glacial till to range from 10 to 20 percent, and for mixed sand and gravel to range from 20 to 35 percent. The estimated horizontal flow velocity included herein is based on an assumed porosity of 0.25, a reasonable estimate that is approximately midway between the ranges listed above given that the soil materials in the lower water bearing unit generally consist of a mixture of silt and sand. Porosity is inversely related to horizontal flow velocity – the lower the porosity the higher the calculated horizontal flow velocity. Even if the lowest porosity in the range was assumed (0.10) the resulting calculated horizontal flow velocity would only change from four meters per year to 10 meters per year.

In summary, therefore, the estimated horizontal flow velocity is likely significantly overestimated with respect to hydraulic conductivity, and could be slightly underestimated with respect to porosity. The net effect, however, is that the calculated horizontal flow velocity is likely somewhat high and is, therefore, conservative with respect to potential contaminant migration. The actual number of required extraction wells is inversely related to horizontal flow velocity – the higher the calculated velocity the fewer number of wells. Since field measurements would likely reveal lower hydraulic conductivities, the required number of extraction wells and corresponding water level monitoring well pairs would increase, thereby increasing the cost of the extraction system. However, the cost of the extraction well network currently represents only about four percent of the estimated total remediation costs. As such, the actual well spacing and, by extension, the number of extraction wells in the extraction network do not significantly affect the overall cost of remediating Site groundwater.

The estimated costs are also based on-Site groundwater pre-treatment utilizing reverse osmosis. Such a system would cost approximately $25,000 and would be capable of achieving the anticipated discharge standards required by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Such pre-treatment discharge standards would be established with the MWRDGC during the permitting process.

Engineering, permitting, and construction quality assurance costs associated with the system elements described above were estimated to be 15 percent of the capital costs, or $1,714,000.

Finally, the annual operation and maintenance cost was estimated to be $40,000. This includes assumed annual costs to replace one extraction pump, hourly technician costs to maintain the on-Site reverse osmosis unit, disposal and required analytical costs associated with discharge to the MWRDGC, and system power consumption. The total estimated operation and maintenance cost assuming a 25-year groundwater extraction, treatment, and disposal period is $1,000,000. The 25-year period is based on the assumed horizontal flow velocity of 4 meters per year (for chloride assuming no retardation) and a contaminated groundwater flow path of 100 meters from the southeast quadrant of the landfill near the southeast edge of waste to the southeast property boundary. Clearly, the groundwater extraction, treatment, and disposal period would increase dramatically if

Site hydraulic conductivities were found to be lower (a strong possibility) and if the theoretical landfill leakage was occurring, or was assumed to be occurring, somewhere other than in the southeast corner of the landfill. For example, the contaminant flow path would increase from 100 meters to 400 meters if the theoretical leakage was assumed to be from the middle of the landfill. This would effectively quadruple the estimated operation and maintenance period and associated costs.

Such costs are economically unreasonable and not justified from any perspective. The lack of economic reasonableness is apparent from the facts described in this Petition. There are no groundwater receptors or potential human health impacts since users within one half-mile downgradient of the Site obtain their drinking water supplies from sources other than the lower water bearing unit. Further, despite the program outlined above, Bensenville cannot control or eliminate the sources of chloride. Even if Bensenville implemented some type of groundwater isolation, extraction, and treatment program, the source of chloride is ongoing and not subject to control by Bensenville. State and county highway departments apply the salt surrounding roads and Interstate 294 as a means of ensuring driving safety during snow and ice events and these separate government entities are expected to continue this application in the future. As a result, Bensenville cannot describe the conditions that would occur if it were to comply with the groundwater standards since the non-compliance is not as a result of its actions and there is no action it can take which could result in compliance.

Although Bensenville, DuPage and Cook Counties, and the Illinois Department of Transportation could, in theory, cease further road salting along the adjacent roads, the potential health effects as they are related to road safety would be significant. In fact, a significant increase in the frequency of automobile accidents, many resulting in severe injury and some with resulting fatalities, would surely be attributed to increased road hazards associated with snow and ice if the application of road salt were to cease during the winter months. Road salt has long been the material of choice in northern Illinois for snow and ice melting because of its relative abundance, cost effectiveness when compared with alternative materials, and minimal impact to the environment.

Furthermore, there are no known significant health risks associated with the ingestion of groundwater with the current level of chloride concentrations found in the Site groundwater. A Federal Highway Administration (FHWA) study concluded that the major objection to high concentrations of sodium and chloride in public water supplies arises from the taste preference of consumers (Winters, et al., 1985, *Environmental Evaluation of CMA,* Report FHWA-RD-84-095, FHWA, USDOT). In other words, the consumption of such groundwater would be objectionable to the consumer. The Ohio Local Technical Assistance Program (LTAP), associated with the Federal Highway Administration, Ohio Department of Transportation, and the Ohio State University reported that "Chloride [from road salt] affects taste, but has no effect on [human] health at the levels possible from road salt." (Ohio LTAP Quarterly, 1998, Volume 13, No. 1). Finally, the Environment Canada (Canada's equivalent of the USEPA) found that, although high chloride concentrations in groundwater could result in some adverse environmental effects to plant and aquatic life, "The principal problem for humans from road salt is its adverse effect on taste…" and that "Road salts are not dangerous to humans." (Environment Canada, 2000, *Priority Substances Assessment Report: Road Salts*) there are no known health risks associated with the ingestion of groundwater with elevated chloride concentrations. Therefore, there would be no health and environmental benefits associated with potentially meeting existing groundwater standards by stopping the use of road salt.

VI. JUSTIFICATION FOR RELIEF
(35 Ill. Adm. Code 104.406(h))

Again, while Bensenville is not bound by the standards of 35 Ill. Adm. Code 811.320(b)(4), Bensenville will look to these standards as a useful framework for justifying the relief it seeks here.

a) The groundwater from the lower water bearing unit does not presently serve as a source of drinking water.

As described above, Bensenville has documented that the groundwater from the lower water bearing unit does not serve as a source of drinking water for municipal or private wells in Bensenville, or the downgradient communities of Northlake (to the east) and Elmhurst (to the south) within one half-mile downgradient of the Site.

b) The change in standards will not interfere with or become injurious to, any present or potential beneficial uses for such waters.

As stated above, there are no current beneficial uses being made of these waters and municipal ordinances in Bensenville and Elmhurst would preclude the use of this groundwater as a potable water source in the future in those communities. More significantly, the Village and the adjacent communities of Northlake and Elmhurst obtain their drinking water supplies from Lake Michigan. There are no known industrial or residential uses of the specific groundwater downgradient and within one half-mile of the Site.

c) *The change is necessary for economic or social development.*

The proposed change will advance economic and social development by allowing Bensenville to complete the golf course contemplated by the IEPA grant encouraging Bensenville to develop additional open space. In addition, the change would relieve Bensenville from a significant financial burden insofar as the required quarterly assessment monitoring and reporting are concerned. These costs account for approximately $35,000 to $40,000 per year (as documented in Exhibit 11), an amount that could be allocated to beneficial community development, beautification, or recreation projects.

The proposed change will not affect human health because groundwater from the lower water bearing unit is not utilized for human consumption within one half-mile downgradient of the Site.

d) *The groundwater does not presently and will not in the future serve as a source of drinking water.*

Although it is technically feasible to eliminate or reduce the chloride concentrations in Site groundwater, it is not economically reasonable to eliminate or reduce the chloride concentrations in Site groundwater because the cost is extremely high and there is no evidence to suggest that Site groundwater is used for human consumption or any known industrial purposes within one half-mile downgradient from the Site. In order to ensure that groundwater at the Site will not be used for potable purposes, Bensenville will record an ELUC to preclude such use if so requested by the PCB. There are no known human health impacts associated with the consumption of groundwater with chloride concentrations similar to those measured in Site groundwater. It is also unlikely that a person would willingly ingest such groundwater because of its offensive taste associated with the high chloride concentration. Bensenville and adjacent communities obtain their drinking water from Lake Michigan. Since the groundwater is not used for human consumption, it must be concluded that the safety benefits to motorists of using road salt (ice-free roads) far outweigh any potentially beneficial impact of reducing chloride concentrations in Site groundwater by eliminating the application of road salt to heavily traveled Grand Avenue, County Line Road, and Interstate 294 adjacent to the Site. It is possible, however, that existing groundwater quality will be maintained as a function of the quantity of road salt applied during upcoming years.

This Petition also meets the statutory requirements set out at Section 28.1(c) of the Illinois Environmental Protection Act (415 ILCS 5/28.1(c)) for justifying an adjusted standard. There are numerous factors which establish that the Bensenville situation is substantially and significantly different from those the Board considered in adopting the Ground Water Quality standards. First, Bensenville has sought this change to complete the project of turning a private landfill into a public open space resource pursuant to IEPA funding. The groundwater issues represent conditions which originated from other sources and which cannot be resolved by any reasonable action that Bensenville can take. Finally there will be no environmental impact associated with the Board's granting of this adjusted standard and no impact on public health since the public is not consuming this groundwater and not likely to in the future for reasons which do not relate to the activities for which the Petitioner seeks relief. Finally, as is stated below, this relief can be granted consistently with federal law. For all these reasons, the adjusted standard sought by Petitioner is justified.

VII. THIS RELIEF CAN BE GRANTED CONSISTENT WITH FEDERAL LAW
(35 Ill. Adm. Code 104.406(i))

The closure of this Site is not controlled by any federal law and no federal law sets standards for groundwater which is not used as a potable water supply. Neither the municipal solid waste landfill regulations nor the hazardous landfill regulations adopted under the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.) apply to this Site. Therefore, this relief can be granted consistent with federal law.

VIII. STATEMENT OF RELIEF REQUESTED
(35 Ill. Adm. Code 104.406(g))

Bensenville requests that the Board adopt the following adjusted standard:

The dissolved chloride standard in 35 Ill. Adm. Code 620.410 shall be adjusted from the existing standard of 200,000 ug/L to 728,963 ug/L. This adjusted standard shall apply to groundwater within the lower water bearing unit down to the top of the Silurian dolomite bedrock beneath the former Village of Bensenville Landfill Site located at:

Address: Northwest corner of Grand Avenue and County Line Road, Bensenville, Illinois.

Legal Description:
Parcel 1 (Pin Number 03255200004): *That part of the northeast quarter of Section 25, Township 40 North, Range 11 East, of the third principal meridian described by commencing in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue, thence easterly on the centerline of Grand Avenue 700.0 feet for a place beginning; thence northerly 1602.1 feet to a point in the section line which is 1865.04 feet of the northwest corner of said northeast quarter; thence east along the north line of said northeast quarter 768.8 feet to the northeast corner thereof; thence south along the east line of said northeast quarter 1641.55 feet to the centerline of Grand Avenue; thence westerly along the centerline of Grand Avenue 692.28 feet to the place of beginning (except therefrom the rights of the public all existing roads and streets), in DuPage County, Illinois.*

Parcel 2 (Pin Number 0325200003): *That part of the northeast quarter of Section 25, Township 40 North, Range 11 East, of the third principal meridian described by beginning in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue; thence easterly on the centerline of Grand Avenue, 700 feet; thence northerly 1602.1 feet to a point in the section line which is 846.0 feet east from the place of beginning; thence west 846.0 feet to the place of beginning, except therefrom that part thereof described as follows: the west 200 feet (as measured along the centerline of Grand Avenue) north of the south 400 feet (as measured on the easterly line of property described in document 388417) lying northerly of the northerly line of Grand Avenue (said northerly line of Grand Avenue being 40 feet northerly of and parallel with the centerline of Grand Avenue; in DuPage County, Illinois.*

Parcel 3 (Pin Number 0325200002): *The west 200 feet (as measured along the center-line of Grand Avenue) of the south 400 feet (as measured on the easterly line of property described in document 388417) lying northerly of the northerly line of Grand Avenue (said northerly line of Grand Avenue being 40 feet northerly of and parallel with the centerline of Grand Avenue) of that part of the northeast quarter of section 25, Township 40 North, Range 11, east of the third principal meridian, described by beginning in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue; thence easterly on the centerline of Grand Avenue, 700 feet, thence northerly 1602.1 feet to a point in the section line which is 846.0 feet east from the place of beginning; thence west 846.0 feet to the place of beginning, in DuPage County, Illinois.*

A map showing these boundaries has been attached hereto and incorporated herein as Exhibit 12.

IX. HEARING WAIVER
(35 Ill. Adm. Code 104.406(j))

Bensenville conditionally waives a hearing for this Adjusted Standard.

Bensenville reserves the right to a hearing if the Agency chooses to recommend denial.

X. CONCLUSION

The Village requests an adjusted standard for chloride in Site groundwater so that the IEPA will release Bensenville from further post-closure care monitoring at the Site. The Site is currently used as a public golf course, and is located within a highly developed area that consists primarily of industrial and commercial properties downgradient of the Site. Bensenville and adjacent communities are served by municipal water supplies that are sourced by Lake Michigan and, therefore, are not dependent upon groundwater obtained from the glacial materials beneath the Site.

The request for the adjusted standards are supported by a significant amount of Site-specific data, summarized herein, that demonstrates that the Site does not represent a threat to human health or the environment. The data indicate that an off-Site source, probably road salting on adjacent roads, is likely responsible for the relatively high chloride concentrations observed in some Site groundwater from the lower water bearing unit. Reviews of regional studies indicate that both the glacial materials and the underlying Silurian Age dolomite bedrock have been significantly influenced by human activity, resulting in high chloride concentrations, among others. However, human consumption of Site groundwater will not occur because the public drinking water in Bensenville and the adjacent (downgradient) communities of Elmhurst and Northlake are sourced from Lake Michigan. Furthermore, Bensenville and Elmhurst maintain local ordinances that restrict the private use of groundwater from the glacial materials, including the lower water bearing unit.

WHEREFORE, for the reasons stated herein, the Village of Bensenville requests that the Illinois Pollution Control Board grant this adjusted standard.

VILLAGE OF BENSENVILLE

By: ______________________
One of its Attorneys

Date: June 3, 2005

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VILLAGE OF BENSENVILLE
SECOND AMENDED PETITION FOR ADJUSTED STANDARD, AS 05-02

EXHIBIT LIST

EXHIBIT 1	**December 21, 2004 EIL Groundwater Summary Report (Revised)**
EXHIBIT 2	**Site Map**
EXHIBIT 3	**Contour Maps Showing Area Chloride Levels**
EXHIBIT 4	**Municipal Well Ordinances**
EXHIBIT 5	**Map Showing Wells Within One Half Mile of the Site**
EXHIBIT 6	**Compliance Cost Summary (Revised)**
EXHIBIT 7	**Red-Lined Amended Pleading**
EXHIBIT 8	**Landfill Gas Report**
EXHIBIT 9	**Revised Chloride and Sodium Contour Maps**
EXHIBIT 10	**Lead Tables (Withdrawn)**
EXHIBIT 11	**Monitoring Costs**
EXHIBIT 12	**Site Map Showing Boundaries**
EXHIBIT 13	**Red-Lined Second Amended Petition**

EXHIBIT 1

December 21, 2004 EIL Groundwater Summary Report (Revised)

(Narrative attached. See previously attached binders.)

Environmental Information Logistics, LLC
26W271 Durfee Road
Wheaton, IL 60187
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December 21, 2004

Re: Groundwater Summary Report Regarding Chloride Concentrations in Landfill Groundwater
Village of Bensenville Landfill
0434140001 – DuPage County
Permit No. 1973-35-DE
Log No. 2001-174

To Whom It May Concern:

On behalf of the Village of Bensenville (Village), Illinois, the owner and operator of the Village of Bensenville Landfill (Site), Environmental Information Logistics, LLC (EIL) has prepared this Groundwater Summary Report summarizing the results of investigations performed to date regarding the source of elevated chloride concentrations in downgradient groundwater monitoring wells at the Site.

The Village submitted a Supplemental Permit Application (SPA) to the IEPA on May 1, 2001 (**Appendix 1**) requesting a release from the requirements of post-closure care at the above-referenced Site. Since that time, three addenda, (**Appendices 2 through 4**) related to groundwater quality in the vicinity of the Site were submitted to the IEPA in response to draft denial letters. Currently, the IEPA contends that the current chloride concentrations are the only remaining groundwater issue that precludes them from releasing the Site from the requirements of post-closure care. This report summarizes the information submitted to the IEPA that supports the Village's position that the chloride concentrations are not landfill-related. This report also includes descriptions of the Site's geologic and hydrogeologic conditions, the groundwater monitoring network, and chloride analytical results, and an evaluation of other potential chloride sources.

BACKGROUND

The Site is located in DuPage County, near the northwest corner of the intersection of Interstate 294 and Grand Avenue (**Appendix 5**), in the Village of Bensenville. The Site covers 53 acres, 41 of which are filled, and is bordered by the River Forest Golf Club to the west, Grand Avenue and the Mount Emblem Cemetery to the south (Elmhurst), County Line Road and Interstate 294 to the east (Northlake), and a residential area to the north. The area east of Interstate 294 consists primarily of commercial and industrial properties. There are no schools, hospitals, or churches located within the residential area north of the Site. The Site is bisected by Addison Creek.

The Village, including the golf course facility, is served by a municipal drinking water supply. Local ordinance (8-7-23) prohibits the installation and use of a private well if the property line upon which the well is to be located is within 200 feet of an underground water main. Based on discussions with the Village engineer, this restriction effectively eliminates private well installation in almost the entire Village. The Village wastewater treatment plant, located approximately one mile north and upstream of the Site, routinely discharges treated effluent, in accordance with its permit, to Addison Creek. Addison Creek serves as a local source of irrigation water for the golf course.

Prior to operation as a landfill, the Site, owned by John Sexton Filling & Grading Contractors Corp. (Sexton), was used as a borrow pit for materials utilized in the construction of Interstate 294. From May 31, 1973 through July 24, 1987, Sexton operated the Site as a landfill, accepting demolition debris, concrete rubble, foundry sands, and logs, brush, and debris generally derived from the landscaping industry. The Site also accepted ash generated by an on-site, permitted air curtain destructor (ACD) that operated intermittently from March 1974 to October 1985. The ACD consisted of a subsurface rectangular structure with concrete walls used to burn landscaping debris. The Site was not authorized to accept hazardous or general domestic wastes.

GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The near surface geology at the Site is generally characterized by a varying thickness of glacially-derived soils overlaying Silurian Age dolomite bedrock. Based on the findings of investigations conducted when the facility closed, the glacially-derived soils at the Site range in thickness from approximately 55 feet, below Addison Creek, to over 70 feet. These consist, in descending order, of an upper silty clay unit (5 to 25 feet thick), an upper water-bearing unit comprised of silty sands (10 feet thick), a middle unit consisting of clayey till (5 to 20 feet thick), a lower water-bearing unit consisting of silty sand (<5 to 20 feet thick), and a lower silt and clay unit (5 to 15 feet thick). The horizontal component of groundwater flow within the lower water-bearing unit at the Site is to the southeast, as shown on **Appendix 6**.

The underlying Silurian Age dolomite bedrock is regionally extensive and is mined where it outcrops near the ground surface, such as in Hillside (approximately 4 miles south-southeast of the Site) and in Elmhurst (approximately 2 miles south-southwest of the Site). The IEPA does not require the Village to monitor groundwater in the Silurian Age dolomite bedrock. At some locations, including the Site, the lower water-bearing unit is in direct physical contact with the Silurian Age dolomite bedrock.

Groundwater recharge in both the lower water-bearing unit and the underlying Silurian age dolomite is generally derived from surface infiltration through the overlying soil materials.

The adjacent community south of the Site, Elmhurst, has in place an IEPA-approved groundwater ordinance (MCO-1-2003) prohibiting the private use of groundwater wells.

Although the adjacent community to the east, Northlake, has no such approved ordinance, there are no known private well users within their community (personal correspondence with Northlake office of public works and some homeowners). As previously stated, the Village has a local groundwater ordinance that prohibits the installation of private water wells within 200 feet of any underground water main.

Based on discussions with the Northlake, Bensenville, and Elmhurst public works departments, DuPage and Cook County Public Health Departments, personnel at Mt. Emblem Cemetery to the south, a number of residents in a small residential area in Northlake within one-half mile of the Site, well database information obtained from the Illinois State Geological and Water Surveys, and a reconnaissance performed on December 2, 2004, the various industries/commercial operations and the residential areas located within one-half mile downgradient of the Site obtain all of their water from either deep bedrock wells or from Lake Michigan. Although there were some monitoring wells associated with Leaking Underground Storage Tank (LUST) sites that were likely screened in the lower water bearing unit within one-half mile downgradient of the Site, including on the Mt. Emblem Cemetery property to the south and the Leon Parent Trucking Company property to the east-southeast, those wells have since been decommissioned based on discussions with the current property owners and visual observations during the December 2, 2004 reconnaissance. Therefore, there is no evidence to suggest that there are existing private wells or monitoring wells screened within the lower water bearing unit within one-half mile downgradient of the Site. A copy of the information obtained from the various State agencies/City departments discussed above, as well as a record of telephone discussions with those agencies, departments, and homeowners, is included in **Appendix 7**.

GROUNDWATER MONITORING NETWORK

The upper water-bearing unit was monitored from 1974 to 1990 using three wells. In 1990, as part of closure activities, the IEPA required groundwater monitoring to be conducted in the lower rather than upper water-bearing unit. Since 1990, therefore, groundwater has been monitored only in the lower water-bearing unit via a network of six monitoring wells. Of these, one well (G114) is located hydraulically upgradient of the Site. The remaining five wells (R115, G116, G117, R118, and R121) are located downgradient of the Site. The locations of each of the six monitoring wells are shown on **Appendix 8**.

CHLORIDE ANALYTICAL RESULTS

The chloride concentrations measured in lower water-bearing unit groundwater monitoring wells during the 2001 groundwater investigation are summarized in **Appendix 9.** The 2001 groundwater investigation, included as **Appendix 1**, was based on a work plan submitted to and approved by the IEPA and included soil borings, subsurface electrical conductivity measurements, and the collection and analysis of groundwater samples from around the perimeter of the Site. The table in **Appendix 9** includes both total and dissolved results. This is appropriate because the difference between total and dissolved chloride concentrations in a solution is negligible due to the soluble nature of chloride. In other words, the concentration of total chloride in a given solution will be comparable to the concentration of dissolved chloride in the same solution. This was addressed in detail in the response to draft denial included as **Appendix 4**.

As shown in **Appendix 9**, the chloride concentrations are higher in the downgradient monitoring wells than in upgradient monitoring well G114. Furthermore, the chloride concentrations in monitoring wells G117 and G121 exceeded the numerical Illinois Class I Groundwater Quality Standard of 200,000 ug/L promulgated as part of Title 35 Illinois Administrative Code (IAC) 620.410.

DISCUSSION

Chloride is the most important indicator of landfill leachate impacts to groundwater in the midwest United States because it is highly water soluble, does not degrade over time, and migrates readily. Because chloride concentrations in leachate are usually orders of magnitude higher than those found in uncontaminated groundwater, elevated chloride concentrations are typically found at the forefront of a leachate plume. Consequently, a rise in chloride concentrations in groundwater monitoring wells near a landfill is often the first indication that leachate is impacting groundwater.

While the presence of chloride often indicates landfill leachate releases we believe it does not do so at this site. Landfill leachate typically contains elevated concentrations of many other naturally occurring constituents as well as many man-made organic compounds. Since landfills do not selectively leak individual constituents, potential long-term leachate impacts to groundwater will be manifested by the presence or elevated concentrations of constituents in addition to chloride, possibly including man-made organic compounds. However, during the last 14 years of post-closure groundwater monitoring, there have been no other detected constituents that are not attributable to naturally occurring background concentrations or to regional influences. More significantly, there have been no confirmed detections of organic compounds in groundwater near the landfill. The supporting analytical data and the evaluation of these data are included in **Appendices 1 through 4**.

Comparison of Chloride to Boron Ratios in Leachate and Groundwater

In order to verify that chloride is not associated with leachate, EIL compared the levels of chloride to the levels of other leachate constituents. We compared the ratios of chloride to total boron in leachate to the ratio of chloride to total boron in groundwater. Boron was chosen for this evaluation because, like chloride, it is water soluble, mobile, and does not degrade (i.e., it is also a conservative leachate impact indicator). In addition, we had historical data, included in **Appendices 2 and 3**, which included both chloride and boron in both leachate and groundwater. Based on the assumption that boron is as conservative a leachate indicator as chloride, then one would expect that the ratios of chloride to total boron would be similar in both leachate and groundwater if the landfill were the cause of the elevated chloride concentrations in groundwater. In other words, the groundwater would also contain proportionate elevated concentrations of boron.

The chloride to boron ratio for downgradient monitoring well G121 during the 2001 groundwater investigation is shown in **Appendix 10**. As indicated in **Appendix 10**, the actual concentration of total boron in groundwater in G121 was approximately three times less than would be expected if the source of the chloride were landfill leachate.

Although the literature supports our assumption that boron is comparably mobile to chloride in groundwater (detailed in our response to draft denial included as **Appendix 3**), the IEPA did not concur with this assumption. The IEPA did not offer a basis upon which their non-concurrence was based. However, given the length of time that elevated chloride concentrations have been present (approximately 11 years) and the proximity of the wells to the landfill, one would expect to see boron impacts in groundwater by now even if boron mobility was retarded relative to chloride by a factor of three. Therefore, the degree of comparability between boron and chloride mobility is academic. However, it should be noted that Groundwater Impact Assessments (GIAs) performed under the guidance of the IEPA at landfills in Illinois model both boron and chloride as "unretarded" and, therefore, the assumption in these GIAs is that boron and chloride are equally mobile in groundwater.

Based on these evaluations of groundwater data collected from the groundwater monitoring network, leachate does not appear to be the source of the chloride in groundwater. There are significant non-landfill related sources of chloride in the environment that must be considered when evaluating chloride concentrations in groundwater. The most ubiquitous source of anthropogenic chloride in groundwater is deicing salt used on roadways (herein referred to as "road salt").

Regional Chloride Concentration Study
The Illinois State Water Survey completed an extensive study of the Silurian Age dolomite aquifer in DuPage County in 1981 (ISWS Circular 149, 1981). The study, included as **Appendix 11**, was aimed at assessing the regional effects of over-utilization of the aquifer, evaluating concentrations of various naturally occurring parameters, and exploring possible causes for regional and temporal increases in the concentrations of some groundwater constituents, including chloride. The study specifically identified areas traversed by major highways and roads as those most likely to be affected by deicing salt application resulting in high chloride concentrations in groundwater. In fact, this study, conducted over twenty years ago, documented that the chloride concentrations in Silurian Age dolomite groundwater near the Site approached the concentrations detected in the lower water-bearing unit groundwater at the Site. Specifically, the ISWS paper states the following:

> *"The concentrations of chloride in the samples from the dolomite aquifer ranged from 0 to 450 mg/L (Elmhurst) with a median of 22 mg/L."*

and,

> *"Another area of high chloride concentration [in the Silurian Dolomite aquifer] is located nearby in the Lombard-Villa Park-Elmhurst region. These areas are traversed by several major state and interstate highways such as Interstates 294, 55, and 290. Because of the high densities of highways in this area, deicing salt application and storage may be a major cause of the high chloride concentrations in this portion of the study area."*

The concentrations of chloride in Site groundwater are typically within, or slightly above, the concentrations reported in the twenty-year old ISWS study. Since both the lower water-bearing unit and the Silurian Age dolomite are recharged via surface infiltration through the overlying soils, it must be assumed that the overlying soils are also influenced by road salt. Furthermore, surface infiltration would result in relatively high chloride concentrations near the surface that generally decrease with depth. This is significant because road salt impacts in the Silurian Age dolomite would, in theory, be less than those in the overlying lower water-bearing unit that is monitored at the Site.

Relationship of Site Topography to Chloride Concentrations

As shown on **Appendix 9**, chloride concentrations in Site groundwater are highest in the southeast corner of the landfill property. The setting and topography of this area is conducive to road salt runoff affecting groundwater chloride concentrations. Both Grand Avenue and County Line Road, two major roads that bound the Site, decrease in elevation to the east and south, respectively, to a point where they intersect at the southeast corner of the Site. Both roads are routinely salted by Village and County authorities during the winter months. Interstate 294, located just a few hundred feet east and parallel to County Line Road, is also heavily salted by State authorities during the winter months. Based on information obtained from the Illinois State Toll Highway Authority, road salt rates during the last eight years have averaged 56,665 tons of salt annually over their 274 miles of toll roads. This is equivalent to 207 tons of salt per mile of road per year, or 34.5 tons of salt per lane-mile for a six lane highway. The combined salt load eventually finds its way to topographic low areas during periods of snow melt, such as the southeast corner of the Site, where it ultimately infiltrates into the ground or is discharged via stormwater control systems.

Comparison of Sodium to Chloride Molar Ratios in Site Leachate and Groundwater

Road salt consists of equal molar ratios of both sodium and chloride. Therefore, groundwater impacted with road salt would be expected to contain near equal molar ratios of both sodium and chloride (i.e., sodium-chloride molar ratio of approximately one). This is nicely illustrated in the ISWS study that included concentration contour maps for both sodium and chloride for the study area. The maps, included in **Appendix 12**, show that the approximate sodium and chloride concentrations in the vicinity of the Site were 100 mg/L and 150 mg/L, respectively, a molar ratio of almost exactly one. Landfill leachate, on the other hand, typically contains sodium-chloride molar ratios of less than one because the source of chloride in the leachate is related to waste decomposition, not road salt. Therefore, leachate is typically comparatively depleted in sodium compared to chloride (or enriched in chloride compared to sodium).

As shown in **Appendix 13**, the results of recent leachate and groundwater analysis at the Site indicate that the sodium-chloride molar ratio in leachate is considerably less than one, as expected, since leachate is typically enriched in chloride compared to sodium. The two most impacted downgradient wells, G117 and R121, have sodium-chloride molar ratios of 1.27 and 0.75, both of which are much closer to one than the leachate sample. This suggests that road salt, with the expected sodium-chloride molar ratio of one, is responsible for the elevated chloride concentrations in Site groundwater, and that the landfill is not the source of chloride in Site groundwater. EIL provided a verbal report of these results to the IEPA during the June 9, 2003 meeting.

Results of Groundwater Assessment Investigation

A groundwater assessment investigation was conducted in March 2001 to supplement the routine information collected permit-required groundwater monitoring in the lower water-bearing unit at the Site. The investigation, which was approved by the IEPA with the February 13, 2001 issuance of Supplemental Permit No. 2000-321-SP, consisted of advancing seven cone penetrometer (CPT) soundings in which temporary polyvinyl chloride (PVC) piezometers were installed. Cone penetrometer (CPT) technology consists of specialized direct-push tooling that provides a means to collect data, on a real-time basis, which are used to evaluate soil stratigraphy and, to a limited degree, groundwater quality. The locations of the soundings are shown in **Appendix 8**. Groundwater was collected from each of the temporary piezometers and from the six existing Site monitoring wells. The groundwater samples were analyzed for the site-specific chemicals of concern (COCs), which included chloride. The chloride results from this investigation are shown in **Appendix 9**.

Comparison of Chloride Concentrations in CPT Soundings and Monitoring Wells

Four of the temporary piezometers were installed between existing Landfill monitoring wells and the adjacent roadways (CPT4, CPT5, CPT6, and CPT7). At three of the four locations, the chloride concentrations were higher at the temporary piezometers (CPT4, CPT5, and CPT7), closer to the road, than those measured in the paired monitoring well. At the fourth location (CPT6), the chloride concentration was similar to that measured in the paired monitoring well. These results are not consistent with a landfill-only source of chloride. If the landfill were the source of chloride in groundwater from the lower water-bearing unit in the southeastern portion of the Site, then we would expect the monitoring wells to have similar, or higher, concentrations of chloride when compared to the paired temporary piezometers.

Results of Soil Electrical Conductivity Profile Testing

Soil electrical conductivity profile data were collected during the original CPT investigation. Soil conductivity is a measure of the ability of the soil matrix to conduct an electrical charge. This ability is directly proportional to the concentration of ions in solution (for groundwater), or within the soil matrix pore spaces. As such, electrical conductivity is typically a required monitored parameter at landfills because it is a qualitative indicator of leachate impacts to groundwater. Chloride is one of the primary ions in groundwater and soil that can result in increased electrical conductivity.

The results of the soil electrical conductivity profile data, shown in **Appendix 14**, show near-surface electrical conductivity peaks at each of the four downgradient CPT sounding locations (CPT4, CPT5, CPT6, and CPT7) and at side-gradient location CPT1, which is located adjacent to County Line Road. The peaks ranged in depth from approximately five feet to approximately 25 feet below ground surface, in each case above the saturated zone. Of greater significance was that the near-surface peaks exceeded in magnitude the smaller peaks observed in the saturated zone (i.e., in the lower water-bearing unit). These near-surface electrical conductivity peaks were not observed at either of the two CPT sounding locations that were located away from the major roads, or on topographically high areas (CPT2 and CPT3).

These near-surface electrical conductivity peaks are evidence of a surface source of ions that are infiltrating the ground. The proximity of the CPT soundings that have near-surface electrical conductivity peaks to the roads suggests that chloride from road salt is the most likely source of these ions.

PROPOSED ADJUSTED STANDARD FOR CHLORIDE

The Village proposes a Site-specific adjusted groundwater standard for chloride at the Site that supersedes the Class I ILGWQS for chloride of 200,000 ug/L. Specifically, the Village proposes an adjusted standard of 728,963 ug/L because, as demonstrated herein, there is significant evidence to suggest that an off-Site source is responsible for the elevated chloride concentrations currently observed in Site groundwater.

The proposed adjusted standard of 728,963 ug/L was calculated in accordance with permit-approved methods at the 99% confidence interval using all ten current quarterly data points from monitoring well R121, beginning in the second quarter 2002 and ending with the third quarter 2004. The data upon which the proposed adjusted standard is based is included in **Appendix 15**.

SUMMARY

While there is no way to unequivocally determine the source of the chloride or to eliminate the possibility that some of the chloride is coming from the landfill, we have established, as best we can, that the landfill is neither the most likely source of, nor a major contributor to, the elevated chloride concentrations in the lower water-bearing unit groundwater.

Sincerely,
ENVIRONMENTAL INFORMATION LOGISTICS, L.L.C.

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Sincerely,
ENVIRONMENTAL INFORMATION LOGISTICS, L.L.C.

A. Michael Hirt, P.G.
Senior Geologist

FOR

Jay Corgiat, Ph.D.
President

Attachments

cc: Steve Marshall, Village of Bensenville, Director of Community Development
David Rieser, McGuireWoods LLP
Barbara Magel, Karaganis, White & Magel Ltd.

EXHIBIT 6

Compliance Cost Summary (Revised)

Bensenville Landfill
Cut-Off Wall Construction, Groundwater Extraction and Treatment, and Operation and Maintenance

Items	Units		Construction Cost
Cut-Off Wall			
Total Length of Cut-Off Wall	6100	ft	
Average Depth to Bedrock	50	ft	
Maximum Depth to Bedrock	60	ft	
Minimum Depth to Bedrock	40	ft	
Average Depth to Top of Silt	35	ft	
Average Depth to Bottom of Silt	50	ft	
Average Depth to Bedrock Tie-in	65	ft	
Maximum Depth to Bedrock Tie-in	75	ft	
Quoted Cost of Cut-Off Wall Construction	$ 10,350,000		$ 10,350,000
Addison Creek Isolation			
Creek Bed Width	25	ft	
Depth of Bed	3	ft	
Thickness of Concrete	6	inch	
Cross Sectional Area	13	ft^2	
Length of Creek Bed	1600	ft	
Volume of Placed Concrete	770.4	C. Y.	
Cost of Placed Concrete	$ 260.00	$/C.Y.	
Total Cost to Line the Creek	$ 200,296		$ 200,296
Groundwater Extraction			
Extraction Well Spacing	300	ft	
Number of Wells	20		
Average Depth of Well	65	ft	
Cost of Well	$ 150	$/ft	
Cost of Pump	$ 2,000	$	
Pipeline to Treatment System	7625	ft	
Cost of Pipeline	$ 30	$/ft	
Monitoring Well Pair	20		
Total Cost of Extraction Well System	$ 853,750	$	$ 853,750
Water Treatment RO Unit	$ 25,000	$	$ 25,000
Engineering, Permitting & CQA	15%		
Engineering, Permitting & CQA Cost	$ 1,714,357		$ 1,714,357
Total Estimated Construction Cost			**$ 13,143,403**
Operation and Maintenance			
Annual Operation and Maintenance	$40,026	$/yr	
Anticipated Treatment Period	25	yr	
Total O&M			$1,000,650
Total Est. Construction and O&M			**$14,144,053**

Bensenville Landfill
System O&M

Item			Units		Annual Cost
Pump Replacement		1	per year		
Pump Cost	$	2,000			
Replacement Cost	$	2,000	per year	$	2,000
RO Membrane	$	500		$	500
O&M Hours		2	per week		
Technician Hourly Rate	$	54			
O&M Costs	$	5,616	per year	$	5,616
Disposal of Brine to MWRD	$	0.001	$/gal		
Reduction Ratio		0.65			
Total Process Water		1,356,319	gal/year		
Disposal Cost	$	1,356	per year	$	1,356
Sampling and Analytical Cost	$	20,000	per year	$	20,000
Power Use per 1 HP Pump		0.753	kw		
Number of Pumps		20			
Power Cost		0.08	$/kwh		
Total Power Used		131925.6	kwh/year		
Power Cost	$	10,554		$	10,554
Total Estimated O&M Cost per Year				$	40,026
Estimated Number of Years to Treat		25			
Total Estimated O&M					**$1,000,659**

Bensenville Landfill
Cut-off Wall Construction

Total Length of Wall	6100	ft
Average Depth to Bedrock	50	ft
Maximum Depth to Bedrock	60	ft
Minimum Depth to Bedrock	40	ft
Average Depth to Top of Silt	35	ft
Average Depth to Bottom of Silt	50	ft
Average Depth to Bedrock Tie-in	65	ft
Maximum Depth to Bedrock Tie-in	75	ft
Average Thickness of Aquifer	30	ft
Ground Water Flow Area	183000	ft^2
Average Cut-off Wal Thickness	3	ft
Average Water Level Differential Across Wall	0.5	ft
Gradient Across Wall	0.166667	ft/ft
Estimated Wall Hydraulic Conductivity	1.00E-07	cm/sec
	1.97E-07	ft/min
Estimated GW Flow into Landfill Area	6.00E-03	ft^3/min
	4.49E-02	gpm
	65	gpd
Area enclosed by wall	2206460	ft
	51.8	Acres
Infiltration	1.5	in/year
Estimated infiltration	275808	ft3/year
	5652	gpd
Total Water Pumped and Treated	5717	gpd
	4.0	gpm
Estimated Linear Flow Velocity	4	m/year
Flow path distance across site	660	m
Assumed flow path of impacted gw	100	m
Estimate years to treat impacted gw	25	year

EXHIBIT 13

Red-Lined Second Amended Petition

BEFORE THE

ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PETITION OF THE VILLAGE OF	)	AS 05-02
BENSENVILLE FOR AN ADJUSTED	)	(Adjusted Standard – Water)
STANDARD FROM	)	
35 ILL. ADM. CODE 620.410	)	
REGARDING CHLORIDE ~~AND LEAD~~	)	

SECOND AMENDED PETITION FOR ADJUSTED STANDARD FROM GROUNDWATER QUALITY STANDARDS FOR CHLORIDE ~~ANDLEAD~~ AT THE VILLAGE OF BENSENVILLE LANDFILL

The Village of Bensenville ("Bensenville"), by and through its attorneys McGuireWoods, LLP, submits this **second** amended petition to the Illinois Pollution Control Board ("PCB") for adjusted groundwater standards for dissolved chloride ~~and total lead~~ at the Village of Bensenville Landfill located in Bensenville, Illinois. Bensenville submits this petition pursuant to Section 28.1 of the Illinois Environmental Protection Act (415 ILCS 5/28.1) and 35 Ill. Adm. Code 104, Subpart D. These amendments are in response to the PCB's order dated January 20, 2005 requesting additional information. These amendments also respond to certain questions submitted by the Illinois Environmental Protection Agency ("IEPA") after the filing of the original **and the amended** petition. A redlined copy of this **Second** Amended Petition, identifying the changes **from the Amended Petition** is attached hereto and incorporated herein as Exhibit ~~7.~~**13.**

The most significant of these changes is the withdrawal of Bensenville's request for an adjusted standard related to lead. At the time Bensenville filed its original petition current groundwater sampling data indicated that the groundwater quality standard for lead was not being exceeded. Because of past exceedences, Bensenville included relief for lead solely to provide additional support for its request for certification of release from post closure care as described below. Yet after further review of the data, Bensenville determined that regulatory relief regarding lead is not necessary and that the request for this relief complicated its petition regarding chloride. For that reason, Bensenville submits this revised petition. Consistent with these revisions, and as discussed below, Bensenville submits revised Exhibits 1 and 6 and withdraws Exhibit 10.

I. INTRODUCTION

Bensenville seeks this relief for the Village of Bensenville Landfill ("Site") located at the northwest corner of Grand Avenue and County Line Road. Bensenville acquired the Site, which was closed in 1989, from John Sexton Filling and Grading Contractors Corporation ("Sexton") in 1997. Since 1997, Bensenville has worked with the IEPA to ~~certify completion of~~**gain release from** post closure care. As will be described below, Bensenville has resolved all groundwater-related issues with the IEPA except for the current presence of elevated concentrations of dissolved chloride~~ and some periodic, historical elevated concentrations of lead~~. Bensenville maintains and has demonstrated that~~ the periodic, historic elevated concentrations of lead and~~ the elevated levels of chloride are anthropogenic but not related to landfill impacts. The IEPA has taken the position that it cannot certify completion of post closure care for the Site when groundwater on the Site exceeds the PCB's groundwater quality standards. Bensenville seeks this relief in order to obtain its certification of completion of post closure care. As stated in this Petition, Bensenville believes this relief is justified because the conditions are different than those contemplated by the Groundwater Quality Regulations, because compliance is not economically reasonable **and because** the conditions create no impact to human health or the environment~~, and because compliance is not economically reasonable~~.

II. DESCRIPTION OF RELIEF

A. Standard from Which Adjusted Standard is Sought. (35 Ill. Adm. Code 104.406(a)).

Bensenville seeks relief from 35 Ill. Adm. Code 620.410(a) solely as it sets out a standard for chloride ~~and lead~~. This regulation became effective November 25, 1991.

B. Statute Which Regulation is Intended to Implement. (35 Ill. Adm. Code 104.406(b)).

The PCB adopted this regulation pursuant to the Illinois Groundwater Protection Act, 415 ILCS 55/1 et seq. and not to implement the requirements of the statutes listed at 35 Ill. Adm. Code 104.406(b).

C. Level of Justification. (35 Ill. Adm. Code 104.406(c)).

The Groundwater Quality Regulations do not specify a level of justification for seeking an adjusted standard of an individual groundwater quality standard, although they do specify a standard for seeking the reclassification of a given groundwater. 35 Ill. Adm. Codes 620.450. ~~The~~ PCB~~'s~~ regulations applicable to landfills which continued to be in operation after 1990 (and not applicable to the Site) contain justification for adjusted groundwater standards at 35 Ill. Adm. Code 811.320(b)(4). Although the Part 811 standards do not apply to this Site, the regulations for adjusting groundwater quality standards provide a useful framework for justifying this relief.

III. DESCRIPTION OF PETITIONER'S ACTIVITY
(35 Ill. Adm. Code 104.406(d))

Bensenville attaches and incorporates as Exhibit 1 the Groundwater Summary Report dated December 21, 2004 prepared by Environmental Information Logistics, LLC (EIL), Bensenville's environmental consultant[1]. The Site description and environmental information included in this Petition is taken from that document and its attachments.

A. Location of Site.

The Site is located in the Village of Bensenville in DuPage County at the northwest corner of Grand Avenue and County Line Road. The landfill covers 53 acres, 41 of which are filled. The landfill is bordered by the River Forest Golf Club to the west, Grand Avenue and the Mount Emblem Cemetery to the south (City of Elmhurst), County Line Road and Interstate 294 to the east (City of Northlake), and a residential area to the north (Village of Bensenville). A map showing the location of the Site is attached hereto and incorporated herein as Exhibit 2. The area east of County Line Road and Interstate 294 is industrial and is located in the City of Northlake within Cook County. There are no schools, hospitals, or churches located within the residential area north of the landfill. The Village is served by a municipal drinking water supply that obtains water from Lake Michigan.

B. Past Operations.

Prior to operation as a landfill, the Site, owned by John Sexton Filling & Grading Contractors Corp. (Sexton), was used as a borrow pit for materials utilized in the construction of Interstate 294. From May 31, 1973 through July 24, 1987, Sexton

[1] **A revised version of the narrative portion of this report is attached hereto and should be substituted for the original narrative section of Exhibit 1.**

operated the Site as a landfill, accepting demolition debris, concrete rubble, foundry sands, and logs, brush, and debris generally derived from the landscaping industry. To the best of Bensenville's knowledge, Sexton did not design or construct any features such as a liner, leachate collection system, or landfill gas control system but simply used the existing borrow pit to dispose of the construction, demolition, and landscaping debris. The Site also accepted ash generated by an on-Site, permitted air curtain destructor (ACD) that operated intermittently from March 1974 to October 1985. The ACD consisted of a subsurface rectangular structure with concrete walls used to burn landscaping debris. At no time was the Site authorized to accept either hazardous or general domestic wastes.

C. Closure/Post-Closure Care History

Sexton completed closure activities, including the decommissioning of the ACD, on October 4, 1989. Sexton submitted documentation of these activities to the IEPA on October 30, 1989. On January 29, 1990, the IEPA issued Supplemental Permit No. 1989-305-SP beginning the required five-year minimum post-closure care period. On March 27, 1997, Sexton submitted a supplemental permit application (SPA) (IEPA Log No. 1997-116) demonstrating that the post closure care requirements for the facility had been met. Due to the then pending transfer of the property to Bensenville, however, Sexton requested that this SPA be withdrawn in a letter received by the IEPA November 25, 1997.

The permit was transferred from Sexton to Bensenville by the IEPA on December 23, 1997. Bensenville acquired the Site with a grant provided by the IEPA. Bensenville sought the Site to develop it for use as open space. In accordance with the

IEPA's grant, and consistent with its post-closure care permit, the Village constructed a golf course, which was opened to the public in the spring of 2003.

As stated above, Sexton did not install any pollution control equipment to control leachate or landfill gas. With respect to leachate control, pursuant to its post-closure care permit, Sexton constructed a landfill cap consisting of two feet of clay and six-inches of topsoil, with additional soil and vegetation installed by Bensenville above the cap in order to support the golf course. With respect to landfill gas, Bensenville submitted a plan to investigate landfill gas in August, 1998 and the Agency accepted the plan in October of 1998. In June, 1999, Bensenville submitted its report documenting that landfill gas was not being generated in sufficient quantities to cause concern with regard to landfill gas migration, greenhouse gas issues, or impacts to human health and the environment. During a meeting with Bensenville on February 17, 2000 the IEPA agreed that the landfill gas concerns were satisfactorily addressed by the report. A copy of this report is attached hereto and incorporated herein as Exhibit 8.

The IEPA issued Supplemental Permit 1998-166-SP on June 12, 1998 in response to a SPA requesting placement of soils on the cap and that the landfill's name be changed from the "County Line Landfill" to the "Village of Bensenville Landfill." Bensenville's consultant, EIL, prepared and submitted a SPA on August 31, 2000 to satisfy the IEPA's request for further Site groundwater assessment. After EIL responded to a draft denial, the IEPA issued Supplemental Permit No. 2000-321-SP on February 13, 2001 approving the scope of the groundwater assessment monitoring plan.

EIL conducted the groundwater investigation and submitted the results to the IEPA as a SPA (Log No. 2001-174) on May 1, 2001, as required. The results of the investigation indicated that there were no organic compounds in Site groundwater. The results also indicated that there were some inorganic constituents in Site groundwater, including chloride ~~and lead~~, but at concentrations that were below permit-specified criteria or were attributable to background or non-landfill anthropogenic conditions (see discussion at pages 13-15). The conclusion presented in the SPA, therefore, was that the landfill had not caused any impacts to groundwater beneath the Site. On this basis Bensenville again requested that the IEPA release the Site from post-closure care.

From October, 2001, through September, 2004, Bensenville and the IEPA exchanged correspondence regarding the completion of post closure care for the Site. The IEPA submitted several draft denial letters and Bensenville answered the IEPA's concerns until the only remaining issues were the current presence of chloride~~, and the periodic presence of lead~~ in the Site groundwater at concentrations exceeding ~~their~~**its** respective Illinois Class I groundwater quality standards and not attributable to naturally occurring conditions. No other constituent concentration in Site groundwater currently exceeds Illinois Class I groundwater quality standards.

Messrs. Michael Hirt and Jay Corgiat of EIL met with Mr. Paul Eisenbrandt and Ms. Gwenyth Thompson of IEPA on June 9, 2003 to discuss the May 9, 2003 IEPA draft denial letter and the IEPA's concern regarding the elevated chloride ~~and lead~~ concentrations. During the meeting EIL summarized the previously submitted documentation that suggested an off-Site source of chloride (e.g., road salt) and presented the results of new evidence (comparison of sodium to chloride molar ratios in groundwater and leachate) that further strengthened the non-landfill chloride source argument.

The IEPA responded that because the sources of chloride ~~and lead~~ are believed to be anthropogenic, non-landfill sources and not due to naturally occurring, background variability, and because the current chloride ~~and periodic lead~~ concentrations in Site groundwater exceeded Illinois groundwater standards, the Village would have to obtain a Site-specific adjusted standard for dissolved chloride ~~and total lead~~ from the PCB before the IEPA will agree to release Bensenville from the requirements of post-closure care at the Site. As a result, Bensenville submitted this Petition in order to obtain this release.

IV. DESCRIPTION OF GROUNDWATER CONDITIONS AND LACK OF ENVIRONMENTAL IMPACT
(35 Ill. Adm. Code 104.406(g))

A. Geology

The near surface geology of this area is generally characterized by a varying thickness of glacially-derived soils overlying Silurian Age dolomite bedrock. Based on the findings of investigations conducted when the facility closed, the glacially-derived soils at the Site range in thickness from approximately 55 feet, below Addison Creek, to over 70 feet. These consist of, in descending order, an upper silty clay unit (5 to 25 feet thick), an upper water bearing unit comprised of silty sands (10 feet thick), a middle unit consisting of clayey till (5 to 20 feet thick), a lower water bearing unit consisting of silty sand (<5 to 20 feet thick), and at some locations a lower silt and clay unit (5 to 15 feet thick). The lower water bearing unit is commonly referred to as a basal outwash, a term that is based on its physical connection with the underlying Silurian Age dolomite bedrock. This basal outwash is the only water-bearing unit at the Site that the IEPA requires to be monitored. The results of more recent investigations suggest that the glacially-derived soils overlying bedrock may be less than 60 feet thick outside the perimeter of the landfill. These glacially-derived soils tend to vary significantly in thickness, texture, and continuity in northern Illinois. In fact, the glacially-derived soils completely "pinch out" approximately four miles to the southeast at the former Hillside rock quarry and approximately two miles to the southwest at the current Elmhurst rock quarry (Piskin, K, 1975, Illinois State Geological Survey Circular 490, *Glacial Drift in Illinois: Thickness and Character*), both of which were/are used to mine Silurian Age dolomite bedrock where it essentially outcrops at the ground surface (i.e., where there is no glacially-derived soil overburden material). Based on regional information, the Silurian Age dolomite bedrock under the Site may be greater than 200 feet thick and contains a relatively large amount of fissures, fractures, and solution cavities.

B. Hydrogeology

Groundwater in the upper and lower water bearing units generally occurs as a function of recharge derived from vertical infiltration of runoff and precipitation from the surface through the glacial deposits. The upper water bearing unit is highly discontinuous and heterogeneous across the Site based on existing borehole information. As such, it yields minimal amounts of groundwater. The IEPA previously allowed groundwater monitoring in the upper water bearing unit to be discontinued.

On a regional basis, the lower water bearing unit is discontinuous and is entirely absent a few miles downgradient of the Site (Piskin, K, 1975, Illinois State Geological Survey Circular 490, *Glacial Drift in Illinois: Thickness and Character*). Groundwater yield in the lower water bearing unit is generally related to the degree of connectivity with the underlying Silurian Age dolomite bedrock. The yield potentials tend to be much higher at locations where the lower water bearing unit is in direct hydraulic connection with the underlying Silurian Age dolomite bedrock (ISWS Circular 149, 1981).

The lower water bearing unit, or basal outwash, has been monitored during the post closure care period since 1990 via a network of six monitoring wells. Of these, one well (G114) is located hydraulically upgradient of the Site. The remaining five wells (G115/R115, G116, G117, G118/R118, and G117/R117) are located downgradient of the landfill. Depths to groundwater in the lower water bearing zone currently range from approximately 20 feet to 35 feet below ground surface. Horizontal groundwater flow in the lower water bearing unit at the Site has been consistently from northwest to southeast. Unretarded, horizontal groundwater flow rates are on the order of approximately four meters per year, based on a calculated gradient of 0.003 feet per feet (EIL, 2004, *Annual Assessment of Groundwater Flow and Hydraulic Gradients*), an estimated hydraulic conductivity of 1 x 10 $^{-3}$ cm/sec (Fetter, C., 1980, *Applied Hydrogeology*), and an assumed porosity of 0.25 (Fetter, C., 1980, *Applied Hydrogeology*). [12]

Chloride is a conservative constituent in terms of its mobility in groundwater, meaning that it generally travels unretarded in groundwater and, therefore, horizontal travel times for chloride would be expected to be on the order of four meters per year, or 1300 feet per 100 years. ~~Lead, however, is significantly retarded compared to chloride. Lead is typically modeled in Illinois as retarded by a factor of 18 (IEPA, *Appendix C to LPC-PA2, Instructions for the Groundwater Protection Evaluation for Putrescible and Chemical Waste Landfills*, rev. 10/21/92). That is, lead is expected to migrate in groundwater at a rate approximately 18 times slower than conservative constituents, such as chloride. As such, horizontal travel times for lead would be on the order of 0.22 meters per year, or 75 feet per 100 years.~~

Groundwater in the Silurian Age dolomite bedrock occurs in joints, fissures, and solution cavities. The groundwater yield within the bedrock varies considerably based on the distribution and connectivity of the joints, fissures, and solution cavities, but tends to be most productive in the upper portion of the bedrock where it is more densely fractured. The Silurian Age dolomite bedrock is recharged directly from the overlying glacial

[12] EIL believes that these values are conservative based on field experience, including the generally slow recovery rate of the monitoring wells (four of the six wells, including G114, G116, G117, and R121 are typically bailed dry prior to sampling).

deposits, or directly from precipitation where the bedrock is exposed at the surface. In general, the Silurian Age dolomite bedrock is capable of yielding significant volumes of water compared to the lower water bearing unit. For example, based on a 1981 Illinois State Water Survey report (ISWS Circular 149, 1981), "Groundwater withdrawals from the shallow aquifers in DuPage County averaged 36.7 mgd [million gallons per day] during the past 13 years; 34.3 mgd was from the [Silurian Age] dolomite and 2.4 mgd was from the sand and gravel." As such, less than 10 percent of the DuPage County groundwater budget was historically (from the late 1960s through the early 1980s) provided by the unconsolidated glacially-derived units. These numbers have likely decreased in recent years with the increased availability of municipally-supplied Lake Michigan water.

Groundwater flow within the Silurian Age dolomite bedrock is generally from west to east. However, this flow is significantly affected on a local basis by dewatering activities associated with numerous local rock quarries. There is no Site-specific groundwater flow information in the Silurian Age dolomite bedrock.

C. Groundwater Quality – Silurian Age Dolomite Bedrock

Groundwater quality in the Silurian Age dolomite bedrock near the Site and elsewhere in the region is well documented and is known to be high in chloride and other inorganic constituents (ISWS Circular 149, 1981). In general, concentrations of total dissolved solids (TDS), hardness (as $CaCO_3$), sulfate, chloride, sodium, and total iron are high and, in many cases, several times higher than applicable drinking water standards. The greatest concentrations of these constituents tend to be found in areas that are more densely developed by human activity, such as near the Site (ISWS Circular 149, 1981).

These constituents include the highest total dissolved solid concentrations in the LaGrange-McCook and the Elmhurst-Bensenville-Northlake areas, the highest chloride concentrations in the Elmhurst-Berkley-Bensenville area, and the highest sodium concentrations in the Elmhurst-Berkley-Bensenville and the Burr Ridge-Hinsdale areas. Concentration contour maps of chloride in the Silurian Age dolomite bedrock from ISWS Circular 149 are included as Exhibit 3. Revised contour maps showing the location of the Site, Interstate 294, and O'Hare airport are attached as Exhibit 9. In fact, chloride concentrations in the Silurian Age dolomite bedrock near the Site were observed to be similar to those observed in Site groundwater collected from the lower water bearing unit.

The Illinois State Water Survey attributed the high chloride concentrations in the Silurian Age dolomite bedrock to heavy road salt applications along major roads, including Interstate 294 (ISWS Circular 149, 1981), that infiltrates through the overlying glacial units, including the lower water bearing unit. Based on information provided by the Illinois State Toll Highway Authority (http://www.illinoistollway.com/portal/page?_pageid=135,41314&_dad=portal&_schema =PORTAL), the Authority applied an average of 56,665 tons of salt annually during the past eight years to their 274 miles of toll roads. This is equivalent to 207 tons of salt per mile of road per year, or 34.5 tons of salt per lane-mile for a six lane highway. As previously indicated, Interstate 294 runs north-south adjacent to the east boundary of the Site. In addition, Grand Avenue and County Line Road (which border the Site to the south and east, respectively) are also salted during the winter months by both Bensenville and DuPage County road crews.

In addition to surface infiltration of contaminants, significant dewatering activities, such as those associated with nearby rock quarries in Elmhurst (two miles to the southwest) and Hillside (four miles to the southeast), have changed the redox conditions in the Silurian Age dolomite bedrock, resulting in increased concentrations of some dissolved constituents (ISWS Circular 149, 1981).

D. Groundwater Quality – Lower Water Bearing Unit

Groundwater quality in the lower water bearing unit at the Site is well documented on the basis of nearly 14 years of quarterly post closure care monitoring and statistical reporting. During the 14-year time period there have been no confirmed detections of organic compounds in Site groundwater.

Based on the information collected at the Site and on the regional information regarding the Silurian Age Dolomite bedrock, Bensenville can document that the groundwater quality issues observed in the lower water bearing unit for which this petition seeks relief are not landfill related.[23] With respect to chloride, as discussed above, the 1981 ISWS Circular identified regional chloride impacts in the Silurian Age dolomite which are consistent with the impacts in the lower water bearing unit **with which it is connected at the Site**. Groundwater investigations at the Site indicated generally higher chloride concentrations further from the landfill waste boundary, adjacent to the roadways. This is not consistent with a possible leachate release.

~~Similarly, the concentrations of lead do not reflect landfill impacts. As demonstrated by the concentration time trends for total and dissolved lead in~~

[23] Bensenville acknowledges that this conclusion has been the subject of extensive discussion with the IEPA. While Bensenville asserts it can fully document and support its position, it also notes that the Board can grant this relief without resolving this debate. As is demonstrated below, identified control measures would be economically unreasonable and there is no environmental impact associated with the relief.

~~downgradient groundwater monitoring wells in Exhibit 10, the concentrations of total lead are extremely erratic over time, and exhibit no discernible trend that would be typically associated with a release from the landfill. The widely varying concentrations are generally indicative of sample turbidity in the case of a metal, such as lead. These metals adhere strongly to minute, suspended soil particles that are contained in turbid groundwater samples typically associated with relatively fine-grained, silty aquifers such as the lower water bearing unit at the Site. Therefore, the total lead concentrations will tend to vary directly with the groundwater sample turbidity, independent of and unrelated to a possible landfill release.~~

~~The concentration of dissolved lead is a much better indicator of leachate impacts than total lead because dissolved lead concentrations are not as biased by the presence of sediment/turbidity in the sample. As shown on the concentration time trends for dissolved lead, this parameter has only been detected a few times, specifically during the period between 2000 and 2001. Since that time, dissolved lead has not been detected. Dissolved lead has never been detected in Site leachate and, therefore, it is improbable that the source of lead in groundwater is Site leachate.~~

~~The total lead concentrations measured in groundwater have been higher than those measured in leachate. For example, the total lead concentrations in leachate well L302 (also known as L2), which is located in the southeast corner of the Site closest to the monitoring wells at which total lead concentrations have exceeded Class I standards (see Petition, Exhibit 1, Volume 3, Attachment 2), ranged from 14 to 17 ug/L, less than the total lead concentrations detected in nearby groundwater monitoring wells G117 (24 ug/L) and G121/R121 (23 ug/L). If landfill leachate were the source of the total lead,~~

~~then we would expect that landfill leachate would contain higher, not lower, concentrations of total lead when compared to groundwater.~~

~~Finally, and perhaps most tellingly, the CPT boring samples, which were positioned between the monitoring wells and the adjacent roads, almost all contained significantly higher total and dissolved lead concentrations than their respective monitoring well pair samples. This was especially apparent for the total lead concentrations. The lead concentrations were generally *higher* closer to the roads adjacent to the landfill. This is also entirely inconsistent with a landfill source of lead. Since the Site-specific data suggests that the "lead gradient" is generally from the adjacent roads towards the landfill, we believe this is strong evidence for an off-Site source of lead.~~

E. Groundwater Usage

In order to evaluate the impact of the proposed change, EIL evaluated groundwater usage and monitoring wells within one half-mile of the Site. Bensenville previously obtained all of its water from deep wells (ISWS Circular 149, 1981), and currently obtains its water from Lake Michigan. Bensenville also maintains a private well use restriction (Bensenville Municipal Code 8-7-23), included as Exhibit 4, that states:

> *"From and after July 6, 1984, it shall be unlawful for any person to install a well, cistern, or other groundwater collection device to be used to supply any water supply system if a water main constituting a part of the Village's public water supply system is within two hundred feet (200') of the nearest property line of the property upon which the well, cistern, or other groundwater collection device would be drilled or connected."*

Based on communications with personnel in the Bensenville public works department and DuPage County Public Health Department, well database information obtained from the Illinois State Geological Survey (ISGS) and the Illinois State Water Survey (ISWS), and a reconnaissance performed on December 2, 2004, there are no known private wells or monitoring wells in Bensenville located within one half-mile of the Site that are screened in the lower water bearing unit, with the exception of the Site monitoring wells.

Based on that same reconnaissance, there are no wells screened in the lower water bearing unit in the City of Northlake located adjacent to and east (downgradient) of the Site. Northlake, as shown in the map in Exhibit 5, does not currently maintain a private well use restriction. The majority of properties located within one half-mile of the Site are industrial/commercial in nature. In addition, there is a small residential area located due east of and within one half-mile of the Site. Based on discussions with the Northlake public works department, Cook County Public Health Department, and a number of residents in the residential area, well database information obtained from ISGS and ISWS, and a reconnaissance performed on December 2, 2004, the various industries/commercial operations within one half-mile downgradient of the Site obtain their water from either deep bedrock wells or from Lake Michigan. The homeowners within the small residential area are connected to the Northlake municipal water supply that is sourced from Lake Michigan and there are no known private wells or monitoring wells located in Northlake within one half-mile downgradient of the Site that are screened in the lower water bearing unit.

There were, however, a few monitoring wells previously located within one half-mile of the Site associated with a former Leaking Underground Storage Tank (LUST) site (Leon Parent Trucking, LUST incident number 961459). Those monitoring wells were abandoned based on discussions with the property owner and field observations during the December 2, 2004 reconnaissance. There was also a private well previously located east of the Site on what is now property owned by National Trucking. Based on ISGS well records, the well was screened in the underlying Silurian Dolomite bedrock. Company representatives of National Trucking indicated that the well was previously abandoned. The abandonment was evident during the December 2, 2004 field reconnaissance.

The City of Elmhurst, located adjacent to and south (downgradient) of the Site, maintains an ordinance (Elmhurst Municipal Code MCO-1-2003), included in Exhibit 4, that prohibits the use of groundwater for potable use within the city limits except via well points operated by a city, those private wells in existence prior to the ordinance date (not including those in need of repair), and private irrigation wells equipped with a backflow prevention device. The ordinance was approved subject to a memorandum of understanding (MOU) between Elmhurst and the IEPA. The MOU was completed on December 4, 2003. Elmhurst provides municipal water service sourced from Lake Michigan to its residents.

Mt. Emblem Cemetery is the only property in Elmhurst that is located within one half-mile downgradient (south to southeast) of the Site, as shown on the map included as Exhibit 5. There are no other industrial/commercial facilities or residential areas located in Elmhurst within one half-mile downgradient of the Site. Based on communications with personnel in the Elmhurst public works department, Mt. Emblem Cemetery, and DuPage County Public Health Department, well database information obtained from the ISGS and ISWS, and a reconnaissance performed on December 2, 2004, there are no known private wells or monitoring wells in Elmhurst located within one half-mile downgradient of the Site that are screened in the lower water bearing unit.

There were, however, a number of monitoring wells previously installed in Mt. Emblem Cemetery that were associated with a LUST incident (LUST incident number 913205). These wells have since been abandoned based on discussions with the Mt. Emblem Cemetery property manager and observations during the December 2, 2004 reconnaissance. In addition, there were a number of private wells that were located approximately one half-mile south of the Site, likely within the confines of the cemetery. However, based on well records obtained from the ISWS and ISGS, these wells were screened in the underlying Silurian Age dolomite bedrock. The Mt. Cemetery property manager had no knowledge of the existence of these wells and there was no evidence that they are still in existence based on the December 2, 2004 reconnaissance.

In summary, based on discussions with the public works departments of Bensenville, Northlake, including some local residents, and Elmhurst, including personnel at Mt. Emblem Cemetery, and with the DuPage and Cook County Public Health Departments, well database information obtained from the ISGS and ISWS, and a reconnaissance of the area within a one half-mile downgradient of the Site, there is no evidence to suggest that the lower water bearing zone is used as a source of drinking water in Bensenville downgradient of the Site, or the adjacent (downgradient) communities of Northlake and Elmhurst within one half-mile of the Site. These communities obtain their public drinking water supplies primarily, or solely, from Lake Michigan. Some deep wells were identified from well logs as screened in the Cambrian-Ordovician aquifers underlying the Maquoketa Formation that, in turn, underlies the Silurian Age dolomite bedrock. It is not known whether these wells are currently in use. In any event, the Cambrian-Ordovician aquifers are physically and hydraulically isolated from the Silurian Age dolomite bedrock.

V. DESCRIPTION OF COMPLIANCE EFFORTS AND IMPACT OF EFFORTS TO COMPLY
(35 Ill. Adm. Code 104.406(e))

Bensenville evaluated the estimated costs for actions necessary to bring the groundwater into compliance with the Board's standards. While it is not clear that any action would achieve compliance with the Board regulation, a basic approach would be to construct a cut-off wall around the lower water bearing unit, to isolate Addison Creek (which receives wastewater treatment plant and other discharges), to pump groundwater with elevated chloride ~~and lead~~ from the lower water bearing unit, and to treat this groundwater in an on-Site treatment unit. The costs, including hydraulic isolation of the lower water bearing unit around the Site, hydraulic isolation of Addison Creek where it crosses the Site, groundwater extraction, and construction of an on-Site reverse osmosis treatment facility to treat the affected groundwater would be on the order of **$~~19,150,000.~~14,144,000.** These costs are summarized in Exhibit 6[4] and are discussed below.

The costs assume that hydraulic isolation of the lower water bearing unit would be achieved through the installation of a bentonite-soil slurry wall with "leap-frogging" overlapping panels 2.4 meters in width. The length of the wall would be 6,100 feet, the approximate perimeter length of the property. The depth of the wall is assumed to be 75 feet, 60 feet in soil overburden material and an additional 15 feet in the underlying fractured Silurian dolomite bedrock to minimize potential seepage. The depth estimates are based on current site information. The estimated cost of the slurry wall would be $10,350,000 based on discussions with Layne GeoConstruction out of Butler, Pennsylvania, a qualified contractor with experience in the construction of slurry cut-off wall systems.

The bottom of Addison Creek, a possible source of contaminants, is separated from the top of the lower water bearing unit by approximately 25 feet of soil material. Contaminants in Addison Creek could potentially migrate through these soil materials and impact the lower water bearing unit. Therefore, the cost estimate includes hydraulic isolation of Addison Creek via a concrete bed liner along the approximately 1,600 length

[4] **A revised version of Exhibit 6 is attached hereto and should be substituted for the Exhibit 6 attached to the original petition.**

of creek-bed across the Site. The concrete bed liner would be six-inches thick and an average of 25 thick wide, based on the current configuration of the creek. The estimated cost of the creek bed liner would be $200,300 based on the calculated volume of concrete and estimated installation costs.

Groundwater extraction would be achieved via a series of twenty extraction wells installed on 300-foot centers and connected via a pipeline. Each well would be installed to an approximate depth of 65 feet and would be fitted with a submersible pump. An additional well pair would be installed adjacent to each extraction well, one inside the cut-off wall and one outside the cut-off wall. The purpose of the well-pairs would be to monitor the performance of the cut-off wall. The total estimated cost of the extraction system is $854,000, $625,000 of which represents well installation costs.

Bensenville recognizes that the estimated number of wells is based on the assumed hydraulic properties of the lower water bearing unit, specifically a hydraulic conductivity of 1 x 10^{-3} cm/sec and a porosity of 0.25. Fetter (*Applied Hydrogeology*, 1980) estimates hydraulic conductivity for silty and fine sands to range from 1 x 10^{-3} cm/sec to 1 x 10^{-5} cm/sec. The calculated horizontal flow velocity was based on an assumed conservative hydraulic conductivity of 1 x 10^{-3} cm/sec. That is, the highest potential contaminant migration rate was assumed.

This hydraulic conductivity is a conservative assumption because four of the six Site monitoring wells routinely draw down when manually purged with a bailer. It is highly unlikely that a well could be bailed dry with a hydraulic conductivity around the well screen of 1 x 10^{-3} cm/sec. Given the relatively fine grained nature of the lower water bearing unit, it is more likely that the actual hydraulic conductivity

would be in the 1 x 10^{-4} cm/sec to 1 x 10^{-5} cm/sec range. Such hydraulic conductivities are also consistent with a well that can be bailed dry manually. These lower hydraulic conductivities would result in calculated horizontal flow velocities of ten to one hundred times *slower* than the currently assumed value of 4 meters per year, or 0.4 to 0.04 meters per year. As such, the number of required extraction wells and, therefore, the total cost of the extraction system would increase.

Fetter (*Applied Hydrogeology*, 1980) estimates porosity for glacial till to range from 10 to 20 percent, and for mixed sand and gravel to range from 20 to 35 percent. The estimated horizontal flow velocity included herein is based on an assumed porosity of 0.25, a reasonable estimate that is approximately midway between the ranges listed above given that the soil materials in the lower water bearing unit generally consist of a mixture of silt and sand. Porosity is inversely related to horizontal flow velocity – the lower the porosity the higher the calculated horizontal flow velocity. Even if the lowest porosity in the range was assumed (0.10) the resulting calculated horizontal flow velocity would only change from four meters per year to 10 meters per year.

In summary, therefore, the estimated horizontal flow velocity is likely significantly overestimated with respect to hydraulic conductivity, and could be slightly underestimated with respect to porosity. The net effect, however, is that the calculated horizontal flow velocity is likely somewhat high and is, therefore, conservative with respect to potential contaminant migration. The actual number of required extraction wells is inversely related to horizontal flow velocity – the higher the calculated velocity the fewer number of wells. Since field measurements would

likely reveal lower hydraulic conductivities, the required number of extraction wells and corresponding water level monitoring well pairs would increase, thereby increasing the cost of the extraction system. However, the cost of the extraction well network currently represents only about four percent of the estimated total remediation costs. As such, the actual well spacing and, by extension, the number of extraction wells in the extraction network do not significantly affect the overall cost of remediating Site groundwater.

The estimated costs are also based on-Site groundwater pre-treatment utilizing reverse osmosis. Such a system would cost approximately $25,000 and would be capable of achieving the anticipated discharge standards required by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Such pre-treatment discharge standards would be established with the MWRDGC during the permitting process.

Engineering, permitting, and construction quality assurance costs associated with the system elements described above were estimated to be 15 percent of the capital costs, or $1,714,000.

Finally, the annual operation and maintenance cost was estimated to be $40,000. This includes assumed annual costs to replace one extraction pump, hourly technician costs to maintain the on-Site reverse osmosis unit, disposal and required analytical costs associated with discharge to the MWRDGC, and system power consumption. The total estimated operation and maintenance cost assuming a ~~150~~**25**-year groundwater extraction, treatment, and disposal period is $~~6,004,000.~~**1,000,000.** The ~~150~~**25**-year period is based on the assumed horizontal flow velocity of ~~0.22~~**4** meters per year (for ~~lead using a flow velocity of 4 meters per year and a~~**chloride assuming no** retardation~~ factor of 18~~) and a contaminated groundwater flow path of 100 meters from the southeast quadrant of the landfill near the southeast edge of waste to the southeast property boundary. Clearly, the groundwater extraction, treatment, and disposal period would increase dramatically if Site hydraulic conductivities were found to be lower (a strong possibility) and if the theoretical landfill leakage was occurring, or was assumed to be occurring, somewhere other than in the southeast corner of the landfill. For example, the contaminant flow path would increase from 100 meters to 400 meters if the theoretical leakage was assumed to be from the middle of the landfill. This would effectively quadruple the estimated operation and maintenance period and associated costs.

Such costs are economically unreasonable and not justified from any perspective. The lack of economic reasonableness is apparent from the facts described in this Petition. There are no groundwater receptors or potential human health impacts since users within one half-mile downgradient of the Site obtain their drinking water supplies from sources other than the lower water bearing unit. Further, despite the program outlined above, Bensenville cannot control or eliminate the sources of chloride~~ and lead~~. Even if Bensenville implemented some type of groundwater isolation, extraction, and treatment program, the source of chloride is ongoing and not subject to control by Bensenville. State and county highway departments apply the salt surrounding roads and Interstate 294 as a means of ensuring driving safety during snow and ice events and these separate government entities are expected to continue this application in the future. ~~The source of lead has also been demonstrated to be from an anthropogenic, off-Site, non-point source(s) and is, therefore, beyond the ability of Bensenville to control.~~ As a result, Bensenville cannot describe the conditions that would occur if it were to comply with the groundwater standards since the non-compliance is not as a result of its actions and there is no action it can take which could result in compliance.

Although Bensenville, DuPage and Cook Counties, and the Illinois Department of Transportation could, in theory, cease further road salting along the adjacent roads, the potential health effects as they are related to road safety would be significant. In fact, a significant increase in the frequency of automobile accidents, many resulting in severe injury and some with resulting fatalities, would surely be attributed to increased road hazards associated with snow and ice if the application of road salt were to cease during the winter months. Road salt has long been the material of choice in northern Illinois for snow and ice melting because of its relative abundance, cost effectiveness when compared with alternative materials, and minimal impact to the environment.

Furthermore, there are no known significant health risks associated with the ingestion of groundwater with the current level of chloride concentrations found in the Site groundwater. A Federal Highway Administration (FHWA) study concluded that the major objection to high concentrations of sodium and chloride in public water supplies arises from the taste preference of consumers (Winters, et al., 1985, *Environmental Evaluation of CMA,* Report FHWA-RD-84-095, FHWA, USDOT). In other words, the consumption of such groundwater would be objectionable to the consumer. The Ohio Local Technical Assistance Program (LTAP), associated with the Federal Highway Administration, Ohio Department of Transportation, and the Ohio State University reported that "Chloride [from road salt] affects taste, but has no effect on [human] health at the levels possible from road salt." (Ohio LTAP Quarterly, 1998, Volume 13, No. 1). Finally, the Environment Canada (Canada's equivalent of the USEPA) found that, although high chloride concentrations in groundwater could result in some adverse environmental effects to plant and aquatic life, "The principal problem for humans from road salt is its adverse effect on taste…" and that "Road salts are not dangerous to humans." (Environment Canada, 2000, *Priority Substances Assessment Report: Road Salts*) there are no known health risks associated with the ingestion of groundwater with elevated chloride concentrations. Therefore, there would be no health and environmental benefits associated with potentially meeting existing groundwater standards by stopping the use of road salt.

~~There are commonly known health effects associated with the ingestion of lead. The main target for lead toxicity is the nervous system, both in adults and in children. Long-term exposure of adults to lead has resulted in decreased performance in some tests that measure functions of the nervous system. Lead exposure may also cause weakness in fingers, wrists, or ankles. Some studies in humans have suggested that lead exposure may increase blood pressure. Lead exposure may also cause anemia. At high levels of exposure, lead can severely damage the brain and kidneys in adults or children (USEPA, 2004, *Health Effects of Lead*). In spite of the potentially toxic effects of lead exposure, there are no known groundwater receptors and, if there were, they would be unlikely to ingest the water willingly because of the poor taste associated with the high chloride concentrations.~~

VI. JUSTIFICATION FOR RELIEF
(35 Ill. Adm. Code 104.406(h))

Again, while Bensenville is not bound by the standards of 35 Ill. Adm. Code 811.320(b)(4), Bensenville will look to these standards as a useful framework for justifying the relief it seeks here.

a) The groundwater from the lower water bearing unit does not presently serve as a source of drinking water.

As described above, Bensenville has documented that the groundwater from the lower water bearing unit does not serve as a source of drinking water for municipal or private wells in Bensenville, or the downgradient communities of Northlake (to the east) and Elmhurst (to the south) within one half-mile downgradient of the Site.

b) The change in standards will not interfere with or become injurious to, any present or potential beneficial uses for such waters.

As stated above, there are no current beneficial uses being made of these waters and municipal ordinances in Bensenville and Elmhurst would preclude the use of this groundwater as a potable water source in the future in those communities. More significantly, the Village and the adjacent communities of Northlake and Elmhurst obtain their drinking water supplies from Lake Michigan. There are no known industrial or residential uses of the specific groundwater downgradient and within one half-mile of the Site.

c) The change is necessary for economic or social development.

The proposed change will advance economic and social development by allowing Bensenville to complete the golf course contemplated by the IEPA grant encouraging Bensenville to develop additional open space. In addition, the change would relieve Bensenville from a significant financial burden insofar as the required quarterly

assessment monitoring and reporting are concerned. These costs account for approximately $35,000 to $40,000 per year (as documented in Exhibit 11), an amount that could be allocated to beneficial community development, beautification, or recreation projects.

The proposed change will not affect human health because groundwater from the lower water bearing unit is not utilized for human consumption within one half-mile downgradient of the Site.

d) *The groundwater does not presently and will not in the future serve as a source of drinking water.*

Although it is technically feasible to eliminate or reduce the chloride ~~and lead~~ concentrations in Site groundwater, it is not economically reasonable to eliminate or reduce the chloride ~~and lead~~ concentrations in Site groundwater because the cost is extremely high and there is no evidence to suggest that Site groundwater is used for human consumption or any known industrial purposes within one half-mile downgradient from the Site. In order to ensure that groundwater at the Site will not be used for potable purposes, Bensenville will record an ELUC to preclude such use **if so requested by the PCB**. There are no known human health impacts associated with the consumption of groundwater with chloride concentrations similar to those measured in Site groundwater. ~~While there are human health impacts associated with the ingestion of lead, its migration rate would be on the order of only 0.22 meters per year (or approximately 75 feet per 100 years) and, therefore, it would take a few hundred years before lead impacted groundwater from the Site would be expected to migrate off-Site to the nearest downgradient property.~~ It is also unlikely that a person would willingly ingest such groundwater because of its offensive taste associated with the high chloride concentration. Bensenville and adjacent communities obtain their drinking water from Lake Michigan. Since the groundwater is not used for human consumption, it must be concluded that the safety benefits to motorists of using road salt (ice-free roads) far outweigh any potentially beneficial impact of reducing chloride concentrations in Site groundwater by eliminating the application of road salt to heavily traveled Grand Avenue, County Line Road, and Interstate 294 adjacent to the Site. It is possible, however, that existing groundwater quality will be maintained as a function of the quantity of road salt applied during upcoming years.

This Petition also meets the statutory requirements set out at Section 28.1(c) of the Illinois Environmental Protection Act (415 ILCS 5/28.1(c)) for justifying an adjusted standard. There are numerous factors which establish that the Bensenville situation is substantially and significantly different from those the Board considered in adopting the Ground Water Quality standards. First, Bensenville has sought this change to complete the project of turning a private landfill into a public open space resource pursuant to IEPA funding. The groundwater issues represent conditions which originated from other sources and which cannot be resolved by any reasonable action that Bensenville can take. Finally there will be no environmental impact associated with the Board's granting of this adjusted standard and no impact on public health since the public is not consuming this groundwater and not likely to in the future for reasons which do not relate to the activities for which the Petitioner seeks relief. Finally, as is stated below, this relief can be granted consistently with federal law. For all these reasons, the adjusted standard sought by Petitioner is justified.

VII. THIS RELIEF CAN BE GRANTED CONSISTENT WITH FEDERAL LAW
(35 Ill. Adm. Code 104.406(i))

The closure of this Site is not controlled by any federal law and no federal law sets standards for groundwater which is not used as a potable water supply. Neither the municipal solid waste landfill regulations nor the hazardous landfill regulations adopted under the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.) apply to this Site. Therefore, this relief can be granted consistent with federal law.

VIII. STATEMENT OF RELIEF REQUESTED
(35 Ill. Adm. Code 104.406(g))

Bensenville requests that the Board adopt the following adjusted standard:

The dissolved chloride standard in 35 Ill. Adm. Code 620.410 shall be adjusted from the existing standard of 200,000 ug/L to ~~728,963. The total lead standard in 35 Ill. Adm. Code 620.410 shall be adjusted from the existing standard of 7.5 ug/L to 47.8 ug/L. These adjusted standards~~**728,963 ug/L. This adjusted standard** shall apply to groundwater within the lower water bearing unit down to the top of the Silurian dolomite bedrock beneath the former Village of Bensenville Landfill Site located at:

Address: Northwest corner of Grand Avenue and County Line Road, Bensenville, Illinois.

Legal Description:
Parcel 1 (Pin Number 03255200004): *That part of the northeast quarter of Section 25, Township 40 North, Range 11 East, of the third principal meridian described by commencing in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue, thence easterly on the centerline of Grand Avenue 700.0 feet for a place beginning; thence northerly 1602.1 feet to a point in the section line which is 1865.04 feet of the northwest corner of said northeast quarter; thence east along the north line of said northeast quarter 768.8 feet to the northeast corner thereof; thence south along the east line of said northeast quarter 1641.55 feet to the centerline of Grand Avenue; thence westerly along the centerline of Grand Avenue 692.28 feet to the place of beginning*

(except therefrom the rights of the public all existing roads and streets), in DuPage County, Illinois.

Parcel 2 (Pin Number 0325200003): *That part of the northeast quarter of Section 25, Township 40 North, Range 11 East, of the third principal meridian described by beginning in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue; thence easterly on the centerline of Grand Avenue, 700 feet; thence northerly 1602.1 feet to a point in the section line which is 846.0 feet east from the place of beginning; thence west 846.0 feet to the place of beginning, except therefrom that part thereof described as follows: the west 200 feet (as measured along the centerline of Grand Avenue) north of the south 400 feet (as measured on the easterly line of property described in document 388417) lying northerly of the northerly line of Grand Avenue (said northerly line of Grand Avenue being 40 feet northerly of and parallel with the centerline of Grand Avenue; in DuPage County, Illinois.*

Parcel 3 (Pin Number 0325200002): *The west 200 feet (as measured along the center-line of Grand Avenue) of the south 400 feet (as measured on the easterly line of property described in document 388417) lying northerly of the northerly line of Grand Avenue (said northerly line of Grand Avenue being 40 feet northerly of and parallel with the centerline of Grand Avenue) of that part of the northeast quarter of section 25, Township 40 North, Range 11, east of the third principal meridian, described by beginning in the north line of said section at a point 1019.04 feet east of the northwest corner of said northeast quarter; thence southeasterly along the easterly line of property described in document 388417, 1573.55 feet to the centerline of Grand Avenue; thence easterly on the centerline of Grand Avenue, 700 feet, thence northerly 1602.1 feet to a point in the section line which is 846.0 feet east from the place of beginning; thence west 846.0 feet to the place of beginning, in DuPage County, Illinois.*

A ~~Site~~ map showing these boundaries ~~is~~**has been** attached **hereto and incorporated herein** as Exhibit 12.

IX. HEARING WAIVER

(35 Ill. Adm. Code 104.406(j))