

EXHIBIT L

O&M PLAN FOR THE WATERBURY LANDFILL

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WATERBURY LANDFILL ASSOCIATES

OPERATION AND MANAGEMENT PLAN

FOR
DISPOSAL OF BULKY WASTE
AT THE
WATERBURY LANDFILL ASSOCIATES
DISPOSAL AREA
WATERBURY, CONNECTICUT

SOLID WASTE COMPLIANCE
Dept. of Environmental Protection
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FILED _____

JANUARY 1983

ROALD HAESTAD, INC.
CONSULTING ENGINEER
WATERBURY, CONNECTICUT

WATERBURY LANDFILL ASSOCIATES
Waterbury, Connecticut

OPERATION AND MANAGEMENT PLAN
FOR
DISPOSAL OF BULKY WASTE
AT THE
WATERBURY LANDFILL ASSOCIATES DISPOSAL AREA
Waterbury, Connecticut

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Waterbury, Connecticut

OPERATION AND MANAGEMENT PLAN
FOR
DISPOSAL OF BULKY WASTE
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WATERBURY LANDFILL ASSOCIATES DISPOSAL AREA
Waterbury, Connecticut

SUMMARY AND CONCLUSIONS

Purpose

The purpose of this Operation and Management Plan (the Plan) is to provide the required engineering studies and recommendations which are necessary for the Waterbury Landfill Associates (WLA) to obtain a Permit from the Department of Environmental Protection (DEP) to construct and operate a bulky waste facility on their land.

WLA desires that DEP issue a conditional permit in the near future allowing WLA to deposit waste on a specified (Lift 1A) uphill portion of the site and thus begin operation as a disposal area. After monitoring actual annual high groundwater this spring and finalizing site preparation requirements, the actual Permit will be issued by DEP.

As a matter of record, the land discussed herein was, at one time, intended for use by the City of Waterbury as a solid waste disposal area and DEP had issued a Permit for this use.

Existing Conditions

The site under study is at the southeast corner of the intersection of Highland Avenue and Highview Street in the south/central section of the City of Waterbury. The site is the westerly end of

a 28 acre parcel of land owned by WLA; the portion of the property designated for the bulky waste disposal site is about 6.2 acres. With regard to topography, the site slopes steeply southerly from the above-noted intersection to form a hollow. With regard to areas surrounding the site, the land to the east and to the north is rising, wooded, undeveloped land. To the west are two commercial establishments. To the south is undeveloped land owned by the City of Waterbury. It is understood the City intends to use this land as a future landfill for incinerator ash. There are no residential areas near the site.

The area is served by a public water supply. There is a 12-inch main and two fire hydrants in Highland Avenue abutting the site for fire protection.

In former years, a brook transversed the site. This brook is now diverted around the site via a 72-inch pipe flowing south in Highland Avenue.

Soil/Groundwater Studies

Sixteen test pits were dug and five piezometers installed at the site. Information resulting from this work indicates that the bedrock is generally 10 feet below the site. The soils on the site are glacial till.

With regard to annual high groundwater, it is estimated that the annual high level will remain at least two feet below the present surface, except in the south/central portion of the site.

Groundwater samples from two piezometers were tested for those parameters which are indicative of leachate and for those parameters which would indicate residue from a metal finishing operation. The results of these test show that the groundwater at the site is

comparable to "natural" groundwater.

It is estimated that the future leachate plume which the bulky waste will generate will follow the course of the former brook southerly, possibly extending to the Naugatuck River about 1,500 feet south of the site. It is noted that there is already an existing landfill bounded by the Naugatuck River, Route 8, and the main line railroad. It is probable that the existing plume from this landfill will intersect and overlap the future plume from WLA disposal area. Previous studies by DEP have concluded that the Naugatuck River and its abutting aquifer is already contaminated with heavy metals. Therefore, it is concluded that future leachate from the WLA disposal area will have little impact on the quality of the downgradient water.

Site Preparation

It is recommended that a two foot layer of gravel be placed on the south/central portion of the site to obtain the required two foot separation between bottom of waste and groundwater. This recommendation will be evaluated in the spring of 1983 after the actual annual high groundwater has been determined by monitoring of the piezometers. It is recommended that two permanent groundwater monitoring wells, one upgradient, one downgradient, be installed for future monitoring of groundwater quality. Evergreen trees will be planted along Hillview Street and Highland Avenue sides of the site to augment the existing growth and serve as a visual barrier. Finally, the upstream end of the existing culvert under the embankment will be plugged to avoid a point discharge of leachate.

Operation and Management

The bulky waste will be placed in a series of six lifts, each 10 feet deep. A 6-inch depth of cover will be placed weekly on the waste.

During the life of the site, the permanent groundwater wells will be monitored annually for those parameters indicative of bulky waste and quarterly for specific conductance.

Closure and Post-Closure

Proposed grades for the closure are not flatter than 4% and no steeper than 3 horizontal to 1 vertical. A two foot layer of final cover will be installed upon the waste. This layer will be composed of 21 inches of fine material and 3 inches of topsoil. Topsoil will be limed, fertilized, seeded, and mulched. Final surface drainage will be a ditch system draining to the outlet which presently serves the site.

Groundwater will be monitored in the post-closure period following the same program used during the life of this disposal area. In addition, the closed site will be periodically inspected to monitor the integrity of the cover and the functioning of the drainage system.

Miscellaneous

The volume available for the deposition of waste at this site is about 245,000 cubic yards. Estimated closing costs, based on 1982 prices, are \$67,750.

WATERBURY LANDFILL ASSOCIATES
Waterbury, Connecticut

OPERATION AND MANAGEMENT PLAN
FOR
DISPOSAL OF BULKY WASTE
AT THE
WATERBURY LANDFILL ASSOCIATES DISPOSAL AREA
Waterbury, Connecticut

1. PURPOSE

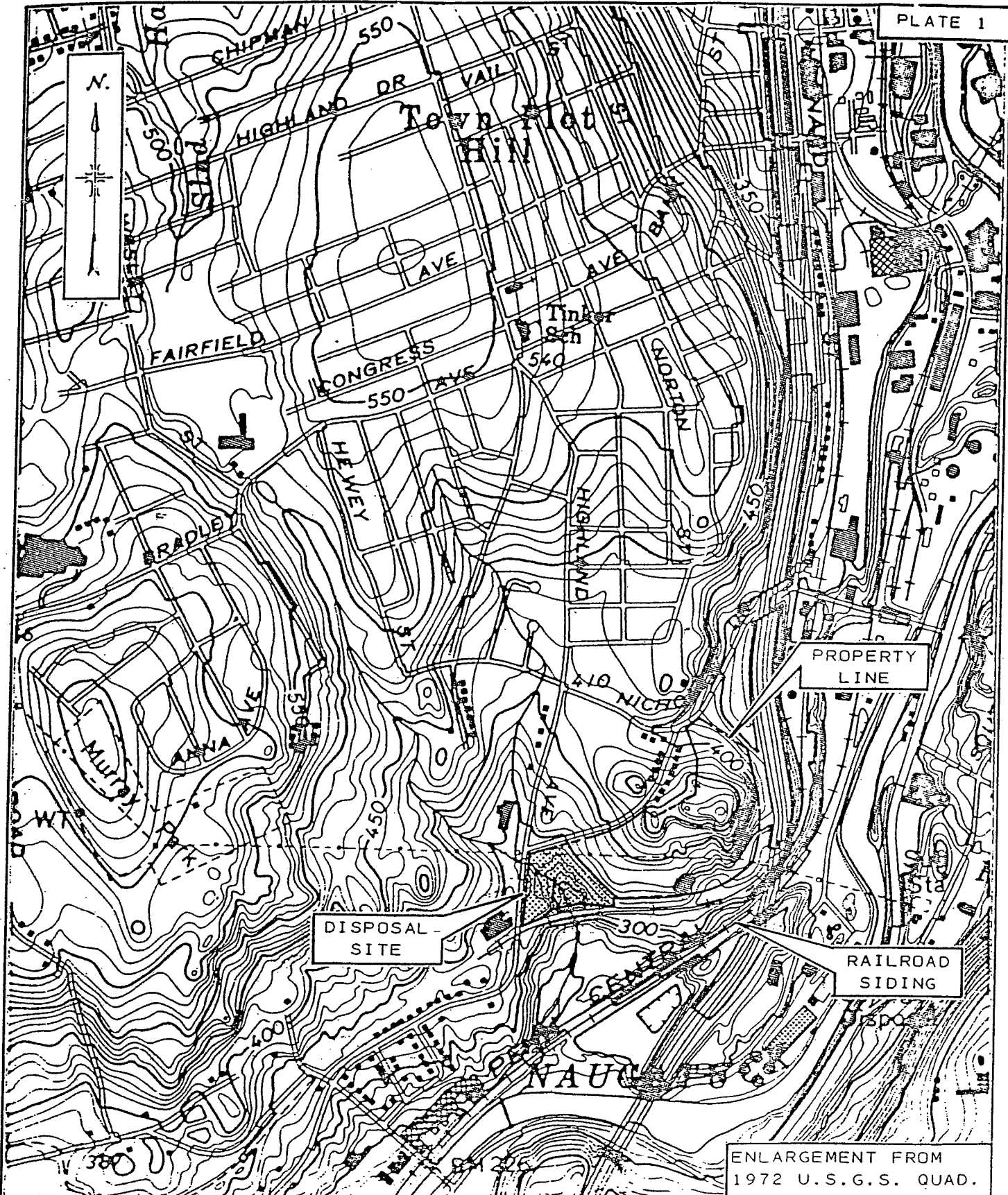
The purpose of this Operation and Management Plan (the Plan) is to describe the engineering studies performed and to provide those engineering recommendations concerning site improvements, operational and management procedures, closure requirements, and other pertinent subjects which are required for Waterbury Landfill Associates (WLA) to obtain a Permit from the Solid Waste Management Section (SWM) of the Department of Environmental Protection (DEP) to construct and operate a bulky waste facility under Section 19-524b(c) of the State General Statutes.

The Plan is written with the intent of obtaining a conditional permit in the near future to dispose of waste in a specific uphill section of the site, thus allowing WLA to begin operations. In the spring, when annual groundwater can be measured, the Plan will be modified, if necessary, predicated on those measurements to obtain a final Permit to dispose of bulky waste on the entire site. The fully executed Application for Permit is included in Appendix A.

The Plan has been prepared in accordance with the current SWM guideline entitled "Engineering Guidelines for New Bulky Waste Disposal Areas, July 1980".

As a matter of record, the land discussed herein was, at one time, intended for use by the City of Waterbury as a solid waste disposal area and DEP had issued a Permit for this use; DEP revoked this Permit in 1980.

The general location of the site and the entire WLA property is within the City of Waterbury as shown on Plate 1, entitled "Location Plan", following.



WATERBURY LANDFILL ASSOCIATES

DISPOSAL AREA
LOCATION PLAN

SCALE: 1" = 1000'

ROALD HAESTAD, INC.

JANUARY 1983

II. EXISTING CONDITIONS

A. Disposal Site

The disposal site is located in the south-central portion of Waterbury, specifically in a hollow to the southeast of the intersection of Highland Avenue and Highview Street. The site is on the westerly portion of a 28 acre parcel of land owned by WLA. The portion of this property to be used for disposal purposes is about 6.2 acres.

With regard to prior use, the land has been vacant for many years, which is to be expected due to the steepness of the terrain and a brook which, at one time, traversed the site. Dumping of blasted rock has occurred as evidenced by the mound located in the southwest corner of the site.

With regard to groundwater quality, DEP has proposed the groundwater under the site be classified as GB. There are no wetlands on the site; the site is not located in a flood plain.

In the early 1970's certain improvements were made in and adjacent to the site by the City of Waterbury in anticipation of using this area for waste disposal. The primary improvement made was the diversion of the unnamed brook which flows southeasterly from the hillside to Highland Avenue at a point about 150 feet south of Highview Street. This brook was diverted into a 72-inch pipe flowing southerly in Highland Avenue and southeasterly across City

property to the existing culvert under the main line of the railroad some 300 feet north of the Naugatuck River. This diversion, therefore, removed the major surface flow from the site. The location of the brook prior to diversion can be seen on Plate 1.

To remove other surface flows into the site, cut-off ditches were built along the east hillside to intercept drainage from the east and direct it to around the site to the above-noted 72-inch diversion pipe; a drainage system was built in Highview Street to intercept surface flows from the north. Other improvements included fencing of the site and the installation of a prefabricated metal shed for operational purposes. Two fire hydrants served by a 12" main abut the site on the Highland Avenue side for fire protection. Details of these existing conditions may be seen on Figure 1, entitled "Existing Site Conditions", found at the back of this Plan.

B. Surrounding Area

As stated above, the site is located in a hollow. A review of Plate 1 and Figure 1 will show that the site is bound to the east and north by rising, wooded land. To the west are two commercial establishments on the west side of Highland Avenue and an existing line of trees along the east side of that street to serve as a visual buffer. To the south is a railroad siding built on an embankment. The embankment is heavily wooded, thus serving as a visual screen for the areas to the south of the disposal area. In addition, the land directly to the south of this embankment is owned by the City of Waterbury, which intends to develop said area into a disposal area for incinerator ash.

As previously stated, the unnamed brook flowing southeast into the site has been diverted around the site. The size of the drainage area tributary to the culvert under Highland Avenue about 150 feet south of Highview Street is approximately 350 acres. This is the drainage area which was formerly tributary to the disposal site but now has been rerouted around the site.

With regard to utilities, there are public sanitary sewers in Highland Avenue; there are no sewers in Highview Street, as this section of the street is not developed. With regard to public water supply, there is an existing 12-inch main in Highland Avenue and a 6-inch main in Highview Street. There are two adjacent fire hydrants, one each at the northwest and southwest corners of the site. With regard to gas, there is a 10-inch gas main in both Highland Avenue and Highview Street.

There are no known wells used for water supply downgradient of the proposed site. The site is not located on an ~~a~~quifer or in a watershed used for drinking water supply.

There are no known unusual or unique natural features or archaeological or historic resources related to the site. ✓

III. SOIL/GROUNDWATER STUDIES

A. Soil/Bedrock

Various test pits were dug at the site to determine types of soil present, depth to bedrock, and groundwater elevation. To illustrate the findings, two cross-sections have been drawn through the site, one in a north/south direction, the second in an east/west direction; location of these test pits and the cross-sections are shown on Figures 2 and 3 respectively, to be found at the back of this Plan.

Also of note is the recent construction of the sanitary sewer in Highland Avenue along the full length of the westerly boundary of the site. The sewer was constructed by the City of Waterbury in the fall of 1982. The average trench depth was 7 feet north of the 72-inch diversion and about 9 feet south of that diversion. According to City personnel, no bedrock was encountered, although several large boulders had to be removed from the trench. The soil found in the trench was a silty sand; the City has judged this soil to be suitable for compaction and therefore was used as trench backfill. Groundwater was encountered to a small extent in the trench north (uphill) of the 72-inch diversion, but did not impede the construction process.

Based on the data available, the soils on the site may be described as glacial till, that is, soils which vary in texture and gradation in different areas of the site and which sometimes contain large boulders. As to be expected, the coarser soils are found on hill sides while the finer soils are in the lower portions of the site.

Appendix B is a memo recording the findings during the actual test pit work and a tabulation for each test pit of the ground surface elevation, bedrock elevation, and groundwater elevation for each pit.

Review of Section A-A, the north/south section, indicates that filling has occurred in the past in two localized areas. The first area is from just south of Highview Street southerly to just south of the existing shed. This fill was probably placed as part of the improvements constructed in the early 1970's. The second area of filling is at the very bottom of the hollow at the embankment. Here the original ground was some 12 feet below the present surface. Material found in the upper portion of Test Pit No. 3, at the embankment, is very fine material, indicating sediments from upgradient or possibly the deposition of street sweepings in former times.

B. Groundwater

1. Present Level

The level of groundwater as measured on December 27, 1982, is shown on the cross-sections and Appendix B. It is to be noted that the groundwater was found considerably below the surface, except in the area of Test Pits 6 and 7. Also, the point of origin of surface flow in the valley of the former brook on the west side of the site was field located and is shown on Figure 2. This surface flow disappears into the ground just uphill (northwest) of the flat bottom of the hollow.

2. Estimated Annual High Level

The data noted above indicates that present groundwater levels on the hillside on the easterly portion of the site and on the lesser slopes of the northerly half of the site are 8 feet or more below the present surface. It is also noted that these soils are generally the coarser soils on the site. Note that the water levels in Wells 3 and 4 were 8 feet down, even though they are at the bottom of the hollow. Therefore, it is reasonable to presume the annual high groundwater will not rise to within 2 feet of the present surface in the above areas.

In the lower, southerly portion of the site, groundwater is near the surface at Piezometer No. 5. This condition is probably caused by the relatively shallow bedrock found in Test Pits 6 and 7 and the fine organic material found when Piezometer No. 5 was installed.

3. Background Water Quality

A sample of groundwater was obtained from Piezometers 2 and 5. The parameters tested were those parameters which would be indicative of bulky waste and those parameters which would indicate the residue from a metal finishing or similar operation. The detailed results of this testing are shown in Appendix C.

The parameters used to indicate bulky wastes are:

pH	Ammonia
Specific Conductance	Nitrate
Total Dissolved Solids	BOD ₅
Suspended Solids	COD ₅
Alkalinity (CaCO ₃)	Iron
Chloride	Manganese

The test values from the analysis of the site groundwater fall within the range of values which may be found in "natural" surface or groundwater, with the exception of ammonia. The higher values of ammonia are probably due to the brush and leaves which accumulate annually in the lower portions of the site.

The parameters used to indicate a metal finishing operation are cyanide, cadmium, lead, copper, nickel, zinc, and phenols. Test values are zero or only trace amounts.

Recommendations for future groundwater quality monitoring will be addressed in a later section of this Plan.

4. Future Leachate Plume

a. Estimated Extent of Plume

Bulky waste will produce a leachate that can contaminate surface and groundwater. This leachate is considerably less chemically potent in nature than leachate produced by solid or mixed municipal waste. The primary contaminants resulting from bulky waste are heavy metals; only small amounts of bacteria should be produced as leaves, brush, and wood are the only materials susceptible to decomposition.

The leachate from the site will, over time, move into the groundwater and travel downgradient with that water, thus forming a "plume". This plume would contain contaminants generated by bulky waste. Based on the present state of the engineering art, it is not possible to estimate at what point in time nor at what location these contaminants are no longer contaminants and the groundwater regains drinking water quality.

Therefore, in estimating the geographical extent of the plume, the most conservative approach must be taken.

For this particular study, it is estimated that plume will extend downgradient from the site, following the movement of existing groundwater, which, in turn, will follow the slope of the existing land. It is noted that the low-area of the site under study is very narrow in width in the east/west direction. This topographic feature will tend to concentrate leachate from the waste into a narrow band. It is therefore estimated that the plume downgradient of the site will also be a narrow band, following, more or less, the direction of the existing downgradient swale. To maintain the

conservative approach, it is also possible that the plume could extend downgradient some 1,500 feet to the Naugatuck River.

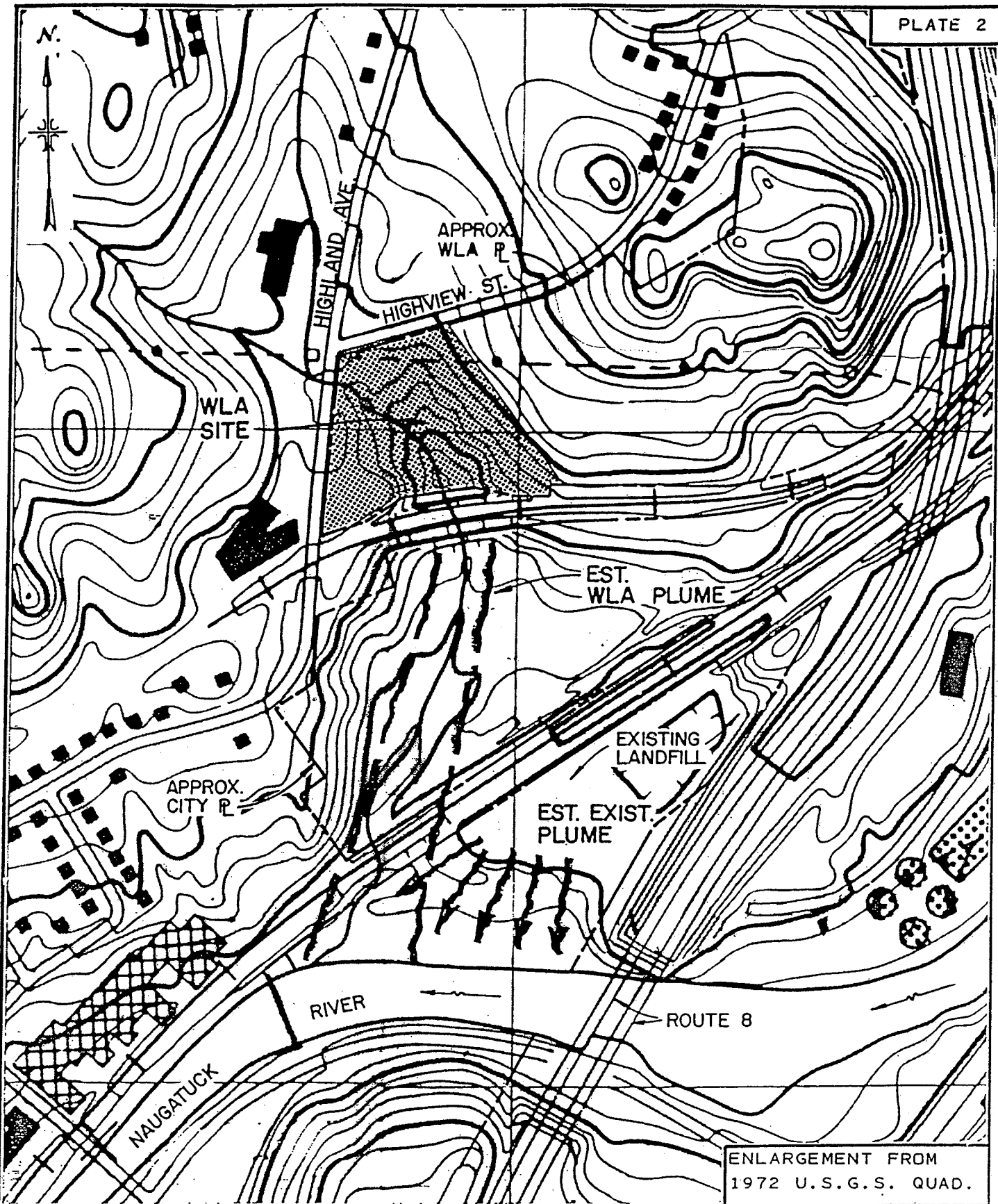
The plume described above is shown on Plate 2, following.

b. Impact of Plume

As previously noted, the land downgradient of the site is owned by the City of Waterbury; further, it is understood that the City intends to develop this land as a disposal area for incinerator ash from their proposed "waste to energy" project. Also as previously stated, there are no downgradient wells for water supply in that the City water system provides this service to the areas abutting the land under discussion. In addition, the groundwater under the site and downgradient thereof to the Naugatuck River is not considered as a potential drinking water supply.

It is also noted that an existing City landfill is located between the main line railroad and Route 8 and abuts the Naugatuck River. This landfill was used in past years for the deposition of ash from the City's former solid waste incinerator. As in any landfill, a leachate is produced and travels downgradient from that landfill. Based on the location of this landfill, the plume generated nearby probably goes directly to the Naugatuck River, as shown on Figure 2, following. It is possible that the plume created in the future by the WLA site would intersect and overlap the existing plume from the City landfill, presuming that the WLA site plume does, in fact, reach the Naugatuck River.

With regard to the Naugatuck River itself, the DEP, in conjunction with the United States Geological Survey, prepared



ENLARGEMENT FROM
1972 U.S.G.S. QUAD.

WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
 ESTIMATED PLUME
 SCALE: 1" = 400'

study of water quality in the Naugatuck River. This study was prepared in the mid 1970's and is entitled "Water Resources Inventory of Connecticut, Part 5, Lower Housatonic River Basin". The study concluded that the Naugatuck River and its adjacent aquifer from Waterbury southerly to its confluence with the Housatonic River, were already contaminated with heavy metals.

It is therefore concluded that any leachate produced by the site under study and which might reach the Naugatuck River, will have a minimal impact on the quality of groundwater downgradient from that site and on the quality of the water in the Naugatuck River.

IV. SITE PREPARATION

The various site improvements recommended and described below are shown on Figure 4 at the back of this Plan. The Outline Specifications for this work may be found in Appendix D. WLA intends to complete all required site improvements by April of 1983.

A. Waste/Groundwater Separation

DEP requires that a minimum of two foot vertical separation be provided between the bottom of waste and the annual high groundwater level or bedrock. As stated above, it is estimated that annual high groundwater will be more than two feet below the existing ground surface in all portions of the site except in the lower, southerly portion. Therefore, it is recommended that 2 feet of free draining gravel blanket be placed in the bed of the former brook and in the area of Piezometer No. 5. In addition, the existing rock outcropping along the east face of the site should be covered with a minimum of 2 feet of well draining gravel.

Groundwater elevation will be monitored through the spring of 1983. Based on these readings, the above recommendations will be revised and modified as necessary.

DEP also requires that there be no surface or point discharge of future leachate from the downgradient portion of the site. Therefore, it is recommended that the existing 18-inch concrete pipe, which connects the existing manhole/catch basin to the upstream end of the stone culvert be plugged and that a means to intercept and diffuse leachate over a broad area be provided. Interception and diffusion of the leachate can be accomplished by digging a trench along the northerly toe and parallel to the embankment and backfilling

with free draining gravel. The trench should be an "L" shape totaling 100 feet in length and deep enough to reach the underlying native soils. The plugging of the 18-inch pipe may be accomplished by a brick and mortar bulkhead 12 inches thick.

The existing manhole/catch basin is constructed of 4 foot inside diameter precast concrete manhole risers. Observation of the inside surfaces reveals no staining or other evidence of leakage through the joints. It is therefore concluded that the structure is generally watertight and thus will prevent groundwater and leachate from draining into the manhole.

B. Groundwater Monitoring Wells

Two permanent groundwater wells are proposed for monitoring quality during the life of the site and after closure. Location of these wells is shown on Figure 4. Well A is located near the north-westerly corner of the site so that upgradient water quality may be tested. The second well, Well B, is located near the embankment so that downgradient quality may be monitored. It is noted that, as waste is deposited in the area of Well B, the 2-inch PVC well and its steel casing with locked cap should be extended upward periodically to maintain access.

It is recommended that these wells be soil wells with bottom of the screen near bedrock. Details of these wells, including estimated depths, may be found in Appendices D and E.

After the wells are installed, field surveys should be done to determine elevation (U.S.G.S. datum) of the top of each cap. This information is necessary for the future monitoring of groundwater elevation. Each time Well B is extended upward in the future, the length of the steel casing extension must be measured accurately so that the new elevation of the top of the cap may be determined.

C. Other Improvements

Other preparations required are to clean out all existing perimeter ditches and regrade as necessary to insure that drainage will reach Highview Street and the existing 24-inch outlet on the east side of Highland Avenue. It is noted that these existing ditches, in conjunction with street drainage, intercept almost all uphill flows.

In order to facilitate future operations, it is recommended that the existing shed be moved to the fence along Highview Avenue and just west of the existing gate. The fill upon which this shed was constructed can then be removed down to the elevation indicated so that this area may be used as the first area for waste deposition. The shed would then be equipped with electric and telephone services.

Permanent markers in the form of telephone poles sunk 4 feet into the ground and extending 3 feet above the ground should be installed to indicate the limits of waste deposition; a total of 4 markers are recommended. ✓

The existing vegetation on the railroad embankment and along the east side of Highland Avenue will be maintained in order to serve as a visual buffer between adjacent areas and the site. A line of evergreen trees will be planted along Highview Street and similar trees along Highland Avenue to augment the growth already there. Recommended species which are fast growing, full body types are Eastern Hemlock (*Tsuga canadensis*) and Eastern White Pine (*Pinus strobus*).

V. OPERATION AND MANAGEMENT

A. Waste Types and Source

Type of waste to be accepted at the site is so-called bulky waste; bulky waste is defined as waste resulting from building demolition, brush, stumps, leaves, tires, rubble, and white goods.

The sources of the waste in geographical terms will be from the City of Waterbury and surrounding towns. It is expected that the great majority of the waste will be material from structure demolition or pavement removal hauled to the site by private haulers.

Wastes which are excluded from the site are solid wastes (garbage), incinerator ash, wastes such as metal hydroxides, and chemical wastes.

B. Access/Sequence of Filling

Access to the site will probably be via South Leonard Street, Nichols Drive, and Highland Avenue. This route is not only convenient for haulers, but also has few residential properties abutting. Access into the site is through the existing chain link gate on Highview Street. Access within the site is via a bituminous road which runs from the gate southerly about 300 feet.

With regard to sequence of filling, it is proposed to deposit waste first in the uphill portion of the site. This lift is identified as Lift 1A. As previously stated, WLA is requesting that DEP issue, at their earliest convenience, a conditional permit so that WLA may begin operations. Lift 1A and all subsequent lifts are shown on Figures 5 and 6.

After annual high groundwater has been determined and site preparation requirements are finalized, the next lifts are Lifts 1 through 3. In summary, it is proposed to begin filling against the embankment at the south end of the site to a depth of 10 feet and building this layer northerly until the lower portion of the site is filled in. The top surface of the lift must be pitched such that the surface water will flow southerly toward the embankment and, at that point, diffuse through the waste into the ground. Lifts 2 and 3 would be deposited in the same manner, working from south to north. Upon completion of these three lifts, top of the waste at the embankment will be about elevation 320 and will rise slightly to the north. This sequence of lifts is shown on Figure 5.

For the next sequence of lifts, 4 through 6, it is proposed that each lift be started at the hillside to the east and built to the west. The top surface of each lift should be sloped slightly to the

west to take advantage of the existing 24-inch drainage outlet at Highland Avenue. As Lift 4 is completed and Lift 5 begun, a bench at the proper elevation for the future cutoff ditch along the south slope of the final fill must be built. This ditch will flow westerly to the existing drainage outlet. This sequence of lifts is shown on Figure 6.

Lift 7 is the final lift.

The working face on each lift should be kept at a 3 - 4 horizontal to 1 vertical slope for ease of operations and to maximize compaction of waste deposited thereon. Maximum depth of waste spread on the working face should not exceed 5 feet. The cell construction method of deposition of waste is not required. ✓

*will use
area method*

C. Operation

WLA will designate one of its employees as daily operator of the landfill. At such time as DEP provides its next course of instruction for landfill operators, WLA will send this individual to the course in order to obtain certification.

It is anticipated that the disposal area will be open Monday through Friday from 8:00 a.m. to 3:00 p.m. These hours may be changed based on the demand for the area or special arrangements WLA might make in the future with specific hauling contractors.

Cover will be placed weekly on the open face of the waste. *Daily Compaction ✓*

Depth of cover should be 6 inches and be a fine material as defined in Appendix D, Outline Specifications. The cover material itself will be obtained from the WLA bank at the 109 Nichols Avenue location ✓ discussed below. A certain amount of material suitable as cover is already on the site and will be stockpiled and used during the initial stages of the operation.

With regard to dust and litter, it is noted that bulky wastes do not generate large amounts of this type of nuisance. It is also noted that winds in this part of the country are generally from the west or north. Winds from these directions would therefore tend to concentrate dust and litter in the low portions of the site, thereby minimizing nuisance to the public.

Vectors which may be of concern during the life of the landfill are basically rodents. Periodic inspection for the burrows created by rodents must be made during the life of the landfill.

With regard to equipment, WLA intends to use an International 250 tracked loader to spread and compact the waste. This machine

will be stored in the shed at the site. It is noted that office and maintenance garage of the firm of Bart LoRusso and Sons, Inc., general contractors, is located at 109 Nichols Drive, some 0.4 of a mile northeast of the site. The principals of this firm and WLA are the same; therefore, WLA intends to use the Nichols Drive facilities for maintenance of equipment and for providing other types of equipment needed for proper operation at the site.

No special recommendations are necessary for wet weather or snow conditions. The existing paved access road may be plowed as necessary during the winter. As stated above, the majority of the flows from abutting areas have been already rerouted around the site, thus minimizing surface water entering the site. Finally, demolition material, by its very nature, will be useful in stabilizing any soil that becomes saturated or unable to support the weight of equipment.

D. Groundwater Quality Monitoring

During the life of the site, it is proposed to monitor groundwater quality as follows:

1. In July of 1983, Wells A and B shall be tested for the full range of parameters as follows:

pH	Ammonia
Specific Conductance	Nitrate
Total Dissolved Solids	BOD ₅
Suspended Solids	COD ₅
Alkalinity (CaCO ₃)	Iron
Chloride	Manganese

2. Assuming the July test results do not disclose anything out of the ordinary, the wells shall be tested quarterly in October, January, and April for specific conductance only.

3. The full range of tests would then be performed in July of 1984. The above parameters would be followed in subsequent years unless test results showed significant change from previous results. Copies of all test results will be provided to SWM, DEP. Any change in the testing program must be approved by DEP.

All testing shall be done to the accuracy required to test for drinking water criteria. Details of the sampling procedure may be found in Appendix E.

Each time a well is sampled, the elevation of the groundwater at that well must be measured and recorded with a copy sent to SWM, DEP.

It is noted that, as waste is deposited in the area of Well B, the 2-inch PVC well and its steel casing with locked cap should be extended upward periodically to maintain access to the well. The length of each extension of the steel casing must be accurately measured so that the new elevation of the top of cap may be determined.

E. Miscellaneous

As stated above, the existing shed shall be located next to the gate on Highview Street. The shed will be furnished with telephone and electric service, toilet facilities, as well as first aid equipment.

With regard to fire protection, two hydrants are located on the west side of the site. The longest run of hose required to reach a fire on the site is approximately 500 to 600 feet.

Site security is provided by the existing 7 foot high chain link fence, which is in good condition. This fence isolates the site along the Highland Avenue and Highview Street sides and runs southerly from Highview Street along the east side of the site approximately 300 feet. This fence will serve to keep four wheel vehicles out of the site. The gate on Highview Street will be locked when the site is not in operation.

With regard to future use of the land, the most likely use is for development into light industrial or commercial uses, which generate lighter foundation loads. This use would be in keeping with the present land use along Highland Avenue and current zoning. An alternate use might be for a park; however, it does not appear the surrounding neighborhood needs such a facility at this point in time.

VI. CLOSURE

A. Grading/Surface Drainage

The final grading plan for the disposal area is shown on Figure 7. There are no slopes in excess of 3 horizontal to 1 vertical nor less than 4%. The contours shown on Figure 7 reflect the finished surface, which includes the 2 foot layer of final cover and topsoil. Actual area to be ultimately covered by waste is about 5.9 acres.

Final drainage requirements are a swale along the east side of Highview Street to carry surface waters westerly to a perimeter ditch along the east side of Highland Avenue. This ditch outlets to the existing 24-inch opening into the existing 72-inch diversion.

B. Final Cover/Vegetation

The final cover on the waste will comprise 21 inches of cover material plus 3 inches (compacted) of topsoil. The 21 inch layer shall be material as described in the Outline Specifications in Appendix D.

The vegetative cover recommended is the seed mix defined in the Outline Specifications, Appendix D. No special treatment such as crownvetch is required because of the gentle slopes of the final surface.

C. Miscellaneous

1. Groundwater Monitoring

The groundwater monitoring should be continued until it is judged that the wastes have sufficiently stabilized or the downgradient conditions which may develop over the life of the site render such monitoring unnecessary. The downgradient conditions referred to are the development of the area south of the embankment as a landfill by the City of Waterbury.

The parameters to be tested for and the schedule of testing is the same as previously stated under Section V.D, Groundwater Quality Monitoring. Also as stated in that Section, quarterly and annual reports of test results must be furnished to DEP.

2. Methane Gas

In that very little methane gas is generated by bulky waste, no special provisions should be required for final closure. Any such gas that is generated will probably vent itself naturally.

?

VII. POST-CLOSURE

A. Groundwater Quality Monitoring

The program defined previously in this Plan is recommended to be continued after closure unless, with DEP approval, otherwise modified.

B. Periodic Inspection

A general inspection of the closed site should be performed twice a year, once in the spring to identify problems which may have been created by cold weather and once in late fall to identify problems caused by surface runoff. A detailed record of each inspection should be kept and a copy sent to DEP. Various specifics to inspect or monitor are as follows:

1. Settlement/Erosion

The disposal area should be completely walked to ascertain whether decomposition of the waste has created ponding areas; such ponding areas should be filled and regarded to minimize leachate production. Any areas found eroded or without adequate vegetative cover should be repaired.

2. Surface Drainage

It is most important to insure that the ditching along Highland Avenue and Highview Street is kept cleared of debris, bushes, and young trees. The outlet of this ditch system, the 24-inch opening at Highland Avenue, should be kept clean and free of debris. The catch basins in Highland Avenue at the 72-inch diversion pipe should be inspected for proper operation.

The 18-inch pipe taking water from the easterly side slope ditch at Highview Street should be inspected and the headwall kept free of debris, bushes, and young trees.

3. Vectors

The disposal area should be inspected for the presence of rodents, as indicated by burrows. If such are evident, a program to eliminate the rodents should be instituted.

VIII. AVAILABLE VOLUME

As previously stated, the final contours of the disposal area are shown on Figure 7. The gross volume represented by these contours is 264,000 cubic yards (c.y.). From this figure must be deducted about 19,000 c.y., which represents the final 2 feet of cover. The volume thus available for actual deposition of waste is an estimated 245,000 c.y.

IX. IMPLEMENTATION

A. Schedule

Tabulated below is an estimated schedule from the time of Application for Permit by WLA to the point in time when the actual Permit is issued. The life of the site has not been estimated because the economic conditions which create the demand for the site are too variable.

1/10/83 - This Plan and Application for Permit hand-delivered to DEP.

2/7/83 - DEP issues approval to deposit waste in the northerly portion of the site, as shown on the Lift Plan.

5/30/83 - WLA completes monitoring of groundwater and submits final plan of site improvements to DEP.

6/30/83 - DEP issues final Permit.

B. Estimated Costs

The estimated costs listed below are based on prices current in 1982; details of each estimate may be found in Appendix

F. The estimated costs are as follows:

1. Site Preparation: \$10,530.
2. Annual Groundwater Quality Monitoring: \$270 for testing laboratory cost and 36 manhours.
3. Closure: \$67,750.
4. Post-Closure: No estimate of the cost of periodic inspection and resulting maintenance has been made. Estimated annual cost of groundwater quality monitoring after closure is as in Item 2, above.

C. Permits/Easements

Based on recent discussions with DEP, it is understood that only one permit from DEP is required; this permit is to operate the site and is issued by the SWM Section of DEP. We understand that a Discharge Permit under State General Statute 25-54(i) is not required. With regard to Inland Wetlands (I/W), the City of Waterbury does not have a constituted I/W Commission and therefore the Water Resources Unit of DEP has jurisdiction. We understand that the Water Resources Unit has made an inspection of the site and determined that there are no wetlands or watercourses at the site and therefore an I/W permit from DEP is not required. Correspondence relating to the above may be found in Appendix G.

With regard to City approvals, only one approval is required in accordance with the City's Zoning Ordinance, which is effective as of July 1, 1982. This Ordinance states that a permit must be obtained from the City Engineer. Because of the activities proposed adjacent to the railroad embankment on the south side of the site, coordination will be required with the owner of that land.



STATE OF CONNECTICUT
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115



APPLICATION FOR PERMIT(S) FOR CONSTRUCTING AND OPERATION OF A SOLID WASTE FACILITY UNDER SECTION 19-524b(c) OF THE GENERAL STATUTES

Date December 29, 1982

STATE OF CONNECTICUT
 Department of Environmental Protection
 Solid Waste Management Program
 State Office Building
 Hartford, Connecticut 06115

To The Commissioner of Environmental Protection:

The Waterbury Landfill Associates in Waterbury
Name of Operator/Owner City/Town

State of Connecticut herewith make application to the Commissioner for permit(s) to construct and operate a solid waste facility. In support of the application of the following information is submitted:

SECTION I

1. This application pertains to a (check the appropriate facility, if other, explain):

Section A:

- Private Solid Waste Disposal Area
 Private Regional Solid Waste Disposal Area
 Municipal Solid Waste Disposal Area (serves one municipality)
 Municipal Regional Solid Waste Disposal Area (serves two or more municipalities)
 Other

Section B:

- Private Bulky Waste Disposal Area
 Private Regional Bulky Waste Disposal Area
 Municipal Bulky Waste Disposal Area (serves one municipality)
 Municipal Regional Bulky Waste Disposal Area (serves two or more municipalities)
 Other

Section C:

- Regional Transfer Station (serves two or more municipalities)
- Municipal Transfer Station (serves one municipality)
- Private Transfer Station (serves one or more municipalities)

Section D:

- Regional Resource Recovery Plant (serves two or more municipalities)
- Municipal Resource Recovery Plant (serves one municipality)
- Private Resource Recovery Plant (serves one or more municipality)

Section E:

Other (Be specific, e.g. shredder, incinerator, baler, etc.)

2. These questions apply if your facility falls into Sections A or B above.

A. If you are applying for a ^{Bulky} Solid Waste Disposal Area Permit, this application is for (check one)

- A new site (no previous permit);
- a vertical expansion of an existing site;
- a horizontal expansion of an existing site.

B. If this application is for expansion of an existing facility, what additional acreage and/or volume is being applied for?

6.2 acres, 245,000 cy
acreage and/or cubic yds.

C. Does the existing facility have a valid Solid Waste Permit? X
yes/no

3. A. If you are applying for a Volume Reduction Plant or Transfer Station Permit, will this be a new or modified facility? (circle one)

B. If you are modifying an existing facility, does this facility have a valid Solid Waste Permit?

yes/no

If yes, give Permit No. _____ and date of issuance _____.

4. Location of facility: Attach a survey and map certifying the location of the property on which this facility is or will be located (certified Deed Survey is adequate). See 5, below.

5. Attach a list of materials being submitted in support of this application in accordance with applicable guidelines. (e.g. maps, plans, diagrams, operational plans and details, specifications, operational and maintenance manuals, etc.) Note: Three copies of all supportive material are required to complete an application package.

A report entitled "Operation and Management Plan for Disposal of Bulky Waste at the Waterbury Landfill Associates Disposal Area, Waterbury, Connecticut January 1983".

6. Supportive materials were prepared by Roald Haestad, Inc.
Name of Professional Engineer registered
of 37 Brookside Road, Waterbury, Connecticut 0670
in Connecticut Address

7. Prime contact for engineer/applicant. (Name and phone number)

George C. Sinclair - #(203) 753-9800 ←

8. A. Does this facility require any additional DEP Approvals or Permits?

No
yes/no

B. If yes, attach an explanation of the nature and present status of all other required DEP permits.

✓ 9. If this project involves a designated wetland, have all applicable wetland permits been obtained? No wetlands involved. OK
yes/no

10. If water quality monitoring points (ground and surface) exist at this site, does this application include all data collected to date at these points? yes
yes/no

11. Does this facility comply with the State Solid Waste Management Plan?
yes
yes/no

SECTION II (Attach extra sheets when necessary)

- If owner is municipality, go directly to Section III -

1. Are you prepared to post a performance bond or other security sufficient to assure compliance with any permits, certificates, or approvals granted to you through this application? Yes
yes/no

2. A. Are you as the applicant for this facility, an individual,
x partner, corporation, other? (Check one)

B. If you are an individual, give your full name and address.

C. (1) If you are a partnership, give the names and addresses of all partners. (Attach separate sheet if necessary)

- Bartholomew LoRusso, 185 Macauley Avenue, Waterbury, CT
- * Vincent LoRusso, 26 Rena Lane, Waterbury, CT
- Bart LoRusso, 42 Rena Lane, Waterbury, CT
- D/B/A Waterbury Landfill Associates as operator

- (2) If you are a limited partnership under Section 34-9, et seq. Connecticut General Statutes, give the names and addresses of all general partners: (Attach separate sheet if necessary)
- (3) Have any of the partners (general partners in the case of a limited partnership) ever filed for voluntary bankruptcy?
No If yes, attach an explanation as to who filed, when, where; why
yes/no
- (4) Do any of the partners (general partners in the case of a limited partnership) have a present intention to file for voluntary bankruptcy? No If yes, attach an explanation as to who will file and why.
yes/no
- (5) Have any of the partners (general partners in the case of a limited partnership) ever been placed in receivership? No
yes/no
If yes, attach an explanation of who was so placed, by whom, when, where, and why.
- (6) Have involuntary bankruptcy proceedings ever been instituted against the partnership (limited partnership) or any of its partners (general partners)? No If yes, attach an explanation of who instituted the proceeding, against whom, where, when, why.
yes/no

D. If you are a corporation, give:

- (1) The full name of the corporation.
- (2) The State in which you are incorporated.
- (3) The address of your principal place of business.
- (4) If you are not incorporated in the State of Connecticut, are you registered as a foreign corporation with the Office of the Secretary of State?
yes/no
- (5) The name and address of your Agent for Service of Process.

- (6) The names and addresses of corporate officers.
- (7) The names and addresses of all principal shareholders (those holding 10% or more of the total capital stock issued and outstanding as a percent of par value).
- (8) Has the corporation or have any of its officers or principal shareholders ever filed for voluntary bankruptcy? If so, attach an explanation as to who filed, where, when, and why.
yes/no
- (9) Does the corporation or do any of its officers or principal shareholders have a present intention to file for voluntary bankruptcy? If so, attach an explanation as to who will file and why.
yes/no
- (10) Has the corporation or have any of its officers or principal shareholders ever been placed in receivership? If so, attach an explanation of who was so placed, by whom, when, where, why.
yes/no
- (11) Have involuntary bankruptcy proceedings ever been instituted against the corporation or any of its officers or principal shareholders? If so, attach an explanation of who instituted the proceeding, against whom, where, when, why.
yes/no

- E. If you are other than an individual, corporation, or partnership, attach a detailed explanation of your identity as an applicant for this facility.

SECTION III

NOTE: This section should be completed by the owner of the facility being applied for.

1. A. What is the nature of your ownership interest in the facility and the land upon which the facility will be located? (Check one)
 x Deed, Lease, Other

(1) If deed, attach a copy of said deed.

(a) Is this deed recorded? Yes (yes or no)

(b) If so, where? (include volume, page)

Waterbury, Volume 1545, Page 072

(c) Attach the names and address of any person or persons having or claiming any interest in said land or facility other than those specified in said deed. Include an explanation of the nature of such interests or claims e.g. mortgage, lien, lease, contract, option, right of way, easement, etc. and attach a copy of all relevant documents setting forth such interests.

(2) If lease, attach a copy of said lease (If the lease is oral, set forth its essential terms including the name and address of lessor).

(a) If the lease is written, does said attached lease represent the entire agreement as between the parties to said lease?
 (yes or no)

(b) Is this lease recorded? (yes or no)

(c) If so, where? (Include volume, page)

(d) If the lease does not contain warranties or other representations of ownership by the lessor, attach a copy of the document by which the lessor asserts the right to lease said land (facility) to you..

(3) If ownership interest is asserted by virtue of something other than a deed or lease, please explain (attach copies of relevant documents).

- B. 1. Who will operate this facility? (Give name and address of certified operator)

[Vincent LoRusso
26 Rena Lane
Waterbury, CT]

mailing
address

2. What is the nature of your business relationship to the operator (if the operator is to be someone other than yourself) e.g. employee, independent contractor, joint venturer, partner, etc. _____
Attach copies of any written agreements and other relevant documents establishing your business relationship with the operator. If no such written documentation exists, set forth the essential terms of any oral agreements made which evidence the establishment of your business relationship with the operator.

SECTION IV

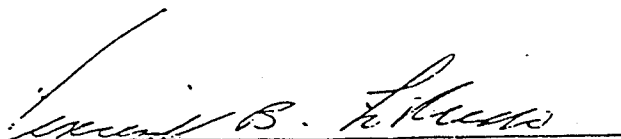
NOTE: This section should be completed by the operator of the facility being applied for.

1. Who is the owner of the subject land (facility)?
Bartholomew LoRusso, Vincent LoRusso and Bart LoRusso D/B/A
Nichols Realty
2. Have you examined this application of Nichols Realty
(Owner's name)
dated December 29 as on file? Yes (yes or no)
3. Are you in complete agreement with the representations made in and application as to the nature of your business relationship as operator for said owner? Yes (yes or no) If not, attach an explanation indicating in which respect you disagree and state your reasons.
4. Attach copies of any written agreements between you and any person other than the owner relating to the operator or proposed operation of said facility. If no such written agreements exist, state terms of any oral agreements between you and such other person relating to the operator of said facility.

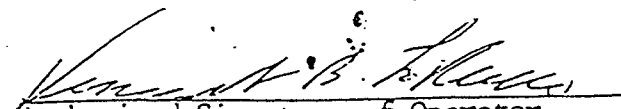
SECTION V

NOTE: Both the owner and operator of this facility must sign this section.

I certify that I have examined the above information and that to the best of my knowledge and belief, it is true and complete. (Signature subjects the owner and operator to provisions of the General Statutes regarding false and misleading statements).



Authorized Signature of Owner
Vincent B. LoRusso



Authorized Signature of Operator

APPENDIX B
TEST PIT DATA

MEMORANDUM

143

TO: WLA File DATE: December 30, 1982
FILE NO: 88-001
FROM: Michael J. Turner SHEET 1 OF 8
SUBJECT Test Pit/Piezometer Installation at LoRusso Site

1. Test Pits/Piezometers

On 12/21/82 I directed the digging of test pits and installation of temporary piezometers at the above site. A sketch cross-section of each test pit is shown on Sheets 4 through 6, following. The piezometers were 4-inch perforated PVC. A total of 7 pits were dug and 5 piezometers installed.

2. Field Survey

On 12/22/82, I obtained field survey of the location, ground surface elevation, and top of pipe elevation of each test pit/piezometer. See Field Book 91, pages 1 through 4.

3. Groundwater Elevations

On 12/22/82 and 12/27/82, I measured groundwater elevations in the piezometers. The results are shown on the Table on Sheet 7.

4. Other Observations

a. Manhole/Catch Basin

At the upstream end of the stone culvert under the embankment is a manhole/catch basin. The structure is built of 4-foot diameter concrete manhole risers, each 4' long; the top is a 4-foot diameter C.I. grate. At the bottom is an 18-inch concrete pipe to the south. Invert of the 18-inch is 12.5' down from grate. The manhole walls were dry and no stains were seen, indicating that the joints were tight.

b. South (Downstream) End Stone Culvert

I observed the downstream end of the stone culvert under the railroad. It is a 4'x4' stone culvert with ground sloping up approximately

1' at exit. I could see the 18-inch RCP by looking up the culvert indicating the culvert is not filled. There was standing water on the bottom of the culvert due to slope at the bottom of the exit. The ground downstream from the culvert appeared dry; drainage swales appeared to be in good condition.

c. Hill in Southwest Corner of Site

The mound that appears on our map at the southwest corner of the site appears to be a pile of demolition material, scrap lumber, and shot rock, probably from Connecticut Lumber. There was no evidence of ledge outcrop in the pile and there was a good stand of grass and trees atop the mound.

d. Culvert under Highland Avenue

I observed the bar screened inlet to the culvert which crosses under Highland Avenue some 150' south of Highview Street. The bar screen had an accumulation approximately 18" high x 6" thick of leaves and small sticks blocking the full width of the culvert. A catch basin above the culvert on the east side of Highland Avenue was completely filled with sand, forcing surface water to be channeled past the catch basin to the LoRusso property.

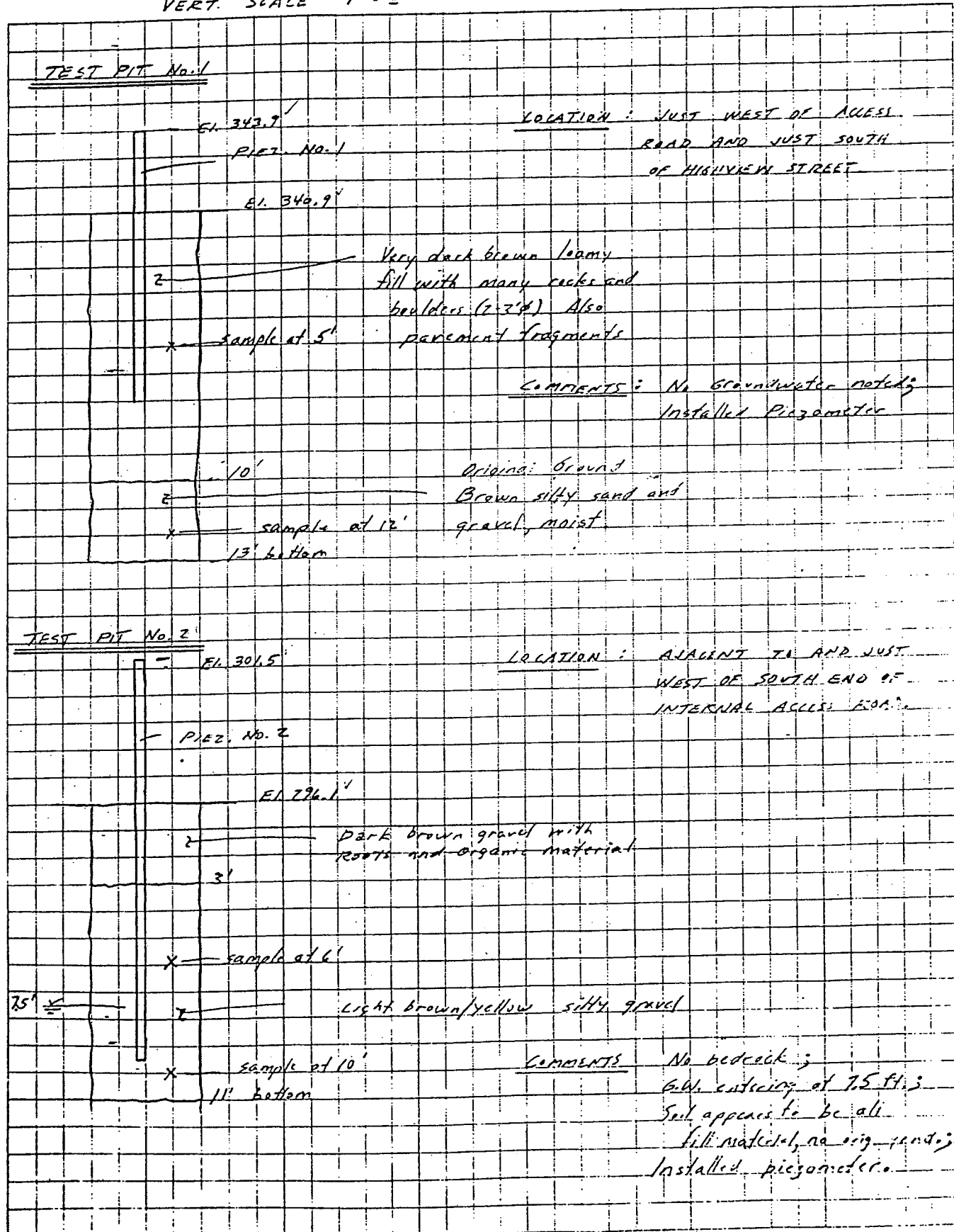
e. LoRusso Test Pits

LoRusso had dug test pits the weekend of December 18, 1982, to determine depth to bedrock. These test pits are located on the top of the slope along the east property line. These pits were left open for our survey. For identification, the pits were labeled A through I, with A being the most northerly pit. See Table, Sheet 8, for

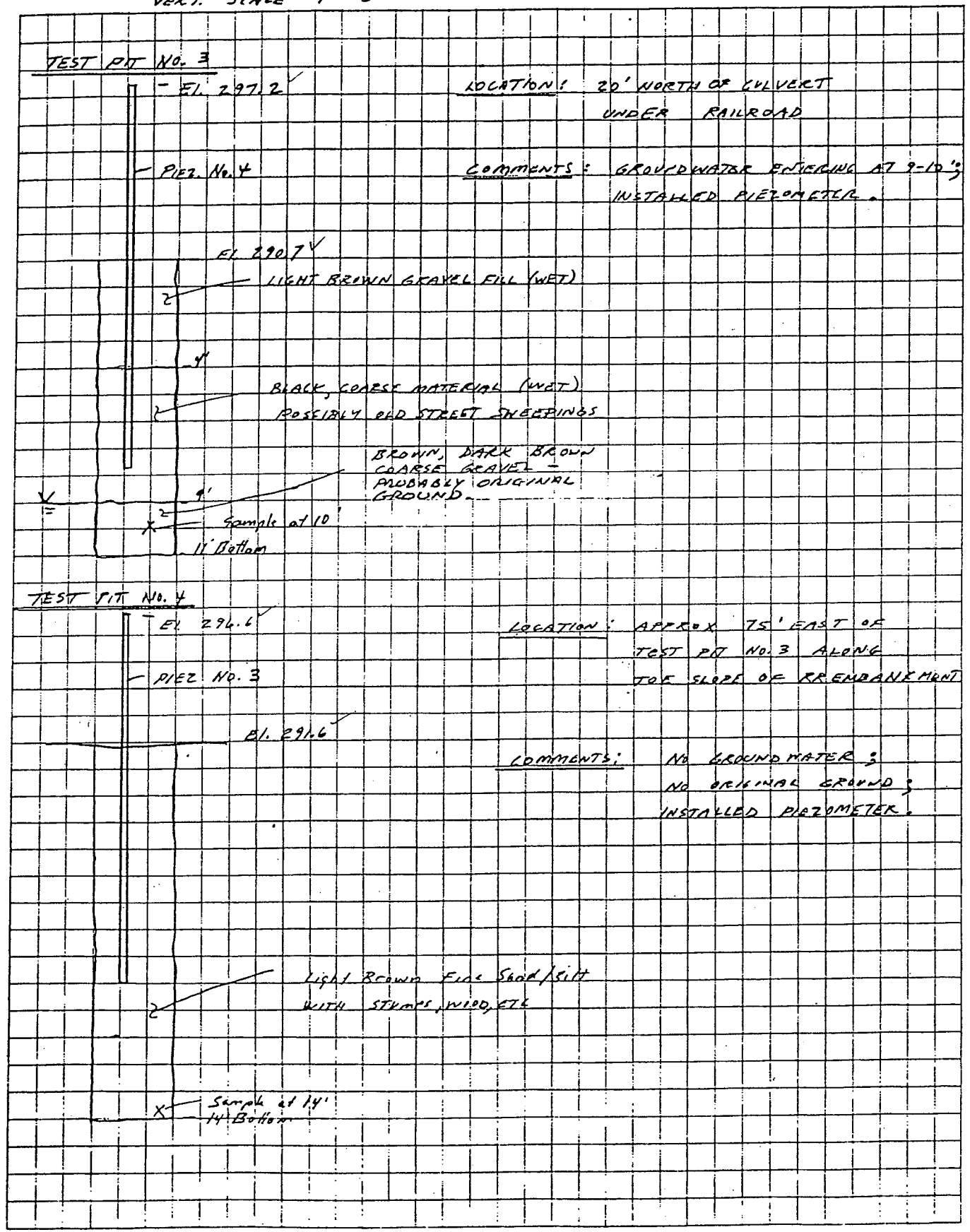
LoRusso Files
Michael J. Turner
Sheet 3 of 8

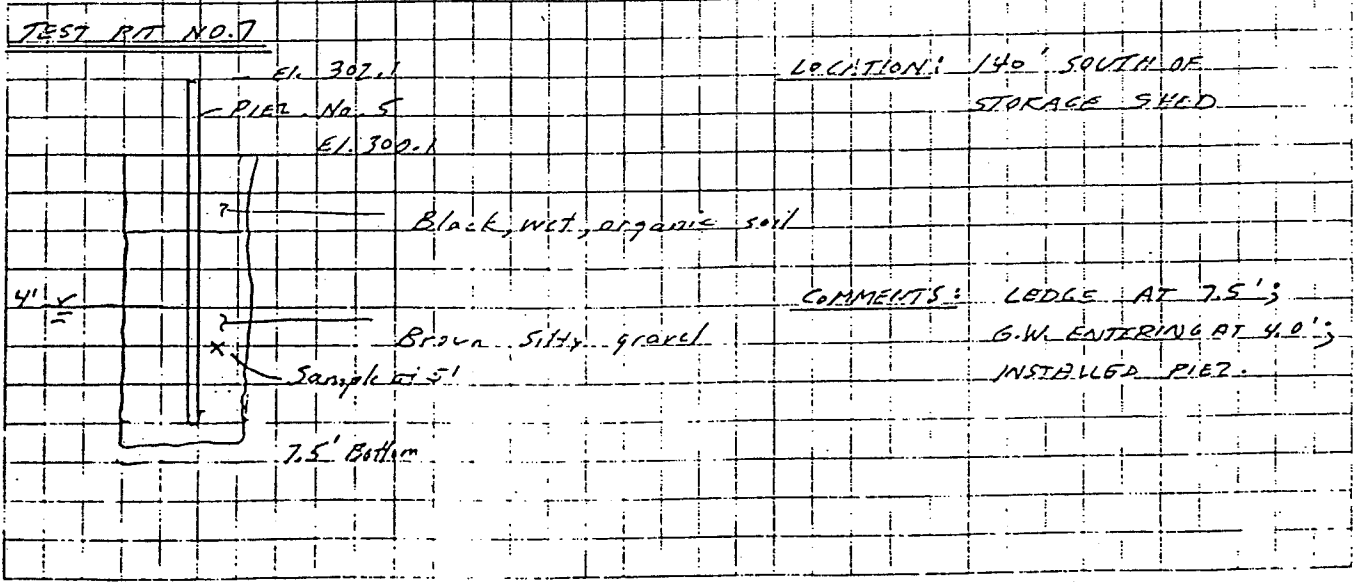
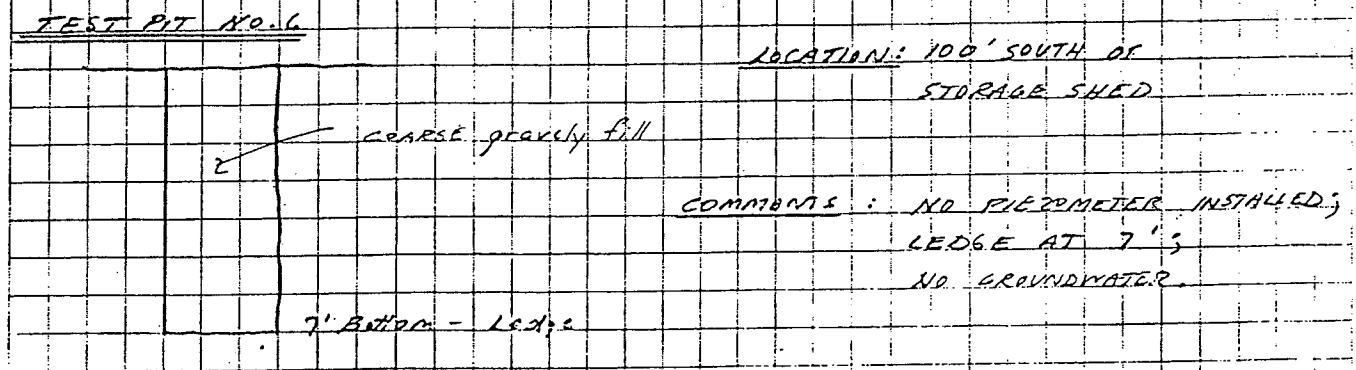
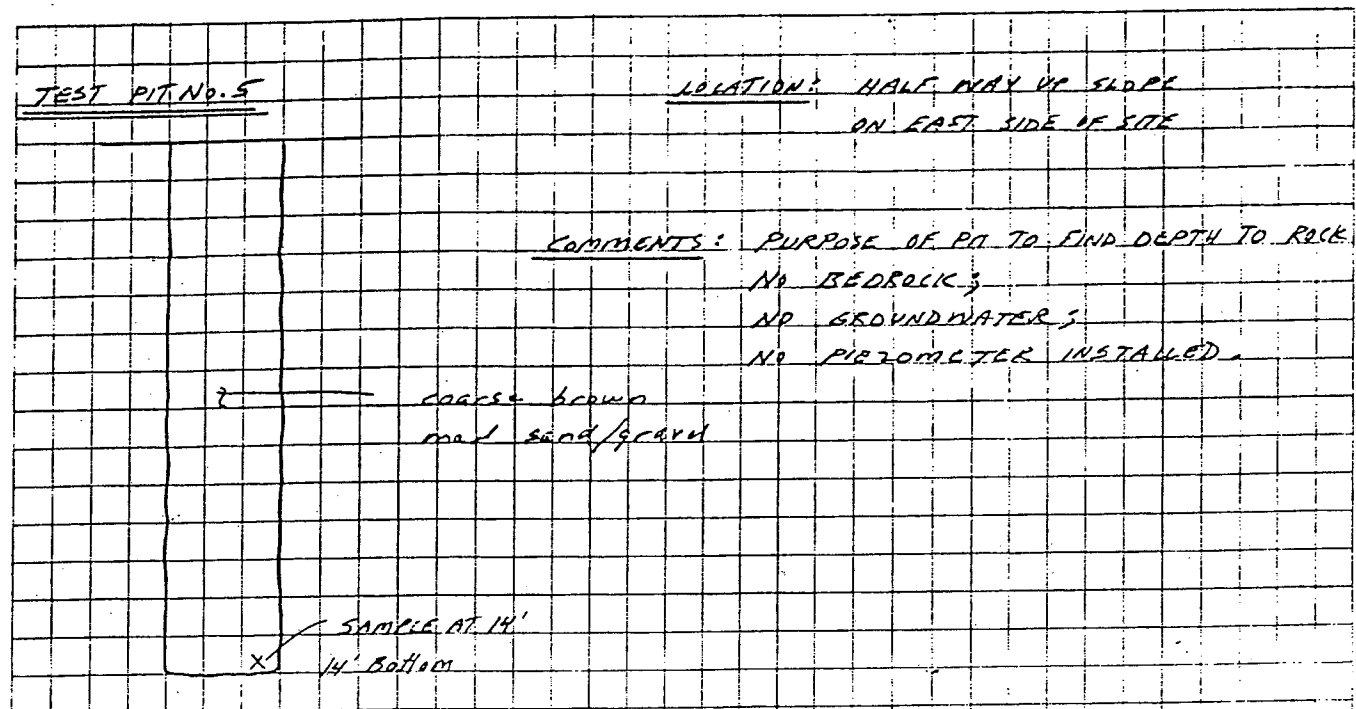
elevations. The soil appeared to be sandy gravel, depth to bedrock varied from 5.0 to 11.6 feet.

VERT. SCALE 1" = 5'



VERT. SCALE 1" = 5'





BY MJT DATE 12/30/82

ROALD HAESTAD, INC. SHEET NO. 7 OF 8

CKD BY CPK DATE 1/1/83

CONSULTING ENGINEERS
37 Brookside Road - Waterbury, Conn. 06708 JOB NO. 88-001

SUBJECT LoRusso SITE

GROUNDWATER LEVEL READINGS

TEST PIT	P.F.Z. NO.	GROUND G.L.C.K.	READING DE 12/22/82 ELEV. S.W.	DEPTH FROM GROUND	READING DE 12/21/82 ELEV. S.W.	DEPTH FROM GROUND
1	1	340.1	DRY @ 331.9		DRY @ 331.9	
7	5	300.1	298.9	1.2	300.1	0
2	2	296.1	287.4	8.7	288.1	8.0
4	3	291.6	DRY @ 282.8		287.3	8.3
3	4	290.7	284.3	6.4	284.3	6.4
MH/CB	-	289.2	276.7	12.5	276.7	12.5

↑

NOTE: AT MH/CB AT UPSTREAM END STONE CULVERT
- GATE ELEV. IS 282.2
- FULL 18" HDPE CULVERT IS 276.7

BY MIT DATE 12/3/82 **ROALD HAESTAD, INC.** SHEET NO. 8 OF 8
 CONSULTING ENGINEERS
 CKD BY JAN DATE 1/2/82 37 Brookside Road - Waterbury, Conn. 06708 JOB NO. 88-001
 SUBJECT Lo Russo Site - Lo Russo Test Pits

<u>TEST PIT</u>	<u>GROUND ELEV.</u>	<u>BOTTOM ELEV.</u>	<u>DEPTH PIT</u>	<u>COMMENTS</u>
A	350.7	339.1	11.6	Bedrock
B	349.2	341.0	8.2	"
C	346.8	337.2	9.6	"
D	345.3	334.7	10.6	"
E	347.8	338.6	9.2	"
F	347.3	341.6	5.7	"
G	347.2	339.2	8.0	"
H	345.0	340.0	5.0	"
I	334.3	326.8	7.5	"
Note: From Field Book 91, pp 1-4.				

APPENDIX C
WATER QUALITY
TEST RESULTS

REPORT OF ANALYSIS

REPORT TO: Roald Haestad, Inc.
37 Brookside Road
Waterbury, Ct. 06708
Att: George Sinclair

DATE OF COLLECTION
December 30, 1982

SAMPLE SOURCE: LoRusso Disposal Area, Waterbury

<u>Parameter</u>	<u>Well #2</u>	<u>Well #5</u>
pH	6.1	6.3
Total Dissolved Solids	82. mg/1	96. mg/1
Alkalinity (CaCO ₃)	12.0 "	20.0 "
Cyanides	.000 "	.000 "
BCD	5.4 "	7.6 "
COD	3.04 "	5.20 "
Ammonia	.056 "	.728 "
Phenols	.22 "	.29 "
Total Suspended Solids	61.5 "	38.0 "
Lead	.00 "	.00 "
Manganese	2.60 "	.56 "
Cadmium	.003 "	.004 "
Copper	.02 "	.05 "
Iron	1.42 "	.76 "
Nickel	.00 "	.00 "
Zinc	.04 "	0.50 "
Conductivity	137 micromho	166 micromho

APPENDIX D
OUTLINE SPECIFICATIONS

OUTLINE SPECIFICATIONS

A. Gravel Blanket/Diffusion Trench

Scope of Work

Furnish and place gravel blanket over former brook channel.
Install diffusion trench.

Materials

Gravel for the blanket and for backfill in the diffusion trench shall be free draining material conforming to DOT Form 812, Article M.02.07.

Compaction

Neither the gravel blanket nor trench backfill shall be compacted.

B. Permanent Groundwater Monitoring Wells A and B

Scope of Work

Furnish and install wells in soil; no rock coring required.

Well A depth estimated at 15 feet.
Well B depth estimated at 30 feet.

Materials and Procedures

See Schematic following.
See Appendix E for DEP requirements.

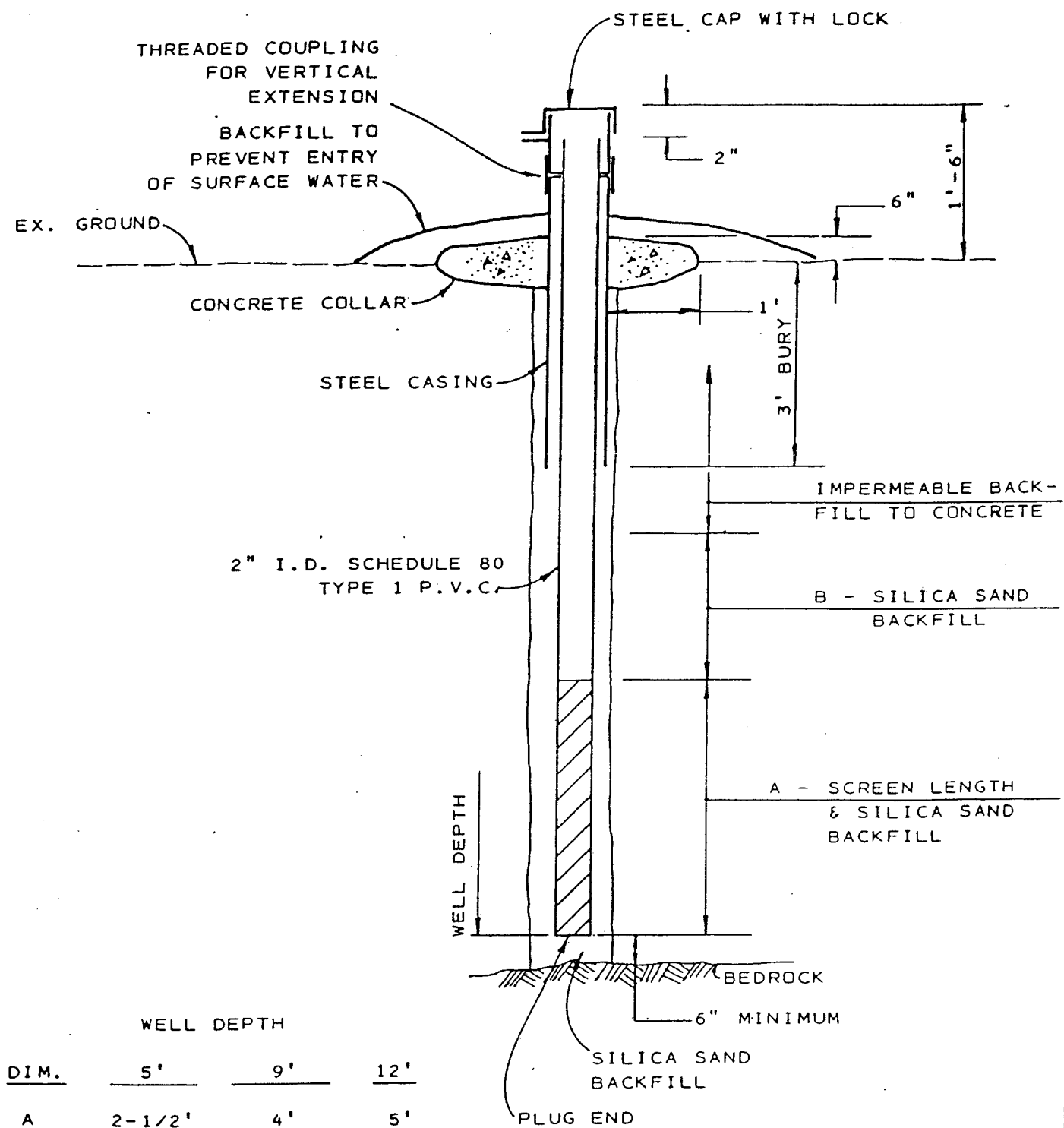
C. Final Cover

Scope of Work

Grade surface of waste to final contours, less 2 feet.
Furnish and place cover material, grade and compact to a 21 inch thickness.
Construct cut-off ditch on south slope.
Furnish and place topsoil, grade and compact to a 3 inch thickness, ready for seeding.

Materials and Procedures

Cover materials shall be GM/SM, GC/SC, or ML, according to the Unified Soil Classification System.
Compact all cover material with a minimum of three passes of a five ton vibratory roller.
Topsoil shall conform to DOT Form 812, Section M.13.01.
See schematic, following, for cut-off ditch.



APPENDIX C

WATERBURY LANDFILL ASSOCIATES
DISPOSAL AREA
GROUNDWATER MONITORING WELL

WATER QUALITY
TEST RESULTS

NOT TO SCALE

APPENDIX E

DEP TEST BORING,
MONITOR WELL AND GROUNDWATER
QUALITY SAMPLING
SPECIFICATIONS AND PROCEDURES



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

TEST BORING, MONITOR WELL AND GROUND WATER QUALITY
SAMPLING SPECIFICATION AND PROCEDURES

All test borings and monitor wells shall be constructed and installed by a reputable contractor and the work shall be supervised by an experienced engineer or geologist.

These specs do not address site specific details or objectives. Such factors as well locations, depths, screen settings and slot sizes should be discussed with the Water Compliance staff hydrogeologists at 566-3654 or 7295 before any work is started.

Test Boring and Monitor Well Specifications

A. Materials

1. Casing shall be nominal 2 inch inside diameter (minimum), Schedule 80, Type 1 Polyvinyl chloride (PVC) and shall conform to the requirements of ASTM-D 1785 of the latest revision. Screens shall be of an equal material, shall have the same nominal inside diameter as the casing and the slot size shall be based on an analysis of aquifer grain size distribution. Couplings shall be Schedule 80, threaded type, of the same nominal inside diameter as the casings and screens and shall conform to the requirements of ASTM-D 2466 of latest revision. It is noted that other pipe sizes, thicknesses and joint securing methods may be used provided the alternate method is submitted in writing and approved by the Department prior to commencing work.
2. Protective steel casing shall be standard weight, standard steel pipe conforming to the latest revision of ASTM Specification A-53. The nominal diameter shall be a minimum of 3 inches. At the Department's discretion, casing shall be equipped with a steel cap with a locking device, which shall be approved by the Department. No combination locks shall be utilized. Locks shall be Masters or Navy Standard or equal and shall be supplied with keys. American Standard pipe threads are to be utilized if the cap and pipe are to be threaded.
3. At installations selected by the Department, the screens shall be enveloped in a non-woven filter fabric by a method acceptable to the Department. Alternate filter methods such as backfill with silica sand or other approved material around the screen and/or extra well development beyond that normally required to assure continued sediment-free water may be acceptable at the discretion of the Department.

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APR 3 1981

ROALD HAESTAD, INC.
37 BROOKSIDE
WATERBURY, CT. 06703
E1

Phone:

State Office Building, Hartford, Connecticut 06115

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4. Material utilized for impermeable backfill shall be similar or equal to bentonite clay in the granular form for dry installations and in pellet form for either dry or wet installations.

B. Methods

1. Monitor well installation may be made by placement in auger holes, driven casings, hollow stem auger borings or any other approved method provided that the work is in conformance with all requirements of these Provisions. The configuration of a typical monitor well installation is shown on Figure No. 1. This work may be modified according to conditions at the time the work is in progress.
2. If soil samples are required, the equipment and methods employed must allow samples to be taken as herein described.
3. The inside diameter of the casing and screen may in no way be restricted as a result of installation practices. Failure to comply with this provision may result in rejection of the monitor well.
4. The depth of boring and elevation of placement of screen and screen length are to be determined through consultation with the Department. The use of nested well points (multi-level monitor wells) may be required dependent upon site hydrogeology.
5. Backfilling the annular space between the soil and the casing or screen shall also be carried out with the properly designated, approved material, taking care to completely fill such space, leaving no voids. Backfilling with silica sand (if selected as an alternate to the use of a non-woven filter fabric) or other approved material in the annular space around the screen, for hollow stem auger and driven casing installations, shall be accomplished as follows: The silica sand or approved material shall be poured down the space between the well casing and the auger or driven casing in sufficient quantity to complete approximately one (1) foot of backfilling. The auger or driven casing shall then be withdrawn one (1) foot. The backfilling process shall then be repeated and the auger or driven casing withdrawn for another interval. This process shall be continued until the annular space around the screen and casing is filled with the silica sand or approved material to the appropriate depth. At the ground surface, material shall be placed around the casing in a manner which will prevent the entry of surface water. See Figure No. 1 for construction details.
6. In locations where rock is expected to be encountered, borings shall be made to the rock surface. Holes shall then be continued to appropriate depth by coring with a bit that will produce a bore hole a minimum of 2½ inches in diameter. The 2 inch inside diameter PVC casing will be fitted with O-ring seals at approximately 3 inches and 2 feet 3 inches from the bottom and

inserted 3 feet into the rock. No screen shall be utilized in wells of this nature. Backfilling above rock shall be with approved material as defined elsewhere in the specifications. The design of a typical installation into the bedrock is shown on Figure No. 2.

7. Protective steel casings shall be installed to a depth three feet below existing grade and shall extend approximately 2½ feet above grade. All such casings shall be equipped with caps which fit over the outside diameter. Caps must have locking devices which shall be approved by the Department.
8. All well installations shall be numbered by steel stamping the exposed portion of the steel or plastic casing (not the cap) with a numbering system designated by the Department. The numbers shall be a minimum of one-half inch in height. Exposed casings and caps will be painted with a permanent traffic orange paint.

C. Soil Samples

1. Soil samples shall be obtained at all borings at approximately one foot below the ground surface, at the beginning of every change of stratum and at intervals of approximately five (5) feet, unless otherwise indicated through consultation with the Department.
2. Unless otherwise directed, sampling operations in unconsolidated materials shall be performed with a split tube sampler. With any boring technique, advancement of the bore hole shall be stopped at the appropriate depth and all material removed so that the sampler will not pass through disturbed material when samples are taken. Samples shall then be obtained by driving a split tube sampler 18 inches into the undisturbed material below the bottom of the casing or bore hole.

D. Alignment

All wells must, upon completion, be capable of passing a ten foot long section of pipe (a plumb) throughout their entire length. The outer diameter of the plumb shall be not more than 1/4 inch smaller than the inside diameter of the well casing and screen.

Alignment tests shall be made on all wells. Should the plumb fail to move freely throughout the length of the casing and screen, the alignment shall be corrected.

E. Monitor Well Development

Following installation, monitor wells shall be developed by an appropriate method to remove fines from the immediate surrounding material, and subsequently, to remove such material as well as any other from the casing and screen. Appropriate development consists of pumping, blowing the installation with compressed air, surging and bailing. Development by forcing water down the installation is

not acceptable. Development will continue in each well until a recharge rate satisfactory for bailing and sampling is achieved. Final approval for each well will be given by the Department.

F. Sample Collection Methods

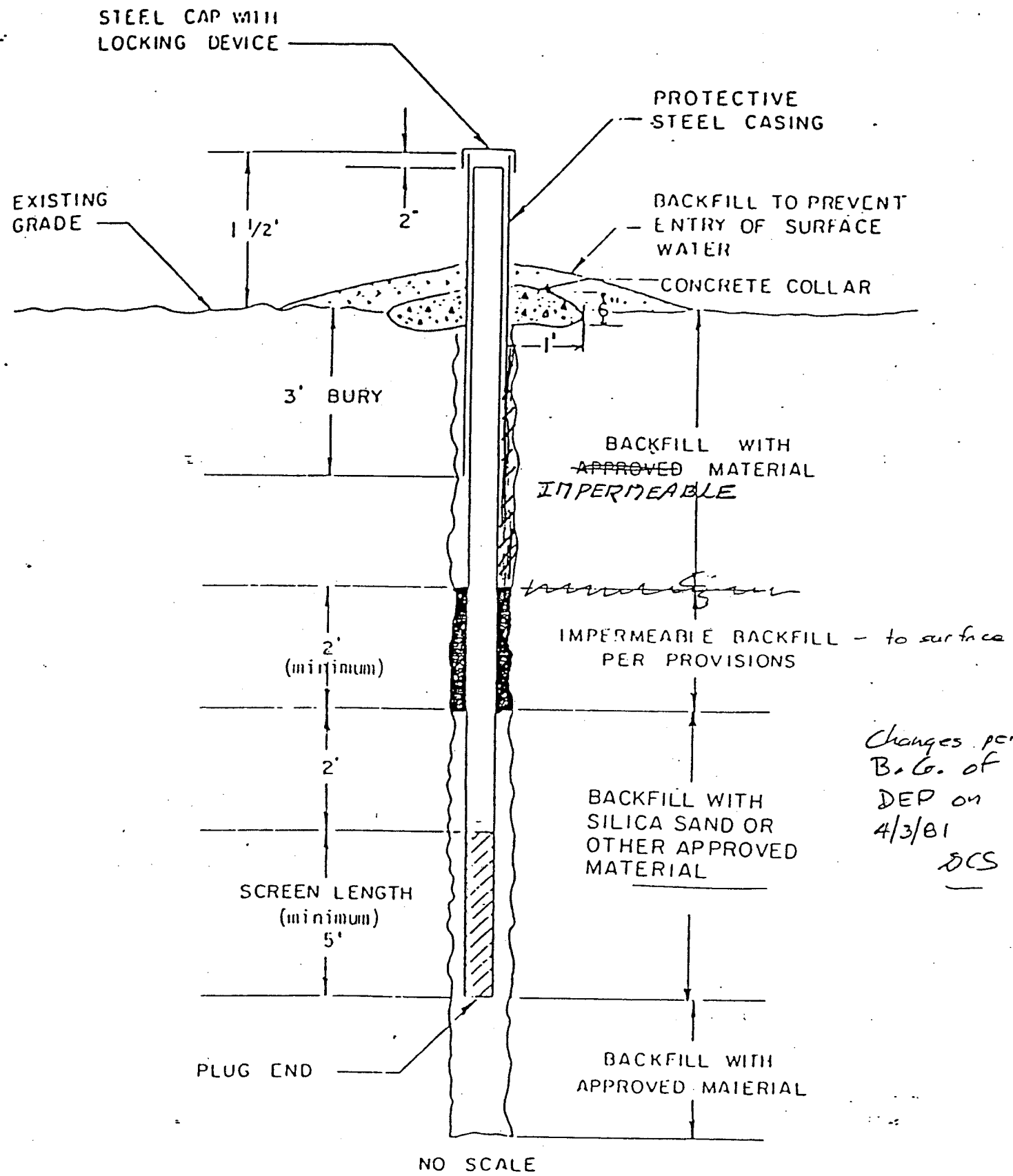
1. Sampling shall not occur until one (1) week after well development unless otherwise approved by the Department. A minimum of three (3) times the volume of water in the well casing shall be withdrawn from the well immediately prior to sample collection.
2. Sample collection materials, containers and techniques shall be such that they will not affect the quality of waters being sampled or the validity of results of subsequent analyses. Samples collected for trace volatile organic analysis are especially sensitive to collection and storage procedures. These requirements for sample collection and storage should be strictly followed:
 - a) collection samples should represent formation water and not stagnant water within the well casing;
 - b) the entrainment of air into samples should be avoided;
 - c) collection materials (bailers, pumps and tubing) should consist of materials not likely to transmit or adsorb trace volatile organics;
 - d) all collection devices should be purged and rinsed between samples;
 - e) sample containers should be specially prepared for volatile organic analysis or other specific analysis and be free of air when sealed;
 - f) samples should be analyzed as quickly as possible after collection and kept chilled at all times until analysis;
 - g) records of sampling equipment, methods and results are required as outlined in part G. below.

G. Records

Records of all information obtained shall be submitted to the Department and contain the following data:

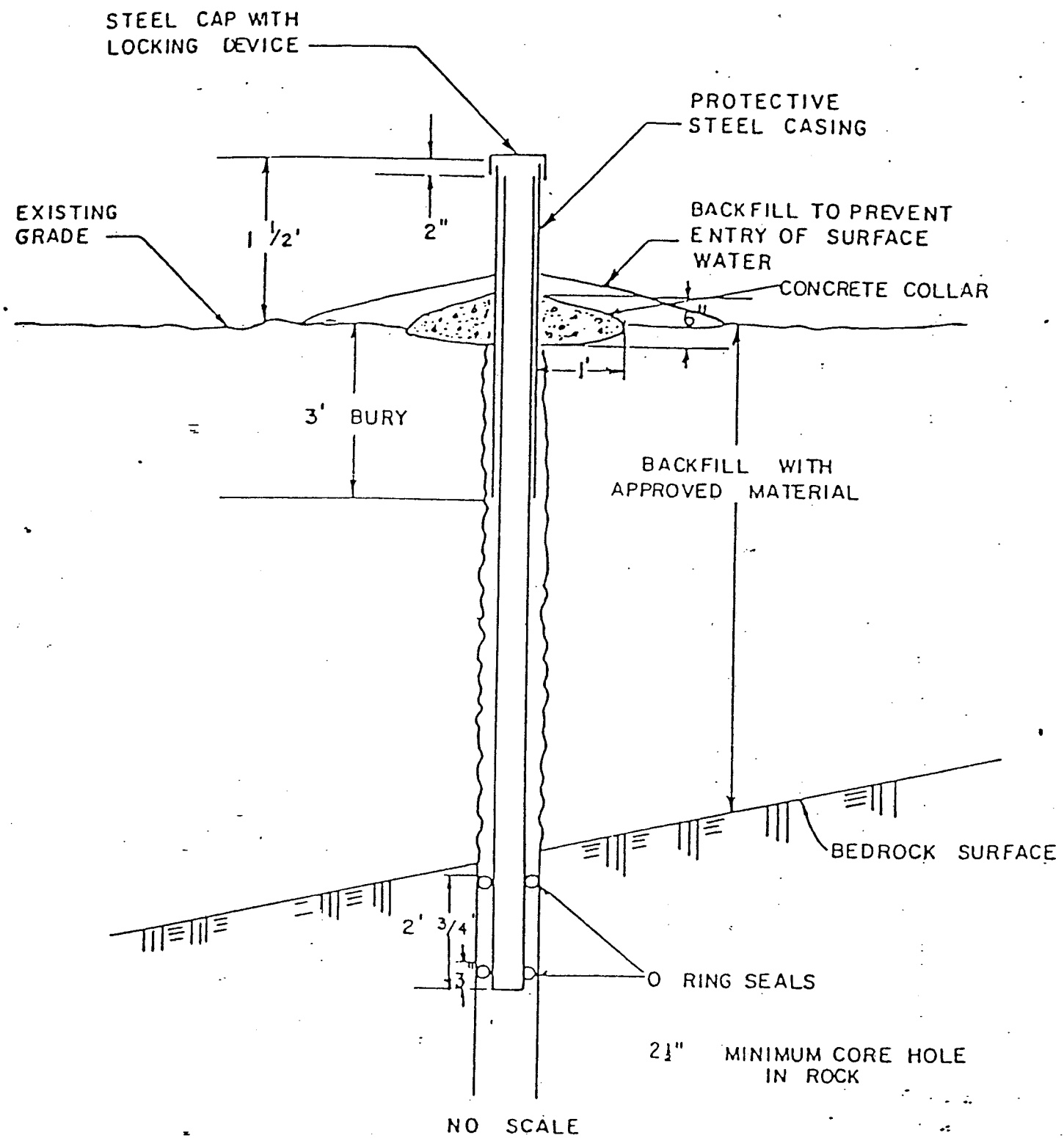
1. Detailed logs of all test borings and monitor wells
 - a) date and time;
 - b) locations and identifying numbers;
 - c) ground elevation to the nearest 0.1 foot for representative datum;

- d) boring details of each hole giving vertical thickness and classification of material penetrated;
- e) depth to bottom of hole, screened interval, water level below land surface and date and time of measurements;
- f) type and number of samples taken;
- g) height of drop and weight of drop hammer for taking drive samples;
- h) number of blows required for each 6 inch penetration of split tube sampler;
- i) method of well development and time spent in development;
- j) sampling procedures;
 - 1. size and type of samples device used;
 - 2. measures taken to obtain a representative ground water sample such as quantity of water removed from well prior to sampling and methods of cleaning/rinsing sampler between samples;
 - 3. sample container: size, type and method of preparation.
- k) name of person(s) recording results and/or collecting samples;
- l) location and/or availability of well cap lock keys.



*Changes per
B.G. of
DEP on
4/3/81
JCS*

TYPICAL
MONITOR WELL
INSTALLATION



TYPICAL
MONITOR WELL
INSTALLATION
IN BEDROCK
 Figure No. 2

APPENDIX F
COST ESTIMATES

SUBJECT WLA Site - ESTIMATED COSTS

ITEM OF WORK	Units Price	Est. Cost
Annual Groundwater Monitoring Costs:		
Laboratory Costs		
July Tests -		
Cost to test for 12 parameters = \$120;		
x 2 wells = \$240		
Oct., Jan. + April tests - for specific		
= conductance only @ \$5 per test		
2 wells x 3 tests @ \$5 = \$30		
Total Lab cost		\$270
Manpower Requirements		
Bail 2 wells (see Appendix E); ob-		
tain samples and deliver to lab;		
Est. 6 hr. 4 times per year =	24 hrs	
Review 4 sets of test results		
and forward to DEP =	8 hrs	
Admin. + misc.	4 hrs	
Total hours		36 hrs

APPENDIX G
PRIOR CORRESPONDENCE

Interdepartment Message

SAVE TIME: Handwritten messages are acceptable.
 Use carbon if you really need a copy. If typewritten, ignore faint lines.

STO-200 REV 5-81 (Stock No. 6938-050-01)

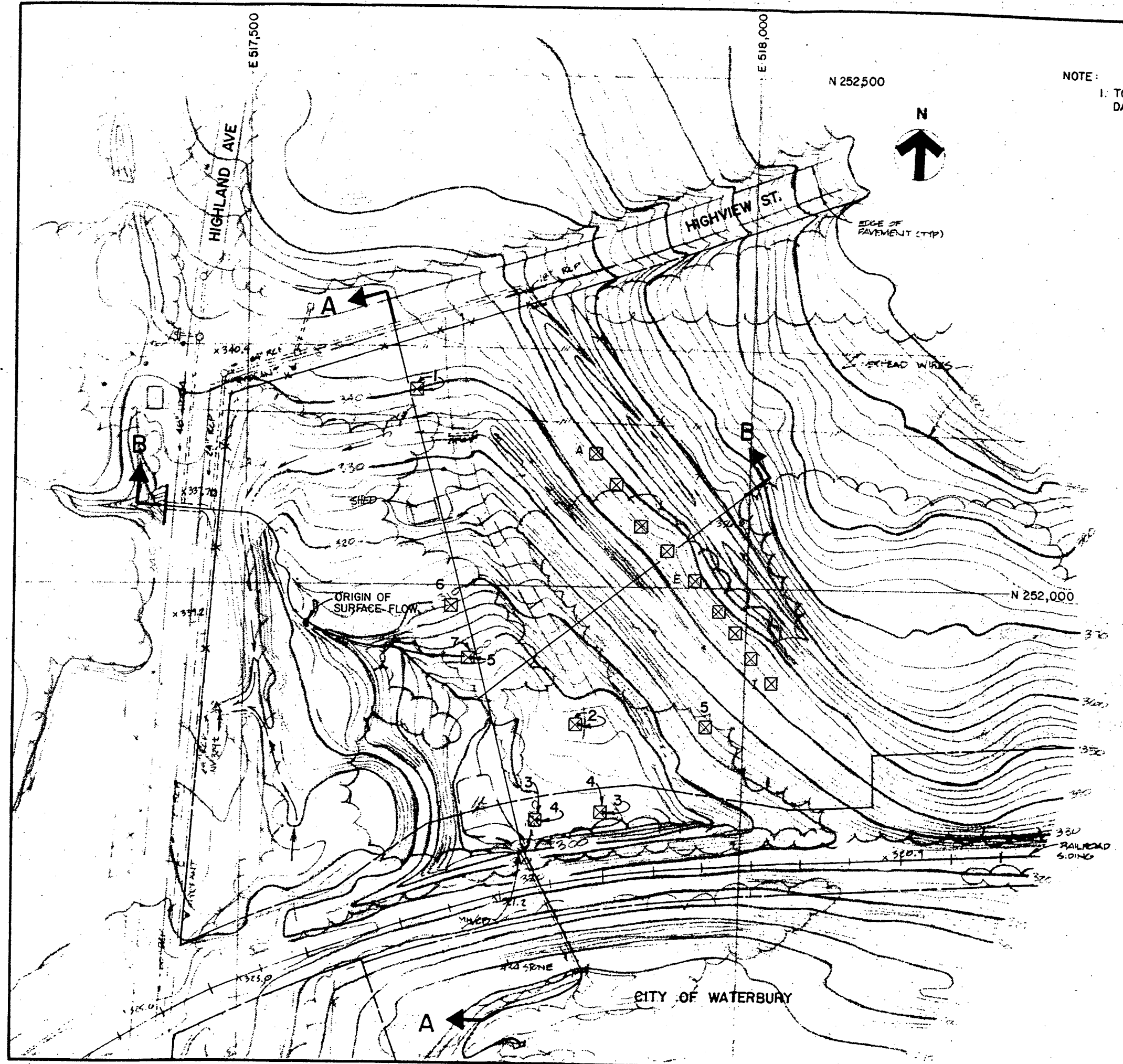
To	NAME John England	TITLE Senior Environmental Analyst	DATE 10/19/82
	AGENCY DEP/Solid Waste	ADDRESS	
From	NAME Doug Cooper <i>D. Cooper</i>	TITLE Chief, Inland Wetland	TELEPHONE 7280
	AGENCY DEP/Water Resources Unit	ADDRESS	
SUBJECT RE: Proposed Land Fill, Highland Avenue, Waterbury, Ct.			

Members of this Unit have reviewed the proposed fill as referenced above and as noted on the map titled "79 - 261, Waterbury, New Haven, 1" = 100', 2', Line 1 - 4 & 5". The area has been heavily disturbed and is not considered to contain any wetlands and/or watercourses as per Sections 22a-36 through 45 of the Connecticut General Statutes. Therefore, no permits shall be required from this Office for the current proposal.

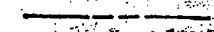
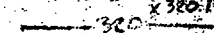

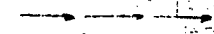
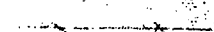


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SOLID WASTE COMPLIANCE
 Dept. of Environmental Protection
 RECEIVED

NOTE:
1. TOPOGRAPHY IS AERIAL MAPPING, DATE OF FLIGHT 12/9/79;
DATUM IS U.S.G.S.; COORDINATES ARE STATE OF CONN. SYSTEM.



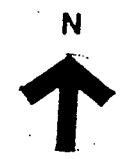
LEGEND

-  PROPERTY LINE
-  EX. CONTOUR AND SPOT ELEVATION
-  EX. DITCH DRAINAGE
-  EX. FENCE
-  EX. STORM DRAIN WITH C.B. AND M.H.
-  TEST PIT AND NUMBER
-  PIEZOMETER AND NUMBER

**WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
 TEST PIT / PIEZOMETER
 LOCATIONS**
 SCALE: 1" = 100'
 ROALD HAESTAD, INC. JANUARY 1983

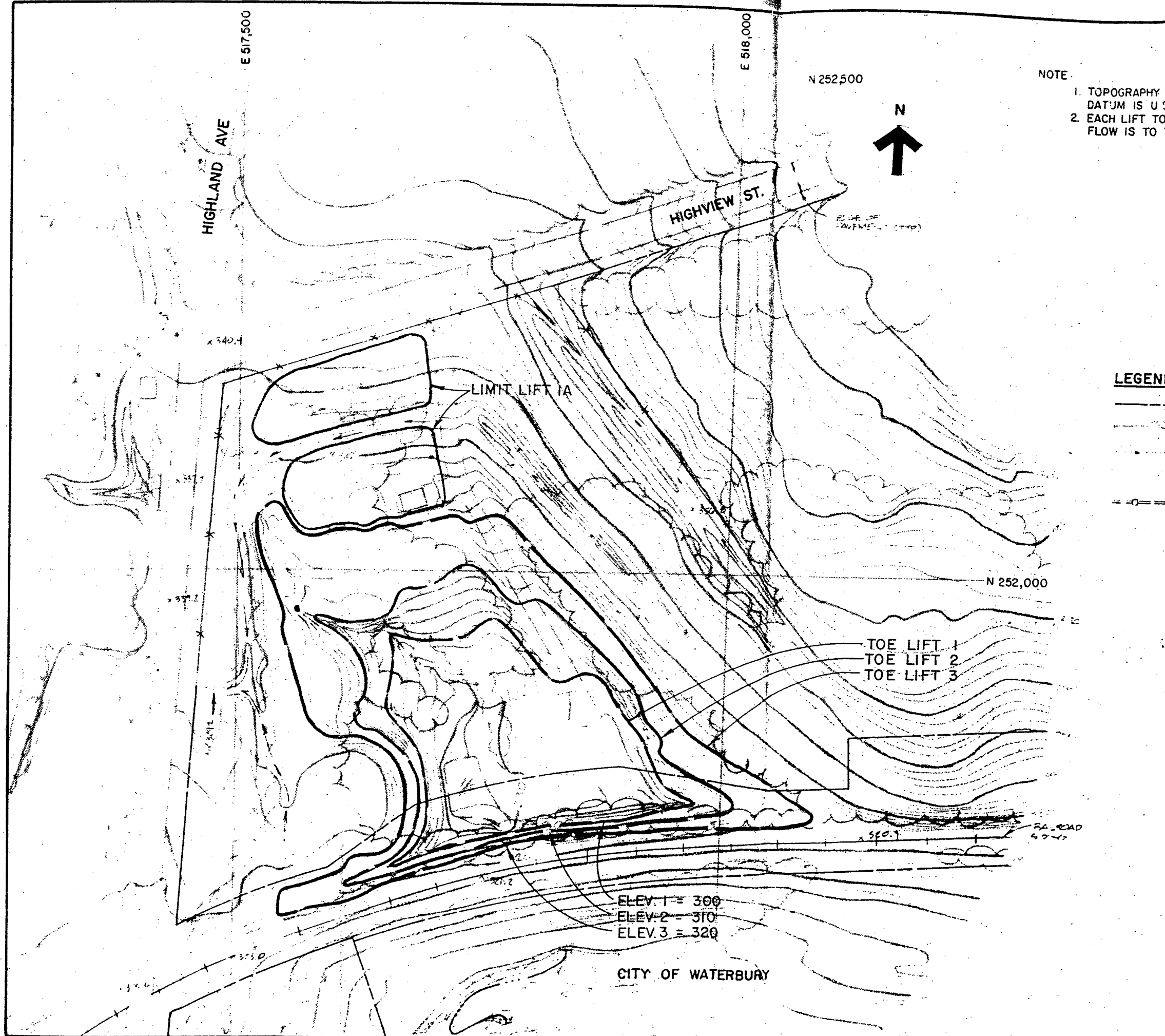
NOTE

1. TOPOGRAPHY IS AERIAL MAPPING, DATE OF FLIGHT 12/9/79; DATUM IS U.S.G.S.; COORDINATES ARE STATE OF CONN. SYSTEM.
2. EACH LIFT TO BE 10' DEEP; BUILD LIFT SUCH THAT THE SURFACE FLOW IS TO THE SOUTH.



LEGEND

- — — — — PROPERTY LINE
- - - - - EX. CONTOUR AND SPOT ELEVATION
- - - - - EX. DITCH DRAINAGE
- - - - - EX. FENCE
- o - o - o - EX. STORM DRAIN WITH C.B. AND M.H.

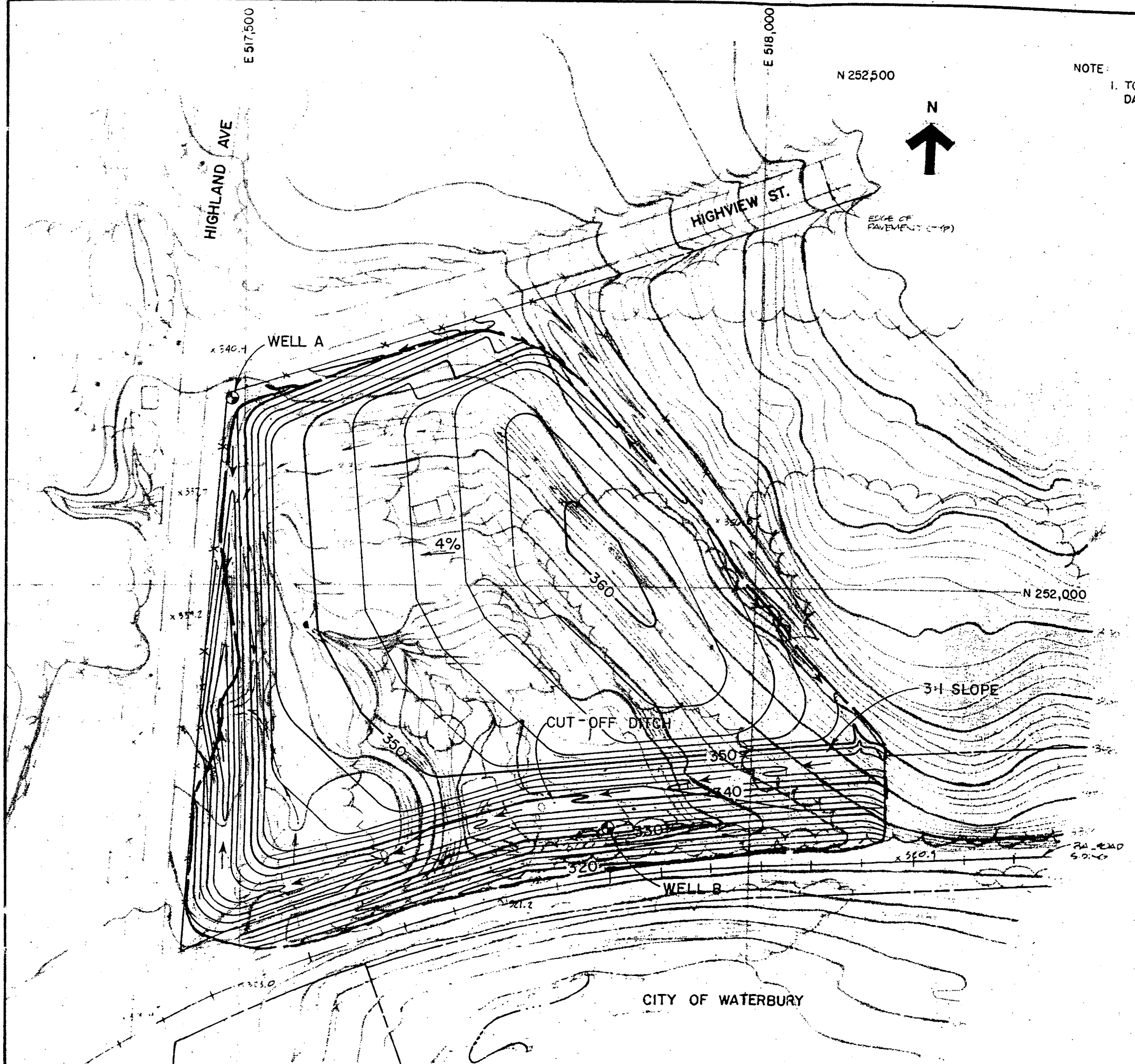


**WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA**


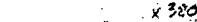
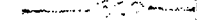
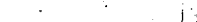
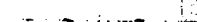
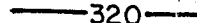



LIFTS 1, 1A, 2 AND 3

 SCALE: 1" = 100'
 ROALD HAESTAD, INC. JANUARY 1983

NOTE:
1. TOPOGRAPHY IS AERIAL MAPPING, DATE OF FLIGHT 12/9/79;
DATUM IS U.S.G.S.; COORDINATES ARE STATE OF CONN. SYSTEM.



LEGEND

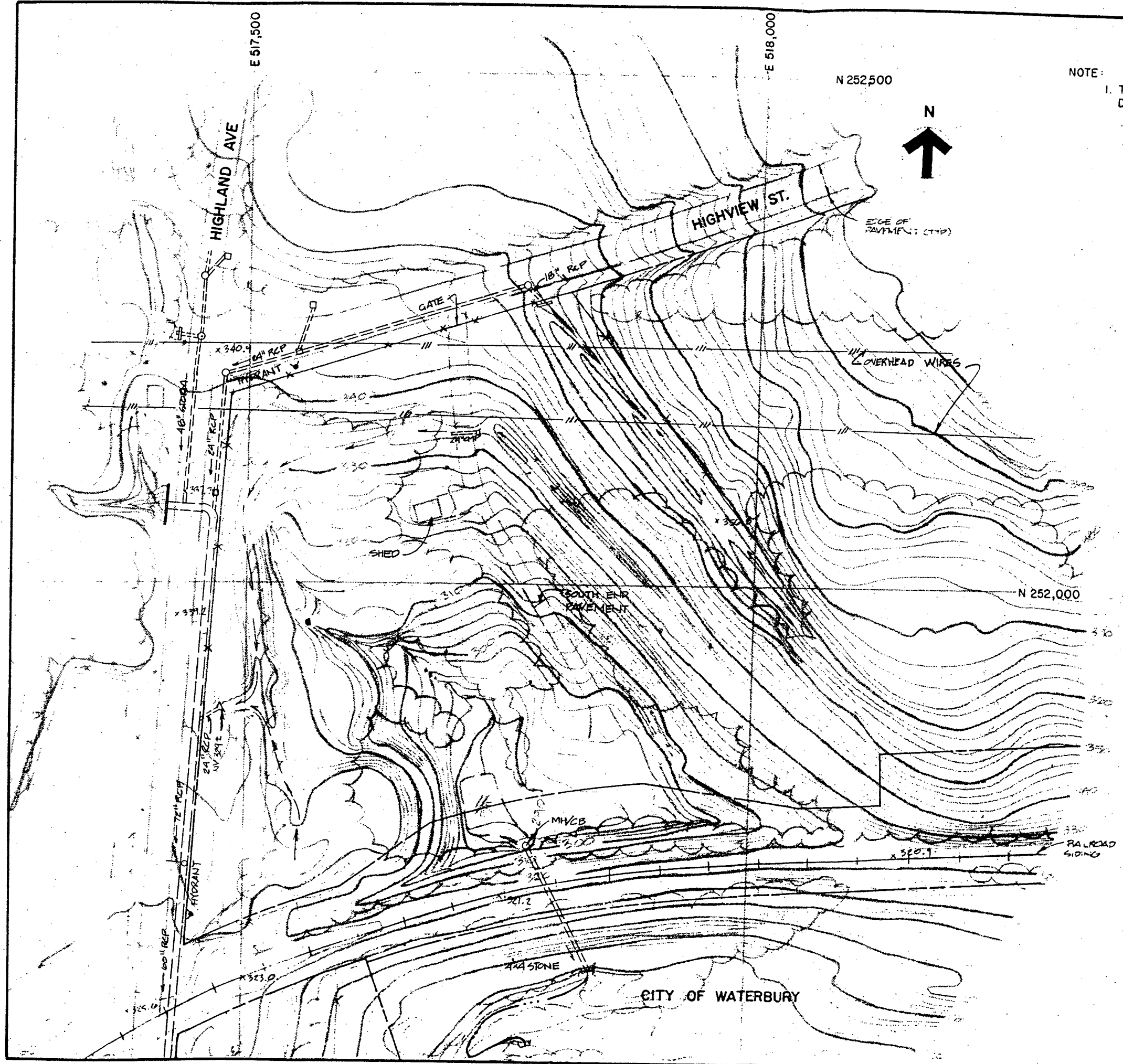
-  PROPERTY LINE
-  EX. CONTOUR AND SPOT ELEVATION
-  EX. DITCH DRAINAGE
-  EX. FENCE
-  EX. STORM DRAIN WITH C.B. AND M.H.
-  320 FINAL CONTOUR AND SPOT ELEVATION
-  PROP. DITCH DRAINAGE
-  LIMIT OF WASTE
-  PERM. GROUNDWATER MONITORING WELL

**WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
 FINAL GRADES**

SCALE: 1" = 100'

ROALD HAESTAD, INC. JANUARY 1983

NOTE:
1. TOPOGRAPHY IS AERIAL MAPPING, DATE OF FLIGHT 12/9/79;
DATUM IS U.S.G.S.; COORDINATES ARE STATE OF CONN. SYSTEM.



LEGEND

	PROPERTY LINE
	EX. CONTOUR AND SPOT ELEVATION
	EX. DITCH DRAINAGE
	EX. FENCE
	EX. STORM DRAIN WITH C.B. AND M.H.

SOLID WASTE COMPLIANCE
 Dept. of Environmental Protection
RECEIVED
 JAN 10 1983

ANSWERED _____
 REFERRED _____
 FILED _____

WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
 EXISTING
 SITE CONDITIONS

SCALE: 1" = 100'

ROALD HAESTAD, INC. JANUARY 1983

E 517,500

E 518,000

N 252,500

NOTE:

- 1. TOPOGRAPHY IS AERIAL MAPPING. DATE OF PHOTOGRAPHIC MAPPING IS U.S.G.S. COORDINATES ARE STATE PLANE
- 2. EACH LIFT TO BE 10' DEEP; BUILD LIFT SUCH THAT FLOW IS TO THE WEST



HIGHLAND AVE

HIGHVIEW ST.

EDGE OF PAVEMENT (CMP)

LEGEND

- PROPERTY LINE
- - - EX. CONTOUR AND SPOT ELEVATION
- - - EX. DITCH DRAINAGE
- - - EX. FENCE
- - - EX STORM DRAIN WITH C&B AND MM

N 252,000

TOE LIFT 4
 TOE LIFT 5
 TOE LIFT 6

RELOCATE FENCE
 TO ACCOMMODATE
 LIFT 5

PROVIDE BENCH FOR FINAL
 CUT-OFF DITCH REQUIRED
 FOR CLOSURE.

CITY OF WATERBURY

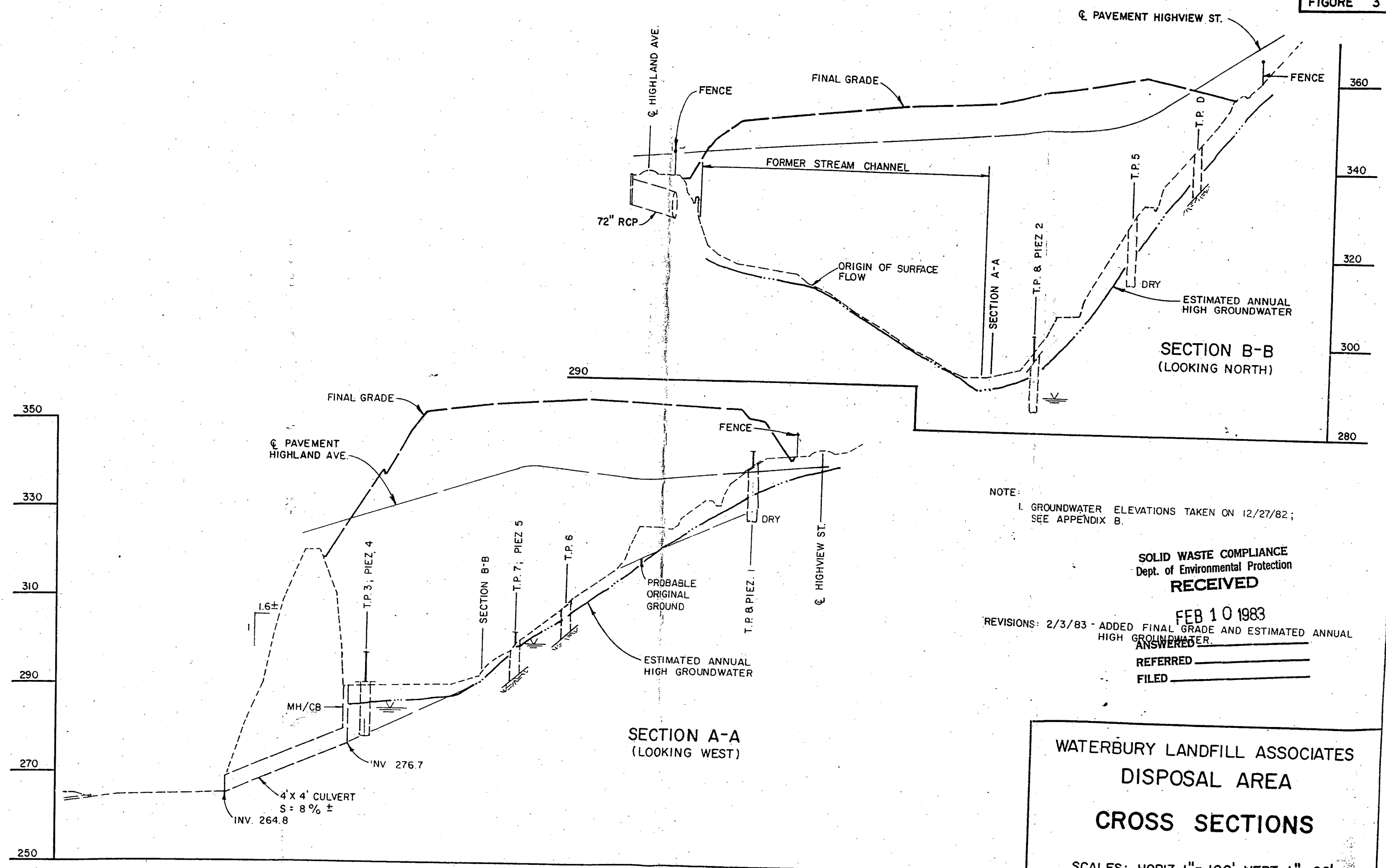
WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA

LIFTS 4, 5 AND 6

SCALE 1" = 100'

ROALD HAESTAD, INC.

JANUARY 1983



NOTE:
 1. GROUNDWATER ELEVATIONS TAKEN ON 12/27/82;
 SEE APPENDIX B.

SOLID WASTE COMPLIANCE
 Dept. of Environmental Protection
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FEB 10 1983

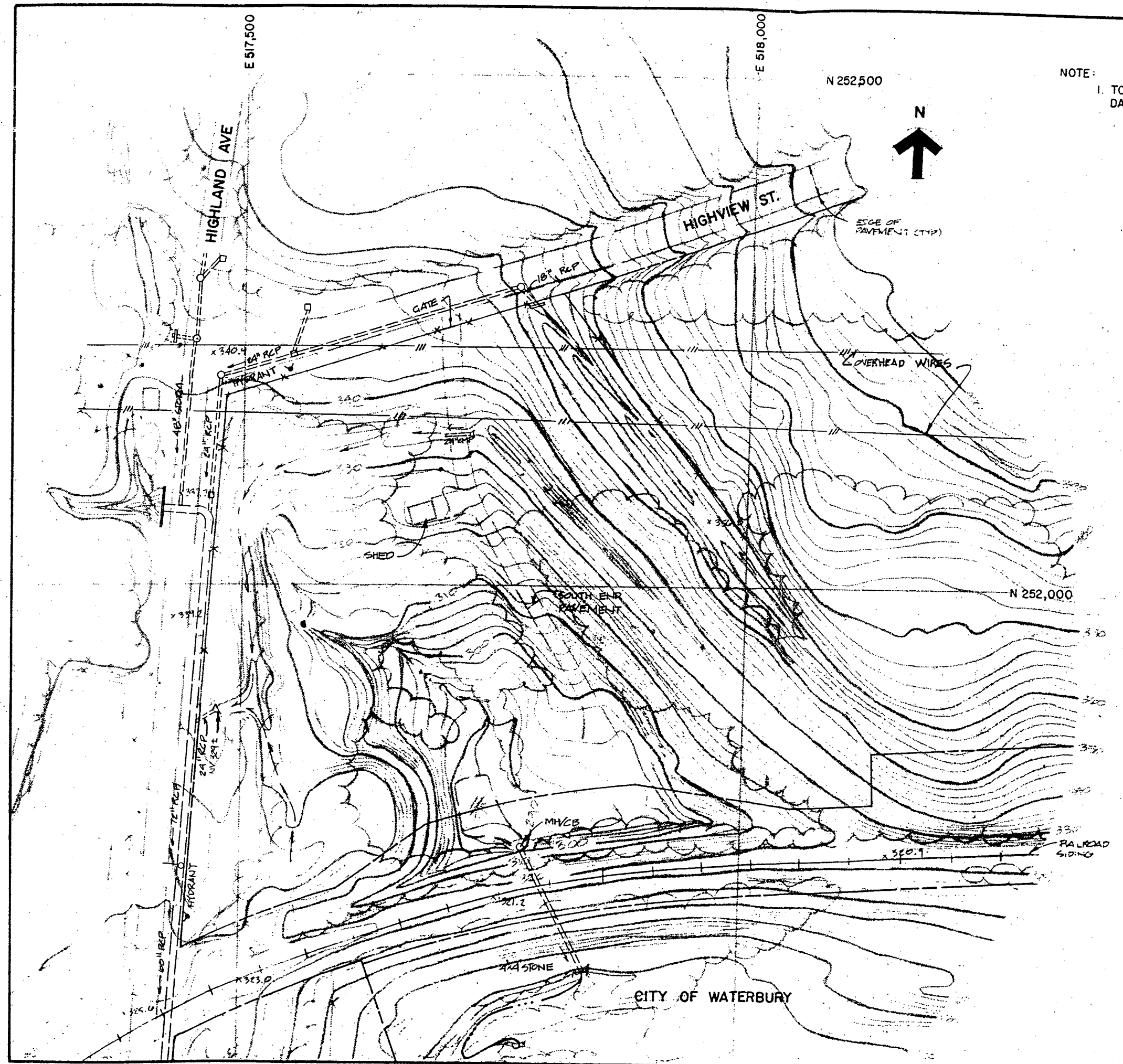
REVISIONS: 2/3/83 - ADDED FINAL GRADE AND ESTIMATED ANNUAL HIGH GROUNDWATER.
 ANSWERED _____

REFERRED _____
 FILED _____

WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
CROSS SECTIONS

SCALES: HORIZ. 1" = 100', VERT. 1" = 20'
 ROALD HAESTAD, INC. JANUARY 1983

NOTE:
1. TOPOGRAPHY IS AERIAL MAPPING, DATE OF FLIGHT 12/9/79;
DATUM IS U.S.G.S.; COORDINATES ARE STATE OF CONN. SYSTEM.



- LEGEND**
- — — — — PROPERTY LINE
 - — — — — EX. CONTOUR AND SPOT ELEVATION
 - — — — — EX. DITCH DRAINAGE
 - — — — — EX. FENCE
 - — — — — EX. STORM DRAIN WITH C.B. AND M.H.

SOLID WASTE COMPLIANCE
 Dept. of Environmental Protection
RECEIVED
 JAN 10 1983

ANSWERED _____
 REFERRED _____
 FILED _____

WATERBURY LANDFILL ASSOCIATES
 DISPOSAL AREA
 EXISTING
 SITE CONDITIONS
 SCALE: 1" = 100'
 ROALD HAESTAD, INC. JANUARY 1983



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Solid Waste Management

December 2, 1982

RECEIVED
DEC 7 1982
ROALD HAESTAD, INC.
37 BROOKSIDE ROAD
WATERBURY, CT. 06708

Mr. Vincent LoRusso
Bart LoRusso & Sons, Inc.
109 Nichols Drive
Waterbury, Connecticut 06708

Dear Mr. LoRusso:

This letter will briefly summarize the meeting held in Hartford on November 18, 1982 between you, George Sinclair of Haestad, Inc., Paul Marin of the Water Compliance Unit, and John England of the Solid Waste Management Unit. You had requested the meeting to discuss the feasibility of waste disposal on 7 acres of property located off Highland Avenue in the southern part of Waterbury. In the past, the city held a permit to dispose of incinerator residue on the same parcel, but that permit was revoked in 1980.

The DEP is familiar with the geology, hydrology, topography and other physical characteristics of this property, and how they relate to present siting criteria for solid waste disposal areas. As we discussed, the site does not appear to meet the criteria for disposal of certain wastes. Neither the Solid Waste Management nor Water Compliance Unit feel the property is permittable for disposal of mixed solid waste. Mixed wastes can include municipal refuse, incinerator residue, fly ash, wire insulation, or certain non-hazardous sludges. This is not to say that you cannot apply for the necessary permits, but only that the DEP does not feel the site meets the State siting criteria (in conformance with the proposed ground and surface water classification).

On a preliminary basis, the property does appear to meet the criteria to be permitted as a bulky waste disposal area. Bulky wastes include brush, stumps, leaves, demolition, and tires (non-putrescible wastes of "natural" origin). As discussed, bulky waste disposal areas are permitted under less stringent criteria than mixed waste landfills because they generate a less potent leachate. Only one DEP permit from the Solid Waste Management Unit is needed for a new bulky waste landfill on this property (the wetlands issue has been resolved).

As your engineer is aware, substantial site plans and operational details will be needed to accompany the permit application. Some of the concerns we discussed for this property include:

1. impact of filling on abutters (ie. - railroad);
2. plugging the under drain;
3. determining maximum high water table and elevation of backfill needed;

Phone:

State Office Building, Hartford, Connecticut ~~06106~~ 06106

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Vincent LoRusso
Page 2
December 2, 1982

4. improved upslope surface drainage diversions;
5. delineate the potential leachate plume and show that it will not affect any water supply wells.

Upon receipt of the completed application, the DEP will be able to issue or deny a bulky waste permit for the site.

The applicant should also be aware that the solid waste guidelines, regulations, and the proposed water classification for the area are in the process of revision within the DEP. Any or all of these changes may affect the outcome of a future application for bulky waste disposal on this property.

Very truly yours,



John England
Sr. Env. Analyst

JE/cm

cc: Mr. Spallone, Waterbury Engineer
George Sinclair, Haestad
Paul Marin, Water Compliance