932021

Occidental Chemical Corporation

RECEIVED
APR 10 1995
N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9

FINAL CONSTRUCTION REPORT

BLOODY RUN EXCAVATION AND SEWER REMEDIATION

REVISION 1: MARCH 1995

Hyde Park Remedial Program

Niagara Falls, New York

PRINTED ON
MAR 29 1995

Occidental Chemical Corporation

FINAL CONSTRUCTION REPORT

BLOODY RUN EXCAVATION AND SEWER REMEDIATION

REVISION 1: MARCH 1995

Hyde Park Remedial Program

Niagara Falls, New York

MAY 1994 (ORIGINAL DATE)
REFERENCE NO. 1069 (162)
This report printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

A document entitled "Bloody Run Remediation, Protocols and Procedures for Bloody Run Excavation and Sewer Cleaning" (Work Plan) dated June 8, 1992 was submitted by Occidental Chemical Corporation (OCC) to the United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (State) for approval. Following EPA/State review and subsequent comments dated June 16, 1992, OCC submitted revised pages for the Work Plan along with its responses to comments, dated September 11, 1992. This Work Plan was produced in accordance with the "Stipulation and Judgment Approving Settlement Agreement" (Settlement Agreement), dated January 19, 1981, for the Hyde Park Landfill Site (Landfill) and included:

i) Bloody Run storm sewer cleaning/replacement procedures and protocols;
ii) Bloody Run soils excavation and backfill procedures and protocols;
iii) health and safety and air monitoring requirements; and
iv) long-term monitoring requirements.

Subsequently, OCC submitted to EPA/State a document entitled "Project Specifications - Exhibit D - University Drive Storm Sewer Replacement" (Storm Sewer Specs) dated February 1, 1993. Following EPA/State review and subsequent comments dated April 12, 1993, OCC submitted a revised document, along with its responses to comments, dated May 18, 1993. The Storm Sewer Specs were produced in accordance with the requirements of the Settlement Agreement and include the following:

i) construction of a new 24-inch diameter high density polyethylene (HDPE) spirolite storm sewer beneath University Drive from the Bloody Run culvert under University Drive to the existing RCVR #10 adjacent to Lewiston Road;

ii) excavation, transportation and disposal of NAPL-contaminated soils extending from the north end of Bloody Run under University Drive and westerly along the existing sewer to Sophomore Drive, and a

separate NAPL-contaminated area where the existing sewer crosses under Vincentian Drive;

iii) construction of sewer bedding plugs at the upstream and downstream ends of the existing sewer to prevent any potential groundwater migration via the sewer bedding material; and

iv) restoration of all affected areas to preconstruction conditions or better.

OCC contracted Sevenson Environmental Services, Inc. (SES) and Sevenson Industrial Services, Inc. (SIS) under various contracts to perform the remedial work activities on the sewer beneath Greif Bros. property, the excavation and backfilling activities in the Bloody Run north of Greif Bros. property (hereinafter referred to as the Site) and the new storm sewer construction and existing sewer abandonment along University Drive north of the Site. Conestoga-Rovers & Associates (CRA) personnel were on Site to inspect and document the work activities.

Representatives of the EPA and the New York State Departments of Health and Environmental Conservation (State) were on Site regularly to oversee the work throughout the duration of the remedial activities.

All remedial work was performed in accordance with the Settlement Agreement, the approved Work Plan, the Project Specifications, and associated drawings and documents.

This final construction report has been prepared to document the completed remedial work activities performed relative to the Bloody Run remediation and is divided into four sections as follows:

Section 2.0	Sewer Cleaning/Replacement Activities;
Section 3.0	Bloody Run Excavation and Backfilling;
Section 4.0	University Drive Storm Sewer; and
Section 5.0	Additional Storm Sewer Piping.

2.0 SEWER CLEANING/REPLACEMENT ACTIVITIES

2.1 GENERAL

The work activities outlined in the Settlement Agreement [Section H(2)(a,b)] related to the Bloody Run sewer cleaning/replacement were conducted from October 7 through 21, 1993 and were as follows:

i) cleaning of the storm sewer under the Greif Bros. building using a high pressure water jetting head with alternate applications of a porcupine and sponge pig;

ii) collection of a sample of the wash water to be analyzed for trichlorophenol (TCP) and hexachlorobenzene (HCB);

iii) removal and replacement of the storm sewer pipe and bedding between the manhole south of the Greif Bros. building and the south face of the building; and

iv) replacement of culverts across Sherman Avenue and Belvedere Avenue.

Figure 1 illustrates the portions of the storm sewer addressed by the above scope of work.

2.2 SEWER CLEANING ACTIVITIES

On October 7, 1992, SIS mobilized to the Site and began cleaning portions of the storm sewer directly south of and beneath the Greif Bros. building. The manhole directly south of the Greif Bros. property (MHA) was cleaned using a vacuum tank truck (Vac Truck) and a hand operated high pressure water jet. Traces of visible non-aqueous phase liquid (NAPL) were present in the manhole sump and were removed during cleaning. The sump of the manhole was then filled with concrete which was molded to match the wetted perimeter of the inlet and outlet pipes. This modification was

performed to facilitate better drainage through the manhole and to prevent ponding in the sump and the corners of the manhole. While cleaning/modifying the manhole, it was noted that the 21-inch inside diameter (ID) corrugated metal pipe (CMP) discharge line to the north was crushed and partially blocked.

Additionally, SIS, CRA and OCC Field Representatives performed an inspection of the manhole inside the Greif Bros. building (MHB). The manhole was found to have a 12-inch ID tributary pipe to the west, a 21-inch ID tributary pipe to the south, and a 24-inch ID outlet pipe to the north. The manhole construction also included a three-foot deep sump. The sump of this manhole was also cleaned using the Vac Truck and was subsequently filled with concrete in a manner similar to MHA. The concrete was again molded to match the wetted perimeters of the pipes to the north and west, however, as the invert of the pipe to the south was slightly higher than the other two pipes, the wetted perimeter of this pipe does not meet the molded concrete.

Following the sump modifications, SIS began cleaning the southern portion of the sewer from MHB inside the Greif Bros. building towards MHA south of the Greif Bros. property, using the high pressure water jetting system. Due to the condition of the pipe directly north of MHA, the porcupine and sponge pig was not able to be pulled through this portion of the sewer. All wash water was collected at MHB and subsequently transported to the LSTF using the Vac Truck. Any sediment collected during the cleaning was retained in the Vac Truck during water discharge and then disposed of in Waste Disposal Area No. 8 at the Landfill.

The 12-inch diameter tributary pipe to the west of MHB was cleaned next using the same procedure as previously used for the MHB to MHA portion. However, for this portion cleaning originated at a catchbasin adjacent to the south side of the Greif Bros. building and proceeded toward MHB. All sediment and wash water were collected at the catchbasin and similarly disposed of at the Landfill/LSTF.

Finally, SIS set up the cleaning equipment at the outfall on the north side of the Greif Bros. building. Cleaning of the remaining portion of the sewer was then initiated from the outfall and proceeded towards MHB using the same high pressure water jetting system. All rinse water, sediment and stone were collected from a temporary sump constructed immediately beneath the outfall. The high pressure water jetting continued until the water nozzle had reached MHB and until the effluent wash water appeared clear. During the cleaning of this northern portion of the storm sewer, a water stream was also introduced at two catchbasins/sumps inside the Greif Bros. building, which were connected to the storm sewer, in an effort to rinse the connecting lines of any sediment which may have accumulated. The sediment flushed from these catchbasins and connecting sewers was also collected at the temporary sump beneath the outfall.

SIS then proceeded to insert a 24-inch diameter porcupine and sponge pig at MHB, which was to be pulled toward the outfall. The pig was pulled to a point only 70 to 80 feet north of MHB before it became lodged. After several attempts to continue pulling the pig toward the outfall, the pig was pulled back and retrieved through MHB. The sewer was then completely rinsed once more using the high pressure water jetting head and the cleaning procedures deemed complete, pending the results of subsequent confirmatory sampling.

2.3 CONFIRMATORY SAMPLING

Following all sewer cleaning activities, a confirmatory water sample was taken of the sewer effluent to determine the effectiveness of the cleaning procedures. A steady flow of water was introduced at MHA and a sample collected from the effluent at the outfall. The sampling protocols used were as follows:

i) a new pair of nitrile gloves were worn for sample collection;
ii) water was collected directly from the outfall into a clean sample bottle (no sampling tools were used); and

iii) the bottle was immediately capped and refrigerated until delivery to laboratory.

The sample was analyzed for TCP and HCB. Neither parameter was detected at the action level of 100 parts per billion (ppb), as contained in the Settlement Agreement.

2.4 STORM SEWER REPLACEMENT

On October 28, 1992, SES mobilized to the Site and began removing the existing storm sewer between the south face of the Greif Bros. building and MHA directly south of the Greif Bros. property. Following removal of the existing RCP storm sewer pipe and bedding material, a new 21-inch diameter high density polyethylene (HDPE) pipe was installed between MHA and the south face of the building. In conjunction with the pipe installation, a new concrete manhole was installed approximately 20 feet south of the Greif Bros. building. A new catchbasin was also installed approximately 60 feet west of the replaced storm sewer, due to observed surface drainage problems in this paved area of the Greif Bros. property. This catchbasin was connected to the new Bloody Run sewer via a 12-inch diameter HDPE pipe. Figure 2 illustrates the locations of these installed pipes and structures, indicating the surveyed invert elevations for the newly installed sewer pipes.

The new 21-inch diameter HDPE storm sewer was installed at similar elevations to the previous 21-inch diameter RCP storm sewer, with connections to the existing MHA to the south and the existing pipe stub at the Grief Bros. building face to the north. All pipe connections to existing and new manholes and catchbasins were made watertight using "Link-Seal" connections at the penetration points. A fabricated watertight seal was installed by pouring a concrete ring around the connection of the new HDPE storm sewer pipe installed within the bell end of the existing RCP storm sewer pipe adjacent to the south Grief Bros. building face.

During coincident remedial work within the Bloody Run to the north, culverts under Sherman Avenue and Belvedere Avenue were removed to facilitate excavation activities. During backfilling, these culverts were then replaced using 24-inch diameter concrete culvert pipe, as requested by the Town of Lewiston.

2.5 SEWER VIDEO INSPECTION

OCC televised the line from the new manhole directly south of the Greif Bros. building to the outfall on the north side of the Greif Bros. building in order to verify the integrity of the remaining concrete sewer. The video inspection was conducted on November 6, 1992, but could not be adequately completed due to the significant quantities of stone and concrete rubble found to be present within the storm sewer beneath the Greif Bros. building. It was agreed that this accumulated material must be removed prior to a subsequent inspection being video conducted.

On November 11, 1992, Robinson Pipe Cleaning (Robinson) mobilized to the Site under subcontract to SES to commence removal of the stone remaining in the 24-inch sewer pipe beneath the Greif Bros. building. A drag bucket/winch assembly was utilized by Robinson to remove the stone as follows:

i) one winch was stationed at MHB (inside the Greif Bros. building) with a second winch stationed at the outfall (north of the Greif Bros. building);

ii) a drag bucket was connected in series to both winch cables and was inserted into the sewer pipe; and

iii) the drag bucket was then pulled back toward the outfall where the removed stone was deposited and collected.

Cleaning activities continued until the drag bucket was pulled from MHB to the outfall without stone being present in the bucket.

Following the drag bucket cleaning, the video inspection was completed simultaneously with a final high pressure water rinse. The resultant video showed the storm sewer pipe to be free from stone, debris and any other material which could restrict water flow. The concrete pipe and its joints were in good condition with only two minor leaks observed at 201 feet and 216 feet north of MHB. The quality of the water entering the pipe from those leaks was observed to be clear with no NAPL present. The quantity of leakage was insignificant as compared with the normal flow through the sewer. The video also indicated seven break-in connections at locations between 116 and 151 feet north of MHB, ranging in size from 4 to 12 inches in diameter. These laterals are believed to originate from the roof drains, floor drains and cooling water sumps of the Greif Bros. building.

2.6 ADDITIONAL CLEANING ACTIVITIES

Upon completion of the final video inspection of the main Bloody Run sewer, two contributory 18-inch diameter CMP sewers/culverts terminating to the east and west of the sewer outfall on the north side of the Greif Bros. building were washed using the high pressure water jetting nozzle. During these procedures, NAPL presence was observed along the west culvert and this pipe was subsequently removed and replaced to the northwest corner of the Greif Bros. building. All effluent water and sediment was again collected at the outfall using a Vac Truck and disposed of at the LSTF/Landfill. The removed culvert and bedding was also disposed at the Landfill.

2.7 FINAL SAMPLING

As a final measure, each of the three sewers discharging to the Bloody Run north of the Greif Bros. building were sampled as follows:

i) a flow of fresh water was introduced at an upstream point (MHA south of the Greif Bros. property for the main 24-inch sewer, a catchbasin at

the northwest corner of the Greif Bros. building for the 18-inch diameter culvert from the west, and the open swale on the east edge of the Greif Bros. property for the 18-inch diameter culvert from the east);

ii) samples were collected directly from each pipe in the outfall area using precleaned 1-liter glass bottles (no sampling tools were used); and

iii) each sample was analyzed for the HCB and TCP.

Neither parameter was detected in any of the three samples at the action limit of 100 ppb.

2.8 INSITUFORM LINING

Subsequent to all of the above remedial work on the storm sewer under the Grief Bros. building, NAPL was observed to be present within the new catchbasin installed north of the Grief Bros. following an exceptionally heavy rainfall. As a result, OCC proposed to line this portion of the storm sewer by a process called Insituform, wherein a chemical and corrosive resistant, resin impregnated tube is installed within an existing pipe. The tube is installed by inverting it inside the existing pipe and curing the thermosetting resin to create a hard, structurally sound pipe-within-a-pipe. The lining has no joints or seams and is usually stronger than the pipe it replaces. The Insituform surface offers little resistance to flow and eliminates infiltration/exfiltration. Following installation, a cutter is sent down the pipe and remotely cuts holes at predetermined locations for access to the existing sewer laterals.

Prior to Insituform installation, the existing sewer needed to be cleaned (by water jetting) and the line was subsequently inspected by remote TV video. Insituform used this video display of the pipe interior to custom manufacture the impregnated tube to fit the damaged pipe exactly. As well, this video information was used to determine the required locations for sewer lateral access holes to be cut. Insituform lining was installed from the new manhole south of the Greif Bros. building to the new catchbasin to the

north, with the lining discontinuous through MHB and all interior connections remaining in service. Following installation, Insituform performed another video inspection to verify the integrity of the lined pipe.

3.0 BLOODY RUN EXCAVATION AND BACKFILL

3.1 GENERAL

On September 28, 1992, SES mobilized the necessary equipment to the Site to begin clearing the Bloody Run area for the excavation activities. All trees and shrubs were cut off at ground surface, removed from the area and disposed of off Site. All below ground material, such as trunks or root matter, was disposed of in Waste Disposal Area No. 9 at the Landfill.

Prior to commencing excavation activities, SES contracted Fox Fence Inc. to install a wooden stockade fence along the south edge of University Drive to restrict access and visibility to the excavation area. Fox Fence also relocated the existing chain link fence around the Bloody Run beyond the proposed excavation limits, where necessary. The relocated fence and wooden stockade fence provided a continuous barrier around the excavation to restrict unauthorized entry. Gates were installed on Sherman Avenue and Belvedere Avenue east of the excavation area to allow for truck traffic to and from the excavation area. To the west of the excavation area, these roads were blocked by the continuous fence. The locations of the stockade and relocated fences are shown on Figure 3.

A stone haul road was installed along the east edge of the proposed excavation limits inside the chain link fence. The stone haul road facilitated access to the excavation for all truck traffic throughout the excavation activities and was maintained as part of the "clean" zone, while the excavation itself was delineated as the "dirty" zone. All waste haulers were stationed in the "clean" zone while being loaded. All loading was performed by a trackhoe stationed within the "dirty" zone, with the necessary precautions taken to ensure that excavated material only contacted the interior bed of the waste haulers. Upon completion of excavation and clay backfilling activities, the stone haul road was removed prior to final landscaping and the stone disposed of at the Landfill. The stone haul road location is shown on Figure 3.

Prior to excavation, the Bloody Run storm sewer was plugged at the outfall north of the Greif Bros. building to prevent surface water flow into the construction area. By-pass pumping was provided to direct this water around the excavation area to the University Drive storm sewer. The plug and pump were inserted into the newly installed manhole directly south of the Greif Bros. building. All flows originating within the Greif Bros. building were isolated and temporarily rerouted to the building's sanitary sewer to prevent discharge to Bloody Run.

The proposed horizontal and vertical excavation limits were field-located by SES using baseline reference points along approximate 50-foot cross-section intervals previously set by surveyors from McIntosh & McIntosh P.C. Survey grade stakes were set along each cross-section indicating the proposed vertical excavation depths and delineating the horizontal limits of excavation.

Exact vertical and horizontal excavation limits varied at times and were based on the following field conditions: excavation continued until the proposed horizontal and vertical limits were reached, or until visible contamination was no longer observed, or until the bedrock surface was contacted and continued excavation was infeasible. The final recorded excavation limits along 17 cross-sections are presented in the Record Drawings, as listed below:

Drawing No.	*Title*
1RD	Final Grading Plan
2RD	Cross-Sections AA1, AA2, A, AB1, AB2 and AB3
3RD	Cross-Sections B, BC1, BC2, BC3 and C
4RD	Cross-Sections CD1, CD2 and CD3
5RD	Cross-Sections D, DD1 and DD2

3.2 EXCAVATION ACTIVITIES

On November 9, 1992, SES commenced excavation activities at Bloody Run (Cross-Section AA1) along the north edge of Greif Bros. building. Some visible discoloration was noted in the surficial soils at Cross-Section AA1 and beneath the 18-inch diameter CMP sewer entering from the west. As a result, the 18-inch diameter CMP was removed and replaced back to the catchbasin at the northwest corner of the Greif Bros. building. All excavated material including the culvert pipe was disposed of in Waste Disposal Area No. 9 at the Landfill. During installation of the new 18-inch diameter CMP, several clay plugs were installed and compacted around the entire pipe to restrict any possible liquid migration along the new pipe bedding. Clay was also compacted adjacent to the existing catchbasin.

The visible discoloration in the surficial soils noted along Cross-Section AA1 was no longer visibly observed to be present as the excavation progressed northward across Sherman Avenue. However, as excavation activities proceeded further north across Belvedere Avenue, a larger additional area of visible discoloration was noted between Cross-Sections C and DD2, primarily at locations beneath the Bloody Run. Several individual areas of visible discoloration between Cross-Sections D and DD1 extended to the top of the bedrock surface. Any visible seams which extended beyond the proposed excavation limits in the overburden materials were excavated entirely. All over-excavation was done at the direction of OCC, CRA and EPA/State Site Representatives. At the northernmost edge of the excavation (north of Cross-Section DD2), a two-foot thick visible seam was detected. The seam was located approximately 10 to 12 feet below the existing University Drive pavement grade and extended horizontally from the storm sewer inlet to a point approximately 70 feet east of the inlet. The seam appeared to continue beneath University Drive and was therefore left in place. It was agreed that this material would be removed at a later date, i.e., during excavation for the installation of the new storm sewer along University Drive. Bloody Run excavation activities were completed on January 26, 1993 and the total excavation volume was approximately 27,000 cubic yards.

3.3 BACKFILLING ACTIVITIES

As the excavation activity moved north, backfilling was initiated at the southern end of the excavation. The backfill material was imported clay from the Indian Hills clay pit meeting the Project Specifications. The excavation was backfilled using a bulldozer and the backfill compacted using a vibratory sheeps foot roller. Clay compaction testing was performed at the specified frequency, resulting in approximately one test per 2,300 cubic yards of imported clay, and the testing results indicated that the in-place clay met all of the requirements of the Project Specifications. Backfilling and compaction continued until the elevation of the underside of the future landscaping (stone/loam/topsoil) grades were reached, as shown on the Record Drawings. Clay backfilling and compaction was completed on February 3, 1993.

3.4 LANDSCAPING

Following completion of backfilling operations, SES began lining the newly constructed Bloody Run and connecting swales with a six-inch layer of rip rap. The rip rap layer extended up the side slopes to the top of each swale and was continuous throughout all portions of the newly constructed swales. A drainage catchbasin was installed to replace the existing sewer outfall (north of the Greif Bros. building) and served as a junction point for the main 24-inch diameter concrete sewer under the Greif Bros. building, the two 18-inch diameter CMP culverts from the east and west, and the new 24-inch diameter concrete culvert installed under Sherman Avenue.

The remainder of the backfilled area to the west and east of the completed swales was covered with six inches of loam and six inches of topsoil. Seed and mulch was then applied over the completed topsoil surface to promote vegetative growth.

All fence (previously existing, relocated and wooden stockade) was removed following backfilling activities. The permanent

barricades on Marshall Road and Sherman Avenue were also removed although the gate at the entrance to Marshall Road was left in place. The permanent barricade on Belvedere Avenue at Penrose Street was also left in place. The stone haul road was removed between University Drive and Sherman Avenue, however, the haul road to the east of Greif Bros. remains in place.

4.0 UNIVERSITY DRIVE STORM SEWER

On May 15, 1993, SES mobilized the necessary equipment to the University Drive area north of the Site to begin the excavation for the new storm sewer installation. No clearing activities were required for this work, in fact all trees were to be avoided or replanted. Prior to construction of the new sewer, the last remaining contaminated sections between the remediated Bloody Run and RCVR #2 had to be removed (see drawing 4RD).

Excavation commenced at the north end of the Bloody Run, south of University Drive, to remove the existing culvert and all visibly NAPL-contaminated soils adjacent to the culvert prior to installation of the new culvert. The excavation of visible NAPL extended beyond the former RCVR #2 to the west as far as Sophomore Drive, between RCVR #5 and RCVR #6 (see drawing 4RD). The upper soils (approximately 8 feet in depth) were stockpiled adjacent to the excavation and the lower soils deemed "dirty" for the continued excavation of visible NAPL to the west of RCVR #2. All clean/dirty zones were clearly delineated in the field in order to maintain the proper precautionary controls. A new 24-inch HDPE culvert under University Drive was installed prior to backfilling this area with compacted clay.

All contaminated soils and sewer pipe were transported to the Hyde Park Landfill Site via University Drive, Penrose Street, the existing stone haul road around Greif Bros., New Road and through the LSTF. No new haul roads were constructed for this construction program.

Excavation for the new University Drive storm sewer then commenced at the west end adjacent to RCVR #10 and proceeded southeast to University Drive and then east along University Drive to the newly installed culvert connection to the Bloody Run. Excavation was performed by a trackhoe stationed over the trench alignment, with excavated materials placed directly in hauling vehicles. As the initial excavated materials were deemed clean but inappropriate for reuse as compacted backfill, this material was placed in a designated stockpile area east of the Hyde Park Landfill and new clay imported for use as backfill. This procedure

continued until approximately the location of the new CBMH4, whereupon the excavated materials were sorted at the stockpile location and suitable material returned to the excavation site for reuse as backfill.

During excavation and installation of the new University Drive storm sewer, no dewatering was required. All existing stormwater flow continued to flow through the existing sewer, until the final connection of the new storm sewer to the new Bloody Run culvert was made.

Prior to the installation of the new University Drive storm sewer, it was found that an existing sewer from the area south of University Drive (specifically Roosevelt Avenue) crosses under University Drive and discharges to existing RCVR #9. It was decided to leave this existing sewer intact and abandon only the old sewer from RCVR #9 to the east. However, during the excavation for the installation of the required bedding plug east of RCVR #9, additional NAPL-contaminated soil was identified. As OCC was then required to submit a removal plan for EPA/State approval prior to further work in this area and University Drive needed to be reopened for resumption of classes at Niagara University, final grouting of the existing sewer was not performed at this time and the Contractor demobilized from the Site on August 25, 1993.

On December 23, 1993 (during the winter break from classes at the University), SES returned to the University Drive area to complete the NAPL removal adjacent to RCVR #9 and to complete the sewer abandonment (grouting). Excavation of NAPL-contaminated soils extended west as far as RCVR #10 and east beyond Vincentian Drive towards RCVR #8. Between RCVR #9 and RCVR #10 (both chambers were left in place), a new 24-inch diameter HDPE sewer pipe was installed to handle the stormwater discharge entering RCVR #9 through an 18-inch diameter sewer pipe from the Roosevelt Avenue area to the south. A 12-inch HDPE sewer and a new catchbasin was also installed along the east side of Vincentian Drive to handle the surface water flow from this paved area.

At the point where NAPL-contamination ceased, approximately midway between RCVR #9 and RCVR #8, a clay bedding plug

was installed to block all residual flow from the east traveling through the sewer bedding. Thereafter, grouting of the old sewer commenced, with each pipe section filled with cement grout progressively moving from manhole to manhole in an upstream direction. This work was completed by January 7, 1994, prior to classes resuming at Niagara University.

The final planned activity involved with the University Drive storm sewer replacement was the restoration of all affected surfaces. The paved surface of University Drive was completed at the end of the work conducted in the summer of 1993. In fact, the entire width of this roadway received a new asphalt top surface. The affected landscape (grass) areas were primarily addressed last year as well, although the excavation work around RCVR #9 was conducted in the winter and therefore the grass could not be restored in these affected areas at that time. SES returned to the University Drive area on April 19, 1994 to complete the restoration of the landscaped areas.

Subsequent to overall completion of the University Drive Storm Sewer project, a situation developed at the Niagara University wherein continued drainage was no longer available from a manhole located near the southeast corner of the greenhouse building. A check by University personnel of their in-house drawings showed a discrepancy wherein the sewer in question was indicated to be a sanitary sewer but it was in fact a storm sewer. As the previously existing sewer line to the south from this manhole was thought to be a sanitary sewer overflow pipe blindly connected to the old University Drive storm sewer, this lateral was grouted during the abandonment of the main sewer line. However, as a result of this new information from Niagara University, a new connection to the new University Drive storm sewer was necessary. In October 1994, SES was remobilized to the area to install a new 12-inch diameter HDPE pipe connection from the manhole by the greenhouse to CB3A. Upon completion, the topsoil was replaced and new grass seed planted to complete the restoration of this area.

During construction, the excavation limits and sewer pipe installation details were field-located by SES using baseline reference

information along the University Drive centerline, as previously established by surveyors from McIntosh & McIntosh P.C. Upon completion of the new sewer installation, surveyors from McIntosh & McIntosh were on-Site to accurately locate the sewer manhole and catchbasin locations, both vertically and horizontally. Depths to inverts were also measured in order to confirm overall pipe slopes. The final recorded sewer installation details are presented in the Record Drawings as listed below:

Drawing No.	*Title*
1RD	Pre-Construction Conditions
2RD	Plan and Profile
3RD	Lateral Plan and Profiles
4RD	Abandonment Plan
5RD	Storm Sewer Details
6RD	Abandonment/Restoration Details

5.0 ADDITIONAL STORM SEWER PIPING

As part of the same contract package as for the University Drive storm sewer, OCC included additional forcemain and perimeter capping work in areas adjacent to the Landfill. In an attempt to reduce infiltration of precipitation to the OBCS, additional perimeter clay capping work was performed over the area north and south of New Road to the northwest of the Landfill, extending the perimeter landfill cap westerly to Hyde Park Boulevard in this area. As a result of this additional capping work, the collected surface waters needed to be addressed. The proposed design included swales on both sides of New Road, with the collection point being in the northeast corner of this additional capping area. At this point, 271 feet of 18-inch diameter Spirolite storm sewer culvert was installed to the east connecting into the existing 24-inch diameter Bloody Run culvert. Figure 2 illustrates the location of this new culvert from the west and includes the surveyed invert elevations at the manholes and catchbasin.

6.0 MISCELLANEOUS LANDFILL ACTIVITIES

The following construction activities were also performed at the Landfill in relation to the Bloody Run excavation and sewer cleaning activities:

i) finalization of Waste Disposal Area No. 8 at the Landfill including completed waste placement, daily interim clay cover, final clay cover, clay berm removal, access fence removal and maintenance;

ii) construction, partial filling and temporary closure of Waste Disposal Area No. 9 at the Landfill including existing topsoil and clay removal, clay berm construction, access fence installation and removal, haul road installation, drainage sump construction, bulk waste and drum disposal, daily interim clay cover installation, partial clay berm removal in completed areas and maintenance; and

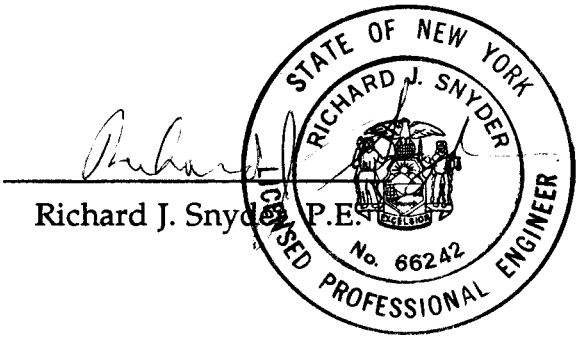
iii) vertical extension of manholes (MH44, MH45 and MH18) and monitoring wells (OEW-1, OEW-3 and OW35-82) located within Waste Disposal Area No. 9 to accommodate the proposed waste fill height.

7.0 PROJECT CLOSEOUT

Prior to releasing any heavy equipment or tools from the excavation and sewer cleaning areas, the Landfill Waste Disposal Areas and the individual monitoring well survey sites; a preliminary decontamination was performed to remove any gross, visible contamination or loose sand and debris. Following the preliminary decontamination, each piece of equipment was transported to the equipment wash building at the Hyde Park Site and then thoroughly cleaned using high pressure steam. Personal protective equipment worn during all remedial activities was placed in 55-gallon drums which were subsequently disposed of in Waste Disposal Areas No. 8 and 9 at the Landfill.

8.0 CERTIFICATION

I, Richard J. Snyder, a Professional Engineer in the State of New York certify, based on site visits during progress of the works and interviews with persons directly responsible for supervising the performance of the work, that the activities performed during the construction of the Bloody Run excavation and sewer remediation activities at the Hyde Park Landfill Site were performed in accordance with the scope of work description provided in the documents entitled "Bloody Run Remediation, Protocols and Procedures for Bloody Run Excavation and Sewer Cleaning" dated September 11, 1992 and "Project Specifications - Exhibit D - University Drive Storm Sewer Replacement", dated May 18, 1993.



Richard J. Snyder, P.E.

3-31-95

Date

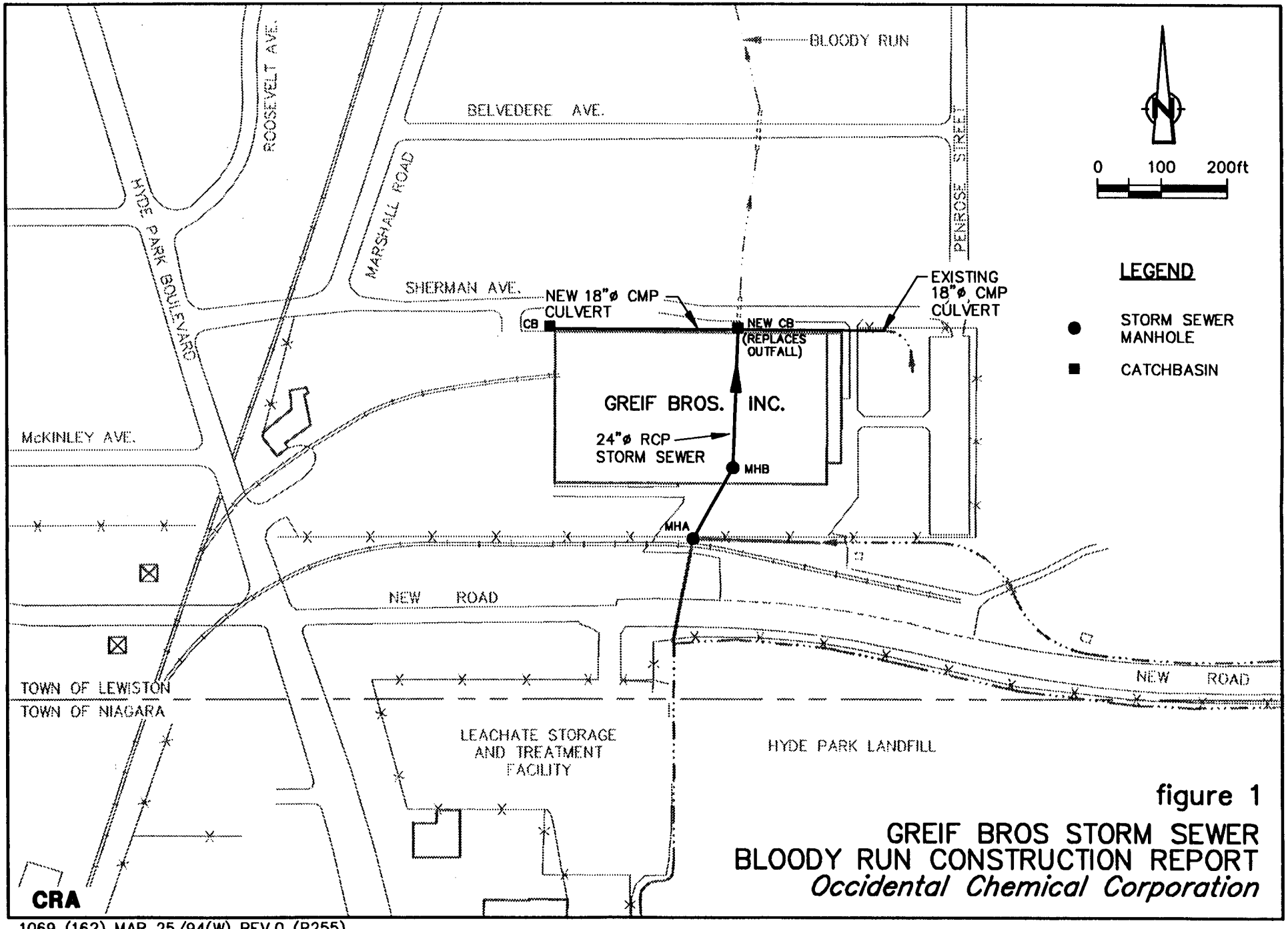


figure 1

GREIF BROS STORM SEWER
BLOODY RUN CONSTRUCTION REPORT
Occidental Chemical Corporation

1069 (162) MAR 25/94(W) REV.0 (P255)

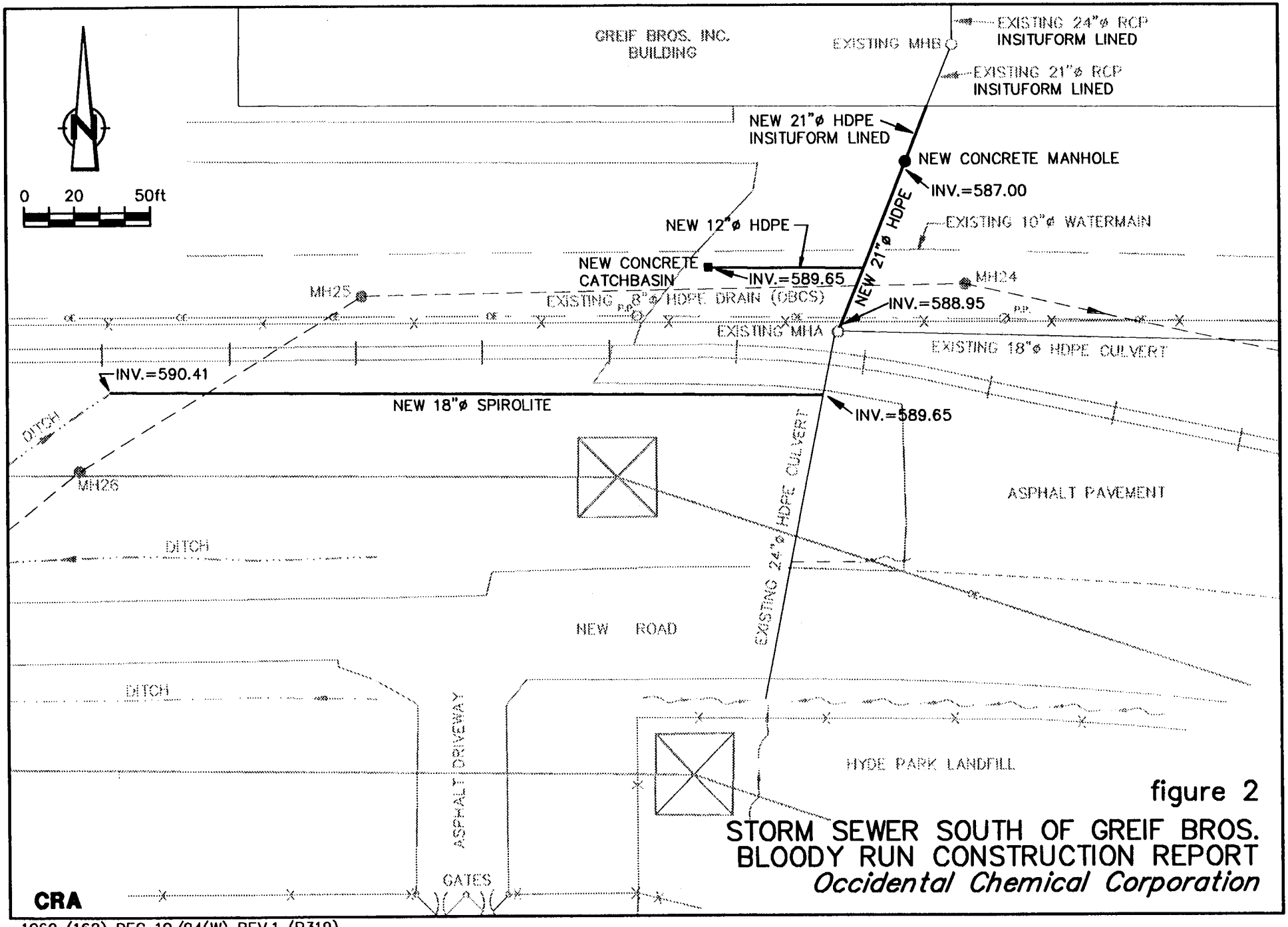


figure 2

STORM SEWER SOUTH OF GREIF BROS.
BLOODY RUN CONSTRUCTION REPORT
Occidental Chemical Corporation

1069 (162) DEC 19/94(W) REV.1 (P319)

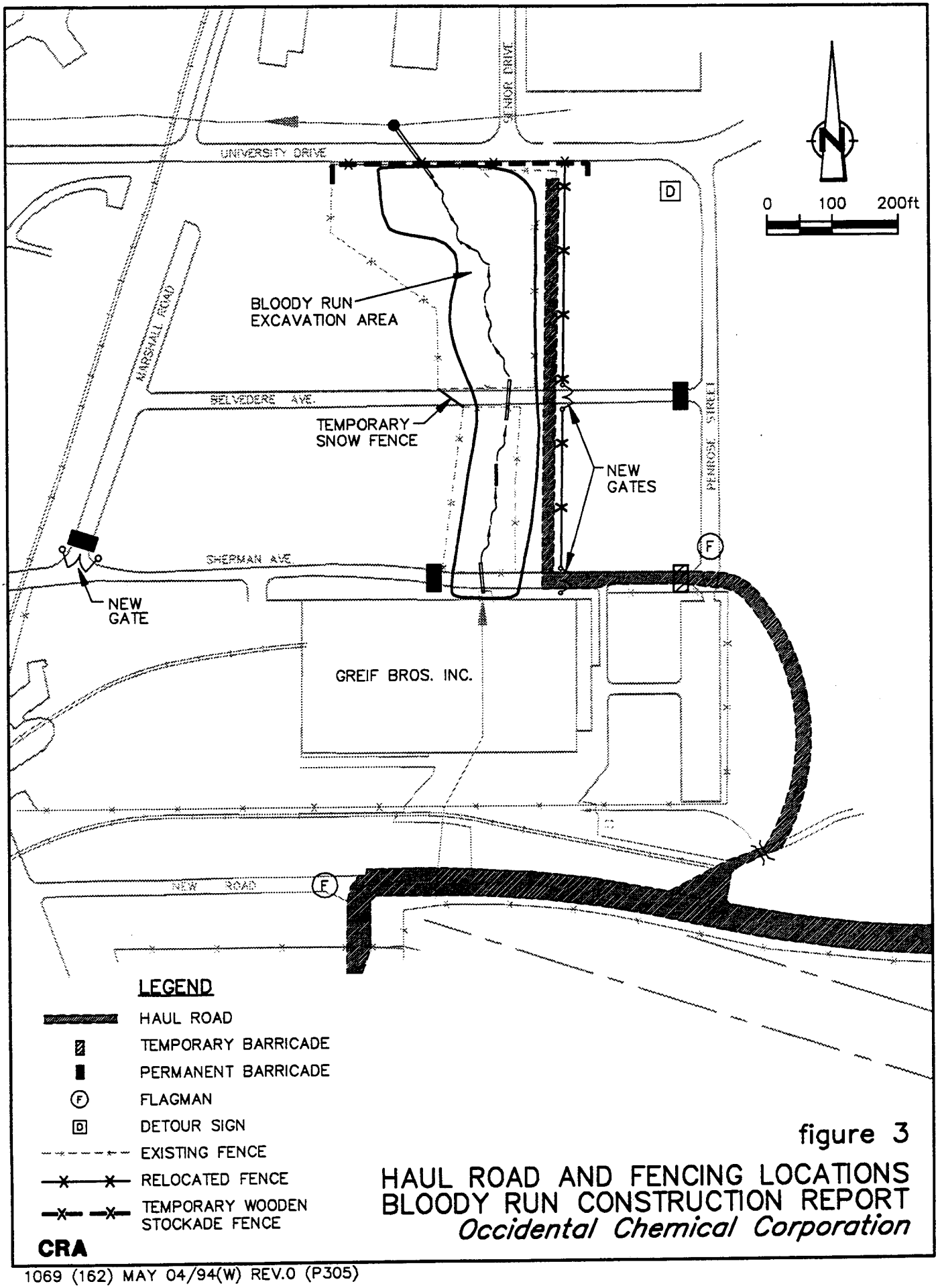


figure 3

HAUL ROAD AND FENCING LOCATIONS
BLOODY RUN CONSTRUCTION REPORT
Occidental Chemical Corporation

1069 (162) MAY 04/94(W) REV.0 (P305)