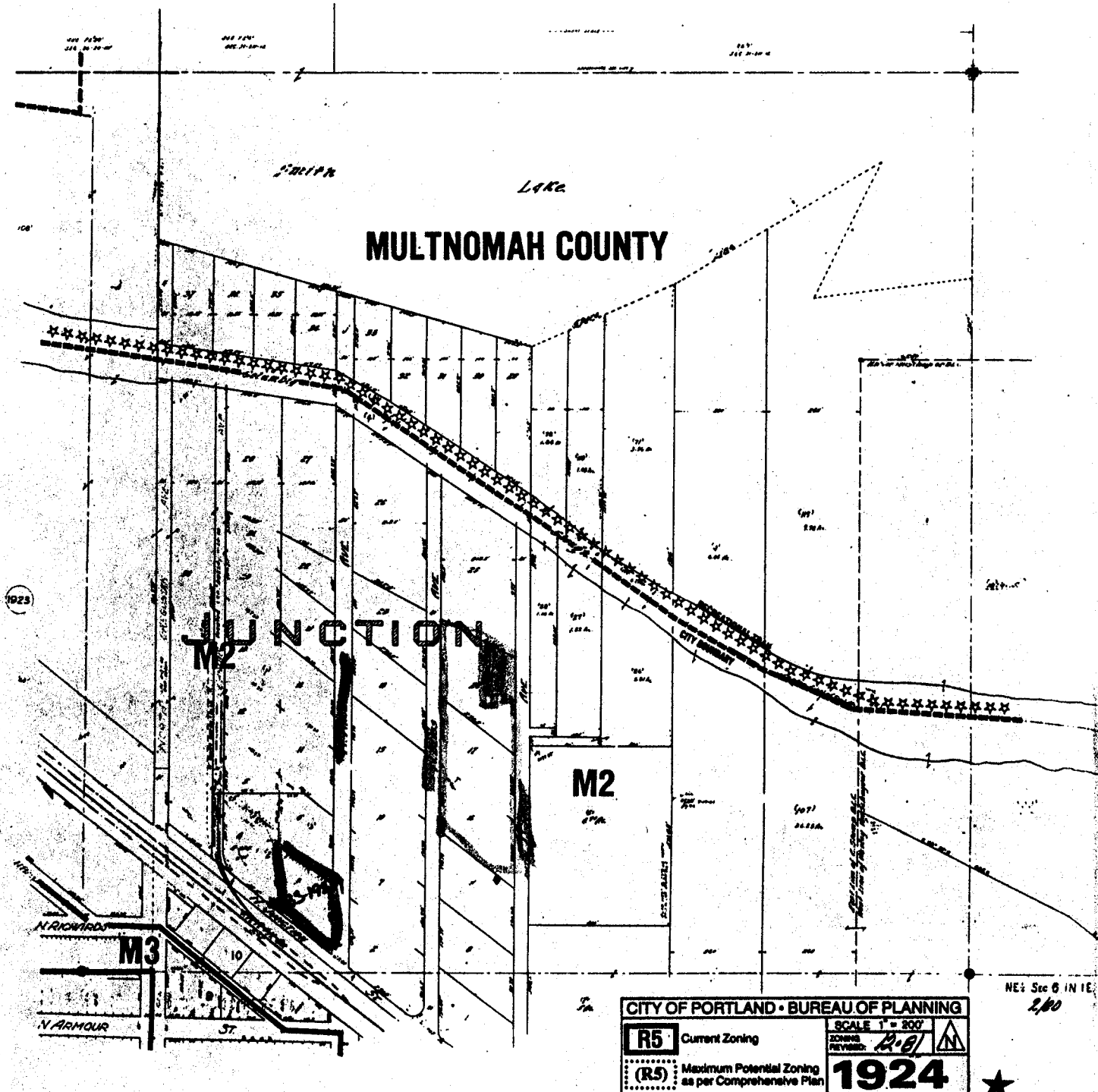


Scils

1/65 1924

GT_002198



Dames & Moore



1220 S.W. Morrison Street
Portland, Oregon 97205
(503) 228-7688

TWX: 910-464-4790 Cable address: DAMEMORE

January 31, 1985

Columbia Steel Casting Company, Inc.
10425 N. Bloss Avenue
Portland, OR 97203

Attention: Mr. James P. Stromme,
Plant Engineer

Gentlemen:

Three copies of our report "Soils Investigation, North Foundry Crane Rail Addition, Portland, Oregon, for Columbia Steel Casting Company, Inc." are herewith submitted.

Please contact us if you have any questions regarding the information provided in this report.

Yours very truly,

DAMES & MOORE

K. C. Robbins,
Partner

185312
KCR:DLT:jm
4628-017-04

cc: Moffatt, Nichol & Bonney, Inc. (3)
1845 N. E. Couch Street
Portland, OR 97232

Attention: Mr. Greg Shea

~~10425~~ 10425 N Bloss Ave

INIE00200

83-002778-LU

INTRODUCTION

This report presents the results of a soils investigation conducted for a proposed crane rail addition adjacent to the existing north foundry building at Columbia Steel Casting Company in Portland, Oregon. The location of the site, with respect to adjacent features and existing buildings, is shown on the Plot Plan, Plate 1.

Proposed construction consists of the addition of two crane rails to support one 10 ton crane. The first of the new crane rails will be placed immediately adjacent to an existing crane rail. The footings for the existing crane rail will be used to support the additional loads imposed by the new crane rail. A second crane rail will be located approximately 60 ft east of the first one and founded on newly installed footings. Future construction in the area may include a metal building to house the cranes.

Footings for the new crane rail will be designed to impose a maximum bearing pressure of 2,500 lb/sq ft. The existing footings have been designed to impose a maximum bearing pressure of 4,800 lb/sq ft.

The purpose of this investigation was to provide recommendations for site preparation and foundation support. The scope of the investigation to accomplish this purpose included exploration of subsurface conditions, evaluation of pertinent physical properties of the soils encountered, review of previous investigations by Dames & Moore at the site, engineering analyses to serve as a basis for our recommendations, and preparation of this report summarizing the results of the investigation.

Site Conditions

The area to be occupied by the proposed construction is an existing

scrap iron storage area. Ground surface elevations in this area range from approximately 35 at the south end to about 30 at the north end. The scrap iron pile covers most of the new crane rail alignment and is approximately 6 ft high.

Subsurface conditions in this area were previously explored by Dames & Moore prior to extension of the existing foundry crane rails. Results of this investigation are included in our report entitled "Soils Investigation, North Foundry Addition, Portland, Oregon, Columbia Steel Casting Company, Inc.," dated May 22, 1980. For the present exploration, subsurface conditions were explored by means of 2 test pits; designated number 5 and 6. The location of the present test pits, as well as explorations for the previous investigation, are shown on the plot plan. A description of the field explorations is presented in Appendix A, Field Explorations. Graphical representations of the present test pits, as well as data for the previous explorations, are presented on Plates A-1 and A-2, respectively.

Our explorations in the area of the proposed crane rail addition indicate the area is underlain by a significant thickness of fill material. The fill thickness ranges from about 8 ft at the location of Test Pit 6 to greater than 15 ft at the location of Test Pit 5. This fill material consists primarily of waste foundry sand with variable amounts of slag, wood, sod material, and brick and metal fragments. Generally, the amount of debris decreases with depth. This fill material is generally loose to medium dense.

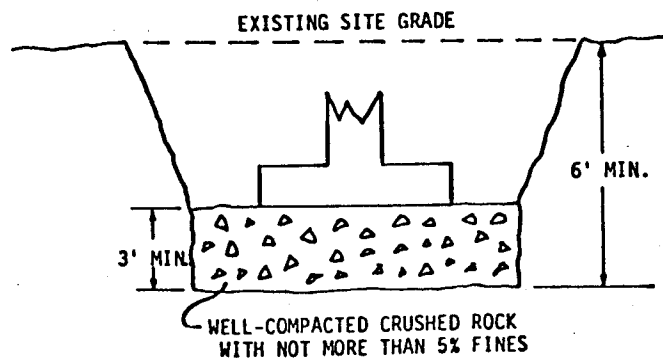
Natural soils underlying the fill consist of fine sandy silts to fine to medium sands with variable amounts of silt. This material is generally medium dense.

Groundwater was not encountered in Test Pit 6 which extended to a depth of 17 ft. A small amount of groundwater seepage was encountered at a depth of 14 1/2 ft in Test Pit 5.

Conclusions and Recommendations

A limited laboratory testing program, consisting of moisture and density determinations and visual classification, was performed on samples obtained from the test pits. The moisture and density results are presented to the left of the test pit logs on Plate A-1. Based on field and laboratory information, the fill materials generally possess low strength and are moderately to highly compressible. The underlying natural soils possess moderate strength and compressibility characteristics.

Since the proposed crane rails will impose relatively light foundations loads and the site has been preloaded by the scrap iron stockpile, it is our opinion that suitable support can be provided by spread footings. However, due to the nature of the fill materials, it will be necessary to install a well-compacted pad of crushed rock beneath the footings in order to provide more uniform supporting conditions. It is recommended that footings be underlain by a minimum of 3 ft of compacted crushed rock. Further, the base of the crushed rock fill should be placed at a minimum depth of 6 ft below present grade. This is illustrated on the following sketch.



Following completion of footing excavations, the base of the excavation should be inspected by a qualified soils engineer. Excessively loose or unsuitable material should be removed and replaced with compacted granular fill. Prior to placing the granular fill material, the entire base of the excavation should be compacted.

The crushed rock pad should be constructed of well-compacted granular material having a maximum size of 2 in. and less than 5 percent by weight passing the No. 200 sieve. This material should be installed in loose lifts not exceeding 8 in. in thickness and compacted with a self-propelled heavy, walk-behind drum-type or backhoe-mounted plate-type vibratory compactor. The material should be compacted to at least 95 percent of the maximum dry density obtainable by the Modified AASHTO Method of Compaction (Designation T-180).

Footings constructed according to the above recommendations may be designed to impose an allowable bearing value of 2,500 lb/sq ft. This value applies to the total of dead plus frequently applied live loads and may be increased by 1/4 to include wind, seismic, or infrequent dynamic loads. We estimate that settlement of conventional spread footings designed in accordance with the above recommendations will be on the order of one in. or less.

It is our understanding that when the additional load is applied they will impose maximum bearing pressures of 4,800 lbs/sq ft. The bearing values given in the table on page 7 of our May 22, 1980 report for this area may be used to check the allowable bearing values for these footings. The values in the table may be extrapolated up to a maximum bearing pressure of 5,000 lb/sq ft.

Inspections

We recommend that various inspections be performed during preparation of the site to evaluate the degree of compaction of the crane rail foundation, as well as inspections of the base of excavations. The inspections should be made by a qualified engineer/inspector.

Limitations

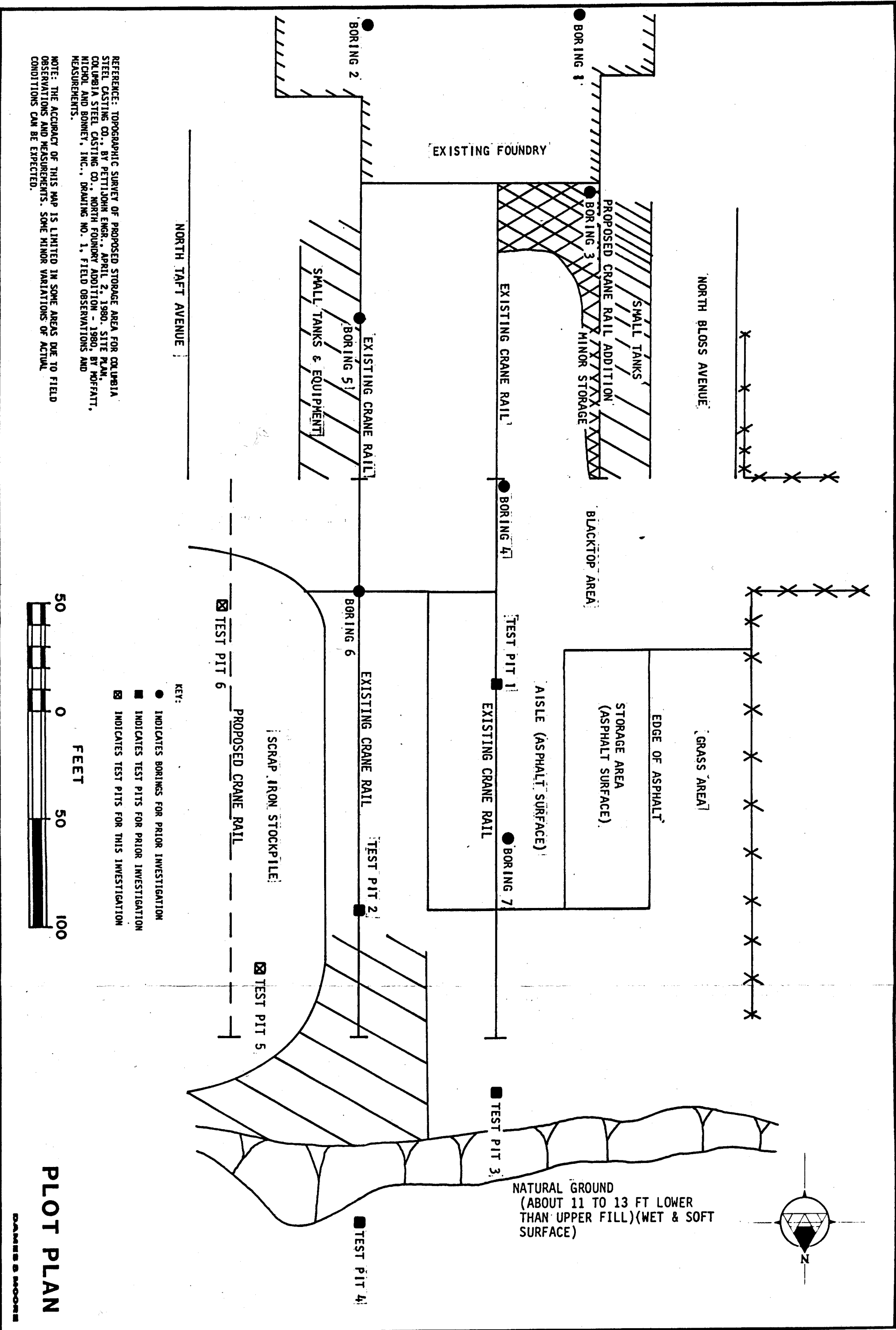
Dames & Moore has prepared this report to aid in the evaluation of the site and to assist in site preparation and foundation design of this project. We have developed our conclusions and recommendations in accordance with generally accepted professional engineering principles and practice. We make no other warranty, either express or implied. Our conclusions are based on the results of field explorations and on our interpretation of subsurface conditions between and beyond these explorations. If the contractor encounters conditions that appear different from those described in this report, he should notify us so that we may review and verify or modify our recommendations.

APPENDIX A

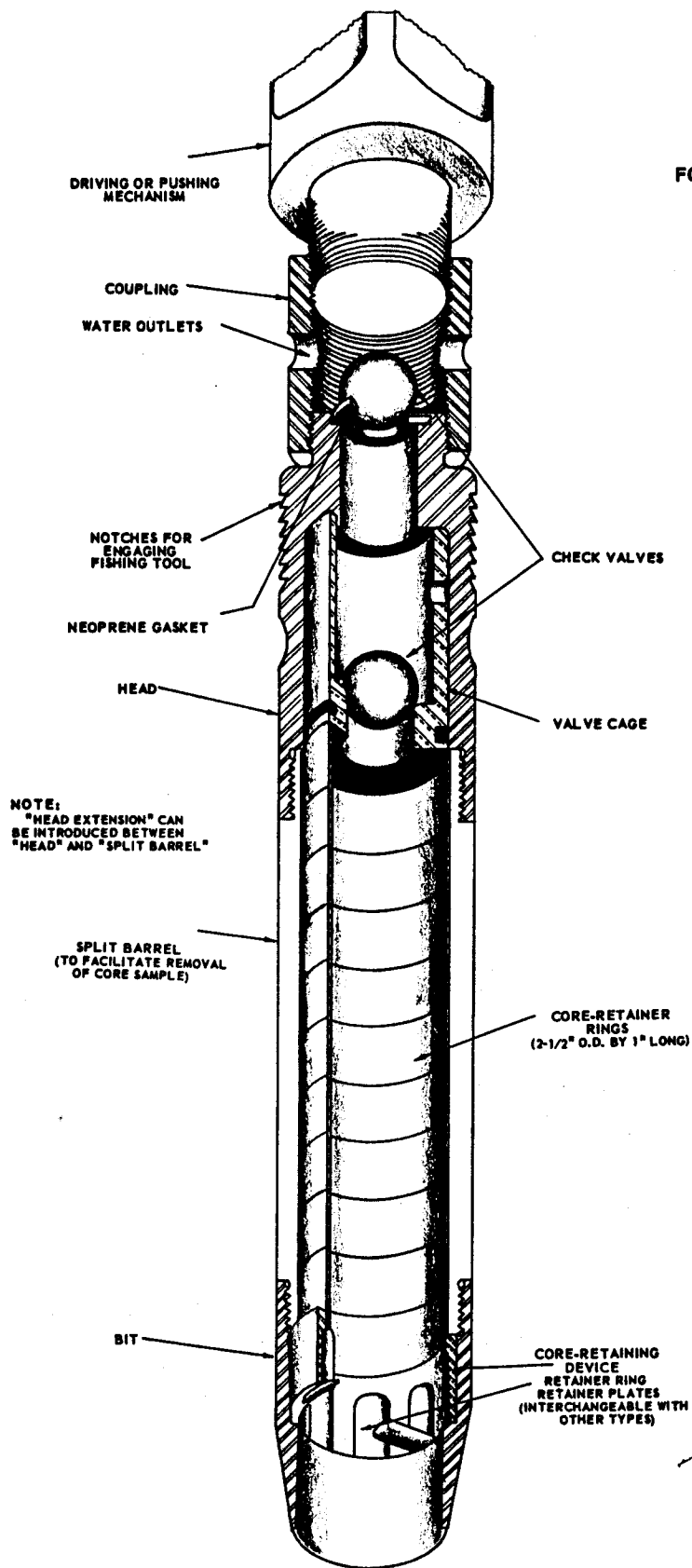
FIELD EXPLORATIONS

Subsurface conditions at the site were explored by means of two test pits at locations shown on the Plot Plan, Plate 1. The test pits were approximately 2 ft wide and 10 ft long and extended to depths ranging from 15 to 17 1/2 ft below present grade. The test pits were dug with a rubber-tired backhoe and backfilled upon completion.

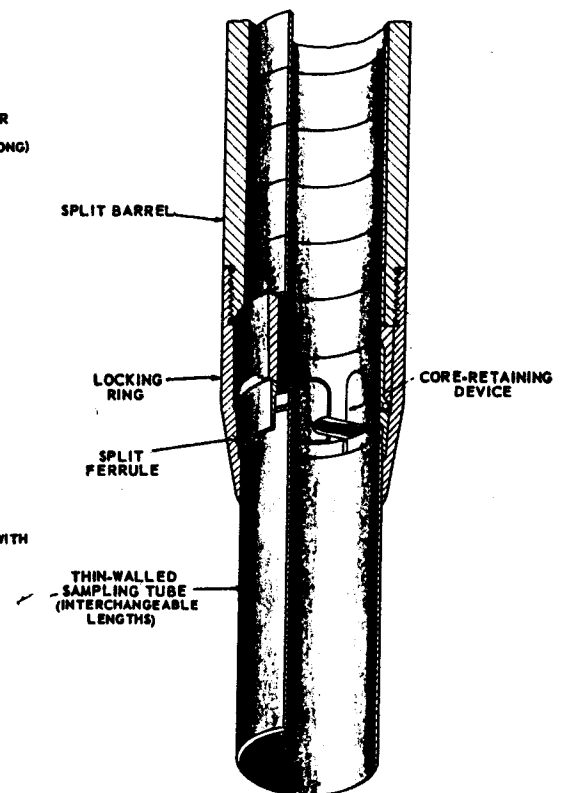
The explorations were coordinated by an engineering technician from this office who maintained detailed logs of materials and conditions encountered in each test pit, extracted relatively undisturbed soil samples at appropriate depths, and recorded various other pertinent site information. "Undisturbed" soil samples were extracted with a Dames & Moore sampler of the type illustrated on page A-2. Graphical representations of the test pit logs are presented on Plate A-1, Log of Test Pits. The nomenclature used in classifying the soils is described on Plate A-3, Unified Soil Classification System.



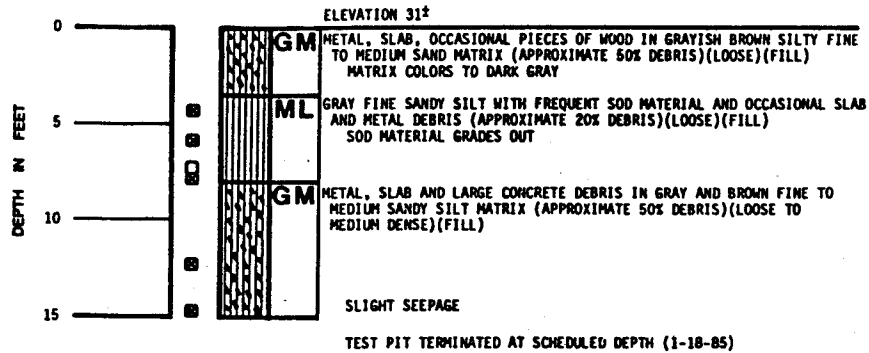
SOIL SAMPLER TYPE U FOR SOILS DIFFICULT TO RETAIN IN SAMPLER



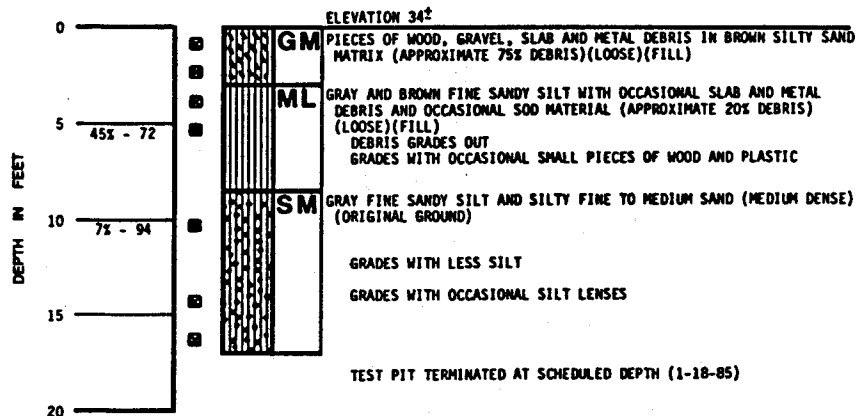
ALTERNATE ATTACHMENTS



TEST PIT 5



TEST PIT 6



KEY:

DAMES & MOORE TYPE-U SAMPLER
 ■ UNDISTURBED SAMPLE
 □ DISTURBED SAMPLE

LABORATORY TEST DATA
 — FIELD MOISTURE CONTENT, % DRY SOIL WEIGHT
 — IN SITU DRY DENSITY, LB/CU FT

45% - 72

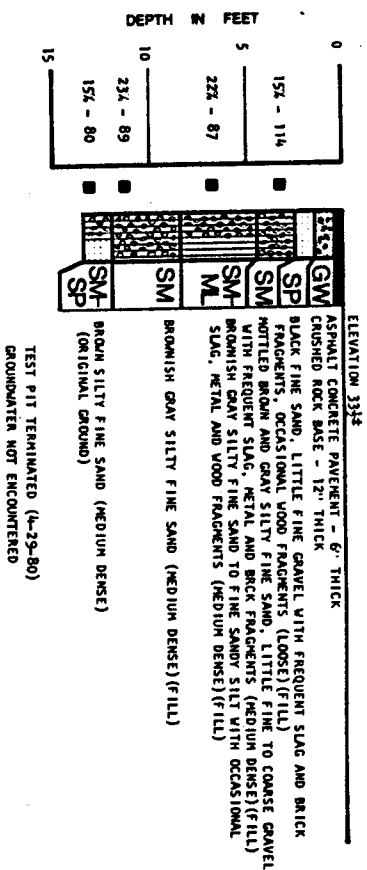
NOTE:

DISCUSSION IN THE TEXT OF THIS REPORT IS NECESSARY FOR A PROPER UNDERSTANDING OF SUBSURFACE CONDITIONS REVEALED BY THE TEST PITS.

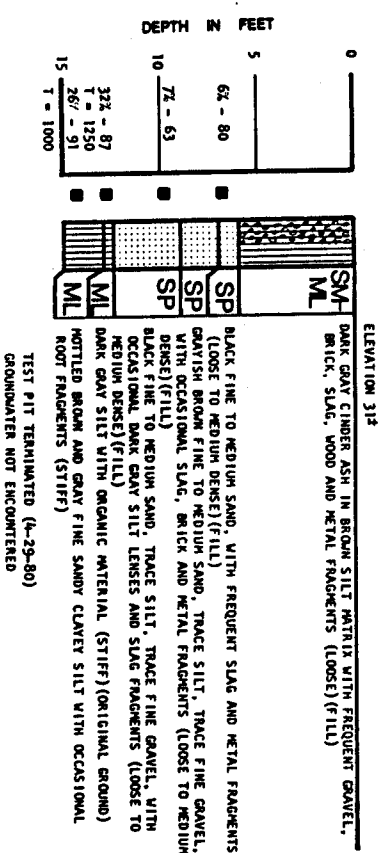
LOG OF TEST PITS

DAMES & MOORE

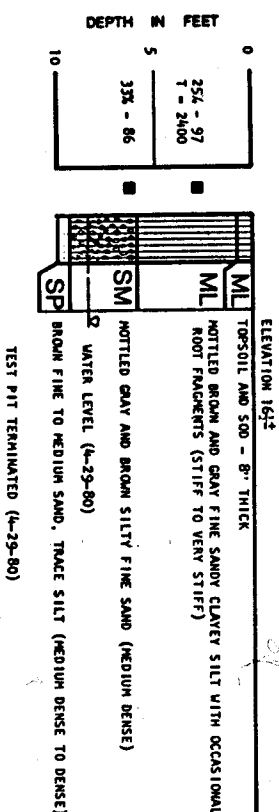
TEST PIT 1



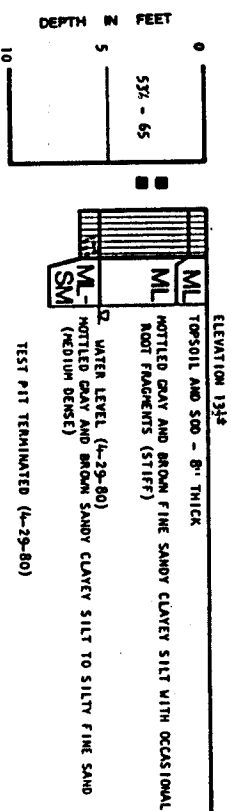
TEST PIT 2



TEST PIT 3

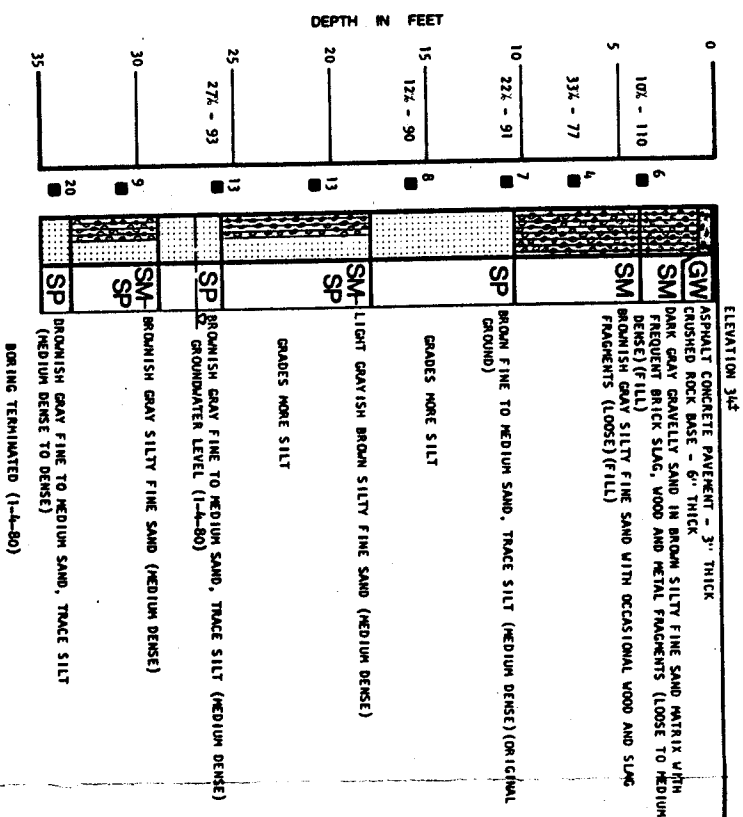


TEST PIT 4

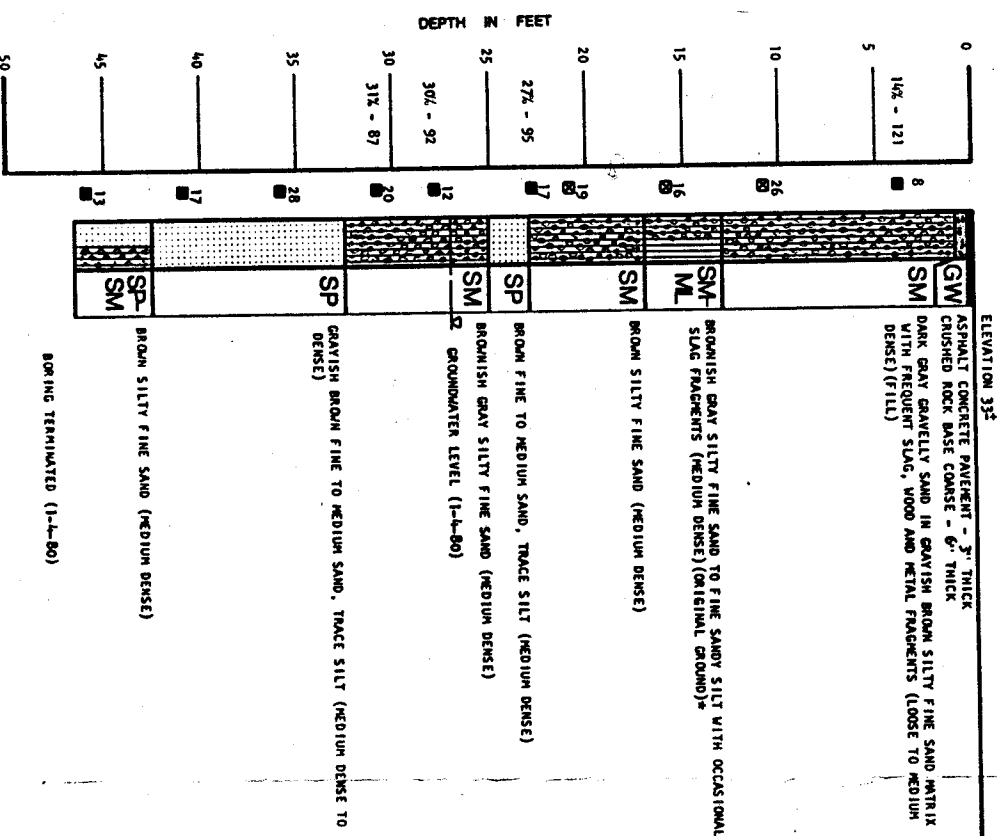


NOTES:
1. SURFACE ELEVATIONS WERE OBTAINED BY HAND LEVEL TO THE FLOOR GRADE IN THE EXISTING FOUNDRY BUILDING - ELEVATION 35.5.
2. DISCUSSION IN THE TEXT OF THIS REPORT IS NECESSARY FOR A PROPER UNDERSTANDING OF SUBSURFACE CONDITIONS REVEALED BY THE TEST PITS.

BORING 6



BORING 7



KEY:
DAMES & MOORE TYPE-U SAMPLER
6 NUMBER OF BLOWS REQUIRED TO DRIVE SAMPLER
1 FT WITH 800 POUND WEIGHT FALLING 24 IN.
UNDISTURBED SAMPLE
DISTURBED SAMPLE
LABORATORY TEST DATA
FIELD MOISTURE CONTENT, % DRY SOIL WEIGHT
28% - 98
IN SITU DRY DENSITY, LB/CU FT
* ORIGINAL GROUND SURFACE BASED ON SURVEY PERFORMED BY PETTIGREW ENGR., DEC. 1959.

NOTES:
1. SURFACE ELEVATIONS WERE OBTAINED BY HAND LEVEL TO THE FLOOR GRADE IN THE EXISTING FOUNDRY BUILDING - ELEVATION 35.5.
2. DISCUSSION IN THE TEXT OF THIS REPORT IS NECESSARY FOR A PROPER UNDERSTANDING OF SUBSURFACE CONDITIONS REVEALED BY THE BORINGS.