DURHAM

GENERAL DESCRIPTION

The proposed site is in a low pass or gap between the Tualatin and Willamette valleys and is aligned with the long axis of Lake Oswego (Figure 1 and 2). This gap is believed to have been caused by flood erosion water of catastrophic magnitude. The Durham area is, then, the "delta" of these floods.

The subsurface material is about 100 feet thick in the site area and conists of a mixutre of a silt, sand, gravel and boulders. Two abandoned gravel pits, excavated by the owner to about 100 feet below the surface, were examined by COR-MET representatives.

The south pit contains some faint, subtle bedding. The apparent maximum boulder size in the pit is about three feet in diameter. The north pit has a large (approximately 100 feet by 150 feet) clay lens that remains from the gravel mining operation. The layer has three feet of thickness exposed. There is a minimum of 1,000 cubic yards of this clay which could be used to mix with quarry material to provide a bottom seal. A 50-foot by 100-foot pond in the north pit stands three feet above the pit's lowest elevation (Figure 3). The pond, which is above the local water table, was formed by fines from gravel washing that sealed the pit bottom. The apparent maximum boulder size in the pit is about 1.5 feet in diameter.

GENERAL GEOLOGY

The site i underlain by deposits that have been mapped as lacustrine gravel by the Oregon Department of Geology and Mineral Industries (Figure 5). Below the lacustrine gravel, the Troutdale Formation is found at about the bed elevation of Fanno Creek. This is about 100 to 110 feet above sea level. The Troutdale Formation here consists of about 300 feet of sands and silty sands. To the south and west of the site, lacustrine silts, in some places overlain by yonger alluvium, are found. To the north, the slightly older Willamette silts are found as superficial deposits.

SURFACE WATER

Surface runoff does not seem to present any problems at this site, but shallow ditching to divert surface runoff might be necessary on the south and west sides of the property.

This site's flood hazard is negligible; the enitre site is above the elevations of the 1933 Tualatin River flood (Figure 4).

GROUNDWATER

Groundwater elevations were obtained from existing well data. The water table gradients from this data indicate potential groundwater

movement toward Fanno Creek and the Tualatin River (Figure 6 and 7). Both would act as discharge areas and should limit the migration of groundwater.

Well data from the area indicated that sediments underlying the landfill site are quite permeable and would not act as an effective barrier to leacheate seepage.

Well logs on file with the State of Oregon indicate that modest-yield wells in the site area are producing from the Tualatin Formation. These wells generally have specific capacities of less than one gallon per minute per foot of drawdown, although some wells produce over this figure.

One well drilled near the site in 1961 encountered turbid water at a depth of 65 to 90 feet. This would be in the lacustrine gravels. This stratum was cased off and the well completed to 146 to 165 feet where usable water was found.

The gravel mining operation in these pits was reported to have contaminated nearby wells. Both turbidity from wash water and bacterial contamination were reported. It should be noted that domestic sewage in the area at the time was processed by subsurface disposal (septic tanks) methods.

The distance from the general land surface down to the water table is about 40 feet. One of the pit excavations is below this elevation and would allow the water table to reach the surface duing periods of high water. Without a barrier, infiltration of rainwater and contact with the water table would produce leachate.

COVER MATERIAL

There is generally no cover material on the site because the site consists of a large excavation. Material from the road separating the two pits is not suitable for impermeable cover material, so cover material would have to be imported.

BOTTOM SEAL MATERIAL

The clay lens in the north pit could be mixed with pit material to give a highly impermeable bottom seal. Various test mixes would have to be tried to determine the feasibility of this option. The addition of the clay and reworking of the other materials could reduce the permeability of the bottom of the site.

GAS MIGRATION

Gas migration from the site into the surrounding material is possible. Once in the surrounding material, gas migration would probably be nearly vertical because of this material's high permeability. As the filling progressed upward, sealing at the side would be required to prevent gas migration to nearby buildings.

DESIGN CONSIDERATIONS

This site is best suited for a design based on retention and recovery of leachate, or a low migration of leachate under acceptable conditions (Figure 9). Some impermeable bottom and cover material would have to be imported. Surface water drainage would present only minimal problems. Gas migration to nearby residences would have to be controlled with soild barriers or other devices.

Traffic maneuverability on the natural site materials would be good (Figure 8). The character of the imported cover would determine traffice maneuverability on those portions of the site where it was used.

Prepared by Metro Staff

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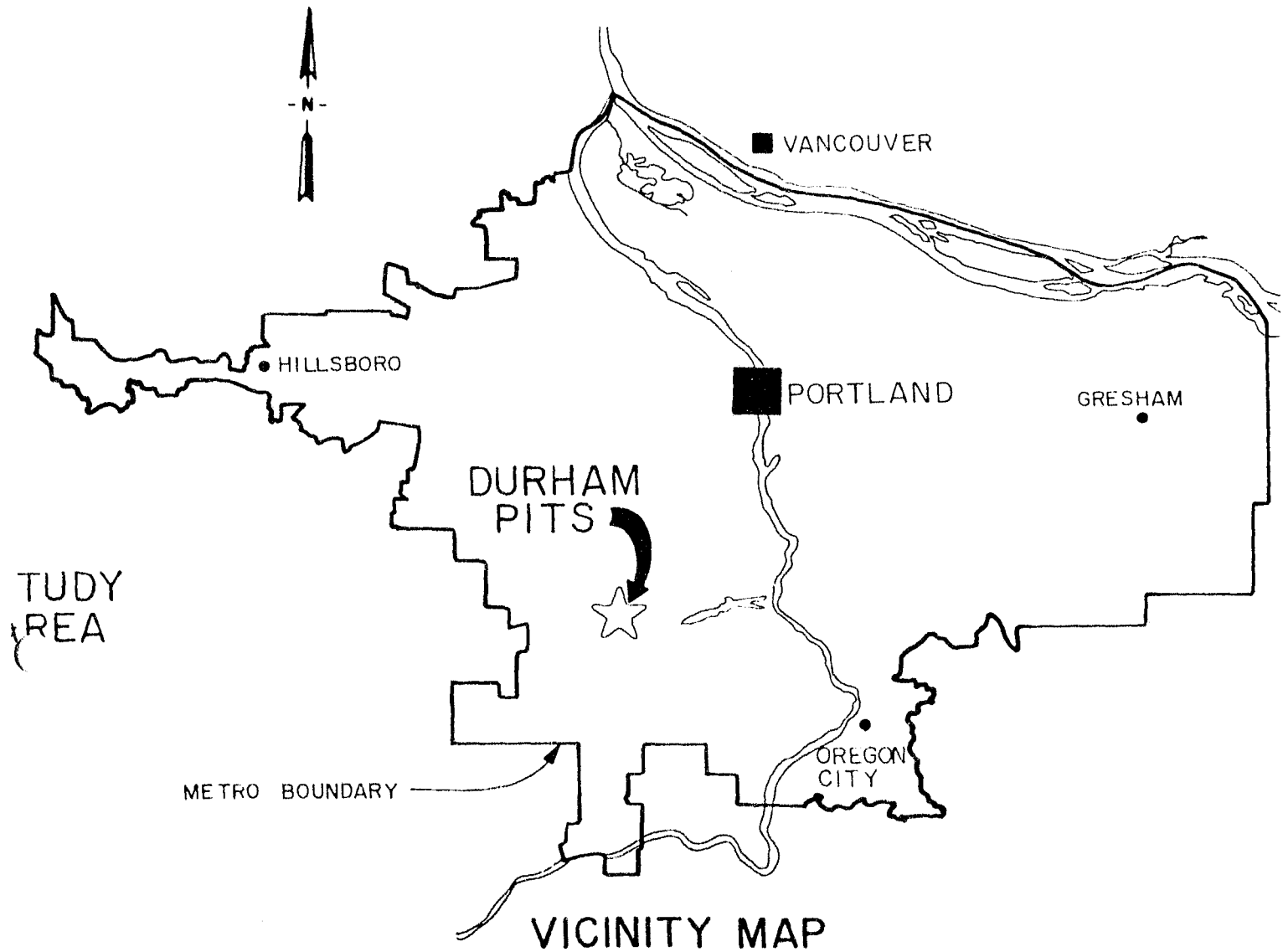


Figure 1

Durham Pit
General Location

E MAP 19

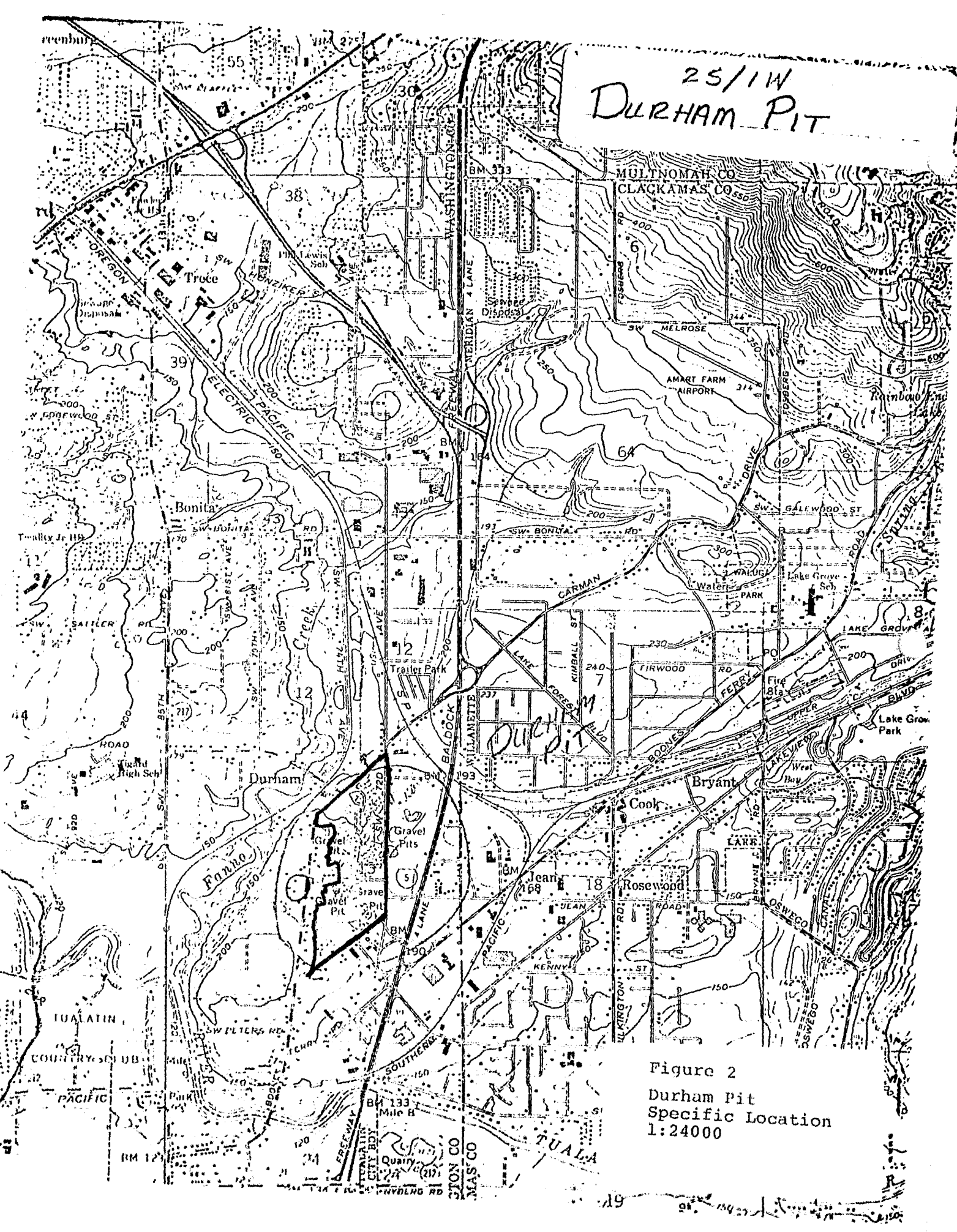
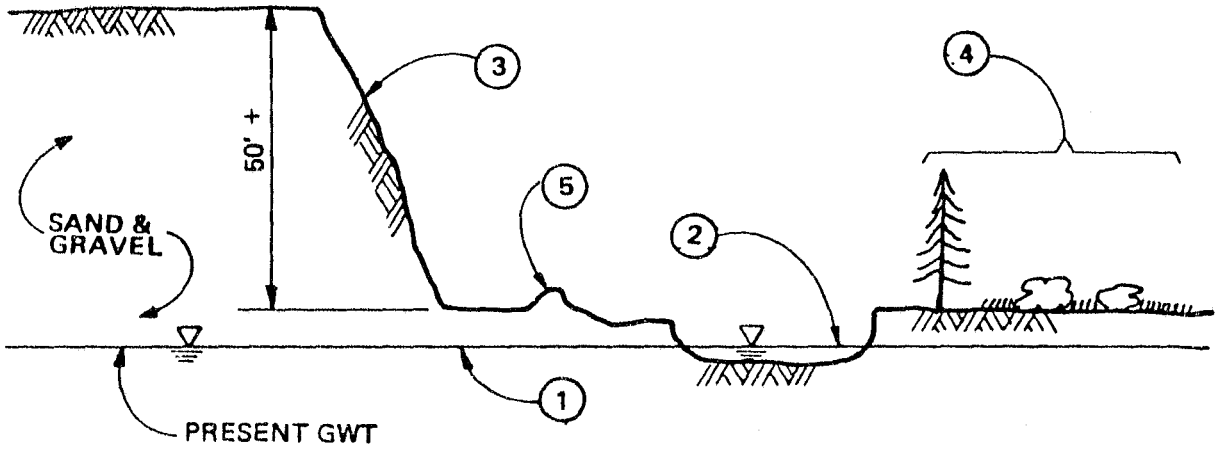


Figure 2

Durham Pit
Specific Location
1:24000



1. PRESENT GROUND WATER TABLE USUALLY A FEW FEET BELOW MOST OF THE PIT FLOOR.
2. SOME AREAS OF DEEPER EXCAVATION, WITH WATER.
3. VERY STEEP SLOPES, ROUGH SURFACE, OCCASIONAL LARGE BOULDERS THAT MAY FALL.
4. SMALL TREES, BRUSH, & GRASS.
5. ROUGH, UNEVEN SURFACE OVER MUCH OF THE PIT FLOOR.

EXISTING CONDITIONS

FIGURE III

METROPOLITAN SERVICE DISTRICT
POTENTIAL SANITARY LANDFILL SITE
LEACHATE IMPACT AND CONTROL
FOR DURHAM SITE
WASHINGTON COUNTY, OREGON

CH2M HILL

P12946.B0

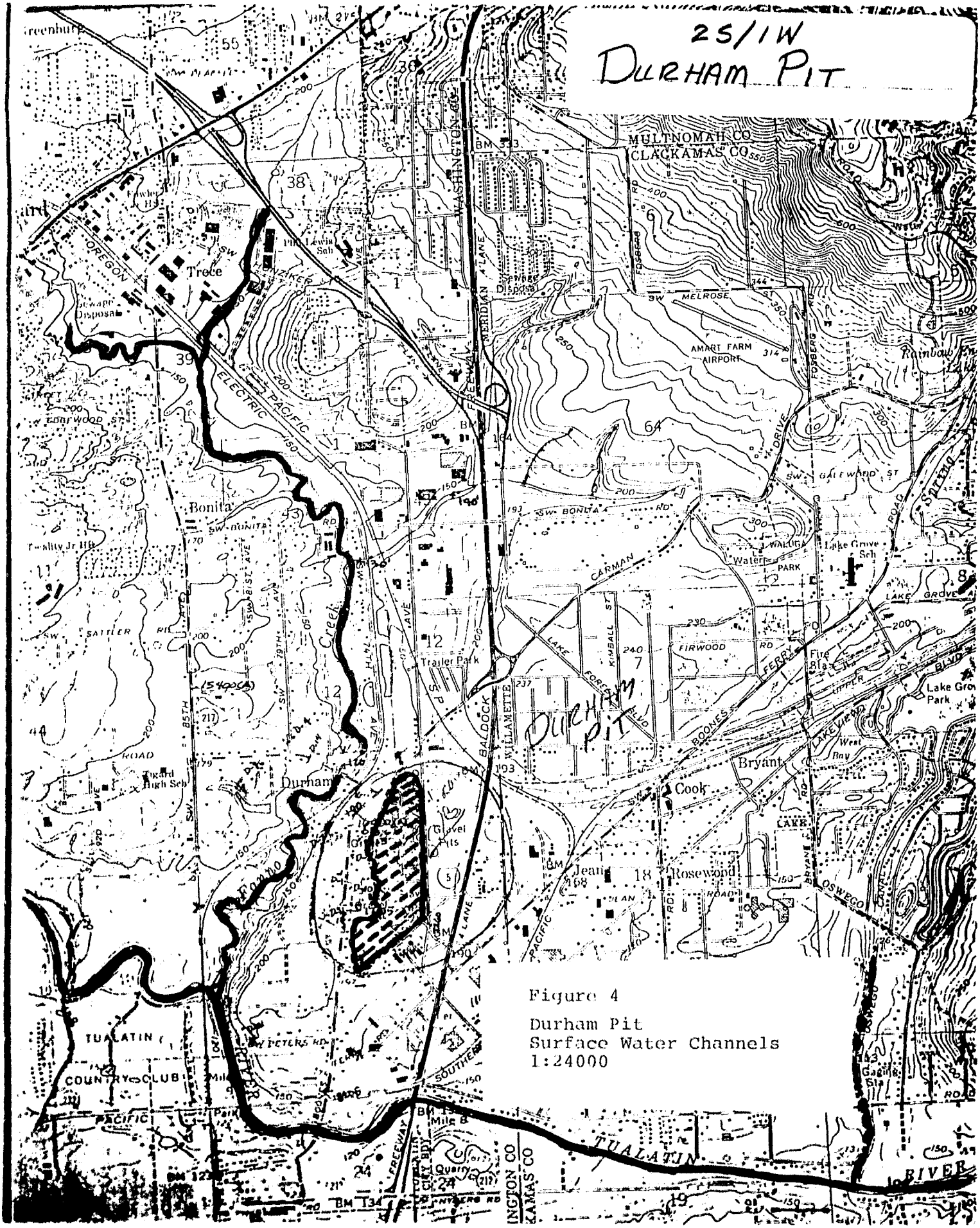


Figure 4

Durham Pit
Surface Water Channels
1:24000

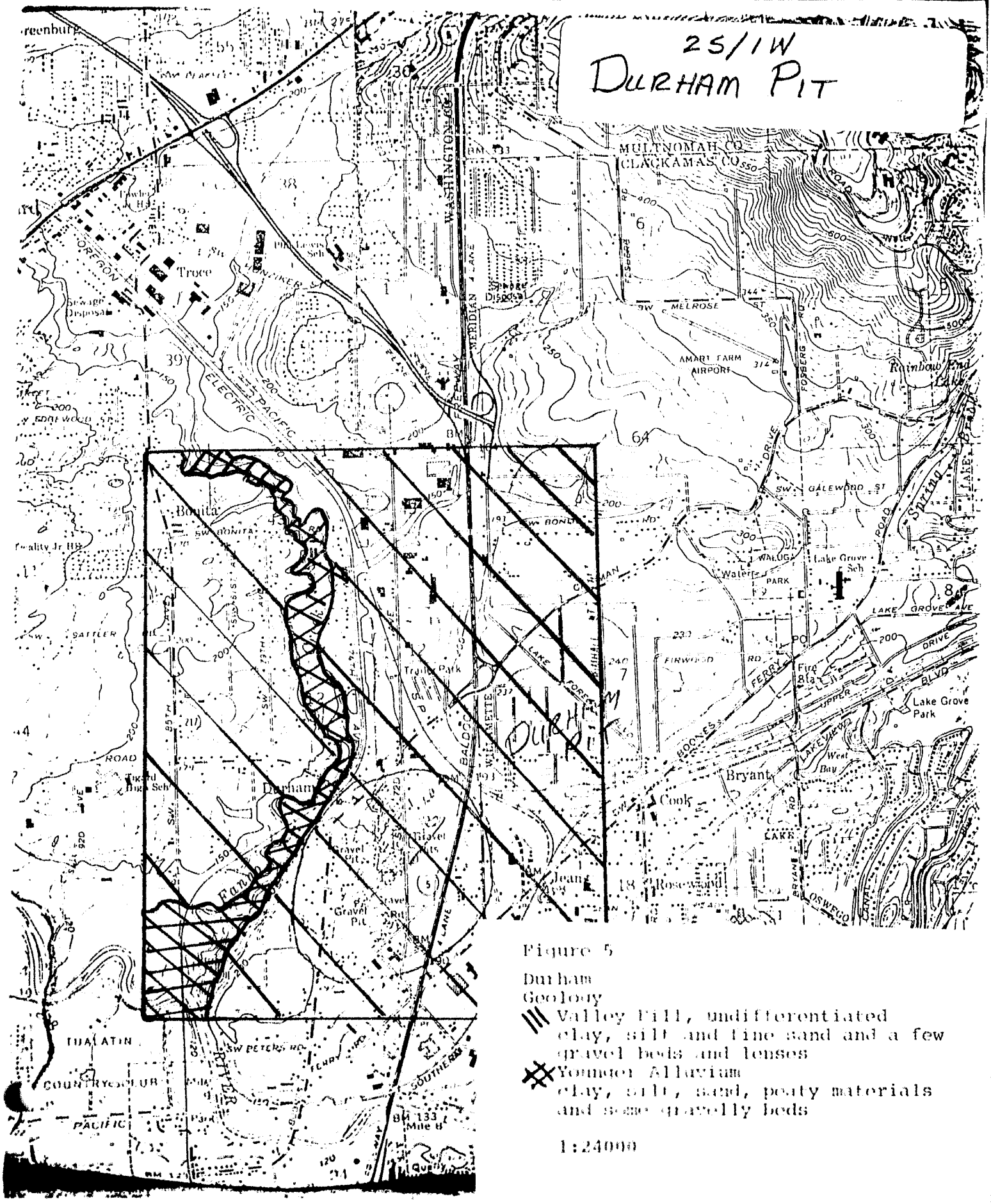


Figure 5

Durham
Geology

Valley Fill, undifferentiated clay, silt and fine sand and a few gravel beds and lenses

Younger Alluvium clay, silt, sand, peaty materials and some gravelly beds

1:24000

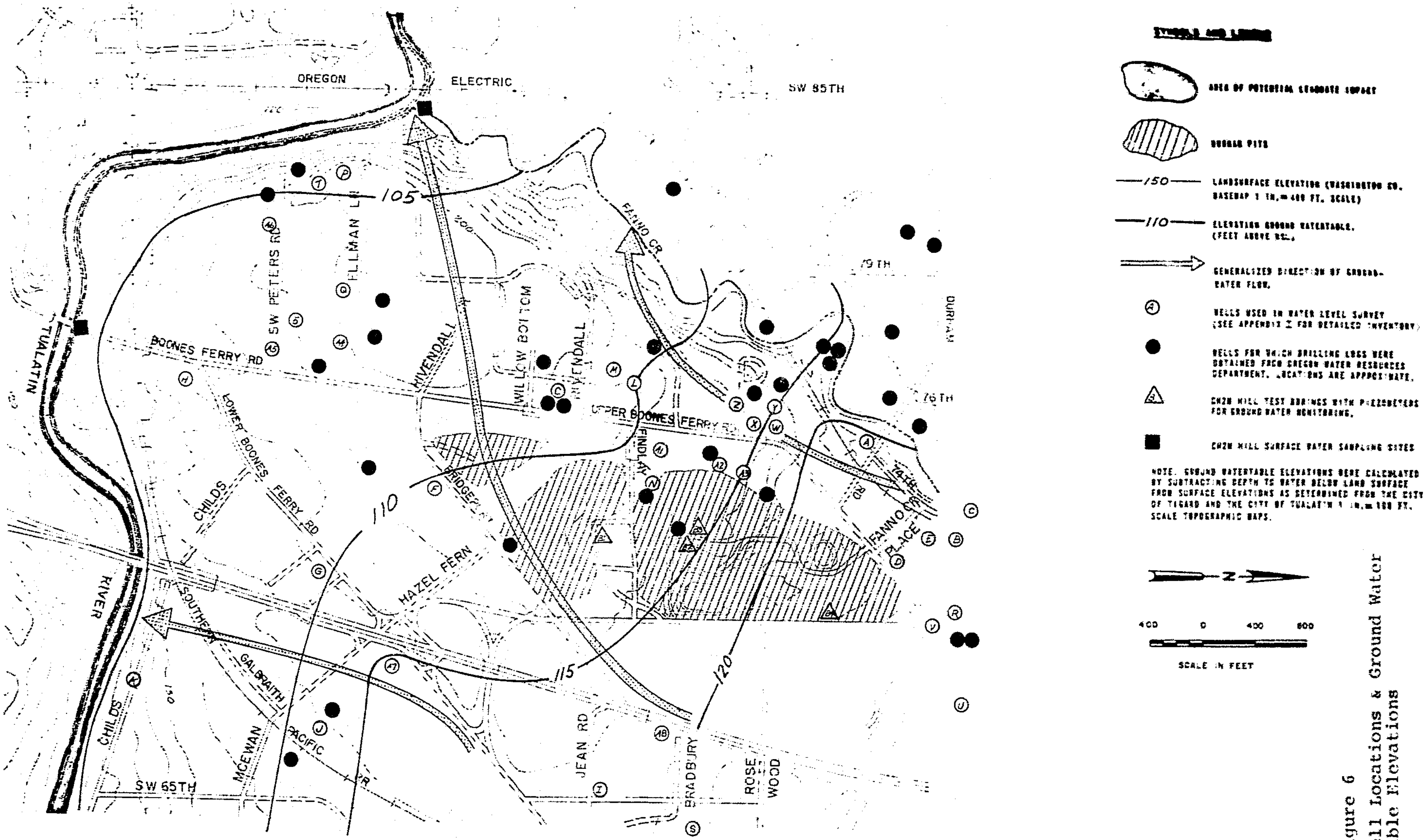
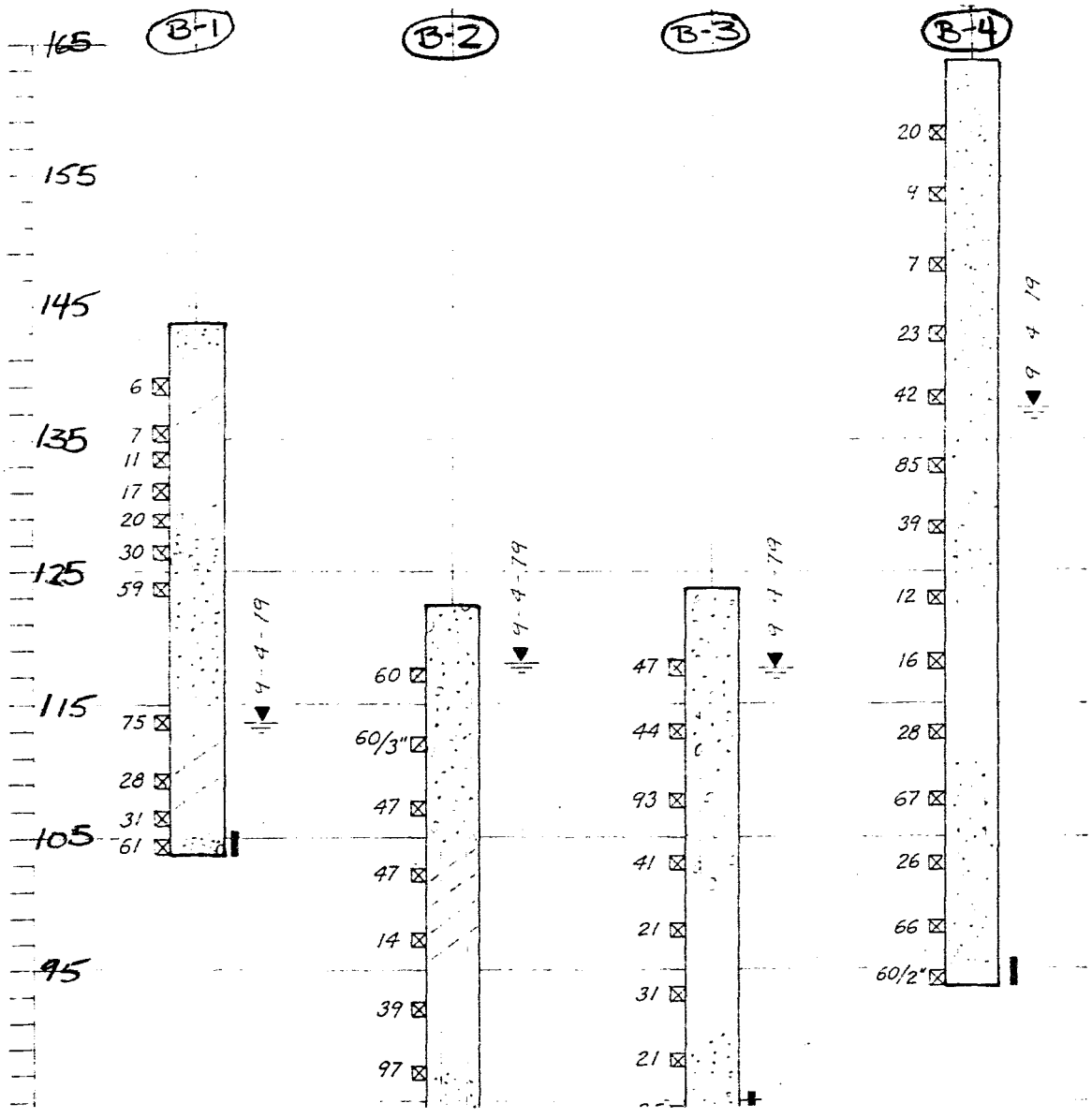


Figure 6
Well Locations & Ground Water Table Elevations



SYMBOLS AND LEGEND

SAND

SILTY SAND

SILT

CLAYEY SILT

SANDY SILT

B-1

SPLIT SPOON SAMPLE 16
STD PENETRATION BLOW COUNT BLOWS/FT

PENETRATION LESS THAN ONE FOOT 60.3"

LOCATION OF SLOTTED CASING FOR PIEZOMETER

NOTES:

1. BORINGS DRILLED 16 22 AUGUST 1979 A TRUCK MOUNTED CME 55 5½" ROTARY H
2. LOGS REPRESENT ONLY THE OPINION OF T ENGINEER REGARDING THE TYPE OF MA ENCOUNTERED.

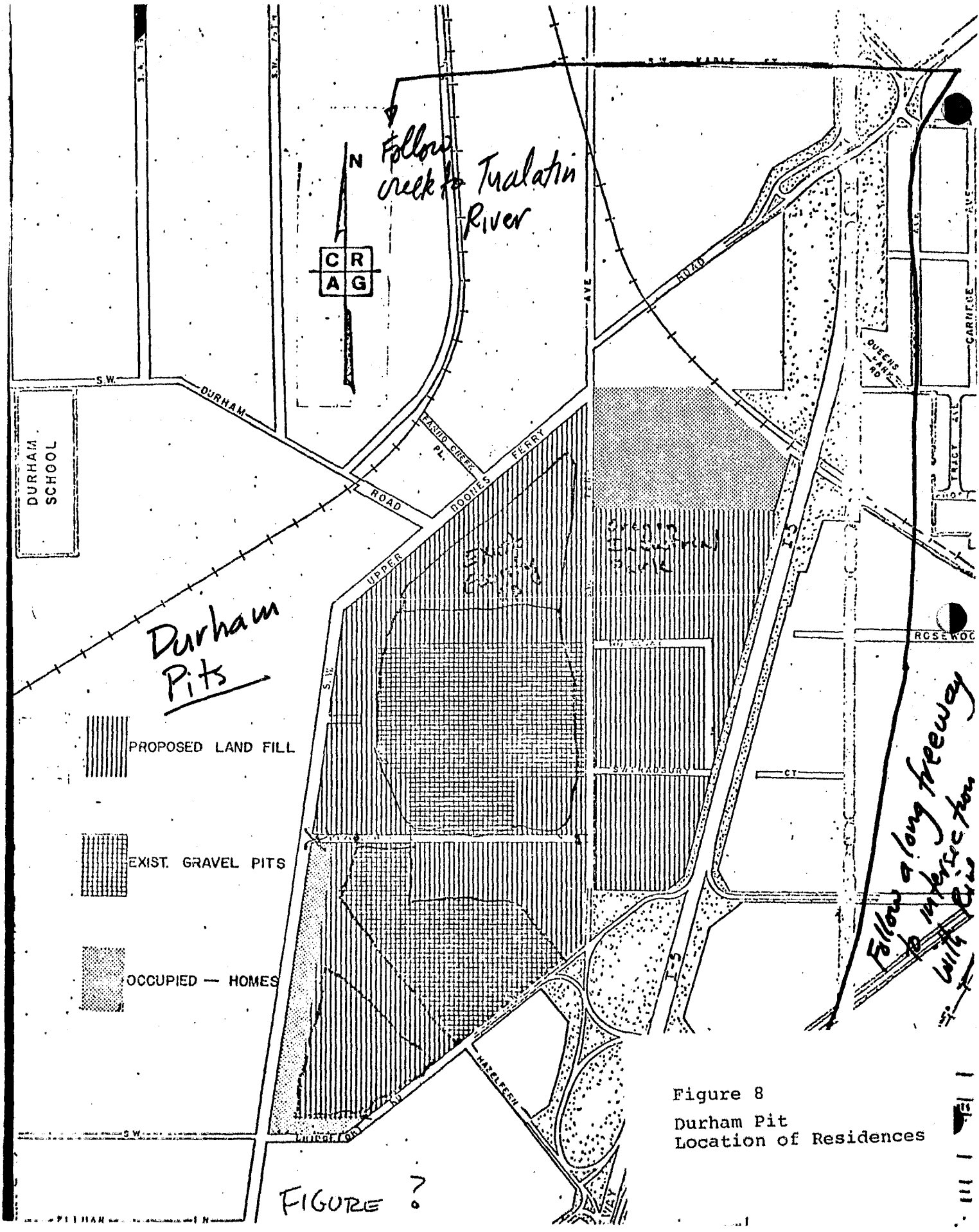
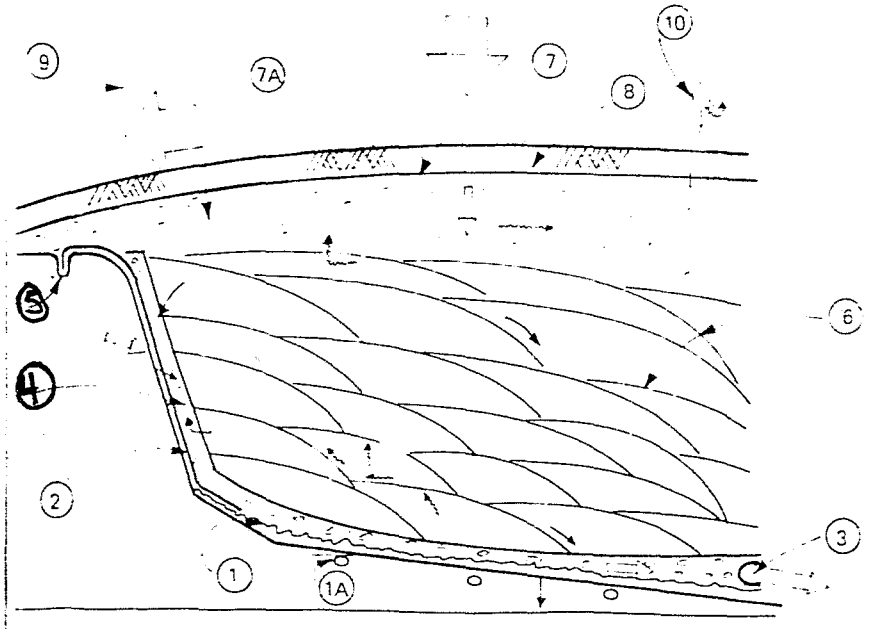


Figure 8

Durham Pit
Location of Residences



RELATIVE AMOUNT

WATER

GAS

1. IMPERMEABLE MEMBRANE LINER. PROVIDE SAND BELOW AND ABOVE. PROVIDE 18" PERVIOUS COVER FOR MECHANICAL PROTECTION AND TO LEAD LEACHATE TO DRAIN (3)

1A. POSSIBLE VENT PIPES TO PREVENT AIR PRESSURE WHICH MAY LIFT LINING (1) BEFORE WASTE IS IN PLACE AND TO MONITOR LEACHATE ESCAPE

2. PLASTIC LINER DRAPED OVER SLOPES. SHEETS OVERLAPPED WITH NO FIELDSEAM. COVER WITH SUNSHADE IF NECESSARY. STAKE TO SLOPE OR COVER WITH WIRE NET TO PREVENT WIND DAMAGE UNTIL WASTE IS PLACED

3. LEACHATE COLLECTION PIPES AT LOW POINTS

4. PERVIOUS, GRANULAR MATERIAL PLACED AS PIT IS FILLED

5. ANCHOR TRENCH FOR SLOPE LINER

6. PERVIOUS COVER ON CELLS SERVES TO CONDUCT WATER QUICKLY TO THE BOTTOM. ALSO GAS CAN VENT UPWARDS

7. PLASTIC LINER FOR ROOF, SLOPED TO DRAIN AWAY

7A. PERVIOUS MATERIAL TO ALLOW GAS VENTING TO (10)

8. SOIL COVER WITH TOPSOIL AND PLANTED

9. EAVE OR OVERHANG ON "ROOF"

10. GAS VENTS

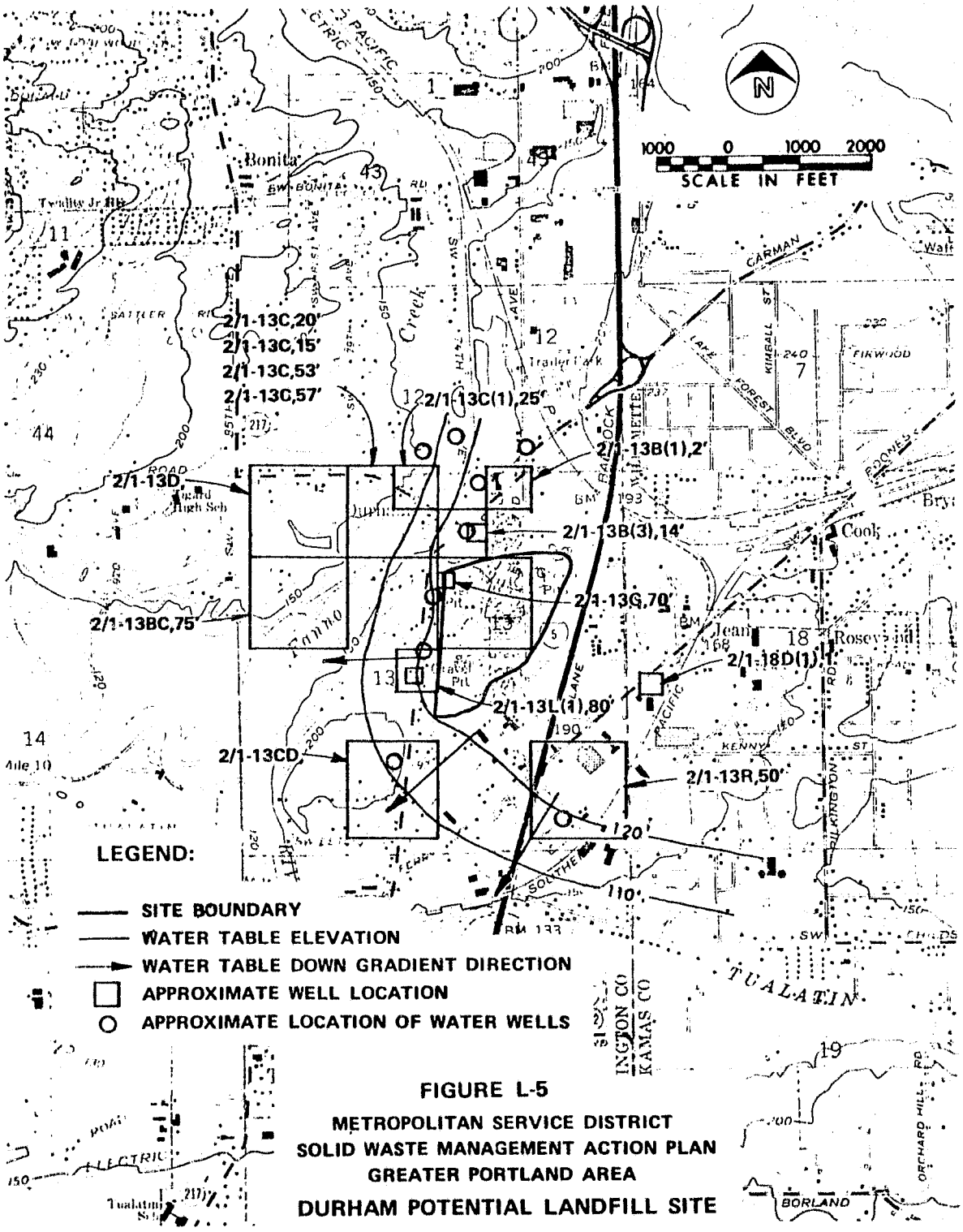


FIGURE L-5

METROPOLITAN SERVICE DISTRICT
SOLID WASTE MANAGEMENT ACTION PLAN
GREATER PORTLAND AREA

DURHAM POTENTIAL LANDFILL SITE

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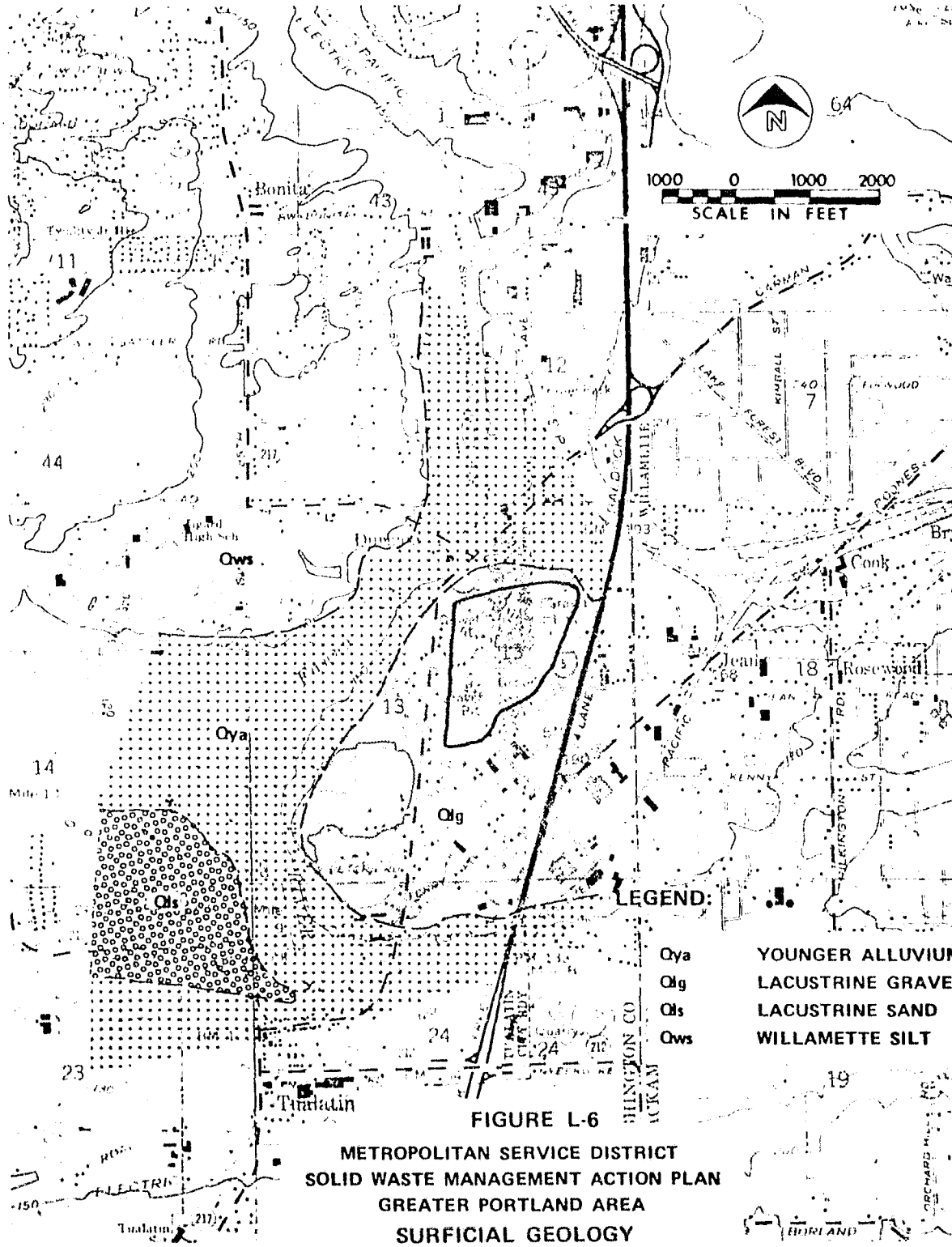

FIGURE L-6

METROPOLITAN SERVICE DISTRICT
SOLID WASTE MANAGEMENT ACTION PLAN
GREATER PORTLAND AREA
SURFICIAL GEOLOGY