

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P. O. Box 15027
Las Vegas, NV 89114

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Research and Development



AERIAL PHOTOGRAPHIC ANALYSIS OF HAZARDOUS WASTE SITES Duwamish Valley, Washington

EPA Region 10



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Duwamish Valley, Washington

by

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ABSTRACT

An intensive analysis of historical aerial photography of the Duwamish Valley, Washington, was performed by the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring Systems Laboratory, Las Vegas. This project was conducted at the request of the EPA's Region 10 office in Seattle and the Office of Emergency and Remedial Response in EPA headquarters, Washington, D.C.

The purpose of this project was to provide a historical hazardous waste site inventory of the Duwamish and Green Rivers in the Duwamish Valley. The Region 10 office also requested an analysis and evaluation of the area along the Duwamish Waterway in Seattle and the Duwamish Valley extending to Auburn to pinpoint those sites which could contribute to toxic pollution in the region.

Analysis of the historical (1940 through 1980) photography revealed 34 potential hazardous waste sites. While some of these sites appear to be minor, there are several which could contribute contaminants to the rivers and Elliot Bay.

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INTRODUCTION

An intensive analysis of historical aerial photography of the Duwamish Valley, Washington (Figure 1), was performed by the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring Systems Laboratory, Las Vegas. This project was conducted at the request of the EPA's Region 10 office in Seattle and the Office of Emergency and Remedial Response in EPA headquarters, Washington, D.C.

The purpose of this project was to provide a historical hazardous waste site inventory of the Duwamish and Green Rivers in the Duwamish Valley. The Region 10 office also requested an analysis and evaluation of the area along the Duwamish Waterway in Seattle and the Duwamish Valley extending to Auburn to pinpoint those sites which could contribute to toxic pollution in the region.

The specific area under investigation in this report are the lands on either side of the Duwamish Waterway, beginning at Elliott Bay, the Duwamish River, and the Green River as far south as Auburn, Washington. Development in this study area ranges from small agricultural operations along the Green River to heavy industrial and commercial facilities along the lower Green and Duwamish Rivers and the Duwamish Waterway. There is extensive residential development in the uplands overlooking the valley areas.

To develop a historical perspective of potential hazardous waste sites and disposal practices, black and white photography from the years 1940, 1961, 1968, 1974 and color photography obtained in 1980 were analyzed. The scales of the photography ranged from 1:12,000 (1 inch = 1,000 feet) to 1:30,000 (1 inch = 2,500 feet). The quality of the photography was generally good and cloud free.

Originally the Region 10 request called for analysis of photography obtained in the 1950's. However an extensive search of the records from all sources revealed no complete coverage of the study area was flown during the 1950's. The photography available was very limited coverage of a very small portion of the study area. Therefore, to get complete coverage, 1961 photography was obtained. In addition a search was made for late 1940's photography. However, none was available for that period.



METHODOLOGY

Stereoscopic pairs of historical and current aerial photographs were used to perform the analysis. The use of stereo enhances the interpretation effort by allowing the analyst to observe the vertical as well as the horizontal spatial relationships of natural and manmade features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors which can be found within a given study area.

Selection or inclusion of various sites in this report was based on several criteria deemed indicative of potential hazardous waste sites. These criteria include: ground scarring not associated with any type of construction; piles of materials in more remote areas; pits, ponds, and lagoons away from industrial facilities; waste ponds associated with various chemical or industrial facilities; drums in unprotected locations; and spillage or spill stains noted in or by drainage channels. Those industrial sites with uncontained storage/processing tanks are also included. Those industries which do not meet the criteria and have adequate containment are not considered as hazardous waste sites and omitted from the report.

Evidence of waste burial and dumping is a prime consideration when conducting an analysis. Leachate or seepage originating at these areas often threaten ground and surface water resources which are located within a study area. Pools of unexplained liquid are routinely noted because they may be seepage from buried wastes and could enter drainages which carry effluent away from a site. Spills, spill stains, and vegetation damage are very good indicators of the manner in which hazardous materials are being handled. Drainage analysis is conducted in order to determine the direction a spill or other surface runoff may take.

The size of the Duwamish Valley study area and the scope of historical analysis create some problems with data presentation. The major thrust of the request for the Las Vegas laboratory support was a historical analysis of hazardous waste sites in the study area. To reduce confusion over site numbering and lend continuity to the data presentation, potential hazardous waste sites are numbered beginning with the 1940 photography. For example, in 1940 seventeen possible sites were noted and thus numbered Sites 1, 2, 3, etc. Since they were first observed on 1940 photography, the complete site designation is Site 1 ('40), Site 2 ('40), etc. These sites keep the same number in subsequent years. The numbering sequence continues for sites first observed in each of the succeeding years, so there is no duplication of site numbers throughout the entire span of historical analysis. Each set of new sites first noted in a particular year has the year in parenthesis following the site number. For example, Site 18 ('61) or Site 32 ('74).

Aerial photographs were acquired from the following sources:

1. 1940 photography (U.S. Army Corps of Engineers)
2. 1961 photography (Walker & Associates in Seattle, Washington)
3. 1968 photography (U.S. Geological Survey)
4. 1974 photography (Washington State Department of Transportation)
5. 1980 photography (U.S. EPA's Environmental Monitoring Systems Laboratory, Las Vegas).

Photo scales range between 1:12,000 (1 inch = 1,000 feet) and 1:30,000 (1 inch = 2,500 feet). All photographs are free of clouds and cloud shadows and of good quality. Drainage direction was obtained from the analysis of the historical and current photography and through the use of U.S. Geological Survey 7.5-minute quadrangle sheets. Supplementary geological, soils and water resource information was obtained from two documents published by the U.S. Department of Interior, Geological Survey. These are:

1. Geology and Groundwater Resources of Southwestern King County, Washington, U.S. Geological Survey, Water-Supply Bulletin No. 28, 1969

2. Water Resources of King County, Washington, U.S. Geological Survey, Water-Supply Paper 1852, 1968.

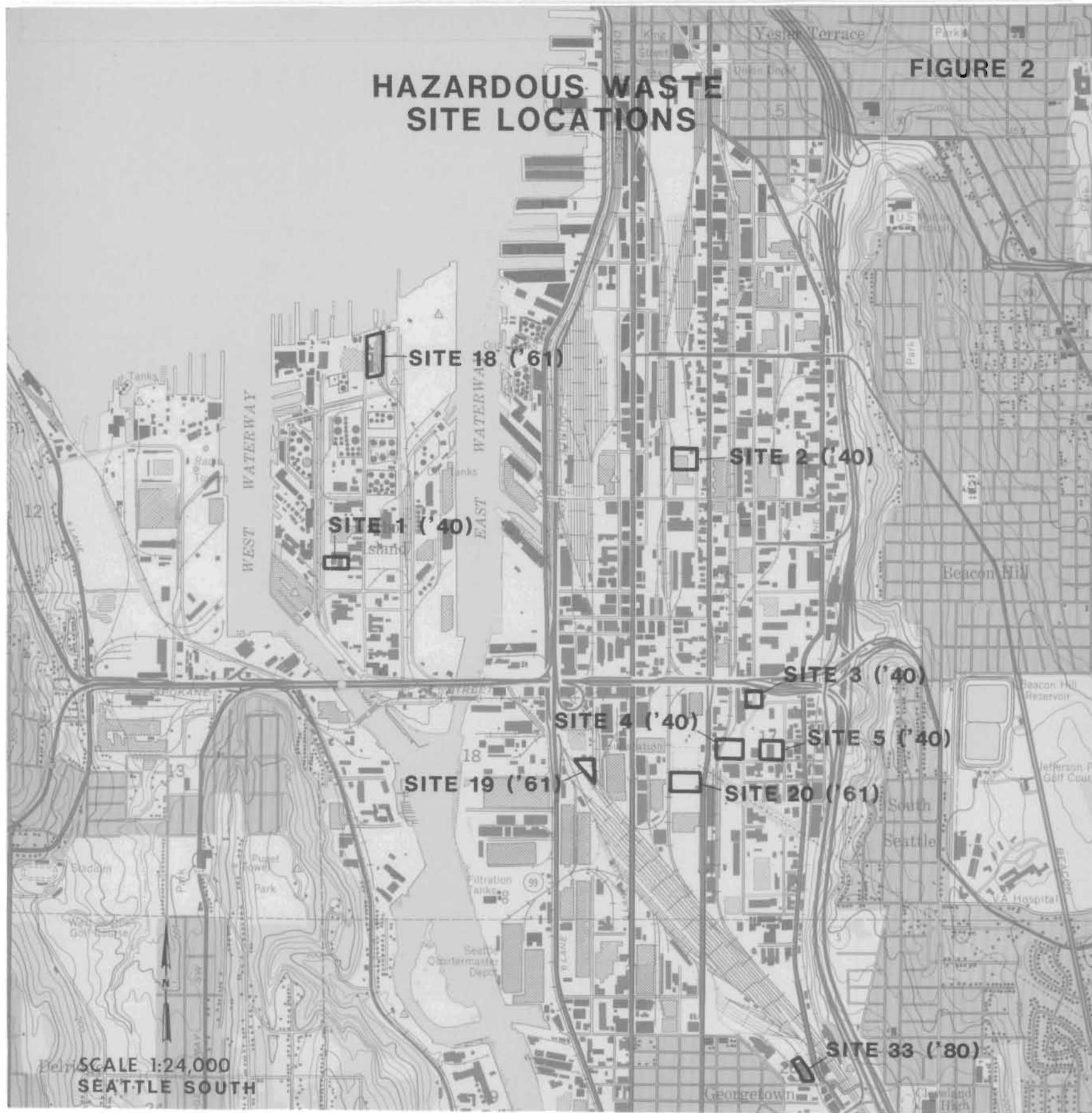
The study area is displayed on the Seattle 1:250,000 U.S. Geological Survey (USGS) topographic map (Figure 1). Site locations are portrayed on the Seattle South, Washington; Des Moines, Washington; Renton, Washington; and Auburn, Washington, 7.5-minute USGS topographic quadrangles (Figures 2 through 6). Geographic coordinates for each site can be found in Table 1.

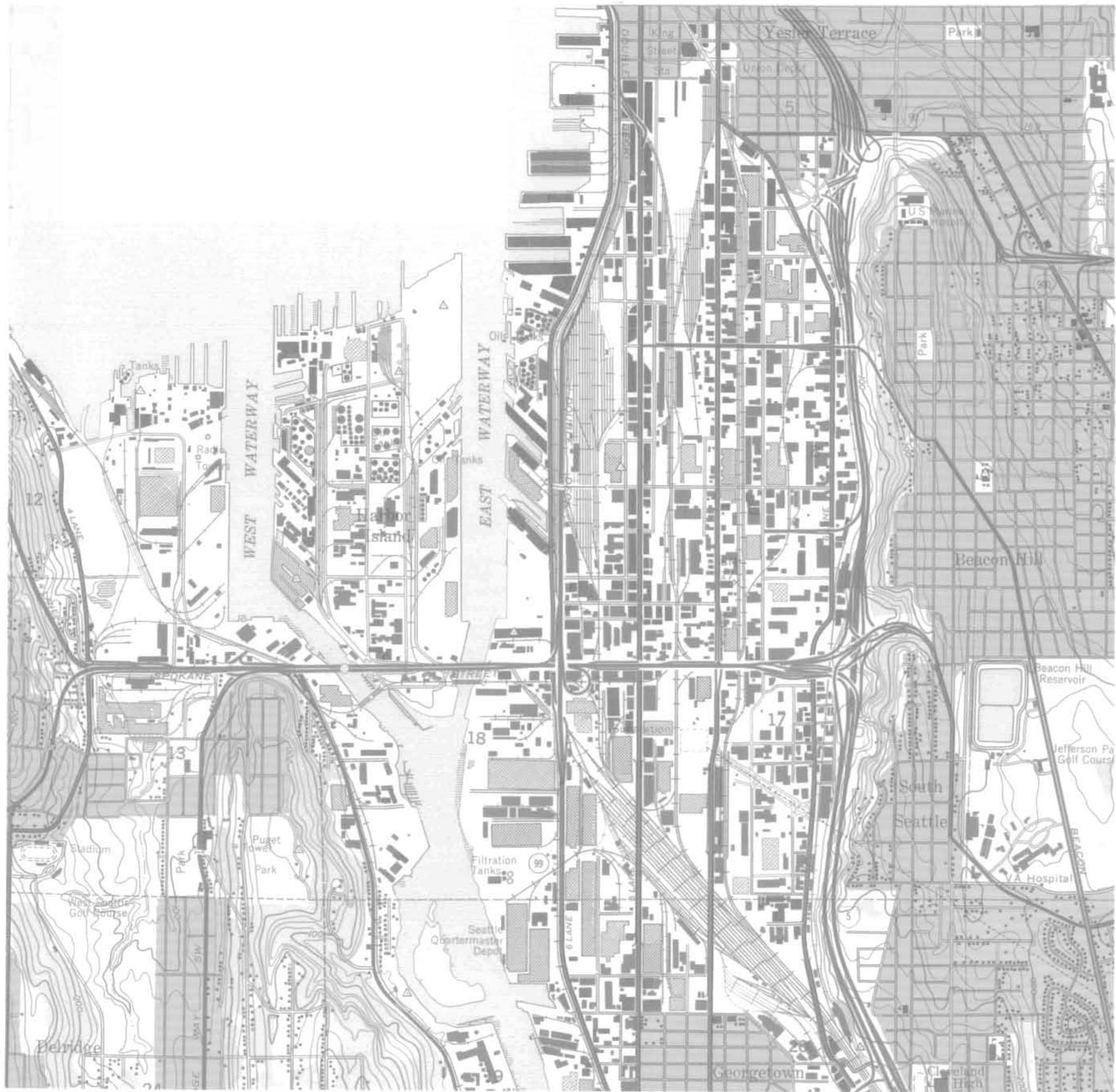
TABLE 1. HAZARDOUS WASTE SITE GEOGRAPHIC COORDINATES

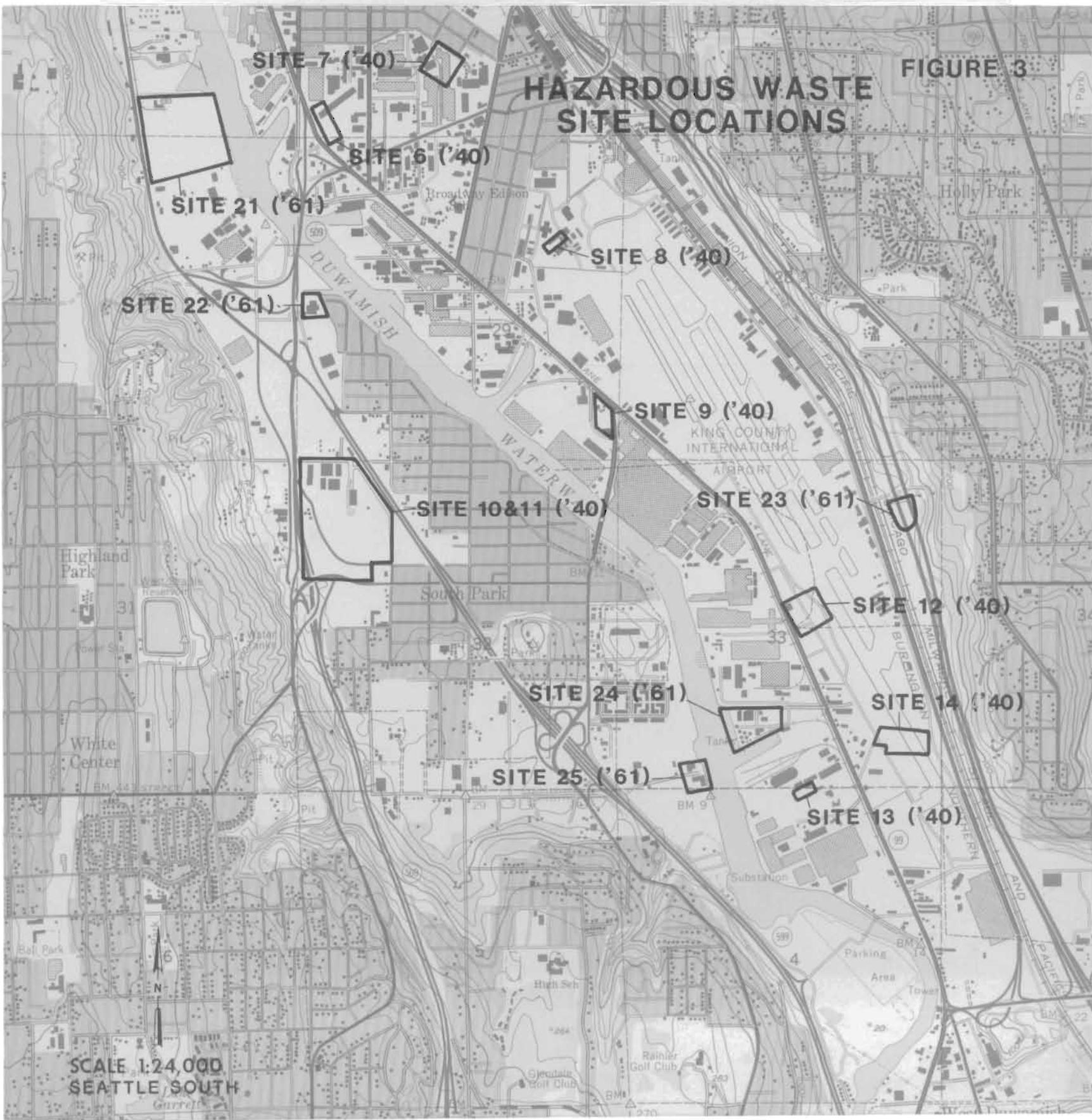
Site Number	Coordinates
1('40)	N47°34.6' W122°21.2'
2('40)	N47°34.9' W122°19.75'
3('40)	N47°34.25' W122°19.5'
4('40)	N47°34.15' W122°19.6'
5('40)	N47°34.15' W122°19.4'
6('40)	N47°32.8' W122°19.9'
7('40)	N47°32.95' W122°19.45'
8('40)	N47°32.5' W122°19.0'
9('40)	N47°32.05' W122°18.8'
one site { 10('40)	N47°31.75' W122°19.8'
11('40)	
12('40)	N47°31.5' W122°17.9'
13('40)	N47°31.05' W122°17.95'
14('40)	N47°31.1' W122°17.6'
15('40)	N47°28.7' W122°14.0'
16('40)	N47°23.05' W122°14.4'
17('40)	N47°22.2' W122°14.3'
18('61)	N47°35.2' W122°21'
19('61)	N47°34.1' W122°20.15'
20('61)	N47°34.05' W122°19.75'
21('61)	N47°32.8' W122°20.5'
22('61)	N47°32.3' W122°29.95'
23('61)	N47°31.8' W122°17.6'
24('61)	N47°31.2' W122°18.2'
25('61)	N47°31.1' W122°18.4'
26('61)	N47°28.9' W122°15.4'
27('61)	N47°26.1' W122°16.1'
28('61)	N47°23.1' W122°14.05'
29('68)	N47°28.1' W122°14.5'
30('68)	N47°27.6' W122°13.8'
31('68)	N47°25.5' W122°14.5'
32('74)	N47°23.2' W122°16.3'
33('80)	N47°33.25' W122°19.3'
34('80)	N47°23.1' W122°16.4'

HAZARDOUS WASTE SITE LOCATIONS

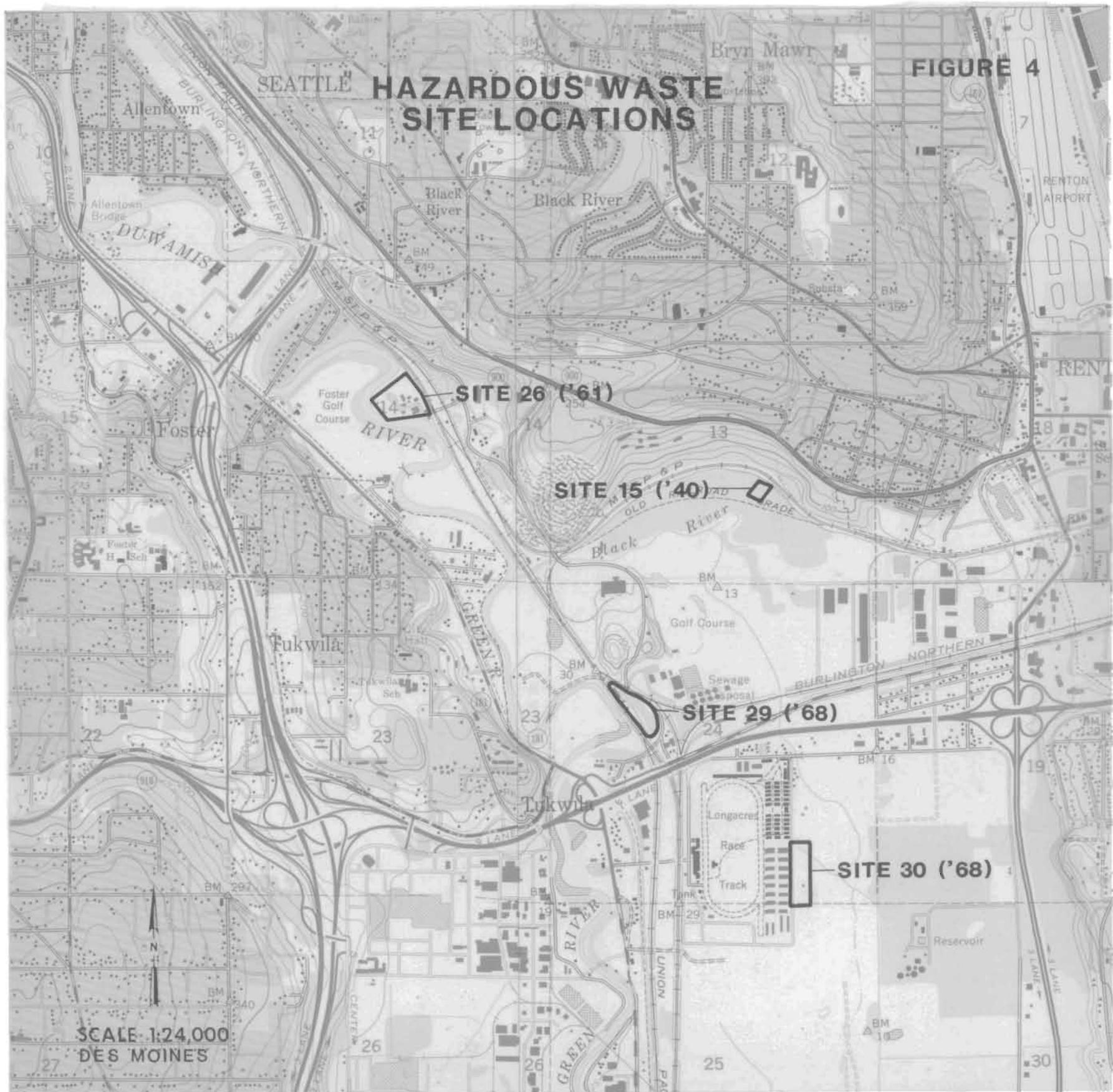
FIGURE 2





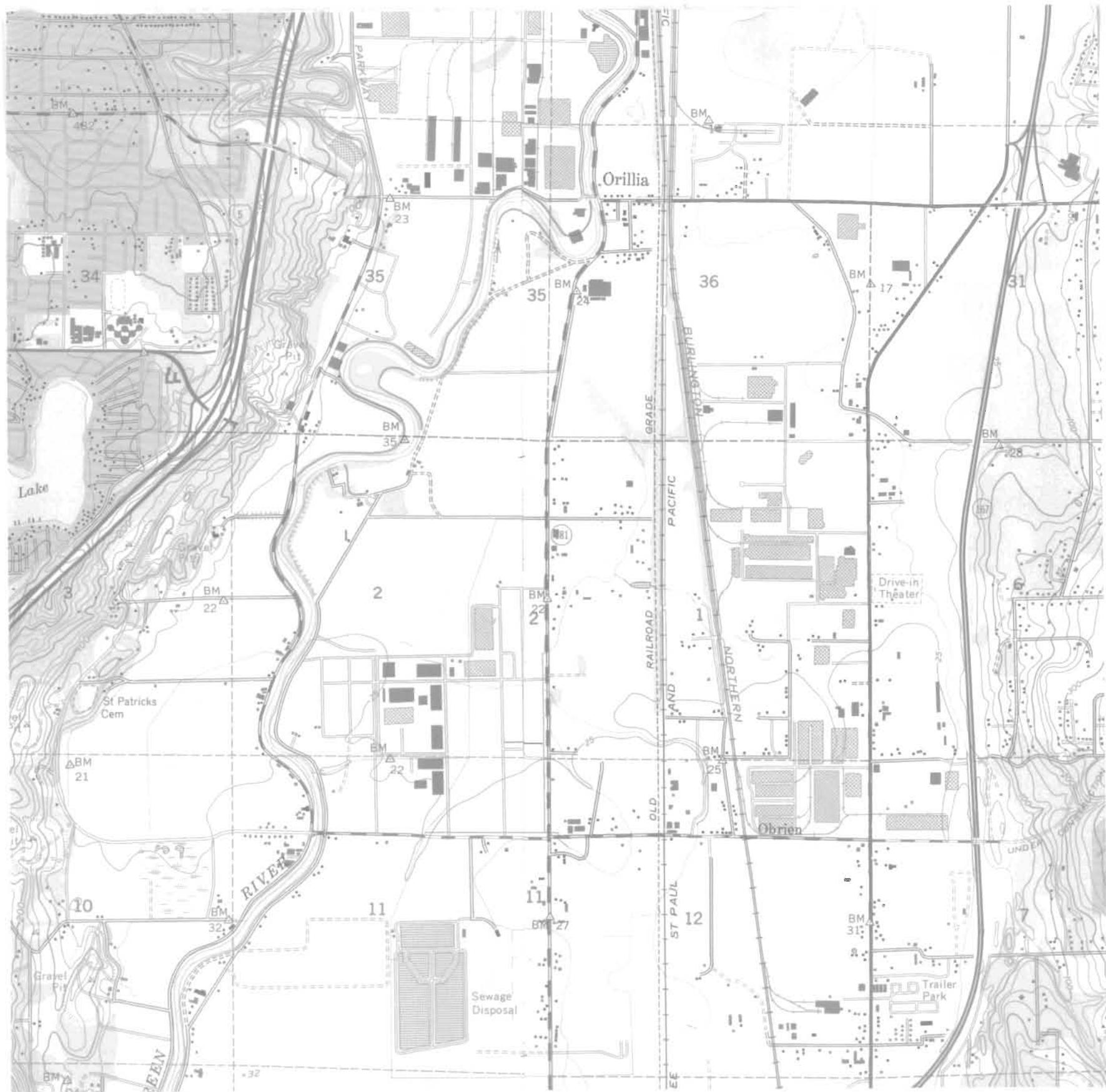


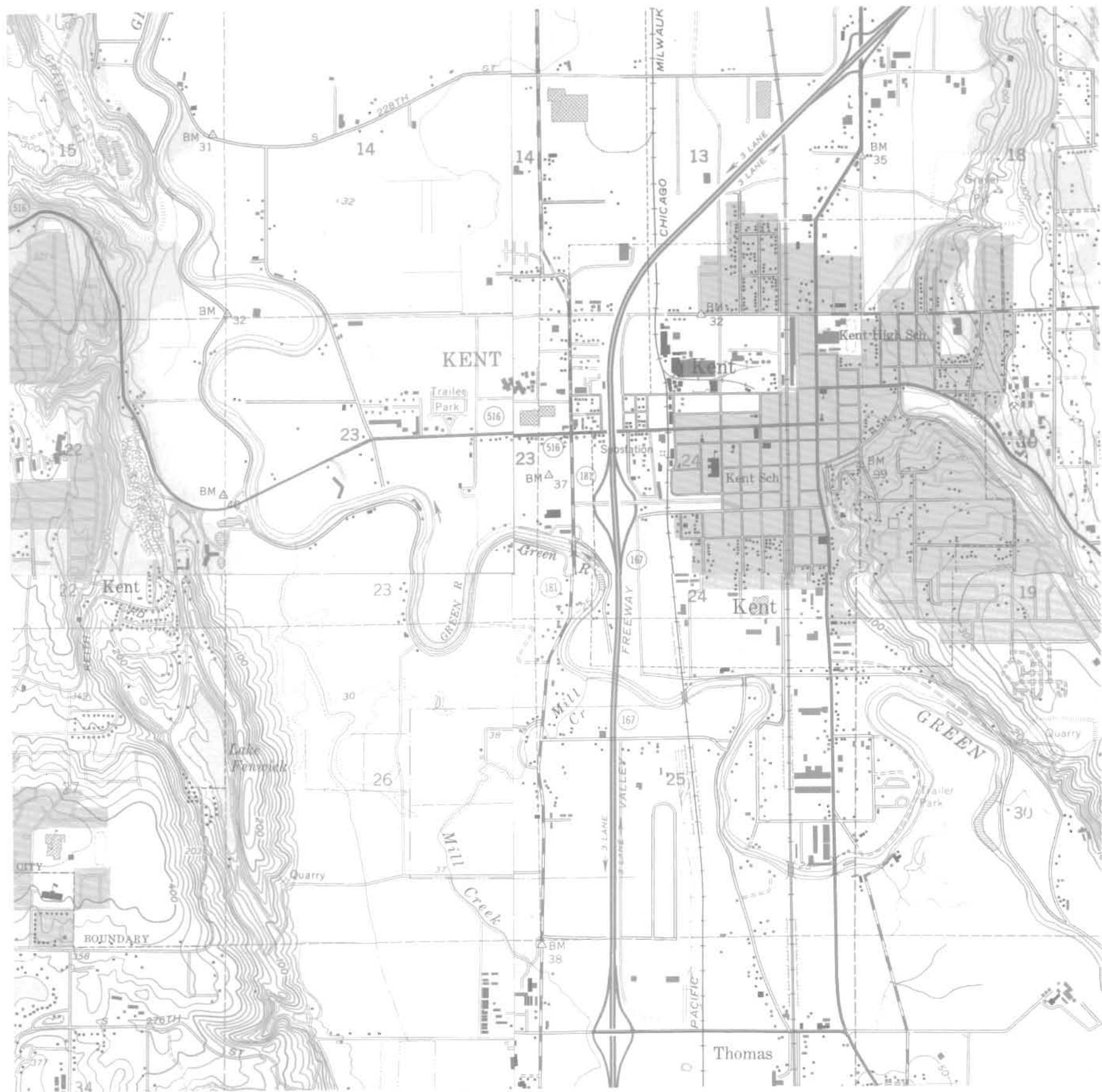












ENVIRONMENTAL OVERVIEW

TOPOGRAPHY AND GEOLOGY^{1,2}

The study area falls within a broad physiographic area of Washington known as the Pacific Border Province. Within this province lies the area known as the Puget Lowlands, a broad drift plain which extends from the Cascade Mountains on the east to the Olympic Mountains on the west. This plain has moderate relief ranging from 200-700 feet in elevation and is transected by many "steep walled alluviated and marine embayments," the largest of which is Puget Sound. These embayments divide the Puget Lowlands into isolated remnants or uplands. The study area occupies a small portion of these uplands on either side of a "steep walled alluviated embayment" known as the Duwamish Valley.

The topography or surface expressions of the study are a product of glacial and glaciofluvial processes as a result of the Pleistocene age Vashon Glacier. In the upland portion of the study area are basically till or drift plains with small segments of glaciated bedrock exposed. The stream courses in this drift plain are poorly defined and lakes or swamps occupy local closed depressions or kettles. Linear ridges or drumlins in the drift plain are another surface feature left by the Vashon Glacier.

The major portion of the study area lies in the Duwamish Valley. This valley, an old marine embayment, extends from Auburn, Washington, north to Elliott Bay at Seattle, Washington. This old marine embayment was "filled and aggraded" to slightly above sea level by the Green, Black, and White Rivers. The White River was diverted

¹Luzier, J. E., 1969, "Geology and Groundwater Resources of Southwestern King County, Washington," U.S. Geological Survey, Water-Supply Bulletin No. 28, pp. 5,11.

²Richardson, E., J. W. Bingham, and R. J. Madison, 1968, "Water Resources of King County, Washington," U.S. Geological Survey, Water-Supply Paper 1852, pp. 3-4.

to the south in 1906 and now joins with the Puyallup River to flow into Commencement Bay at Tacoma. The Black River joins with the Green River just west of Renton, Washington, to form the Duwamish River. The Duwamish River becomes the Duwamish Waterway at the point where the river has been dredged and channelized. The waterway extends from near the south end of King County International Airport to Elliott Bay.

The Puget Lowland is underlain by semiconsolidated and unconsolidated materials which include clay, silt, sand, gravel, and glacial till. In some places these materials exceed 2,000 feet in depth. For the most part, the materials were deposited during Recent Pleistocene and Tertiary time. The Pleistocene deposits are glacial drift from the Vashon Glacier. The subsurface materials vary widely in degree of permeability from high in the strata of coarse sands or sand and gravel to low in the strata of clay, silt, fine sand, and till.

CLIMATE³

The study area has a marine climate characterized by mild, wet winters and cool, dry summers. Precipitation is generally heavy during the winter months and lightest in the summer. The average yearly rainfall in the study area is about 38 inches, most of which falls as rain.

Winter temperatures are mild with frosts a rare occasion. The average minimum temperature in this area is 35°F. Summer temperatures are also mild with average highs in the low 70's. The diurnal ranges, both in winter and summer, generally are in the neighborhood of 20°F.

SURFACE DRAINAGE

The major drainage channels in the study are the Green, Black, and Duwamish Rivers. These rivers are fed by a variety of small creeks, streams, and springs

³Ibid., p. 5.

throughout their natural course through the study area. In the heavily developed area along the Duwamish Waterway runoff from storm sewers and industrial discharges add to the flow.

Groundwater⁴

The availability of groundwater within the study area depends on the particular physiographic area being considered. In the areas of glaciated bedrock the availability is very low (1-50 gpm). In the upland drift plains, groundwater availability can vary from 1 or 2 gpm to several thousand gpm, depending on the type of material penetrated by the well. Many wells completed in glacial till have inadequate yields in the summer.

In the Duwamish Valley, groundwater availability also depends on the subsurface material. As the water table is near the ground surface, most shallow wells will produce adequate domestic water supplies. These wells are completed in fine grained sand and silt deposits. In some areas, however, coarse gravel deposits can yield over 3,000 gpm and could be used for municipal water supplies.

A water table contour map (Figure 7) shows the general shape of the regional groundwater reservoir and the direction of groundwater movement. In the Duwamish Valley the water table is generally less than 10 feet beneath the surface but in local areas can be as much as 20 feet. In the upland areas the piezometric surface lies some 100-250 feet beneath the land surface. In some places the upland water table is as much as 125 feet above the adjacent valley floor, and (as can be seen in Figure 7) the flow is toward the valley.

⁴Op cit., Luzier, pp. 40-42.

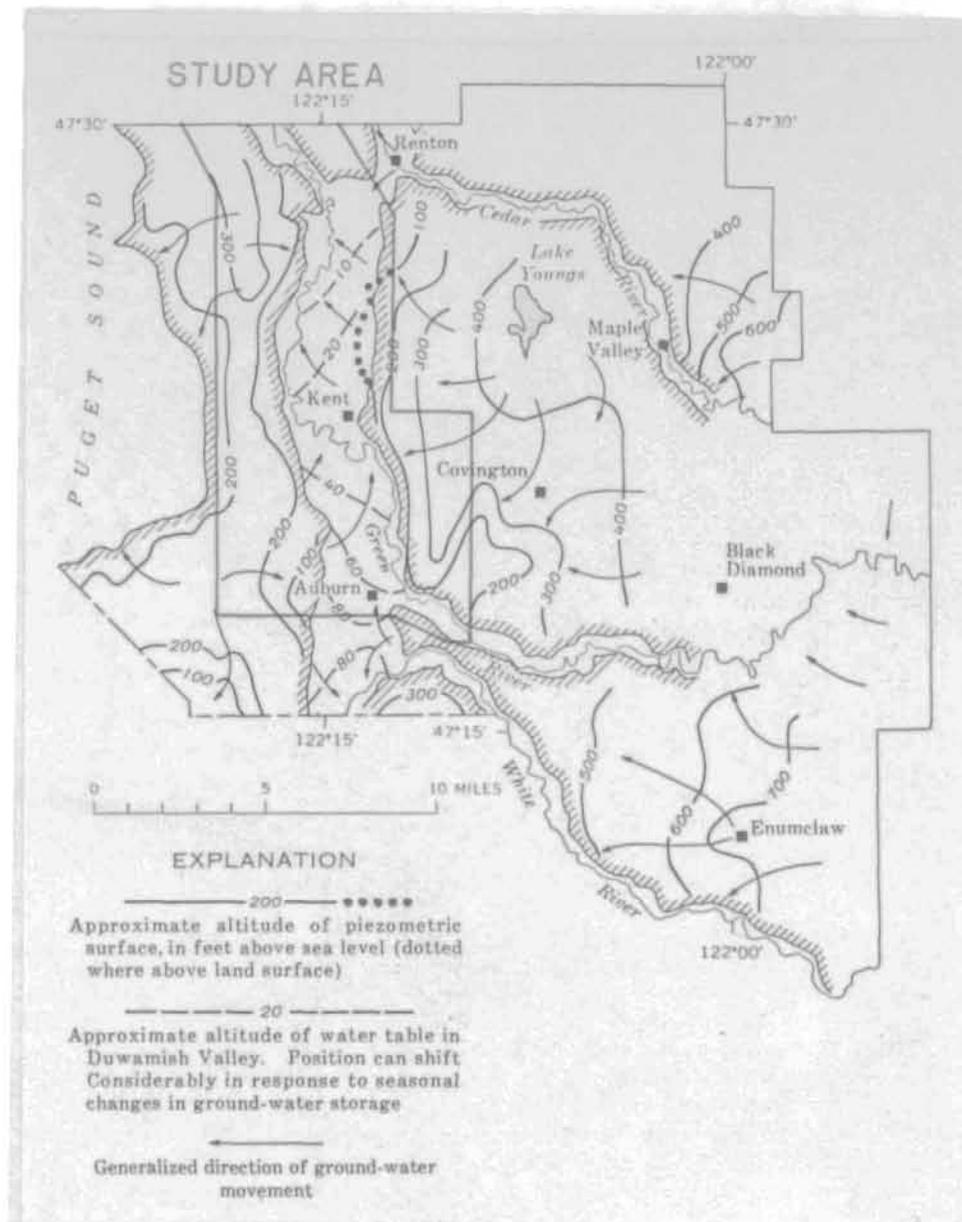


Figure 7. Regional groundwater piezometric surface in Pleistocene deposits, and water table in Recent alluvium of Duwamish Valley.⁵

⁵Ibid., p. 41.

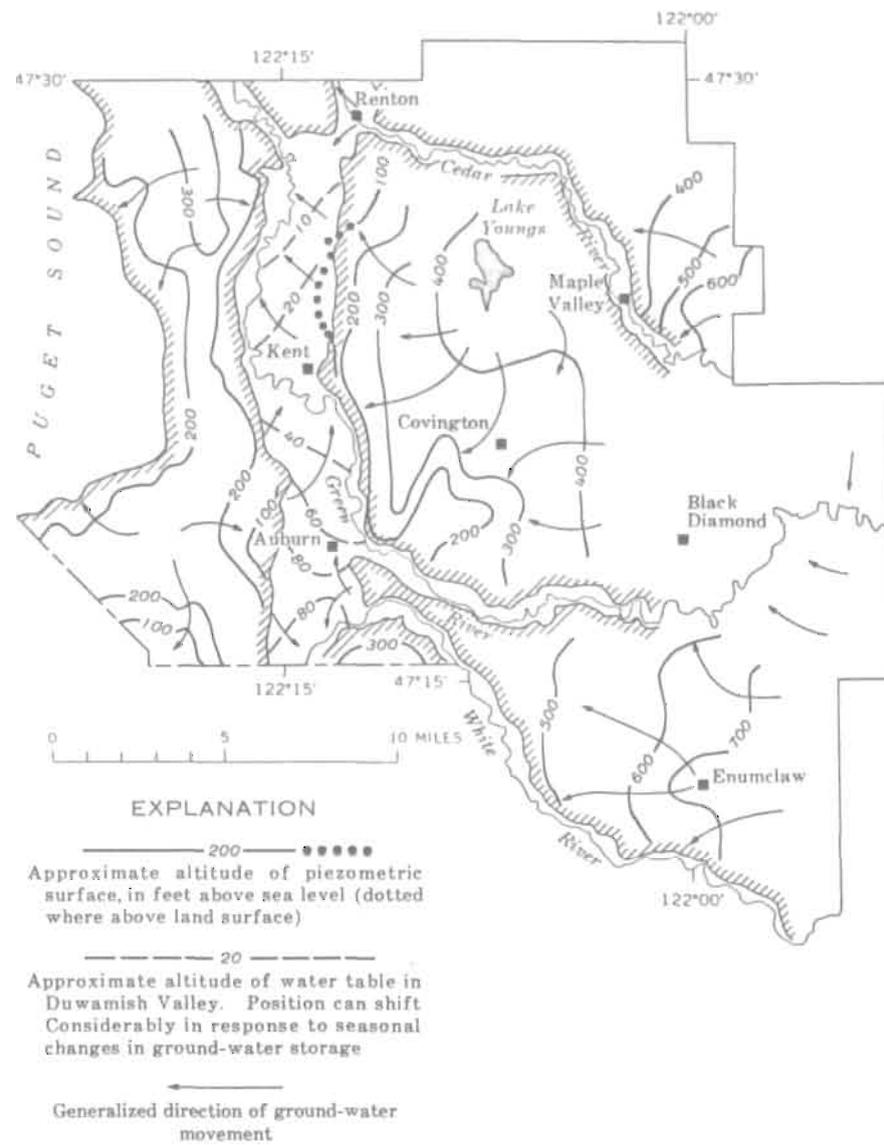


Figure 7. Regional groundwater piezometric surface in Pleistocene deposits, and water table in Recent alluvium of Duwamish Valley.⁵

⁵Ibid., p. 41.

ANALYSIS SUMMARY

In 1940 the pattern of development throughout the study area appeared to be well established (Figures 8 through 15). Along the Duwamish Waterway there is heavy industrial and commercial development. This development extends along the Duwamish River, but along the Green River the land use is agricultural. The only exceptions are the urban development of Kent and Auburn. Analysis of the 1940 photography reveals the presence of 17 potential hazardous waste sites: 14 are located along the Duwamish Waterway, 1 near the Black River, and 2 at Kent.

The photography of 1961 revealed continued development along the Duwamish Waterway. In addition, a new industrial development is under construction just south of the confluence of the Black and Green Rivers. Construction of State Highway 599 is evident west of the Duwamish Waterway. Analysis of the photography identified another 11 potential hazardous waste sites: 8 are along the Duwamish Waterway, 1 along the Duwamish River, 1 on a bluff above the Green River, and the last at Kent.

The major changes evident in the study area by 1968 are the continued development (industrial, commercial, and residential) and the construction of Interstate Highway 5, Interstate Highway 405, and State Highway 167. Analysis of the 1968 photography reveals only three potential sites, one of which appears to contain a large volume of waste that could reach Black River.

The 1974 photography revealed a continuation of the development pattern established years before. Industrialization of the Duwamish Valley along the Green River has accelerated. However, there is no evidence of major hazardous waste sites as only one site was evident on the photography; a small dump with drainage into the Green River.

The 1980 photography did not reveal any great change in the study area since 1974. Only two sites were identified, a drum storage/handling facility in Seattle and a dump located near the Green River.

PHOTO ANALYSIS

1940 PHOTOGRAPHY

By 1940 the pattern of development in the study area is well established. Along the channelized portion of the Duwamish Waterway the development in the floodplain is predominately industrial and commercial while residential development is concentrated on the adjoining upland areas. South of the confluence of the Green River and Black River the predominate land use is agriculture in both the valley and the uplands.

Analysis of the photography revealed 17 potential sites throughout the study area. Fourteen of these are in the industrial area along the Duwamish Waterway. One is along railroad tracks just north of the Black River. The final two are dumps located in Kent, Washington. Due to the terrain, the drainage from most sites probably would not reach the waterway or rivers. However, several are directly tied to the rivers by distinct drainage paths.

SITE 1 ('40) - This small industrial facility, located on the Harbor Island has an area of apparent waste dumping (Figure 8). Piles of white material are evident in the wetland area west of the buildings. Drainage from this area is into the wetlands but there is no evidence that surface drainage could reach the nearby waterways.

SITE 2 ('40) - This dump site is located in an apparent low-lying area east of the railroad tracks (Figure 8). The site does not appear to be associated with any local industry but rather is apparently a general dump area. Several large vehicles are visible, possibly trucks bringing in waste material.

SITES 3 ('40), 4 ('40), and 5 ('40) - These sites are all small dump areas just south of Spokane Street (Figure 9). None appear to be associated with any industry

and are probably nothing more than general refuse dumps. Piles of material are visible at each site. Drainage is toward a low area between the sites.

SITE 6 ('40) - This site consists of two small dump areas located along the east side of Highway 99 (Figure 10). Drainage from the two points leads into a low area just east of the road. There is no evidence that hazardous wastes are present.

SITE 7 ('40) - This site is a possible waste pit east of Site 6 ('40) (Figure 10). The pit contains a white toned material some of which has migrated away from the pit into the low area reaching a drainage channel that connects with the Duwamish Waterway.

SITE 8 ('40) - This site is a small dump area probably associated with a nearby industry (Figure 11). The dump is located next to a drainage channel leading to the Duwamish Waterway. It is very probable that waste materials from the dump could reach this drainage way and flow into the Duwamish Waterway.

SITE 9 ('40) - This small industry adjacent to King County Airport has two pits which contain a white material (Figure 11). It appears some of this material has escaped from the larger pit but has not migrated off the site. It appears the drainage is blocked on all sides so material would be confined to the site.

SITE 10 ('40) - This site, located on the west side of the waterway, is an area of heavy dumping (Figure 11). All the dumping is adjacent to a drainage channel which leads to the Duwamish Waterway. The various tones visible in the dump area suggest a wide variety of waste material.

SITE 11 ('40) - This site is located approximately 228 meters (750 feet) south of Site 10 ('40) and is about 2.5 times larger (Figure 11). This site is also located in the same drainage as 10 ('40) and any waste materials could reach the Duwamish Waterway via this drainage channel. The size of this site suggests it could be the local garbage dump.

SITE 12 ('40) - This site is a small industry with a probable stockpile of white material (Figure 12). Drainage from this stockpile is north toward some nearby farmland. The type of material cannot be determined from the photography.

SITE 13 ('40) - This small site consists of at least 10 uncontained storage tanks (Figure 12). Any spill from these tanks would reach an adjacent drainage channel and flow into the Duwamish Waterway. There is no evidence that any spills have occurred.

SITE 14 ('40) - This site is probably a petroleum distributor (Figure 12). All the tanks appear to be contained, but dark tones near the loading racks could indicate past spills. Drainage is south and leads to a small pool of liquid.

SITE 15 ('40) - This site is a small dump area in a low spot just south of the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks (Figure 13). There are no roads in the vicinity so presumably the material in this dump comes from the railroad. As this is the lowest point, all drainage in the vicinity is toward the site.

SITE 16 ('40) - This is a small dump area alongside the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks in Kent, Washington (Figure 14). The site does have some vegetation cover which does obscure some of the piles of materials. Drainage is toward the north along old railroad grade.

SITE 17 ('40) - This is another small dump alongside the Chicago, Milwaukee St. Paul and Pacific Railroad tracks and adjacent to the Duwamish River (Figure 15). Piles of waste material are visible at the site and the drainage from the site is south into the river. A small shed is visible near the south end of the site. Access to the site is via a small county road.







1940
slip 3





1940 aerial
P85+7



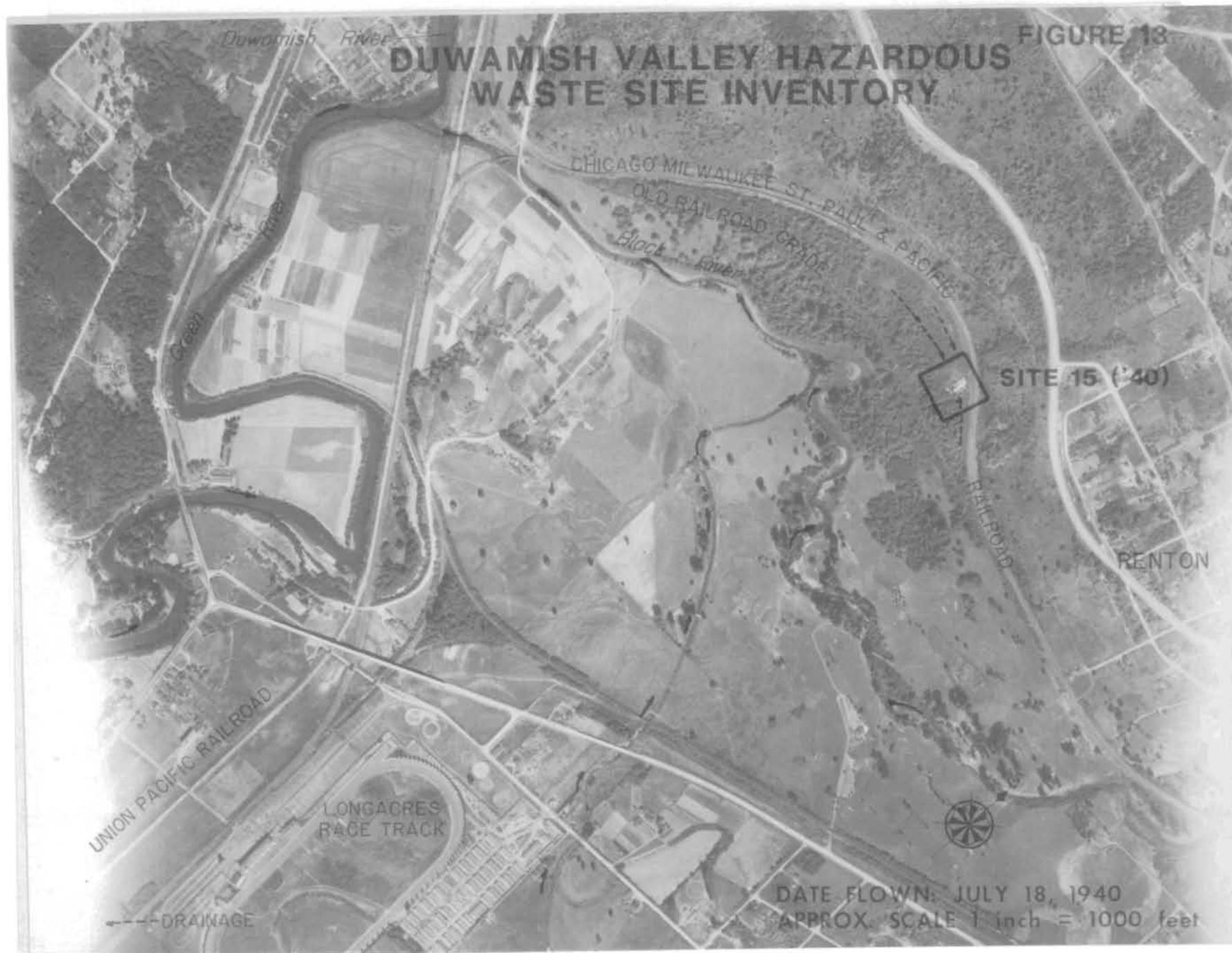




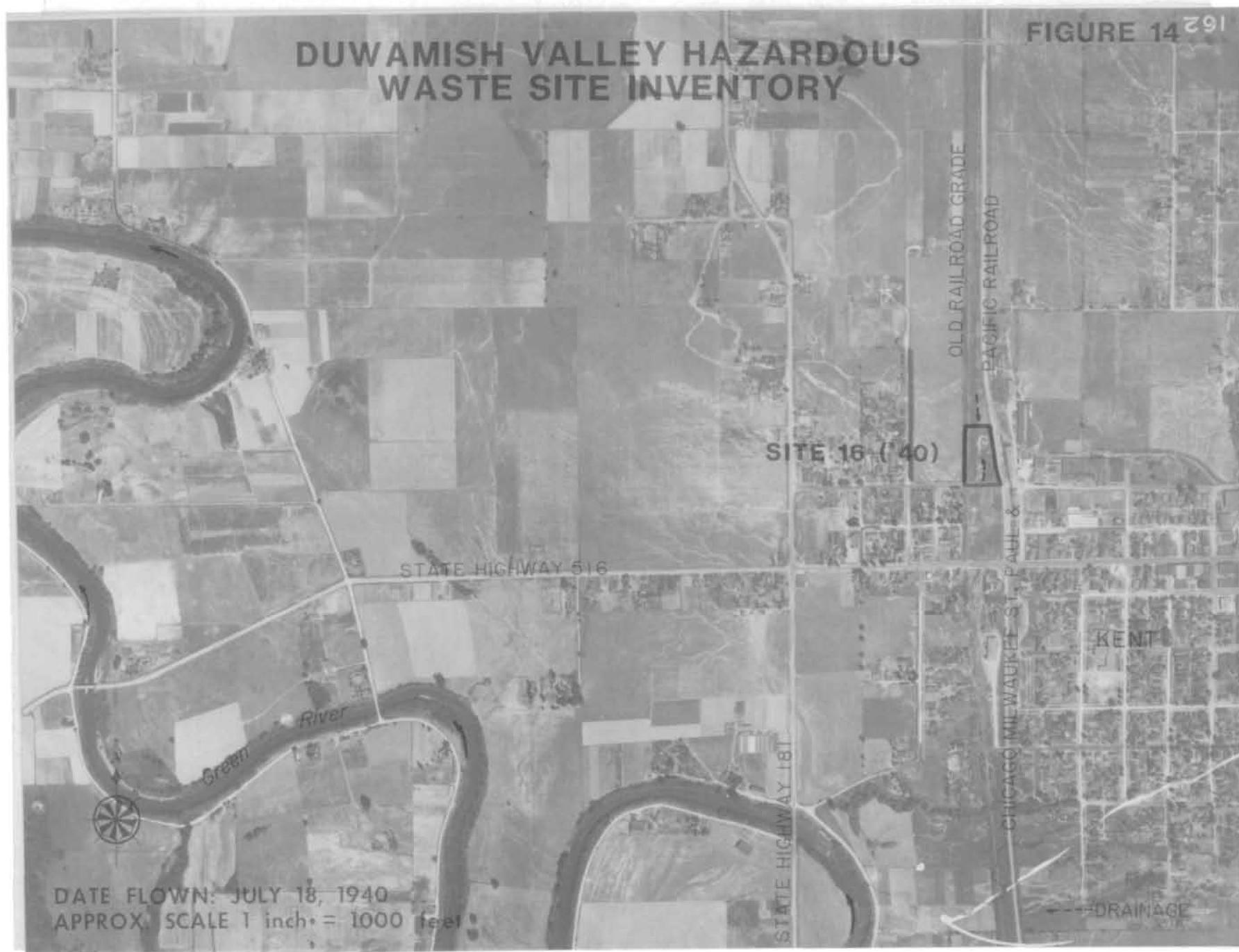


1940
P 35 - Kenneth

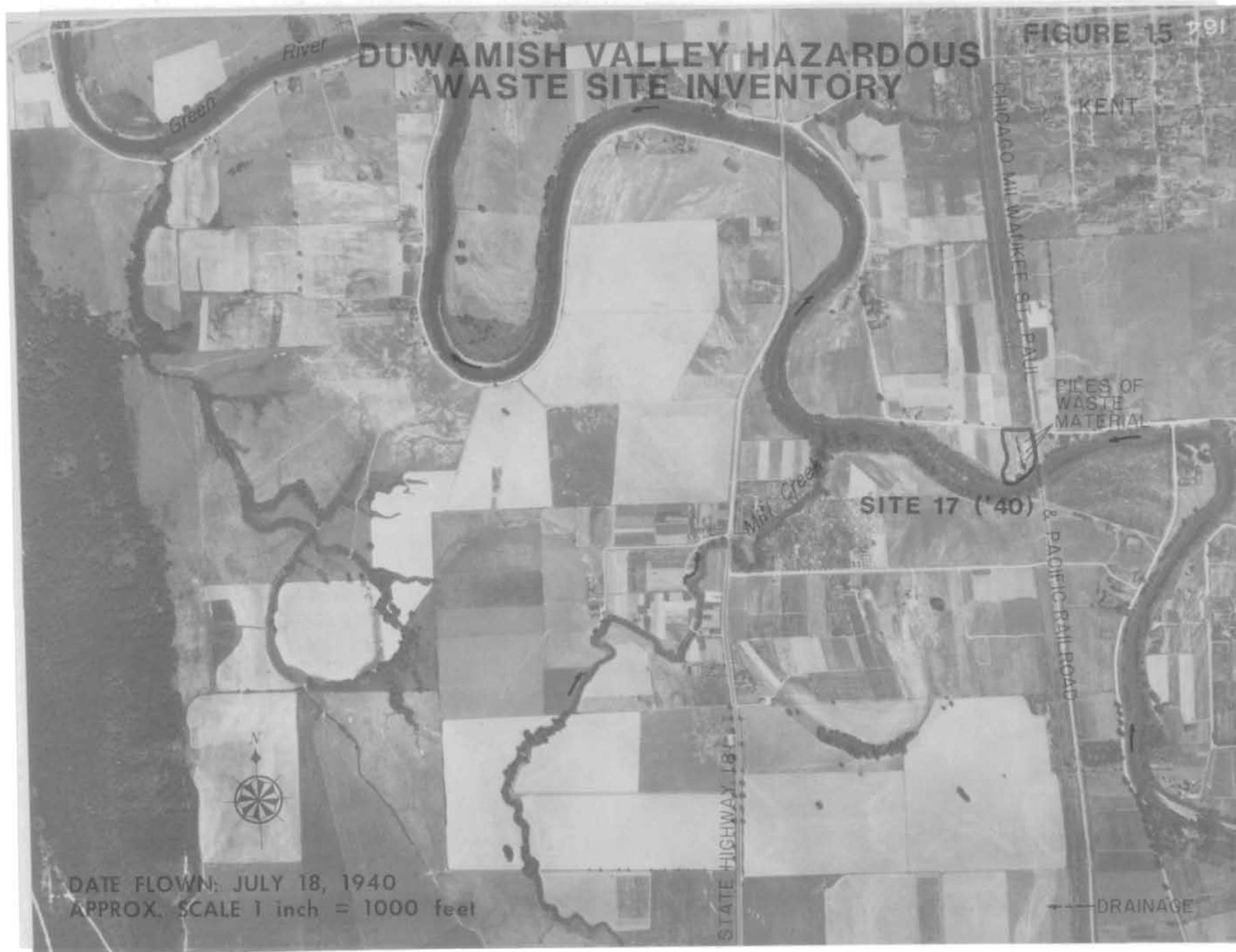


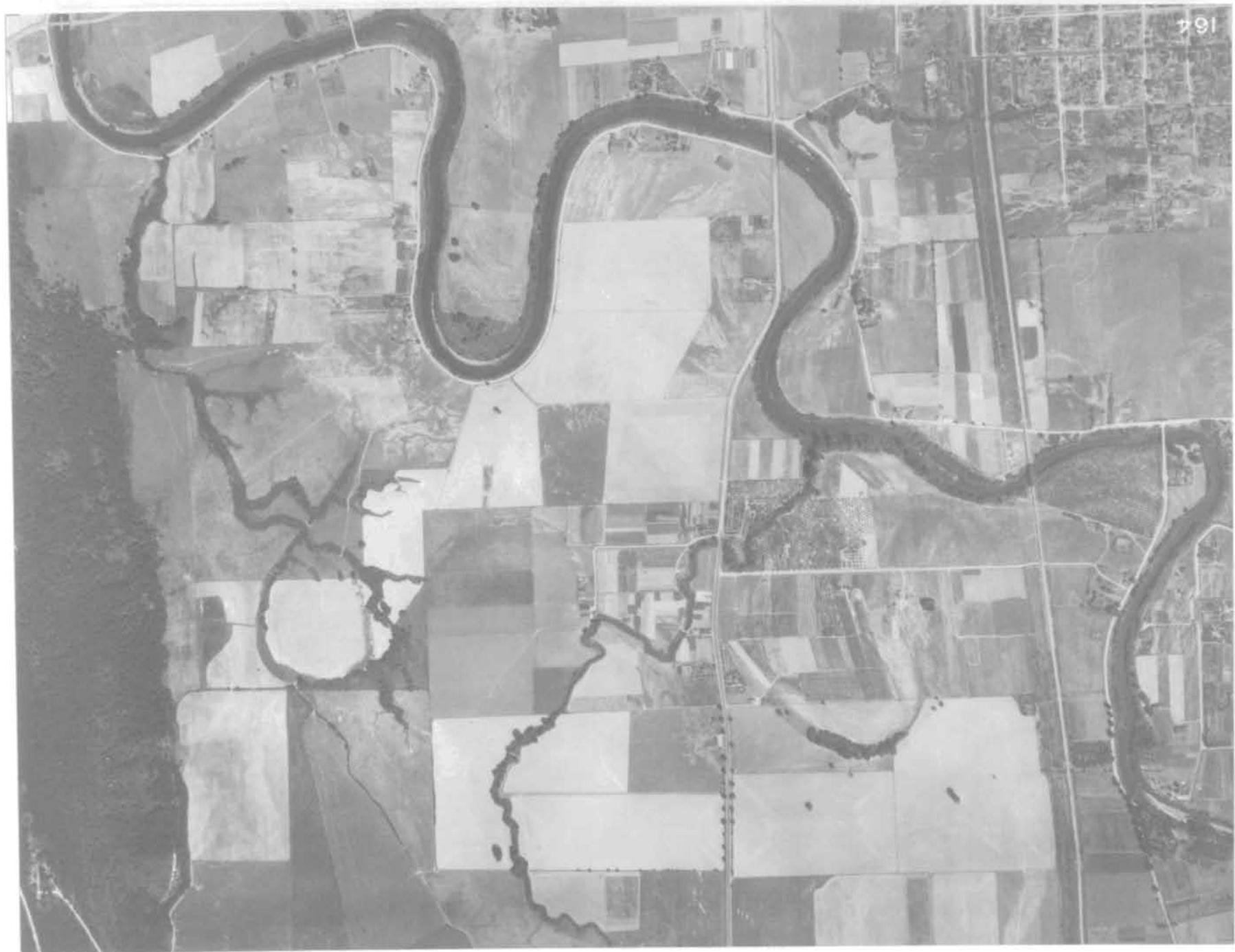












1961 PHOTOGRAPHY

The major change noted on the 1961 photography is the large industrial/commercial development underway along the Green River south of its confluence with the Black River. Throughout the remainder of the study area, the industrial/commercial and residential development continues. A major north-south highway route (State Highway 599) is under construction on the west side of the Duwamish River valley. The King County International Airport has expanded and now appears to include a major industrial development. Many of the original sites have been covered over by the development.

Analysis of the photography reveals the presence of an additional 11 potential hazardous waste sites. Eight of these are along the Duwamish Waterway, one is adjacent to the Duwamish River, one is on a bluff above the Green River, and the final site is in Kent, Washington.

SITE 1 ('40) - All of the open land around this site in 1940 is now developed and the dumps have been covered over (Figure 16). There are two well-contained storage tanks on the site that do not pose any threat to the environment. There is no evidence of hazardous waste disposal.

SITE 2 ('40) - This site has been covered over by industrial development (Figure 16).

SITE 3 ('40) - This site is only partially covered by the 1961 photography (Figure 17). It now appears industrial/commercial development occupies the site.

SITE 4 ('40) - The site is now covered partially by an auto junkyard (Figure 17).

SITE 5 ('40) - This site is not included in the 1961 photography.

SITE 6 ('40) - This site has been covered by industrial and commercial development (Figure 19). All traces of the site have been removed.

SITE 7 ('40) - This site has been covered by fill, probably in preparation for further commercial/industrial development (Figure 19).

SITE 8 ('40) - This site has been covered by commercial and industrial development associated with King County International Airport (Figures 19 and 20).

SITE 9 ('40) - Most of this site has been developed into a parking lot, probably for the adjacent industry (Figure 20). At the north end of the site a small triangular pit is still visible and contains a white material. There is no evidence that any of this material has migrated from the site.

SITES 10 and 11 ('40) - As these sites have changed drastically since 1940 they have been combined into one large site (Figure 20). The area of dumping labeled Site 10 ('40) is now an auto junkyard. All drainage from this area is into the adjacent drainage ditch. The area that was Site 11 ('40) is now covered with vegetation but traces of the past dumping are still visible. Part of this area is also an auto junkyard. Between these two sites is a new large area of dumping. It appears this dumping is a sanitary landfill, as some attempts are being made to cover the waste material. All of this dumping is into the drainage channel which leads to the Duwamish Waterway. Along the east side of this dumping area are two liquid waste ponds. The large pond is filled with a light-toned liquid with a patch of black material apparently floating on top. The point of entry into the pond is on the west bank. The smaller pond contains dark-toned liquid which may be water.

SITE 12 ('40) - The stockpile area noted in 1940 has been reduced because of the construction of the adjacent airport (Figure 21). The drainage is blocked and it does not appear this site is any threat to the local environment.

SITE 13 ('40) - There are only four storage tanks remaining at this site, however, they are still uncontained (Figure 21). The adjacent drainage would carry any spill into the Duwamish Waterway.

SITE 14 ('40) - This site has been removed by the construction of the King County Airport extension (Figure 21).

SITE 15 ('40) - Most of this site has been overgrown by vegetation so only a small trace of the waste material is visible (Figure 23). There are no indications of any recent dumping.

SITE 16 ('40) - This site has been overgrown by vegetation and there is no trace of any waste material (Figure 25).

SITE 17 ('40) - This site has had some vegetation growth, enough to cover whatever waste materials were present (Figure 25). There is no evidence that any recent dumping has occurred.

SITE 18 ('61) - This site, at the north end of Harbor Island, appears to be an area of liquid waste disposal (Figure 16). A pool of dark-toned liquid is visible in the middle of the site. Stains located just south of this pool indicate the dumping point. The flow is toward the pool. There is no indication that any of this liquid has reached the adjacent water via surface drainage.

SITE 19 ('61) - This small site is located just outside the south boundary of the Puget Sound Fabricators facility (Figure 17). Several piles of white toned waste material are present and the drainage is toward the adjacent railroad tracks.

SITE 20 ('61) - This site, located just south of the substation, appears to be a dump for trash and other waste materials in a low area (Figure 17). Drainage from this site is blocked by all of the surrounding commercial/industrial development.

SITE 21 ('61) - This site is the Reichhold hazardous waste site covered in the EMSL-LV Report AMD 81102 published in September 1981 (Figure 18). Analysis of the 1961 imagery (not used in previous report) reveals the presence of pipelines leading to the three waste pits. All three waste pits drain into the Duwamish Waterway. The dike of the largest pit has been breached and waste material flows directly into the water while discharge pipes are evident for the other two pits. The source of this material cannot be identified from the photography.

SITE 22 ('61) - This site is adjacent to the Duwamish Waterway and contains what appear to be piles and stacks of several thousand drums (Figures 18 and 20). There

T-115 or
AML?

are no storage tanks visible so this may be a refurbishing facility recycling used drums. Surface drainage from the site leads to the waterway.

SITE 23 ('61) - This small dump site is located on the east side of the King County International Airport and may be nothing more than smoothed over construction rubble (Figure 21).

SITE 24 ('61) - This site, located along the bank of the waterway, appears to be a small chemical facility (Figure 21). There are several uncontained storage processing tanks and any major spill could reach the adjacent waterway. There is no evidence of waste disposal.

SITE 25 ('61) - This small industrial facility is located on the west bank of the waterway across from Sites 13 ('40) and 24 ('61) (Figure 21). A liquid discharge from the plant is evident in the Duwamish waterway. There is no other evidence of waste disposal.

SITE 26 ('61) - This small industrial facility is located on the banks of the Duwamish River at Foster (Figure 22). All of the storage/processing tanks are uncontained and any spill would drain into the adjacent river. There is no other evidence of waste disposal.

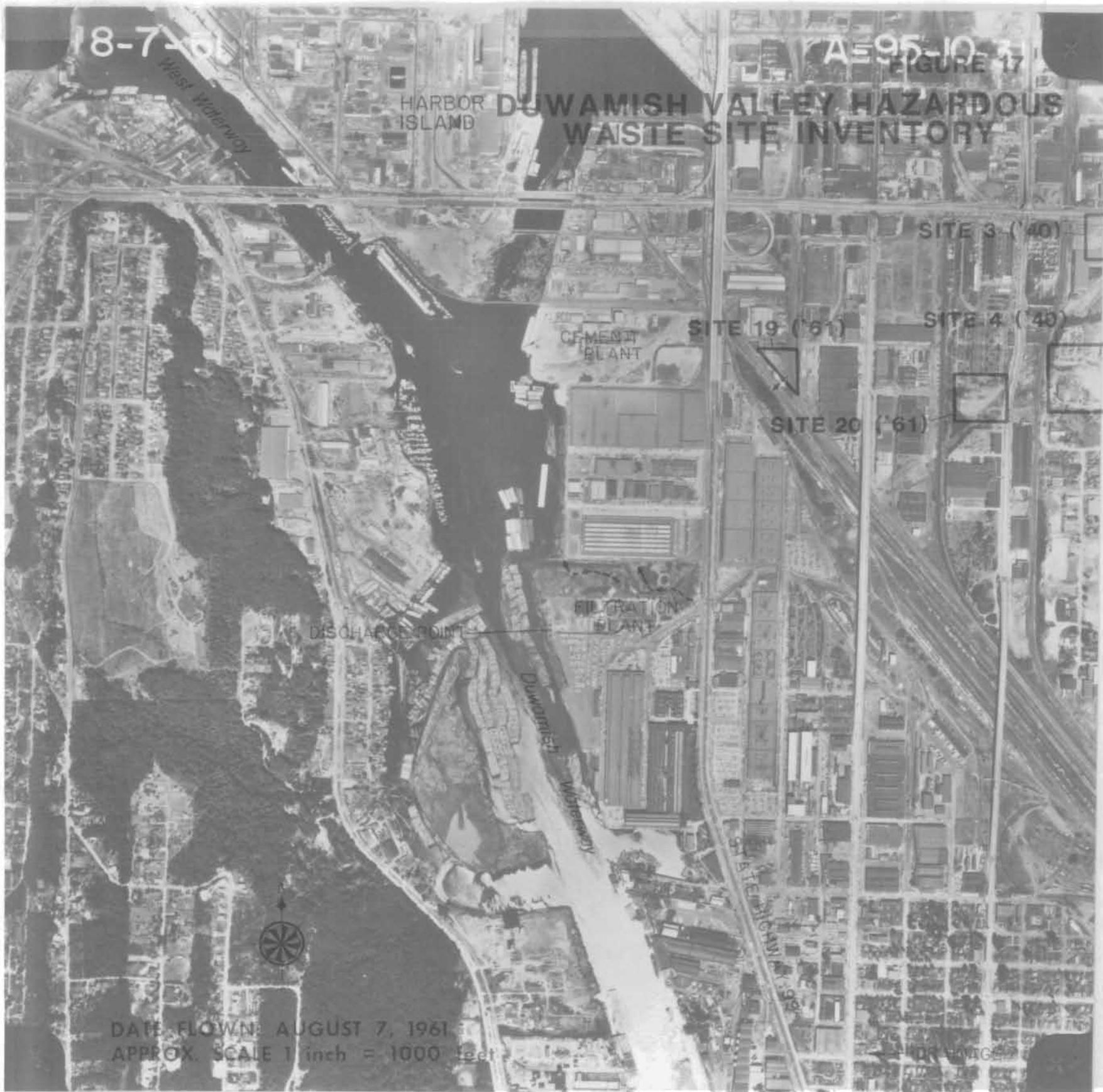
SITE 27 ('61) - This site, located on the bluff overlooking the Green River, appears to be a local garbage dump (Figure 24). A fire is present in the waste material, as black smoke can be seen. Below the dump area is a loading/unloading facility. While the exact purpose of this facility cannot be determined from the photography the proximity to the waste dump suggests it is part of a disposal operation.

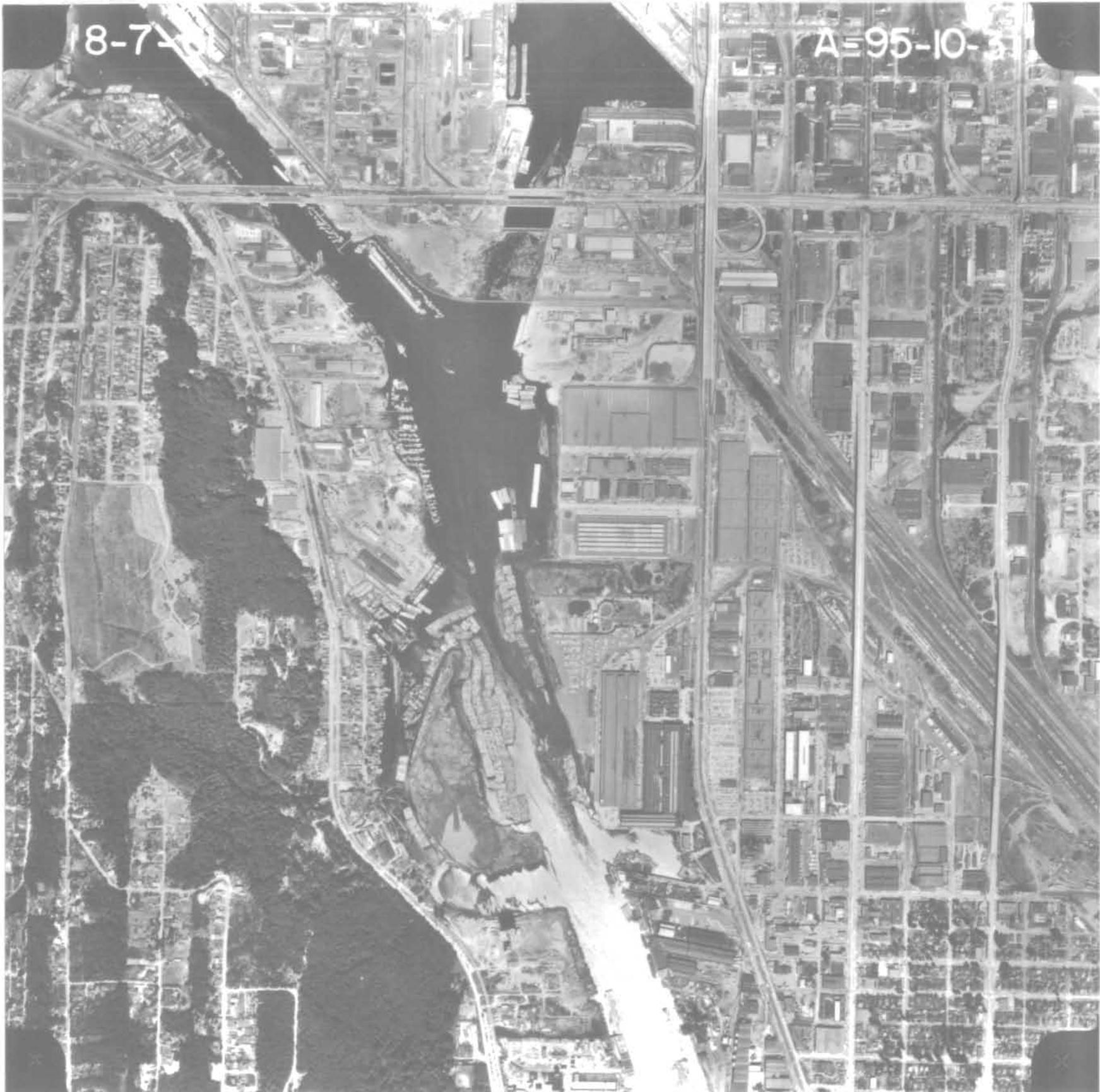
SITE 28 ('61) - This site is a small industrial facility located in Kent, Washington (Figure 25). Four uncontained storage tanks and stains in the vicinity indicate spills have occurred in the past. However, the terrain would prevent any surface drainage from migrating off site. In addition, two waste ponds are evident near the storage tanks.

8-7-61

A-95-10-33







8-7-6

A-95-10-29
FIGURE 18

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY



1961
Tatsky +
Int'l yard
(Boyer)













1961
P35, 80+81



8-7-61

7-13-54-14-12

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY

FIGURE 22



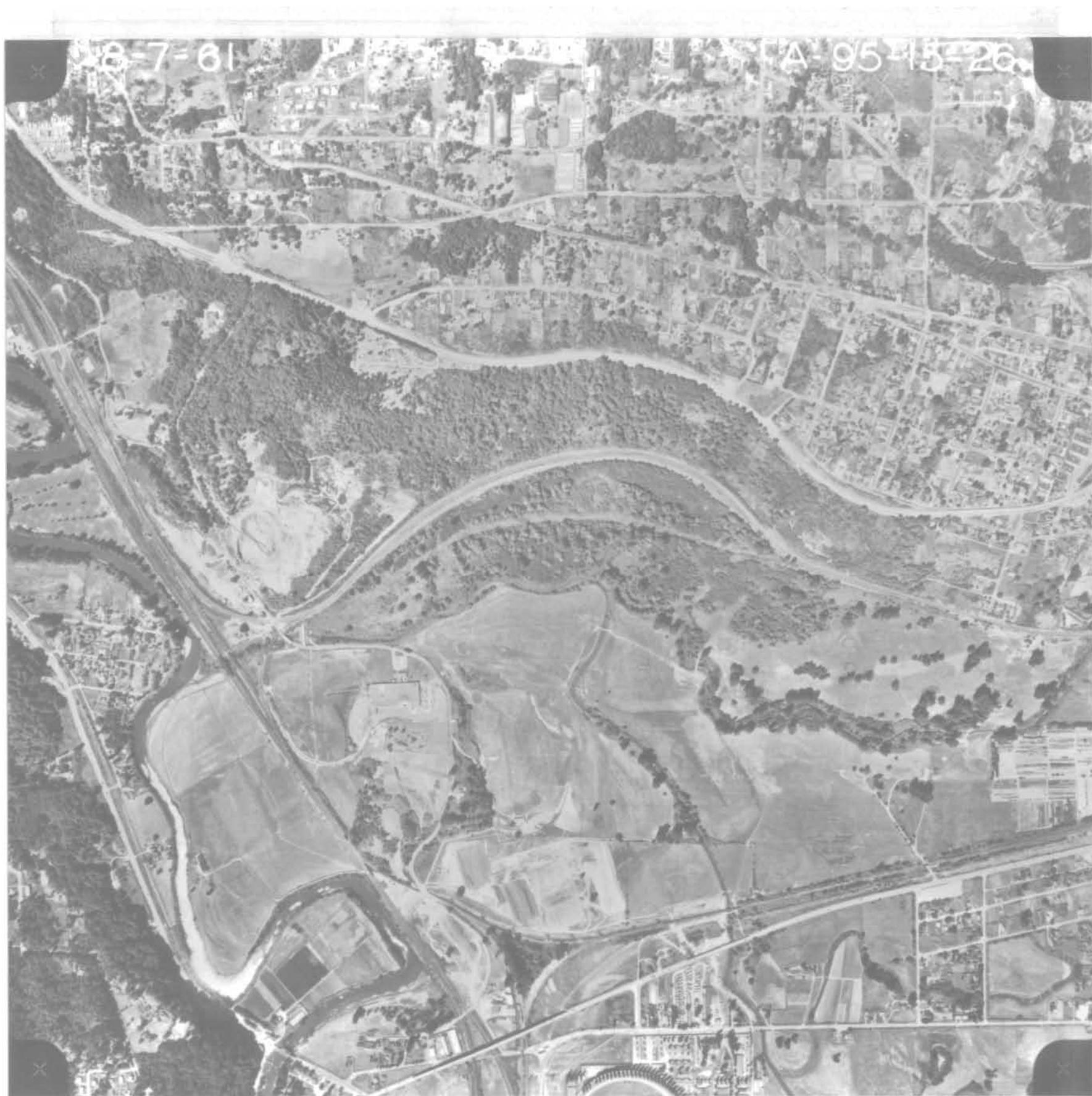
DATE FLOWN AUGUST 7, 1961
APPROX. SCALE 1 inch = 1000 feet



8-7-62

5-14-1













1968 PHOTOGRAPHY

The continued industrial, commercial and residential development is evident on the 1968 photography. Major visible changes are the construction of three major highways in study area; Interstate Highway 5, Interstate Highway 405, and State Highway 167. Analysis of the photography reveals only three potential sites in the study area, one of which appears to contain a substantial amount of liquid wastes and the drainage from the site is into the Black River.

Analysis of the 1968 photography reveals no changes in the following sites: 1 ('40), 2 ('40), 4 ('40), 6 ('40), 9 ('40), 13 ('40), 14 ('40), 15 ('40), 16 ('40), 17 ('40), 19 ('61), 24 ('61), 25 ('61), and 26 ('61).

SITES 3 ('40) and 5 ('40) - Both of these sites are covered by the commercial/ industrial development of the area (Figure 26).

SITE 7 ('40) - In 1961 this site had been covered by fill material in preparation for construction (Figure 26). This construction is complete and the entire area is covered with commercial and industrial development.

SITES 10-11 ('40) - There have been some major changes here (Figures 26 and 27). Some of the dump area has been covered over and buildings constructed. Some of the dumping area is still visible and a drainage channel has been dug through it. The liquid waste ponds are no longer present but a new dumping area can be seen. Drainage from the entire site is still toward the Duwamish Waterway.

SITE 12 ('40) - This site has been entirely covered over with parking lots (Figure 27).

SITE 18 ('61) - This site now contains several railroad tracks and a new building (Figure 26). No trace of the spilled material remains visible.

SITE 20 ('61) - This site has been covered by commercial development (Figure 26).

SITE 21 ('61) - The size and configuration of the waste ponds have been changed (Figure 26). There is no evidence to suggest that waste material is being discharged into the Duwamish Waterway. The scale of photography precludes the identification of any possible pipeline. Dark toned material in all three ponds suggests a different type of waste than was present in 1961.

SITE 22 ('61) - There is no apparent change in this site and piles of what was identified as drums are still present (Figure 26).

SITE 23 ('61) - This site is now covered by the Interstate 5 highway (Figure 26).

SITE 27 ('61) - The construction of Interstate 5 has either removed or covered over the garbage dump (Figure 29). The loading/unloading facility is still present and it appears to be in operation as some vehicles are present.

SITE 28 ('61) - The uncontained tanks appear to have been removed but the two waste ponds remain (Figure 30). A possible dump area is evident east of the waste ponds. There is no evidence of any spills or waste disposal.

SITE 29 ('68) - This is a possible dump site located near a new sewage disposal facility (Figure 28). The scale of photography precludes the identification of any waste material.

SITE 30 ('68) - This site is an area of dumping associated with the Long Acres Race Track (Figure 28). This dump probably contains waste materials from the horse barns. Drainage from this site leads into the Black River.

SITE 31 ('68) - This site is a small industrial facility located south of Orilla, Washington (Figure 29). There are at least seven small waste pits present plus a larger waste pond and all appear to contain liquid. What appears to be small storage tanks are located between the pits and the pond. A drainage ditch is located along the west edge of the site. The scale of the photography and the small size of the site preclude any further analysis.

9-2-68

3-218

GS-VCBA
FIGURE 26



9-2-68

3-218

GS-VCBA





9-2-68

3-220

GS-VCBA



9-2-68

1-151

GS-VCBA

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY

Lake Washington
FIGURE 28



DATE FLOWN: SEPTEMBER 2, 1968
APPROX. SCALE: 1 inch = 2500 feet

9-2-68

1-151

GS-VCBA



9-2-68-

1-153

GS-VCBA
FIGURE 29

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY





9-2-68

1-155

GS-VCBA
FIGURE 30

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY



9-2-68

1-155

GS-VCBA



1974 PHOTOGRAPHY

In 1974 the general industrial, commercial, and residential development in the study area continues. Growth of the industrial area along the Green River has accelerated but no hazardous waste sites are evident.

Analysis of the photography did locate one potential site; a small dump area along the Green River. The drainage from this site leads to the Green River.

There has been no change evident in the following sites: 1 ('40), 2 ('40), 3 ('40), 4 ('40), 5 ('40), 6 ('40), 7 ('40), 8 ('40), 9 ('40), 12 ('40), 13 ('40), 14 ('40), 15 ('40), 16 ('40), 17 ('40), 19 ('61), 20 ('61), 23 ('60), 25 ('61), 27 ('61), and 29 ('68).

SITES 10 and 11 ('40) - Several new buildings are evident since 1968, one of which now covers one of the old auto junkyards (Figure 32). A storage yard is evident south of the buildings covering what was once a part of the dump. Some piles of material between this storage area and the drainage ditch suggest some type of dumping is occurring. Construction of State Highway 509 did encroach on the western edge of the site.

SITE 18 ('61) - More railroad sidings are evident and numerous railroad cars are present (Figure 31). This site is apparently a transshipment point.

SITE 21 ('61) - The entire site has been paved over and there are several thousand cars present (Figures 31 and 32). No evidence of the past hazardous waste site remains.

SITE 22 ('61) - The only significant change in this site is a diminished number of drums visible (Figure 32). All else remains the same.

SITE 24 ('61) - Additional storage/processing tanks have been constructed at this site (Figure 32). All tanks now appear to be contained so any spills would remain on site.

SITE 26 ('61) - There has been some expansion of this site with the addition of two buildings and a horizontal storage tank (Figure 32). None of the storage/processing tanks appear to have secondary containment.

SITE 28 ('61) - There has been a moderate expansion of this site with addition of numerous tanks and buildings (Figure 38). All tanks now appear to be contained. The area of possible dumping noted in 1968 does not appear to have changed.

SITE 30 ('68) - There has been an expansion of the dumping going on at this site (Figure 34). Surface drainage is still into the nearby Black River.

SITE 31 ('68) - Better quality imagery reveals what appears to be some major changes in the site (Figures 35 and 36). Approximately 30 storage/processing tanks are visible, none of which appear to have secondary containment. There are 10 new waste pits/ponds while those noted in 1968 have been removed. The large waste pond noted at the south end of the site in 1968 has been reduced in size. Scattered stacks of objects could be drums, but the scale of photography precludes positive identification. Surface drainage from the site continues to be toward the north into the drainage ditch which connects with Black River.

SITE 32 ('74) - This site is a small dump in a low wet area that drains into the Duwamish River (Figure 37). The various tones visible in the site suggest different types of waste materials are being placed here.

6-12-74

2000

SEABLOCOV

7-17-341

DUWAMISH VALLEY HAZARDOUS WASTE SITE INVENTORY

FIGURE 31



DATE FLOWN: JUNE 12, 1974
APPROX. SCALE: 1 inch = 2000 feet



















6-12-74

2000

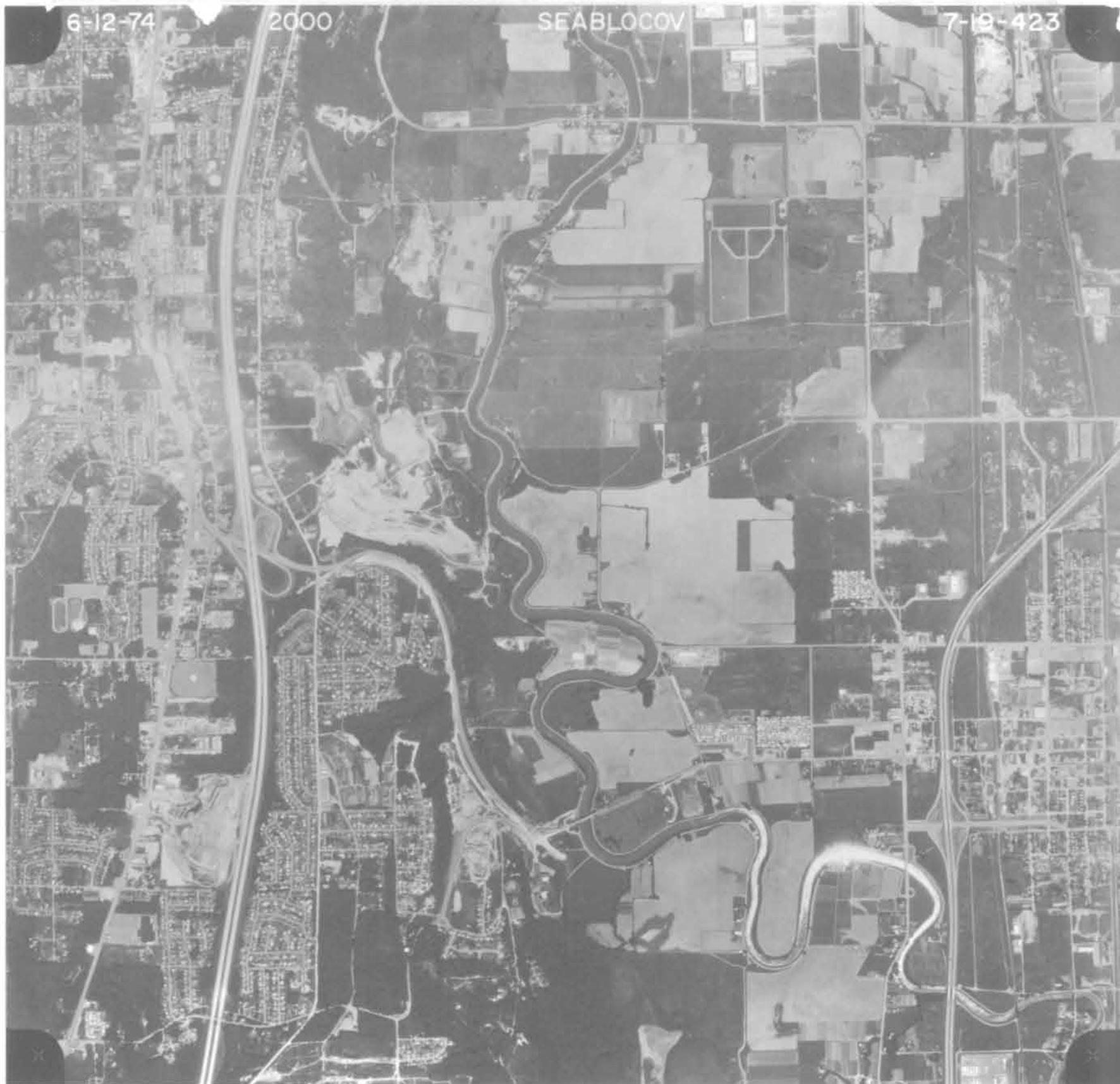
SEABLOCOV

7-19-421













1980 PHOTOGRAPHY

Analysis of 1980 photography did not reveal any major changes in the study area; other than the continued commercial/industrial development. Only two new sites were identified on the photography. The first is a drum storage/handling facility in Seattle. While there is no direct linkage between this site and the river, any spills could reach the storm sewers and from there the river. The second site is another dump just south of site 32 ('74) and drainage from this site is also toward the Green River. An area of damaged vegetation between the two sites suggests a need for some further investigation.

There has been no change in the following sites since 1974: Sites 1 ('40), 2 ('40), 3 ('40), 4 ('40), 5 ('40), 6 ('40), 7 ('40), 8 ('40), 9 ('40), 12 ('40), 14 ('40), 15 ('40), 16 ('40), 17 ('40), 18 ('61), 19 ('61), 20 ('61), 21 ('61), 23 ('61), 24 ('61), 28 ('61), and 29 ('68).

SITES 10-11 ('40) - The small dump area noted in 1968 has been covered with a storage yard (Figure 40). The drainage ditch is still visible and it appears to contain some liquid.

SITES 13 ('40) - This site has been removed and the area paved over (Figure 41).

SITE 22 ('61) - The color photography reveals various colored drums, piled or stacked throughout the site (Figure 40). In several areas, stains are evident indicating past spills. All surface drainage is toward the river so any major spill would probably reach the waterway.

SITE 25 ('61) - This site no longer appears to be an industrial facility (Figure 41). There is no evidence of a liquid waste discharge and two small boat docks suggest another function.

SITE 26 ('61) - The site has been expanded with the addition of a large building and six possibly uncontained horizontal storage tanks (Figure 42). Drainage from these tanks is toward the river. Another change has been the removal of one of the original buildings.

SITE 27 ('61) - The only change has been the addition of a large building which appears to cover the loading/unloading area (Figure 44). There are five large vehicles present in the parking area just north of the building.

SITE 30 ('68) - There has been a reduction in the dumping at this site (Figure 43). Only at the south end of the site is a pile of yellow material visible. This pile is probably hay or straw from the barns. Drainage from the site is still toward the Black River.

SITE 31 ('68) - The site is still active with 10 small waste pits, a single large pit, an area of waste piles, and numerous uncontained tanks (Figure 44). Surface drainage remains toward the ditch which leads to the Black River.

SITE 32 ('74) - The site appears to be overgrown with vegetation with only a small amount of waste material still visible (Figure 45). South of the site is an area of vegetation damage. The cause of this damage cannot be determined from the photography.

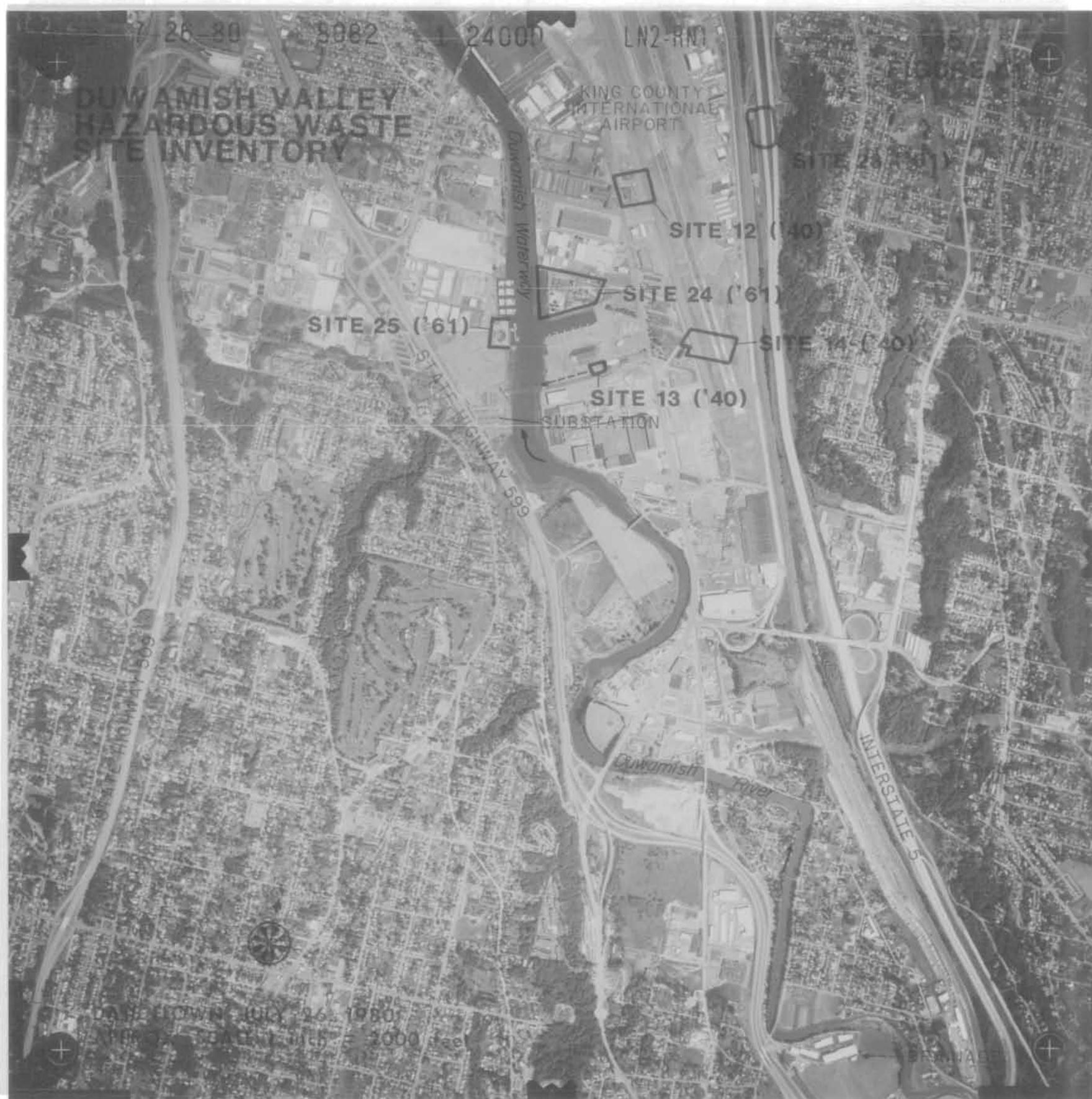
SITE 33 ('80) - Analysis of the 1980 color photography reveals this site contains numerous 55-gallon drums (Figures 39 and 40). Any major spills from these drums would probably reach the local storm sewer and eventually flow into the Duwamish Waterway.

SITE 34 ('80) - This site is immediately south of Site 32 ('74) and contains numerous piles of various material (Figure 45). Drainage from this site is north into the Duwamish River. The area between the two sites appears to have suffered some vegetation damage but the reason for this damage cannot be determined from the photography.























7-26-80

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