WASTE DISPOSAL AT COQUALEETZA

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COQUALEETZA FEDERAL BUILDINGS

S U M M A R Y

Settled raw sewage from the Coqualeetza Federal Buildings is discharged to a small creek tributary to the Chilliwack Creek. Smoke and flyash emissions result from the incineration of paper waste.

It is recommended that the domestic sewage be connected to the recently constructed gravity sewer crossing the Coqualeetza property.

The incinerator should be either upgraded to comply with federal interim guidelines, or phased out.

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WASTE DISPOSAL AT COQUALEETZA FEDERAL BUILDINGS

1. INTRODUCTION

The Coqualeetza Federal Buildings are located on a 58 acre site in the Village of Sardis within the Township of Chilliwhack. (Figure 1) This facility was operated until November 1974 by the Medical Services Branch of the Department of National Health and Welfare as an Indian Tuberculosis Hospital. The site (Figure 2) encompassing 12 buildings is now operated by the Department of Public Works on a lease basis providing facilities for the Department of National Defence (DND), Coqualeetza Indian School (CIS), and the Fraser Valley Community College (FVCC).

The objective of this evaluation report is to detail the existing waste handling, treatment and disposal facilities, and to identify the need for and scope of necessary corrective measures.

2. LIQUID WASTE

2.1 General

Domestic sewage, including kitchen wastes, are collected by means of sewerage system servicing all buildings and discharging via an 8" ϕ V.C. pipe to an Imhoff tank. Discharge from the Imhoff tank is to three seepage pits which are by-passed to an outfall pipe to Luck-a-Kuck Creek. Luck-a-Kuck Creek is a small salmon spawning creek tributary to the Chilliwack Creek. Since the late 1950's the number of salmon spawners has steadily declined.

There is a separate collection system for storm runoff which discharges on the south side of the Coqualeetza property, adjacent to Luck-a-Kuck Creek (Plate 1 shows the storm water outlet). However, some of the roof drains discharge to drains connected to the sanitary sewer. (Plate 2)

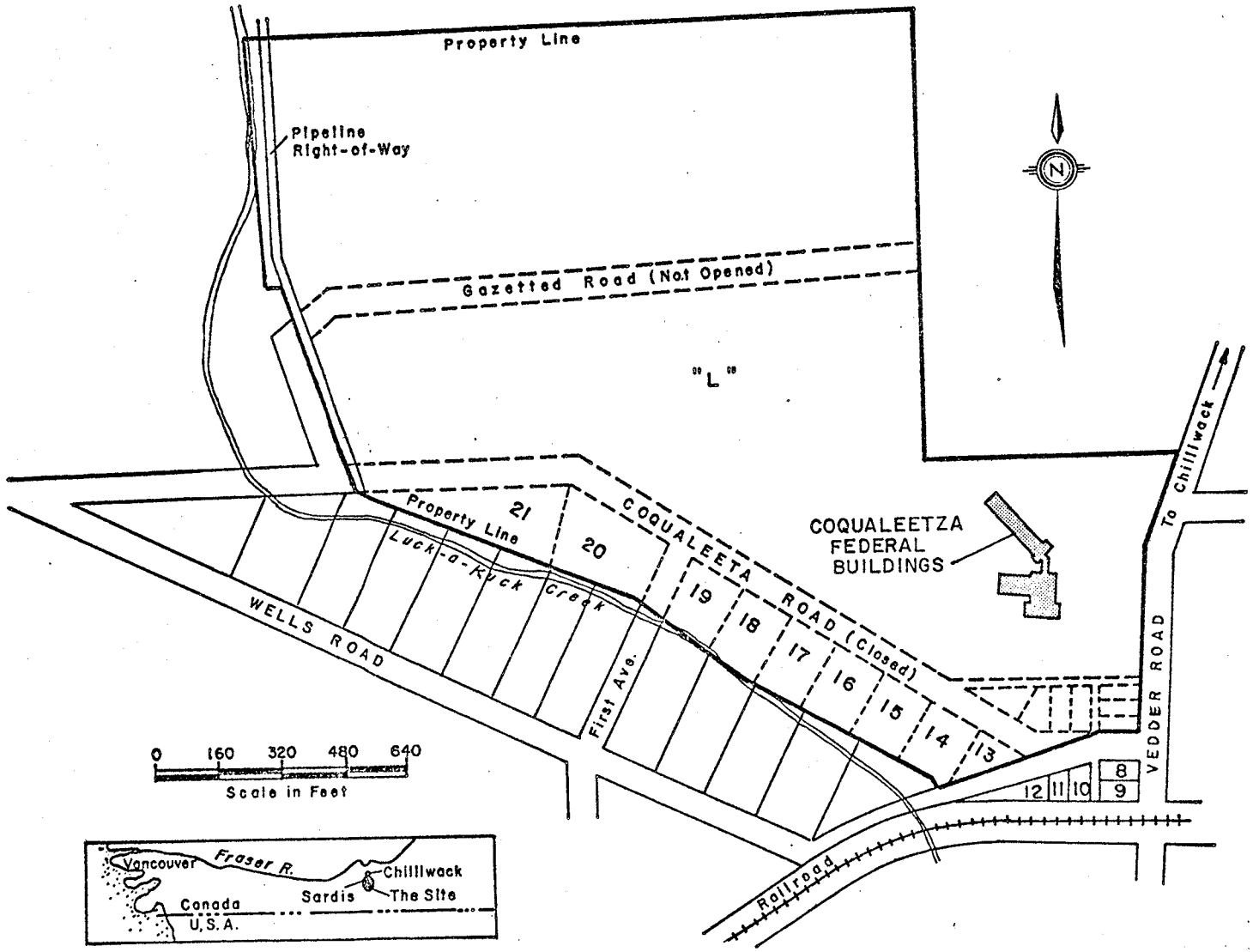


FIGURE 1 LOCATION PLAN - COQUALEETZA FEDERAL BUILDINGS AT SARDIS, B.C.

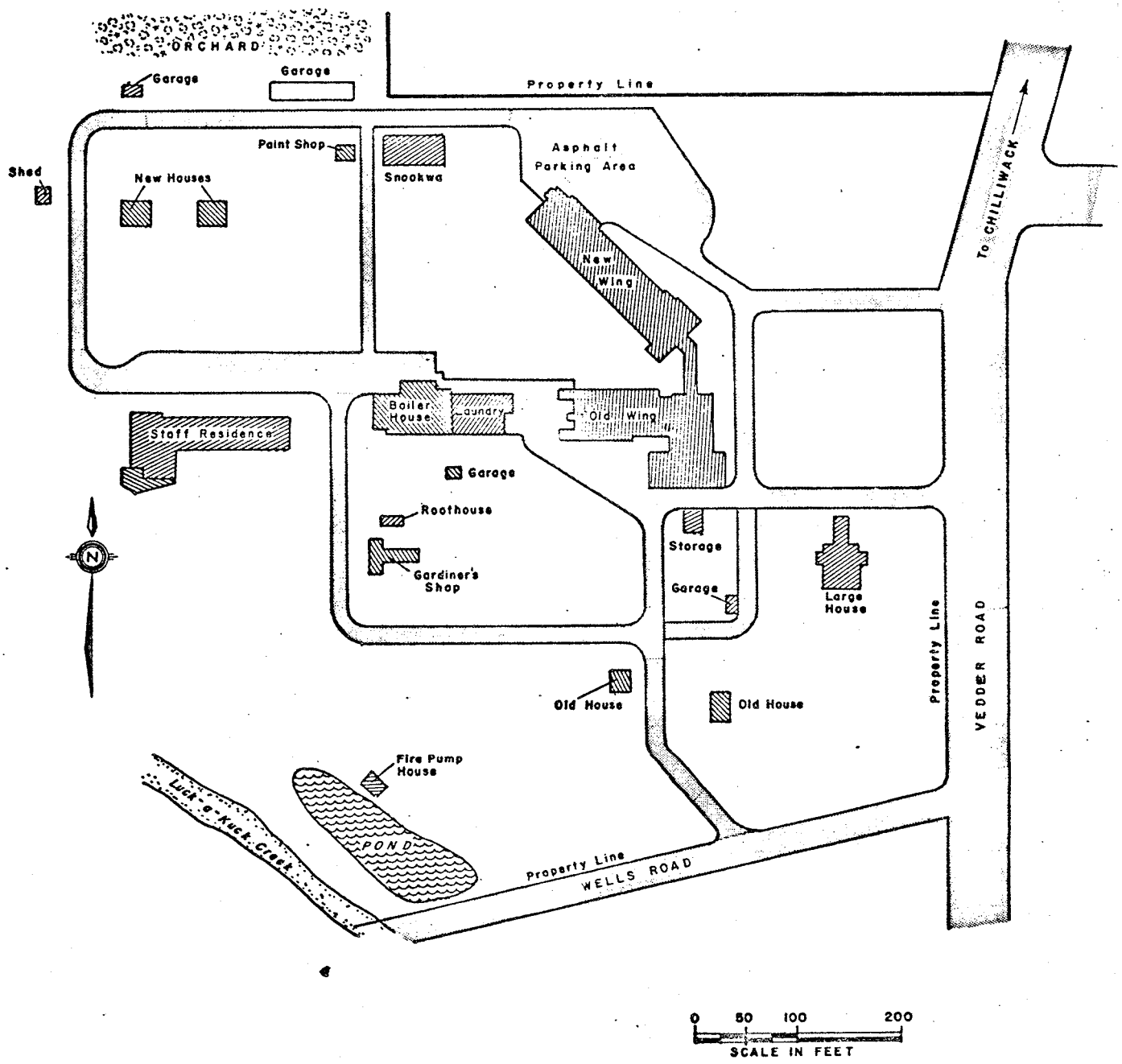


FIGURE 2 SITE PLAN - COQUALEETZA FEDERAL BUILDINGS AT SARDIS, B.C.

Kitchen wastewater is directed through a grease trap (Plate 3) which is not cleaned on a routine basis and has, as a result, caused some plugging of the sewerage works.

The domestic sewerage works are shown in Figure 3, and the water and storm sewer layout in Figure 4.

Prior to 1971, the Imhoff tank discharged directly to Luck-a-Kuck Creek following chlorination. In 1971, as an interim measure, rock filled seepage pits were constructed with the discharge emanating from a submersible pump located in what was previously the chlorine contact chamber. However, either because of the elevation difference, seepage pit blinding or direct by-pass, the settled raw sewage now discharges to the creek outfall pipe (Plate 4 shows flow in outfall manhole). As no plans are available of the post-1971 discharge modifications, it is not possible to determine the exact path of the sewerage discharge. Dye tests and visual inspections have, nevertheless, identified the discharge from the treatment works to the creek. Plate 5 shows the creek outfall and Plate 6 the growth of sphaerotilus (sewage fungus) adjacent to the outfall pipe.

Within the treatment works compound (Plate 7) there is a bar rack, an Imhoff tank, covered sludge drying bed and chlorination facilities. The bar rack (Plate 8) has had every other bar removed, yielding approximately a 4" spacing and appears to be seldom, if ever, cleaned. The sludge drying bed is used periodically for sludge disposal from the Imhoff tank. The chlorination facilities were abandoned when the disposal scheme was modified in 1971. Malodours in the vicinity of the treatment compound were attributed mainly to solids build-up around the bar rack and the chlorine contact chamber.

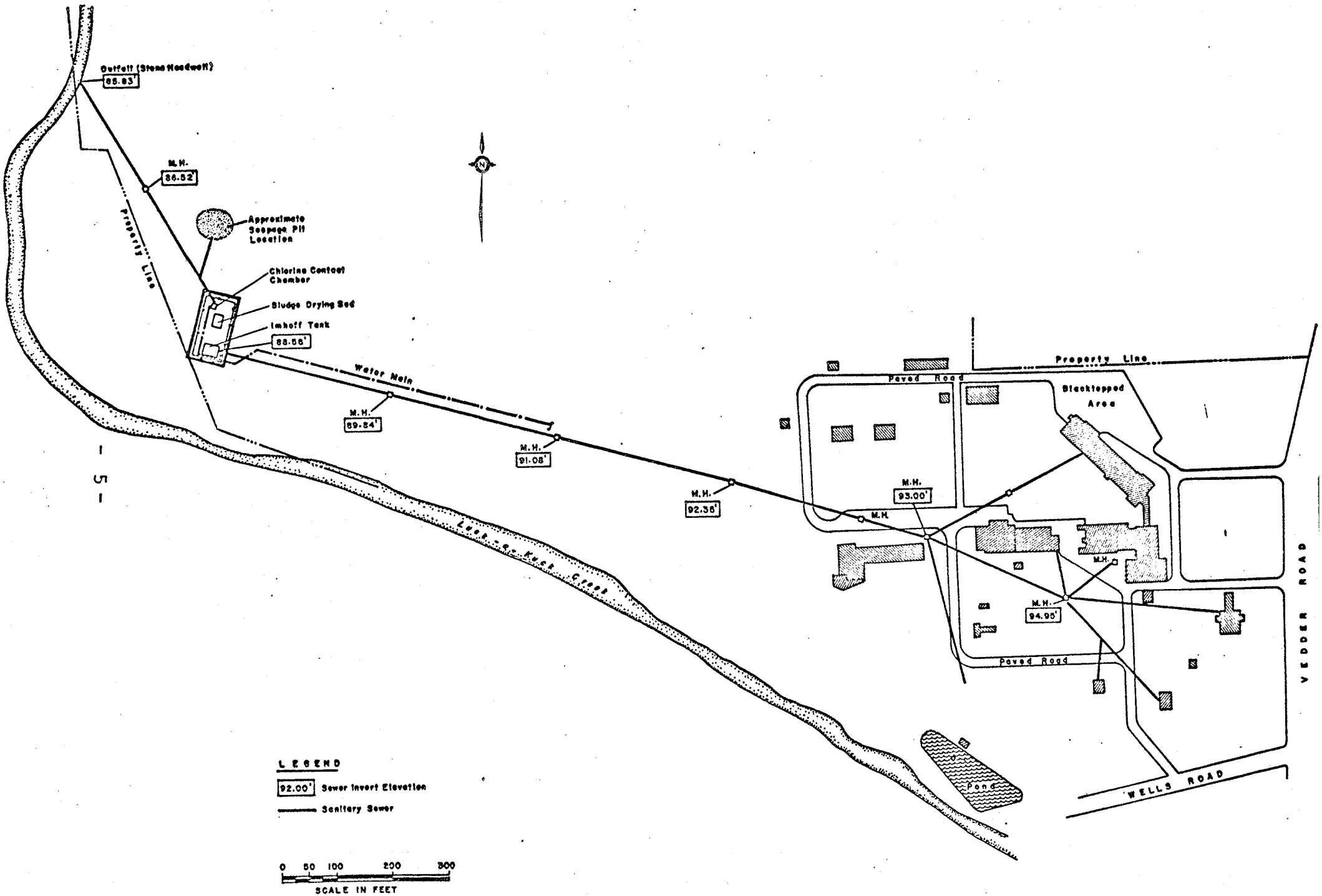


FIGURE 3 DOMESTIC SEWAGE COLLECTION, TREATMENT AND DISPOSAL SYSTEM

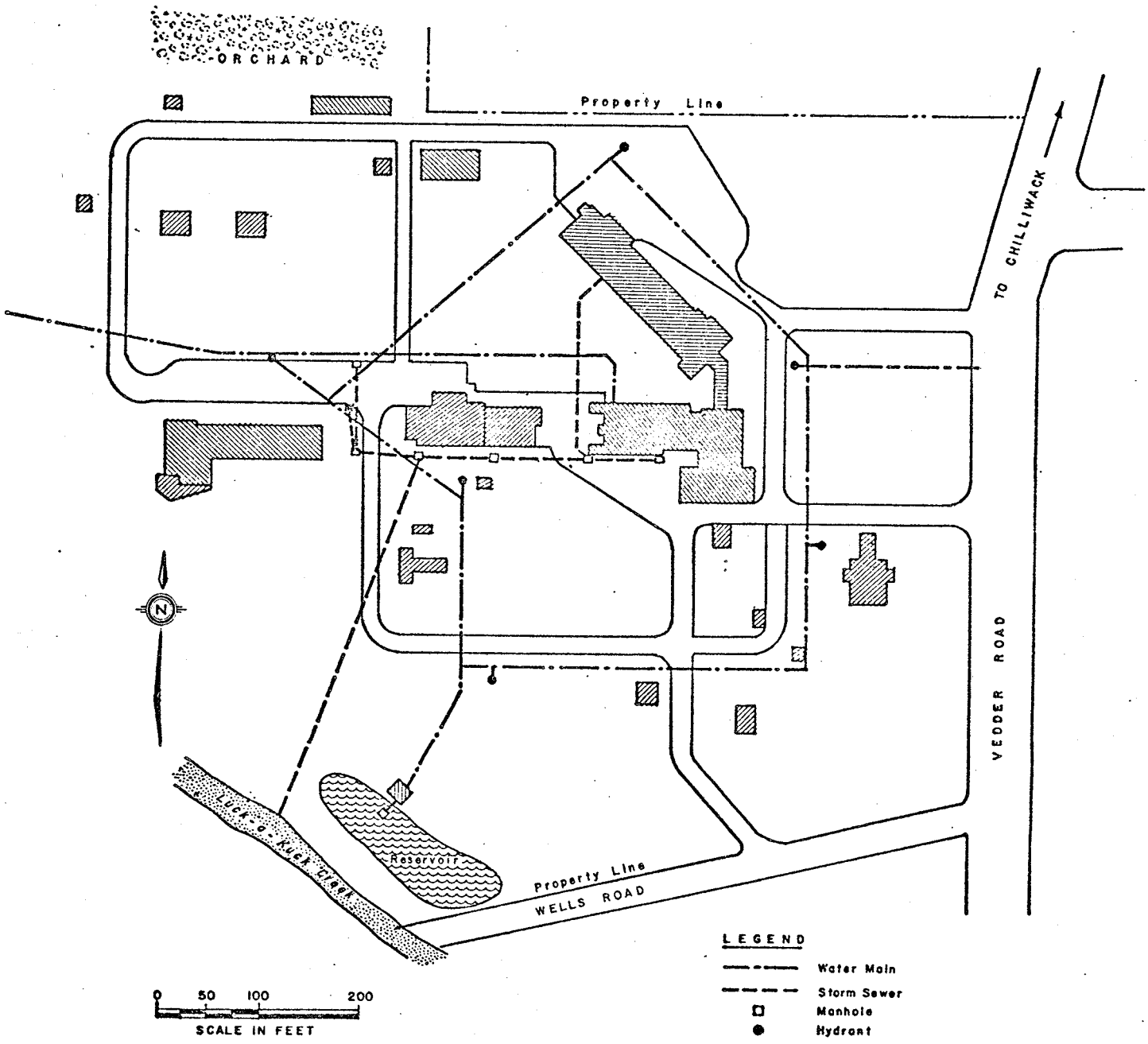


FIGURE 4 WATER SUPPLY AND STORM SEWER LAYOUT

Regardless of the generally poorly maintained treatment works with resultant associated malodours, the discharge of settled raw sewage to Luck-a-Kuck Creek is unacceptable in terms of both aesthetics, public health and fisheries. As well, the discharge does not comply with provincial Pollution Control Branch regulations or the Draft Guidelines for Wastewater Discharges from Federal Facilities.

2.2 Population and Flow

The estimated number of people involved in the Coqualeetza facilities are as follows:

	DPW Staff	14
*	DND	120
	CIS	30 (12 - 14 live-in)
	FVCC	40

* 100 DND staff served breakfast and supper each day. Water consumption figures obtained from the Elk Creek Water District indicate an average daily usage in the order of 2500 GPD.

Estimated daily flow based on population figures:

14 DPW staff @ 15 GPD	= 210
120 DND personnel @ 15 GPD	= 1800
100 x 2 meals @ 3 GPD/meal	= 600
17 CIS students @ 15 GPD	= 255
13 live-in CIS students @ 75 GPD	= 975
40 FVCC students @ 15 GPD	= 600
	4440 GPD

Discharge flow measurement during a one week wet weather, high water table, April 11, 1975, through April 18, 1975, determined the average 24-hr. flow to be approximately 20,000 IGPD. Subsequent discharge and water meter flow measurement during both dry and wet weather periods in August and September 1975 were as follows:

Period	Water Consumption	Imhoff Discharge	Rain-Fall	Δ%
Aug.7 - 11		5050	nil	
Aug.22-Sep.2	6650	7760	heavy	17% (gain)
Sept.2 - 8	5250	4420	nil	16% (loss)

As the groundwater during the spring period rises to a level very close to the surface, the spring flow periods are indicative of probable ground water infiltration. The subsequent summer period measurements indicate storm-water entry and exfiltrative losses. Consequently, in order to ensure that there is not excessive stormwater and ground water entry and exfiltrative losses, all stormwater connections to the sanitary sewerage works should be removed and redirected to the stormwater collection system,and the amount of groundwater infiltration/ joint exfiltration, quantified.

2.3 Recommended Disposal Alternative

A recently constructed gravity sewer line discharging to the Chilliwhack inter-municipal treatment plant, crosses by right-of-way adjacent to and within the west boundary of the Coqualeetza property, and it is recommended that a connection to this system be sought. This line was constructed by and services Fraser Valley Milk Producers, Fraser Valley Frosted Foods and Sardis Land Developments. The sewer is operated by the Municipality in the right of the three companies who own the sewer line and consequently, whose permission for connection is required for a period of five years. A manhole for this system is located approximately 100 feet from the treatment compound (Plate 9) with an invert elevation estimated to be 8 feet lower than the Imhoff tank inlet. The Coqualeetza property was included in the original project capital costing. However, in the same time period, the turnover from Health and Welfare to DPW was underway and a connection agreement apparently was never consumated. The consultant's estimate of the Coqualeetza population was 200, or 3%, and the proportionate cost of connection was estimated at approximately $50,000, or 4.5%, of the total net capital cost.

The actual capital cost for the connection is estimated

as follows:

Gravity sewer - 400 ft. x $20./ft.	$8000.
* New manhole and connection	4000.
** Demolish, cover and grade treatment compound	4000.
TOTAL	$14,000.
Contingencies @ 20%	2,800.
TOTAL	$16,800.

* Not including sewage collection system improvements

** It may be desirable to initially blank the inlet and remove the outlet without removal of the Imhoff works until its possible utilization as a training complex is established

3. SOLID WASTES

Solid waste generated at Coqualeetza is comprised of kitchen wastes, waste paper and incinerator ash.

Kitchen waste made up of scraps, peelings, cans, etc. is deposited in plastic lined garbage cans, several of which are located within the kitchen facilities (Plate 10). The full cans are taken to a small building on the property where the full garbage bags are stored for removal. The garbage cans are cleaned in a steam washing facility (Plate 11) and stored.

Other waste comprised almost entirely of waste paper, is burned in an incinerator (Plate 12) located in the boiler house. Approximately 16 to 20 garbage cans of refuse are burned per day, yielding about 1 garbage can of ash per week.

The bagged garbage and incinerator ash is picked up under private contract and disposed of at the Bailey Road Land-

fill (Provincial Pollution Contract Permit No. PR-(1822).

4. AIR EMISSIONS

Air emissions involved at Coqualeetza are associated with the incinerator discussed above and the central heating plant boilers, both of which share a common 50 to 60 foot stack (Plate 13).

The incinerator, with no auxiliary fuel or air supply, operates about 4 hours per day; 2 hours in the a.m. and 2 hours in the p.m. The operator advised that fly ash and smoke can be seen emitting from the stack during incinerator operation.

The three boilers involved in the central heating plant are natural gas fired with #2 fuel oil standby capacity. The low fuel consumption (avg. 16,000 cfs, max. 22,000 cfs) precludes the necessity of switching to standby fuel oil during peak loading.

The incinerator does not comply with Federal Facilities Interim Guidelines because of visible emissions produced and lack of air control.

5. CONCLUSIONS

a) Domestic sewage from the Coqualeetza federal buildings is presently discharged through a poorly maintained Imhoff tank treatment facility to an outfall pipe discharging to Luck-a-Kuck Creek.

b) The discharge of settled raw sewage to Luck-a-Kuck Creek is contrary to both the Provincial Pollution Control Branch requirements and draft Guidelines for Wastewater Discharges from Federal Facilities.

c) The grease trap servicing the kitchen drains is not cleaned on a regular basis thereby allowing a grease and fat discharge to the sewerage works.

d) The net difference between water consumption figures and effluent discharge measurements indicates an appreciable volume of non-domestic flow attributed to storm water connection and groundwater infiltration into the sewage collection works.

e) A gravity sewer line discharging to the Chilliwhack Municipal treatment plant passes through a right-of-way located on the Coqualeetza property and adjacent to the Imhoff tank. Estimated cost to connect to the gravity sewer line is approximately $66,800.

f) Solid wastes are handled and disposed of in an acceptable manner.

g) Incinerator air emissions, viz. smoke and fly ash from the burning of paper waste, do not comply with federal interim guidelines.

h) Natural gas fired boiler emissions are negligible.

6. RECOMMENDATIONS

a) A connection of the domestic sewage discharge from Coqualeetza to the gravity sewer passing across the Coqualeetza property is recommended as the most adequate means of sewage disposal. Appendix A shows the suggested connection scheme.

b) A connection agreement between DPW and the Township of Chilliwhack in the right of the three owners of the sewer line, should be negotiated.

c) Existing sewerage works should be upgraded to preclude stormwater and groundwater infiltration.

d) The kitchen grease traps should be cleaned on a regular basis.

e) A sewer connection scheme should be designed with a view to connecting the raw sewage discharge prior to the Imhoff works at a manole associated with the new gravity sewer located within the bounds of the right-of-way crossing the west side of the Coqualeetza property. The treatment compound should be isolated by blanking the inlet and removing the outfall. The Imhoff works may be useful for operator training and as such should not be removed until its use for this purpose is investigated.

f) For the purposes of flow measurement, the connection manhole diameter should be 36" with a 24" manway and provision for installation of a weir and stilling well. (See Appendix B)

g) The incinerator should be either phased out or upgraded to comply with federal interim guidelines.

7. CONTACTS

Jim Gorman - Regional Mechanical Engineer, DPW
Erwin Johnson - Environmental Coordinator, DPW
Art Shaw - DPW, Administrator Coqualeetza Federal Buildings
Harold Carter - Maintenance Staff, Coqualeetza Federal Buildings

8. REFERENCES

1. Coqualeetza Feasibility Study, Western Consultants, 1971.
2. Chilliwhack Sewerage District, Integrated Sewerage Study, 1969, Associated Engineering Services Ltd.
3. Submission to the Corporation of the Township of Chilliwhack for a pre-paid sewage facility.

Plate 1: Storm Sewer Outlet

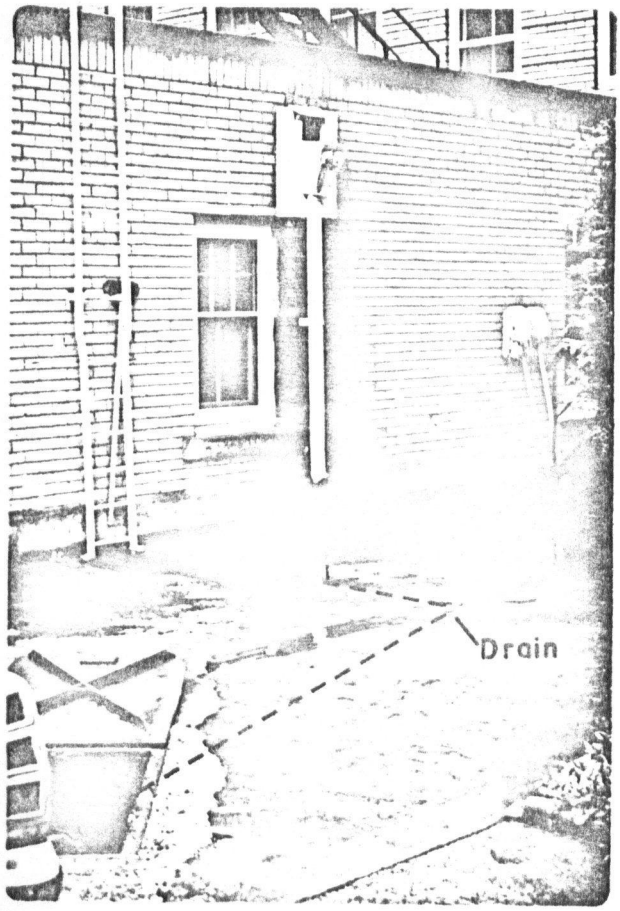


Plate 2: Storm Drain Connection to Sanitary Sewer

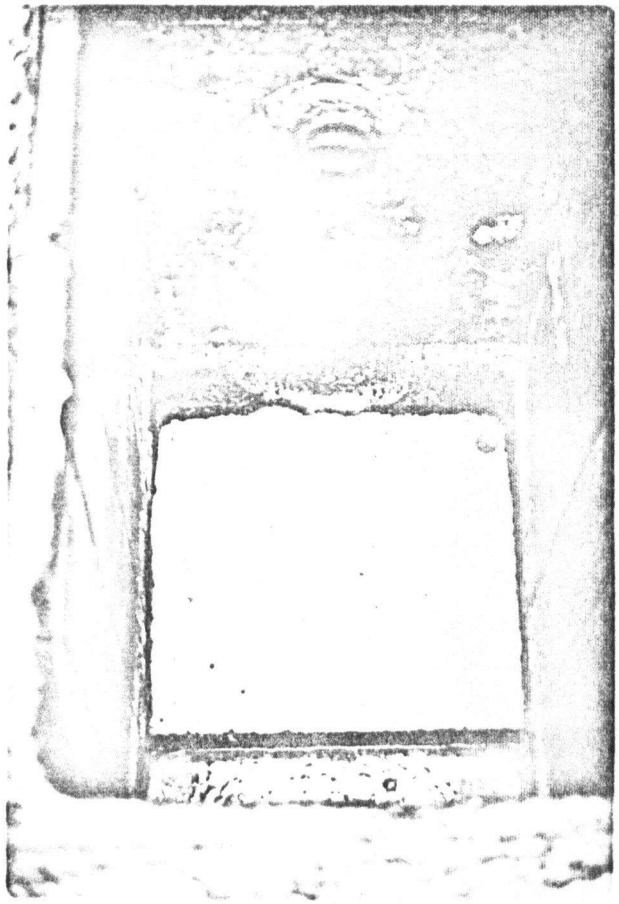


Plate 3: Grease Trap

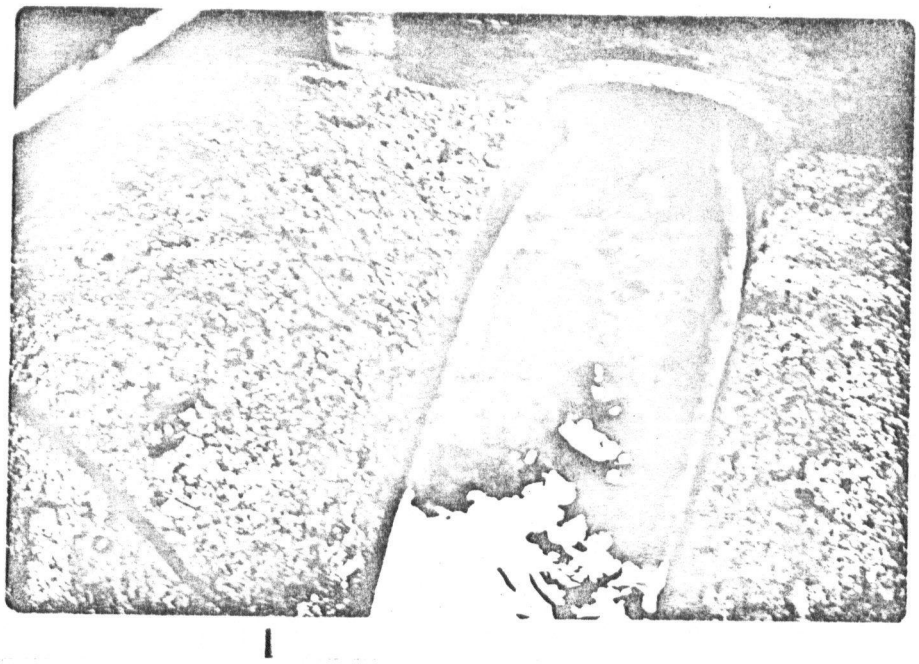


Plate 4: Flow in outfall manhole

Plate 5: Location of outfall into Luck-a-Kuck Creek

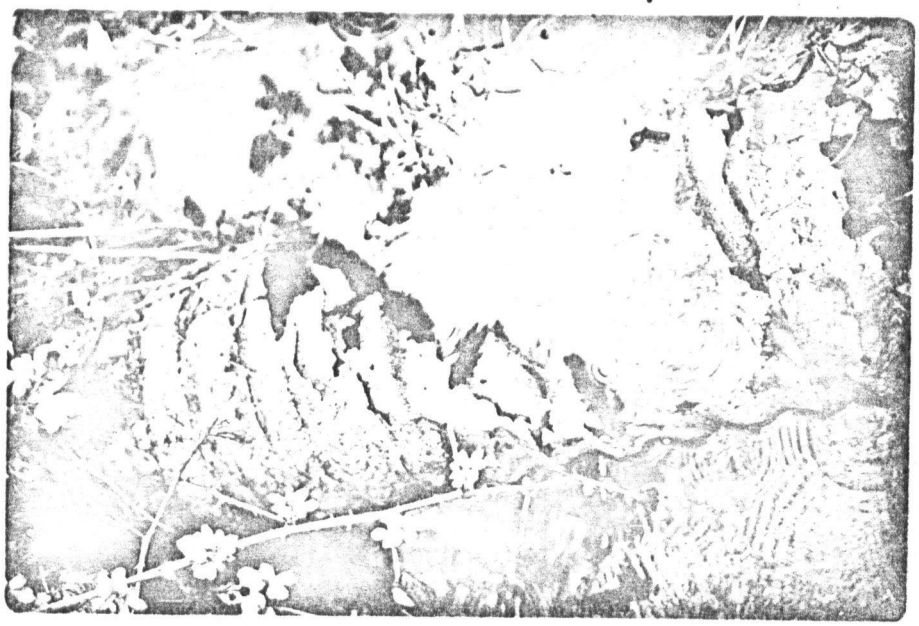


Plate 6: Outfall Pipe

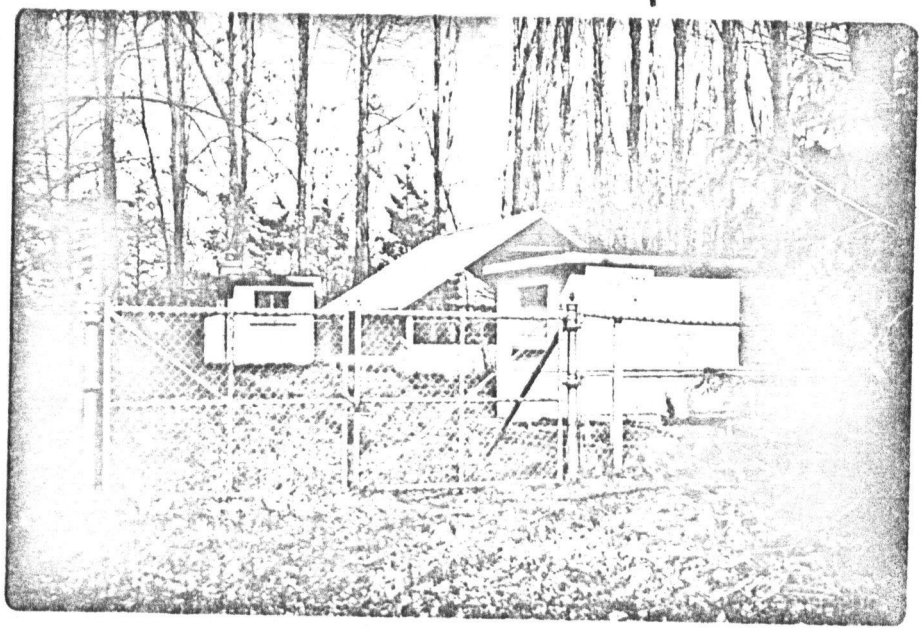


Plate 7:
Treatment
Works
Compound

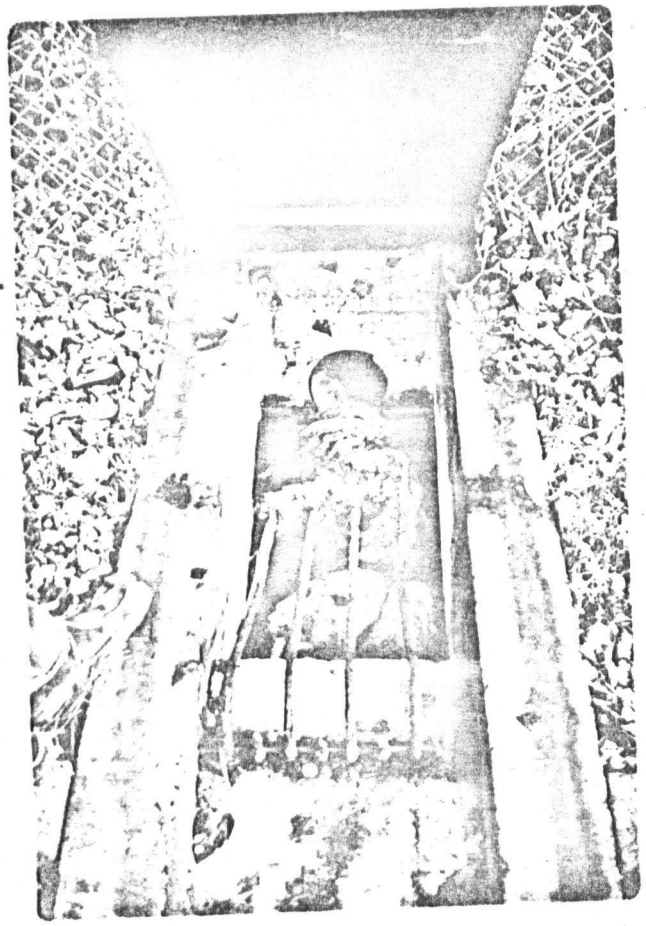


Plate 8: Bar Rack

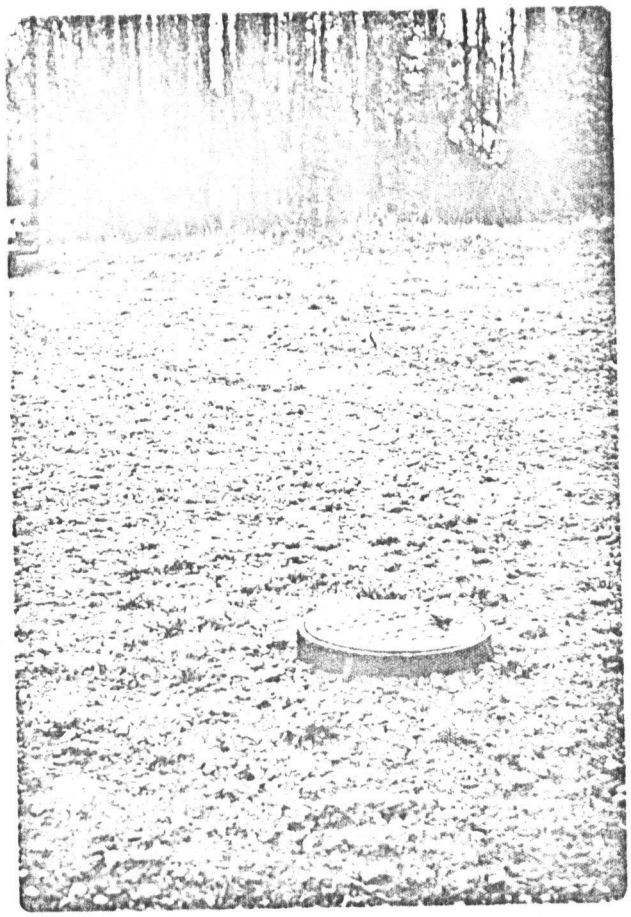


Plate 9: New Sewer Manhole

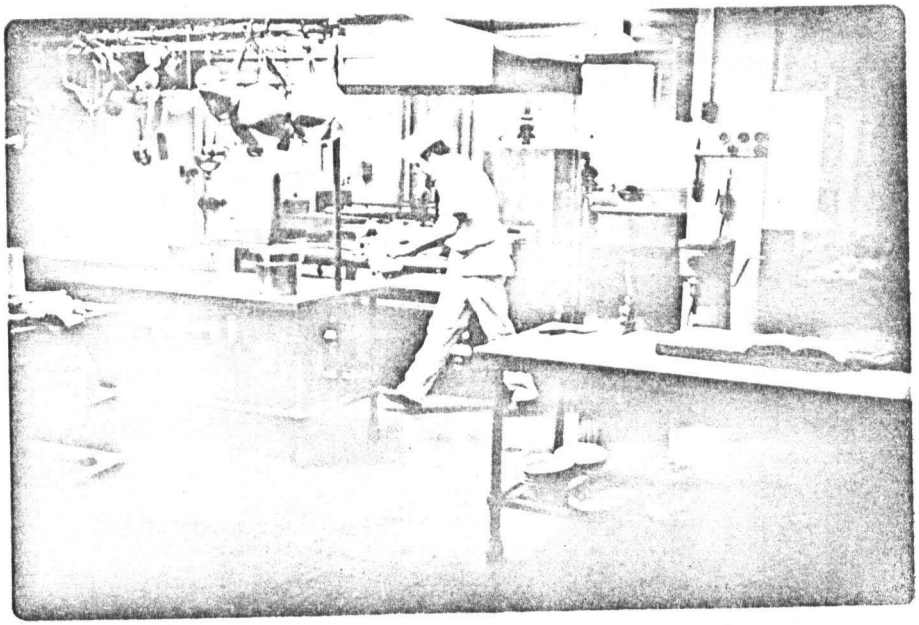


Plate 10: Kitchen

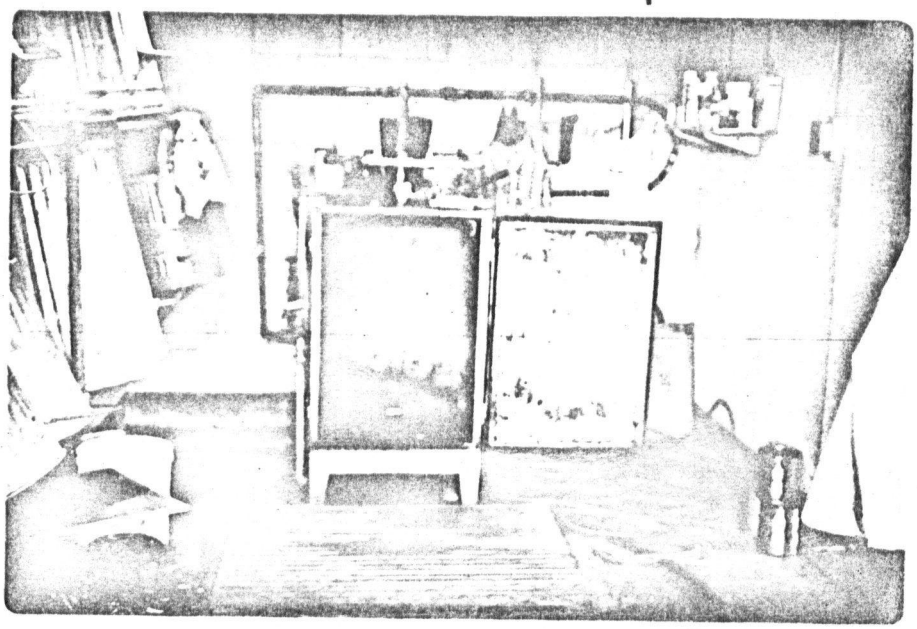


Plate 11: Garbage Can Cleaning and Storage Room

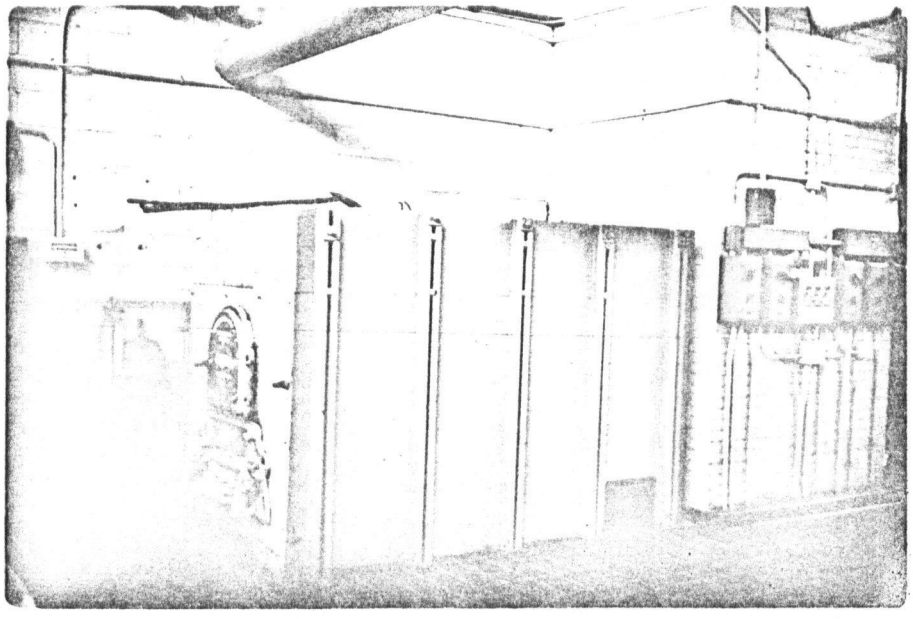


Plate 12: Incinerator

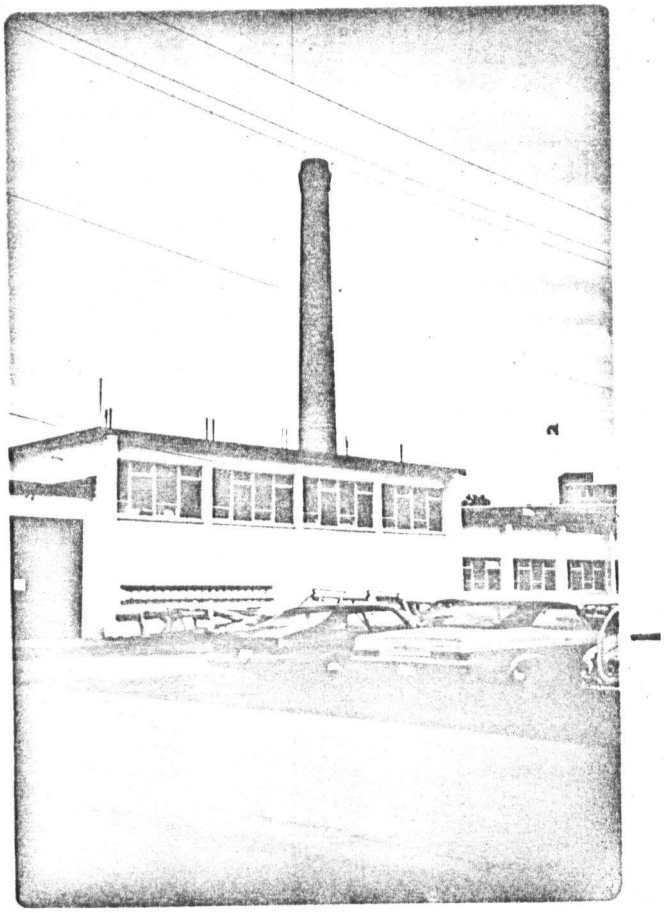
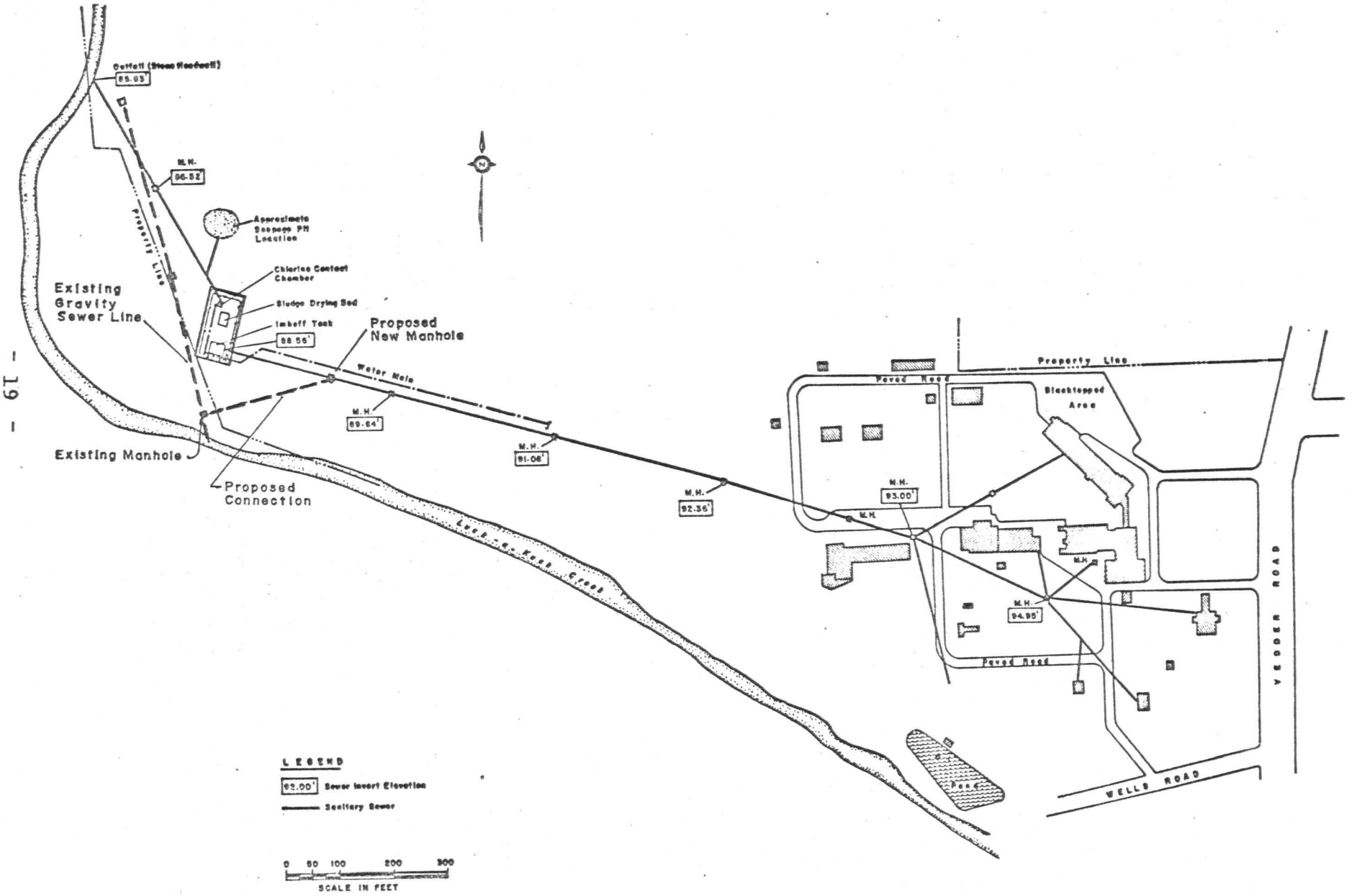
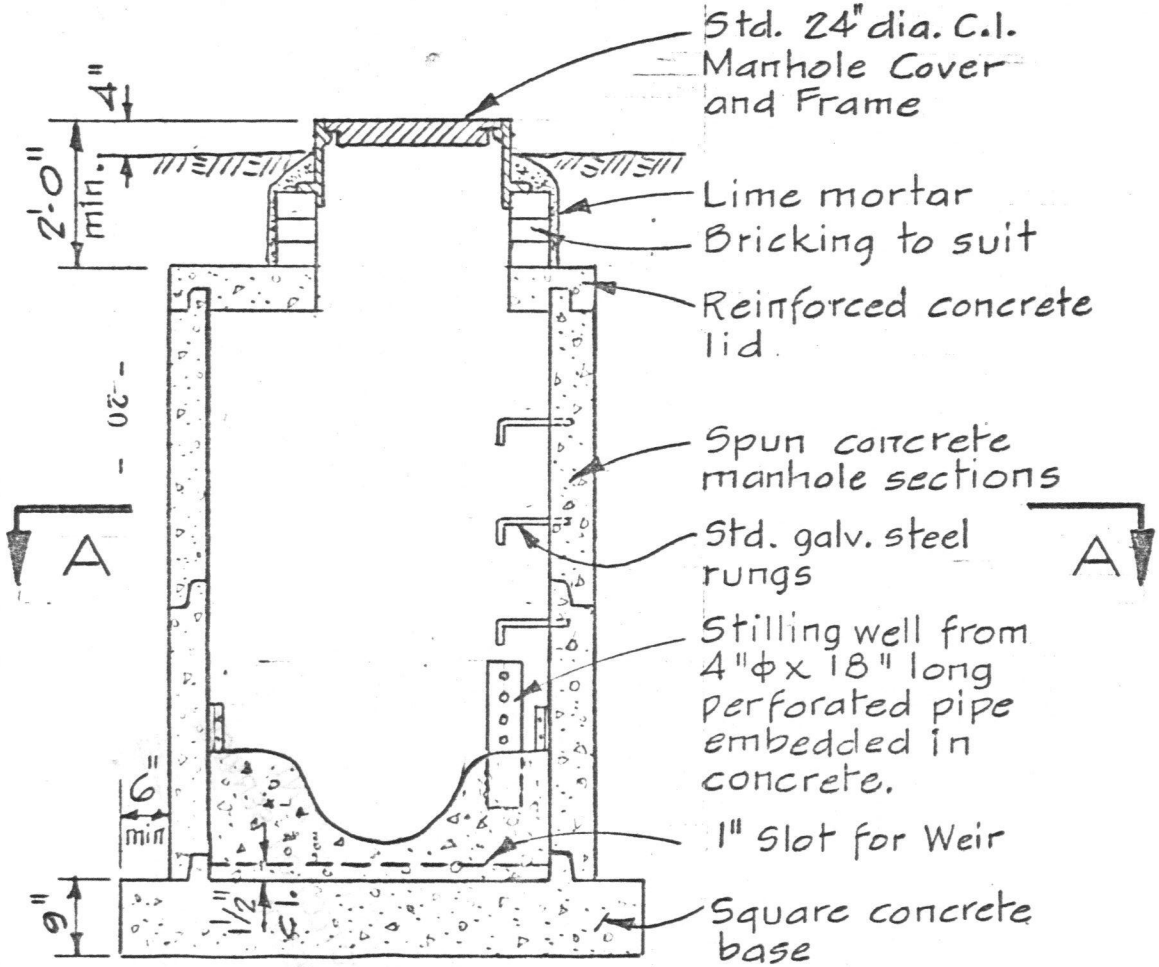


Plate 13: Boiler Plant Stack

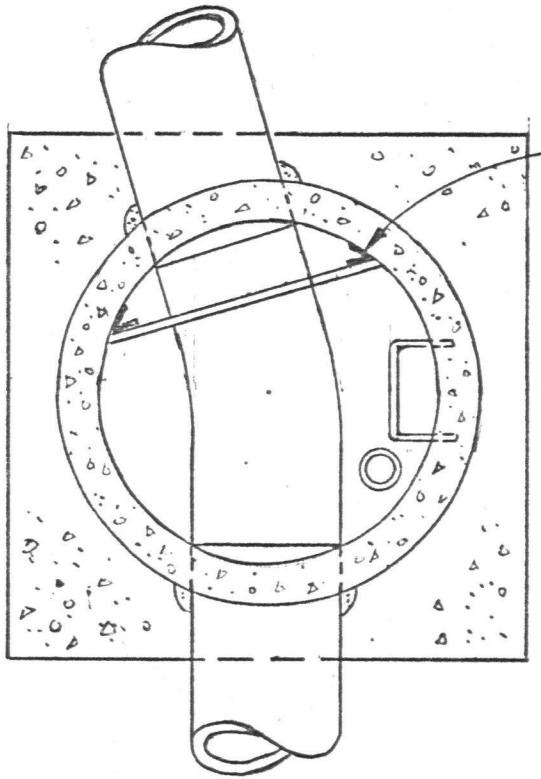


APPENDIX "A" PROPOSED SEWER CONNECTION



MANHOLE DETAILS

Scale: ½" = 1'-0"



SECTION A-A

APPENDIX 'B' MANHOLE WITH WEIR SLOT AND STILLING WELL.