



Earlier report, see File

GSF Energy Inc.
2750 Signal Parkway
P.O. Box 1900
Long Beach, California
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March 4, 1987

Walter T. Kaczmarek
Principal
THE MARTIN COMPANY
4256 Hacienda Dr., Suite 101
Pleasanton, California 94566

Dear Walter:

Attached is a copy of "Assessment of Gas Emissions at the Bay Center Apartments Site". In this report, we find that previous testing on the site is generally applicable to your current project. Additionally, we state that the tiered garage and apartment design provides a good solution to minimize the gas emission hazard at your site.

It was a pleasure working with you on this project. If we can be of further service, please let me know.

Sincerely,

Joan P. Siegal
Supervisor
Landfill Evaluation Services

JPS:cv-ASC

Attachments

ASSESSMENT OF GAS EMISSIONS
AT THE BAY CENTER APARTMENTS SITE)

GSF ENERGY INC.
March 3, 1987

1.0 Project Description

Bay Center Apartment Associates is planning to develop an 8.6 acre area on the east side of the Christie Avenue extension in Emeryville, California as Bay Center Apartments. The project will be comprised of three groups of four story apartment buildings, on top of a continuous two story parking garage. No general excavation of the property is planned. Excavation will be limited to building footings and two or more four foot deep elevator pits.

The site of Bay Center Apartments was tested for methane and other gaseous emissions in September, 1986 by GSF Energy Inc. as part of a test of the entire 16.5 acre parcel held by Bay Center Associates. The results of this test are contained in "Results of the Gas Emissions Test of the Bay Center Construction Site", dated October 9, 1986. The report addressed gas emissions from the site as a whole and specifically as they pertained to the three proposed office buildings. The report concluded that gas generation on the site was extremely low, no greater than 7000 CFD, and possibly substantially less.

The present report will discuss the test results as they pertain to the Bay Center Apartment site, as well as discuss additional monitoring that was done at the site. For a full discussion of test methods and previous test results, please refer to the October 9, 1986 document.

2.0 Test Results

1. Site walk

The site walk with an FID of September 4, 1986 covered the entire 16.5 acre site. Methane was virtually undetected (<5 ppm) over the entire landfill surface, except in open pits. This walk was repeated on March 2, 1987. Again, no concentrations of methane above 5 ppm were discovered. All of the open pits had been filled in, so these areas of slightly higher gas concentrations are now gone. Office buildings A and B, both of which were partially enclosed were also surveyed. Construction has not yet begun on pad "C". Again, no concentrations of methane above 5 ppm were found, even in the subsurface elevator pits.

2. Probes

A total of 13 probes were installed on September 3, 1986 at the locations marked in Exhibit 1. Note that probes D, E, F, G and H fall on the east side of Christie Avenue, the site of Bay Center Apartments. Probes F, G and H are directly under the proposed building site. The methane content of gas from these probes ranged from 0.5 % in probe D, to 88.8 % in probe H. Five (B,D,E,F,H) of the original 13 probes were still standing on March 2, 1987. These probes were reread with an explosivity meter, with a range of 0 to 100 % LEL. The results of this survey are presented in Exhibit 2. Note that there is no change in the presence of high concentrations of methane in probes where it was originally found. It should be noted, however, that these high concentrations of gas were coupled with extremely low gas pressures (less than 0.05 inches of water), indicating a very low gas generation rate.

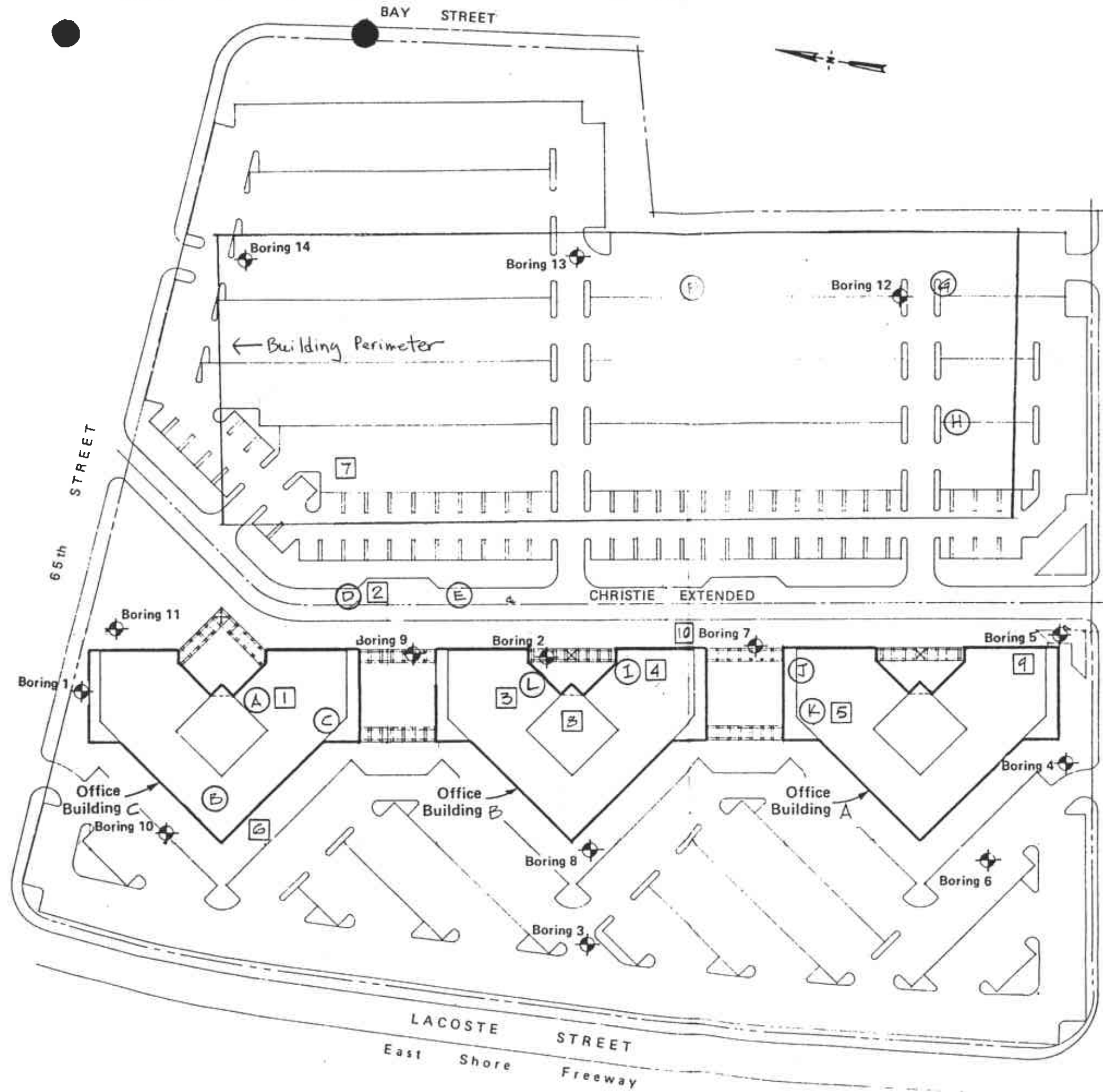
3. Refuse samples




All samples taken from well bores, including those in the Bay Center Apartment section were extremely low in volatile content. All samples had less than 2.5 % volatiles on a wet weight basis, and less than 0.2 % cellulose on a wet weight basis. This indicates that there is little raw material left in the landfill to support methane production.

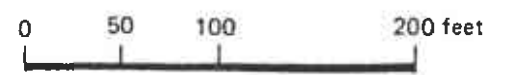
Test borings performed by Geomatrix consultants also did not indicate any decomposable refuse. The locations of these borings are shown in Exhibit 1. Note that borings 12, 13 and 14 are under the proposed building site.

4. Flux box testing

Flux box testing was centered at the site of Bay Center Office buildings. Flux box No. 7 was located in the present study site, and no methane buildup was detected after 24 hours with field instruments. Gas emissions were calculated from flux box testing to be less than 200 CFD. Because of the similarities in refuse characteristics between the two



- LEGEND**
- Boring 1  Test Boring Locations
 -  GSF FLUX BOX (1-10)
 -  GSF PROBE (A-L)



SITE AND BORING LOCATION PLAN		
Project No. 1084B	BAY CENTER PROJECT Emeryville, California	Figure 1
Geomatrix Consultants		

Exhibit 2.

Methane Content in Remaining Probes on March 2, 1987

Probe	LEL (%) ¹	% (GC) ²
B	0 ³	33.2
D	0	0.5
E	100	61.3
F	100	30.8
H	100	88.8

(1) 100% LEL equals 5 % methane

(2) Percent methane by gas chromatograph from Sept. 5, 1986 samples. See Exhibit 4, October 9 report.

(3) Bore was enlarged to 12 inches around probe, may have caused decrease of gas buildup in probe.

3.0 Proposed construction

GSF believes that the Bay Center Apartments building plan (Exhibits 3 and 4) has certain advantages for construction on this site:

1. There is no general excavation of the site, and none of the inhabited structure is below grade. This greatly decreases the probability of gas seepage into the structure.
2. There is a two story parking garage that is unenclosed as required in the building codes below the apartments. This eliminates contact of the apartments with the source of gas generation, and allows what little gas there may be generating to vent to the atmosphere.
3. There are only two proposed subsurface elevator pits in the project, and these are located near the building corners. These pits will be excavated to a depth of four feet. No methane was measured at the 2 ppm detection limit in the elevator pits of the Office buildings as of March 2, 1987.

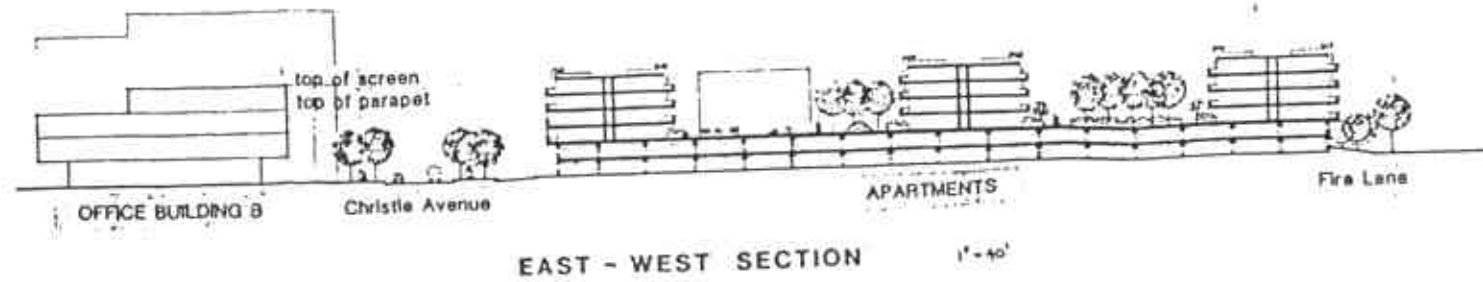
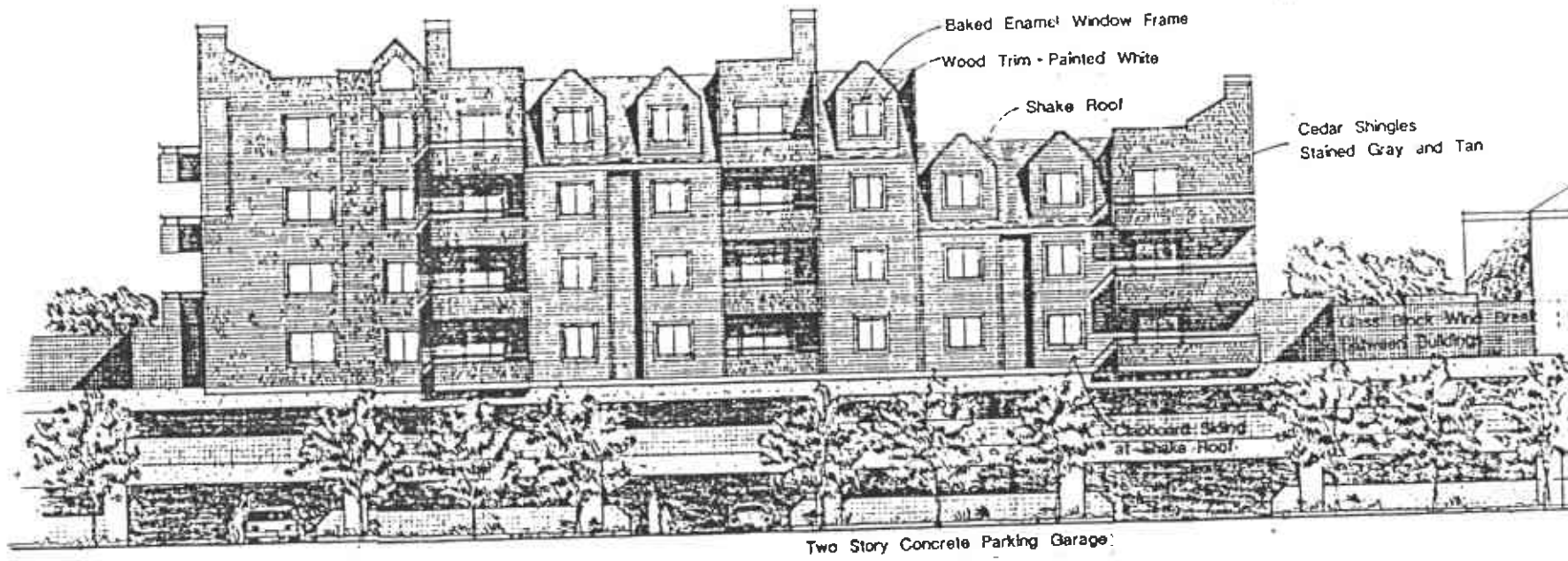
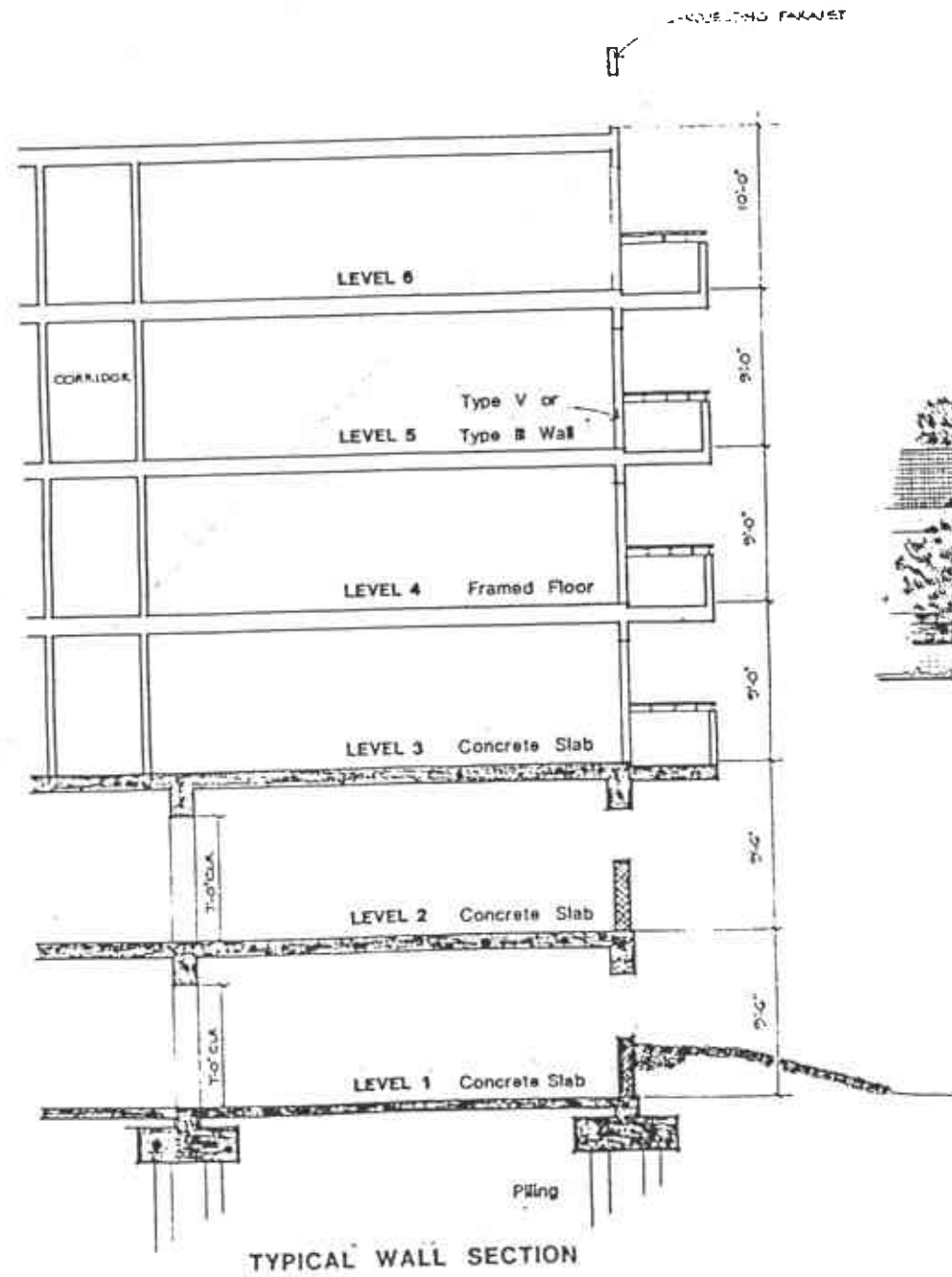
There is approximately 2000 square feet of commercial development that will be on a concrete slab at base elevation. Since this structure is less protected than the apartments, care should be taken to adequately ventilate this area.

4.0 Conclusions and Recommendations

GSF believes that the testing results discussed in "Results of the Gas Emissions Test of the Bay Center Construction Site" apply to the Bay Center Apartment site as well. Further, we believe that the use of a open air, two story garage beneath the apartments is particularly appropriate for this site, and should provide protection from gas emissions to the above stories, provided that building code ventilation standards for parking garages are met.

As in our initial report, we reiterate that the following precautions should be taken:

1. Elevator shafts and other areas likely to trap gas should be well ventilated and equipped with a methane detector and alarm system.
2. Utility boxes should be either fully ventilated or lined with a gas impermeable material and secured from public access. No access should be allowed to the boxes unless they are first checked for methane concentrations by an explosimeter.



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BAY CENTER APARTMENTS
 FOR
 BAY CENTER ASSOCIATES
 EMERYVILLE, CALIFORNIA

Prepared by JCH/E/ALC
 Project No. 100



BAY CENTER APARTMENTS
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EMERYVILLE, CALIFORNIA

