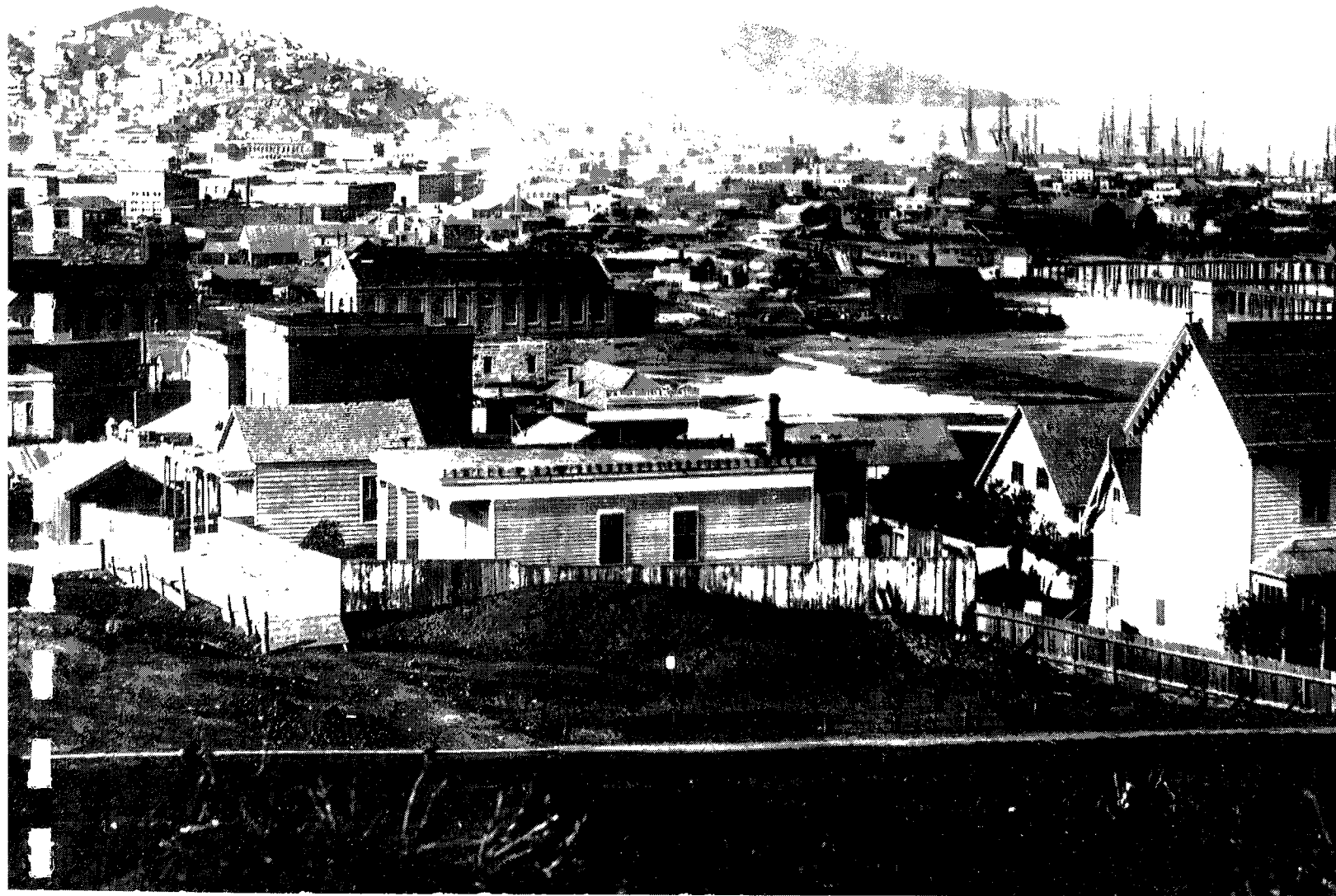


# **Tar Flat--19th Century Solutions 20th Century Hazards**



## **CAL-TRANS SF-480 TERMINAL SEPARATION REBUILD**

**Study of Historic Potential Hazardous Materials Sites**

**Resource Consultants  
1993**

# **Tar Flat: 19th Century Solutions 20th Century Hazards**

**A Survey of Historic Potential Hazardous Materials Sites**

**On SF-480 Terminal Separation Rebuild**

**Postmiles: 0.0/0.7**

**04220-190751**

**by**

**Roger Wolcott Olmsted**

**Resource Consultants**

**P.O.B. 262 - Kentfield, CA 94914**

**Maps by Stuart Guedon, Basin Research**

**Prepared for**

**CALIFORNIA DEPARTMENT OF TRANSPORTATION**

**P. O. B. 7310**

**San Francisco, California**

**September 25, 1993**

## **TABLE OF CONTENTS**

### **Tar Flat: 19th Century Solutions, 20th Century Hazards**

#### **A Survey of Historic Potential Hazardous Materials Sites SF-480 Terminal Separation Rebuild**

---

	<b>page</b>
Scope, Method & Background of the Survey	1
Integrating Historic Research with Analysis of Potential Hazardous Materials Sites	5
Block 1: Bounded by Mission & Howard; Main & Beale	9
Block 2: Bounded by Howard & Folsom; Main & Beale	19
Block 3: Bounded by Howard & Folsom; Beale & Fremont	27
Block 4: Bounded by Howard & Folsom; Fremont & First	36
Block 5: Bounded by Howard & Folsom; First & Second	48
Block 6: Bounded by Folsom & Harrison; First & Second	52
Block 7: Bounded by Harrison & Bryant; First & Second	55
Block 8: Bounded by Harrison & Bryant; Fremont & First	57
Block 9: Bounded by Harrison & Bryant; Second & Third	59
Block 10: Bounded by Harrison & Bryant; Third & Fourth	61
Block F: Bounded by Harrison & Bryant; Maine & Beale	64
Off-Site Sources of Potential Hazardous Materials Contamination	68
Bibliography	76

## **LIST OF PLATES**

### **Following Page:**

Plate 1 & 2: Yerba Buena Cove 1852/53	8
Plate 3 & 4: The Progress of Bay Filling 1854	8
Plate 5: Views from Rincon Hill, 1855	18
Plate 6: Looking North from First & Harrison, 1856	18
Plate 7: Detail from Gifford's view of San Francisco, 1864	18
Plate 8: View from Essex Street on Rincon Hill Over Tar Flat, 1867	35
Plate 9: Industry on Block 3	35
Plate 10: Pioneer Lead Works Advertisement	35
Plate 11 & 12: The Miners' Foundry Over Three Quarters of a Century	35
Plate 13: Looking South on 2nd Street, 1906	51
Plate 14 & 15: Block 2 in 1920	51
Plate 16 & 17: Industries in 1920	58
Plate 18 & 18a: Block F in 1920	65
Plate 19: Whitelaw Wrecking Company Scrapyard on Block E	65
Plate 20 & 21: Block F Along Beale & Main in 1920	65
Plate 22: 19th Century Advertisements of On-Site Industries	65

Note: Detail of Chevalier Birdseye View of San Francisco, 1912, Focused on Project SF-480 has been included following page 58.



## **MAPS**

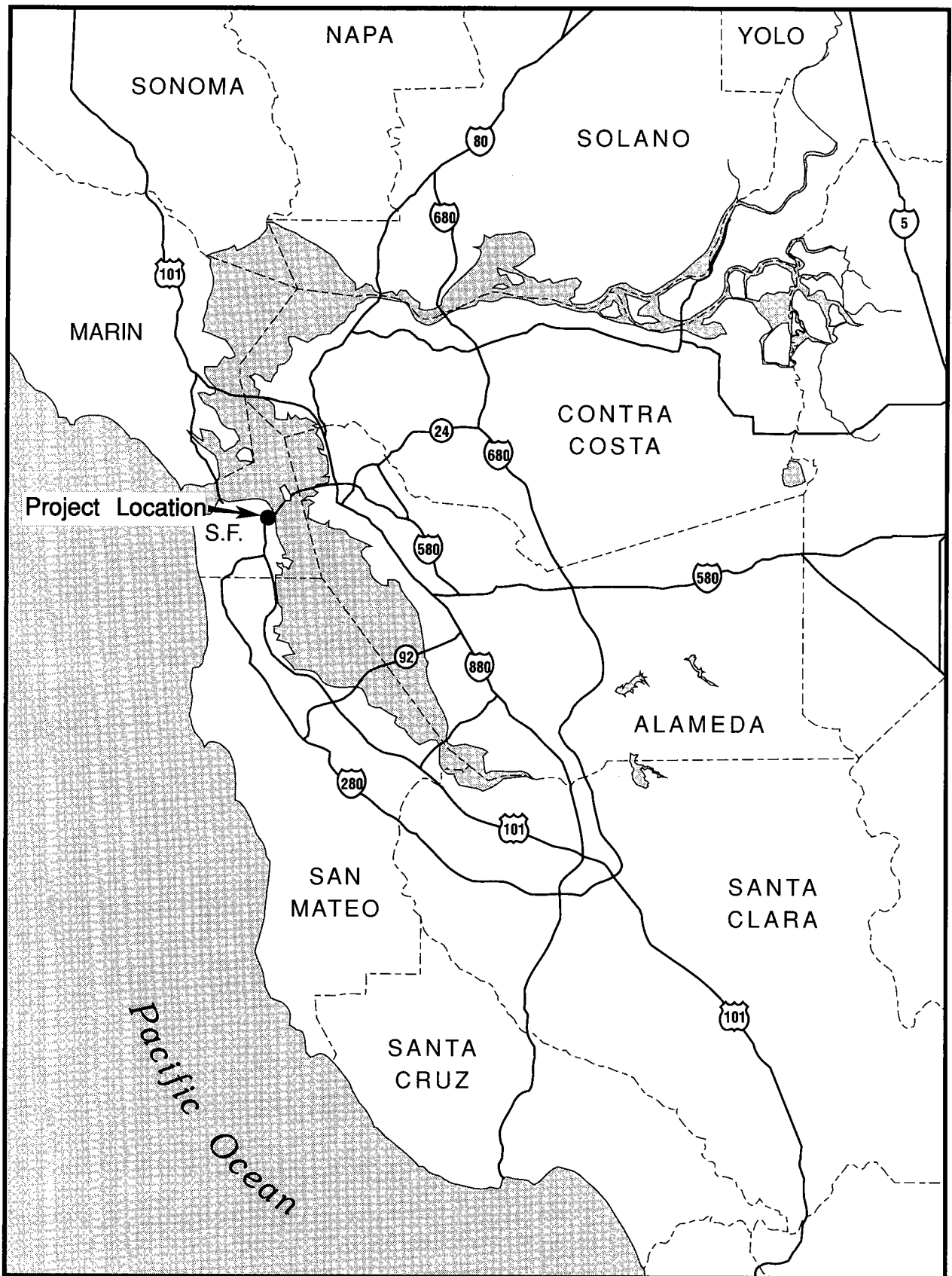
Map 1: Project Location: SF-480 Terminal Separation	Follows Front Matter
Map 2: Project Location: SF-480 Terminal Separation Outlined	Follows Front Matter
Map 3: Project Location: SF-480 Terminal Separation Close Up With Project Blocks Numbered 1-10 plus Block F Note: For Reader's Convenience: Map 3 has been repeated on a fold-out map in front of back cover. Block Numbers are used through out this study are shown here.	Follows Page 1
Map 4: Chevalier Map of San Francisco, 1912--Pre-Freeway & Bridge Map Showing SF-480 Project with Blocks Outlined and Numbered	Follows Page:  4
Map 5a: U.S. Coast Survey, 1852/53 with SF-480 Terminal Separation Toxic Study Area, Outlined with Numbered Blocks Note: For Reader's Convenience: Map 5a has been repeated on a fold-out map in front of back cover. Useful for quick reference on filled blocks.	9
Map 5b: Enlarged Detail of U.S. 1852/53 Coast Survey	9
Map 6a: U.S. Coast Survey 1857/59 San Francisco, SF-480 Project area	10
Map 6b: Enlarged detail of U.S. Coast Survey, 1857/59	10

---

Note: All the Following Sanborn Maps are color keyed to specific industrial sites with a potential for hazardous materials.

---

Block 1: 1887 Sanborn Map	11
Block 1: 1913/29 Sanborn Map	17
Block 2: 1887 Sanborn Map	21
Block 2: 1913/29 Sanborn Map	25
Block 3: 1887 Sanborn Map	27
Block 3: 1899 Sanborn Map	34



**Map 1: Project Location: SF-480 Terminal Separation - Toxic Study**



## **SCOPE OF WORK**

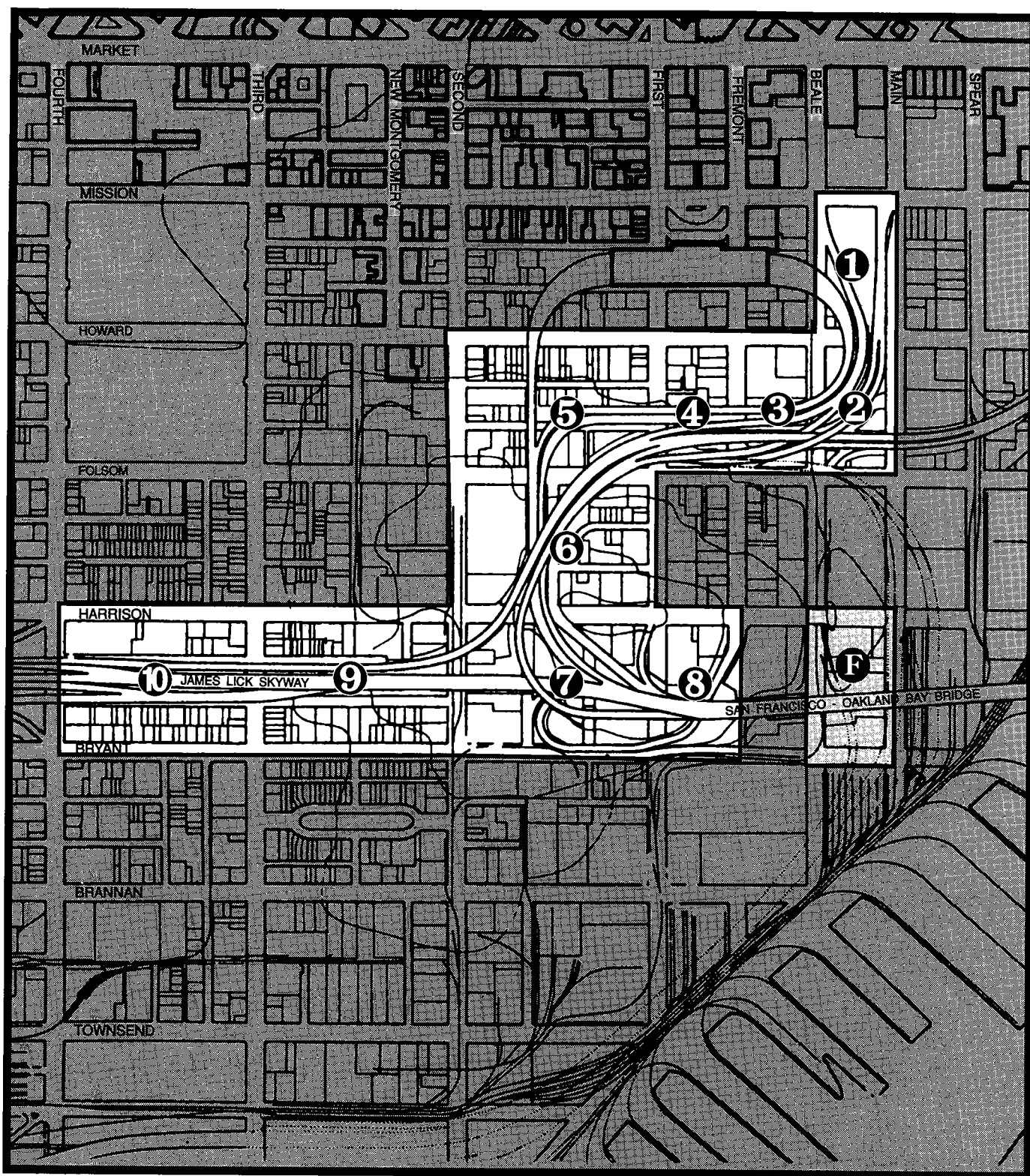
The scope of work for the survey of historic industries with a potential for past deposition of hazardous materials on the SF-480 Terminal Separation Rebuild area includes a survey of the 11 blocks south of Market Street in San Francisco shown on Maps 1-4. The blocks can be best delineated on Map 4 (following page 4), a pre-freeway 3-dimensional street map executed in 1912. Throughout this study, the project blocks are referred to by the numbers 1-10 respectively. An additional block, bounded by Harrison, Bryant, Main, and Beale streets was added as amendment to the original contract to ascertain the potential for hazardous materials contamination of that site. This block is referred to as Block F, being one of a group of blocks (A-F) adjoining the SF-480 Separation Terminal Rebuild site.

The study was not limited to blocks directly affected by the SF-480 Terminal Rebuild, but also included adjoining blocks (A-E). These blocks were included because, along with blocks 1-4, they were once part of Yerba Buena Cove and adjoin the project blocks. These adjacent blocks have been studied from the standpoint of source of potential contamination before the filling of blocks 1-4 was completed, and also in terms of potentially very hazardous industries whose wastes, at a later time, might have migrated through filled land onto the project blocks. From this latter perspective, only industries known to have used substantial quantities of highly persistent hazardous materials are considered. At the request of CALTRANS, Block F is treated as a project block.

The study period covered is from the first recorded indications of industry in 1850 on this 11-block site, and it extends up to 1948, the date of the Sanborn Map Company survey most closely associated with the building of SF-480.

### **Limits to the Study**

Beyond developing a detailed picture of potentially hazardous industries, placed within the best understanding attainable of 19th century technological processes, this study does not attempt to make decisions or predictions based on chemical or engineering data. Instead, the study attempts to provide engineers with relevant information on specific locations. Certain data bases have been put together that specialize in enlarging our contemporary understanding of 19th century industrial materials and their likely residues; however, within the 12-week time frame of this



Map 3: Project Block Location: SF-480 Terminal Separation - Toxic Study

survey it would have been unwise to attempt to execute a "quick-study" on these various evolving data bases. Instead, this study involved careful consideration of industrial processes on the site as recorded in newspaper articles, historically contemporary descriptions of specific industries, maps, photographs, business directories, and municipal sources.

## BACKGROUND AND METHOD OF THE STUDY

Early in the process of historical investigation of SF-480 Terminal Rebuild Project as an aid to archaeological study of the site, the **Pioneer White Lead and Color Works** was discovered to have operated on Block 3 between 1875-1896. The obvious problem that this large and persistent operation would pose for CALTRANS, involving potentially substantial quantities of lead and other heavy metals, made it urgent to communicate findings as early as possible--well in advance of the completion of the historical-archaeological survey. Because the **Pioneer White Lead and Color Works** had an important monopoly on the West Coast, producing all of the lead paint used in California and other western states, the industry was described extensively. It was also established that the lead works were destroyed by fire in 1896, making release of hazardous materials into the soil of the SF-480 right-of-way likely.

Beyond the discovery of this one site involving potentially hazardous 19th century technological processes, the historical research revealed the extent to which **Tar Flat** had been part of Yerba Buena Cove, with blocks 1-3 entirely submerged in the early 1850s, and partially unfilled up until the late 1860s (See Maps 5 and 6, following pages 9 and 10). This made part of the project area subject to migrating hazardous wastes--such as substantial amounts of coal tar being continuously dumped into the unfilled area by the **San Francisco Gas Company** from 1854 until as late as the date of the closing of the gasworks in 1891.

This survey was then undertaken to give careful attention to locate all potentially hazardous industry on blocks 1-10 and the amended Block F, and to document industries with a potential for substantial deposits on adjoining blocks that were part of **Tar Flat**.

Because **Tar Flat** was the earliest site of heavy industry in San Francisco, or indeed on the West Coast, many iron and brass foundries, blacksmith shops, boat-building yards, woodworking plants, metal working, plating, machine shops, coal yards, ink factories, paint shops, lithographers, and warehouses were found to be present. Individual companies frequently moved from site to site within the same block or to nearby blocks, and were subject to corporate name changes over the decades. The area reached a peak of industrial activity in the 1890s, and continued as a major concentration of the metal industry until the 1940s.

Beyond establishing the physical presence of change and industrial development on the project site through these sources, San Francisco business directories, beginning in 1859, and continuing through our cut-off date of 1948, provided fairly complete listings by address of specific classes of industries. This information located specific industries by address and type of industrial activity on each of the individual project blocks. This date identified industries that did not appear on Sanborn Maps, and established the general time frames of their operations.

San Francisco Municipal Reports, the extensive scrapbooks of newspaper clippings kept by H.H. Bancroft for his *History of the Pacific Coast* (which included eight extensively footnoted volumes on California) 1884-1890, and the more industrially focussed scrapbooks of J.S. Hittell, the author of *Commerce and Industries of the Pacific Coast of North America* (1882), were all sources for the information on industrial processes in this survey. Beyond these important reference materials, there are assorted pamphlet collections at the Bancroft Library from specific local industries. Although frequently written as advertisements, they contained extensive listings and catalogues of products.

**A Reminder:** Because San Francisco today is primarily a service oriented city with virtually no heavy industry, it is important to keep in mind that from the 1850s up until the early decades of this century, local manufacturing of mining equipment had an international market. The same was true for iron and metal products of all kinds: this at the time that railroads were under construction as "the wonder of the age"; steam powered vessels carried the world's international commerce using the complex and elaborate mechanisms produced in this city; and continuous innovation in farming and lumbering equipment led to the production of highly specialized machinery.

Just as the 19th century became the age of mechanical invention and expansion, so also the Gold Rush of the 1850s and the Silver Bonanza of the 1860s made San Francisco the most influential center of mining technology anywhere. The city rewarded mechanical innovation and attracted the skilled craftsmen of the world in order to attain a very sophisticated level of production.

This is especially relevant to **Tar Flat** because from the 1850s it was the center of industrial San Francisco on a dense scale unknown in this century--and much of this industry was located on the right-of-way of SF-480. Industrial expansion in the 1880s led to the development of the extensive **Union Ironworks**, later **Bethlehem Steel**, and **Scott's Ironworks** on the Potrero, with important deep water access--but research has revealed that even after the 1906 fire, early foundries, such as **The Golden State and Miner's Ironworks**, rebuilt on the same sites and continued in operation until the 1930s.







## INTEGRATING HISTORIC RESEARCH WITH ANALYSIS OF POTENTIAL HAZARDOUS MATERIALS SITES

Until recently, the direct documentation of hazardous materials as part of the historical record was of little account. Public agencies neither kept, nor required the keeping, of records of waste generation, storage, or disposal. Most commonly, intentional references to hazardous wastes in historical records appear when their disposal became such an immediate problem as to constitute a public nuisance. Even here, observations tend to be limited to direct public health problems, offensive smells or sights, or the destruction of wildlife, rather than to the exact type or quantity of the waste discharged.

The historian is therefore compelled to look to logical inference from definite historical sources as the best guide to evaluating the likelihood of historical hazardous materials contamination. For the CALTRANS SF-480 Terminal Separation Rebuild project, a great deal of information has emerged concerning historic general land use and industrial activity.

It is often difficult to discover if a particular industry was careful or not in handling or disposing of hazardous materials. In general, since the local groundwater in the project area was not used for drinking purposes after the 1860s-1870s, there was no particular reason not to dump liquid or powdered wastes in yards, sumps, or street gutters. During the period prior to World War II (or even more recently) waste was disposed of in the cheapest and most convenient way possible; prior to the development of motorized trucking this could often mean on-site disposal. Any historic industry on the site using known hazardous materials could, therefore, be considered at least a possible source of contamination.

This view should be tempered by common sense and the application of all available data. In determining the possible residual historic contamination of a site, there emerge three categories to consider.

**First**, are those areas which:

- 1) were the site of large-scale industrial activity over a substantial, well-documented period of time,*
- 2) involved known hazardous substances in quantity,*
- 3) where either the industrial process, the structure in which it was carried out, or some event such as a fire could probably have resulted in a release of hazardous materials into the soil, and,*
- 4) where intervening changes of topography make it probable that the substance may still be present.*

**Second**, areas appear where it is unlikely that there is any historic hazardous materials contamination because:

- 1) the area was residential, and potentially hazardous waste disposal was restricted to limited quantities of household chemicals,*
- 2) industrial use involved products and processes unlikely to be hazardous, such as food processing, and,*
- 3) subsequent historic land use does not suggest the likelihood of hazardous materials contamination.*

**Third**, a large intermediate category exists of areas which show some probability of historic hazardous materials contamination, but do not present an altogether clear picture. These sites often include areas used for industry which may probably have used hazardous materials, but did not necessarily involve documented on-site disposal or long-term storage, or the intervention of some definite event likely to have caused spillage onto the soil. Rather than simply leaving these sites in limbo, an effort has been made to evaluate them in terms of common sense variables. These include:

- 1) the type of structure in which the industry was conducted; generally, a building known to have a concrete floor may be considered less of a hazard than a building with an earth floor;*
- 2) the type of soil of the site; filled land may be more likely to absorb hazardous materials than hard rock; in this regard, the subsequent cutting or filling of a site should be evaluated by engineers to assess its significance in making a rough determination of its potential contamination;*
- 3) the overall context in which the industrial activity was carried out can correlate with the general degree of care shown--for example, photographic research has shown that vacant lots in largely residential areas of the Rincon Hill neighborhood tended to be empty fields, whereas similar lots in purely industrial areas were used for machinery and waste storage.*

## USE OF SANBORN MAPS

In presenting research findings in this report, historic industries with potential for hazardous materials contamination have been located and marked on Sanborn maps reproduced in this report and covering the entire project area. Sanborn maps that were studied included the dates 1887, 1899, and 1913 with updates to 1929 and 1948. The original Sanborn maps are hand colored and bound in very large folio volumes, which in the updated 1913 editions have successive paper overlays glued on to show changes in land use. Even so, some potentially hazardous industries do not appear on any Sanborn map, either because they ceased operations prior to 1887, or were in business on a particular site for a relatively short period of time. Despite these limitations, putting together Sanborn maps of any one site together yields a series that includes most post-1887 industries. For this study, reproductions of the Sanborn maps of individual blocks have been shaded and keyed to show all known potentially hazardous industries, rather than just those indicated on the original map.

### Reproduction of Sanborn Maps in this Study

In the case of Tar Flat, both 1887 and 1913/29 Sanborn maps have been reproduced, with pre-1906 industries shaded on the 1887 map, and post-1906 industries on the 1913/29 map. In the single case of Block 3, the site of the **Pioneer White Lead and Color Works**, the 1899 Sanborn Map, documenting the destruction of the lead works in a fire in 1896, has also been included.

Because Rincon Hill was primarily residential prior to 1906, only the 1913/29 Sanborn maps have been reproduced for blocks 5-10. As a result, industries that had ceased by 1929, or had not yet begun operations at that date, are overlaid on the map of each block.

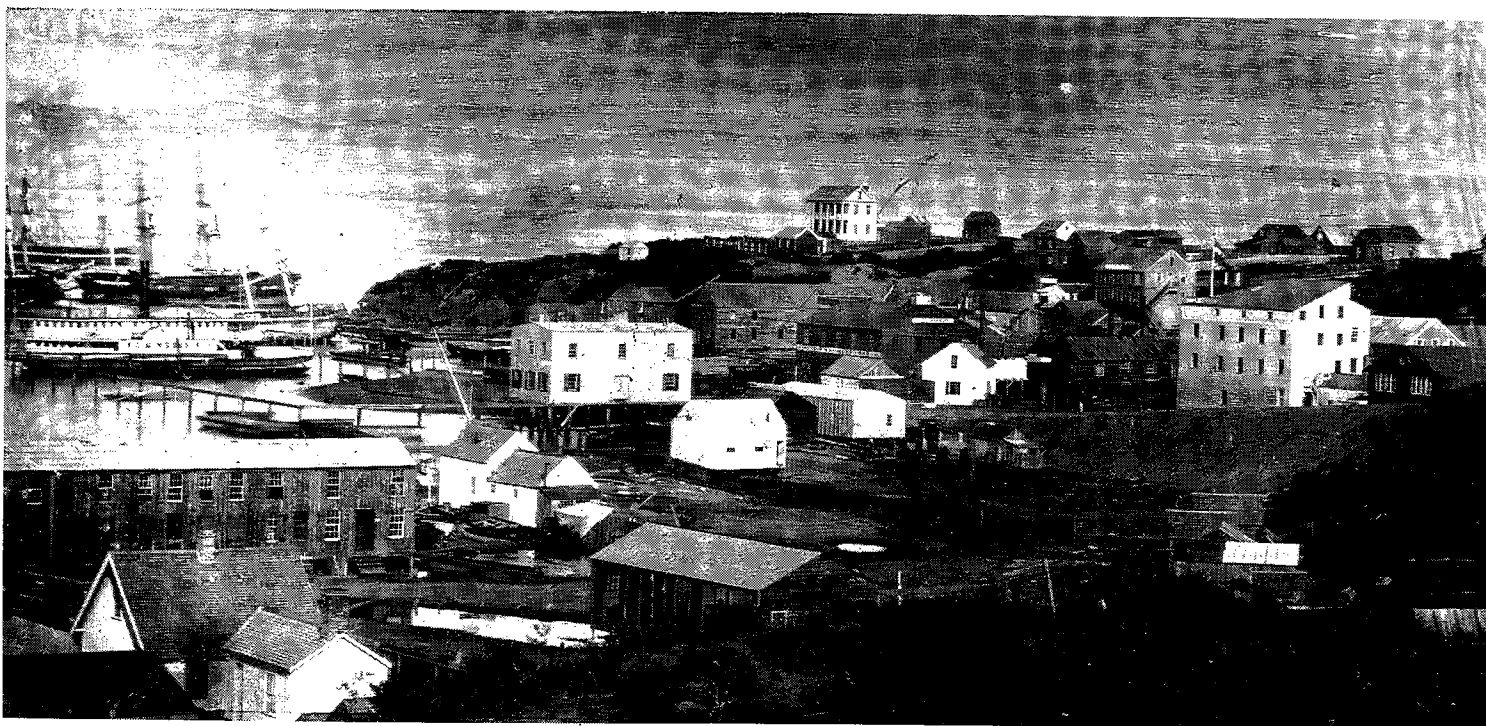
Putting these maps together shows that most of the area of the blocks traversed by SF-480 in Tar Flat was the site of potentially contaminating industry at one time or another. There is of course a wide range of potential hazards, and beyond the common sense system of classification described above, expert engineering judgment is needed to assess the potential hazard of any particular industry.

This report has differentiated between potentially hazardous sites primarily in terms of the types of materials that were commonly used in industry. The many **ferrous metal working industries**, such as iron foundries, machine shops, tool and die works, and automobile assembly plants and garages, **have been shaded in light red**; industries using **heavy metals**, such as brass foundries, melting plating works, sheet metal works, paint factories and warehouses, battery factories, ink factories, printing shops, and chemical works **have been shaded in darker red**.

Although most of the potentially hazardous industries in the project area fall into either the ferrous or non-ferrous metals category, some do not. Gas stations and oil warehouses have been shaded in red; frequently, paints and oils were stored together. Warehouses used for general purposes have been shaded in light red.

To a limited extent, this differentiation does correspond to the significance of potential hazard, in that a paint factory, lead smelter, or plating works may pose a serious hazard, whereas a machine shop only a minor hazard at most. The primary reason for showing the ferrous metals industries on the Sanborn maps in a separate category is because the potential hazards they present are often considered much less important than those of heavy metal industries.

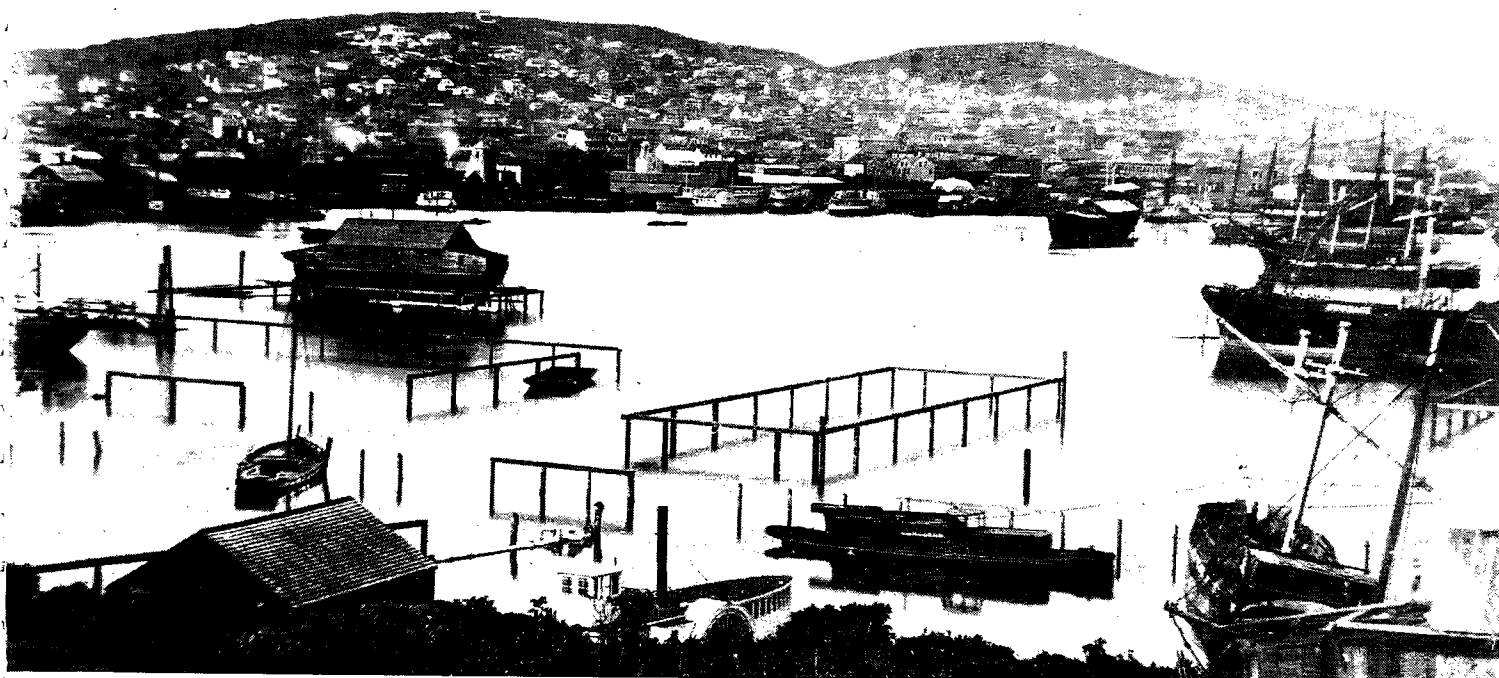
Warehouses pose a special problem to the investigator because almost any warehouse that was not dedicated to a known and safe use may be considered to have some potential for hazardous materials contamination; obviously, a paint or oil warehouse, or one used for storing used steel drums, may present a more significant hazard.

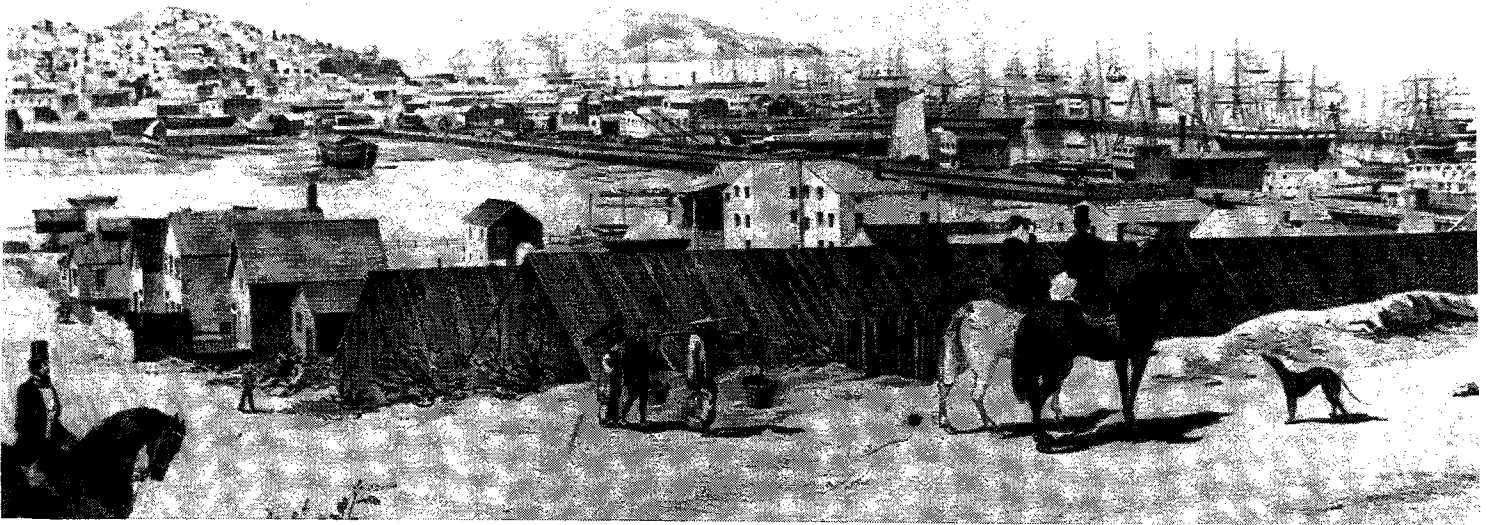


**Plates 1 & 2: Yerba Buena Cove 1852/53 . . .** The earliest detailed view of the project area appears above, taken from a 60-foot high sand ridge at First and Howard. The grade of Folsom Street is marked by the inclined embankment at the right center, and Block 4 occupies the foreground. The long two-story building is located on Block 3 and marks the line of Fremont Street; its south end is exactly halfway between Howard and Folsom. We can see that the existing grade of those blocks was achieved mainly by leveling out the sand bank whose steep east face formed the edge of the cove; in the case of Block 4, this process raised the level of the block considerably.

Below is a section of an 1853 Shew panorama taken from a 60-foot elevation on Rincon Point, near Spear and Harrison, showing the intersection of Folsom and Main outlined by pilings driven to demarcate corner lots. Together, these two views show us that in 1853 blocks 1, 2, and 3 were still water, while Block 4 shows evidence of recent filling and is still quite muddy.

*Top View: California Historical Society   Lower View: Courtesy of the Bancroft Library*

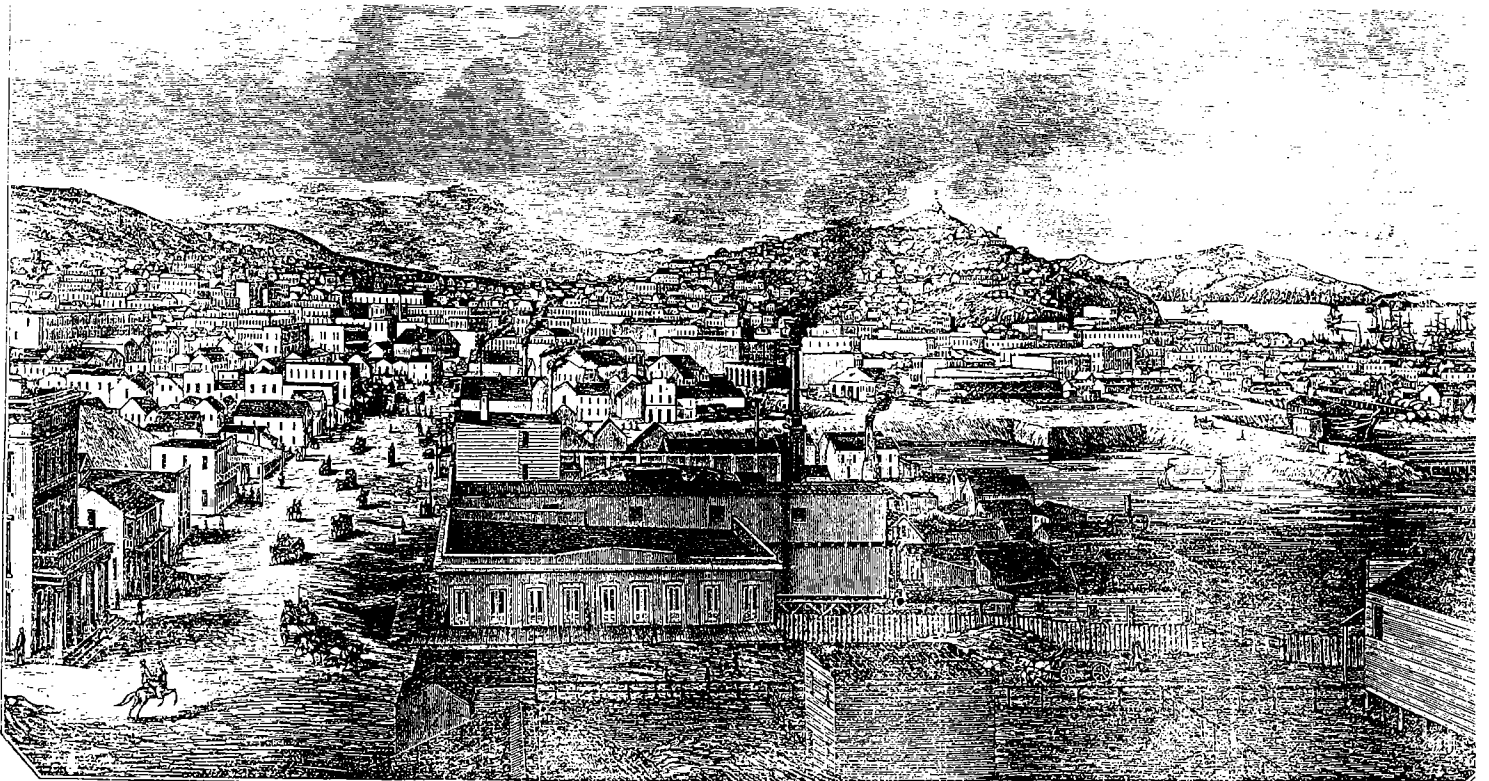




**Plates 3 & 4: The Progress of Bay Filling, 1854 . . .** In the view above, the artist is looking north from Harrison and Fremont. The long black line bisecting the center of the view is the Main Street Wharf: the buildings beyond it are also on piles. Blocks 1, 2, and 3 unfilled but cut off by the wharf from bay access. The marooned storeships are the same that appear in Plate 2.

The view below has been precisely dated to December, 1854. It was drawn from a 40-foot rise on Rincon Point, looks directly north at blocks 1-4, with 1st Street on the left, and Beale Street newly filled as an unfinished spit of land to the right, partially enclosing a storeship. The large smokestack in the center marked the newly-completed gas works at Fremont and Howard. Note the careful delineation of the filling going on in a stair-step fashion along property and street lines. The height of the prominently shaded right-angled embankment, a valuable corner lot at the southwest corner of Mission and Beale, shows the amount of fill needed to bring property up to city grade. Horses and wagons can be seen dumping fill to extend Beale.

*Both Views: Courtesy of the Society of California Pioneers*



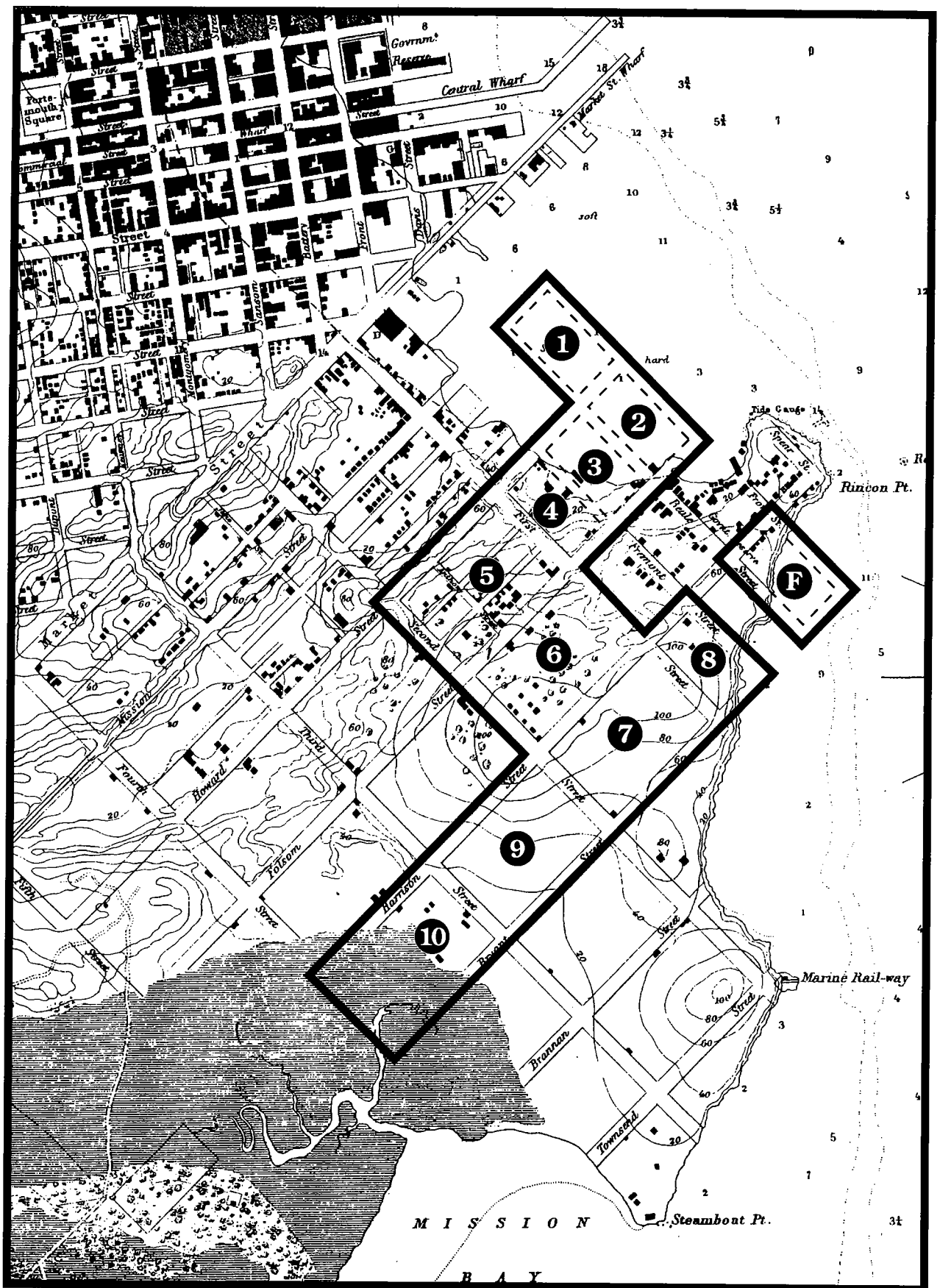
## **BLOCK ONE: Bounded by Beale & Main, Mission & Howard Streets**

### **Summary**

Block 1 occupies what was once part of Yerba Buena Cove; filling began in the early 1850s but was not complete until the late 1860s. From the beginning, Block 1 was developed entirely for industry, starting with **boat-building yards** and **blacksmiths**, and later **iron and brass foundries**, **machine shops**, **planing mills**, and **tool and machinery manufacturers**. Between the 1870s and the 1906 fire, these industries filled many small frame and brick structures on Block 1. After the 1906 fire, the block was rebuilt to house similar metal working industries; gradually, many of these were replaced by **warehouses** and **auto garages**, beginning in the 1920s. As a result of the dense concentration of metal working industries on Block 1, virtually the entire block may be presumed to have relatively non-hazardous residues from the ferrous metals industries; potentially more hazardous industries have been located scattered throughout the block, such as **plating works**, **asphaltum works**, **brass foundries**, and **painting shops**. All of these industries were located on small, discrete sites; these sites are shown shaded in red on the Block 1, 1887, and 1913/29 Sanborn maps, following pages 11 and 17. There were no extensive large-scale industries on Block 1.

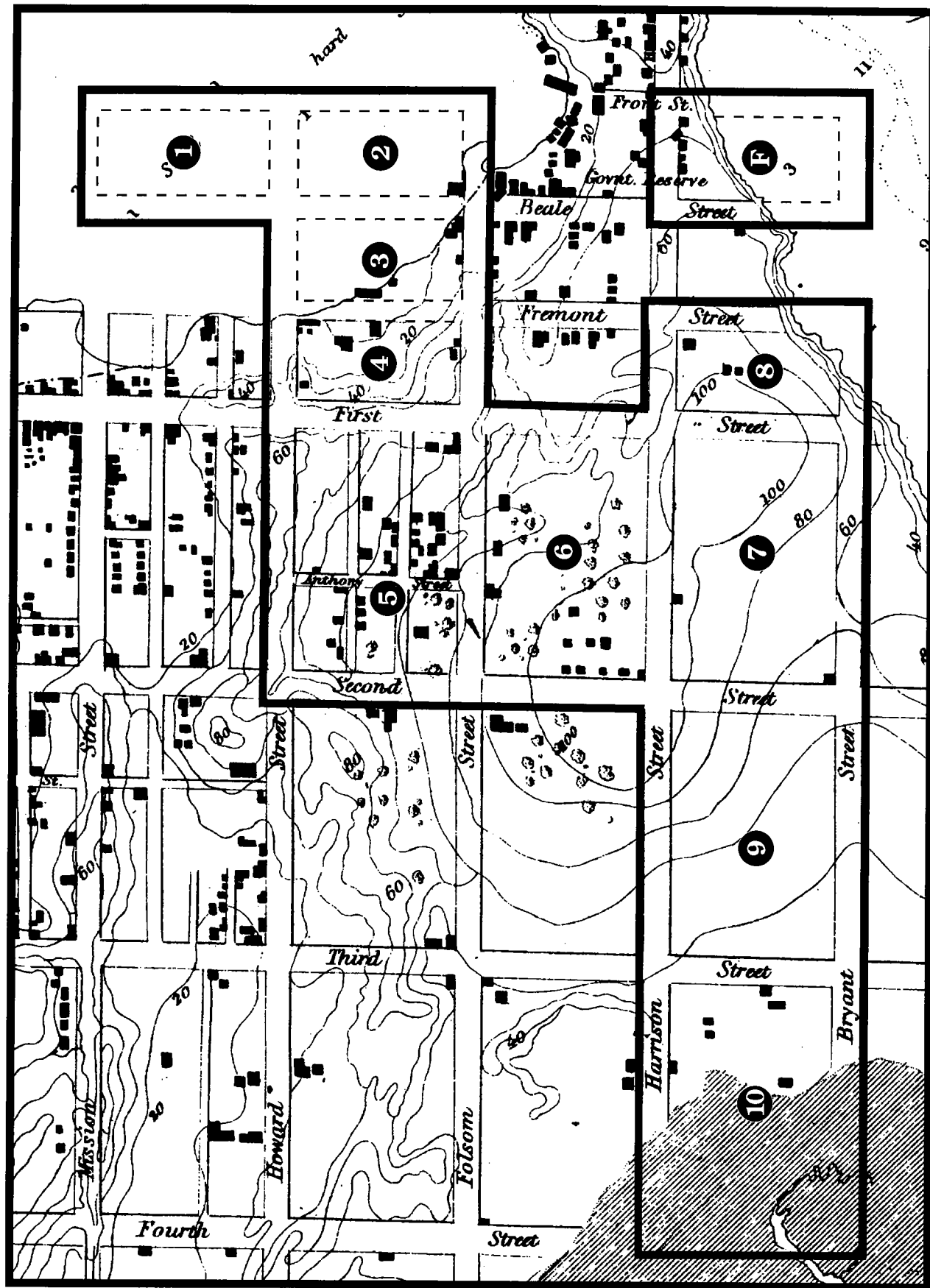
### **Topography and Filling**

Originally entirely submerged under the waters of Yerba Buena Cove, filling of Block 1 began in the early 1850s and was completed circa 1869-1870. (A Muybridge photographic panorama made about 1870, shows most of the industry in place on Block 1; however, a coal yard further south, still had planked floors over pilings, indicating on-going filling.) The 1852/53 U. S. Coast Survey Map on the following page shows that the depth of water at low tide was only one foot, with a sandy bottom. By December, 1854, filling had begun, progressing southwards from the north end of the block, as seen on Plate 4, opposite: Mission Street had been filled as far east as Main, and Beale Street extended as a mole halfway towards Howard. As can be seen on Plate 3, Main Street had been extended as a double wharf between Folsom and Mission no later than 1854. As the 1857/59 Coast Survey Map shows (following page 10), the double wharf of Main Street was built on the privately owned water lots flanking the actual street reservation: an innovation designed to allow for easy filling of the street proper, though in fact the actual street would not be filled in until after 1867.



Map 5a: San Francisco, 1852/53 with SF-480 Terminal Separation - Toxic Study Area Outlined (U.S. Coast Survey)





Map 5b: San Francisco, 1852/53 Detail with SF-480 Terminal Separation - Toxic Study Area Outlined  
(U.S. Coast Survey)

Comparing the 1857/59 Coast Survey Map with views drawn in 1854, it is evident that after the initial spurt of filling during the years 1852-54 (concomitant with a speculative boom in property values) there was little extension of fill during the subsequent real estate bust in 1855-1859. The wagons shown on Plate 4, busily extending Beale Street in 1854 in anticipation of the rapid development of the adjacent water lots would soon be diverted to other tasks: Beale Street would remain uncompleted for almost another decade, while the filling of Howard Street between Beale and Main was not even begun until after 1864. On Plate 7 (opposite page 19), in Gifford's view of that year, Block 1 appears to be still mostly mud except for some structures near the corner of Mission and Beale; a storeship, in the northwest corner of the block parallel to Beale near Mission, which also appears in Plates 2-4, was still the most prominent feature of Block 1 in 1864.

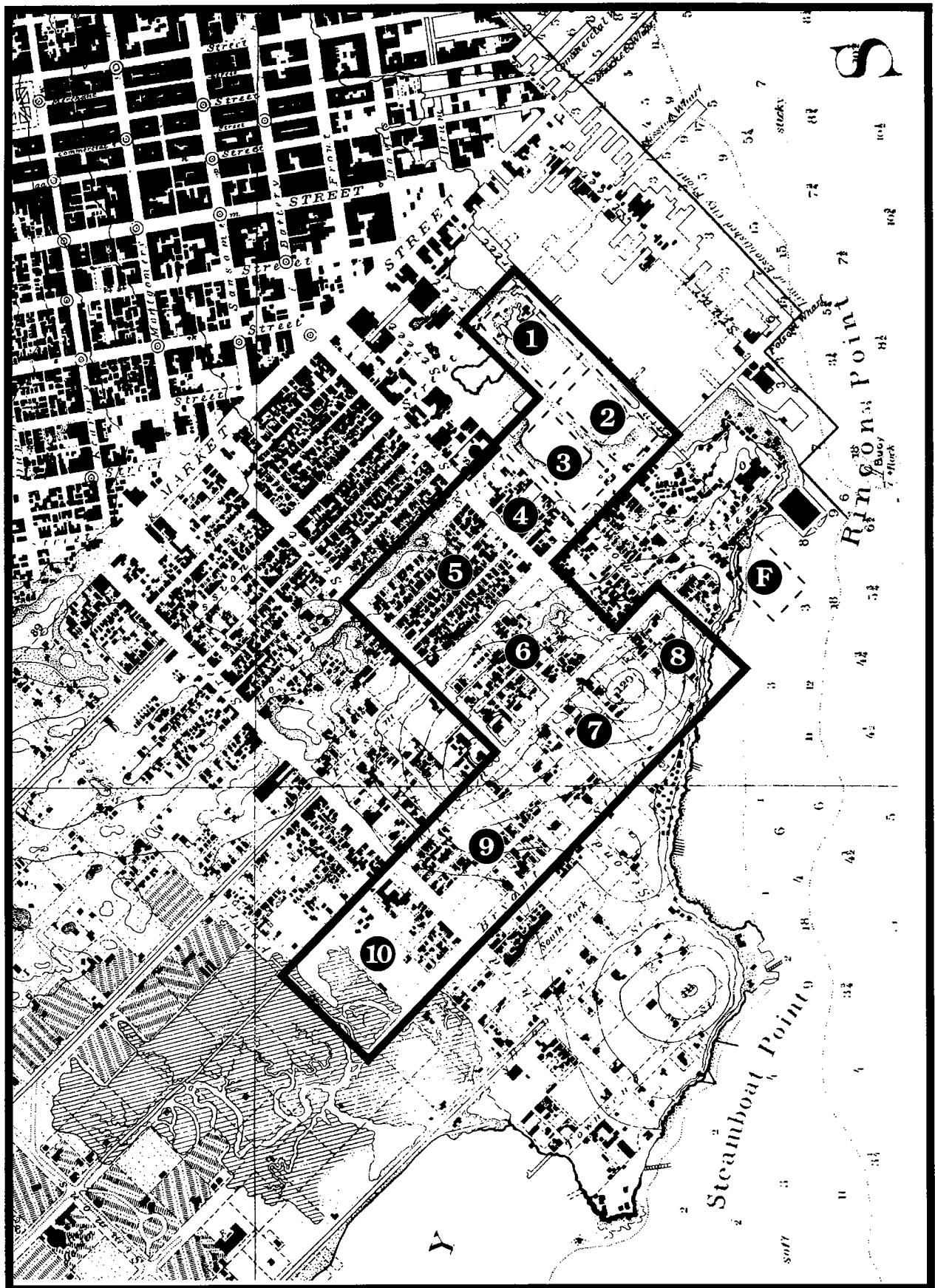
After 1864, with the rapid development of metal working industries to serve the Comstock mining boom, the filling of the block proceeded more rapidly, and the construction of the **Risdon Ironworks** on the adjacent Block 2 in 1868-1869 most probably marks the completion of the conversion of the more landlocked Block 1 to industrial sites.

### **Early Industrial Development, 1850-1860**

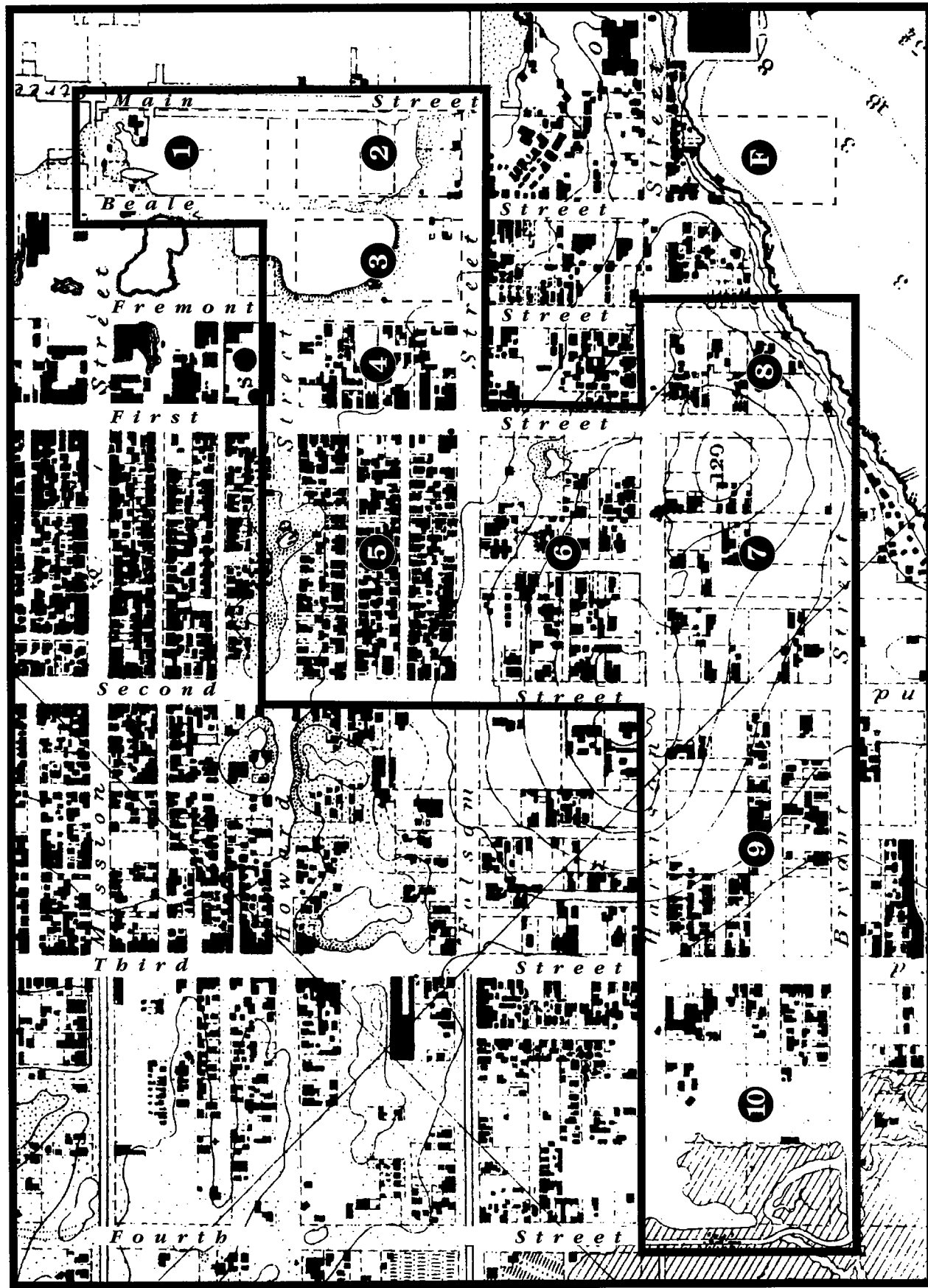
Notwithstanding the slow progress of fill on Block 1, industrial development began by 1854 with the establishment of several small **blacksmith shops** along Mission and Beale streets near their intersection. By the late 1850s, the Beale Street mole attracted **boat-builders**, whose enterprises fronted on the solid street while extending out over the water on piles. These boatyards were gradually converted into **blacksmith, wagon, and carpentry shops** as the filling along Main Street removed their access to the bay. Along both Beale and Main, these small industries were concentrated at the north end of the block, and did not extend far south past Mission until after 1860.

Potential for hazardous materials contamination from these enterprises is consonant with their size: although any wastes that they did produce, in the way of waste paint, varnish, and metals, was undoubtedly dumped in the convenient mudflats beneath or behind them, the quantities were small and the wastes mostly non-hazardous and non-persistent.

The greater potential for hazardous materials contamination during the 1850s was from the effluent from the **San Francisco Gas Company** works, located at Howard and Fremont streets. Although the effluent was directly discharged onto Block 3, the tar effluent may be presumed to have reached Block 1 by way of Block 2 through tidal action. Block 1 was certainly considered to be part of Tar Flat by contemporary observers. Indeed, the slow pace of



Map 6a: San Francisco, 1857/59 with SF-480 Terminal Separation - Toxic Study Area Outlined (U.S. Coast Survey)



Map 6b: San Francisco, 1857/59 Detail with SF-480 Terminal Separation - Toxic Study Area Outlined  
(U.S. Coast Survey)

development of Block 1 after the initial spurt of filling in 1853-1854 may be related to pollution from the gas works--only purely industrial enterprises, of which there were a limited number at that time, could ignore the environment of Tar Flat; commercial establishments that sought the patronage of the public at large located in more attractive precincts (see page 69 for a fuller discussion of potential gas works contamination.)

### **Industrial Development, 1860-1906**

Thorough examination of Sanborn maps and business directories has indicated that, more than any other block in San Francisco, Block 1 became the concentrated focus of small **foundries** and **machine shops**. Some of these industries operated out of frame or metal clad sheds built on 25-foot wide lots, while others shared larger and more substantial structures. This concentration of smaller metal working shops reached its height during the period from the 1880s to 1906. Tracing the chronology of individual industries on Block 1 presents a very complex picture, with frequent changes in ownership and relocation of the same enterprise on the same block. From the perspective of potential historic contamination, the many small **machine** and **blacksmith shops** may be considered to cover essentially the entire block before 1906. The risk of persistent contamination from these ferrous-metals industries is generally thought to be low. In the case of Block 1, the distribution of these industries therefore suggests an essentially general possibility of minor contamination throughout the block from metal shavings, lubricants, and paint associated with these industries.

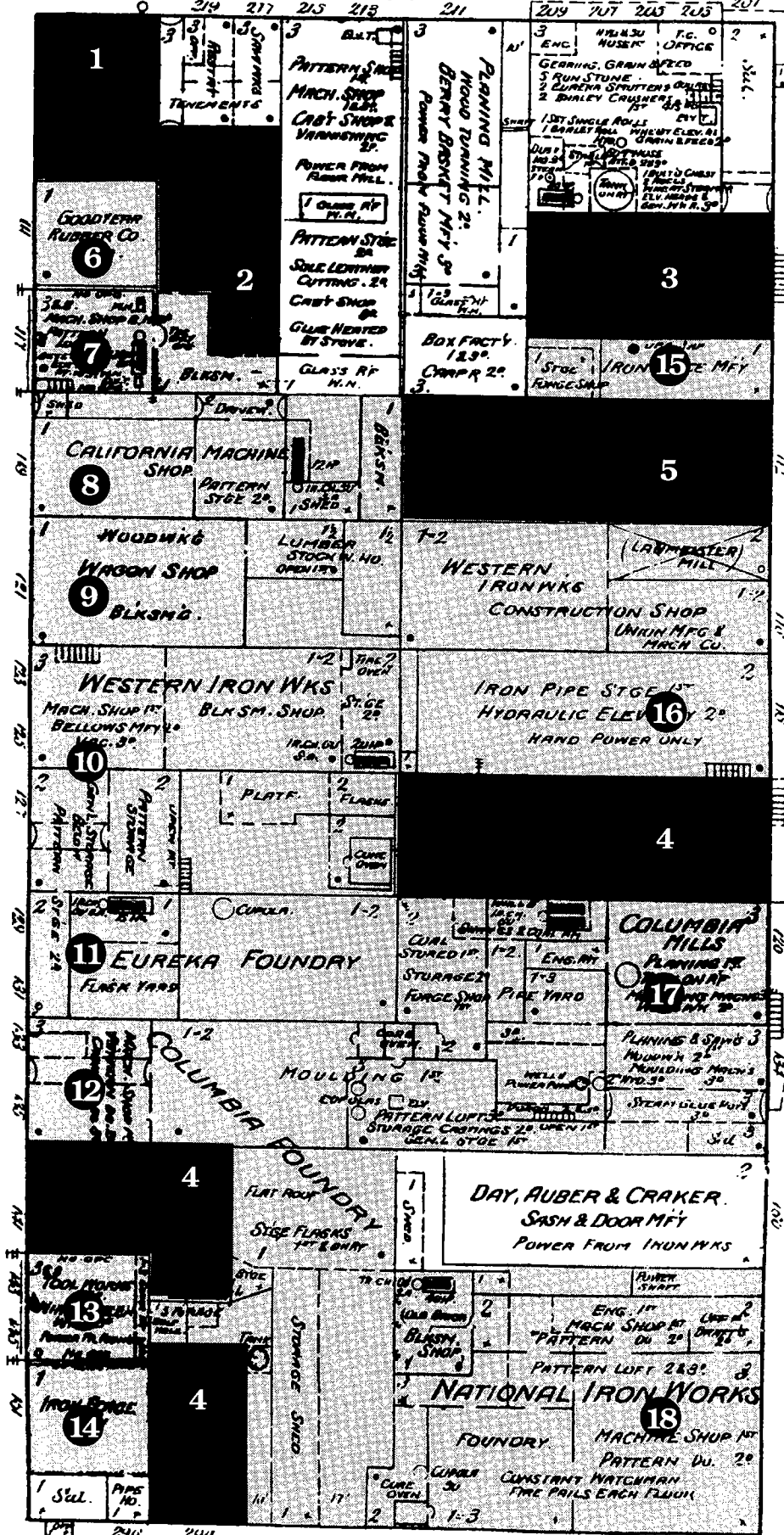
The industrial development of Block 1 began in the vicinity of the corner of Beale and Mission streets, the first part of the block to be filled. Directories from the early 1860s do not give precise street addresses, but three **boat repair** or **ship-building** yards are listed at "Beale near Mission," which are almost certainly on Block 1, since its Beale Street frontage at the time had direct access to the waters of Tar Flat. After the mid-1860s, these boatbuilding operations are no longer listed, indicating that filling of Block 1 had progressed far enough to deprive them of water access. Instead, we see the appearance of two **blacksmith shops** and **carriage makers** located on the "east side of Beale near Mission," one operated by Charles Steinweg, and the other by John Farren in conjunction with a saloon, apparently sharing the same premises.

The earliest industry that can be located by street address is **John Lochhead's Blacksmithing & Engine Building Works**, located at 111 Beale Street from 1862 through 1870. Subsequently, Lochhead's works occupied a one-story frame structure that by the 1880s housed the **Goodyear Rubber Company warehouse** fronting on Beale, with an **asphaltum works** and a **paint-mixing** shed to the rear. Shortly before the turn of the century, the **Golden West Plating**

# MISSION STREET

LAUMEISTER MILL  
FEED & MEAL

NEWPORT BLDG



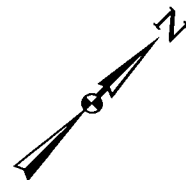
Key to Potential  
Hazardous Materials Sites  
Block 1  
1887 Sanborn Map

Shaded in Red:

- 1: Golden West  
Plating Works
- 2: asphaltum works  
and paint mixing
- 3: Griswold & Berry  
Coach Painters
- 4: Globe Brass  
& Bell Foundry  
(3 sites)
- 5: Joseph Roylance  
Brass Foundry

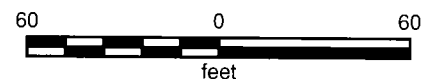
Shaded in Light Red:

- 6: John Lochhead  
Engine Builder
- 7: Schrader Ironworks
- 8: California Bolt Works
- 9: John W. Farren  
Blacksmith & Wagons
- 10: Iron Door & Safe Works
- 11: Eureka Foundry
- 12: Columbia Foundry  
& Atlas Ironworks
- 13: California Tool Works
- 14: Excelsior Ironworks
- 15: iron fence factory
- 16: Hinckle Elevators
- 17: Ohmen Engine Works  
& Machinists
- 18: Marchutz & Cantrell  
National Ironworks



HOWARD STREET

Block 1, 1887 Sanborn Map



**Works** was established at 103 Beale Street, near the corner of Mission, specializing mainly in nickel electroplating, though chromium was also used. Next door to **Goodyear Rubber**, at 113-117 Beale, was the **Cyclops Engine Works**, in operation from 1872 to 1906:

The Cyclops Engine and Machine works, Martial Hainque proprietor, 115-117 Beale Street, [was] founded in 1869 by Tait and Hainque. Hainque became sole proprietor in 1888. He engages in the manufacture and repair of all kinds of machinery, and is sole manufacturer of the patent wood branding and printing press; particular attention is given to repairing, the facilities for which are ample and complete. 35 skillful and efficient mechanics are required, and the pay roll average from 1800-2000 dollars per month. The large three-story building occupied at numbers 115-117 Beale Street was erected in 1877 on the site of the old wooden shop (then occupied by the firm of Tait and Hainque), the first having bought the ground for the purpose....Trade is carried on all over the coast (San Francisco, Its Commerce and Industries, 1889: 187).

As the Block 1, 1887 Sanborn Map on the preceding page shows, the foundry with its cupola furnace was on the ground floor, with the machine shop above, and a pattern loft on the third floor. Before the building was built, **Bruns & Company**, dealers in pig iron, were also listed at 117 Beale. Likewise, by 1905, the premises were shared with the **North Machine Company**, which probably occupied one of the upper floors, and also **Schrader's Ironworks**, which specialized in architectural iron founding, such as fences, railings, elevator cages, and gates; the Schrader works occupied at least part of the ground floor. With the intense concentration of metal working industry on Block 1, multi-story buildings like the **Cyclops Engine Works** frequently shared scarce working space even with competitors.

Immediately to the south of the Cyclops Engine Works, **Birch, Argall & Company Elevator Works** were established in 1878, and continued in operation until the 1906 fire. Elevators had come into use in San Francisco in the 1870s, and were custom-made for the buildings which they were to occupy; by 1906, the elevator manufacture and repair business for the city was largely concentrated on Block 1. William Birch not only made elevators, but also specialized in manufacturing sawmill machinery, and general machinist work. **Birch, Argall & Company** shared the same large, one-story frame building with the **California Machine Works**, at various times known as the **California Bolt Works**, or the **California Bolt & Nut Works**, and operated on a different site nearby until the 1940s as the **Payne Bolt Works**. In contrast to most of the foundries in the project area, the bolt works contained specialized machinery for turning out bolts, nuts, washers, and many other small parts used in larger machinery. To complete the tenants of 119 Beale, John Petty had a **blacksmith shop** there in the 1880s, succeeded by James Manson in the early years of this century; the 1887 and 1899 Sanborn Maps

show that the blacksmith shop occupied the rear of the building, behind the furnaces used to melt the metals used in the bolt works.

**John Farren's Blacksmith & Carriage Works** moved to 121 Beale Street from its site nearer to Mission in 1869 and continued to occupy a one-story frame structure with an open rear yard on that site until 1887, after which the building was used for a **woodworking shop** in the 1890s, and later occupied by **William Jenkins' Machine Shop** immediately before the 1906 fire.

The lot at 123-125 Beale was first occupied by **William Lynch's Stove Works** in 1871-72; Lynch manufactured heat reflectors for stoves out of sheet metal. By 1873, the site was the address of **F. I. Curry, Boilermaker**, who specialized in boilers for marine engines, mines, and lumber operators. **Bigelow, Sims & Morris Iron Door Works**, established by 1878 by John R. Sims, constructed a large three-story masonry building on the site, and manufactured iron fire shutters for brick commercial buildings until 1886, together with safes and strongrooms. The **California Bellows Manufactory** occupied the second floor of the building, while **pattern makers** and **machinists** used the third floor at different times in the 1880s and 1890s. In 1886-1887, the **Bigelow, Sims & Morris** firm was renamed (or acquired by) the **Western Ironworks**, while continuing to specialize in architectural iron work and bank vaults. It continued in operation in expanded premises until well after 1906.

At 127 Beale Street, James R. Smedberg had set up in business in 1878 as an engineer and contractor, specializing in the design and construction of gas works; by the 1880s the address had been taken over by the **Thompson Brothers' Eureka Foundry**, with a two-story structure on Beale Street used for pattern storage, and a large rear yard with a core oven located in a second two-story structure at the rear of the lot. The **Eureka Foundry** was first established by Thomas and Thornton Thompson in 1868 at 129-131 Beale Street, occupying a two-story building, probably of frame construction, with an open flask yard in its center for storing molds. The foundry undertook general iron founding, but particularly advertized iron shutters and doors. It remained in operation up to 1906 on the 127-129 Beale Street premises:

The Eureka Foundry was established by Thomas and Thornton Thompson brothers in 1868 on the site of its present location, at 129 and 131 Beale Street, and was owned and conducted under the same proprietorship until the death of Thornton Thompson in March, 1886, since which Thomas Thompson has had sole management. The Eureka Foundry uses from 500 to 600 tons of pig and scrap iron per annum, which is manufactured into castings of all kinds, largely order work. This foundry has for many years done an extensive business in casting for gas works, and now has the lead in that line of work in San Francisco. The Eureka also has a large run of custom work for various machine shops of the city, some of whom have been its regular patrons for twenty years. Mr. Thompson being an expert molder with forty five years experience, gives his personal attention to the



business, and under his efficient management the Eureka Foundry has earned a proud reputation for first class work, and is doing a prosperous business. It now employs thirty skilled men, and has the capacity for making every size and style of casting. [The Bay of San Francisco, 1904, vol 1: p 693]

Adjacent to the **Eureka Foundry** and extending to Howard Street through the interior of the block, the **Columbia Foundry** and the **Atlas Ironworks** co-occupied an L-shaped site excluding the corner of Beale and Howard, and were in operation from circa 1869 until 1906; although primarily an iron foundry, it also included a brass foundry, shown highlighted in red on the Block 1, 1887 Sanborn Map. At 147 Beale, in a three-story masonry structure, the **California Perforating Screen Company** manufactured specialized screens for quartz and flour mills, and all types of perforated metal and piano strings.

Located next to the **Columbia Foundry** on Howard Street, and occupying the southeast corner of Block 1, the **National Ironworks** made a specialty of boiler and engine manufacturing, producing a number of small railway locomotives and donkey engines for logging. The **National Ironworks** were established circa 1880 and occupied the site until 1906; previously, the corner had been occupied by a planing mill beginning in the late 1860s.

Moving north along Main Street, the eastern half of Block 1 was developed somewhat later than the Beale Street frontage, and with a different industrial pattern. Aside from the **National Ironworks** at the corner of Howard, most of the block was occupied by **planing mills** and woodworking establishments, beginning with **Day, Huber, & Craker, Sash and Door** immediately next to the **National Ironworks**, which received mechanical power from an engine in the ironworks. In the early 1890s, the **National Ironworks** expanded into this space, and continued to occupy the full corner lot up to 1906. Next door, a large three-story masonry building, constructed in the early 1880s at 130-136 Main Street, housed a number of different manufactories, including **machine shops** on its ground floor, with **planing mills** and **shoe and leather working** shops above. The main tenant of this structure was the **Joseph Wagner Manufacturing Company**:

The Joseph Wagner Manufacturing Company, whose works are located at numbers 134 and 136 Main Street, in San Francisco, is one of the largest manufacturers of flour mills and milling machinery in the United States, and the only one in this line existing on the Pacific Coast.

The original founder of the business of this company was Charles F. Travis, about twenty five years ago. Travis was soon joined as a partner by Joseph Wagner, who afterward became the sole proprietor. While the business was in a prosperous condition, the entire plant was destroyed by fire, involving a heavy loss, but a new building was speedily erected and equipped with the best

machinery and appliances for carrying on the business of making machinery for and building flour, feed, and meal mills. The company is constantly supplying mills to different localities in California and other American states and territories on the Pacific Coast, as well as Mexico, Central and South America, British Columbia, Japan, China, Siberia, Australia, and New Zealand, varying in capacity from 2500 to as low as 25 barrels daily. Among the specialties manufactured by this company are the Wagner Wheat Roller Mills, and Wagner Feed Rolling Mills, and Wagner Sliding Scalpers, Wagner Flour Dressers, Wagner Centrifugal Reels, Wagner Quartz Purifiers, and a full line of all classes of machinery required to manufacture flour, feed, and meals. The factory gives employment to an average of one hundred men.

Brass foundries also located on Main Street from the mid-1870s. The most successful of these, **Globe Brass & Bell**, was established by Whyte and DeRome at 292 Howard Street in the early 1880s on a site which was later incorporated into the **Columbia Foundry**. **Globe Brass & Bell** moved to 120 Main Street in the late 1880s; it moved once again to 128 Main Street in the 1890s, and was rebuilt there after the 1906 fire (Plate 22 opposite page 66).

Globe Brass and Bell Foundry [was] established by Louis De Rome and Neil C. Whyte, one a San Franciscan from four years of age, the other a native son. They both grew to manhood and learned their trade in the Pacific metropolis, Mr. De Rome being the pioneer brass founder in business who learned the trade on this coast. Mr. Whyte is a practical machinist. In 1880 they entered into partnership, and without capital other than brains, energy, and mechanical skill, started the nucleus of the above foundry, in the lower floor of John Center's windmill house, on 16th Street, their entire premises being about twenty five feet square. Their industry, energy, and skill soon placed them on the road to prosperity; and at the end of the first year they decided to move downtown, renting a small shop about thirty by forty feet at 292 Howard Street. The rapid growth of the business necessitated several enlargements during the next two years, and at the end of that time the firm leased an L to the same building, which fronts on Beale Street at number 137. Here they continued with a steady increase of business until 1881, when the great fire which swept down Beale street, and through to the bay, opened up an opportunity for them to lease the site upon which the Globe Brass and Bell Foundry is now situated. Securing a long lease of the ground at 126-128 Main Street, the proprietors erected a substantial brick building with three stories and basement, 45 110/12 by 137 1/2 feet. The front is devoted to office and machine shop, the rear to the brass and bell foundry. Possessing a thorough knowledge of the requirements of their business, they built and equipped the foundry in the best manner, and have the finest and most complete brass foundry on this coast. They are importers of phosphor bronze and ingot metals, and they manufacture all kinds of castings: copper, bronze, brass, zinc, white metal, aluminum bronze, gun metal, church and steamboat bells and gongs, brass work

for cars and ships, and do a general jobbing, making a specialty of manufacturing propellers and other heavy castings. The heaviest and most difficult bronze and brass work ever produced west of the Rocky mountains have been turned out by the Globe Foundry (The Bay of San Francisco, 1904, vol. 2: 353)

In addition to brass and bronze castings, Whyte and DeRome also carried out nickel plating, and all three of its sites on Block 1 have accordingly been shaded in red. From the late 1880s, the **Joseph Roylance Brass Foundry** was located nearby at 114 Main Street; it remained in operation until 1906. The **Roylance Brass Foundry** was already a substantial operation in 1889, despite the small premises it occupied:

This business was founded about ten years ago and has acquired a position of great influence and importance....formerly at 411 1/2 Mission Street, [it] now occupies a two-story brick structure at 112 and 114 Main Street. The ground floor contains the office, salesroom, and foundry, while the second story constitutes the brass works...[containing] complete equipment of all essential machinery and devices to facilitate the operation of work. About 60 skilled men are regularly employed. This concern engages in the manufacture of plumbing, steam, and water brass goods, and castings of every description, globe valves, angle, check, patent gate, safety, and gate valves; service, steam, and hose cocks, compression work, hose pipes, coupling, and x steam cocks. Fuller [hammered] work and plated goods are a specialty....The trade is carried on all over the Pacific Coast and the volume is steadily increasing. (The Industries of San Francisco, 1889)

Even this brief description of the **Roylance Brass Foundry** gives us an idea of the intensity of industrial activity on Block 1. Although the works are simply listed in business directories under brass and bell founding, the fact that plating was also carried on and not separately listed shows that plating was so commonly associated with brass founding that a separate listing was not thought necessary.

**Paint stores** were also located on Main Street at least as far back as 1875, when **Griswold & Berry Coach Painting** was briefly established at 110 Main Street; the site was thereafter used by **John Jung's Iron Fence & Door Works** for at least the next ten years. **Robert Mills' Stained Glass Works** were located nearby at 118 Main Street in the mid-1870s; Mills specialized both in cut glass for doors and ornamental windows, and painted glass which contemporary taste preferred for church windows. Also during 1870s, William O'Day and later Henry W. Carson operated a **paint and varnish store** at 120 Main Street, in a building that had previously housed the **Deacon & Bulger Machine Shop & Pump Works**, and would subsequently be one of the several locations of the **Globe Brass & Bell Foundry**.

## Industrial Development after 1906

Most of Block 1 burned in the 1906 fire, although the southeast corner site of the **National Ironworks** did not [Map of the Conflagration in San Francisco, National Board of Fire Underwriters, 1906]. Even on the part of the block that did burn, the brick shells of several buildings, such as **Globe Brass & Bell**, survived and were quickly restored to meet the immense demand that the destruction of the fire engendered [photograph at the Bancroft Library]. The other buildings which appear to have partially survived the fire were the three-story machine shop at 143-145 Beale Street, and the three-story machine shop of the former **Eureka Ironworks** at 133-135 Beale. In the case of both of these masonry buildings, the 1913 Sanborn Map appears identical to the 1899 Sanborn Map, indicating a high likelihood of structural continuity.

Reconstruction of Block 1 was not immediate; the 1913 Sanborn Map shows many vacant lots, especially along Main Street, but by 1929 there were still few empty spaces left. Some of the same enterprises rebuilt on their pre-fire sites, but the block never again attained the intensity of small-scale industry that had characterized it in the three decades before the fire. None of the planing mills and woodworking shops were rebuilt. Instead, the larger enterprises expanded their premises; the **Western Ironworks**, for example, expanded to an L-shaped site extending across the entire depth of the block between Main and Beale.

Soon after the fire, and continuing until the 1940s, the corner of Beale and Mission streets, with the street address of 101-117 Beale, was occupied by a **sheet metal works**. At 119-121 Beale, a two-story building housed a **machine shop** up through the 1920s, after which it appears to have been used for storage. Next to it, at 129-131 Beale, a **brazing works** occupied a one-story frame building, with a **machine shop** adjacent. Both of these structures were demolished in the early 1920s for a pair of **auto garages**.

The **Western Ironworks** occupied a single large one-story, wood-floored frame building extending across to Main Street; this building was built as a temporary structure right after the 1906 fire, but continued to house the **Western Ironworks** until the 1950s, though it would appear that the firm was increasingly a wholesale ironworks, specializing in ready-made structural steel and architectural ironwork. It did not contain a foundry furnace after it was rebuilt following the 1906 fire.

The **California Ironworks & Krogh Manufacturing Company** was located at 147-149 Beale, in a large rectangular frame building with a wood and earth floor; it specialized in structural ironwork. Adjacent to it, the **Joseph Wagner Manufacturing Company** was located in the three-story brick building which had been built for the **Columbia Foundry**, and was rebuilt after the fire. Wagner specialized in making flour mill machinery; other **machine shops**

# MISSION STREET

Key to Potential  
Hazardous Materials Sites,  
Block 1  
1913/1929 Sanborn Map

Shaded in Red:

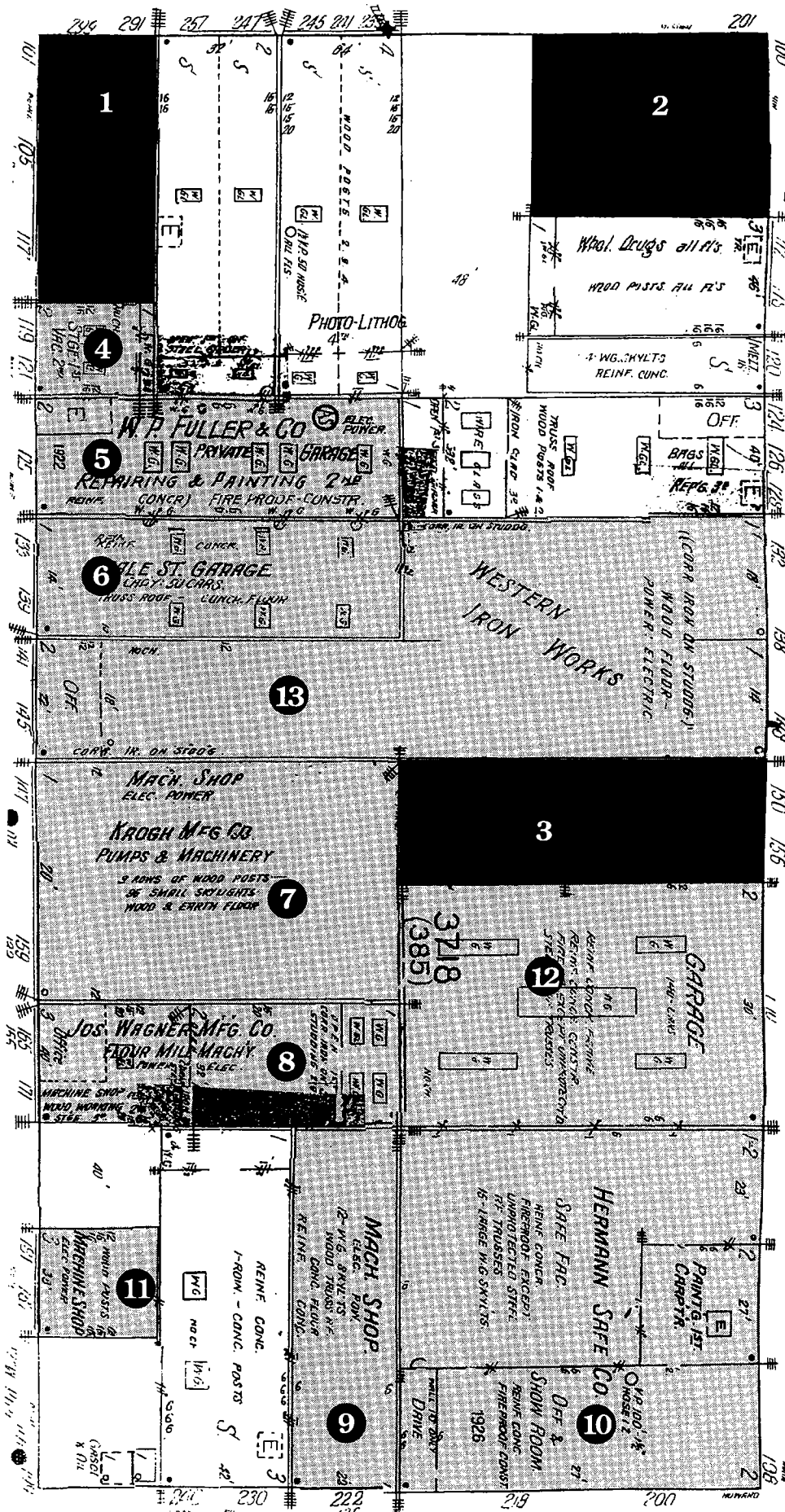
- 1: Blakeway Sheet Metal Works
- 2: gas station
- 3: DeRome Bronze, Brass, & Bell Foundry
- later,  
Shell Company  
Sign Making & Painting

Shaded in Light Red:

- 4: J.F. Mitchell Machine Works
- 5: David P. Co. Ironworks
- 6: San Francisco Welding & Brazing Works
- 7: Krogh Manufacturing Co.
- 8: Joseph Wagner Manufacturing Co.
- 9: machine shop
- 10: Fred Ward & Son Machine Tools
- later:  
Hermann Safe Co.
- 11: California Tool Works
- 12: Goines' Garage (auto repair & storage)
- 13: Western Ironworks

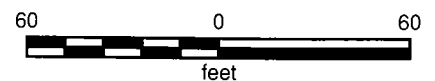
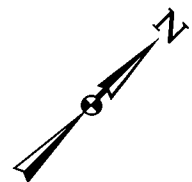
BEALE STREET

MAIN STREET



HOWARD STREET

Block 1, 1913/29 Sanborn Map



occupied the upper floors of the building. A **machine shop** occupied another surviving part of the **Columbia Foundry**, standing isolated at 181-187 Beale. Finally, the corner lot at Beale and Howard appears to have been occupied from the 1920s through at least the 1930s by a **gas station**. The entire southwest quadrant of the block, containing these buildings, was levelled for the construction of the curving bridge railway viaduct in the late 1930s, which is still standing.

At 200-220 Howard, occupying the corner of Howard and Main, the **Moore & Scott Ironworks** was not burned in the 1906 fire, and continued in operation up through the mid-1920s. The complex contained the foundry in a one-story, earth-floored frame structure at 220 Howard, while the corner lot contained a two-story wood-floored building with a machine shop on the ground floor, and pattern loft above. In 1926, this site was taken over by the **Hermann Safe Company**, one of the largest safe factories on the West Coast, which constructed a two-story concrete building to house facilities for manufacturing, repairing, and servicing safes, together with corporate offices and showrooms. Hermann Safe remained in operation until the 1950s.

At 170 Main Street, the large rectangular lot remained vacant until the 1920s, when a large two-story concrete **parking garage** was constructed on it. The next enterprise north on Main Street was the **Globe Brass & Bell Foundry**, which quickly re-occupied its fire-gutted premises in 1906, and remained in operation until circa World War I, when it became the **Shell Company Sign Making & Painting Shop**--which still occupied the old, earth-floored building as late as 1948. This site has been shaded in red on the Block 1, 1913/29 Sanborn Map for both of these industrial uses. The foundry proper occupied the rear of the building, near the center of the block, and was earth-floored; to the front was the machine shop.

Immediately beyond the brass foundry was the Main Street frontage of the **Western Ironworks**, while beyond that, at 124-128 Main Street was a **coffee and spice warehouse**, with a **wholesale liquor store** at 112-118 Main which became a **wholesale drugstore** during prohibition.

The Mission Street frontage of Block 1 was rebuilt with several **ship chandlers**, the **sheet metal works** at the corner of Beale, mentioned above, and a **gas station** at the corner of Main.

The southwest quadrant of Block 1 was cleared in the late 1930s for the construction of the elevated approaches to the Transbay Terminal; the remainder of the block was demolished for the construction of SF-480 in the mid-1950s, after which the surface area between the highway ramps was turned over the Southern Pacific for its downtown **railroad freight terminal**, relocated at that time from Block 2. Because the railroad yard was paved and used for automobile parking and a diminishing amount of railroad activities, it is less likely to pose a potential for hazardous materials contamination than its predecessor yard on Block 2.



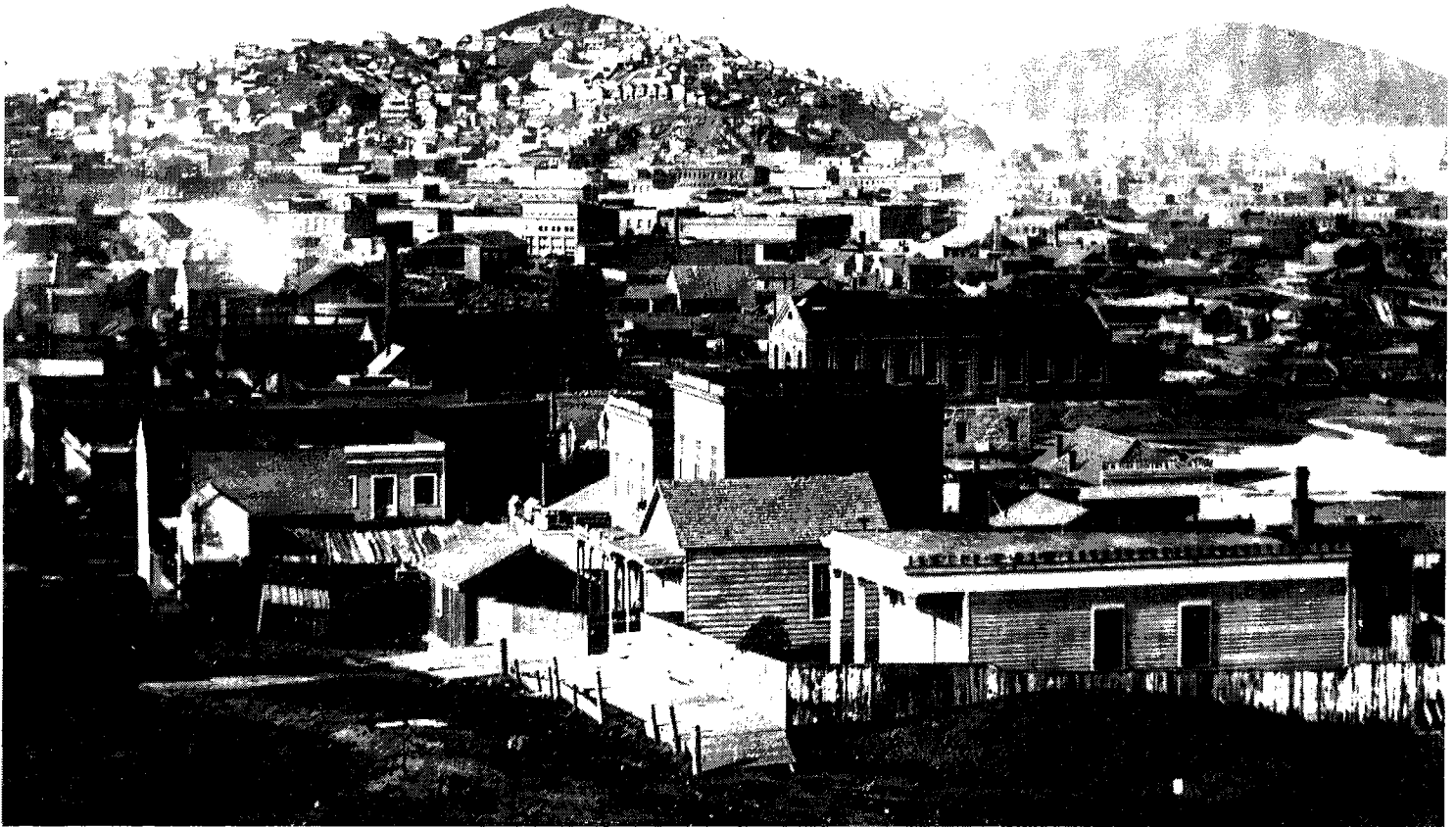
**Plate 5: Views from Rincon Hill, 1855 . . .** This meticulous drawing shows that although filling has progressed, blocks 1 and 2 remain largely water, while the completion of Beale Street has mostly enclosed Block 3. Drawn from Block 6, the complete view, of which this is the eastern portion, encompasses a 180 degree view.

Folsom Street bisects the center of the view with the same elevation that it has today. When this view was made, property bordering the north side of Folsom Street on blocks 3-5 was not as high as the street, and the area between Folsom and Clementina north of 1st Street was a fairly deep declivity.

Industrial development is marked not only by the new gasworks smokestack at left, but also by the chimney of a foundry on Block 4, on the site of the later Miners' Foundry.

Examination of the details of the original color lithograph shows some light industry, probably small boat building operations, along Beale Street near Mission on Block 1, while Block 2 remains entirely water. The southern end of Block 3 has been filled but is as yet unoccupied except for a few small houses, though Beale Street appears to have been completed between Mission and Folsom. 1st Street marks the clear division between industrial and residential land use that was to remain largely unbroken until the 1906 fire. No industries appear in the original view within the project area west of 1st Street.

*Courtesy of the Bancroft Library*



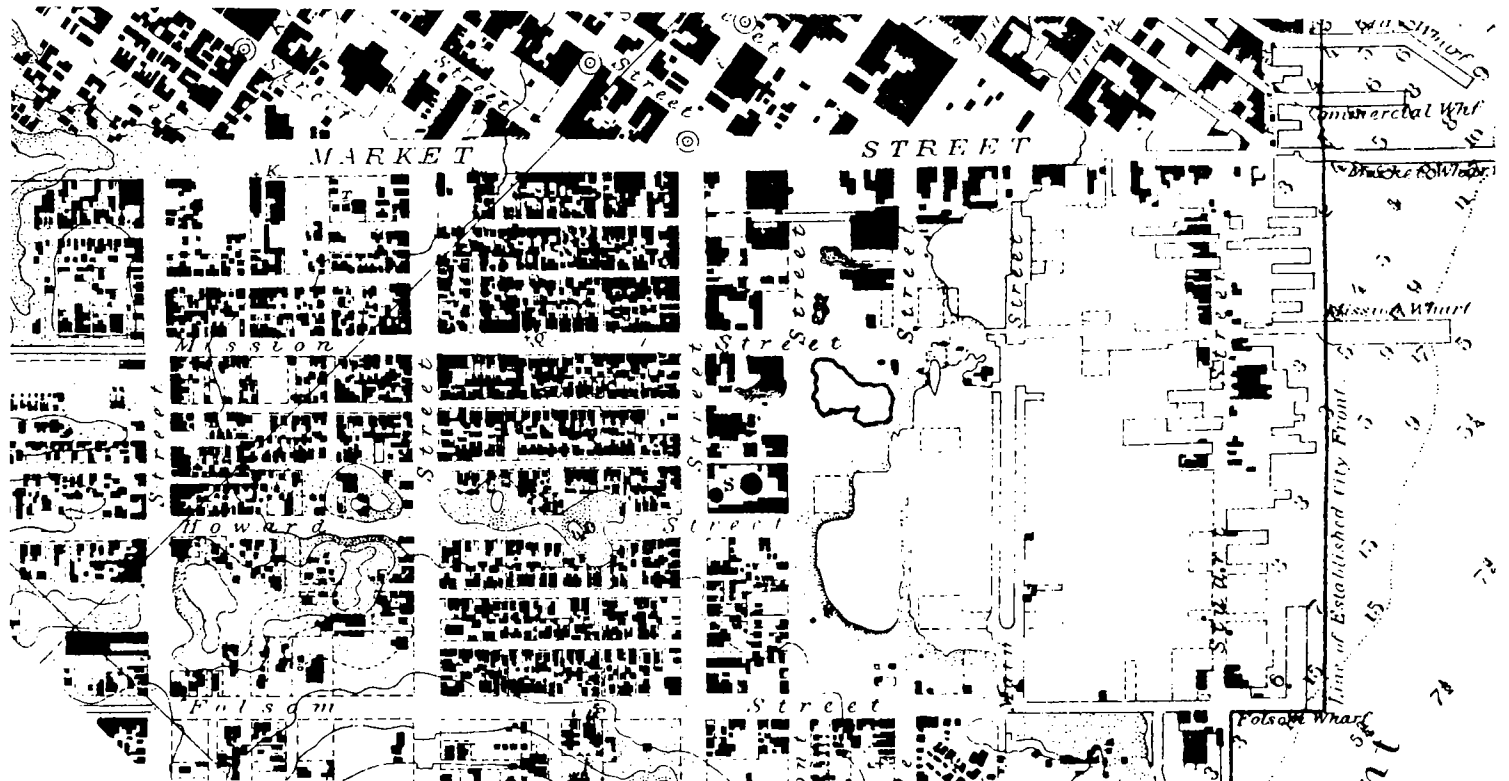
**Plate 6: Looking North from First & Harrison, 1856 . . .** A closer look at Tar Flat at low tide, taken from the promontory at the intersection of First and Harrison streets. In the portion reproduced on the left, the San Francisco Gas Works includes the large buildings along Howard, on either side of Fremont Street, adjacent to the present Transbay Terminal. The giant gas holder and smokestack are just visible on the left. The second gasworks building fronts on the north side of Howard, east from Fremont. The open mudflat in front of this structure is Block 3, with an outfall ditch for the gasworks at the right, where tar byproducts were dumped into the bay.

In the continuation of the same photograph to the right, we can discern the progress of fill and the beginnings of industry on Block 1. The same storeship, near the corner of Mission and Beale, that appeared in previous views surrounded by open water, provides a reference point to the developing light industry along Beale Street. The large shed structure to the south of the ship is part of the boat building and blacksmithing activities listed in contemporary business directories, and forms the only substantial area of solid fill on the block. A number of boat repair shops appear near it. City directory information places several shipwrights, boat builders, ship joiners, and carpenters at "Beale near Mission" or "Main near Mission " from 1861 through 65. From this view, it would appear that they were at work on Block 1 as early as 1856.

Though obscured by the houses in the foreground, Block 2 presented a similar aspect, except that only a small area along Folsom Street had any development at all. As can be seen, the Main Street Wharf was an open structure that did allow for tidal action, although some views show mud building up along the base of the wharf. The more substantial wharves along Stuart Street were extensive, and served as the foundations for numerous structures, whose refuse could conveniently be disposed of directly into the bay.

On the opposite page, the 1857/59 Coast Survey Map information lags behind the expansion of the gas works. Locate the round gas holder on Howard near First: what is shown as fenced fill on the map has become the site of the second gasworks building extending east of Fremont Street. The isolated storeship near the corner of Beale and Mission has the customary Coast Survey symbol for a permanently moored ship.







**Plate 7: Detail from Gifford's View of San Francisco, 1864 . . .** Gifford made this remarkably accurate view of San Francisco hypothetically, as if seen from a balloon, but it is very accurate and individual buildings are carefully delineated. The detail shown includes the entire SF-480 Project Area. Market Street is the wide street to the right. The storehouse that appeared in earlier views is clearly shown. Blocks 1 and 2 are still mostly unfilled mudflat with little industrial activity, and Main Street is still shown as the long wharves that they were in 1855. The southern part of Block 2 shows some structures and development, and a possible coal yard at its southwest corner. Block 3 remains part mudflat and part fill along Folsom Street.

The San Francisco Gas Works are clearly visible on Howard Street, just across from Blocks 3 and 4, but the Selby Shot Tower would not be in place until early next year, in 1865. Smoke billows up from First Street foundries. Rincon Hill is prominent and appears completely developed with residences.

Most important, this 1864 view confirms our understanding that Tar Flat was not filled--more than a decade after initial filling had begun.

*Courtesy of the Bancroft Library*

## **BLOCK TWO: Bounded by Beale & Main, Howard & Folsom Streets**

### **Summary**

Block 2 was the last of the project blocks in Tar Flat to be filled and developed; like Block 1, it was devoted entirely to industry, but instead of numerous small foundries and machine shops, Block 2 was dominated from the late 1860s to the turn of the century by the **Risdon Ironworks**, one of the largest and most successful foundries in San Francisco, and the first to be planned from the start as a large integrated operation. The Risdon works specialized in producing very large riveted pipe, boilers, marine engines, and mining dredges. The **Risdon Ironworks** occupied most of the north half of Block 2; on the south half of the block, the **Pacific Rubber Paint Company**, a branch of **Pioneer White Lead**, occupied a large warehouse structure on Folsom Street that survived the 1906 fire and was not demolished until the construction of SF-480 in the 1950s. Smaller industries on the block included **brass foundries**, **plating works**, and **machine shops**. After the **Risdon Ironworks** moved to the Potrero district before the 1906 fire, most of the north end of the block was vacant, and later occupied by a **Southern Pacific Railroad freight yard**.

Each of these industries has some potential for hazardous materials contamination. Because the **Pacific Rubber Paint** building was not used for manufacturing the hazardous raw materials of paint, but rather for mixing and storage, and since it did not burn in the 1906 fire, the probability of contamination from its operations may be seen as much lower than those of **Pioneer White Lead** on Block 3. As is the case of Block 1, successive metal working industries activities cover essentially all of the remainder of Block 2.

### **Natural Site and Filling**

Like Block 1, Block 2 was originally entirely part of Yerba Buena Cove, as can be seen on Plates 2 and 3 (following page 8). On Map 5, the 1852/53 Coast Survey Map, Block 2 is shown to have had a depth of approximately one foot at low tide. A comparison of Map 5 and Plate 3 shows that filling began along the shore south of Folsom Street. By the time the map was surveyed, the first structure on Block 2, a two-story frame commercial structure built on piles out over the water, had already been erected at the corner of Folsom and Beale, a building that appears also in Plate 1 and serves as a convenient point of reference.

By the time that Map 6 was surveyed in 1857, the south end of Block 2 had been filled in, and two more small structures had been constructed along its Folsom Street frontage. The

Main Street double wharf had been constructed, flanking the current alignment of Main Street, and additional water lots demarcated by rows of pilings. Some efforts had been made by 1857 to fill in Beale Street, but thus far only a partly submerged mole extended north towards Howard Street.

Business directory research has revealed that the northern part of Block 2 remained unfilled for most of the ten years between 1857 and 1867. Plate 7 shows this graphically, with most of the block, except for its Folsom Street frontage, remaining as a mudflat in 1864, and no fill at all along Main Street. Plate 8 (following page 35) indicates that the Main Street wharf was still in use as late as 1867.

The long delay in filling Block 2 reflected contemporary land use patterns. Because the initial natural site was too shallow to allow for the entrance of any but the smallest vessels, except at the highest tides, the development of wharves along Main and Stuart streets was carried out early on to provide wharfage for mid-sized vessels. The wharves also made a thoroughfare to shipbuilding ways and deepwater port facilities constructed off Rincon Point beginning in the mid-1850s. Contemporary views show that these wharves led to a buildup of mud and debris along their piles, impeding tidal action.

The construction of the **San Francisco Gas Company Works** in 1854, and the resulting continual discharge of coal tar into the mudflats of blocks 1-3, made the filling of the privately owned water lots on these blocks contingent upon the demand for industrial sites. Noxious pollution from the gasworks made the location of Tar Flat unattractive to residential or general commercial uses. Block 1 had the advantage of access to Mission Street and the most developed portion of the city, and was filled beginning at its north end, but Block 2 was accessible only via the Main Street wharf and Folsom Street, and was much less convenient.

The filling of Block 2 appears to have been accomplished mostly for the purpose of building the **Risdon Ironworks** in 1867-1868. By that time, Block 2 was the only large site still open for development within the foundry district of Tar Flat. Organized from the start as a joint stock company, the **Risdon Ironworks** was large enough to invest the necessary capital in acquiring its site and filling it up to street grade.

Although the early filling of Block 2 along Folsom Street used sand from the bluffs of Rincon Point, the later fill used to create the site for the **Risdon Ironworks** may well have originated elsewhere. By the mid-1860s, street grades in the general area were mostly well-established, and Rincon Hill was a developed area. As a result, much of the fill on Block 2 may have origins from outside the project area.

### Early Industrial Development, 1850-1860

There do not appear to have been any substantial industries located on Block 2 prior to 1860, and any development was limited to small commercial structures, and possibly some **boat building** or **boat repair** activity. The main source of potential historic hazardous materials contamination from this period arises from the **San Francisco Gas Company Works**, which discharged tar waste onto Block 3 and onto Block 2, beginning in 1854 and continuing until Block 2 was entirely filled in after 1867, at which time the discharge pipe was relocated east of Main Street.

### Industrial Development, 1860-1906

The earliest industry that can be located on Block 2 with certainty is Life C. Watts' **shipbuilding yard** at 235 Beale Street, in operation in the mid-1860s. The address of Watts' boatyard appears, on the Block 2 1887 Sanborn Map, to be the same as the early commercial building on the corner of Beale and Folsom, which also housed a saloon, billiard parlor, with lodgings above. Thus, it would appear that Watts' boatyard proper was located to the rear of this corner structure, which served him as an office. The potential for historic hazardous materials contamination from a boatbuilding operation of this type would appear to be minor, limited to paints, varnishes, and perhaps the copper-based coating used on boat bottoms.

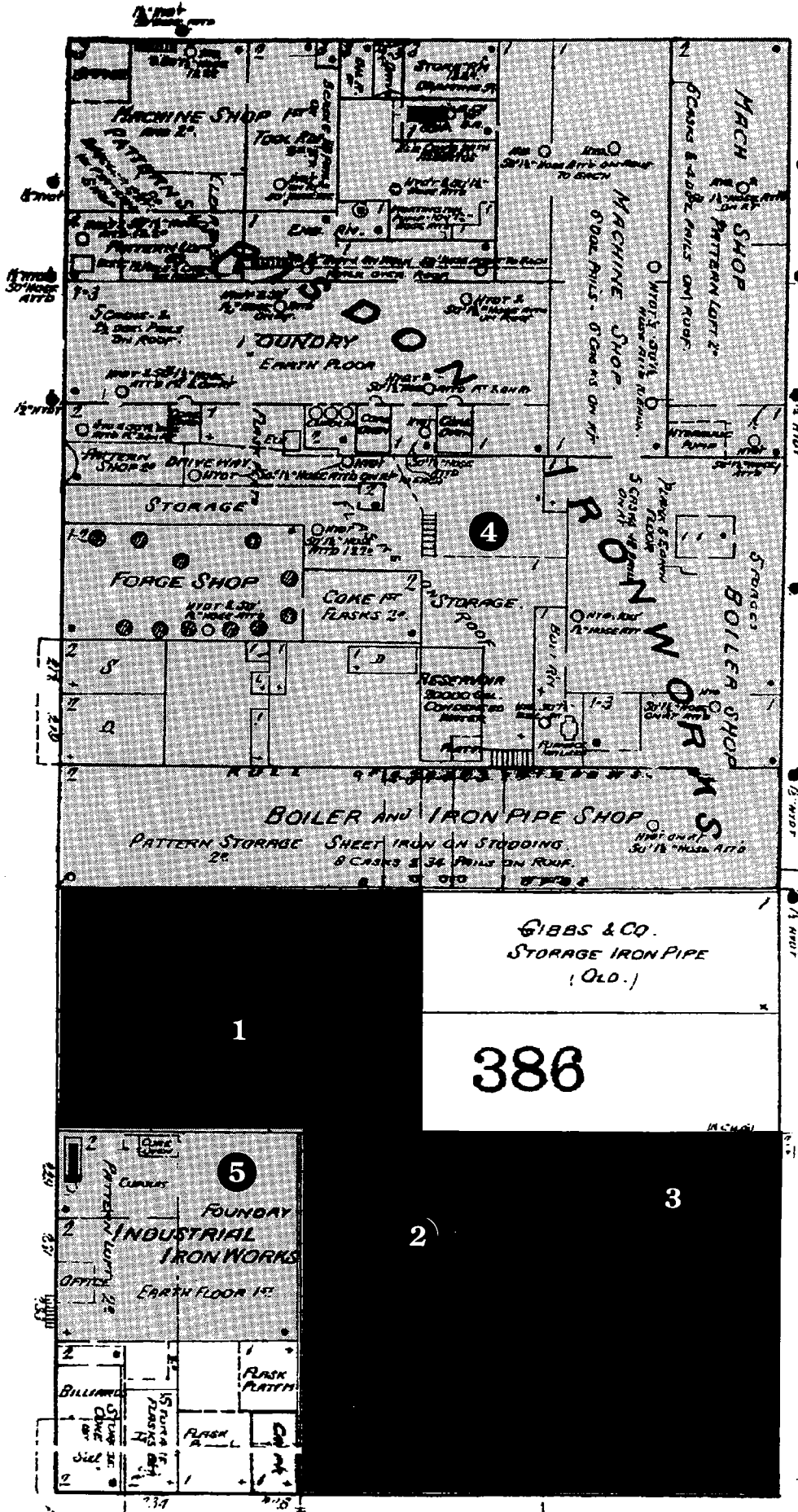
By the late 1870s, the site immediately north of the corner of Beale and Folsom, at 233 Beale, was occupied by the **Industrial Ironworks**, under the proprietorship of Lewis, McCormick & Company and the McCormick Brothers after 1883. As shown on the Block 2, 1887 Sanborn Map, the **Industrial Ironworks** occupied an earth-floored, two-story, wood-framed square structure, with a storage yard connecting it to Folsom Street, and remained in operation until the 1890s. The premises were later taken over by the **Brown & Nugent Blacksmith Shop**, in operation until 1906, which like many larger blacksmith shops also made carriages and wagons. The **Industrial Ironworks** was a small iron foundry specializing in engine building, but also turned out all general types of iron castings. Hazardous materials contamination from the foundry and successor blacksmith shop would most likely be limited to lead-based paints used on metal and wood parts, but the typical earth floor would have ensured that any spillage entered the underlying soil.

North of the **Industrial Ironworks** was Charles H. Leavitt's **Pioneer Ironworks**, begun in 1872, and remaining in operation until the 1880s. Like several other small foundries in the project area, Leavitt specialized in iron fireproofing, in an age when fires were frequent and all urban businessmen were rightly concerned about the dangers of conflagration. Iron doors were

# HOWARD STREET

BEALE STREET

MAIN STREET



Key to Potential  
Hazardous Materials Sites,  
Block 2  
1887 Sanborn Map

Shaded in Red:

1: Tatum & Bowen  
Machine Works;

by 1905, site of:

Morris Greenberg's Sons'  
Brass Foundry &  
Nickel Plating Works

Eagle Brass Machine  
& Plating Works

2: Pacific Rubber Paint;

by 1905:  
Haslett Warehouse Co.

3: Enterprise Foundry  
(brass and ironworks)

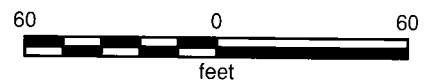
Shaded in Light Red:

4: Risdon Ironworks

5: Industrial Ironworks

FOLSOM STREET

Block 2, 1887 Sanborn Map



specially designed for warehouse and commercial buildings, fitted so that they would have room for expansion in case of fire. Leavitt's advertisements show woodcuts of the elaborate safes which he manufactured; at the time, safes were just as much an insurance against fire as theft. The **Pioneer Ironworks** remained in operation until the 1880s, when the premises were taken over by the **Tatum & Bowen Machine Works**. **Tatum & Bowen** were large printing machinery manufacturers, and San Francisco was the center of the printing industry on the West Coast. **Tatum & Bowen** dealt in other types of machinery that were based on a continuous-feed principle, such as saw mill machinery. Detailed information about the **Tatum & Bowen** works is scarce, but given the general business of the company, and the fact the works did include a machine shop, forge, blacksmith shop, pattern shop, millwright, and saw shop, it would appear to be the general metal works of the firm. The furnace may have been used for melting lead for printers' type, which was part of **Tatum & Bowen's** business.

**Tatum & Bowen** did not occupy the site past the 1890s, when the building was converted into a **brass foundry and plating works**. Two enterprises shared the site up the 1906 fire: the **Eagle Brass Machine & Plating Works**, and **Morris Greenberg's Sons' Brass Foundry**, both of which had previously been located on Block 3. Activities carried out in the plant included the full range of brass and bell founding, and metal plating. The buildings on the site do not seem to have changed very much between these different owners; as can be seen on the Block 2, 1887 Sanborn Map, the north half of the lot was occupied by a one-story machine and blacksmith shop with a second-story pattern loft on the Beale Street Frontage, while the south half, immediately adjacent to the **Industrial Ironworks**, was largely an open yard with several small shed structures housing more specialized crafts. The possibility of hazardous materials contamination resulting from heavy metals associated with metal plating, brass founding, and printing machinery production would be greatest in the vicinity of this open yard.

Along the Folsom Street frontage of Block 2, just east of Beale Street, two small boarding houses built in the late 1860s were converted to pattern storage for the nearby **Industrial Ironworks** in the 1880s. Occupying the exact central third of the Folsom Street frontage of the block was the **Pacific Rubber Paint Company**, a branch of **Whittier, Fuller & Company**, but operated separately from the **Pioneer White Lead & Color Works**. Rubber paint was produced here from the late 1870s through the 1890s, probably co-extensive with the operation of the lead works on Block 3. Rubber paint was the predecessor of modern latex paint, and was made by adding small amounts of natural rubber to the other paint constituents. In the 19th century, because the processes used to produce rubber paint were still novel, they tended to be closely guarded trade secrets of the paint manufacturers. Surviving documents from the **Pacific Rubber Paint Company** are full of testimonials to the durability of rubber paint but contain scant



technical information. Aside from the non-hazardous rubber and linseed oils used, pigments were similar to those used in conventional paint at the time. Since white lead, litharge, and red lead were themselves pigments that were produced by Whittier, Fuller, it appears that natural rubber was merely added to ordinary lead paint, giving it greater durability. Colors based on metals such as chromium, cadmium, and arsenic were also likely ingredients of rubber paint.

The building in which these materials were used was a large, three-story brick warehouse building that is shown in Plates 14 and 15 (following page 51); in addition to **Pacific Rubber Paint**, it also served as a general warehouse for Whittier, Fuller company operations, storing linseed oil for paint mixing and glass used in mirror manufacture. After Whittier, Fuller moved its manufacturing operations to South San Francisco, the warehouse was acquired by the **Haslett Warehouse Company**, and used for general storage. The building was unharmed by the 1906 fire, and was not demolished until the construction of SF-480 in the 1950s. After 1906 it had an asphalt floor; before that date its floor type is not indicated on maps and was therefore probably earth or brick. Since the building never burned, and contained only a very narrow rear yard, the possibility of historic hazardous materials contamination would be limited to routine spillage onto the floor, or disposal of wastes in sumps or in the small rear yard.

On the lot immediately east of the paint factory was the **G. E. Pennington & Sons Tool Manufacturers**, which was built in the late 1880s:

Messrs. G. and E. Pennington and Sons are manufacturers of the best refined cast tool steel, machinery and hammer steel, steel piston rods, shear blades, lathe spindles, and all kinds of steel forgings, refined bar steel in octagon, round, square, or flat is made in sizes and lengths to order; while miners' drill steel, picks, crowbars, sledges, hammers, etc., are manufactured on an extended scale. The works at numbers 218 and 220 Folsom Street occupy a full water lot 45 by 137 1/2 feet in size and are supplied with all adequate machinery operated by an engine of 75 horse power. Conspicuous amongst the machinery are two steam hammers weighing 1000 and 2000 pounds respectively. The firm gives employment to ten skillful and competent machinists and has all the work that can possibly be attended to. Special attention is given to the manufacture of cast steel tools which are used extensively by carpenters and builders in the city and throughout this portion of the state. Their business was started in 1873 and deserves that liberal encouragement and support it has received from the beginning (The Industries of San Francisco: 109).

On the corner of Folsom and Main, **S. B. Seeley Iron & Steel** was established in the early 1880s. After 1882, the corner lot was occupied by a three-story building with an asphalt floor housing the **California Oil Works**, operated by Haycock, Tallant & Cotton. The oil works



do not provide a likelihood of hazardous materials contamination, because the oils manufactured were linseed, coconut, and castor oils, obtained through pressing and refining these natural products.

The oil works site was occupied after the mid-1890s by the **Enterprise Foundry**, a mid-sized ironworks, which "employs nearly 100 men....This concern began in a comparatively small way eighteen years ago, and increased in size and importance until seven years ago when it was incorporated on a most extensive basis, and now does the bulk of the foundry work in this vicinity [San Francisco, Her Great Manufacturing, Commercial, and Financial Institutions...: 148].

Along Main Street, several small industries were present in the 1870s and 80s, though later all were displaced to make way for expansion of the **Risdon Ironworks**. At 230 Main, E. H. Thomson operated a **machine shop** in the late 1870s; next door at 228 Main, W.S. Ray operated the **O.K. Foundry** from the mid-1870s; at the same address in the late 1870s William Rutherford manufactured and sold mining machinery from his **ore pulverizing machine shop**. At 230 Main, **Pacific Plumbago M. & M. Company** located in 1878, which specialized in manufacturing stove polish; graphite was commonly the main ingredient of stove polish at the time. This business became the **Pacific Stove & Ironworks** in the early 1880s, an iron foundry specializing in castings for stoves for home, commercial, industrial, and maritime uses.

### The Risdon Ironworks

The **Risdon Ironworks** was the first metal working industry in San Francisco planned from the start as a major industrial enterprise by a group of influential industrialists, one of whom, William Alvord, was elected mayor of San Francisco in 1871. The foundry soon established a major market share by manufacturing unusually large castings and machinery. As Hittell describes:

The Risdon Iron and Locomotive Works, which makes a specialty of machinery for mines, steamships, and sugar mills, is one of the great iron establishments of our time, especially worthy of note for having manufactured the Virginia City water pipe and the Chollar-Norcross pump, which seem destined to occupy a place in the history of hydraulic engineering, as well as in that of our coast. The Risdon Works also made the pipe to convey water across a deep ravine for the irrigation of Claus Spreckels' sugar plantation in the Hawaiian island of Maui, and the Yellow Jacket hoisting apparatus, which last, constructed to hoist ore from a depth of 4,000 feet, weighs 350 tons, and is the heaviest machinery of the kind ever made. The Risdon Works had the first hydraulic press riveting machine in the United States. The pump and hoisting works which they are building for the Eureka Consolidated Mine, are designed on a plan bold and original in conception

as well as grand in scale, and promise to add much to a reputation already high. In short, if the Risdon establishment is not so large as many in Europe or even on the Atlantic Slope of our continent, it is second to none as to capacity in its specialties. In order to handle the enormous weight of the pieces of machinery manufactured in its shops, it has a revolving crane, capable of lifting 50 tons, with 12 hydraulic side cranes....The establishment, at the corner of Howard and Beale streets, San Francisco, is the property of an incorporated company, in which there are 12 shareholders. W.H. Taylor is president, and Joseph Moore superintendent. [Hittell, 1882: 660-661]

Contemporary photographs of the **Risdon Ironworks** reveal that its production was so substantial as to spill out of the buildings shown on the Block 2, 1887 Sanborn Map, and fill nearby vacant lots and sidewalks [Muybridge: 1873]. In the Muybridge view, many large boilers may be seen stacked among massive riveted iron pipes, a specialty of the works. During the 1880s and 1890s, the works were the largest manufacturers of riveted pipe in the world. According to Hittell, in constructing one irrigation system for sugar cane in Hawaii:

The pipes to cross the ravines, measuring 21,000 feet, were made by the Risdon Ironworks out of 700 tons of plate iron, the diameters varying from 35 to 41 inches. Four lengths were telescoped into each other before loading on the sailing vessels which took them to Maui. In putting them together 80 tons of lead were used to make the joints tight (Hittell 1882: 662).

From such contemporary descriptions, and the types of products listed in the **Risdon Ironworks** catalogues dating back to the turn of the century, the potential for historic hazardous materials contamination arises mainly from the large scale of the works' operations over a period of more than thirty years. The primary hazards come from materials ancillary to the ironworking process, such as paint and lubricating oils. Additionally, lead may have been used to seal iron pipes right at the plant; alternatively, lead may only have been used when the pipes were put together at their eventual resting place. Boilers were produced in large quantities, which raises the possibility of minor asbestos contamination from boiler lagging.

### **Industry on Block 2 after 1906**

Even before the 1906 Fire, the **Risdon Ironworks** had opened another plant on Potrero Point for maritime work, and were closing down their operations on the Block 2 site, which could no longer accommodate the space needed for the firm. The works were not rebuilt after the fire, and their site remained mostly vacant, used for a **Southern Pacific Railroad freight yard** until the

HOWARD STREET

BEALE STREET

MAIN STREET

FOLSOM STREET

Block 2, 1913/29 Sanborn Map

Key to Potential  
Hazardous Materials Sites,  
Block 2  
1913/1929 Sanborn Map

Shaded in Red:

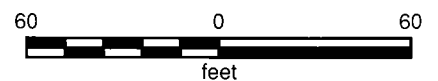
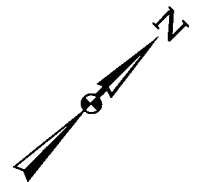
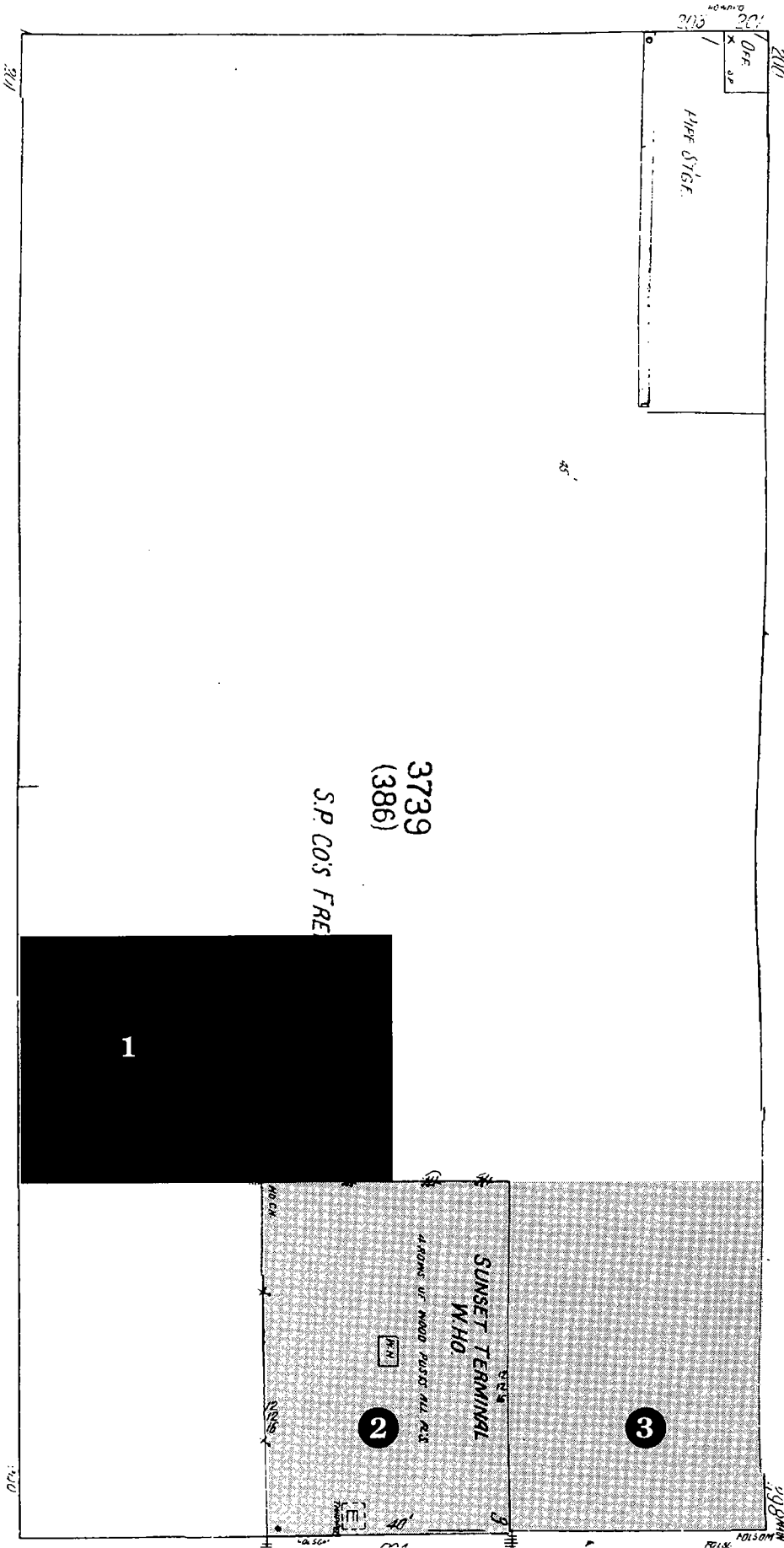
1: Eagle Brass &  
Plating Works

Morris Greenberg's Sons'  
Brass Foundry &  
Nickel Plating Works

Shaded in Light Red:

2: Haslett Warehouse  
(formerly Pacific  
Rubber Paint)

3: Enterprise Foundry



construction of SF-480 in the mid-1950s. The former **Pacific Rubber Paint** factory, later used by the **Haslett Warehouse Company** and called the **Sunset Warehouse**, was unharmed by the 1906 fire, and continued in warehouse use until the 1930s when it was acquired by the **Guittard Chocolate Company** and used as a candy factory. It was only demolished in the 1950s for the construction of SF-480. There is only a minor post-fire potential for contamination of Block 2, with the exception of contamination resulting from the **freight yard**, which like most railroad freight yards presents an unknown potential.

**BLOCK THREE: Bounded by Fremont & Beale, Howard & Folsom Streets****Summary**

Block 3 is located along the original shoreline of the bay and formed the westernmost part of Tar Flat up through the late 1860s. From the 1860s until 1906, it was developed for industrial uses, except for its Folsom Street and Lincoln Place frontages, which were residential. From the perspective of potential hazardous materials contamination, Block 3 is dominated by the **Pioneer White Lead and Color Works**, shown on the Block 3, 1887 Sanborn Map on the following page\*. Established in 1875, and in operation until it was destroyed in a fire in 1896, the **Pioneer White Lead and Color Works** represented one of the largest chemical manufacturing industries on the West Coast during this period. It was the only significant source of the very widely used white lead paint for the whole West Coast region. The process of corroding pig lead into white lead (a carbonate of lead) and grinding it into a fine powder is well described by Hittell, quoted below on pages 31-32, and was carried out in sheds that occupied much of the center of the block bounded by Folsom, Fremont, Howard, and Beale streets.

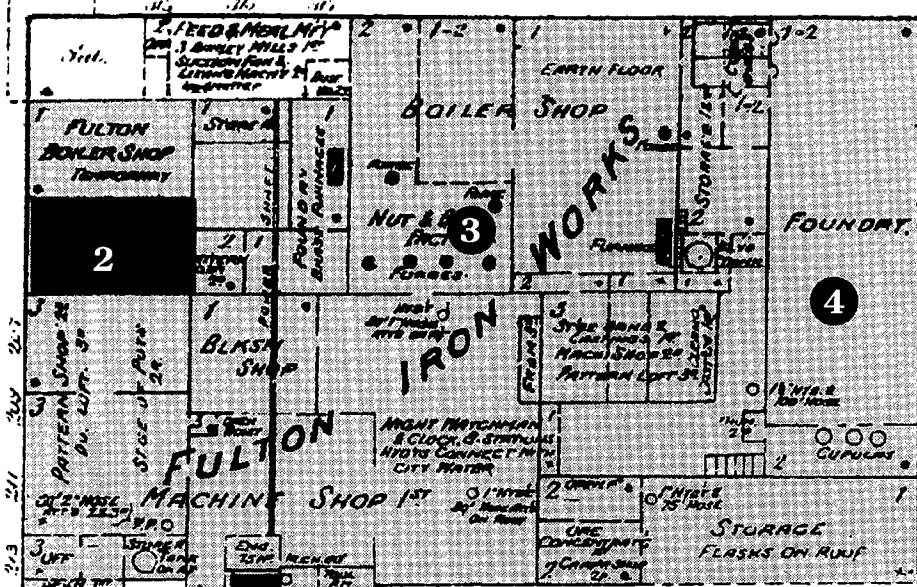
The works had a capacity to produce 20 tons of white lead daily, the three-month long chemical reaction taking place continually in batches. The lead works often operated at capacity, day and night. Thus, the total amount of white lead produced on the site during the period of operation does not appear to have possibly exceeded 290,000,000 pounds. Based on figures for consumption of white lead in California recorded by Hittell during the period the lead works were in operation, it would appear that about half of that amount was actually produced.

Other potentially hazardous materials in use on the lead works site included red lead, litharge, benzene, and mercury, together with all of the various chemical ingredients of oil paints (such as compounds of cadmium), and many types of oils, varnishes, and solvents. Prior to the construction of the lead works, its site was part of a mud flat that was primarily used for the discharge of large quantities of tar waste from an adjacent **gas works** on Howard Street. The tar discharge began in 1854, and continuing as late as early 1870s, immediately prior to the construction of the lead works.

After the 1896 fire, much of the lead works site remained vacant; the remaining structures on the block were destroyed in the 1906 fire, and the block was then rebuilt for entirely industrial uses, including the **W. T. Garratt Brass Foundry**, and **The Examiner Color Printing Shop**, both of which were located on the SF-480 right-of-way at near the corner of Folsom and Fremont.

# HOWARD STREET

MONITOR FEE'D MILLS

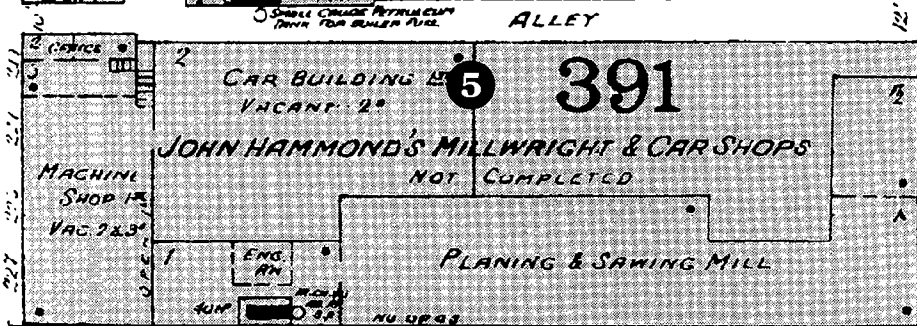


Key to Potential  
Hazardous Materials Sites  
Block 3  
1887 Sanborn Map

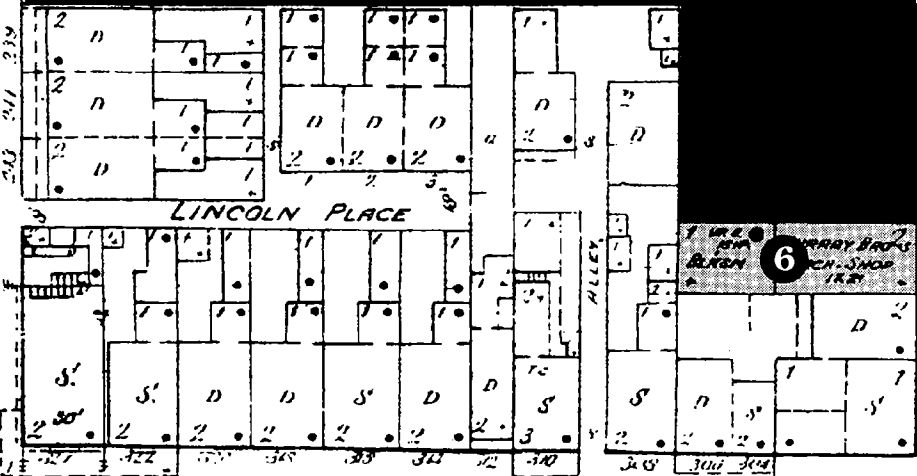
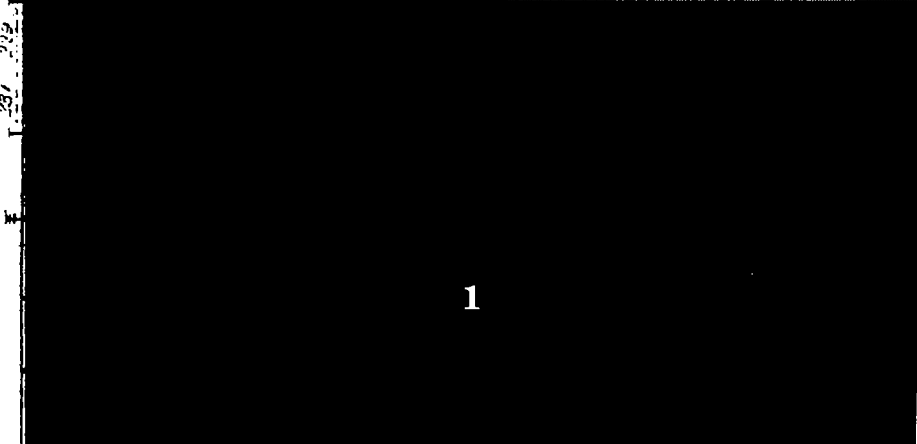
Shaded in Red:

- 1: Pioneer White Lead & Color Works
  - 2: Eagle Brass Works (Morris Greenberg)
- Shaded in Light Red:
- 3: Fulton Ironworks
  - 4: Hawkins & Cantrell Engine Builders
  - 5: John Hammond Car Building Shops
  - 6: Murray Brothers' Machine Shop

FREMONT STREET

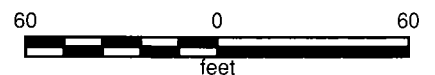
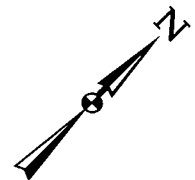


BEALE STREET



FOLSOM STREET

Block 3, 1887 Sanborn Map



### Early Industries on Block 3

The approximate line of the original shore was Fremont Street; in 1852, as shown on Map 5, the shore bisects Block 3 diagonally from Howard and First to Beale and Folsom streets. Only the southwest corner of the block at Fremont and Folsom appears to have been substantially elevated above the high tide line. As Map 5 and Plate 1 show (following pages 9 and 8, respectively), industry was already established on the block in the early 1850s; a long two-story building, probably used as a **warehouse**, had been built along Fremont Street midway between Howard and Folsom; the east side of this building opened out onto the bay.

In Plate 6 (following page 18), a daguerreotype dated 1856, Block 3 is clearly shown to be a shallow mud flat; the substantial brick structure in the center of Plate 6 was the distillation house of the **San Francisco Gas Company**, located directly across Howard Street from Block 3, and constructed in 1854. Waste tar from this process appears to have been discharged directly onto Block 3 by a pipe running beneath Howard Street. The entire area from the date of the completion of the gasworks was known as Tar Flat.

Map 6, the 1857/59 U.S. Coast survey (following page 10), shows that Block 3 was still mostly a mudflat, except along Folsom Street, and partly cut off from access to the bay by a narrow tongue of fill along Beale Street; blocks 1 and 2 were also still part of the bay in 1857.

The first major industry on Block 3 was **Hawkins & Cantrell Engine Builders**, located at 210 Beale Street, at the corner of Howard, from the late 1860s through the 1880s. Further south along Beale Street there were smaller **machine shops** and **boiler makers**, such as James W. Hall's **Sacramento Boiler Works**, in operation during the 1880s. The site of the lead works had been occupied in the early 1870s by Adelbert Wolf, **filemaker**, at 248 Beale; at 294 Beale, near the corner of Folsom, the **Murray Brothers' Machine Shop** had been in operation in a small frame structure since the early 1880s and would remain in at that location until the 1906 fire.

Along Fremont Street, **Morris Greenberg's Brass Foundry** had begun operations in the early 1870s near the corner of Howard at 203 Fremont; further south along Fremont, Tobey Varney and William Ware operated small **machine shops** which were removed to make way for the lead works in 1875. Lodging houses were farther south along Fremont Street, and the entire south end of the block, as can be seen on the Block 3, 1887 Sanborn Map, was crowded with small tenement houses, many of them fronting on Lincoln Place, a narrow alley running east from Fremont.

## Description of the Pioneer White Lead and Color Works Site

The **Pioneer White Lead and Color Works** is shown on the Block 3, 1887 Sanborn Map, occupying an L-shaped site. The site begins 75 feet north of Folsom Street on Beale, continues along Beale Street for 160 feet towards Howard Street, divides the block in a straight line to Fremont Street, where it continues for 135 feet along the Fremont frontage. The south boundary of the site forms an L, with one leg extending perpendicular to Fremont for 150 feet, adjoining the rear yards of houses off of Lincoln Place. At a distance of 70 feet from Beale Street, the property line turns right, south towards Folsom Street, for a distance of 70 feet. From there it continues to meet Beale Street at a right angle.

The north end of the site was occupied by two four-story brick structures containing **warehouse** and **white lead milling** facilities, and a **mirror manufactory** plant using mercury. These buildings, illustrated in an advertisement for the company reproduced in Plate 9 \*, and shown on the Sanborn Map, are approximately fifty feet wide. The remainder of the site was occupied by **lead corroding** sheds, where white lead powder was produced out of pig lead through a traditional acid corrosion process. These sheds were contained within a wooden structure that may have had an earth floor. The buildings are shown on Plate 9, following page 35.

## Lead Works Chronology

According to Hittell and the biographer of W. P. Fuller, the works were established on the site in 1875. San Francisco City Directory research largely supports this information. Whittier had set himself up in the paint retail and wholesale business in 1863, when he appears as a partner in "Cameron, Whittier and Co., importers and jobbers, paints, oils, window glass, at 425-427 Front Street" in the Langley's directory of that year. William Parmer Fuller was at the time the principal of the second largest paint company in California, and the two firms merged in 1868. In the 1876 directory, Whittier, Fuller is still listed at Front and Pine streets, but by the 1877-1878 directory, the address is listed at 229-231 Fremont Street, which is the address of the brick warehouse structure described above. In 1880, a listing also appears also for the **Pacific Rubber Paint Company** at 228-230 Beale Street, on Block 2. By 1882, the Fremont Street address had been expanded to 229-239 Fremont, reflecting the construction of additional white lead corroding sheds. Directories subsequent to 1887 show the continued presence of the works through 1896 with William P. Fuller, proprietor.

The buildings of the lead works were projected in 1872, and constructed in 1875, according to Fuller's biographer, as shown on the illustration of the firm's catalogue. In 1896 the lead and acid works were completely destroyed by fire, and the paint warehouse and lead mill



was gutted [Ninety Years, p 144]. The fire was described as "one of the fiercest fires ever to visit the neighborhood" and the loss set at \$225,000. Rather than rebuild on the same location, a new site was chosen in South San Francisco, which opened in 1899 [ibid, p 116].

## **Hazardous Materials Related to the Pioneer White Lead and Color Works**

### **1. Lead Compounds**

Most of the wooden buildings in 19th century California were painted with white lead, and between 1875 and 1896 most of this paint was produced on Block 3. Before the construction of the works, all of this paint had to be imported by sea, because no local chemical industry existed. Hittell describes how Whittier, Fuller got into white lead manufacturing and how it was done:

As the people of our coast erect a great number of wooden buildings every year, and generally paint them externally as well as internally, we consume paints [including] 3,500 tons of white lead, worth about \$600,000 at wholesale. The white lead, linseed oil, and most of the varnish, are made here; and here the colors are ground in oil, but we produce no pigment save white lead....The processes used here in the manufacture of lead...have no novel feature....The painters add 4 gallons of oil to 1000 pounds of ground white lead. Putty is made by mixing whiting with linseed oil....One of the forms of paint most extensively used on our coast is the rubber paint, of which 80,000 gallons are consumed annually. It contains some India rubber, and is considered an excellent protection for wood exposed to much moisture [Hittell 1882: 713].

All of the white lead that Hittell refers to here was produced from pig lead at the **Pioneer White Lead** works, since it was the only such factory on the West Coast. Likewise, the rubber paint was made either at the lead works, or at the Whittier, Fuller rubber paint works adjoining Folsom Street on Block 2. The processes used for the manufacture of white lead were closely based on European and American models, which William Fuller studied while travelling. As his biographer describes:

Before leaving for Europe [in 1872] Fuller had been discussing with his partner the plans for their white lead works. While in England he inspected numerous paint factories, and upon returning to New York he visited still more. He had come home with definite working ideas for the Whittier, Fuller & Company White Lead and Color Works. After one serious delay in their preparation for expansion, caused by the panic of 1873, the firm retained Edward Burnham, an expert in white lead corrosion, to supervise the new project [Fuller 1939: 73].

Lead used in the works came from the **Selby Smelter** in North Beach [ibid, p 74], smelted from ores extracted in the process of silver mining. As the Fuller biography explains:

The presence of this large supply of pig lead was the biggest factor in Whittier, Fuller's decision to establish a white lead works in the San Francisco Bay Region in 1875. For a time they purchased their pig lead from the Selby Company, then in the 'eighties, they experimented with smelting their own ores [in Melrose near Oakland] [Fuller 1939: 75].

The company also manufactured its own acetic acid, and had a total of twenty-five forty-ton capacity corroding stacks on the site [ibid, p 75]. The mirror works were moved to the new factory from the Front Street store, and were located in the upper floors of the warehouse buildings midway between Howard and Folsom streets. Hittell describes the details of the process of white lead manufacturing:

The Pioneer White Lead and Color Works of Whittier, Fuller & Co. in San Francisco, the only establishment that makes white lead on the Pacific Coast, consist of 2 massive brick buildings connected by a bridge, and were erected in 1875. They cover an area of ground 275 by 137 feet, and extend from Fremont to Beale, between Howard and Folsom streets. That portion of the factory facing Beale Street is used for the manufacture of white and red lead. Piles of pig lead are on hand awaiting the melting process....The melted lead runs from a furnace upon an endless band of iron molds. In these cases the lead assumes the form of thin disks, 6 inches in diameter, and pierced with holes about one fourth of an inch in size. When cool, these disks are put into earthenware pots with strong acetic acid, but in such a position that the acid does not come in direct contact with the metal. These pots are imbedded in tanbark, in tiers, and each succeeding tier is covered with boards until a stack is built up 25 feet in height. The fermentation of the tan creates a double reaction, caused by the heat generated, and the acid becoming volatilized, changing the lead into an acetate. The acetate again undergoes a change by a combination with the carbonic acid gas evolved by the tanbark, and thus becomes a carbonate of lead. Three months elapse before the material is ready for further working, but owing to the number of stacks scarcely a day passes that one is not emptied. The carbonate, when ready, is passed over elevators to a crushing and grinding mill, where it is mixed with water; a steam pump conveys the fluid mass to the topmost floor of the factory, where it passes into tanks for the purpose of being precipitated; the residue from the last tank is conveyed to copper drying pans heated by steam.

The pigment is pulverized in its dry condition, then ground three times over in different mills, to secure a complete and uniform mixture with the linseed oil into the best kind of ground white lead ready for the use of the painter. The works have a capacity to produce 20 tons of ground lead in 24 hours, and

sometimes run day and night. Besides these extensive departments for the manufacture of the white lead and for grinding it in oil, there are others for making red lead and litharge in furnaces, for grinding colors generally in oil, for making rubber paint and putty, and for the manufacture the acetic acid required in their business. They give employment to 150 men. Their establishment deserves credit for several improvements in the methods of manufacturing white lead, of a character designed to protect the health of the operatives [Hittell 1882: 714].

The processes that Hittell describes in this passage were the traditional methods widely used for manufacturing white lead, a basic lead carbonate, and were commonly referred to as the Dutch method, as opposed to the more advanced German technique. The advantage of this technique for Whittier and Fuller was that it was a relatively simply operation whose raw materials of pig lead and tanbark were readily available, or, in the case of acetic acid, manufactured on the site. The disadvantage of the Dutch method lay in the amount of time it took to gradually corrode the pig lead into the lead carbonate. The plant had to plan its output several months in advance with an accurate idea of demand, or face either the burden of storing large quantities of surplus white lead, or alternatively of being unable to meet customers' demands. The monopoly position which **Pioneer White Lead** enjoyed undoubtedly eased this burden considerably.

Of the other processes mentioned by Hittell, red lead was produced by heating pig lead to a high temperature to accelerate oxidation; the resulting red lead oxide was then scraped off. After white lead, red lead was the most common variety of paint used in the late 19th century, especially for painting exposed metal. Litharge, another type of lead oxide, was likewise produced by heating up pig lead, and had a variety of uses in the manufacture of oil varnishes, lead plaster, and lead salts.

## 2. Mercury

In the brick warehouses in the center of the block, Whittier, Fuller also carried out mirror manufacturing on an extensive scale, a business in which the firm enjoyed a monopoly on the West Coast. Whittier had begun manufacturing mirrors at his previous paint importing establishment on Pine Street, but it was moved to the lead works plant, and Whittier continued to advertise mirrors made-to-order in his catalogue published from the new plant in the late 1870s, and also mercury for sale to individual consumers in various sized containers. Mercury was the major ingredient in the mirroring process, as Hittell describes:

In 1863, the firm of Cameron, Whittier, and Co. of this city inaugurated the silvering of mirrors as a branch of home industry. They commenced with one operative and one silvering table, but have increased their apparatus until they have three silvering and tow polishing tables....They are the only parties engaged

in the business of the Pacific Coast, and the advantages offered by the freshness of the process done here has almost entirely stopped the importation of mirrors into this port.

The processing of silvering glass plates is a most interesting one. The...imported plates...are polished prior to shipment, but the voyage tarnishes the glass so that they have to be repolished here. This is done on wooden tables covered with woolen blankets, rouge power and blanker brushes being used to polish with. The greatest care has to be taken in polishing to have it perfectly done. The light is let in from a single aperture so as to fall on the center of the plate, in order that imperfections in the surface of the glass can be detected and removed. The silvering tables are made of white Italian marble, encased in a border of wood, in which is a continuous gutter or trough to catch and convey away the surplus quicksilver.

The table being leveled, a sheet of tin foil is spread on its surface and slight stripes of glass of wood placed along its edged on three sides, with weights to keep the quicksilver from escaping. Quicksilver is now poured on the foil, and an operative, with a long handled blanket brush scrubs the surface of the foil until it looks bright. More quicksilver is then gradually added, till the quantity needed is spread evenly over the foil....The plate of glass is now slid slowly on the table, ...blankets are then placed on the plate, and the source of the glass covered with iron weights varying from 1500 to 2000 pounds....The tin foil which is used here for mirrors comes from England [Hittell Scrapbooks: 222].

### 3. Other Potentially Hazardous Materials

Because the Fuller, Whittier Company was a very large business that provided a complete range of products related to painting, it is appropriate to assume that any substances used in conjunction with painting in the late 19th century were present on the site in substantial quantities. The entire plant burned in 1896, including the warehouse in which these chemicals were stored; their residues released by this fire may remain in the soil of the site, apart from accidental spills over the years or disposal in waste sumps.

In a catalogue of the **Pioneer White Lead** works dating from the late 1870s, a partial list of the chemicals sold by the company offers us an idea of what might be found on the site. In addition to white lead packed in oil in kegs ranging from 12 and 1/2 to 250 pounds, and 1 to 5-pound cans, colors were sold packed in cans or in pails of 1 to 25 pounds, including colors for artists, of which the company boasted that it carried a full line: cadmium red, cadmium yellow, Prussian blue, etc. Zinc based paint imported from France was also was offered. A complete range of dry colors was available, which the buyer could have mixed to his requirements. Fuller's biographer mentions that the warehouse was a very dusty place, because of the many powdered pigments stored there.

Apart from paints, a full range of chemicals associated with painting and varnishing were offered. These included benzene, calcimine [a type of white-wash for walls], rosin, glues, gilder's materials, and many types of artists' materials.

### **The Lead Works Site, 1896-1906**

The lead works were destroyed in a fire in 1896, which was variously alleged to have started in the works themselves, or in the adjacent **Murray Brothers' Machine Shop** [Fuller Biographer]. A comparison of the Block 3, 1887 Sanborn Map with the Block 3, 1899 Sanborn Map on the following page shows that the machine shop and all of the small houses along Folsom and Lincoln Place escaped the fire; the remains of the wood-framed corroding sheds of the lead works are gone the land is vacant. Most of this land would remain vacant until the 1906 fire, except for the Beale Street portion of the site which was occupied in the early years of this century by the **C.G. Corson Machine Works** at 254 Beale.

The four-story warehouse building occupied by the **lead milling, mirror manufactory, and paint storage** was gutted in the fire, but was rebuilt and used by the **Whittier-Coburn Paint Company**. This firm was founded from Whittier's interest in **Pioneer White Lead** after the dissolution of his partnership with William Fuller in the early 1890s. Fuller retained control of the company, buying out the Whittier family, who obtained the security of the land and buildings of the lead works. After the 1896 fire, and the removal of Fuller's operations to South San Francisco, the **Whittier-Coburn Paint Company** was formed as a competing paint firm occupying the rebuilt brick buildings at the north end of this lot up until 1906. Whittier-Coburn was engaged less in the manufacture of raw materials, such as white lead, than in importing and wholesaling a general line of paint. Therefore, the subsequent burning of the rebuilt brick buildings in the 1906 fire may have further released lead and other paint components into the soil of Block 3, but perhaps in more moderate quantities than the 1896 conflagration.

Almost all of Block 3 north of the lead works as far as Howard Street appears to have been burned in the 1896 fire. The Block 3, 1899 Sanborn Map shows the two main industries on the block, the **Fulton Ironworks**, located on Howard and Fremont streets, and the **John Hammond Car Shops**, established immediately to the north of the lead works in the mid-1880s, have disappeared. Instead, new and smaller metal working enterprises occupy the Howard Street frontage of Block 3, including the **Judson Manufacturing Company**, which was in the iron and steel tool-making business; the **Union Gas Engine Company**, one of the first local firms building and repairing gas engines; and the **John Finn Metal Works**, specializing in non-ferrous metals, primarily copper, and carrying out nickel plating and zinc galvanizing activities.

# HOWARD STREET

Key to Potential  
Hazardous Materials Sites  
Block 3  
1899 Sanborn Map

Shaded in Red:

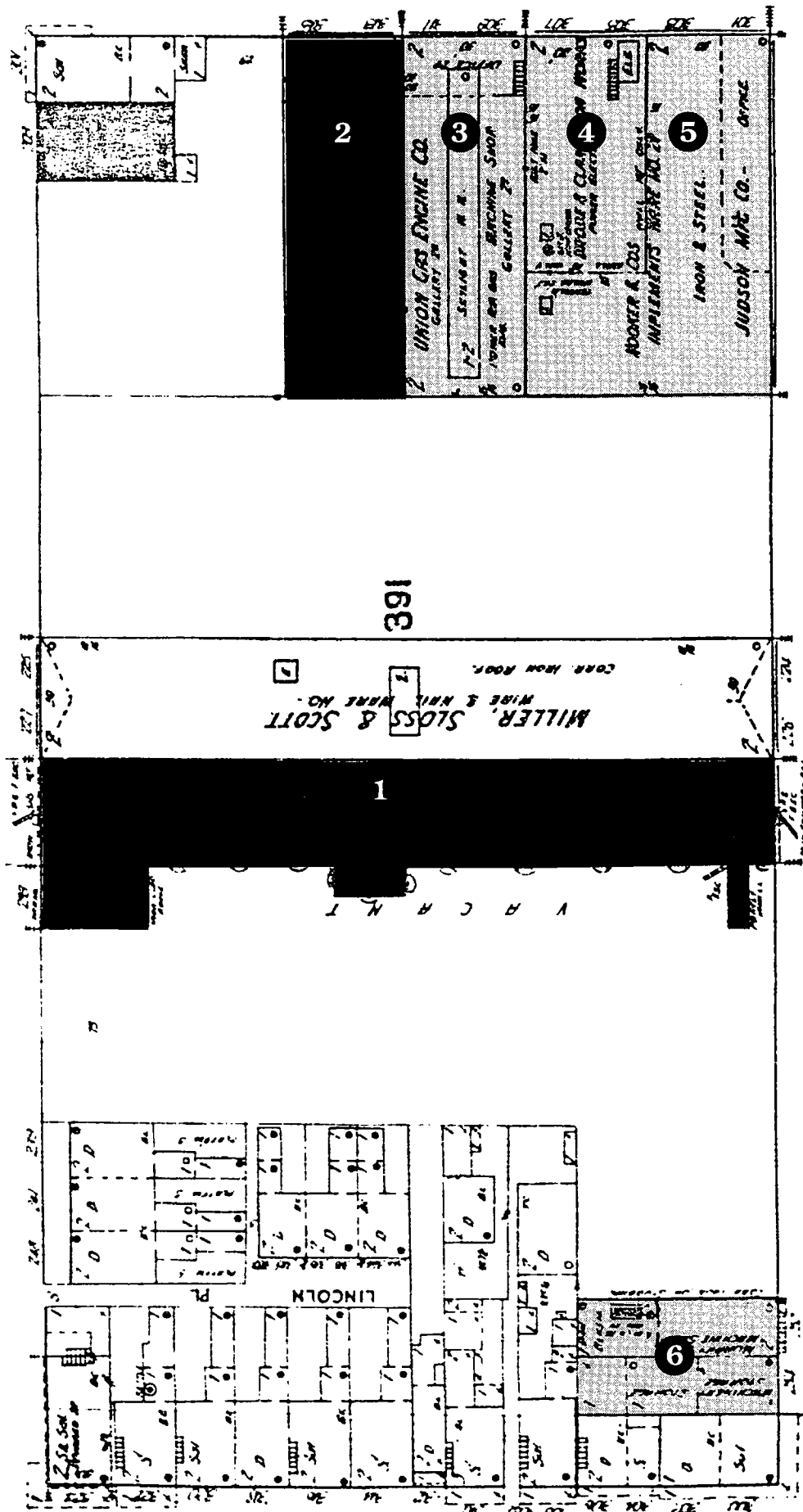
- 1: Whittier-Coburn  
Paint Company
- 2: John Finn Metal &  
Plating Works

Shaded in Light Red:

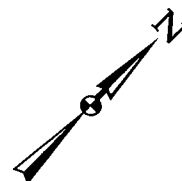
- 3: Union Gas Engine
- 4: Brode & Clark  
Ironworks
- 5: Judson Manufacturing
- 6: Murray Brothers'  
Machine Shop

FREMONT STREET

BEALE STREET



FOLSOM STREET



Block 3, 1899 Sanborn Map

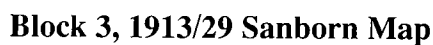
### Block 3 After 1906

After the 1906 fire, Block 3 was only gradually rebuilt; the 1913 Sanborn Map shows the entire central part of the block still vacant, together with much of the Folsom and Howard Street frontages. The corner of Fremont and Folsom streets, formerly the site of lodging houses and shops, was rebuilt with a substantial brick building, shown in Plate 10, to house the **W.T. Garratt Brass Foundry**, which had been burned out of its earlier location near the present Transbay Terminal. The Garratt foundry was one of the oldest continuously operating brass foundries in the city, and would remain in operation on Block 3 until the 1930s, when it was replaced by a **warehouse**. To the north of the brass foundry on Fremont street was a **wholesale drug warehouse**, shown on the Block 3, 1913/29 Sanborn Map on the following page.

At 350 Folsom Street a **machine shop** operated out of a one-story wood-floored building that by the 1920s housed the **Examiner Color Printing** works, and was later torn down for a **warehouse**. The corner of Folsom and Beale streets long remained vacant, occupied only by an **express company**, with a **coal yard** next to it along Beale Street, both of which appear on the Block 3, 1913/29 Sanborn Map. These two large lots, together with a **machine shop** built in the 1920s and demolished to make way for the bridge railway viaduct in the late-1930s, are shown as vacant on the 1913/1948 Sanborn Map except for small structures connected with express operations.

The north half of Block 3 was first rebuilt with the new home of the **Whittier-Coburn Paint Company**, at 301 Howard at the corner of Beale; by 1929 the paint company was gone and the entire corner was occupied by the **Magnus Fruit Products Company**, a firm specializing in root beer production. As can be seen on the Block 3, 1913/29 Sanborn Map, the remainder of the north end of Block 3 was occupied by the **Butler Brothers' Wholesale Drug Company**, occupying a substantial reinforced concrete building constructed in 1927. Earlier, its site was occupied by a small **iron foundry**, **machine shop**, and a **belting factory**.

The primary post-1906 potential sources of hazardous materials are the **W. T. Garratt Brass Foundry** and the adjacent **Examiner Color Printing Shop**. Both of these are located on a site at the Fremont and Folsom street corner of Block 3.







**Plate 8: View From Essex Street on Rincon Hill Over Tar Flat in 1867 . . .** We have included this view because it confirms that Tar Flat was still not filled on Blocks 1 and 2 as late as 1867. At the right, the storeship remains apparently intact on Block 1; Main Street remains a wharf just below its juncture with Mission.

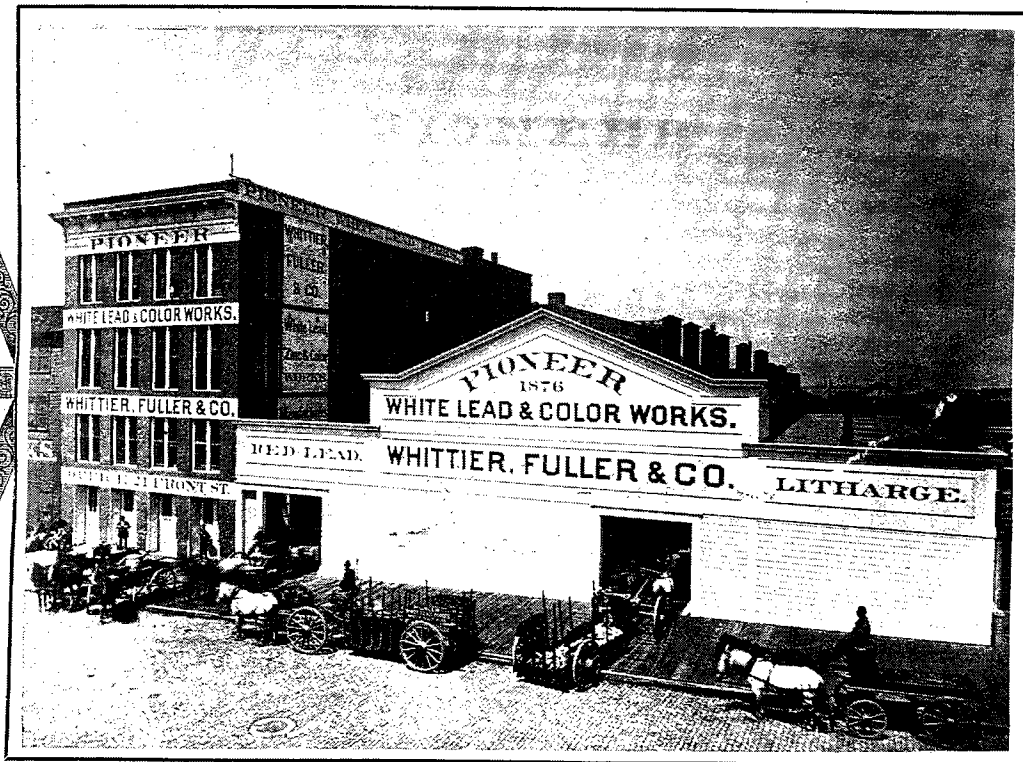
The new landmark in the scene is the Selby Shot Tower (1865) that punctuated the southeast corner of First and Howard streets until the 1906 fire. There, molten lead was dropped 200 feet down into barrels of cold water--the descent gave it time to form into lead shot. Even after the tower was destroyed in the 1906 earthquake and fire, the site continued in use until the 1940s for lead, copper, and metal working and plating operations.

*Courtesy of the Bancroft Library*

**PIONEER  
WHITE  
LEAD**

**PACIFIC RUBBER PAINT**

**HOME MANUFACTURE**



WHITTIER, FULLER & CO. VIEW OF COLOR WORKS.

Works { 228 to 238 Beale Street, } San Francisco.  
          { 229 to 239 Fremont St., }

**WHITTIER, FULLER & CO.**  
PROPRIETORS.

Office, S. W. Cor. Pine and Front Streets.

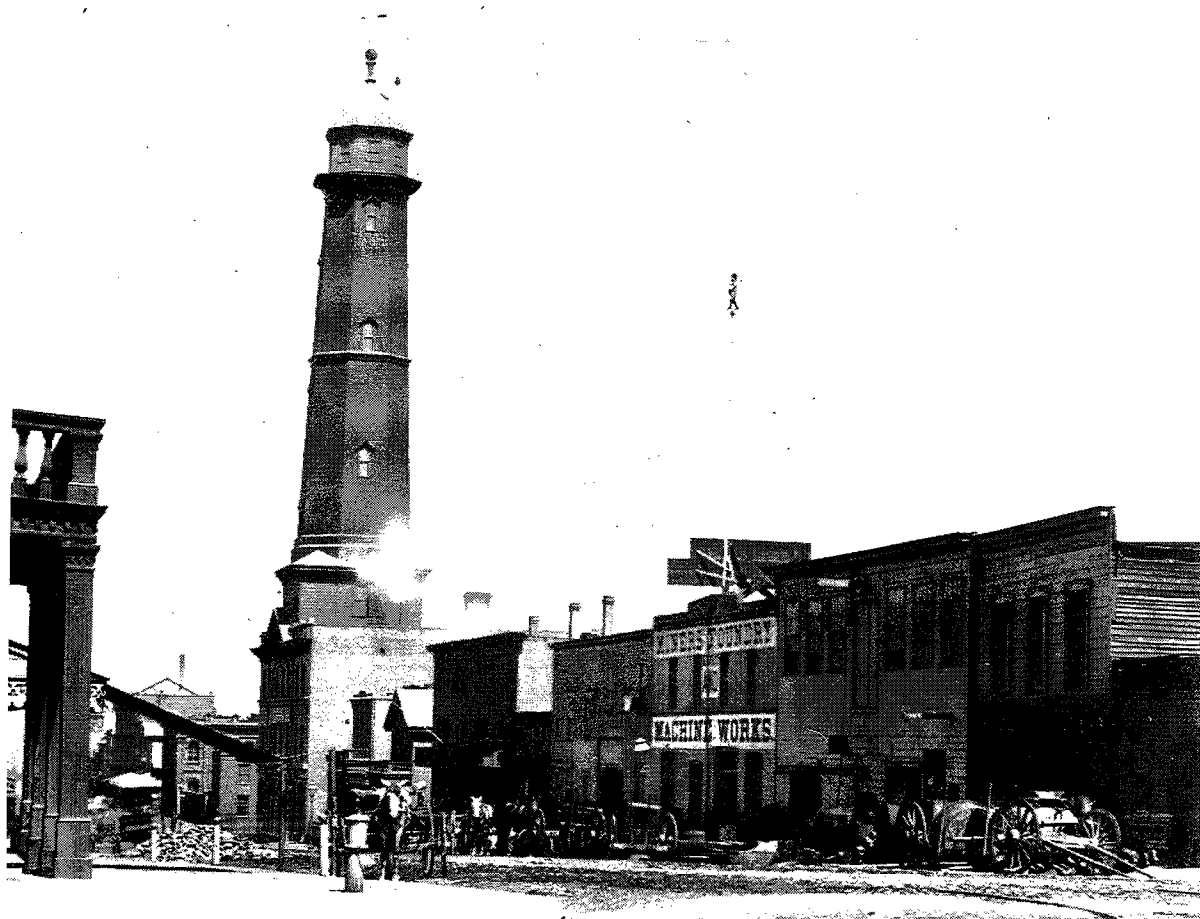


**Plates 9 & 10: Industry on Block 3 . . .** The advertisement to the left is the only known view of the Pioneer White Lead and Color Works, seen here along its Fremont Street frontage. The tall brick structure extended the depth of the block to Beale Street, and served as a warehouse for metallic pigments and oils used in paint, and contained mills for grinding white lead into a fine powder, as well as a mirror manufactory using mercury as its main ingredient on the top floor. The shed structures to the right housed the actual corroding stacks, where pig lead was corroded into white lead during a three-month long chemical process. The pig lead can be seen being taken into the sheds on horse carts. This structure appears to have had an earth floor; it burned to the ground in 1896 and was not rebuilt, the site remaining vacant until the 1906 fire leveled the rest of the block. The warehouse buildings were gutted in the 1896 fire, but were rebuilt for the Whittier-Coburn Paint Company, which continued in business on the site until 1906.

Above we see the same street frontage looking down Fremont Street towards Folsom in 1915. The William T. Garratt Brass Foundry occupies a large new brick building just south of the still vacant leadworks site. The Garratt foundry was one of the largest brass foundries in the city, manufacturing bells, pumps, and other very large brass castings, as well as containing a complete machine shop. Before the 1906 fire, the Garratt foundry was located on the site of the present Transbay Terminal, and it moved to the lead works site circa 1910, remaining in operation through the 1920s.

*Advertisement on Opposite Page: Courtesy of the Bancroft Library*

*View Above: San Francisco Engineering Archives*



**Plates 11 & 12: The Miners' Foundry Over Three Quarters of a Century . . .** The iron molding industry was the first and most enduring in the project area. The Miners' Foundry, begun in 1860, continued in operation until its site was needed for the Transbay Terminal approaches. Both iron and brass castings were made, and there was an extensive machine shop. Rebuilt after the 1906 fire in a structure very similar to its predecessor, the foundry was an archaic framed structure with an earth floor. Yet in such an unassuming and dilapidated building, some of the most advanced mining machinery in the world was developed and manufactured.

*Upper View: California Historical Society Lower View: San Francisco Engineering Archives*



## **BLOCK FOUR: Bounded by First & Fremont, Howard & Folsom Streets**

### **Summary of Block 4 Industries**

Although some small blacksmith shops and foundries, together with the purifying house of the **San Francisco Gas Works**, were constructed on the block in the 1850s, the last four decades of the 19th century saw the block intensively developed with **iron foundries** and **machine shops**. The **Selby Lead & Shot Works** at the corner of First and Howard was a major industry in operation until after the 1906 fire, while the **Great Western Smelting & Refining Works** on First Street worked with a variety of heavy metals from the 1890s up to 1906. The only part of Block 4 with little potentiality of directly site-produced hazardous materials contamination from 19th century industries is an eighty-foot deep strip along the north side of Folsom Street that was developed for residences and retail shops starting in the 1850s, and was not turned to industrial uses until after 1906.

After the 1906 fire, the same industries were rebuilt on much the same sites. New industries included a **printers' ink factory** immediately north of the **Miners' Foundry**, and a **sheet metal works** (later replaced by a **gasoline filling station**) on the corner of Fremont and Folsom. After part of the **Miners' Foundry** was demolished for the construction of the railroad viaduct leading to the **Transbay Terminal**, the remainder of the building was expanded and occupied by **U.S. Pipe & Manufacturing Company**.

Taken as a whole, the history of industries on Block 4 presents an unusually consistent land use pattern dominated by the metal industries. Virtually the entire block, at one time or another, was occupied either by iron foundries and machine shops, or lead smelters and sheet metal works. From the late 1850s until the construction of SF-480 in the 1950s, Block 4 was one of the most densely complex industrial sites in downtown San Francisco.

### **Topography and Filling**

Block 4 straddles the original duneline of Yerba Buena Cove. It was a very early site of both filling and modest industrial development, with iron foundries locating on it because its sandy soil was ideal for iron molding. 1850s photographs confirm that the soil of the block is mainly sand, not clay or rock.

Map 5, the 1852/53 United States Coast Survey (following page 9), shows that filling had already begun in 1852, indicated by the original shoreline shown crossing Fremont Street. As Plate 1 shows (following page 8), this early filling consisted in cutting down and levelling the

steep sand bank that ran behind the original shoreline east of First Street. To allow access to the waterfront, the grade of Folsom Street was established before 1853, and Plate 1 shows the street as a raised embankment sloping down to meet the bay near, or slightly beyond, the alignment of Fremont Street. The southern and southwest corner area of Block 4 has been substantially filled to bring it up to street grades.

Plate 4 (opposite page 9), drawn in December, 1854, shows an industrial building fronting on First street; its southern wall was approximately 80 feet north of First Street. This building was raised up on a substantial framework foundation in order to maintain a floor that was level with the higher elevation of First Street. The survival of some 1850s commercial structures up through the 1887 Sanborn Map indicates that this filling a haphazard process, undertaken by individual property owners when new buildings required more substantial foundations.

### **Early Industrial Development Before 1860**

From the early 1850s, industrial and warehouse structures covered most of the block apart from the Folsom Street frontage, which was gradually developed with residences and small commercial buildings. This pattern of development would remain largely unchanged through the 1906 fire. These early industries were mainly blacksmith shops and small iron foundries, and their sites were subsequently occupied by more recent industries which used the same type of materials and industrial processes. Thus, these first industries are significant only in that their wastes, related to the ironworking process and considered generally non-hazardous, may underlie later accumulations of similar materials.

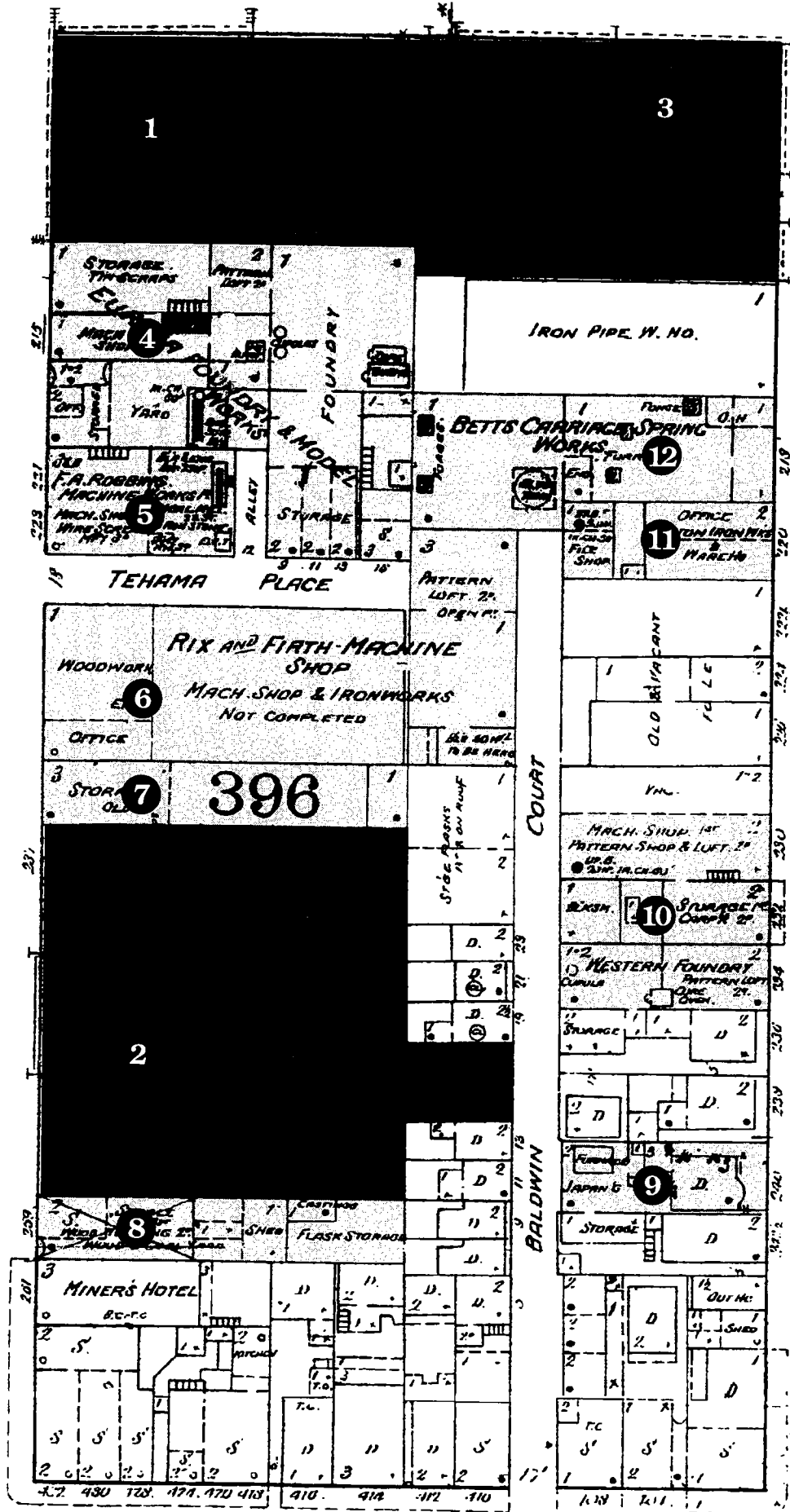
The largest of these industries, and the only one that may be clearly identified as to location on the site of the projected SF-480 Terminal Separation Rebuild footings, was a small foundry appearing in Plates 4 and 5 (following page 18) as a two-story structure with a small smokestack. Apparently still standing in 1887 and used for storage by that time, the foundry occupied a twenty-five foot lot extending to the center of the block; its south wall was 80 feet north of Folsom Street with the **Miners' Hotel** immediately adjacent to the south.

During the early to mid-1850s, the **San Francisco Gas Company** constructed a gas purifying house on the corner of Fremont and Howard, which together with its pipe warehouse immediately to the south, appears on the Block 4, 1887 Sanborn Map on the next page.

The only other substantial industry on Block 4 in the 1850s was the **Jackson Brewery**, which occupied part of the site of the later **Miners' Foundry**.

# HOWARD STREET

FIRST STREET



Key to Potential  
Hazardous Materials Sites  
Block 4  
1887 Sanborn Map

Shaded in Red:

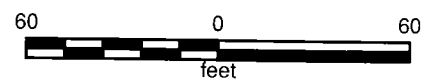
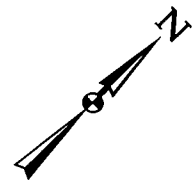
- 1: Selby Lead  
& Shot Works
- 2: Golden States &  
Miners' Ironworks
- 3: San Francisco Gas  
Company  
(gas purifying house)

Shaded in Light Red:

- 4: Eureka Foundry
- 5: Roberts Machine  
Works
- 6: Rix & Firth  
Machine Shop
- 7: vacant storage  
building
- 8: 1850s Foundry
- 9: japanning factory
- 10: Western Foundry
- 11: Fulton Ironworks
- 12: Betts Carriage  
& Spring Wheels

FREMONT STREET

FOLSOM STREET



Block 4, 1887 Sanborn Map



## Industrial Development, 1860-1905

Before the 1906 fire, First Street marked the western boundary of industrial development in the project area, and except for lots that fronted on Folsom Street and extended about 80 feet to the north, almost all of Block 4 was devoted to heavy industrial use, as can be seen on Block 4, 1887 Sanborn Map.

Two of these industries stand out as especially significant from the perspective of historical hazardous materials contamination: the **Golden State & Miners' Ironworks** on First Street, and the **Selby Smelting & Lead Works** at the corner of First and Howard. Both of these industries were begun in the 1860s and continued in operation on Block 4 until the 1930s.

**The Selby Smelting & Lead Company:** At the corner of Howard and First streets on Block 4, the Selby Shot Tower, seen in Plate 11 opposite page 36, was one of the most prominent landmarks of 19th century San Francisco. The works were established by Thomas Selby in 1865 to produce lead products, then in short supply because of the great demands of the Civil War, and occupied a three-story brick building 70 by 80 feet on the corner of First and Howard. The shot tower was 200 feet tall, and molten lead was dripped from its top platform into a pool of water at the base, assuming the necessary spherical shape in the course of its descent. A one-story shed building, 50 by 80 feet, adjoined the main structure east along Howard Street. In addition to lead shot, Selby produced lead pipe, wire, and sash, bullets, sheets and pipe of block-tin (tin alloyed with a small proportion of antimony), solder, and Babbitt metal (Hittell: 688). This last product was a soft, white, anti-friction metal consisting of varying proportions of copper, antimony, and tin. Bearings, for example, were often plated with Babbitt metal to reduce friction.

The actual smelting of lead and antimony ores was carried out by Selby in a smelter in North Beach, not on Block 4; but because contemporary chroniclers, such as Hittell, did not clearly differentiate between the Selby works operations at the two sites, we cannot be certain which manufacturing processes, apart from lead shot manufacture, were carried out on Block 4. Pig lead was brought to the lead works from the smelter and melted down in what the 1887 Sanborn Map describes as a "shot furnace." The Sanborn maps show a number of other lead furnaces, not only on the ground floor, but also on the first and second floors of this building. number of other lead furnaces were found not only on the ground floor, but also on the first and second floors of the Selby works. Thus, we may infer that other lead articles were manufactured in the building, apart from its main production of shot. Opposite page 66, Plate 22 reproduces an advertisement of the Selby works, but it gives only a partial list of the firm's many products.



The success of the Selby works can be seen its successive expansion into larger buildings on Block 4. The one-story addition to the original shot tower building was replaced in the 1890s by a large three-story brick building with a basement; the original building was then shown with a basement extending out under the sidewalk. This new configuration allowed for different manufacturing activities to be carried out on separate floors: thus, lead was melted on the third floor, finished shot was sifted and polished on the second, and then, stored on the first.

Destroyed in the 1906 earthquake, the Selby works were rebuilt to include a lead smelter on the same site, but the shot tower was not reconstructed.

**The Golden State and Miners' Ironworks:** Hittell best describes the origins of the Miners' Foundry and its importance in San Francisco industry:

The Miners' Foundry was established January, 1860 by Messrs. Howland, Angel and King, is located on First Street near Folsom. The first mining machinery for Washoe was turned out here. In addition to that kind of work, this foundry turns out all kinds of machinery, engines, and boilers. About 2,400 tons of pig iron and 200 tons of bar iron are used annually. For the smelting of this pig iron, 600 tons of Lehigh coal are used, together with an equal amount from Sydney, Vancouver, and Mount Diablo for other purposes. During the past year, 25 steam engines have been turned out at this foundry for mining, saw, and flour mills, 250 stamps, with the necessary amalgamating apparatus for the same. A large proportion of their work is to supply the mills with duplicate shoes and dies. Some sugar mill machinery has been made here within the past year for the Sandwich Islands....Some cotton mill and mining machinery for Mexico has also been made....The proportion of increase is greater out of state than within. The Miners' Foundry employs 150 hands (Hittell, Scrapbooks, p 35).

Unlike many contemporary enterprises that leased their premises, the **Miners' Foundry's** site is listed on the 1894 Handy Block Book as owned by Wales S. Palmer, one of the foundry's principals. The ownership of the land is probably why the foundry was reconstructed on the site following the 1906 fire, at a time when other comparable foundries were moving to sites further away from the downtown area with better rail and water access (pre- and post-fire views of the foundry, taken from the same position in the 1860s and 1920s are reproduced facing page 36.)

From its beginnings, the **Miners' Foundry** was conceived as a cooperative venture in which individual inventors would share the same facilities, while still competing against one another. This unusual arrangement reflected the rapid development of mining technology, in which the **Miners' Foundry** played a leading role. Many of the **Miners' Foundry's** craftsmen had been miners themselves in the 1850s, and the foundry offered a mining machinery emporium where miners visiting San Francisco could compare different amalgamating and crushing machines, and even test them out free of charge, in an assaying room, using their own ore

samples [this room is designated as such on the 1887 Sanborn Map, and may be discerned towards the center of the block]. Because of this cooperative structure, the range of products made at the **Miners' Foundry** was exceptionally broad.

The foundry depended on advertisements circulated among its customers in the mining districts; as well as testifying to the quality of the castings produced, the circulars stressed the variety of custom work that was available. Thus, the 1865 circular proclaims that:

We manufacture machinery and iron and brass castings of all kinds, steam engines, high and low pressure, of any required power, horizontal, vertical, and oscillating with every appurtenance. Boilers of every description, cylinder, flue, tubular, upright, locomotive and low pressure; architectural, agricultural, and marine castings and machinery of all kinds made to order. Mills, saw mills, circular, gang, muley, and sash, latest and most approved patterns; flouring mills, complete with all the latest improvements; sugar, malt and bark mills. Machinery for sugar refineries, distilleries, etc., King's patent shingle machine, cutting 1,000 per hour.

Planing, tongue and grooving, morticing, sticking, drilling, pile driving, coining, punching, hoisting, and smut machines are made.

Presses made include: cotton, hay, rag, drop, screw, and hydraulic.

Pumps are produced for mining, fire engines--force and lift, rotary, lifting, force with air chamber.

Miscellaneous products include: balance wheels, car wheels, hand wheels, wheel flanges, pulley flanges, pillar blocks, clamp blocks, spiders for pulleys, cast and wrought iron pipes, shafting, hangers, gearing, mandrels, gudgeons, retorts, melting and soap kettles, coolers for oil, tallow, etc., candle molds, forge backs, tuyer irons, jack screws, fan blowers, derrick irons, segments, cranks, horse powers, wheat screens, edging arbors, slitting arbors, cutting-off arbors.

Quartz mining machinery made includes: quartz mills complete, straight iron batteries, straight and rotary batteries, quartz rollers and crushers, chillian mills, grinders; rock breakers--Blake's and Wheeler's; amalgamators, pans, German barrels, Hungarian bowls; and arastras, separators, concentrators, retorts, ingot molds, quartz mill screens of any required fineness.

Water wheels made to fifty feet in diameter: the center discharge water wheel is cheapest, most simple and effective [water wheel] we make.

After the first Comstock boom ran its course in the 1860s, the **Miners' Foundry** still further diversified its products. Its 1881 circular looks back on the previous three decades of innovation in mining machinery:

California is justly credited with the honor of having accomplished more during the last thirty years toward perfecting quartz machinery than in the two thousand years preceding. The achievements of the proprietors of the **Golden State & Miners' Ironworks** in attaining this important result are well attested by the great

amount of quartz machinery of their manufacture now working the highest satisfaction to all concerned, in all the principal mining districts of the Pacific States and Territories, Mexico, and Central and South America. Our motto is to keep fully up with the progress of the times, to thoroughly investigate any proposed improvement or invention, and to adopt the best for the benefit of our patrons.

That same year, the 1881 catalogue lists an exhaustive range of products. A partial list is reproduced below to afford some idea of the tremendous diversity of the **Miners' Foundry's** activities--greater than most other foundries in the project area, and yet not in any way exceptional, unless one considers that all of these various goods were produced in a building of little more than 10,000 square feet:

**Castings:**

architectural, agricultural, boiler, gear, mining, mill (various), ship, steam engine, street, side walk, work shop, etc.

**Steam engines:**

compound, high pressure, horizontal, locomotive, low pressure, marine, etc.; oscillating, portable, propeller, saw mill, stationery, steam boat, vertical.

**Steam Engine Fittings:**

anchor bolts, condensers, couplings, exhaust pipes, feed pumps, governors, heaters, indicators, oiler, oil cups, hemp, patent, and rubber packing, registers, steam gauges, steam pipes, valves (globe), washers, etc.

**Boilers:**

Cornish, sectional, horizontal, flue, marine, portable, stationary, tubular, upright, etc.

**Boiler fittings:**

blow off cocks, boiler stands, breechings, doors and door linings, single and double fire fronts, fire backs, feed pipes, grate pipes, grate bars, grate rests, mud valves, retention valves, safety valves and scales and weights, smoke stacks, steam gauges and pipes and whistles, water gauge cocks and valves.

**Water wheels:**

breast, central discharge, Fourneron, hurdy-gurdy of all the various styles, Jonval, outer discharge, over shot, Poncelet, undershot, etc.

**Mills:**

bark, chilean, coffee, copper, cotton, flour, gold grist, malt, paper, powder, quartz and quartz prospecting, rice, saw--gang, single and double circular--silver, spice, sugar, woolen, etc.

Machines for bolting, bolt-sawing, blubber cutting, broom handle saw, dredging, gumming, hand and lath sawing, morticing, nosing, iron and wood planing,

punching, shearing, shingle, shaping, smut, sticking, tenoning, tonguing and grooving.

Presses for cloth, cider, cotton, drop, hay, hydraulic, macaroni, oil, screw, scum, vermicelli, wool, wire, etc.

Pumps:

Cornish, force, force and lift, jack head, lift, ship's, steam, etc.

Furnaces:

assayers, calcining, chloridizing, cupola, portable, quicksilver, reverberatory, revolving, roasting, and smelting.

Quartz machinery:

agitators, amalgam safes, amalgamating plates, arastras, circular buddles, crucibles, crushing rollers, concentrators dry and wet, single and doubles armed cams, gridiners, prospecting batteries of two stamps, pestles, pan dies, iron and wood quartz mill frames, quicksilver riffles, retorts, and retort stands, rock breakers, revolving blankets, Russia iron screens.

Grinders and amalgamators

guides, german barrels, ingot molds, latches, mortars, mortar dies, mullers and muller shoes, self feeders, separators or settlers, stamp steams, shoes, and heads, shafting, gib and Coleman tappets, wire screens, etc.

Sugar Mill Machinery:

agitators, air pumps, bay filters, blow ups bone mills, centrifugal dryers, charcoal filters, cane and mash carriers, evaporating pans, elephants, heaters, liquor apparatus, animal, steam and water power rolls, pumps, refiners, sugar molds vacuum pans, etc.

Oil mill machinery:

Brundell's presses, crushing rolls, edging stones, hydraulic presses, heating pans, oil presses, rumps, refining kettles, etc.

Flour mill machinery:

bails, bushes, bolting machines, conveyors, elevators, exhaust fans, gearing, hoisting screws, improved moll spindles, mill stones, portable grist mill, proof staves, separators, silent feed, smut machines, etc.

Saw mill, wood cutting and stone machinery:

arbor boxes, band saws, belt feed, carriage mountings, carriage rolls, cut-off arbors, circular saws, edging arbors, friction feed, frame or gate saws, Gilchrist's saws, haul up gear, hand cross cut saws, improved guides, head blocks, and self acting feed and backing motion saws; marble, Merriman's, muley, re-cutting saws, rubber beds, saw frames, sliding arbors, sweep sash saws, swing cross cut saws, turn over gear, etc.

Hoisting machinery:

capstans, derrick cranes, friction gear hoists, hydraulic hoists, and elevators, steam elevators, spur gear hoists, windlasses, whims, etc.

Hydraulic mining machinery:

- distributors, hose pipes, hydraulic hose covering, hurdy gurdy
- derricks, little giants, monitors, nozzles, water pipes
- Retorts, stills, and molds....
- Ship castings and ship work....
- Casting and machinery for various purposes.

What is most remarkable is that this wide variety of machinery was produced in a very modest structure on a small site on Block 4. By 1865, the foundry occupied essentially the same site that is shown on the Block 4, 1887 Sanborn Map; the circular of that year states that the premises had been recently expanded. Early pictures and woodcuts, such as Plate 11, show a jumble of false front frame buildings along First Street; these extended back as far as Baldwin Court in two places, but for the most part were only 100 feet deep. Most of these structures, as shown on the Sanborn Map, had earth floors--the common floor surface for foundries at the time. The structure shown on the 1887 Sanborn Map survived until the 1906 fire, and was rebuilt essentially unchanged after the fire.

The potential for hazardous materials contamination of the site of the **Miners' Foundry** is less a question of contamination resulting from the iron castings that were the main product of the foundry, but rather of contamination resulting from ancillary operations, such as brass casting and the painting of finished ironwork taking place in a building with an earth floor over a period of many years. Most of the products listed in the **Miners' Foundry** catalogues were iron and not brass, but a full range of industrial brass castings, mainly valves, pumps, and marine castings, were made at the foundry. Boilers made at the time increasingly used asbestos lagging, and at least some if not many iron and steel goods would have been painted with lead-based paint--often for ornamental as much as utilitarian purposes. Finally, the assaying room described above would have used materials such as mercury as part of the amalgamating process being demonstrated, though probably in small quantities. For all of these reasons, the **Miners' Foundry** presents a somewhat higher potential for hazardous materials contamination than other smaller foundries that were exclusively engaged in iron casting, or were in operation for a much shorter period of time.

### **Other Industries on Block 4, 1860-1905**

The **Miners' Foundry** is the only major industry directly in the right of way of SF-480, but several small industries occupied frame buildings along Fremont Street before the 1906 fire. Although the **Metropolitan Ironworks** had moved before the publication of the 1887 Sanborn Map, the iron works had been located at 228-230 Fremont Street since the 1870s under the

proprietorship of Curtis Tobey. In the early 1880s, this foundry was joined by the **Western Ironworks**, immediately adjacent to the south, at 232-234 Fremont, which continued in operation until 1906. Because the **Western Ironworks** and the **Metropolitan Ironworks** appear to have engaged only in iron casting and some machine shop work, and do not appear to have produced or used potentially hazardous heavy metals, they present a lower potentiality for contamination than the more extensive operations of the **Miners' Foundry**.

Still closer to Folsom Street, a **Japannery**, one of three on the Pacific Coast in the 1880s, was operated by Charles R. Short in a converted residence at 240 Fremont. Japanning consisted in the application of lacquer to a wood, metal, or leather base. Hittell explains the japanning process:

Japanning, as done on the coast, consists in applying varnish to tinned or plain sheet-iron ware, and drying in a heated oven. Ordinary articles, as the cheaper kinds of tinware, receive a single coat, but the better class of goods are treated several times; each coat being heated, and when hardened, polished by hand with powder. Further ornamentations is added, in the form of gilding, or painting with bright colors.

The process of Japanning encompassed several different industrial processes, including the application of asphalt-based and colored metal lacquers which were baked-on in an oven, shown on the 1887 Sanborn Map in the rear yard of 240 Fremont. Because of this, and the fact that Japanning operations appear from the Sanborn Map to have been carried out in the rear yard of the site, the **Charles Short Japannery** is marked as a potential source of hazardous materials contamination.

The north half of the block, outside of the SF-480 alignment, was entirely devoted to the metals industries before the 1906 fire. The **Selby Lead & Shot Works** have already been mentioned; the other industries were iron foundries, machine and tool works, and one non-ferrous metal smelter. The **Eureka Foundry** at 215 First Street, immediately south of the **Selby Works**, and extending midway towards Fremont Street, operated as an iron foundry from the 1870s until the early 1890s; at that time the rear foundry section of the building was taken over by the **Mechanics' Foundry**, which conducted iron founding there until 1906. The front section of the **Eureka Foundry** along First Street was occupied in the 1890s up to 1906 by the **Great Western Smelting & Refining Company**. Great Western dealt with lead, copper, tin, zinc, Babbitt metal, and alloys of these metals; it may be considered to have a significant potential for hazardous metals contamination, at least at its immediate site (Great Western moved to 75 Folsom Street, at the southeast corner of Folsom and Spear after 1906 and remained in operation there through the 1940s; recent testing of that site by Morrison-Knudsen for CALTRANS has detected high lead levels in the soil, phone conversation, 3/30.)

At 221-223 First Street, the **Aetna Ironworks** was in operation until the mid-1880s in a three-story frame structure; by the time the 1887 Sanborn Map was published the Aetna works had moved and the building was occupied by the **Roberts Machine Shop**. Hittell gives a good description of the **Aetna Ironworks**:

One of the oldest and most prominent iron manufacturing establishments on our coast is the Aetna Ironworks started on Sutter Street, between Montgomery and Sansome in 1857, by Thomas Pendergast, and moved to the present site at 217-221 Fremont Street, between Howard and Folsom, in San Francisco. The works include pattern, foundry, blacksmithing, and machine shop departments, supplied with all the complex and fine implements required for a foundry and machine shop of the superior class. The blacksmith shop connects the machine shop with the foundry, and has a 3-ton hammer. The foundry is 80 feet long and 40 wide, with an L, and contains 2 cupola furnaces, capable of melting 15 tons of iron daily. The machine-shop, occupying the main building, 90 feet long, 80 wide, and 3 stories high, embraces all the latest improvements in heavy tools, such as lathes, boring, planing, and slotting machines. The principal products of the Aetna Ironworks are designed for mining purposes, and include engines, boilers, amalgamators, ore-breakers, smelters for reducing argentiferous galena and copper ores, and hoisting and pumping engines. The White Rotary Furnace, of which George W. White is the inventor and sole owner, is manufactured exclusively in this establishment, of which the present proprietors are Thomas Pendergast, James Pendergast, and George Johnson. The number of men employed varied from 80 to 120 (Hittell 1882: 662).

Across Tehema Place, immediately to the north of the **Miners' Foundry**, the **Rix & Firth Machine Shop** occupied a large frame structure; in the 1890s this became a branch of the **Union Ironworks** while remaining a machine shop.

Along Fremont Street, the former **Gas Works Purifying House** on the corner of Howard and Fremont was replaced in the late 1890s by the **Abner Doble Tool Works**, which remained in operation until after 1906. At 218 Fremont Street, the **Betts Spring Company** manufactured iron and steel springs for carriages, drays, and railway cars. Essentially, the Betts works operated as a highly specialized foundry and machine shop, producing the finished springs, step-by-step, from pig iron melted in furnaces on the premises. Hittell describes the Betts works:

The only wagon spring factory west of the Rocky Mountains is that of the Betts Spring Company in San Francisco, located at 218 Fremont Street, with a frontage of 70 feet and a depth of 138 feet, where all kinds of steel springs, from the locomotive to the baby carriage, are manufactured. The factory was started in 1868 by William M. Betts, the head of the establishment, and a practical mechanic. Eighteen men are employed at wages averaging \$2.75 per day. They

import their steel from the Eastern States, and occasionally from Europe; and about 80 tons were worked up last year. A heavy item of expense, which puts this company at a disadvantage compared with Eastern factories, is the price of anthracite coal, which is imported from Pennsylvania at a cost of \$13 per ton. However, the business is prospering and gradually extending, small shipments having been made to China, Japan, and Mexico (Hittell: 674).

#### **Block 4 Industries, 1906-1948**

All of the structures on Block 4 were destroyed in the 1906 fire, but many were quickly rebuilt by their owners in new buildings very similar to the old. Residences and small commercial structures along Folsom Street were not rebuilt, and much of the Folsom Street frontage would remain vacant for many years. The main long-term effect of the fire on Block 4 was therefore to intensify and expand the existing pattern of industrial use.

Historical research has not revealed any warehouses that may have contained hazardous materials on Block 4 at the time of the 1906 fire; on the other hand, metal works, such as the **Selby Smelting & Lead Works** and the **Great Western Smelting and Refining Company**, would have had stocks of lead and other potentially hazardous materials on hand for use at the time of the fire, and these metals may well have been affected or altered by the great intensity of the fire and released into the underlying soil. None of the buildings on Block 4 at the time of the fire had concrete pad foundations which might have blocked such releases; after the 1906 fire, concrete foundations became increasingly common and will be mentioned where they are found in conjunction with otherwise hazardous materials activity.

Among the first industries that were rebuilt after the 1906 fire were the **Selby Smelter & Lead Company** at First and Howard, and the **Golden State & Miners' Ironworks** further down First Street towards Folsom.

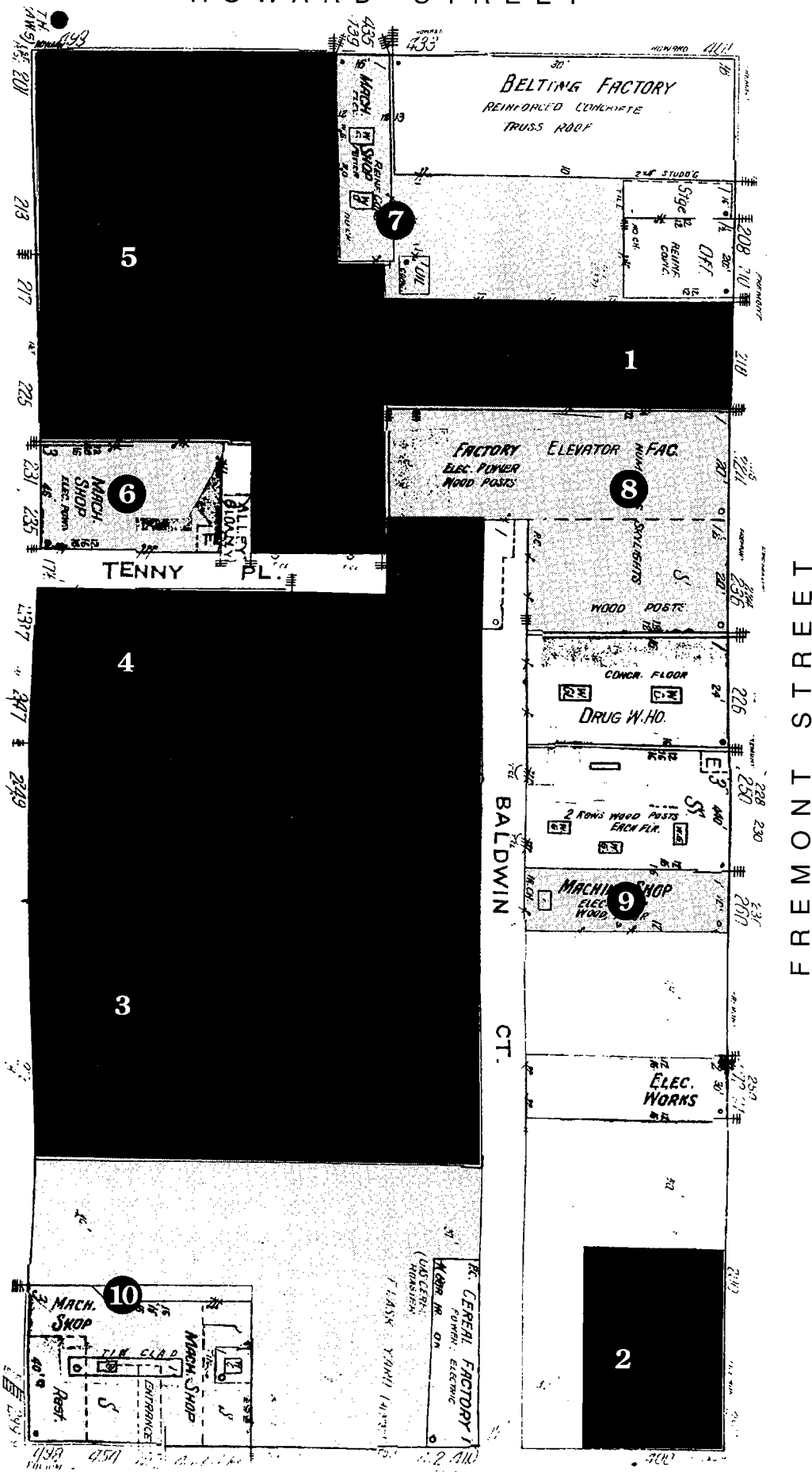
The new **Selby Smelting Works** covered a larger space than the old, extending to include the former **Great Western Smelting & Refining Co.** site just north of Tenny Place. The actual smelter occupied a new concrete floored structure in the center of the north half of the block off of Tenny Place; this is shown on the Block 4, 1913/29 Sanborn Map on the following page, by which time the lead works were no longer operated under the Selby name, but were part of the **American Smelting & Refining Company**. The smelting section of these works remained in operation until after 1948 as a plating factory, while the structures fronting on First and Howard streets were converted into clothing and paper warehouses in the 1930s.

The **Golden State & Miners' Ironworks** was rebuilt in a corrugated iron shed structure on a slightly larger site than it occupied before 1906; it remained in operation until the mid-1930s, when the north half of the building was demolished to allow construction of the Transbay



HOWARD STREET

FIRST STREET



Key to Potential  
Hazardous Materials Sites  
Block 4  
1913/1929 Sanborn Map

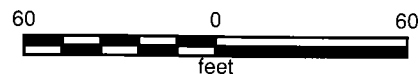
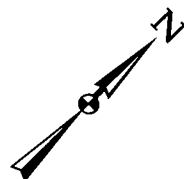
Shaded in Red:

- 1: Edison Storage Battery Co.
- 2: Stephenson & Nichols Gauge Manufacturers & Sheet Metal Works
- 3: Miners' Foundry, later: U.S. Pipe & Manufacturing Company

- 4: International Printers' Ink Corp. factory
- 5: American Smelting & Refining Co.

Shaded in Light Red:

- 6: Larkin Specialty Manufacturing Co.
- 7: W.I. Birth Welding
- 8: Van Emon Elevator
- 9: machine shop
- 10: machine shop in commercial building



FOLSOM STREET

Block 4, 1913/29 Sanborn Map

Terminal viaduct, originally built to accommodate electric train service to the East Bay. The remainder of the ironworks structure was then extended as far as Folsom Street over the former **Miners' Foundry** flask yard [for pattern storage], except for the corner lot at Folsom and First. The enlarged building was used by the **U.S. Pipe & Manufacturing Company** as a very large machine shop; map information does not indicate that the building received an improved foundation or floor at that time.

Along First Street between the **Selby Works** and the **Miners' Foundry**, the site of the former Rix and Firth machine shop was occupied immediately after the fire by the **Jackson Ironworks**, a small architectural iron foundry; this was replaced in the 1920s by a **printers ink factory** that manufactured ink for the many nearby printing shops. The ink factory occupied a one-story truss roofed building at 237-247 First Street; its site included an open yard in the center of the block fronting both on Tenny Place and Baldwin Court. This open yard allowed for convenient deliveries of raw materials and finished ink, but was also used for open air ink manufacturing: map information shows a twenty-foot square structure on Baldwin Court labeled "ink mixing," and several sheds used for "can storage." The ink factory operated under several different names at least until 1948.

At the corner of First and Folsom, a three-story masonry commercial and residence hotel building, shown on the 1929 Sanborn Map, was erected shortly after the 1906 fire and remained standing until demolished for SF-480 in the 1950s. At one point in the 1920s and 1930s, most of the lower floor of this building was occupied by a small machine shop.

A **metal plating works** was built in the 1920s in a structure previously occupied by a **cigarette factory**, between Baldwin Court and Fremont Street, and extending north from its Folsom Street frontage approximately 80 feet. The plating works closed in the 1930s and were demolished; a **gas station** was built on the site which appears in the 1948 Sanborn Map.

The Fremont Street frontage of Block 4 was occupied after the 1906 fire by a row of one and two-story industrial buildings, which mainly housed small **machine and pattern shops**. An **elevator factory** occupied a large one-story masonry building on the site of the former **Betts Carriage Spring Works**. At 218 Fremont, on the site of the **Holman Car Company Works**, which built railway cars and trolleys (the cars mainly constructed of wood), a **storage battery warehouse** operated out of a two-story concrete building built in 1925; it continued in operation until the 1930s, and the building subsequently housed a **machine shop** up through 1948.

## **BLOCK FIVE: Bounded by Howard & Folsom, Second & First Streets**

### **Summary**

Block 5 marks the division of the project area between the Tar Flat and Rincon Hill districts, and in the 19th century a separation of industrial and residential land use patterns. The part of the block that the SF-480 right-of-way passes through was developed in the early and mid-1850s with houses, most of which are shown as still standing on the 1887 Sanborn Map. Immediately before the 1906 fire, which destroyed all the structures on the block, some industries were already replacing residences, and after the fire, the block was rebuilt with industrial structures.

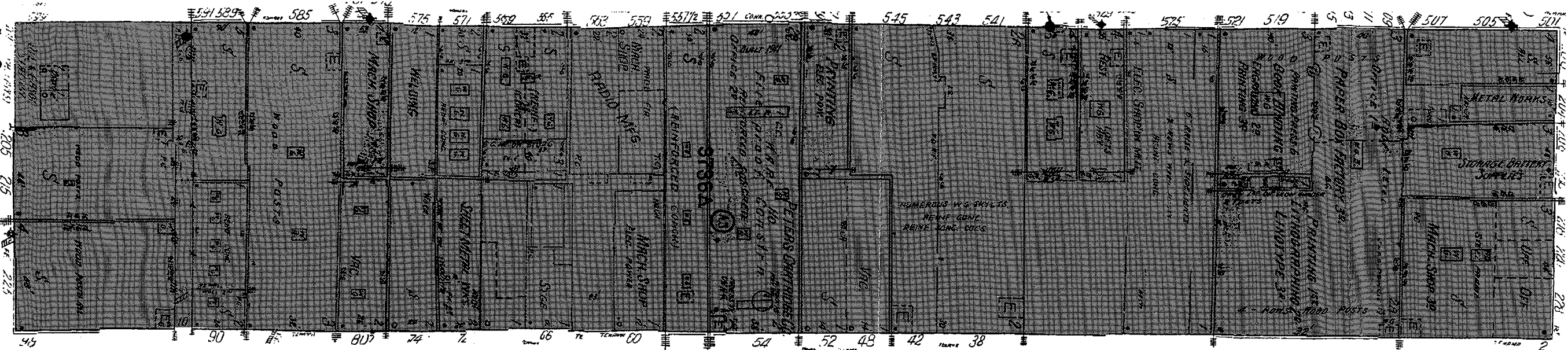
Because SF-480 only passes through the southeast corner of Block 5, the complex pattern of industrial land use for the remainder of the block after 1906 has been investigated only to locate potentially substantial sources of hazardous materials that might have migrated onto the project area. No such industries have been found.

Post-1906 industries included **machine shops, iron foundries, ink factories, food processing factories, metal plating works, and non-ferrous metal industries**. Although some of these industries did use hazardous materials, the post-fire structures in which they were located did not have earth floors, and there were no open yards in the area traversed by SF-480 that could have served as dumping grounds for waste. Several **brass foundries and sheet metal works** were located clustered together on Block 5 both on the SF-480 right-of-way, but no extraordinary sources of potential hazardous materials contamination were found anywhere on the block

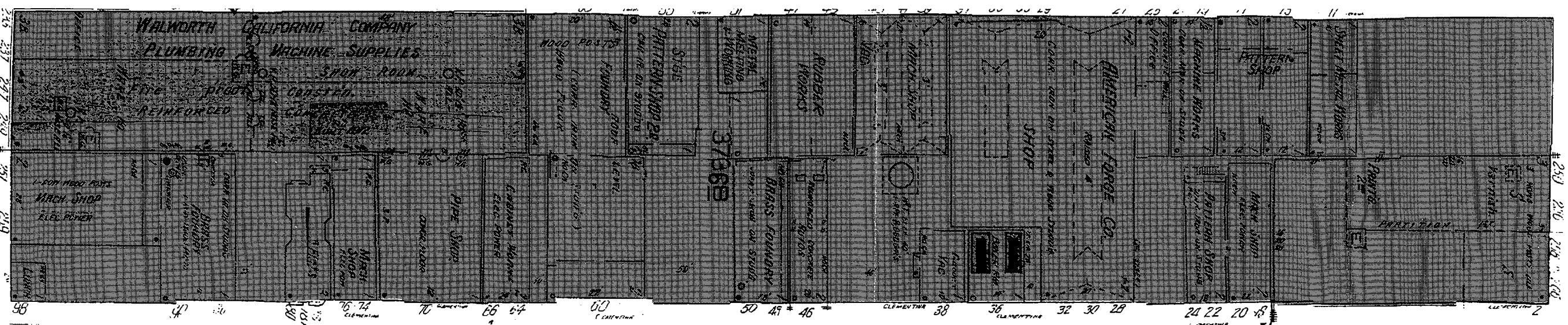
### **Natural Site**

Plate 5 (following page 18) shows that in the early 1850s, the portion of Block 5 containing the SF-480 right-of-way formed a hollow between Folsom and Clementina streets, instead of the gentle downward slope of the present grade. Houses fronting on Folsom Street were either set back and down from the street, or had a natural basement to the rear. The ground floor of the substantial building with the cupola appearing in Plate 5 at the corner of First and Folsom was perhaps ten feet or fifteen feet higher than the ground behind it. This hollow was probably only completely filled in after the 1906 fire, when the block was rebuilt with larger industrial buildings. The 1913 and 1913/29 Sanborn maps show that buildings fronting on Folsom Street had an additional half-story or half-basement on their Clementina Street frontage. Early photographs show that the surface soil of the southeast corner of Block 5 was sand; substantial sand hills were found closer to Howard Street, as can be seen on Map 5, which were later used to fill Tar Flat.

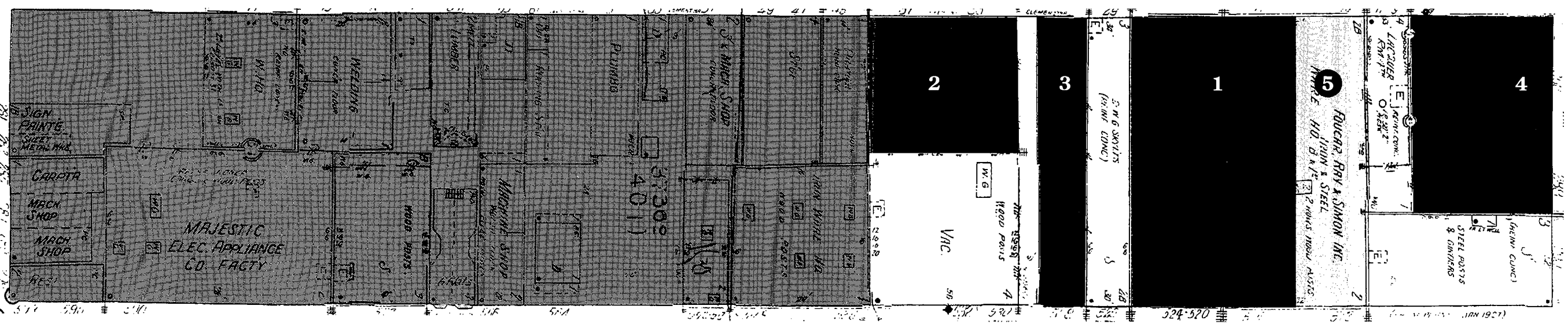
# HOWARD STREET



# TEHAMA STREET



# CLEMENTINA STREET



# FOLSOM STREET

Key to Potential  
Hazardous Materials Sites  
Block 5  
1913/1929 Sanborn Map

Shaded in Red:

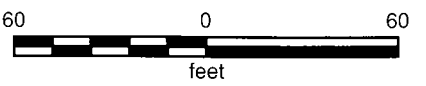
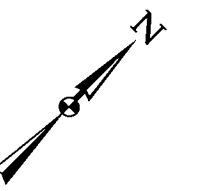
- 1: Mutual Label & Lithograph
- 2: Chapman Baker Machine Works
- Standard Brass Casting
- 3: Pacific Brass Foundry
- 4: Standard Plating Works

Shaded in Light Red:

- 5: Foucar, Ray & Simon Iron & Steel

FIRST STREET

SECOND STREET





### Block 5 before 1906

The 1887 Sanborn Map shows that virtually all of Block 5 was built up, with single family houses along the alleyways, and larger homes, boarding houses, and commercial structures along the major streets. By 1899, industries had begun to move onto Block 5; the largest was the **Mutual Label & Lithograph Company**, which assembled a site at 510-514 Folsom Street reaching across to 13-15 Clementina Street for its printing factory, on the SF-480 right-of-way. At 236 First Street the **California Paint Company** had its factory immediately before the 1906 fire; because the paint factory was well north of Clementina Street and the SF-480 right-of-way, it is unlikely that heavy metal residues from paint have contaminated the SF-480 site.

At 33-37 Clementina, the **Chapman-Baker Machine Works** operated **machine shop** and **brass foundry** in the years immediately before 1906. The firm specialized in fire fighting equipment, and made its own brass castings for hydrant and hose systems, also selling the hoses themselves, and may have supplied the San Francisco Fire Department with specialized machinery. Following the lead of **Mutual Label & Lithograph**, the foundry was built on the site of gold-rush era residences, and accelerated the industrial transformation of the southeast corner of Block 5. At 39 Clementina next door to it another brass foundry, **Standard Brass Casting**, operated during the same time period; it appears to have been a typical small brass foundry similar to many others already established in Tar Flat. **Mutual Label & Lithograph Company** did not continue in business up to 1906; around the turn of the century its premises were taken over by the **McMaster-Pieper Machine Company**, which imported specialized machinery and dealt in second-hand machine tools. Further to the west, at 528-530 Folsom Street, the **Bryan Elevator Company** also began business after 1899 on a previously residential site; it was one of many small elevator building and repair companies that appear in the project area at the time, reflecting the growing use of sidewalk and small business elevators.

### Block 5 after 1906

All of Block 5 burned in the 1906 fire, and the new buildings that were built upon it were almost entirely industrial. The 1913 Sanborn Map shows this striking transformation of a block that was still mostly filled with small houses and tenements before the fire. In 1913, much of Block 5 was still vacant, and many of the buildings shown were temporary sheet-metal structures. The area between Howard and Tehama streets contained many lots occupied by these temporary buildings or lying vacant, while land owners waited in hope of erecting substantial loft buildings along this major artery. In the central third of the block, between Tehama and Clementina streets, new

buildings were mostly occupied by metal working industries, including a **gas engine factory**, **brass and iron foundries**, **sheet metal works**, and a **plumbing supply** company.

The section of Block 5 under primary consideration here, bounded by Clementina, First, Folsom, and extending halfway to Second opposite Essex, showed a pattern of development similar to the central third of the block. At the southwest corner of Clementina and First streets, with the address of 268 First, the **Standard Plating Works** occupied the first floor of a reinforced concrete three-story building; the upper floors housed a **metal works** and a **book bindery**, and later by a **die works**. All of these industries remained in operation in this building until at least 1948; the building was demolished for SF-480 in the 1950s. Immediately next to this structure a four-story loft building was constructed at 9-11 Clementina Street, which may have served as an annex to the **Standard Plating Works**; its fourth floor was used separately as a **lacquer works**. The corner of First and Folsom streets remained vacant until a three-story concrete building was constructed on it in 1927; business directory research has not revealed its use, and it is possible that it was also part of the **Standard Plating Works**, to which it had connecting doors.

Just to the west of the plating works, on part of the site of the **Mutual Label & Lithograph Company**, at 512-516 Folsom and 15-17 Clementina, **Foucar, Ray & Simon Iron and Steel** built a two-story warehouse-type building, with interior wood posts. In addition to housing the steel company's operations, parts of the building were used at different times for general warehouse purposes. **Foucar, Ray & Simon** remained in the building until at least 1948. The formerly residential lots at 520-524 Folsom, extending back to Clementina, were the site of a two-story warehouse building similar to that of **Foucar, Ray & Simon** next door; this building was used by the **Sunset Nut Company** for nut shelling and roasting, and later by a **flag manufactory**.

Immediately after the 1906 fire, the property at 528 Folsom was rebuilt by the **Pacific Brass Foundry of San Francisco**, which remained in operation in the same brick-floored structure until 1948; it was demolished for the construction of SF-480. After 1929, the foundry expanded into the building immediately behind it, fronting on Clementina Street. Across the narrow alleyway of Ecker Place from the brass foundry, the **California Ink Company** factory was housed in a three-story building with a concrete floor at 33-37 Clementina, which had been the site of the pre-fire **Chapman-Baker Machine Works** and the **Standard Brass Casting** works. By 1929, the ink company had vacated the building, and it was later used for **warehouse space**, and **machine shops**. At 530-534 Folsom Street, backing up against the ink factory, a four-story masonry building with interior wood post construction housed **warehouse space** and **food**

**processing** firms; in 1929 it was vacant, and later contained a **wholesale wine and liquor** dealer; it is still standing, and marks the edge of the SF-480 right-of-way.

Separated from the SF-480 right-of-way by surviving structures, the curving Transbay Terminal viaduct and the Fremont Street off-ramp of the Bay Bridge are on the site of a post-fire **iron foundry**, a **machine shop**, a **plumber's shop**, and an **iron warehouse**. The buildings housing these industries were all demolished in the late 1930s for the Bay Bridge facilities.



**Plate 13: Looking South on 2nd Street, 1906 . . .** The deep cut of 2nd through Rincon Hill that appears at the right in the distance was made in 1869, leaving high bluffs on either side that were gradually eroded. Harrison Street crossed 2nd on a viaduct. The remains of the hill to the west of the cut were reduced to their present grade in the mid-1920s to create level sites for industries, principally engaged in food processing and paper box making, while the bluff to the east was graded and lowered for construction of the Bay Bridge approaches.

In this photograph, industrial reconstruction is proceeding after the 1906 fire; the brick buildings will be part of the very large **Shilling Company** complex of spice manufacturing. The corner lot was used at that time for storing drums that probably contained flavoring extracts rather than hazardous materials; later, the corner would be developed for the company offices.





**Plates 14 & 15: Block 2 in 1920. . . The large warehouse building on the right of the upper plate dates back to before 1886, and housed the Pacific Rubber Paint factory, a part of the Pioneer White Lead Works. It survived the 1906 fire and was used as a general warehouse for several decades. By 1948, with the rest of the block devoted to a railway freight yard, it was one of the only structures that remained. Below, Main Street looking south from Howard was the site of successive generations of iron and brass foundries, and machine shops.**



## **BLOCK SIX: Bounded by Harrison & Folsom, Second & First Streets**

### **Summary**

Prior to 1906, Block 6 was almost entirely residential, with large houses dating back to the 1850s set among spacious gardens. Only the southwest corner of the block, at Folsom and Second, was used for outdoor storage of foundry flasks. After 1906, the Folsom and Second street frontages of the block were filled with substantial industrial buildings used mainly for **paper warehouses** and **food processing** industries. The upper part of the block was rebuilt with tenement buildings, which were gradually joined by smaller industries. The only identifiable potential source of hazardous materials contamination along the SF-480 right-of-way are a **sheet metal works** located at the corner of Lansing and Essex streets, a **steel tank storage** warehouse near the corner of Essex and Harrison, and a **gas station** at the corner of Second and Harrison.

### **Natural Site**

Block 6 has been cut down substantially from its original height, as can be seen on Maps 5 and 6. Folsom Street was the first street which was graded, circa 1851, and approximates the natural grade of the Rincon Hill. Until 1869, Second Street intersected with Harrison at an elevation some 70 feet higher than it now does, forming a barrier to traffic to the south waterfront. In 1869, Second Street was cut through between Folsom and Bryant to its present grade; Harrison Street was left at its previous grade and crossed Second Street on an iron viaduct. The loose rock of Rincon Hill frequently slid down onto Second Street in wet weather, and as a result, an irregular steep bank was left extending from Second and Harrison as far as Folsom and Essex, which can be seen in Plate 13 on the facing page, taken immediately after the 1906 fire. As the cut continued to crumble, the Harrison Street viaduct proved a temporary expedient, and photographs taken in 1920 show that Harrison Street was by then an unimproved path between Second and Sterling streets. With the construction of the Bay Bridge in the mid-1930s, Harrison Street was established in its present grade between First and Second. Aside from its frontage along Folsom Street, it would appear that all of Block 6 has been cut down from its original elevation.

### **Industrial Development**

In the wake of the Second Street cut, the corner of Folsom and Second was left at the bottom of a steep bank and the 1887 Sanborn Map shows that this area was used for the **outdoor storage** of flasks or molds from iron foundries. The remainder of the block was occupied by

SECOND STREET



- 



large houses prior to 1906, many of them dating back to the 1850s, when Rincon Hill was San Francisco's first fashionable neighborhood. By the time of the 1906 fire, many of these homes had been turned into boarding houses, schools, or sanitariums, but industries had not penetrated into this part of Rincon Hill. All of these houses burned in the 1906 fire, leaving Block 6 as it appears in Plate 13.

Immediately after the fire, the Folsom Street frontage of Block 6 began to be developed with substantial industrial and warehouse buildings. Of these, the largest was the **Schilling Company** factory, occupying the entire corner of Second and Folsom, and extending back as far as the bottom of the bluff left over from the Second Street cut. This factory can be seen under construction in Plate 13; it was built of brick, and the Block 6, 1913/29 Sanborn Map shows that a variety of food-processing operations were carried out in it up through the 1950s. Further east along Folsom Street, a small **wholesale chemical company** operated from a three-story masonry building at 565 Folsom Street; the remainder of the block as far as First Street along Folsom was covered by substantial loft buildings housing the **Gimbal Brothers' Candy Factory**, **Hoefler's Candy**, and several **paper warehouses**. The only potentially hazardous industry located along Folsom Street was the **Galloway Lithographing Company** at 513-523 Folsom, later the **Associated Ink Company Ltd.** and the **Lithotype Process Company**, and since these businesses were housed in modern reinforced concrete buildings, they are unlikely to have contaminated the site.

The upper part of Block 6, bisected by Essex Street and further divided by the alleys of Guy, Lansing, Charlestown, and Essex places, was never fully rebuilt after the 1906 fire. As can be seen on the Block 6, 1913/29 Sanborn Map, small tenements, some of which are still standing along Guy and Lansing places, were interspersed between vacant lots and small industries. Photographs from the 1920s show that some of these vacant lots were used for storing old machinery and scrap iron; no photographic evidence of hazardous materials dumping has been discovered.

Along First Street, a **machine shop** at 314 First, a **millwright** at 316 First, and **Wilcox & Co.'s Printing Shop** at 318 First typify the small businesses established on the block after the fire; photographs show that these small industries were housed in often ramshackle wood-frame buildings. Further up First towards Harrison, **food processing** industries operated out of large reinforced concrete warehouses occupying the street frontage between Guy and Lansing places; at the corner of First and Harrison, the **Wesix Electric Heater Factory** was constructed in the late 1920s. None of these industries should pose a problem of hazardous materials contamination to the SF-480 right-of-way.

In the interior of the block, a **knitting mill** occupied a two-story reinforced concrete building at 75-81 Lansing Street; next to it at the corner of Essex, the **American Push Broom and Brush Factory** was housed in a one-story building. Across Lansing from these two industries, a **sheet metal works** at 90 Lansing Place at the corner of Essex was housed in a large, one-story building of wood-post construction. The sheet metal works was demolished in the 1930s when, concomitant with the construction of the Bay Bridge approach ramps along Essex Street, Essex Street was lowered and Guy Place and Lansing connected by a new, curved extension of Guy Place, directly on the site of the sheet metal works. At the same time, immediately behind the knitting mill and set back from Harrison Street, a **steel tank storage warehouse** was built, of corrugated iron and steel truss construction. A **gas station** was later built at the corner of Harrison and Second. This and the sheet metal works mentioned above appear to be the only potential sources of hazardous materials contamination near the SF-480 right-of-way on Block 6.

## **BLOCK SEVEN: Bounded by Bryant & Harrison, Second & First Streets**

### **Summary**

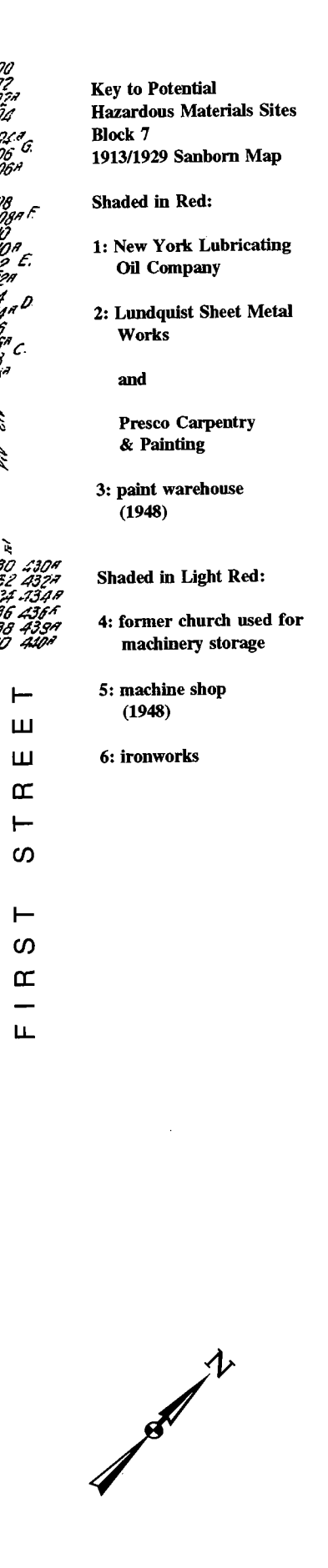
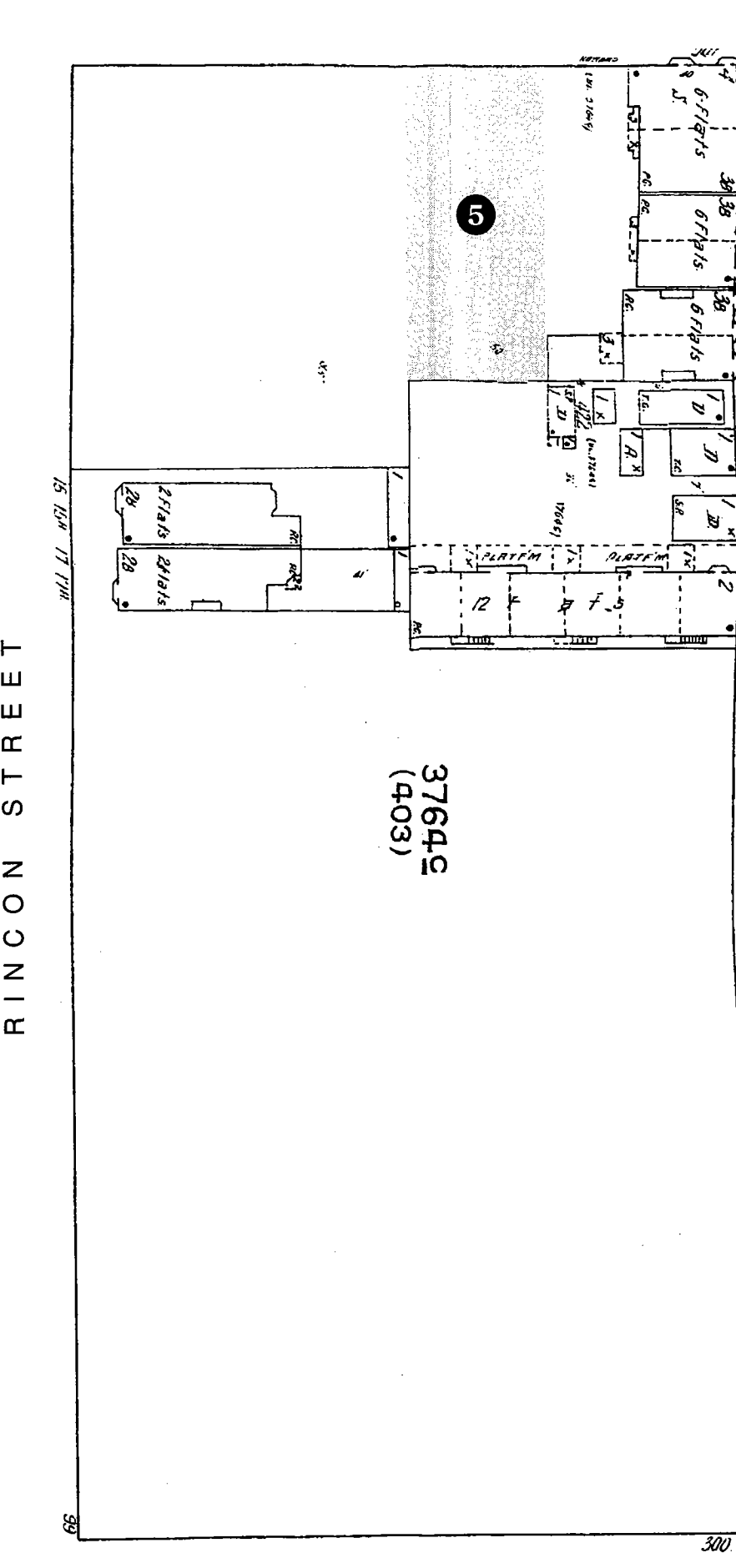
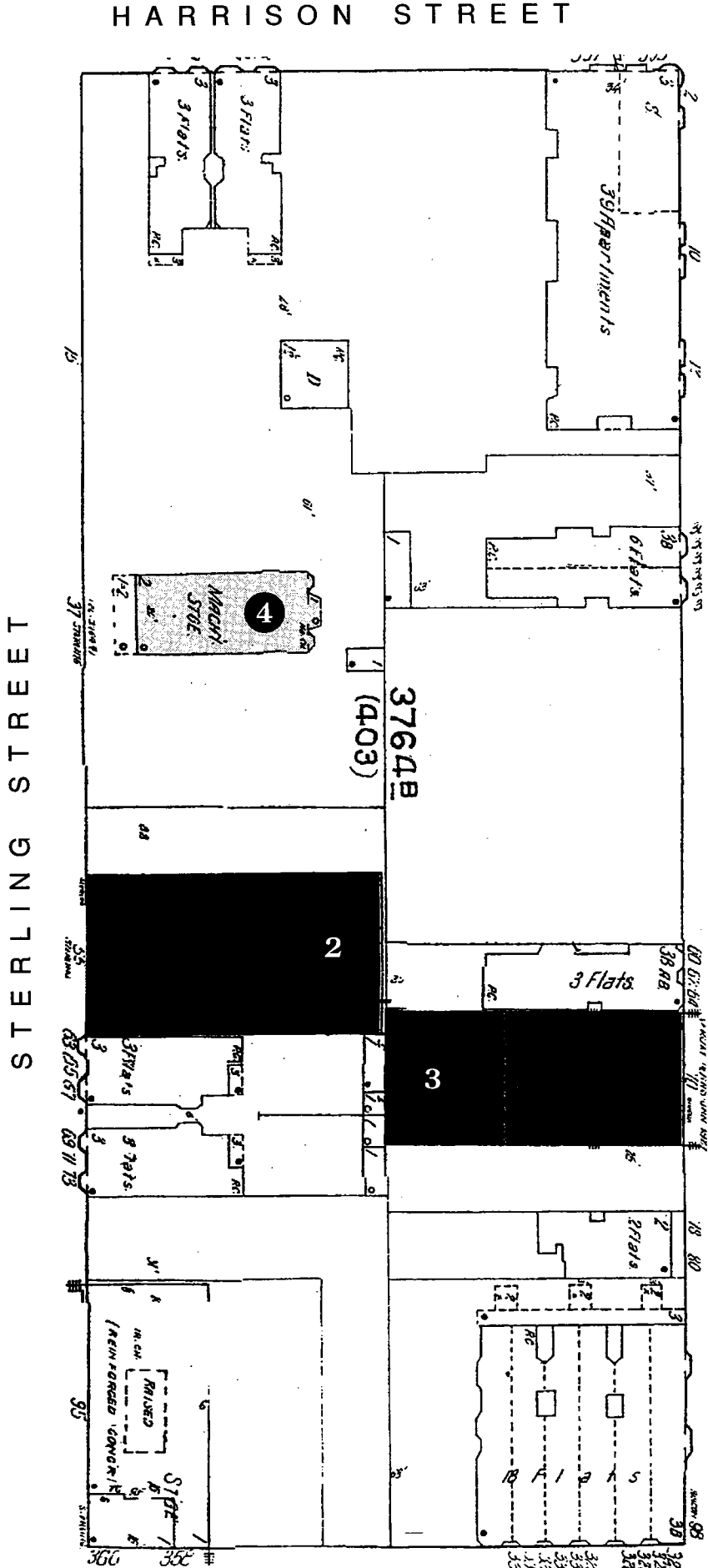
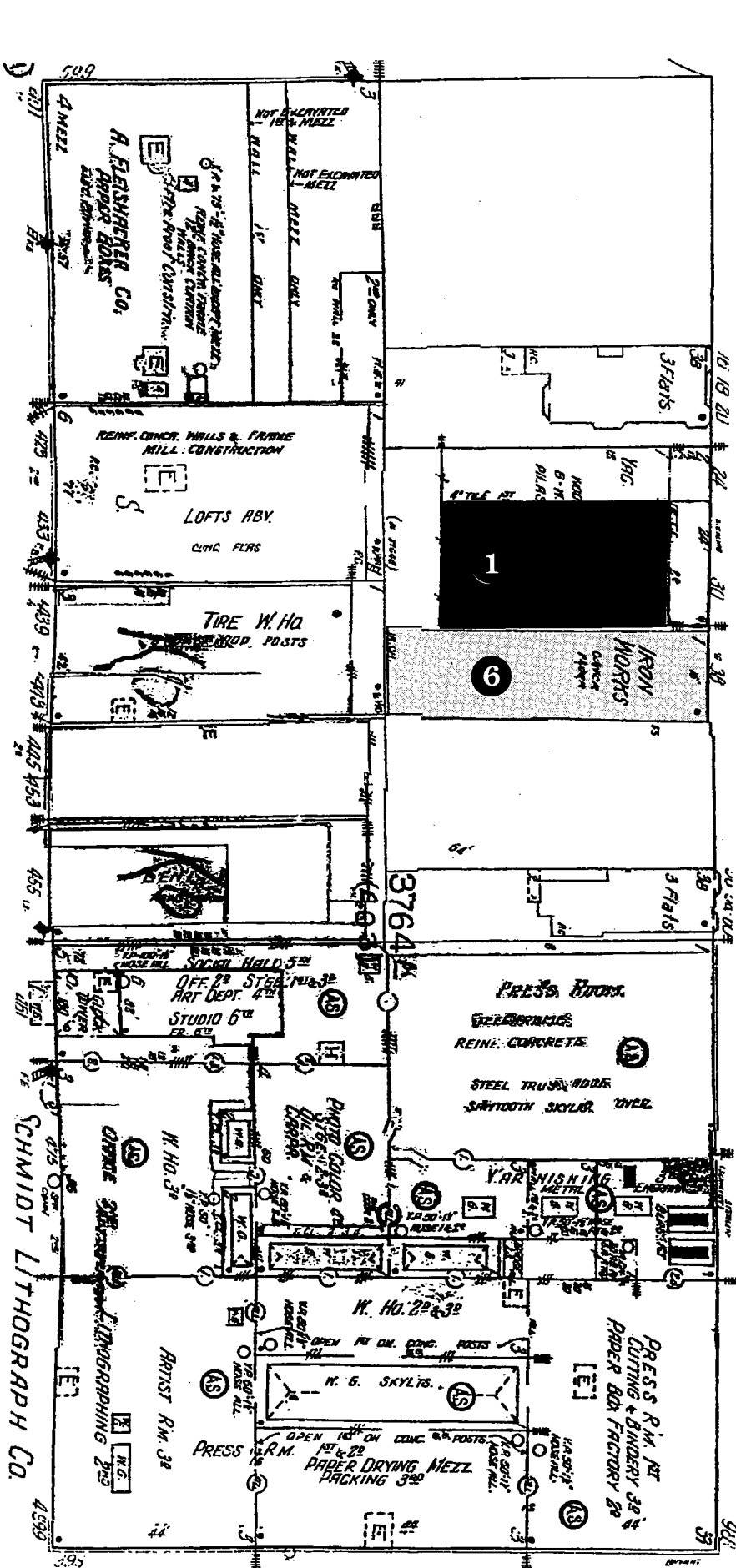
At the summit of Rincon Hill, Block 7 was one of the most attractive residential blocks in San Francisco prior to 1906. On its eastern end, between Rincon Place and First Street and fronting on Harrison, Saint Mary's Hospital had been constructed in 1861. The hospital and all of the residences burned in the 1906 fire, and much of the block remained vacant until the construction of the Bay Bridge. Only the westernmost third of the block, between Second Street and Sterling, was developed after 1906 with substantial industries; after the construction of the bridge, other industries were located in the interstices that remained between the bridge approach viaducts. Any potential for hazardous materials contamination dates from the period after 1906; the post-fire industries on the block were mainly in modern buildings. Several **paint** and **lubricating oil warehouses** have been noted on the Block 7, 1913/29 Sanborn Map on the following page.

### **Natural Site**

Block 7 is now the highest point of Rincon Hill, but it has been lowered, first by establishing street grades in the 1850s, and more significantly for the construction of the approaches to the Bay Bridge. Second Street was cut through at Harrison in 1869 to establish its present grade, and Sterling and Rincon places were rearranged and lowered when the Bay Bridge approaches were built.

### **Industrial Development**

Photographs from the San Francisco Engineering Archive show that in 1920 Block 7 was gradually being developed with light industry, but that it still contained many vacant lots and tenement apartments. Along Second Street, the substantial **Schmidt Lithograph Company** factory was the largest industry on the block, occupying its southwest corner between Second, Bryant, and Sterling. Although printing industries did use heavy metals in ink manufacture, which in the case of **Schmidt Lithograph** appears to have been carried out in the building, the potential for hazardous materials contamination from that source would appear to be limited by the modern design of the still-extant building. Further north along Second Street, large industrial loft buildings were erected after the extension of a Southern Pacific Railway spur down the center of the street in the 1910s. At 425 Second, the **American Cable Company**, a branch of a New



Block 7, 1913/29 Sanborn Map

York firm, had a cable warehouse; in the same building the **Page Steel and Wire Company** made or distributed wire fences, and the **Weed Chain Company** manufactured chains. At 401 Second, at the corner of Harrison, the **Fleishhacker Paper Box Company** was one of the first industries to locate its operations on Block 7, opening its box factory before 1919.

The interior streets of Block 7, Sterling and Rincon, present a mixed picture of development prior to the construction of the Bay Bridge. Two and three-story tenement apartments, built immediately after the 1906 fire when land owners anticipated that Rincon Hill would become a working-class neighborhood, stood amidst large vacant lots that were only slowly developed for light industries in the 1920s. At 30 Sterling Street the **New York Lubricating Oil Company** was housed in a one-story masonry building with interior wood post construction; by 1948 this building was used for a wholesale liquor store. Next to it at 38 Sterling a small ironworks occupied a one-story concrete-floored building. On the east side of Sterling Street a derelict wooden church at 37 Sterling was used for **machinery storage** in the 1920s; at 55 Sterling K. G. Lundquist's **sheet metal works** shared a concrete-floored building with **Oscar Presco & Sons Carpentry and Painting**. On Rincon Street, the only industry was a **printing shop** housed in a reinforced concrete building constructed in the late 1920s and still standing in 1948, used by time it for a **paint warehouse**.

The construction of the Bay Bridge Approaches displaced some of the industries of Block 7, but improvements in vehicular access encouraged the development of formerly residential or vacant lots for new industries. At 424 First Street a **machine shop** was housed in part of an L-shaped building that extended around to 511-515 Harrison Street; the remainder of the building was used as a **warehouse**. At 324-340 Bryant Street, the **Paterson-Pacific Parchment Company** warehouse was housed in a large reinforced-concrete warehouse structure designed to fit inside the loop of the Bryant Street access ramp of the Bay Bridge. Off of Sterling Street, on the site of the disused church mentioned above, an **electric substation** was constructed in 1939 to provide power for the bridge railway; it remained in operation until the bridge railway trains came to an end in 1958 but is still standing.

Because the industries of Block 7 mostly operated out of modern concrete buildings, the potential for hazardous materials contamination would appear to be lower than from the older industries of Tar Flat. Since the vacant land on Block 7 was only inconveniently accessible prior to the construction of the Bay Bridge, there is less potential for dumping or storage of hazardous materials than vacant land in Tar Flat. Photographs taken in the 1920s confirm this.



## **BLOCK EIGHT: Bounded by Bryant & Harrison, Fremont & First Streets**

### **Summary**

Because of its isolated location on the eastern bluff of Rincon Hill, Block 8 was never substantially developed for industrial uses. Spacious houses along First Street were replaced after 1906 with shanties, which in turn were demolished for the Rincon Hill footing of the Bay Bridge in the 1930s. As a result, there is little historic potential for hazardous materials contamination on Block 8.

### **Natural Site**

As can be seen on Maps 5 and 6, the southeast corner of Block 8 descended in a steep slope to the original shoreline of the bay. During the 1850s, small **marine ways**, shown on Map 6, were established along the shore in the general vicinity of Block 8; none appear to have been located directly on Block 8. Using rock from Rincon Hill, the area between Steamboat Point and Rincon Point was filled, beginning in the late 1850s, to provide for deep-water anchorage. Some of this fill probably came from Block 8; its current highest elevation is substantially lower than the 120 feet shown on Map 6. Further alteration of the original slope of the hill was associated with the construction of the Bay Bridge, as bridge construction photographs reveal. Nevertheless, the steep bank corresponding to the original bluff is shown in essentially the same location on the 1887, 1899, 1913/29, and 1913/48 Sanborn Maps. This bluff appears most clearly in a 1912 birdseye view, reproduced following page 58.

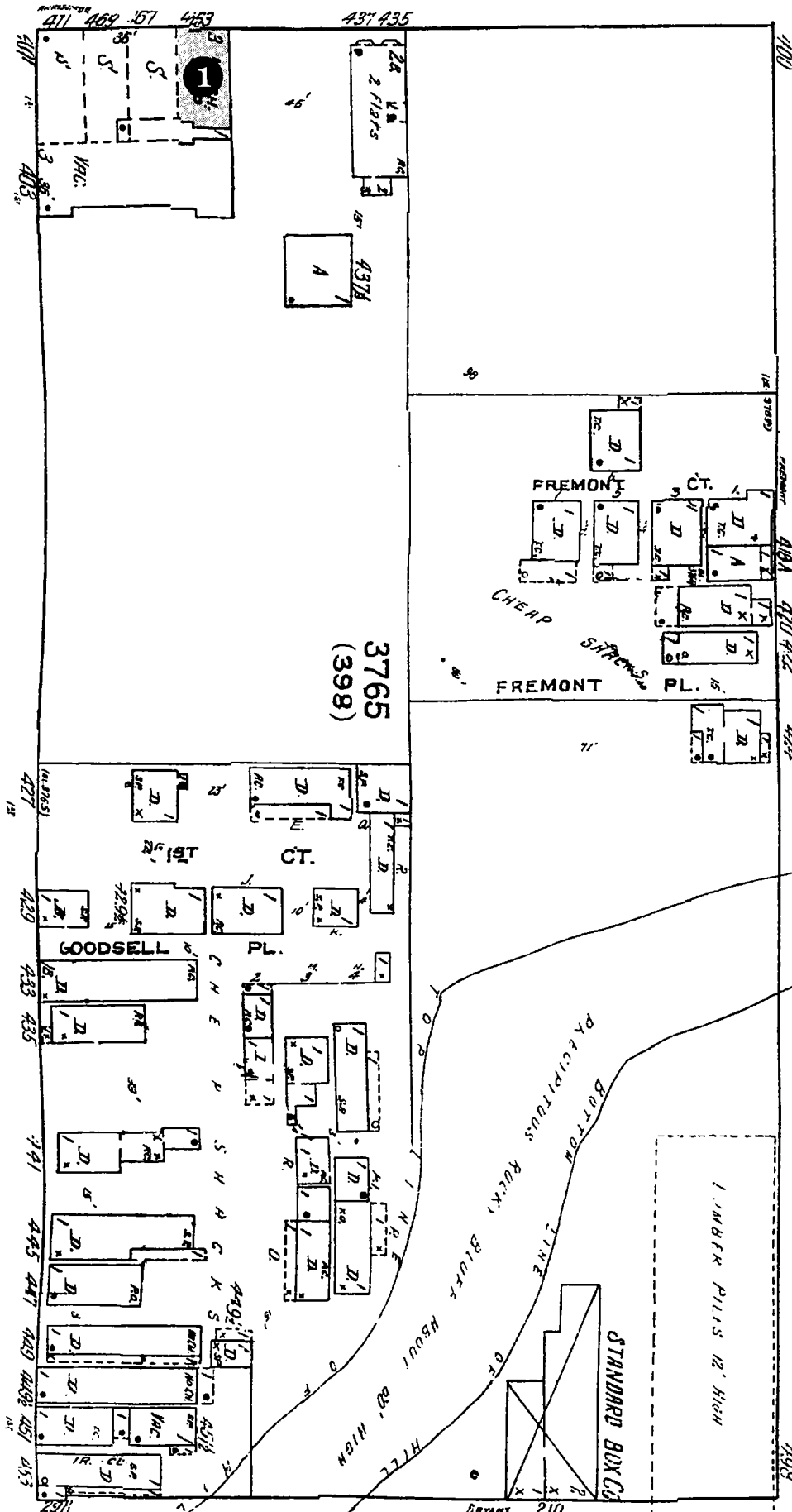
### **Historic Development of Block 8**

Map 6 shows that, dating back to the 1850s, the First, Harrison, and Fremont Street frontages of Block 8 were developed for residential use. The 1887 and 1899 Sanborn Maps show a mixture of large and small houses on the upper part of the block; Patrick Perey, a **coppersmith**, had a shop in one of these at 433 First Street in the early 1880s. At the bottom of the bluff, the southeast corner of the block was part of a **lumber yard** that extended across the alignment of Fremont Street as far as Beale. In the 1906 fire, the upper part of the block burned, but the lumber yard was unaffected, and the small shed shown on the Block 8, 1913/29 Sanborn Map on Bryant Street near Fremont also appears on the 1899 Sanborn Map. The lumber yard remained in operation until displaced by bridge construction, as part of the **Standard Box Company**.

# HARRISON STREET

FIRST STREET

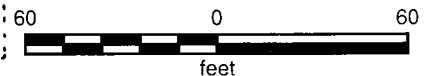
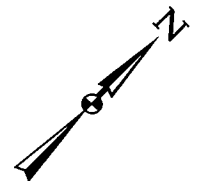
FREMONT STREET



Key to Potential  
Hazardous Materials Sites  
Block 8  
1913/1929 Sanborn Map

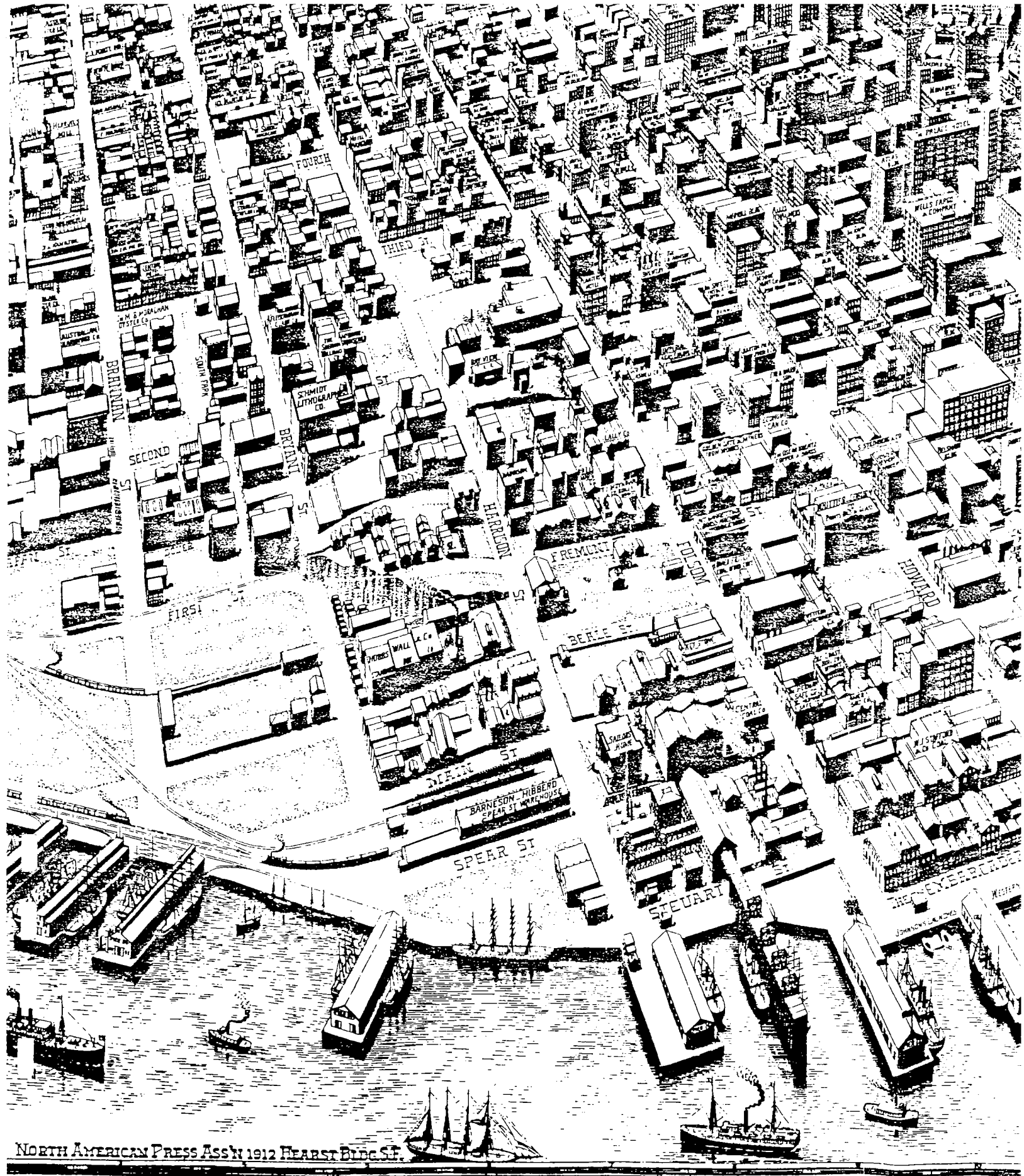
Shaded in Light Red:

1: West Coast Elevator Co.  
machine shop



Block 8, 1913/29 Sanborn Map

After the 1906 fire, the upper part of Block 8 was rebuilt with small houses and shanties; which are shown on the Block 8, 1913/29 Sanborn Map. Photographs taken during the 1920s show that this was some of the worst housing in San Francisco, with very small frame houses and shacks constructed of cardboard and sheet metal. The only substantial post-fire structure on Block 8 prior to the construction of the Bay Bridge was a three-story apartment building on the corner of First and Harrison streets; part of its ground floor housed the **machine shop** of the **West Coast Elevator Company**. After the construction of the Bay Bridge, the **Union Oil Company** office building, now a prominent landmark, was built in 1941 at 425 First; at the same time, a **gas station** was built at the corner of Fremont and Harrison.



NORTH AMERICAN PRESS ASS'N 1912 HEARST BLDG. SF.

Detail of Birdseye View of San Francisco, 1912 . . . The nearest thing to an aerial view of the SF-480 Project after the 1906 fire and reconstruction of the site. In this view the heights of buildings has been greatly exaggerated but details showing lots that were not rebuilt at that time are correct.



**Plates 16 & 17: Industries in 1920 . . . Above is the Sherwin-Williams Paint Company at the corner of 2nd and Stillman; below, looking east on Harrison towards 3rd: the Union Lithograph factory occupied much of the block extending south to Perry Street.**

*Both views: San Francisco Engineering Archives*



## **BLOCK NINE: Bounded by Third & Second, Bryant & Harrison Streets**

### **Summary**

Developed for residential use from the 1850s, Block 9 was still largely residential on the eve of the 1906 fire. After the fire, the southern and eastern parts of the block were developed for light industry, while the residences between Stillman and Perry streets were demolished for construction of the Bay Bridge approaches in the mid-1930s. Several industries using hazardous materials in substantial quantities were located on Block 9, including the **Sherwin Williams Paint Company** building at the northwest corner of Stillman and Second Street, shown in Plate 16, opposite page, and demolished for the bridge approaches; and the **Willard Battery Company** factory at the southeast corner of Stillman and Second. Several small **machine shops** were on the bridge approach right-of-way, together with a large **printing plant** between Perry and Harrison streets, built in 1947. Although all of these are possible sources of hazardous materials contamination, the actual potentiality must be weighed against the generally modern construction of the buildings in which they were housed, and the fact that none of them appear to have been affected by catastrophic events, such as fires. Because of this, and the absence of pre-1906 industry, Block 9 should be considered to have a low probability of historic hazardous materials contamination.

### **Natural Site**

Early photographs of Block 9 show it to have had mostly sandy surface soil, ranging from an elevation of less than 20 feet above sea level along Third Street, and steadily rising to an elevation of approximately 100 feet at the corner of Harrison and Second, close to the western summit of Rincon Hill, as can be seen in Maps 5 and 6. Second Street was cut through close to its present grade in 1869, and Harrison Street extended across it on an iron viaduct. After the 1906 fire, the viaduct was removed and Harrison Street decayed into a footpath mostly impassable to vehicular traffic, as can be seen in Plate 17, opposite below. As a result of the cut, Rincon Hill was divided in half along Second Street, and the western half was not cut down to the current grade of Harrison Street until the 1930s.

### **Industrial Development**

Before 1906, the only industry on Block 9 was a **wine warehouse** located between Bryant and Silver streets midway between Second and Third; the balance of the block was filled with large

and small houses, and three schools operated on the site of the Bay Bridge approaches.

After 1906, much of the central portion of the block along Silver and Perry streets was rebuilt with similar small residences, some of which remained until the 1950s. Second Street was improved with a railroad spur prior to 1919, and the Second Street frontage of Block 9, like that of Block 7, was quickly developed with substantial industrial buildings. On the corner of Harrison and Second, the **Pacific Coast Envelope Company** factory was erected in 1917; like most of the other industrial buildings along Second Street, it was built of reinforced concrete; by 1948 the building was occupied by the **City of Paris furniture warehouse**. Next door at 420 Second Street, the **Fisk Rubber Company** warehouse shared a reinforced concrete warehouse built in 1924 with a **wholesale drug company**; by 1948 the building was used as a tobacco and **liquor warehouse**; prior to its construction, the site was occupied by a **machine shop**. A **coffee and tea mill** was housed in a similar warehouse at 416-452 Second Street; it was demolished in the 1930s for the bridge approaches. At 454 to 466 Second Street, at the corner of Stillman, the **Sherwin Williams Paint Company** occupied a four-story brick warehouse, constructed for its use circa 1910, and shown in Plate 16. Research has not determined whether Sherwin Williams actually carried out paint manufacturing in the building, or used it instead for paint mixing and storage; from the design of the building, it would appear that the latter use was more likely. The Sherwin Williams building was demolished for construction of the Bay Bridge approaches in the mid-1930s.

Across Stillman Street from the paint company, the **Willard Battery Company** built a two-story reinforced concrete battery warehouse and factory in 1922; by 1948 this building was used as a **liquor warehouse**. The remainder of the portion of Block 9 bounded by Second, Bryant, Third, and Stillman streets was the site of many small **warehouses** and **machine shops**, including an **oil warehouse** at 462-466 Bryant; because these industries were located a substantial distance from the SF-480 right-of-way, and were mostly housed in reinforced concrete or masonry buildings with concrete floors, they are mentioned here only in passing.

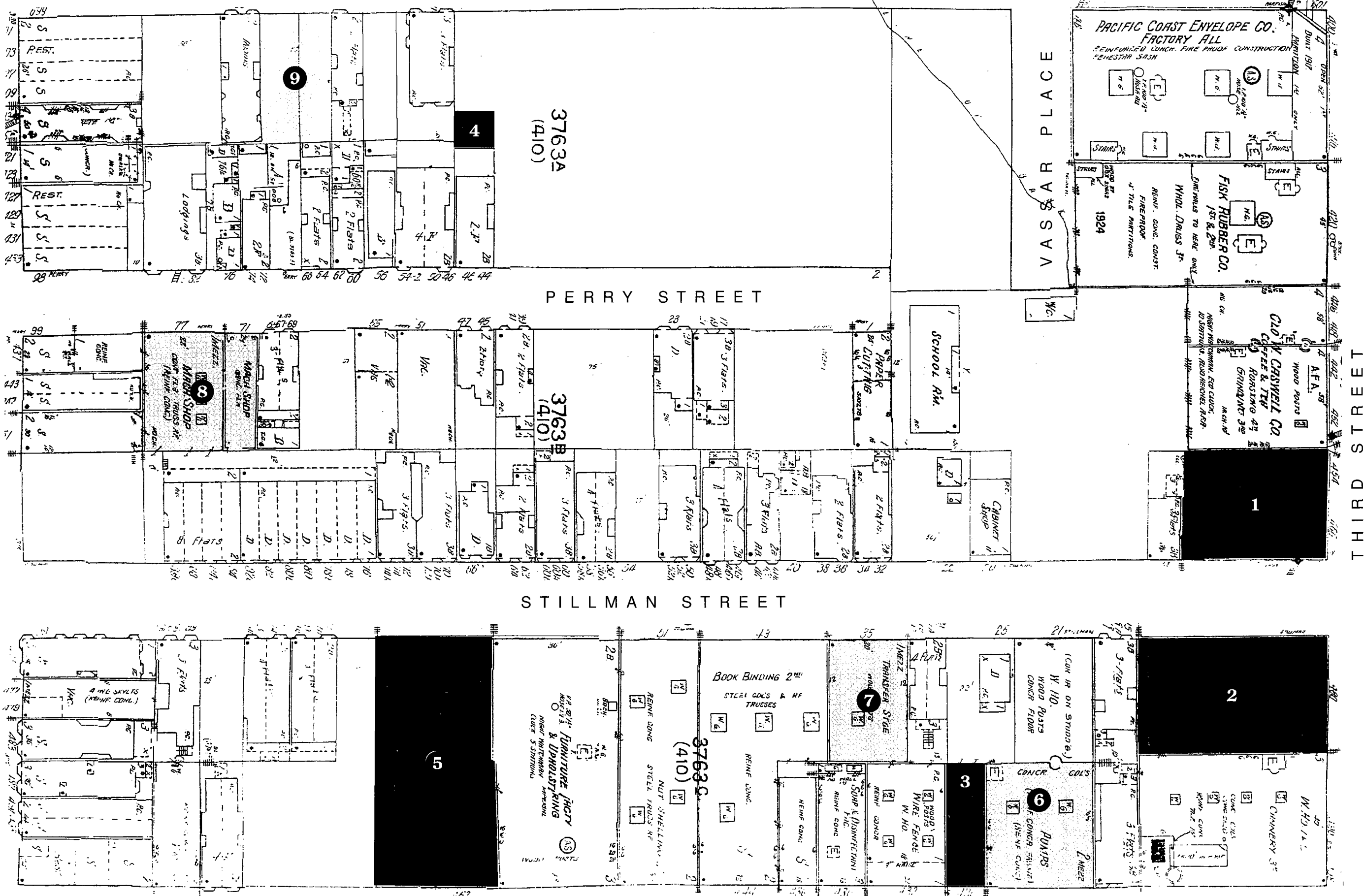
The northern third of Block 9, directly alongside the SF-480 alignment, remained mostly vacant or in residential use until Harrison Street was cut down to its present grade and paved. In 1947 a large **printing plant** was built in the area between Harrison, Vassar Place, and Perry streets that is shown as vacant on the Block 9, 1913/29, Sanborn Map. In the 1930s, several small reinforced concrete commercial buildings were erected further west along Harrison Street, replacing several of the small houses and vacant lots shown on the 1913/29 Sanborn Map on the following page, but most of these houses were still standing in 1948, except for those demolished for the bridge approaches.

HARRISON STREET

PERRY STREET

STILLMAN STREET

BRYANT STREET



Key to Potential  
Hazardous Materials Sites  
Block 9  
1913/1929 Sanborn Map

Shaded in Red:

- 1: Sherwin Williams Paint
- 2: Willard Battery Co.
- 3: chemical warehouse
- 4: spray painting (1948)
- 5: oil warehouse

Shaded in Light Red:

- 6: pump factory
- 7: warehouse
- machine shop (1948)
- 8: machine shops
- 9: machine shop



## **BLOCK 10: Bounded by Harrison & Bryant, Third & Fourth Streets**

### **Summary**

In Block 10 we see the most complete transformation from a pre-1906 residential block to one devoted almost entirely to industry. Originally at the edge of Mission Bay, the first houses were built on Block 10 in the mid-1850s, and the 1887 Sanborn Map shows the block entirely occupied by small, densely packed houses, with shops and flats along Third and Fourth streets. After the 1906 fire, light industry dominated the block, with one-story **machine shops** and **truck garages**, and the large **Union Lithograph** plant. After the construction of the Bay Bridge approaches in the mid-1930s removed the structures on the central third of the block, including most of the remaining residences, the **Gray Line Bus Terminal** occupied the corner of Harrison and Fourth, two **gas stations** were built on Third Street, but the light industrial character of the block remained unaltered. The potential for hazardous materials contamination of the SF-480 right of way on Block 10, as in the case of Block 9, appears to be low.

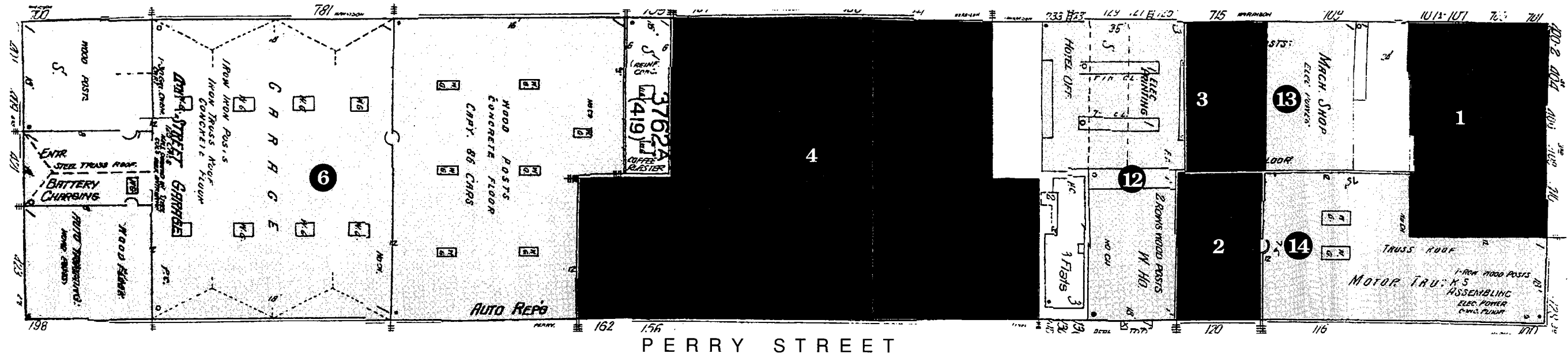
### **Natural Site**

Block 10 is the only part of the SF-480 project to traverse the marshes bordering Mission Bay, a substantial natural inlet that appears, in part, on Map 5 following page 9. The 1857/59 Coast Survey Map shows that wetlands extended as far as Folsom and Fourth streets, with sloughs and marshes extending into Block 10. By 1857 the eastern two-thirds of Block 10 had been filled in, but boggy ground continued almost as far as the line of Third Street. In the 1850s and 1860s some of this land was used for market gardens, but by the 1870s, small houses and tenements filled Block 10. It would appear that the current street grades have remained unaltered since the 1870s, at the latest.

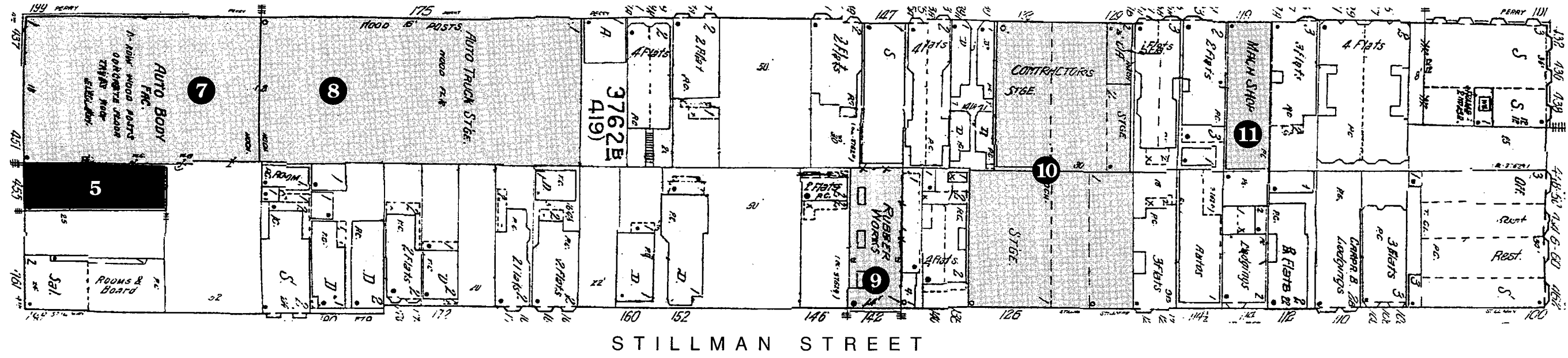
### **Industrial Development**

The 1887 and 1899 Sanborn maps show that Block 10 before the 1906 fire was densely crowded with small row houses, with some shops and laundries along Third and Fourth streets. The entire block burned to the ground in the 1906 fire, and very few single family houses were rebuilt upon it. Instead, by 1920 most of the block was developed with light industries, interspersed with small blocks of flats and vacant lots. Given the alignment of SF-480, the southern third of the block, between Stillman and Bryant streets, is noted only briefly for its many **machine shops** and small **warehouses**, such as the **Standard Metal Products Company**, at 556 Bryant, the **Thorkote Products asphalt** company, and the **Phoenix Iron and Sheet Metal Works** at 548 Bryant.

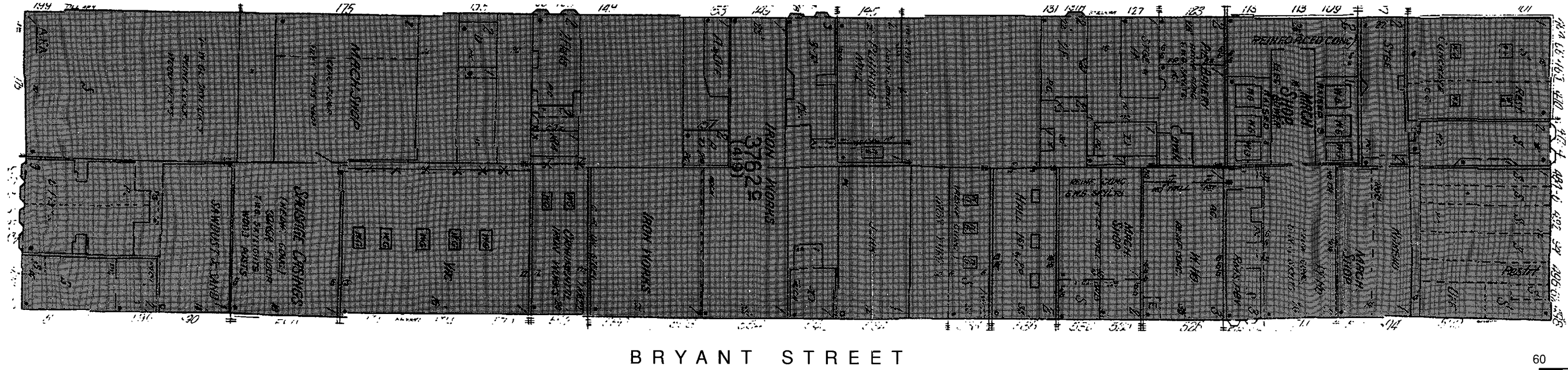
# HARRISON STREET



# PERRY STREET



# STILLMAN STREET



# BRYANT STREET

Key to Potential  
Hazardous Materials  
Sites

Block 10  
1913/1929 Sanborn Map

Shaded in Red:

1: sheeting metal works  
& sign printing

gas station  
(1948)

2: paint shop &  
warehouse

3: sheet metal works

4: Union Lithograph  
printing plant

5: oil storage

Shaded in Light Red:

6: 4th Street Garage

Greyline Bus station  
and bus repair (1948)

7: auto body factory

8: truck storage

9: rubber works

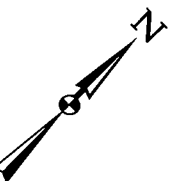
10: contractor's yard

11: machine shop

12: warehouses

13: machine shop

14: truck assembly  
factory



In the central third of the block, entirely demolished in the mid-1930s for the construction of the Bay Bridge approaches, the Block 10, 1913/29 Sanborn Map shows a mixture of land uses, with sheds used for **contractors' storage** mixed among residences, a **machine shop** at 119 Perry, an **auto garage** at 114 1/2 Stillman, the **American Chemical Agencies Disinfectant Plant** at 147 Perry, and a **rubber works** at 142 Stillman--all of which were small operations with a probably minor, but at this date unknowable, potential for hazardous materials contamination. The only substantial industry in the central third of the block was an **auto body factory** at the corner of Fourth and Perry, occupying a concrete-floored building from the 1920s up through its demolition in the 1930s; next to it at 175 Perry a long wood-floored shed was used for **automobile and truck storage**, while adjacent at 455 Fourth Street was an **oil warehouse**.

The northern third of Block 10, between Fourth, Perry, Third, and Harrison streets, was occupied after the 1906 fire by larger scale industry than the block's southern two-thirds. The corner of Third and Harrison housed a **sheet metal works** in the 1920s; after the construction of the bridge this was demolished and replaced by a **gas station**. At the corner of Perry and Third, a **motor truck assembly plant** operated during the 1920s in a concrete-floored building that housed a **printing plant** in the 1940s. Another **machine shop and sheet metal works** was located at 709-715 Harrison in a wood-floored building that had been demolished by 1948, most probably replaced by a parking lot. Directly behind it, at 120 Perry, a **paint shop and warehouse** was housed in a concrete-floored building in the 1920s, and had been converted to warehouse use in the 1940s. Another **machine shop** stood at 128 Perry in the 1940s; previously it had been used as a warehouse.

The largest and most important industry on Block 10, appearing in Plate 17 opposite page 59, was the **Union Lithograph Company**, one of the largest printing plants in San Francisco in the 1920s, and one which continued in operation until after 1948. **Union Lithograph's** printing factory was located midway between Third and Fourth streets, and extended back as far as Perry, as can be seen on the Block 10, 1913/29 Sanborn Map. It was a one-story reinforced masonry structure, with wood post interior construction, and is still standing and used as a garage. Although the building did not possess any yards in which hazardous materials could be dumped, its original floor type is unknown, and it may be considered to have some limited potential for hazardous materials contamination, given the heavy metals used in the printing process at the time. Immediately to the west of **Union Lithograph** was a complex of garages built as the **Fourth Street Garage** in the 1910s or 1920s, and converted into the **Grey Line Bus Terminal** following completion of the Bay Bridge. The different parts of the garage contained facilities for automobile repair, battery charging, and automobile trimming, and had a concrete floor except the portion at the corner of Perry and Fourth streets, which had a wood floor. After its acquisition

by Gray Line, the basic functional plan of the building remained the same as is shown on the Block 10, 1913/29 Sanborn Map. Like **Union Lithograph**, a large auto repair shop and garage must be considered to have some potential for hazardous materials contamination of its own building footprint, but the relatively modern construction used, and the distance from the footings of SF-480, make it an unlikely source of right-of-way contamination.

## **BLOCK F: Bounded by Harrison & Bryant, Beale & Main Streets**

### **Summary**

As Map 5 shows, Block F lies astride the original shoreline of the bay in an area that was filled and developed for port uses beginning in the late 1850s. The **Humboldt Warehouses** were constructed in the 1860s on Main Street, on the filled central portion of the block shown on Plate 7, opposite page 19. From the 1850s, the rocky north end of Block F along Harrison Street was built up with saloons, sailors' boarding houses, and other non-industrial structures. Block F was unaffected by the 1906 fire, and the **Humboldt Warehouses** remained in use until their demolition in the 1930s, concomitant with the construction of the Bay Bridge. The houses along Harrison Street were torn down in the 1910s, when Beale Street was cut through for a level railway spur, and Harrison Street extended over it on a viaduct. The potential for hazardous materials contamination exists mainly in the use of a section of the **Humboldt Warehouses** as an **oil and paint warehouse**. In addition, after the demolition of the warehouses, their site was occupied by a **painting shed**, where waste paint may have been dumped over a fifty-year period beginning in the 1930s; there is also a potential for contamination from paint scrapings from the Bay Bridge, which passes directly over the center of Block F (telephone conversation, Mark Sinnicks, February, 1992).

### **Natural Site and Early Development**

Block F formed part of Rincon Point, a rocky promontory that reached as far east as the alignment of Spear Street, and was about 50 feet high along the Harrison Street frontage of Block F. The northern and northwestern borders of Block F originally fell away to the bay below in forty-foot high steep bluff, shown on Map 6 (following page 10); the depth of bay bottom on the southern part of Block F is shown on the same map to be two or three feet at low tide.

Filling of Block F consisted in leveling out this bluff and cutting down the elevation of Rincon Point, and also may have involved fill brought in from elsewhere to create level and solid foundations for warehouses and open storage. The extent of this cutting down and filling may be gauged by comparing Map 6 with later pictures of the area around Block F. The large H-shaped structure just north of Harrison between Main and Spear streets was the Marine Hospital (later called the Sailors' Home), constructed in 1853-54 on the end of the mostly level plateau of Rincon Point. Photographs taken shortly before its demolition in the early 1920s show that it was left isolated on rock foundations twenty to thirty feet higher than the surrounding streets.

which had been lowered to their present grades in the intervening decades. The large amounts of rock removed from Rincon Point were used to advance the natural shoreline closer to deep water and provide for warehouse sites, and it is probable that Block F was mostly filled in this manner.

The exact chronology of the filling of Block F is more difficult to ascertain than the filling of Tar Flat. On Map 5, the large rectangular building immediately east of Block F and across Harrison Street from the Sailors' Home is Hathaway's Warehouse, built in the mid-1850s on piles, which began the large-scale maritime development of the southern edge of Rincon Point. A photograph taken at Second and Brannan streets in 1867 shows that Beale Street was in the process of being extended out into the water, while Block F appears at least partially built up with small frame structures and sheds.

The 1869 Coast Survey Map shows that all of Block F, except for perhaps the immediate Bryant Street frontage, had been filled by that time, with unbuilt areas of the block marked with scattered dots to indicate recent filling. Structures are not shown on the 1869 Coast Survey with the highly detailed accuracy of the 1852/53 and 1857/59 Coast Surveys, but a building corresponding to the location and dimensions of the **Humboldt Warehouses** appears on the 1869 Coast Survey, indicating that the warehouses were most probably constructed during the late 1860s. An 1877 Harbor Master's Map (port archives) shows the block entirely filled in, with the south side of Bryant Street forming the waterline.

Subsequent physical changes on Block F are mainly related to the lowering of Harrison Street to its present grade, which would appear to be coincident with the completion of filling of Block F in the late 1860s, and the much later cutting through of Beale Street at a level slightly above city base grade to accommodate a railroad spur giving access to the industries of Tar Flat and terminating in a freight yard located in Block 2. This project, which is well-recorded in San Francisco City Engineering Archives, took place about 1915, at which time an iron and steel viaduct, shown in the Block F, 1913/29 Sanborn Map (following page 66), was constructed to allow a streetcar line on Harrison Street to pass over the deep cut in which Beale Street now ran. As viaduct construction photos show, this cut ran through the solid rock of Rincon Point, which may still be seen at Beale Street. In 1935 this viaduct was deemed too narrow to accommodate the anticipated traffic associated with the Bay Bridge, and the presently existing full-width concrete viaduct was built.

## Industrial Development

Map 6, the 1857/59 U.S. Coast Survey, shows small structures along the Harrison Street frontage of Block F, extending down Beale as far as the top of the original rocky bluff of the bay shore.

HARRISON STREET

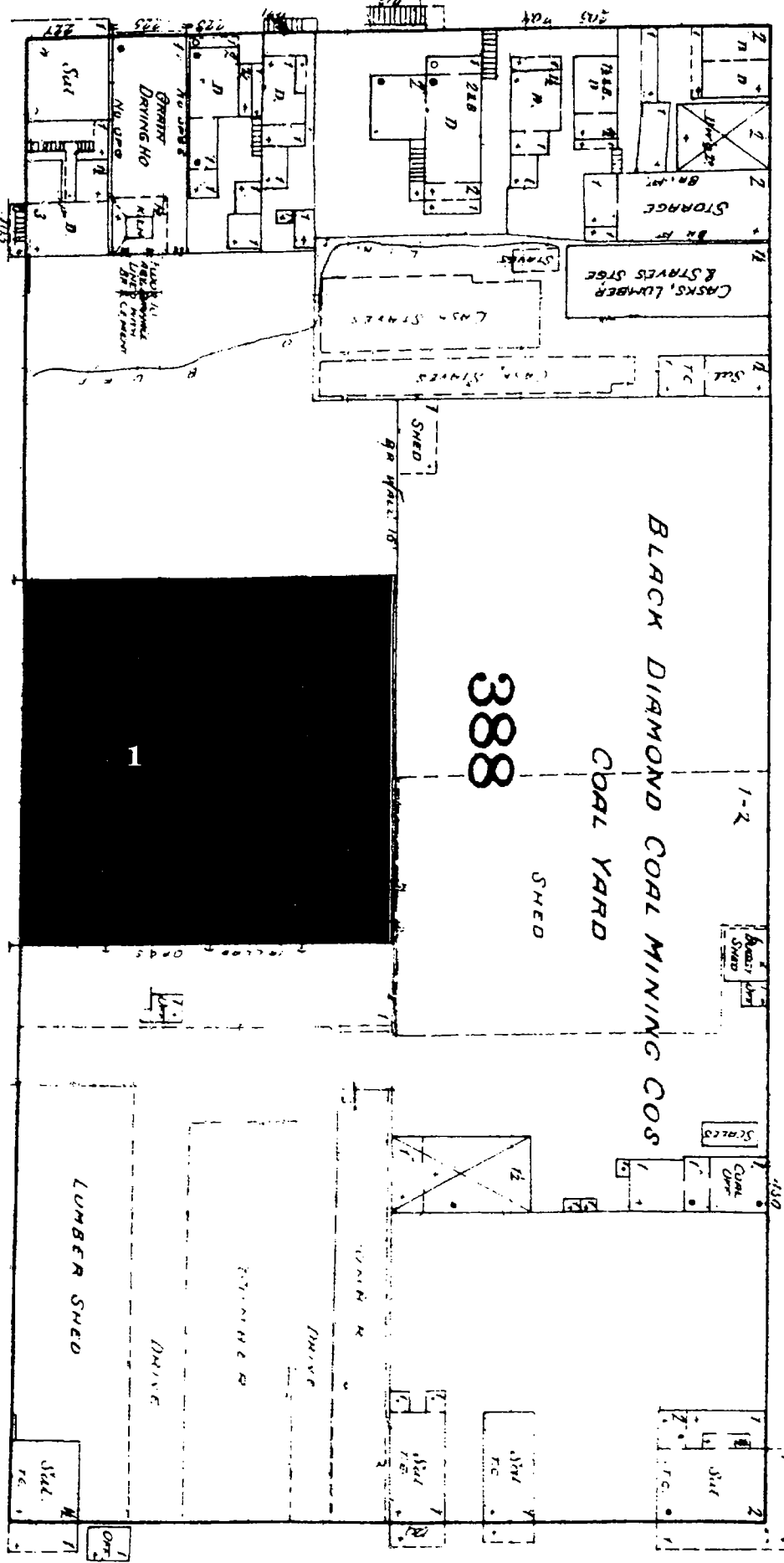
Key to Potential  
Hazardous Materials Sites  
Block F  
1887 Sanborn Map

Shaded in Red:

1: Beale Street Warehouse

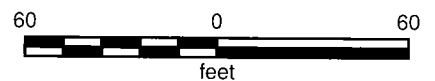
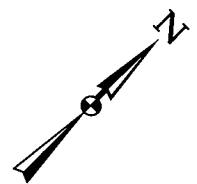
BEALE STREET

MAIN STREET



BRYANT STREET

Block F, 1887 Sanborn Map







**Plates 18 & 18a: Block F in 1920 . . .** In these two views looking up Harrison Street, Block F appears in the center left. Across Harrison Street on Block E, note the many steel drums stored there in the Whitelaw Wrecking Company's junk yard. Below, the rear of the Standard Box Company can be seen at left center occupying the part of the Humbolt Warehouse; much of the north end of the block remained vacant after the demolition of the small residences that had occupied it. The numbers on the original print referred to elevations to be lowered as part of the projected Rincon Hill regrade.

*Both Views, San Francisco Engineering Archives*







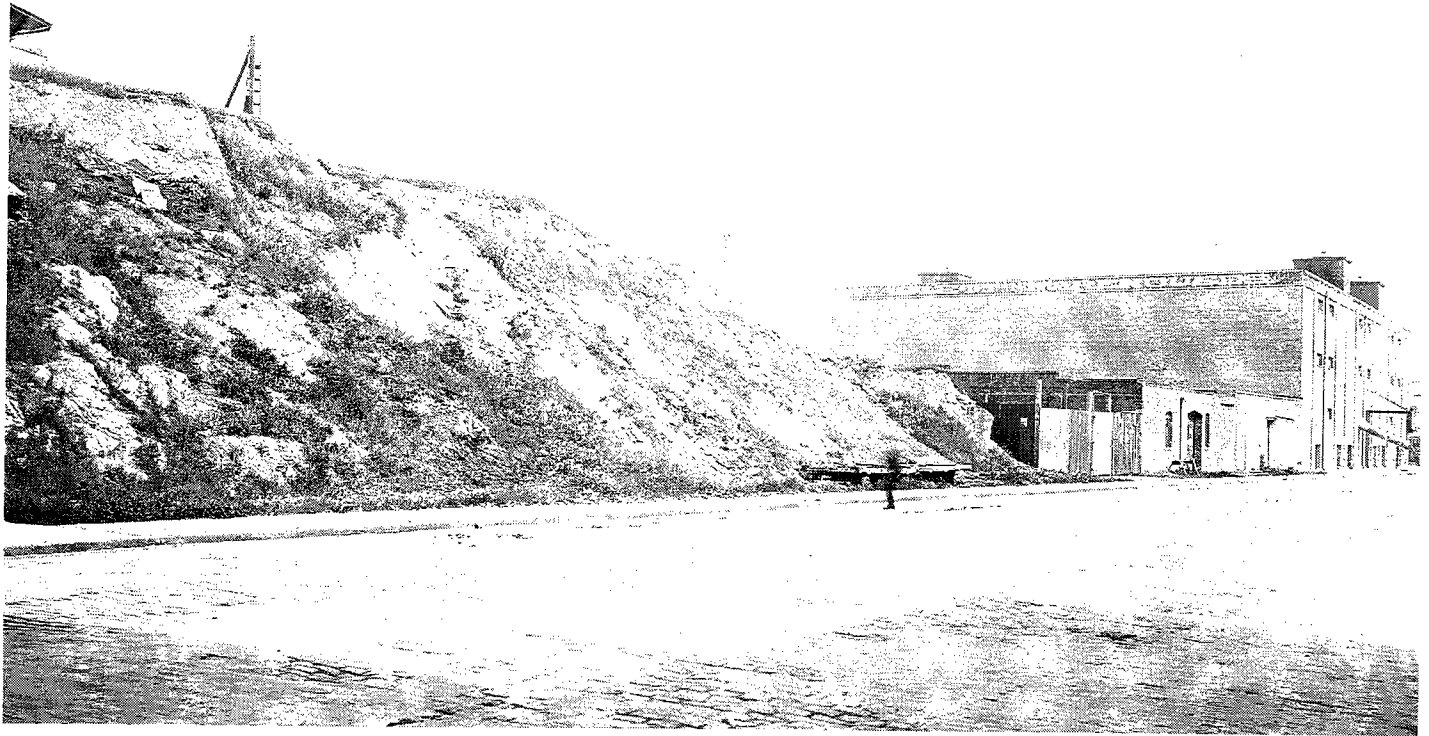
**Plate 19: The Whitelaw Wrecking Company Scrapyard on Block E. . .** This company stored used steel drums with unknown contents on the southern part of Block E, across Harrison Street from Block F. One of the problems in considering historic land use is the very common use of otherwise vacant lots in the project area for the storage of junk and waste products. As this view shows, the most common type of materials stored were old castings and scrap iron. Not only did such materials fill vacant lots, but street views show the sidewalks stacked with pipes and boilers.

The main reason for this accumulation was the custom nature of the metal industries in the project area. Since machinery was fabricated from pig iron or brass to the customer's specifications, used one-of-a-kind goods were thriftily saved on the chance that they might adapted to the needs of a future order.

Although stripped-down boilers might present asbestos contamination, in general the metal goods themselves do not present a potential contamination. However, as Plate 18 shows, old steel storage drums and tanks were also stored, and the disposition of their residual contents was probably not carried out with any thought of avoiding contamination.

Examination of all available photographic sources has not revealed any dump sites for storage drums aside from this large dump on Block E; the possibility of other such dumps cannot however be entirely excluded.

*Three views: San Francisco Engineering Archives*



**Plates 20 & 21: Block F along Beale and Main in 1920 . . . Above, looking south along Beale from under the Harrison Street viaduct, the large warehouse structure occupied most of the southeastern quadrant of the block. Below, Main Street south of Harrison bisects the photograph, with Block F to the center-right; the shed structures were occupied by a coal yard and paper box factory.**

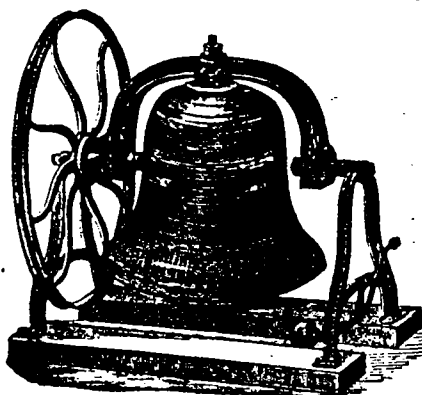


# GLOBE BRASS AND BELL FOUNDRY

WHYTE & DE ROME, Proprs.

137 Beale and 292 Howard Street,

SAN FRANCISCO.



Manufacturers of the

Tucker & Salsbury Patent Lubricator;  
Fisher's Patent Oil Cup and Lubri-  
cator; Kelborn's Patent Safety Pop  
Valve; Phosphor Bronze; Brass,  
Composition, Zinc and Babbitt Metal  
Castings; Church and Steamboat Bells  
and Gongs; Ship Work, Spikes, etc.;  
Car Brasses and general car work;  
Hydraulic Pipes, Nozzles and Hose  
Couplings.

Heavy Machinery Castings a Specialty

# SELBY SMELTING and LEAD CO.

OFFICE, 416 MONTGOMERY STREET,  
SAN FRANCISCO.

Manufacturers of

PIG LEAD, LEAD PIPE, SHEET LEAD, SHOT, BABBITT  
METAL, SOLDER, BLUESTONE, and

"STANDARD"

Machine Loaded Shot-Gun Cartridges,  
(Under Chamberlin Patents.)

GOLD AND SILVER BARS REFINED.

Ores Assayed.

Base Bullion, Lead and Silver Ores Purchased.

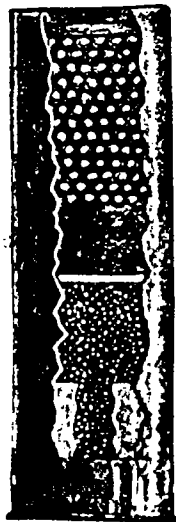


Plate 22: Advertisements from San Francisco City Directories of On-Site Industries. . . Nineteenth century industries frequently advertised their products in some detail, giving information about potential hazardous materials which might not otherwise be known. Brass foundries often contained electroplating works, but as we can see, the Globe Brass & Bell Foundry, located at several addresses at different times on Block 1, did not. On the other hand, in the case of the Selby Smelting & Lead Company, advertisements are of little assistance, since different metal working activities were carried on in several locations.

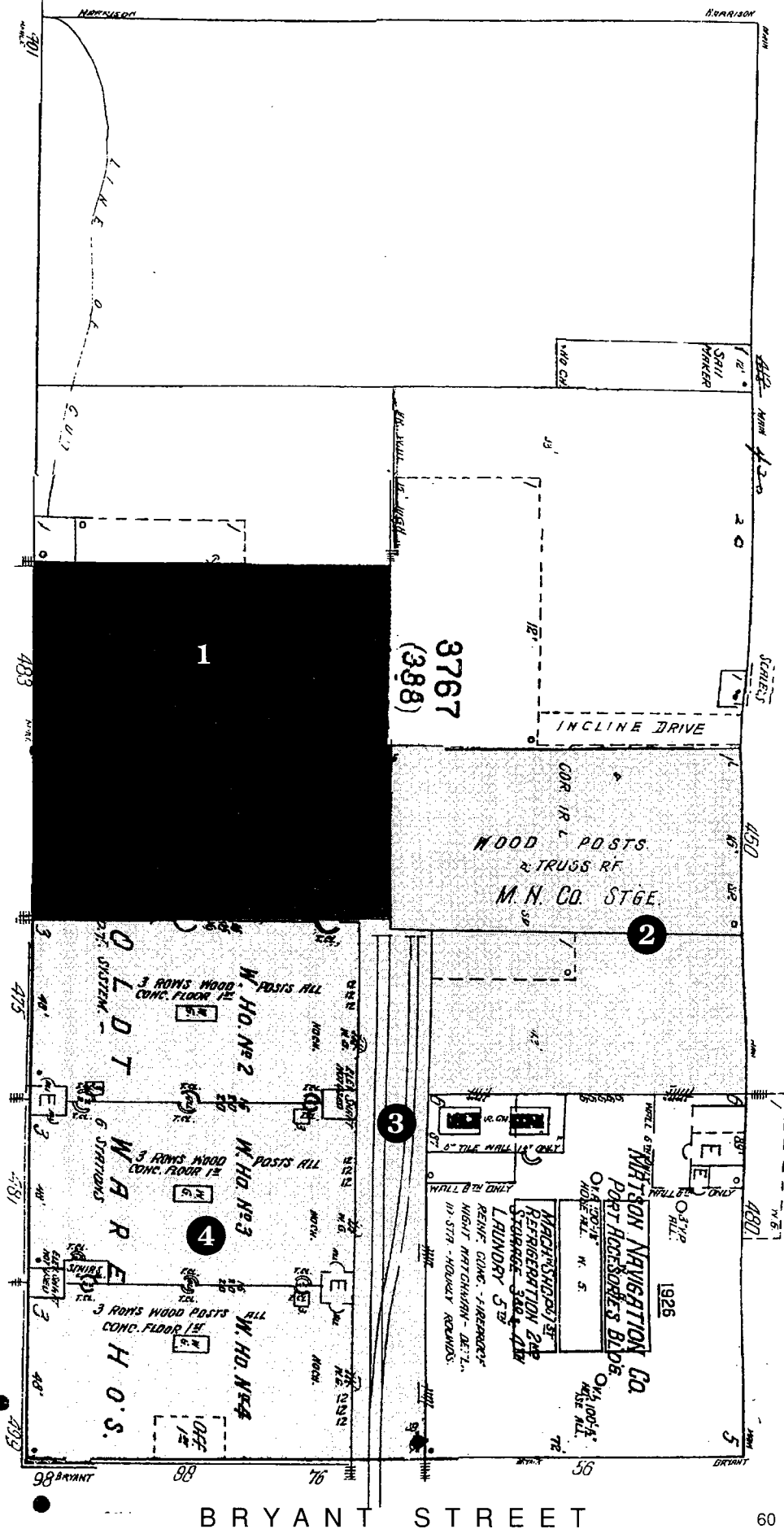
One structure, which may be a **boatyard**, appears off of Beale Street extending out over the water, while other structures extending down to the water near Harrison and Main may likewise have been **marine ways**, used to haul up vessels out of the water for repair. Photographs of the shore between Steamboat and Rincon points made during the 1850s show that this part of the bay shore was intensively used for ship repair activity. Any substantial quantities of potential hazardous materials relating to boat repair, such as copper oxide bottom paint, would most probably have been dispersed by tidal action.

The filling in of Block F for the construction of the **Humboldt Warehouses** in the mid to late-1860s left the Harrison Street frontage of the block essentially unaltered; photographs taken between 1900 and 1910 show sailors' boarding houses and saloons which have every appearance of dating back to the 1850s, and present little possibility of hazardous materials contamination.

The Block F, 1887 Sanborn Map shows the block dominated by the **Beale Street Warehouse**, the oldest and northernmost section of the **Humboldt Warehouses**, probably constructed during the late 1860s, when the Beale and Main Street wharves were extended out along the present alignment of those streets from Bryant. With additions dating to the early part of the 20th century, the **Humboldt Warehouses** remained standing until the construction of the Bay Bridge, and were of brick construction, probably with brick floors originally, which were later covered with asphalt. Since the warehouses were not, unlike other warehouses in the general area, designated for the storage of particular types of materials, it may be assumed that they were used for the storage and reception of all the varieties of cargo that arrived in the port. For considerations of fire safety, the warehouses were divided by interior brick firewalls, and the westernmost third was noted on the 1887 Sanborn Map as especially devoted to storing paint and oil, which, together with explosives, were commonly housed separately at the time because of the constant danger of fire. Because the **Humboldt Warehouses** were not burned in the 1906 fire, and seem to have retained their general interior arrangement up through the Block F, 1913/29 Sanborn Map, catastrophic release of paint, oil, or other hazardous materials, appears remote. Accidental spillage of small quantities of such materials intermittently over a period of many decades remains a possibility. After the demolition of the **Humboldt Warehouses**, part of their site was occupied by a **paint shed**, shown on the 1913/1948 Sanborn Map; this shed was located on the red-shaded section of the warehouses shown on the Block F 1913/29 Sanborn Map and corresponds to the site of the original **Beale Street Warehouse**.

Before the construction of the **Matson Navigation Company** supply building, still standing, the southernmost part of Block F was used for **outdoor storage**, primarily of stacks of lumber, and this use continued for many years and extended back across Beale Street as far as

## BEALE STREET



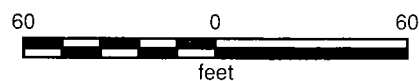
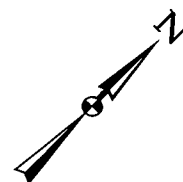
**Shaded in Red:**

- ## 1: Humboldt Paint & Varnish Warehouse

paint storage shed  
on warehouse site  
(1948)

**Shaded in Light Red:**

- 2: Matson Navigation Company storage yard and shed
- 3: railway freight spurs
- 4: Humboldt Warehouse addition



### Block F, 1913/29 Sanborn Map

the southeast corner of Block 8 at Bryant and Fremont. The area behind the **Humbolt Warehouse**, fronting on Main Street, was used between the 1880s and the 1930s mainly as a **coalyard**; between the coalyard and the Matson building the Block F, 1913/29 Sanborn Map shows a partially-roofed area used by the Matson company for outdoor storage. Aside from the oldest section of the **Humboldt Warehouse**, this outdoor **storage yard**, together with an adjacent **railway freight spur**, presents some possibility of hazardous materials contamination.

## Off-Site Sources of Potential Hazardous Materials Contamination

### Summary

Off-site sources of potential hazardous materials contamination in the SF-480 project area are especially significant because blocks 1-3 were only gradually filled during the years between 1850 and 1870. During much of that period, these blocks served as a dumping area for tar waste from the **San Francisco Gas Company** works, located on and behind the present location of the Transbay Terminal at Fremont and Howard streets.

Apart from contamination from the gas works prior to the completion of filling operations, research has been done to ascertain the presence of any especially polluting industries located immediately nearby the project area. Three criteria have been used in this study in evaluating off-site sources of potential contamination:

- 1: industries that used persistent hazardous materials in substantial quantity over a long period of time; and,*
- 2: that were housed in structures where release into the soil seemed probable; and,*
- 3: where the substances used differed from industries already considered that are closer to SF-480.*

Only one such industry was found that met these criteria, **Federated Metals**, located at 75 Folsom Street. Soil engineering analysis could best determine the likelihood of hazardous materials from that industry migrating into the soil of the project area.

### Problems of Bay Fill

East of First Street, the right-of-way of SF-480 passes over what was once open water, as can be seen on Maps 5 and 6, and Plates 1-7. Filling began in this area as early as 1850, but was not completed until the late 1860s. Filling was mostly undertaken by private lot owners, and at first consisted of sand from sand-hills in the vicinity of First Street. Later, fill of unknown origins may have been used, including local refuse and waste from businesses built on piles. Much of this refuse would have consisted of household garbage, and spoiled goods from arriving ships that would have been dumped off wharf facilities directly into the bay below. This type of waste fill may be presumed to be largely non-hazardous or non-persistent. In addition, research has shown that several ship repair and boat building enterprises were located directly in or near the project area. Their operations depended on access to the water, and their wastes--such as paint, varnish,

and coppering materials for hulls--would have a high probability of ending up in the bay on or near the project area. Wastes of the types discussed above may be found mixed with conventional bay fill throughout the filled area of downtown San Francisco, and so do not present a special hazard to the SF-480 project.

Of considerably greater importance are large-scale industries located on or near filled land whose chemical processes involved the disposal of persistent hazardous materials in substantial quantities. This is especially true because of the gradual process of the filling of Yerba Buena Cove, which from the early 1850s involved the construction of substantial deep-water wharfs near the present line of the Embarcadero. The unfilled backwater areas of the cove, especially in the project area, were left as shallow mudflats and waste repositories for many years in the 1850s and 1860s. As a result, an industry discharging waste into these mudflats during this period would be more likely to leave behind substantial deposits of waste in these subsequently filled areas, than an industry discharging waste directly into the bay proper.

Research has revealed that a number of industries located near the project area may have discharged wastes into the mudflats of Yerba Buena Cove during the 1850s and 1860s, but, aside from the shipbuilding industries mentioned above. Wastes from these industries are either classified non-hazardous--such as wastes from planing mills, food processing industries, coalyards, and lumber yards--or of relatively low level of potential hazard, such as wastes from blacksmith shops and iron foundries.

## **Tar Flat**

Apart from these unimportant industries, the **San Francisco Gas Company** works, located near Fremont and Howard street from 1854 up to 1891, may does present a significant hazard to all of the SF-480 project area east of Fremont Street. In Plate 6 (following page 18), a daguerreotype dated 1856, the newly-completed gasworks dominate the scene in the project area, their large brick buildings appearing to rise out of the mudflats. A total of three substantial structures were built: one at the northeast corner of Fremont and Howard, which housed the coking ovens for gas production; a second building, located on Block 4 at the southeast corner of Fremont and Howard, housing the gas purifying apparatus; and a third, located across Howard Street on the block bounded by First, Howard, Fremont, and Natoma streets, which contained gas storage tanks. Map 5 shows that these buildings were built on or near the original shoreline, except for the easternmost structure just north of Block 3 which was built mostly on filled land. In front of and to the right of these structures Plate 6 shows a shallow mud flat; earlier, it had been part of the bay. By the time Plate 6 was taken in 1856, this block and the blocks to the east were known as Tar Flat, referring to the tarry effluent from the gas works which was discharged through a pipe onto Block 3.



At the time of their construction, the gas works were the first to be built west of Saint Louis. Gas light was a badge of civic maturity and the gas works were one of the first large-scale industrial enterprises on the West Coast. The company was founded by Peter Donahue, one of the first and the most successful iron founders in San Francisco, whose **Union Ironworks** were located just outside of the project on First Street, near the site of the gas works. The location of the works appears to have been selected partly for proximity to Donahue's foundry and convenient water-borne shipments of coal, and partly because the location was seen as the center of the expanding metropolis, reducing the required distance of costly gas mains. Built to provide light for city streets and private businesses, the gas works also served the private dwellings of the newly rich, located on nearby Rincon Hill. The *Daily Alta California* published a detailed account of the gas works on February 21, 1854, shortly after their opening:

We yesterday took occasion to visit the Gas Works and to inquire into the method of making, purifying, and confining the gas, preparatory to sending it throughout the city to be used in the streets and houses. The coal used is bituminous or cannel--at present they are using cannel coal. The first apartment is the Retort House. This contains a large structure of brick in which are distributed twenty-one retorts of cast iron. Each retort is about eight feet long, a foot and a half wide, and a foot thick. These retorts are filled with coal, then a very hot fire is kindled beneath them and the gas passes off through a pipe at the top. About four hours of white heat in the retort are necessary to drive all the gas from the coal.

The gas is conveyed into a large pipe, called the hydraulic main to the Purifying Room. In the purifying room the gas is forced by the constant increase from the retorts to pass through water in which it deposits the remainder of its tar and some ammonia which escaped from the hydraulic main in which the gas is still warm. After passing through a number of pipes the gas, not yet pure, is admitted in large purifying boxes where slaked lime is kept upon shelves, and lime absorbs the sulphur and carbonic acid gas, and leaves the gas sufficiently pure for use.

From the purifying room the gas passes to the Reservoir or Holder. Imagine a brick cistern 60 feet in diameter and 20 feet deep without a top. Then think a sheet iron tub about 2 feet less in diameter sitting inside the cistern bottom upwards. That is the Gas Holder. In the bottom of the cistern is water, and the gas passes up through it into the tub, which rests upon the water and is held up by the gas within; and the more gas inside, the higher rises the vast tub, and when there is no gas, the tub rests flat down on the water.

This tub or holder is made of sheet iron, supported by a wrought iron frame work, and its weight is the force which drives the gas throughout the city. The holder has a capacity of 35,000 cubic feet, and 50,000 cubic feet might be made by the works in 24 hours.

To make 50,000 feet, about 6 tons of first rate coal is necessary, and after the gas is extracted from the coal, there remains in the retort a substance resembling charcoal called coke. It is nearly all carbon and makes an excellent

fire. The coke, after being taken from the retorts, is used in the furnace to drive the gas from other coal, so that the establishment is at no expense for fuel after purchasing its coal from which the coke is made.

Prior to the construction of the gas works, the shoreline in the project area was rich in edible marine life--the only fresh food that many could afford--but the discharge of tar, which unlike coke had no economic value at the time, soon led to the disappearance of the mussels for which made the area especially attractive to the poor. According to E. G. Fitzhamon (compiler), "The Streets of San Francisco, Tar Flat," *San Francisco Chronicle*, 1928:

Coal tar was waste and a nuisance in those days, its valuable byproducts not having been discovered. The gas company had to get rid of it in some way. So, ignoring protests from the good folks that were wont to gather cockles, and by dint of a little "fixing" at the City Hall, a large pipe was laid from the gas ovens at Beale and Howard out into the shallow tidewater only a block away.

Thus the coal tar liquid was pumped almost incessantly over the cockle beds, which promptly were ruined and soon passed away.

As the heavy black stuff sank and accumulated at low tide, a tarry area was gradually created. In disgust, fishermen and other folks gave it the opprobrious name of *Tar Flat*. And as such it was known through all those years until the bay was filled in as far as East street (the Embarcadero.)

As late as the early 1880s these gas works were still the largest on the Pacific coast. By then their capacity had been expanded, and the gas works could produce up to 70,000 feet of gas per day from about eight tons of coal (Hittell, 1882: 733). Fitzhamon mentions that an eventual economic use for waste tar was discovered--probably for the newly-popular asphalt paving--but as yet no information on this subject has emerged, beyond the location of several asphaltum works in the general vicinity of the site, including one on Block 1 near Mission and Beale, in operation during the late 1880s.

Therefore, although February, 1854 marks the beginning of the tarry discharge, the date of its ending can only be dated with certainty as no later than 1891, when the gas works were closed down and demolished. It might reasonably be expected that considerable amounts of tar may remain dispersed or stratified on project blocks 1-3. Roxburgh describes the extent of tar pollution as late as the period of 1875-1880 in his recollections in the *South of Market Journal*, published in 1933:

Between Howard and Folsom was Adams & Blinn's lumber yard [at Steuart Street]. Next to them was the shipyard of Middlemas & Boole, who built many vessels at this yard. Here many boys used to swim and get full of tar that came

from the gas house at First and Howard. Now and then some boy would fall in the water fully dressed. Soaked to the skin he would walk up to the gas house to get his clothes dry.

It would appear that by the 1870s the gas works had extended its outfall pipe to keep pace with bay filling, as Roxburgh recalls:

The way that Tar Flat got its name was like this: The Gas Company, at First and Howard, in making gas used coal, and one of the byproducts was coal tar, and as the company had no use for this tar they had to get rid of it, so they built a pipe line from the gas house to Spear and Howard. There being an empty lot with a deep depression in it opposite the California Planing Mill, into this depression the tar was emptied. It was this spot that attracted the boys of the flat, who amused themselves by poking long sticks into this liquid mass, seeing who could get the most tar upon the sticks they held. Now and then some kid would go home with tar upon his hands and clothes, much to the mother's disgust.

The necessity of having to extend the tar discharge pipe as far as Spear Street is a measure of the extent to which the gasworks, originally located on the waterfront at the edge of the city, became engulfed by urban development. By the mid-1870s, the entire area surrounding the gasworks was devoted to industrial and commercial use, and the works themselves were approaching technological obsolescence.

The reason for this obsolescence had nothing to do with the production of hazardous tar wastes, but lay in the fact that the use of coal for gas production was expensive in California because of limited local coal mines worked by expensive local labor, mainly near Mount Diablo. With the beginnings of the petroleum industry in the later 19th century, attention turned to producing gas from this much cheaper and more abundant source. Gas companies, including the **San Francisco Gas Company**, which had much of their capital invested in coal distilling apparatus, viewed this new trend with dismay, especially since petroleum gasification plants were small and designed for individual household or industry use. The **San Francisco Gas Company** went so far as to distribute circulars to its customers to try and dissuade them replacing its services with their own gasification machines. Although the original circular has not survived, the prominent engineer J. W. Stow's response provides us with an explanation of why the gasworks near the SF-480 project area were eventually closed:

The attempt to produce gas from petroleum is no new thing. Scores have tried, only to fail. The great difficulty which has always been encountered in the efforts to manufacture illuminating gas from the liquid hydrocarbons is the deposit of free carbon in the retorts and pipes, making the process impracticable, no matter what

appliances were used. In this fact is found the cause which has compelled the successive abandonment of every device resorted to during the many years over which the experiments in this direction have extended.

So many and so discouraging have been the failures in the past, that men skilled as gas engineers hesitate to believe that *any* method can be devised which shall make that *possible* which has hitherto proved an *impossibility*. Still, few things that are really necessary are found to be impossible; and it is now definitely determined that illuminating gas of superior quality *can* be produced from petroleum, and upon the most extensive scale. And it is also found that this is not only possible, but that gas can be produced at so low a cost that coal gas companies *cannot hope to compete* with those using petroleum as the basis of their operations.

It is natural, therefore, that such companies should struggle earnestly to maintain the position which they have attained--the more so as they see so formidable a rival rising up to contend for the field they have hitherto monopolized (J.W. Stow, Reply to the San Francisco Gas Company's Circular about Petroleum Gas, 1871: 3-4).

Although the 1887 Sanborn Map shows that the **San Francisco Gas Company** works were still in operation in that year, their fate had already been sealed by an obsolete and expensive technology. A new gas works, capable of using either coal or petroleum as raw material, was already under construction in the Marina District, and when it came on line in 1891 the gas works on Howard Street were closed. The works were demolished, and the valuable land was sold off in forty-one small twenty-five foot parcels for industrial use in a public auction held on May 19th, 1896 (auction circular, Bancroft Library).

An examination of the map publicizing the auction shows the gas works property divided up into lots and delineates its precise boundaries, including the entire block bounded by Natoma, First, Howard, and Fremont streets, the site of the gas tanks; lots on block 4, the site of purifying house, with the corner Fremont and Howard lot, 91.8 feet along Fremont and 32.6 feet wide along Howard selling for \$8000; the others for \$4000-4750; and an area along Howard, between Fremont and Beale, the site of the coal distillery, extending as far as the alignment of Natoma, selling for a total of \$43,500.

The fact that the property was broken up into the smallest possible lots for sale is indicative of the proliferation of small machine and metal working shops in the project area during the 1890s. The promoter of the sale remarked that: "This property is located in the present growing business portion of our city and certainly has the brightest outlook for investors of any section. Howard, Fremont, and Beale streets are paved with basalt rock" (auction circular, 1896).

Parts of the gasworks lying below ground, such as the pipes for discharging tar waste into the bay, are not indicated in the surviving documentation of the sale of the works, and may still remain below street grade in some locations within the project area.

### Other Off-Site Sources of Potential Historic Hazardous Materials

The **San Francisco Gas Company** works appear to be the only substantial source of extensive off-site hazardous materials contamination of the SF-480 project area. No other single industry discharged substantial quantities of hazardous wastes into the waters of Tar Flat, and the volume of potential contamination from smaller sources--such as warehouses and small industries mounted on pilings--would appear to be trivial in comparison. Most of the commercial buildings located over the water of Tar Flat before the completion of filling were sailors' boarding houses, saloons, and warehouses and yards for generally non-hazardous materials, mainly coal, food, fodder, lumber, and finished manufactured goods.

With the completion of filling within the project area, dated conservatively to the 1870s, the potential for off-site hazardous materials contamination must be seen in the framework of underground migration of wastes. Such migration cannot be entirely discounted, partly because of the uncertainty involved in long-term underground movements of wastes, and partly because of the fact that the Tar Flat area was filled land of uncertain subsurface permeability. To limit the scope of this enquiry, the problem of migration of waste has been considered in terms of the presence nearby industries which, if they were located on the site, would be considered highly likely to present a very significant potential for hazardous materials contamination.

Review of historic directory, photographic, and map resources reveals a limited number of nearby, off-site potentially hazardous waste generating industries. None of these industries are located in areas within one hundred feet of SF-480 project footings. With that arbitrary cut-off limit, only industries such as **iron foundries, machines shops, and warehouses** are found--industries which have some potential for hazardous materials contamination, but much lower than that of heavy metal plants, paint factories, and known hazardous materials waste dumps.

Outside the hundred-foot limit, research has revealed that near or on the site of the **San Francisco Gas Works**, in the vicinity of the present Transbay Terminal, there were located at different times several **brass foundries, copper works, lead works, metal plating works, small paint factories, ink factories**, and similar industries using known materials, mainly non-ferrous metals, which tend to be persistent in the soil. But, although these sites may be contaminated, the route of SF-480 that passes a block away from these industries also passes directly through similar industries that present a more immediate and qualitatively similar potential for contamination.

As a result, any additional migrating waste from these off-site industries does not present a separate problem for SF-480.

East of Main Street, the blocks closer to the bay outside the project area are similar to blocks 1 and 2 in terms of the type of industries that they supported. Blocks A and B, directly

## **BIBLIOGRAPHY**

**Newspapers:** *Daily Alta California*, for those dates cited.  
*San Francisco Chronicle*, for those dates cited.

### **Annuals & Periodic Reports:**

Le Count and Strong, Colville, Crocker-Langley, Langley, Morgan and Parker refer to the San Francisco City Directories published under those names in those years cited.

Mun. R. refers to the Municipal Reports of the City and County of San Francisco for those years cited.

**Pamphlets and Compendiums:** Business and local industry reports are cited by title and date as authors are seldom listed. These are to be found in the pamphlet files of the Bancroft Library, University of California.

Industries of San Francisco, 1889. Bancroft Library.

San Francisco, Its Commerce and Industries, 1889. Bancroft Library.

The Bay of San Francisco, Vol. 1-2 1904. Bancroft Library.

### **Books & Articles:**

Bancroft Hubert Howe  
 1884-1890

History of California. A.L. Bancroft & Company, San Francisco.

n.d.

Bancroft Scraps (notebooks of clippings) on file at the Bancroft Library, University of California, Berkeley.

Dow, Gerald  
 1973

"Bay Fill in San Francisco: A History of Change." M.A. Thesis, California State University, San Francisco.

Fitzhamon, A. G.  
 1928

The Streets of San Francisco. San Francisco Chronicle, 1928. San Francisco.

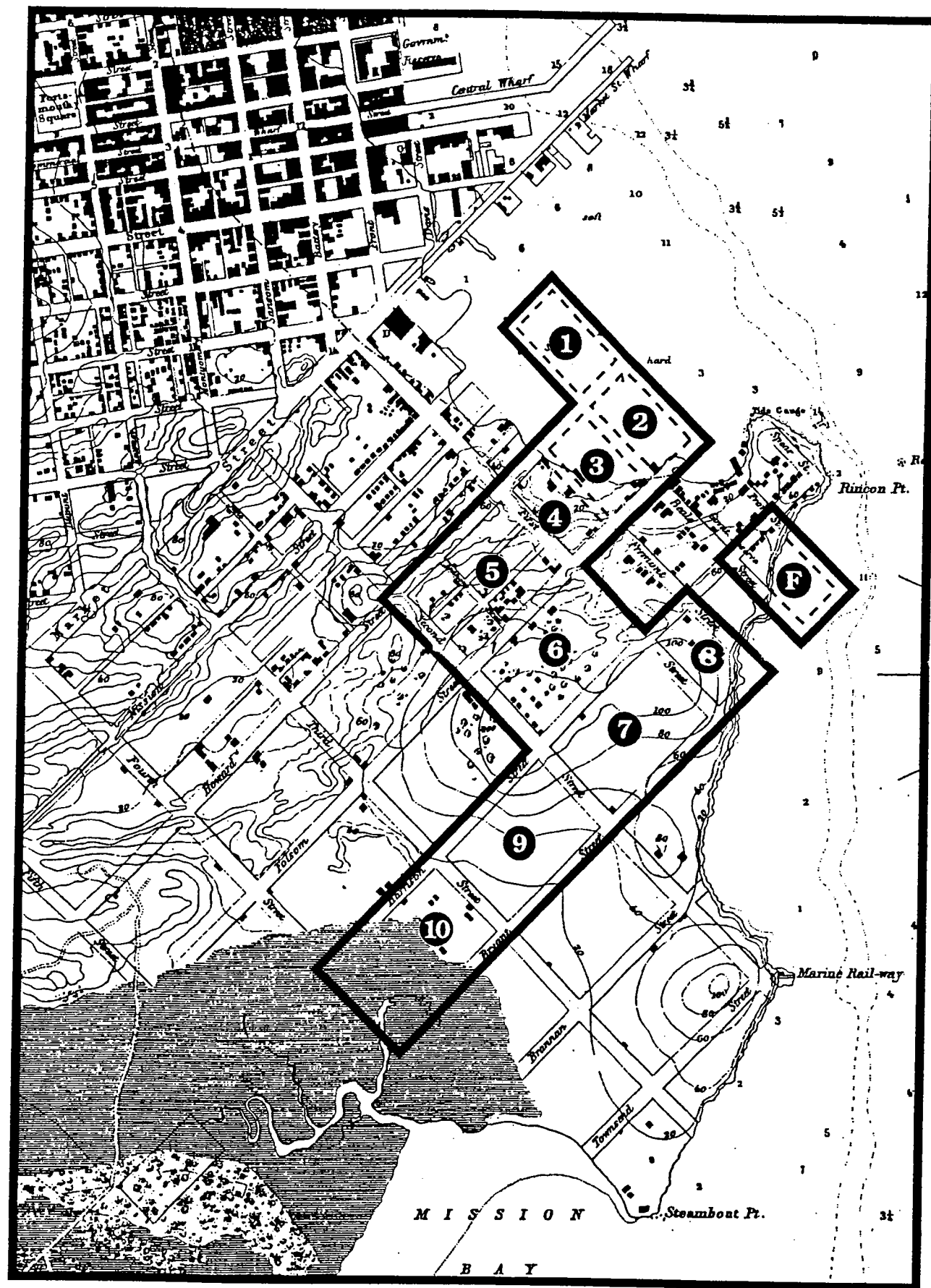
Fuller, William P.  
 1939

Ninety Years--The Story of William P. Fuller. San Francisco.

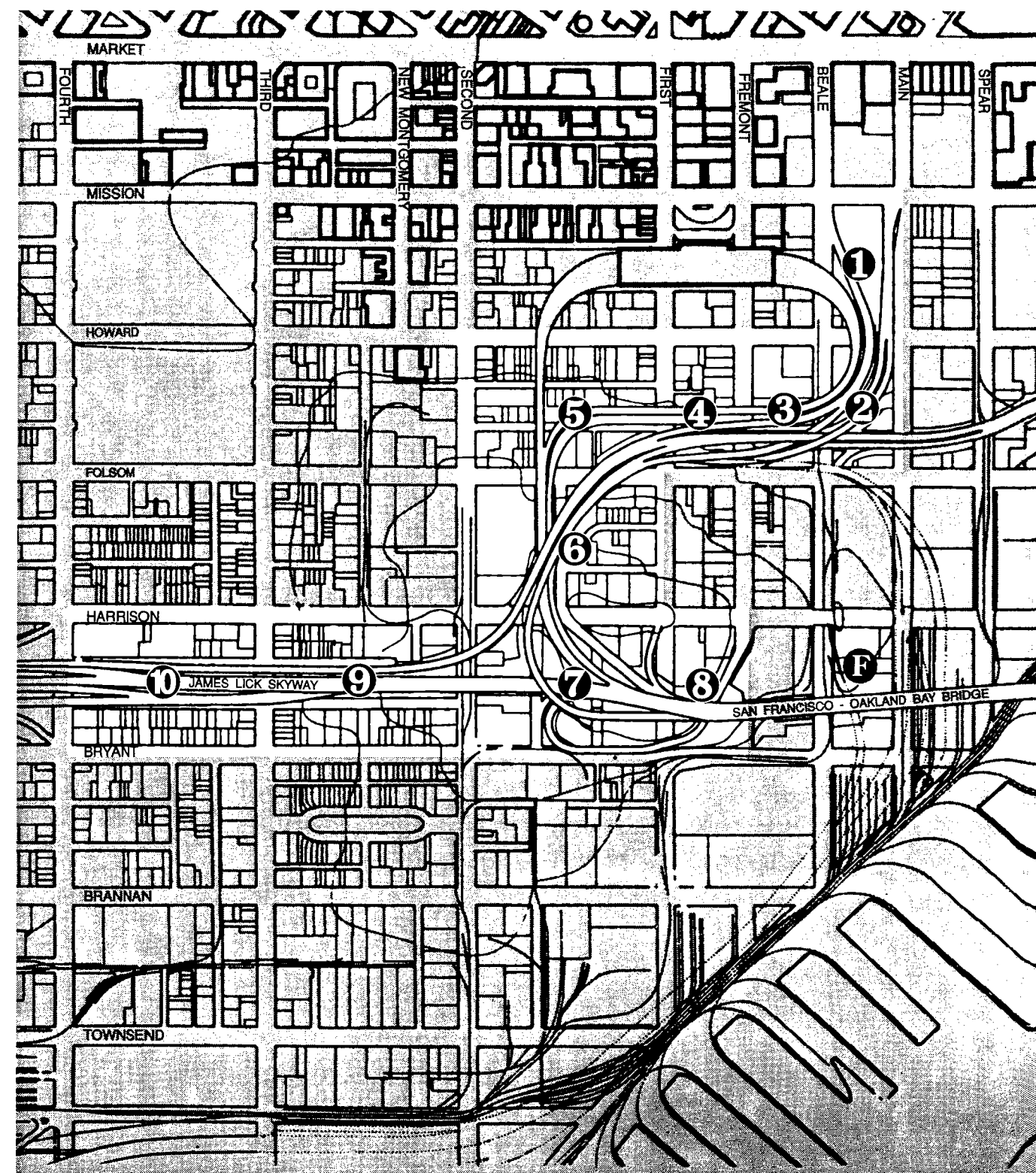
- Hittell, John S.  
1878 A History of San Francisco and Incidentally of the State of California. A. L. Bancroft and Company, San Francisco.
- 1882 The Commerce and Industries of the Pacific Coast of North America. A. L. Bancroft and Company, San Francisco.
- n.d. Hittell Scrapbooks, Newspaper clippings on California industries. On file Bancroft Library, University of California at Berkeley.
- Olmsted, Roger, Nancy Olmsted & Allan Pastron  
1977 The San Francisco Waterfront: Historical Cultural Resource Survey. San Francisco Waste Water Management, San Francisco.
- 1979 Yerba Buena Center: Historical Resource Survey of the YBC. San Francisco Redevelopment Agency, San Francisco.
- 1979 The Edge of Rincon Hill--Eastern Block 3, Report on Cultural Resources for the San Francisco Redevelopment Agency.
- Roney, Frank  
1875-76 Diary of Life in San Francisco during 1875 and 1876, Frank Roney Papers, Ms. Bancroft Library, University of California, Berkeley.
- Roxburgh, James H.  
1926 Memories of the Past, November, 1926, South of Market Journal.
- 1933 Tar Flat Recollections, October 1933, South of Market Journal.
- San Francisco Department of Public Works  
1920-23 Annual Report of the Bureau of Engineering of the Department of Public Works, City and County of San Francisco.
- Scott, Mel  
1959 The San Francisco Bay Area: A Metropolis in Perspective. University of California Press, Berkeley.
- Shumate, Albert  
1988 Rincon Hill and South Park. Wingate Press, Sausalito.

- Shumskey, Neil Larry  
1963  
Tar Flat & Nob Hill: A Social History of Industrial San Francisco During the 1870s. Unpublished Ph.D. dissertation, Bancroft Library, University of California, Berkeley.
- Stow, J. W.  
1871  
Reply to the San Francisco Gas Company's Circular about Petroleum Gas, San Francisco.
- Wheelan, Albert P.  
1928  
Levelling of South of Market's Sand Hills, January 1928. South of Market Journal. San Francisco.
- Young, John P.  
1912  
San Francisco, a History of the Pacific Coast Metropolis. S. J. Clark Publishing Company., San Francisco.
- Maps**
- Handy Block Books  
1887  
Ms. Land-ownership for Handy Block Books, California Historical Society, Incomplete Set.  
1894  
Hick-Judd Company published The Handy Block Book for San Francisco, showing land-ownership.
- Sanborn Maps of San Francisco  
1887  
Library of Congress microfilm at Bancroft Library.  
1899  
Main Library University of California, Berkeley.  
1913  
Main Library University of California, Berkeley.  
1913 updated 1929  
Bancroft Library, University of California, Berkeley.  
1913 updated 1948  
Bancroft Library, University of California, Berkeley.
- United States Coast Surveys  
1852  
City of San Francisco & Vicinity, California. Survey completed in February, 1852. Ms. Map.  
1853  
City of San Francisco & Vicinity, California. Survey completed in 1852 and published 1853.  
1857  
City of San Francisco & Its Vicinity, California.  
1859  
City of San Francisco & Its Vicinity, California. Topography completed in 1857-58, hydrography completed 1857, published in 1859.  
1869  
San Francisco Peninsula. Survey completed in 1868.  
1884  
San Francisco Peninsula. Survey completed in 1883.
- Insurance Adjustors  
1907  
Part of San Francisco showing the area destroyed by fire, April 18-21, 1906. Map Room from Gerstle Mack papers.





Map 5a: San Francisco, 1852/53 (U.S. Coast Survey)



Map 3: Project Block Location: SF-480 Terminal Separation - Toxic Study

*The Whitelaw Wrecking Company yard shows a typical assortment of the products of industries located within SF-480 project area. Here, from the 1860s up through the 1930s, was one of the largest concentrations of diversified metal industry anywhere on the West Coast. Some of the less visible products of this intense industrial development of the past may yet remain in the soil, posing problems for the present.*

