

# 4 Underground Utilities

4.1 Underground Utilities

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## Overview (Introduction)

Subterranean facilities function as the veins of city life. The large conglomerate of underground facilities contained beneath Market Street stand as an emblem of the many lives and services it sustains. An eventful, active, hustling street in San Francisco demands an efficient means to convey/transport sewer, potable water, gas, electricity, telecom services, steam, and auxiliary water for supplemental fire fighting capabilities. These utilities ensure life safety. Market Street's large, conglomerate of underground utilities have helped meet these demands in an exemplary, unique manner for over a hundred years.

An eventful street servicing various types of traffic, such as Market Street, should have well identified, located, and maintained subterranean facilities. Due to its location underground, identification, location, and maintenance of these facilities can become challenging. Keeping these essential, subterranean street elements coordinated in their life-cycles, using opportunities to aggregate refurbishment efforts prior to re-pavement keeps evidence of trenches out of street view, allowing the beauty, life and character of a grand street to take the spotlight.

San Francisco has mechanism of "Street Moratoriums" to preserve a street's beauty and character. Street Moratoriums regulate when newly paved streets can be excavated for services such as utility refurbishment, maintenance, replacement, and construction. After Market Street is repaved, a moratorium will be in effect for five years.

Reporting the location of existing utilities also aids in preventing accidents during construction into a street. Market Street's large conglomerate of underground utilities requires a unique effort to coordinate street construction accordingly.

For this report on Utilities, the original intentions were to answer (1) what and where are the utilities under Market Street and (2) what part of the life cycle are they in.

Both goals required large volumes of data. As the Key Findings exhibits show, Market Street is a spaghetti field of longitudinal and transverse utilities. The second goal of determining life cycle turned out to be even more difficult, if not impossible to determine without empirical data from physical assessment in the field. We were fortunate to have some construction dates, but many of those utilities were past the end of their "text book" life spans.

We interviewed the utility owners, who certainly would have a vested interest in keeping their utilities working and having clarity of a rehabilitation programs.

In general, utility owners have up to a five year plan. Some utility owners, such as for sewer, water, and San Francisco's high pressure auxiliary water supply system (AWSS), are in the process of updating their five year plan with field exploration.

So, the practical goal of this report evolved to:

1. What and where are the utilities under Market Street?
2. What utilities (according to the utility owners) will be refurbished?

## SECTIONS IN THIS REPORT

### Methodology:

Describes the methods used to obtain and compile existing underground utility location and utility refurbishment data.

### Key Findings:

Presents the results of the existing underground utility location and utility refurbishment data. These exhibits are presented with a top and bottom window pane. The top pane shows comprehensive utilities. The bottom pane shows utilities with planned refurbishment.

### Discussion of Key Findings:

Discusses the significance of the results of the existing underground utility location and utility refurbishment data.

### References:

Report references used.

## Methodology

This section describes the process of obtaining underground utility data in a series of steps: data received, exhibit compilation, communication records, problems/issues, next steps, and lastly limitations, which describe what this report does not cover.

### Data Received

At the initial Better Market Street planning stages, the City and County of San Francisco Department of Public Works (DPW) sent two Notices of Intent (NOI) over the course of a year to known underground utility owners. The NOI's asked utility owners to provide record maps of any existing or proposed/refurbished underground utilities within the corridor to coordinate any underground utility construction before the scheduled 2015 Market Street repaving. The NOI process also served to alert utility owners of the forthcoming Market Street construction. In addition to these NOI's, follow up emails were sent confirming whether or not any information from each utility owner was received and stated the following steps to be taken.

Utility location and utility refurbishment record maps were obtained through email and ground mail. Various types of electronic files were reviewed by Civil Engineers, and the record maps varied in quality, detail and clarity. The record maps varied from scaled drawing files showing facilities in their correct locations to schematic hand drawn lines on monument maps only marking approximate underground utility locations. On occasion, word descriptions of refurbished areas

and areas to be evaluated were also submitted instead of maps.

### Exhibit Compilation

All record drawings in hard copy format were scanned to electronic files for compilation. All electronic record map files were then converted to image files, cropped, inserted into AutoCAD and scaled appropriately. Over one hundred pages of record maps were reviewed by Civil Engineers, and reduced down to about 80 images. Utility lines were then traced with corresponding colors and line-types. City agencies also provided over 3,400 electronic files of extensive construction As-Built records from the past decades. This data was reviewed by Civil Engineers and used for background information where appropriate.

### Communication Records

In order to ensure that the correct facilities were traced, follow up emails and telephone conversations for each utility clarified, confirmed and further explained utility location and refurbishment schedules. The communication history and progress with each utility owner was tracked throughout by means of various lists and spreadsheets.

The final exhibit was then, organized, labelled and explanations were provided as necessary.

## Problems/Issues

While most utility owners were able to provide us with record maps, descriptions of the location of their facilities, and refurbishment schedules, some utility owners were nonresponsive which is beyond our control, despite our efforts. Our initial intent was to obtain material and age information from each utility owner along with the record maps, but we quickly changed our efforts to focus only on existing utility location and refurbishment schedules. Asking for utility material and age information proved to be problematic and many utility owners did not provide this information. Even with the material and age information for the combined sewer, many variables make assessment based on age and material alone not practical. For this reason, we believe the utility owner themselves are opting for additional field-obtained information to determine refurbishment prioritization.

Additionally, a small list of utility owners had separate contractors and/or engineers aid in locating, mapping, and describing the corresponding underground utilities. At the time of this publishing, some utility owners continued to assess the utilities.

## Next Steps

The information that will be received from the pending utility owners will be saved and made available for continued planning and design efforts. The utility owners that have pending information are:

- Level 3 Communications
- NRG Energy
- SFDPW Hydraulic Section – Combined Sewer
- Verizon Business (MCI)
- XO Communications
- SFPUC-AWSS
- SFPUC-City Distribution Div.-Water
- AT&T
- Time Warner

## Limitations

Our findings are limited by the accuracy of the data we obtained from the utility owners. Due to the varying quality and substance of the data received, our findings are meant for the reader to obtain a global sense of the location of underground utilities. The exact location, material and size of underground utilities should be confirmed by a utility locating company through field efforts, which is crucial for future design and construction.

In addition, this report does not include any underground utility information from:

- BART
- Caltrans
- Central Subway Project
- Muni / BRT
- Transbay Project

Physical assessment of any utilities was not performed for this report. The existing utility information reported is strictly a result of tracing over record maps obtained from utility owners and compiling data received into one exhibit. The refurbishment information reported is a result of input from the utility owners.

## Key Findings

Utility owners provided data with varying degrees of completeness, ranging from complete record maps and refurbishment schedules to replies confirming that information will be sent in the near future. After reviewing the data sent, if there were locations along the project scope not included in the provided record maps, then it was assumed there were no underground utilities located or to be refurbished in the areas not included in the record maps.

Below is a table summarizing the utilities and findings. Following the table are exhibits showing the composite existing utilities (top) and the utilities that owners identified as needing refurbishment in the next five years, generally between years 2011 and 2015 (bottom). For reader navigation, the legend and notes are on the first page. Numbers with a circle around it refer to locations identified in the plan exhibits. A key map is available at the bottom of each page to show location along Market Street.

**Table 4.1.1: Summary of utilities and status of records received**

| Utility        | Owner Agency  | Responded with “No Conflict” (i.e. Not in Project Area) | Responded with Existing Mapping | Has Reported Refurbishment (See Exhibits) | No Response at Time of Publish | Pending Information at Time of Publish |
|----------------|---|---|---------------------------------|---|--------------------------------|--|
| Combined sewer | SFDPW Hydraulic Section   |   | x                               | x   |                                | x                                      |
| AWSS           | SFPUC   |   | x                               |   |                                | x                                      |
| Water          | SFPUC City Distribution Division                                  |   | x                               | x   |                                | x                                      |
| Gas            | PG&E  |   | x                               | x   |                                |  |
| Electric       | PG&E  |   | x                               |   |                                |  |
| Electric       | SF Street Lighting  |   | x                               |   |                                |  |
| Telecom        | Abovet Communications   |   | x                               |   |                                |  |
| Telecom        | Astound Broadband   |   | x                               |   |                                |  |
| Telecom        | AT&T  |   | x                               |   |                                | x                                      |
| Telecom        | Level 3 Communications  |   | x                               |   |                                | x                                      |
| Telecom        | Qwest Communications  |   |                                 |   | x                              |  |
| Telecom        | Time Warner   |   |                                 | x   |                                | x                                      |
| Telecom        | XO Communications   |   | x                               |   |                                | x                                      |
| Steam          | NRG Energy  |   | x                               |   |                                | x                                      |
| Telecom        | Verizon Business  |   |                                 |   |                                | x                                      |
| Potholing      | SFDPW Bureau of Street and Sewer Repair                           |   | x                               |   |                                |  |
| Paving         | SFDPW r/e Central Subway Project                                  |   | x                               |   |                                |  |
| Telecom        | Comcast Cable Co.   | x   |                                 |   |                                |  |
| Varies         | SFDPW Bureau of Construction Management                           | x   |                                 |   |                                |  |
| Telecom        | Global Crossing   | x   |                                 |   |                                |  |
| Other          | SFMTA Sustainable Streets Division<br>Livable Streets Subdivision | x   |                                 |   |                                |  |
| Telecom        | Point to Point, Inc.  | x   |                                 |   |                                |  |
| Telecom        | Sprint/Nextel   | x   |                                 |   |                                |  |
| Telecom        | ExteNet Systems   |   |                                 |   | x                              |  |
| Telecom        | Western Lightwave   |   |                                 |   | x                              |  |
| Sewer          | SFPUC – Wastewater Enterprise Engineering                         |   | x                               | x   |                                |  |

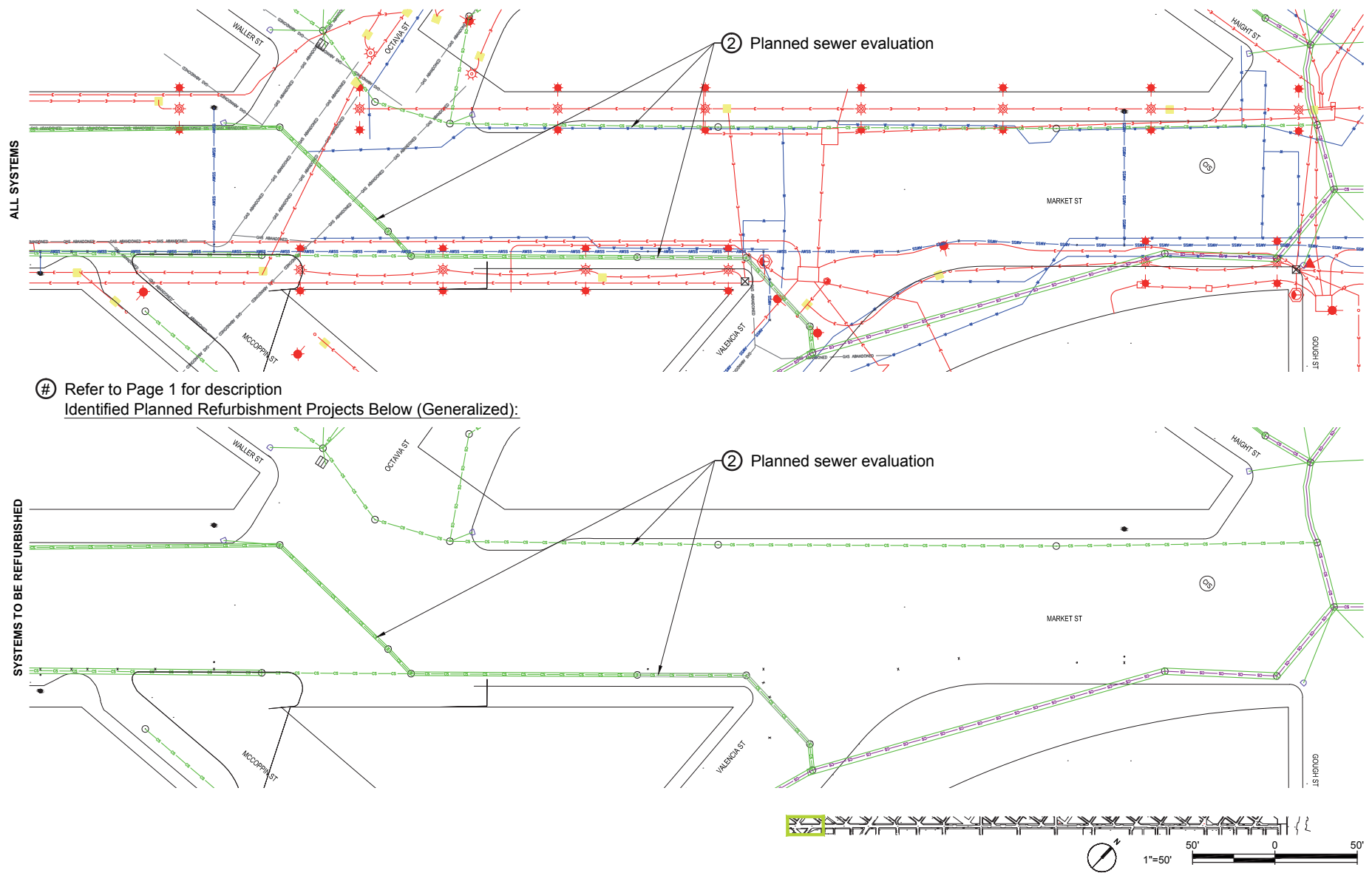
## Legend

|                 |                                      |
|-----------------|--------------------------------------|
| <b>SEWER</b>    |                                      |
|                 | COMBINED SEWER                       |
| <b>WATER</b>    |                                      |
|                 | AUXILIARY WATER SUPPLY SYSTEM        |
|                 | WATER                                |
| <b>GAS</b>      |                                      |
|                 | PG&E GAS                             |
|                 | PG&E GAS ABANDONED                   |
| <b>ELECTRIC</b> |                                      |
|                 | ELECTRIC (PG&E & SF Street Lighting) |
| <b>TELECOM</b>  |                                      |
|                 | ABOVENET                             |
|                 | ASTOUND                              |
|                 | AT&T                                 |
|                 | LEVEL 3                              |
|                 | QWEST                                |
|                 | TIME WARNER                          |
|                 | XO COMMUNICATIONS                    |
|                 | MCI                                  |
|                 | MFS                                  |
| <b>STEAM</b>    |                                      |
|                 | STEAM                                |
| <b>UNKOWN</b>   |                                      |
|                 | UNK-UNK (Unkown)                     |
| <b>SLUDGE</b>   |                                      |
|                 | ABANDONED SLUDGE MAIN                |

## Planned Refurbishment Summary

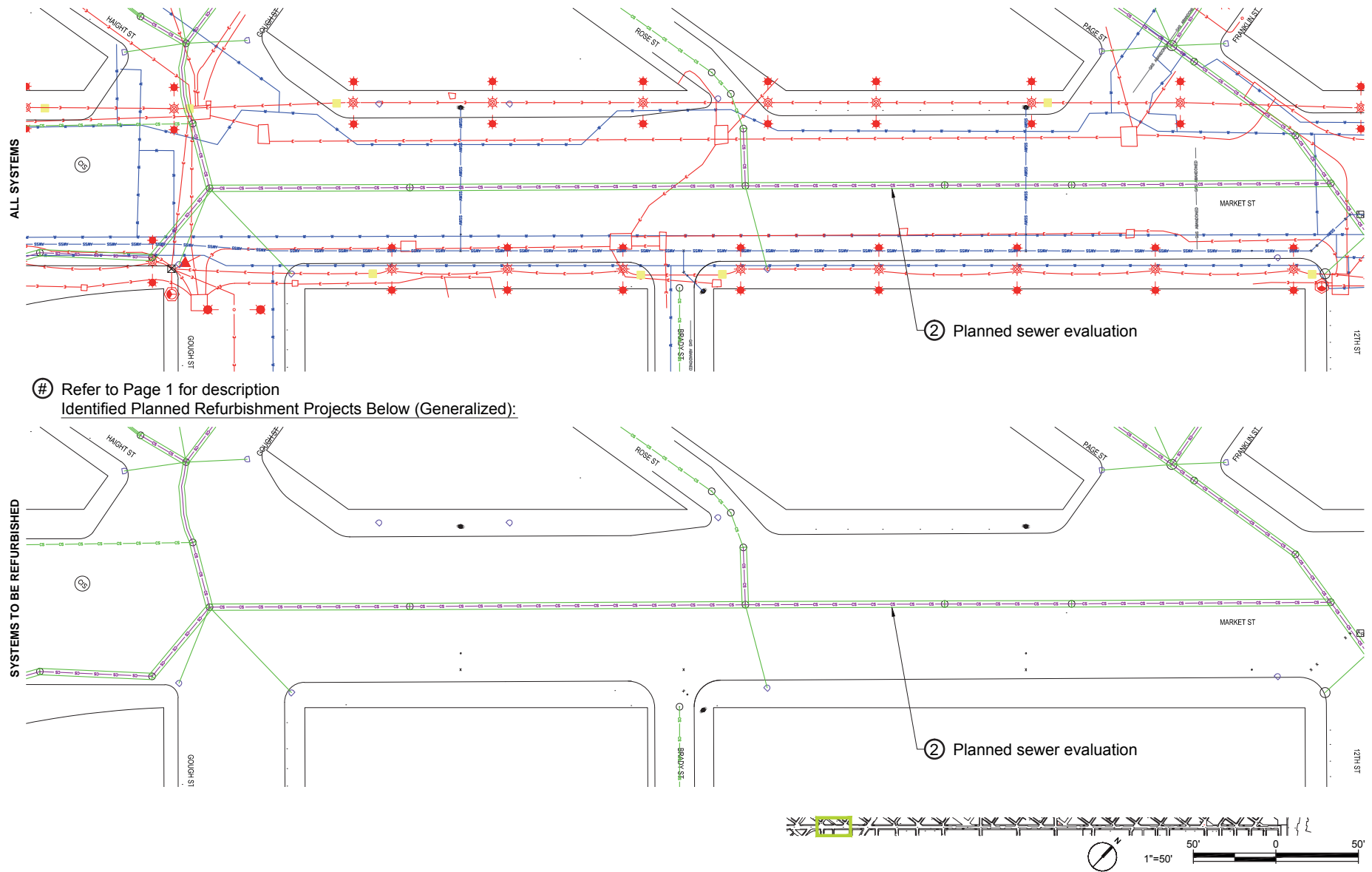
- ① Planned sewer refurbishment
  - Market St. from Steuart St. to Main St. .... pg 18-20
  - Market St. from Bush St. to 2nd St. .... pg 16-17
  - Market St. from Geary St. to Stockton St. .... pg 13-15
  - Market St. from Powell St. to Taylor St. .... pg 10-12
  - Market St. from 6th St. to 7th St. .... pg 9-10
  - Market St. from Van Ness Ave. to Octavia St ..... pg 2-4
- ② Planned sewer evaluation
  - Market St. from 8th St. to Van Ness Ave. .... pg 4-7
- ③ Planned gas refurbishment
  - Beale St. from Market St. to Mission St. (Spot Main 2013) ..... pg 18
- ④ Planned Time Warner telecom refurbishment
  - Market St. and Spear St. Intersection (New Telecom Structure) ..... pg 19
  - Market St. and California St. Intersection (New Telecom Structure) ..... pg 19
- ⑤ Planned abandoned sludge force main refurbishment
  - Crosses Market St. at Davis St. (Northerly) ..... pg 18  
(to be replaced and reused as a recycled water main)
  - Crosses Market St. at Beale St. (Southerly)..... pg 18  
(to be replaced and reused as a recycled water main)
- ⑥ Planned Central Subway project paving
  - Crosses Market St. at Stockton St. (Northerly) ..... pg 13
  - Crosses Market St. at Ellis St. (Southerly)..... pg 13
- ⑦ Planned Bureau of Street and Sewer Repair (BSSR) potholing
  - Market St. from Van Ness Ave. to Beale St (starting June 2011)..... pg 4-18
- ⑧ Planned Water Refurbishment
  - Davis St. (Refurbishment ends before crossing Market St.)..... pg 18

**Figure 4.1.1: Underground utilities (top) and planned refurbished projects (bottom) - Zone 5 Octavia (1 of 3)**



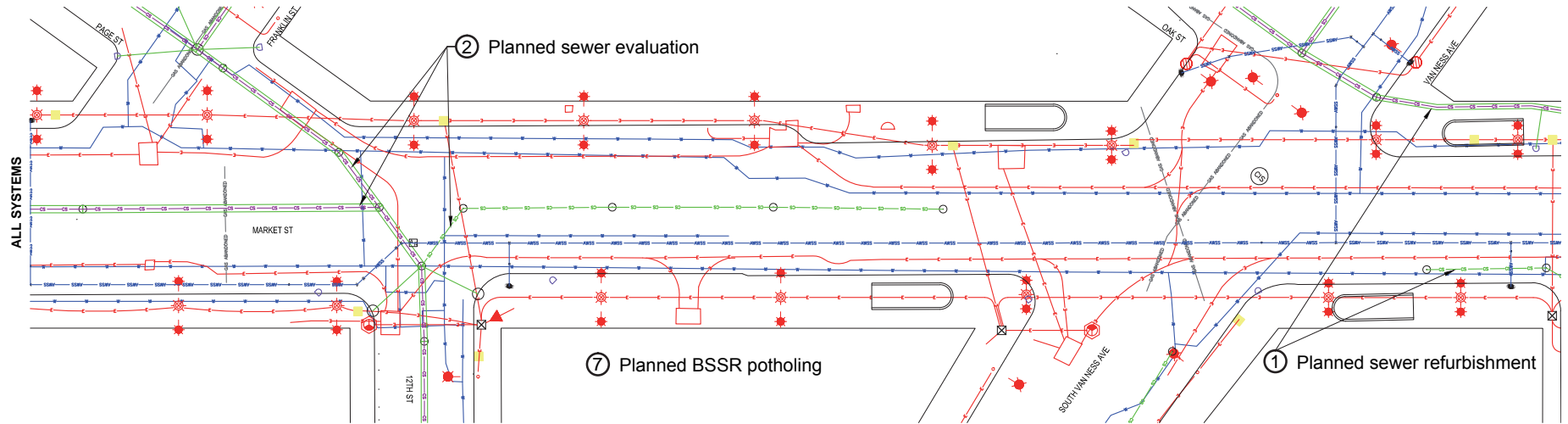


**Figure 4.1.1: Underground utilities (top) and planned refurbished projects (bottom) - Zone 5 Octavia (2 of 3)**

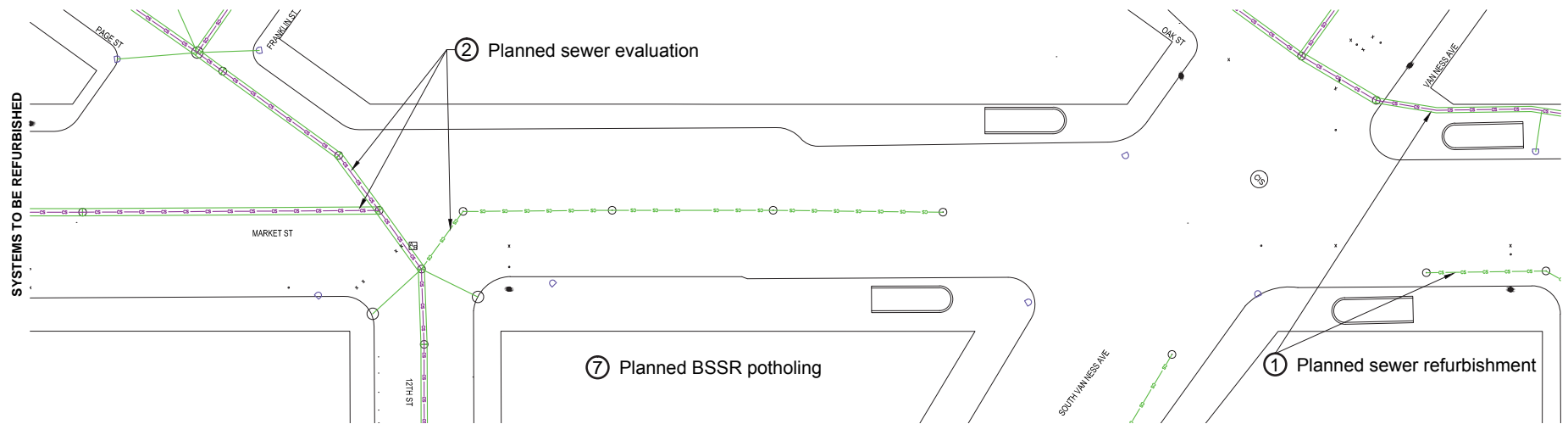


① Refer to Page 1 for description  
Identified Planned Refurbishment Projects Below (Generalized):

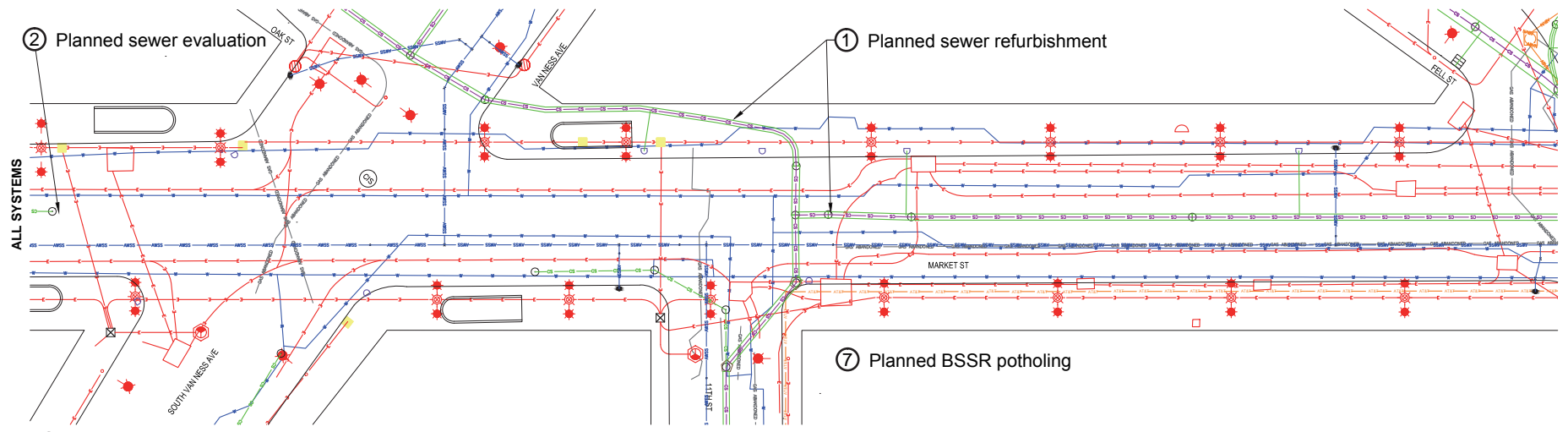
**Figure 4.1.1: Underground utilities (top) and planned refurbished projects (bottom) - Zone 5 Octavia (3 of 3)**



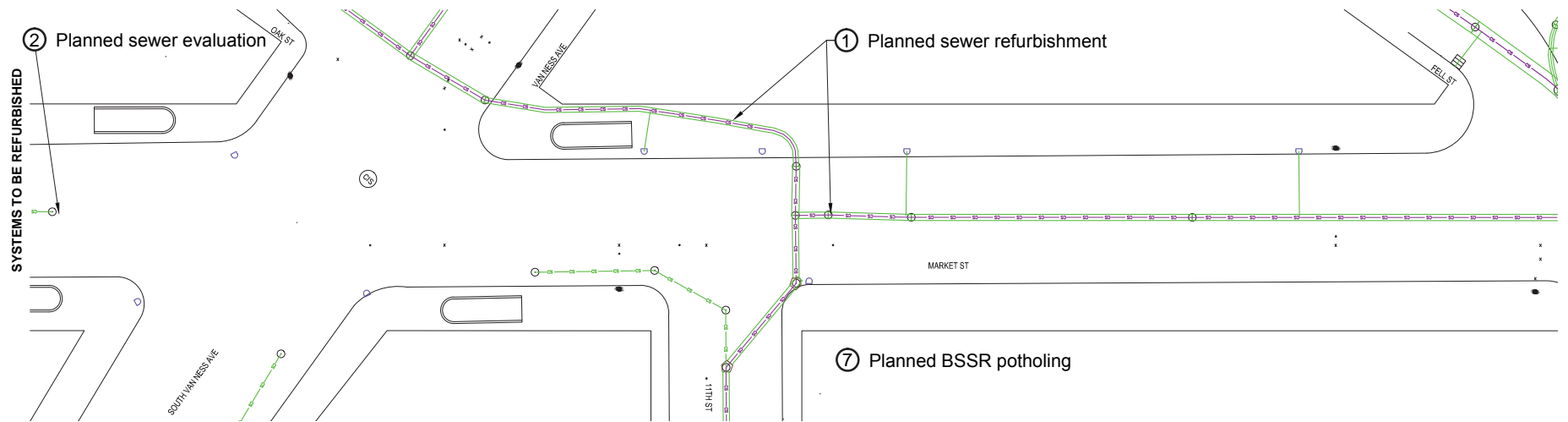
⑧ Refer to Page 1 for description  
 Identified Planned Refurbishment Projects Below (Generalized):



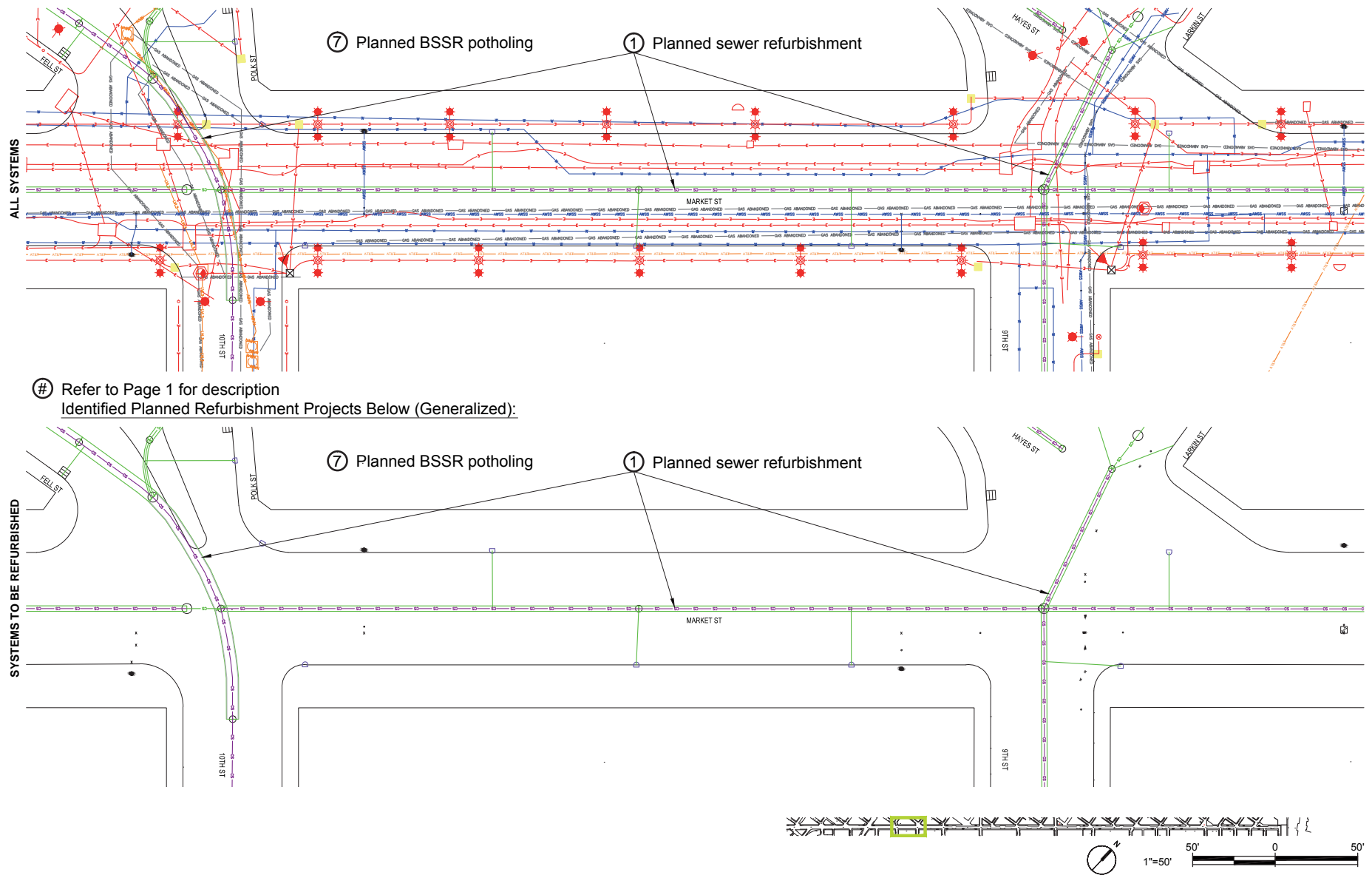
**Figure 4.1.2: Underground utilities (top) and planned refurbished projects (bottom) - Zone 4 Civic Center (1 of 4)**



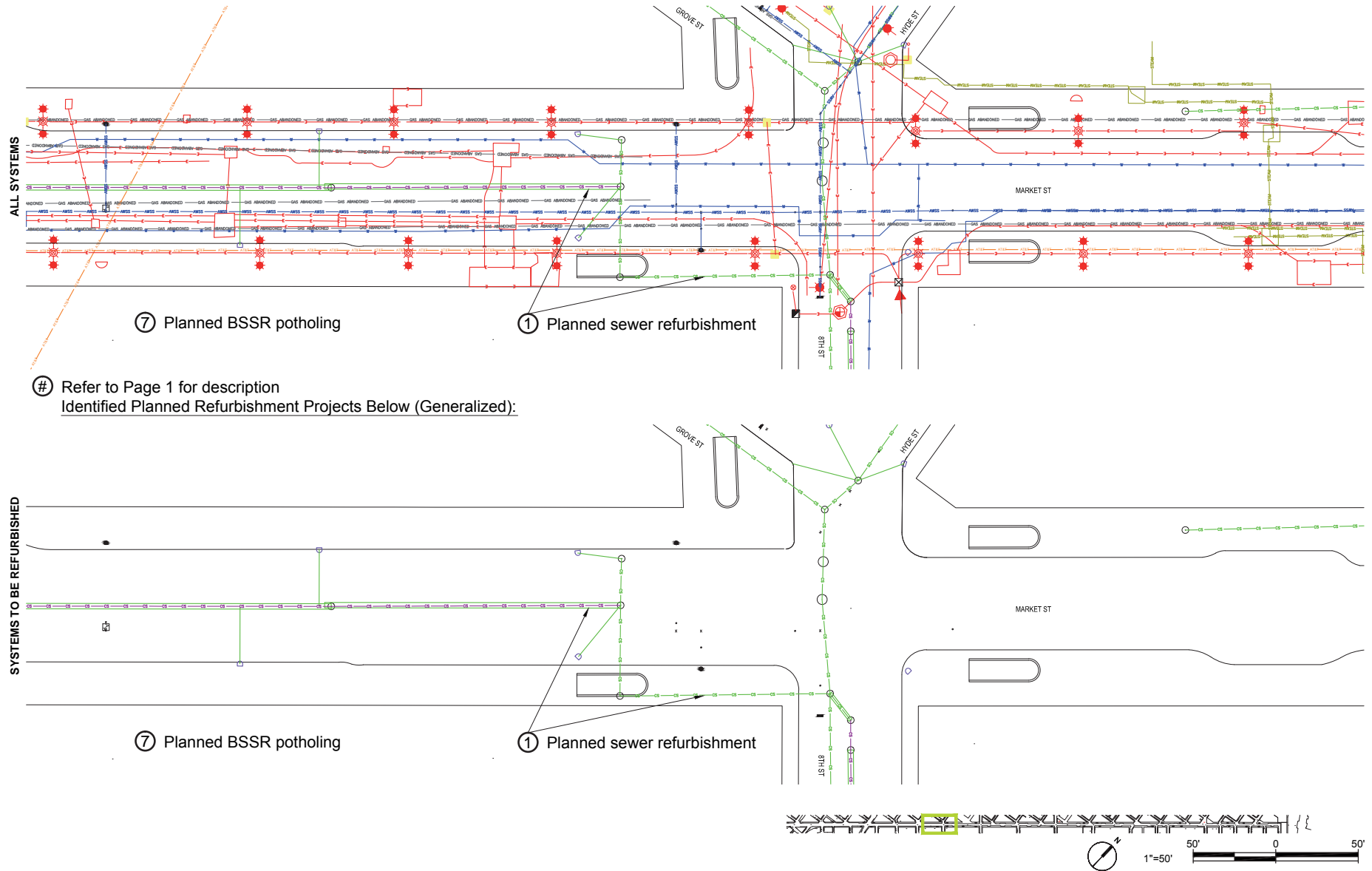
# Refer to Page 1 for description  
Identified Planned Refurbishment Projects Below (Generalized):



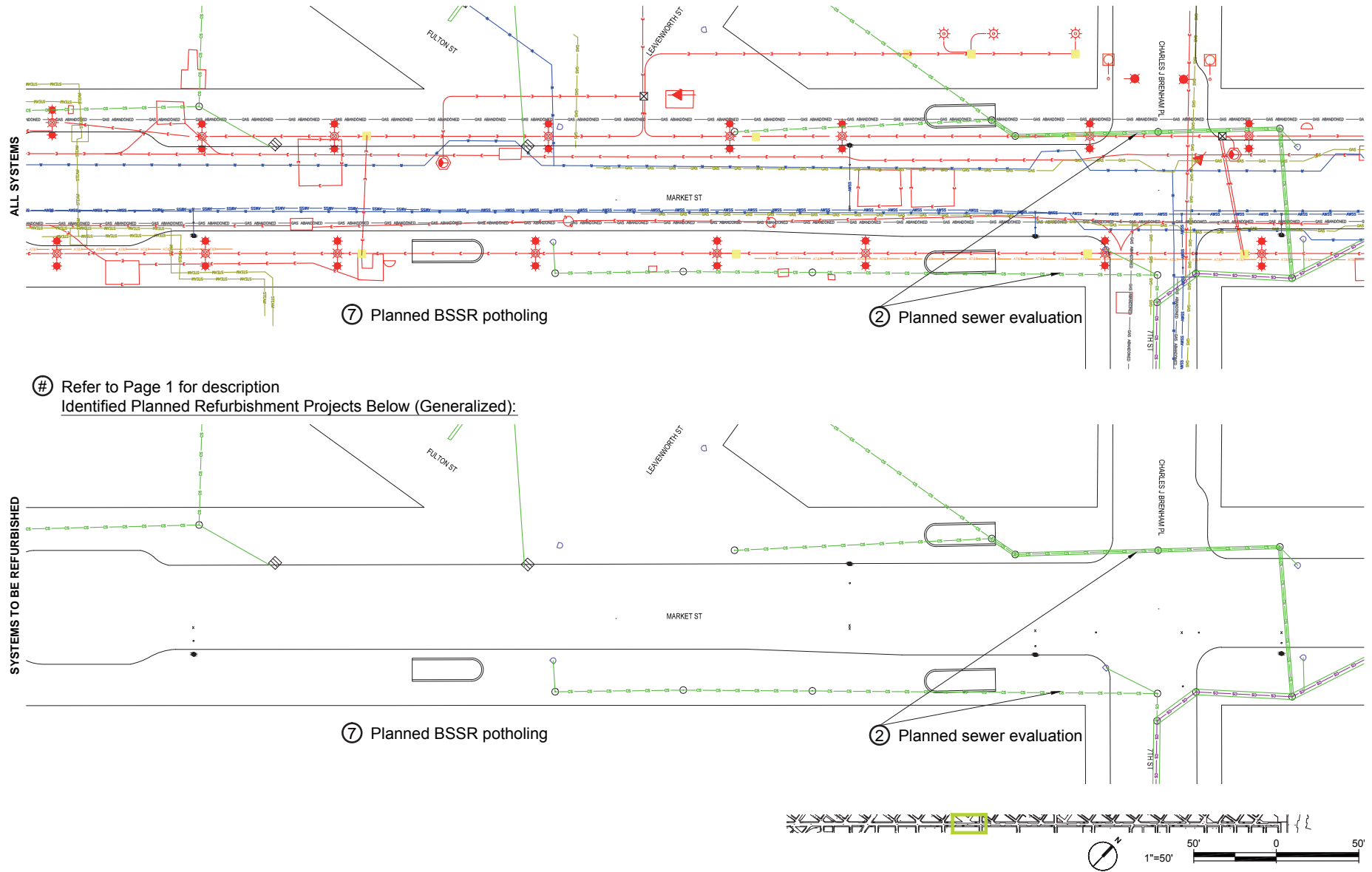
**Figure 4.1.2: Underground utilities (top) and planned refurbished projects (bottom) - Zone 4 Civic Center (2 of 4)**



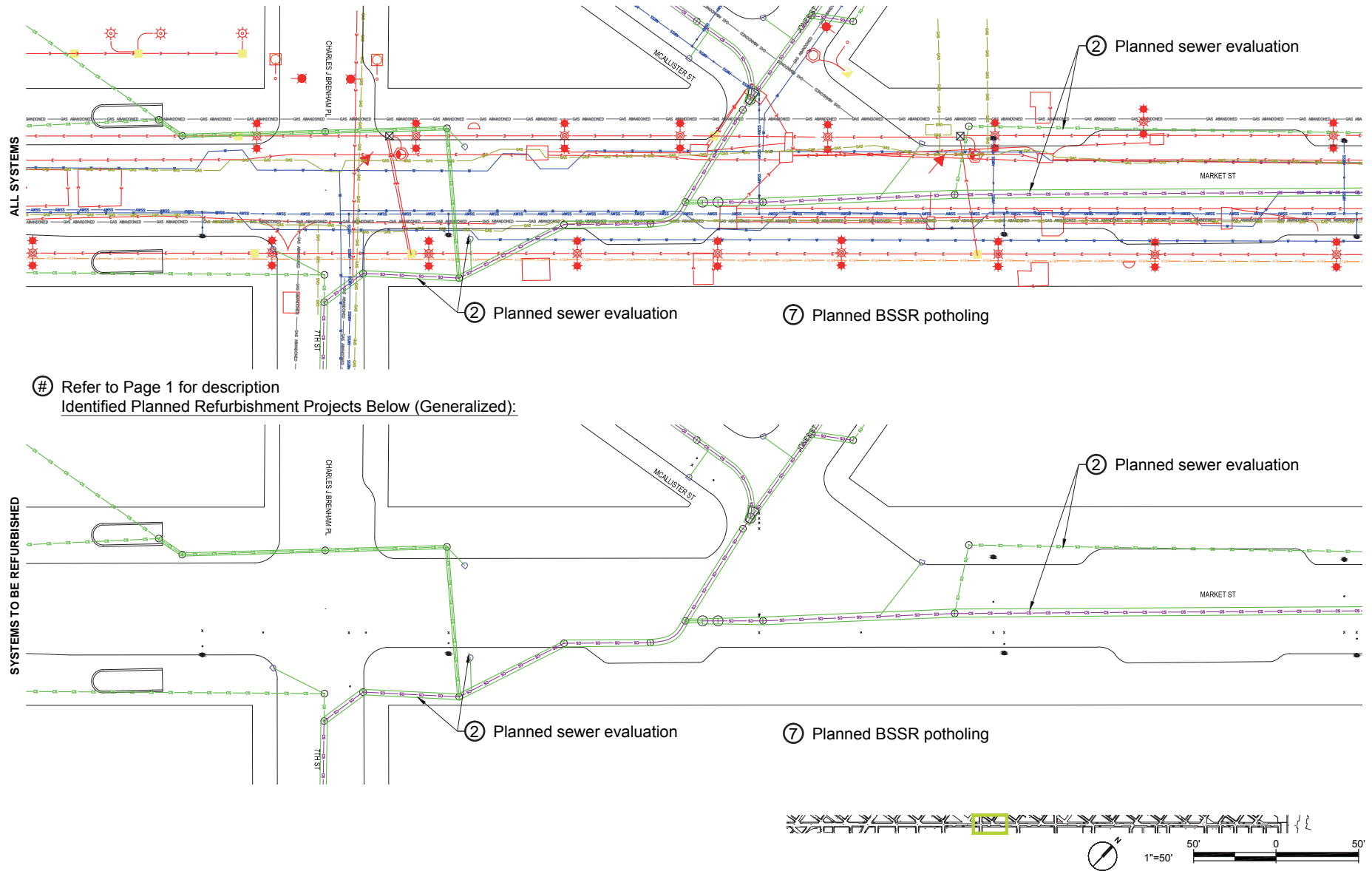
**Figure 4.1.2: Underground utilities (top) and planned refurbished projects (bottom) - Zone 4 Civic Center (3 of 4)**



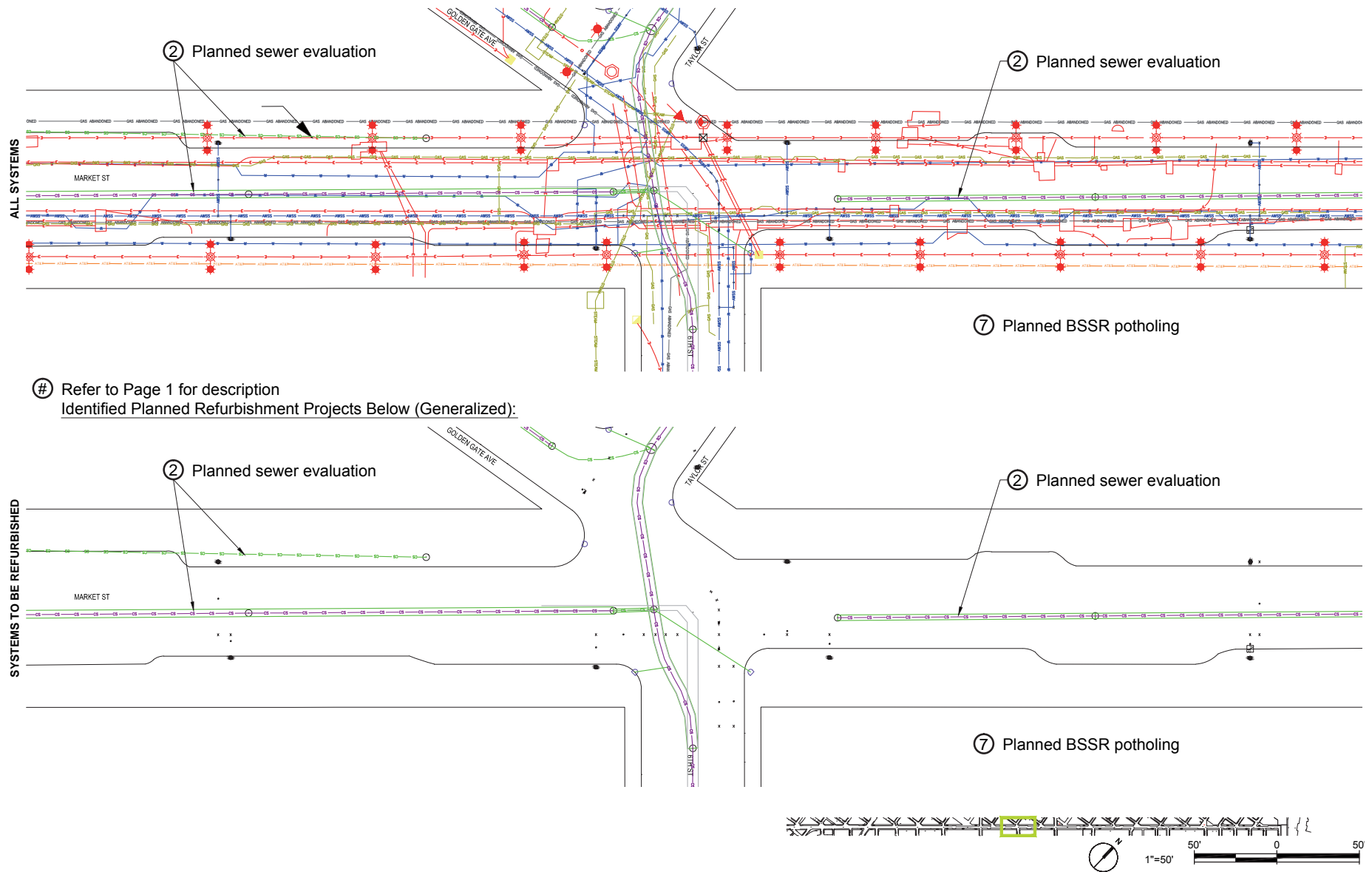
**Figure 4.1.2: Underground utilities (top) and planned refurbished projects (bottom) - Zone 4 Civic Center (4 of 4)**



**Figure 4.1.3: Underground utilities (top) and planned refurbished projects (bottom) - Zone 3 Mid-Market (1 of 3)**



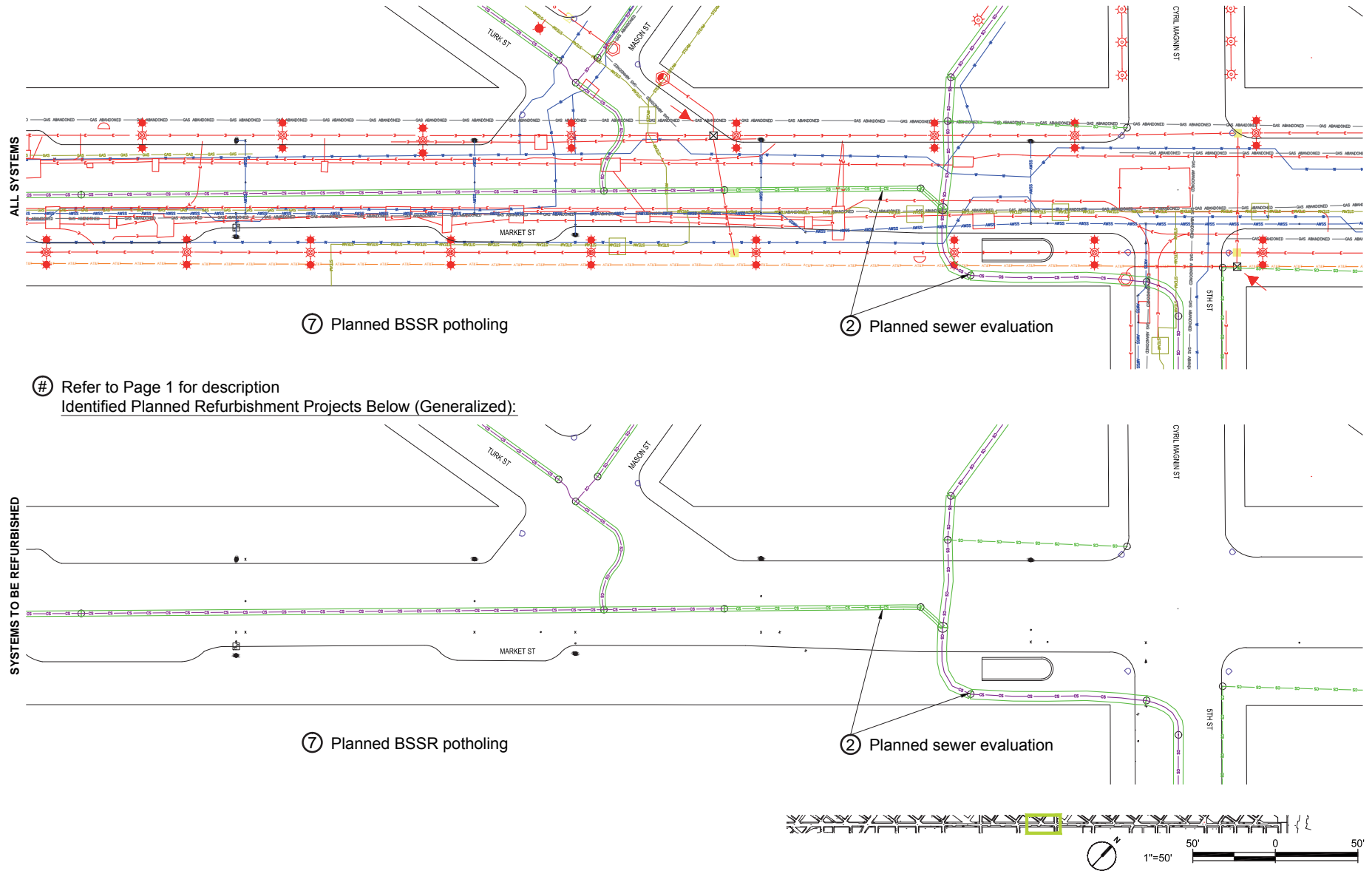
**Figure 4.1.3: Underground utilities (top) and planned refurbished projects (bottom) - Zone 3 Mid-Market (2 of 3)**



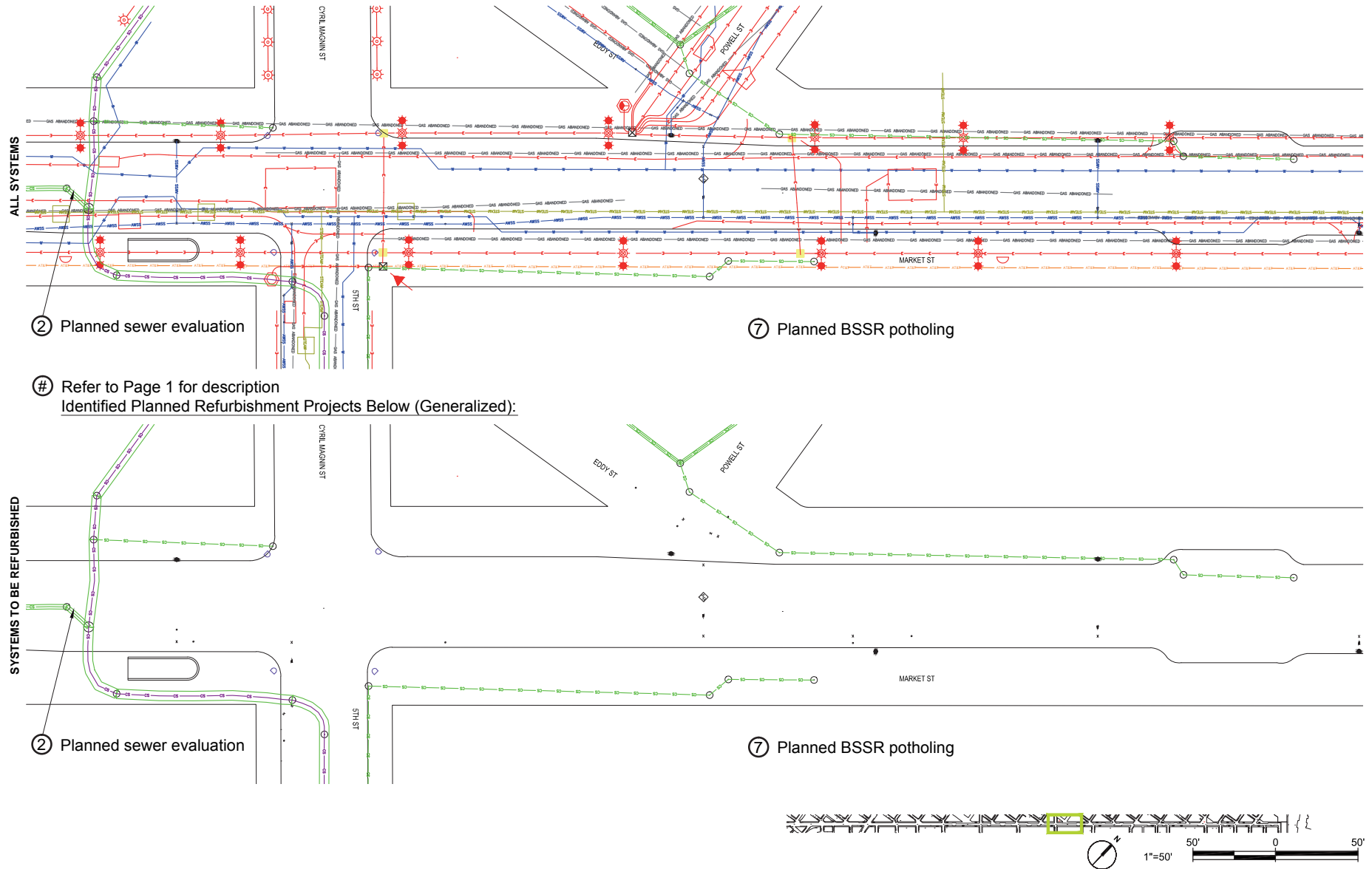
# Refer to Page 1 for description  
 Identified Planned Refurbishment Projects Below (Generalized):



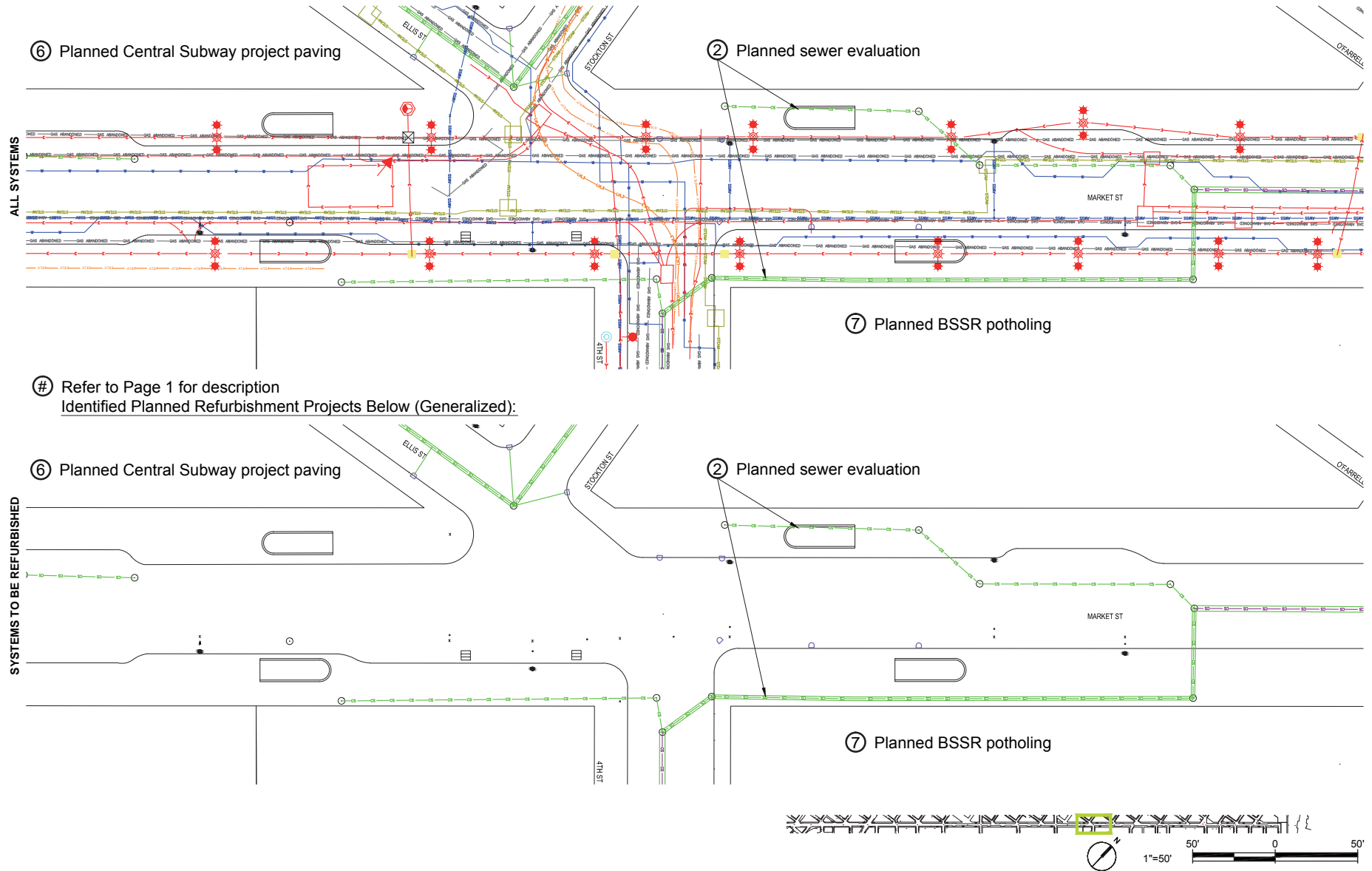
Figure 4.1.3: Underground utilities (top) and planned refurbished projects (bottom) - Zone 3 Mid-Market (3 of 3)



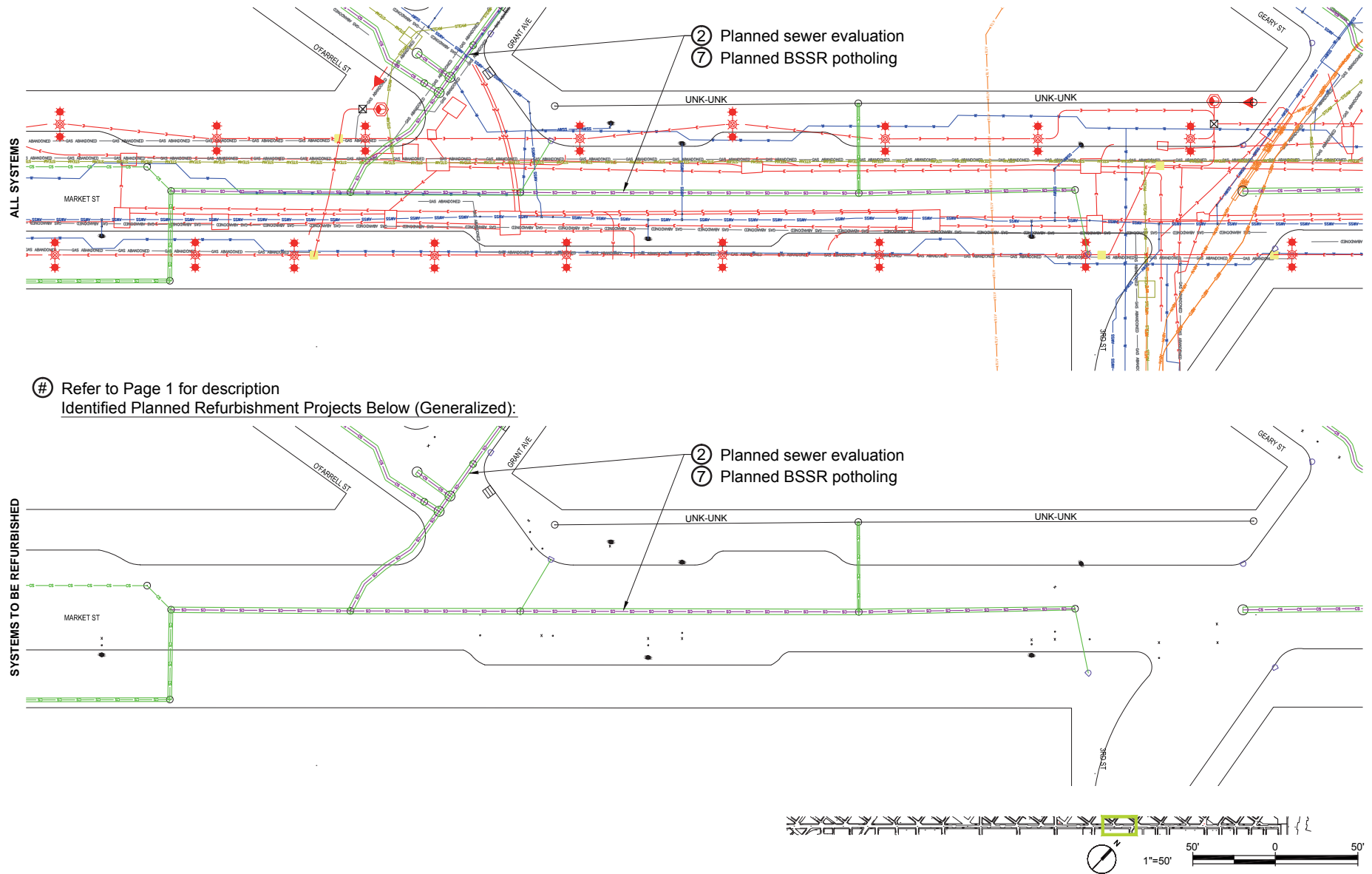
**Figure 4.1.4: Underground utilities (top) and planned refurbished projects (bottom) - Zone 2 Retail District (1 of 3)**



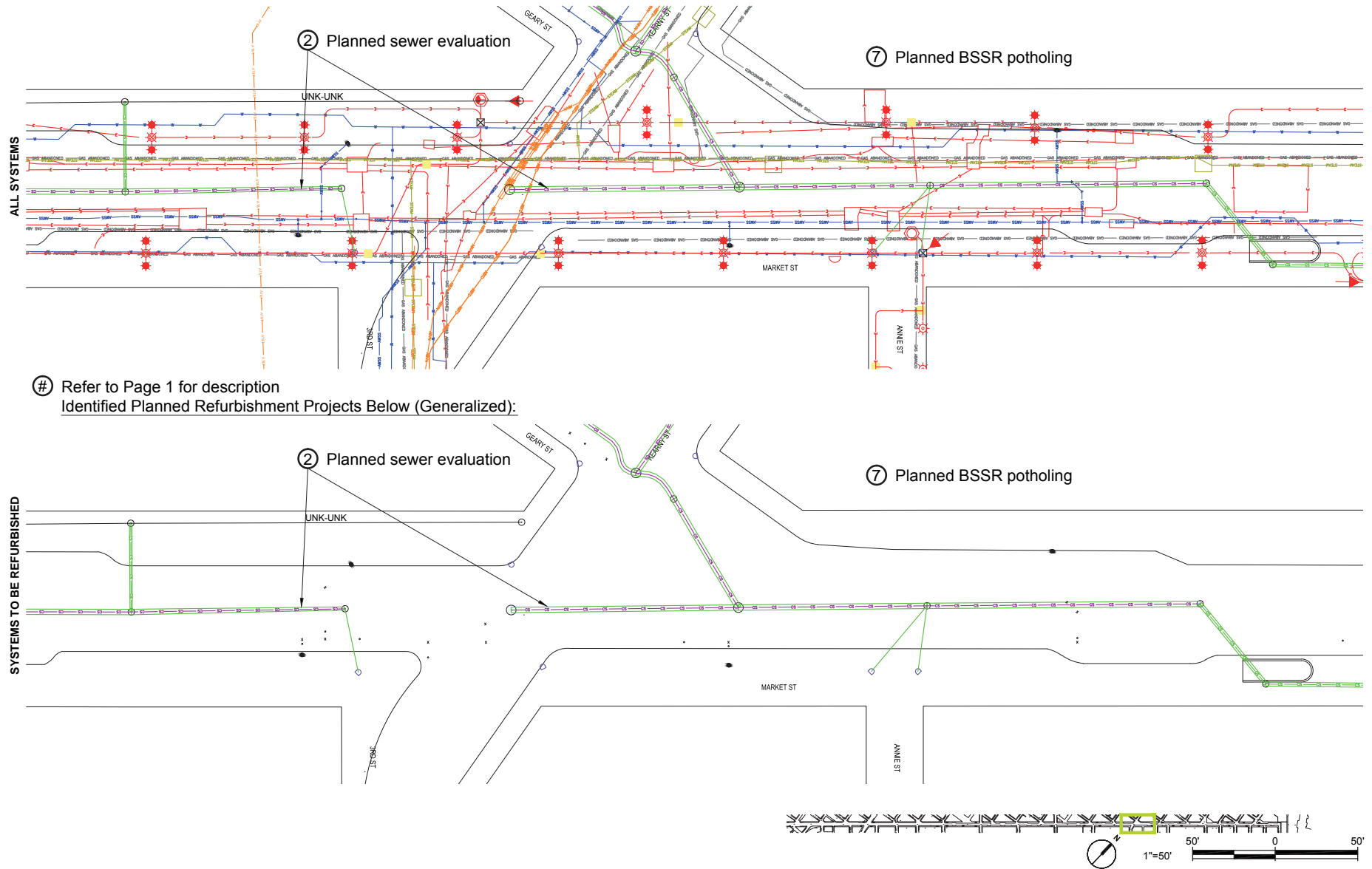
**Figure 4.1.4: Underground utilities (top) and planned refurbished projects (bottom) - Zone 2 Retail District (2 of 3)**



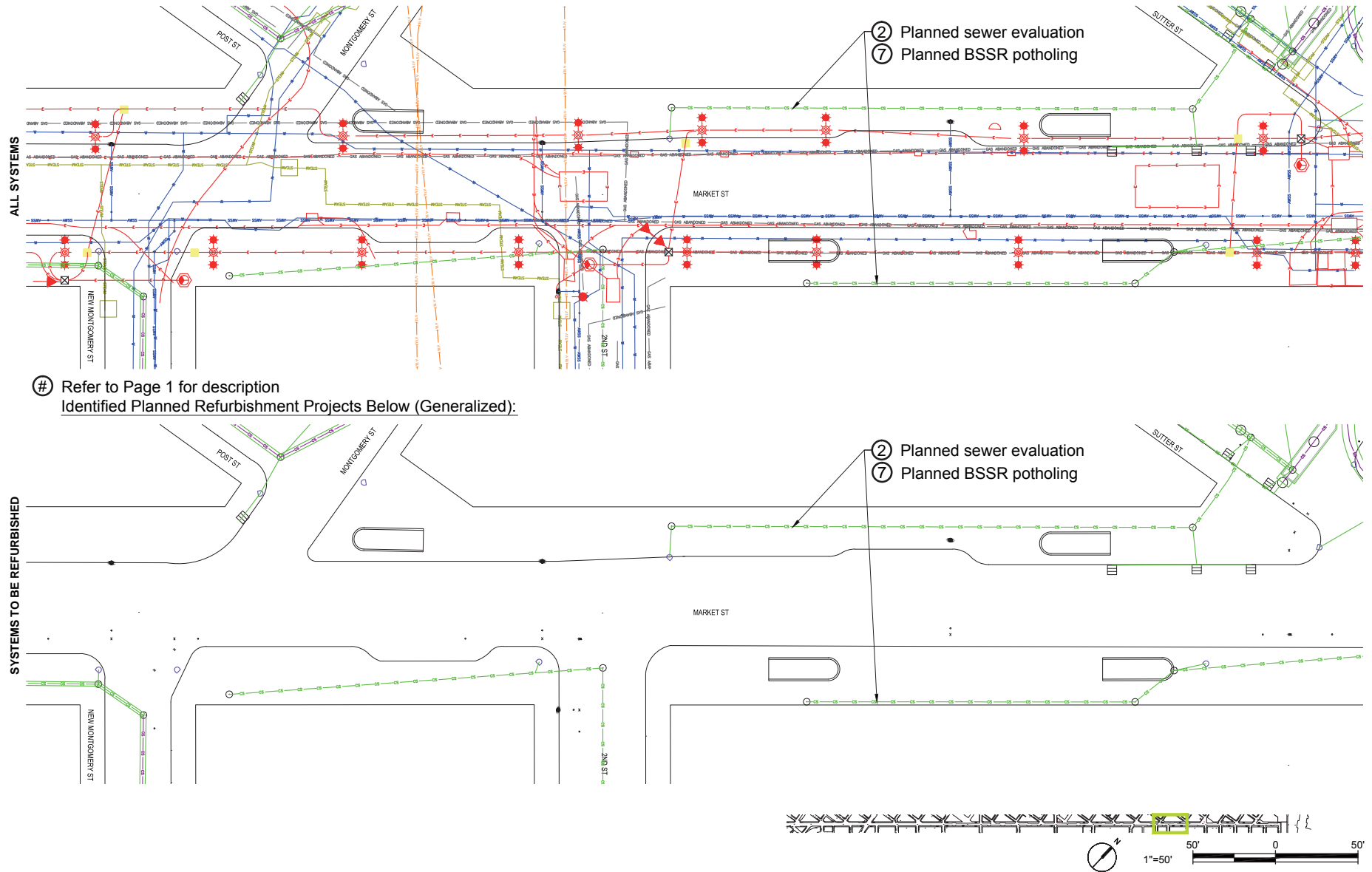
**Figure 4.1.4: Underground utilities (top) and planned refurbished projects (bottom) - Zone 2 Retail District (3 of 3)**



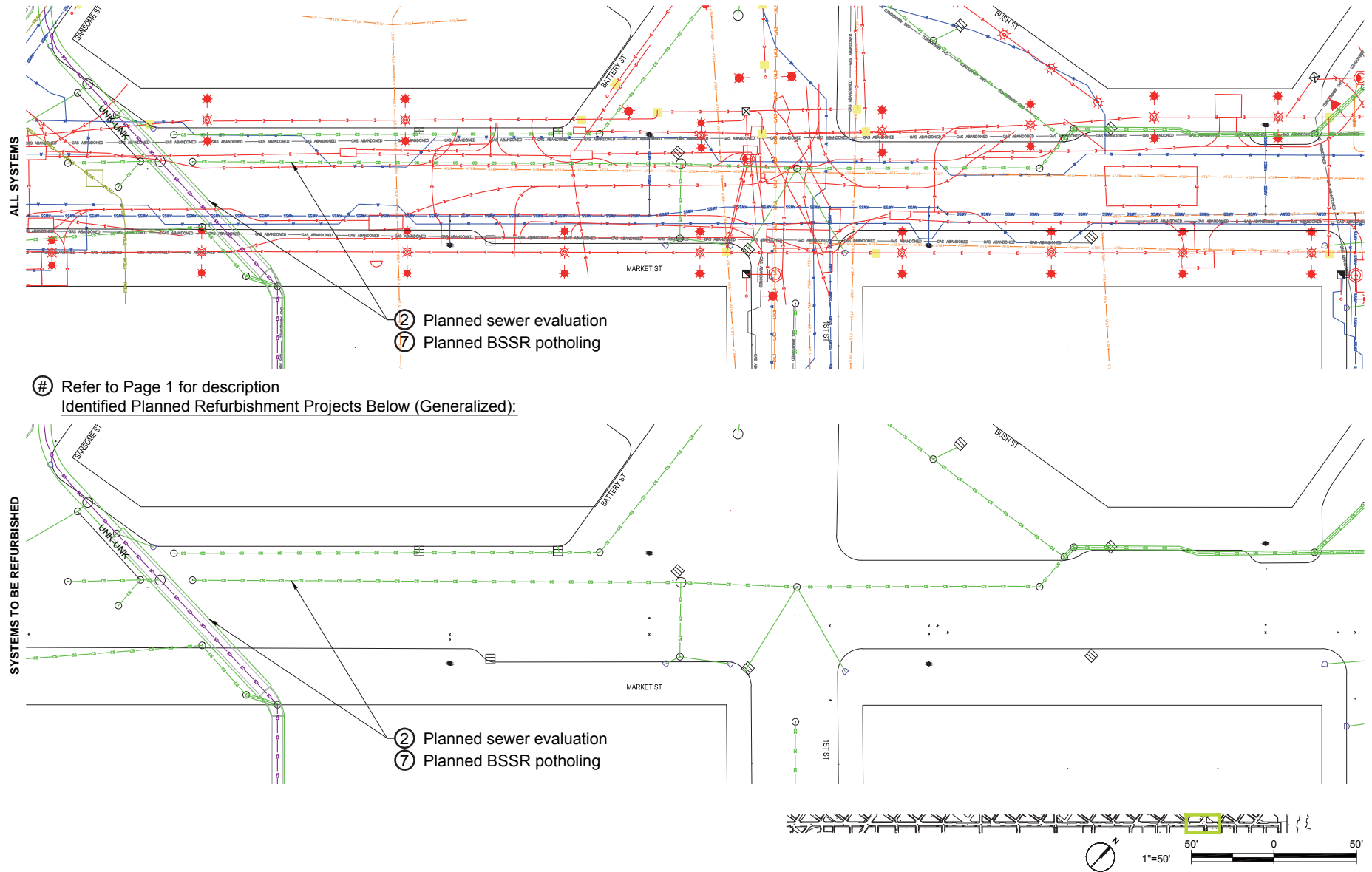
**Figure 4.1.5: Underground utilities (top) and planned refurbished projects (bottom) - Zone 1 Financial District (1 of 6)**



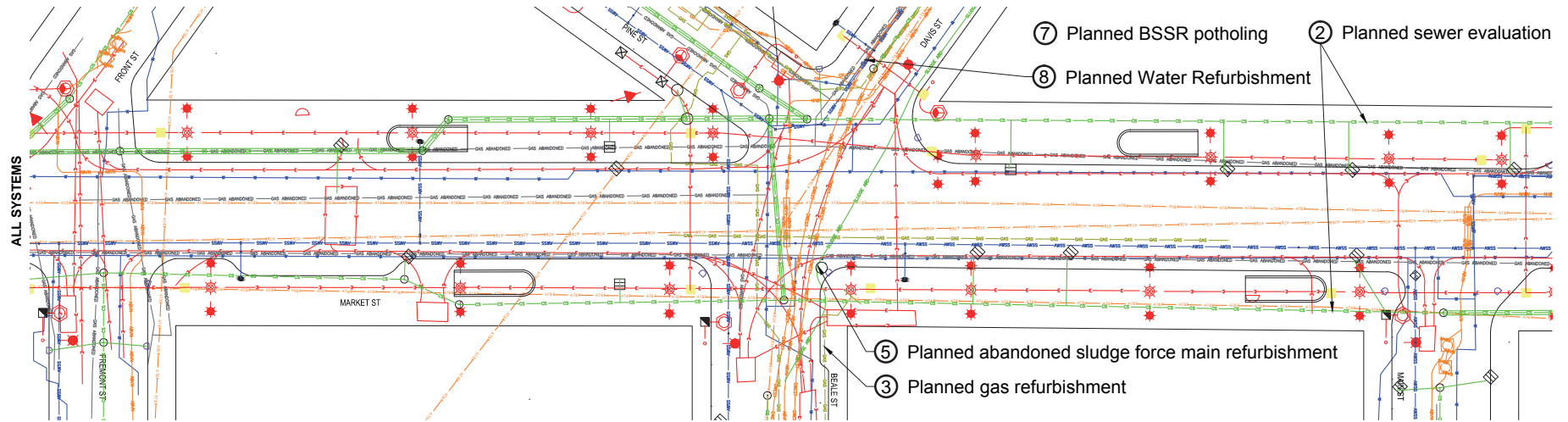
**Figure 4.1.5: Underground utilities (top) and planned refurbished projects (bottom) - Zone 1 Financial District (2 of 6)**



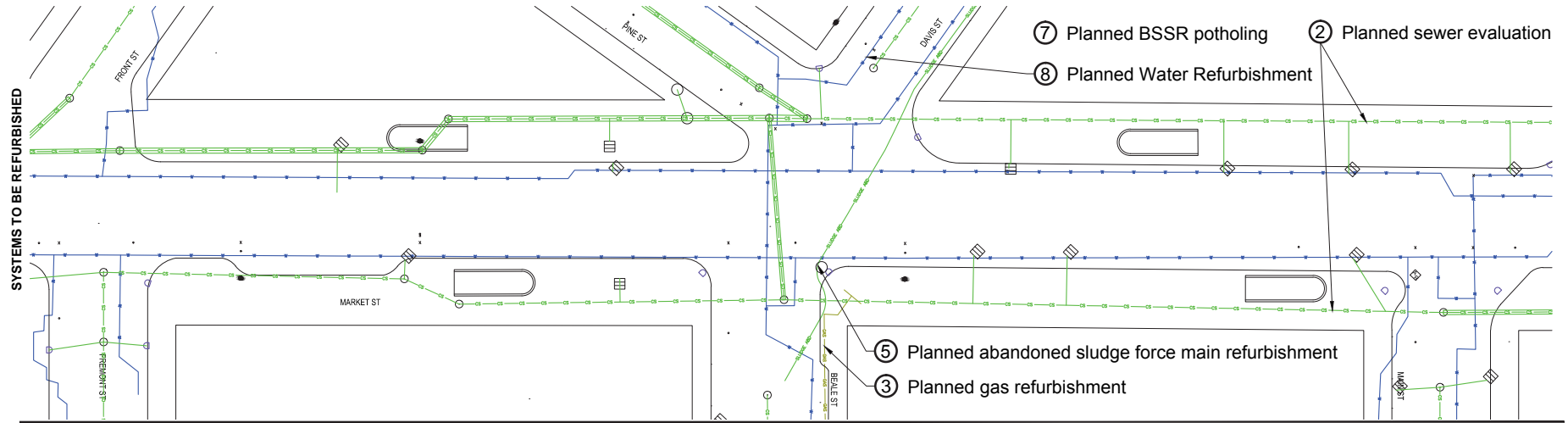
**Figure 4.1.5: Underground utilities (top) and planned refurbished projects (bottom) - Zone 1 Financial District (3 of 6)**



**Figure 4.1.5: Underground utilities (top) and planned refurbished projects (bottom) - Zone 1 Financial District (4 of 6)**



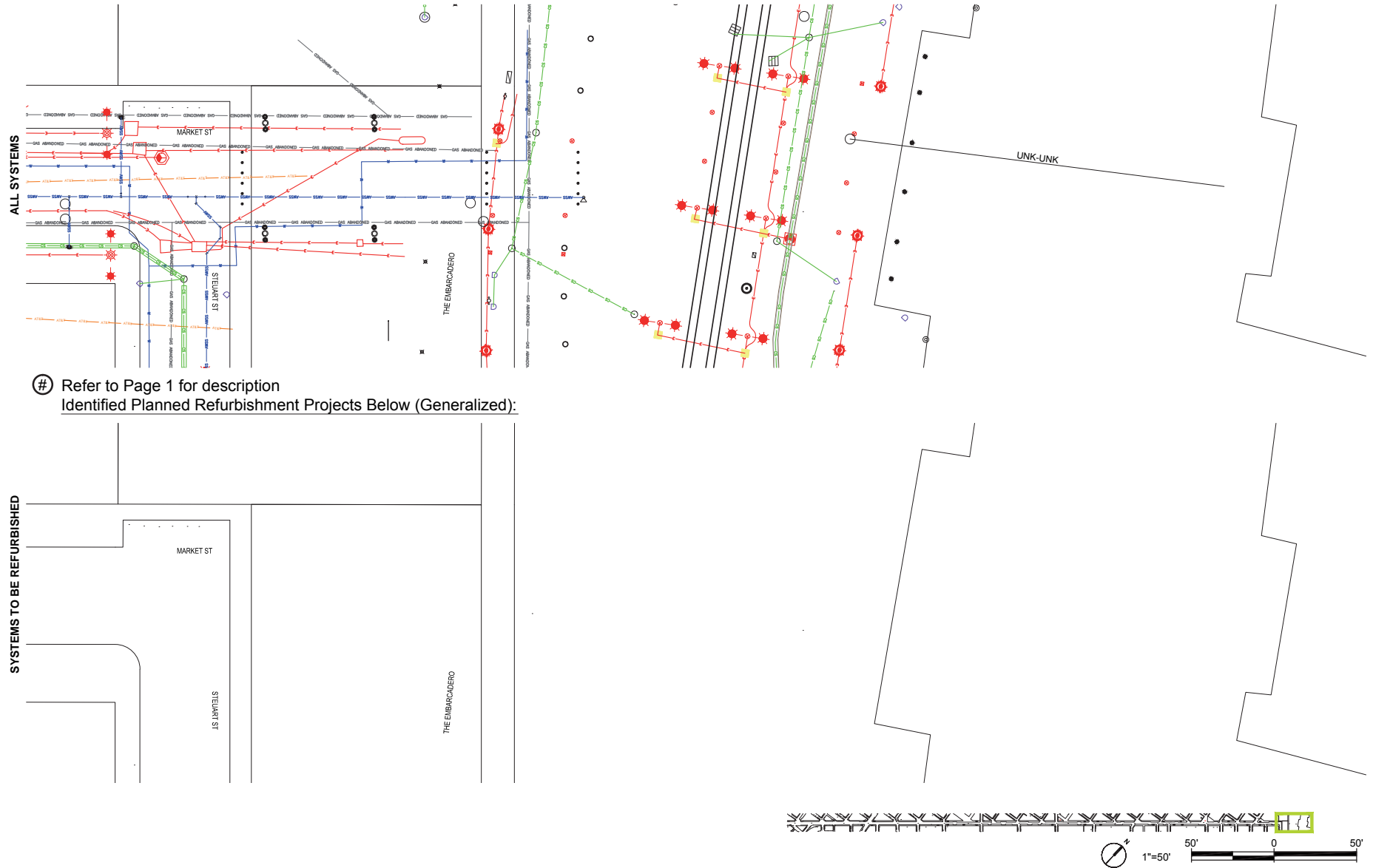
⑧ Refer to Page 1 for description  
 Identified Planned Refurbishment Projects Below (Generalized):







**Figure 4.1.5: Underground utilities (top) and planned refurbished projects (bottom) - Zone 1 Financial District (6 of 6)**



## References

The contacts below assisted in obtaining data about the owners' underground utilities. The data, in some cases, was not provided by the utility owners themselves.

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