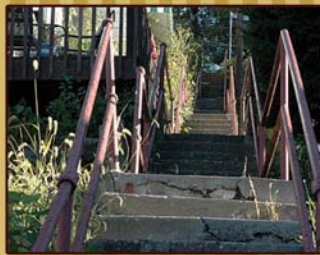


SOUTH SIDE SLOPES

Public Staircase Inspection



south side
LOCAL DEVELOPMENT COMPANY

SOUTH SIDE
SLOPES
NEIGHBORHOOD
ASSOCIATION

Baker

July 2008

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Introduction

Michael Baker Jr., Inc. (Baker) contracted with the South Side Local Development Company (South Side LDC) and South Side Slopes Neighborhood Association (SSSNA) to conduct a visual observation of the public stairs in the South Side of Pittsburgh.

The South Side Slopes neighborhood is steeped in the history of Pittsburgh's steel industry. Houses that were built for the immigrants that arrived to work in the mills in the early 1900's cling to its hillsides. Built close together, they are often only one room wide and cascade down the slopes for three or four stories. Streets are narrow, winding, and connected by public stairs. The public stairs are the link between the Flats and the Slopes neighborhoods.

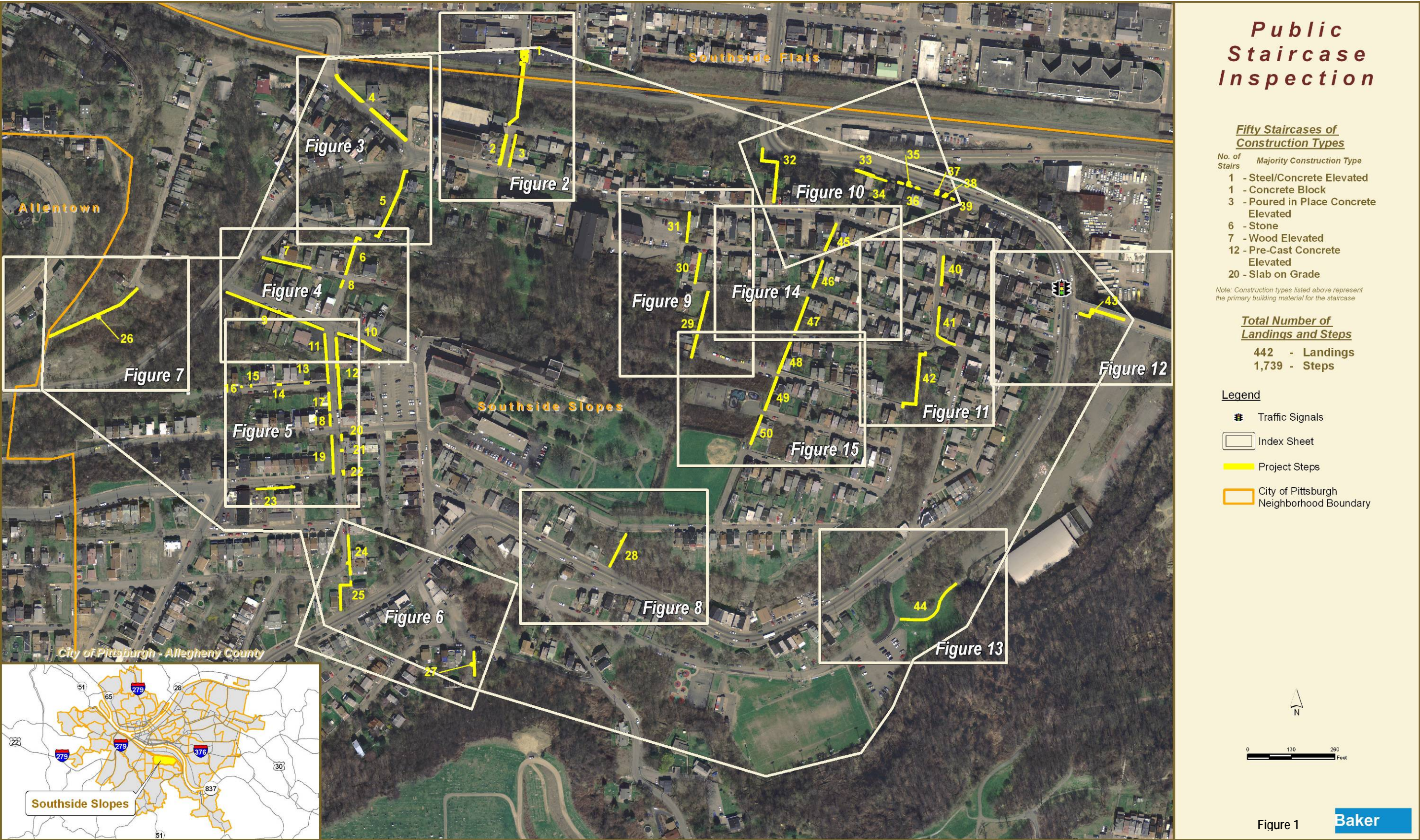
In 2005, a portion of the South Side Slopes neighborhood was designated as an Elm Street district. Funded by the State Department of Community and Economic Development, Elm Street is a residential improvement program. The South Side Slopes Elm Street program is managed by South Side LDC in cooperation with an Elm Street Committee made up of residents of the South Side Slopes. The public stairs in the Elm Street district have become the focus of the Elm Street committee and are the subject of this report.

This project encompasses a visual observation and condition assessment of public stairs in the South Side Elm Street District. This inspection included steps, railings, lighting and other safety features.

Location

The project area is located within the City of Pittsburgh, Pennsylvania on the south side of the Monongahela River (see Figure 1). The public stairs all fall within the Elm Street district on the South Side Slopes. The area of the stair inspection is bound on the north by Breed Street and South 18th Street, to the east by South Side Park, to the north by South 18th Street and the South 18th Street Extension and to the west by Arlington Avenue.

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Methodology

Field observations were conducted between 1 and 3 April 2008, and a nighttime observation of staircase light levels was conducted 23 April 2008. Visual observations of the steps were conducted using two teams each consisting of a planner and a GIS technician. Data was collected on pre-designed data sheets created to ensure consistency and comprehensiveness of data collection.

Data collected included observations of conditions in the following areas: steps, support structure, railings and lighting. In addition to condition information data was also collected on adjacent infrastructure and amenities such as streetlight locations, utilities and bus stops.

In conducting the condition assessment the following data was collected:

- For treads and risers the following conditions were observed:
 - Cracking
 - Spalling
 - Wear/Aging
 - Rust Staining
 - Exposed Reinforcing Steel
 - Chipping
 - Loose Steps
 - Opening of Expansion Joints
 - Excessive Slope
- For structural support and cast in place stringers the following conditions were observed:
 - Cracking
 - Spalling
 - Erosion of Foundation
 - Exposed Reinforcing Steel
 - Chipping
 - Deformed (bending) of structural support
- For railings the following conditions were observed:
 - Rusting
 - Bent
 - Crack at the base of handrail
 - Unstable
 - Non-Existing
- Other conditions observed during the field work included:
 - Obstructions
 - Overgrowth
 - Runoff Deposit
 - Adjacent Structure Condition

Data collected during field observations was recorded in a GIS data layer on a step by step basis. During the analysis phase of the project deficiencies were combined at the individual step level and steps were compared with each other. Further analysis aggregated the individual steps to the staircase level. Staircases were then prioritized using a weighted average of condition and use characteristics. The result was a prioritized list of staircases to address deficiencies.

Field observation data was reviewed by a structural engineer who developed maintenance recommendations and cost estimates on the staircase level based on the data gathered.

The following sections include a brief description of each staircase and its observed condition followed by a map depicting the condition on a step by step basis.

Assumptions

Field Observations

While conducting field observations, evaluations were based on based on International Building Code (IBC), Americans with Disabilities Act (ADA) and Illuminating Engineering Society of North America (IESNA) guidelines. Although the IBC contains a section dealing exclusively with stairs, it was used primarily in determining the railing requirements. IBC requires that railings with step elevations exceeding thirty (30) inches to ground level must contain handrails between thirty-four (34) and thirty-six (36) inches in height, and horizontal railing bars should be spaced no more than four (4) inches apart.

Realizing that the South Side steps are not likely to become fully ADA compliant, field teams viewed their observations through the context of ADA guidelines. ADA guidelines on staircases require handrail extensions both at the bottom and top of the staircase, closed risers on all steps and necessitate that tread slopes be less than 1:48 or two (2) percent.

The IESNA standard selected to be most applicable for the South Side steps was that of a low-activity parking lot. The standard for low activity lots was a minimum of 0.5 foot-candles of light.

Cost Estimating

Cost estimates for individual staircases were prepared using the data collected on deficiency occurrences and unit costs for typical repair types. Cost estimates for deficiencies were not developed base on individual inspection of each occurrence, rather assumptions were made regarding the average severity and size of deficiency types. These average levels of severity and size were then applied to the unit costs to develop the cost estimates.

Each staircase cost estimate was developed to allow maintenance and repair of that staircase individually. Cost savings may be realized by conducting work on groups of staircases at the same time.

These cost estimates should be considered planning level estimates and are rounded to the nearest one hundred dollars. Planning level cost estimates are those developed without the benefit of detailed plans or specifications. These estimates account for the effects of the most important design parameters. A detailed description of the cost estimate for each staircase can be found in Appendix A.

Prioritization

Staircase repairs and maintenance were prioritized based on the extent of the deficiencies as well as the level of use a staircase receives. The table on the following page summarizes the evaluation criteria into six categories described below: lighting, surface deficiencies, structural deficiencies, railing deficiencies, other concerns and level of use. In each category an average value for an entire staircase is provided, this value is then weighted and combined with the other five criteria to determine the total score for a staircase. Total scores are compared to determine the priority. In the table on the following page the staircase with the lowest priority value (one) is the highest priority for repairs.

The lighting category includes the average foot-candles for the staircase based upon multiple measurements recorded along the length of the stairs.

The surface category includes the average number of occurrences per step of the following deficiencies: cracking, spalling, age/wearing, rust stains, exposed steel, openings in joints, excessive slope, potential for water deposit, cracks at handrail base, loose steps, and chipping.

The structure category includes the average number of occurrences per step of the following deficiencies: wood supports; structural cracking, spalling and chipping; exposed steel; rust stains; and bending of structural support.

The railing category includes the average number of occurrences per step of the following deficiencies: rusting, bending of handrail as well as unstable handrails and missing handrails.

The other category includes the average number of occurrences per step of the following deficiencies: overgrowth, runoff deposit on steps, obstructions, adjacent wall damage and other adjacent structure damage.

The steps were categorized by type with a different deficiency category rating applied to elevated steps as opposed to slab on grade construction. This was done in order to compensate for the lack of structural defects on slab on grade construction and to enable a comparison between elevated and slab on grade priorities. The weighting systems as well as a description of the staircase types are included in the figure on the following page.

Staircase thirty-two, located between 18th Street and Pius Street was the highest priority staircase according to the analysis described above. Staircase thirty-two received the highest use classification as a major transportation route and exhibited some of the most severe and the greatest amount of structural damage. These two factors combined to make Staircase thirty-two the greatest concern and therefore the highest priority of those observed.

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South Side Staircase Prioritization

Step	Type	Lighting ¹	Surface ²	Structure ³	Railings ⁴	Other ⁵	Use	Total ⁶	Priority
1	1	0.1	0.4	1.5	0.2	0.0	4	1.74	24
2	5	0.0	0.8	0.0	0.0	0.0	4	1.93	20
3	5	0.1	1.5	0.0	0.0	0.0	3	1.72	25
4	5	0.0	3.0	0.0	0.0	0.0	3	2.15	17
5	3	0.0	1.7	0.3	0.0	0.0	5	1.93	19
6	3	0.0	2.5	0.5	0.0	0.0	4	1.84	23
7	5	0.0	0.8	0.0	0.0	0.0	5	2.36	10
8	5	0.0	0.6	0.0	3.6	0.3	1	1.11	43
9	3	0.0	1.9	2.4	0.0	0.0	5	2.62	6
10	3	0.1	1.7	1.8	0.6	0.1	5	2.44	9
11	5	0.1	1.0	0.0	0.5	0.0	2	1.22	36
12	3	0.1	1.5	1.8	0.0	0.1	5	2.32	12
13	6	0.0	0.0	2.0	0.0	0.0	2	1.20	38
14	6	0.3	0.0	1.8	0.0	0.0	2	1.11	42
15	6	1.2	0.0	1.8	0.0	0.0	2	1.04	46
16	6	0.5	0.0	2.0	0.0	0.0	2	1.16	41
17	5	0.0	1.1	0.0	0.0	0.8	2	1.20	37
18	5	0.0	2.8	0.0	0.0	0.0	2	1.64	28
19	5	0.1	2.1	0.7	0.3	0.3	1	1.07	44
20	5	0.1	2.0	0.0	0.0	0.0	2	1.42	33
21	6	0.1	0.0	2.0	0.0	0.0	2	1.19	39
22	6	0.1	0.0	2.0	0.0	0.0	2	1.19	40
23	6	0.2	2.5	2.1	3.0	0.0	4	2.60	7
24	5	0.1	3.1	0.0	0.9	0.1	3	2.29	13
25	4	0.0	0.6	0.5	0.0	0.0	4	1.45	32
26	5	0.0	1.3	0.0	1.7	0.2	1	1.06	45
27	5	0.0	5.5	0.0	2.0	0.6	2	2.74	4
28	4	0.0	1.0	1.4	1.2	0.0	3	1.62	29
29	3	0.0	1.0	0.3	0.3	0.2	3	1.24	35
30	5	0.0	0.0	0.0	0.0	0.0	0	0.00	48
31	5	0.0	3.1	0.1	2.4	3.2	2	2.24	15
32	3	0.1	0.8	5.9	0.0	0.0	5	3.45	1
33	7	0.0	0.0	0.0	0.0	1.1	2	0.90	47
34	2	0.0	6.1	0.0	3.0	0.0	2	3.03	2
35	2	0.0	0.0	0.0	0.0	0.0	0	0.00	48
36	2	0.0	1.9	0.0	3.0	2.0	2	1.92	21
37	2	0.0	2.0	0.0	3.0	2.1	2	1.94	18
38	2	0.0	1.9	0.0	0.0	2.0	2	1.48	30
39	2	0.0	0.0	0.0	0.0	0.0	0	0.00	48
40	5	0.0	0.0	0.0	0.0	0.0	3	1.29	34
41	5	0.1	2.6	0.0	1.1	0.6	3	2.19	16
42	3	0.0	0.8	0.9	0.4	0.3	4	1.66	27
43	4	0.0	2.0	3.2	0.1	0.0	1	1.67	26
44	5	0.0	2.2	0.0	2.8	0.0	1	1.46	31
45	5	0.0	0.8	0.0	3.0	0.0	5	2.81	3
46	5	0.0	0.9	0.0	1.6	1.1	5	2.68	5
47	3	0.0	1.0	0.6	0.5	0.0	5	1.92	22
48	3	0.1	1.2	1.6	1.3	0.0	5	2.33	11
49	3	0.0	1.2	1.2	1.6	0.0	5	2.24	14
50	3	0.0	1.5	2.3	0.6	0.0	5	2.56	8

Weighting	Elevated	Slab
Lighting	7%	10%
Surface	20%	29%
Structure	30%	0%
Railings	10%	14%
Other	3%	4%
Use	30%	43%
Total	100%	100%

Use Definition

0	Not Utilized
1	Recreational/Rarely Used
2	Minor Transportation
3	Transportation
4	Housing Access/Major Transportation
5	Only Housing Access/Major Transportation Use

Type Definition

1	Steel/Concrete Elevated
2	Stone
3	Pre-Cast Concrete Elevated
4	Poured In Place Concrete Elevated
5	Slab on Grade
6	Wood Elevated
7	Concrete Block

Notes

¹ Includes the average foot-candles for the staircase based on multiple measurements along the length of the stairs.

² Includes surface cracking, spalling, age/wearing, rust stains, exposed steel, openings in joints, excessive slope, potential for water deposit, cracks at handrail base, loose steps, and chipping.

³ Includes staircases with wood supports; structural cracking, spalling and chipping; exposed steel; rust stains; and bending of structural support.

⁴ Includes rusting, bending of handrail as well as unstable handrails and missing handrails.

⁵ Includes overgrowth, runoff deposit on steps, obstructions, adjacent wall damage and other adjacent structure damage.

⁶ The total is a weighted sum of each of the attributes.

Public Staircase Inspection

The staircases in the following table were arranged by priority and displayed with estimated repair costs. Although costs are a good indicator of the amount of repairs, there is not a direct correlation between cost and priority because the level of use plays a significant role in determining the priority for the steps.

Staircase	Type	Priority	Cost
32	Pre-Cast Concrete Elevated	1	\$ 12,400
34	Stone	2	\$ 4,500
45	Slab on Grade	3	\$ 2,500
27	Slab on Grade	4	\$ 8,400
46	Slab on Grade	5	\$ 2,800
9	Pre-Cast Concrete Elevated	6	\$ 10,200
23	Wood Elevated	7	--
50	Pre-Cast Concrete Elevated	8	\$ 6,000
10	Pre-Cast Concrete Elevated	9	\$ 6,000
7	Slab on Grade	10	\$ 3,700
48	Pre-Cast Concrete Elevated	11	\$ 6,000
12	Pre-Cast Concrete Elevated	12	\$ 6,200
24	Slab on Grade	13	\$ 3,900
49	Pre-Cast Concrete Elevated	14	\$ 7,400
31	Slab on Grade	15	\$ 6,600
41	Slab on Grade	16	\$ 5,700
4	Slab on Grade	17	\$ 3,700
37	Stone	18	\$ 3,500
5	Pre-Cast Concrete Elevated	19	\$ 8,800
2	Slab on Grade	20	\$ 2,600
36	Stone	21	\$ 4,500
47	Pre-Cast Concrete Elevated	22	\$ 6,500
6	Pre-Cast Concrete Elevated	23	\$ 7,400
1	Steel/Concrete Elevated	24	\$ 2,400
3	Slab on Grade	25	\$ 2,300
43	Poured in Place Concrete Elevated	26	\$ 6,300
42	Pre-Cast Concrete Elevated	27	\$ 9,100
18	Slab on Grade	28	\$ 2,300
28	Poured in Place Concrete Elevated	29	\$ 7,000
38	Stone	30	\$ 2,300
44	Slab on Grade	31	\$ 15,200
25	Poured in Place Concrete Elevated	32	\$ 4,100
20	Slab on Grade	33	\$ 2,300
40	Slab on Grade	34	--
29	Pre-Cast Concrete Elevated	35	\$ 7,200
11	Slab on Grade	36	\$ 3,000
17	Slab on Grade	37	\$ 2,600
13	Wood Elevated	38	--
21	Wood Elevated	39	--
22	Wood Elevated	40	--
16	Wood Elevated	41	--
14	Wood Elevated	42	--
8	Slab on Grade	43	\$ 5,700
19	Slab on Grade	44	\$ 6,500
26	Slab on Grade	45	\$ 13,200
15	Wood Elevated	46	--
33	Concrete Block	47	\$ 2,900
30	Slab on Grade	48	--
35	Stone	48	--
39	Stone	48	--

Staircase One

Overview

The bottom of Staircase One (Figure 2) is located at the south terminus of South 15th Street and climbs to the west end of Clinton Street. The staircase consists of three sections. The first section structural steel stairs with concrete treads. This section consists of six landings and fifty-five steps. The second section is a structural steel bridge with a concrete surface that traverses two railroad tracks. The bridge is 117 feet in length. The third section of this staircase is a cast-in-place concrete structure with steps included in the pour. This section consists of four landings and fifty-five steps.



Staircase One

Condition



Surface Cracking at Handrail Base

Surface

The first section of the staircase has mild spalling and rust staining from the surrounding COR-TEN steel structure. The second section of the staircase also contains rust staining on the surface of the bridge from both the COR-TEN steel structure and the chain link fence surrounding the bridge. The third section of the staircase contains some cracking, mainly on the surface of the steps at the base of the handrail.

Structure

The structure on the first section of the staircase has oxidized. The COR-TEN steel used on this staircase is a corrosion resistant low-alloy steel that forms a protective coating of rust when exposed to natural atmospheres. The rust layer on the steel becomes protective when the fine crystallites of early rust recrystallize into a relatively intact barrier layer of rust through alternating wetting and drying cycles. The second section of this staircase is similarly constructed of COR-TEN steel and exhibits parallel rusting characteristics. The third section structural support is in good condition.

Railings

The railings on the first section of the staircase were constructed of COR-TEN steel; they are in good condition and meet IBC standards. The second section of the staircase consists of a handrail backed by fine mesh chain link fence for safety purposes. This section of handrail is in good condition. Overall, the handrails of the third section of staircase are in good condition. There are a number of areas where the handrail is damaged and has been bent. The major deficiency with the handrails in this section is that they do not meet IBC standards.



Inoperable Light

Lighting

The lighting on the first section of the staircase is sufficient. Lighting in this section consists of one light on each landing; this configuration provides enough light to illuminate the stairs above and below the landing. The second section of the staircase has sufficient lighting installed, but the southern most light is not operational. Repairs to this light will provide adequate lighting for this section. The third section of the staircase contains sufficient lighting at both the bottom and top of the section, but lighting in the

center of the staircase falls below the Illuminating Engineering Society of North America (IESNA) guidelines of .5 foot-candles for low activity areas.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,400. A detailed description of the cost estimate can be found in Appendix A.

Staircase Two

Overview

The bottom of the staircase (Figure 2) is located at the corner of South 15th Street and Clinton Street. The staircase climbs the west side of South 15th Street to the corner of South 15th Street and Pius Street. The staircase consists of cast-in-place concrete slabs and was constructed recently. This staircase contains ten steps and seventeen landings.

Condition

Surface

This staircase contains minor cracking and spalling.

Structure

This staircase is slab on grade and has no structural concerns.

Railings

This staircase is slab on grade. All sections of the staircase have an elevation of less than thirty (30) inches, therefore railings are not necessary.

Lighting

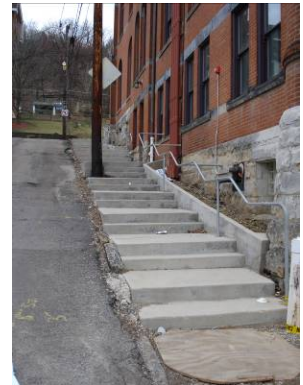
The staircase has street lighting at the corner of South 15th Street and Clinton Street at the base of the steps and one light at the top of the steps across Pius Street. The staircase has adequate lighting on the first step but the remainder of the staircase falls below IESNA lighting standards.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,600. A detailed description of the cost estimate can be found in Appendix A.



Staircase Two

Staircase Three

Overview

The bottom of the staircase (Figure 2) is located at the corner of South 15th Street and Clinton Street. The staircase climbs the east side of South 15th Street to the corner of S 15th Street and Pius Street. The staircase consists of cast-in-place concrete slabs. This staircase consists of eleven steps and eleven landings.

Condition

Surface

This staircase contains a significant amount of cracking and spalling throughout the staircase.

Structure

This staircase is slab on grade and has no structural concerns.



Staircase Three



Surface Cracking

Railings

This staircase is slab on grade. All sections of the staircase are elevated less than 30 inches thirty (30) inches, therefore railings are not necessary.

Lighting

The staircase has street lighting at the corner of South 15th Street and Clinton Street at the base of the steps and one light at the top of the steps across Pius Street. The staircase has adequate lighting on the first step but the remainder of the staircase falls below IESNA lighting standards.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,300. A detailed description of the cost estimate can be found in Appendix A.

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Staircase Four

Overview

The bottom of Staircase Four (Figure 3) is located at the junction of Brosville Street and South 12th Street and climbs south to the intersection of Pius Street and Brosville Street. The staircase consists of cast-in-place concrete slabs and contains forty-five landings.

Condition

Surface

This staircase contains a moderate amount of cracking and spalling throughout the staircase. In addition, the expansion joints on a number of the steps are beginning to open and each of the steps contains rust staining resulting from the railing drip line.

Structure

This staircase is slab on grade and has no structural concerns.



Staircase Four



Rusting Handrail

Railings

This staircase contains a single railing down the center of the steps. The railing contains some rust which is contributing to rust staining on the steps. All sections of the staircase are elevated less than 30 inches thirty (30) inches, therefore railings are not necessary.

Lighting

The staircase has street lighting at the corner of South 12th Street and Brosville Street at the base of the steps, one light in the middle of the staircase and one light at the top of the steps at the intersection of Pius and Brosville Streets. Only the light at the base of the steps is located on the same side of the street as the steps, the other two lights are located across Brosville Street. The staircase light levels fall below IESNA lighting standards.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$3,700. A detailed description of the cost estimate can be found in Appendix A.

Staircase Five

Overview

The bottom of Staircase Five (Figure 3) is located at the junction of Brosville Street and Pius Street and climbs south to the Hackstown Street. The staircase is constructed almost entirely of cast-in-place concrete structures with precast treads and contains one hundred and thirty-eight steps and eleven landings.

Condition

Surface

This staircase exhibits a significant amount of cracking (including cracking at the base of handrails) and to a lesser extent spalling and wear due to aging throughout the staircase. In addition to these surface defects, on nineteen (19) steps portions of the concrete has eroded or chipped away exposing the rebar and four steps were noted to be loose.



Surface Chipping

Structure

The support structure for two landings and two stairs were found to have exposed rebar. Otherwise, the structural defects observed are minor.

Railings

Railings on this staircase are in a fair condition, but they do not meet IBC.

Lighting

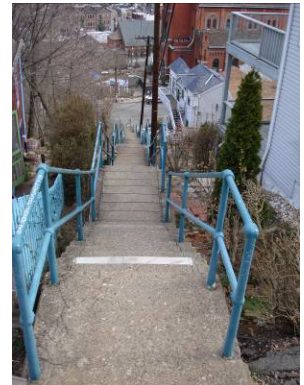
This staircase has three lights. One streetlight at the bottom of the staircase across Brosville Street, one approximately one-third up the staircase, and one at the top across Hackstown Street. Except in areas immediately adjacent to lights, the staircase light levels fall below IESNA lighting standards.

Other Concerns

The landing at the top of this staircase showed evidence of water pooling.

Repair Cost

The estimated repair cost for this staircase is \$8,800. A detailed description of the cost estimate can be found in Appendix A.



Staircase Five



Structural Chipping



Staircase Six

Overview

The bottom of Staircase Six (Figure 4) is located on Hackstown Street and climbs south to the Saint Joseph Way. The staircase is constructed almost entirely of cast-in-place concrete structures with precast treads and contains seventy-one steps and seven landings.

Condition



Surface Chipping

Surface

These steps have a significant amount of cracking and spalling throughout the staircase, as well as, nine (9) instances of exposed rebar.

Structure

The structural support on this staircase contains a minor amount of cracking and spalling, as well as, one instance of exposed rebar.



Staircase Six

Railings

Railings on this staircase contain minor areas of rusting but are otherwise in a fair state of repair. These railings do not meet IBC.

Lighting

This staircase had no public lighting immediately adjacent to the steps. There is a streetlight on either side of the bottom landing along Hackstown Street but the light is not sufficient to meet IESNA standards. There is one light east of the top landing on St. Joseph Way. Other lighting on this staircase is provided by adjacent housing. Except on the top landing, the staircase light levels fall significantly below IESNA lighting standards.



Efflorescence

Other Concerns

The landing at the bottom of this staircase shows evidence of water pooling and is collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is \$7,400. A detailed description of the cost estimate can be found in Appendix A.

Staircase Seven

Overview

The bottom of Staircase Seven (Figure 4) is located at the junction of Brosville Street and Hackstown Street and climbs east to the west end of St. Joseph Way. The staircase consists cast-in-place concrete slabs and contains sixty-two steps and sixteen landings.

Condition

Surface

These steps contain a moderate amount of cracking and spalling but otherwise are in good condition.



Staircase Seven



Spalling

Structure

This staircase is slab on grade and has no structural concerns.

Railings

The railings on this staircase are in good condition. All sections of the staircase have an elevation of less than thirty (30) inches, therefore the railings meet IBC.

Lighting

This staircase has street lighting at both the top and the bottom of the steps. The streetlight at the bottom of the stairs was not operating at the time of inspection. Other lighting on this staircase is provided by adjacent housing. Except on the top landing, the staircase light levels fall below IESNA lighting standards.

Other Concerns

One landing shows evidence of water pooling and is collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is \$3,700. A detailed description of the cost estimate can be found in Appendix A.



Runoff Debris

Staircase Eight

Overview

The bottom of Staircase Eight (Figure 4) is located at the junction of Saint Thomas Street and Saint Joseph Way and climbs south to along the west side of Saint Thomas Street. The staircase consists of cast-in-place concrete slabs and contains two steps and five landings.

Condition

Surface

There is cracking on two of the seven steps and landings, otherwise this staircase is in good condition.

Structure

This staircase is slab on grade and has no structural concerns.



Staircase Eight



Missing Handrail

Railings

The railings on this staircase no longer exist, the railing has been removed except the portion that is anchored in the cement. All sections of the staircase have an elevation of less than thirty (30) inches, therefore a railing is not needed on this staircase.

Lighting

There is one light east of the bottom landing on St. Joseph Way. The staircase light levels do not meet IESNA lighting standards.

Other Concerns

The landing at the bottom of this staircase shows evidence of water pooling and is collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is 5,700. A detailed description of the cost estimate can be found in Appendix A.

Staircase Nine

Overview

The bottom of Staircase Nine (Figure 4) is located at the junction of Brosville Street and Monastery Street and climbs east along the south side of Monastery Street to the junction of Monastery Street and Saint Thomas Street. The staircase is constructed of both cast-in-place concrete structures with precast treads and cast-in-place structures with steps included in the pour. This staircase contains seventy-nine steps and thirteen landings.



Staircase Nine

Condition



Structural Cracking

Surface

More than half of the steps and landings on this staircase contain surface cracking including significant cracking at the base of the handrails. In addition to cracking these steps exhibit a moderate amount of spalling and four steps have exposed rebar.

Structure

The structural support on this staircase contains a moderate amount of cracking, chipping and exposed steel.

Approximately one third of the steps and landings on this staircase exhibit at least one of these structural issues.



Exposed Steel

Railings

Railings on this staircase are in a good state of repair, but they do not meet IBC.

Lighting

This staircase is illuminated by four streetlights on the north side of Monastery Street, one light at the Brosville Street/Monastery Street intersection, one a quarter of the way up the staircase, one three-quarters of the way up, and one at the top of the staircase. Light levels on the steps adjacent to the four streetlights meet IESNA lighting standards, but the remainder of the steps do not.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$10,200. A detailed description of the cost estimate can be found in Appendix A.

Staircase Ten

Overview

The bottom of Staircase Ten (Figure 4) is located at the junction of Saint Thomas Street and Monastery Street and climbs east along the south side of Monastery Street to where Monastery turns south. The staircase is constructed of both cast-in-place concrete structures with precast treads and cast-in-place structures with steps included in the pour. This staircase contains twenty-six steps and seven landings.



Staircase Ten

Condition

Surface

Cracking and spalling exist on a significant portion of this staircase. Cracking contained on this staircase occurs both on the pre-cast tread and at the base of the railing supports.



Structural Cracking

Structure

The structural support for this staircase exhibits significant cracking. Cracking occurs on the downhill side of each landing and continues to the stringer below the steps. There are also two instances of chipping and exposed steel on the stringers below steps.

Railings

One quarter of the railings on this staircase have significant rust damage. This damage consists of both rusting of

railing joints and rusting at the base of vertical support. In addition to rust damage, one section of railing is missing on this staircase. These railings do not meet IBC.



Rusting Handrail Joint

Lighting

There are two lights illuminating this staircase, one at the bottom of the staircase and one across Monastery from the top landing. Light levels on the steps adjacent to these streetlights meet IESNA lighting standards, but the remainder of the steps do not.

Other Concerns

The landing at the top of this staircase shows evidence of water pooling and is collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is \$6,000. A detailed description of the cost estimate can be found in Appendix A.

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Staircase Eleven

Overview

The bottom of Staircase Eleven (Figure 5) is located at the junction of Saint Thomas Street and Monastery Street and climbs south along the west side of Saint Thomas Street to the junction of Saint Thomas and Regina Street. The staircase consists of cast-in-place concrete slabs and contains fifteen steps and thirty landings.

Condition

Surface

This staircase exhibits some cracking and opening of expansion joints, otherwise the surface of this staircase is in good condition.



Staircase Eleven



Surface Chipping

Structure

This staircase is slab on grade and has no structural concerns.

Railings

The railings on the lower third of this staircase are rusting at the base of the vertical support. All sections of the staircase have an elevation of less than thirty (30) inches, therefore a railing is not needed on this staircase.

Lighting

This staircase has a streetlight at the bottom landing across Saint Thomas Street, one two-thirds of the way up the staircase across Saint Thomas Street and one near the top on the west side of the street. Light levels at the top of the staircase adjacent to the streetlight and nearby housing meet IESNA lighting standards, but the remainder of the steps do not.



Handrail Rusting

Other Concerns

Steps on this staircase are not level, they slope downward towards and adjacent retaining wall. This may lead to water pooling on tread surfaces.

Repair Cost

The estimated repair cost for this staircase is \$3,000. A detailed description of the cost estimate can be found in Appendix A.

Staircase Twelve

Overview

The bottom of Staircase Twelve (Figure 5) is located at the junction of Saint Thomas Street and Monastery Street and climbs south along the east side of Saint Thomas Street to the junction of Saint Thomas and Saint Martin Street. The staircase is constructed of both cast-in-place concrete structures with precast treads and cast-in-place structures with steps included in the pour. This staircase contains seventy-one steps and nine landings.



Staircase Twelve

Condition

Surface

There is significant cracking on the surface of this staircase. In addition, there are twelve instances where surface chipping of concrete has exposed rebar beneath.



Structural Cracking

Structure

The structural support for this staircase exhibits significant cracking. Cracking occurs on the downhill side of each landing and continues to the stringer below the steps. There are also four instances of chipping and exposed steel on the stringers below steps and one occurrence of the support structure shifting which has resulted in uneven treads.

Railings

Railings on this staircase are in a fair condition, but they do not meet IBC.

Lighting

This staircase has a streetlight at the bottom landing, one two-thirds of the way up and one near the top on the west side of the street. Light levels adjacent to the streetlights meet IESNA lighting standards, but the remainder of the steps do not.

Other Concerns

The landing at the bottom of this staircase shows evidence of water pooling and is collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is \$6,200. A detailed description of the cost estimate can be found in Appendix A.



Runoff Debris

Staircase Thirteen

Overview

Staircase Thirteen (Figure 5) runs parallel to Regina Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains ten steps and one landing.



Staircase Thirteen

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, but do not meet IBC.

Lighting

There is one streetlight on Regina Street to the west of the staircase. It does not provide sufficient light to meet IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.

Staircase Fourteen

Overview

Staircase Fourteen (Figure 5) runs parallel to Regina Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains eight steps and one landing.

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, but do not meet IBC.

Lighting

There is one streetlight on Regina Street to the east of the staircase. Except for the top landing, this streetlight does not provide sufficient light to meet IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.



Staircase Fourteen

Staircase Fifteen

Overview

Staircase Fifteen (Figure 5) runs perpendicular to Regina Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains seven steps and one landing.

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, but do not meet IBC.

Lighting

There is one streetlight immediately adjacent to this staircase. This streetlight provides sufficient light to meet IESNA guidelines for the entire staircase.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.



Staircase Fifteen

Staircase Sixteen

Overview

Staircase Sixteen (Figure 5) runs perpendicular to Regina Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains two steps and one landing.



Staircase Sixteen

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, and meet IBC because step elevations do not exceed thirty (30) inches to ground.

Lighting

The nearest streetlight is adjacent to Staircase 15. This streetlight provides sufficient light to meet IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.

Staircase Seventeen

Overview

The bottom of Staircase Seventeen (Figure 5) is located at the junction of Saint Thomas Street and Regina Street and climbs south along the west side of Saint Thomas Street to the junction of Saint Thomas and the driveway just north of Saint Martin Street. The staircase consists of cast-in-place concrete slabs and contains eleven steps and seven landings.

Condition

Surface

The majority of the steps in this staircase exhibit cracking and two steps are missing significant sections of concrete. One of these sections of missing concrete has resulted in the failure of the handrail discussed below.

Structure

This staircase is slab on grade and has no structural concerns.



Staircase Seventeen



Damaged Handrail

Railings

One vertical support for this railing has separated from the step, this failure has caused the upper portion of the railing to become unstable. Otherwise, all sections of the staircase have an elevation of less than thirty (30) inches, therefore a railing is not needed on this staircase.

Lighting

The nearest light is at the top of Staircase Eleven across Regina Street. Light levels at the bottom of the staircase nearest to the streetlight meet IESNA lighting standards, but the remainder of the steps do not.

Other Concerns

The steps on the lower half of this staircase show evidence of water pooling and are collecting debris deposited by runoff.

Repair Cost

The estimated repair cost for this staircase is \$2,600. A detailed description of the cost estimate can be found in Appendix A.

Staircase Eighteen

Overview

The bottom of Staircase Eighteen (Figure 5) is located at the junction of Saint Thomas and the driveway just north of Saint Martin and climbs south along the west side of Saint Thomas Street to the junction of Saint Thomas and Saint Martin Street. The staircase consists of cast-in-place concrete slabs and contains four landings.

Condition

Surface

The surface of this staircase has cracking on three of the four landings. The remaining landing is chipped on the corner adjacent to the street.



Staircase Eighteen

Structure

This staircase is slab on grade and has no structural concerns.

Railings

Railings on this staircase are in a good state of repair, but they do not meet IBC.

Lighting

There is no lighting adjacent to this staircase, therefore, the staircase light levels do not meet IESNA lighting standards.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,300. A detailed description of the cost estimate can be found in Appendix A.

Staircase Nineteen

Overview

The bottom of Staircase Nineteen (Figure 5) is located at the junction of Saint Thomas and Saint Martin Streets and climbs south along the west side of Saint Thomas Street to the junction of Saint Thomas and East Warrington Avenue. The staircase consists of both cast-in-place concrete slabs and cast-in-place concrete structures with steps included in the pour. This staircase contains fourteen steps and two landings (a large portion of this staircase is a sidewalk at grade but elevated above the street level).



Staircase Nineteen

Condition



Excessive Slope

Surface

The surface of this staircase contains significant cracking throughout and the elevated sidewalk portion has excessive slop perpendicular to the direction of travel.

Structure

The top of this staircase contains a section that is elevated. This section contains structural cracking and sections of concrete have chipped away revealing the rebar.

Railings

With the exception of one missing section the railings on this staircase are in a good state of repair, but they do not meet IBC.

Lighting

There is one streetlight across Saint Thomas from the landing at the bottom of this staircase. Light levels at the bottom of the staircase nearest to the streetlight meet IESNA lighting standards, but the remainder of the steps do not.

Other Concerns

The landing at the bottom of this staircase and the elevated sidewalk portion of this staircase show evidence of water pooling and are collecting debris deposited by runoff.



Structural Cracking

Repair Cost

The estimated repair cost for this staircase is \$6,500. A detailed description of the cost estimate can be found in Appendix A.

Staircase Twenty

Overview

The bottom of Staircase Twenty (Figure 5) is located at the junction of Saint Thomas and Saint Martin Streets and climbs south along the east side of Saint Thomas Street. This staircase runs parallel to Saint Thomas Street. It conveys pedestrian traffic from the street level to the sidewalk, where there is access to houses. The staircase is constructed of cast-in-place concrete slabs. This staircase contains six steps and one landing.

Condition

Surface

The concrete is in good condition, except for some chipping where the railing meets the concrete.

Structure

This staircase is cast-in-place concrete slabs there are no structural concerns.



Surface Chipping

Railings

The railings show some rusting but otherwise are in fair condition.

Lighting

There is one streetlight landing at the bottom of this staircase. Light levels for this staircase meet IESNA lighting standards.

Other Concerns

There are no additional areas of concern for this staircase.



Staircase Twenty

Repair Cost

The estimated repair cost for this staircase is \$2,300. A detailed description of the cost estimate can be found in Appendix A.

Staircase Twenty-One

Overview

Staircase Twenty-One (Figure 5) runs perpendicular to Saint Thomas Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains five steps and one landing.

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, but do not meet IBC.

Lighting

There are not streetlights in the vicinity of this staircase, all lighting is provided by adjacent housing. Lighting from adjacent structures do not provide sufficient light to meet IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.



Staircase Twtwenty-One

Staircase Twenty-Two

Overview

Staircase Twenty-Two (Figure 5) runs parallel to Saint Thomas Street. It conveys pedestrian traffic from the street level to the sidewalk level below for access to adjacent housing. This staircase is of wood construction and contains six steps and three landings.

Condition

Surface

The treads of this staircase are treated lumber, they are weathered but otherwise in good condition.



Staircase Twenty-Two

Structure

The structural support for this staircase consists of treated wood four (4) inch posts. The posts contain weathering similar to the steps but are also in good condition.

Railings

The railings on this staircase are treated lumber and in good condition, but do not meet IBC.

Lighting

There is one streetlight on Saint Thomas Street to the south of the staircase. It does not provide sufficient light to meet IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

This staircase is weathered but in good condition, a repair cost estimate was not developed for this staircase. It is recommended that this staircase be replaced with concrete steps for a long-term solution.

Staircase Twenty-Three

Overview

Staircase Twenty-Three (Figure 5) is located on the south side East Warrington Street. This staircase is of wood construction and consists of seven landings and twenty-seven steps.

Condition

Surface

The wood boards that make up the stairs are extremely aged and worn. Some of the steps are broken.

Structure

The wood elevated structure of the steps is uneven and not sturdy. The nails used to keep the structure together are raised. The wood is cracked, rotted, and has holes in multiple places.



Staircase Twenty-Three



Rotten Steps

Railings

Although the entire staircase has a railing, there are no places on the staircase where the railing is sturdy.

Lighting

There is one streetlight at the beginning of the staircase and one streetlight at the end of the staircase. Light levels nearest these streetlights meet IESNA standards, the rest of the steps do not.

Other Concerns

There is overgrowth from the side of the staircase that does not border the street. There is a gap where the wooden staircase meets the sidewalk.

Repair Cost

This staircase was not in the scope of this project but was adjacent to project staircases. The condition of this staircase is poor and a full demolition and replacement with concrete steps is recommended for a long-term solution. A repair cost estimate was not developed for this staircase.

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Staircase Twenty-Four

Overview

Staircase Twenty-Four (Figure 6) starts where St. Thomas Street meets Angelo Street and continues south along the east St. Thomas Street. The staircase is cast-in-place concrete slab and consists of twenty landings and three steps.

Condition

Surface

The surface has major cracking and chipping, and concrete slabs have settled causing expansion joints to open and creating an excessive slope perpendicular to the pedestrian traffic.

Structure

The staircase is constructed of slab on grade there are no structural concerns.



Staircase Twenty-Four



Surface Cracking

Railings

The railing is bent and rusted in multiple places.

Lighting

The area is illuminated by one nearby streetlight and internal lighting from the adjacent houses. The staircase falls below IESNA guidelines.

Other Concerns

There are no additional concerns about this staircase.

Repair Cost

The estimated repair cost for this staircase is \$3,900. A detailed description of the cost estimate can be found in Appendix A.

Staircase Twenty-Five

Overview

Staircase Twenty-Five (Figure 6) starts on South 18th Street and run parallel to a house, makes a 90-degree right turn towards another house, and then make another 90-degree right turn to meet the beginning of the sidewalk on St. Thomas Street. This staircase is constructed of cast-in-place concrete structure with steps included in the pour and consists of six landings and forty-one steps.



Staircase Twenty-Five

Condition

Surface

The surface has minor cracking.



Structural Exposed Steel

Structure

There are a couple places where the concrete has chipped off and structural steel is exposed.

Railings

The railing is in fair condition, but there is a cracked railing joint and a missing lower railing segment.

Lighting

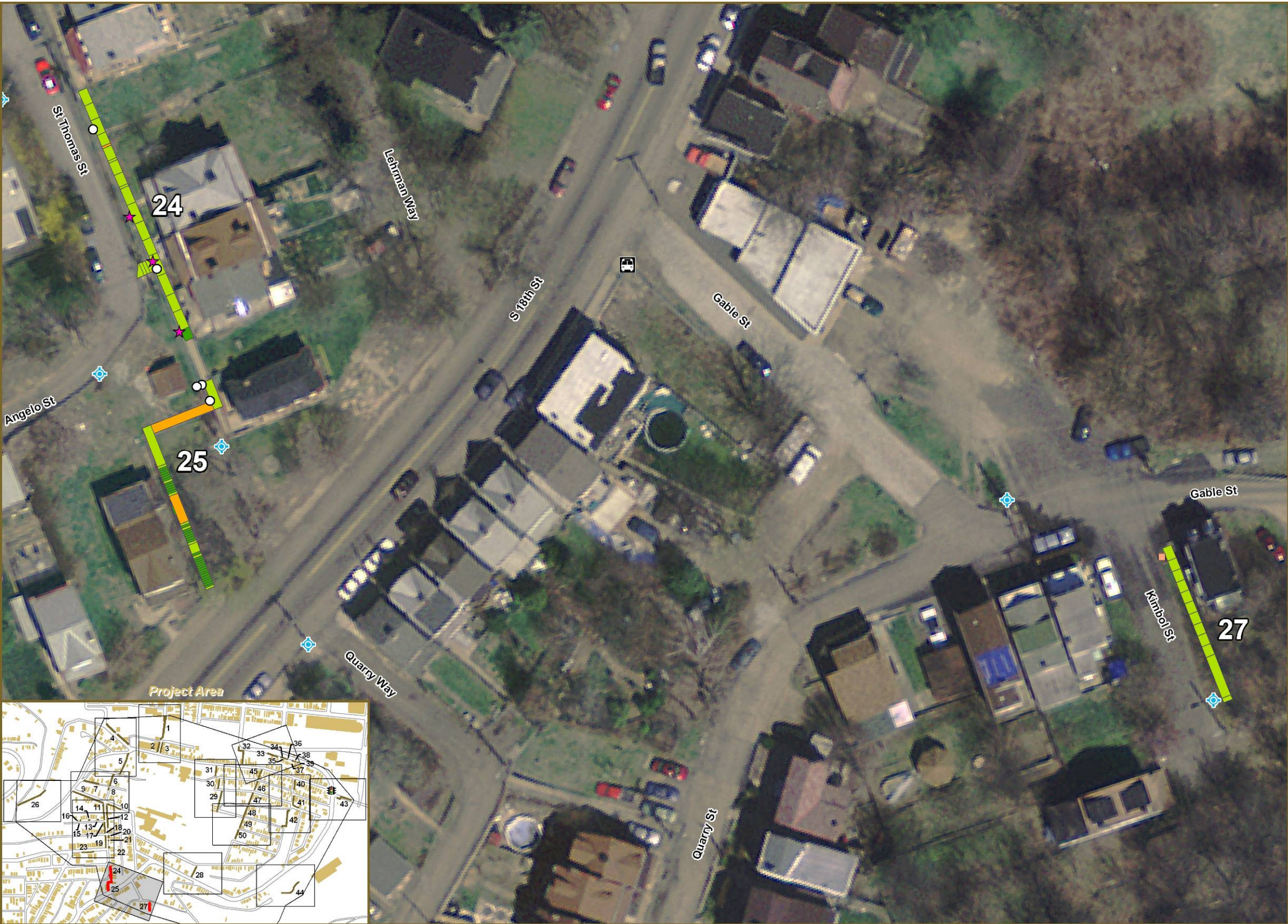
There is one light near the 90-degree turns in the stairs and one streetlight at the corner of Angelo St. and St. Thomas St., the staircase falls below IESNA guidelines.

Other Concerns

There is minor overgrowth on the stairs from adjacent bushes.

Repair Cost

The estimated repair cost for this staircase is \$4,100. A detailed description of the cost estimate can be found in Appendix A.



Staircase Twenty-Six

Overview

The bottom of Staircase Twenty-Six (Figure 7) meets the south end of Welsh Way and continues up towards Arlington Avenue. The staircase is constructed mostly of cast-in-place concrete slabs and consists of forty-eight landings and sixty-three steps.

Condition

Surface

The staircase contains major chipping and cracking on the surface and at the base of the handrails, as well as some exposed steel, spalling, and rusting.



Staircase Twenty-Six



Eroded Step

Structure

This staircase is slab on grade, there are no structural concerns.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. There are a number of areas where the handrail does not exist anymore.

Lighting

There is one streetlight near the top of the stairs, one streetlight near the bottom, and one streetlight $\frac{3}{4}$ of the way up the stairs, and a little up the hill on a walking path. The staircase falls below IESNA guidelines.



Missing Handrail

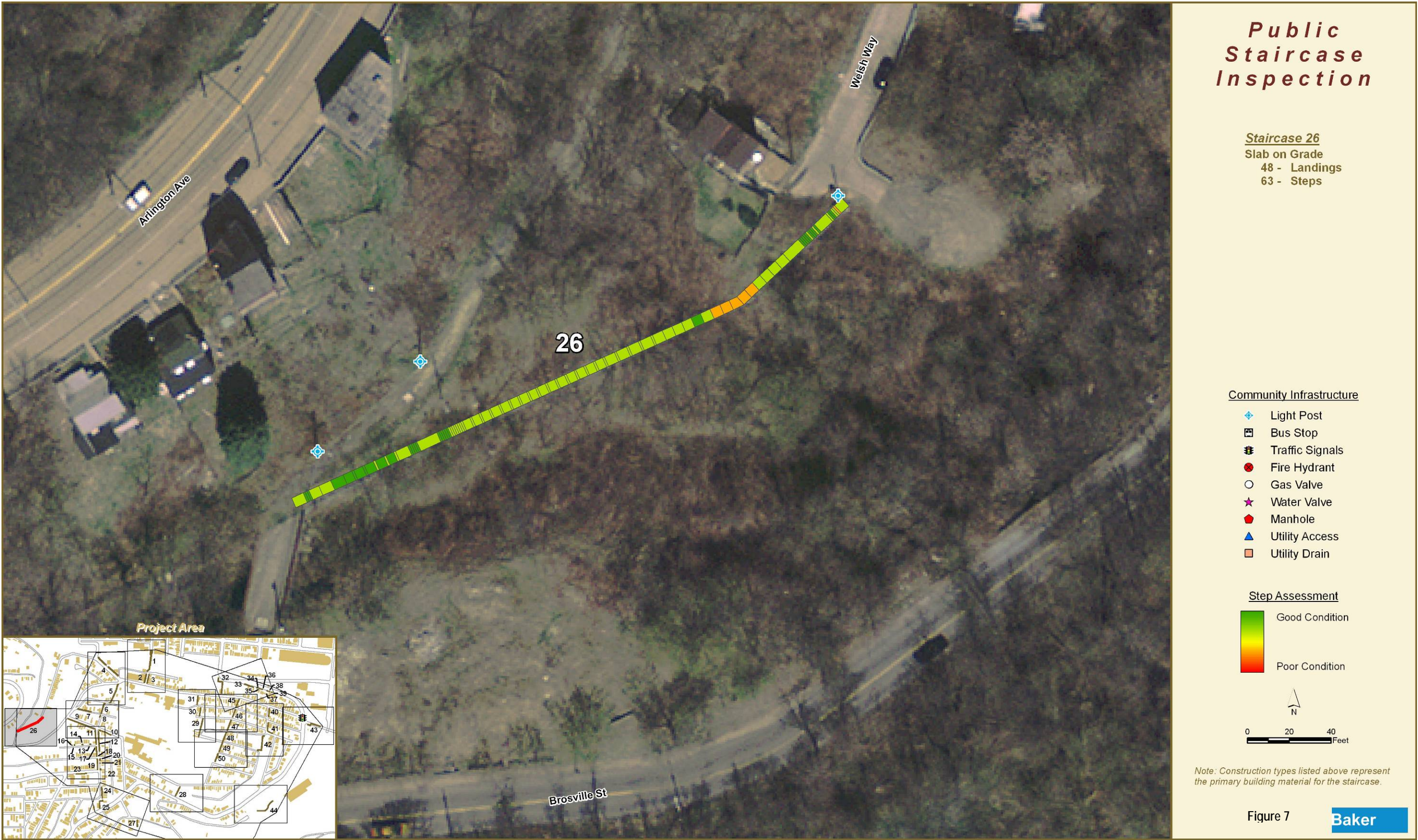
Other Concerns

The bridge and other structures should be checked for structural integrity.

Repair Cost

The estimated repair cost for this staircase is \$13,200. A detailed description of the cost estimate can be found in Appendix A.

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Staircase Twenty-Seven

Overview

The bottom of the staircase (Figure 6) is located near the intersection of Gable Street and Kimbol Street and climbs south to service two households. The staircase consists of twelve landings of approximate five feet in length each. The stairs are constructed from asphalt and wooden six by six blocks on grade.



Staircase Twenty-Seven

Condition

Surface

The staircase contains major cracking, chipping, and spalling. The slopes of the landings fail IBC standards. The top half of the staircase is moss covered and slippery.



Moss Covered Steps

Structure

The staircase is constructed of slab on grade and has no structural concerns.

Railings

The railings are built from four by four posts and two by four treated lumber. The handrails are in poor condition and do not meet IBC standards.

Lighting

There is one streetlight at the top of the staircase. Except for the top step, the staircase falls below IESNA guidelines.

Other Concerns

There is minor overgrowth at the top from residential bushes.

Repair Cost

The estimated repair cost for this staircase is \$8,400. A detailed description of the cost estimate can be found in Appendix A.

Staircase Twenty-Eight

Overview

The bottom of the staircase (Figure 8) is located on South 18th Street and climbs north to St. Paul Street. The staircase consists of six landings and seventy-nine steps. The stairs are constructed of cast-in-place concrete structures with steps included in the pour.

Condition



Structural Cracking

Surface

The staircase has major chipping and cracking on the surface and at the base of the handrails, as well as some exposed steel, spalling, and rusting.

Structure

The staircase has major structural cracking, chipping, spalling, exposed steel, and rusting. The majority of these areas can be found at or near the landings.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase and are unstable/missing in numerous areas. They do not meet IBC standards.

Lighting

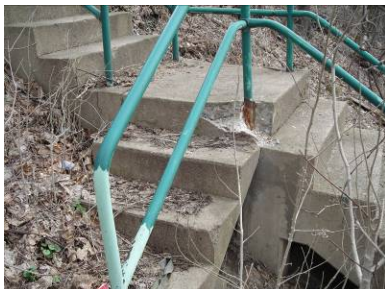
The staircase has street lighting across S. 18th Street. at the bottom, one in the middle, and one at the top. The light at the top provides adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines. The light in the middle of the staircase is not operational.



Staircase Twenty-Eight



Missing Handrail



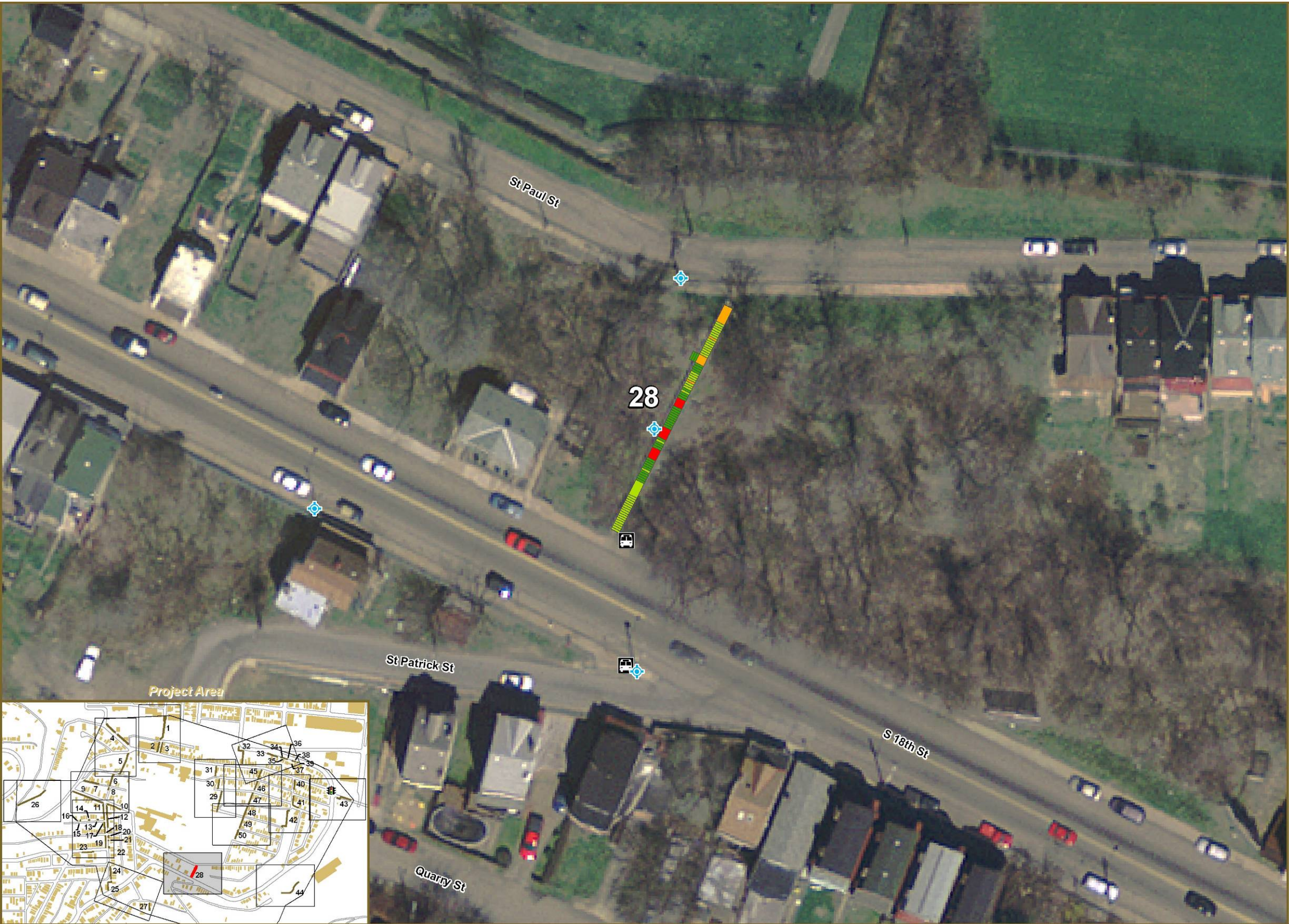
Surface Chipping

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$7,000. A detailed description of the cost estimate can be found in Appendix A.



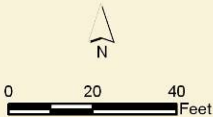
*Public
Staircase
Inspection*

Staircase 28
Poured in Place
Concrete Elevated
6 - Landings
79 - Steps

Community Infrastructure

- Light Post
- Bus Stop
- Traffic Signals
- Fire Hydrant
- Gas Valve
- Water Valve
- Manhole
- Utility Access
- Utility Drain

Step Assessment



Note: Construction types listed above represent the primary building material for the staircase.

Figure 8

Baker

Staircase Twenty-Nine

Overview

The bottom of the staircase (Figure 9) is located on Magdalena Street and climbs south to Baldauf Street. The staircase consists of nine landings and one hundred four steps. The first nineteen stairs are constructed from cast-in-place concrete structures with steps included in the pour while the remaining are cast-in-place concrete structures with precast treads.

Condition



Exposed Steel

Surface

The staircase has chipping, spalling, and cracking on the surface and at the base of the handrails.

Structure

The structure of the staircase has cracking, exposed steel, and chipping. All of the structural cracking can be found on the landings.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. There are a number of areas where the handrail does not exist anymore.

Lighting

The staircase has street lighting at the bottom and middle of the steps, and lighting from adjacent residents at the top. The only steps that have sufficient lighting are the first few at the bottom, while all the rest fall below IESNA guidelines.

Other Concerns

There is an overgrowth concern from ivy and brush in the middle of the staircase.

Repair Cost

The estimated repair cost for this staircase is \$7,200. A detailed description of the cost estimate can be found in Appendix A.



Staircase Twenty-Nine

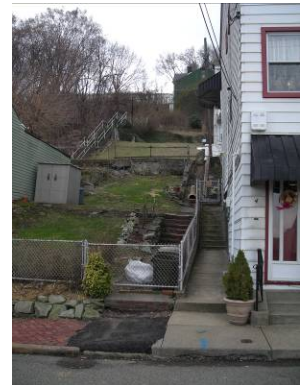


Overgrowth

Staircase Thirty

Overview

The staircase (Figure 9) is located between Gregory Street and Magdalena Street. It is closed off to pedestrian traffic and is not being utilized.



Staircase Thirty

Staircase Thirty-One

Overview

The bottom of the staircase (Figure 9) is located on Pius Street and climbs south to Gregory Street. The staircase consists of four landings and seventeen steps. The stairs are constructed from cast-in-place concrete slabs.

Condition



Surface Cracking

Surface

The staircase has chipping, spalling, age/wearing, and major cracking on the surface and at the base of the handrails. One step near the top of the stairs is missing large pieces and is almost gone. The slopes of the landings also fail IBC standards.

Structure

The staircase has structural cracking in a landing adjacent to a residence.



Staircase Thirty-One

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railings are only on one side and are bent, unstable, and rusted off at the foundation. They also do not meet IBC standards.

Lighting

The staircase has two streetlights, one at the bottom and top. All steps fall below IESNA guidelines



Handrail Rusting

Other Concerns

There is runoff from a neighboring lot and the adjacent stone wall is leaning toward the steps.

Repair Cost

The estimated repair cost for this staircase is \$6,600. A detailed description of the cost estimate can be found in Appendix A.

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Staircase Thirty-Two

Overview

The bottom of the staircase (Figure 10) is located on 18th Street and climbs south to Pius Street. The staircase consists of twelve landings and one hundred twenty-seven steps. The stairs are constructed from cast-in-place concrete structures with precast treads.

Condition

Surface

The staircase contains some surface cracking and minor spalling, chipping, exposed steel, and age/wearing. There are twelve step treads that have cracking located throughout the staircase. The figure below shows the location of each of these cracked treads.



Staircase Thirty-Two



Location of surface cracking on Staircase 32.



Structural Chipping and Efflorescence

Structure

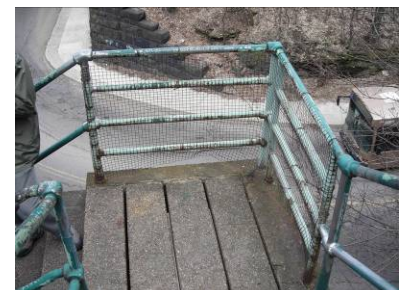
The structure of the staircase is in poor condition. The support columns have cracking, exposed steel, chipping, and rusting. Over fifty percent of the staircase length has structural damage. Structural cracking, chipping and exposed steel are the types of damage that are most prevalent on this staircase. Repair of the support columns particularly in area running parallel to the hillside is a priority. The figure below shows the location of structural exposed steel on this staircase.



Location of structural exposed steel on Staircase 32.

Railings

The railings are constructed of metal. They are painted but have rusting throughout the entire staircase. They are in fair condition but do not meet IBC standards. One area of concern is the wire mesh fence on the backside of the handrail over 18th street.



Wire Mesh

Lighting

The staircase has three streetlights, one at the bottom, middle, and top. Steps directly under the light have sufficient lighting while in between fall below IESNA guidelines.

Other Concerns

Below four steps on the upper half of the staircase is a utility manhole; access to this manhole must be maintained.

Repair Strategy and Recommendations

This staircase needs work in four different areas. Handrail repairs, precast tread replacement, structural concrete repairs and foundation undermining.

First, a comprehensive survey should be done by a professional engineer or architect to document the areas in need of structural repair, whether main stair structure, precast tread or handrail post base. An architect might also be able to document the requirements for handrail modifications to meet current codes. Ideally, dimensioned drawings would be produced to show the plan layout of the stairs. Additional elevation view drawings would show the main concrete structure, beams, columns, visible footings, and handrails (as desired). If the stair structure has historic significance, this work might be done under the auspices of HABS – the Historic American Building Survey. Details like actual member dimensions and precise heights of landings would be beneficial but not necessary. The drawings would be used to define the extent of repairs required. The work could then be bid competitively. The need for handrails could be handled separately, but the base drawings could be used for both the structural repairs and re-used to show the handrail work if desired.

The survey work might also be done by a contractor experienced in this type of work. The client could hire an experienced concrete repair contractor to simply do the work, without a bid process. Or have more than one willing contractor take a look at the stair and offer a fee proposal to repair the structure. In this type of scenario, the client would probably want at least some kind of prescriptive description of the type of damage that must be repaired so that a final inspection of the repaired structure would have a baseline for any disagreements about what the initial scope included.

The following describes recommended repair methods for defects found on this staircase.

STRUCTURAL CONCRETE REPAIR - First, all loose and delaminated concrete is removed, especially around corroding reinforcing steel. At all edges of a patch, right angle saw cuts to the concrete surface are provided to terminate the patch against. Abrasive blasting then removes bond inhibiting materials such as dirt or loosely bonded aggregates. All heavy corrosion and scale must also be removed from the reinforcing steel. If the reinforcing steel has lost a significant amount of its cross section a structural engineer must be consulted to provide more detailed analysis and recommendations.

Second, a mortar scrub coat consisting of portland cement, clean sand and enough water to provide a consistency of thick cream is prepared. Immediately prior to patching material installation, the repair area and surrounding concrete 6 inches beyond repair area is dampened and the scrub coat applied with a brush, scrubbing it into the surface and thoroughly coating the repair area, filling pores and voids.

Once surface is prepared, replacement material is installed in layers no thicker than recommended by the manufacturer. There are a wide variety of repair mortar manufacturers including Euclid, Sika and Conproco to name just a few. These manufacturers provide a wide assortment of repair materials for numerous specific applications, including vertical and overhead repairs. Additional layers can be placed after initial set until an even patch is achieved. Each layer should be scratched to provide mechanical bond; trowel finish flush with adjacent surface. Some manufacturers provide alternate materials for deeper one lift patches.

Finally, the patching materials are wet cured in place for not less than seven days, or a manufacturer approved curing compound is applied.

Many of the materials used in concrete repair are proprietary to specific manufacturers. The manufacturer's precautions and instructions with respect to the safe and proper use of their products must always be followed.

Other steps may sometimes be required. It will occasionally be necessary to temporarily shore the existing structure prior to any removal of damaged concrete to provide complete access to the damaged structure and ensure safety. It can also be effective to coat the reinforcing steel with a rust inhibiting coating for further protection.

TREAD REPLACEMENT - In many locations, the precast stair planks have been replaced by newly cast members, apparently cast-in-place. Replacement of badly deteriorated treads and landings is the most cost effective solution; however it may be possible for a contractor to mass produce precast planks to match the existing as a more inexpensive operation than cast-in-place. The bearing ledge will need to be repaired/prepared in either case. The advantage of precast is a higher quality plank, with controlled concrete mixes and curing. In addition, these planks will very likely perform better in the field since there will be more "give" at the connection between new concrete and existing, with less susceptibility to cracking caused by restraint or reflection from the existing members.

EFFLORESCENCE - Efflorescence is a whitish powdery deposit on the surface of concrete (or masonry). It forms as water laden with dissolved minerals and salts leaches through cracks in the concrete and eventually evaporates. The salts are very often dissolved in the original concrete, having been inadvertently in the mix. Effort is made in modern concrete mixes to exclude anything that may effloresce. The "left behind" film is more unsightly than damaging, but it is an obvious sign of water penetration into the concrete. Another possible cause of the staining is deposits left behind by de-icing operations.

FOUNDATION EROSION - The foundation at the top of the rock face appears to be in some danger of being undermined by rock erosion. The opinion of a geotechnical engineer should be sought. A potential solution might be encasing the eroding rock in concrete to prevent further loss of foundation bearing material. This work could most likely be done at the same time as the structural concrete repairs to the main stair structure.

There is a chance of unforeseen conditions arising during the selective demolition and repair of the damaged concrete. The extent of damage is difficult to determine accurately until the spalled/cracked concrete is removed, and sound sub-structure is found. In some cases, the reinforcing steel which is integral to the strength of the members can be very heavily damaged by rusting deterioration. This may necessitate a more thorough structural analysis and/or the in-place strengthening of the affected members. Should additional analysis necessitate strengthening of the structural members, SikaWrap® or a similar product should be

considered. SikaWrap is an externally applied carbon fiber strengthening system for reinforced concrete, masonry or timber. SikaWrap can be used to strengthen reinforced concrete structures for flexural and shear loads due to loading increases, damage to structural parts, changes in structural system, design or construction defects, and earthquake/seismic requirements.

Repair Cost

The estimated repair cost for this staircase is \$12,400. A detailed description of the cost estimate can be found in Appendix A.

Staircase Thirty-Three

Overview

The staircase (Figure 10) is located along 18th Street and climbs up the hill to provide access to housing. The staircase consists of three landings and twenty-seven steps. The stairs are constructed of concrete blocks.

Condition

Surface

There are no surface concerns for this staircase.

Structure

There are no structure concerns for this staircase.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. They are in good condition but do not meet IBC standards.

Lighting

The lighting is located on the other side of 18th Street. All steps fall below IESNA guidelines.

Other Concerns

There is a fire hydrant obstruction on the first landing and runoff from the adjacent hillside.

Repair Cost

The estimated repair cost for this staircase is \$2,900. A detailed description of the cost estimate can be found in Appendix A.



Staircase Thirty-Three

Staircase Thirty-Four

Overview

The staircase (Figure 10) is located along 18th Street and climbs up the hill to provide access to housing. The staircase consists of two landings and fourteen steps. The stairs are constructed of stone.

Condition

Surface

There are major surface concerns for this staircase. Each step has cracking, chipping, and age/wearing.

Structure

There are no structure concerns for this staircase.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railing is only on one side and is unstable. The opposite side is a stone wall foundation. They do not meet IBC standards.

Lighting

The lighting is located on the other side of 18th Street. All steps fall below IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$4,500. A detailed description of the cost estimate can be found in Appendix A.



Staircase Thirty-Four

Staircase Thirty-Five

Overview

The staircase (Figure 10) is located along 18th Street and is closed off to pedestrian traffic. This staircase is constructed of stone and is not being utilized.



Staircase Thirty-Five

Staircase Thirty-Six

Overview

The staircase (Figure 10) is located along 18th Street and climbs up the hill to provide access to housing. The staircase consists of one landing and twelve steps. The stairs are constructed of stone.

Condition

Surface

The staircase has some cracking, chipping, age/wearing, and a loose step.

Structure

There are no structure concerns for this staircase.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railing is only on one side, unstable, bent, and cracked at the base of the steps. The opposite side is a stone wall foundation. They do not meet IBC standards.

Lighting

The lighting is located on the other side of 18th Street. All steps fall below IESNA guidelines.

Other Concerns

The adjacent stone wall foundation is cracked and leaning toward the steps.

Repair Cost

The estimated repair cost for this staircase is \$4,500. A detailed description of the cost estimate can be found in Appendix A.



Staircase Thirty-Six

Staircase Thirty-Seven

Overview

The staircase (Figure 10) is located along 18th Street and climbs up the hill to provide access to housing. The staircase consists of one landing and ten steps. The stairs are constructed of stone.

Condition

Surface

The staircase has some cracking, chipping, age/wearing, and loose steps.



Staircase Thirty-Seven



Surface Chipping

Structure

There are no structure concerns for this staircase.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railing is only on one side, bent, and unstable. The opposite side is a stone wall foundation. They do not meet IBC standards.

Lighting

The lighting is located on the other side of 18th Street. All steps fall below IESNA guidelines.

Other Concerns

The adjacent stone wall foundation is cracked and leaning toward the steps. The lower landing has a drain into the foundation.

Repair Cost

The estimated repair cost for this staircase is \$3,500. A detailed description of the cost estimate can be found in Appendix A.

Staircase Thirty-Eight

Overview

The staircase (Figure 10) is located along 18th Street and climbs up the hill to provide access to housing. The staircase consists of one landing and eight steps. The stairs are constructed of stone.

Condition

Surface

The staircase has some minor cracking, chipping, and age/wearing.

Structure

There are no structure concerns for this staircase.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railing is only on one side, while the opposite side is a stone wall foundation. They do not meet IBC standards.

Lighting

The lighting is located on the other side of 18th Street. All steps fall below IESNA guidelines.

Other Concerns

The adjacent stone wall foundation is cracked and leaning toward the steps.

Repair Cost

The estimated repair cost for this staircase is \$2,300. A detailed description of the cost estimate can be found in Appendix A.



Staircase Thirty-Eight

Staircase Thirty-Nine

Overview

The staircase (Figure 10) is located along 18th Street and is closed off to pedestrian traffic. This staircase is constructed of stone and is not being utilized.



Staircase Thirty-Nine



Staircase Forty

Overview

The data received from the Department of City Planning listed a staircase at this location from Pius Street to Roscoe Street. From field inspection there is no evidence of a staircase existing between Pius Street and Gregory Street, but Staircase Forty-One does exist between Gregory Street and St. Leo Street.



Staircase Forty

Staircase Forty-One

Overview

The bottom of the staircase (Figure 11) is located at the intersection of Gregory Street and Oporto Street, and climbs south along Oporto Street to St. Leo Street. The staircase consists of twenty-one landings and thirteen steps. The stairs are constructed of cast-in-place concrete slabs.

Condition



Surface Spalling

Surface

The staircase has chipping, spalling, rusting, and cracking on the surface and at the base of the handrails. The slopes of the landings also fail IBC standards.

Structure

There are no structure concerns for this staircase.



Staircase Forty-One

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase and are bent in numerous areas. They do not meet IBC standards.

Lighting

The staircase has street lighting at the bottom, middle and near the top. The light at the bottom and middle of the staircase provides adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines.



Handrail Damage

Other Concerns

There are a number of additional concerns for this staircase. The first landing has a storm water drain through the foundation. An adjacent concrete support slab at the bottom of the stairs has cracking in its foundations. There is also a telephone pole obstruction in the middle of a landing.

Repair Cost

The estimated repair cost for this staircase is \$5,700. A detailed description of the cost estimate can be found in Appendix A.

Staircase Forty-Two

Overview

The bottom of the staircase (Figure 11) is located near the intersection of Roscoe Street and St. Leo Street, and climbs south to Baldauf Street. The staircase consists of nine landings and one hundred seventeen steps. Twenty-four of the stairs are constructed from cast-in-place structures with steps included in the pour while the remaining steps and landings are constructed of cast-in place structures with precast treads.



Staircase Forty-Two

Condition

Surface

The staircase has chipping, spalling, exposed steel, and cracking on the surface and at the base of the handrails.

Structure

The staircase has major structural cracking, chipping and exposed steel. The majority of these areas are in the foundation of the landings.



Missing Handrail

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase and are bent in numerous areas. There is a missing hand rail on one side of the landing. They do not meet IBC standards.

Lighting

The staircase has street lighting near the bottom, and near the top. The light at the top of the staircase provides adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines.

Other Concerns

There is an overgrowth of trees, shrubs, vines, and moss on the bottom sections of the stairs. Also, at the top of the staircase is an overhead utility cable approximately eight feet above the steps.

Repair Cost

The estimated repair cost for this staircase is \$9,100. A detailed description of the cost estimate can be found in Appendix A.



Overgrowth

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Staircase Forty-Three

Overview

The bottom of the staircase (Figure 12) is located under Mission Street Bridge and climbs west to the intersection of South 18th Street and Mission Street. The staircase consists of nine landings and ninety-four steps. The stairs are constructed of cast-in-place structures with steps included in the pour.

Condition



Structural Exposed Steel

Surface

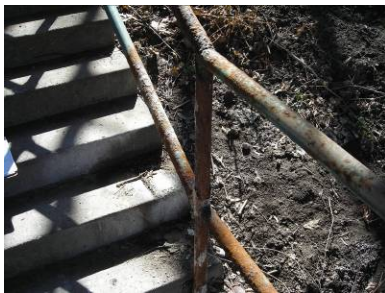
The staircase has major surface cracking and chipping, as well as a number of instances of spalling and exposed steel. The slopes of the landings also fail IBC standards.

Structure

The staircase has major structural cracking, chipping and exposed steel. The majority of these areas are in the foundation of the landings. One of the landings has addition wood support in the foundation.

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railing on one landing is extremely rusted due to overhead leaking from Mission St. Bridge. On another landing the railing is unstable. They do not meet IBC standards.



Handrail Rust

Lighting

The staircase has a street lighting at the top and middle. The light at the top provides adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines. The light in the middle of the staircase was not operational.

Other Concerns

Overhead runoff from Mission Street Bridge is causing excess rusting and deposit build up on a small section of the stairs.



Staircase Forty-Three



Structural Chipping

Repair Cost

The estimated repair cost for this staircase is \$6,300. A detailed description of the cost estimate can be found in Appendix A.

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Public Staircase Inspection

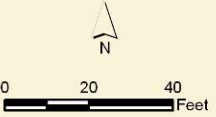
Staircase 43
Pre-Cast Concrete
Elevated
9 - Landings
94 - Steps

Community Infrastructure

- Light Post
- Bus Stop
- Traffic Signals
- Fire Hydrant
- Gas Valve
- Water Valve
- Manhole
- Utility Access
- Utility Drain

Step Assessment

- Good Condition
- Poor Condition



Note: Construction types listed above represent the primary building material for the staircase.

Figure 12



Staircase Forty-Four

Overview

The bottom of the staircase (Figure 13) is located at the Neville Ice Arena and climbs south west to the South Side Park parking lot near South 18th Street. The staircase consists of twenty-four landings and forty-nine steps. The stairs are constructed of cast-in-place concrete slabs.

Condition



Handrail Rust and Surface Chipping

Surface

The staircase has major surface cracking and chipping, as well as a number of instances of spalling, rusting, exposed steel, and cracks at the base of the hand rails. The slopes of a majority of the landings also fail IBC standards.

Structure

There are no structure concerns for this staircase.



Staircase Forty-Four

Railings

The railings are constructed of metal. They are painted but have major rusting through out the entire staircase and are unstable. There is a large section that has no railings on either side, while the rest are located on one side only.

Lighting

The staircase has streetlight at the top. The light at the top provides adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines. There are a number of lights in the parking lot of the ice arena at the bottom of the steps but are not operational.



Surface Chipping

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$15,200. A detailed description of the cost estimate can be found in Appendix A.

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Staircase Forty-Five

Overview

The bottom of the staircase (Figure 14) is located on Pius Street and climbs south to Gregory Street. The staircase consists of nine landings and four steps. The stairs are constructed from cast-in-place concrete slabs.

Condition

Surface

The surface is in good condition with one minor crack, but the slopes of the landings fail IBC standards.



Staircase Forty-Five

Structure

There are no structural concerns for this staircase.

Railings

The railings are constructed of metal. They have no rusting but are not painted. The railing is stable but only on one side. Since there are no areas where there is a greater than thirty (30) inch drop off, these railings meet IBC standards.

Lighting

The staircase has street lighting at the top and bottom but all steps fall below IESNA guidelines.

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,500. A detailed description of the cost estimate can be found in Appendix A.

Staircase Forty-Six

Overview

The bottom of the staircase (Figure 14) is located on Gregory Street and climbs south to Magdalena Street. The staircase consists of thirteen landings and twenty-five steps. The stairs are constructed from cast-in-place concrete slabs.

Condition

Surface



Chipping at Handrail Base

The surface has some exposed steel, chipping, minor surface cracks and cracks at the base of the handrail. The slopes of all but one landing fail IBC standards.

Structure

There are no structure concerns for this staircase.



Staircase Forty-Six

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase. The railings are rusting out at the base and are unstable. The middle section of the staircase is missing the handrail on one side. They do not meet IBC standards.



Handrail Rusting

Lighting

The staircase has street lighting at the top and bottom. The top streetlight provides adequate lighting for the top few steps, while the rest of the steps fall below IESNA guidelines.



Surface Cracking

Other Concerns

There is a runoff concern from the adjacent property at the top of the staircase.

Repair Cost

The estimated repair cost for this staircase is \$2,800. A detailed description of the cost estimate can be found in Appendix A.

Staircase Forty-Seven

Overview

The bottom of the staircase (Figure 14) is located on Magdalena Street and climbs south to Roscoe Street. The staircase consists of seven landings and seventy-eight steps. The first fifteen stairs are constructed from cast-in-place structures with steps included in the pour while the remaining steps and landings are constructed of cast-in place structures with precast treads.

Condition



Surface Cracking

Surface

The surface has some cracking, spalling, exposed steel, and chipping.

Structure

The staircase has structural cracking, exposed steel, and chipping.

Railings

The railings are constructed of metal. They are painted but have rusting

through out the entire staircase and are unstable in numerous areas. There are two areas of the staircase missing the handrail on one side. They do not meet IBC standards.

Lighting

The staircase has street lighting at the top and bottom. The bottom streetlight provides adequate lighting for the bottom few steps, while the rest of the steps fall below IESNA guidelines.

Other Concerns

There is a utility access on the bottom landing. The edge of pavement at the top of the staircase is considerably higher than the landing.

Repair Cost

The estimated repair cost for this staircase is \$6,500. A detailed description of the cost estimate can be found in Appendix A.



Staircase Forty-Seven



Missing Railing

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Public Staircase Inspection

Staircase 45
Slab on Grade
9 - Landings
4 - Steps

Staircase 46
Slab on Grade
13 - Landings
25 - Steps

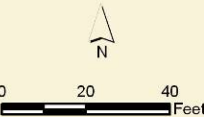
Staircase 47
Pre-Cast Concrete
Elevated
7 - Landings
78 - Steps

Community Infrastructure

- Light Post
- Bus Stop
- Traffic Signals
- Fire Hydrant
- Gas Valve
- Water Valve
- Manhole
- Utility Access
- Utility Drain

Step Assessment

Good Condition
Poor Condition



Note: Construction types listed above represent the primary building material for the staircase.

Figure 14

Baker

Staircase Forty-Eight

Overview

The bottom of the staircase (Figure 15) is located on Roscoe Street and climbs south to Baldauf Street. The staircase consists of five landings and fifty-eight steps. The first eleven stairs are constructed from cast-in-place structures with steps included in the pour while the remaining steps and landings are constructed of cast-in place structures with precast treads.

Condition



Surface Cracking

Surface

The surface has some cracking, spalling, exposed steel, chipping, and loose steps.

Structure

The staircase has structural cracking, exposed steel, rusting and chipping. Also, the structure of one of the landings is bending outward from the staircase.



Staircase Forty-Eight

Railings

The railings are constructed of metal. They are painted but have rusting through out the entire staircase and are unstable in numerous areas. The bottom handrail support is missing in one section and in another section it is bent and falling over. They do not meet IBC standards.

Lighting

The staircase has street lighting at the top and bottom. Both lights provide adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines.



Handrail Rusting

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$6,000. A detailed description of the cost estimate can be found in Appendix A.

Staircase Forty-Nine

Overview

The bottom of the staircase (Figure 15) is located on Baldauf Street and climbs south to Huron Street. The staircase consists of six landings and forty-seven steps. The first ten stairs are constructed from cast-in-place structures with steps included in the pour while the remaining steps and landings are constructed of cast-in place structures with precast treads.

Condition



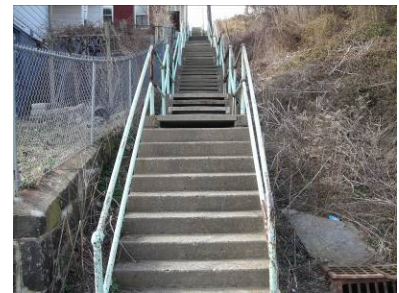
Structural Cracking

Surface

The surface has numerous instances of cracking, spalling, and rusting, as well as a few occurrences of exposed steel, chipping, and loose steps.

Structure

The staircase has some structural cracking, exposed steel, rusting, chipping, and spalling.



Staircase Forty-Nine

Railings

The railings are constructed of metal. They are painted but have major rusting in a number of sections. Many of these sections are also unstable. They do not meet IBC standards.

Lighting

The staircase has street lighting at the top and bottom. The light at the bottom of the staircase provides adequate lighting for the first few steps, while the rest of the steps fall below IESNA guidelines.



Handrail Rusting

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$7,400. A detailed description of the cost estimate can be found in Appendix A.

Staircase Fifty

Overview

The bottom of the staircase (Figure 15) is located on Huron Street and climbs south to the intersection of Yard Way and Shamokin Street. The staircase consists of four landings and fifty-nine steps. The first twelve stairs are constructed from cast-in-place structures with steps included in the pour while the remaining steps and landings are constructed of cast-in place structures with precast treads.



Staircase Fifty

Condition



Surface Cracking

Surface

The surface has numerous instances of cracking, chipping, loose steps, and a few occurrences of exposed steel and rusting.

Structure

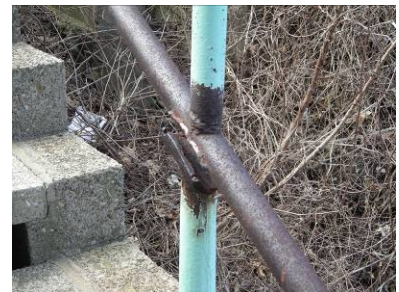
The staircase has major structural cracking, exposed steel, rusting, and chipping. There is also one instance of a wooden block being utilized for additional support of a landing.

Railings

The railings are constructed of metal. They are painted but have rusting in a number of sections. One section between two landings is unstable. They do not meet IBC standards.

Lighting

The staircase has street lighting at the top and bottom. Both lights provide adequate lighting for the first few steps in the area, while the rest of the steps fall below IESNA guidelines.



Handrail Rust and Joint Damage

Other Concerns

There are no additional areas of concern for this staircase.

Repair Cost

The estimated repair cost for this staircase is \$6,000. A detailed description of the cost estimate can be found in Appendix A.

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Public Staircase Inspection

Staircase 48
Pre-Cast Concrete
Elevated
5 - Landings
58 - Steps

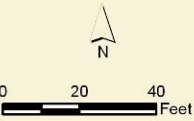
Staircase 49
Pre-Cast Concrete
Elevated
6 - Landings
47 - Steps

Staircase 50
Pre-Cast Concrete
Elevated
4 - Landings
59 - Steps

Community Infrastructure

- Light Post
- Bus Stop
- Traffic Signals
- Fire Hydrant
- Gas Valve
- Water Valve
- Manhole
- Utility Access
- Utility Drain

Step Assessment



Note: Construction types listed above represent the primary building material for the staircase.

Figure 15 Baker



Recommendations

The following section includes repair recommendations base on construction type. Each recommendation may be applied in whole or in part to each staircase of that construction type.

Type 1 - Structural Steel Stairs

These stairs appear to be fairly new and in excellent structural condition.

Type 2 - Stone Steps Laid on Grade with Stone (Gravity) Retaining Walls

These stairs are probably the oldest structures in the survey. They were built together with the stone retaining walls adjacent to them. The stones appear to be quarried but could actually be cast stone products. There is no steel reinforcing in these steps or walls. The steps are laid on grade and the walls are gravity type retaining structures which rely on their own substantial dead weight to keep the retained earth behind them in place. Many of the same distresses observed in the concrete slab-on-grade steps can be observed in this type as well. Freeze/thaw cracking, handrail post rusting expansion damage, simple long term abrasion/wear and settlement or frost heave damage and misalignment. It also appears that some of the damage could very well be due to traffic collisions. Efflorescence type staining is most likely the result of de-icing salts.

The walls appear to be stable. Repairs to the steps must be considered in the light of final appearance. It will be difficult to match the existing stones' appearance. Concrete repairs can be done to these stones, but matching the repair mortar properties to the stone is critical and dowelling of rebar in the stone could be more harmful than helpful. Very badly deteriorated steps will be cost effectively replaced with new concrete steps, less cost effectively with a combination of re-laid and new stones.

Type 3- Cast-in-Place Concrete Structures with Precast Treads

These stairs consist of cast-in-place concrete stringers spanning between concrete columns or piers bearing on spread footing foundations either at or below grade. The stringers are bent, forming level landings at various locations along the stair run, in some places changing direction. A ledge is formed along the top of the stringer for the bearing of small precast planks which form the stair treads or landing platform as they span between the stringers. The handrails are steel pipes, with the posts embedded some inches into the top of the stringers.

Large cracking and spalling in these types of structures is the result, almost exclusively, of two basic water related mechanisms. First is freeze-thaw action of infiltrating water and second is the rusting expansion of deteriorating steel embedded in the concrete. All concrete will crack soon after it is poured due to shrinkage, but generally these cracks remain small and tight until water enters the crack.

Wintertime temperatures will freeze any water present in a crack, expanding that water and resulting in tension forces applied to the concrete on either side of the crack. As concrete is weak in tension, the cracks will widen and lengthen and form additional cracking. This iterative process will eventually weaken portions of the concrete to break away, or fail under structural loading.

Water entering a crack will also begin to rust any steel reinforcing or other embedded steel item, such as a handrail post, which crosses or is adjacent to a crack. Over time rusting steel will expand to over eight times its

un-rusted size. As with freeze-thaw action, expanding steel will result in tension forces applied to the concrete on either side of the crack. Unchecked, the rusting steel will continue to expand with added moisture, continue to apply tension stresses to the surrounding concrete, continue to expand and widen cracks exposing more steel and concrete to the effects of this deterioration. Chlorides used to melt snow and ice will accelerate the deterioration process of steel rusting.

Cracking and steel deterioration in these structures affects all of the various members, from precast treads to main structural stringers and columns; even the foundations can be damaged in this way. Over the breadth of the survey many degrees of damage can be observed, from the beginning of cracking, through total separation of rebar now draped loosely beneath the member to structural failure.

STRUCTURAL CONCRETE REPAIR - Repair of this type of cracking can be very expensive. Some conditions may warrant the entire replacement of portions of the concrete structure. In general, concrete repairs involve the following steps.

First, all loose and delaminated concrete is removed, especially around corroding reinforcing steel. At all edges of a patch, right angle saw cuts to the concrete surface are provided to terminate the patch against. Abrasive blasting then removes bond inhibiting materials such as dirt or loosely bonded aggregates. All heavy corrosion and scale must also be removed from the reinforcing steel. If the reinforcing steel has lost a significant amount of its cross section a structural engineer must be consulted to provide more detailed analysis and recommendations.

Second, a mortar scrub coat consisting of portland cement, clean sand and enough water to provide a consistency of thick cream is prepared. Immediately prior to patching material installation, the repair area and surrounding concrete 6 inches beyond repair area is dampened and the scrub coat applied with a brush, scrubbing it into the surface and thoroughly coating the repair area, filling pores and voids.

Once surface is prepared, replacement material is installed in layers no thicker than recommended by the manufacture. There are a wide variety of repair mortar manufacturers including Euclid, Sika and Conproco to name just a few. These manufacturers provide a wide assortment of repair materials for numerous specific applications, including vertical and overhead repairs. Additional layers can be placed after initial set until an even patch is achieved. Each layer should be scratched to provide mechanical bond; trowel finish flush with adjacent surface. Some manufacturers provide alternate materials for deeper one lift patches.

Finally, the patching materials are wet cured in place for not less than seven days, or a manufacturer approved curing compound is applied.

Many of the materials used in concrete repair are proprietary to specific manufacturers. The manufacturer's precautions and instructions with respect to the safe and proper use of their products must always be followed.

Other steps may sometimes be required. It will occasionally be necessary to temporarily shore the existing structure prior to any removal of damaged concrete to provide complete access to the damaged structure and ensure safety. It can also be effective to coat the reinforcing steel with a rust inhibiting coating for further protection.

PIPE POST BASES - A common problem with many of the stairs, regardless of their structural classification, is the rusting deterioration of the base of the handrail pipe posts and the consequent damage done to the concrete nearby. A wide variety of conditions can be observed ranging from complete loss of the handrail base with very little damage to the concrete to complete spalling of the concrete around the pipe base with little damage to the pipe. Obviously site specific conditions such as local concrete cracking, local concrete strength and quality of workmanship, tendency for puddling water and painting maintenance of the pipe affect how each individual pipe post and the surrounding concrete behave under adverse conditions. There can be no "one covers all" solution.

If the concrete is sound, the embedded remnants of the railing can be removed, by careful chipping or a somewhat larger core drill. A slightly oversized pipe base that has been galvanized can be lapped over the prepped portion of the pipe (all damaged steel removed and squared off) to remain at top side and embedded into the cored hole at the bottom. A crowned sealant at the base should be installed to prevent water from seeping into the void between pipe and cored hole. The galvanized pipe will be more durable than its painted counterpart.

In cases where the railing is embedded in a structural member such as a concrete stair stringer, and the railing is sound, with the base concrete badly spalled or cracked, the damaged concrete can be removed and a new concrete patch placed around the pipe post base. Very important for this repair is the removal of all rust and the coating of the pipe base with a high quality rust inhibitive coating. The concrete removal operation should take care to shore the structure if necessary and be careful not to cut any structural reinforcing steel in the member. In addition, the new patch must be dowelled into the surround sound concrete. The patch can be made with ready-mix concrete, at least 4000 psi in strength with 5 to 7% entrained air, or better with an engineered repair mortar as described in the structural concrete repair section.

TREAD REPLACEMENT - In many locations, the precast stair planks have been replaced by newly cast members, apparently cast-in-place. Replacement of badly deteriorated treads and landings is the most cost effective solution; however it may be possible for a contractor to mass produce precast planks to match the existing as a more inexpensive operation than cast-in-place. The bearing ledge will need to be repaired/prepared in either case. The advantage of precast is a higher quality plank, with controlled concrete mixes and curing. In addition, these planks will very likely perform better in the field since there will be more "give" at the connection between new concrete and existing, with less susceptibility to cracking caused by restraint or reflection from the existing members.

These treads, whether existing or new are held in place by mortar. The best mortar for this purpose is Type N, with not so much strength as to be brittle. New treads can be set tightly with this mortar in the joint and existing joints with little or no mortar remaining can be repaired with this type of mortar also.

EFFLORESCENCE - Efflorescence is a whitish powdery deposit on the surface of concrete (or masonry). It forms as water laden with dissolved minerals and salts leaches through cracks in the concrete and eventually evaporates. The salts are very often dissolved in the original concrete, having been inadvertently in the mix. Effort is made in modern concrete mixes to exclude anything that may effloresce. The "left behind" film is more

unsightly than damaging, but it is an obvious sign of water penetration into the concrete. Another possible cause of the staining is deposits left behind by de-icing operations.

STRUCTURAL FAILURE –At Stair #12 at least one stair tread has failed and needs to be quickly repaired or shored. In addition, at this stair, a ramp column is badly leaning, likely having lost much of its capacity. This ramp should be closed to traffic until the column is repaired, replaced or adequately shored. This same stair has an unusual repair consisting of a wood ledger bolted to the concrete stringer supporting the precast walking planks above. This method is not necessarily wrong, but will not result in a lasting repair. Uneven or leaning concrete stringers that may have more damage than can be observed at the surface. These stringers should be more closely observed and potentially shored prior to repair.

Stair #48 displays a potentially dangerous problem. At one landing the handrail post is leaning noticeable outward, appearing to rotate the concrete stringer to which it is embedded. This stringer is very likely heavily damaged and should be more closely observed and potentially shored prior to repair.

Type 4 - Cast-in-Place Concrete Structures with Steps included in Pour

These stairs consist of cast-in-place concrete stringers spanning between concrete columns or piers bearing on spread footing foundations either at or below grade. The stringers are bent, forming level landings at various locations along the stair run, in some places changing direction. Unlike the predominant stair type (type 2), the steps and landings in these structures are not formed with precast members but are poured integrally with the rest of the structure. As a result these stairs are generally more rigid and consequently more prone to cracking from initial shrinkage and from support settlement. The handrails are steel pipes, with the posts embedded some inches into the top of the stringers.

Structural concrete deterioration and damage due to rusting expansion of deteriorating steel embedded in the concrete, including handrail bases and freeze-thaw cracking is identical to that of type 3 structures. The repairs for these defects are described in the Type 3 stair section.

An additional type of distress seen in these stairs is the rusting of the nosing bar at the “tip” of the concrete steps. Nosing bars are not usually used in today’s construction because the damage they cause when rusting is very difficult to fix. Short of total replacement, any repair will likely be short lived, but in any case must be properly notched into the step and doweled into sound concrete. The choice of repair mortar is critical.

Type 5 - Cast-in-Place Concrete Sidewalk Slabs, Ramps and Steps-on-Grade

These types of steps are not “structures” in the true sense, that is, they really do not carry a load. Generally, all loading on these steps is transferred into the ground directly beneath these steps. Stairs of this type are meant to provide a more safe, level and regularly uniform surface for walking than a dirt path.

The most common causes of deterioration of concrete sidewalk slabs-on-grade are freeze-thaw cracking, settlement, frost heave and plant growth. The cause of cracking due to freeze-thaw action is discussed above. Settlement, frost heave and plant growth can have very similar effects on these slabs. The long-term quality of a slab-on-grade is very dependent on the preparation of the sub-grade beneath it. Weak subbase beneath

slabs-on-grade can require portions of the slab to span over soft spots. The resulting flexural stresses exert tension in the concrete. As discussed above, concrete is weak in tension. Loading on the slabs from foot traffic or even self-weight can cause overstress cracking to form. Frost heave is essentially settlement in the opposite direction with all of the same consequences. It can be difficult to differentiate between these distresses, but their results on the slab are the same. Similarly, root growth, especially from large trees can heave slabs causing similar flexural cracking. Once cracks form in slabs of this kind, lacking of any binding reinforcing steel, the cracks will quickly widen and lengthen.

Rusting of pipe railing bases at embedment in concrete is discussed elsewhere but is a common problem in these types of steps. The repair for these locations may include a more wide ranging removal of the concrete near the post bases because there is not a need to be wary that the structure will lose integrity.

Nosing bar rusting is identical to that described in Type 4, with the same repair difficulties.

Efflorescence can be seen in some locations, and is discussed elsewhere. To reiterate, efflorescence can be a sign of chlorides used in the original concrete or the result of de-icing operations. The staining is unsightly but not really damaging.

Water Erosion of Subbase – Stair #45 and possibly Stair #31 appear to be affected by water erosion. Stair #45 has had a portion of its subbase washed-out. Eventually, if the material under the slab is not replaced, the slab will crack and buckle into the void. Stair #31 appears to have water washing material out of cracks and may be the cause of the obvious settlement in this stair.

Poor Patch Preparation - Stair #4 displays areas where the new concrete was poorly tied to the existing and the preparation for the patch, particularly the notch added to prevent feathered edges, was not performed. The feathered edge will continue to crack and spall.

Type 6 - Wood Steps, Stringers and Posts on Precast Laid on Grade

In some locations, wood step structures, similar to those used in residential construction have been used to carry a sidewalk path over an obstacle such as a new retaining wall. Common types of distress that can be addressed with routine maintenance include tread wear and loose nails. However some of these structures are rotted, both treads and stringers. Several of these structures are visibly racked sideways, with missing treads and broken stringers. These stairs are unsafe and need to be replaced wholesale. In addition, all of the handrails on these types of steps should be fastened to stringers with thru- bolts as a minimum, not with nails or screws. Gaps over 1" wide in the walking surface between wood planks or between the wood and adjacent concrete must be filled with lengthened or respaced wood.

Type 7 – Precast Concrete Blocks

These stairs appear to be fairly new and in excellent structural condition.



Appendix A

Cost Estimates

Cost Estimate

Staircase One

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	8	SF		\$ 2.71	\$ 2.71	\$ 22
Crack Chase and Seal Cracks	15	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 141
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	74	SF			\$ 0.92	\$ 68
Carborundum Rub, Dry	66	SF			\$ 1.48	\$ 98
				Subtotal		\$ 2,201
				Contingency	10%	\$ 220
				Total¹		\$ 2,400

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Two

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	2.2	SF		\$ 2.71	\$ 2.71	\$ 6
Prep/Patching - Medium	0.6	SF		\$ 6.69	\$ 6.69	\$ 4
Prep/Patching - Maximum	0.2	SF		\$ 12.32	\$ 12.32	\$ 2
Crack Chase and Seal Cracks	10	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 94
Repaint Steel Handrail - Rust Inhibitor	270	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 138
Repaint Steel Handrail - Gloss Topcoat	270	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 186
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	2	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 3
Rubbing Wall:					\$ -	
Burlap Rub with Grout	3	SF			\$ 0.92	\$ 3
Sand Blasting	27	SF			\$ 2.20	\$ 59
Subtotal						\$ 2,366
Contingency 10%						\$ 237
Total¹						\$ 2,600

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Three

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	8	SF		\$ 2.71	\$ 2.71	\$ 22
Crack Chase and Seal Cracks	18	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 170
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	8	SF			\$ 0.92	\$ 7
Subtotal						\$ 2,069
Contingency 10%						\$ 207
Total¹						\$ 2,300

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Four

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	6	SF		\$ 2.71	\$ 2.71	\$ 16
Crack Chase and Seal Cracks	18	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 170
Repaint Steel Handrail - Rust Inhibitor	780	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 398
Repaint Steel Handrail - Gloss Topcoat	780	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 538
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	31	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 51
Rubbing Wall:					\$ -	
Burlap Rub with Grout	51	SF			\$ 0.92	\$ 47
Carborundum Rub, Dry	45	SF			\$ 1.48	\$ 67
Sand Blasting	78	SF			\$ 2.20	\$ 172
				Subtotal		\$ 3,328
				Contingency	10%	\$ 333
				Total¹		\$ 3,700

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Five

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	138.6	SF		\$ 2.71	\$ 2.71	\$ 376
Prep/Patching - Medium	10.8	SF		\$ 6.69	\$ 6.69	\$ 72
Prep/Patching - Maximum	3.6	SF		\$ 12.32	\$ 12.32	\$ 44
Crack Chase and Seal Cracks	13	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 123
Precast Concrete Tread 2.25x12x48	40	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 2,747
Caulking for Precast Tread - Epoxy	80	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 781
General Caulking - Latex	12	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 72
Repaint Steel Handrail - Rust Inhibitor	1269	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 647
Repaint Steel Handrail - Gloss Topcoat	1269	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 876
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	161	SF			\$ 0.92	\$ 148
Carborundum Rub, Dry	4	SF			\$ 1.48	\$ 6
Sand Blasting	126.9	SF			\$ 2.20	\$ 279
Subtotal						\$ 8,041
Contingency					10%	\$ 804
Total¹						\$ 8,800

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Six

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	25.4	SF		\$ 2.71	\$ 2.71	\$ 69
Prep/Patching - Medium	7.2	SF		\$ 6.69	\$ 6.69	\$ 48
Prep/Patching - Maximum	2.4	SF		\$ 12.32	\$ 12.32	\$ 30
Crack Chase and Seal Cracks	2	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 19
Precast Concrete Tread 2.25x12x48	38	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 2,610
Caulking for Precast Tread - Epoxy	76	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 742
General Caulking - Latex	27	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 163
Repaint Steel Handrail - Rust Inhibitor	780	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 398
Repaint Steel Handrail - Gloss Topcoat	780	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 538
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	42	SF			\$ 0.92	\$ 39
Carborundum Rub, Dry	3	SF			\$ 1.48	\$ 4
Sand Blasting	78	SF			\$ 2.20	\$ 172
				Subtotal		\$ 6,702
				Contingency	10%	\$ 670
				Total¹		\$ 7,400

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Seven

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	32	SF		\$ 2.71	\$ 2.71	\$ 87
Crack Chase and Seal Cracks	16	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 151
Repaint Steel Handrail - Rust Inhibitor	876	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 447
Repaint Steel Handrail - Gloss Topcoat	876	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 604
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	33	SF			\$ 0.92	\$ 30
Carborundum Rub, Dry	1	SF			\$ 1.48	\$ 1
Sand Blasting	87.6	SF			\$ 2.20	\$ 193
Subtotal						\$ 3,385
Contingency 10%						\$ 339
Total¹						\$ 3,700

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Eight

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Crack Chase and Seal Cracks	4	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 38
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Subtotal						\$ 1,908
Contingency 10%						\$ 191
Total¹						\$ 2,100

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Nine

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	18.2	SF		\$ 2.71	\$ 2.71	\$ 49
Prep/Patching - Medium	15.6	SF		\$ 6.69	\$ 6.69	\$ 104
Prep/Patching - Maximum	5.2	SF		\$ 12.32	\$ 12.32	\$ 64
Crack Chase and Seal Cracks	14	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 132
Precast Concrete Tread 2.25x12x48	46	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 3,159
Caulking for Precast Tread - Epoxy	92	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 898
General Caulking - Latex	57	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 344
Repaint Steel Handrail - Rust Inhibitor	1860	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 949
Repaint Steel Handrail - Gloss Topcoat	1860	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 1,283
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	41	SF			\$ 0.92	\$ 38
Carborundum Rub, Dry	2	SF			\$ 1.48	\$ 3
Sand Blasting	186	SF			\$ 2.20	\$ 409
				Subtotal		\$ 9,304
				Contingency	10%	\$ 930
				Total¹		\$ 10,200

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Ten

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	6.6	SF		\$ 2.71	\$ 2.71	\$ 18
Prep/Patching - Medium	1.8	SF		\$ 6.69	\$ 6.69	\$ 12
Prep/Patching - Maximum	0.6	SF		\$ 12.32	\$ 12.32	\$ 7
Crack Chase and Seal Cracks	6	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 57
Precast Concrete Tread 2.25x12x48	13	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 893
Caulking for Precast Tread - Epoxy	26	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 254
General Caulking - Latex	36	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 217
Demolition - Steel Handrail	21	LF		\$ 2.10	\$ 2.10	\$ 44
2-rail Steel Handrail (New)	21	LF			\$ 38.00	\$ 798
Paint Steel Handrail (New)	63	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 68
Repaint Steel Handrail - Rust Inhibitor	765	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 390
Repaint Steel Handrail - Gloss Topcoat	765	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 528
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	2	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 100
Rubbing Wall:					\$ -	
Burlap Rub with Grout	13	SF			\$ 0.92	\$ 12
Sand Blasting	76.5	SF			\$ 2.20	\$ 168
				Subtotal		\$ 5,436
				Contingency	10%	\$ 544
				Total¹		\$ 6,000

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Eleven

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.6	SF		\$ 2.71	\$ 2.71	\$ 2
Prep/Patching - Medium	1.8	SF		\$ 6.69	\$ 6.69	\$ 12
Prep/Patching - Maximum	0.6	SF		\$ 12.32	\$ 12.32	\$ 7
Crack Chase and Seal Cracks	24	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 226
Repaint Steel Handrail - Rust Inhibitor	441	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 225
Repaint Steel Handrail - Gloss Topcoat	441	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 304
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	7	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 11
Rubbing Wall:					\$ -	
Burlap Rub with Grout	3	SF			\$ 0.92	\$ 3
Sand Blasting	44.1	SF			\$ 2.20	\$ 97
Subtotal						\$ 2,758
Contingency					10%	\$ 276
Total¹						\$ 3,000

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twelve

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	3.4	SF		\$ 2.71	\$ 2.71	\$ 9
Prep/Patching - Medium	10.2	SF		\$ 6.69	\$ 6.69	\$ 68
Prep/Patching - Maximum	3.4	SF		\$ 12.32	\$ 12.32	\$ 42
Crack Chase and Seal Cracks	8	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 75
Precast Concrete Tread 2.25x12x48	13	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 893
Caulking for Precast Tread - Epoxy	26	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 254
General Caulking - Latex	108	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 651
Repaint Steel Handrail - Rust Inhibitor	1260	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 643
Repaint Steel Handrail - Gloss Topcoat	1260	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 869
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	17	SF			\$ 0.92	\$ 16
Sand Blasting	126	SF			\$ 2.20	\$ 277
Subtotal						\$ 5,669
Contingency					10%	\$ 567
Total¹						\$ 6,200

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Seventeen

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.4	SF		\$ 2.71	\$ 2.71	\$ 1
Prep/Patching - Medium	1.2	SF		\$ 6.69	\$ 6.69	\$ 8
Prep/Patching - Maximum	0.4	SF		\$ 12.32	\$ 12.32	\$ 5
Crack Chase and Seal Cracks	12	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 113
Repaint Steel Handrail - Rust Inhibitor	270	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 138
Repaint Steel Handrail - Gloss Topcoat	270	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 186
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Sand Blasting	27	SF			\$ 2.20	\$ 59
Subtotal					\$	2,384
Contingency					10%	\$ 238
Total¹					\$	2,600

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Eighteen

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	1.2	SF		\$ 2.71	\$ 2.71	\$ 3
Prep/Patching - Medium	0.6	SF		\$ 6.69	\$ 6.69	\$ 4
Prep/Patching - Maximum	0.2	SF		\$ 12.32	\$ 12.32	\$ 2
Crack Chase and Seal Cracks	6	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 57
Repaint Steel Handrail - Rust Inhibitor	102	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 52
Repaint Steel Handrail - Gloss Topcoat	102	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 70
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Sand Blasting	10.2	SF			\$ 2.20	\$ 22
Subtotal						\$ 2,083
Contingency 10%						\$ 208
Total¹						\$ 2,300

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Nineteen

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	1.6	SF		\$ 2.71	\$ 2.71	\$ 4
Prep/Patching - Medium	1.8	SF		\$ 6.69	\$ 6.69	\$ 12
Prep/Patching - Maximum	0.6	SF		\$ 12.32	\$ 12.32	\$ 7
Crack Chase and Seal Cracks	15	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 141
General Caulking - Latex	3	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 18
2-rail Steel Handrail (New)	77	LF			\$ 38.00	\$ 2,926
Paint Steel Handrail (New)	231	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 249
Repaint Steel Handrail - Rust Inhibitor	459	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 234
Repaint Steel Handrail - Gloss Topcoat	459	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 317
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Rubbing Wall:					\$ -	
Burlap Rub with Grout	4	SF			\$ 0.92	\$ 4
Sand Blasting	45.9	SF			\$ 2.20	\$ 101
Subtotal						\$ 5,886
Contingency					10%	\$ 589
Total¹						\$ 6,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	1.2	SF		\$ 2.71	\$ 2.71	\$ 3
Prep/Patching - Medium	0.6	SF		\$ 6.69	\$ 6.69	\$ 4
Prep/Patching - Maximum	0.2	SF		\$ 12.32	\$ 12.32	\$ 2
Crack Chase and Seal Cracks	7	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 66
Repaint Steel Handrail - Rust Inhibitor	108	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 55
Repaint Steel Handrail - Gloss Topcoat	108	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 75
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Sand Blasting	10.8	SF			\$ 2.20	\$ 24
Subtotal						\$ 2,101
Contingency 10%						\$ 210
Total¹						\$ 2,300

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Four

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	1.2	SF		\$ 2.71	\$ 2.71	\$ 3
Prep/Patching - Medium	3.6	SF		\$ 6.69	\$ 6.69	\$ 24
Prep/Patching - Maximum	1.2	SF		\$ 12.32	\$ 12.32	\$ 15
Crack Chase and Seal Cracks	23	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 217
Single Steel Handrail (New)	34	LF			\$ 26.09	\$ 887
Paint Steel Handrail (New)	102	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 110
Repaint Steel Handrail - Rust Inhibitor	273	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 139
Repaint Steel Handrail - Gloss Topcoat	273	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 188
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	3	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 5
Rubbing Wall:					\$ -	
Burlap Rub with Grout	9	SF			\$ 0.92	\$ 8
Carborundum Rub, Dry	3	SF			\$ 1.48	\$ 4
Sand Blasting	27.3	SF			\$ 2.20	\$ 60
Subtotal						\$ 3,532
Contingency						10% \$ 353
Total¹						\$ 3,900

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Five

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.4	SF		\$ 2.71	\$ 2.71	\$ 1
Prep/Patching - Medium	1.2	SF		\$ 6.69	\$ 6.69	\$ 8
Prep/Patching - Maximum	0.4	SF		\$ 12.32	\$ 12.32	\$ 5
Crack Chase and Seal Cracks	25	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 236
General Caulking - Latex	6	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 36
Demolition - Steel Handrail	14	LF		\$ 2.10	\$ 2.10	\$ 29
2-rail Steel Handrail (New)	14	LF			\$ 38.00	\$ 532
Paint Steel Handrail (New)	42	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 45
Repaint Steel Handrail - Rust Inhibitor	660	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 337
Repaint Steel Handrail - Gloss Topcoat	660	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 455
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Sand Blasting	66	SF			\$ 2.20	\$ 145
Subtotal						\$ 3,702
Contingency					10%	\$ 370
Total¹						\$ 4,100

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Six

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
3000 psi Cast-in-Place Concrete	2	CY	\$ 106.70	\$ 50.93	\$ 157.63	\$ 315
Seal and Curer	20	CY	\$ 0.35		\$ 0.35	\$ 7
Demolition - SOG Concrete/Cast in Place	2	CY		\$ 51.00	\$ 51.00	\$ 102
Prep/Patching - Minimum	7.8	SF		\$ 2.71	\$ 2.71	\$ 21
Prep/Patching - Medium	20.4	SF		\$ 6.69	\$ 6.69	\$ 136
Prep/Patching - Maximum	6.8	SF		\$ 12.32	\$ 12.32	\$ 84
Crack Chase and Seal Cracks	28	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 264
Demolition - Steel Handrail	35	LF		\$ 2.10	\$ 2.10	\$ 74
2-rail Steel Handrail (New)	155	LF			\$ 38.00	\$ 5,890
Paint Steel Handrail (New)	465	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 502
Repaint Steel Handrail - Rust Inhibitor	1359	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 693
Repaint Steel Handrail - Gloss Topcoat	1359	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 938
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Forms/Reinforcing - Sidewalk	20	SF	\$ 5.71		\$ 5.71	\$ 114
Concrete Expansion Joint (New)	2	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 3
Remove/Repair Vertical Sock for Metal Rail	13	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 650
Rubbing Wall:					\$ -	
Burlap Rub with Grout	35	SF			\$ 0.92	\$ 32
Sand Blasting	135.9	SF			\$ 2.20	\$ 299
				Subtotal		\$ 11,995
				Contingency	10%	\$ 1,199
				Total¹		\$ 13,200

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Seven

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
3000 psi Cast-in-Place Concrete	11	CY	\$ 106.70	\$ 50.93	\$ 157.63	\$ 1,734
Seal and Curer	110	CY	\$ 0.35		\$ 0.35	\$ 39
Demolition - SOG Concrete/Cast in Place	11	CY		\$ 51.00	\$ 51.00	\$ 561
Prep/Patching - Minimum	2.2	SF		\$ 2.71	\$ 2.71	\$ 6
Prep/Patching - Medium	6.6	SF		\$ 6.69	\$ 6.69	\$ 44
Prep/Patching - Maximum	2.2	SF		\$ 12.32	\$ 12.32	\$ 27
Crack Chase and Seal Cracks	22	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 207
Demolition - Steel Handrail	72	LF		\$ 2.10	\$ 2.10	\$ 151
2-rail Steel Handrail (New)	72	LF			\$ 38.00	\$ 2,736
Paint Steel Handrail (New)	216	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 233
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	11	SF			\$ 0.92	\$ 10
Subtotal						\$ 7,619
Contingency 10%						\$ 762
Total¹						\$ 8,400

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Eight

Description	Quantity	Unit	Material	Labor/		Cost per Unit	Total Cost
				Equipment			
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00		\$ 6,800.00	\$ 510
3000 psi Cast-in-Place Concrete		CY	\$ 106.70	\$ 50.93		\$ 157.63	\$ -
Seal and Curer		CY	\$ 0.35			\$ 0.35	\$ -
Demolition - SOG Concrete/Cast in Place		CY		\$ 51.00		\$ 51.00	\$ -
Prep/Patching - Minimum	3.6	SF		\$ 2.71		\$ 2.71	\$ 10
Prep/Patching - Medium	7.8	SF		\$ 6.69		\$ 6.69	\$ 52
Prep/Patching - Maximum	2.6	SF		\$ 12.32		\$ 12.32	\$ 32
Crack Chase and Seal Cracks	36	LF	\$ 6.60	\$ 2.83		\$ 9.43	\$ 339
Precast Concrete Tread 2.25x12x48	0	EA	\$ 29.26	\$ 39.42		\$ 68.68	\$ -
Caulking for Precast Tread - Epoxy	0	LF	\$ 6.50	\$ 3.26		\$ 9.76	\$ -
General Caulking - Latex	51	LF	\$ 3.11	\$ 2.92		\$ 6.03	\$ 308
Demolition - Steel Handrail	23	LF		\$ 2.10		\$ 2.10	\$ 48
2-rail Steel Handrail (New)	30	LF				\$ 38.00	\$ 1,140
Single Steel Handrail (New)	0	LF				\$ 26.09	\$ -
Paint Steel Handrail (New)	90	SF	\$ 0.66	\$ 0.42		\$ 1.08	\$ 97
Repaint Steel Handrail - Rust Inhibitor	564	SF	\$ 0.09	\$ 0.42		\$ 0.51	\$ 288
Repaint Steel Handrail - Gloss Topcoat	564	SF	\$ 0.25	\$ 0.44		\$ 0.69	\$ 389
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00		\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00			\$ 800.00	\$ 800
Forms/Reinforcing - Sidewalk		SF	\$ 5.71			\$ 5.71	\$ -
Forms/Reinforcing - Stairs		LF	\$ 48.12			\$ 48.12	\$ -
Concrete Expansion Joint (New)	0	LF	\$ 0.64	\$ 1.00		\$ 1.64	\$ -
Remove/Repair Vertical Sock for Metal Rail	33	EA	\$ 5.00	\$ 45.00		\$ 50.00	\$ 1,650
Rubbing Wall:						\$ -	
Burlap Rub with Grout	37	SF				\$ 0.92	\$ 34
Carborundum Rub, Dry	5	SF				\$ 1.48	\$ 7
Sand Blasting	56.4	SF				\$ 2.20	\$ 124
Fiber Wrap:							
SikaWrap Hex 100G		SF	\$ 1.12			\$ 1.12	\$ -
Sikadur 330 US (1 unit = 3 gal)		Unit	\$ 178.25			\$ 178.25	\$ -
Sika Armatex 110 EpoCem (1 Unit = 3.5 gal)		Unit	\$ 92.00			\$ 92.00	\$ -
Manlift (Optional Scaffolding)		Day	\$ 550.00			\$ 550.00	\$ -
Subtotal							\$ 6,389
Contingency 10%							\$ 639
Total¹							\$ 7,000

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Twenty-Nine

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	6.6	SF		\$ 2.71	\$ 2.71	\$ 18
Prep/Patching - Medium	7.8	SF		\$ 6.69	\$ 6.69	\$ 52
Prep/Patching - Maximum	2.6	SF		\$ 12.32	\$ 12.32	\$ 32
Crack Chase and Seal Cracks	7	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 66
Precast Concrete Tread 2.25x12x48	12	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 824
Caulking for Precast Tread - Epoxy	24	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 234
General Caulking - Latex	12	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 72
Demolition - Steel Handrail	25	LF		\$ 2.10	\$ 2.10	\$ 53
2-rail Steel Handrail (New)	43	LF			\$ 38.00	\$ 1,634
Paint Steel Handrail (New)	129	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 139
Repaint Steel Handrail - Rust Inhibitor	1089	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 555
Repaint Steel Handrail - Gloss Topcoat	1089	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 751
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	19	SF			\$ 0.92	\$ 17
Carborundum Rub, Dry	2	SF			\$ 1.48	\$ 3
Sand Blasting	108.9	SF			\$ 2.20	\$ 240
Subtotal						\$ 6,562
Contingency 10%						\$ 656
Total¹						\$ 7,200

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-One

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	10.6	SF		\$ 2.71	\$ 2.71	\$ 29
Prep/Patching - Medium	4.8	SF		\$ 6.69	\$ 6.69	\$ 32
Prep/Patching - Maximum	1.6	SF		\$ 12.32	\$ 12.32	\$ 20
Crack Chase and Seal Cracks	22	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 207
General Caulking - Latex	3	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 18
Demolition - Steel Handrail	66	LF		\$ 2.10	\$ 2.10	\$ 139
2-rail Steel Handrail (New)	66	LF			\$ 38.00	\$ 2,508
Paint Steel Handrail (New)	198	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 214
Repaint Steel Handrail - Rust Inhibitor	72	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 37
Repaint Steel Handrail - Gloss Topcoat	72	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 50
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	17	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 850
Rubbing Wall:					\$ -	
Burlap Rub with Grout	17	SF			\$ 0.92	\$ 16
Sand Blasting	7.2	SF			\$ 2.20	\$ 16
Subtotal						\$ 6,004
Contingency					10%	\$ 600
Total¹						\$ 6,600

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Two

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	26	SF		\$ 2.71	\$ 2.71	\$ 70
Prep/Patching - Medium	36	SF		\$ 6.69	\$ 6.69	\$ 241
Prep/Patching - Maximum	12	SF		\$ 12.32	\$ 12.32	\$ 148
Crack Chase and Seal Cracks	30	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 283
Precast Concrete Tread 2.25x12x48	16	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 1,099
Caulking for Precast Tread - Epoxy	32	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 312
General Caulking - Latex	213	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 1,284
2-rail Steel Handrail (New)	16	LF			\$ 38.00	\$ 608
Paint Steel Handrail (New)	48	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 52
Repaint Steel Handrail - Rust Inhibitor	1182	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 603
Repaint Steel Handrail - Gloss Topcoat	1182	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 816
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	126	SF			\$ 0.92	\$ 116
Carborundum Rub, Dry	52	SF			\$ 1.48	\$ 77
Sand Blasting	118.2	SF			\$ 2.20	\$ 260
Fiber Wrap:						
SikaWrap Hex 100G	600	SF	\$ 1.12		\$ 1.12	\$ 672
Sikadur 330 US (1 unit = 3 gal)	4	Unit	\$ 178.25		\$ 178.25	\$ 713
Sika Armatex 110 EpoCem (1 Unit = 3.5 gal)	4	Unit	\$ 92.00		\$ 92.00	\$ 368
Manlift (Optional Scaffolding)	3	Day	\$ 550.00		\$ 550.00	\$ 1,650
Subtotal						\$ 11,242
Contingency					10%	\$ 1,124
Total¹						\$ 12,400

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Three

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Repaint Steel Handrail - Rust Inhibitor	510	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 260
Repaint Steel Handrail - Gloss Topcoat	510	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 352
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Sand Blasting	51	SF			\$ 2.20	\$ 112
Subtotal						\$ 2,594
Contingency 10%						\$ 259
Total¹						\$ 2,900

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Four

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	3.2	SF		\$ 2.71	\$ 2.71	\$ 9
Prep/Patching - Medium	9.6	SF		\$ 6.69	\$ 6.69	\$ 64
Prep/Patching - Maximum	3.2	SF		\$ 12.32	\$ 12.32	\$ 39
Crack Chase and Seal Cracks	33	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 311
Demolition - Steel Handrail	15	LF		\$ 2.10	\$ 2.10	\$ 32
2-rail Steel Handrail (New)	15	LF			\$ 38.00	\$ 570
Paint Steel Handrail (New)	45	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 49
Repaint Steel Handrail - Rust Inhibitor	204	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 104
Repaint Steel Handrail - Gloss Topcoat	204	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 141
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	16	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	16	SF			\$ 0.92	\$ 15
Sand Blasting	20.4	SF			\$ 2.20	\$ 45
Subtotal						\$ 4,048
Contingency 10%						\$ 405
Total¹						\$ 4,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Six

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.2	SF		\$ 2.71	\$ 2.71	\$ 1
Prep/Patching - Medium	0.6	SF		\$ 6.69	\$ 6.69	\$ 4
Prep/Patching - Maximum	0.2	SF		\$ 12.32	\$ 12.32	\$ 2
Crack Chase and Seal Cracks	5	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 47
Demolition - Steel Handrail	30	LF		\$ 2.10	\$ 2.10	\$ 63
2-rail Steel Handrail (New)	30	LF			\$ 38.00	\$ 1,140
Paint Steel Handrail (New)	90	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 97
Repaint Steel Handrail - Rust Inhibitor	144	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 73
Repaint Steel Handrail - Gloss Topcoat	144	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 99
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Concrete Expansion Joint (New)	1	LF	\$ 0.64	\$ 1.00	\$ 1.64	\$ 2
Remove/Repair Vertical Sock for Metal Rail	13	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 650
Rubbing Wall:					\$ -	
Burlap Rub with Grout	1	SF			\$ 0.92	\$ 1
Sand Blasting	14.4	SF			\$ 2.20	\$ 32
Subtotal						\$ 4,081
Contingency						10% \$ 408
Total¹						\$ 4,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Seven

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Demolition - Steel Handrail	12	LF		\$ 2.10	\$ 2.10	\$ 25
2-rail Steel Handrail (New)	12	LF			\$ 38.00	\$ 456
Paint Steel Handrail (New)	36	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 39
Repaint Steel Handrail - Rust Inhibitor	96	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 49
Repaint Steel Handrail - Gloss Topcoat	96	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 66
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	11	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 550
Rubbing Wall:					\$ -	
Sand Blasting	9.6	SF			\$ 2.20	\$ 21
Subtotal						\$ 3,152
Contingency 10%						\$ 315
Total¹						\$ 3,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Thirty-Eight

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.4	SF		\$ 2.71	\$ 2.71	\$ 1
Prep/Patching - Medium	1.2	SF		\$ 6.69	\$ 6.69	\$ 8
Prep/Patching - Maximum	0.4	SF		\$ 12.32	\$ 12.32	\$ 5
Crack Chase and Seal Cracks	2	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 19
Repaint Steel Handrail - Rust Inhibitor	147	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 75
Repaint Steel Handrail - Gloss Topcoat	147	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 101
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Sand Blasting	14.7	SF			\$ 2.20	\$ 32
Subtotal						\$ 2,113
Contingency 10%						\$ 211
Total¹						\$ 2,300

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-One

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	4.2	SF		\$ 2.71	\$ 2.71	\$ 11
Prep/Patching - Medium	3.6	SF		\$ 6.69	\$ 6.69	\$ 24
Prep/Patching - Maximum	1.2	SF		\$ 12.32	\$ 12.32	\$ 15
Crack Chase and Seal Cracks	25	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 236
Demolition - Steel Handrail	59	LF		\$ 2.10	\$ 2.10	\$ 124
2-rail Steel Handrail (New)	59	LF			\$ 38.00	\$ 2,242
Paint Steel Handrail (New)	177	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 191
Repaint Steel Handrail - Rust Inhibitor	300	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 153
Repaint Steel Handrail - Gloss Topcoat	300	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 207
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	12	SF			\$ 0.92	\$ 11
Carborundum Rub, Dry	3	SF			\$ 1.48	\$ 4
Sand Blasting	30	SF			\$ 2.20	\$ 66
Subtotal						\$ 5,155
Contingency					10%	\$ 515
Total¹						\$ 5,700

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Two

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	4.8	SF		\$ 2.71	\$ 2.71	\$ 13
Prep/Patching - Medium	11.4	SF		\$ 6.69	\$ 6.69	\$ 76
Prep/Patching - Maximum	3.8	SF		\$ 12.32	\$ 12.32	\$ 47
Crack Chase and Seal Cracks	26	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 245
Precast Concrete Tread 2.25x12x48	9	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 618
Caulking for Precast Tread - Epoxy	18	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 176
General Caulking - Latex	39	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 235
Demolition - Steel Handrail	52	LF		\$ 2.10	\$ 2.10	\$ 109
2-rail Steel Handrail (New)	59	LF			\$ 38.00	\$ 2,242
Paint Steel Handrail (New)	177	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 191
Repaint Steel Handrail - Rust Inhibitor	1143	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 583
Repaint Steel Handrail - Gloss Topcoat	1143	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 789
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	16	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 800
Rubbing Wall:					\$ -	
Burlap Rub with Grout	23	SF			\$ 0.92	\$ 21
Carborundum Rub, Dry	3	SF			\$ 1.48	\$ 4
Sand Blasting	114.3	SF			\$ 2.20	\$ 251
Subtotal						\$ 8,271
Contingency 10%						\$ 827
Total¹						\$ 9,100

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Three

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	16.2	SF		\$ 2.71	\$ 2.71	\$ 44
Prep/Patching - Medium	36.6	SF		\$ 6.69	\$ 6.69	\$ 245
Prep/Patching - Maximum	12.2	SF		\$ 12.32	\$ 12.32	\$ 150
Crack Chase and Seal Cracks	76	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 717
General Caulking - Latex	96	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 579
Demolition - Steel Handrail	16	LF		\$ 2.10	\$ 2.10	\$ 34
2-rail Steel Handrail (New)	16	LF			\$ 38.00	\$ 608
Paint Steel Handrail (New)	48	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 52
Repaint Steel Handrail - Rust Inhibitor	882	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 450
Repaint Steel Handrail - Gloss Topcoat	882	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 609
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	1	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 50
Rubbing Wall:					\$ -	
Burlap Rub with Grout	98	SF			\$ 0.92	\$ 90
Carborundum Rub, Dry	1	SF			\$ 1.48	\$ 1
Sand Blasting	88.2	SF			\$ 2.20	\$ 194
Subtotal						\$ 5,692
Contingency						10% \$ 569
Total¹						\$ 6,300

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Four

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	10.8	SF		\$ 2.71	\$ 2.71	\$ 29
Prep/Patching - Medium	11.4	SF		\$ 6.69	\$ 6.69	\$ 76
Prep/Patching - Maximum	3.8	SF		\$ 12.32	\$ 12.32	\$ 47
Crack Chase and Seal Cracks	37	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 349
Demolition - Steel Handrail	154	LF		\$ 2.10	\$ 2.10	\$ 323
2-rail Steel Handrail (New)	210	LF			\$ 38.00	\$ 7,980
Paint Steel Handrail (New)	630	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 680
Repaint Steel Handrail - Rust Inhibitor	30	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 15
Repaint Steel Handrail - Gloss Topcoat	30	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 21
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	48	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 2,400
Rubbing Wall:					\$ -	
Burlap Rub with Grout	33	SF			\$ 0.92	\$ 30
Carborundum Rub, Dry	7	SF			\$ 1.48	\$ 10
Sand Blasting	3	SF			\$ 2.20	\$ 7
Subtotal						\$ 13,838
Contingency						10% \$ 1,384
Total¹						\$ 15,200

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Five

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Crack Chase and Seal Cracks	2	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 19
Repaint Steel Handrail - Rust Inhibitor	259.5	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 132
Repaint Steel Handrail - Gloss Topcoat	259.5	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 179
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Rubbing Wall:					\$ -	
Sand Blasting	25.95	SF			\$ 2.20	\$ 57
				Subtotal		\$ 2,257
				Contingency	10%	\$ 226
				Total¹		\$ 2,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Six

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	0.2	SF		\$ 2.71	\$ 2.71	\$ 1
Prep/Patching - Medium	0.6	SF		\$ 6.69	\$ 6.69	\$ 4
Prep/Patching - Maximum	0.2	SF		\$ 12.32	\$ 12.32	\$ 2
Crack Chase and Seal Cracks	8	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 75
Repaint Steel Handrail - Rust Inhibitor	330	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 168
Repaint Steel Handrail - Gloss Topcoat	330	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 228
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	3	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 150
Rubbing Wall:					\$ -	
Burlap Rub with Grout	2	SF			\$ 0.92	\$ 2
Carborundum Rub, Dry	1	SF			\$ 1.48	\$ 1
Sand Blasting	33	SF			\$ 2.20	\$ 73
Subtotal						\$ 2,574
Contingency					10%	\$ 257
Total¹						\$ 2,800

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Seven

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	3.2	SF		\$ 2.71	\$ 2.71	\$ 9
Prep/Patching - Medium	3.6	SF		\$ 6.69	\$ 6.69	\$ 24
Prep/Patching - Maximum	1.2	SF		\$ 12.32	\$ 12.32	\$ 15
Crack Chase and Seal Cracks	19	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 179
Precast Concrete Tread 2.25x12x48	12	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 824
Caulking for Precast Tread - Epoxy	24	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 234
General Caulking - Latex	33	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 199
Demolition - Steel Handrail	19	LF		\$ 2.10	\$ 2.10	\$ 40
2-rail Steel Handrail (New)	25	LF			\$ 38.00	\$ 950
Paint Steel Handrail (New)	75	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 81
Repaint Steel Handrail - Rust Inhibitor	627	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 320
Repaint Steel Handrail - Gloss Topcoat	627	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 433
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	12	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 600
Rubbing Wall:					\$ -	
Burlap Rub with Grout	8	SF			\$ 0.92	\$ 7
Sand Blasting	62.7	SF			\$ 2.20	\$ 138
Subtotal						\$ 5,923
Contingency 10%						\$ 592
Total¹						\$ 6,500

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Eight

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	7.8	SF		\$ 2.71	\$ 2.71	\$ 21
Prep/Patching - Medium	8.4	SF		\$ 6.69	\$ 6.69	\$ 56
Prep/Patching - Maximum	2.8	SF		\$ 12.32	\$ 12.32	\$ 34
Crack Chase and Seal Cracks	8	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 75
Precast Concrete Tread 2.25x12x48	10	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 687
Caulking for Precast Tread - Epoxy	20	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 195
General Caulking - Latex	15	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 90
Demolition - Steel Handrail	26	LF		\$ 2.10	\$ 2.10	\$ 55
2-rail Steel Handrail (New)	26	LF			\$ 38.00	\$ 988
Paint Steel Handrail (New)	78	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 84
Repaint Steel Handrail - Rust Inhibitor	546	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 278
Repaint Steel Handrail - Gloss Topcoat	546	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 377
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	10	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 500
Rubbing Wall:					\$ -	
Burlap Rub with Grout	26	SF			\$ 0.92	\$ 24
Carborundum Rub, Dry	7	SF			\$ 1.48	\$ 10
Sand Blasting	54.6	SF			\$ 2.20	\$ 120
Subtotal						\$ 5,466
Contingency					10%	\$ 547
Total¹						\$ 6,000

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Forty-Nine

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	6.6	SF		\$ 2.71	\$ 2.71	\$ 18
Prep/Patching - Medium	4.8	SF		\$ 6.69	\$ 6.69	\$ 32
Prep/Patching - Maximum	1.6	SF		\$ 12.32	\$ 12.32	\$ 20
Crack Chase and Seal Cracks	6	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 57
Precast Concrete Tread 2.25x12x48	12	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 824
Caulking for Precast Tread - Epoxy	24	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 234
General Caulking - Latex	12	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 72
Demolition - Steel Handrail	46	LF		\$ 2.10	\$ 2.10	\$ 97
2-rail Steel Handrail (New)	46	LF			\$ 38.00	\$ 1,748
Paint Steel Handrail (New)	138	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 149
Repaint Steel Handrail - Rust Inhibitor	486	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 248
Repaint Steel Handrail - Gloss Topcoat	486	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 335
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	18	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 900
Rubbing Wall:					\$ -	
Burlap Rub with Grout	21	SF			\$ 0.92	\$ 19
Carborundum Rub, Dry	6	SF			\$ 1.48	\$ 9
Sand Blasting	48.6	SF			\$ 2.20	\$ 107
Subtotal						\$ 6,739
Contingency					10%	\$ 674
Total¹						\$ 7,400

Notes

¹ Rounded to the nearest \$100.

Cost Estimate

Staircase Fifty

Description	Quantity	Unit	Material	Labor/ Equipment	Cost per Unit	Total Cost
Clear and Grub	0.075	Ac	\$ -	\$ 6,800.00	\$ 6,800.00	\$ 510
Prep/Patching - Minimum	4.6	SF		\$ 2.71	\$ 2.71	\$ 12
Prep/Patching - Medium	13.8	SF		\$ 6.69	\$ 6.69	\$ 92
Prep/Patching - Maximum	4.6	SF		\$ 12.32	\$ 12.32	\$ 57
Crack Chase and Seal Cracks	12	LF	\$ 6.60	\$ 2.83	\$ 9.43	\$ 113
Precast Concrete Tread 2.25x12x48	12	EA	\$ 29.26	\$ 39.42	\$ 68.68	\$ 824
Caulking for Precast Tread - Epoxy	24	LF	\$ 6.50	\$ 3.26	\$ 9.76	\$ 234
General Caulking - Latex	27	LF	\$ 3.11	\$ 2.92	\$ 6.03	\$ 163
Demolition - Steel Handrail	13	LF		\$ 2.10	\$ 2.10	\$ 27
2-rail Steel Handrail (New)	13	LF			\$ 38.00	\$ 494
Paint Steel Handrail (New)	39	SF	\$ 0.66	\$ 0.42	\$ 1.08	\$ 42
Repaint Steel Handrail - Rust Inhibitor	573	SF	\$ 0.09	\$ 0.42	\$ 0.51	\$ 292
Repaint Steel Handrail - Gloss Topcoat	573	SF	\$ 0.25	\$ 0.44	\$ 0.69	\$ 395
Dump Charge (Load Dumpster)	10	Hr		\$ 56.00	\$ 56.00	\$ 560
Dump Charge (Dumpster)	1	Mo	\$ 800.00		\$ 800.00	\$ 800
Remove/Repair Vertical Sock for Metal Rail	13	EA	\$ 5.00	\$ 45.00	\$ 50.00	\$ 650
Rubbing Wall:					\$ -	
Burlap Rub with Grout	37	SF			\$ 0.92	\$ 34
Carborundum Rub, Dry	14	SF			\$ 1.48	\$ 21
Sand Blasting	57.3	SF			\$ 2.20	\$ 126
Subtotal						\$ 5,448
Contingency					10%	\$ 545
Total¹						\$ 6,000

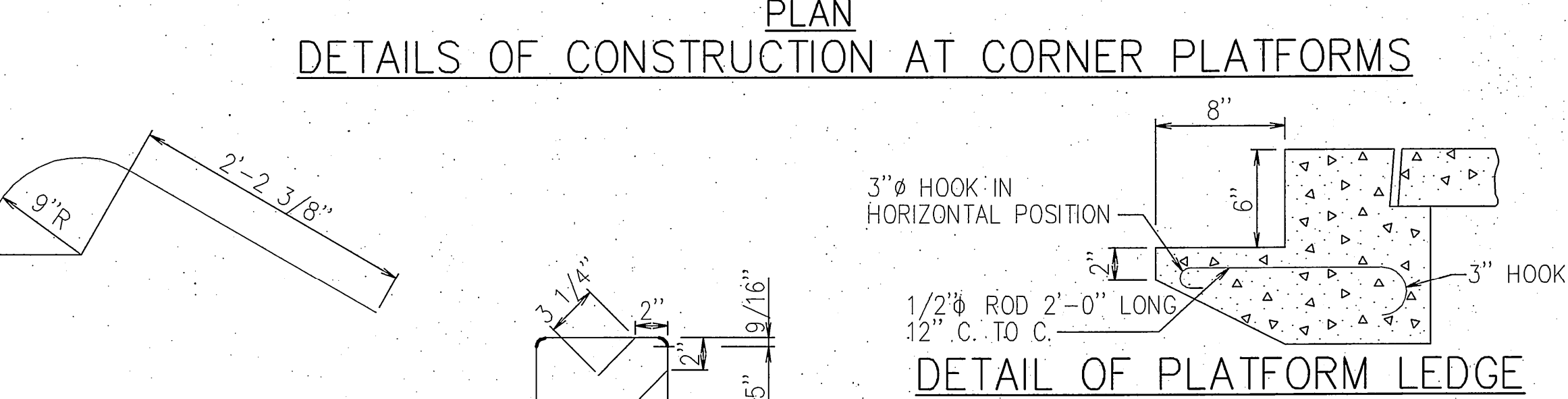
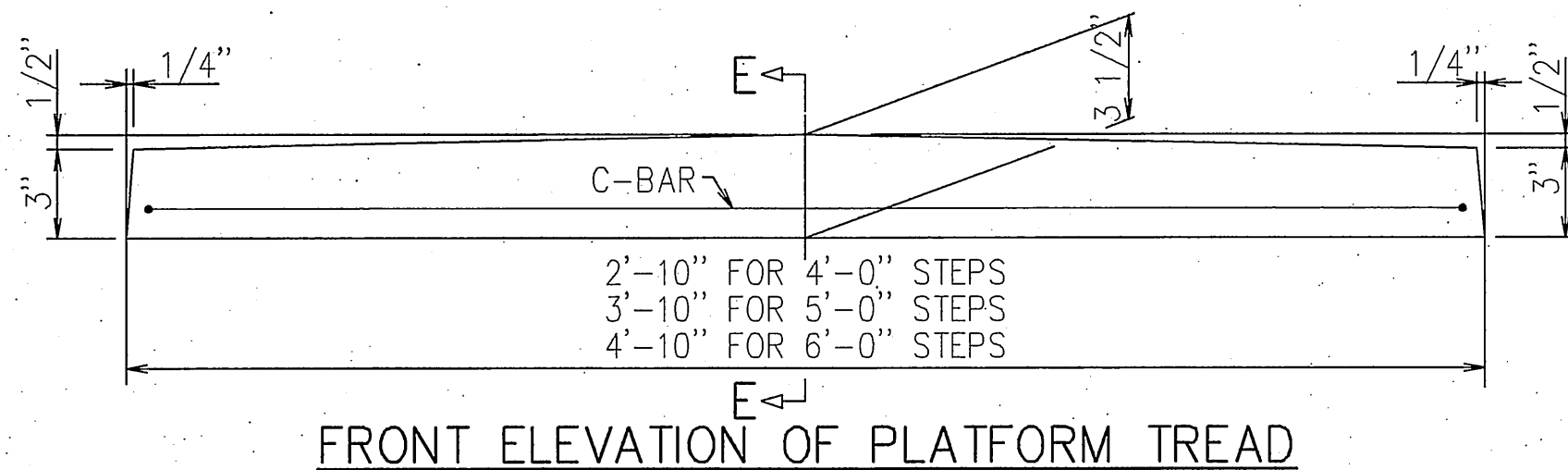
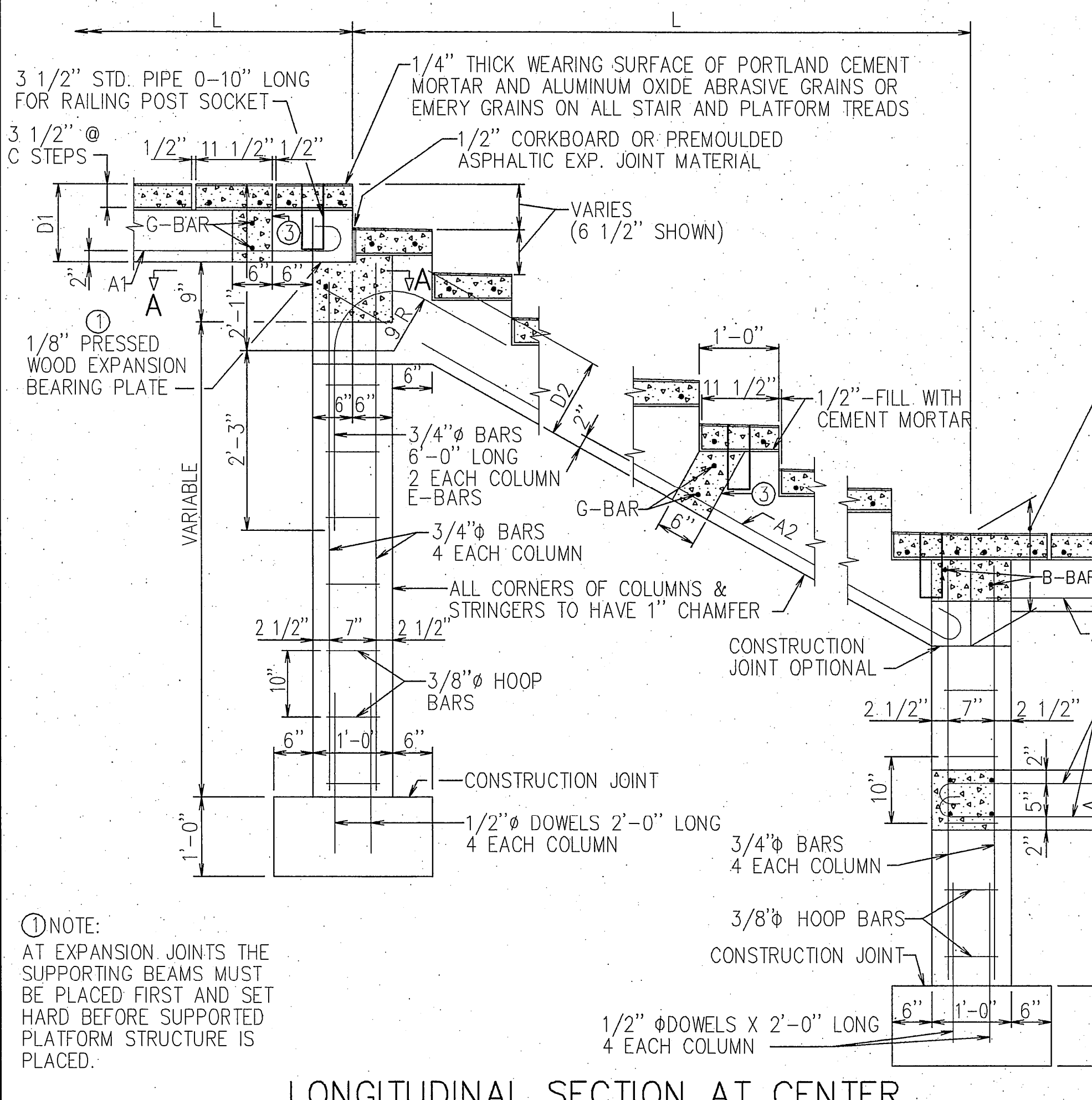
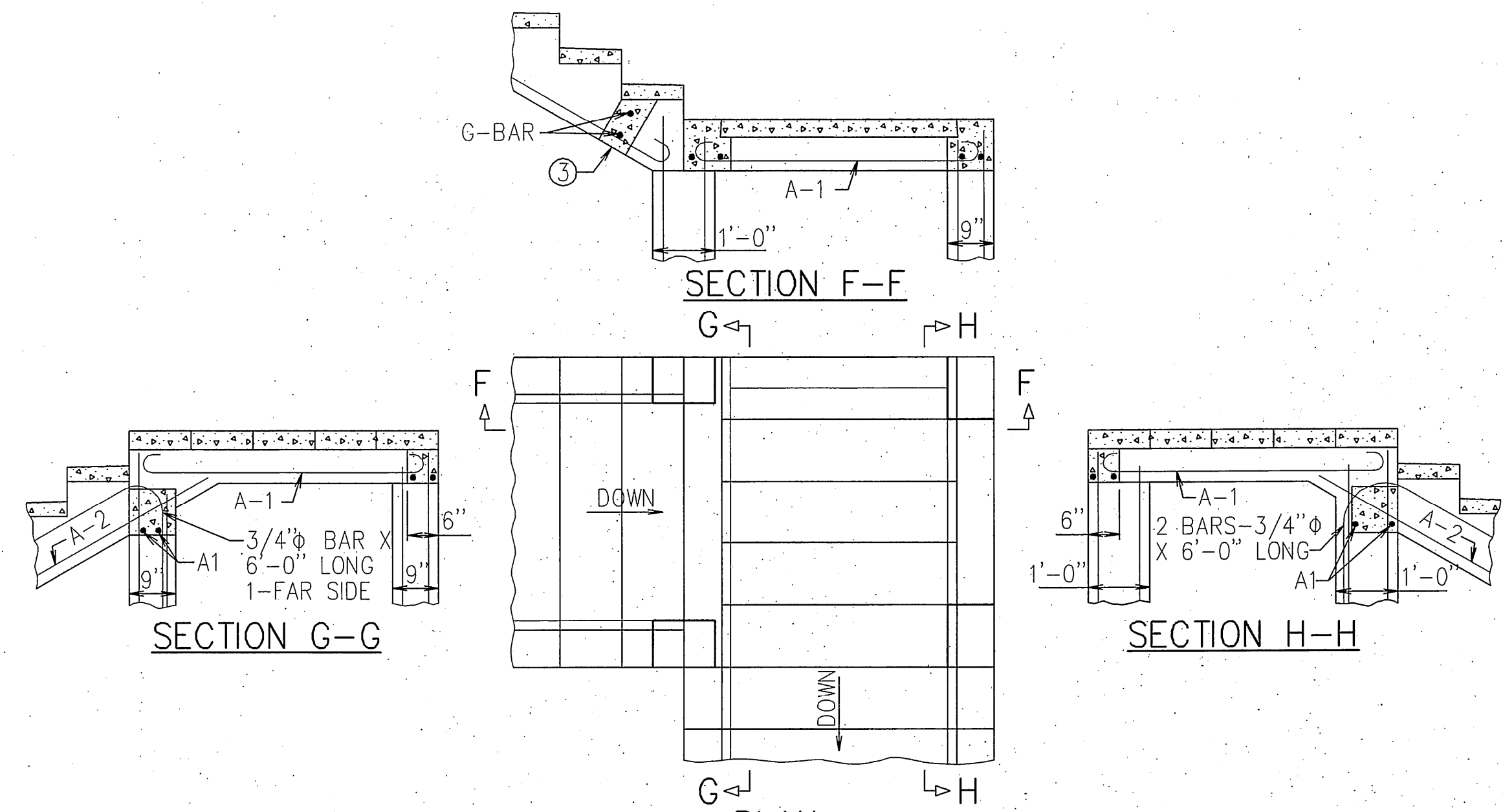
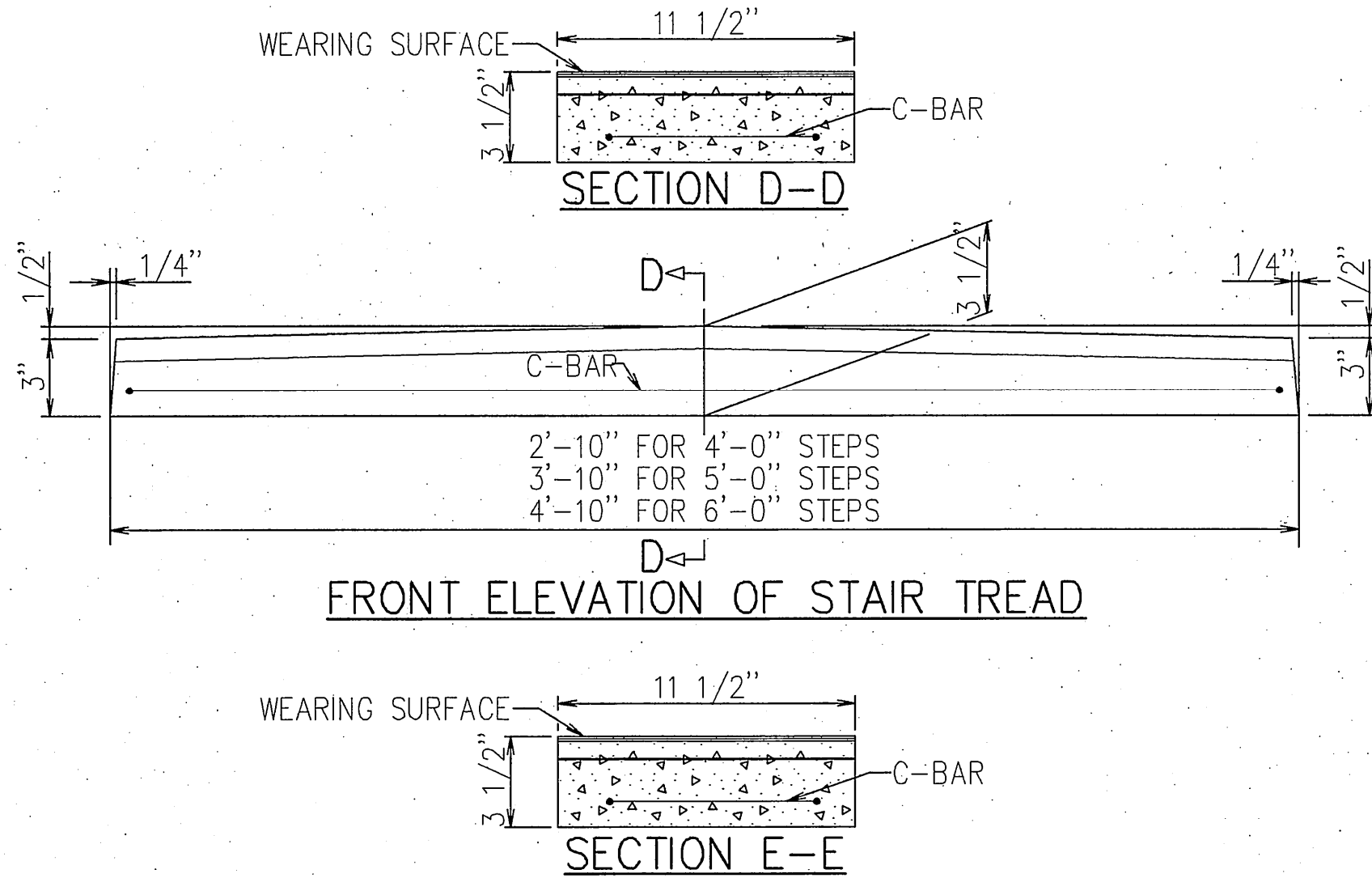
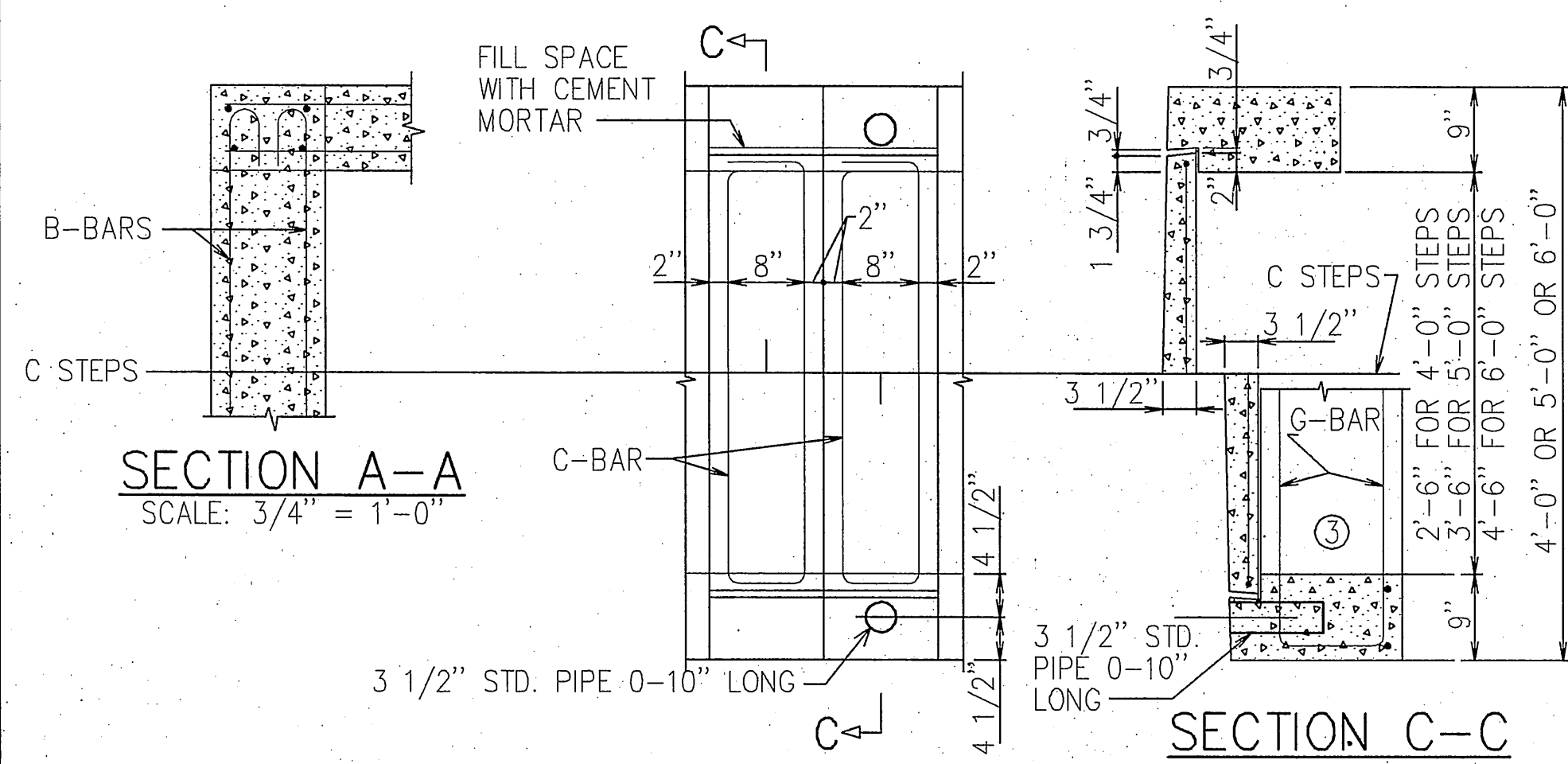
Notes

¹ Rounded to the nearest \$100.

The background of the page features faint, sepia-toned architectural drawings. On the left, there is a vertical section of a wall with a grid-like pattern. On the right, there are two views of a staircase: the top view shows a plan of the stairs with a railing, and the bottom view shows a side elevation of the stairs with a railing. The text 'Appendix B' is prominently displayed in a large, dark serif font, with 'Step Details' in a smaller, bold sans-serif font below it.

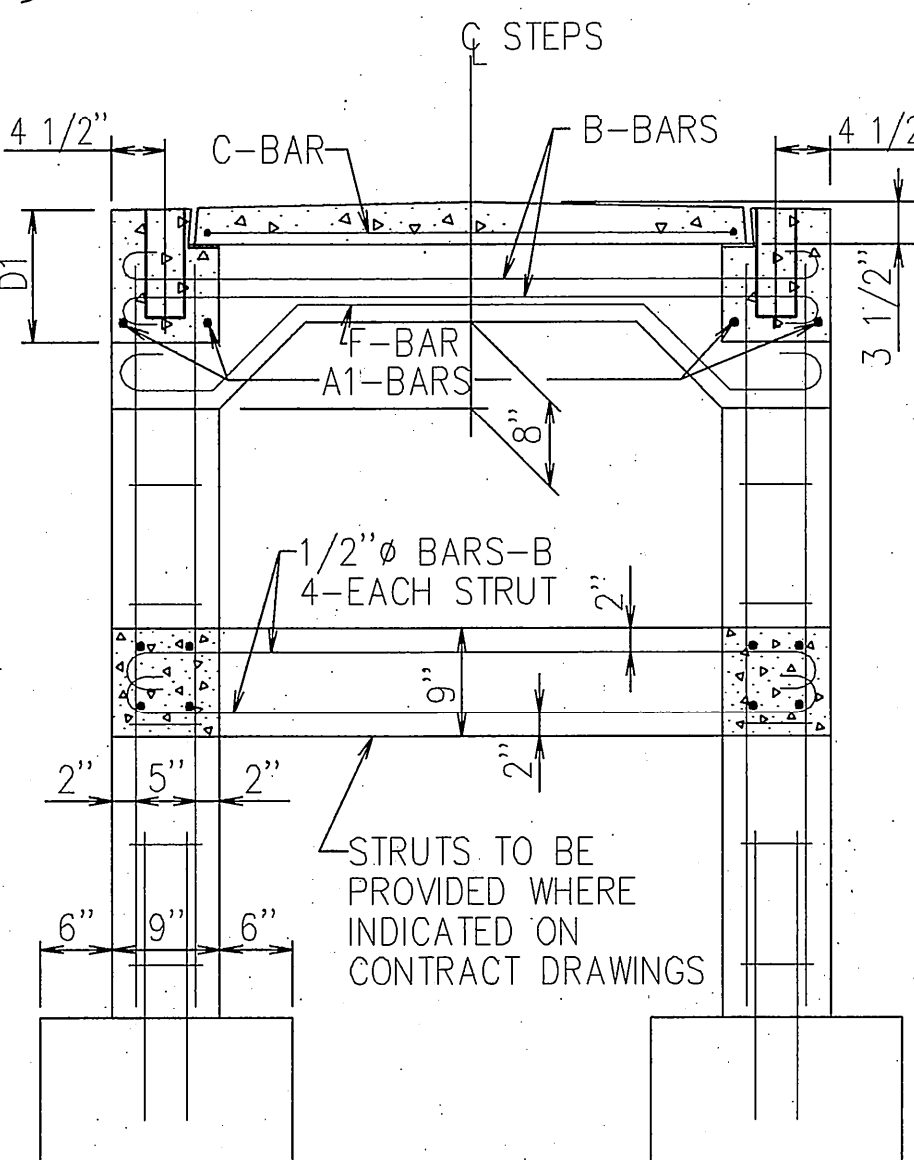
Appendix B

Step Details



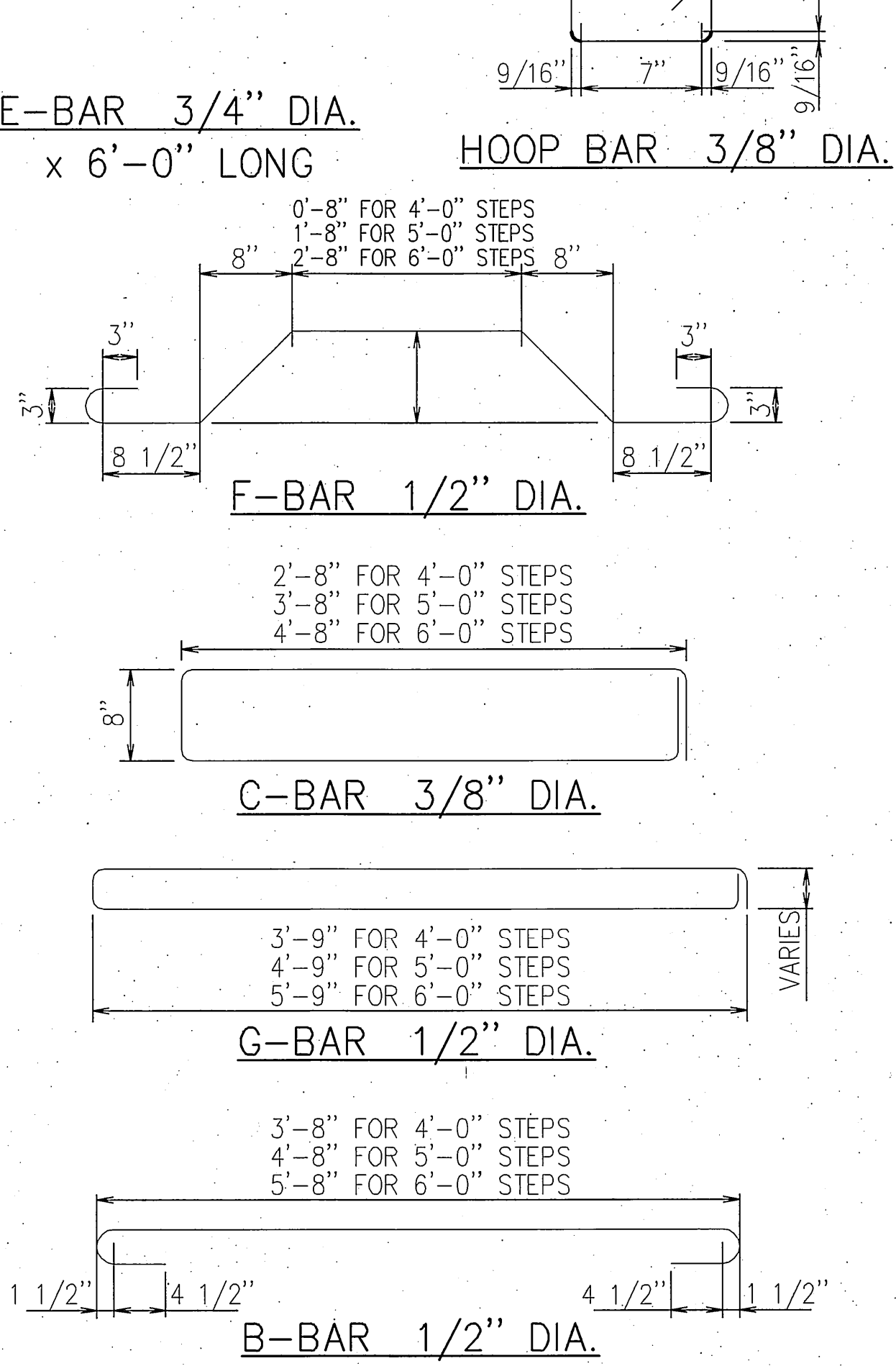
NOTE:
AT EXPANSION JOINTS THE
SUPPORTING BEAMS MUST
BE PLACED FIRST AND SET
HARD BEFORE SUPPORTED
PLATFORM STRUCTURE IS
PLACED.

LONGITUDINAL SECTION AT CENTER



SECTION B-B

NOTE:
BOTTOM OF ALL FOOTERS TO EXTEND
BELOW SURFACE OF GROUND FOR A
MINIMUM DISTANCE OF 3'-0" AT
CENTER OF COLUMN.

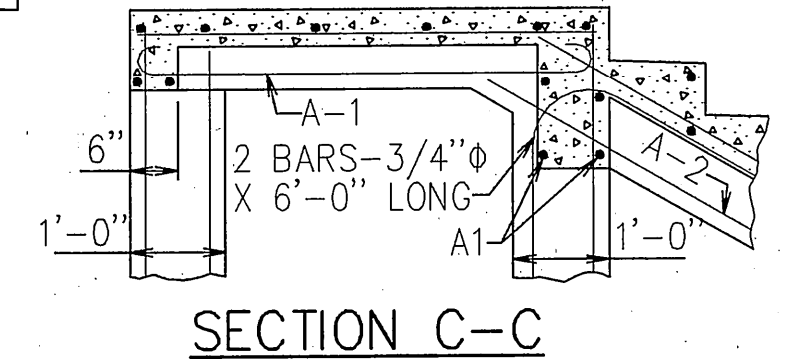
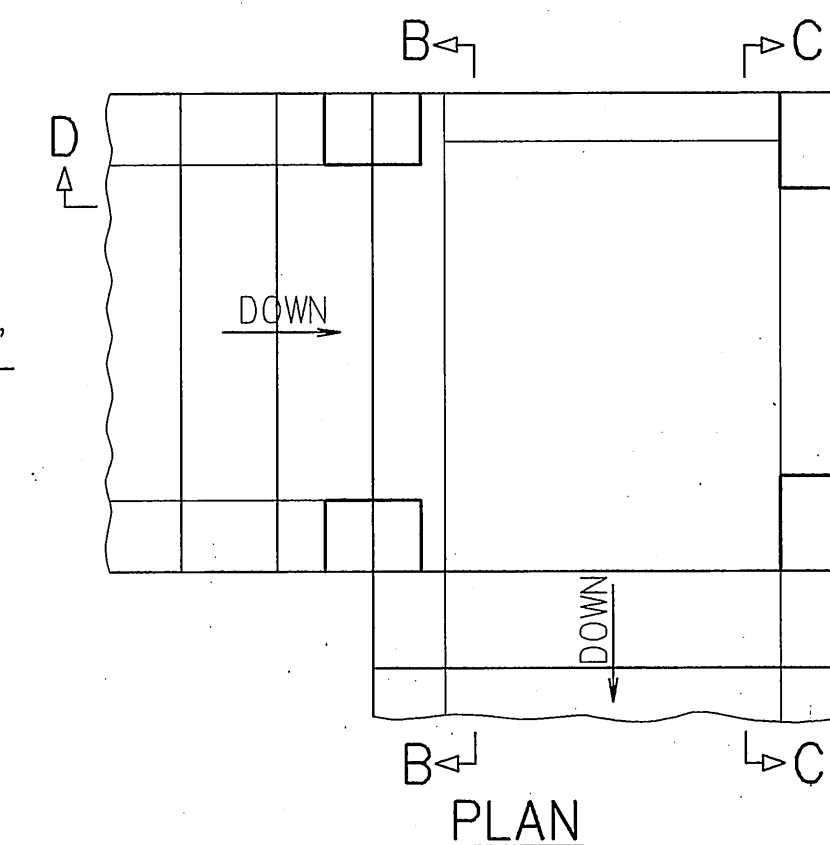
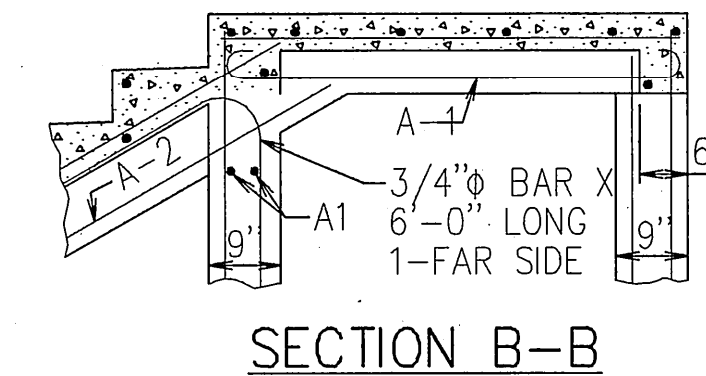
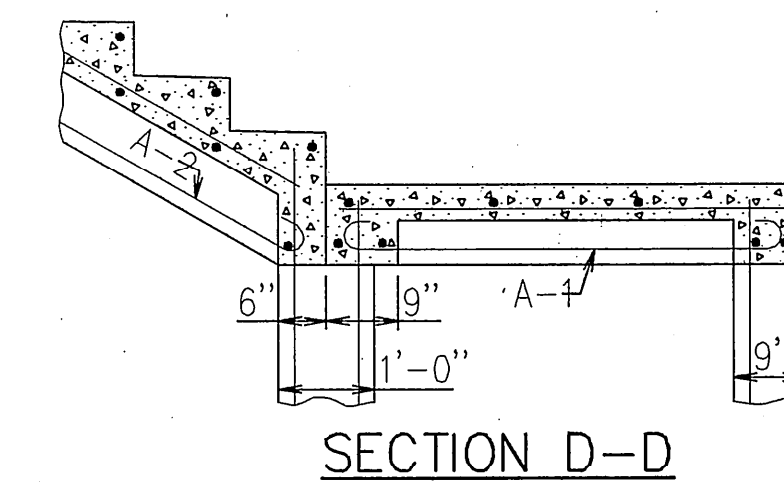
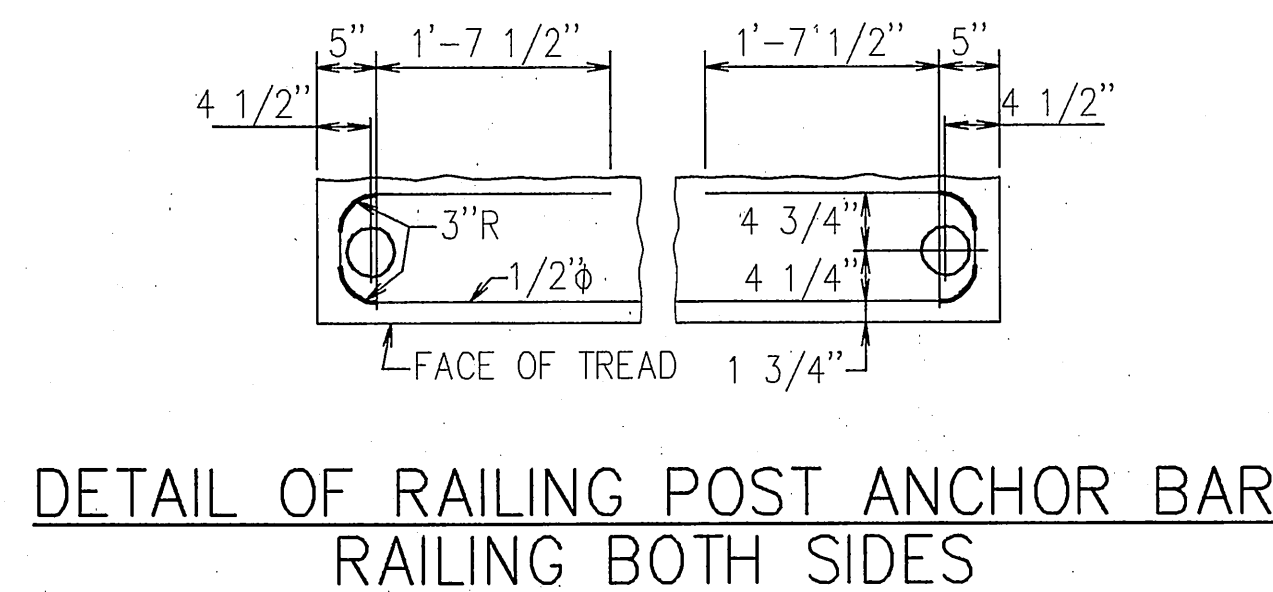
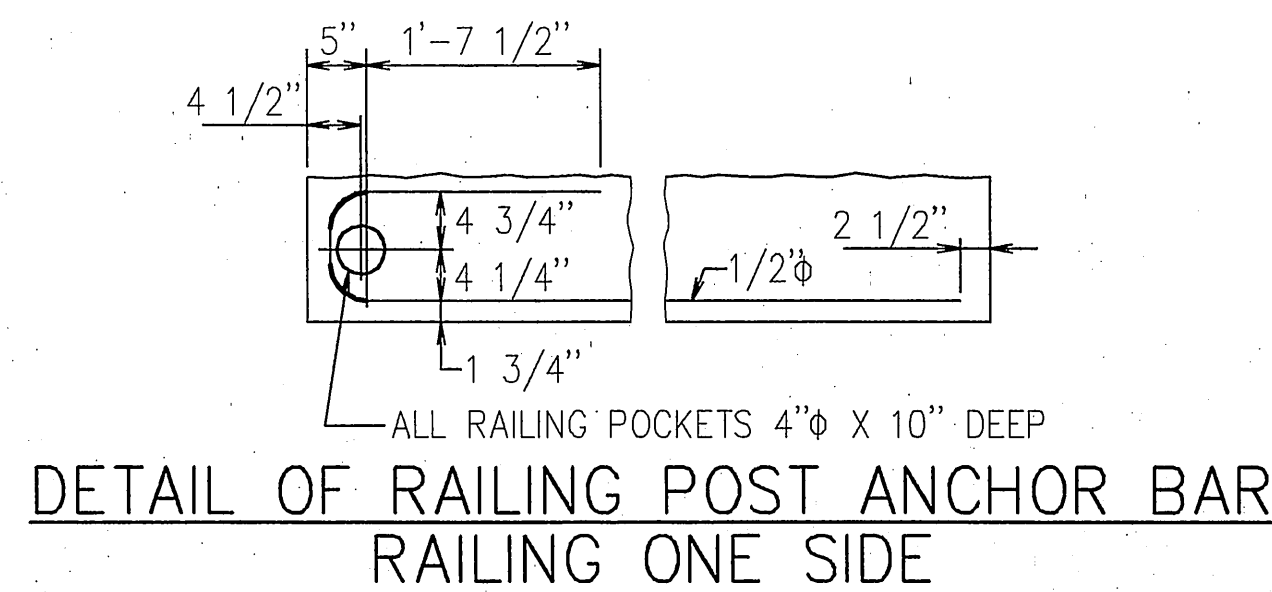


REINFORCING BAR DETAILS

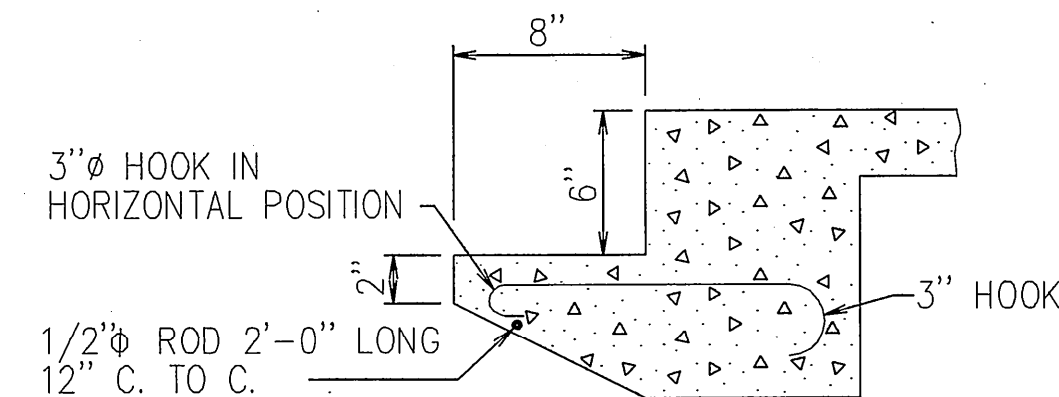
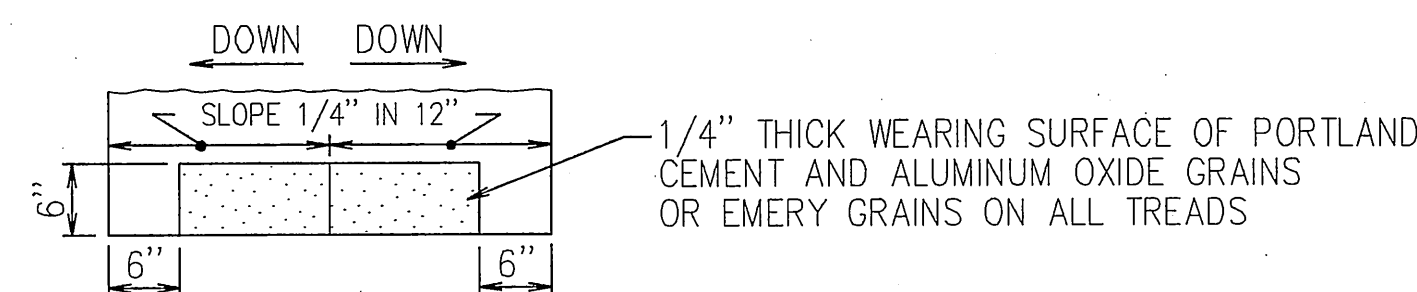
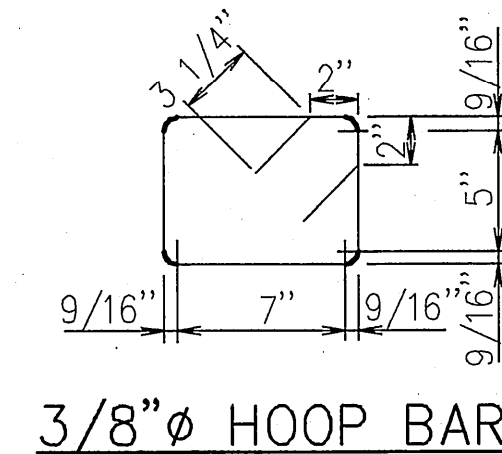
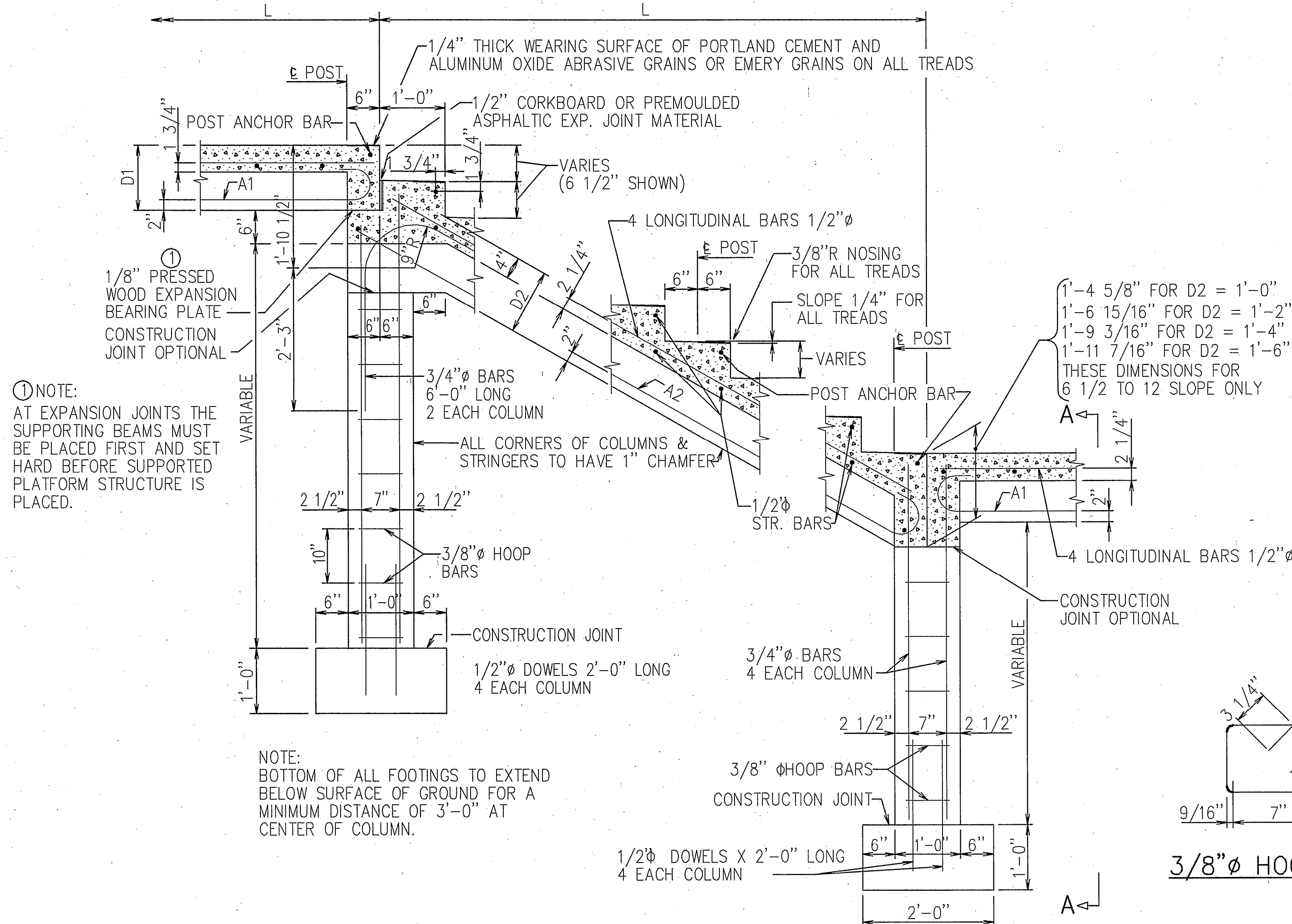
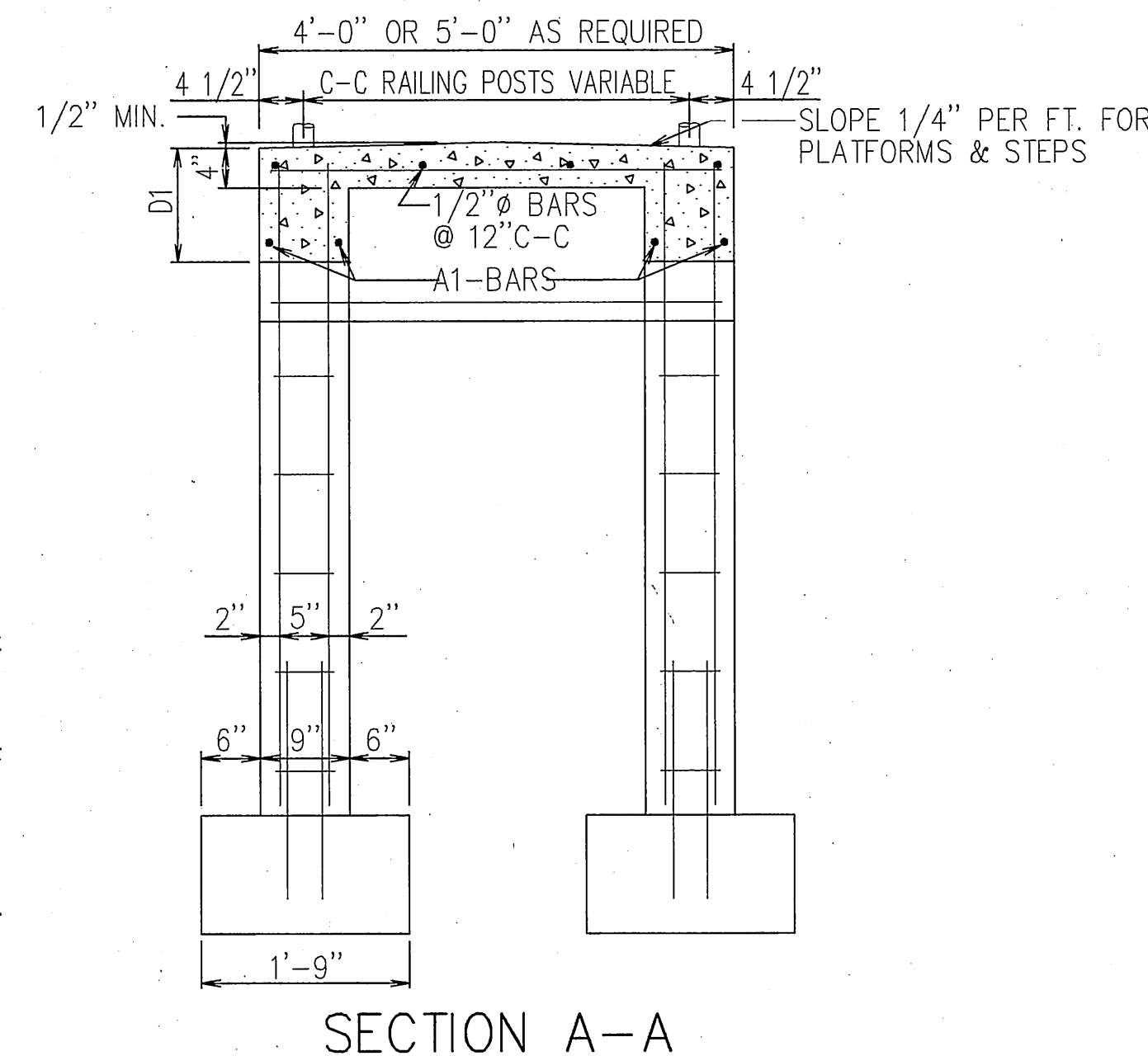
NOTE: DIMENSIONS GIVEN ON C OF BAR.
ALL REINFORCING STEEL TO BE STANDARD DEFORMED BARS.

REINFORCED CONCRETE STRINGER FOR PLATFORMS				REINFORCED CONCRETE STRINGER FOR STEPS			
FOR ONE STRINGER 9" WIDE				FOR ONE STRINGER 9" WIDE			
SPAN L	WIDTH	DEPTH D1	REINFORCING BARS A-1	SPAN L	WIDTH	DEPTH D2	REINFORCING BARS A-2
10'-0" OR LESS	5'-0"	1'-0"	2 @ 5/8"	UP TO 11'-0"	5'-0"	1'-0"	2 @ 5/8"
10'-1" TO 13'-0"	5'-0"	1'-0"	2 @ 5/8"	12'-0" & 13'-0"	5'-0"	1'-2"	2 @ 5/8"
13'-1" TO 15'-0"	5'-0"	1'-1"	2 @ 3/4"	14'-0"	5'-0"	1'-4"	2 @ 5/8"
15'-1" TO 17'-0"	5'-0"	1'-2"	2 @ 3/4"	15'-0"	5'-0"	1'-4"	2 @ 3/4"
17'-1" TO 18'-0"	5'-0"	1'-2"	2 @ 7/8"	16'-0", 17'-0", 18'-0"	5'-0"	1'-6"	2 @ 3/4"
12'-0" OR LESS	6'-0"	1'-0"	2 @ 3/4"	10'-0" OR LESS	6'-0"	1'-0"	2 @ 5/8"
12'-1" TO 13'-0"	6'-0"	1'-1"	2 @ 3/4"	11'-0" TO 13'-0"	6'-0"	1'-2"	2 @ 3/4"
13'-0" TO 15'-0"	6'-0"	1'-2"	2 @ 3/4"	14'-0" TO 16'-0"	6'-0"	1'-6"	2 @ 3/4"
15'-1" TO 16'-0"	6'-0"	1'-3"	2 @ 3/4"				

REVISION	MADE BY	CHECKED BY	DESCRIPTION
CITY OF PITTSBURGH STANDARDS OF CONSTRUCTION			
STEPS - CONCRETE STEPS TYPE 2			
APPROVALS:			
Donald J. Kellmeyer			July 1, 1993
MANAGER - DIVISION OF BRIDGES			DATE
Fred Reganella			July 1, 1993
ASST. DIRECTOR OF ENGINEERING			DATE
Ray B. Simell			July 1, 1993
DIRECTOR, ENGR. AND CONSTR.			DATE
John W. Schuch			July 1, 1993
DIRECTOR - DEPARTMENT OF PUBLIC WORKS			DATE
FORMER STANDARD DRAWING NO.		ACCESSION NO.	
F6710		CASE NO.	
DWG. NO. SU-101			



DETAILS OF CONSTRUCTION AT CORNER PLATFORMS



NOTE:
BARS NOT NOTED, 1/2" STRAIGHT.
DIMENSIONS GIVEN ON C OF BAR.

REINFORCED CONCRETE STRINGER FOR PLATFORMS				REINFORCED CONCRETE STRINGER FOR STEPS			
FOR ONE STRINGER 9" WIDE				FOR ONE STRINGER 9" WIDE			
SPAN L	WIDTH	DEPTH D1	REINFORCING BARS A-1	SPAN L	WIDTH	DEPTH D2	REINFORCING BARS A-2
10'-0" OR LESS	5'-0"	1'-0"	2 @ 5/8"	10'-0" OR LESS	5'-0"	1'-0"	2 @ 5/8"
10'-1" TO 13'-0"	5'-0"	1'-0"	2 @ 5/8"	11'-0"	5'-0"	1'-0"	2 @ 3/4"
13'-1" TO 15'-0"	5'-0"	1'-1"	2 @ 3/4"	12'-0" & 13'-0"	5'-0"	1'-2"	2 @ 3/4"
15'-1" TO 17'-0"	5'-0"	1'-2"	2 @ 3/4"	14'-0" & 15'-0"	5'-0"	1'-4"	2 @ 3/4"
17'-1" TO 18'-0"	5'-0"	1'-2"	2 @ 7/8"	16'-0"	5'-0"	1'-6"	2 @ 3/4"
12'-6" OR LESS	6'-0"	1'-0"	2 @ 3/4"	17'-0" & 18'-0"	5'-0"	1'-6"	2 @ 7/8"
12'-7" TO 13'-6"	6'-0"	1'-1"	2 @ 3/4"	10'-0" OR LESS	6'-0"	1'-0"	2 @ 5/8"
13'-7" TO 15'-0"	6'-0"	1'-2"	2 @ 3/4"	11'-0" TO 13'-0"	6'-0"	1'-2"	2 @ 3/4"
15'-1" TO 16'-0"	6'-0"	1'-3"	2 @ 3/4"	14'-0" TO 16'-0"	6'-0"	1'-6"	2 @ 3/4"

REVISION	MADE BY	CHECKED BY	DESCRIPTION
CITY OF PITTSBURGH STANDARDS OF CONSTRUCTION			
STEPS - CONCRETE STEPS TYPE 1			
APPROVALS:			
Donald J. Kellmeyer			July 1, 1993
MANAGER - DIVISION OF BRIDGES			DATE
Fred Repenella			July 1, 1993
ASST. DIRECTOR OF ENGINEERING			DATE
Chris R. Simcoe			July 1, 1993
DIRECTOR, ENGR. AND CONSTR.			DATE
John Calabrese			July 1, 1993
DIRECTOR - DEPARTMENT OF PUBLIC WORKS			DATE
FORMER STANDARD DRAWING NO.		ACCESSION NO.	
M-485		CASE NO.	
DWG. NO. SU-100			