



Facility Assessment
Fort Worth Botanic Garden
3220 Botanic Garden Boulevard
Fort Worth, Texas 76107



August 31, 2018
PROJECT NO. 16-1031.00



BOTANIC GARDEN
FORT WORTH

Assessment – Fort Worth Botanic Garden

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Executive Summary

FWBG Assessment Priority Ranking

RANKING CATEGORIES - 1) Life Safety; 2) Prevention of further/future deterioration; 3) Visitor Experience; 4) Wait on Master Plan.

RANK	ZONE	Bldg	BUILDING NAME	GENERAL ASSESSMENT	COST
1	1	3	Conservatory	Replace glazing & framing system, drainage improvements, accessibility items, canopy replacement, boilers, heaters, ventilation fans/air curtains, plumbing valves, mister system, water pump, electrical elements, and fountain repairs.	\$2,266,314
1	2	13N-B	Production Fiberglass Greenhouse	Building demolition and replacement.	\$1,001,880
1	3	18-4	Karesansui	Building demolition and replacement.	\$872,850
1	2	13N-A	Production Glass Greenhouse	Equipment and glazing replacement, structural repairs, electrical and mechanical element replacement, and accessibility items.	\$702,078
1	2	15	Rock Springs Center and The Gardens Restaurant	Kitchen renovations, firewall repairs, electrical panel replacement and circuitry repairs, site drainage elements, and accessibility repairs.	\$399,961
1	2	13N-E	Quonset House Storage	Building demolition and replacement.	\$376,740
1	3	18-8	Moon Bridge	Building demolition and replacement.	\$60,720
1	3	18-7	Hill Arbor	Building demolition and replacement, and pavement modifications.	\$33,840
1	4	13S	South Production Greenhouse	Repair structural connections, mechanical vent repair, VCT flooring installation, electrical wiring repair and exit lighting replacement.	\$28,601
1	4	20	Cactus Garden	Install shed tie down anchors, install permanent code compliant electrical wiring and repairs, and pavement upgrades.	\$6,720
1	4	10	Compost Outpost	Install shelter tie down anchors, and mulch pathway dressing.	\$6,660
1	4	25C	Backyard Vegetable Garden Storage Shed	Reset piers and tie downs, and install GFI electrical outlet.	\$3,240
2	2	9R	Parking Areas and Miscellaneous Site Areas	Irrigation line replacement, north perimeter fence replacement, roadway and path improvements, drainage improvements, and erosion control.	\$2,709,600
2	1	1	Deborah Beggs Moncrief Garden Center	Fountain repairs, hardware updates, repair of finishes, exterior envelope, accessibility items, entry canopy, RTU replacement, plumbing fixtures, electrical lighting panel and generator replacement.	\$1,455,059
2	5	33	South Vista	Entrance gate fountain repair, site excavation, grading and drainage improvements, landscape and irrigation modifications, dredge lagoons, and french drain installation.	\$887,400
2	1	4	Dorothy Leonhardt Lecture Hall	HVAC replacement, exterior maintenance, ceiling repairs, hardware updates, accessibility items, plumbing and electrical items, site and irrigation improvements, and fountain repairs.	\$822,950
2	5	29	Victor and Cleoyne Tinsley Rock Springs Garden	Replace south perimeter fence, address drystack walls, expansion joints, paint repair, install guardrails at bridge, address boardwalk beam seats, drainage and irrigation improvements.	\$797,250

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2	3	18-16	Waterfall	Pond repairs and liner replacement.	\$750,000
2	1	7	Adelaide Polk Fuller Garden	Irrigation line replacement, new irrigation system, paving and drainage repairs, fountain repairs, pedestrian bridge maintenance, and garden element repairs.	\$250,464
2	5	28	Rose Ramp	Drainage, fountain, and irrigation improvements	\$246,000
2	2	17A	Exhibition Greenhouse	Glazing and equipment replacement, and accessibility items.	\$206,386
2	2	17B	Tri-Plex Building	Exterior wall waterproofing and grading upgrades, mechanical equipment replacement, site paving and drainage upgrades.	\$174,834
2	3	18-13	Pavilions	Roof, siding, soffit and trim repairs, kitchen upgrades, electrical equipment replacement, handrail and guardrail replacement.	\$160,203
2	3	18-18	Treasure Tree Gift Shop	Exterior wood paneling cleaning and replacement, paver replacement, mechanical & plumbing repair/replacement, guardrail, door/hardware, casework and flooring replacement, and electrical repairs.	\$78,972
2	5	32	Oval Rose Garden	Metal lattice maintenance, repoint columns, lighting upgrades, irrigation and drainage improvements.	\$59,206
2	5	27	Shelter House	Foundation repair, masonry repointing, install accessible ramp at structure, resurface parking lot, and install accessible curb ramp,	\$43,704
2	5	26	Perennial Garden	Dredge pond, install storm inlet and drain pipe, construct swale, and minor electrical repair.	\$35,100
2	5	30	Lower Rose Garden	Fence and gate maintenance items, and repair wall cracking,	\$32,356
2	3	18-15	Mikoshi Shrine	Roof, paneling, stair and trim replacement, and paving walkway reconstruction.	\$31,352
2	4	9J	Japanese Garden Parking	Asphalt overlay and striping, incorporate curb cut and flume.	\$31,200
2	3	18-5	Lake Arbor	Floor beam, decking, and guardrail replacement.	\$16,215
2	3	18-ST	Miscellaneous Structural Elements	Repair ramp structure, fence repairs and upgrades, pavement replacement, concrete beam repair at bridge, steel beam paint coating at bridge.	\$14,760
2	3	18-1	Main Entrance Gate	Wood material element replacement, and site paving upgrades.	\$11,530
2	4	21	Grove	Replace interpretive sign and resurface asphalt roadway.	\$9,960
2	4	25D	Backyard Vegetable Garden Greenhouse	Install 6 piers and relevel grade beam.	\$7,200
2	3	18-10	Summer House	Wood trim replacement.	\$406
3	3	18-SI	Miscellaneous Site Elements	Accessibility repairs, irrigation upgrades, paving and site element repairs.	\$423,000
3	2	11	Texas Native Forest Boardwalk	Boardwalk maintenance, entrance repairs, paving improvements, accessibility items, lighting and exterior facility upgrades,	\$172,602
3	1	2	Margery Leonard Courtyard	Drainage and pavement repairs, fountain repairs, and irrigation upgrades.	\$86,400
3	1	5	George Beggs, Jr. Garden	Exterior paving and drainage improvements, fountain and irrigation repairs.	\$25,800

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3	5	31	Republic of Texas Garden	Repair cedar arbors, add skirt at EWC, incorporate drainage improvements.	\$17,850
3	3	18-19	Exit	Replace turnstile gate, steps, ramp and railing, and repair courtyard fencing.	\$17,400
3	3	18-12	Bride's Room & Restrooms	Countertop replacement, mechanical, plumbing and electrical upgrades, and utility water line replacement.	\$11,382
3	3	18-9	Mary K. Umstead Teahouse	Exterior refinishing, guardrail and pathway replacement.	\$11,316
3	4	25	Backyard Vegetable Garden	Repair drinking fountain, top-dress granite pathways, and replace damaged entry gates,	\$9,180
3	4	25B	Backyard Vegetable Garden Playhouse	Removed exposed nailing on underside of decking, replace door hardware, replace accessibility ramp, repair trim and surfaces, replace porch column, and install GFI electrical outlet.	\$7,155
3	3	18-6	Waterfall Overlook	Handrail replacement and guardrail modifications.	\$3,450
3	3	18-17	Pagoda	Material surface cleaning, trim replacement, and electrical upgrades.	\$810
4	2	14	North Vista	Drainage, landscape and irrigation improvements.	\$648,000
4	2	13N-D	Break Room Building	Building envelope and interior upgrades, electrical and mechanical elements,	\$348,360
4	1	9N,9S	Parking Areas and Main Entrance	Entry wall repairs, paving and drainage improvements, and fountain upgrades.	\$337,800
4	4	9W	Weekend Parking	Incorporate accessible sidewalk, lighting upgrades, drainage improvements, asphalt overlay and striping, install curb cut and flume.	\$147,120
4	1	6	Water Conservation Garden	Retaining wall repair, incorporate site lighting, pavement improvements and accessibility items.	\$52,221
4	4	22	Trial Garden	Replace pavilion and shed structures, and replace landscape timber edging.	\$46,770
4	2	12	Sister Cities International Grove	Pedestrian bridge replacement.	\$42,000
4	3	18-20S	South Restrooms	Sanitary sewer line replacement, replace drinking fountain, and lighting upgrades.	\$35,280
4	3	18-11	Moon Viewing Deck	Paving replacement, and stair modifications.	\$22,008
4	3	18-3	Suzuki Garden	Paving and walkway repairs.	\$12,600
4	3	18-2	Ticket Office	Screen wall, wood trim, hardware, and electrical items.	\$9,819
4	3	18-20N	North Restrooms	Replace ceilings, signage and door hardware, seal concrete, mechanical upgrades, remove drinking fountain, and lighting upgrades.	\$9,113
4	3	18-14	Checkerboard Bridge	Paving, steps and handrail upgrades at feeding station.	\$9,000
4	2	13N-C	Shop Office	Paving repairs and cladding replacement	\$7,507
4	2	16	Fragrance Garden	Pavement repairs.	\$1,440
4	4	25A	Backyard Vegetable Garden Pavilion	Perform rain gutter maintenance.	\$0
4	4	23	Four Seasons Garden	No recommendations.	\$0
4	4	24	Horseshoe	No recommendations.	\$0
FWBG Facility Assessment Total					\$17,107,094

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Overview

A. Purpose

The purpose of this assessment report is to observe the present condition of select buildings, structures and site areas within the Fort Worth Botanic Garden. This assessment will identify insufficiencies regarding these facilities, make recommendations for repairs, as well as provide an opinion of probable cost for these repairs.

B. Responsibility

This report was prepared by Elements of Architecture, Inc. (Elements) for the exclusive use of the client; and is to be published only as the instrument of services to the client. Elements nor the client assumes no duty or responsibility which may be constructed as being for the benefit of, and thereby enforceable by, anyone other than the client. No part of this report can be assigned to a third party without the written consent and approval of Elements.

C. Code Compliance

The facilities were reviewed only for basic compliance with the building code, life safety codes, handicapped accessibility laws along with other code requirements as identified throughout this document. Areas observed in violation are noted within the report. On this basis, Elements does not guarantee that all code issues have been identified.

D. Hazardous Materials

This report does not include any investigation of asbestos containing materials (ACM) or other hazardous material within the building structures or buried on site.

E. Project Scope

As these buildings and structures shows signs of aging, the client has requested Elements to review the overall condition of the facilities as well as make recommendation for repairs. To assist with allocation, of funds and budgeting, an opinion of probable construction cost for each item is provided. It is important to note that the estimates provided are for construction costs only and do not include design fees. Opinion of probable construction costs are all based on current pricing. Escalation factors should be applied to the estimates as time progresses. The estimate includes the general conditions for the project. Based on the programming level presented and evaluated at this time, a 20% contingency is added to each item. The general conditions for each project will vary depending on how many and which projects are grouped together for repairs performed at one time. Estimates are based on an average project and not the extreme.

Observations of the facilities and structures were limited to those areas that could be seen without destructive testing or demolition work to expose elements.

F. Texas Accessibility Standards

The Americans with Disabilities Act (ADA) prohibits the discrimination of a disabled person. Specific to our use, is the discrimination of a disabled person to a public place. It is this federal law that governs that all facilities are required to be accessible. Federal compliance is determined through an individual filing a case in Federal Court that he or she was not able to use a facility in the same manner as an abled-bodied person. Texas Accessibility Standards (TAS) are compliance requirements for the elimination of architectural barriers per Texas Government Code, Chapter 469. In general, modifications affecting a primary function often result in additional work related to the provision of greater access for those with disabilities. These provisions include, but are not limited to, parking areas, building entrance, accessible routes, restrooms, and drinking fountains. Some project renovation types may be exempt from updating to meet these provisions where they do not directly impact a primary function (such as mechanical HVAC systems and other work requiring only a trade permit). TAS is construction law, so the triggers for project registration,

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review, and inspection of compliance is directly related to the building permit, construction, and building occupancy process & procedures.

These facilities have been generally reviewed for TAS compliance with identified areas of deficiencies included within this report. The estimate of construction cost is based on the anticipated solution determined at the programming level.

G. Introduction to Zone Map, Japanese Garden Map and Secondary Structures Grid

Our assessment review focused on key structures identified by Fort Worth Botanic Garden staff. A key location map was provided for our use. While the key map identified the primary structures within the park, various secondary structures were also assessed that were not called out on the initial key map.

For the purpose of coordinating inter-disciplinary reviews, our assessment team divided the Fort Worth Botanic Garden property into 5 natural zones with identifiable boundaries. In Figure 1, we have identified the natural boundaries of each Zone. These assessment zones were reviewed in succession from Zone 1 at the northern end of the property, through Zone 5 at the southern end of the property. These Zones have further been identified as individual chapters for this assessment report.

Zone 3, identified as *18 Japanese Garden* on the overall Botanic Garden key map, has multiple structures requiring identification within our assessment. To identify these key structures, we have provided the Japanese Garden key map as Figure 2 within the assessment. These Zone 3 structures are identified by a dual number designation, where 18 indicates the Japanese Garden, and the secondary number identifies the structure number on the Japanese Garden key map. Refer to Figure 2 as well as the Zone 3 Table of Contents for further information.

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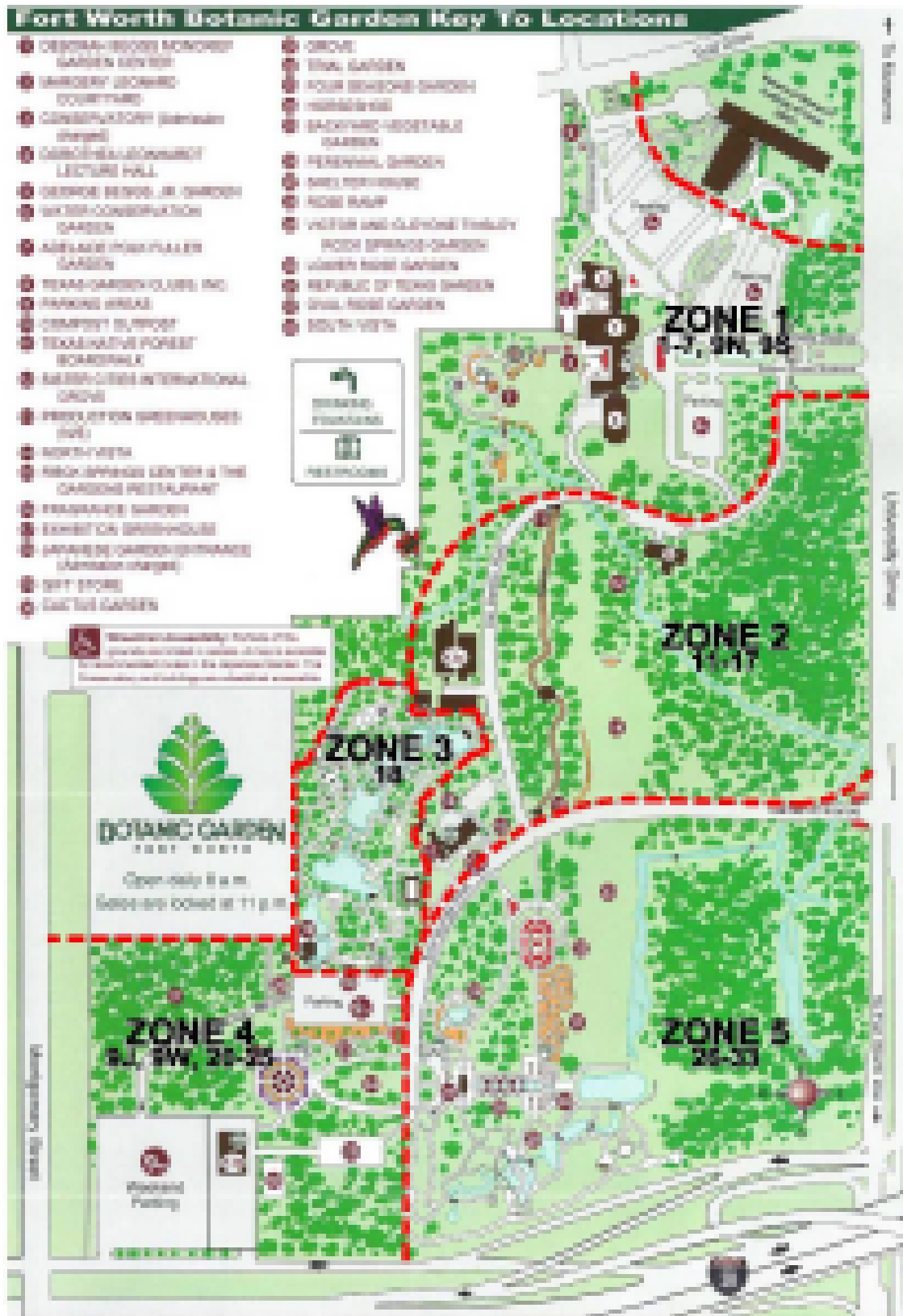


Figure 1

Assessment – Fort Worth Botanic Garden



Figure 2

Assessment – Fort Worth Botanic Garden

For the purpose of identifying and coordinating the various secondary structures not identified on the Fort Worth Botanic Garden Key Map, our assessment team established a Secondary Structure Locator Grid. In Figure 3, we have provided the Secondary Structure Locator Grid to assist in identifying and locating any secondary structures or areas referenced within this assessment report that do not fall under the purview of the main zone map in Figure 1. Any structure or area formatted this way will be identified with the letter first followed by the numeral (ex: W10) along with a written description or title of the item at or near this location (ex: W10 – Garden Main Entrance).

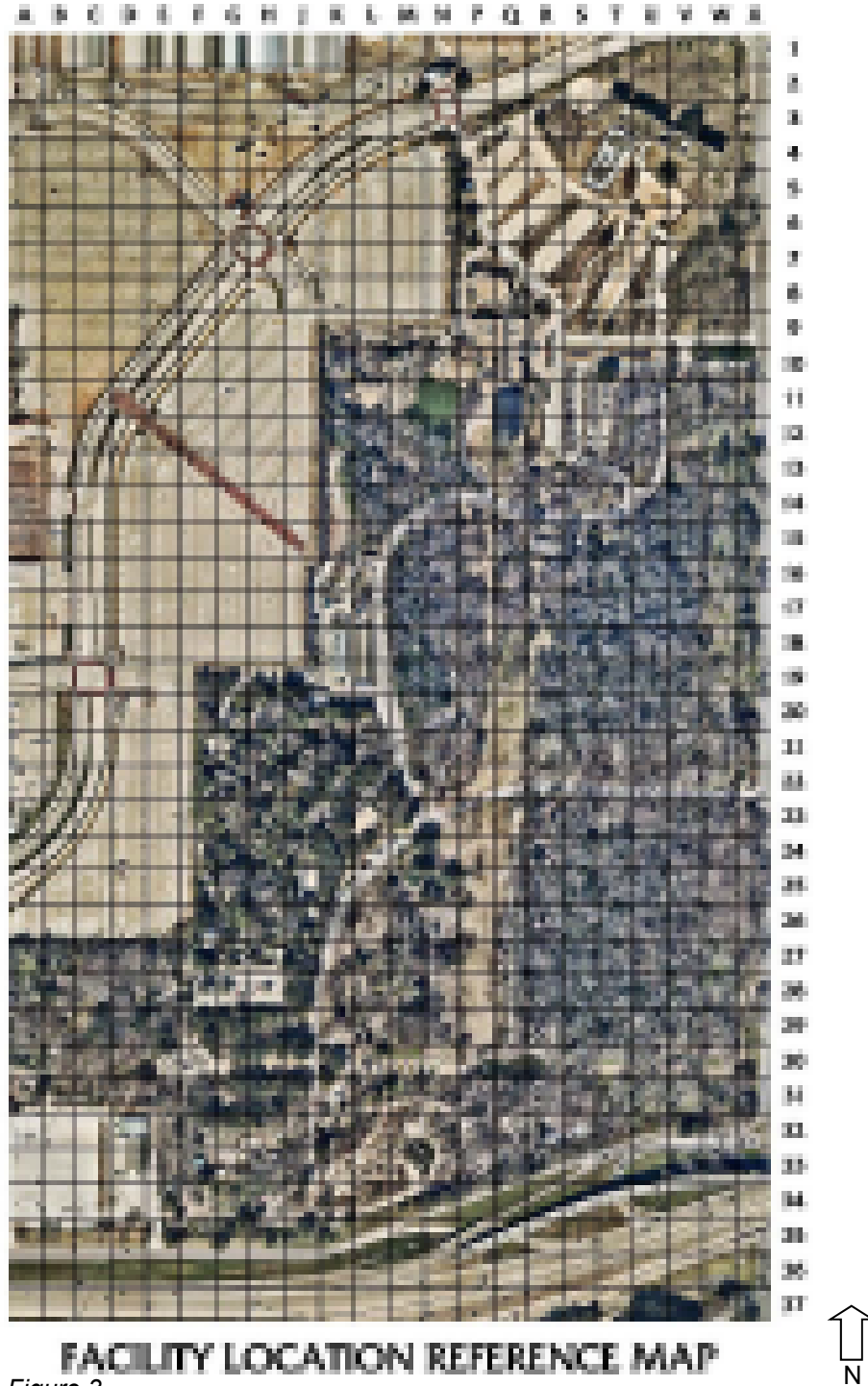


Figure 3

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H. Platting Investigation

The Botanic Garden is approximately 109 acres of land located north of West Freeway (I-30) and west of South University Drive, situated in Thomas White Survey, Abstract No. 1636, City of Fort Worth, Tarrant County, Texas. The northern 30 acres of the Gardens have previously been platted as Lots 2 & 3, Block 1, Botanic Garden (Known now as the remainder of Lots 2 & 3), recorded in Volume 388-214, Page 97, Plat Records, Tarrant County, Texas and the southern 79 acres is a part of those certain tracts of land described by deeds to the City of Fort Worth, recorded in Volume 1671, Page 42 and Volume 410, Page 61, Deed Records, Tarrant County, Texas.

Please see Figure 4 showing the Botanic Garden.



Figure 4

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Zone 1

Key Locations: 1-7, 9N, 9S

FORT WORTH
BOTANIC GARDEN



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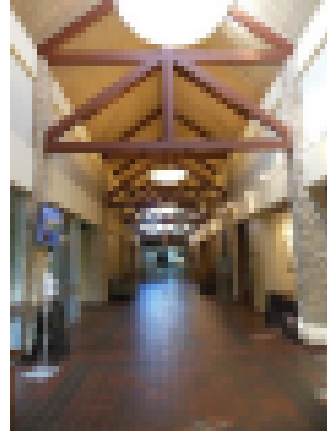
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I. 1 – DEBORAH BEGGS MONCRIEF GARDEN CENTER

A. General Building Information



Building Entrance



Interior Atrium Gallery

ARCHITECTURAL

The approximately 18,800 s.f. Garden Center dedicated in 1986, was designed to replace the original Garden Center, which has now become the Rock Springs Center. The Deborah Beggs Moncrief Garden Center is bound by the Dorothea Leonhardt Lecture Hall to the north, and the Conservatory to the south which are connected by a Lobby spine which frames views of the Margery Leonard Courtyard and its covered colonnade walkway. The North-South Lobby spine is further reinforced with its linear vaulted ceiling with skylights, connecting the administrative office wing to the meeting rooms wing.

The concrete entry canopy is the facility's most recent addition. The quarry tile paving begins underneath the entrance canopy and continues through the entry doors and flows throughout the Lobby Gallery space and beyond at the colonnade walkway surrounding the Margery Leonard Courtyard.

The Deborah Beggs Moncrief Garden Center Meeting Rooms can support 20 to 240 occupants and are equipped with movable partitions which can be divided into six individual meeting spaces, or two large meeting room arrangements. Each meeting room east of the spine is equipped with a pantry as well as its own furniture storage to support the various configurations required. The Meeting Rooms have acoustical lay-in ceilings, terrazzo flooring, and vinyl wall covering on the perimeter walls. Each Pantry support area is equipped with a stainless-steel sink, microwave and refrigerator. The finishes in the Pantry include millwork cabinets with wood facings and plastic laminate countertops, VCT floor, rubber base and continuous wall protection. The kitchen areas are finished with VCT flooring, wood faced millwork and vinyl wall covered walls.

The Meeting Rooms west of the spine are served from a commercial kitchen and prep area, and a large furniture storage room. The Meeting Rooms have acoustical lay-in ceilings that were painted in place, wall to wall terrazzo, and vinyl wall covering on the perimeter walls. The kitchen support areas are served by a corridor with VCT floor, rubber base and continuous wall protection. The commercial kitchen is finished with 2x2 mosaic floor tile, ceramic tile wall tile, wood faced millwork, stainless steel sinks and countertops.

The Administrative Wing has similar finishes with acoustical Lay-in ceilings, wall to wall carpet in the offices and conference room, with mosaic tile flooring in staff restrooms, VCT in break areas, and painted drywall and vinyl wall covering on the walls. The Garden Center is also supported at the south end of the facility with public restroom facilities, a Brides Room, as well as dedicated Mechanical and electrical spaces.

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The exterior envelope consists of a limestone veneer with structural steel columns and metal stud back up. The roof system consists of built up roofing on rigid insulation on metal deck with structural steel joists and utilizes internal roof and overflow drains.

The Deborah Beggs Moncrief Garden Center is served at the rear of the site by an equipment and storage building. The storage building is a concrete panel wall construction with a R Panel roofing with scuppers on steel framing with insulation blankets. The equipment building is supported with two overhead doors to drive equipment in and out, a storage room as well as an office area.

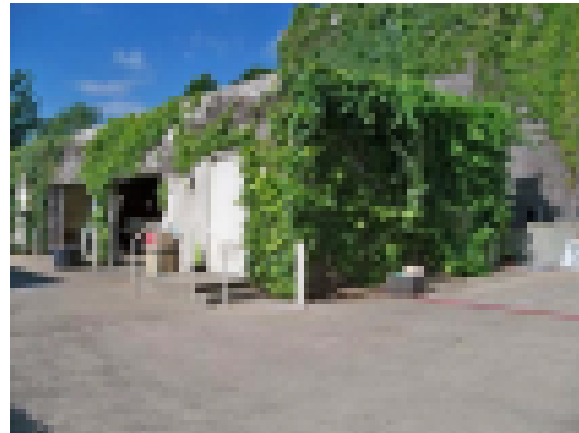
STRUCTURAL

This building, constructed in 1985, is steel framed with metal deck, except for the main corridor, which has exposed timber trusses with wood decking. The foundation is steel framed with concrete slab on form deck and is supported on concrete piers. There is a crawl space beneath the floor framing.

The Entry Canopy is a precast concrete structure that was added at the east entry of the building after the initial building construction drawings were not provided for this structure. There is a Maintenance Building positioned in the restricted parking area located near the northwest corner of the Moncrief Garden Center. This is a concrete tilt wall building with metal building roof structure.



Entry Canopy



Maintenance Building

MECHANICAL / PLUMBING

The facility has twelve gas-fired, constant volume packaged direct expansion rooftop units (RTU) utilizing R-22 refrigerant. RTU-1 is 5 tons and serves Reception, Work Room, and Breakroom. RTU-2 is 3 tons and serves Offices and Conference Room. RTU-3 is 7 1/2 tons and serves Gifts Room and Restrooms. RTU-4 and RTU-5 are 7 1/2 tons and serve Meeting Rooms. RTU-6 is 15 tons and serves Vestibule, Lobby, and Galleries. RTU-7, RTU-8, RTU-9, and RTU-10 are 7 1/2 tons and serve Meeting Rooms. RTU-11 is 5 tons and serves West Gallery. RTU-12 is 10 tons and serves the Kitchen. It appears all rooftop units were installed in 2002, about 15 years ago and have reached their life expectancy. Most of them show normal signs of aging. The facility is managed with a Johnson Control System. There are nine roof mounted down draft exhaust fans serving general exhaust for Restrooms and Meeting rooms. There is one upblast roof mounted exhaust fan serving the Kitchen grease hood.

With the exception of a few instances, the facility plumbing fixtures appear to be in working order and do show some signs of age. The office has a stainless steel sink and under counter electric water heater and Break Room has two wall mount, flush valve water closets and two counter mount lavatories. The main Women's and Men's Restrooms have eight wall mount, flush valve water closets, three urinals, five counter mount lavatories. Lavatory faucets are sensor operated. Floor drains are located in each restroom. Fixtures are all vitreous china. A 30 gallon, gas-fired water heater installed in 2009 is located in the Boiler Room and serves these restrooms. Near the Main Restroom is a single height recessed electric water cooler.

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Each Pantry near the Meeting Room has a stainless steel counter mount sink with an under counter electric water heater. In the North Gallery there is one high/low electric water cooler with a bottle filler.

For the Kitchen and associated Pantry area, there are six counter mount stainless steel sinks and a three compartment sink. The restroom near this area has one wall mount, flush valve water closet and one wall hung lavatory. Near this Restroom is a single height recessed electric water cooler. This area of the facility has one 50 gallon, gas-fired water heater. It was installed in 2012.

ELECTRICAL

The Garden Center has a standard power distribution system. The utility transformer is located in the back of the facility. The service entrance is a 1,600 A, 208/120 V, 3-phase, 4-wire switchboard with fusible switches. The switchboard feeds distribution panels DPA and DPB, panels C and OL, and a transfer switch for panel G. Panel G is under emergency power via a generator located outside the main switchboard room. Distribution panels DPA and DPB feed mechanical equipment. Distribution panel DPB also feeds panels A, B and K. Main switchboard, distribution panels DPA and DPB, panels A and B and transfer switch for panel G are located in the main electrical room at the back of the facility. Panel G is located in the Conservatory. Panels C and OL are located in the south mechanical room. Panel K is located in the kitchen. Panel labels indicate they were built in 1985. The estimated life span of circuit breakers is between 30 and 40 years, depending on environment. The Garden Center's environment is clean and all panels seem to be in good condition without damage.

The emergency generator shows signs of aging and has not been maintained.

The lighting system consists of a combination of fluorescent, incandescent and LED lighting fixtures with switches, occupancy sensors and time clocks. The system has been upgraded over the life of the facility. The facility faces normal maintenance issues with lighting, such as lamps needing replacement. Most of the lighting systems are in good working condition. The service area has fluorescent lighting fixtures that show signs of aging. Lighting system does not comply with the 2015 version of the International Energy Conservation Code. Compliance can be achieved gradually as the building is renovated.

SITE

The Moncrief Garden Center serves as the primary arrival for visitors to the Botanic Garden. In front of it is a vehicular drop off with planted median and stone monument signage. The walkway approach is a covered pedestrian entry paved with unit tile along a slight incline to the building doors, which have custom stone fountains on either side of the walkway. Foundation plantings and gardens surround the building and pedestrian approach.

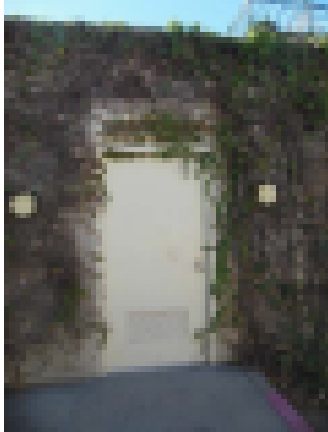
B. Areas of Insufficiency

ARCHITECTURAL

■ Doors and Hardware

Most of the interior doors inside the Garden Center and a few exterior doors have knob type hardware which is no longer compliant with current accessibility codes. It is recommended to switch all existing knob type hardware to lever type hardware.

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Exterior Knob Hardware



Interior Knob Hardware

Exterior door pulls at just over half of the exterior doors have finishes that are beginning to deteriorate and should be replaced. A door at the adjacent maintenance building is in a state of severe disrepair and should be replaced.



Exterior Door Pulls



Damaged Door

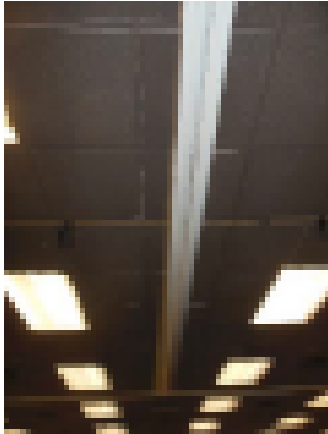
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Knob Hardware	\$34,500
Replace Door Pulls	\$4,600
Replace Door & Hardware	\$1,725
Sub-Total	\$40,825
Contingency	\$8,165
Total Cost	\$48,990

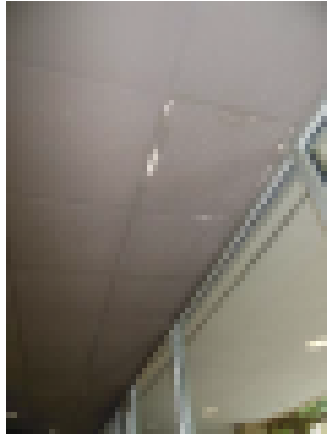
Meeting Room Finishes

All of the meeting rooms inside the Garden Center currently have vinyl wall covering on the walls and some ceiling soffits. This vinyl wall covering is peeling off in many places and at the exterior walls it poses a risk of water entrapment due to the vapor impermeability. It is recommended to take off the vinyl wall covering and utilize a paint finish. The Oak Hall and the hallway adjacent to this room have ceiling tiles that were painted in place. This paint is becoming damaged and moving thus exposing the white tile beneath. It is recommended to replace these tiles with pre-finished thru color tiles that will not lose their color due to damage or movement shifts.

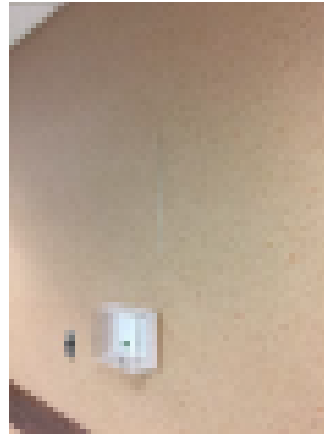
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Damaged Ceiling Tiles

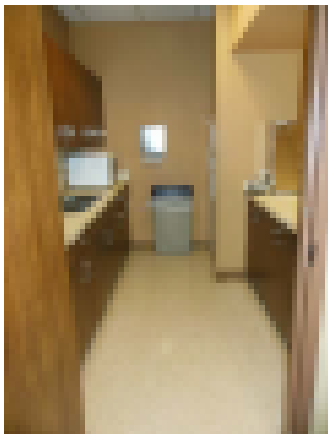


Damaged Ceiling Tiles



Peeling Vinyl Wall Covering

The two small serving areas that are adjacent to the Camellia and Azalea meeting rooms have millwork with finishes that are peeling and chipping away. The counter is too high to meet accessibility standards at both areas and the sink doesn't have the required skirt for knee and toe clearances. It is recommended to replace all of the millwork in these areas with new compliant casework.



Serving Area



Serving Area Countertop Damage

Opinion of Probable Construction Cost for Recommended Remediation Work:

Remove Wallpaper and Paint	\$39,284
Replace Painted Ceilings	\$29,900
Replace Serving Area Casework	\$15,525
Sub-Total	\$84,709
Contingency	\$16,942
Total Cost	\$101,651

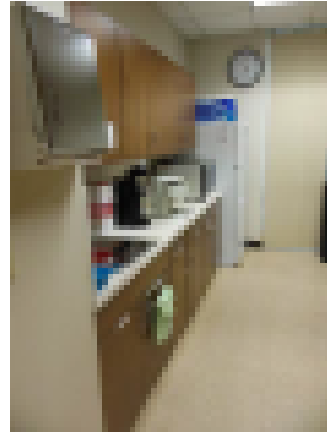
Prep Room, Break Room Millwork & Reception Counters

The cabinet face finish on the millwork in the Prep Room area is beginning to swell and roughen and should be sanded and re-finished. One section of the millwork should be replaced at an accessible height of 34". A skirt for knee and toe clearance should also be included at a sink in this area as none of the millwork in this area is accessible. The stainless-steel counters themselves are in good shape and could be re-used. The millwork in the Employee Breakroom is also too high for TAS compliance. The bottom cabinets should be replaced with an accessible countertop and a skirt should be added at the sink.

Assessment – Fort Worth Botanic Garden

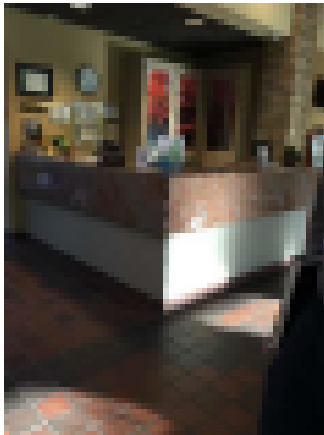


Prep Room Millwork

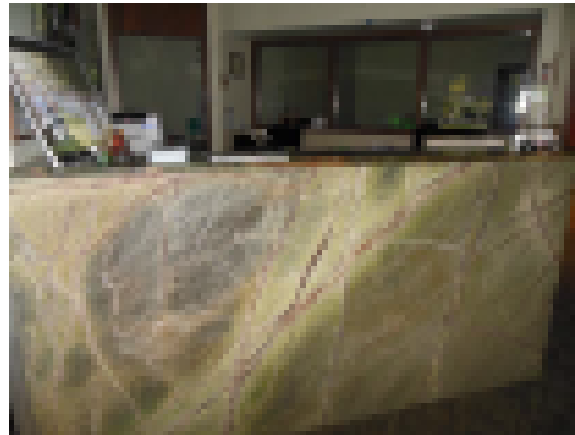


Break Room Millwork

The two reception counters inside the Garden Center (one at the front entry and one at the booking area) are lacking a lower accessible service area and need to be modified to have an area at least 36" long that is 34" high.



Entry Reception Counter



Booking Reception Counter

Opinion of Probable Construction Cost for Recommended Remediation Work:

Refinish Prep Room Cabinets	\$3,450
Replace Cabinets and Add Skirts	\$10,350
Reception Counter Accessibility	\$9,200
Sub-Total	\$23,000
Contingency	\$4,600
Total Cost	\$27,600

d. Exterior Items

The exterior of the facility is in good condition. The clerestory area that runs north/south through the building has a paint finish over galvanized steel that is peeling off. This paint finish should be removed and repainted with a paint more appropriate for galvanized steel at an exterior condition. There are also a few pieces of trim at these soffit areas that are loose and need to be replaced. Many of the flashing conditions at transitions or capping storefront areas are damaged and should be repaired and/or replaced.

Assessment – Fort Worth Botanic Garden

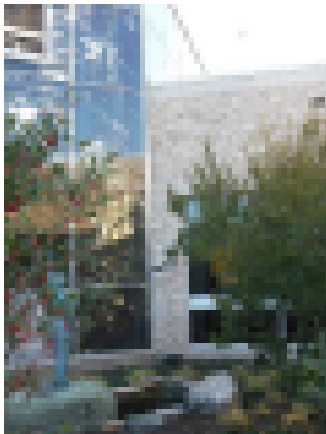


Peeling Clerestory Paint



Flashing Damage

The expansion joints that separate the Garden Center from the Conservatory are in disrepair and should be replaced with new expansion joint filler and backer after removal of any existing jointing. There is a broken skylight at the front entry canopy area that should be replaced.



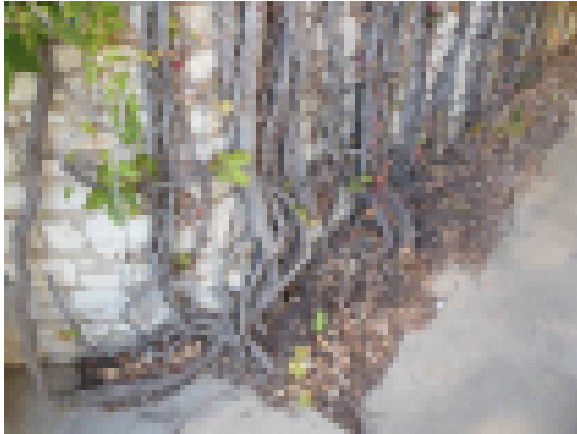
Expansion Joint



Broken Skylight

Vines are crawling up the walls at many areas around the facility. Care should be taken to maintain these vines so that they do not mature and break open mortar joints or crawl over parapets. As a maintenance issue, it is also important to note that these vines constitute displayed plant life and although our recommendation would typically be to remove these vines, we understand the desire to keep intact therefore no price for removal or remediation has been provided.

Assessment – Fort Worth Botanic Garden



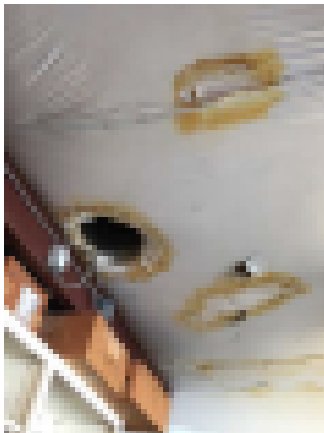
Wall Vines

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair/Refinish Clerestory Trim	\$10,350
Replace Flashings	\$2,300
Expansion Joint Replacement	\$2,588
Skylight Replacement	\$978
Sub-Total	\$16,215
Contingency	\$3,243
Total Cost	\$19,458

Maintenance Building Roof

The maintenance building behind the Garden Center is in need of repair. The metal 'R' panel roof leaks and has damaged much of the exposed roof insulation on the inside. The roof has been damaged by multiple hail events and age. It is unknown when the last time the roof was replaced on this facility. This roof and the insulation should all be replaced. Care should also be taken that the vines growing on the walls of this facility do not overtake the parapet as this could exacerbate any roof leak issues.



Damaged Insulation



Damaged Roof and Parapet Vines

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Opinion of Probable Construction Cost for Recommended Remediation Work:

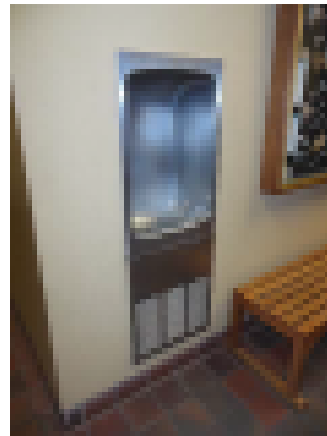
Replace Roof & Insulation		\$20,700
	Sub-Total	\$20,700
	Contingency	\$4,140
	Total Cost	\$24,840

■ Miscellaneous Accessibility Items

One set of restrooms inside the Garden Center next to the bride’s room are close to accessible compliance. All of the other restrooms in the facility need to point patrons to these accessible restrooms with signage. These nearly compliant restrooms require pipe insulation protection on the exposed pipes under the sink. Most of the drinking fountains in the facility are not accessible and do not meet the height or knee/toe clearance requirements. At least 50% of the fountains in the facility need to be compliant. It is recommended to replace the fountains outside of the accessible restrooms with compliant fixtures in order to meet this requirement.



Missing Pipe Insulation



Non-Compliant Drinking Fountain

There are other issues with accessibility in this facility that are addressed in other sections of this report respective to the individual item or area.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Pipe Insulation		\$345
Restroom Signage		\$805
Drinking Fountain Replacement		\$3,450
	Sub-Total	\$4,600
	Contingency	\$920
	Total Cost	\$5,520

STRUCTURAL

■ Entry Canopy

The two cantilevered concrete beams at the east end of the canopy have significant cracking near the top of the beams where they pass over the easternmost columns. The cracking suggests that either the top reinforcement is inadequate for actual loads or that the structure was over-loaded at some point in time. We understand that this condition was previously investigated and recommendations made by Frank W. Neal & Associates in October of 2014, due to concerns regarding an 800 pound hanging basket that had been hung from the end of the canopy. Further, we understand that the Botanic Garden staff subsequently refrained from hanging loads from the end of the canopy but that the recommended repairs put forward from this prior investigation were never implemented. However, in comparing the current distress to that

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shown in Neal & Associates 2014 drawings, it does not appear that the cracking has progressed, which supports the theory that the 800 pound hanging basket caused an overstress condition which resulted in the cracking. It is recommended to perform the following repair procedure:

1. Engage a Structural Engineer to observe repairs and make additional recommendations as appropriate for conditions encountered.
2. Shore end of cantilevered beams.
3. Remove any loose or delaminated concrete, being careful not to damage reinforcing steel.
4. If any reinforcing steel is exposed after removal of delaminated concrete, chip around the reinforcing bars or tendons leaving a minimum clear area of ¾" around the exposed reinforcing.
5. Call for the Engineer to observe and measure exposed reinforcing steel to determine if significant loss of section has occurred. And if so, to recommend procedures for strengthening beam.
6. Once any additional steel or strengthening has been addressed, coat the exposed reinforcing steel and surface of concrete to be patched with Sika Armetec 110 (bonding agent and steel protectant).
7. Patch concrete with SikaTop 123 Plus by trowel application (Concrete repair mortar with extra protection for steel reinforcement).
8. Coat all of the concrete beams with Sika FerroGard 903 (a penetrating corrosion inhibitor to help protect reinforcing steel that is too close to the concrete surface).
9. Paint all beams to match existing (this will be required because the patching mortar will not match the existing beams).

The cost below assumes that strengthening the beam is not required.



Cracking at Concrete Beams



Cracking at Concrete Beams

Opinion of Probable Construction Cost for Recommended Remediation Work:

Engineer Survey	\$2,000.00
Repair Work	\$4,500.00
Sub-Total	\$6,500.00
Contingency	\$1,300.00
Total Cost	\$7,800.00

MECHANICAL / PLUMBING

h HVAC Equipment Replacement

It is recommended to replace all rooftop units and general exhaust fans. Rooftop units and exhaust fans appear to be 15 years old had have reached their life expectancies. Several units have severe condenser coil damage. The RTU-6 condenser coil is directly in-line with the adjacent pitched roof and this is probably a cause for much of the unit's condenser coil damage. It is recommended to paint natural gas piping, repair natural gas and condensate piping supports, and repair sagging condensate piping. There are numerous locations on the roof with pipe supports missing and condensate pipe sagging. Additionally, there is not a

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dirt leg installed on the natural gas piping prior to connection to each RTU. There are several locations throughout the facility where ceiling mounted supply air grilles are rusting, peeling paint and should be replaced.



RTU Condenser Coil Damage



RTU Adjacent to Pitched Roof



Exhaust Fan Damage



Rusted Natural Gas Piping on Roof

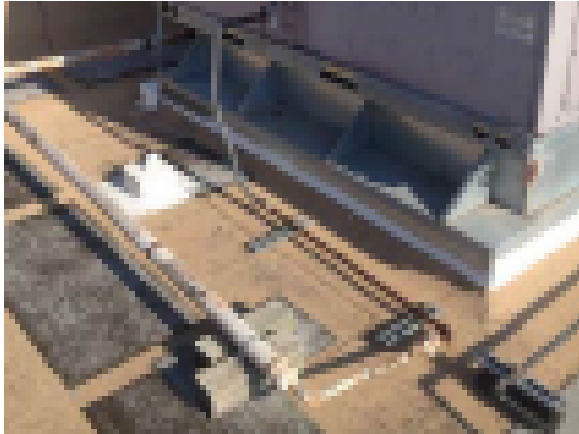


Sagging Condensate Piping



Misaligned Natural Gas Pipe Support

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No Natural Gas Pipe Dirt Leg



Rust on Ceiling Air Device

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replacement of 12 RTU's, General Exhaust Fans, Controls	\$834,000
Repair Condensate and Gas Piping on Roof, Add Dirt Legs to RTU's	\$50,000
Replace Air Devices	\$2,000
Sub-Total	\$886,000
Contingency	\$177,200.00
Total Cost	\$1,063,200.00

I. Kitchen Exhaust Fan Replacement

It is recommended to replace the kitchen exhaust fan since installation does not meet NFPA requirements with exhaust fan discharge distance above the roof and vented curb.



Kitchen Exhaust Fan Does Not Meet NFPA

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Kitchen Exhaust Fan	\$13,500
Sub-Total	\$13,500
Contingency	\$2,700
Total Cost	\$16,200

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↓ Plumbing upgrades and repairs

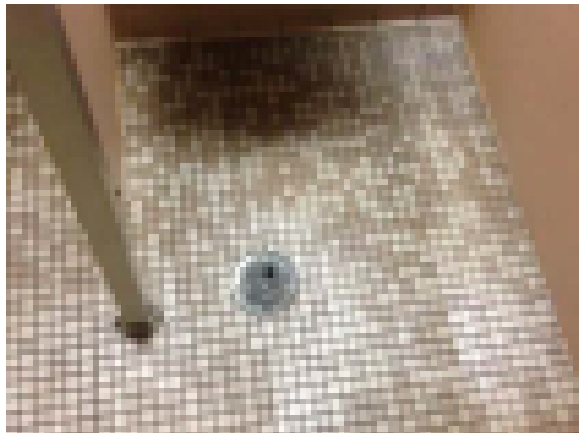
There are several instances in the facility where plumbing fixtures are not operating and faucets are dripping. The pantry area near the Meeting Room has a dripping faucet. Some wall mount lavatories need to be re-caulked and re-hung. Certain floor drains in the restrooms need to be replaced due to damaged covers. It is recommended to repair any damaged fixtures. Current installation does not provide any thermostatic mixing valves for the domestic hot water to provide tepid water to lavatories. It is recommended to install thermostatic valves for each domestic hot water system. These valves can either be point of use or a group type of mixing valve for the Main Restrooms.



Lavatory Caulk



Non Operational Lavatory



Damaged Floor Drain Cover

Opinion of Probable Construction Cost for Recommended Remediation Work:

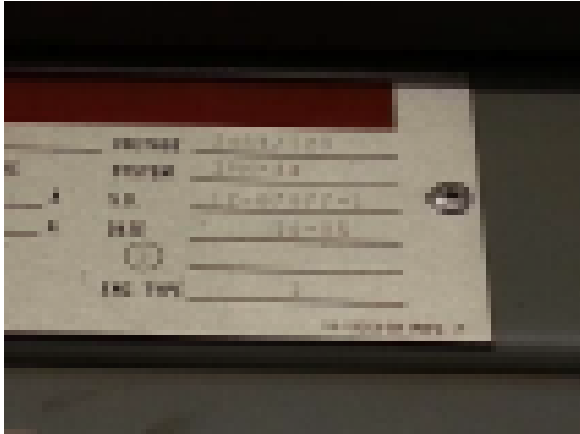
Install Thermostatic Mixing Valves	\$15,500
Repair Plumbing Fixtures and Faucets	\$17,000
Sub-Total	\$32,500
Contingency	\$6,500
Total Cost	\$39,000

ELECTRICAL

⚡ Electrical Panel Replacement

Original panelboards were manufactured in 1985. They are approaching the end of life and the recommendation is to replace them within the next 10 years.

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Manufacturing Date of Equipment

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Panels A, B, C, OL, DPA, and DPB	\$40,000.00
Sub-Total	\$40,000.00
Contingency	\$8,000.00
Total Cost	\$48,000.00

i. Emergency Generator

Emergency generator has not been maintained and with reliability unknown, requires replacement. Replace emergency generator and transfer switch.



Generator in Need of Replacement

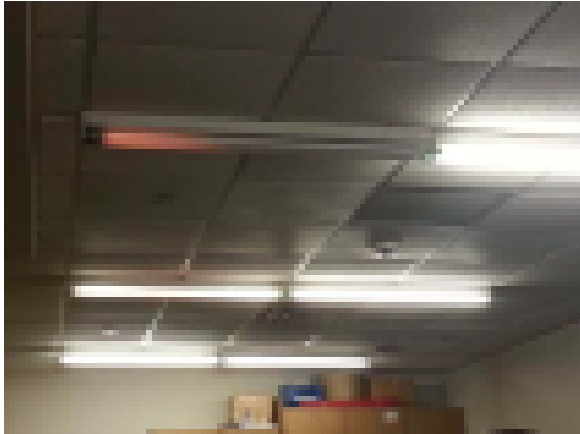
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Emergency Generator & Transfer Switch	\$25,000.00
Sub-Total	\$25,000.00
Contingency	\$5,000.00
Total Cost	\$30,000.00

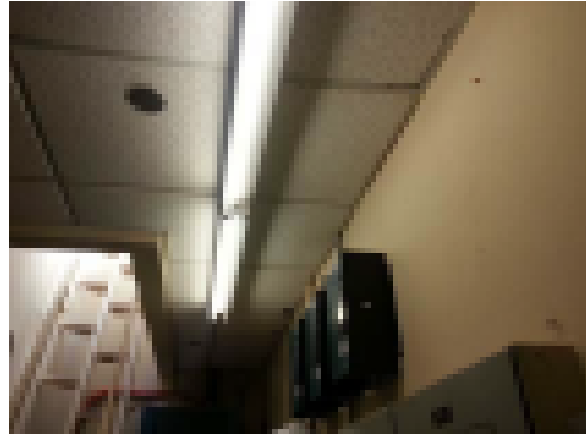
m. Lighting System Maintenance

The lighting system requires minor repairs. Replace burnt out lamps, repair malfunctioning fixtures and replace incandescent lamps with LED light bulbs.

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Lighting System in Need of Maintenance



Lighting System in Need of Maintenance

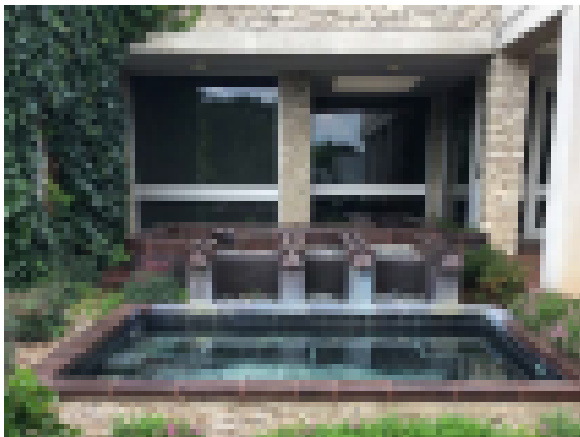
Opinion of Probable Construction Cost for Recommended Remediation Work:

Lighting System Maintenance		\$4,000.00
	Sub-Total	\$4,000.00
	Contingency	\$800.00
	Total Cost	\$4,800.00

SITE

■ Fountain Repairs

Each side of the Garden Center entrance walk includes a runnel type fountain feature with custom tile and stone work that weir into a lower basin. This fountain leaks and the electrical equipment is buried making it difficult to service. The leak in this fountain will need to be identified and repaired and the electrical equipment relocated so that the equipment is more serviceable and the junction boxes are out of view of the visitors.



Entrance Fountain (Left Side)



Entrance Fountain (Right Side)

Opinion of Probable Construction Cost for Recommended Remediation Work:

Runnel Water Feature Repairs		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

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II. 2 – MARGERY LEONARD COURTYARD

A. General Building Information



Interior Courtyard



Interior Courtyard

ARCHITECTURAL

The Margery Leonard Courtyard is framed by the Moncrief Garden Center on three sides, to the north, east and south. Along these three sides is a trellis covered walkway (last replaced in 2009), which shades the full height glazing of the lobby and associated building wings of the Garden Center.

The Courtyard paving features a grid pattern of exposed aggregate concrete paving with flagstone tile banding. The grid pattern is offset with a layer of arbitrarily shaped raised planters. The raised planters are composed of low seat walls with a stucco wall finish and a flagstone cap. The Courtyard is also accentuated by a round water feature at the northeast corner.

The Margery Leonard Courtyard is the northern point of the Botanic Garden north-south walking path with the south termination point being at the Lower Rose Garden (30). The courtyard is utilized for a variety of outdoor events including meetings, group gatherings, weddings and receptions.

STRUCTURAL

This courtyard contains stucco faced CMU planter walls with stone caps and wood framed pergolas.

MECHANICAL / PLUMBING

There are no mechanical or plumbing systems to be reviewed at this area.

ELECTRICAL

There are no electrical systems to be reviewed at this area.

SITE

The Margery Leonard Courtyard is a formal space where visitors may stroll or enjoy events. At grade with the adjacent Moncrief garden center building, the courtyard features decorative paving of exposed aggregate concrete with flagstone banding, raised planters / seat walls of stucco with stone cap, and a water feature.

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B. Areas of Insufficiency

ARCHITECTURAL

The insufficiencies consist of settling paving in the courtyard caused by water infiltration within the paving joints, spalling planter facings, as well as loose flagstone wall caps. These are covered in more detail along with repair costs in the Site section of this report.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not applicable.

ELECTRICAL

Not applicable.

SITE

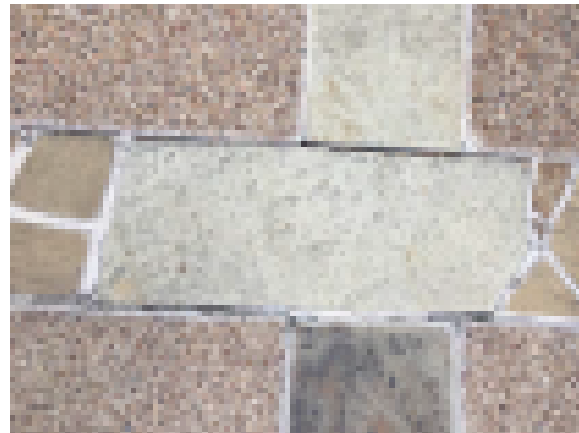
■ Drainage and Pavement repairs

The low planter walls in the plaza have a stone cap and a stucco veneer. In several locations, the stucco is cracking and / or spalling. The concrete pavement around the raised planters in the courtyard has settled. This shift in pavement prevents proper drainage and has caused cracking of the mortar joints in flagstone paving, resulting in uneven walking surfaces, puddling, and rapid deterioration.

The courtyard paving needs to be removed, and new exposed aggregate concrete pavement with flagstone bands should be installed with appropriate slopes and deck drains that are connected to the adjacent storm drains in the Fuller Garden. The damaged wall areas should be removed / replaced, then the entire wall surface should be prepped, primed and painted.



Stucco Veneer in Need of Repair



Flagstone Bands with Damaged Mortar Joints

Opinion of Probable Construction Cost for Recommended Remediation Work

Pavement Repair	\$30,000
Sub-surface drainage system	\$15,000
Stucco Repair / Refinish of walls	\$7,500
Sub-Total	\$52,500
Contingency	\$10,500
Total Cost	\$63,000

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b. Fountain repair

The existing fountain is a circular concrete basin with tile on the side vertical walls and a smaller stone bowl with one single display nozzle. The plumbing and electrical equipment are visible inside the lower basin. Fountain repairs should include replacement of the bubbler fountain nozzle and installation of basin uplighting. The plumbing should be rerouted inside the basin walls, and the electrical junction boxes should be relocated to a more discrete location in an adjacent planting area. At the completion of all the improvements, the basin should be cleaned, patched and resurfaced.



Water Feature in Disrepair

Opinion of Probable Construction Cost for Recommended Remediation Work:

Fountain Repair		\$16,000
	Sub-Total	\$16,000
	Contingency	\$3,200
	Total Cost	\$19,200

c. Irrigation Upgrades

The courtyard system should be upgraded with a new irrigation system that is installed to meet current City of Fort Worth irrigation design standards. The irrigation system in this area should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system. Costs associated with the water conserving infrastructure and central control system are described elsewhere in this zone report.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Irrigation Upgrades		\$ 3,500
	Sub-Total	\$ 3,500
	Contingency	\$700
	Total Cost	\$4,200

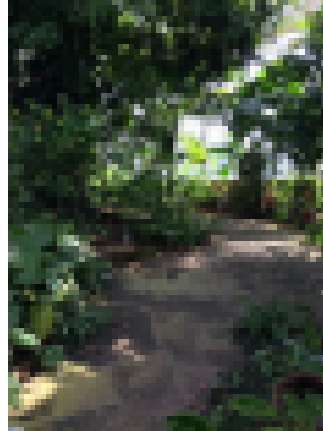
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III. 3 - CONSERVATORY

A. General Building Information



Conservatory Exterior



Conservatory Interior

ARCHITECTURAL

Of approximately 10,120 square feet, the Conservatory is located on the south end of the Moncrief Garden Center and accessed from its main lobby. The conservatory entrance consists of a vestibule with separate entrance and exit doorways, along with an air curtain unit mounted on the headwall within the conservatory space. Visitors meander through the rainforest environment along a flagstone path observing the plant life exhibits and water features. There are various changes in elevation served by ramps and bridges as one crosses over the water features and displays. These ramps and bridges are accompanied with a steel and brass handrail system for visitor safety. It was identified that the flagstone paving must be power-washed 1-2 times per week to remove the slime build-up on walking surfaces due to its environment. A main attraction is the concrete and stone waterfall which empties itself into a glass half wall tank allowing visitors to peer into the underwater rainforest environment.

A low rock wall is placed along the flagstone path edging to retain the plant life within the exhibit. The grade of the exhibit gradually slopes up towards the perimeter wall and uses the concrete stem wall as its rear retaining wall. The flagstone pathway curves through the Conservatory and returns to the entrance.

At the time of our observations, the Conservatory was closed to the public due to falling glass panels within the greenhouse structure. Over time, individual glass panels have been replaced due to storm damage. Upon repairing, the correct hardware and proper cleaning/reinstallation of the zipper gasket was not performed correctly causing the glass panels to become loose and slide out of its frame.

The pier supported concrete stem wall (grade beam) as well as the structural frame appear to be in good condition with no signs of movement or cracking

GREENHOUSE

The Conservatory primarily consists of aluminum structural trusses and purlins, an aluminum glazing system with tinted 1/4" laminated glass. The primary structure has a truss spacing of +/- 14'-6" along the east and west sidewalls with truss members at each chamfered corner edge for the north and south outside faces. Other primary structure elements include the purlins, hip rafters, tees and angles.

The Conservatory has a three-level aluminum finned tube hot water heating system that surrounds the perimeter. The hot water is supplied by a boiler system within the Botanic Garden Center building. There are also Modine unit heaters and Bahnsen humidifiers to assist the finned tube system. Kool Cel evaporative pad cooling systems are in place along an entire sidewall and two chamfer ends, accompanied

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by a sidewall scissor arm ventilation system. On the opposing sides from the Kool Cel pads are exhaust fans with shutters. Multiple exhaust fans, direct drive, and supply fans are located throughout the space. There is also a double ridge vent system allowing for passive ventilation located on the upper most ridge of the Conservatory space.

It appears all of the automated greenhouse equipment is controlled by Link 4 and existing irrigation controls are Rain Bird.

STRUCTURAL

Structural Items are included in the Greenhouse consultant's assessment.

MECHANICAL / PLUMBING

The Botanic Garden Conservatory is heated by two water tube boilers installed about 18 years ago. Each boiler is rated at 1,825,000 Btu/hr input and 1,496,000 Btu/hr output. One of the boilers started a fire in 2014. There have been issues of meeting Conservatory (60°F) temperature requirements when outdoor temperatures are less than 40°F. Boiler and main circulating pumps have had seals replaced numerous times. There has been issues of getting parts for boiler repairs. The two boilers and associated in-line circulating pumps provide heating water to eight (8) hot water unit heaters in the Conservatory. Hot water unit heaters show signs of rust damage; and as such some have been recently replaced.

There are eighteen (18) box type exhaust ventilation fans with exterior wall shutters. Six of these fans have had motor replacements in 2016. The control system for these ventilation fans was recently replaced in 2016 with a new control system due to the detrimental effects of high humidity on the original control system. To deal with the humidity issues, a 3/4 ton ductless mini-split air conditioning system was installed at the same time.

There are two (2) air curtains serving the north two doors. These air curtains show signs of rust damage. There is an existing mister system comprised of high pressure piping and water emitters utilized for Conservatory humidity control. The system is about 15 years old. The system that serves the north and west parts of the facility is operational, but the south and east parts are not operational.

There is a reverse osmosis system installed about 10 years ago along with a 250 gallon tank and another 600 gallon tank. The system circulating pump's seal was recently replaced due to leaking. Based on staff input, the reverse osmosis capacity is sufficient.

There are several "cooling water walls" around the interior perimeter that staff indicates are working. Water plumbing piping to them sags in many areas due to lack of full support.

ELECTRICAL

The Botanic Garden Conservatory is powered through a series of panelboards installed inside and outside the Conservatory. These panels are part of the Garden Center's distribution system. The panels inside the Conservatory are located in a separate area where they are protected from water and plants. Power distribution in the Botanic Garden Conservatory consists of (1) two-section panel (G) and (2) control panels (CP-1 and CP-2) located inside the Conservatory, but protected from water and plants. Additional power is provided from the main building by panel C and other panels in the Garden Center.

Conservatory power and control panels look in good condition and no apparent code issues were found. Facilities personnel reported that breakers associated with the fountains have tripped in the past due to pumps getting clogged. Lighting fixtures in the conservatory are mostly mounted to structure and show signs of corrosion. Raceways in the conservatory are two types: metallic and PVC. Metallic raceways show signs of corrosion. PVC raceways show deterioration due to heat and sun light. Additionally, some PVC raceways have lost supports and have sagged. No expansion joints were found installed for PVC raceways.

An extension cord was found to provide power to some water amenities. Some receptacles and their covers were found in good condition. Some receptacles show signs of failure.

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SITE

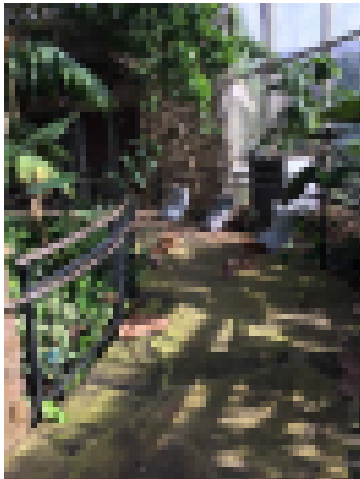
Entry to the Conservatory is controlled through the south end of the Moncrief Garden Center building. Garden plantings and open grass lawn are on the east and south sides of the building. A small paved parking lot that also accommodates some loading and deliveries is on the west side of the building.

B. Areas of Insufficiency

ARCHITECTURAL

■ Miscellaneous Accessibility Items

The running slope and cross-slope of the flagstone ramp just inside the Conservatory entrance are outside of TAS limitations. In addition, elevational variations within the flagstone paving and its setting mortar are a potential trip hazard. It is recommended that the 25' flagstone ramp be reconstructed to meet TAS guidelines for running slope and cross slope. It is also recommended that the ramp hand rail be replaced entirely due to rust and corrosion being beyond repair. It is recommended to replace the entire railing system in the facility with either galvanized or stainless steel but to reuse the brass handrail.



Flagstone Ramp



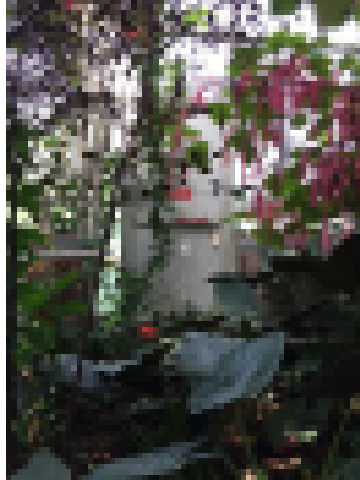
Handrails & Guardrails

The secondary emergency exit in the southeast corner is non-accessible as one must travel into the sloped planting exhibit with a 2' grade difference between the sidewalk paving inside and the raised threshold of the exit door. There is no exit sign over the door, but a sign is located on the door face and crash bar is installed as required for exiting. A stair should be built with handrails to access this door and a new exit sign should be placed above the door. A landing with a step should be placed at the exterior of this door.

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Emergency Exit (Exterior)



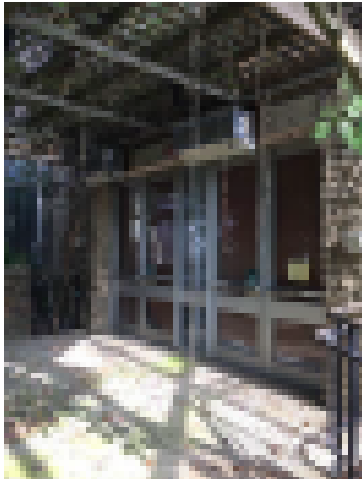
Emergency Exit (Interior)

Opinion of Probable Construction Cost for Recommended Remediation Work:

Reconstruct Flagstone Ramp	\$20,125
Replace Handrails and Guardrails	\$22,770
Create Path to Secondary Exit	\$11,500
Door	
Sub-Total	\$54,395
Contingency	\$10,879
Total Cost	\$65,274

Entry Canopy

It is recommended that the trellis canopy mounted directly above the vestibule doors be removed. This wood trellis has issues with rotting wood and was not intended to support maintenance personnel when pruning the wall area above the trellis. A new wood canopy should be installed and designed to support maintenance personnel with safe access. This canopy should also incorporate light fixtures designed for the corrosive environment.



Entry Canopy

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Opinion of Probable Construction Cost for Recommended Remediation Work:

New Canopy		\$10,350
	Sub-Total	\$10,350
	Contingency	\$2,070
	Total Cost	\$12,420

GREENHOUSE

▣ Glazing System

It is recommended that the existing glazing system (including framing members) be replaced. The glazing bar spacing shall be no more than 24 3/4" centers with new aluminum glazing bars and bar caps. It is recommended to install 1/4" laminated glass with tinted inner layer for roof & 1/8" lapped tempered glass for sidewalls.



Roof Glass Slippage and Failing Glazing



Fallen Glass

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Glazing & Framing System		\$1,294,850
	Sub-Total	\$1,294,850
	Contingency	\$258,970
	Total Cost	\$1,553,820

STRUCTURAL

Structural Items are included in the Greenhouse consultant's assessment above.

MECHANICAL / PLUMBING

▣ Boiler and unit heater Replacement

It is recommended to replace boilers and eight unit heaters. The boilers are 18 years old and associated with a fire several years ago. It is also recommended to upsize boilers to maintain desired temperature within the Conservatory since there are issues with maintaining temperature in winter time operation.

Assessment – Fort Worth Botanic Garden



Boilers to be Replaced



Hot Water Unit Heater to be Replaced

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Boilers and Unit Heaters		\$279,000.00
	Sub-Total	\$279,000.00
	Contingency	\$55,800.00
	Total Cost	\$334,800.00

■ Replacement of general ventilation fans and air curtains.

It is recommended to replace the eighteen general ventilation box fans. There have been many issues with motor replacements for these fans. Since these units are mounted to and connected to the Conservatory envelope that is recommended to be replaced, it would make sense to replace these at the same time. It is recommended to replace the two air curtains since they are rusting.



Box Ventilation Fan



Rusted Air Curtain Over Doors

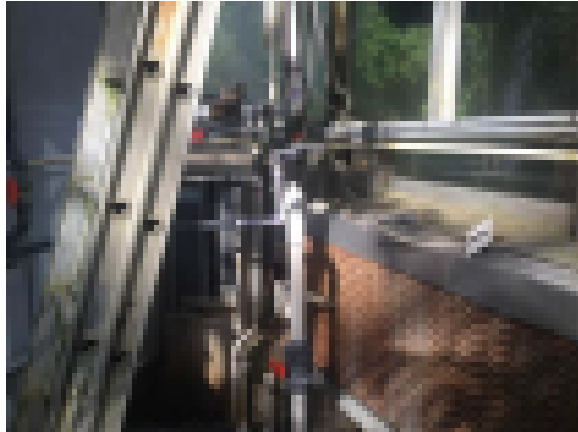
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Ventilation Fans		\$114,000.00
Replace Air Curtains		\$13,000.00
	Sub-Total	\$127,000.00
	Contingency	\$25,400.00
	Total Cost	\$152,400.00

Assessment – Fort Worth Botanic Garden

f. Replacement of mister system, repair underground water leaks, repair above ground piping, and replace water feature pump.

It is recommended to replace the mister system since the existing system has become an issue to repair and find parts. Numerous emitter heads need to be replaced along with high pressure piping. It is recommended to repair the underground water leaks or replace the piping, including repairing leaks in the above ground shut-off valves. The underground domestic water and reverse osmosis piping has leaks, although exact locations are unknown. Domestic water and reverse osmosis is configured in a switch-over valve arrangement. One of these valves is leaking. It is recommended to replace the water feature pump with a grinder pump in order to minimize the clogging issues that have occurred.



Leaking Valves



Set of Leaking Valves



Sagging PVC Water Pipes

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Mister System	\$30,000
Repair Underground Leaks and valves	\$20,000
Replace Water Feature Pump	\$20,000
Sub-Total	\$70,000
Contingency	\$14,000
Total Cost	\$84,000

Assessment – Fort Worth Botanic Garden

ELECTRICAL

g. Lighting Fixture Replacement

It is recommended to replace lighting fixtures in the Conservatory entrance and other locations with lighting fixtures suitable for the high humidity, high corrosion Conservatory environment.



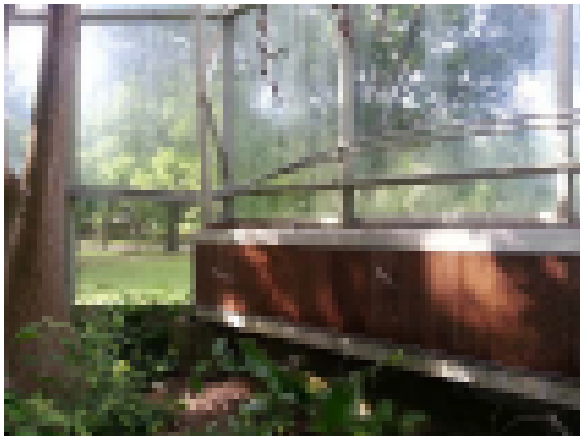
Lighting Fixture to be Replaced

Opinion of Probable Construction Cost for Recommended Remediation Work:

Lighting Fixture Replacement		\$5,000
	Sub-Total	\$5,000
	Contingency	\$1,000
	Total Cost	\$6,000

h. Raceway Replacement

Replace corroded raceways and associated conductors inside the Conservatory with raceways suitable for the high humidity, high corrosion environment. Existing raceways are supported insufficiently. It is recommended to support the raceways per National Electric Code and secure firmly to structure.



Unsupported Raceways



Corroded Devices and Raceways

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Raceways and Associated Conductors	\$8,000
Sub-Total	\$8,000
Contingency	\$1,600
Total Cost	\$9,600

I. Receptacle Replacement

It is recommended to replace damaged receptacles throughout the Conservatory.



Damaged Receptacle

Opinion of Probable Construction Cost for Recommended Remediation Work:

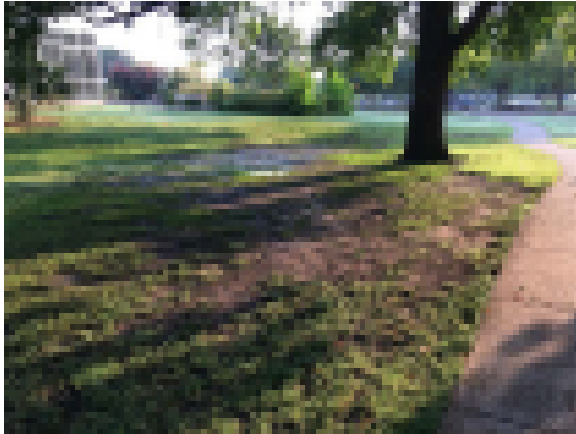
Replace Damaged Receptacles	\$500
Sub-Total	\$500
Contingency	\$100
Total Cost	\$600

SITE

↓ Drainage Repairs

The grass lawn area between the visitor parking lot and conservatory building does not drain adequately. Current drainage system appears to be undersized and should be upgraded to reduce ponding in grass areas.

Assessment – Fort Worth Botanic Garden



Inadequate Drainage

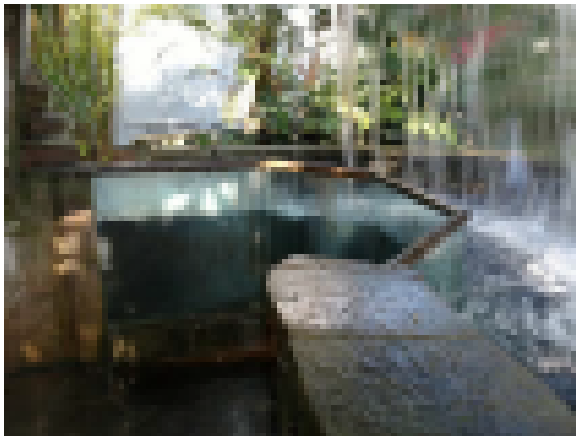
Opinion of Probable Construction Cost for Recommended Remediation Work:

Drainage Repairs		\$4,500
Sub-Total		\$4,500
Contingency		\$900
Total Cost		\$5,400

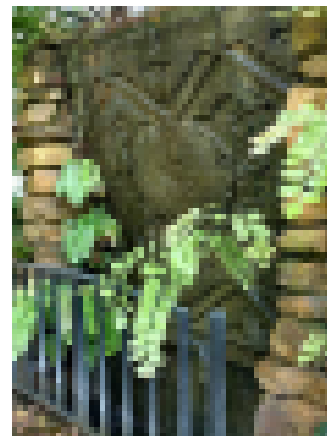
INTERIOR FOUNTAINS

Fountain Repairs

Initial observations of the waterfall feature include severe calcium deposits on the glass. The weir edge where the water falls from the top basin to the bottom basin needs cleaning, possible repairs, and/or potential replacement. The fill line has an issue that needs to be further diagnosed, the current floats could be updated with electronic probes, and water is collecting on the ground.



Waterfall Feature



Decorative Stone Wall

The decorative stone wall on the back of the waterfall feature is starting to fall/lean, and water is collecting on the surrounding floor. Whether the water is coming from the stonework or splash from the water weir into the lower basin could not be determined. This leaning stone wall is cause for concern, as it could present danger to patrons/employees and lead to further damage to the feature itself. It is recommended that a further structural study be performed on this wall and make a determination for resolution.

The water supply comes from a small lake/pond that fills the water feature. When the lake/pond water level drops in drought conditions, a strong sulfur smell is present. The source of this smell is at a molecular level

Assessment – Fort Worth Botanic Garden

in the water source, and our team is not aware of any equipment that could help to reduce this symptom. A secondary water source may be needed (e.g., City of Fort Worth potable water) as an alternative.

The glass has heavy calcium deposits, and it will need consistent cleaning to remove and reduce calcium deposits. Current maintenance does not appear to be enough. Also, the debris load in the feature is excessive. This debris load is not only an eyesore to visitors, but it can also lead to equipment failure.

The overflow pipes currently have no caps. Installation of copper domes on top of the piping is recommended to reduce large debris from entering the overflow and to hide the suction pipe from view. A deep cleaning of all features is also recommended and will provide fountain technicians an opportunity to inspect for structural and/or waterproofing issues in each fountain.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Conservatory Fountain Repairs		\$35,000
	Sub-Total	\$35,000
	Contingency	\$7,000
	Total Cost	\$42,000

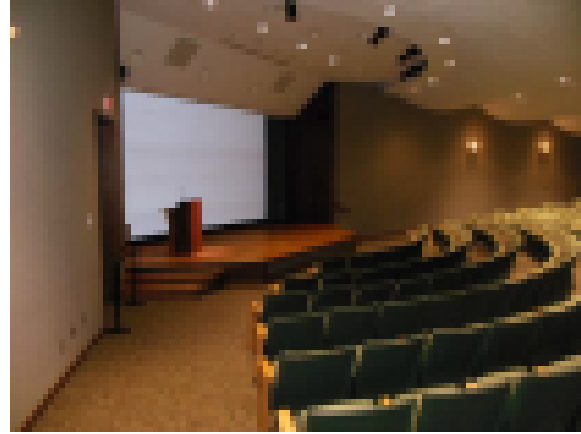
Assessment – Fort Worth Botanic Garden

IV. 4 – DORTHEA LEONHARDT LECTURE HALL

A. General Building Information



Leonhardt Lecture Hall Exterior



Leonhardt Lecture Hall Interior

ARCHITECTURAL

Located north of the Deborah Beggs Moncrief Garden Center, the approximately 8,000 s.f. Dorthea Leonhardt Lecture Hall offers a seating capacity of 241 for lectures, recitals, and film presentations. The lecture hall space has a sloped floor for sight lines, cushioned chairs, carpet flooring, and a scalloped plaster ceiling on metal lath. There is a control room for lighting and sound located at the rear of the lecture hall with a glass window for visibility to the raised platform wood stage.

The Lecture Hall lobby allows beautiful views to the exterior garden spaces; not only at the main building entry, but also to the adjacent George Beggs, Jr. Garden. The lobby and adjacent garden are used for pre-function gathering spaces and offer an excellent space for breaks and receptions.

The high lobby ceiling of 12x12 acoustical ceiling tile flows throughout the space and is accented with a skylight centered on the main entry. Below the skylight is a large planter which is open through the floor slab. Each lobby entrance is protected with a stone floor walk off area, then blends with the carpet that flows throughout the space and lecture hall.

The Link Atrium space offers its views of the gardens through its east and west storefront glazing. The ceiling inside the Link is a tongue and groove wood deck with a whitewashed finish on the bottom side of 6" metal stud joists. The roof system consists of faux slate concrete tiles to match the existing Garden Center along with built up troughs and internal roof / overflow drains on each side of the roof curb.

The exterior envelope consists of a 2" cut stone veneer with structural steel columns and metal stud back up. The roof system consists of built up roofing on rigid insulation on metal deck and steel joists and utilizes internal roof and overflow drains.

Other support spaces include coat check, production room, restrooms, workroom, and green room along with mechanical / electrical and janitorial spaces.

STRUCTURAL

This circa 1988 building has a steel framed superstructure. The floor framing is a concrete structural slab system supported on grade beams and concrete piers.

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

The facility has constant flow chilled water system with electric duct heaters. There is a 70 ton air cooled chiller that was installed in 2002 that is approaching its life expectancy. There are four constant volume, chilled water air handling units (AHU) located within the Mechanical room, including single, end suction chilled water pump and hydronic accessories such as pot filler and expansion tank. AHU-1 (8,200 CFM) serves Lecture Room and Platform. Supply duct for this unit is routed overhead and return air duct routed under floor. AHU-2 (6,100 CFM) serves the Foyer. Supply duct for this unit is routed overhead and return air duct routed under floor. AHU-3 (2,900 CFM) serves the Work Room and Restrooms. Both the supply and return air ducts for this unit are routed overhead. AHU-4 (3,000 CFM) serves the Link. Both the supply and return air ducts for this unit are routed under floor. AHU's do not operate in economizer mode and have minimal outdoor air. All equipment in Mechanical room appears to be original to the facility and is 30 years old. The facility is managed with a Johnson Control System. The Mechanical room is very crowded and difficult to access AHU's and other chilled water equipment. HVAC and piping insulation is damaged or missing. There are ceiling mounted exhaust fans in the Restrooms that appear to be original to the building.

The main restrooms for this facility have five floor mounted, flush valve water closets, six counter mount sensor operated lavatories, and two sensor operated urinals. These plumbing fixtures appear to be in working condition. There are two single electric water coolers located near the Restrooms. There is an electric water heater installed in 2012 located in the Mechanical room. There is an above floor utility sink located in Janitor Room.

ELECTRICAL

The Lecture Hall has a standard power distribution system. The utility transformer is located in the back of the building. The service entrance is a 1,600 A, 208/120 V, 3-phase, 4-wire switchboard with fusible switches. The switchboard feeds panels A, B and D, a dimmer control panel, and the chiller. Panels A and B are located in the same electrical room as the main switchboard. Panel D is located in the mechanical room. The main switchboard and panel D have fusible switches, while panels A and B have circuit breakers. All panels were manufactured in 1987. The estimated life span of circuit breakers is between 30 and 40 years, depending on environment. The Lecture Hall's environment is clean and all panels seem to be in good condition without damage.

This building does not have an emergency generator.

Most lighting in the facility is dedicated to the Lecture Hall and is in good condition.

SITE

The Dorothea Leonhardt Lecture Hall is adjacent to the main visitor center, the Deborah Beggs Moncrief Garden Center. The grounds in front of the building serve as a transition from the parking lot to the buildings, and they feature concrete walk ways, raised planters, low walls containing flagstone paving, lighting, and an entry monument to the building.

B. Areas of Insufficiency

ARCHITECTURAL

■ Exterior Items

The exterior of the Lecture Hall is in good condition. The stone veneer needs to be cleaned with equipment under strict American Masonry Institute guidelines. After the veneer is cleaned it should be sealed to maintain visual aesthetics. Care should be taken to protect the plant life around the building during this process. Most of the joint sealants on the façade are starting to fail. It is recommended to replace all joint sealants on the exterior.

Assessment – Fort Worth Botanic Garden



Stone Veneer Requires Cleaning



Worn Sealants

The storefront at the front of the building is missing the metal trim piece at the head detail. These trim pieces should be repaired/replaced.



Missing Head Trim

Opinion of Probable Construction Cost for Recommended Remediation Work

Clean and Seal Facade	\$52,785
Replace Joint Sealant	\$21,735
Storefront Trim	\$2,588
Sub-Total	\$77,108
Contingency	\$15,422
Total Cost	\$92,529

☒ Ceilings and Skylights

The ceilings inside of the lobby area outside of the Lecture Hall and the ceilings inside of the two restrooms are in disrepair. Tiles have been removed or have fallen off and the finish is nearing its lifespan and should be replaced.

Assessment – Fort Worth Botanic Garden



Chipped Ceilings Tiles



Missing and Damaged Ceiling Tiles

The sealants on the skylight in the lobby area are starting to peel away and should be replaced.



Peeling Skylight Sealant

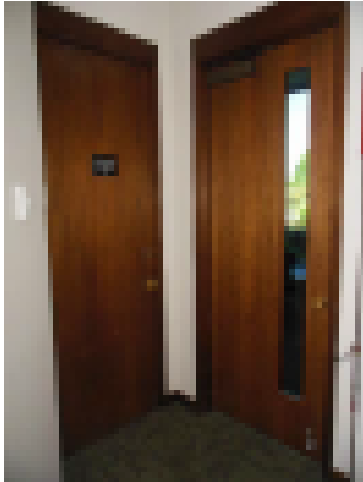
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Ceilings		\$18,975
Skylight Sealant		\$604
	Sub-Total	\$19,579
	Contingency	\$3,916
	Total Cost	\$23,495

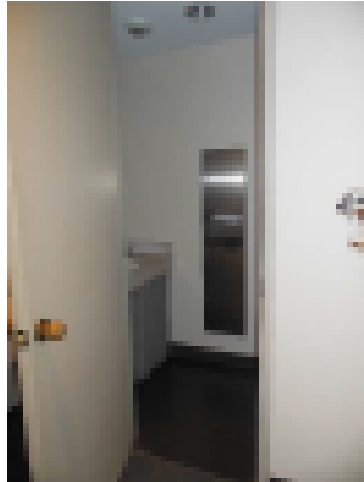
Doors and Hardware

Most of the interior doors inside the Lecture Hall and a few exterior doors have knob type hardware which is no longer compliant with current accessibility codes. It is recommended to switch all existing knob type hardware to lever type hardware.

Assessment – Fort Worth Botanic Garden



Knob Hardware



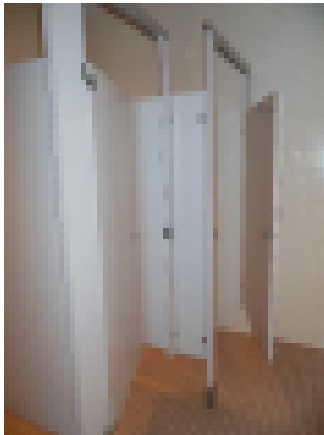
Knob Hardware

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Knob Hardware		\$14,490
	Sub-Total	\$14,490
	Contingency	\$2,898
	Total Cost	\$17,388

▣ Miscellaneous Accessibility Items

Restrooms in the facility do not meet current accessibility codes. However, because there are restrooms in the Garden Center that are accessible, these restrooms simply need signage pointing to the accessible restrooms. The drinking fountains outside the restrooms are not accessible. These fountains should be replaced with an accessible hi/low configuration.



Non-Compliant Stall



Non-Compliant Drinking Fountains

The coat check counter does not meet required reach ranges. This high counter should be modified keeping the low counter in place. The auditorium itself has several accessibility issues. A few seats have been designated with the handicap symbol presumably as assistance to an adjacent wheelchair space, but inadequate wheelchair space and cross slope is provided. There needs to be at least 5 wheelchair spaces in this auditorium and only 4 are provided. Seats should be modified and/or removed and areas should be designated for these spaces.

Assessment – Fort Worth Botanic Garden



Coat Check Counter

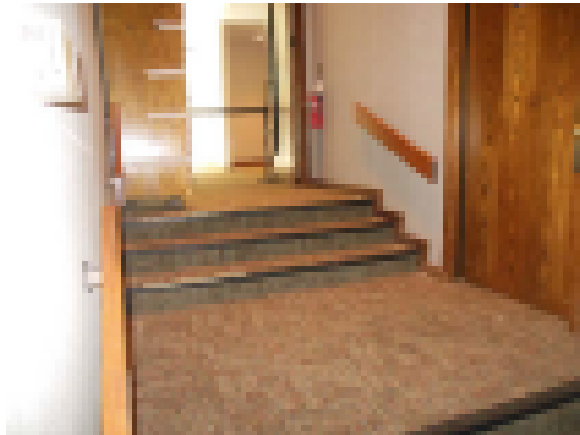


Auditorium Seating

Considering the extremely steep slope of the aisles, handrails should be added both at the wall and at the seating (single loop rails at each seat). The stairs that serve the stage and the stairs that serve the lecture hall have non-compliant railings that should be replaced.



Stage Stairs and Handrails



Handrails at Stairs

Opinion of Probable Construction Cost for Recommended Remediation Work

Restroom Signage	\$345
Coat Check Counter	\$2,300
Auditorium Seating Modifications	\$17,250
Handrails	\$14,720
Sub-Total	\$34,615
Contingency	\$6,923
Total Cost	\$41,538

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

■ HVAC Equipment Replacement

The air-cooled chiller is 15 years old and has reached its life expectancy. There are signs of age, including deteriorated piping insulation. The AHUs and hydronic accessories are all 30 years old and have reached their life expectancies. HVAC and piping insulation inside the mechanical room shows signs of damage

Assessment – Fort Worth Botanic Garden

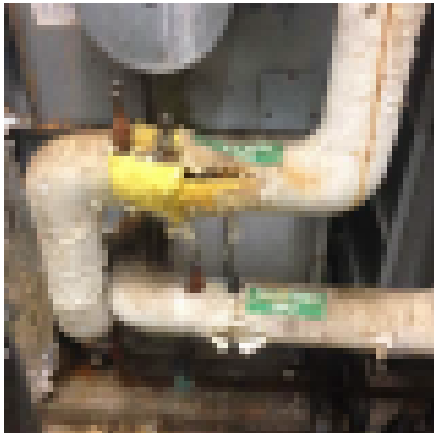
and missing insulation. There are signs of rust damage throughout the Mechanical Room. There is a musty odor for the entire Lecture Hall facility and becomes apparent when entering the Link from the adjacent Garden Center building. The musty odor could possibly be attributed to under floor ducts and water entrance into ducts. The musty odor for this entire facility should be addressed and further investigation as to the specific cause. It is recommended to replace entire HVAC system including equipment and insulation with new.



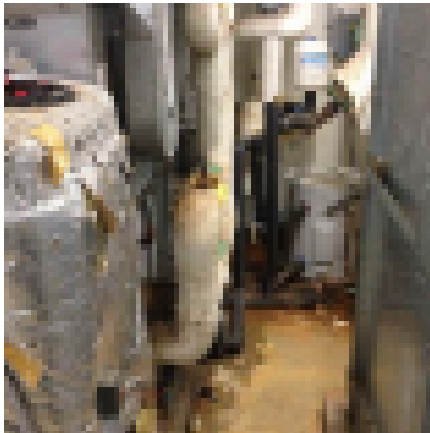
Chiller Coil Damage



Insulation Damage Near Chiller



Insulation Damage



Insulation Damage



Rusted Ball Valve Handles / Tight Clearances

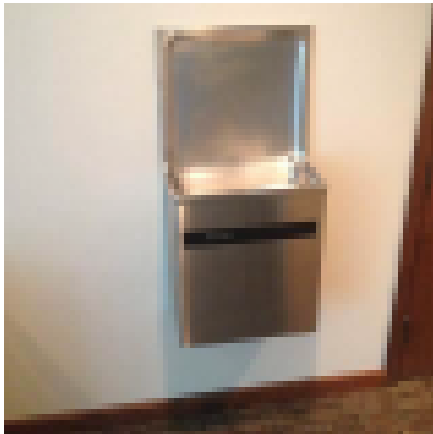
Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

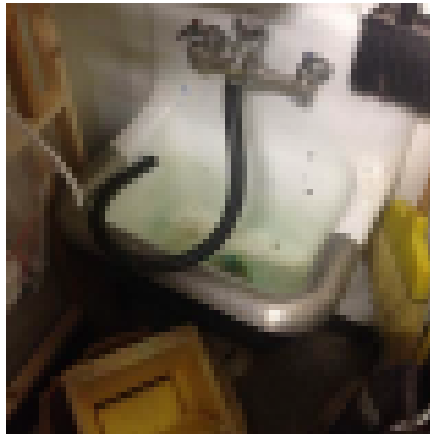
Replace entire HVAC system including equipment, ductwork and piping insulation	\$498,000
Sub-Total	\$498,000
Contingency	\$99,600
Total Cost	\$597,600

Replacement of plumbing fixtures

The north-most electric water cooler is not operating. It is recommended to replace this water cooler. Pricing for this is included in the accessibility portion of this report. The janitor sink has reached its lifespan and should be replaced. It is recommended to unclog the floor drain in the mechanical room.



Water cooler not Functioning



Utility Sink Stained



Floor Drain Clogged

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Water Cooler, Janitor Sink, Unclog Floor Drain, Exhaust Fans	\$12,000
Sub-Total	\$12,000
Contingency	\$2,400
Total Cost	\$14,400

Assessment – Fort Worth Botanic Garden

ELECTRICAL

g. Electrical Panel Replacement

Panelboards are original and were manufactured in 1987. They are approaching the end of life and the recommendation is to replace them within the next 10 years.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Panels A and B		\$7,000
	Sub-Total	\$7,000
	Contingency	\$1,400
	Total Cost	\$8,400

SITE

h. Irrigation Upgrades

This irrigation system is part of a larger irrigation system which is currently utilizing potable water. To reduce the amount of potable water used in the Botanic Garden, this system should be connected to the raw water main utilized throughout the garden. This system should be connected to an overall Botanic Garden central control system. Costs associated with the water conserving infrastructure and central control system are described elsewhere in this zone report.

The courtyard system should be upgraded with a new irrigation system that is installed to meet current City of Fort Worth irrigation design standards. The irrigation system in this area should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Irrigation Upgrades		\$7,500
	Sub-Total	\$7,500
	Contingency	\$1,500
	Total Cost	\$9,000

i. Site Improvements

Low walls along the walk ways have louvered lights imbedded in them. Some of the lights and louvres are missing and need to be replaced. Some joints between pavement and concrete walls are missing or need to be sealed. Also, some walkway joints need to be sealed.



Damaged Wall Lighting



Non-Sealed Paving Joints

Assessment – Fort Worth Botanic Garden

A bus drop-off is in front of the building and is part of the asphalt drive. It has been patched and repaired in the past and will need to be replaced with concrete paving to match the adjacent parking lot. Costs for this item are included elsewhere in this report.



Leonhardt Lecture Hall Drop Off

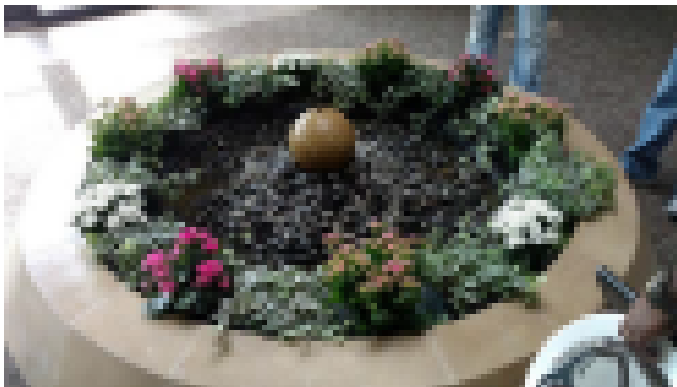
Opinion of Probable Construction Cost for Recommended Remediation Work:

Light and Louvre Replacement	\$6,000
Joint Sealant	\$1,500
Sub-Total	\$7,500
Contingency	\$1,500
Total Cost	\$9,000

INTERIOR FOUNTAINS

↓ Fountain

The water feature in the Lecture Hall has a circular basin with a submersible sump and discharges a low flow of water from an orifice in a decorative stone sphere. The basin is filled with river rock. The nozzle for discharge should be replaced, the river rock should be removed, and grating should be installed for better pump function, ease of maintenance, and improved aesthetics.



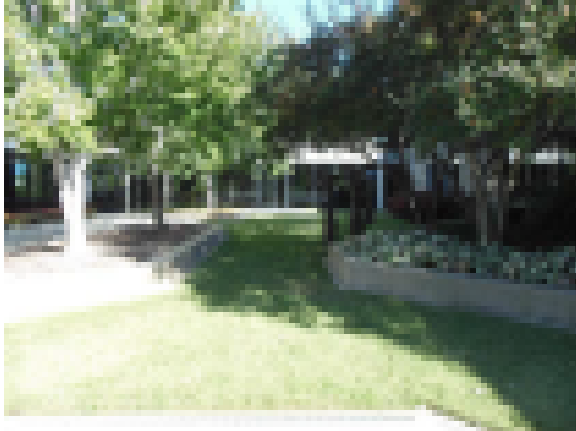
Leonhardt Lecture Fountain

Opinion of Probable Construction Cost for Recommended Remediation Work

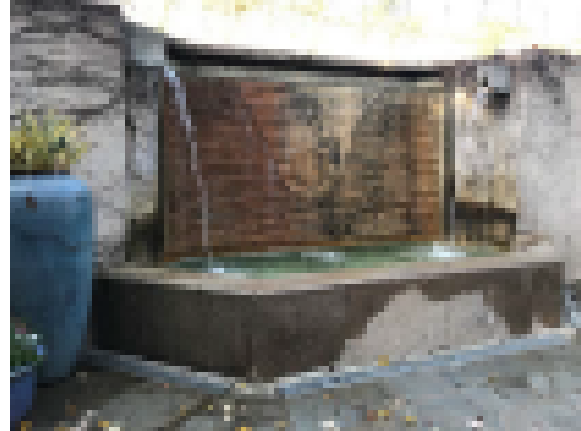
Fountain Repairs	\$8,000
Sub-Total	\$8,000
Contingency	\$1,600
Total Cost	\$9,600

5 – GEORGE BEGGS, JR. GARDEN

A. General Building Information



George Beggs, Jr. Garden Interior



George Beggs, Jr. Garden Fountain

ARCHITECTURAL

The George Beggs, Jr. Garden is an intimate setting bound by the Moncrief Garden Center, Leonhardt Lecture Hall, and an ivy accented screen wall. Beautiful views of the garden are captured and framed from the windows of the adjacent structures focusing on the garden lawn and water fall feature along the west concrete screen wall. Other featured elements of the garden consist of sculptures, flagstone walks, raised concrete planter walls and luscious plant life, all surrounded by a backdrop of the smooth stone cladding of the Leonhardt Lecture Hall and limestone exterior of the Moncrief Garden Center. The Beggs Garden is utilized for a variety of outdoor events including gatherings, weddings and receptions.

STRUCTURAL

This garden contains short concrete planter walls supported on concrete piers.

MECHANICAL / PLUMBING

There are no mechanical or plumbing systems to be reviewed at this area.

ELECTRICAL

There are no electrical systems to be reviewed at this area.

SITE

The primary purpose for this courtyard is for viewing of art and quiet reflections. Garden features include mortared flagstone paving, grass lawn with art installations, a wall fountain and curbed planting beds. This garden is primarily for visitors of the Lecture Hall but also includes an access gate to staff maintenance area.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

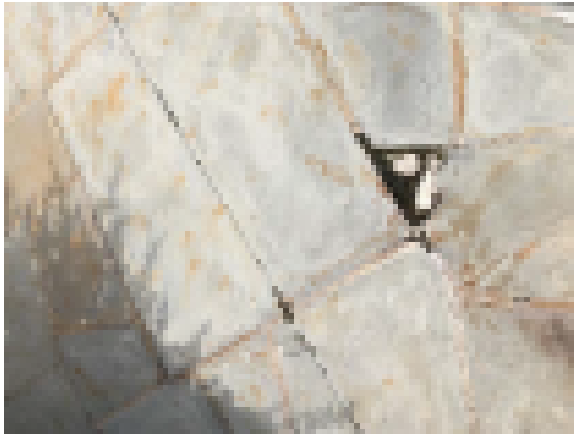
Not Applicable

SITE

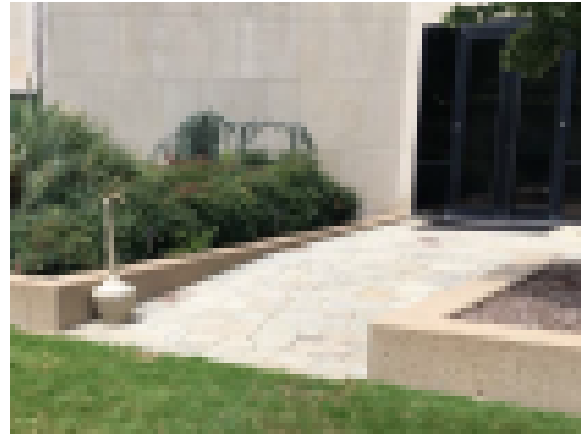
■ Pavement Repairs

The general condition of the flagstone paving is good, however in several locations the stones are either cracked or broken and the grout joints appear to be damaged or missing. The damaged stones should be removed and replaced and new grout joints installed.

The courtyard includes two levels, the building entry level and the lower fountain level. A paved sloped visitor access route connecting the upper level to the fountain area is greater than 5%. Additionally, the landing at the base of this route is grass requiring visitors to walk over grass to view the fountain and hard surface required for accessibility. Handrails and a paved flagstone landing should be installed in this area as required for ADA compliance.



Chipped Flagstone Paving and Mortar



Ramp in Need of Handrails

Opinion of Probable Construction Cost for Recommended Remediation Work:

Paving Repairs	\$7,500
Ramp Landing and Handrails	\$3,500
Sub-Total	\$11,000
Contingency	\$2,200
Total Cost	\$13,200

■ Drainage Improvements

The trench drain at the lower level of the garden near the fountain functions properly. This drain, however, is connected to the sanitary sewer system. A lateral line should be installed connecting this inlet to the storm drain system in the service area behind the courtyard.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Drainage Repairs	\$2,500
Sub-Total	\$2,500
Contingency	\$500
Total Cost	\$3,000

■ Fountain Improvements

At the far end of the garden is a focal point water wall with a small lower basin. Underground equipment is housed in a vault behind the back wall. The current float mechanism is an eyesore, and is recommended

Assessment – Fort Worth Botanic Garden

for replacement with an outside probe in a small well. Additionally, the fountain lighting should be upgraded to increase visibility and enhance the visitor experience.



Wall Fountain

Opinion of Probable Construction Cost for Recommended Remediation Work:

Fountain & Lighting Repairs		\$5,500
	Sub-Total	\$5,500
	Contingency	\$1,100
	Total Cost	\$6,600

▣ Irrigation Improvements

This irrigation system is part of a larger irrigation system which is currently utilizing potable water. To reduce the amount of potable water used in the Botanic Garden, this system should be connected to the raw water main utilized throughout the garden. This system should be connected to an overall Botanic Garden central control system. Costs associated with the water conserving infrastructure and central control system are described elsewhere in this zone report.

The courtyard system should be upgraded with a new irrigation system that is installed to meet current City of Fort Worth irrigation design standards. The irrigation system in this area should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Irrigation Upgrades		\$2,500
	Sub-Total	\$2,500
	Contingency	\$500
	Total Cost	\$3,000

Assessment – Fort Worth Botanic Garden

V. 6 – WATER CONSERVATION GARDEN

A. General Building Information



Water Conservation Garden Pavilion



Water Conservation Garden Entry

ARCHITECTURAL

The Water Conservation Garden dedicated to visually attractive native and adaptive landscape that utilize xeriscape concepts for their water efficiency, is located north of the Garden Center near the Botanic Garden entrance off of Trail Drive. The drought tolerant garden offers a shaded walkway through reflection areas against a stone and concrete form-liner back drop serving as the retaining wall for the Will Rogers complex. Structures such as a bold stone and red iron security gate create a celebratory entrance to the north end of the Botanic Garden. Park visitors can meander through the concrete garden paths and reflection areas with teak benches, leading to a tube steel pavilion with an exposed wood deck and metal roof. The garden path concludes to the south at the service entrance to the Moncrief Garden Center.

STRUCTURAL

This garden contains a steel framed gazebo and stone clad walls at the north entry off Trail Drive.

MECHANICAL / PLUMBING

There are no mechanical or plumbing systems to be reviewed at this area.

ELECTRICAL

There were no electrical systems noted to be reviewed at this area.

SITE

The Water Conservation Garden is an educational space for visitors which highlights native and adaptive species of plants that are low water users. This garden features exposed aggregate walkways, a metal pavilion, seating, a drinking fountain, and interpretive signage for visitors.

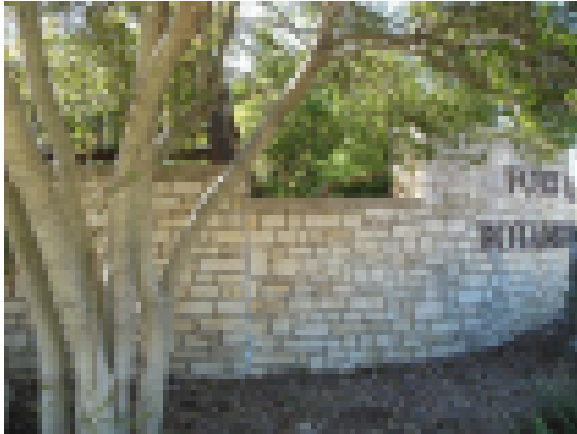
B. Areas of Insufficiency

ARCHITECTURAL

Retaining Wall

The retaining wall for the Will Rogers Complex behind the garden area is damaged in a few places and should be repaired. There is also an expansion joint at this area that has deteriorated and requires replacement.

Assessment – Fort Worth Botanic Garden



Wall Expansion Joint

Opinion of Probable Construction Cost for Recommended Remediation Work

Repair Damaged Wall		\$6,900
Replace Expansion Joint		\$518
	Sub-Total	\$7,418
	Contingency	\$1,484
	Total Cost	\$8,901

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

North Entrance Gate Lighting

North Entrance Gate requires additional lighting. Provide new area lighting to achieve 1 FC on pedestrian and vehicle access.

Opinion of Probable Construction Cost for Recommended Remediation Work

Incorporate New Lighting at North Entrance		\$25,000
	Sub-Total	\$25,000
	Contingency	\$5,000
	Total Cost	\$30,000

SITE

Pavement Improvements

To access this garden visitors must walk in the parking lot or through planting areas. A connecting 5' wide concrete sidewalk with curb ramps at the service drive crossing should be installed.

In the garden, the pavement appears to be in good condition; however, the redwood expansion joints are not flush with the pavement. Also, gaps exist between the pavement and joints, which allow weed growth. The redwood should be removed and the joints sealed.

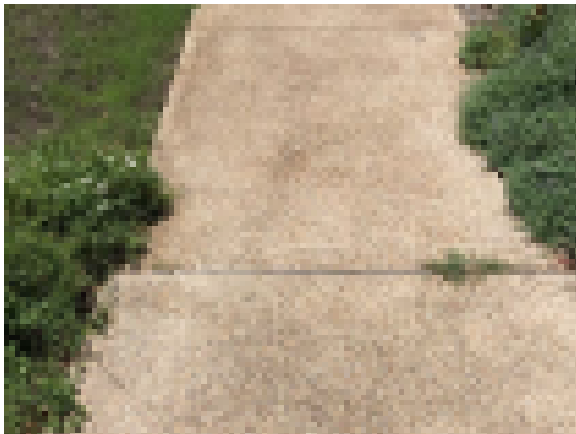
The ramp is cracked and has peeling paint. It should be replaced.

Assessment – Fort Worth Botanic Garden

At the north entry, the sidewalk leading to the pedestrian gate does not connect to the accessible pathway at Trail Drive. Install 75 lf of 5' wide concrete pathway and (2) curb ramps where the pathway crosses the service drive.



Pedestrian Crossing needs Ramps / Crosswalks *North Entry Pedestrian Gate Pathway*



Pavement with Redwood Expansion Joints *Ramp with Cracks and Peeling Paint*

Opinion of Probable Construction Cost for Recommended Remediation Work:

Connecting Sidewalk and Accessible Ramps	\$7,600
Pavement Repairs	\$1,000
Sub-Total	\$8,600
Contingency	\$1,720
Total Cost	\$10,320

■ Drinking Fountain Repair

The drinking fountain has a significant leak. It should be repaired to stop the leak and prevent discoloration of the pavement.

Assessment – Fort Worth Botanic Garden



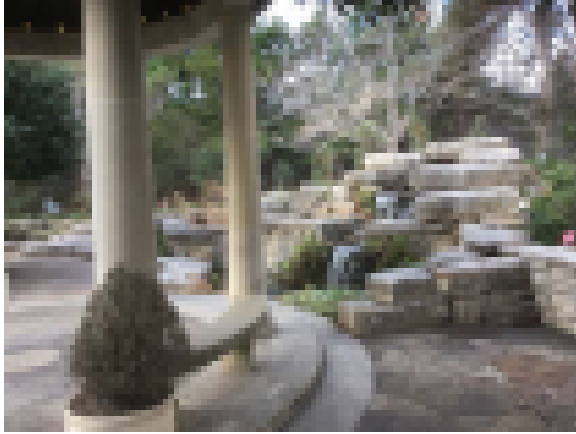
Leaky Drinking Fountain

Opinion of Probable Construction Cost for Recommended Remediation Work:

Drinking Fountain Repair		\$2,500
	Sub-Total	\$2,500
	Contingency	\$500
	Total Cost	\$3,000

VI. 7 – ADELAIDE POLK FULLER GARDEN

A. General Building Information



Fuller Garden Waterfall



Fuller Garden Trellis and Fountain

ARCHITECTURAL

The approximately 3.5 acre Adelaide Polk Fuller Garden is located west of the Margery Leonard Courtyard and the Deborah Beggs Moncrief Garden Center. It is dedicated to the seasons of life, utilizing a variable palette of materials with its stone-faced planters, retaining walls, water crossings, and flagstone paving. Garden structures include the gazebo, garden trellis, waterfall and reflecting pond all sit prominently in a setting of trees and seasonal plant life. The Fuller Garden is utilized for a variety of outdoor events including gatherings, weddings and receptions.

STRUCTURAL

This garden contained numerous stone-faced planter and retaining walls, steel arbors and trellises, and two bridges. The first bridge, located between the Leonard Courtyard and the Fuller Garden is a stone faced, concrete and steel framed pedestrian bridge (reference photograph below, left). The second bridge, located on the path between the Fuller Garden and Old Garden Road was constructed circa 1990 (reference photograph below, right). This bridge is steel framed with wood walk boards supported on a concrete buttresses and piers.



Fuller Garden Bridge I



Fuller Garden Bridge II

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be reviewed at this area.

ELECTRICAL

There were no electrical systems noted to be reviewed at this area.

SITE

The Adelaide Polk Fuller Garden serves as a prominent pedestrian route into the overall garden trail system. This garden is frequented by day-to-day visitors and available for event rentals. Garden features include stone pathways, bench seating, pergola structures, stone walls, planting areas, and multiple water features, creating a variety of water effects throughout the Fuller Garden. These include a shell wall fountain, a naturalistic steam, a bubbling ground fountain, and a circular pond with aquatic planting.

B. Areas of Insufficiency

ARCHITECTURAL

Trellis Cleaning and Sealant

The steel trellises have stone pilasters that have become dirty from constant interaction with people as well as general wear over time. These pilasters should be cleaned and sealed to protect their aesthetic value.



Pilasters Require Cleaning

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean and Seal Pilasters		\$7,820
	Sub-Total	\$7,820
	Contingency	\$1,564
	Total Cost	\$9,384

STRUCTURAL

Exposed Steel Beam

The pedestrian bridge located between the Leonard Courtyard and the Fuller Garden (see photograph below, left) has steel beams along the two sides of the bridge. These beams have surface rust on the exposed bottom face of beam (see photograph below, right). We recommend that the exposed surfaces be painted with a rust-inhibitive paint to extend the useful life of the bridge.

Assessment – Fort Worth Botanic Garden



Pedestrian Bridge



Steel Bridge Support Beam

Opinion of Probable Construction Cost for Recommended Remediation Work:

Paint Exposed Steel Beam		\$400
	Sub-Total	\$400
	Contingency	\$80
	Total Cost	\$480

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

Site Improvements

The main visitor paths throughout this garden are natural flagstone set on a concrete base and are in relatively good condition. In several locations, however, the main pathway has steps or slopes that may make accessibility by some patrons difficult, and it should be improved.

The intersection of the main path and the walkway leading to the round pavilion and natural rock waterfall exceeds the slope requirements and should be reconstructed to meet current accessibility standards.

At the 'round sunken garden' are steps and what appears to be an access maintenance ramp, which are often used by visitors. These steps and ramp need to be reconstructed to have appropriate handrails, surfaces, and slopes.

Assessment – Fort Worth Botanic Garden



Ramp at 'Round Sunken Garden'

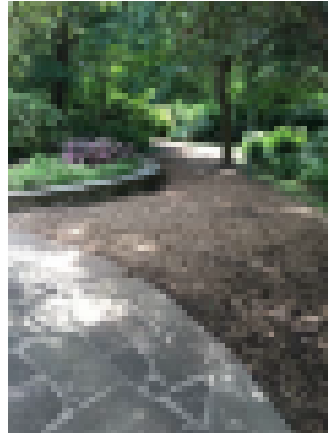


Steps and Maintenance Ramp

The bridge crossing the creek has a wooden railing that has been added to the steel structure, but additional railing modifications are needed to make openings less than 4" as required by code. After crossing the creek, visitors arrive at a round pool water feature surrounded by flagstone pavement. Visitors are then encouraged to continue walking on a mulch path that links the 'round water feature' to the roadway crossing near the Nature Boardwalk entrance. This mulch path should be removed and replaced with an 8' wide flagstone-on-concrete path to match the paving in the rest of the garden and as required for accessibility.



Bridge Crossing the Creek



Path Linking 'Round Water Feature' to Old Garden Rd

Opinion of Probable Construction Cost for Recommended Remediation Work:

Ramps and Rail	\$8,000
Bridge Rail Modifications	\$4,500
8' Wide Flagstone Walkway	\$20,000
Sub-Total	\$32,500
Contingency	\$6,500
Total Cost	\$39,000

d. Irrigation Improvements

The Fuller Garden irrigation system is served by a 3" main raw water lines and a 2-1/2" city water service. Approximately, 180 LF of PVC pipe main line should be installed to connect the existing main lines on each side of the creek. This will complete a main loop for this garden improving water pressure throughout the garden.

Assessment – Fort Worth Botanic Garden

The irrigation system for this garden is currently a combination of the original system, numerous improvements, and modification repairs that have occurred since the original installation. The entire system should be upgraded with a new system that is installed to meet current City of Fort Worth irrigation design standards. The irrigation system in this area should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system. Costs associated with the water conserving infrastructure and central control system are described elsewhere in this zone report



Irrigation Mainline Extension Exhibit

Opinion of Probable Construction Cost for Recommended Remediation Work:

Main Line Installation	\$5,500
New Irrigation System	\$62,500
Sub-Total	\$68,000
Contingency	\$13,600
Total Cost	\$81,600

■ Drainage Improvements

A large concrete and river rock swale crosses under the main pathway to the north of the site. This swale was previously used to convey large amounts of water across the site; however, the construction of the drainage system and large retaining wall on the property north of the Botanic Garden has reduced the quantity of run off in this area.

Assessment – Fort Worth Botanic Garden

The concrete-lined swale should be removed and replaced with an appropriate permeable natural surface to promote infiltration of rainwater. The swale should be graded so that the surface elevation is less the 30” below the walking surface of the adjacent walk so handrails will not need be required by code.



River Rock Swale Under Main Pathway

Opinion of Probable Construction Cost for Recommended Remediation Work:

Swale Reconstruction		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

¶ Fountain Improvements

The shell wall fountain feature has massive amounts of organic growth built up on its wall. It should undergo a deep cleaning, then it should be upgraded with filtration and sanitation equipment.

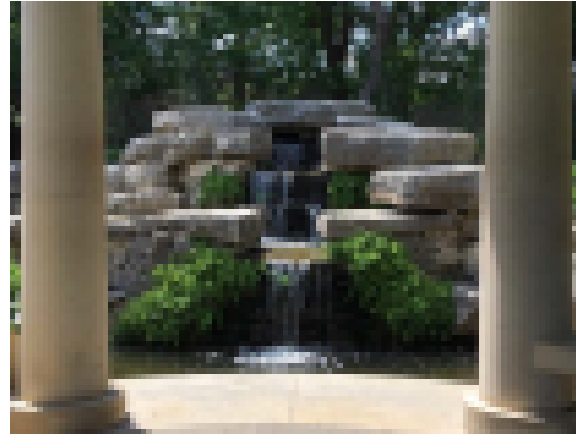
The Botanic Garden staff have identified that the naturalistic waterfall and creek feature has a damaged shell/liner. The pool should be drained, the leak identified, and the pool liner repaired. The extent of repair is difficult to determine without additional investigation, but for the sake of this report, we anticipate that the gunite repair will be significant.

The garden has several other water features, including the round pond and the bubbling pedestal fountain, which appear to be functioning properly and do not require anticipated improvements. Additionally, the ground bubbler fountain beneath the round pavilion is not functioning. This fountain would be considered a public interactive water feature (PIWF) by current standards and would require significant mechanical and filtration system upgrades, including primary and secondary forms of sanitation similar to what is found in swimming pools and spray grounds. These improvements would be considerable and at this time are not recommended or included in costs.

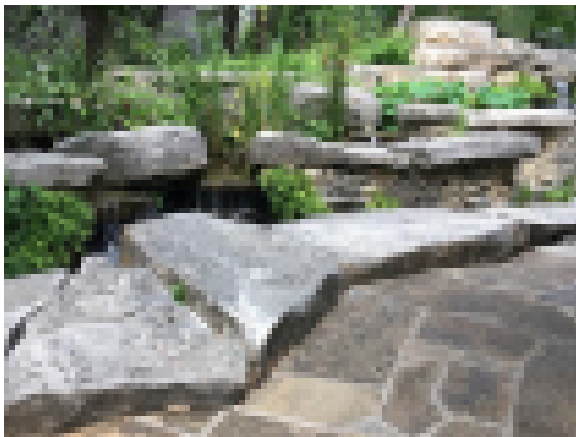
Assessment – Fort Worth Botanic Garden



Shell Wall Fountain



Waterfall with Damaged Shell / Liner



Creek with Damaged Shell / Liner

Opinion of Probable Construction Cost for Recommended Remediation Work:

Shell Fountain Upgrades	\$15,000
Creek Repairs	\$70,000
Sub-Total	\$85,000
Contingency	\$17,000
Total Cost	\$102,000

Assessment – Fort Worth Botanic Garden

Assessment – Fort Worth Botanic Garden

VII. 9N & 9S – PARKING AREAS AND MAIN ENTRANCE

A. General Building Information



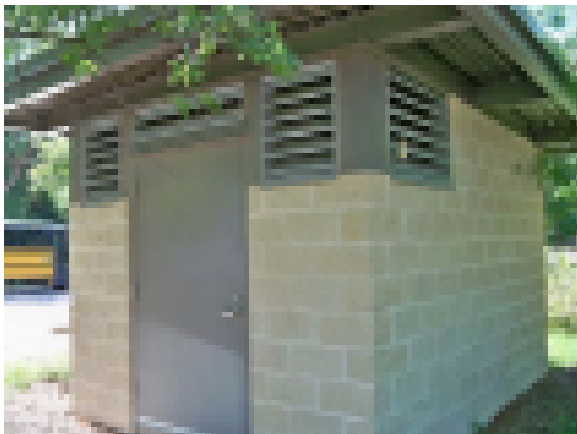
Entry Planter Clock



Accessible Parking

ARCHITECTURAL

There is a small equipment building constructed of CMU walls and metal roof located north of Botanic Garden Boulevard and east of the parking lot at grid W8.



Equipment Building

STRUCTURAL

The circa 1988 entry walls are concrete and stone. The taller screen walls are concrete with stone veneer and are supported on concrete piers. The shorter planter walls on either side of the boulevard are unreinforced stone walls supported on shallow footings. Per the construction drawings, the shorter planter walls were to have a maximum height of 36 inches. However, the planter walls on the south side of the boulevard were constructed significantly taller with heights varying from 38.5 inches to 57 inches tall.

MECHANICAL / PLUMBING

There are no mechanical or plumbing systems to be reviewed at this area.

ELECTRICAL

The North parking lot has LED lighting fixtures mounted on top of round poles. Light is evenly distributed along parking spaces and traffic zones. The average lighting level measured in parking areas was 0.5 FC

Assessment – Fort Worth Botanic Garden

with a maximum of 0.9 FC and a minimum of 0.1 FC. Areas with low illumination were due to tree interference.

The South parking lot has LED lighting fixtures mounted on top of round poles. Light is evenly distributed along parking spaces and traffic zones. The average lighting level measured in parking areas was .1.1 FC with a maximum of 2.5 FC and a minimum of 0.3 FC. Areas with low illumination were due to tree interference.

SITE

Botanic Garden Boulevard is the main entrance to the site and connects University Drive to the main parking areas and the Garden Center drop-off. The drive is concrete and flanked on each side by stone signs, planters, and iron fences. The median includes signature features such as the Floral Clock and three water features. The main parking areas in this zone are concrete lots and serve as places to park vehicles, direct foot traffic, and gather/direct rain water into planting islands. Conservatory Drive runs along the west boundary of these parking areas from Trail Drive to the north in front of the Garden Center extending to Old Garden Road to the south.

B. Areas of Insufficiency

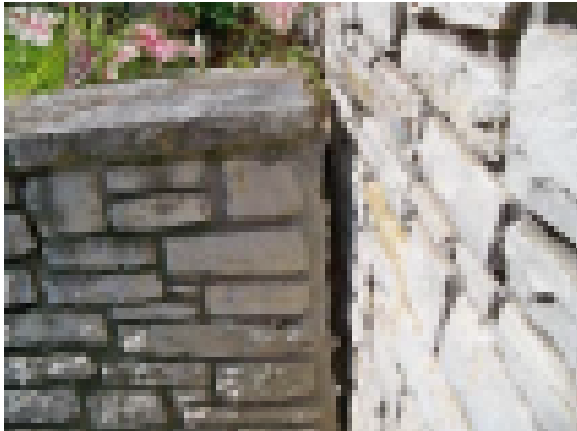
ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

■ Entry Gate Walls at Botanic Garden Boulevard Entrance

The planter walls on the south side of the boulevard were constructed taller than shown on the construction drawings and have suffered distress. This wall has dropped and rotated outward relative to the taller pier-supported walls and has significant movement related cracking. We recommend that this wall be replaced with a properly designed and reinforced wall and footing.



Structural Wall Movement



Retaining Wall Cracking

Opinion of Probable Construction Cost for Recommended Remediation Work:

New Wall and Footing		\$23,000
Sub-Total		\$23,000
Contingency		\$4,600
Total Cost		\$27,600

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

ELECTRICAL

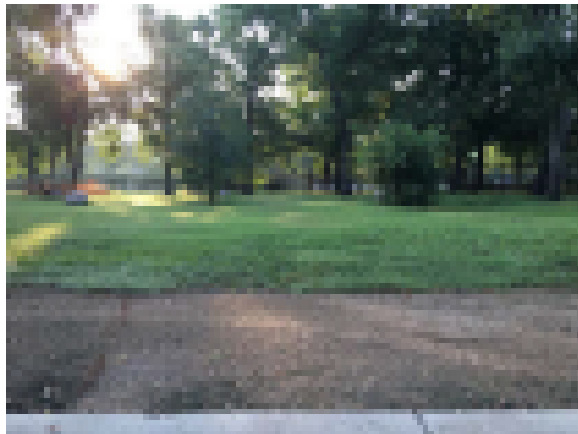
There were no electrical insufficiencies noted in the assessment of this area.

SITE

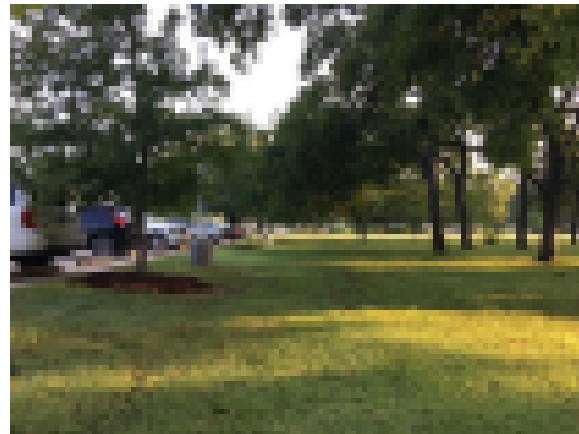
▣ Drainage Improvements

Runoff from the parking lot north of Botanic Garden Drive is intended to surface drain to an existing inlet in the heavily vegetated area north of the Main Entrance. This drainage pattern has been obstructed by a TXU access road and existing mature trees creating a standing water problem. Additionally, runoff from the garden entrance road collects along the stone wall parallel to University. This area should be re-graded with grass swales to promote proper drainage to the existing inlet.

The concrete parking lot south of Botanic Garden Boulevard was constructed without curbs to promote rainwater infiltration in the planting areas. However, after a rain event runoff collects in the landscape areas east of the lot creating standing water. A drain inlet should be installed in this area to alleviate the ponding and transfer the water to a new inlet constructed with future roadway improvements for Old Garden Road.



Grass Access Drive



Slow Draining Area Adjacent to the Parking Lot.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Construct Swales	\$3,500
Install Inlet and Drain Pipe	\$5,000
Sub-Total	\$8,500
Contingency	\$1,700
Total Cost	\$10,200

▣ Irrigation Improvements

The landscape areas for parking lot 9S and the gardens immediately adjacent to the Garden Center, Conservatory, and Leonhardt Lecture Hall currently use potable water for irrigation. These systems should be modified and connected to the raw water main line to promote water conservation. This area's irrigation system should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system.

Approximately 1,600 LF of 4" PVC main line, through the BRIT parking lot, should be installed to continue the loop.

Assessment – Fort Worth Botanic Garden



Irrigation Mainline Extension Exhibit

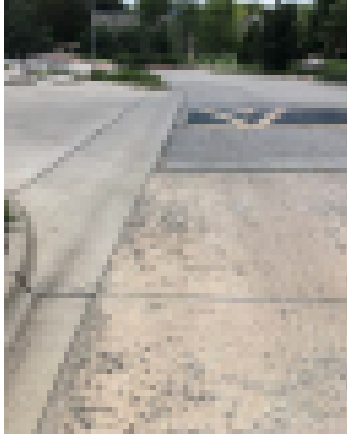
Opinion of Probable Construction Cost for Recommended Remediation Work:

Change to Raw Water	\$25,000
Extend 4" Main Line	\$48,000
Central Control System	\$30,000
Sub-Total	\$103,000
Contingency	\$20,600
Total Cost	\$123,600

d. Pavement Improvements

Portions of the pavement of Conservatory Drive north of the Botanic Garden Boulevard are asphalt that show signs of damage and wear. These portions of the drive should be replaced to match the adjacent concrete pavement in the parking areas.

Assessment – Fort Worth Botanic Garden



Transition of Asphalt/Concrete Paving

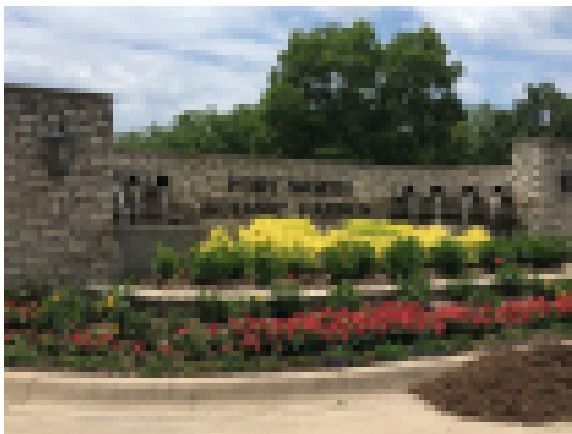
Opinion of Probable Construction Cost for Recommended Remediation Work:

Repave Conservatory Drive		\$85,000
	Sub-Total	\$85,000
	Contingency	\$17,000
	Total Cost	\$102,000

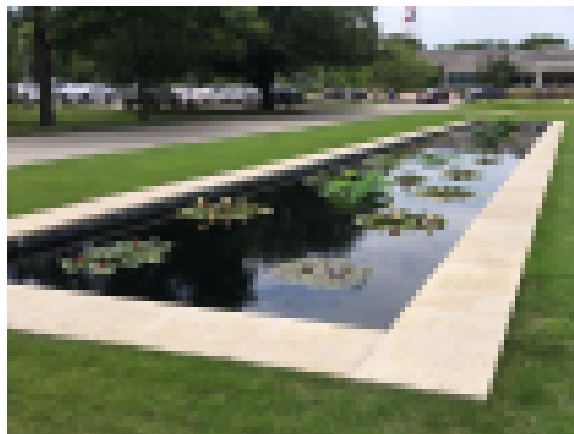
■ Fountain Upgrades

The boulevard to the main entrance includes two water features. The Main entry feature is a stone wall fountain and sign with stone scuppers that pour into a lower stone basin. On the back side of this wall is a sheer descent weir that spills into a lower stone basin viewed by patrons as they leave the site. Both of these basins leak, the source of the leaks will need to be identified and repaired with structural repairs or waterproofing measures. The prominence of this feature and the age of the equipment require that the pump and mechanical space should be rehabilitated and replaced to ensure that the feature remains in good working order.

The 'Frog Fountain' in the boulevard consists of two large rectangular basins with dyed water planted with aquatic plants. One pool features two frog sculptures; the other does not. The pools include 24 nozzles on the top basin and 38 nozzles on the lower basin. The existing PVC nozzles have been broken repeatedly by patrons stepping on them. These nozzles should be replaced with new brass nozzles in niches to reduce the likelihood of patrons stepping on them and disrupting the fountains' performance in the future.



Main Entry Fountain



Frog Fountain (Nozzles Are Turned Off)

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work

Main Fountain Upgrades		\$45,000
Frog Fountain Upgrades		\$17,000
	Sub-Total	\$62,000
	Contingency	\$12,400
	Total Cost	\$74,400

Assessment – Fort Worth Botanic Garden

VIII. Cost Summary

To summarize the information found in this document, this section provides a cost summary by key element of the Botanic Garden. Please refer to sections AREAS OF INSUFFICIENCY for detailed information on each item. Note that if multiple options/costs were provided, then the highest of the costs are included in the numbers below.

1	Deborah Beggs Moncrief Garden Center	\$1,455,059
2	Margery Leonard Courtyard	\$86,400
3	Conservatory	\$2,266,314
4	Dorothy Leonhardt Lecture Hall	\$822,950
5	George Beggs, Jr. Garden	\$25,800
6	Water Conservation Garden	\$52,221
7	Adelaide Polk Fuller Garden	\$250,464
9N,9S	Parking Areas and Main Entrance	\$337,800
	Zone 1 Total	\$5,297,008

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Zone 2

Key Locations: 11-17



Assessment – Fort Worth Botanic Garden

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Assessment – Fort Worth Botanic Garden

I. 9R – PARKING AREAS AND MISCELLANEOUS SITE AREAS

A. General Building Information



Rock Springs On-Street Parking



Rock Springs On-Street Parking

ARCHITECTURAL

There were no architectural items noted to be reviewed at this area.

STRUCTURAL

There were no structural systems noted to be reviewed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be reviewed at this area.

ELECTRICAL

There were no electrical systems noted to be reviewed at this area.

SITE

The Old Garden Road serves as the vehicular connection from Botanic Garden Boulevard near the main entrance to Rock Springs Road near the Gardens Restaurant. This two-lane roadway is paved in asphalt without curbs except in select locations to direct drainage.

The Woodlands & Clock Woods area is located on the east side of the Botanic Garden property between the North Vista and University Drive. This area includes a mix of heavily wooded riparian vegetation as well as some open, mowed turf grass under mature shade trees. Near University Drive, this area is bisected by a narrow drainage channel, and serves as a nice buffer between this busy roadway and the rest of the grounds.

B. Areas of Insufficiency

ARCHITECTURAL

Not Applicable

STRUCTURAL

Not Applicable

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

Not Applicable

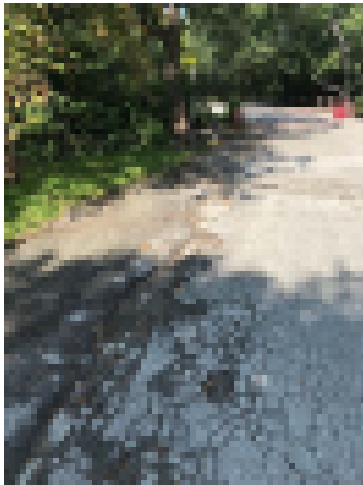
ELECTRICAL

Not Applicable

SITE

a. Old Garden Road Improvements

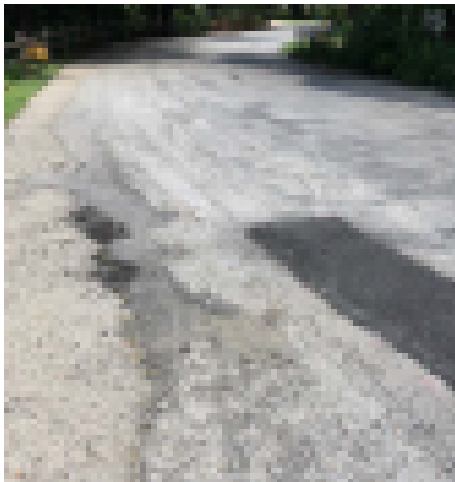
Roadway surface experiences heavy traffic volumes at times and is deteriorating faster than repairs can be made. Recommend replacement of entire roadway with new concrete roadway to match new concrete roadways in Zone 1. Subsurface storm drain system should be incorporated into new roadway improvements.



Road Deterioration



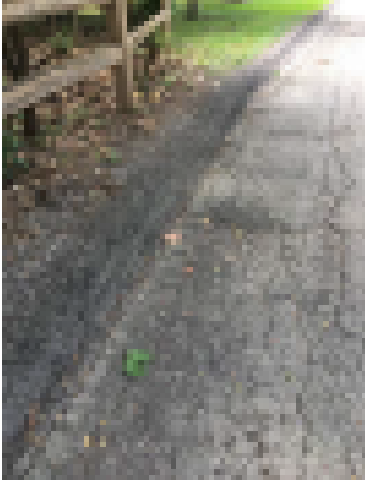
Road Deterioration



Road Deterioration

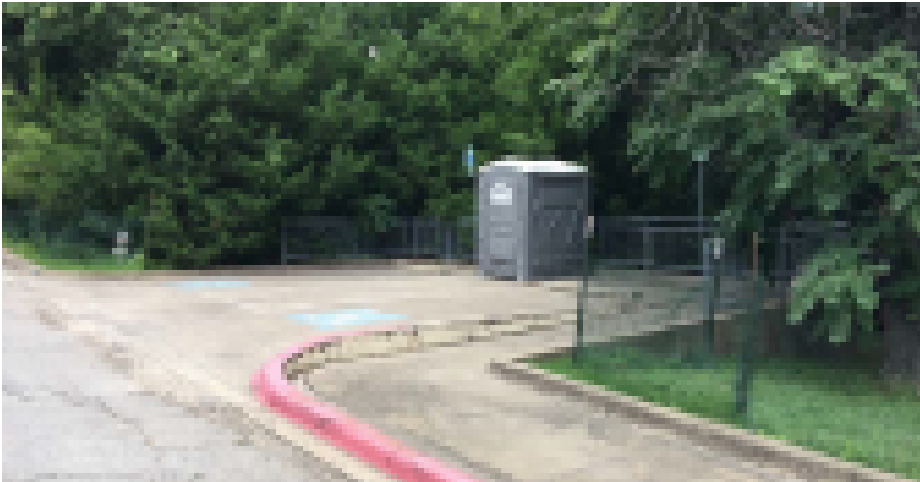
An asphalt curb appears to have been scabbed on to the roadway to direct or control surface drainage flow. These should be replaced with concrete integral curb and gutter when roadway is reconstructed.

Assessment – Fort Worth Botanic Garden



Asphalt Curb

The accessible route from the handicap parking to the Texas Native Boardwalk area appears difficult to negotiate. This route needs to be reevaluated. Additionally, drainage is directed into street rather than into landscape behind the parking. Recommend storm/surface drainage to be re-evaluated with new construction of Old Garden Road.



Handicap Parking

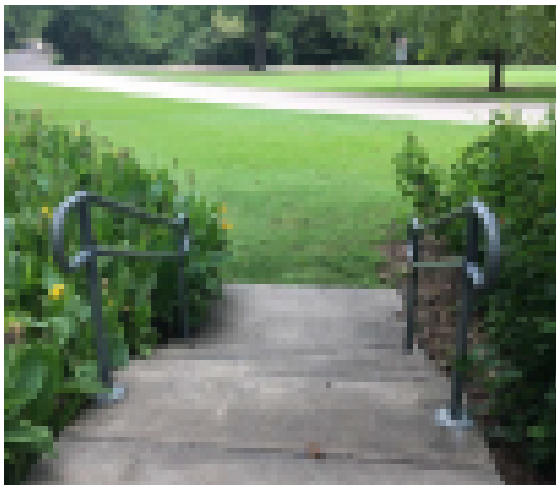
A temporary mulch access path between Botanic Garden Boulevard and Conservatory Drive intersects Old Garden Road. This appears to be used by maintenance vehicles to access the Clock Grove area. Recommend installation of concrete drive apron to prevent drainage ponding, mud and standing water.

Assessment – Fort Worth Botanic Garden



Maintenance Drive Entrance

Concrete stairs with handrails currently connect the Boardwalk area to the North Vista lawn. A connecting concrete pathway should be installed from the base of the stairs to Old Garden Road connecting the base of the stairs to the intersection of Old Garden Road and Rock Springs Road.



Concrete Stairs

Opinion of Probable Construction Cost for Recommended Remediation Work:

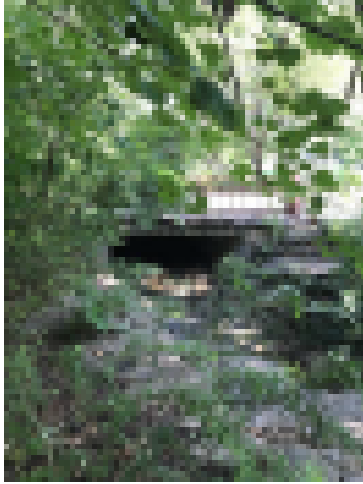
Demolish Existing Asphalt Roadway	\$300,000
New Concrete Roadway w/ Integral Curb	\$500,000
Storm Drainage System	\$45,000
Concrete Drive Apron	\$30,000
Sub-Total	\$875,000
Contingency	\$175,000
Total Cost	\$1,050,000

b. Old Garden Road Site Improvements

The drainage channel/creek that runs from the Fuller Garden south to the Sister Cities International Grove crosses underneath Old Garden Road. This stone lined drainageway is partially collapsing near the road intersection and is in need of repair. Recommend removal of approximately 50 lf of collapsing stone edges

Assessment – Fort Worth Botanic Garden

both upstream and downstream of roadway. Replace with installation of reinforced decorative stone to match existing.



Drainage Channel

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Creek Edges		\$90,000
	Sub-Total	\$90,000
	Contingency	\$18,000
	Total Cost	\$108,000

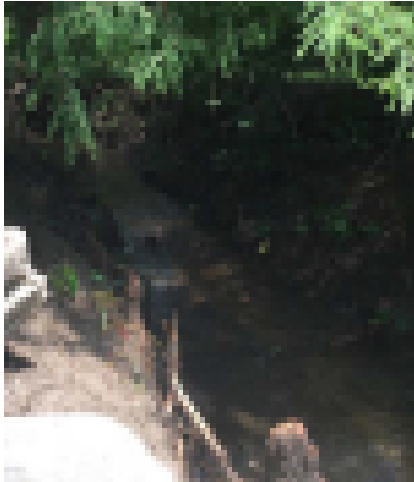
c. Rock Springs Road Culvert Improvements

The culvert at Rock Springs Road daylights into a channel then flows north through the site. The garden staff has planted this channel with a variety of riparian vegetation including aquatic plants and trees. As they have matured, the trees and larger vegetation now limit the capacity of the channel. The obstructions in the channel should be removed and the sides of the channel should be regraded to increase capacity. A drainage study will need to be performed to determine the required extent of the improvements

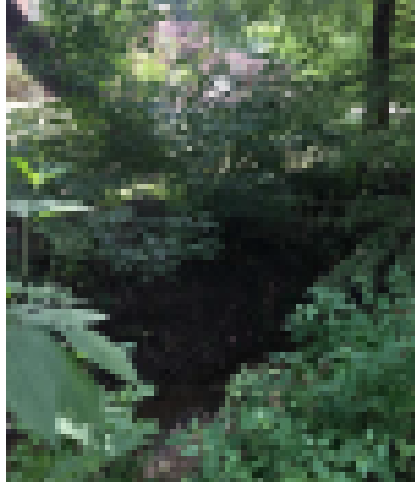


Channel with Vegetation

Assessment – Fort Worth Botanic Garden



Channel with Erosion



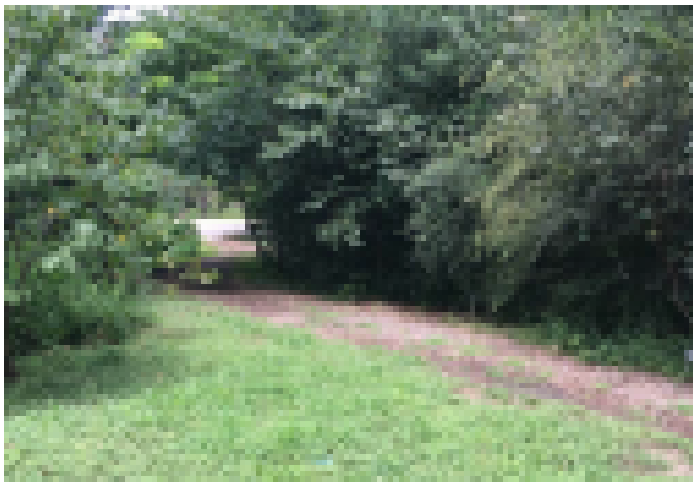
Narrow Channel

Opinion of Probable Construction Cost for Recommended Remediation Work:

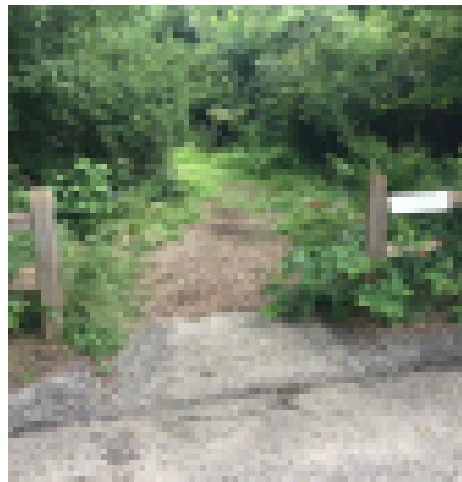
Remove Vegetation Blocking Channel	\$5,000
Regrade Channel Sides	\$2,500
Install Erosion Control System	\$25,000
Sub-Total	\$32,500
Contingency	\$6,500
Total Cost	\$39,000

d. Wildscape Area Site Improvements

The Wildscape area is an interpretive educational garden that highlights the native vegetation and sustainable garden techniques. Visitors access the site by using a mulch path connection from Old Garden Road. A portion of this pathway should be replaced with a 5' wide concrete pathway to provide access to the main interpretive elements.



Mulch Path



Mulch Path Connection

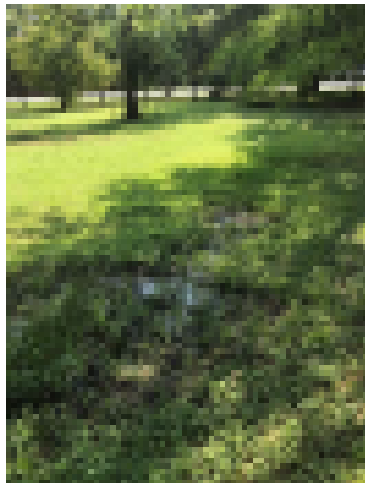
Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

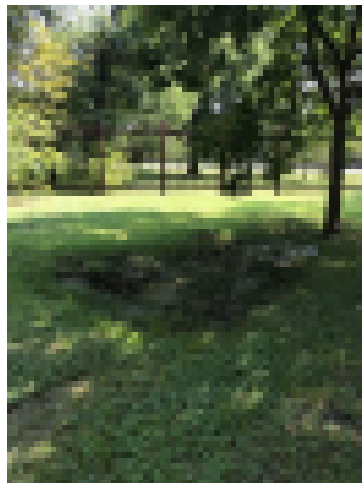
Concrete Pathway		\$4,500
	Sub-Total	\$4,500
	Contingency	\$900
	Total Cost	\$5,400

e. Clock Woods Site Improvements

The large area adjacent to University Drive is informally described as the Clock Woods. This low-lying area consists of lawn grasses beneath mature trees and includes several grass swales to promote runoff toward the culvert that crosses University Drive. However, not all of this area drains well and a nuisance water problem exists in some areas. The surface drainage swales that exist in this zone should be regraded to promote positive drainage and eliminate standing water.



Standing Water



Standing Water

Opinion of Probable Construction Cost for Recommended Remediation Work:

Regrade Existing Swales		\$2,500
Hydromulch Disturbed Areas		\$1,000
	Sub-Total	\$3,500
	Contingency	\$700
	Total Cost	\$4,200

f. Zone 2 Irrigation Improvements

The existing irrigation mainline that runs north / south through the Clock Woods is undersized. Recommend upsize and replacement of 4" main with new 6" PVC and upsize existing 6" main to 8" PVC pipe to meet current and future irrigation needs. This work will include miscellaneous replacement of lateral lines and heads for a comprehensive irrigation upgrade within this zone.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Upsize Mainlines		\$75,000
Misc Irrigation Modifications		\$75,000
	Sub-Total	\$150,000
	Contingency	\$30,000
	Total Cost	\$180,000

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g. Perimeter Fence

The Botanic Garden is bordered on University Drive and the IH30 Service Road by a custom ornamental metal picket fence with a weathered steel finish. At the base of the fence is a continuous concrete mow strip/maintenance edge. With busy traffic along University Drive, this fence has been impacted by vehicular accidents on multiple occasions with staff providing spot repairs as needed. In addition, several pickets are either missing or have rusted through, and the mow strip is deteriorating or missing in several locations. It is recommended to replace the fence and mow strip in its entirety.



Perimeter Fence Rust



Perimeter Fence



Concrete Mow Strip Damage

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Perimeter Fence (Zone 2 Only)	\$325,000
Concrete Mow Strip	\$35,000
Sub-Total	\$360,000
Contingency	\$72,000
Total Cost	\$432,000

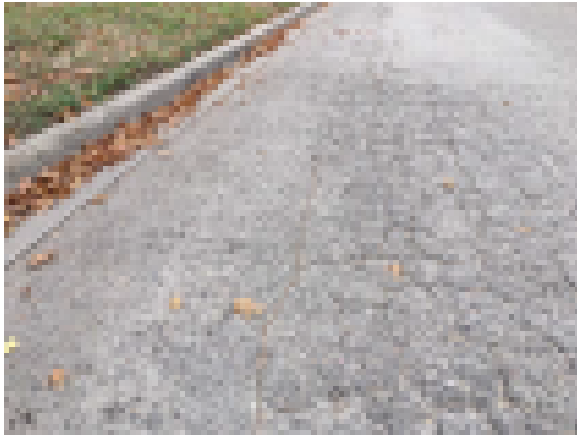
h. Rock Springs Road Improvements

The asphalt roadway surface is deteriorating and has many cracks and potholes. The roadway conveys runoff in the gutter then continues through a curb cut to the creek. The area directly adjacent to the roadway shows signs of wear from pedestrian traffic.

It is recommended to replace the entire road with a new concrete roadway to match the recommendations in Zone 1. Included in this construction, a 5' wide sidewalk should be added to the north side of the road

Assessment – Fort Worth Botanic Garden

from the steps at the North Vista leading to the garden entrance. Additionally, all parking spaces and pavement markings should be repainted and pedestrian access ramps should be reconstructed to meet current standards.



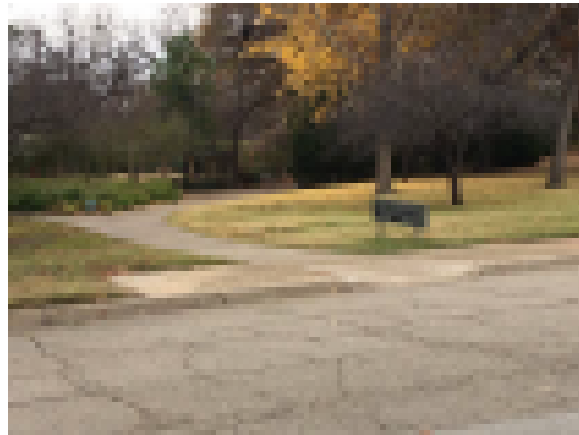
Deteriorating Asphalt Surface



Sediment in Gutter and Worn Pedestrian Path



Worn Markings and Intersection Ramps



Non-Compliant Curb Ramp.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Demolish Existing Asphalt Roadway	\$270,000
New Concrete Roadway w/ Integral Curb	\$450,000
Storm Drainage System	\$22,500
Sub-Total	\$742,500
Contingency	\$148,500
Total Cost	\$891,000

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II. 11 – TEXAS NATIVE FOREST BOARDWALK

A. General Building Information



Texas Native Forest Boardwalk North Entry



Texas Native Forest Boardwalk Pavilion

ARCHITECTURAL

The Texas Native Forest Boardwalk is a pedestrian way that runs north and south between Old Garden Road and the North Vista. The north entry located at Old Garden Road consists of a flagstone paved plaza with an entry arcade depicted by stone wrapped columns at each side supporting a rustic log lintel overhead. The northern portion of the pedestrian way is a 10' wide elevated boardwalk that runs from Old Garden Road towards the south to an interpretive pavilion which is partially on grade. The pedestrian way transitions at the pavilion to an 8' wide paved concrete walk on grade which terminates with another stone wrapped entry arcade with rustic log lintel at the trail head along Rock Springs Road.

The 10' wide elevated boardwalk is a wood framed structure supported on concrete piers. The guardrail is constructed of ipe wood posts with a cable rail system with stainless steel connectors. There are no vertical transitions along the Boardwalk and each end connects at grade level.

The Boardwalk consists of several interpretive stations both at grade (6 stations), as well as along the elevated boardwalk (6 stations). These learning stations located adjacent to the pedestrian way generally consist of one to two ipe wood benches and a interpretive signage display.

There are four group activity areas located along the trail (north to south), one raised high above the ground along the Boardwalk, the interpretive pavilion connecting the elevated Boardwalk to the trail at grade, one identified as the Log Hotel, and lastly to the south one as a natural amphitheater area built into the sloping grade.

The approximately 20' x 40' elevated group activity area located on the Boardwalk high above the ground consists of ten (5 side by side) ipe benches with an instruction area at each end. The approximately 28' x 28' interpretive Pavilion is a hexagon galvanized steel tube framed structure with six stone wrapped columns and a metal roof. The Pavilion, with its lighted interpretative signage displays, connects the paved sidewalk trail to the elevated boardwalk. The Log Hotel is a wood framed shed with a shade canopy extending over its front which offers looking glass displays for learning. The natural Amphitheater consists of log benches resting on concrete paver footings that are stair stepped with the natural grade. The log benches surround a small concrete "stage" made to resemble a tree stump with growth rings.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

The structural system for the Boardwalk is an elevated wood framed walkway supported on drilled concrete piers. The North and South entrances to the Boardwalk have stone clad columns with log lintels. Botanic Garden staff reported that the log lintels need to be regularly maintained or replaced with their deterioration.

The Pavilion is a pre-engineered steel structure with stone clad columns and a shallow slab-on-grade foundation system. There is a wood storage/demonstration building along the route, called the Log Hotel, which doubles as a learning exhibit. The elevated Boardwalk section of the route has wood framed cable guardrails with periodic stainless steel channels as stanchions.



Pavilion



Log Hotel



North Entrance



South Entrance

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be reviewed at this area.

ELECTRICAL

The Boardwalk contains some electrical elements such as lights in the pavilion and GFI protected receptacles to support the exhibits. The receptacles appear to be in good working condition, however the pavilion lighting needs to be replaced. The north entrance of the Boardwalk was noted as having no pedestrian lighting.

The Log Hotel has electric power fed from a nearby box located to the east in the garden area. It all seems to be in good condition.

SITE

The Texas Native Forest Boardwalk links the Moncrief Garden Center, gardens, and parking lots in the north to the gardens and restaurant in the south. It is comprised of a wooden boardwalk with interpretive and educational stations. It is used as a passageway and outdoor classroom intended to educate visitors on the difference between native and invasive species of plants.

Assessment – Fort Worth Botanic Garden

B. Areas of Insufficiency

ARCHITECTURAL

a. Boardwalk Guardrails and Wood Decking

All exposed wood finishes of the elevated Boardwalk are worn due to weather exposure and natural debris. The entire exposed wood framing has faded to its natural patina and surfaces need to be cleaned to keep dirt, debris and natural substances such as sap and scaling from plant life from limiting the usefulness of the wood. The wood should be swept clean and lightly scrubbed with a mild hardwood cleaner and rinsed thoroughly with light water pressure. If retaining the original color and finish is desired, after cleaning the wood surfaces, a UV protectant should be applied.



Guardrail Weathering

Deck Weathering

Opinion of Probable Construction Cost for Recommended Remediation Work

Clean Wood Guardrails	\$1,438
Refinish Wood Guardrails	\$4,313
Clean Wood Decking	\$6,325
Refinish Wood Decking	\$18,975
Sub-Total	\$31,050
Contingency	\$6,210
Total Cost	\$37,260

b. Log Hotel Repairs

The Log Hotel needs a new cedar shake shingle roof and decking, as well as minor wood trim and siding repair.

Assessment – Fort Worth Botanic Garden



Log Hotel



Siding in Disrepair

Opinion of Probable Construction Cost for Recommended Remediation Work

Replace Roof and Deck	\$3,450
Repair Trim and Siding	\$805
Sub-Total	\$4,255
Contingency	\$851
Total Cost	\$5,106

c. Miscellaneous Accessibility Items

At the north entrance, there are a few accessible issues with the curb ramp and access to the trash receptacles (Reference Site description). However, the surface texture of the flagstone paving at the trail head varies more than the 1/2" maximum allowed for accessibility. This problem also exists at the pavilion area.



North Entrance



Pavilion

At the Amphitheater Area, there is no accessible route to the seating space. A paved route from the existing paved path and a pad near the seating area should be provided so a person in a wheelchair could participate in demonstrations at this area.

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Amphitheater Area



Amphitheater Area

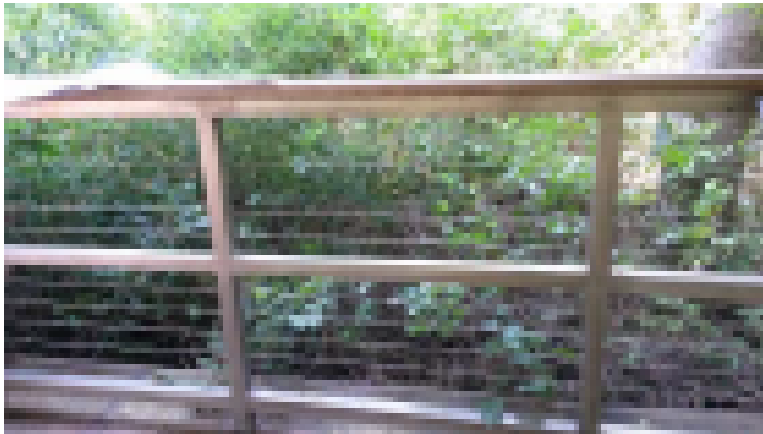
Opinion of Probable Construction Cost for Recommended Remediation Work

Repave Flagstone Areas	\$57,500
Amphitheater Accessible Route	\$8,280
Sub-Total	\$65,780
Contingency	\$13,156
Total Cost	\$78,936

STRUCTURAL

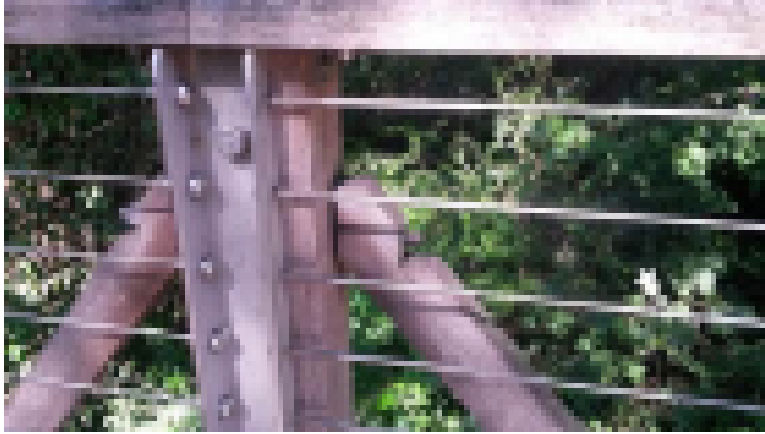
d. Boardwalk Cable Guardrails

Many of the bolts and nuts connecting the diagonal braces to the vertical posts of the guard rail frame were loose. In addition to the loose nuts, one location was found where the nut for the bolt was missing and another location where the bolt was missing. All bolts should be tightened and nuts secured. Any missing bolts or nuts should be replaced.



Boardwalk Guardrails

Assessment – Fort Worth Botanic Garden



Loose Cross Bracing

Opinion of Probable Construction Cost for Recommended Remediation Work

Tighten Bolts and Replace as Required	\$1,000
Sub-Total	\$1,000
Contingency	\$200
Total Cost	\$1,200

MECHANICAL / PLUMBING

Not Applicable.

ELECTRICAL

e. Pavilion Lighting

Pavilion lighting needs to be upgraded to new, energy efficient lighting.

Opinion of Probable Construction Cost for Recommended Remediation Work

Upgrade Pavilion Lighting	\$3,000
Sub-Total	\$3,000
Contingency	\$600
Total Cost	\$3,600

f. North Entrance Lighting

There is no pedestrian lighting at the north entrance. Replace two entrance bollards with two new light bollards that match existing.

Opinion of Probable Construction Cost for Recommended Remediation Work

Upgrade Pavilion Lighting	\$12,000
Sub-Total	\$12,000
Contingency	\$2,400
Total Cost	\$14,400

SITE

g. Site Improvements

A gravel path is currently utilized as a service access from Old Garden Road to the North Vista. This area is also the location where portable restrooms are placed for the Concerts in the Garden. This drive should be paved with concrete to provide an accessible path and level pad for the restrooms.

Assessment – Fort Worth Botanic Garden



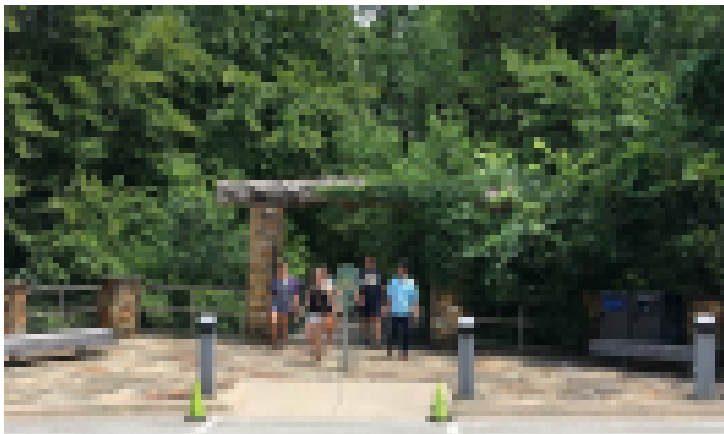
Service Drive Area at Portable Restrooms for Events

Opinion of Probable Construction Cost for Recommended Remediation Work.

Concrete Pavement		\$18,500
	Sub-Total	\$18,500
	Contingency	\$3,700
	Total Cost	\$22,200

h. Boardwalk Entrance Area

The northern Boardwalk entrance intersects Old Garden Road where pedestrian/vehicle conflicts may be a concern. The accessible ramp should be modified to include a truncated dome warning surface. This may be constructed in conjunction with the future renovation of Old Garden Road. Trash receptacles should be relocated from behind the existing benches to allow an ADA compliant clear floor area and access to receptacle openings.



North Entrance to the Boardwalk

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

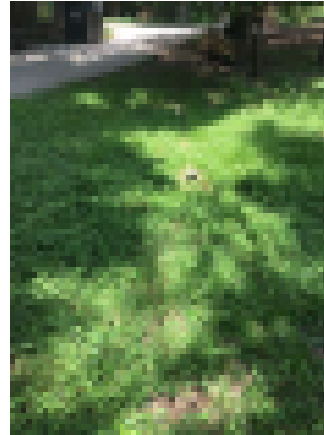
Accessible Ramp w/ Truncated Domes	\$1,500
Relocate Trash Receptacles	\$250
Sub-Total	\$1,750
Contingency	\$350
Total Cost	\$2,100

i. South End Boardwalk Approach

The approach walkway on the south side of the boardwalk was constructed so that it is elevated slightly above the adjacent grade, which obstructs the natural drainage pattern from west to east and creates nuisance water. These low-lying areas should be regraded and area drains installed to reduce the amount of standing water.



Low Lying Area Adjacent to Elevated Concrete Walk



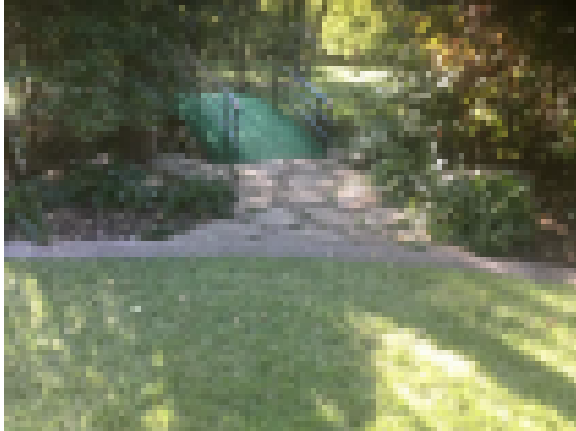
Low Lying Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

Subsurface Drainage Allowance	\$5,500
Earthwork / Fine Grading	\$1,000
Sub-Total	\$6,500
Contingency	\$1,300
Total Cost	\$7,800

III. 12 – SISTER CITIES INTERNATIONAL GROVE

A. General Building Information



Grove Bridge Approach



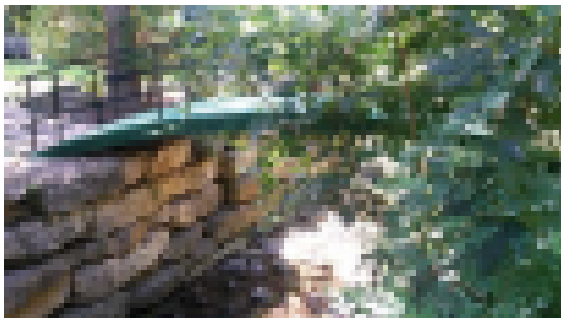
Grove Bridge Walking Surface

ARCHITECTURAL

A small concrete arch footbridge with an artificial turf walking surface and a low steel guardrail is located adjacent to the Texas Garden Clubs Facility and is used to cross the drainage way into the north grove. The bridge is flanked by a series of flagstone pavers; however, one must cross the lawn to gain access to the pavers and the bridge.

STRUCTURAL

The only structure within this area is the bridge located adjacent to the Texas Garden Club site. This circa 1962 bridge is concrete framed with a steel guardrail system. We found no structural deficiencies for this bridge.



Sister Cities International Grove Bridge

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be reviewed at this area.

ELECTRICAL

There were no electrical systems noted to be reviewed at this area.

SITE

The Sister Cities International Grove is located between the North Vista and The Woodlands. This area is defined by a mature grove of trees, meandering mulch path and includes several bench seats and a pedestrian bridge connection to the Texas Garden Clubs building. Typically, this area is a passive space

Assessment – Fort Worth Botanic Garden

meant to be enjoyed by daily visitors for picnicking and strolling. However, during the Concert in the Gardens events this area receives heavy foot traffic and large crowds of overflow seating for large events.

B. Areas of Insufficiency

ARCHITECTURAL

The steepness of the bridge is a slip hazard and the guardrails do not meet current code requirements for height and rail/picket spacing (reference Site). Costs for replacement of this bridge are included in the Site section below.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

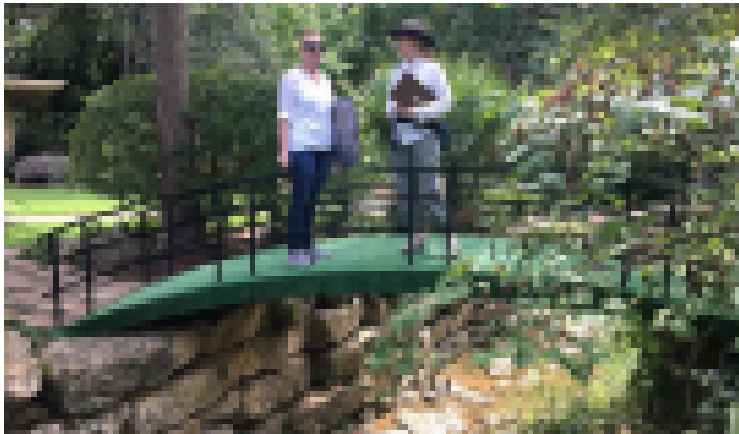
ELECTRICAL

Not Applicable

SITE

a. Pedestrian Bridge

The small pedestrian bridge connecting the Texas Garden Clubs building with the grove should be replaced. The railing and slopes are not compliant with current building code / accessibility standards and the artificial turf is slippery when wet. This bridge should be replaced with a new bridge that meets current standards.



Existing Pedestrian Bridge

Opinion of Probable Construction Cost for Recommended Remediation Work:

Bridge Replacement		\$35,000
	Sub-Total	\$35,000
	Contingency	\$7,000
	Total Cost	\$42,000

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IV. 13Na – PRODUCTION GLASS GREENHOUSE

A. General Building Information



Production Glass Greenhouse Front



Production Glass Greenhouse Rear

ARCHITECTURAL

The Production Glass Greenhouse is approximately 3,100 s.f. and centrally located in the North Production Greenhouse Maintenance Compound. To the east of the Glass Greenhouse is another Production Greenhouse with Fiberglass skin (13Nb), and to the south is the Shop Office (13Nc). The Production Greenhouse is used for growing and storing plants for use within the garden. The workspaces are served by full time employees and volunteers as well as an occasional public tour.

The Greenhouse envelope consists of glass panels inside an aluminum frame supported by a galvanized steel frame. The aluminum framed greenhouse is supported on a CMU stem wall at the perimeter, with galvanized steel columns at the center between the two greenhouse bays. The interior of the greenhouse has gravel floors with table fixtures in rows separated by 48" and 32" concrete walks. There is shade fabric hung from the existing structure under the glass roof panels. There are four access ways into the greenhouse space with man doors located at the front and rear of each structural bay. The back doors of the Greenhouse feed into the attached Potting Shed structure.

At the back of the Greenhouse is a wood framed Potting Shed work room with T111 plywood on the exterior and corrugated roof panels. The interior work space is equipped with large work counter fixtures, a stainless steel double sink with drain board, a single pedestal drinking fountain, perimeter shelving fixtures, a refrigerator, a work table and lockers. The floor is concrete slab and the ceiling is plywood panels with strip fluorescent fixtures mounted at the ceiling. There is a man door and an overhead door to the east, two windows and two man doors to the north. One of the north man doors serves as the entry into a secondary material storage/tool room. This building addition is also a wood framed structure with corrugated metal siding and a metal roof.

GREENHOUSE

The Production Glass Greenhouse (North) is a gutter connected two-roof system, each house is approximately 25' x 124' of greenhouse space attached to a prefinished metal building that acts as a headhouse. The total greenhouse space is approximately 6,200 square feet and is made up of glass glazing supported by an all metal support frame surrounded by a masonry knee wall.

The structural components of this Greenhouse consist primarily of what appear to be aluminum rafters and purlins which support the aluminum glazing system. There is a masonry knee wall that surrounds the Greenhouse structure supporting the secondary structure of aluminum glazing system and lapped glass pieces.

Assessment – Fort Worth Botanic Garden

The existing Greenhouse mechanical systems include an exterior mounted evaporative pad cooling system paired with opposing sidewall exhaust fans to keep the space cool, unit heaters blowing through fan jet tubing to help distribute the air throughout the greenhouse space, and manually operated single ridge vents for passive ventilation (a single run of vents at each peak).

STRUCTURAL

No construction drawings were available for this Greenhouse and its age is unknown. The glazing system appears to be glass panels set in an aluminum frame attached to a steel framed structural system. The foundation system appears to be concrete grade beams with short plinths at column locations. It is unknown if piers were incorporated into the foundation. There is a partial height CMU wall, approximately 32 inches tall, at the perimeter of the building. There is a wood framed head house at the north end of the greenhouse and a wood framed shed with corrugated metal roof and wall skins at the northeast corner of the building.

MECHANICAL / PLUMBING

The work area portion of this facility has two wall mounted window air conditioners, 1.5 ton and 2 ton units, that appear to be in good condition. Both units utilize R-410A refrigerant, and it appears one of the units was installed in 2016. There are two suspended gas-fired unit heaters. They appear to have been installed in 1998. A wall mount exhaust fan with shutter appears to be original to the facility and looks its age. For the work area, plumbing consists of one stainless steel, two compartment free standing sink with associated eyewash and an electric water heater located near the sink. A floor mounted electric water cooler is also located next to the sink. These items appeared to be in working condition.

The Greenhouse portion of this facility has five wall mounted exhaust fans with shutters that appear to be original to the facility. There are two gas-fired unit heaters ducted to plastic duct socks to distribute air throughout the Greenhouse. For the Greenhouse, plumbing consisted of one free standing single compartment stainless steel sink and one emergency shower. A water spray emitter system is throughout the facility and shows signs of aging.

ELECTRICAL

The electrical distribution system is located remotely in the Shop Office (13Nc). It consists of (2) 120/240V, 1-phase, 3-wire panels with a total of 32 circuits available. Circuits feeding the Greenhouse are underground. General greenhouse lighting does not seem operational. Most lighting fixtures do not have lamps. There are plant growth lighting fixtures located throughout the Greenhouse. Power distribution for the lighting fixtures is accomplished with a combination of hardwired nearby receptacles and extension cords. Greenhouse office has fluorescent strips with manual controls. Raceways and equipment inside the Greenhouse show their age, although they are in working condition.

SITE

The North Production Greenhouse Compound is primarily a staff area with various greenhouses, storage buildings, and staff support structures. The site is primarily made up of concrete, asphalt, gravel and rock paving and is in purposefully sufficient shape for this work area. There are no drainage or Irrigation issues that apply to this compound work zone.

B. Areas of Insufficiency

ARCHITECTURAL

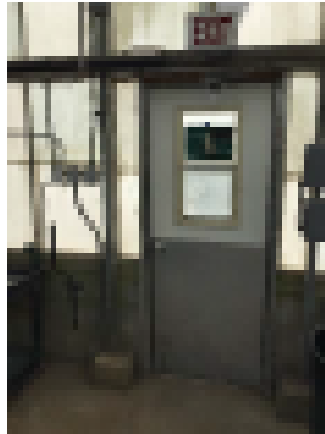
a. Miscellaneous Accessibility Items

The entrances at the Production Glass Greenhouse and the Potting Shed are not considered with the threshold height between the outside grade and the interior concrete paving. Pavement should be modified outside to gradually slope up to the existing stoop. The door hardware at the Production Glass Greenhouse does not meet current accessibility standards with its knob hardware. The door hardware should be replaced with lever type hardware to meet accessible requirements.

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Non-Compliant Entrance



Knob Hardware

The head clearance of the galvanized steel structure does not meet accessibility compliance. The structure between the two bays and the unit equipment is hung approximately 70" a.f.f. As this issue cannot be resolved without rendering the greenhouse non-functional it is recommended to indicate the lower clearance with clear signage. The exit signs above the egress doors are reflective and non-illuminated. For compliance, replacement with illuminated exit signs is required.



Low Structure Clearance



Non-Illuminated Exit Signs

Opinion of Probable Construction Cost for Recommended Remediation Work:

Paving Modifications at Doors		\$2,760
Replace Knob Hardware		\$3,450
Replace Exit Signs		\$2,300
	Sub-Total	\$8,510
	Contingency	\$1,702
	Total Cost	\$10,212

GREENHOUSE

b. Greenhouse Repairs and Upgrades

The existing glazing & glazing system are in need of replacement. It is recommended to replace with a new mill finish aluminum TECHLITE glazing system and 16mm clear Impact Modified acrylic glazing panels. Currently, there is a manual ridge vent that for all intents and purposes is non-functional. It is recommended

Assessment – Fort Worth Botanic Garden

to install an automatic ridge vent drive system for tighter temperature control including new rack and pinion vent operators, drive shaft, and drive motor(s).



Outdated Glazing System



Corroded Ridge Vent Drive

The existing evaporative pad cooling system has wood framing and open water collection system. It is recommended to replace the existing evaporative cooling system and all wood supports with a new efficient evaporative pad cooling system using new aluminum stringers, framing, and flashing. Furnish and install new outside vent operator system supported by 2.5" galvanized steel posts.



Vulnerable Evaporative Cooling System



Weathered Pads

The existing exhaust fans, although very old, seem to be operational. It is recommended that if a new evaporative pad cooling system is installed, that replacement of the exhaust fans with new high efficiency models happen simultaneously. The existing system consists of unit heaters that 'blow' warm air through a fan jet tube that restricts space in the greenhouse. The fan jet model of heat distribution is outdated and a more efficient and 'plant growth friendly' means is to relocate the unit heaters to allow room for new shade system and utilize HAF fans to distribute and de-stratify warm air. It is suggested to remove the jet tube system and relocate the existing unit heaters.

Assessment – Fort Worth Botanic Garden



Outdated Exhaust Fans



Unit Heaters and Fan Jet Tube

The existing shade cloth is an exterior type spray on shade. It is recommended to install a new automated interior shade cloth/heat retention system. The existing controls are a series of individual single stage thermostats. It is recommended to upgrade to a Wadsworth environmental control system.



Spray on Shading



Single Stage Thermostats

Opinion of Probable Construction Cost for Recommended Remediation Work

Equipment Update and 16mm Poly Reglaze	\$546,340
Sub-Total	\$546,340
Contingency	\$109,268
Total Cost	\$655,608

STRUCTURAL

c. Miscellaneous Structural Items

Many of the anchor bolts which were intended to connect the steel columns to the foundation were installed with inadequate bolt projections and thus did not properly engage the anchor bolts nuts. In some cases, the nut was simply omitted as shown in the photograph below, left; in some cases, the nut was applied but lacked proper engagement with the anchor bolt, as shown in the photograph below, right; and in other cases, the bolt was plug welded to the base plate. 56 of the 104 anchor bolts installed in this greenhouse (54%) lacked sufficient attachment and require remediation. It is recommended to plug weld these bolts to the column base plates and apply a zinc rich repair paint to the welded area.

Assessment – Fort Worth Botanic Garden

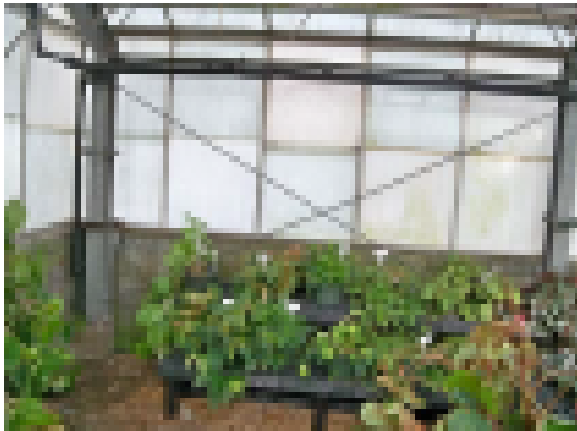


Missing Anchor Bolt



Plug Welded Anchor Bolt

There are eight wall X-braces within the Greenhouse. Most of these are loose and require re-tensioning. It is recommended to re-tension braces to a snug tight condition. The anchor bolts at the southeast corner of the building were set too close to the edge of the plinth which contributed to the spalling of the plinth. It is recommended that the spalled area of the plinth be removed and the plinth reinforced and enlarged to provide a minimum 2.5" clearance over the anchor bolts. Drill and epoxy three #3 U-shaped bars into the side of the plinth to be enlarged and repair with Sikatop 111 Plus repair mortar.



Loose X-Bracing



Plinth Spalling

Opinion of Probable Construction Cost for Recommended Remediation Work:

Weld Anchor Bolts to Base Plates	\$3,150
Tighten X-Braces	\$165
Repair Southeast Plinth	\$1,200
Sub-Total	\$4,515
Contingency	\$903
Total Cost	\$5,418

MECHANICAL / PLUMBING

d. Work Area Unit Heater and Exhaust Fan Replacement

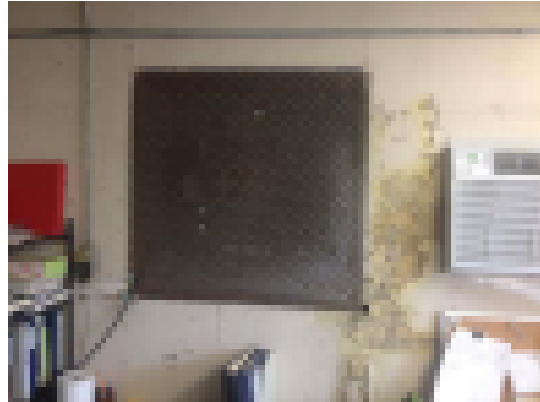
The two unit heaters in the work area have reached their life expectancies. One unit was installed in 1998 and is 19 years old. The wall mount exhaust fan appears to be original to the facility and does not appear to be utilized any more. The eyewash is dirty and could restrict water flow during use. It is recommended

Assessment – Fort Worth Botanic Garden

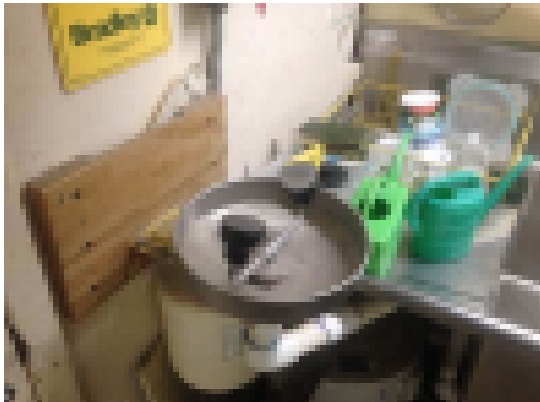
to replace the gas-fired unit heaters and associated flue piping and remove wall mount exhaust fan and patch exterior wall. It is recommended that new unit heaters be separated by combustion and vent type to allow all vent and combustion air to come directly from the outdoors. It is recommended to clean eyewash unit.



Gas-Fired Unit Heater in Work Area



Wall Mount Exhaust Fan in Work Area



Eyewash in Work Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replacement of Two Unit Heaters	\$9,000
Removal of Wall Mount Exhaust	\$2,500
Clean Eye Wash Unit	\$200
Sub-Total	\$11,700
Contingency	\$2,340
Total Cost	\$14,040

e. Greenhouse Exhaust Fans and Unit Heaters

The five wall mounted exhaust fans appear to be original to the facility. Numerous exhaust fans squeak and have loose belts. It is recommended to replace the exhaust fans due to years in service of 22 years and have service life between 15 to 20 years. Costs for replacement of these fans is included in the Greenhouse insufficiencies.

Assessment – Fort Worth Botanic Garden



Wall Mount Exhaust Fans

Two gas-fired units should have belt guards on the fans and unit heaters show signs of rust. Gas piping within the Greenhouse is rusted. It is recommended to replace unit heaters and to clean and paint the natural gas piping. Costs for replacement of these heaters are included in the Greenhouse Items.



Unit Heater



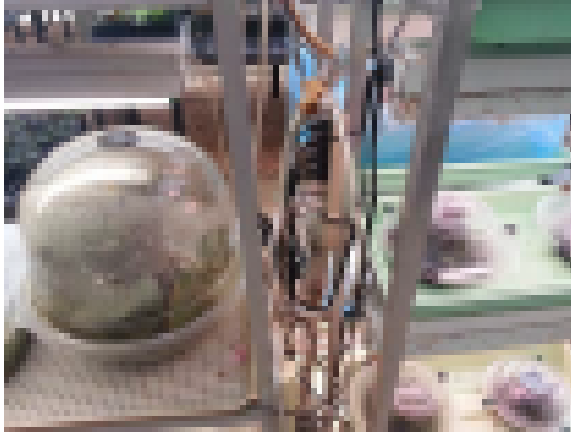
Rusted Natural Gas Piping

ELECTRICAL

f. General Greenhouse Convenience Receptacles

This Greenhouse needs more receptacles throughout the facility. Current needs are met using power strips and extensions cords. Provide two to four quadruplex receptacles per rack depending on rack use.

Assessment – Fort Worth Botanic Garden



Example of Power Strips in Greenhouse



Example of Extension Cord Use

Opinion of Probable Construction Cost for Recommended Remediation Work:

Provide New Power Receptacles	\$4,000
Sub-Total	\$4,000
Contingency	\$800
Total Cost	\$4,800

g. General Greenhouse Lighting

Existing general lighting is not operational and needs replacement with new LED fixtures.



Example of Non-Operational Lighting Fixture

Opinion of Probable Construction Cost for Recommended Remediation Work:

Upgrade General Lighting with LED Fixtures	\$7,500
Sub-Total	\$7,500
Contingency	\$1,500
Total Cost	\$9,000

h. General Greenhouse Raceway Maintenance

Power raceways are in disrepair throughout the entire building. It is recommended to repair these raceways.

Assessment – Fort Worth Botanic Garden



Raceways Requiring Replacement



Raceways Requiring Repair



Raceways Requiring Repair

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair/Replace Existing Raceways	\$2,500
Sub-Total	\$2,500
Contingency	\$500
Total Cost	\$3,000

SITE

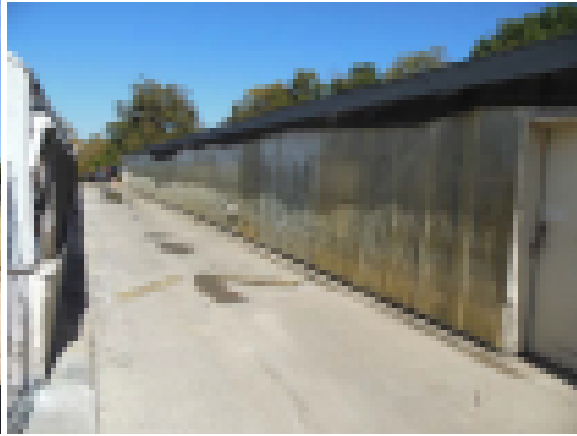
There were no site insufficiencies found within this area. There are no drainage, irrigation or accessibility issues that would apply.

V. 13Nb – PRODUCTION FIBERGLASS GREENHOUSE

A. General Building Information



Production Fiberglass Greenhouse Rear



Production Fiberglass Greenhouse Exterior

ARCHITECTURAL

The Production Fiberglass Greenhouse is approximately 3,100 s.f. and is located along the eastern edge of the North Production Greenhouse Maintenance Compound. To the west of the Production Fiberglass Greenhouse lies the Production Glass Greenhouse (13Na), and to the south is the Quonset Shed Storage (13Ne). The Production Greenhouse is used for growing and storing plants for use within the garden. The workspaces are served by full time employees and volunteers as well as an occasional public tour.

The Greenhouse envelope consists of fiberglass panels attached to a painted steel truss framework and steel columns. Along the west wall, 4" rigid Insulation board has been placed above the CMU knee wall. The steel structure penetrates the CMU knee wall along the perimeter while the fiberglass panels extend down the outside face to finish grade. The steel truss framing is supported in the center valley between the two Greenhouse bays with steel columns. The interior of the Greenhouse has gravel floors with table fixtures in rows separated by 18" and 24" wide concrete walks. There are three access ways into the greenhouse space, two sliding wood doors on the west side and one swinging wood door at the back of the east bay.

STRUCTURAL

The age of this Greenhouse is unknown, but the construction resembles that for which we were provided an untitled and unsealed set of drawings. The building was constructed with 2 and 3 inch diameter steel pipe columns and trusses fabricated from 1 inch diameter steel pipe. The supporting steel columns are embedded in concrete footings. Corrugated fiberglass panels are screw attached directly to steel framing at walls and roof. The lateral bracing system is composed of four X-braces of No. 3 rebar welded to the surface of the steel columns. The structural design of the building is of questionable merit and likely was not properly engineered.

MECHANICAL / PLUMBING

There are four wall mounted exhaust fans with shutters. These fans appear to be original to the facility in 2006. There are four circulation fans that are connected to duct socks that distribute air throughout the facility. Four gas-fired unit heaters feed heated air towards the intake portion of the circulation fans. There are two additional gas-fired unit heaters that are suspended in the Greenhouse. All equipment appears to be original to the facility and is about 11 years old. Equipment is close to reaching its service life within the next 4 years.

Assessment – Fort Worth Botanic Garden

There is a free standing single compartment stainless steel sink with associated electric point of use electric water heater.

ELECTRICAL

The power distribution system consists of a single 120/240V, 24-circuit panel. The panel is in good working condition. General lighting consists of enclosed lighting fixtures with compact fluorescent lamps and manual controls. There are very few convenience receptacles to provide power to greenhouse loads. Current needs are met using power strips and extension cords. Some loads require extension cords of up to 50’.

SITE

The North Production Greenhouse Compound is primarily a staff area with various greenhouses, storage buildings, and staff support structures. The site is primarily made up of concrete, asphalt, gravel and rock paving and is in purposefully sufficient shape for this work area. There are no drainage or Irrigation issues that apply to this compound work zone.

B. Areas of Insufficiency

ARCHITECTURAL

a. Building Demolition and Replacement

The determination has been made structurally that this building is unsafe for habitation and in a state of severe disrepair. It is recommended to demolish the building and build a new greenhouse with similar functionality in its place. Additional individual items have been provided in items below for reference, but pricing has not been provided for those items.

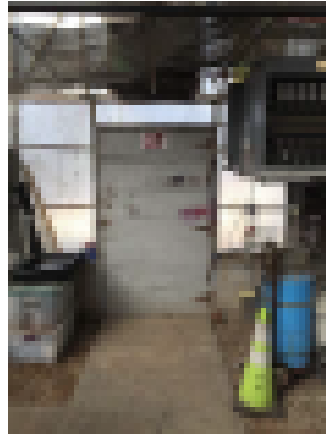
Opinion of Probable Construction Cost for Recommended Remediation Work:

Building Demolition and Replacement	\$834,900
Sub-Total	\$834,900
Contingency	\$166,980
Total Cost	\$1,001,880

b. Miscellaneous Accessibility Items

None of the three entrances are accessible as they exceed the 5 lbs of opening force at these heavy wood doors, along with the door jamb depth being greater than 8” (10” depth provided). The NW sliding door is constructed with a stepped foundation as you cross the threshold. The door hardware at the north swinging wood door does not meet current accessibility standards with its latch and should have hardware that meets accessible requirements. The 80” minimum clearance for projected elements such as various ceiling hung equipment does not meet accessibility compliance. Unit heaters in the area are currently hung at approximately 65” a.f.f.

Assessment – Fort Worth Botanic Garden



Non-Compliant Door (West) Non-Compliant Door (North)

Concrete pathways provided on the interior are 18" and 24" wide. The minimum accessible route width is 36". These concrete pathways need to be 36" minimum. The exit signs above the egress doors are reflective and non-illuminated. These need to be illuminated exit signs. Pricing for all of these accessibility items is not provided as the overall recommendation is for demolition and replacement of the structure.



Narrow Concrete Pathways

STRUCTURAL

c. Facility Structural Integrity

This building has questionable structural integrity and has deteriorated to the point that it would not be economically feasible to attempt to remediate all the problems. It is believed that the structure is not sufficient to resist current code mandated loading. Further, the building is in poor condition with significant rusting of the steel structure (particularly near base of columns), deterioration of the fiberglass panels at roof and wall, and many of the screws intended to secure the fiberglass panels to the structure are missing, loose, or rusted. It is believed that this building constitutes a safety hazard and is recommended that it be demolished and replaced with a properly engineered structure. Refer to Architectural for building replacement costs.

MECHANICAL / PLUMBING

d. Exhaust Fan and Unit Heater Replacement

Equipment appears to be original to the building and about 11 years old with an overall service life of 15 years. There are several wall mounted exhaust fans that are rattling. Two of the gas fired unit heaters flues are non-code compliant as they are too close to the ventilation air intake and entry door to the facility. Pricing for this item has not been provided as the recommendation is for total facility replacement.

Assessment – Fort Worth Botanic Garden



Wall Mounted Exhaust Fan



Flue Clearance to Intake

e. Sink Replacement

The sink's protective finish is peeling and shows deterioration. Pricing for replacement of this item has not been provided as the recommendation is for total facility replacement.

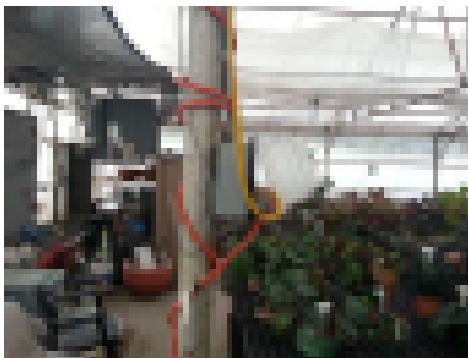


Peeling at Sink

ELECTRICAL

f. Convenience Receptacles

The Greenhouse needs additional convenience receptacles located throughout the facility. Current needs are met using power strips and extensions cords. Pricing for this item has not been provided as the recommendation is for total facility replacement.



Example of Extension Cord Use

Assessment – Fort Worth Botanic Garden

SITE

There were no site insufficiencies found within this area. There are no site drainage, irrigation or accessibility issues that would apply.

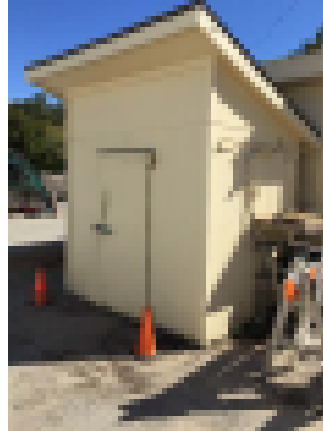
Assessment – Fort Worth Botanic Garden

VI. 13Nc – SHOP OFFICE

A. General Building Information



Shop Office Building Entry



Bulb Cooler Building

ARCHITECTURAL

The Shop Office is approximately 170 s.f., houses the Assistant Field Operations Supervisor and is centrally located in the North Production Greenhouse compound adjacent to the glass and fiberglass greenhouses. The office is constructed of painted CMU with a wood framed roof structure. The office offers one window facing east and a man door with storm door to the south. The interior of the office is painted CMU with a plywood flooring.

On the north side of the Shop Office is a wood panel clad refrigerated building utilized for cooling bulbs with an insulated door to the north.

STRUCTURAL

This is a small one room office with CMU walls and wood framed roof system. There is a small wood-framed refrigerated room located immediately to the north of the office. Both buildings are on a concrete slab foundation. The age of the buildings is unknown, but appeared to be in good condition.

MECHANICAL / PLUMBING

The office has a wall mount air conditioner. Unit appears to be in good condition and operational.

ELECTRICAL

The Shop Office building contains two 120/240V panels that serve the office and the Production Glass Greenhouse. Both panels are in good condition. Lighting in the Office consists of 2x4 fluorescent lighting fixtures with manual controls and is in good condition.

SITE

The North Production Greenhouse Compound is primarily a staff area with various greenhouses, storage buildings, and staff support structures. The site is primarily made up of concrete, asphalt, gravel and rock paving and is in purposefully sufficient shape for this work area. There are no drainage or Irrigation issues that apply to this compound work zone.

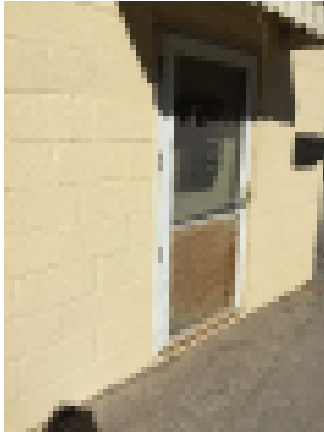
Assessment – Fort Worth Botanic Garden

B. Areas of Insufficiency

ARCHITECTURAL

a. Accessibility Items

The office door threshold does not meet accessibility requirements with its change in elevation. There is a rise greater than 1/2" between the slab and the outside grading in addition to a storm door threshold increases this height restriction. Paving outside this entrance should be modified to allow for an accessible approach.



Shop Office Door Threshold

Opinion of Probable Construction Cost for Recommended Remediation Work:

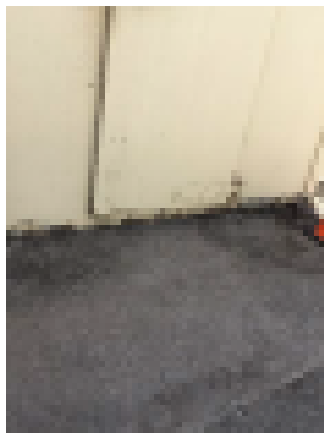
Paving Modifications at Door		\$2,760
Sub-Total		\$2,760
Contingency		\$552
Total Cost		\$3,312

b. Bulb Cooler Cladding

The wood paneling at the base of the refrigerated building is deteriorating from moisture and contact with the ground. Existing cladding should be removed and new weatherproof cladding should be applied to this structure. However, considering the function and location of this structure, consideration should also be made for an exterior rated pre-fabricated cooler. Pricing below reflects re-cladding.



Bulb Cooler



Bulb Cooler Deterioration

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Re-Clad Cooler with Fiber Cement Siding	\$3,496
Sub-Total	\$3,496
Contingency	\$699
Total Cost	\$4,195

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

There were no site insufficiencies found within this area. There are no site drainage, irrigation or accessibility issues that would apply.

Assessment – Fort Worth Botanic Garden

VII. 13Nd – BREAKROOM BUILDING

A. General Building Information



Break Room Building Context



Break Room Building Exterior

ARCHITECTURAL

The Breakroom Building is approximately 2,000 s.f. and provides a base facility for staff use for lunch/meeting space, a restroom, shower room, locker/tool area, and a sign shop. The Breakroom building is centrally located along the south border of the North Production Greenhouse compound, just west of the Quonset Storage Shed (13Ne). The building is a Pre-Engineered Metal Building with metal panel siding and roof. The building offers one window, one man door and an overhead door facing north, while the south has one man door that exits into the Japanese Garden.

Originally, the building was intended as an unconditioned maintenance shop. At some point in the building's life it was converted into a makeshift breakroom and locker room while also retaining an area for the sign shop.

The finishes for the break room, restroom and shower room are painted drywall, 2x4 lighting within an acoustical ceiling tile grid, with VCT flooring and rubber base. The break room fixtures consist of lunchroom tables, 3 refrigerator freezer units, an ice machine, eye wash, a stainless single compartment sink, a counter sink, microwave, vending machines and a single pedestal electric water cooler.

The finishes for the locker and tool area are a concrete slab, painted drywall and an exposed structure ceiling with 8' strip lighting. The locker and tool area consists of assorted lockers, a 12" wide wood bench, and a caged tool area. The sign shop finishes are a concrete slab, painted plywood wall panels and ceiling, with strip lighting. The sign shop is outfitted with a work desk, template storage shelves, and reference material.

STRUCTURAL

This is a Pre-Engineered Metal Building of unknown age on a concrete foundation. No construction drawings were provided for this building. The eastern portion of the building serves as a breakroom with restroom facilities. This portion of the facility has suspended ceilings and drywall partitions which cover the structural system. The west portion of the building is a shop with exposed structure. The framing, roof deck, and wall sheathing appear to have been covered with fireproofing insulation material at one time, which is now mostly gone. Mild to moderate levels of rust were found on the exposed-to-view portions of the structure (purlins, girts, and frames). While we found no structural deficiencies, we recommend cleaning and painting the purlins, girts, and frames in the shop area to extend their useful life.

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

There is a 5-ton split system serving the main breakroom area. The indoor unit appears to have been installed in 2007 and the outdoor condenser installed in 2009. Life expectancies for this equipment is about 15 years. The sign shop area is served by a wall mount air conditioner and appears to be functioning properly. The storage area is heated by a gas-fired horizontal furnace and ventilated with a roof mounted exhaust fan. The restroom has a ceiling mounted heater and an exhaust fan.

The Breakroom area has a free standing, stainless steel single compartment sink, emergency eyewash, counter mounted double compartment stainless steel sink, floor mounted electric water cooler, and ice machine. The restroom for this facility has a floor mounted tank type water closet, wall mounted urinal, and wall mounted lavatory. There is a separate shower area that also houses a 50 gallon gas-fired water heater which was installed in 2012. All fixtures are in working condition.

ELECTRICAL

The Breakroom Building has a 120/240V, single-phase, 30-wire panel and one subpanel. The main panel has 24-circuit breakers and the subpanel has 6 circuit breakers. Both panels are in good condition. The building has fluorescent lighting with manual controls. The locker room area has fluorescent strips with reflectors. The switch that controls the locker rooms also controls an office at the far end.

SITE

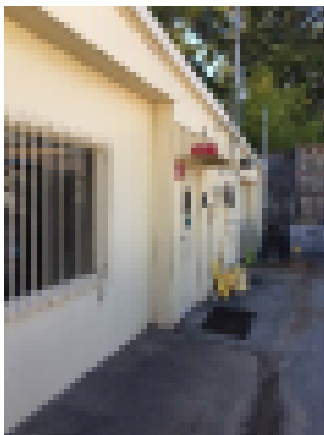
The North Production Greenhouse Compound is primarily a staff area with various greenhouses, storage buildings, and staff support structures. The site is primarily made up of concrete, asphalt, gravel and rock paving and is in purposefully sufficient shape for this work area. There are no drainage or Irrigation issues that apply to this compound work zone.

B. Areas of Insufficiency

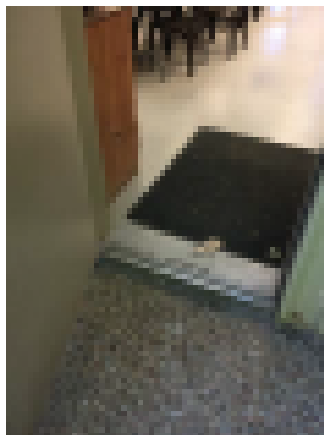
ARCHITECTURAL

a. Architectural Insufficiencies and Renovations

The north break room entrance door does not meet accessibility requirements due to its change in elevation at the threshold as well as the exterior approach slope. There is a rise greater than 1/2" between the floor slab and the outside grading in addition to a sloped stoop to the threshold. The south break room entrance door from the Japanese Gardens does not meet accessibility requirements due to its change in elevation at the threshold as well as the exterior approach. There is a rise greater than 1/2" between the floor slab and the outside stoop as well as the change in elevation from grade to the exposed aggregate stoop.



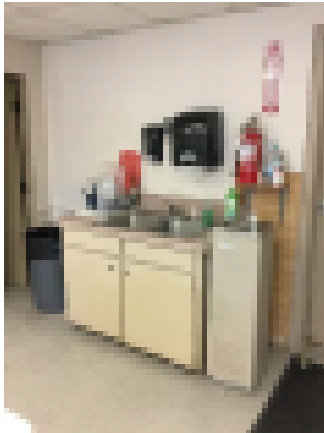
North Entry



South Entry

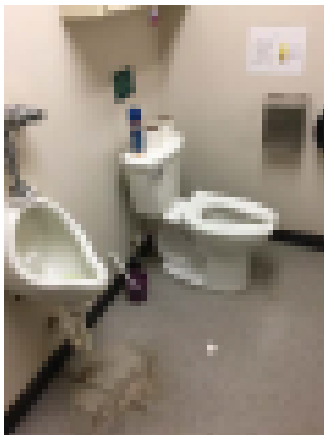
An accessible sink and counter with allowable knee space and appropriate height needs to be provided. An accessible Hi/Lo electric water cooler needs to be provided.

Assessment – Fort Worth Botanic Garden

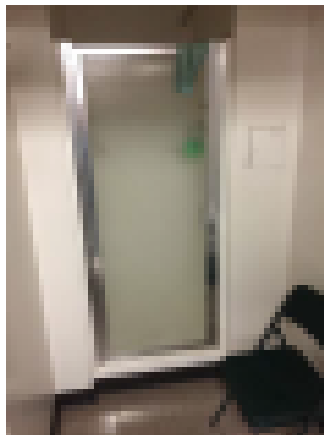


Sink and Water Cooler

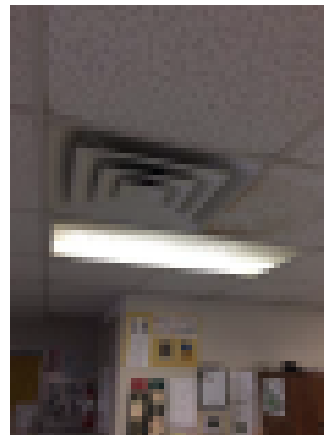
The restroom does not provide the accessible clearances required for fixtures, accessories, or proper turning radii. The shower room does not provide an accessible changing bench, turning radius, or an accessible shower with shower seat or rollover threshold. There are a considerable amount of stained ceiling tiles from either roof leaks or suspected mechanical condensation.



Employee Restroom



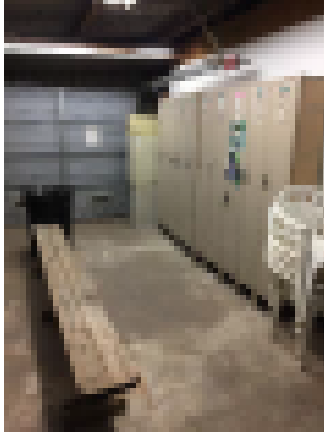
Shower Area



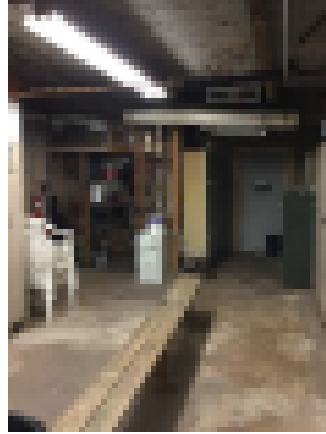
Stained Ceiling Panels

The locker room door does not meet accessibility requirements with its change in elevation at the threshold. There is a rise greater than 1/2" between the break room floor and the locker room floor. The locker room does not provide an accessible locker with proper reach ranges and heights require. The locker room bench is not accessible, though as this is not a changing room it is not required. Should the function of this locker room change to meet this requirement, an accessible bench would have to be provided. The fire proofing on ceiling inside the locker room area has been removed. It is suspected that the fire proofing was required with its former occupancy but is not required for the current one.

Assessment – Fort Worth Botanic Garden



Locker Room



Missing Fireproofing

It is recommended to demolish the interior of this building and reconfigure the space with accessible break room, restroom, locker, and shower provisions. It is also recommended to reskin this building with new metal panels and to add insulation at the roof and walls.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Renovate Building		\$287,500
	Sub-Total	\$287,500
	Contingency	\$57,500
	Total Cost	\$345,000

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

b. Modify 5-ton Condensing Unit

The 5-ton outdoor condensing unit is mounted too close to the ground and there is shrub and leaf debris build-up around it. It is recommended to raise the condensing unit so that it sits higher than adjacent grade and remove overgrown shrubs and leaves around it.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Raise Condensing Unit		\$600
	Sub-Total	\$600
	Contingency	\$120
	Total Cost	\$720

ELECTRICAL

c. Miscellaneous Electrical Items

Locker room lighting shows signs of corrosion and needs to be replaced. In addition, the lighting in the office needs to be controlled separately from the locker room. There is a mostly unsupported MC cable installed on the east side of the Breakroom Building. This cable needs to be replaced with a conduit suitable to withstanding exterior environments. The back exit in the Breakroom Building has a non-lit exit sign. This sign needs to be replaced with an illuminated one.

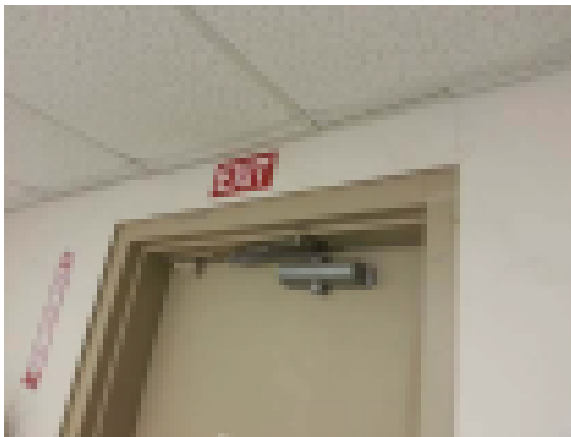
Assessment – Fort Worth Botanic Garden



Example of Corroded Lighting Fixture



Exterior MC Cable Without Protection



Non-Illuminated Exit Sign

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Lighting Fixtures in Locker Room	\$1,200
Provide Separate Controls for Office	\$300
Replace MC with Conduit	\$200
Replace Exit Sign	\$500
Sub-Total	\$2,200
Contingency	\$440
Total Cost	\$2,640

SITE

There were no site insufficiencies found within this area. There are no site drainage, irrigation or accessibility issues that would apply.

Assessment – Fort Worth Botanic Garden

VIII. 13Ne – QUONSET STORAGE SHED

A. General Building Information



Quonset Storage Exterior



Quonset Storage Interior

ARCHITECTURAL

The Quonset Storage Shed is approximately 3,000 s.f. and is located along the southern edge of the North Production Greenhouse Maintenance Compound adjacent to the Breakroom Building (13Nd). To the north of the Quonset Storage Shed is the Production Fiberglass Production Greenhouse (13Nb). The Quonset Storage Shed is used for storing tools, equipment, bagged landscape material, as well as stacked patio chair furniture. The storage spaces are secured with gates at the exterior openings as well as cyclone fence containment for the various groups that utilize the structure. The Quonset Storage Shed envelope consists of corrugated fiberglass panels attached to a painted steel truss framework.

STRUCTURAL

The age of this structure is unknown, but is believed to have been built in the 1940's or 1950's. The structural system is composed of curved steel pipes forming the ribs of the structure, which are directly buried in the ground, and transverse pipe purlins for the connection of the corrugated fiberglass skin.

MECHANICAL / PLUMBING

There are two gas-fired unit heaters and a circulation fan within this facility. Heaters and fan appear to have been abandoned in place.

ELECTRICAL

Electrical power for this facility comes from the Breakroom Building. Equipment has been abandoned in place. Some raceways are not supported according to code.

SITE

The North Production Greenhouse Compound is primarily a staff area with various greenhouses, storage buildings, and staff support structures. The site is primarily made up of concrete, asphalt, gravel and rock paving and is in purposefully sufficient shape for this work area. There are no drainage or Irrigation issues that apply to this compound work zone.

Assessment – Fort Worth Botanic Garden

B. Areas of Insufficiency

ARCHITECTURAL

a. Facility Demolition and Replacement

With the existing extremely poor condition of the steel frame and the corrugated fiberglass skin, it is recommended that this structure be removed and replaced with a new Pre-Engineered equipment and material storage structure.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Building Demolition and Replacement	\$313,950
Sub-Total	\$313,950
Contingency	\$62,790
Total Cost	\$376,740

STRUCTURAL

b. Facility Structural Integrity

This building has questionable structural integrity and has deteriorated to the point that it would not be economically feasible to attempt to remediate all the problems. The building has significant rusting of the steel structure (particularly near base of columns), deterioration of the fiberglass panels, and many of the screws intended to secure the fiberglass panels to the structure are missing, loose, or rusted. It is believed that this building constitutes a safety hazard and recommend that it be demolished and replaced with a properly engineered structure. Refer to Architectural for building replacement costs.

MECHANICAL / PLUMBING

c. Remove Unit Heaters and Fan

It appears that the unit heaters and circulation fan have been abandoned in place. It is recommended to demolish this equipment and its associated piping since it is no longer utilized. Pricing for the equipment removal and providing new is included in the overall pricing of the new building.



Unit Heaters and Circulation Fan

ELECTRICAL

d. Remove Abandoned Equipment

Equipment abandoned in place needs to be removed. Electrical raceways to remain need to be supported according to code, however, recommendation is for demolition of the entire facility, so pricing for this and providing new is included in the overall pricing of the new building.

Assessment – Fort Worth Botanic Garden



Example of Unsupported Raceway

SITE

There were no site insufficiencies found within this area. There are no site drainage, irrigation or accessibility issues that would apply.

Assessment – Fort Worth Botanic Garden

IX. 14 – NORTH VISTA

A. General Building Information



Spirit of Woman Sculpture



North Vista Looking South

ARCHITECTURAL

There is one structured element within the North Vista: the “*Spirit of Woman*” sculpture, which is a life size bronze statue of a pioneer woman waving a towel to call her family in from the crop fields. The sculpture is surrounded on the north side by a tall flower bed exhibit and a series of concrete planter walls. The taller planter wall to the rear is used to recognize recipients of the Altrusa Civic “Women of Distinction” Award each year. The recipients’ names are added to the brass plaques mounted on the face of the wall. The sculpture itself sits on a semicircular concrete pad with a crescent shaped flower bed in its foreground.

STRUCTURAL

The only structures within this area are the concrete planters at the *Spirit of Woman* sculpture. All these planters were in good conditions.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be reviewed at this area.

ELECTRICAL

The North Vista contains two power centers for special event power distribution. Each power center has a 480V panel, a transformer and a 120/208V panel for load distribution. All equipment is in NEMA 3R enclosures and mounted on a unistrut structure on a concrete slab. Both centers seem in good working condition.

SITE

The North Vista is an open lawn area between the Texas Native Boardwalk to the west and The Woodlands to the east. It features the *Spirit of Woman* sculpture and a long “Crescent” bed of showy shrubs and flowers. The North Vista serves as a venue for large gatherings and events like the Concerts in the Garden series, and on a day to day basis as a place where visitors may stroll and enjoy long views.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable.

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

a. Site Improvements / Drainage / Irrigation

The North Vista lawn is elevated above the adjacent grade impeding the drainage patterns from West to East. Over years, this lawn has become compacted and worn resulting in localized puddling. Over time, staff has installed area drains to alleviate localized drainage issues. However, after rain events or heavy use, the lawn in the North Vista still sustains visible wear such as rutting, standing water and muddy areas.



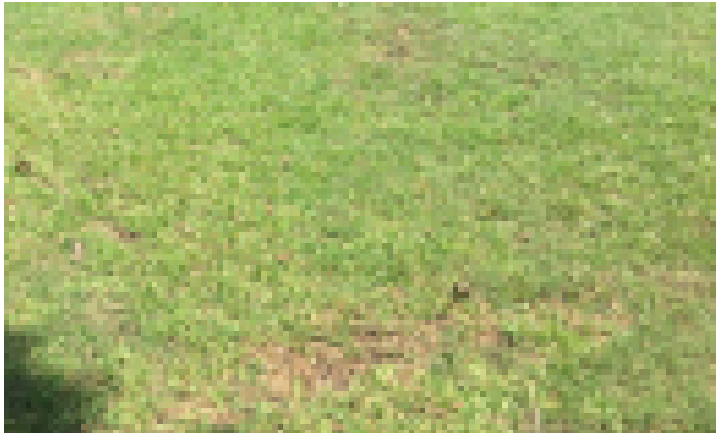
North View From Approximate Stage Location

The entire lawn and soil beneath it should be excavated and reconstructed using a structural soil that is free draining and more capable of supporting the weight of heavy foot traffic and occasional service vehicle use without creating ruts or other damage. This construction would be similar to an athletic field, and would also include a subsurface drainage system to evacuate water. Additionally, surface runoff upstream of the lawn will need to be collected into area drain inlets and connected to a storm drainage system outfalling to the creek. Reconstruction would include installing new sod and irrigation system modifications (new heads, etc.).



Standing Water / Muddy Areas Due to Wear and Lack of Positive Drainage

Assessment – Fort Worth Botanic Garden



Worn Lawn Areas Due to Foot Traffic and Poor Drainage



Localized Drainage Solutions

Opinion of Probable Construction Cost for Recommended Remediation Work:

Excavation & Site Preparation	\$35,000
Subsurface Drainage Allowance	\$75,000
Install Free Drainage Fill Material	\$320,000
Replace Topsoil / Fine Grading	\$15,000
Replace Sod	\$55,000
Irrigation Modifications	\$40,000
Sub-Total	\$540,000
Contingency	\$108,000
Total Cost	\$648,000

Assessment – Fort Worth Botanic Garden

X. 15 – ROCK SPRINGS CENTER & THE GARDENS RESTAURANT

A. General Building Information



Rock Springs Restaurant Entry



Rock Springs Center Rear

ARCHITECTURAL

The Rock Springs Center and Gardens Restaurant of approximately 7,700 s.f. has evolved through a series of renovations and expansions. Originally built in 1934 as an Auditorium, Reception Room and Office adjacent to the Exhibition Greenhouse, the Rock Springs Center has expanded through the years to become administrative offices, the Mary Daggett Lake Library, as well as the Gardens Restaurant with a commercial kitchen, restrooms, and three dining rooms. The latest renovation being in 2000 with renovations to the kitchen and restroom facilities and a new roof installed on the Rock Springs Center in 2017. The building envelope consists of a concrete slab on grade, wood framing, with stone and wood siding veneers. Many of the original windows with leaded glass remain due to its historic classification. Bulk storage for the restaurant is via the Triplex Building (17B).

The Gardens Restaurant also features a dining deck located on the south side of the building. This composite wood slat and rail construction creates a raised dining deck that features an aluminum canopy with frosted plexiglass roof panels.

STRUCTURAL

This main building is comprised of the original 1934 building and additions that were added in 1950, 1955, and 1980. The original building was constructed with a wood framed roof supported on load-bearing stone walls. The remainder of the structure is wood framed with stone and wood siding veneers. All foundations are slab on grade with footings beneath load-bearing walls. The kitchen was remodeled and fire walls added in 1991.

The dining deck located to the southeast of the main building is composed of composite plastic wood decking (TREX) supported on wood framing with galvanized steel posts extending into concrete piers.

MECHANICAL / PLUMBING

The office areas are served by two twinned, gas-fired 5-ton split systems. It appears these 5-ton units were installed in 2008. The buffet dining area is served by one 5-ton gas-fired split system. It appears this 5-ton split system was installed in 2008. The kitchen area is served by one 5-ton packaged rooftop unit. The Dining room is served by a 15-ton split system with gas-fired duct heater. It appears this equipment was installed in 2014. The library and additional offices near the bar area are served by one 3-ton gas-fired split system. It appears this equipment was installed in 2009. For the most part, equipment appears to be in good condition and functioning. Equipment utilizes R-410A refrigerant. The facility utilizes a central Metasys control system.

Assessment – Fort Worth Botanic Garden

The office and buffet dining indoor air conditioning units are located in the mechanical room on the first floor. The other indoor split air conditioning systems are located in the attic which is accessible by a pull-down ceiling access door in the kitchen. Access to equipment in the attic is very difficult as equipment locations are very congested. There is not a clear walking platform provided in front of the attic equipment. Attic access in the kitchen is not the most ideal due to the kitchen equipment locations and operations.

All supply and return air duct systems are ducted with minimal duct insulation where exposed in the attic.

There are two individual men's and women's restrooms in the office area. Each restroom has a wall mounted lavatory, floor mounted tank type toilet, and ceiling exhaust grille. Plumbing fixtures are operational. The main restrooms are located near the bar area. The women's restroom has two floor mounted, flush valve water closets, two wall mounted lavatories, and a floor drain. The men's restroom has a floor mount, flush valve water closet, wall mounted urinal, two wall mount lavatories, and a floor drain. The bar area has a stainless steel, single compartment sink which is counter mounted. There is a mop sink, a wall mount lavatory, and an ice machine near the kitchen. The lavatory and mop sink show signs of age. Plumbing fixtures appear to be operational.

There is a single 99 gallon gas-fired water heater installed in the first floor mechanical room. This water heater was installed in 2014.

The kitchen has a free standing, stainless steel double compartment sink, floor sink, and a hand sink. There are also two kitchen grease hoods ducted up to roof mounted exhaust fans.

The Public restroom attached to this facility has a floor mount, tank type water closet, wall mount lavatory, ceiling mount heater. This room shows signs of age and normal use.

ELECTRICAL

The power distribution system for the restaurant is a 600A, 120/240V 3-phase, 4-wire, high-B delta system. The service entrance equipment is located on the back exterior wall of the restaurant. This panel provides power to the rest of the panels. There are three additional panels located adjacent to the service equipment, one panel in the Exhibition Greenhouse (17A), one panel in the attic, three panels in the kitchen, one panel in the dining area and one panel in the mechanical room. All panels are 120/240V, either single or three phase. The main panel is a Federal Pacific, 600A, 3-phase with four fusible switches for distribution in a NEMA 3R enclosure. This panel has reached its service life capacity. The exterior is showing signs of deterioration.

The distribution panel and two subpanels are together inside a NEMA 3R enclosure adjacent to the main service panel. The distribution panel is a Square D I-Line 400A, 3-phase panel with 9 circuit breakers and one space. The available space is not usable. The bus bars show damage from a loose connection and need to be replaced. The two subpanels adjacent to the distribution panel are Square D 20-circuit load center and a Federal Pacific 22-circuit panel. The squared D panel shows signs of deterioration and has a couple of tandem breakers connected. The Federal Pacific panel is close to the end of its service life. The attic panel is a 400A, 42-circuit, General Electric unit and is in good condition. There are three panels in the kitchen. All three are 200A, 42-circuit. They are all in good condition. The dining area panel is a 200A, 24-circuit Federal Pacific unit. This panel has reached its end of life. The mechanical room panel is a 200A, 16-circuit Westinghouse panel with fusible disconnects. This panel has reached its service life capacity.

Lighting systems in the building vary from surface-mounted fluorescent fixtures to incandescent to LED. The system is not energy code compliant. Some lighting fixtures are not in working condition.

SITE

The Gardens Restaurant is located at the intersection of Rock Springs Road and Old Garden Road. The restaurant serves lunch, Tuesday through Sunday, and is also available for private parties. Guests can dine in a relaxed atmosphere with garden views, either inside or outside on an elevated deck. A small

Assessment – Fort Worth Botanic Garden

asphalt parking lot accessed from Old Garden Road provides limited parking for staff and guests, while the primary guest parking is located on Rock Springs Road.

B. Areas of Insufficiency

ARCHITECTURAL

a. Kitchen Renovations

The kitchen needs to be renovated to be more efficient with its current layout. The current layout is two galley type runs that dead end which makes maneuvering difficult. The attic access, wall construction and finish materials are in disrepair and need to be completely renovated. With this renovation, consideration towards bulk storage should be given without use of the Triplex Building (17B) as a separate structure.



Attic Access



Finishes in Disrepair

Opinion of Probable Construction Cost for Recommended Remediation Work:

Kitchen Renovations		\$77,625
Sub-Total		\$77,625
Contingency		\$15,525
Total Cost		\$93,150

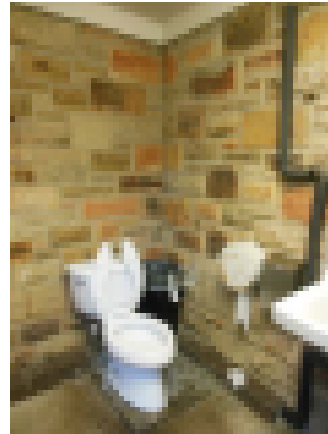
b. Miscellaneous Accessibility Items

The exterior public restroom accessed from the Fragrance Garden, does not provide the accessible clearances required for fixtures, accessories, or proper turning radii. Signage should be removed that points patrons to this restroom. Instead, the signage should point to the recently renovated public restrooms at the Japanese Gardens nearby.

Assessment – Fort Worth Botanic Garden



Restroom Access

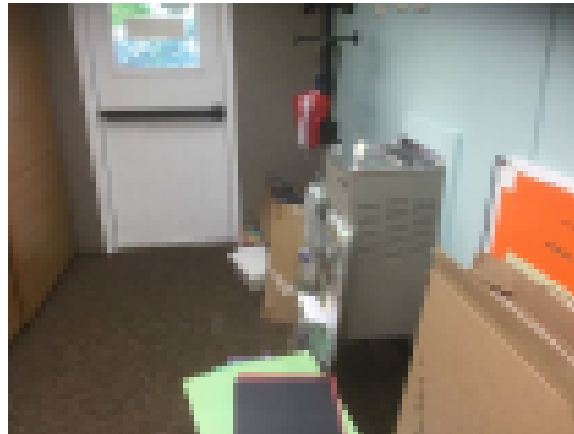


Public Restroom

Accessible water coolers should replace the currently inaccessible coolers.

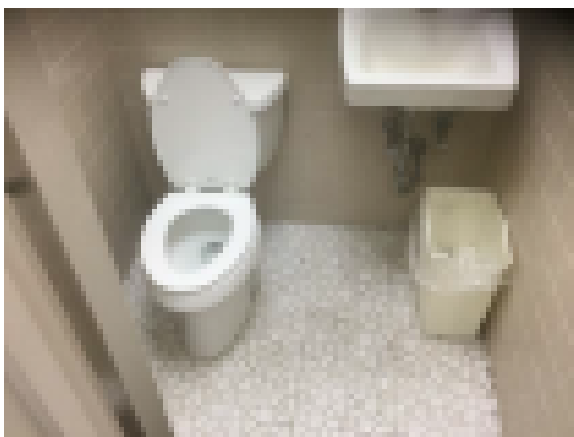


Office Water Cooler



Office Water Cooler

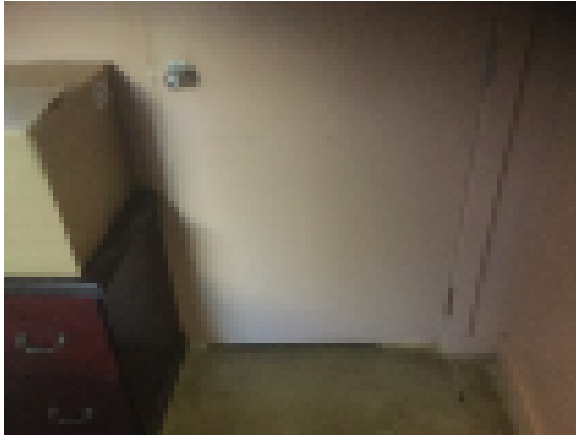
The administrative restrooms do not provide the accessible clearances required for fixtures, accessories, or proper turning radii. These restrooms should be renovated along with the small break area adjacent to it.



Inaccessible Office Restroom

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Doors throughout these spaces have knob hardware that should be replaced with lever type hardware except in those doors original to the 1934 construction.



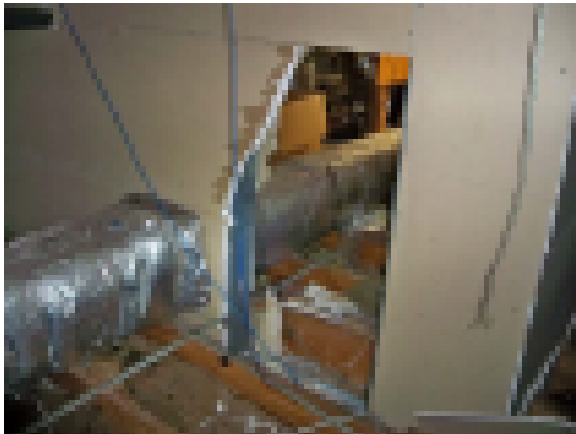
Knob Hardware

Opinion of Probable Construction Cost for Recommended Remediation Work:

Renovate Office Restroom and Break Area	\$51,750
Replace Knob Hardware	\$6,900
Replace Water Coolers	\$4,600
Sub-Total	\$63,250
Contingency	\$12,650
Total Cost	\$75,900

c. Fire Wall Penetrations

The fire wall between the building expansions has been compromised. Penetrations through the rated enclosure need to be reconstructed and sealed properly.



Breach at Fire Wall Penetration



Breach at Fire Wall Penetration

Opinion of Probable Construction Cost for Recommended Remediation Work:

Fire Wall Repairs and Sealant	\$3,450
Sub-Total	\$3,450
Contingency	\$690
Total Cost	\$4,140

Assessment – Fort Worth Botanic Garden

d. Building Envelope Insulation

The Owner mentioned there was insufficient heating in winter time for the North and West exterior offices as well as a few other rooms directly adjacent to the exterior wall. Currently, there is minimal ceiling batt insulation, no wall insulation, and large single pane windows for these areas. One proposed method to increase room comfort would be to increase the insulating means for the building envelope using foam injected insulation at the available exterior cavity walls and blown-in insulation at the attic. Existing windows are single pane and have no insulating value. These windows should be replaced by double pane insulated windows that meet the Historical Commission's guidelines for replacement. All of the existing exterior doors should have their weather stripping replaced.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Wall and Roof Insulation	\$16,560
Replace Windows	\$35,650
Replace Weather Stripping	\$966
Sub-Total	\$53,176
Contingency	\$10,635
Total Cost	\$63,811

STRUCTURAL

The only structural deficiencies found were improper storage of miscellaneous materials in the attic, which the building was not designed to accommodate. It is recommended that these materials be removed from the attic and that the attic space not be utilized for storage.

MECHANICAL / PLUMBING

e. Insufficient Heating

The existing conditions provide ceiling mounted supply air devices for these Office areas. Return air for the west exterior offices is provided through transfer air grilles located in lower portion of office entrance doors. However, it appears for several of these offices, the transfer air grilles have been blanked off. There is a main low mounted wall return air grille located in the large open office area with a limited amount of additional return air provided by return air ducted to interior Corridor.

It is proposed to provide a return / transfer air path from the west exterior individual offices. This would be accomplished by installing new ceiling mounted return air grilles in each office and then extending connecting ductwork from these to ceiling mounted return air grilles to ceiling mounted return air grilles located in the large open office area. The large open office area contains the main centralized return air grille for this HVAC system. The installation of these transfer air ducts would provide a balanced means to relieve supply air pressure from these individual offices. With insufficient return air, supply airflow rates decrease and in-turn room conditions are affected.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Resolve Heating Issues	\$20,000
Sub-Total	\$20,000
Contingency	\$4,000
Total Cost	\$24,000

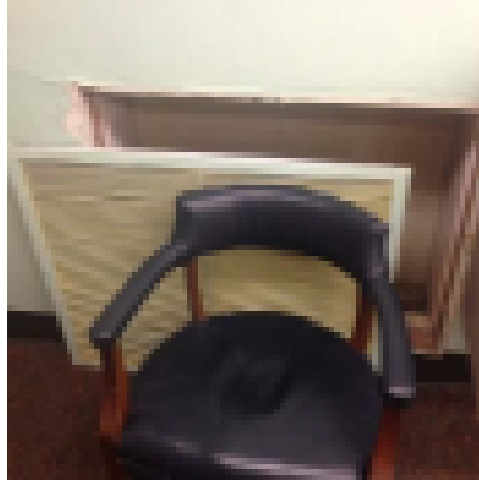
f. Provide General Maintenance

There are numerous ceiling mounted air devices that are missing or have rust on the face of them. There is a return air grille not installed in the wall. There are bushes that are overgrown onto the outdoor condensing units. It is recommended to provide the general maintenance to resolve these issues.

Assessment – Fort Worth Botanic Garden



Rusted Air Device



Return Air Grille not Installed



Overgrown Bush on Condensing Unit

Opinion of Probable Construction Cost for Recommended Remediation Work:

General Maintenance		\$3,000
	Sub-Total	\$3,000
	Contingency	\$600
	Total Cost	\$3,600

ELECTRICAL

g. Warmer Circuitry

There is an issue with one of the kitchen panels. The circuit that feeds the warmers trips when operating two warmers simultaneously. Upon investigation, it was discovered that the warmers require one 30A circuit and are connected to a 20A circuit. When only one warmer is operating, the circuit has enough capacity and works fine. When the second warmer is turned on, the warmer demands more than the 20A and the circuit is incapable of delivering and the breaker trips.

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace 20A circuit with 30A		\$300
	Sub-Total	\$300
	Contingency	\$60
	Total Cost	\$360

h. Replace Electrical Panels

The mechanical room panel, the dining room panel and the three panels in the back of the building need to be replaced. These panels have reached the end of their service life including the distribution panel in the rear which has a damaged bus.



Mechanical Room Panelboard



Panels in Back of Restaurant



Damaged Bus

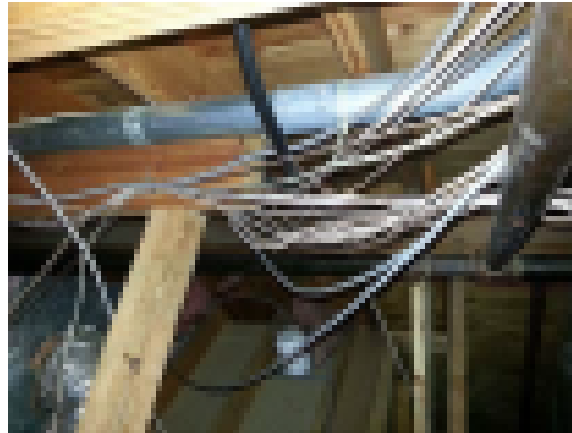
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Panelboards		\$22,000
	Sub-Total	\$22,000
	Contingency	\$4,400
	Total Cost	\$26,400

i. Miscellaneous Electrical Items

Throughout the building, there are wiring devices in need of covers. The attic also has conduits and MC cables in need of support and general maintenance. An exit light requires relamping or replacement.

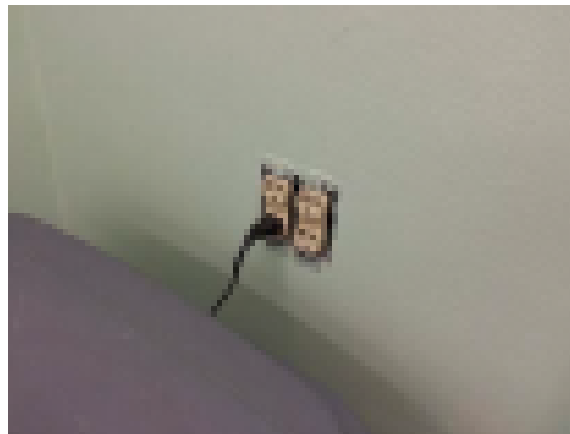
Assessment – Fort Worth Botanic Garden



Examples of Cabling Needing Maintenance



Exit Light Needs Replacement



Wiring Device Needs Cover

Opinion of Probable Construction Cost for Recommended Remediation Work:

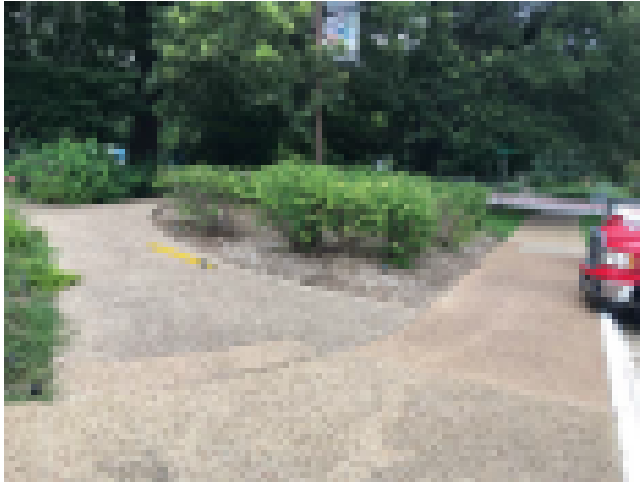
Replace Covers in Attic	\$500
Replace Lamps and Exit Light	\$1,000
Sub-Total	\$1,500
Contingency	\$300
Total Cost	\$1,800

SITE

j. Pathways and Pedestrian Entries

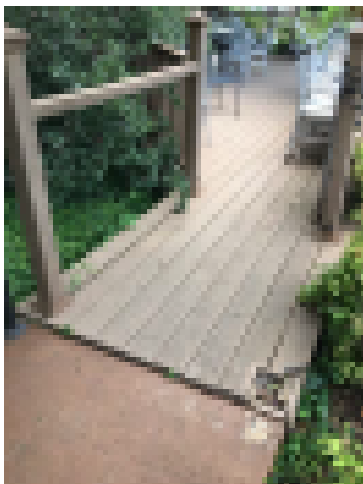
Exposed aggregate pathways link the entrances to the Gardens Restaurant and Rock Springs Center to the parking areas. The pathways exceed allowable slopes and cross slopes for accessible pathways. These walks and ramps need to be reconstructed to provide accessible pathways from parking to the entrance.

Assessment – Fort Worth Botanic Garden



Slopes Exceed Allowable Maximums

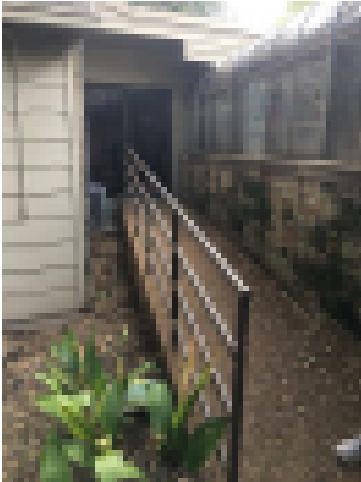
An elevated deck dining terrace is located between the Gardens Restaurant and Rock Springs Road, patrons can access the deck by either using steps or a ramp. This deck and railing is constructed out of composite material. Portions of the ramp rails have been damaged or are missing, and the threshold between the concrete walk and decking exceeds the maximum allowable change in elevation. The ramp approach and handrails should be reconstructed to be in accordance with current standards.



Deck Railing in Need of Repair

The ramp exit at the rear of the Gardens Restaurant does have a landing at the door that is in accordance with the current accessibility standards. This ramp should be reconstructed.

Assessment – Fort Worth Botanic Garden



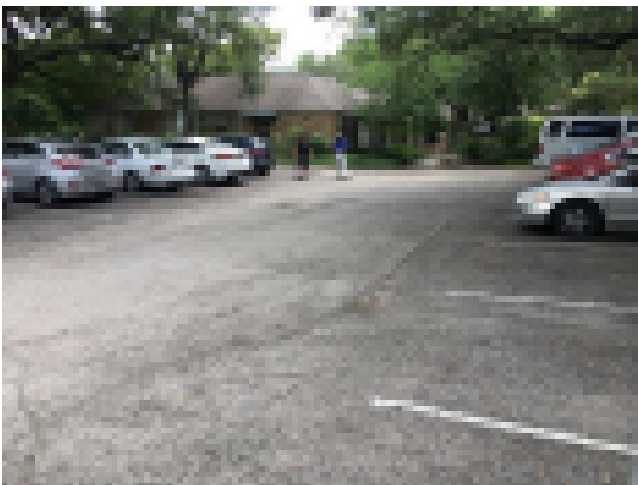
Existing Rear Entrance Ramp

Opinion of Probable Construction Cost for Recommended Remediation Work:

Concrete Walk & Ramp Replacement	\$15,000
Deck Rail and Ramp Approach	\$3,500
Rear Entry Ramp Replacement	\$5,500
Sub-Total	\$24,000
Contingency	\$4,800
Total Cost	\$28,800

k. Parking

The surface of the asphalt parking lot behind the restaurant is in disrepair. This lot should be replaced with a new concrete parking lot consistent with other new pavement in the Botanic Garden.



Asphalt Parking at Rear of Gardens Restaurant

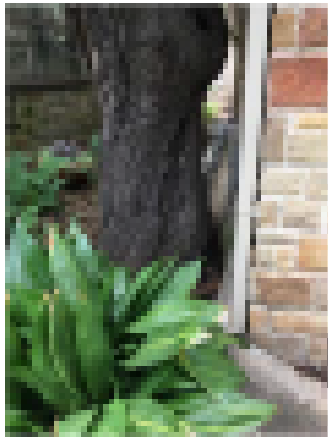
Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

New Concrete Parking		\$40,000
	Sub-Total	\$40,000
	Contingency	\$8,000
	Total Cost	\$48,000

I. Drainage

The flat planting area between the Exhibition Greenhouse and the Gardens Restaurant contains a concrete drainage flume that is intended to drain the downspouts and surface runoff in this area. Currently, a large oak tree has grown into the flume and interrupts the drainage flow causing backup into the Gardens Restaurant. This concrete flume should be removed (with careful attention around tree roots) and a new landscape drain / subsurface drainage system should be installed. All trenching should be performed using an air spade to keep the oak root system intact.



Concrete Drainage Flume



Drainage Between Structures

Opinion of Probable Construction Cost for Recommended Remediation Work:

Landscape Drain & Subsurface System		\$ 25,000
	Sub-Total	\$25,000
	Contingency	\$5,000
	Total Cost	\$30,000

XI. 16 – FRAGRANCE GARDEN

A. General Building Information



Fragrance Garden Lawn and Planter Wall



Fragrance Garden Walkway

ARCHITECTURAL

The Fragrance Garden is an approximately 2,200 s.f. garden located directly behind the Rock Springs Center and is accessed from the parking lot just to the east.

Originally built as a garden for the visually impaired with various fragrant and plant textures. Over the years, the garden has gone through many renovations. The northern masonry wall, walkway and fountain that once bordered the north side of the garden has since been removed and replaced with a loose limestone retaining wall supporting the sloped exhibit beds beyond. The original brick masonry walls that enclosed the east and west edges still remain. The garden features a lawn the full width of the garden in front of the limestone retaining wall. Four urn planters sit within the lawn area. The southern edge of the garden against the Rock Springs Center is made up of a brick paver walk that leads from the east parking lot to the Exhibition Greenhouse.

STRUCTURAL

There were no structural items noted to be reviewed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing items noted to be reviewed at this area.

ELECTRICAL

There were no electrical items noted to be reviewed at this area.

SITE

The Fragrance Garden is accessed from the parking lot and the rear of the restaurant by a unit paver pathway that runs parallel to the building. This space has a formal layout with a central lawn panel bordered by low walls, ornamental plantings, and manicured hedges. This Garden is utilized for special events and gatherings.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

Not Applicable

MECHANICAL / PLUMBING

Not Applicable

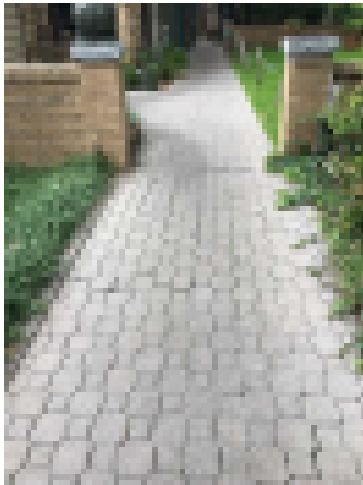
ELECTRICAL

Not Applicable

SITE

m. Fragrance Garden Pavers

The concrete pavers in the walk behind The Gardens Restaurant leading to the Fragrance Garden appear to be shifting due to the proximity of the roots of a large tree nearby. These pavers should be reset and leveled.



Shifting Pavers in Fragrance Garden Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

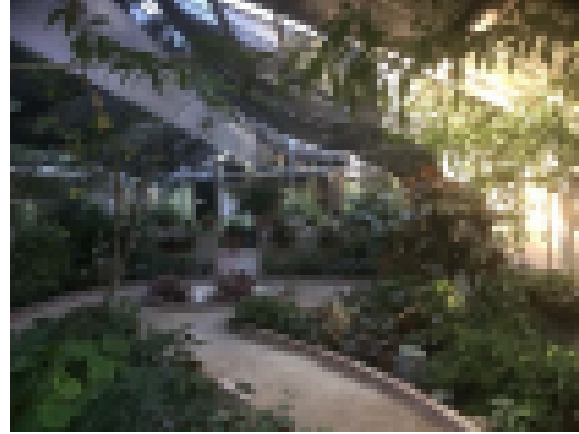
Reset and Level Existing Unit Pavers	\$1,200
Sub-Total	\$1,200
Contingency	\$240
Total Cost	\$1,440

XII. 17A – EXHIBITION GREENHOUSE

A. General Building Information



Exhibition Greenhouse Entry



Exhibition Greenhouse Interior

ARCHITECTURAL

The Exhibition Greenhouse is approximately 2,600 s.f. and is located just west of the Rock Springs Center and Gardens Restaurant (15) and bordered by the Japanese Gardens (13). The building also known as the Begonia Building was constructed in two phases. The south portion of approximately 2,045 s.f. is an aluminum frame greenhouse sitting on a concrete stem wall with a stone veneer. The interior of the greenhouse is an exposed aggregate paving lined with brick planter edging for the exhibits. While a later addition to the north of approximately 555 s.f., added a wood framed office and potting work room clad with wood siding. The roof of the office portion was recently replaced with the balance of the Rock Springs complex.

GREENHOUSE

The Exhibition Greenhouse is attached to the Rock Springs Building and consists of a 3' high concrete knee wall for the structure's base which extends up around the gable end door frame staying consistent with the Rock Springs Building appearance. The greenhouse is made up of glass glazing with curved glass on both sidewalls acting as the eaves; all supported by an aluminum glazing support system.

The concrete and masonry knee wall is the first level of the structure's support. The Exhibition Greenhouse is primarily supported by an aluminum structure and aluminum glazing system.

The Exhibition Greenhouse has two gas unit heaters which blow into a fan jet tube system, dispersing the hot air the length of the greenhouse. There are also two exhaust fans which pull air out of the greenhouse. On the opposite gable wall of the exhaust fans are two evaporative pad cooling systems (one on each side of the greenhouse entrance door) which are accompanied by shutters to allow air into the system. There are also manually operated, ridge vents which allow for passive ventilation within the space.

All of the existing automated greenhouse equipment is controlled by a Wadsworth STEP Control system.

STRUCTURAL

The Exhibition Greenhouse is located immediately to the west of the Gardens Restaurant. The oldest portion of this building was constructed in 1950 and is aluminum framed. The columns of the aluminum frame bear on a low concrete wall with brick veneer. A 1995 addition removed and replaced the north portion of the greenhouse and added a wood framed office and potting shed.

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

The facility has two gas-fired unit heaters and a circulation fan that delivers air through a plastic duct sock for the entire facility. There are two wall mounted exhaust fans with shutters. Equipment shows signs of normal use under the Greenhouse conditions.

ELECTRICAL

The exhibition Greenhouse has one 120/240V, 100A panel installed in the office area. This panel is in good condition. Lighting in the greenhouse is through open reflector incandescent fixtures with manual controls. Sufficient power receptacles are provided throughout as no extension cords were visible.

SITE

The Exhibition Greenhouse serves as home to the Garden’s renowned Begonia Collection. The Greenhouse is an interior space that is open to the public and accessed by a concrete pathway with a brick edge that extends throughout the Greenhouse.

B. Areas of Insufficiency

ARCHITECTURAL

a. Miscellaneous Architectural Items

The hardware within this facility needs to be brought up to accessibility standards with its knob hardware. There were some minor stress cracks noticeable in the stone veneer masonry.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Knob Hardware	\$3,450
Repair Minor Stress Cracks	\$1,150
Sub-Total	\$4,600
Contingency	\$920
Total Cost	\$5,520

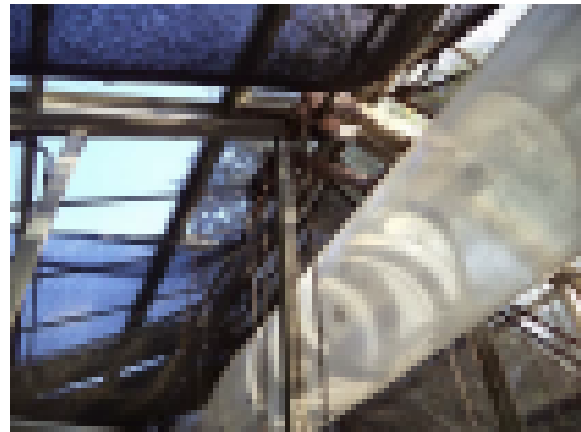
GREENHOUSE CONSULTANT

b. Greenhouse Repairs and Upgrades

The existing glazing is in need of replacement. It is recommended to replace the glass as well as new glazing compounds. Existing aluminum glazing bars to remain. The manual ridge vent drive system is non-operational and it is recommended for replacement. Replacement recommendations include new drive shafting, rack and pinion vent operators, and automated drive motor(s)



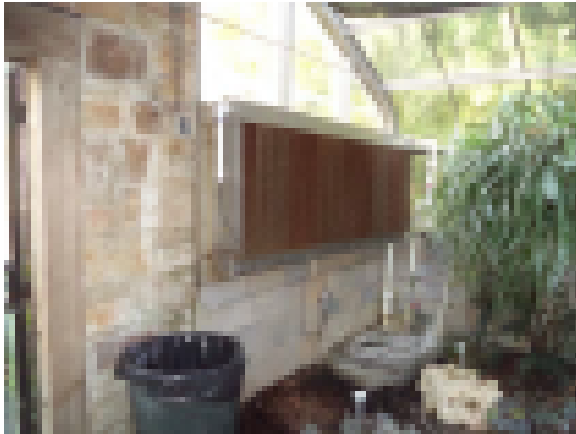
Outdated Glazing Bars



Ridge Vent Operator Corrosion

Assessment – Fort Worth Botanic Garden

The existing cooling system consists of wood stringers and sunken reservoir kits. It is recommended to replace the existing evaporative pad cooling system and all wood supports with a new efficient evaporative pad cooling system using new aluminum stringers, framing, and flashing. Currently there are no HAF (horizontal air flow) fans. It is recommended to install HAF fans for better air circulation, as well as update to new more efficient exhaust fans. The existing system consists of unit heaters that 'blow' warm air through a fan jet tube that restricts space in the greenhouse. The fan jet model of heat distribution is outdated and inadequate. A more efficient and 'plant growth friendly' means is to relocate and mount the unit heaters to diagonal corners and utilize HAF fans to distribute and de-stratify warm air. It is suggested removing the jet tube system and relocating the existing unit heaters.



Evaporative Cooling Pad System



Exhaust Fans and Unit Heaters

The existing shade cloth is an exterior type shade cloth suspended between trusses. It is recommended to install a new automated interior shade cloth/heat retention system with flame retardant shade cloth. The current Wadsworth STEP (Simple Total Environmental Program) controls are no longer supported by Wadsworth Controls and are obsolete. It is recommended to upgrade to a newer and supported Wadsworth environmental control system.



Existing Shade Material

Opinion of Probable Construction Cost for Recommended Remediation Work:

Equipment Update & Glass Reglaze	\$167,388
Sub-Total	\$167,388
Contingency	\$33,478
Total Cost	\$200,866

Assessment – Fort Worth Botanic Garden

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

There were no major mechanical or plumbing insufficiencies noted in the assessment of this area. Refer to Greenhouse Consultant section for additional items.

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

There were no site insufficiencies noted in the assessment of this area.

XIII. 17B – TRIPLEX BUILDING

A. General Building Information



Grade at South Elevation



Grade at Rear of Structure

ARCHITECTURAL

The Triplex Building is an angled storage structure supporting the Rock Springs Restaurant as well as tool storage located between the east boundary of the Japanese Garden and the Exhibition Greenhouse and Rock Springs Center. The building is divided into three separate spaces accessed only from the east elevation at grade. The building is built directly into the surrounding grade with a concrete retaining stem wall on the rear west, north and south elevations. The building is clad with wood siding on wood framed stud walls above the concrete stem wall and along its eastern facade. The eastern facade has a series of clerestory windows allowing light to enter the storage rooms. The interior walls are clad with plywood sheets above the concrete stem wall. The roof structure is wood joist framing clad with masonite paneling on the underside and a recently replaced asphalt shingle roofing above. The flooring is exposed concrete slab.

STRUCTURAL

The Triplex Building is located to the northwest of the greenhouse and backs up to the Japanese Garden fence. This circa 1997 building was constructed in the hillside adjacent to the Japanese Garden and has concrete retaining walls on three sides. The concrete walls stair-step up the two ends of the building, varying in height from 3 to 8 feet. The retaining wall along the back side is 8 feet tall. The building has a 10-foot plate-line and the wall between the retaining walls and plate-line is wood framed. The roof structure is wood trusses supported on the stud walls at front and back of the building. While we found no evidence of structural deficiencies, the Owner has indicated that there have been on-going issues with flooding within the building. The hillside to the rear of the building appears to have sloughed off bringing the grade elevation above the top of the retaining wall. At the time of our visit, we observed that the leaf debris from the bamboo planted hillside had accumulated at the back of the building to just below the building eave. Inside the building we observed what appeared to be water staining from water running down the back wall of the building. We believe that the accumulation of soil and vegetation behind the building and above the top of retaining wall has allowed rain runoff to intrude through the wood framed portion of the wall. According to the construction drawings, there was supposed to be a French drain installed along the back of the building, but we do not know if this was installed and if functioning properly.

MECHANICAL / PLUMBING

This facility is separated into two areas: one is utilized for dry goods storage housing kitchen coolers/freezers/refrigerators and the other is utilized for basic storage. The dry goods storage and kitchen equipment room is very hot with no ventilation. The other storage room has no ventilation and the exterior doors appear to be propped open often.

Assessment – Fort Worth Botanic Garden

ELECTRICAL

This building is fed from the restaurant distribution system. Lighting consists of fluorescent strips with manual controls. The building is very hot due to all the refrigeration equipment with limited ventilation.

SITE

Site items are covered in the architectural section above.

B. Areas of Insufficiency

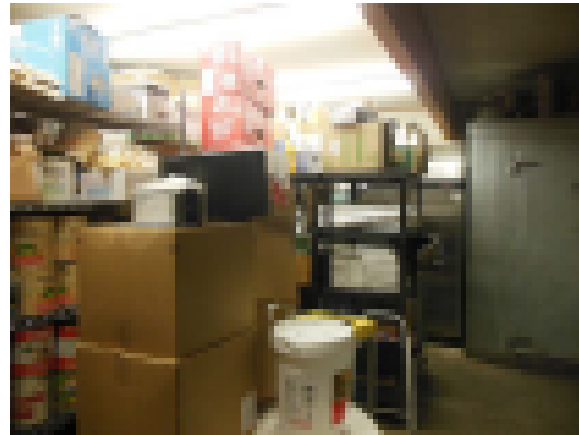
ARCHITECTURAL

a. Exterior Wall Repairs

Due to repetitive water intrusion, the wood framing and plate is suspected to be subject to rotting compromising the building structure. Along with improvements to the grading around the building included in the site scope, the interior plywood paneling and exterior cladding along the back and side walls needs to be removed to examine the condition of the wood framing then replaced with an appropriately waterproofing detail. The gutter and downspout system connections need to be repaired to correct the rain water collection into the sub grade drainage system.



Grading at Exterior Wall



Interior Facing Exterior Wall

Opinion of Probable Construction Cost for Recommended Remediation Work:

Exterior Wall and Waterproofing	\$17,250
Interior Cladding Replacement	\$4,600
Repair Gutter and Downspout	\$345
Sub-Total	\$22,195
Contingency	\$4,439
Total Cost	\$26,634

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

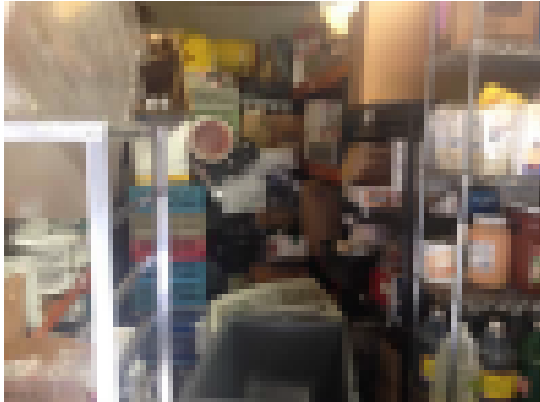
MECHANICAL / PLUMBING

b. Install Air Conditioning and Ventilation

The room that contains kitchen dry goods and houses kitchen coolers, freezers, and other equipment is extremely warm. It is recommended to provide an air conditioning system to this room and incorporate some treated outdoor air to provide a slight positive pressure. Air conditioning this space should aid in the longevity of kitchen equipment. It is also recommended to provide forced air ventilation into the storage room portion of this building. Fresh air is currently being provided manually by propping a door open,

Assessment – Fort Worth Botanic Garden

whereas fresh air movement should be provided with an outdoor air intake louver as well as an exhaust air vent out of the building.



Dry Goods Area



Kitchen Equipment in Dry Goods Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

Provide New Air Conditioning	\$19,000
Power for New Air Conditioning System	\$6,000
Provide Ventilation for Storage Area	\$4,000
Sub-Total	\$29,000
Contingency	\$5,800
Total Cost	\$34,800

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

c. Service Areas

The ground slopes toward the Triplex building, allowing sediment and debris to build up at the base of the wall which has raised the elevation of the ground above the foundation. This has resulted in water seeping inside the structure. This area should be excavated and a French drain with drainage mat installed along the entire wall face below grade, then backfilled with a free draining fill with a perforated PVC pipe at the base of the wall that daylights either to the surface or connects to the adjacent storm drain.

This building is located directly adjacent a utility easement which may limit the amount of excavation allowed in this area. If excavation for the suggested improvements is not possible within this area then it is recommended that this building be demolished and reconstructed.

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Triplex Building Slopes

The service drive at the rear of the Gardens Restaurant and Exhibition Greenhouse, adjacent to the Triplex Building, slopes toward the buildings and collects at an area drain in the service area at the rear of the building. This drive is unpaved and runoff from this area carries debris and sediment which clogs the drain and leads to standing water. In the long term, this service drive should be reconstructed with concrete pavement with subsurface drainage collecting storm water. The concrete should be sloped in a manner so that, if clogged, the water overflows to the existing 24" inlet in adjacent landscape area. In addition, a pipe rail gate should be installed near the end of the service drive at Old Garden Road.



Existing Service Drive & Drainage Between Restaurant and Triplex Building

Assessment – Fort Worth Botanic Garden



Slope Open to Erosion and Bamboo Growing with No Containment

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install French Drain System	\$25,000
New Concrete Paving	\$40,000
Concrete Service Drive w/ Drainage & Curbs	\$25,000
Install Pipe Gate	\$4,500
Sub-Total	\$94,500
Contingency	\$18,900
Total Cost	\$113,400

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XIV. Cost Summary

To summarize the information found in this document, this section provides a cost summary by key element of the Botanic Garden. Please refer to sections AREAS OF INSUFFICIENCY for detailed information on each item. Note that if multiple options/costs were provided, then the highest of the costs are included in the numbers below.

9R	Parking Areas and Miscellaneous Site Areas	\$2,709,600
11	Texas Native Forest Boardwalk	\$172,602
12	Sister Cities International Grove	\$42,000
13N-A	Production Glass Greenhouse	\$702,078
13N-B	Production Fiberglass Greenhouse	\$1,001,880
13N-C	Shop Office	\$7,507
13N-D	Break Room Building	\$348,360
13N-E	Quonset House Storage	\$376,740
14	North Vista	\$648,000
15	Rock Springs Center and The Gardens Restaurant	\$399,961
16	Fragrance Garden	\$1,440
17A	Exhibition Greenhouse	\$206,386
17B	Tri-Plex Building	\$174,834
	TOTAL ZONE 2	\$6,791,388

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Zone 3

Key Locations: 18



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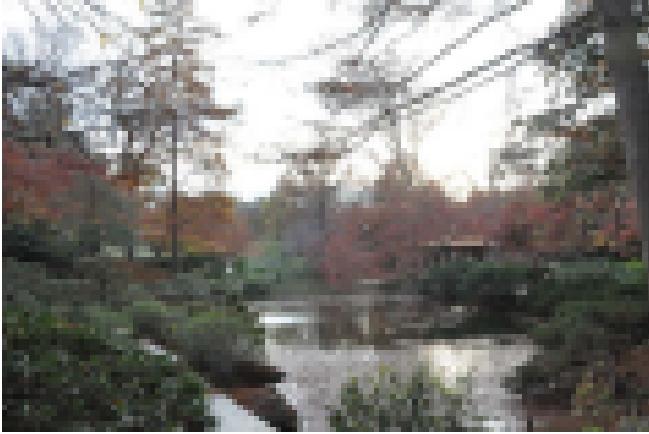
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I. 18-SI – MISCELLANEOUS SITE ELEMENTS

A. General Information



Japanese Garden

SITE

The Japanese Garden is a 7.5 acre area that is comprised of several smaller themed gardens, gathering areas, and contemplative spaces that are situated around a central koi pond.

Visitors experience the gardens by strolling on a winding network of paths, bridges and decks constructed of various materials such as wood, stone, concrete and asphalt. Each garden space utilizes creative arrangements of plants, boulders, rocks and water to create a unique, relaxing atmosphere that is accented by traditional Japanese style architectural details on many viewing structures, bridges, buildings, fences and art pieces. The garden hosts Japanese festivals and ceremonies throughout the year and is also available for rental for weddings or other gatherings.

The entire garden is enclosed by a fence and requires an admission fee for visitors. Visitors access the garden through the ticket office and exit near the Treasure Tree Gift Store.

B. Areas of Insufficiency

Throughout the garden there are design elements that provide visitors with unique experiences and establish a signature aesthetic quality. These items include but are not limited to the bridges, stepping stone pathways over water, art, naturalistic rock steps, garden paths and koi feeding areas. These elements require varying ability levels to negotiate.

This report does not include recommendations for these garden thematic elements or any suggestions for removal, replacement, maintenance or modifications of these elements be completed under direction of garden staff.

SITE

a. General Accessibility at Japanese Garden

Many of the observations made in this section of the report pertain to accessibility standards. These observations cover general walking surfaces and slopes which are governed by accessibility standards set forth in the Americans with Disabilities Act (ADA). Several routes are identified as accessible while others remain unmarked. It is recommended that a consultation by a Registered Accessibility Specialist (RAS) be completed to determine which routes are required to meet full accessibility standards. As part of this inspection, it should be determined whether additional modifications are required to bring the gardens into full compliance.

Assessment – Fort Worth Botanic Garden

Throughout the Japanese Garden there are many steps and ramps along public circulation paths which have been constructed using a variety of traditional Japanese construction methods and materials. Many of which, have handrails that are rustic in style, and irregular walking surfaces that do not meet current accessibility standards. An allowance is provided for installation of new handrails and surface alterations to improve safety of these steps and ramps.

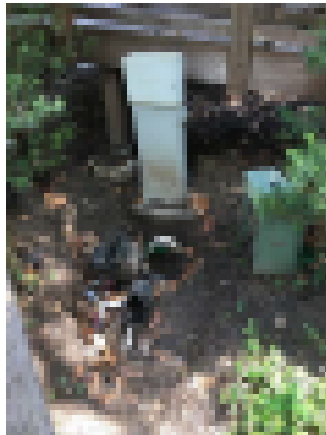
Hardscape improvements requiring significant reconfiguration to improve or create pedestrian routes are identified in other sections of this report. Additionally, all items and routes identified through the recommended RAS accessibility consultation shall be corrected in accordance with current standards.

Opinion of Probable Construction Cost for Recommended Remediation Work:

RAS Inspection Allowance	\$5,000
Steps and Handrail Alteration Allowance	\$70,000
Sub-Total	\$75,000
Contingency	\$15,000
Total Cost	\$90,000

b. Irrigation Improvements

The irrigation system that is in use today was installed in 1981. Since that time, it has been modified extensively due to countless repairs and site improvements. This current system utilizes untreated river water, and the materials and equipment are out of compliance with today’s standards. The current system relies heavily on rotary heads which provide poor water coverage of the planting areas and extensive overspray on walkways which poses a slipping hazard and a maintenance issue throughout the Japanese Garden. The entire system should be upgraded with a new system that is installed to meet current City of Fort Worth irrigation design standards. It is also recommended that the irrigation system be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system.



Aging Irrigation Infrastructure

Opinion of Probable Construction Cost for Recommended Remediation Work:

New Irrigation System	\$200,000
Central Control System	\$50,000
Sub-Total	\$250,000
Contingency	\$50,000
Total Cost	\$300,000

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c. H23 - Site Improvements

The pond overlook and koi feeding area at this location is constructed of natural stone surfaces and has two steps down from the adjacent pedestrian walk. At this transition, there is also a stone seat wall. Where the face of wall, pavement, and steps interface, the stone has an irregular and abrupt change in elevation. This stone pavement should be removed and reconstructed with original stones to eliminate this trip hazard.



Trip Hazard at Koi Feeding Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

Flagstone Repair		\$500
	Sub-Total	\$500
	Contingency	\$100
	Total Cost	\$600

d. K22 - Site Improvements

Just east of the feeding station and pond overlook in the northernmost pond there is a series of ramps and steps that provide pedestrian access from the pond to an upper level walkway. It appears that the ramps were constructed as an alternative accessible ramp adjacent to the concrete steps. This switchback walkway consists of both wooden boardwalk and concrete pathways. The concrete portions of the walkway are difficult to negotiate for visitors and slopes is out of compliance with current regulations. This walkway will need to be removed and reconstructed in accordance with current standards.



Steep Slopes on Accessible Pathway

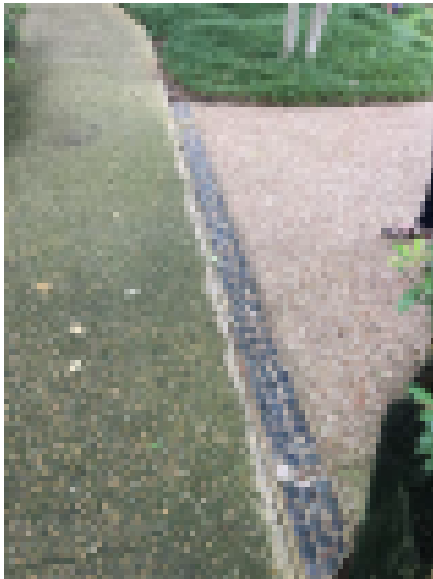
Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Pavement Modifications		\$5,000
	Sub-Total	\$5,000
	Contingency	\$1,000
	Total Cost	\$6,000

e. H26 - Paving Improvements

The intersection of the exposed aggregate concrete pathway near the entrance and the pathway to the restroom building has a black river rock paving band with exposed redwood expansion joints. This material is slippery when wet and of the rocks have popped out creating an irregular walking surface. There are approximately a dozen bands that should be removed and replaced with a slip resistant stone pavement.



River Rock Paving Bands

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Stone Paving Bands		\$8,000
	Sub-Total	\$8,000
	Contingency	\$1,600
	Total Cost	\$9,600

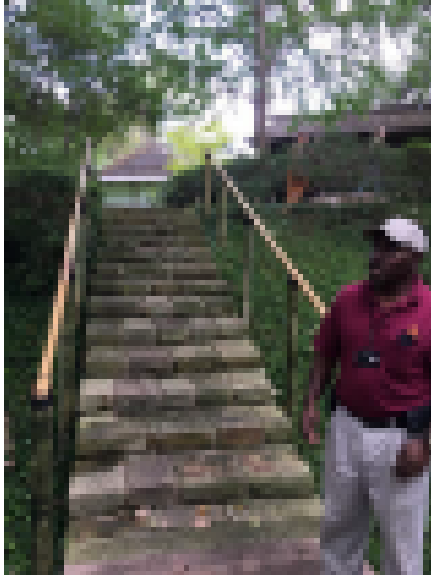
f. H26 – Site Improvements

Directly north of the ticket office is a stone staircase with 13 risers that lead to a pathway that crosses a low-lying area of decorative river rock.

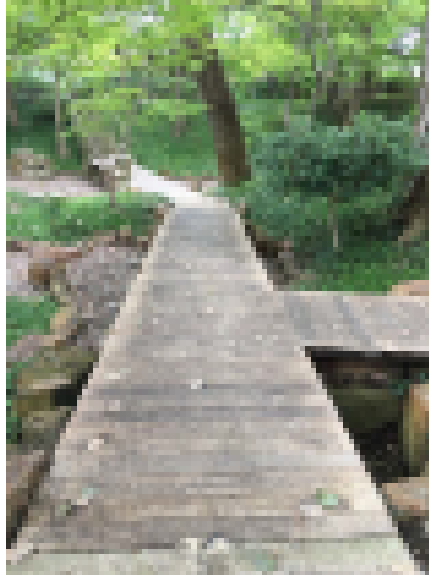
The steps are constructed using large chopped block for treads and have bamboo handrails. Neither the irregular step tread surface nor the handrails are in compliance with existing regulations. This staircase should be reconstructed with stone treads and new handrails.

The pathway is constructed of both exposed aggregate concrete and an ipe wood boardwalk with no rails. Portions of the boardwalk appear to have a drop-off of over 30” above the adjacent surface, which by code requires installation of a guardrail. In lieu of a guardrail, additional fill and river rock could be added to bring the lower surface elevation to within compliance which is how costs are based.

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Non-Compliant Stone Steps



Ipe Boardwalk Without Railing

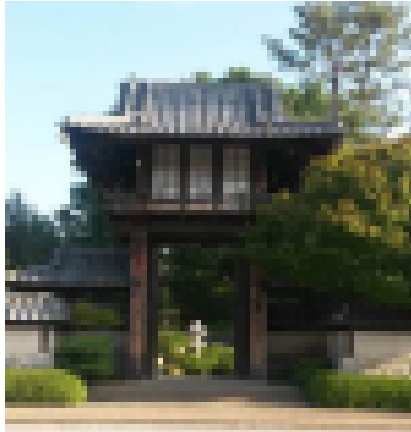
Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Stone Steps and Rail	\$9,500
Boardwalk Drop Off Modifications	\$4,500
Sub-Total	\$14,000
Contingency	\$2,800
Total Cost	\$16,800

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II. 18-1 – MAIN ENTRANCE GATE & COURTYARD

A. General Building Information



Main Entry Gate



Smaller Entry Gate



Japanese Garden Entry Courtyard

ARCHITECTURAL

The Main Entrance Gate Pagoda has an approximately 10' x 12' footprint and stands 30 feet tall. The wood structure consists of 4 main posts with two large wood doors, a decorative balcony level with screened enclosure, and a metal tile roof. The decorative balcony level consists of wood walls and windows, exposed rafters and railing trim, and exposed roof framing.

The Entrance Gate is flanked with two smaller enclosed spaces which initiate the perimeter wall encompassing the Entrance Courtyard. The perimeter wall consists of a loose laid stone at the base with vertical wood posts with stucco infill panels, capped off by a small roof which also incorporates the metal tile roof. Inside the courtyard are a few sitting areas, garden exhibits along with a secondary wooden gate structure that mimics the main tower and leads visitors to the Japanese Garden ticket office.

The Main Entrance and courtyard was originally constructed in 1973 with a perimeter fence replacement in 2007.

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STRUCTURAL

The Main Entry Gate is a wood framed structure with heavy timber posts. Based on available drawings, the original structure was constructed in 1973. Although we noted several checks and splits in the heavy timber members, these are common characteristics of heavy timber members (caused by shrinkage of the surface during curing) and do not generally adversely affect the structural capacity of the member. It is unknown if the structure has been renovated, but the current structural system is in good condition with no significant distress or deterioration noted.

The smaller entry gate is a wood framed structure with heavy timber posts. Based on available drawings, this structure was constructed in 1981. The structure is in fair condition with some deterioration at cantilevered ends of the 6x8 roof beams from water and insect attack. It is anticipated that these beams will need to be replaced within 5 years.

The courtyard is enclosed with a wall on the south side and a wood fence along the other three sides. The wall is constructed with 4x6 posts at 6 feet on center spacing with stone base and stucco panels on 2x4 studs between the posts. The wall has a wood framed roof that mimics the construction of the gate elements. This wall was originally constructed in the late 1970's and appeared to be in good condition at the time of our observation.

MECHANICAL/PLUMBING

There are no mechanical or plumbing systems to be reviewed at this area.

ELECTRICAL

There were no electrical systems noted to be reviewed at this area.

SITE

The Japanese Garden Entry Garden is a transitional space from the parking lot to the ticket booth, through a large gateway structure. This garden is enclosed by a decorative wall and includes carved stone ornaments and plantings. The walking surfaces including crushed rock paving, exposed aggregate concrete and unit pavers.

B. Areas of Insufficiency

ARCHITECTURAL

a. Exterior Cleaning and Refinishing of Entry Tower

Due to weather exposure, the wood trim and railing at the decorative balcony has deteriorated. It is recommended to replace the deteriorated wood framing and trim, as well as cleaning and refinishing remaining members to protect their surfaces.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean & Prepare Exterior	\$4,002
Replace Deteriorated Wood	\$2,346
Sub-Total	\$6,348
Contingency	\$1,270
Total Cost	\$7,618

STRUCTURAL

b. Beam Replacement

Replace (2) 6x8 x 9-4" long redwood beams at the smaller entry gate.

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Deteriorating Beams

Opinion of Probable Construction Cost for Recommended Remediation Work:

2 New Beams		\$1,260
Temporary Shoring & Rework		\$1,000
	Sub-Total	\$2,260
	Contingency	\$452
	Total Cost	\$2,712

MECHANICAL/PLUMBING

Not Applicable

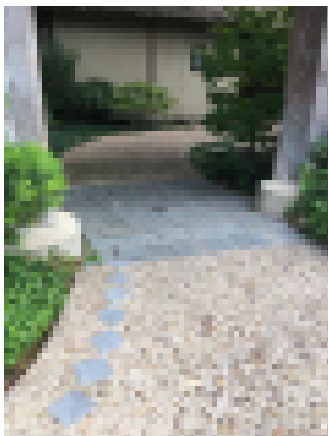
ELECTRICAL

Not Applicable

SITE

c. Paver Adjustment

This area is well maintained however the paver portion of the walkways are shifting which has created an irregular walking surface. These pavers should be removed and re-laid on a new stable base material.



Unit Pavers Near Ticket Office

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Unit Pavers		\$1,000
	Sub-Total	\$1,000
	Contingency	\$200
	Total Cost	\$1,200

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III. 18-2 – TICKET OFFICE

A. General Building Information



South Elevation



Northeast Corner



North Elevation



Visitor Passageway

ARCHITECTURAL

The Ticket Office, approximately 8' x 14', is a one story wood structure with stucco paneling and wood trim, and an approximately 12' x 20' cedar shake roof with gabled ends and exposed wood rafters. There are a series of ticket windows along the east elevation and fixed display windows along the north, with an employee entrance to the west. Adjacent to its east end is a metal turnstile, wood slat screen wall and roof overhang providing weather protection for visitors purchasing tickets. The interior consists of plastic laminate millwork, carpet flooring, and painted gypsum board walls & ceiling. The Ticket Office was originally constructed in 1970 and had a roof replacement in 2005.

STRUCTURAL

This building is a wood framed structure on a conventionally reinforced stiffened slab on grade. There was a hard ceiling that did not allow for observation of the roof framing. However, we did not observe any structural distress or significant deterioration at the exposed portions of the building.

MECHANICAL/PLUMBING

The facility is provided with a 1.8-ton ductless indoor wall mount unit with a remote air-cooled heat pump. This equipment was installed in 2016. It appears the previous air conditioning system in terms of ceiling

Assessment – Fort Worth Botanic Garden

mounted supply air devices has been abandoned in place. A ceiling mounted exhaust fan serves the restroom.

The restroom incorporates a tank type water closet, counter mounted lavatory, and electric water heater located in the cabinet. Plumbing fixtures are in working condition, but show signs of age.

ELECTRICAL

Electrical service consists of a 120/240V, 1-phase, 3-wire, 100A panel. The panel feeds the ticket office building and surrounding trees. Panel is in good condition. Lighting system consists of incandescent downlights for the interior and incandescent cylinders on the exterior. Some light bulbs do not work. Electrical controls use regular switches.

CIVIL

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

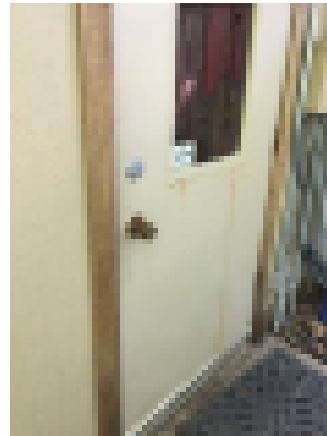
ARCHITECTURAL

a. Building Exterior

While the exterior of entire building is in fair condition, the exterior screen wall at the east ticket windows needs refinishing. The door and hardware at the west employee entrance has exposed rust damage and should be replaced. The wood trim at the base of the building has deteriorated from weather and needs replacing. It was reported that periodically in heavy rains, the cedar shake roof does leak. The current ticket transaction counter is not handicap accessible. A 36" wide portion of this counter will have to be lowered to 34".



Inaccessible Ticket Counter



Damaged Door and Hardware

Opinion of Probable Construction Cost for Recommended Remediation Work:

Refinish Screen Wall	\$1,150
Replace Door at Rear Entry	\$1,725
Repair Trim	\$1,208
Accessible Counter	\$3,450
Sub-Total	\$7,533
Contingency	\$1,507
Total Cost	\$9,039

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this facility.

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MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this facility.

ELECTRICAL

b. Upgrade Lighting

It is recommended to upgrade switching in the restroom to occupancy sensors set for a minimum 20-minute delay, replace incandescent lamps with energy-efficient, LED lamps and provide a lighting fixture in front of the ticket window to allow ticket staff to see buyer clearly.



Interior Downlights Need Upgrading



Exterior Cylinder Lights do not Light Adequately

Opinion of Probable Construction Cost for Recommended Remediation Work:

Upgrading to Occupancy Sensor	\$50
Replace Lighting with LED Lamps	\$250
Provide New Lighting for Ticket Window	\$350
Sub-Total	\$650
Contingency	\$130
Total Cost	\$780

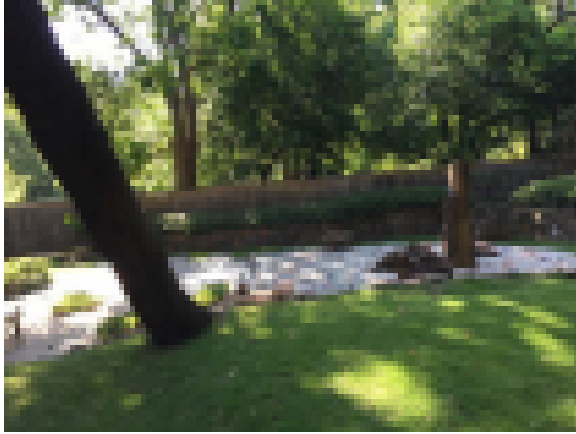
Site

Not Applicable

Assessment – Fort Worth Botanic Garden

IV. 18-3 – SUZUKI GARDEN

A. General Building Information



Suzuki Garden Looking East



Suzuki Garden Looking South

ARCHITECTURAL

The Suzuki Garden, built in 1970, is approximately 240 square feet and is a private garden that is available for viewing only and closed to visitors except by special appointment. With its stone retaining wall around its perimeter, the sunken garden exhibit utilizes a variety of stone types to create bedding areas and pathways in a unique graphic design on the garden floor. The sunken garden is accessed by a narrow cut stone walkway that leads to a stair down into the garden.

STRUCTURAL

This garden contained stone clad, CMU retaining walls along the east, west, and south sides of the garden. The retaining walls have a concrete footing and a maximum height of 40 inches. The walls were in good condition.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

The Suzuki Garden is primarily a rock garden with very minimal use of plant material that is intended to be viewed by visitors from adjacent paths and observation areas.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies in this area.

STRUCTURAL

There were no structural insufficiencies in this area.

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

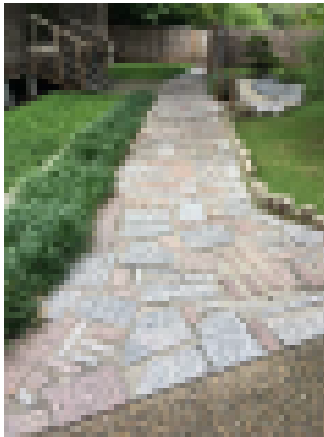
ELECTRICAL

Not Applicable

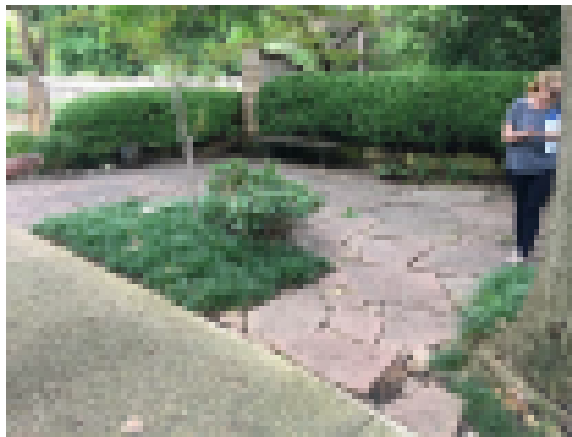
CIVIL

a. Irregular Walkways

The garden itself is in good condition, but the approach walkway is constructed of small granite blocks in an irregularly laid pattern. These paver stones have a slick, polished surface and large uneven joints which pose a slip and fall hazard for visitors. This walkway should be replaced and reconstructed with a similar color granite paver that has a slip resistant (thermal) finish and laid in a pattern that has smaller and shallower grouted joints to provide a smooth walking surface. Additionally, just east of the garden is an overlook terrace that is constructed of natural flagstone on sand base. The stones are laid in an irregular pattern with variable width joints which present a tripping hazard. These flagstones should be removed and re-laid so they are level on a newly prepared flat sand setting bed with tight joints.



Approach Walk



Irregular Flagstone Paving

Opinion of Probable Construction Cost for Recommended Remediation Work:

Walkway Repairs		\$10,500
	Sub-Total	\$10,500
	Contingency	\$2,100
	Total Cost	\$12,600

Assessment – Fort Worth Botanic Garden

V. 18-4 - KARESANSUI

A. General Building Information



Karesansui Exterior



Karesansui Interior Walkway



Karesansui North Stair



Karesansui Interior Garden

ARCHITECTURAL

The wood structure is approximately 5,000 square feet and located along the eastern boundary which consists of a 10' wide raised wood deck in a rectangular configuration surrounding a stone garden. Access to the observation deck is provided by a set of wood stairs with a steel handrail at both the north and south ends of the structure. A ramp is provided on the west side and provides access from the accessible sidewalk. There are wood slat benches located at the perimeter corners of the raised observation deck. The structure has exposed wood deck framing on concrete piers approximately 3 feet above ground, with a wood platform railing, and wood posts that support wood joists, wood decking and covered with a membrane roof.

STRUCTURAL

This wood framed building is believed to be one of the original Japanese Garden structures, constructed in the early 1970's. The roof and floor are wood framed and supported on concrete piers.

Assessment – Fort Worth Botanic Garden



Karesansui

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Building Replacement

All exposed wood finishes are worn from time and weather. The cut wood ends are showing signs of rot and are losing their density. There are small portions of the wood guardrail and wood balustrade along the interior observation deck that are damaged and need replacing. The accessibility ramp does not have handrails and should be added to the existing wood guardrails. Due to the poor condition of the framing members of this exhibit, structural has recommended that this structure be demolished and reconstructed using lpe wood. Pricing for replacement is below.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Building Demolition and Replacement	\$727,375
Sub-Total	\$727,375
Contingency	\$145,475
Total Cost	\$872,850

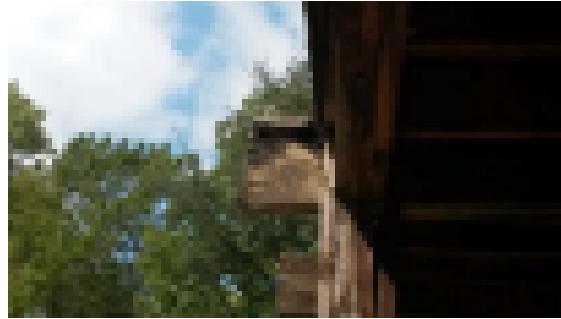
STRUCTURAL

The exposed roof framing of the building is in fair condition with significant deterioration from water exposure which was only observed at the ends of roof beams. These conditions were observed throughout the structure.

Assessment – Fort Worth Botanic Garden



Roof Beam Deterioration



Roof Beam Deterioration

The floor framing is in poor condition with severe deterioration at most perimeter beams, caused by water exposure and insect attack. This deterioration has also compromised the beam to pier connections. The advanced deterioration of the floor framing compromises remediation efforts. It is believed that the safest and most cost-effective solution would be to demolish the building and reconstruct. While it is not believed that this condition constitutes an immediate life/safety issue, it is recommended that the building be taken out of service and reconstructed within the next 12-18 months. Refer to Architectural for building replacement costs.



Damaged Perimeter Beam



Damaged Perimeter Beam

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

Not Applicable

Assessment – Fort Worth Botanic Garden

VI. 18-5 – LAKE ARBOR

A. General Building Information



Lake Arbor Looking East



Lake Arbor Looking North

ARCHITECTURAL

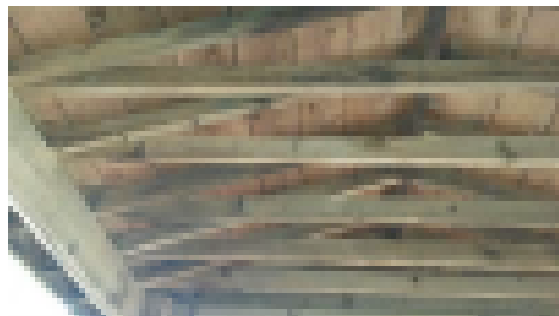
The Lake Arbor, built in 1998, is an approximately 18' x 18' wood structure located on the south pond near the waterfall and takes in views across the pond. The structure has a raised wood deck on exposed wood framing on concrete piers rising from the sloped water's edge, with a wood platform deck, 28" high wood post railing, with 4 corner posts supporting exposed wood joist with wood decking and a cedar shake roof. There is a wood slat bench at both the east and west sides of the structure. Access to the raised deck is provided by a wood stair at the south side of the structure.

STRUCTURAL

This is a wood framed structure supported on concrete piers. The floor framing is 2x decking on 2x12 floor joists on double 2x12 beams at each end. The roof framing is trussed 2x6 rafters with 3x6 tie joists.



Floor Framing



Roof Framing

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

Assessment – Fort Worth Botanic Garden

B. Areas of Insufficiency

ARCHITECTURAL

a. Miscellaneous Architectural

All exposed wood finishes are worn from time and weather. The floor structure is showing signs of aging and exposure and has rotted beyond repair. The stair does not have accessible handrails and a compliant metal handrail should be added to each side of the stair. The wood guardrail is too short and a new 42” high guardrail should be added with appropriate toe clearances.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Floor Structure	\$2,300
Replace Guardrail	\$4,313
Add Handrails	\$1,380
Sub-Total	\$7,993
Contingency	\$1,599
Total Cost	\$9,591

STRUCTURAL

b. Floor Beam Replacement

There is significant deterioration of the floor beams at the southeast and southwest corners of the structure. The deterioration occurs at the beam ends where they are too close to, or in contact with the soil. This deterioration was caused by moisture and insect attack. This condition does not constitute an immediate life safety issue, but should be repaired within the next 12 to 18 months. The recommended repair would entail shoring up the structure and replacing the damaged floor beams. Further, it is recommended that the replacement beams be from a wood species that is less susceptible to moisture and insect attack (such as ipe, teak, or other durable hardwoods).



Southeast and Southwest Floor Beams

Opinion of Probable Construction Cost for Recommended Remediation Work:

Remove Existing Floor Beams and Replace with (4) 4x12 Ipe Floor Beams	\$5,520
Sub-Total	\$5,520
Contingency	1,104
Total Cost	\$6,624

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

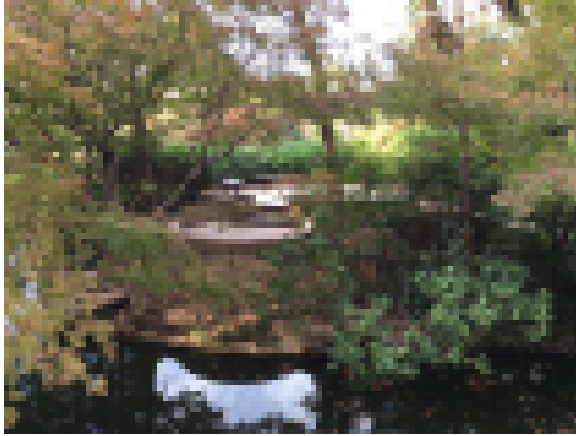
ELECTRICAL
Not Applicable

SITE
Not Applicable

Assessment – Fort Worth Botanic Garden

VII. 18-6 – WATERFALL OVERLOOK

A. General Building Information



Waterfall Overlook

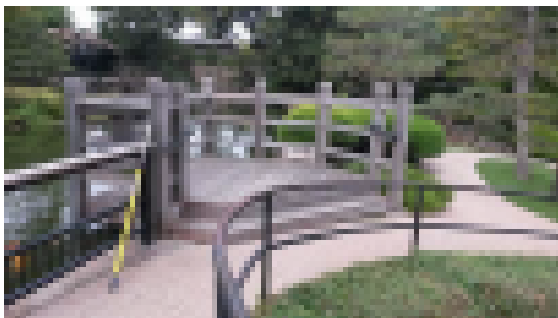
ARCHITECTURAL

The waterfall outlook is a series of observation decks, both at the water's edge to take in views of the pond and the majestic waterfall. The structure has two exposed aggregate concrete platforms - an upper platform deck and a smaller lower platform deck. The upper deck is approximately 20' in diameter and is accessed by two narrow sidewalks, one with low rise long tread steps and the other with uniform steps. The lower deck is approximately 9' in diameter and is accessed from the upper deck by a set of concrete steps. Each deck is bordered by an exposed aggregate curb edging.

A second waterfall outlook structure is a raised wood deck accessed by a sidewalk along the water's edge. The raised deck is approximately 8' x 12' and has a wood step along a chamfered edge with steel handrails that integrate into the guardrail for the raised wood deck.

STRUCTURAL

The original Waterfall overlook is composed of concrete retaining walls and slabs. A smaller overlook was added circa 2012 and is a wood (ipe species) framed deck.



Smaller Overlook

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

Assessment – Fort Worth Botanic Garden

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Guardrail Modifications and Handrails

There is not an accessible route provided to the large upper concrete platform. Provisions for modifying pathways to this feature are covered elsewhere in the 13-SI - Miscellaneous Site Elements portion of this document. A set of handrails need to be added at the steps of this feature to assist with accessibility. While it would take a ramp or series of ramps to make this feature truly accessible, this would not be possible without a total redesign. Pricing for this redesign and creating an accessible path is not included but should be determined if it is desired to be accessible.

At the second waterfall outlook structure, the 43” height of the upper wood guardrail is acceptable. However, a 4” sphere must not pass through the guardrail openings, so an additional bottom rail must be added at this location.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Handrail Additions		\$2,300
Guardrail Modifications		\$575
	Sub-Total	\$2,875
	Contingency	\$575
	Total Cost	\$3,450

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

Not Applicable

VIII. 18-7 – HILL ARBOR

A. General Building Information



Hill Arbor

ARCHITECTURAL

The Hill Arbor built in 1998 is located just west of the Moon Bridge and takes in views across the north pond. This open air wood structure is approximately 8' x 15' with exposed wood decking above, cedar shake roofing, with accent wood trim and ridge beam. The arbor has rails on three sides and incorporates a wood slat bench along the rear. The 4 post structure rests on steel plate anchor supports within the exposed aggregate slab.

STRUCTURAL

The wood framed arbor is supported on a concrete slab foundation. The wood posts and railing systems are badly deteriorated, having suffered moisture and insect attack. Examples of this deterioration was observed at the base of the northwest post, at the base of the southeast post, and at the dislodged railing adjacent to the northwest post.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Replacement of Structure

The wood structure is in poor condition with its column deterioration at the base, loose railing, and exposure to the elements. It has been recommended to demolish and rebuild the arbor in its current location.

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

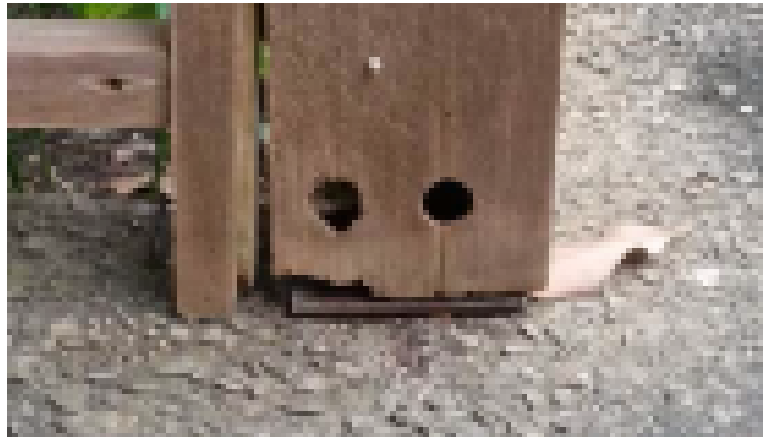
Demolish & Reconstruct		\$20,700
	Sub-Total	\$20,700
	Contingency	\$4,140
	Total Cost	\$24,840

STRUCTURAL

The wood structure has been compromised by deterioration due to moisture and insect attack. The deterioration does not constitute an immediate life/safety issue, but should be addressed within the next 12-18 months. It is recommended that the superstructure (wood portions) be demolished and rebuilt with materials that are less vulnerable to moisture and insect attack (such as lpe wood). Refer to Architectural for anticipated costs to replace structure.



Deteriorated Post



Deteriorated Post



Dislodged Railing

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

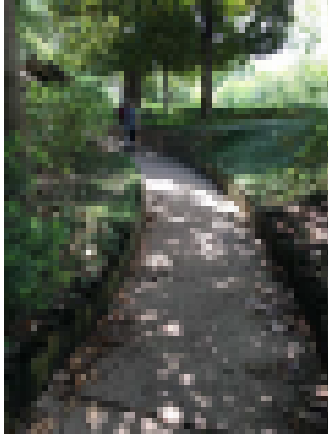
Not Applicable

Assessment – Fort Worth Botanic Garden

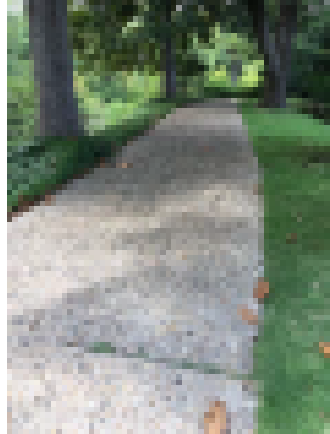
SITE

b. Pavement Modifications

Just east of the Hill Arbor there are two parallel walkways that are constructed out of exposed aggregate concrete. The eastern most path is identified with granite block markers as an accessible pathway. Both paths are out of compliance with current standards due to steep running slopes, cross slopes and shifting pavement at joints caused by invasive tree roots. These pathways should be reconstructed to meet current regulations and eliminate existing trip hazards.



Steep Slope



Trip Hazard

Opinion of Probable Construction Cost for Recommended Remediation Work:

Pavement Modifications		\$7,500
	Sub-Total	\$7,500
	Contingency	\$1,500
	Total Cost	\$9,000

Assessment – Fort Worth Botanic Garden

IX. 18-8 – MOON BRIDGE

A. General Building Information



Moon Bridge

ARCHITECTURAL

The Moon Bridge is a 6' wide arched wood bridge with brass railing accents and spans approximately 20' over the north pond. The bridge structure consists of glue-laminated wood beams with wood decking and framing, wood posts & guardrail at each side.

STRUCTURAL

This is an original Japanese Garden structure constructed in the early 1970's. The bridge is composed of wood decking supported on glue-laminated arched beams along each side and tapered wood posts.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

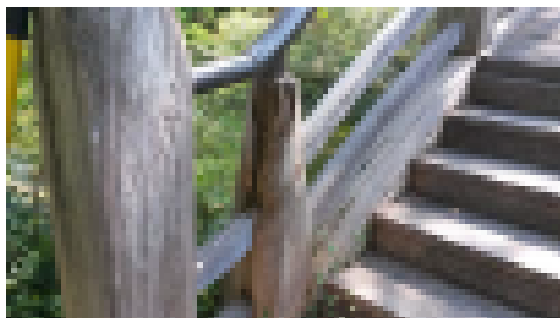
Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Replacement of Structure

The wood bridge structure is in poor condition with its deterioration at the beams, steps and railing. It has been recommended by our team to abandon, demolish and rebuild a new bridge in its current location. During the timing of this assessment, this structure had been taken out of circulation to the public.



Bridge Deterioration

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Demolish & Reconstruct		\$50,600
	Sub-Total	\$50,600
	Contingency	\$10,120
	Total Cost	\$60,720

STRUCTURAL

The wood glue-laminated beams and guardrail posts are severely deteriorated (photographs below). The bridge is a safety hazard and should immediately be abandoned and if desired, replaced with a new bridge. Refer to Architectural for Probable Construction Cost.



Deteriorated Beam



Deteriorated Posts

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

Not Applicable

X. 18-9 – MARY K. UMSTEAD TEAHOUSE

A. General Building Information



Teahouse

ARCHITECTURAL

The Mary K. Umstead Teahouse constructed as one of the original Japanese Garden facilities, is a wood structure, approximately 20' x 30', supported over the north pond by concrete piers. The roughly 10' x 20' Teahouse is surrounded by a 5' walkway constructed of redwood decking on 2x4 redwood planks on floor beams. The exterior of the Teahouse is wood paneling and redwood trim on waterproof felt paper on wood stud framing. The roof structure consists of cedar shake roofing on plywood decking supported by wood joists with plywood soffit and redwood trim.

STRUCTURAL

This building, originally constructed circa 1972 and renovated in 2010 (adding additional floor framing members), is wood framed and supported on concrete piers.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The Teahouse contains general lighting in the form of incandescent downlights. This system is in good condition.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Miscellaneous Architectural

The 24" guardrail does not meet the current height requirements with the limiting capacity of a 4" sphere to pass through the guardrail openings. The entry to the teahouse walkway decking is inaccessible and extremely dangerous. A bridge or solid pathway should be installed in lieu of the stepping stones currently in place. The redwood decking at the perimeter walkway as well as the exterior paneling needs refurbishing.

Assessment – Fort Worth Botanic Garden



Inaccessible Path

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean and Refinish Exterior	\$2,760
Replace Guardrails	\$5,750
New Pathway	\$920
Sub-Total	\$9,430
Contingency	\$1,886
Total Cost	\$11,316

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

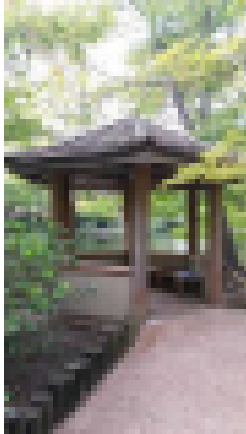
There were no electrical insufficiencies noted in the assessment of this area.

SITE

Not Applicable

XI. 18-10 – SUMMER HOUSE

A. General Building Information



Summer House



Summer House Seating

ARCHITECTURAL

The Summer House is an approximately 9' wide hexagonal shaped wood framed structure. The Summer House sits on an exposed aggregate concrete foundation with wood posts at each corner intersection with a stucco infill panel wrapping the lower portion of the exterior, incorporating a wood bench on the other 5 sides on the interior. The low wall is capped and finished with exposed redwood trim. The roof is an exposed wood frame post and beam construction, pitched with the hexagonal shape, with wood shingles on plywood decking.

STRUCTURAL

This wood framed structure is supported on a concrete foundation slab. The age of the structure is unknown, but it is believed to have been constructed in the late 1970's. No structural distress was observed, but some deterioration of the non-structural trim boards along the base of the walls was noted.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Wood Trim Repair

Portions of the wood trim at the low wall stucco panel and wood cap is in need of replacement due to weather exposure and water damage.

Assessment – Fort Worth Botanic Garden



Trim in Disrepair

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Trim		\$338
	Sub-Total	\$338
	Contingency	\$68
	Total Cost	\$406

STRUCTURAL

There were no structural insufficiencies observed.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

Not Applicable

XII. 18-11 – MOON VIEWING DECK

A. General Building Information



Moon Garden Plaza Space

ARCHITECTURAL

The Moon Viewing Deck is located at the north end of the Japanese Garden and is adjacent to the Bride's Room and Restrooms. The plaza is approximately 50' x 105' and used predominately as a performance area consisting of a sunken concrete octagonal stepped courtyard, as well as a 4' raised circular concrete stage. The raised circular stage is identified with its yin and yang design within the stage floor, one side with smooth concrete while the other incorporates an exposed aggregate finish. Access to the raised performance area is provided by a wood stair and guardrail. The southern end of the plaza is accented with four exposed aggregate panels with concrete banding which appears to be used for viewing performances both on the raised platform as well as in the sunken courtyard. Surrounding the perimeter of the plaza are river rock accent panels with concrete banding that trims out the entire structure.

STRUCTURAL

This deck is composed of a recessed octagonal shaped slab with perimeter curb walls and a raised circular platform with a concrete slab and perimeter retaining walls. There is a wood access stair near the northwest side of the raised platform.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

A majority of the surface is exposed aggregate concrete paving with redwood expansion joints. Inset in the paving are accent panels of black river rock.

B. Areas of Insufficiency

ARCHITECTURAL

a. Concrete Cleaning

The concrete stage and sunken performance areas are in need of power wash cleaning.

Assessment – Fort Worth Botanic Garden



Stage and Sunken Performance Area

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean concrete area		\$1,840
	Sub-Total	\$1,840
	Contingency	\$368
	Total Cost	\$2,208

STRUCTURAL

There were no structural insufficiencies noted in our assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

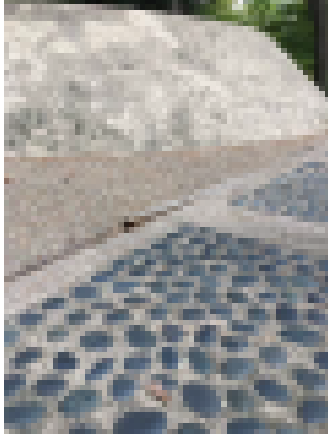
SITE

b. Site Improvements

The redwood expansion joints are not sealed and consistently warp and heave creating tripping hazards. In addition, the river rock panels are extremely slippery when wet. All redwood joints in this area should be replaced and sealed. All river rock panels should be replaced with a more slip resistant stone or other decorative finish.

The steps that lead to the elevated stage are intended to provide performers with access to the stage area. The stage edge has a dangerous drop off that should not be accessible by garden visitors. A lockable gate that is complementary to the stair construction should be added to limit visitor access to the elevated stage platform. If the public is allowed to access the stage area, the stage edge drop (which exceeds the 30" maximum) should be addressed with the incorporation of a 42" high railing.

Assessment – Fort Worth Botanic Garden



Heaving joint



Steps to Performance Stage

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Decorative Stone Panels	\$10,000
Add Gate & Wood Railing Modifications to Steps	\$5,000
Replace Redwood & Seal Exp Joints	\$1,500
Sub-Total	\$16,500
Contingency	\$3,300
Total Cost	\$19,800

Assessment – Fort Worth Botanic Garden

XIII. 18-12 – BRIDE’S ROOM & RESTROOMS

A. General Building Information



Bride's Room & Restrooms

ARCHITECTURAL

The Bride's Room and Restrooms are located in the northwest portion of the Japanese Garden near the Moon Viewing Deck and are approximately 600 square feet. Originally designed in 2001, the restrooms are constructed of 8" CMU with 3/4" painted stucco on metal lath on the exterior face and ceramic tile on the interior from floor to ceiling. The ceramic tile wall is accented with a checkerboard band around the top, and a 2x2 mosaic tile floor. The gable ended roof with vented red wood trim and exposed rafter tails, is constructed of wood joist framing with plywood decking, felt waterproofing and cedar shake shingles. The men's restroom features one water closet, one urinal and one lavatory, while the women's restroom has two water closets, and one lavatory. Incorporated with the women's restroom is the Bride's Room which offers similar finish materials along with a dress hanging rod and make-up vanity. Located behind the Bride's room is a janitorial room which is accessed only from the exterior rear of the building. Each of the restrooms and the janitorial space is equipped with a 2x2 skylight.

STRUCTURAL

The building is composed of a wood framed roof on 8" CMU, supported on a concrete foundation slab.

MECHANICAL / PLUMBING

The Men's Restroom consisted of one wall mounted flush valve water closet, one urinal with sensor operated controls, one counter mounted lavatory, and a floor drain. The Women's Restroom consisted of two wall mounted flush valve water closets, one counter mounted lavatory, and a floor drain. For each restroom there was a ceiling mounted electric heater. There was a mop sink and a water heater in the Janitor's closet area. It appeared plumbing fixtures were all operational.

The Bride's Room had a wall mounted unit ventilator located on the south wall.

Located on the exterior of the building was a high-low drinking fountain.

ELECTRICAL

The electrical system consists of a 120/240V, 1-phase, 3-wire, 100A panel. Interior lighting consists of fluorescent linear fixtures. Some of the light fixtures were out of order, while the exterior lighting fixtures were on during daylight hours.

Assessment – Fort Worth Botanic Garden

SITE

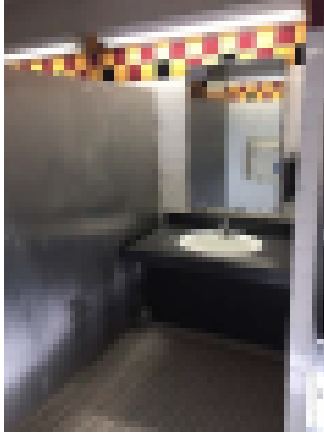
Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Restroom Countertops

The Bride's Room and Restroom is in good condition. The plastic laminate countertops in the restrooms are starting to delaminate and should be replaced with a solid surface or a similarly durable counter for this semi-exterior condition.



Peeling Countertops

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace countertops at sinks		\$1,035
	Sub-Total	\$1,035
	Contingency	\$207
	Total Cost	\$1,242

STRUCTURAL

There were no structural insufficiencies noted in our assessment of this facility.

MECHANICAL / PLUMBING

b. Repair drinking fountain

The lower water fountain was not operational. It is recommended to investigate and repair the issue. Until the cause can be determined, a cost can not be provided. A cost for the investigation is provided.

Assessment – Fort Worth Botanic Garden



Hi-lo Drinking Fountain with Lower Bubbler not Functioning

Opinion of Probable Construction Cost for Recommended Remediation Work:

Investigate and repair lower bubbler	\$300
Sub-Total	\$300
Contingency	\$60
Total Cost	\$360

c. Replacement of unit ventilator grille

The exterior unit ventilator grille is damaged, and it is recommended to replace it.



Damaged Unit Ventilator Grille

Opinion of Probable Construction Cost for Recommended Remediation Work:

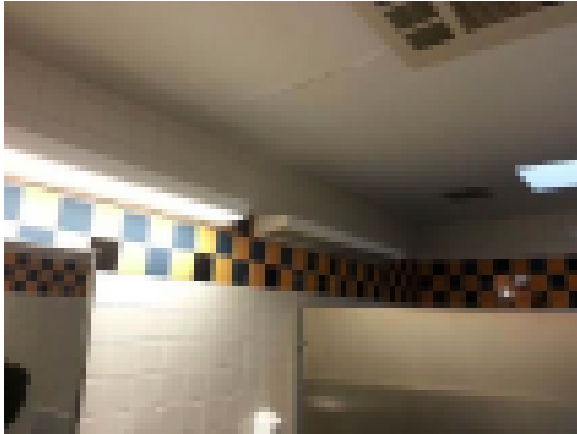
Replace exterior unit ventilator grille	\$350
Sub-Total	\$350
Contingency	\$70
Total Cost	\$420

ELECTRICAL

d. Lighting Maintenance

Replace burned out lamps and provide timer or photocell for exterior lighting control.

Assessment – Fort Worth Botanic Garden



Burned Out Lamp

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace lamps	\$100
Provide exterior lighting control	\$200
Sub-Total	\$300
Contingency	\$60
Total Cost	\$360

SITE

e. Utility Modifications

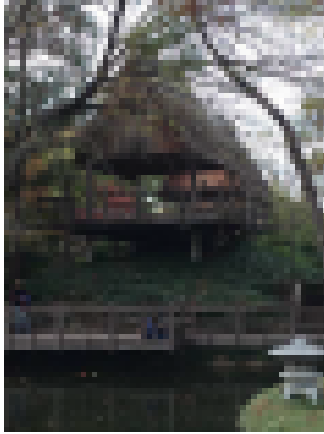
The 1" waterline that serves the Bride's Room and Restroom is undersized for the number of fixtures. Install approx. 300 LF of 2" waterline to the building.

Opinion of Probable Construction Cost for Recommended Remediation Work:

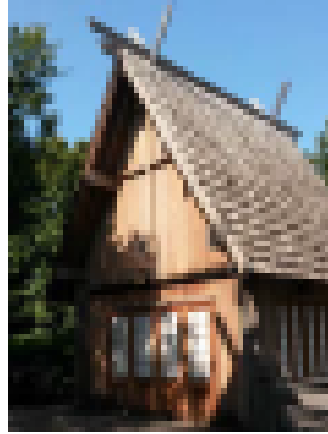
Install New 2" Water Line Allowance	\$7,500
Sub-Total	\$7,500
Contingency	\$1,500
Total Cost	\$9,000

XIV. 18-13 – PAVILION

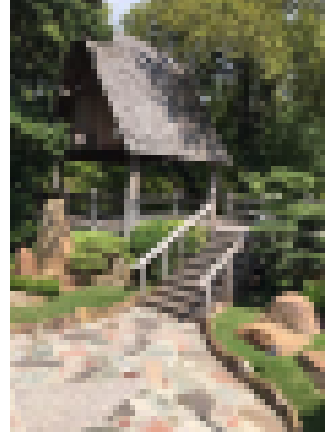
A. General Building Information



Pavilion



Pavilion Kitchen



Pavilion deck and steps

ARCHITECTURAL

The Pavilion is a cluster of buildings located on the west border of the Japanese Garden and consists of a set of 5 raised structures connected by a raised walkway. Each structure has a footprint of approximately 15' x 15' and reaches a ridge height of 24' with its exposed ridge detailing and steeply pitched roofs covered with cedar shake shingles. There are 4 open air structures and 1 enclosed building utilized as a kitchen, with wood framed infill wall paneling.

The raised wood deck is supported by a series of 2 x 10 floor joists that bear on concrete piers. The open Pavilions are also supported by concrete piers underneath the walking deck which support four 12" round post timbers at the corners of each structure and the 4x and 2x roof framing at 8' above the finished wood deck. The Pavilion roof framing has exposed rafter tails; however, the joist framing is enclosed by a plywood panel ceiling with recessed lighting.

The enclosed kitchen is supported in the same way as the open Pavilions, however instead of exposed rafter tails, the roof framing is enclosed with a plywood soffit with recessed lighting. The interior consists of two rooms, a food prep room and a serving room. The food prep is roughly 6' x 15' and contains a stainless 3 compartment sink, a large icemaker, a small hand sink and plastic laminate counter. The serving room is also 6' x 15' and lined with a plastic laminate countertop with under counter storage and three serving windows, one on each side.

The raised wood deck interconnecting each Pavilion has a wood guardrail along its perimeter. There are three sets of wood stairs and a switchback ramp which provide access to the raised wood deck and connect to the sidewalk below.

STRUCTURAL

This is a cluster of 5 Pavilions, four of which are open structures and the fifth is enclosed. These structures are believed to have been included as the original Japanese Garden structures constructed in the early 1970's. The four open structures have solid wood panel ceilings which prevented the observation of the roof framing.

Assessment – Fort Worth Botanic Garden



Wood Panel Ceilings

All five structures are wood framed and supported on a wood framed deck supported on concrete piers. The only distress observed was splitting of one of the floor beams at its cantilevered end near the northeast corner of the easternmost Pavilion. We believe that this splitting is related to wood shrinkage and has not compromised the beams' ability to support the imposed floor loads.

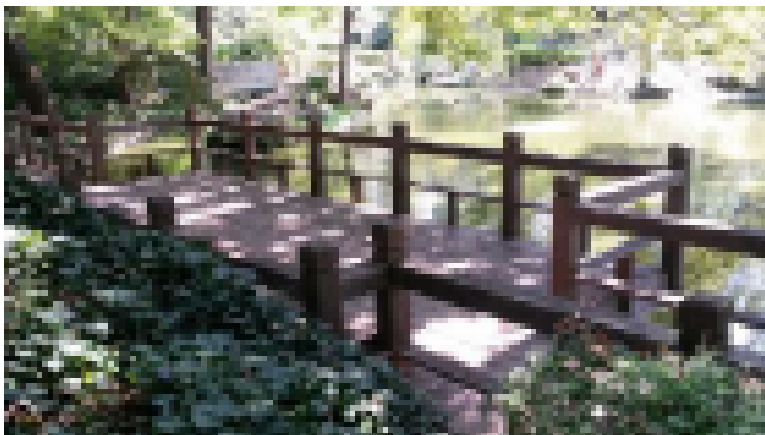


Wood Framed Deck on Concrete Supports



Beam Splitting

There is a wood framed deck immediately to the east of the easternmost Pavilion. This deck is supported on concrete piers.



Pavilion Observation Deck

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

The food service area for this facility contained a counter mounted single compartment stainless steel sink with foot pedal controls, stainless steel double compartment sink, Type 1 grease hood with fire suppression including wall mounted grease exhaust fan, and a wall mounted electric heater.

The service area for this facility contained an ice machine that was no longer utilized.

There was a separate closet area located underneath the Teahouse that housed a water heater for this facility. The water heater is electric with a 38-gallon storage tank. It appears that the water heater was installed in 2011.

ELECTRICAL

The food service building contains electrical panels to feed all pavilion structures. Electrical distribution consists of two 120/240V, 1-phase, 3-wire, 225A panels which are located in the crawl space underneath the food service building. These panels are in good condition. The food service building lighting appears to be in good condition and equipment looks in good condition. Pavilion structures have incandescent downlights controlled by dimmers. Support for downlights is inadequate. Some wiring devices show signs of deterioration.

SITE

The Pavilions are prominently located on a slope overlooking the koi pond with long views across the gardens. This scenic location makes the Pavilions a popular location for group rentals and wedding ceremonies. The Pavilions are surrounded by ipe wood decks, ramps and walkways. The decks appear to be in good condition.

B. Areas of Insufficiency

ARCHITECTURAL

a. Pavilion Exteriors

All structures need to have their cedar shake roofs repaired as they all leak onto their plywood paneling ceilings. After replacement of these roofs, damaged wood panel ceilings should be replaced. The exterior of the kitchen structure needs to be cleaned and refinished due to exposure. Several trim pieces are damaged from an apparent smoke exposure and should be replaced.



Pavilion Roofs



Kitchen Exterior

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean & Prep Exterior of Kitchen Structure	\$3,450
Replace Roofs	\$34,500
Replace Plywood Soffit	\$7,360
Clean Kitchen Structure Wood Paneling	\$3,450
Repair and Replace Wood Trim	\$633
Sub-Total	\$49,393
Contingency	\$9,879
Total Cost	\$59,271

b. Kitchen Pavilion Interior

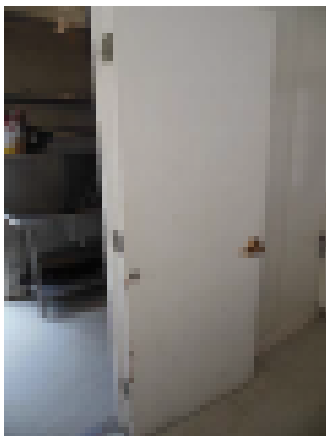
The finish materials in the Pavilion Kitchen have outlived their useful life. The laminated wall panels are splitting at their seams, while the plastic laminate countertop and millwork are becoming delaminated and stained. The hardware on the exterior door as well as the door and hardware on the interior door need to be replaced. The sheet vinyl floors are worn and have outlived its useful life and should be replaced. It is recommended to replace the millwork and install a solid surface countertop in lieu of the laminate finish due to this semi-exterior condition.



Damaged Sheet Vinyl Floor



Damaged Millwork



Damaged Door



Damaged Laminated Paneling

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Flooring	\$3,680
Replace Millwork and Countertops	\$8,280
Replace Laminated Wall and Ceiling Panels	\$6,900
Replace Doors	\$3,450
Sub-Total	\$22,310
Contingency	\$4,462
Total Cost	\$26,772

STRUCTURAL

There were no structural insufficiencies observed.

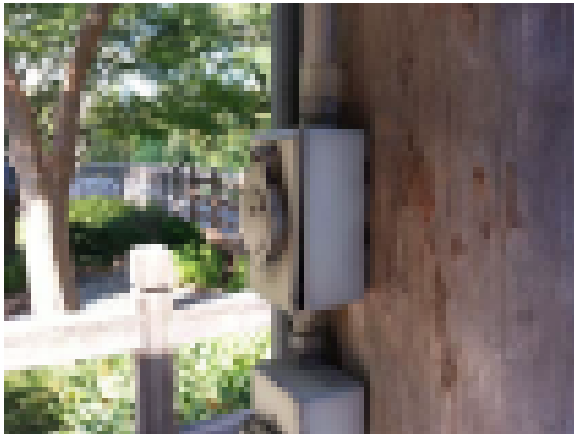
MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies observed.

ELECTRICAL

c. Upgrade Pavilion Lighting

It is recommended to upgrade the Pavilion lighting fixtures to energy-efficient LED downlights with new supports for downlights and new dimmers.



Damaged Dimmer Cover



Downlights in need of upgrading



Downlights in need of upgrading

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace downlights/new supports	\$8,000
Replace dimmers	\$800
Sub-Total	\$8,800
Contingency	\$1,760
Total Cost	\$10,560

SITE

d. Pavilion Approach

Visitors approaching the Pavilion area from the koi pond navigate a steep slope by using a series of exposed aggregate concrete steps and landings with decorative bamboo railing. These steps and landings do not have compliant handrails or guardrails. These should be installed in compliance with current standards.



Non-compliant step railings and landing guardrails

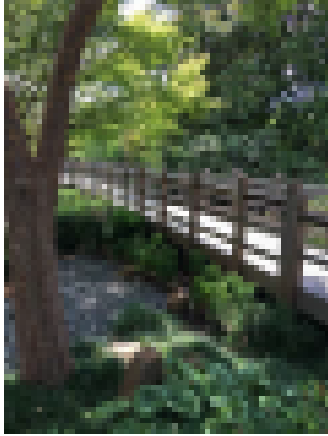
Opinion of Probable Construction Cost for Recommended Remediation Work:

Install New Handrails & Guardrails	\$18,000
Sub-Total	\$18,000
Contingency	\$3,600
Total Cost	\$21,600

e. Pavilion Deck and Guardrails

The guardrails that are installed have large gaps between members which appear to exceed limits allowed by current standards. These guardrails should be modified to reduce all openings to 4” or smaller.

Assessment – Fort Worth Botanic Garden



Ipe Path and Rails



Ipe Path and Rails

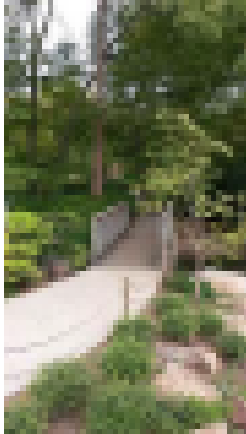
Opinion of Probable Construction Cost for Recommended Remediation Work:

Install Wood Railing Modifications	\$35,000
Sub-Total	\$35,000
Contingency	\$7,000
Total Cost	\$42,000

Assessment – Fort Worth Botanic Garden

XV. 18-14 – CHECKERBOARD BRIDGE

A. General Building Information



Checkerboard Bridge



Checkerboard Bridge

ARCHITECTURAL

The Checkerboard Bridge is a 14' long by 5' wide wooden bridge connecting the east and west sides of the Japanese Gardens located just below the north pond and west of the Mikoshi. As a favorite photo stop, the wooden plank bridge is naturally called the Checkerboard Bridge for its patterned detailing on its 42" guardrail. The pattern consists of 4x4 vertical wood posts with intermediate horizontal 4x4 spacers creating the checkerboard pattern.

STRUCTURAL

This wood framed bridge is composed of wood walk planks, (4) 2x members spanning the length of the bridge, glu-laminated beams along each side of the bridge, and a wood guardrail system.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

The southernmost pedestrian crossing of the main pond is a 5' wide wooden bridge structure. Adjacent to the bridge is a koi feeding terrace that is accessed by three concrete steps.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies observed.

STRUCTURAL

There were no structural insufficiencies observed.

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

ELECTRICAL
Not Applicable

SITE

a. Railing Addition

The koi feeding terrace is non-compliant and should be reconstructed with new handrails, steps, and a new landing.



Narrow bridge at koi pond Drop off and steps to feeding area

Opinion of Probable Construction Cost for Recommended Remediation Work:

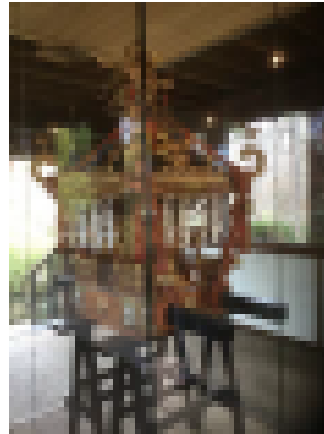
New Paving, Steps & Handrail at Feeding Area		\$7,500
	Sub-Total	\$7,500
	Contingency	\$1,500
	Total Cost	\$9,000

XVI. 18-15 – MIKOSHI HOUSE

A. General Building Information



Mikoshi House



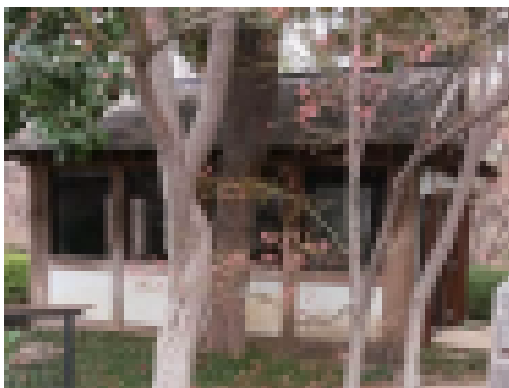
Mikoshi Shrine

ARCHITECTURAL

The Mikoshi House is a 15'x20' wooden structure which houses the Mikoshi Shrine. The Mikoshi Shrine is a 749 AD replica which was a gift from the citizens of Nagaoka, Japan to the citizens of Fort Worth to celebrate its sister city relationship. Located south of the Pavilions, the Mikoshi House is accentuated to its east by the 15'x25' Mikosi Deck which is a popular wedding venue overlooking the Japanese Garden Waterfall. The Mikoshi House is a wood post structure with faux stucco panels (concrete board) and wood trim supporting plexiglass windows to its soffit line above. The exposed wood rafters and overhangs of the roof system have gable ends with redwood trim which support a plywood deck, ridge beam and cedar shake roofing. A set of concrete stairs accented with brick paver treads and a steel and wood guardrail allow entry from the north, while the south end opens at grade. A double set of doors at each end provide entry into the interior viewing area of the shrine itself. The interior consists of an exposed truss ceiling, drywall and plexiglass wall system and an exposed aggregate concrete slab floor.

STRUCTURAL

The Mikoshi House is a wood framed structure with wood shingle roof and partial faux stucco panel exterior finish.



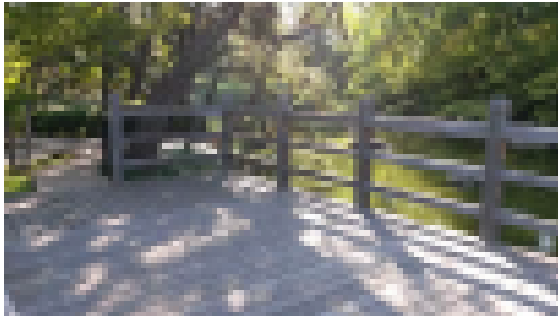
Mikoshi House



Wood Lattice Eave

Assessment – Fort Worth Botanic Garden

The adjacent Mikoshi Deck is a wood framed deck supported on concrete piers along the front and a concrete retaining wall along the back. Based on available drawings, we believe the deck was constructed circa 2012. The deck was in good condition.



Mikoshi Deck

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

The Mikoshi House houses a sacred palanquin donated to the Japanese Garden by Fort Worth's sister city, Nagaoka. It is located on a planted slope overlooking the koi pond.

B. Areas of Insufficiency

ARCHITECTURAL

a. Miscellaneous Architectural

The faux stucco panels at the exterior walls are stained, cracking and coming loose and need replacement along with the base wood trim which has considerable water damage. The north stair entry needs to be reworked to provide an accessible handrail. The roof shows signs of water leaking and needs to be repaired.



Damaged Panels



Damaged Trim

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Concrete Board Panels		\$3,220
Replace Wood Trim		\$1,581
Stair Handrails		\$1,150
Replace Roof		\$5,175
	Sub-Total	\$11,126
	Contingency	\$2,225
	Total Cost	\$13,352

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

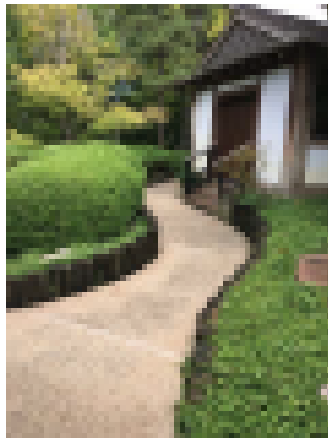
ELECTRICAL

Not Applicable

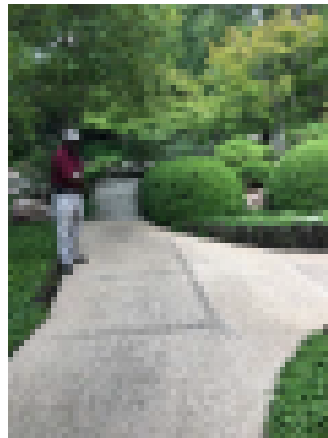
SITE

b. Reconstruct Walkways

Adjacent to this shrine is a long meandering pathway that leads down to the pond and koi feeding area. Closest to the Mikoshi Shrine, the pathway is an exposed aggregate material lined with a landscape timber border. Approximately halfway down the slope, the surface transitions to asphalt as it continues to the pond. The walkway is difficult for some visitors to negotiate because of its variable slopes, cross slopes, and meandering character. This walkway should be demolished and reconstructed using a similar exposed aggregate paving in a new configuration that provides an accessible pathway around the building and incorporates a level landing at the entry steps to the shrine.



Sloping Pathway



Intersection of Paths

Opinion of Probable Construction Cost for Recommended Remediation Work:

Demolish and Reconstruct Walkways & Edging		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

Assessment – Fort Worth Botanic Garden

XVII. 18-16 – WATERFALL

A. General Building Information



Waterfall Looking West



Waterfall Looking South

ARCHITECTURAL

There were no architectural systems noted to be assessed at this area.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

The water features in the Japanese Garden consist of a series of waterfalls, weirs, and ponds. The main Koi Pond shell is concrete lined with naturalized stone edges surrounded by garden plantings and shade trees. Waterfalls are supplied by submersible pumps, and drain lines are accessed from planting areas at pond edges.

B. Areas of Insufficiency

ARCHITECTURAL

Not Applicable

STRUCTURAL

Not Applicable

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

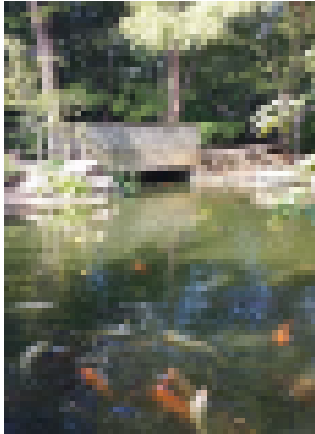
Not Applicable

Assessment – Fort Worth Botanic Garden

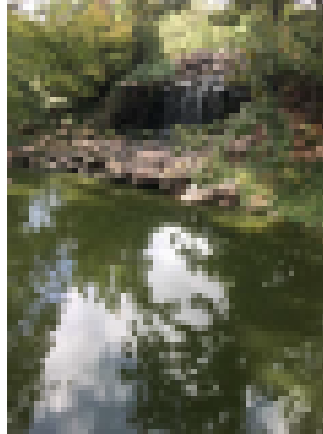
SITE

a. Water Features

There are multiple locations where drain lines, valves, and pump equipment are deteriorating or in disrepair. In addition, pond weirs are leaking and causing erosion in multiple locations. New sumps with valves and drain line connections to the storm sewer system should be installed. The pond should be drained. The pond liner, including concrete shell and waterfall weir structures, should be repaired and waterproofed.



Pond with Concrete Liner



Waterfall Garden Feature

Opinion of Probable Construction Cost for Recommended Remediation Work:

Pond & Waterfall Repairs		\$625,000
	Sub-Total	\$625,000
	Contingency	\$125,000
	Total Cost	\$750,000

XVIII. 18-17 – PAGODA

A. General Building Information



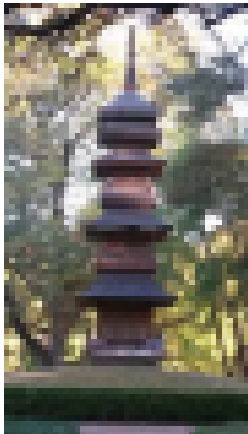
Pagoda

ARCHITECTURAL

The Pagoda is an approximately 32' tall tower with a 5'x5' base, located just northeast of the Treasure Tree Gift Shop. The wood stud framed tower has a series of plywood gusset profiles, with sheet metal covering over redwood nailers and trim.

STRUCTURAL

This circa 1972 structure is composed of a wood stud framed core with plywood sheathing on all sides. The roof sections utilize plywood ribs cut to the desired profile and sheathed with wood strips. The structure is mounted to a concrete pier cap and supported by a single 24" diameter concrete pier.



Pagoda



Lower Tier Detail of Pagoda

MECHANICAL / PLUMBING

There are no mechanical or plumbing systems to review.

ELECTRICAL

The Pagoda has no electrical service. There are convenience receptacles in the area that require maintenance.

Assessment – Fort Worth Botanic Garden

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Clean Exterior and Minor Repairs

The Pagoda is in good shape, however, the redwood trim is starting to show wear and needs to be replaced where possible. The lower gusset and base of the Pagoda are showing the most amounts of wear on the trim and panel facing closest to the ground. Lower levels should be cleaned to match the upper levels.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean Exterior and Repair Trim		\$575
	Sub-Total	\$575
	Contingency	\$115
	Total Cost	\$690

STRUCTURAL

There were no structural insufficiencies observed.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

b. Replace Convenience Receptacle

It is recommended that the convenience receptacles close to the Pagoda are replaced.



Damaged Receptacle

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace receptacles		\$100
	Sub-Total	\$100
	Contingency	\$20
	Total Cost	\$120

SITE

Not Applicable

XIX. 18-18 – THE TREASURE TREE GIFT STORE

A. General Building Information



Treasure Tree Gift Store



Treasure Tree Gift Store

ARCHITECTURAL

The Treasure Tree Gift Store identified on the Japanese Garden key-map as 18-18 and on the Overall Botanic Garden key-map as 19, is approximately 1,500 square feet and is located near the Main Entrance Courtyard in the southwest corner of the Japanese Garden. The structure with its tea house concept, has a wrap-a-round deck that is cantilevered out over the adjacent pond.

The wood deck is made up of 2x6 cedar planking with a 2x4 cedar railing. The deck is accentuated by a platform wood bench located in the center of the deck. The Gift Store exterior envelope is made up of wood stud framing with batt insulation, cedar plywood paneling with 1x2 wood trim, and wood framed windows with 1/4" Plate Glass. The roof structure is made up of wood beams and joist framing, plywood decking, and cedar shake shingles accented by a round ridge beam detail. The exterior roof framing above the cantilevered deck offers exposed wood joists, beams and decking.

The interior consists of a vaulted ceiling with exposed wood beams, painted drywall and wood trim finishes on the ceiling and walls, accented by a bamboo wood floor below. The interior glass and wood sales fixtures light up underneath the pendent hung light fixtures with bamboo blade grass shades. The point of sales millwork consists of wood facing and trim with a plastic laminate countertop inset. Back of house areas consist of an office, stock room and an employee restroom.

The Treasure Tree Gift Store has undergone several upgrades and improvements since its original construction. The most recent improvement consisted of an accessible ramp being added to the north entrance, along with replacing portions of stair and railing which were exposed to weather damage.

STRUCTURAL

This circa 1985 wood framed structure is composed of a wood roof structure supported on a wood post & beam wall system, supported on a wood post & beam floor system on concrete piers. The structural systems of the building are in good condition, although significant deterioration of the wood siding was observed.

MECHANICAL / PLUMBING

There are two 5-ton split systems that service this facility. The two indoor electric furnaces are twinned together and share common ducted supply and return air ductwork with a single thermostat control within the Gift Shop. There are two remote air-cooled condensers on pads at the exterior of the building. It appears these units were installed in 2004.

Assessment – Fort Worth Botanic Garden

The single restroom consisted of one tank-type water closet, counter mounted lavatory, and electric water heater. There was a ceiling grille with exhaust fan serving the restroom.

ELECTRICAL

Electrical distribution consists of two panels. Both panels are 120/240V, 1-phase, 3-wire. Panel A is 150A and panel B is 200A. They are located in the back of the store and are both in good condition. Panel A feeds the waterfall equipment in addition to the Gift Store loads. Panel B is mostly dedicated to A/C equipment for the store. Lighting in the Gift Store consists of a combination of track lights and downlights. The back room has T8 fluorescent fixtures and downlights retrofitted with spiral compact fluorescent fixtures.

SITE

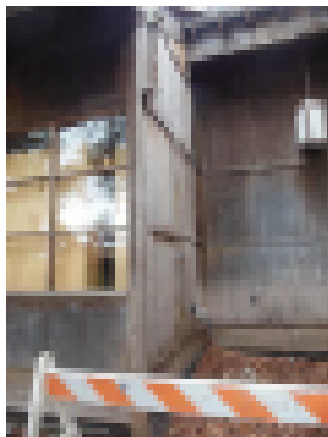
Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

a. Exterior Items

The exterior of the Treasure Tree Gift Store identified a few insufficiencies. The cantilevered deck accessed from the North Entry, provides a low 24" guardrail which does not comply with current code requirements. A 42" guardrail should be provided. The exterior wood paneling on the west side of the building which is not protected by a roof overhang, needs replacing due to weather exposure. The west side paneling also suffered from additional water damage due to a broken pipe in late December 2016. This paneling needs to be replaced along with several sections of wood trim which have rotted and are missing.



Damaged Paneling



Low Guardrails

Much of the exterior is extremely dirty from weathering and should be cleaned – especially the walls and underside of the exterior roof deck. Two doors on the exterior are in disrepair and should be replaced.

Assessment – Fort Worth Botanic Garden



Dirty Roof Deck and Panels



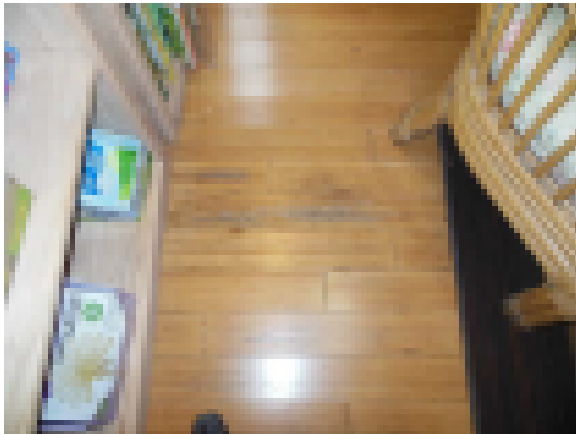
Damaged Door

Opinion of Probable Construction Cost for Recommended Remediation Work:

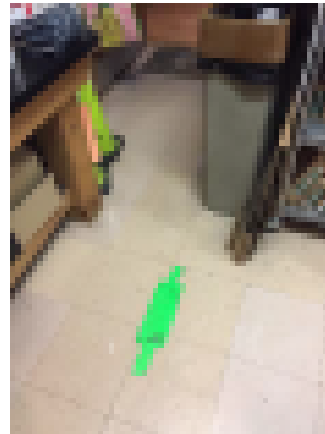
Replace Exterior Wood Panels		\$5,520
Replace Doors		\$2,760
Clean Entire Exterior		\$5,750
Replace Wood Guardrails		\$1,610
	Sub-Total	\$15,640
	Contingency	\$3,128
	Total Cost	\$18,768

b. Interior Items

The interior bamboo sales floor suffered some water damage due to the broken water pipe and shows signs of warping and cupping. Eventually these cupped edges will show signs of traffic wear due to their raised edges. The adjacent stockroom has also suffered from the same water leak in that the flooring substrate was damaged and has allowed for delamination of the VCT flooring.



Damaged Flooring



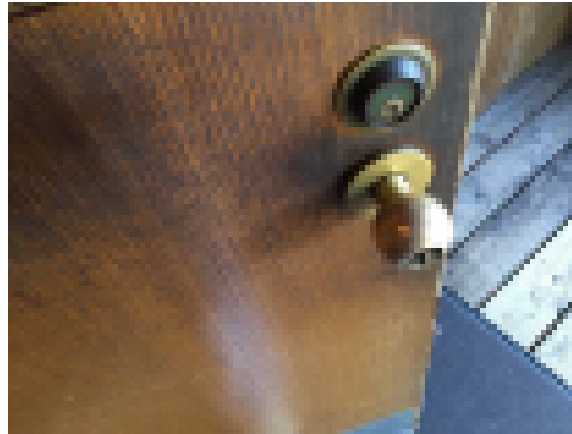
Damaged Flooring

The single employee restroom is not accessible; however, employees can use the accessible restrooms located in the adjacent Entrance Plaza. The main sales counter is too high and needs to be modified with a 36" wide by 34" tall section for accessibility. Doors throughout the building currently have knob type hardware and need to be replaced with lever type.

Assessment – Fort Worth Botanic Garden



Inaccessible Counter



Knob Type Hardware

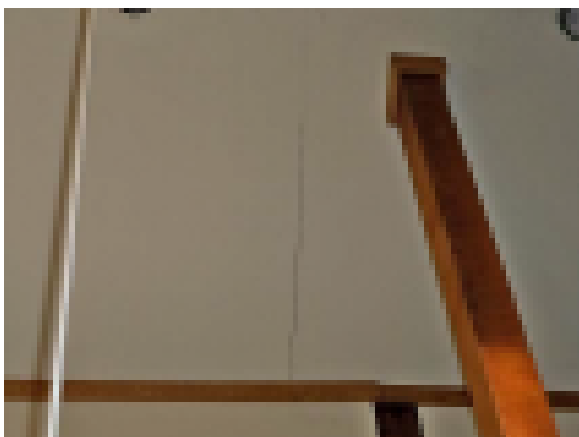
There are a few stress cracks noted by structural that need to be patched and repaired.

Opinion of Probable Construction Cost for Recommended Remediation Work:

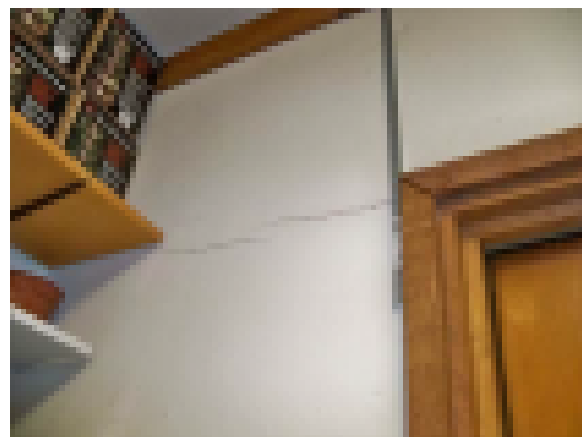
Replace Door Hardware	\$7,360
Replace Store Room VCT	\$1,035
Replace Damaged Wood Floor	\$1,725
Replace Millwork	\$2,875
Repair Wall Cracks	\$1,150
Sub-Total	\$14,145
Contingency	\$2,829
Total Cost	\$16,974

STRUCTURAL

Minor cosmetic distress was observed on the interior finishes with a ceiling crack over the front sales counter and a drywall crack at the south exterior door. It is believed that the ceiling crack was the result of differential deflection of adjacent joists with the roof joists to the left of the crack having a much smaller span than the roof joists to the right of the crack. It is believed that the wall crack was caused by cutting in for the door into what was once a solid wall. This distress is not structurally significant. Costs for patching these items are included in the Architectural section.



Ceiling Crack Over Sales Counter



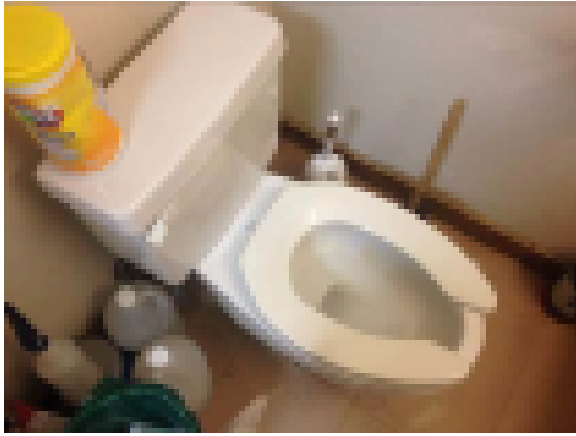
Drywall Crack at South Exterior Door

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

c. Repair running water closet

The tank-type water closet appeared to have constant running water. It is recommended to repair the water closet to stop the constant flow of water. Repair would include changing out flapper and valve assembly.



Water Closet with Constant Running Water

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Water Closet		\$125
	Sub-Total	\$125
	Contingency	\$25
	Total Cost	\$150

d. Replacement of HVAC equipment

The current two 5-ton split systems appear to have been installed in 2004. With an expected life service of 15 years, these units are coming close to reaching their service life, and therefore should be considered for replacement.



Existing two 5-ton condensers

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Two 5-ton Systems		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

ELECTRICAL

e. Lower Store Exit Signs

Exit signs are too high to provide any guidance in case of fire. It is recommended to lower existing exit signs within code height requirements above doors.



Exit Sign Mounted Too High



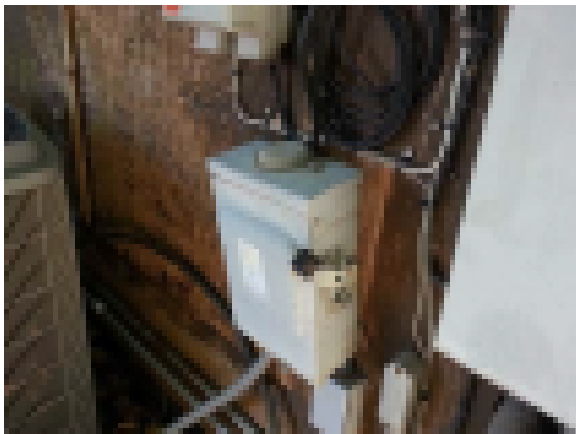
Exit Sign Mounted Too High

Opinion of Probable Construction Cost for Recommended Remediation Work

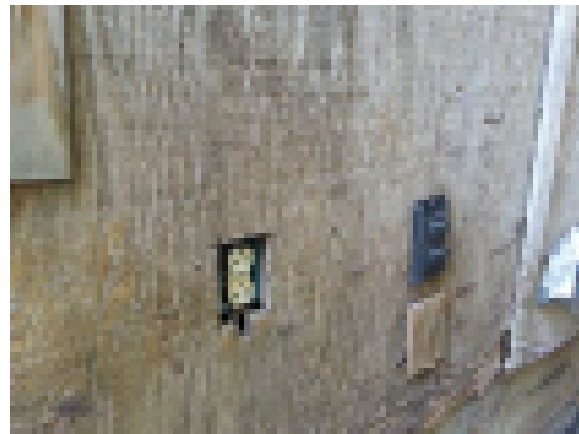
Lower Exit Signs		\$400
	Sub-Total	\$400
	Contingency	\$80
	Total Cost	\$480

f. Repair Exterior Equipment

Exterior equipment installed in the back of the store shows signs of deterioration. The A/C disconnect needs to be supported and wiring devices need proper covers.



Disconnect Without Proper Support



Wiring Device Without Cover

Assessment – Fort Worth Botanic Garden

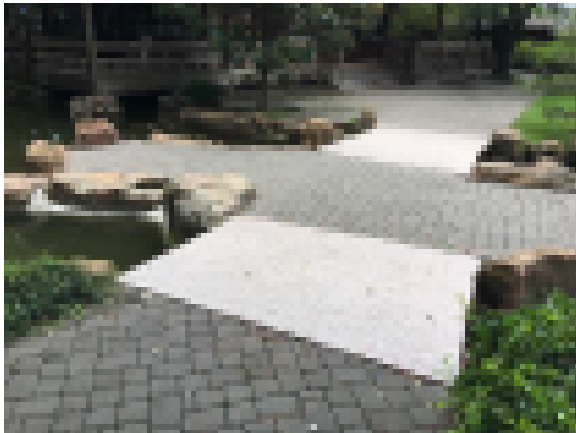
Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Exterior Equipment		\$500
	Sub-Total	\$500
	Contingency	\$100
	Total Cost	\$600

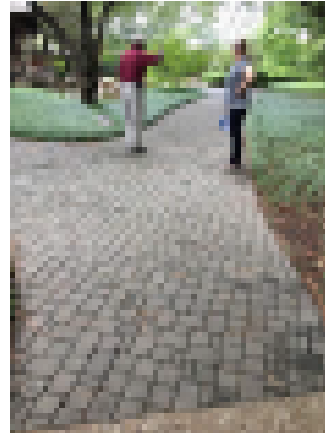
SITE

g. Paver Reinstallation

The walkway leading to the Gift Store building transitions from exposed aggregate concrete to a meandering pathway of concrete unit pavers and stone bridges which cross the southernmost pond in the Japanese Garden. The unit pavers are constructed on a setting bed of sand and are showing signs of settling and moving. This flexible and constantly shifting sub-base material creates an irregular walking surface and requires ongoing attention from maintenance staff. This picturesque setting is frequently used for weddings and ceremonies both day and night. The irregular paving surface create a tripping hazard. The pavers in this area should be removed and reinstalled on a stable sub base material.



Stone Bridge Over Pond



Unit Paver Pathway

Opinion of Probable Construction Cost for Recommended Remediation Work:

Reinstall Unit Pavers on New Sub Base		\$20,000
	Sub-Total	\$20,000
	Contingency	\$4,000
	Total Cost	\$24,000

Assessment – Fort Worth Botanic Garden

XX. 18-19 Exit

A. General Building Information



Exit Gate Structure



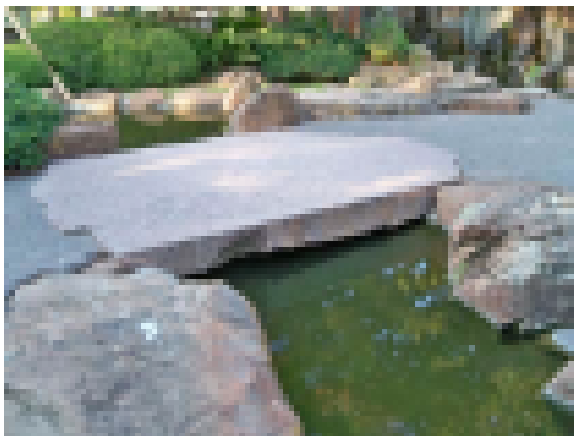
Exit Area Waterfall

ARCHITECTURAL

The Exit is an approximately 800 square foot garden area located at the south entrance of the Treasure Tree Gift Shop and adjacent to the Main Entrance Gate & Courtyard. Originally built as a control point for the Japanese Garden, the exit structure is a wooden gateway with a post and beam system and covered canopy with exposed wood framing and cedar shake shingles. Originally the Exit gateway was equipped with a metal bar circular turnstile which has been removed. The Exit Garden also contains a waterfall in its southwest corner which flows into the pond designed with a granite slab bridge.

STRUCTURAL

There is one small, approximately 8" thick, solid granite platform bridge within the Exit area. This bridge spans approximately 7 feet.



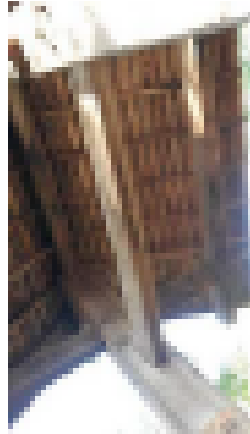
Granite Bridge

There is a heavy timber framed exit gate structure in this area with an identical structural system to the smaller entry gate noted in the Main Entrance Courtyard (photographs below). This structure is in good condition.

Assessment – Fort Worth Botanic Garden



Exit Gate Structure



Exit Gate Detail

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

a. Site Improvements

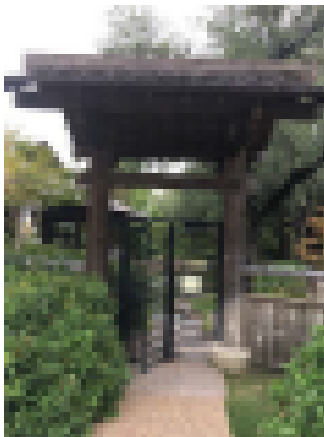
Visitors either exit the Japanese Garden through a two-post wooden pavilion or the Gift Store, and then travel through a transitional garden space adjacent to the parking lot. This small fenced yard includes a pond, concrete unit pavers, wooden ramps and steps and decorative plantings.

The turnstile that was previously at this pavilion has been removed. A new self-closing unidirectional self-latching gate and hardware should be constructed in its place. The low courtyard fence is braced and in need of repair. The cedar ramp and steps are in disrepair and do not have adequate handrails. They should be reconstructed with durable ipe wood to match the other deck renovations in the area.

Assessment – Fort Worth Botanic Garden



Gift Store South Entry Steps



Exit Gate with Turnstile



Leaning Fence at Gift Store Entry Courtyard

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Exit Turnstile with Gate	\$5,000
Rebuild South Entry Steps, Ramp, Railing	\$8,500
Repair Courtyard Fencing	\$1,000
Sub-Total	\$14,500
Contingency	\$2,900
Total Cost	\$17,400

Assessment – Fort Worth Botanic Garden

XXI. 18-20S - MAIN ENTRANCE RESTROOMS – SOUTH ENTRY

A. General Building Information



South Entry Restrooms

ARCHITECTURAL

The approximately 900 s.f. Restrooms are located in the southwest portion of the Japanese Garden courtyard near the Ticket Office. Originally designed in 1981 and remodeled in 2014 for accessibility requirements, the restrooms are organized back-to-back to provide an accessible restroom on both the public side as well as within the Japanese Garden. The restrooms constructed of 8" CMU with 3/4" painted stucco on metal lath with redwood trim accents on the exterior face, with ceramic tile on the interior face from floor to ceiling. The ceramic tile wall is accented with a designed color change band from top to bottom with a 4" cove base, while the restroom floor offers a 6" ceramic tile layout. The gable ended roof with vented red wood trim and exposed rafter tails, is constructed of wood joist framing with plywood decking, felt waterproofing and cedar shake shingles. The public men's restroom features one water closet, two urinals and one lavatory, while the Japanese Garden side men's restroom features one water closet, one urinal and one lavatory. The public women's restroom features three water closets and one lavatory, while the Japanese Garden side women's restroom features two water closets and one lavatory. Each restroom is designed to have the required baby changing station provided.

STRUCTURAL

The Restroom Building adjacent to the Entry Courtyard was constructed in 1981. This building has wood roof framing supported on CMU walls and a conventionally reinforced stiffened slab system on ground. The roof framing was not exposed to view. However, we did not observe any structural distress or significant deterioration within the exposed portions of the building.

MECHANICAL / PLUMBING

There are two sets of Men's Restrooms and two sets of Women's Restrooms. The Men's Restrooms combine to have two wall mounted flush valve water closets, three urinals, two wall mounted lavatories, two floor drains, and two suspended electric heaters. The Women's Restrooms combine to have five wall mounted flush valve water closets, two wall mounted lavatories, two floor drains, and two suspended electric heaters. Plumbing fixtures appear to be all operational.

There is a freeze-proof high-low water fountain located adjacent to the restrooms.

ELECTRICAL

Each restroom has T-12 fluorescent lighting fixtures. Some fixtures do not have diffusers.

Assessment – Fort Worth Botanic Garden

SITE

Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

ARCHITECTURAL

There were no Architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

There were no Structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

a. Investigate exterior drinking fountain

There was no running water for the exterior mounted high-low drinking fountain. Botanical Garden staff indicated the existing drinking fountain should be replaced.



Exterior Mounted Drinking Fountain

Opinion of Probable Construction Cost for Recommended Remediation Work:

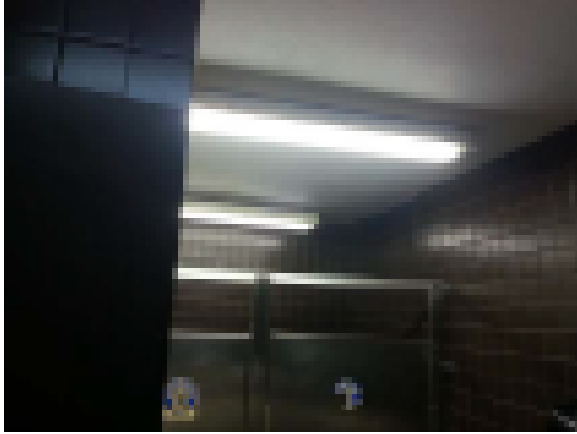
Replace with freeze resistant drinking fountain	\$9,500
Sub-Total	\$9,500
Contingency	\$1,900
Total Cost	\$11,400

ELECTRICAL

b. Upgrade Restroom Lighting

It is recommended to upgrade lighting for each restroom with energy-efficient LED fixtures and occupancy sensors set for a minimum 20-minute delay.

Assessment – Fort Worth Botanic Garden



Sample of T-12 Lighting Fixtures

Opinion of Probable Construction Cost for Recommended Remediation Work:

Upgrade Restroom Lighting		\$2,400
	Sub-Total	\$2,400
	Contingency	\$480
	Total Cost	\$2,880

SITE

c. Upgrade Utilities

The sanitary sewer line to the main restroom facility flows out of the building on the east side and flows toward the south where it connects to a larger sanitary line at a manhole in Rock Springs Road. This line has been serviced several times and has shown that it is compromised and clogged with roots. This line should be replaced in its entirety from the building to the manhole (assumes +/- 500 LF).

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install New 6" Sanitary Sewer Line		\$17,500
	Sub-Total	\$17,500
	Contingency	\$3,500
	Total Cost	\$21,000

Assessment – Fort Worth Botanic Garden

XXII. 18-20N - RESTROOMS – NORTH

A. General Building Information



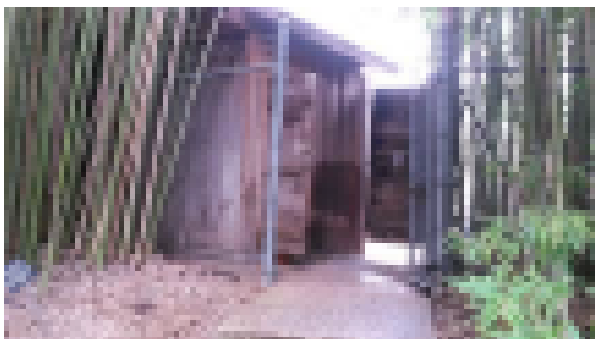
North Restrooms

ARCHITECTURAL

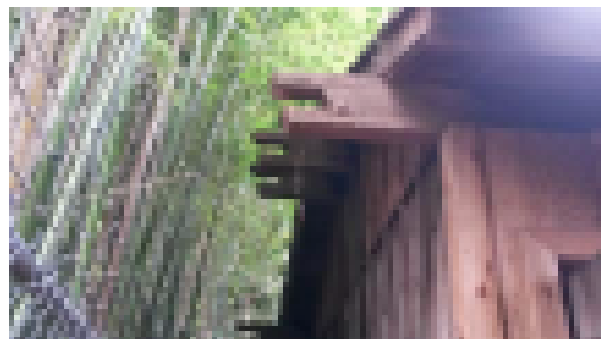
These single user restrooms are located along the northern boundary of the Japanese Garden between the Mary K. Umstead Teahouse and the Moon Viewing Deck. While these restrooms are secluded with limited visibility, they are also located adjacent to an employee access gate into the North Production Greenhouse compound and the Breakroom Building. Located at the rear (north side) of the two single user restrooms is an equipment pump room. The restrooms are constructed of 8" CMU cladded with redwood siding, with low profile gable roof structure of wood framed joists with exposed rafter tails, plywood decking, felt waterproofing and cedar shake shingles. The interior finishes consist of painted CMU walls, concrete floor and a 2x2 lay-in acoustical ceiling. Each restroom is equipped with a stainless steel sink, vitreous china water closet, stainless steel toilet paper dispenser and plastic paper towel dispensers. The restrooms are not designed to meet current accessibility requirements in their size, or required user clearances.

STRUCTURAL

This structure is composed of load-bearing CMU walls with wood veneer and a wood frame roof structure. No significant structural distress was observed, although the decorative ends of the roof framing members are starting to deteriorate.



North Restrooms



Deteriorating Wood Framing

MECHANICAL / PLUMBING

Each Men's and Women's restroom consists of one tank type water closet, one wall mount stainless steel sink, one wall mounted electric heater, and an exhaust grille.

Assessment – Fort Worth Botanic Garden

There is a drinking fountain with three bubblers near the Pump House Restroom.

ELECTRICAL

Each restroom has fluorescent lighting in poor condition.

SITE

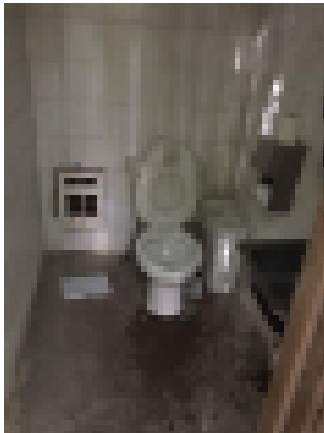
Site summary of the Japanese Garden is covered in a separate section of this chapter.

B. Areas of Insufficiency

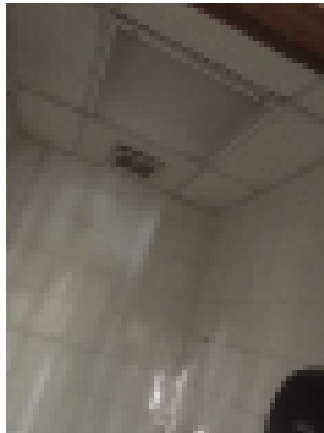
ARCHITECTURAL

a. Miscellaneous Architectural

It is recommended that the concrete floor be tiled (or epoxy painted) to allow for easier maintenance with less staining of the concrete. The door hardware needs to be upgraded to lever type handles as existing hardware is in disrepair. The acoustical ceiling system has rusted and needs to be replaced utilizing vinyl faced ceiling tiles that are designed for moist conditions. Signage needs to be provided directing visitors to the nearest accessible restrooms located to the east at the Bride's Room Restrooms.



Restroom Fixtures



Restroom Ceiling

Opinion of Probable Construction Cost for Recommended Remediation Work:

Tile Flooring	\$1,725
Door Hardware	\$1,380
Replace Ceilings	\$759
Restroom Signage	\$230
Sub-Total	\$4,094
Contingency	\$819
Total Cost	\$4,913

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

b. Replacement of exhaust fan and heater

Both the exhaust fan and heater show signs of rust and corrosion. It is recommended to replace both units in each restroom.

Assessment – Fort Worth Botanic Garden



Exhaust Grille in Restroom



Electric Heater in Restroom

Opinion of Probable Construction Cost for Recommended Remediation Work:

Exhaust grille/electric heater replacement	\$2,000
Sub-Total	\$2,000
Contingency	\$400
Total Cost	\$2,400

c. Investigate bubbler water flow

The drinking fountain with three bubblers is not functioning properly. One of the bubblers is not functioning as no water is coming out, and it has been indicated by Botanic Garden staff that this drinking fountain be removed.



Drinking Fountain

Opinion of Probable Construction Cost for Recommended Remediation Work:

Remove drinking fountain and cap remaining plumbing below slab.	\$500
Sub-Total	\$500
Contingency	\$100
Total Cost	\$600

Assessment – Fort Worth Botanic Garden

ELECTRICAL

d. Upgrade lighting

Upgrade lighting for each restroom to new energy-efficient, LED fixtures and occupancy sensors set for a minimum 20-minute delay.



Lighting in Need of Replacement



Lighting in Need of Replacement

Opinion of Probable Construction Cost for Recommended Remediation Work:

Upgrade restroom lighting		\$1,000
	Sub-Total	\$1,000
	Contingency	\$200
	Total Cost	\$1,200

SITE

Not Applicable

Assessment – Fort Worth Botanic Garden

XXIII. 18-ST – MISCELLANEOUS STRUCTURAL ELEMENTS

A. General Building Information

STRUCTURAL

North Gate (map location Grid L20): This wood framed structure, constructed circa 2008, consists of 8 steel columns with wood trim and a wood framed roof system. The structure is in good condition.

East Maintenance Gate (map location Grid K22): Heavy timber posts support the gates. No significant structural distress was noted.

Ramp transitioning between upper east walk and lower east walk (map location Grid K22): This wood framed ramp appears to have been added as part of an accessible route. While we did not observe any distress to the structure, we noted that several of the support posts are not properly seated on the piers. This appears to be a fairly new structure. It is recommended that the Engineer of Record (EOR) for the project review the as-built condition and provide comment on the sufficiency of the post connection to piers.



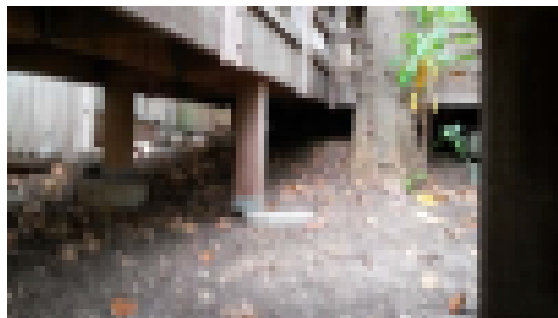
Ramp Transition



Support Posts Not Properly Seated



Support Posts Unseated



Support Posts Unseated

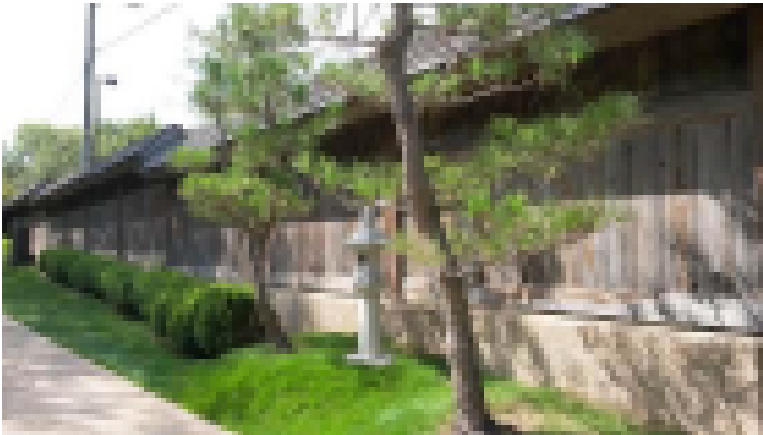
Wood framed bridge adjacent to ramp (map location Grid K22). This appears to be a recent bridge, likely constructed at the same time as the adjacent ramp.

Assessment – Fort Worth Botanic Garden



Wood Framed Bridge

West Fence (map location Grids G20 and F21): This circa 2012 fence is composed of steel columns set into concrete piers and covered with wood trim, and wood fencing and concrete grade beams spanning between the steel posts and piers.



West Fence

East Fence (map location Grids L20 and L21): The fence is composed of steel posts embedded in concrete piers with wood framing/fencing between the steel posts. The steel posts support a wood framed roof system. The roof system and steel posts appear to be in good condition. However, the wood fencing, especially at lower portions of fence, has deteriorated from moisture and insect attack. The wood trim attached to steel posts has also deteriorated and is separating from the posts.

Assessment – Fort Worth Botanic Garden



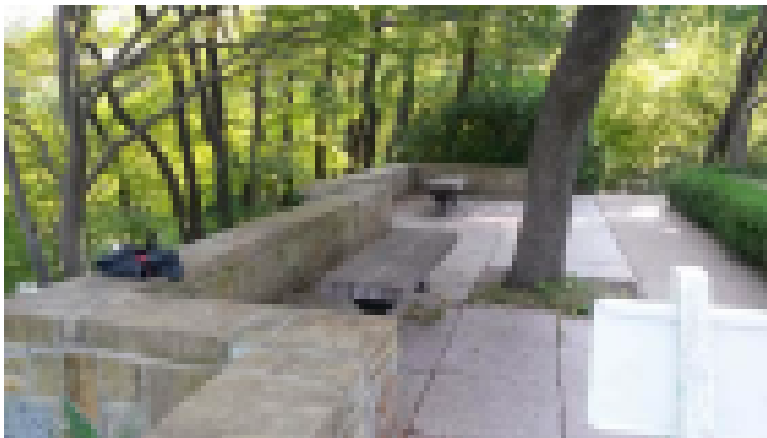
East Fence Deterioration



East Fence Trim Deterioration



East Fence Deterioration



Retaining Wall at Pagoda

Stone Faced Retaining Wall adjacent to Pagoda (map location Grid 25G): No distress or structural insufficiencies noted. The granite stones in this zone is not the preferred paving surface. It is recommended that the stones are removed and replaced with exposed aggregate concrete that will match other locations in the garden. It has also been recommended by Botanic Garden staff that the live oak tree be removed.

Remove Granite Stones	\$1,250
Install Exposed Aggregate Concrete	\$2,500
Remove Existing Live Oak	\$1,500
Sub-Total	\$5,250
Contingency	\$1050
Total Cost	\$6,300

Assessment – Fort Worth Botanic Garden

Bridge (map location Grid G26): This solid granite slab bridge is located northeast of the Treasure Tree Gift Shop. No distress or structural insufficiencies noted.

Bridge (map location Grid F25): This solid granite slab bridge is located just south of the Waterfall. No distress or structural insufficiencies noted.

Bridge (map location Grid F24): This bridge runs parallel to the west fence line and is composed of wood planks supported on steel bar joists.

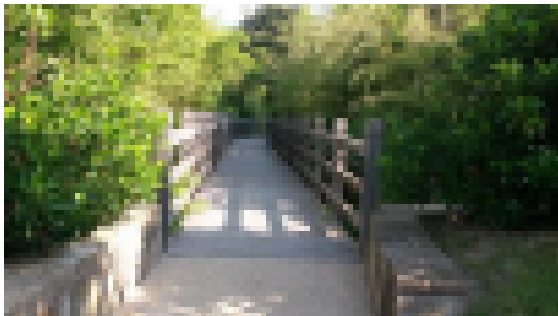


Wood Plank Bridge



Wood Plank Bridge

West Boardwalk (map location Grids F22, G22, and F23): This wood-framed boardwalk is supported on concrete piers. The issue date on the structural drawings was 4/12/2011 and the deck is believed to have been constructed shortly thereafter. No distress or structural insufficiencies noted.



West Boardwalk



West Boardwalk

Bridge at west side of island (map location Grid H22): This bridge has insufficient bottom concrete cover for the lower reinforcing steel and has experienced spalling resulting in exposure and deterioration of the bottom reinforcing steel.

Assessment – Fort Worth Botanic Garden



West Island Bridge



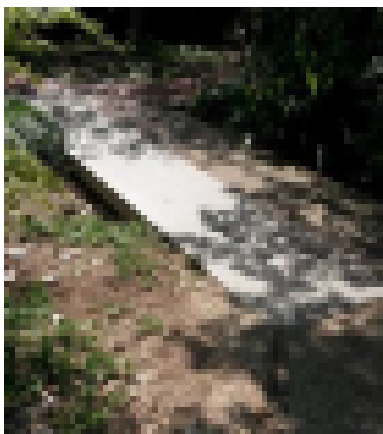
Concrete Spalling and Exposed Steel

Bridge (map location Grid J22): This wood plank bridge is supported along its outer edge (water side) by a steel beam. The inboard edge is most likely supported on a concrete retaining wall (although this element was not exposed to view). The bridge appears to be in relatively good condition, although we recommend cleaning and painting the steel structure to extend its useful life.



Wood Plank Bridge

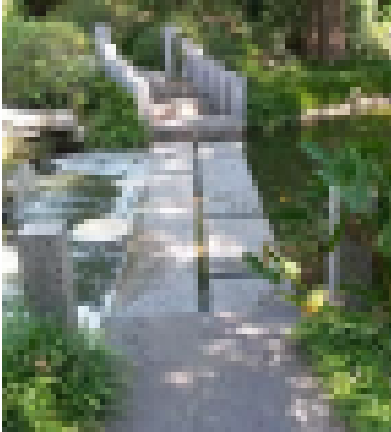
Bridge (map location Grid J21): This concrete bridge is in good condition with no distress noted.



Concrete Bridge

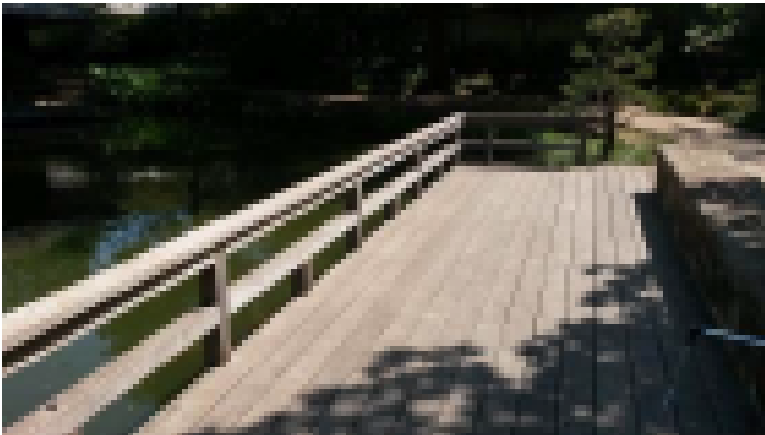
Assessment – Fort Worth Botanic Garden

Concrete Weir (map location Grid K21): This concrete weir is in good condition.



Concrete Weir

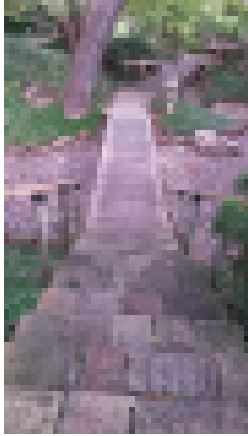
Wood Framed Overlook (map location Grid L21): This overlook is positioned across from the Teahouse. It is wood framed and supported on concrete piers at water side and concrete retaining walls at the earth side. The structure is in good condition.



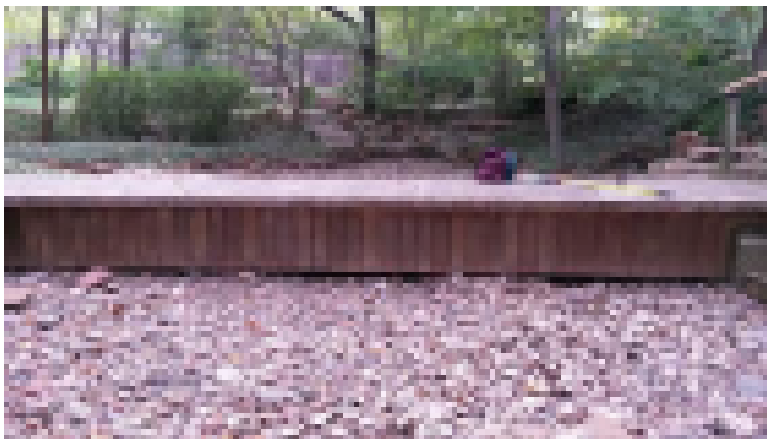
Wood Framed Overlook

Three Wood Plank & Steel Framed Bridges (map location Grid H26): Per available drawings, these bridges were constructed circa 2005 and consist of wood planks spanning between steel joists running along each side of the bridge. There is also wood skirting attached to the outside faces of the steel joists.

Assessment – Fort Worth Botanic Garden



Wood Plank Bridges



Wood Skirting

Bridge (map location Grid K20): This solid granite slab bridge connects the north path to the northernmost island. The bridge is in good condition.



Granite Bridge

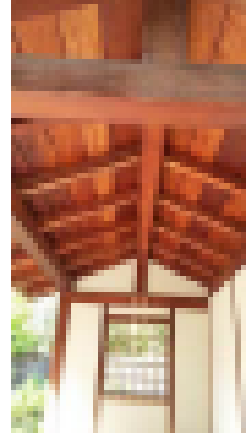
Arbor (map location Grid G21): This wood framed arbor is located along the west walk, between the Pavilion and the Bride's Room and Restroom. The structure consists of 1x8 decking on 4x4 purlins spaced at 24 inches on center, supported on 6x6 side beams and wood posts at the four corners of the structure.

Assessment – Fort Worth Botanic Garden

The outside post is a 6 inch round, while the other three posts are 6x6 square. The walls are infilled with 2x4 studs covered with a textured Masonite board. The structure is in good condition.



Arbor



Arbor Framing

B. Areas of Insufficiency

STRUCTURAL / ARCHITECTURAL

a. K22 - East Maintenance Gate

The bottoms of the heavy timber wood posts are starting to show signs of deterioration due to water and insect attack related to the insufficient separation of the post from the ground. It is anticipated that these posts will need to be replaced within the next 5 years.



Post Deterioration

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Two 6x6 Treated Posts	\$500
Sub-Total	\$500
Contingency	\$100
Total Cost	\$600

b. H22 - Bridge at west side of island

This bridge has insufficient bottom concrete cover for the lower reinforcing steel and has experienced spalling resulting in exposure and deterioration of the bottom reinforcing steel. This is not a current life/safety issue, but it is recommended that the following repairs be performed within the next 5 years:

Assessment – Fort Worth Botanic Garden

Remove any loose, delaminated concrete and all concrete within $\frac{3}{4}$ " around an exposed reinforcing bar. Wire brush clean rebar to white condition. Coat exposed reinforcing bars and concrete surface to be patched with Sika Armatec 110. Patch concrete with Sikatop 123 Plus.



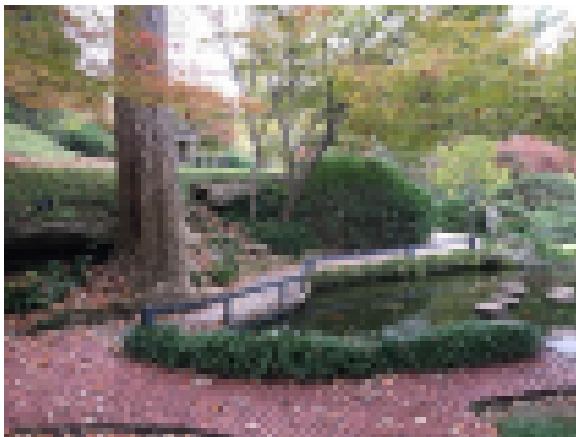
Concrete Spalling and Exposed Steel

Opinion of Probable Construction Cost for Recommended Remediation Work

Repair Concrete		\$800
	Sub-Total	\$800
	Contingency	\$160
	Total Cost	\$960

c. Bridge Steel Painting

Bridge (map location Grid J22): It is recommended to clean and paint the steel structure of this bridge to extend its useful life.



Bridge Requiring Cleaning and Painting

Three Wood Plank & Steel Framed Bridges (map location H26): Mild rusting was observed on the bar joists and bridging, particularly along bottom chord of joists. Although there is no current life/safety issue, it is recommended to clean and paint the steel structure to prolong its useful life. We anticipate that the cleaning and painting will require removal and replacement of the wood skirting.

Assessment – Fort Worth Botanic Garden



Steel Requiring Cleaning and Painting



Steel Requiring Cleaning and Painting

Bridge (map location Grid F24): Mild rusting of bar joints and bridging was noted. While this is not a current life safety issue, it is recommended that the steel structure be cleaned and painted to extend its useful life. We anticipate that the cleaning and painting will require removal and replacement of wood skirting.



Steel Requiring Painting

Opinion of Probable Construction Cost for Recommended Remediation Work

J22 Bridge Clean Steel & Paint	\$1,150
H26 Bridges Clean Steel & Paint	\$3,450
F24 Bridge Clean Steel & Paint	\$1,150
Sub-Total	\$5,750
Contingency	\$1,150
Total Cost	\$6,900

Assessment – Fort Worth Botanic Garden

XXIV. Cost Summary

To summarize the information found in this document, this section provides a cost summary by key element of the Botanic Garden. Please refer to sections AREAS OF INSUFFICIENCY for detailed information on each item. Note that if multiple options/costs were provided, then the highest of the costs are included in the numbers below.

18-SI	Miscellaneous Site Elements	\$423,000
18-1	Main Entrance Gate	\$11,530
18-2	Ticket Office	\$9,819
18-3	Suzuki Garden	\$12,600
18-4	Karesansui	\$872,850
18-5	Lake Arbor	\$16,215
18-6	Waterfall Overlook	\$3,450
18-7	Hill Arbor	\$33,840
18-8	Moon Bridge	\$60,720
18-9	Mary K. Umstead Teahouse	\$11,316
18-10	Summer House	\$406
18-11	Moon Viewing Deck	\$22,008
18-12	Bride's Room & Restrooms	\$11,382
18-13	Pavilions	\$160,203
18-14	Checkerboard Bridge	\$9,000
18-15	Mikoshi Shrine	\$31,352
18-16	Waterfall	\$750,000
18-17	Pagoda	\$810
18-18	Treasure Tree Gift Shop	\$78,972
18-19	Exit	\$17,400
18-20S	South Restrooms	\$35,280
18-20N	North Restrooms	\$9,113
18-ST	Miscellaneous Structural Elements	\$14,760
	Zone 3 Total	\$2,596,026

Assessment – Fort Worth Botanic Garden

Zone 4

Key Locations: 9J, 9W, 20-25



Assessment – Fort Worth Botanic Garden

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I. 9J – JAPANESE GARDEN PARKING LOT

A. General Information



Japanese Garden Parking



Accessible Parking

ARCHITECTURAL

There were no architectural systems noted to be assessed at this area.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The Japanese Garden parking lot has LED light fixtures mounted on high poles. There are two poles with 4 fixtures each located on the east-west midline and a single high pressure sodium street light fixture located on the north side walk. Due to the location of light fixtures, lighting is concentrated around the two Led light poles. Even though lighting at the edges of the parking lot is above minimum recommended levels, the contrast with the center parking lot makes them look dark. The average lighting level measured in parking areas was 3.2 FC with a maximum of 7.5 FC and a minimum of 0.2 FC.

SITE

The Japanese Garden Parking Lot is located directly south of the Japanese Garden, north of the Four Seasons Garden and East of the Grove and Cactus Garden. This asphalt lot is primarily accessed from the east at Rock Springs Road and provides parking and drop-off access to the Japanese Garden and Cactus Garden. It also provides one-way vehicular access to the asphalt service drive through the Grove to the Weekend parking lot in the southwest corner of the site.

B. Areas of Insufficiency

ARCHITECTURAL

Not Applicable

STRUCTURAL

Not Applicable

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MECHANICAL / PLUMBING

Not Applicable

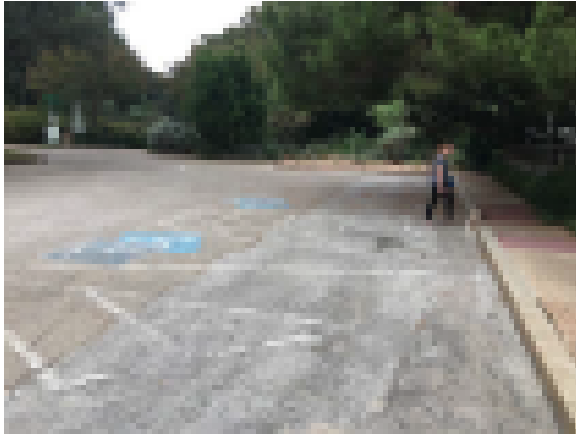
ELECTRICAL

There were no electrical insufficiencies noted in our assessment of this area.

SITE

a. Asphalt, Striping and Drainage

The asphalt parking lot slopes primarily from the west to the east. The surface of the lot is beginning to show wear and the parking striping is difficult to see in some areas. The lot should be overlaid with a new asphalt surface topping and the parking spaces restriped.



Worn Asphalt Parking Surface and Striping



Drainage Ponding in Southeast Parking Lot

In addition, a small pooling of nuisance water has been identified in the southeast corner of the lot. It is recommended that a curb cut and rip rap flume be installed in conjunction with other parking lot improvements to alleviate ponding and release storm water into adjacent planting areas.

Opinion of Probable Construction Cost for Recommended Remediation Work:

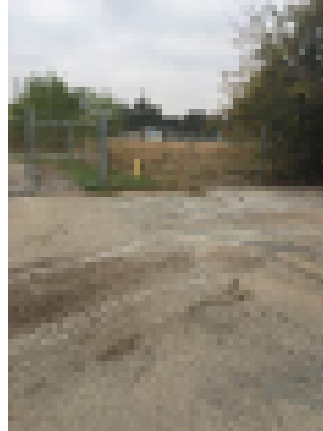
Restripe Parking Lot	\$3,500
Asphalt Overlay	\$20,000
Install Curb Cut & Flume	\$2,500
Sub-Total	\$26,000
Contingency	\$5,200
Total Cost	\$31,200

II. 9W – WEEKEND PARKING LOT

A. General Information



Accessible Parking Spaces (north)



West Fence Line

ARCHITECTURAL

This parking area is located in the southwest corner of the Botanic Garden property and is used for overflow parking on weekends as well as special events parking. This parking lot is accessed from the north by Japanese Garden Lane which traverses one way through the Grove. Secondary points of access are provided directly off of the I-30 access road as well as secondary to Montgomery Street through the adjacent property access. These three access points are controlled through chain link gates.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The weekend parking lot has four poles with flood lights mounted on them. The light poles are placed in a square pattern approximately 150 feet apart. Poles are fed through aerial lines. This light pole arrangement creates light islands that resemble general security lighting more so than parking lot lighting.

SITE

The Weekend Parking Lot is located in the southwest corner of the Botanic Garden property, near the I-30 Access Road. This lot is utilized by garden visitors on busy weekends or event days. Christ Chapel Church also uses this lot as overflow and occasional bus parking. The asphalt parking lot is surrounded by a galvanized chain link and barbed wire fence with gated access to the I-30 Access Road, Montgomery Street, and the Grove. Future plans for garden expansion may include this parking area being utilized as the future site of a new maintenance facility.

B. Areas of Insufficiency

ARCHITECTURAL

With the one-way access of Japanese Garden Lane, vehicles must exit onto the I-30 access road and drive around the block to re-enter the main areas of the Botanic Garden. Consideration should be given for two-way traffic along Japanese Garden Lane when the road is resurfaced.

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The striping for this lot is barely visible making it difficult to see the designated spaces and park efficiently. There are approximately seven accessible parking spaces with one space missing its accessible parking sign. It was difficult to determine the accessible route which did not lead directly into a fence line. One must utilize Japanese Garden Lane as the accessible route to gain access back into the garden exhibits. There is not a striped accessible walking lane along the road, and consideration should be given to creating an accessible sidewalk alongside the road.

Opinion of Probable Construction Cost for Recommended Remediation Work:

New Sidewalk Along Japanese Garden Road	\$16,100
Sub-Total	\$16,100
Contingency	\$3,220
Total Cost	\$19,320

STRUCTURAL

Not Applicable

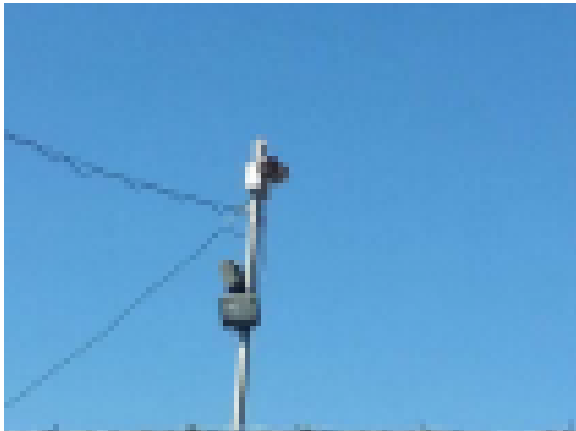
MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

a. Upgrade to LED Lighting

It is recommended to upgrade the parking lot lighting with more efficient LED lighting.



Existing Light Pole

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace with LED Lighting	\$40,000
Sub-Total	\$40,000
Contingency	\$8,000
Total Cost	\$48,000

SITE

b. Striping, Asphalt and Drainage

Approximately half of the surface drainage of this asphalt parking lot runs south toward the I-30 access road and the remainder of the lot slopes north to the Grove. The north parking lot edge does not have a curb and is heavily vegetated along the chain link fence boundary. This creates a barrier to drainage flow and promotes ponding and debris collection at the base of the fence and parking lot edge. A concrete curb and flume should be designed and constructed to capture the surface runoff and prevent ponding and debris collection along the north edge. Additionally, an inlet should be installed in the flume and

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approximately 400 LF of pipe installed to convey this water to the swale in the Grove. Plans for construction of the new maintenance facility should be confirmed prior to proceeding with repairs.

In addition, the parking lot striping has become worn and faded over time. The entire lot should be re-striped and handicap accessible spaces clearly marked.



Parking Slope & Striping



Vegetation and Debris Collection at North Fence Line

The eastern portion of the Weekend Parking Lot is located adjacent to the South Production Greenhouses. This large asphalt parking area is separated by chain link fence and plantings from the main weekend parking lot area. The paving in this area is in similar condition to the main Weekend Parking Lot. Primary surface drainage is collected in an asphalt flume running from the west side of the Production Greenhouses southeast to the center of the parking area. Drainage patterns take surface flow from this flume toward the I-30 service road. This concentrated drainage pattern is causing deterioration and accelerated wear of the asphalt surface. It is recommended to replace the flowline of the swale with a concrete flume to ensure positive drainage on a more durable surface.

With parking lot striping in a similar worn condition to the west side, the entire parking lot should also be re-striped and handicap accessible spaces and signage clearly marked.



Drainage Swale at Surface of Asphalt Parking

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Asphalt Overlay (West & East Side)	\$6,500
Install Concrete Flume, Inlet and Pipe at North Edge	\$35,000
Restripe Parking Lot (West & East Side)	\$5,000
Install Concrete Drainage Flume (East Side)	\$20,000
Sub-Total	\$66,500
Contingency	\$13,300
Total Cost	\$79,800

III. 10 – COMPOST OUTPOST

A. General Building Information



Interactive Pavilion



Interactive Display

ARCHITECTURAL

Located just east of the Weekend Parking Lot and west of the Backyard Vegetable Garden, the Compost Outpost is an interactive learning pavilion dedicated to recycling compost. The structure consists of a 23'x32' concrete slab supporting a galvanized tube framing system with aluminum siding and roof. At the rear of the pavilion is a 10'x20' enclosed storage room for the interactive “hands on” learning aides, while the front of the pavilion serves as an open-air classroom. The classroom is flanked on the north and south sides by an 18" high and 22" deep rock seat wall. The classroom is furnished with eight PVC dipped metal benches that can be arranged to fit the learning environment required.

Adjacent to the Compost Outpost pavilion are 17 caged compost bins with interactive signage exhibits identifying the benefits of composting. The area is also serviced by an 8'x8' prefabricated storage building with wood panel siding and wood subfloor supported on wood skids.



Caged Compost Bins



Learning Pavilion

The Compost Outpost has 2 storage canopies approximately 12'x21' each. The structures consist of galvanized tube framing with aluminum siding. The bottom rail of the tube framing is supported on flagstone blocks for leveling. The frame is then secured to the ground with rebar anchors driven into the ground (refer to structural assessment). Crushed gravel has been spread on the ground surface inside each canopy for compaction. The storage canopies are used to store bagged landscape materials.

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STRUCTURAL

The interactive pavilion is a pre-engineered building on a concrete foundation slab. The exterior columns are encased in a low stone clad concrete seat wall.

There are two pre-fabricated, open-ended steel shelters located just west of the composting beds.



Pre-Engineered Building



Pre-Fabricated Structures

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The Compost Outpost has a small storage building with T8 fluorescent lighting and no automatic controls. Panel BVG is located outside the Compost Outpost adjacent to the Backyard Vegetable Garden. This panel serves the Compost Outpost, Vegetable Garden and surrounding loads. It is 24 circuit, 100A, 120/240V, 1-phase, 3-wire.

SITE

Mulch pathways provide circulation through the space and connect the Compost Outpost to the concrete walkway of the Backyard Vegetable Garden.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

a. Shelter Tie-Down Anchors

The pre-fabricated shelters are set on pieces of limestone with rebar anchors driven into the ground (like a tent stake) near each of the four corners. The provided tie-downs are insufficient to resist wind uplift forces. New properly sized helical or screw type anchors should be installed near each corner of the two shelters.

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Shelter Anchoring

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install 8 Properly Sized Tie-Down Anchors	\$3,200
Sub-Total	\$3,200
Contingency	\$640
Total Cost	\$3,840

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

b. Mulch and Concrete Walk

The mulch pathways throughout the Compost Outpost have settled and vegetation is growing through the material creating an irregular walking surface. A new concrete walkway from the existing sidewalk to the classroom area should be installed. Throughout the mulched pathways, weeds and volunteer plants should be removed and the pathways then top-dressed with mulch to provide a smooth walking surface.



Approach to Compost Outpost from Existing Sidewalk

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Top Dress Mulch Pathways	\$1,750
Install Concrete Walk to Classroom	\$600
Sub-Total	\$2,350
Contingency	\$470
Total Cost	\$2,820

IV. 13S – SOUTH PRODUCTION GREENHOUSE

A. General Building Information



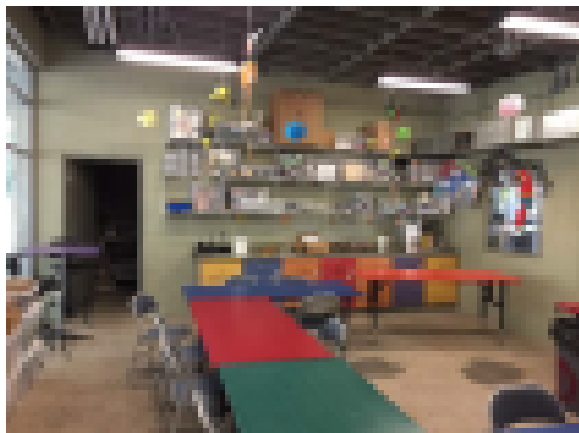
South Production Greenhouse Entry Canopy



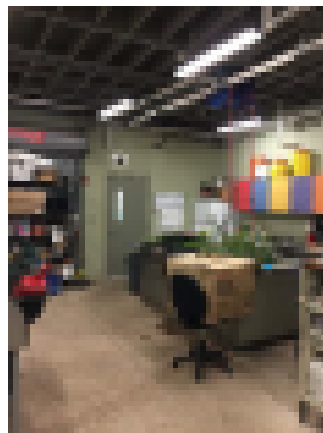
South Production Greenhouse Rear

ARCHITECTURAL

The South Production Greenhouse dedicated in 2007, is located in the southwest corner of the Botanic Garden property adjacent to the Weekend Parking, the Backyard Vegetable Garden and Compost Outpost. The fully sprinkled facility is separated by two different building functions, an approximately 2,000 s.f. administrative area and an approximately 8,300 s.f. greenhouse structure. The administrative area consists of load bearing CMU, exposed wood joist and roof deck with a standing seam metal roof. The metal roof offers a rainwater catchment system which drains into a tank located on the east side of the building. The administrative area provides an office space, a potting workroom for staff and volunteers, along with a connecting education classroom and storage space for visitors and groups. The educational space has the capability to expand into the workroom for larger groups with the use of an overhead coiling door located between the two spaces.



Educational Classroom

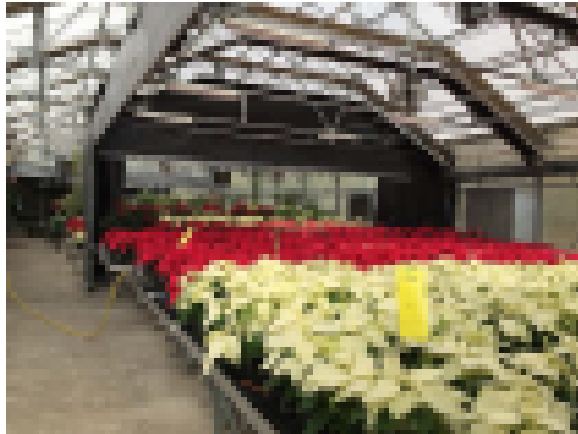


Potting Work Room

The material finishes for the administrative area consist primarily of painted CMU walls, exposed concrete floors, exposed wood joist framing above with north facing storefront in the educational space and clerestory windows inside the vestibule and office areas. The workroom is equipped with plastic laminate upper and lower wall cabinets and freestanding base cabinets, each with stainless steel counter tops. The office fixtures consist of two plastic laminate counters utilized as desk surfaces with rack shelving

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above. Fixtures within the educational space consist of a freestanding stainless-steel work sink, a dry-erase board, plastic laminate base cabinet with adjustable rack storage shelving above, along with moveable tables and chairs. The administrative area also provides accessible public restrooms which open directly to the exterior underneath the covered canopy along the north façade. The covered canopy is supported by concrete columns with exposed wood joist framing above with a stone veneer on the north facade of the building. Along the south side of the administrative area is an employee restroom and an equipment room which are accessed from the greenhouse structure. Direct access from the greenhouse to the potting workroom is provided by a man door along with an overhead coiling door for moving large trays, carts and equipment.



Greenhouse Interior



Greenhouse Interior

The greenhouse consists of a double gable galvanized steel roof structure with a plastic panel skin. The center valley as well as the outside eaves are designed with a rainwater catchment system feeding four 5,000 gallon tanks located on the south side of the greenhouse structure. A 12'x14' Dumpster enclosure located on the southwest side of the greenhouse, has been converted into a material storage building with the addition of a wood roof structure on the top of the CMU walls. Another accessory tool storage building consisting of a 10'x16' Morgan building with wood framing and metal siding, is located along the west side of the administrative building.

STRUCTURAL

The greenhouse portion of this building is framed with galvanized steel. The head house framing system consists of wood roof framing supported on load-bearing CMU walls with stone veneer at exterior walls. The front canopy roof framing consists of wood framing supported on concrete columns. The foundation for the building consists of slab on grade, with grade beams and piers supporting the perimeter of the building and superstructure columns.

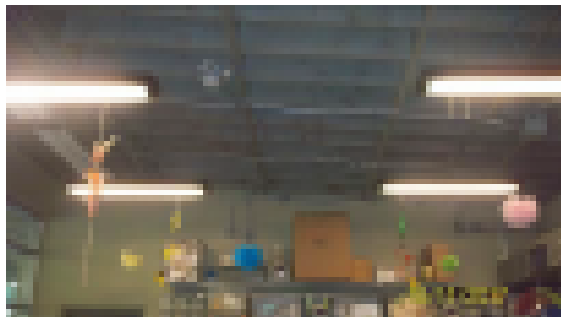


South Production Greenhouse



South Production Greenhouse

Assessment – Fort Worth Botanic Garden

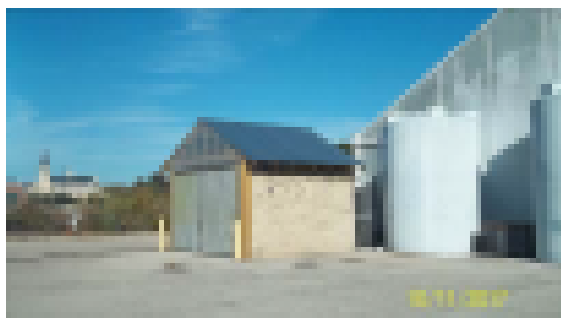


Wood Framing

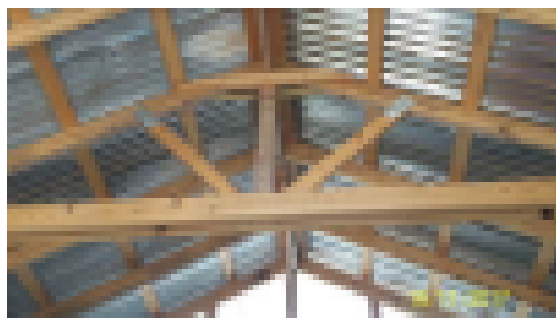


Canopy Framing

There is a small storage shed near the southwest corner of the building. The construction drawings for this project indicates that this was initially a dumpster enclosure composed of walls with stone veneer. A wood roof structure has been added to the walls and the building enclosed.



Storage Shed



Wood Roof Structure

Segmental retaining wall planters are located at the front and east sides of the building. These planters have a maximum height of 24 inches.



Wall Planters

MECHANICAL / PLUMBING

The Greenhouse HVAC included eighteen (18) suspended circulation fans, four (4) gas-fired unit heaters, four (4) wall mounted ventilation fans, and four (4) wall mounted intake motorized louvers. There are two gas-fired, direct expansion packaged rooftop units. One unit serves the Work Room; the other rooftop unit serves the Education Room. There are three roof mounted exhaust fans which serve the restrooms. Each of the Men's and Women's restrooms has a suspended electric unit heater. Equipment appears to be original to the facility which is about 11 years old.

The single staff restroom consisted of one floor mounted, flush valve water closet, floor drain, and lavatory with an emergency shower and large single compartment sink located adjacent to this restroom. A reverse osmosis system including tank and pumps was located near the Greenhouse. The two main Men's and Women's restrooms consisted of four floor mounted, flush valve water closets, two lavatories, and one hi-

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lo electric water cooler. There is a hi-lo water cooler and double compartment sink in the Work room, and one large single compartment sink in the Education Room. Hot water for the entire facility is provided by a gas-fired water heater with a circulating hot water pump. Fixtures appear to be original to the facility.

ELECTRICAL

The Production Greenhouse has public restrooms with T8 fluorescent lighting with occupancy sensors, and a meeting room and workroom with T8 fluorescent lighting with manual controls. All lighting is in good condition. The greenhouse houses the power distribution equipment. There is a 2-section, 400 A, 120/208 V, 3-phase, 4-wire panel with 400 A main breaker. The panel and equipment in the greenhouse is in good condition.

SITE

Site items for this area are covered in the 9W – Weekend Parking section of this report.

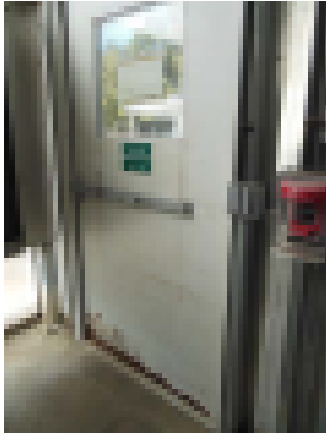
B. Areas of Insufficiency

ARCHITECTURAL

a. Miscellaneous Architectural

It was reported by the Botanic Garden staff that the concrete floor texture in the restrooms, classroom and other administrative areas is too rough and has become a maintenance issue. It is recommended that the floors be overlaid with new flooring product to prevent these issues.

The South Production Greenhouse has some elements which show signs of corrosion such as an exterior metal door as well as welded joists within the greenhouse structure.



Rusted Man Door

Opinion of Probable Construction Cost for Recommended Remediation Work:

New VCT Flooring in Administrative Areas	\$11,954
Replace Door	\$1,380
Sub-Total	\$13,334
Contingency	\$2,667
Total Cost	\$16,001

STRUCTURAL

b. Structural Connections

The rusting at the base of the 4 X-Brace columns along the west wall of the greenhouse was caused by the continuous wetting from the humidifier coils and inadequate protection of the steel. It appears that the bolt

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connecting the X-Braces to the columns were drilled in after the columns had been fabricated and galvanized, interrupting the columns' zinc protection layer and allowing a direct path for moisture to collect within the column, resulting in rapid deterioration of the steel at the column. It is recommended that new steel sleeves and baseplates be fabricated to replace the existing baseplates and rusted base of columns. The new baseplates should be bolted to the foundation with new stainless steel epoxied bolts. The X-brace plate should be welded to the new sleeve and re-painted with a zinc rich galvanizing paint.



Deterioration of Steel

The continuous wetting of the anchor bolts along the west wall (beneath humidifier coils) has resulted in rusting of the carbon steel anchor bolts and nuts. In order to extend the useful life of these bolts, it is recommended that the bolts and nuts be wire brush cleaned and painted with a zinc-rich protective paint. This painting should be repeated annually as part of standard maintenance.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install 4 New Base Plates and Column Sleeves, Reconnect X-Bracing and Paint	\$3,000
Clean and Paint All Anchor Bolts Along West Wall of Greenhouse (40 Bolts)	\$800
Sub-Total	\$3,800
Contingency	\$760
Total Cost	\$4,560

MECHANICAL / PLUMBING

c. Repair compromised plumbing vent

Botanic Garden staff indicated the plumbing vent in the Women's Restroom is compromised and methane gas builds-up in the Restroom.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Women Restroom Plumbing Vent	\$2,500
Sub-Total	\$2,500
Contingency	\$500
Total Cost	\$3,000

ELECTRICAL

d. Non-illuminated exit signs need replacement

Replace (6) non-illuminated exit signs with LED exit signs with 90-minute emergency batteries.

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Non-illuminated exit sign

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace (6) Exit Signs		\$3,000
	Sub-Total	\$3,000
	Contingency	\$600
	Total Cost	\$3,600

e. Provide Permanent wiring for ceiling fans

Two ceiling fans in the greenhouse are connected through an extension cord. Provide permanent wiring for the ceiling fans.



Extension Cord that Feeds Ceiling Fans



Ceiling Fan Connected with Extension Cord.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Provide Permanent Wiring for Ceiling Fans		\$1,200
	Sub-Total	\$1,200
	Contingency	\$240
	Total Cost	\$1,440

SITE

Not Applicable

V. 20 – CACTUS GARDEN

A. General Building Information



Cactus Garden Entrance



Cactus Garden Exhibits

ARCHITECTURAL

The Cactus Garden is a small garden located off the northwest corner of the Japanese Gardens Parking lot (9J) and is served with accessible route from the accessible parking spaces provided thereof. The cactus garden has an exposed aggregate sidewalk and crushed granite walkway to allow visitors to maneuver through the small garden. There are three structures that serve the Cactus Garden. First is an approximately 9'x 16' aluminum and glass panel greenhouse with a concrete stem wall grade beam foundation and brick paver floor. This structure is closed to the public and accessed by appointment only. The greenhouse is accommodated with an electric heating unit for temperature control. Two auxiliary structures include an 8'x10' and 8'-8' prefab storage buildings on CMU blocks.

STRUCTURAL

This garden includes a small prefabricated glass and aluminum greenhouse installed on a perimeter concrete grade beam.



Cactus Garden Greenhouse

This garden also included two small pre-fabricated sheds.

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Pre-Fabricated Shed

MECHANICAL / PLUMBING

The Cactus Garden Greenhouse had one suspended electric unit heater.

The Shed within the Cactus Garden had one wall mounted, through wall air conditioner.

ELECTRICAL

The Cactus Garden has decorative pedestrian lighting which is in good condition. Power distribution for the area is located in the back of the Cactus Garden. The main service is 120/240 V, 1-phase, 3-wire. The equipment includes main service, meter, disconnects and a panel and is in good condition. Adjacent to the service equipment is a shed with its own generator equipment inside. An overhead power line from the closest light pole supplies power to the shed.

SITE

The Cactus Garden is a space designed and maintained in collaboration with the Fort Worth Cactus and Succulent Society, which showcases native cactus and succulents which grow throughout Texas. The Cactus Garden is located near the west side of the Japanese Garden parking lot and includes a small greenhouse, with decomposed granite pathways.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

a. Shed Tie-Downs

The pre-fabricated sheds were set on Concrete blocks with no tie-downs. It is recommended that the sheds be properly anchored to the ground by properly sized helical or screw anchors to resist wind uplift forces and reduce the risk of the unit being lifted and thrown during a wind event.



Shed on Concrete Blocks

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Install 4 Properly Sized Tie-Down Anchors	\$1,600
Sub-Total	\$1,600
Contingency	\$320
Total Cost	\$1,920

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

b. Replace shed wiring with permanent, code-compliant wiring

The shed has a temporary connection from closest light pole. It is recommended to replace with permanent wiring from service equipment adjacent to shed.



Temporary Wiring for Shed



Connection to Light Pole

Opinion of Probable Construction Cost for Recommended Remediation Work:

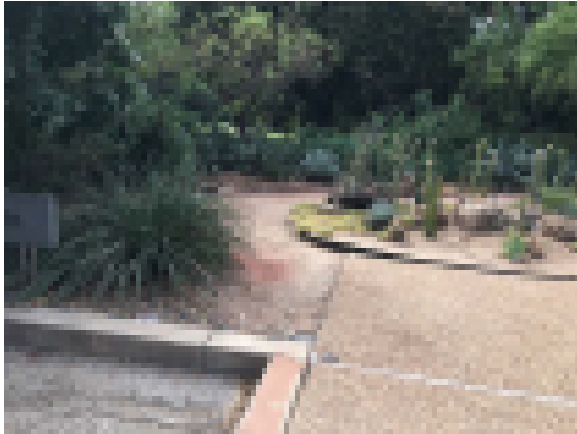
Shed Permanent Wiring	\$1,500
Sub-Total	\$1,500
Contingency	\$300
Total Cost	\$1,800

SITE

c. Decomposed granite paths

The decomposed granite pathways have settled due to erosion and wear. Pathways should be top dressed to bring the walkways flush with top of the adjacent concrete walks.

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Decomposed Granite Walk Connection to Concrete Walkway.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install 450 SF Decomposed Granite Paving	\$2,500
Sub-Total	\$2,500
Contingency	\$500
Total Cost	\$3,000

VI. 21 – GROVE

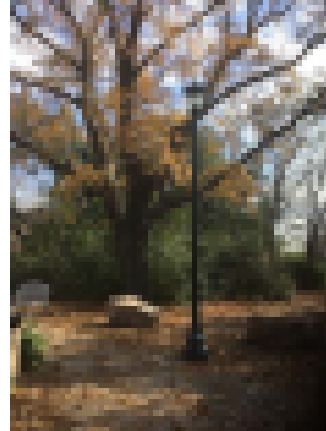
A. General Building Information



Charlie Company Memorial



Dedication Marker



Grove Lamp Post

ARCHITECTURAL

The Grove is a large grouping of trees divided into two parts by Japanese Garden Lane which connects the Weekend parking and the Japanese Garden parking area. There are two war memorial structures located in the Grove along Japanese Garden Lane. To the western end is Vietnam War memorial dedicated to Charlie Company, 1st Battalion, 503rd Infantry and the 13rd Airborne Brigade. The memorial is a round exposed aggregate slab with six freestanding columns with Corinthian capitals standing at a height of 7'-6" tall, and one fallen column representing the symbolism of the memorial to those lost. To the eastern end is a POW-MIA war memorial dedicated to prisoners of war and those missing in action in southeast Asia and their families. This memorial is composed of a brick paver plaza connected by a short access path with a brick dedication pillar and an 8' aluminum bench.

STRUCTURAL

The Charlie Company and POW Memorials are located in this area.



Charlie Company Memorial



POW Memorial

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

Assessment – Fort Worth Botanic Garden

SITE

The Grove is a moderately wooded area of mature maples and oak trees located within a large expanse of grass lawn. This area includes two war memorials and is accessed by an asphalt service drive from the Japanese Garden parking lot to the weekend parking lot. The dappled shade of the lawn area is a popular location for tent event rentals such as weddings and other group gatherings. This area also serves as the location for the biannual plant sale held in the Spring and Fall.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

a. Sign and Asphalt Roadway

The interpretive sign at the Charlie Company Vietnam War Memorial is damaged, peeling and faded. This sign panel should be removed and replaced with a new sign.



Interpretive Sign at Memorial

The access road from the Japanese Garden parking lot through the Grove to the weekend parking lot is a well-traveled route for both visitors and maintenance vehicles including pick-up trucks, and all-terrain vehicles. The asphalt surface is beginning to show wear and cracking in multiple locations. The roadway should be resurfaced with asphalt topping for the entire length of the roadway.

Assessment – Fort Worth Botanic Garden



Asphalt Access Drive

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Interpretive Sign		\$800
Resurface Asphalt Roadway		\$7,500
	Sub-Total	\$8,300
	Contingency	\$1,660
	Total Cost	\$9,960

Assessment – Fort Worth Botanic Garden

VII. 22 – TRIAL GARDEN

A. General Building Information



Trial Garden Entrance

ARCHITECTURAL

The Trial Garden is an octagonal shaped plaza dedicated to testing plant species in the North Texas climate. Bordered by a 10' exposed aggregate walkway with wood benches and decorative lamp posts, the plaza is composed of a series of raised landscape timber planters of varying heights. In between the raised planters are a series of concentric 6' wide and 4' wide brick paver paths that provide access to the plant exhibits. At the center of the plaza is an octagonal shaped pavilion constructed of wood framing members with wood slat decking and a cedar shake roof. The mostly open-air pavilion has four sides with wood picket walls protecting four wood benches located on the interior of the pavilion. The Trial Garden is served with an accessible route through the Four Seasons Garden from both the north end by the Japanese Garden parking lot as well as to the south by Rock Springs Road.

STRUCTURAL

The pavilion, located in the center of the Trial Garden, is a wood framed octagonal structure.



Trial Garden Pavilion



Trial Garden Pavilion Roof Framing

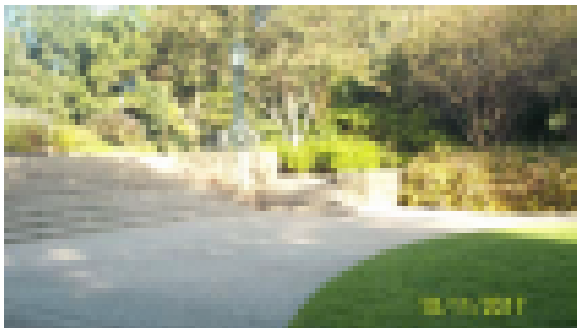
The bluebonnet sculpture located to the south of the gazebo is in good condition. The only deficiency noted was a missing nut on one of the anchor bolts. Pricing for this is negligible and has not been included in this report.

Assessment – Fort Worth Botanic Garden



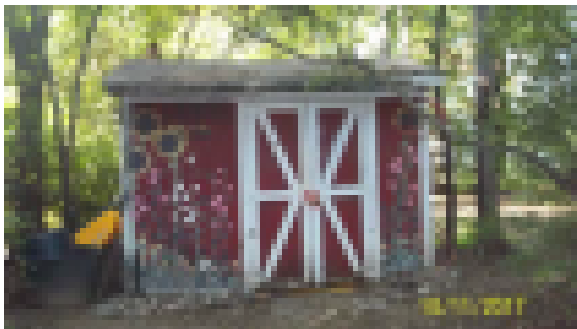
Missing Nut

The stone clad retaining walls, located to the east of the gazebo are in good condition with no deficiencies noted.



Stone Clad Retaining Walls

The storage shed located to the south of the gazebo is in poor condition with significant deterioration of the wood structure and veneers.



Storage Shed

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

Trial Garden has no electrical equipment other than decorative pedestrian lighting. Lighting looks to be in good condition, however the lighting was on during the day.

Assessment – Fort Worth Botanic Garden

SITE

The Trial Garden consists of a series of raised plantings beds and concrete / unit paver walkways in an octagonal pattern positioned around a gazebo centerpiece. The purpose of this garden is to display a variety of plant species being tested for performance in the North Texas climate. Maintenance staff indicated that this area will undergo renovation soon. Improvements may include structure, pavement and planter modifications.

B. Areas of Insufficiency

ARCHITECTURAL

a. Pavilion Replacement

The wood pavilion structure at the center of the Trial Garden is in fair condition but is nearing the end of its useful life and should be replaced.



Trial Garden Gazebo



Trial Garden Gazebo

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Pavilion		\$25,875
	Sub-Total	\$25,875
	Contingency	\$5,175
	Total Cost	\$31,050

b. Storage Shed Replacement

The wood shed structure is in poor condition and should be replaced.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Shed		\$4,600
	Sub-Total	\$4,600
	Contingency	\$920
	Total Cost	\$5,520

STRUCTURAL

c. Pavilion Deterioration

The wood framing is in fair condition with significant deterioration noted within the non-loadbearing portion of the roof outriggers. The structure is nearing the end of its useful life and while its condition does not constitute a current life/safety issue, it is expected that the structure will require replacement within the next 5 years. Refer to Architectural for estimated replacement costs.

Assessment – Fort Worth Botanic Garden



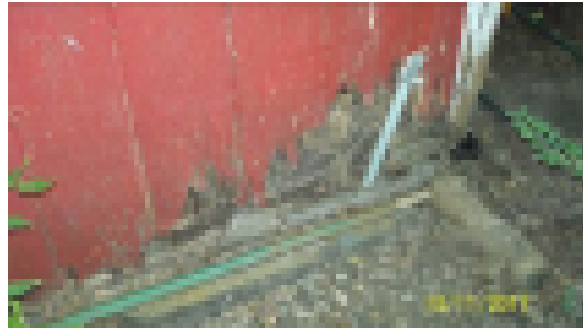
Roof Outriggers

d. Shed Deterioration

The Shed structure is in very poor condition and should be replaced within the next 12-18 months. Refer to Architectural for estimated replacement costs.



Storage Shed Deterioration



Storage Shed Deterioration

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

There were no electrical insufficiencies noted in our assessment of this area.

SITE

e. Replace Landscape Timber

The landscape timbers at the display bed edges are beginning to decay and deteriorate. If it makes sense with the potential future modifications, it is recommended that these timbers be replaced with new landscape timbers.

Assessment – Fort Worth Botanic Garden



Landscape Timber Edging at Display Beds

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Landscape Timber Edging	\$8,500
Sub-Total	\$8,500
Contingency	\$1,700
Total Cost	\$10,200

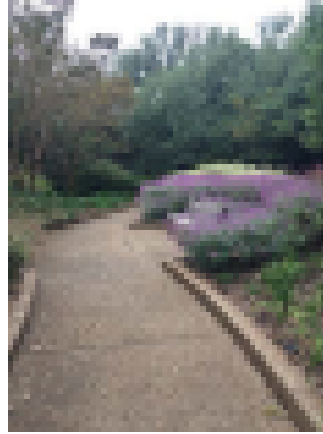
Assessment – Fort Worth Botanic Garden

VIII. 23 – FOUR SEASONS GARDEN

A. General Building Information



Four Seasons Garden Path



Four Seasons Garden Bench

ARCHITECTURAL

The Four Seasons Garden located south of the Japanese Garden parking facility begins at Rock Springs Road and leads up along the north side of the Trial Garden through a meandering path. This 5' exposed aggregate walkway provides an accessible route through the garden and is flanked by an exposed aggregate curbing which serves as the planter bed edging. The walkway is accented with garden sculptures and periodic rest areas with wood benches to take in the garden's scenery.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

The Four Seasons Garden occupies the area between the Horseshoe and the Japanese Garden parking lot. This garden includes a meandering concrete walk, art and benches. The plantings in this garden are designed to showcase the seasonality of our local environment and include a variety of plants with flowers foliage and interest that change with the seasons.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

Not Applicable

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

ELECTRICAL

There were no electrical insufficiencies noted in our assessment of this area.

SITE

There were no site insufficiencies noted in the assessment of this area.

IX. 24 – HORSESHOE

A. General Building Information



Horseshoe Lawn



Horseshoe Garden Path

ARCHITECTURAL

The Horseshoe is a large garden lawn utilized by visitors as a picnic spot and a place to stretch out and enjoy the sunshine. The wishbone shaped perimeter is flanked by a variety of planting beds and a 9'-6" exposed aggregate walkway leading from Rock Springs Road up to the Trial Garden. The Horseshoe path is bounded by a series of mature Live Oak trees and wood benches.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

The Horseshoe is located between the Trial Garden and the Rose Garden. This area has a formal design consisting of a central lawn flanked by two tree lined exposed walkways and planting beds. Visitors can stroll beneath the tree canopies, or rest one of the shaded wooden benches that line the path. The open lawn area is also available to rent for events.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this area.

STRUCTURAL

Not Applicable

MECHANICAL / PLUMBING

Not Applicable

Assessment – Fort Worth Botanic Garden

ELECTRICAL
Not Applicable

SITE
There were no site insufficiencies noted in the assessment of this area.

X. 25 – BACKYARD VEGETABLE GARDEN

A. General Building Information



Backyard Vegetable Garden Features



Backyard Vegetable Garden Path

ARCHITECTURAL

The Backyard Vegetable Garden is an exhibit dedicated to the benefits of growing one's own vegetables in their own backyard. The garden elements include a cyclone fence enclosure, a backyard pavilion, and a playhouse carrying out the "backyard" theme of the garden exhibit. There are two access points into the garden, one at the northeast corner off of Rock Springs Road, and a second access to the west leading to the Compost Outpost. In the garden, visitors stroll along 5' exposed aggregate sidewalks and crushed granite paths through the varying vegetable bed planters. Along its accessible paths are several park benches offering rest stops, as well as an accessible water bubbler near the center of the garden.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

Within the Garden itself, there was one single bubbler drinking fountain.

ELECTRICAL

The Backyard Vegetable Garden has a power distribution panel located at the south edge of the garden, behind the Project Greenhouse and Storage Shed. The panel is 120/240V, single-phase, 100A, with 24 circuits. The panel feeds all buildings in the Backyard Vegetable Garden. There is no exterior lighting in the garden.

SITE

The Backyard Vegetable Garden is a working garden that highlights edible plants that can be grown in the North Texas area. In addition to a wide variety of fruits and vegetables, this garden includes a group pavilion, a children's play house, as well as ornamental planters connected by a series of decomposed granite, mulch and exposed aggregate concrete pathways.

B. Areas of Insufficiency

ARCHITECTURAL

Insufficiencies associated with individual structures are broken out in separate sections below.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

Not Applicable

MECHANICAL / PLUMBING

f. Drinking fountain not operational

The drinking fountain in the Garden area was not working as there was no water flow at the bubbler. A service call is recommended to determine the reason for no water flow.



Drinking Fountain with No Water

Opinion of Probable Construction Cost for Recommended Remediation Work:

Investigate reason for no water		\$150
	Sub-Total	\$150
	Contingency	\$30
	Total Cost	\$180

ELECTRICAL

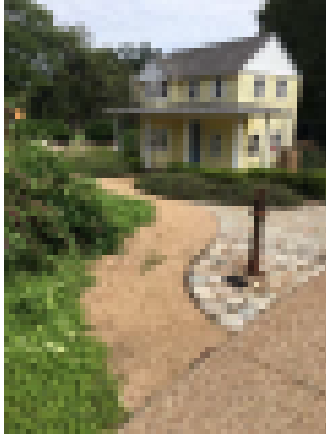
There were no electrical insufficiencies noted in our assessment of this area.

SITE

g. Pathways and Gates

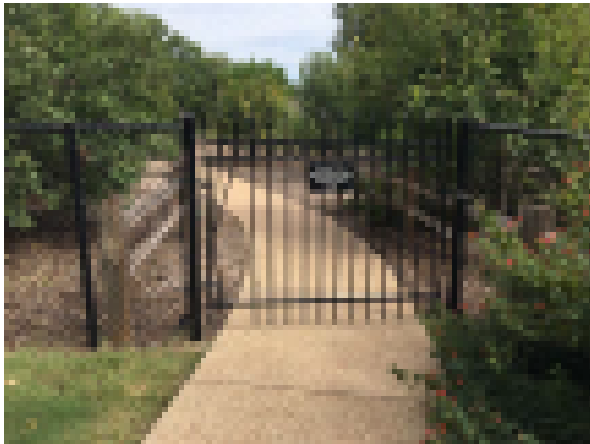
This popular garden has decomposed granite pathways that have settled over time due to heavy foot traffic. These pathways should be top-dressed with decomposed granite material and compacted to form a stable walking surface.

Assessment – Fort Worth Botanic Garden



Decomposed Granite Pathways

In addition, each of the two entry gates to the Backyard Vegetable Garden have damaged pickets. It is recommended to replace these gates.



Damaged South Entry Gate



Damaged North Entry Gate

Opinion of Probable Construction Cost for Recommended Remediation Work:

Top-Dress Decomposed Granite Pathways	\$2,500
Replace Damaged Entry Gates (2)	\$5,000
Sub-Total	\$7,500
Contingency	\$1,500
Total Cost	\$9,000

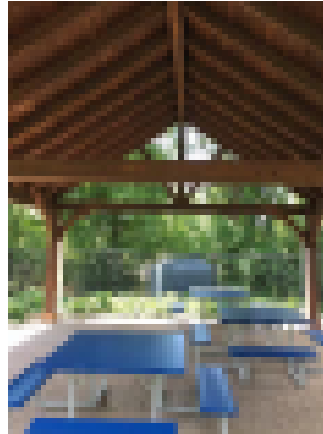
Assessment – Fort Worth Botanic Garden

XI. 25A – BACKYARD VEGETABLE GARDEN PAVILION

A. General Building Information



Backyard Vegetable Garden Pavilion



Pavilion Interior

ARCHITECTURAL

The Pavilion is a wood structure oriented north-south located in the southeast corner of the Backyard Vegetable Garden. The wood structure consists of six 8x8 wood columns supporting three wood trusses with 4x4 wood joists, supporting a wood slat decking and an asphalt shingle roof. The structure sits on a 24'x32' exposed aggregate slab and houses five picnic tables which serve as a gathering place for visitors.

The pavilion is outfitted with a rainwater catchment system whereas rainwater drains to the east and west into rain gutters outfitted with debris screens. The gutters are connected to a 4" schedule 40 PVC pipe which connects to a 1,252 gallon above ground reservoir tank. The tank is connected with a 1" PVC supply line to an above ground water pump which feeds a 1/2" PVC line connected to a hose bib mounted on 4x4 wood post.

STRUCTURAL

The pavilion is heavy timber wood framed structure set on a concrete slab foundation.



Pavilion Structure



Segmented Block Retaining Walls

Segmented block retaining walls form the walls of the planters in this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

Assessment – Fort Worth Botanic Garden

ELECTRICAL

The Pavilion has rain-collection equipment that includes a water pump that connects to a receptacle nearby. The system appears to be in good working condition.

SITE

Site assessment for this area is included in the 25 – Backyard Vegetable Garden section.

B. Areas of Insufficiency

ARCHITECTURAL

a. Gutter Screens

The gutter screens were turned up and therefore ineffective towards blocking debris from entering the catchment system. Screens need to be adjusted to catch debris appropriately. This is a maintenance item, so a price has not been provided.



Ineffective Gutter Screens

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

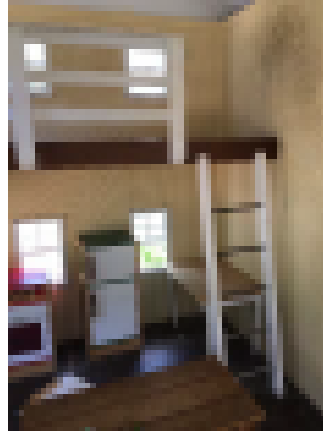
Not Applicable

XII. 25B – BACKYARD VEGETABLE GARDEN PLAYHOUSE

A. General Building Information



Backyard Vegetable Garden Playhouse



Playhouse Interior

ARCHITECTURAL

The Playhouse is an 8'x13' miniature scale house with a wrap-around porch on two sides with miniature operable wood windows and door. The main structure consists of a wood subfloor sitting on a concrete slab with wood framed walls clad with wood siding. The roof is framed with wood joists and decking covered with asphalt shingles. The interior ceiling has exposed wood framing and wood decking. The roof appears to have had a skylight at one time but since has been removed and covered with plywood.

The wrap around porch has a 2x wood floor deck with decorative wood columns and an asphalt shingle roof. The low porch roof is equipped with a rainwater catchment system consisting of rain gutters and a downspout that connects to a 50 gallon plastic barrel with vented overflow drain at the top and a hose bib connection at the bottom.

There are two access points into the playhouse, one full size man door located in the rear, and one miniature scale door underneath the wraparound porch. The rear man door is equipped with a metal grate ramp providing handicapped access. The interior of the Playhouse features a loft area with a 23" railing accessed by a wood ladder from the wood slat flooring below. The interior walls are finished with bead board paneling.

The interior infrastructure appears to have once been equipped with coax cabling which has now been disconnected. Power is provided on the interior with a convenience outlet.

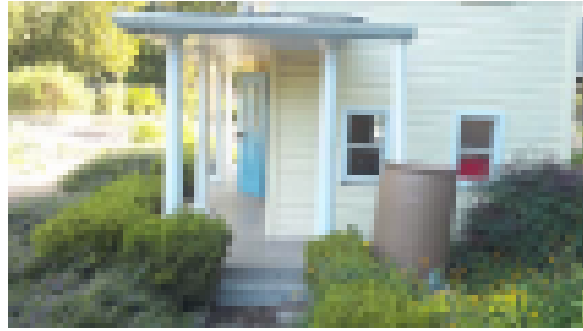
STRUCTURAL

The playhouse is a wood framed structure on a concrete slab foundation. This structure is in relatively good condition.

Assessment – Fort Worth Botanic Garden



Playhouse Facade



Playhouse Porch Detail

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The playhouse has a duplex power outlet by the entrance door.

SITE

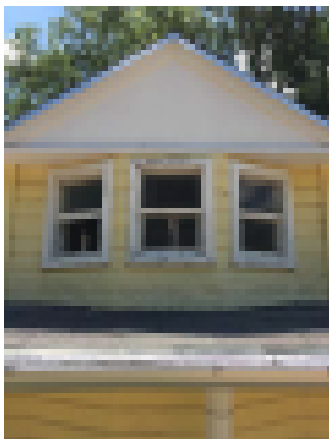
Site assessment for this area is included in the 25 – Backyard Vegetable Garden section.

B. Areas of Insufficiency

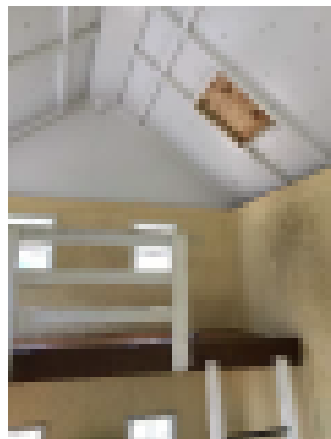
ARCHITECTURAL

a. Miscellaneous Architectural

Wood trim and sills of the miniature windows are water damaged and in need of replacement. The bead board interior paneling is sustaining some water damage from the open windows and needs to be cleaned and painted. The interior loft has a low head clearance with the sloped roof decking above. The roof decking has sharp nails which have penetrated the wood decking and present a safety hazard as it is at standing head height for small children especially at the top of the ladder. A plywood soffit should be placed on the existing wood girts to conceal these roofing nails.



Deteriorated Wood Trim



Exposed Nails at Decking

The hardware on both doors is missing or non-compliant and needs to be replaced. The walkway ramp at the rear entry needs a longer run with a slope that meets the entry threshold instead of using a metal grate ramp.

Assessment – Fort Worth Botanic Garden



Non-Compliant Door Hardware and Ramp

Opinion of Probable Construction Cost for Recommended Remediation Work:

Wood Trim and Soffit	\$920
Bead Board Clean & Paint	\$863
Door Hardware	\$1,380
Concrete Ramp	\$2,300
Sub-Total	\$5,463
Contingency	\$1,093
Total Cost	\$6,555

STRUCTURAL

b. Replace porch column at playhouse.

The base of the southwest porch column has deteriorated and should be replaced.



Deteriorated Column

Opinion of Probable Construction Cost for Recommended Remediation Work:

One Wood Column Painted and Installed	\$400
Sub-Total	\$400
Contingency	\$80
Total Cost	\$480

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

c. Provide GFI Receptacle

It is recommended to replace the existing convenience outlet inside the playhouse with a GFI receptacle.

Assessment – Fort Worth Botanic Garden



Non-GFI Receptacle

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace with GFI Receptacle		\$100
	Sub-Total	\$100
	Contingency	\$20
	Total Cost	\$120

SITE

Not Applicable

XIII. 25C – BACKYARD VEGETABLE GARDEN STORAGE SHED

A. General Building Information



Pre-Fabricated Storage Shed



Water Catchment

ARCHITECTURAL

The prefabricated tool shed is approximately 12'x16' with a steel frame subfloor supported on concrete pavers with wood panel siding and an asphalt shingle roof.

The roof is outfitted with a rainwater catchment system where rainwater drains to the east and west into rain gutters outfitted with debris screens. The gutters are connected to a 4" schedule 40 PVC pipe with a vertical debris drain. A drain pipe connects to the top of the debris drain and runs to a 1,252 gallon above ground reservoir tank. The tank is connected to a 1" PVC supply line to an above ground water pump which feeds a 1/2" PVC line connected to a hose bib mounted on the side of the shed. The structure is equipped with a weather system and rain sprinkler controller.

STRUCTURAL

A pre-fabricated barn structure is located to the east of the Project Greenhouse.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The storage shed has a rain collection system with a pump located at the back of the shed. The power receptacle used for the pump is located at the front. An extension cord is needed to connect the pump to the receptacle.

SITE

Site assessment for this area is included in the 25 – Backyard Vegetable Garden section.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies noted in the assessment of this structure.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

d. Reset piers and tie-downs

This structure is set on stacked concrete paver blocks and does not appear to have tie-down anchors. Further, the stacked paver blocks at the back of the building have settled causing the blocks to lean outward and the bottom rail of the building floor to twist outward.



Twisting Rail

It is recommended to reset the rear piers (stacked Concrete pavers) to a level condition, add stiffeners to back floor rail to prevent torsional twisting of rail, and add appropriately sized helical or screw type tie-down anchors at each corner of the building.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Reset piers and add stiffener to back rail	\$800
Add 4 tie-downs	\$1,600
Sub-Total	\$2,400
Contingency	\$480
Total Cost	\$2,880

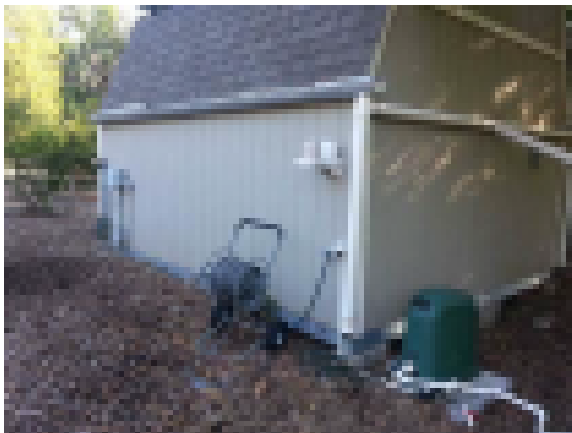
MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

e. Provide GFI Receptacle

The shed's rain collection pump needs a GFI outlet close by. The existing non GFI receptacle is located at the front of the shed while the rain collection pump is located at the rear. The existing pump is currently connected with an extension cord. It is recommended to provide a GFI receptacle for the rain collection pump.



Rain Collector Pump Needs Receptacle

Assessment – Fort Worth Botanic Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace with GFI Receptacle		\$300
	Sub-Total	\$300
	Contingency	\$60
	Total Cost	\$360

SITE

Not Applicable

Assessment – Fort Worth Botanic Garden

Assessment – Fort Worth Botanic Garden

XIV. 25D – BACKYARD VEGETABLE GARDEN PROJECT GREENHOUSE

A. General Building Information



Project Greenhouse Exterior



Project Greenhouse Interior

ARCHITECTURAL

The Project Greenhouse is approximately 15'x29' aluminum frame greenhouse with a galvanized steel truss superstructure, plexiglass panels and supported by a concrete stem wall foundation along its base.

The greenhouse is outfitted with an operable ridge vent system, a gravel floor, work tables, freestanding work sink, and 34" high by 2'-8" deep expanded metal worktop along the perimeter.

STRUCTURAL

The Project Greenhouse, located with the Backyard Vegetable Garden is an aluminum framed structure set on a concrete pad (photograph below, left).



Project Greenhouse

MECHANICAL / PLUMBING

The Project Greenhouse had one suspended electric unit heater and one evaporative wind cooler providing 4,000 CFM airflow. An evaporative wind cooler was installed in 2012. There was one single compartment sink.

ELECTRICAL

The Project Greenhouse includes fluorescent lighting and convenience power. This building installation looks relatively new and is in good condition.

Assessment – Fort Worth Botanic Garden

SITE

Site assessment for this area is included in the 25 – Backyard Vegetable Garden section.

B. Areas of Insufficiency

ARCHITECTURAL

There were no Architectural insufficiencies noted in the assessment of this structure.

STRUCTURAL

f. Relevel greenhouse

Superstructure distress was not observed, but cracking was noted within the grade beams along the north and south sides of the structure (photograph below, right). The grade beam cracking is the result of foundation movement and if left unchecked could become worse over time. It is recommended to relevel greenhouse grade beams using 6 steel push pilings or helical piers.



Cracking Grade Beam

Opinion of Probable Construction Cost for Recommended Remediation Work:

Install 6 piers and relevel grade beam	\$6,000
Sub-Total	\$6,000
Contingency	\$1,200
Total Cost	\$7,200

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in our assessment of this area.

ELECTRICAL

There were no electrical insufficiencies noted in our assessment of this area.

SITE

Not Applicable

Assessment – Fort Worth Botanic Garden

XV. **Cost Summary**

To summarize the information found in this document, this section provides a cost summary by key element of the Botanic Garden. Please refer to sections AREAS OF INSUFFICIENCY for detailed information on each item. Note that if multiple options/costs were provided, then the highest of the costs are included in the numbers below.

9J	Japanese Garden Parking	\$31,200
9W	Weekend Parking	\$147,120
10	Compost Outpost	\$6,660
13S	South Production Greenhouse	\$28,601
20	Cactus Garden	\$6,720
21	Grove	\$9,960
22	Trial Garden	\$46,770
23	Four Seasons Garden	\$0
24	Horseshoe	\$0
25	Backyard Vegetable Garden	\$9,180
25A	Backyard Vegetable Garden Pavilion	\$0
25B	Backyard Vegetable Garden Playhouse	\$7,155
25C	Backyard Vegetable Garden Storage Shed	\$3,240
25D	Backyard Vegetable Garden Greenhouse	\$7,200
	Total Zone 4	\$303,806

Assessment – Fort Worth Botanic Garden

Zone 5

Key Locations: 26-33



Assessment – Fort Worth Botanic Garden

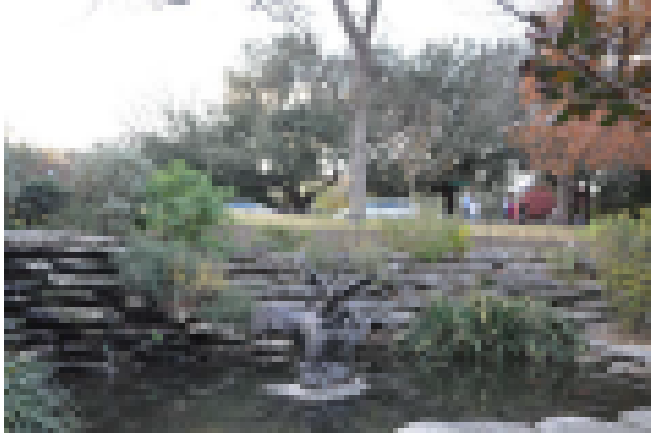
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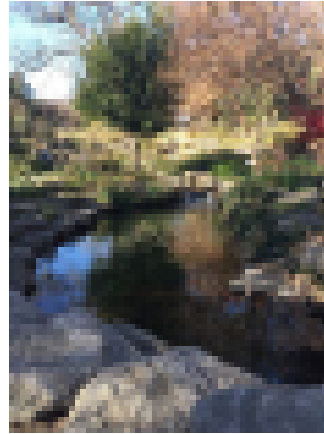
Assessment – Fort Worth Botanic Garden

I. 26 – PERENNIAL GARDEN

A. General Building Information



View of Upper Pond and "Fishing Rock" Sculpture



View of Lower Pond

ARCHITECTURAL

The Perennial Garden located immediately north of the Shelter House, and east of Rock Springs Road, is primarily a series of concrete and asphalt pathways interacting with its various water features and perennial plant exhibits. The meandering walkways focus on rock lined tiered ponds and its tributary creeks and spillways. The large pond features a garden sculpture of playful cranes interacting together. The Perennial Garden is flanked to the east by a north - south circulation path that connects the Shelter House to the Oval Rose Garden and continues on toward the Rock Springs Center.

STRUCTURAL

There were no structural systems noted to be assessed at this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The area does not have electrical equipment. However, there are abandoned raceways that require removal.

SITE

The Perennial Garden and adjacent lawn is situated between the Shelter House and a small wooded area (Cedar Row). It is comprised of concrete pathways and a small pond surrounded by many types of perennial plants. It features a variety of growing conditions, (sunny, shady, wet, and dry) and has a multi-tiered pond as it's focal point. Stacked Palo Pinto sandstone lines the pond, with a sculpture as its focal point. This garden is maintained largely by volunteers and is a favorite stopping point for garden visitors.

B. Areas of Insufficiency

ARCHITECTURAL

There were no architectural insufficiencies found within this area.

STRUCTURAL

Not Applicable

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

a. Remove Junction Box

There is an abandoned junction box located on the east side of the walkway towards the north end, adjacent to a tree stump. The junction box, associated conductors and raceways need to be removed.



Abandoned Junction Box and Conductors

Opinion of Probable Construction Cost for Recommended Remediation Work:

Remove Junction Box		\$250
	Sub-Total	\$250
	Contingency	\$50
	Total Cost	\$300

SITE

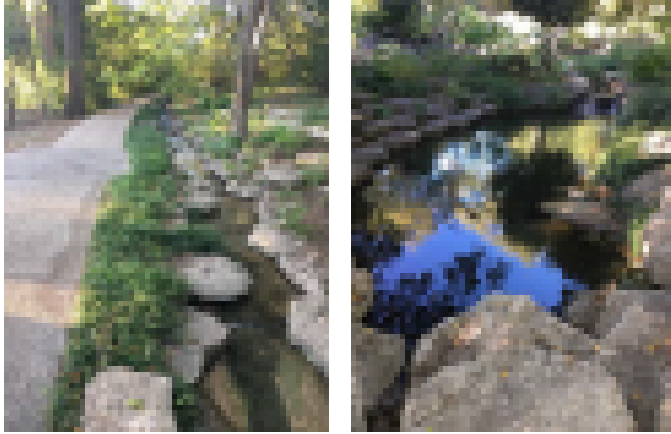
b. Site Improvements

The Perennial Garden's dominant feature is a central pond that spills into an adjacent rock-lined stream. The stream then overflows into a storm drain inlet which outfalls into the adjacent creek. The existing creek liner leaks, the source of the leak will need to be identified and the liner repaired with new waterproof pond/creek liner.

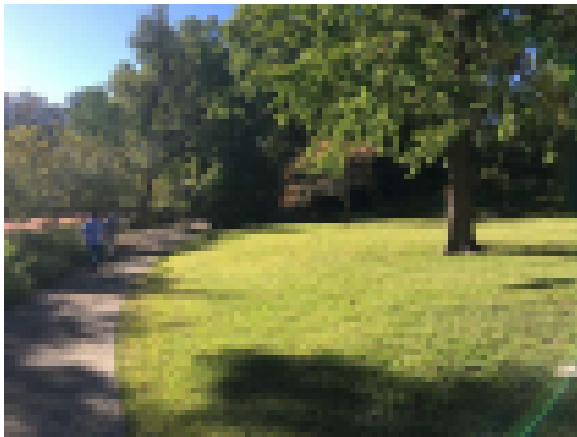
The pond is fed by a raw line and is not filtered. The surrounding areas of the garden slope toward this water feature so the pond effectively acts as a large drainage basin resulting in a buildup of silt in the bottom of the pond. This pond should be drained and dredged to remove the silt. Currently the pond does not have a drain to empty the water for maintenance. Recommend installing a drain that for future maintenance.

Adjacent to the Perennial Garden is a tree row and lawn area. This area slopes from West to East and carries large volumes of surface runoff to the adjacent walkways and into the Oval Rose Garden. This results in continual erosion and frequent flooding of the walk and Oval Rose Garden area in even minor rain events. A new inlet should be installed in the lawn area and a swale constructed to direct water away from the tree row and the adjacent walk toward the new inlet. The new inlet and drain pipe should be sized to handle the existing 24" drain line volume and the additional runoff captured.

Assessment – Fort Worth Botanic Garden



Stream / Overflow to Creek Perennial Garden Pond



Open Lawn Area Sloping to Oval Rose Garden

Opinion of Probable Construction Cost for Recommended Remediation Work:

Dredge Pond		\$8,500
Install Pond Drain		\$7,500
Install Inlet and Storm Drain Pipe		\$6,500
Construct Swale		\$1,000
Repair Creek Liner		\$5,500
	Sub-Total	\$29,000
	Contingency	\$5,800
	Total Cost	\$34,800

Assessment – Fort Worth Botanic Garden

II. 27 – SHELTER HOUSE

A. General Building Information



Shelter House Looking Southwest



Shelter House Entry from Rock Springs Road

ARCHITECTURAL

The Shelter House is located at the end of Rock Springs Road, atop of the Rose Ramp which is located directly to its east. Eight off street parking spaces serve the Shelter House along the turn-a-round at Rock Springs Road. Access to the Shelter House is provided by a broad stone paved sidewalk and is protected by a 42" high, 20" thick stone wall with raised pillars at all transitions and entrance points. Each of these raised stone pillars have cast stone caps with pineapple finials located at its primary entrance ways.

The 20'x40' center pavilion has a 7" raised stone floor slab with a series of stone and ipe wood columns supporting a roof enclosure above. The center element of the pavilion is covered with a bead board ceiling mounted directly to the wood joist framing above, with wood decking and cedar shake shingles.

The center pavilion is flanked on its north and south ends by two 14' wide by 24' long open trellis structures. Each trellis structure has a lower plate height than the central pavilion. The trellis structures provide a similar 7" raised stone floor slab with a series of stone and ipe wood columns supporting twin ipe beams and trellis framing. It appears that the ipe wood has been recently replaced or refurbished.

STRUCTURAL

This circa 1933 structure consists of central covered roof pavilion with wood framed trellises extending north and south from the central pavilion structure. The pavilion roof structure is wood framed with bead-board soffits and stone columns. The foundation of the Shelter House is believed to be shallow concrete slab/grade beam system. The trellis portion of the structure was rebuilt in 2013 using ipe lumber.

MECHANICAL / PLUMBING

There is a single station electrical water cooler in working condition.

ELECTRICAL

The Shelter House contains the electrical distribution equipment for the pavilion as well as the surrounding gardens. The electrical equipment is located on the north wall of the Shelter House. The main service consists of a 120/240V, single-phase, 3-wire, 225A panel with 30 circuits. The equipment is in good condition. There are two decorative light poles within the parking lot located west of the Shelter House. The lighting inside the Shelter House consists of wall sconces on select ipe columns and four step lights located at the east and west main entrances. All lighting is in good condition.

Assessment – Fort Worth Botanic Garden

SITE

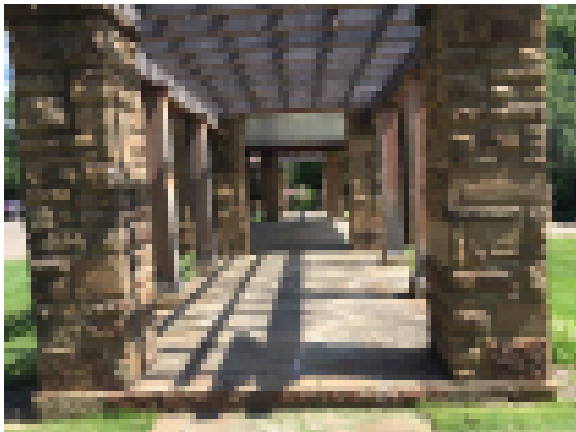
The Shelter House is served by an asphalt parking lot and drop-off at the end of Rock Springs Road and overlooks the Rose Ramp and the Lower Rose Garden. It is a scenic and historic Depression Era structure, constructed from Palo Pinto sandstone.

B. Areas of Insufficiency

ARCHITECTURAL

The southwest corner column appears to be leaning. Reference the structural assessment pertaining to this item.

There is not an accessible route provided for visitors to enter the Shelter House pavilion. Modifications should be made along the accessible route beginning at the accessible parking spaces, providing a ramp at the step located along the west perimeter wall, as well as at the 7" raised slab of the Shelter House.



Step at Shelter House Foundation



Step at Shelter House Perimeter Wall

Opinion of Probable Construction Cost for Recommended Remediation Work:

Ramp at Perimeter Wall	\$9,660
Ramp at Slab	\$9,660
Sub-Total	\$19,320
Contingency	\$3,864
Total Cost	\$23,184

STRUCTURAL

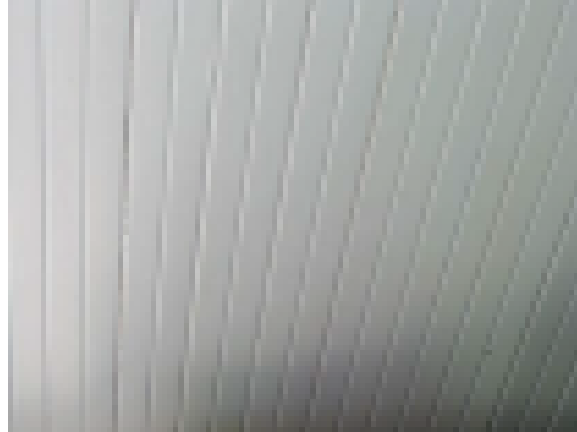
a. Foundation Issues

There has been some differential movement of the Shelter House foundation that has caused the stone column at the southwest corner of the pavilion to lean outward and slight gaps opening up between the ceiling boards. While the observed foundation movement does not constitute a current life safety issue, we recommend that an elevation survey be conducted for this foundation to determine movement patterns and to assess the need for foundation underpinning to stabilize foundation against continued detrimental movement.

Assessment – Fort Worth Botanic Garden



Leaning Column in Southwest Corner



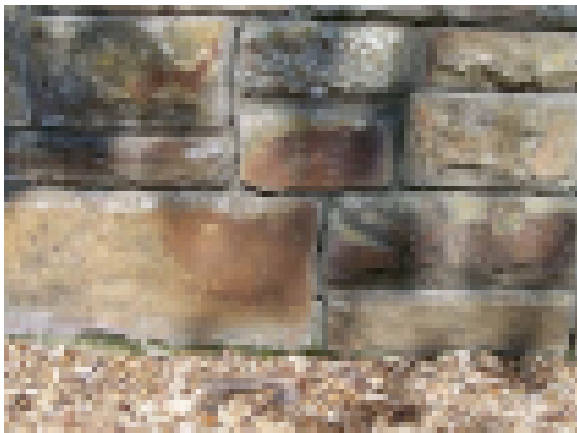
Ceiling Gaps in Bead Board

Opinion of Probable Construction Cost for Recommended Remediation Work:

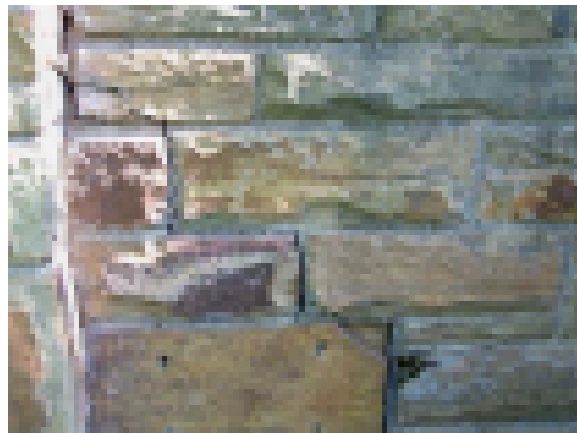
Elevation Survey		\$2,500
8 Underpinning Piers		\$8,000
	Sub-Total	\$10,500
	Contingency	\$2,100
	Total Cost	\$12,600

b. Mortar Cracks

Numerous fine cracks were observed in the stone walls on the east side of the Shelter House. A larger stair-stepping crack was observed in the southwest patio screen wall. These cracks do not constitute life/safety issues, but to extend the useful life of the structure, it is recommended that cracks with thicknesses larger than 1/16" be re-pointed as part of normal maintenance.



Shelter House Crack at Perimeter Wall



Stair-Step Crack at Perimeter Wall

Opinion of Probable Construction Cost for Recommended Remediation Work:

Masonry Repointing		\$600
	Sub-Total	\$600
	Contingency	\$120
	Total Cost	\$720

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

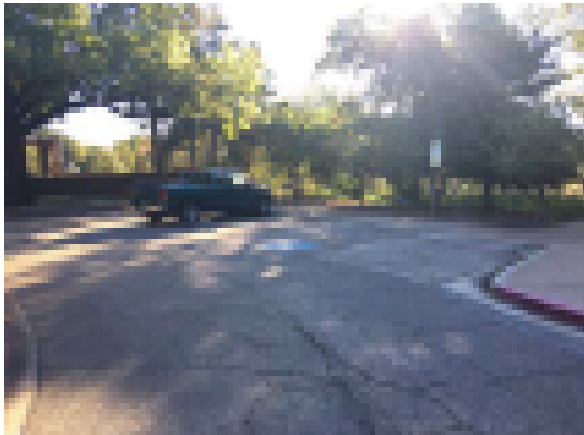
ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

c. Parking Lot Paving

The asphalt parking lot is intended to slope toward the inlet in the southeast corner of the lot. The degraded asphalt surface and previous modifications have resulted in standing water after rain events. The asphalt should be resurfaced when Rock Springs Road is reconstructed. The new paving should be installed to promote proper drainage to the existing inlet and the parking spaces should be restriped. Additionally, all pedestrian curb ramps should be reconstructed to meet current accessibility standards.



Degraded Asphalt Paving



Existing Drain Inlet



Relocate Existing Accessible Ramp

Opinion of Probable Construction Cost for Recommended Remediation Work:

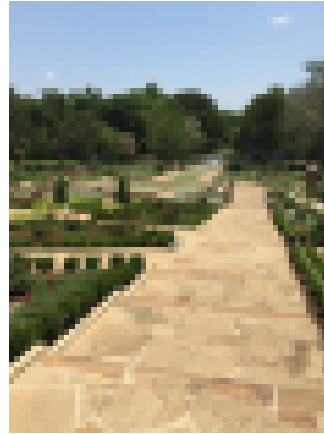
Resurface Parking Lot & Restriping	\$3,500
New Accessible Ramp	\$2,500
Sub-Total	\$6,000
Contingency	\$1,200
Total Cost	\$7,200

III. 28 – ROSE RAMP

A. General Building Information



View of Rose Ramp from Shelter House



Rose Ramp Steps and Switchbacks

ARCHITECTURAL

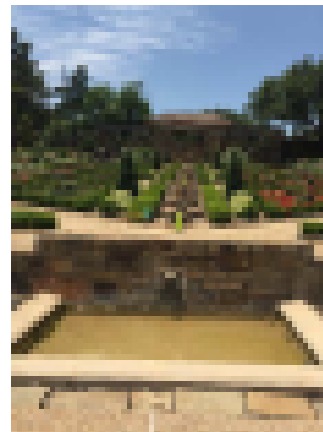
The Rose Ramp connects the Shelter House sitting atop of the ramp to its west, with the Lower Rose Garden to its east. Constructed along with the Shelter House in 1933, the Rose Ramp is bound at its perimeter by a series of stone steps and hedges stair stepping their way down towards the Lower Rose Garden. The perimeter steps accented by large urns, frame a series of twin switchback ramps that crisscross among the truncated flower beds with raised stone edging. The stone paver switchbacks, perimeter steps and bed edging were recently refurbished by resetting loose stone elements with a new setting bed and grout.



Cascading Pools



Fountain at Top



Basin at Bottom

The switchback ramps are bisected by a central water feature of cascading pools that spill from one to another down the Rose Ramp into a basin. The bottom of the Rose Ramp is bound by a stone retaining wall which frames the Lower Rose Garden.

STRUCTURAL

The Rose Ramp is a terraced garden extending from the Shelter House to the Lower Rose Garden. The stone retaining walls at the top of the rose ramp are covered under the Shelter House section of this report and the stone retaining walls at the base of the rose ramp are covered under the Lower Rose Garden section of this report. There were no other structural systems noted to be assessed at this area.

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MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The Rose Ramp contains no electrical distribution equipment. However, it contains low level landscape lighting for the planters. This lighting is in good condition.

SITE

The Rose Ramp plantings are arranged in Italian style formal parterres, complemented by Palo Pinto sandstone trim, steps, walls, and columns. Paved paths crisscross the ramp, allowing visitors to wander between plantings. The ramp is bisected by a water feature that cascades down, ending in a pool at the bottom.

B. Areas of Insufficiency

ARCHITECTURAL

The Rose Ramp has undergone a recent renovation and is in good condition. There are no architectural insufficiencies found within this area.

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

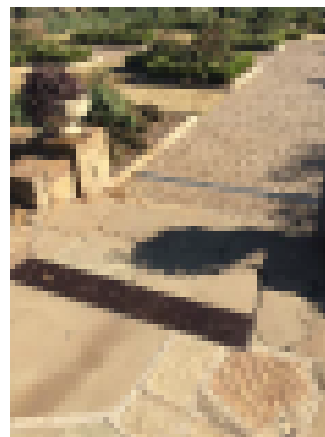
SITE

a. Drainage Improvements

In recent renovations, the Rose Ramp has incorporated new drainage improvements for the parterres. However in heavy rain events, runoff water from the Rose Ramp stairs flow over the steps and across the concrete paving into the Lower Rose Garden creating washout and nuisance water. Additional drain inlets should be installed at the base of the Lower Rose Garden and connect to an outfall into the Reflection Pond.



Rose Garden Pond & Parterres



Existing Stair Drains

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Drainage Improvements		\$20,000
	Sub-Total	\$20,000
	Contingency	\$4,000
	Total Cost	\$24,000

b. Fountain Improvements

The Rose Ramp includes a series of fountains that cascade from the base of the Shelter House through a series of terraced pools and weirs terminating in a large basin in the Lower Rose Garden. The cascade pools will need to be repaired with new waterproofing, drains and plumbing. Ground water is evident around the lower basin and there are spots located in both bottom basins where the waterproofing is breaking apart from hydraulic pressure under the structure. It is recommended that two relief wells be installed to relieve pressure, with piping for the excess water to go to the reflection pond. The type of pump will need to be submersible, but cannot be specified until the well is dug and the volume of water that will need to be transferred can be determined. Once this portion of the service has been completed, the water proofing can be removed, the surface prepped, and new water proofing installed.



Lower Cascade Basin & Fountain Pool

Opinion of Probable Construction Cost for Recommended Remediation Work:

Fountain Improvements		\$170,000
	Sub-Total	\$170,000
	Contingency	\$34,000
	Total Cost	\$204,000

c. Irrigation Improvements

The irrigation system for this garden is currently a combination of the original system, numerous improvements, and repair modifications that have occurred since the original installation. The entire system should be upgraded to meet current City of Fort Worth irrigation design standards. The irrigation system in this area should be upgraded with water conserving irrigation components. The controller should be connected to an overall Botanic Garden central control system.

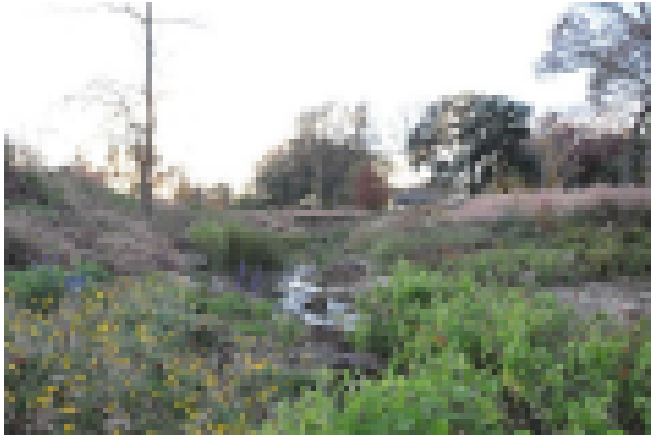
Opinion of Probable Construction Cost for Recommended Remediation Work:

Irrigation Improvements		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

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IV. 29 – VICTOR AND CLEYONE TINSLEY ROCK SPRINGS GARDEN

A. General Building Information



Rock Springs



Rock Springs Garden Walks

ARCHITECTURAL

The Tinsley Rock Springs Garden is one of the more recent renovations at the Fort Worth Botanic Garden starting in 2013. Originally constructed in 1933, Rock Springs Garden has evolved through the years with the local development of Fort Worth. In this most recent renovation, the Springs and the original restroom building were restored, terraced pond structures were added, and new site features such as bridges, walkways, the Overlook, the Boardwalk, water crossing Weirs, and the Shell Pavilion were added.

The Overlook is located in the western portion of the Tinsley Rock Springs Garden. Construction of the project was completed approximately 2 years ago. The Rock Springs Garden connects a series of 10' concrete walkways along its western edge beginning at the Shelter House parking lot and leads along the adjacent service road, and later connects to a stone walkway above a stone bridge. The stone walkway and bridge which spans over the waterway, has a 7" high by 20" wide raised stone edge. The Rock Springs water source begins at a waterfall located above the bridge and continues down through the Rock Springs Garden along a creek incorporated with stack stone banks. The stone bridge which spans over the waterway, has a steel railing between four stone pillars located at each corner.



The Overlook Looking East



Stone Bridge Below Waterfall

To the east of the bridge, a paved stone walkway leads on to the Overlook structure. The Overlook is a 20' by 20' elevated stone plaza with a 19" high by 20" wide seat wall around its perimeter. The seat wall is

Assessment – Fort Worth Botanic Garden

approximately 42" above the adjacent ground below. A curvilinear stone stairway with a metal hand rail connects the north side of the Overlook down to a stone sidewalk which connects the north and south ends of the Rock Springs Boardwalk.



Wood Framed Boardwalk Entry



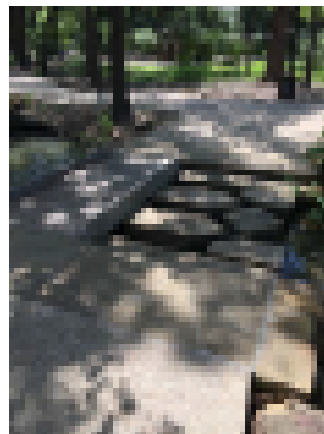
Wood Framed Boardwalk Over Pond #1

The Boardwalk is located south of the Lower Rose Garden and northeast of the Overlook. The Boardwalk is an elevated walkway over pond #1 constructed of ipe wood decking and wood beams resting on 18" round concrete piers rising out of the water. The Boardwalk provides a 42" stainless steel cable rail system with wood posts at 3'-4" on center and stainless-steel posts at 8'-4" on center. Two observation decks offer wood benches as rest areas to take in the views of the Rock Springs Garden.

Located below the Boardwalk and Pond #1 is the westernmost Weir #1. This weir acts as a water crossing connecting the 10' stone paving walkway to the north, to the exposed aggregate walkway to the south. The Weir is constructed with stone facing against the bank of Pond #1 with a concrete box substructure below, and a stone water fall at its leeward side which drains into Rock Springs Garden Pond #2. The interactive water crossing is created by stepping stones which sit atop of concrete pads as water passes between the stepping stones below.



Weir #1 Below Boardwalk



Weir #2 with Accessible Crossing

Located below Pond #2 is the centrally located Weir #2. This weir appears to have been modified from its original design to incorporate a wood platform along its leeward edge which provides an accessible water crossing to the Rock Springs Garden Restrooms and Shell Pavilion. Adjacent to the wood platform are smaller stepping stones which sit atop of concrete pads and allow water to pass between and under the wood platform. Weir #2 connects a 10' exposed aggregate walkway to its north and south. The Weir is

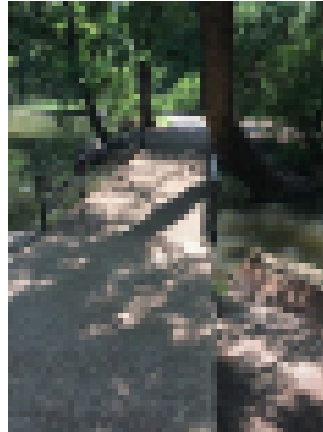
Assessment – Fort Worth Botanic Garden

constructed similar to Weir #1 with a stone facing against the bank of Pond #2, a concrete box substructure below, and a stone water fall at its leeward side which drains into Rock Springs Garden Pond #3.

Located below Pond #3 is the easternmost Weir #3. This weir acts as a water crossing connecting the 10' exposed aggregate walkway to the north and south. The detailing is similar to Weir #1 and drains into the creek which feeds into Ponds #4 & 5 below the Lower Rose Garden.



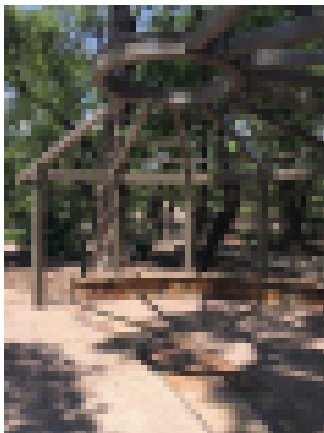
Weir Crossing #3



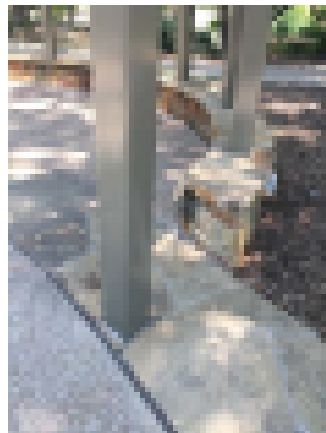
Walking Bridge

The Walking Bridge is a 6' wide exposed aggregate concrete bridge spanning approximately 24' located adjacent to the reflecting pond within the lower Rock Springs Garden. The bridge provides a 25" high steel railing on each side, connected with steel embeds in the sides of the concrete slab.

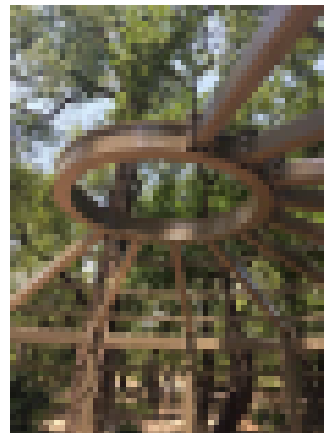
The Shell Pavilion is a painted steel pavilion located in the southwest corner of the Rock Springs Garden. The amphitheater shaped pavilion which incorporates a stone knee wall at its base, culminates at the top with a steel circular band that connects all its vertical members. The connection plates are bolted together with galvanized steel bolts and washers. The adjacent open plaza consists of exposed aggregate paving with stone paver perimeter banding and the FWBG logo in the center of the plaza. The plaza is bound by two stone seat walls along the south edge of the plaza. Convenience outlets are located at the backside of each seat wall as well as behind the pavilion knee wall.



Shell Pavilion



Seat Wall Framing Detail



Steel Framing Detail

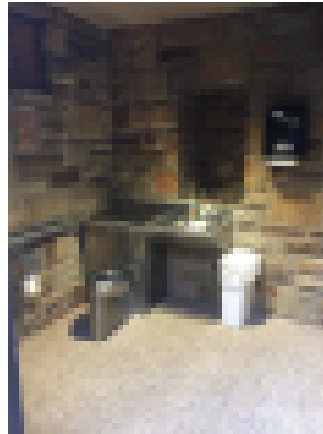
The Restrooms located southwest of the Shell Pavilion, were built as part of the original Rock Springs Garden construction. This facility has undergone recent renovations to repair the roof and framing, while keeping the original wall construction. The restroom signage currently indicates that these restroom facilities are accessible, however the arrangement of the stainless-steel fixtures and accessories are not in

Assessment – Fort Worth Botanic Garden

compliance. As renovations to bring these restrooms into compliance might be cost prohibitive, the accessible signage should be removed and directions provided to the nearest accessible restroom facilities provided at the Japanese Garden courtyard.



Restroom Building



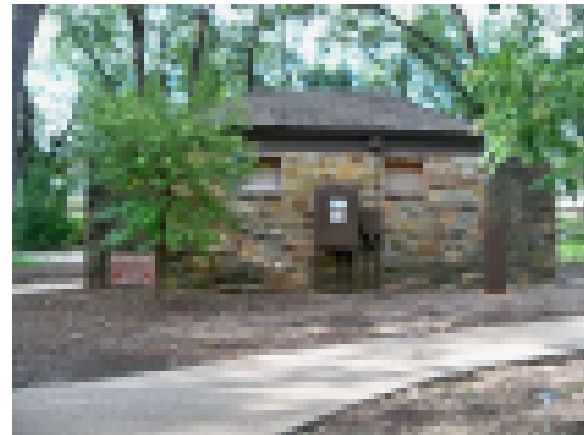
Fixture Arrangement

STRUCTURAL

This garden, which was renovated and enlarged in 2014, includes numerous structures. The Shell Pavilion and the associated stone clad walls were constructed as part of the 2014 renovation. The restroom building was constructed in 1933. This building was closed to the public and did not appear to be in use. Viewing from the exterior, we believe the building has load-bearing stone walls and a wood framed roof supported on a concrete slab foundation system.



Shell Pavilion



Restroom Building

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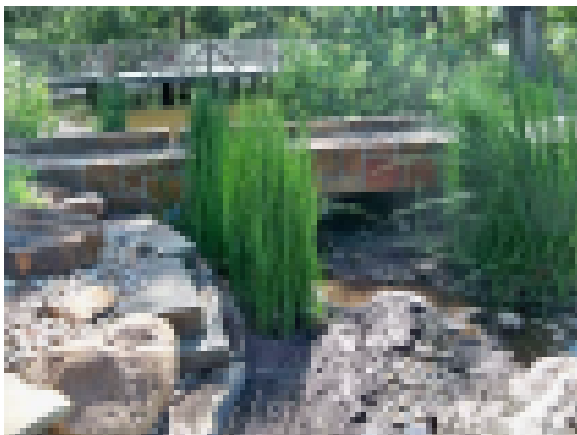


Wood Framed Boardwalk



Concrete Weir #2

This garden includes streams and four ponds extending to the south and west of the large Koi pond located below the Lower Rose Garden. The structures associated with these water features, include a large wood framed boardwalk supported on concrete foundation elements with steel helical piers, several stone clad concrete weirs, a stone clad steel and concrete framed pedestrian bridge, and a stone clad concrete framed bridge.



Stone-Clad Steel and Concrete Bridge



Stone-Clad Concrete Bridge

This garden also includes a stone clad, concrete framed Overlook and several stone clad retaining walls, up to 32" tall, located along the walking paths and service drives within the garden. These retaining walls are believed to be concrete walls with stone veneer, similar to detailing depicted at water's edge within the 2014 construction drawings. However, there are some retaining walls that were not addressed in the construction drawings and their actual construction could not be determined by visual observation. It was reported that these walls are loose laid stair-stepped stones on a gravel setting bed with gravel backfill. Dry stacked stone should not be used as retaining walls. Any walls where stones appear to be failing, should be investigated to determine if they are backed up with a concrete retaining wall. If no concrete retaining wall exists, the walls should be demolished and rebuilt with concrete, utilizing the dry stacked stone only as a veneer.

Botanic Garden staff commented on the verification of the railing attachment at the stone bridge. Per detail 3/L4.1 of the as-built construction documents, the railing post penetrate the stone veneer and are embedded into the concrete structure below.

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Concrete Framed Overlook



Retaining Wall

MECHANICAL / PLUMBING

There are two restrooms with one lavatory and one water closet in each restroom. The plumbing fixtures are all stainless steel and are in working condition.

ELECTRICAL

There is a utility service bank at the southern end of the garden with two 120/240V, single-phase, 3-wire services. The first one serves the pump equipment and is a 100A service. The second one serves the garden lighting and is a 200A service. The garden has a small restroom building to the east. The restroom north exterior wall contains the building's service panel and the water feature control panel. The building service consists of a single 120/240V, single-phase, 3-wire, 16-circuit panel. The lighting in restrooms consists of downlights with control switches. The pavilion located to the east of the restrooms contains convenience receptacles. All equipment and pedestrian lighting throughout the walkways is in good condition.

SITE

The Victor and Cleyone Tinsley Rock Springs Garden is the original site of the Fort Worth Botanic Garden. Constructed during the Depression Era, its design channeled three natural springs into water features. As with other areas in the Botanic Garden, trails were constructed with Palo Pinto sandstone. In a recent improvement project, native gardens were incorporated into the area.

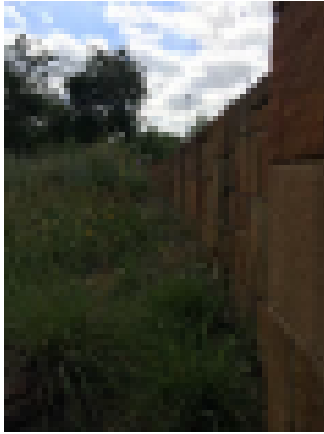
B. Areas of Insufficiency

ARCHITECTURAL

a. Overlook Improvements

The raised walkway connecting the Bridge to the Overlook is constructed with no noticeable expansion joints or control joints with the exception of one provided at each end of the bridge itself. Expansion joints should be added at least 20' on center. In addition, the walkway has areas along its northern edge which exceed 30" to the adjacent grade below. These areas need to have the surrounding grade raised to decrease this drop-off distance and eliminate the need for a guardrail. The same situation occurs at the Overlook with a 42" drop along its edge. The adjacent grade should be raised to eliminate its need for a guardrail as well.

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Raised Walkway



Stone Bridge and Connector

Opinion of Probable Construction Cost for Recommended Remediation Work:

Expansion Joints		\$12,420
Minor Regrading		\$2,300
	Sub-Total	\$14,720
	Contingency	\$2,944
	Total Cost	\$17,664

b. Shell Pavilion Improvements

The field welded joints and steel connections of the Pavilion structure are showing some signs of rust and should be painted to help protect the connections.



Shell Pavilion



Rusted Welds

Opinion of Probable Construction Cost for Recommended Remediation Work:

Paint Rusted Connections		\$2,875
	Sub-Total	\$2,875
	Contingency	\$575
	Total Cost	\$3,450

c. Reflecting Pond Bridge Improvements

The approximately 24' long bridge is designed with 25" high railings which do not meet current code. In areas where pedestrians are expected, the International Building Code (IBC) requires safety rail for vertical drop-offs of 30 inches or more. In this situation, a new 42" high guardrail should be provided. The new

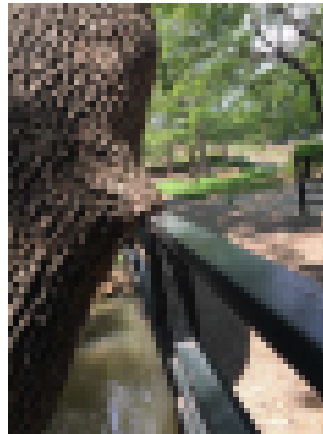
Assessment – Fort Worth Botanic Garden

railing should be designed to match the existing design motif and should be constructed to utilize the existing weld plate embeds in the side of the concrete bridge.

There is a second issue along the south railing of the bridge where an existing tree has come to rest on the top of the railing. Cutting down the limb may cause a problem with the natural landscape restoration in effect for the Rock Springs Garden. However, the new railing could be core drilled and placed further from the slab edge, while the tree limb is cable braced to avoid contact with the new rail.



Reflecting Pond Bridge Railing



Tree Limb Resting on Rail

Opinion of Probable Construction Cost for Recommended Remediation Work:

New Guardrails		\$8,280
	Sub-Total	\$8,280
	Contingency	\$1,656
	Total Cost	\$9,936

STRUCTURAL

d. Boardwalk Beams

Several of the Boardwalk beams have been over-shimmed. The over-shimming appears to have been performed due to incorrect elevations of some of the column tops. The over-shimming resulted in the bolts being placed much closer to the bottom of the beam than indicated in the construction drawings, and some are closer than allowed by the National Design Specification for Wood Construction (NDS). Since this is a fairly new structure, it is recommended that the Engineer of Record (EOR) for the project be contacted to review the as-constructed conditions and provide comment on any remediation action required.



Over-Shimmed Beam



Over-Shimmed Beam

e. Pond #1 Edging

Owner's representatives have expressed concern about what they perceive as undermining of the stone clad walls along Pond #1's edge. The conditions were assessed while the pond was partially drained to

Assessment – Fort Worth Botanic Garden

facilitate below Boardwalk observations. The observed conditions seem to indicate that the stone veneer may have been placed directly on the soil as opposed to on the footing of the concrete retaining wall, as depicted in the contract drawings (reference 6/L5.8 and 6/S1.4 within the 2013 Renovation Drawings). It is recommended that this condition be further investigated to determine if the concrete footing does, in fact, extend below the stone veneer as depicted in the construction drawings and if there has been a wash out between the footing and the stone veneer. If further investigation reveals that these walls were not constructed in accordance with the construction drawings, the EOR should be contacted for recommendations.



Undermined Wall



Undermined Wall

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

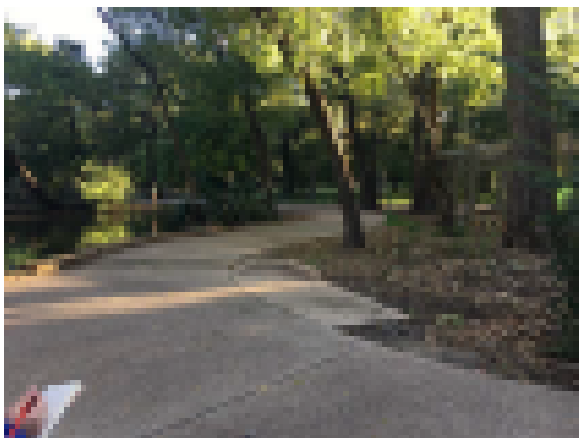
ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

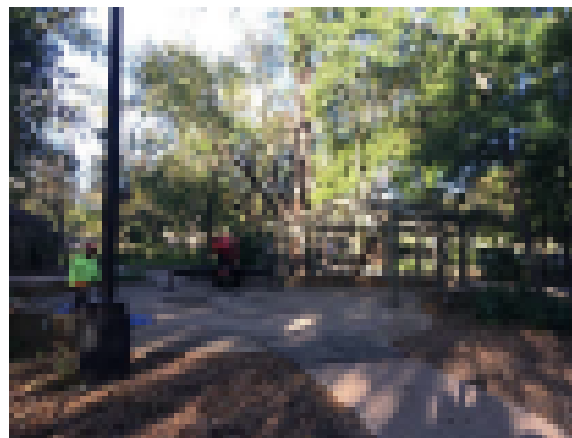
SITE

f. Drainage Improvements

The Rock Springs Garden has recently undergone a significant renovation including new walks, walls, structures, water features, irrigation and plantings. These elements are in good condition; however, the low-lying area is prone to flooding and holding water (up to 6" or more) for several days after significant rain events.



Low Lying Area Prone to Flooding



Shell Pavilion Event Structure

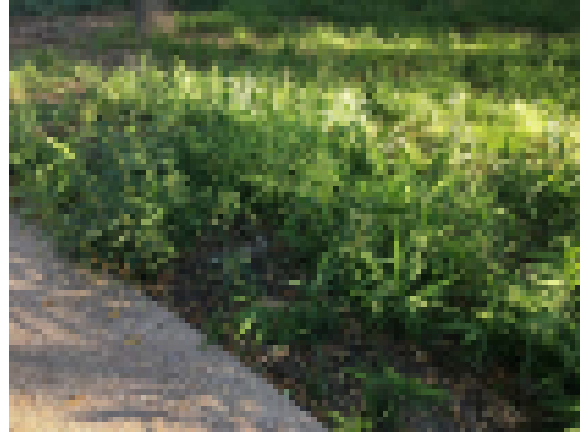
To remove surface water in this area, the current drainage system relies on small landscape drains that flow back to a 12' deep sump which is then pumped into the adjacent pond. In a significant rain event when the pond overflows the banks and the sump inlet, the pump remains on and is ineffective at removing water from the area.

Assessment – Fort Worth Botanic Garden

A comprehensive drainage analysis should be completed with the goal of developing a drainage solution that does not require mechanical pumping.



Existing Sump



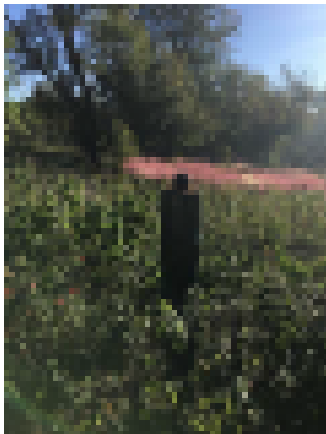
Area Drain in Planting Bed

Opinion of Probable Construction Cost for Recommended Remediation Work:

Drainage Study and Improvements	\$30,000
Sub-Total	\$30,000
Contingency	\$6,000
Total Cost	\$36,000

g. Irrigation Improvements

The existing rotary riser irrigation system is functioning adequately, but is in need of zone adjustments to prevent overwatering of some areas and underwatering of others. A licensed irrigator should be retained to perform these adjustments.



Existing Irrigation Head on Riser

Opinion of Probable Construction Cost for Recommended Remediation Work:

Irrigation System Adjustments	\$3,500
Sub-Total	\$3,500
Contingency	\$700
Total Cost	\$4,200

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h. Perimeter Fence

The Botanic Garden is bordered on University Drive and the I-30 Service Road by a custom ornamental metal picket fence with weathered steel finish. At the base of the fence is a continuous concrete mow strip/maintenance edge. Over time, staff has provided spot repairs as needed, but the overall condition of the pickets, posts, and rails is poor. In addition, several pickets are either missing, bent, or have rusted through. The concrete mow strip is also deteriorating, cracked or missing in several locations. It is recommended to replace the fence and mow strip in its entirety. The price below reflects the balance of the fence and mow strip on the Botanic Garden site in addition to the price reflected in the Zone 2 report.



Damaged Perimeter Fence

Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Perimeter Fence and Mow Strip Fence (Zone 5 Only)	\$605,000
Sub-Total	\$605,000
Contingency	\$121,000
Total Cost	\$726,000

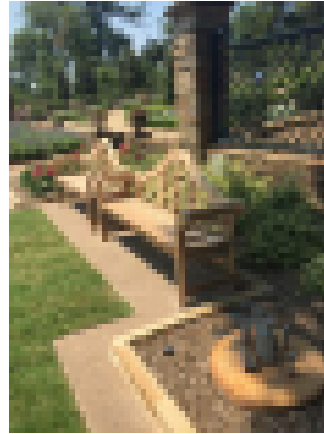
Assessment – Fort Worth Botanic Garden

V. 30 – LOWER ROSE GARDEN

A. General Building Information



Steel Arbors within Lower Rose Garden



Wall at Lower Rose Garden

ARCHITECTURAL

The Lower Rose Garden is bound by an approximately 300 L.F. fence structure comprised of a stone knee wall and painted metal lattice panels. The fence is accented by stone columns at each garden corner and at each walkway opening. The 26"x26" stone columns have an 18" high cast stone base and an 18" high cast stone cap cornice with a pineapple finial above.

The garden itself consists of multiple flower beds and two metal arbor structures which surround a central pool water feature. Four new teak benches are provided along the west perimeter, with two older dedicated teak benches to the east. The flower beds have stone paver edging which appears to have been recently renovated with no signs of distress or breakage.

STRUCTURAL

The western portion of this garden begins at the bottom of the Rose Ramp and extends to the east to include the large koi pond (Pond #5). There is a stone retaining wall with steel fence panels along the north, west, and south sides of this garden. The stone retaining walls are 17 inches wide and between 24 and 30 inches tall. The north, west, and east fences all contain two fence sections, separated by a walkway. There are stone faced columns at the corners and termination points of the fence. Each fence section contains three steel fence panels, a long section and two short sections. Several of the steel fence panels appear to have been replaced in recent years, but the older panels are exhibiting significant rusting, especially along the bottom rail.

This portion of the garden also contains two identical ornate steel arbors.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

The Lower Rose Garden contains pump and control equipment located to the west of the garden's northwest wall. Equipment includes a 120/240V, single-phase, 3-wire, 100A panel, pump controller and timers. The pump is located under a faux rock equipment cover adjacent to the controller. This equipment controls the water feature at the center of the garden. Another pump controller is located just east of the garden. This controller serves the turtle pond to the east of the Rose Garden. All equipment is in good working condition. The Garden has six decorative pedestrian light poles that are in good condition.

Assessment – Fort Worth Botanic Garden

SITE

The Lower Rose Garden includes the Reflecting Pool and a grass area that is unified by surrounding paving and bordered by more parterres. The paving and stonework match the Shelter House and the Rose Ramp.

B. Areas of Insufficiency

ARCHITECTURAL

i. Insufficiency Item Name

The metal lattice panel screens and framework located along the perimeter fence are showing small signs of rust and corrosion and will need periodic painting. Proper preparation including rust removal with a steel brush, application of primer and finish coating should be performed according to the strict Master Painters Institute (MPI) and manufacturer's recommendations.

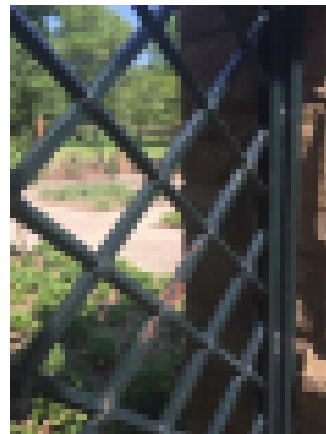
A few cast stone column caps located at the stone columns are showing signs of becoming unseated, cracking and separating at its mortar joints. There are also climbing vines growing around the column. Climbing vines can get inside the mortar cracks and cause further damage if not repaired. These cast stone caps need to be reset and repointed before further damage can occur.



Cast Stone Cap



Unseated Stone Cap

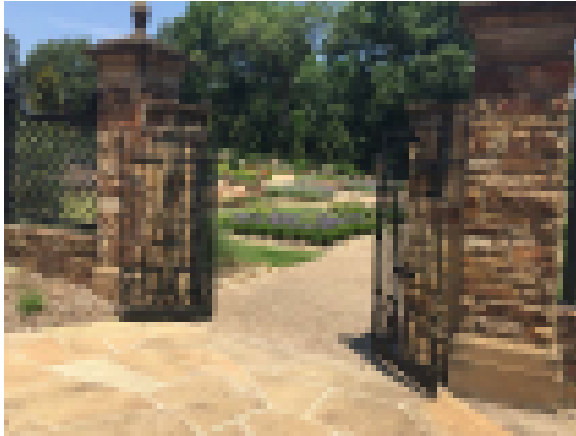


Rust at Fence Panel

The 6' Garden Gate on the south side of the Lower Rose Garden is not used frequently as the gates are usually held in the open position. The hinges are showing signs of rusting and need to be greased and allowed to work its way into the hinge. If the hinges continue to rust, they will most likely corrode and become inoperable. The gates and framework will require periodic paint recoating. Proper preparation including rust removal with a steel brush, application of primer and finish coating should be performed according to the strict Master Painters Institute (MPI) and manufacturer's recommendations.

The 2 dedicated teak benches located on the eastern side of the Lower Rose Garden are in need of replacing.

Assessment – Fort Worth Botanic Garden



Ornamental Metal Gates Along South Side



Teak Bench

Opinion of Probable Construction Cost for Recommended Remediation Work:

Clean and Paint Fence and Gate		\$18,113
Repoint Cast Stone Caps		\$3,450
Replace Benches		\$4,600
	Sub-Total	\$26,163
	Contingency	\$5,233
	Total Cost	\$31,396

STRUCTURAL

j. Wall Cracking

Cracking in the stone base wall of the perimeter fence was observed in various locations. The only significant cracks were a 1/4" wide crack observed on the south fence, a 3/4" wide crack on the north fence, a 1/4" wide stair-stepping crack on the west wall near the southwest corner, and a 3/8" wide crack on the north fence. It is recommended that these cracks be repointed.



Example of Cracked Wall



Example of Cracked Wall

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Wall Cracks		\$800
	Sub-Total	\$800
	Contingency	\$160
	Total Cost	\$960

Assessment – Fort Worth Botanic Garden

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

There were no electrical insufficiencies noted in the assessment of this area.

SITE

There were no site insufficiencies noted in the assessment of this area.

VI. 31 – REPUBLIC OF TEXAS GARDEN

A. General Building Information



Aggregate Paths



Cedar Arbors Project

ARCHITECTURAL

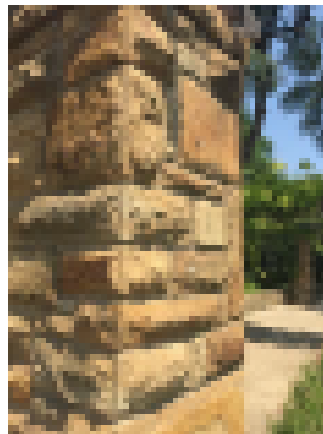
The Republic of Texas Garden consists of the Cedar Arbors Eagle Scout project to the east, and a linear colonnade structure bound by a retaining wall to its west. Pedestrian paths are served with an exposed aggregate walkway that serves the colonnade, while a meandering exposed aggregate walkway connect the seven Cedar Arbors.

The Cedar Arbors Eagle Scout project is made up of a series of 7 cedar arbor structures each consisting of 4 cedar posts with cedar limbs spanning approximately 6' across the walkway. The 4 cedar post columns are set in concrete footings raised approximately 8-12" out of the ground for protection.

The long colonnade structure bounding the western edge of the Republic of Texas Garden, is made up of a series of 2'x2' stone column arbors, with ipe framing spanning approximately 12' across the 10' exposed aggregate walkway. The stone arbors have climbing vines growing up the columns and over the framing members.



The Colonnade



Colonnade Stone Detail

The colonnade with its 10' exposed aggregate walkway is anchored on its western edge with an approximately 20" high, 18" thick retaining wall. The retaining wall runs the entire length of the colonnade and is in good condition with no signs of cracking or stress.

Assessment – Fort Worth Botanic Garden

STRUCTURAL

This garden extends from the north edge of the Lower Rose Garden to the southern end of the Oval Rose Garden. The area contains nine stone clad pergola structures and a low stone clad retaining wall along the west side of the walkway. The pergolas were re-built in 2012 using ipe lumber.

MECHANICAL / PLUMBING

There is a single station electrical water cooler in working condition.

ELECTRICAL

There were no electrical systems noted to be assessment at this area.

SITE

The Republic of Texas Garden is situated between a wooded area and the South Vista. A series of trellises runs along one side, connecting it to the Lower Rose Garden and the Oval Rose Garden. Paths wind through this garden, featuring native Texas plants, antique roses, and other plants of historic significance to Texas.

B. Areas of Insufficiency

ARCHITECTURAL

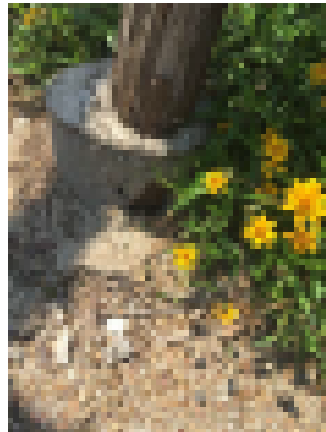
a. Miscellaneous Architectural Items

Two cedar arbors have footings that are cracked and exposing the cedar posts. The column bases are showing signs of rotting and termite damage. At several other arbors, the mulch bed has been raised up over the top of the concrete base which will cause faster decomposition.

There is an existing electric water cooler located at the south end of the colonnade, just north of the Lower Rose Garden. This model EWC in its current arrangement, does not comply with the current projected object clearances required and needs to have an additional knee skirt added to this unit. Since this is an older model unit, a retrofit skirt may have to be located.



Cedar Post Base



Cedar Post Base



Projected Object in EWC

Opinion of Probable Construction Cost for Recommended Remediation Work:

Repair Cedar Arbors	\$2,300
Knee Skirt at EWC	\$575
Sub-Total	\$2,875
Contingency	\$575
Total Cost	\$3,450

Assessment – Fort Worth Botanic Garden

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

Not Applicable

SITE

Water north of the Rose Ramp Stairs flows down the area known as Spirea Hill and over the wall into the Texas Republic Miniature Rose Garden. Drain inlets should be installed at the base of Spirea Hill, and should be connected with a drain pipe to outfall into the Reflection Pond.



Spirea Hill & Adjacent Trellises

Opinion of Probable Construction Cost for Recommended Remediation Work:

Drainage Improvements		\$12,000
	Sub-Total	\$12,000
	Contingency	\$2,400
	Total Cost	\$14,400

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VII. 32 – OVAL ROSE GARDEN

A. General Building Information



Oval Rose Garden Pavilion



Oval Rose Garden Pavilion

ARCHITECTURAL

The Oval Rose Garden consists of a central pavilion bound by four arbors that align north, south, east and west. Between the arbors are post structures that complete the oval theme of the site. The posts are tied and connected at their tops by a rope. The garden consists of exposed aggregate walks and landscape bedding completing the oval pattern.

The center pavilion is an open-air stone structure consisting of twelve stone columns roughly 26" x 26" each, ipe beam framing structure with a cedar shingle roof and bead board ceiling. The ceiling contains an access hatch for a hose bibb connection inside the pavilion roof structure. The pavilion is framed on the east and west by a pair of freestanding columns with metal lattice screen panels and ipe arbor framing above. The pavilion has a raised stone slab which is accessible at grade on the west side.

The four arbors that bound the central pavilion are connected by a 10' wide exposed aggregate sidewalk paving. The arbors consist of four 26"x26" stone columns separated by 4' metal lattice screen panels. Above the four columns are ipe framing spanning approximately 12'.

STRUCTURAL

This garden contains a central pavilion and four pergola structures. The pavilion and the pergolas were re-constructed in 2012, using ipe wood for the exposed wood portions of the structures.

MECHANICAL / PLUMBING

There is a hose bibb located at the center pavilion above the ceiling panels behind an access panel. The hose bibb is in working condition.

ELECTRICAL

There is no power distribution equipment located in this area. The Oval Rose Garden has convenience outlets within the pavilion and located at five individual steel poles. Four poles are located around the garden and one pole is located to the northwest. Two poles have flood lights, while the other three poles do not have equipment mounted on them.

SITE

The Oval Rose Garden is situated between a wooded area and the South Vista. A series of trellises create a colonnade which connects it to the Lower Rose Garden. A small stone shelter, which appears to be a

Assessment – Fort Worth Botanic Garden

much smaller version of the Shelter House, is located at the center of the oval shaped planting area. This site is another favorite venue for ceremonies and weddings.

B. Areas of Insufficiency

ARCHITECTURAL

a. Insufficiency Item Name

The metal lattice panel screens and framework are showing small signs of rust and corrosion and will need periodic paint recoating.

A few stone columns making up the four arbors that bound the central pavilion are showing signs of wear with vertical cracking in the mortar near the top cap (for example at the northwest corner of the southernmost arbor structure). There is evidence where climbing vine attachment devices were once used and have since been removed. Climbing vines can get inside the mortar cracks and cause further damage if not repaired. These mortar cracks need to be repointed and infilled before further damage can occur with climbing vines or water infiltration.



Arbor with Lattice Panels

Opinion of Probable Construction Cost for Recommended Remediation Work:

Prep and Paint Lattice		\$6,038
Repoint Columns		\$2,300
	Sub-Total	\$8,338
	Contingency	\$1,668
	Total Cost	\$10,006

STRUCTURAL

There were no structural insufficiencies noted in the assessment of this area.

MECHANICAL / PLUMBING

There were no mechanical or plumbing insufficiencies noted in the assessment of this area.

ELECTRICAL

b. Lighting Upgrades

Upgrade existing lighting with LED floods for better and more efficient coverage.

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Existing Light Pole

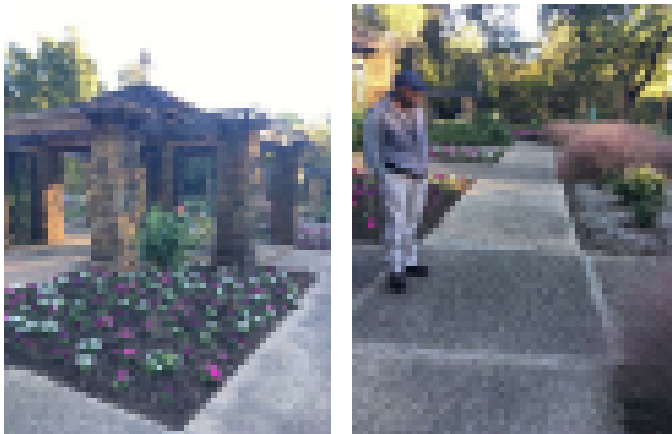
Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace Light Fixtures with LED		\$6,000
	Sub-Total	\$6,000
	Contingency	\$1,200
	Total Cost	\$7,200

SITE

c. Drainage Improvements

The Oval Rose Garden is situated in a low area of the garden and the planting areas include approximately 24” of prepared soil over the native material. This combination results in wet soil and nuisance water on paving that creates maintenance and plant health issues even in minor rain events. A landscape drainage system should be installed in all the beds so that they drain to the adjacent creek. When constructing the drainage system, fine grading will be needed in the planting areas to create swales that direct water away from garden structures.



Slow Draining Planting Area Low Walks Hold Water in Rain Events

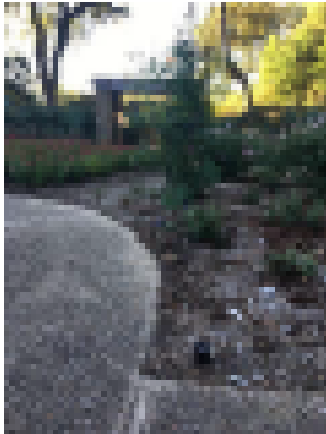
Opinion of Probable Construction Cost for Recommended Remediation Work:

Planting Area Drainage		\$15,000
	Sub-Total	\$15,000
	Contingency	\$3,000
	Total Cost	\$18,000

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d. Irrigation Improvements

The Oval Rose Garden irrigation system is aging and in need of a full upgrade. The new system should be controlled by the central irrigation controller.



Existing Irrigation System

Opinion of Probable Construction Cost for Recommended Remediation Work:

Planting Area Drainage		\$20,000
	Sub-Total	\$20,000
	Contingency	\$4,000
	Total Cost	\$24,000

VIII. 33 – SOUTH VISTA

A. General Building Information



'Birth of Love' by Michael Pavlovsky



Existing Footbridge

ARCHITECTURAL

The South Vista is an open lawn located directly in line with the North Vista, south of Rock Springs Road, and east of the Oval Rose Garden and the Republic of Texas Garden. The South Vista is used extensively for public events such as Concerts in the Garden, Old Fashioned Family Fireworks Picnic, and other activities. There are limited structures within the South Vista being primarily an open lawn, however in the adjacent south grove near the garden entrance there are two footbridges just south of Rock Springs Road crossing the drainage way. In our investigation, only one of these structures still remain and we were informed by staff that the easternmost footbridge has since been removed due to damage. Refer to the structural and civil assessments for information on these footbridges.

STRUCTURAL

The main structural element in this area is a steel framed footbridge located near the north bend in the creek (approximate map location Grid S24). There are no construction drawings available for this footbridge. It is composed of a steel angle frame with pipe guardrails and expanded metal grate walking surface. In addition, the entry element at the Rock Springs Road (map location Grid X22-23) consists of precast stone clad concrete pool walls with columns of brick and cast stone located on each side of the entrance gates. There is a low brick wall with concrete footing, approximately 90 feet long, extending out to the south and north from the two pools.

MECHANICAL / PLUMBING

There were no mechanical or plumbing systems noted to be assessed at this area.

ELECTRICAL

There were no electrical systems noted to be assessed at this area.

SITE

The South Vista is a feature of French Renaissance garden design and is a popular venue for outdoor concerts and for strolling through a clearing where one may view sculptures and other gardens in the distance.

The Lagoon Area and Loop Trail consists of naturalistic ponds and soft surface trails in the area between the South Vista and University Drive. This is a low-lying area prone to flooding. This area was previously

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home to ornamental azalea planting but is currently characterized by mature woods and dense understory growth. The primary use of this trail is for strolling and walking by daily visitors.

B. Areas of Insufficiency

ARCHITECTURAL

There are no architectural insufficiencies found with this area.

STRUCTURAL

The footbridge appears to have been set directly into the soil at each end which has caused advanced degradation of the steel structure. Significant rusting of the footbridge frame was noted, particularly within the portions of the frame in contact with soil. The steel footbridge has degraded to the point that it is unsafe and unsalvageable. The guardrails for the footbridge do not meet current code requirements. This footbridge is a safety hazard and should be removed. Refer to the Site section for replacement costs.

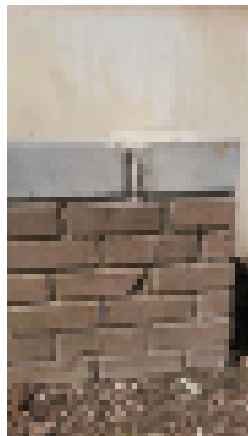


Steel Bridge Framing



Steel Bridge Frame in Contact with Soil

Both precast stone caps at the columns of the Rock Springs Road Garden Entrance, have significant cracks. We recommend that these cracks either be epoxy injected, to extend the useful life of the cap, or replaced. We believe that cap replacement would be more cost effective than injection. There is also isolated cracking located near the north end of the south brick wall (photograph below, right). We recommend that these cracks be re-pointed.



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Opinion of Probable Construction Cost for Recommended Remediation Work:

Replace precast stone caps	\$3,500
Repoint brick wall cracks	\$1,000
Sub-Total	\$4,500
Contingency	\$900
Total Cost	\$5,400

MECHANICAL / PLUMBING

Not Applicable

ELECTRICAL

Not Applicable

SITE

a. South Vista Site Improvements

The South Vista lawn is located in one of the lower lying areas of the site between the rose gardens and the lagoons. Due to extensive use and compaction this area does not drain sufficiently and there are visible signs of wear.

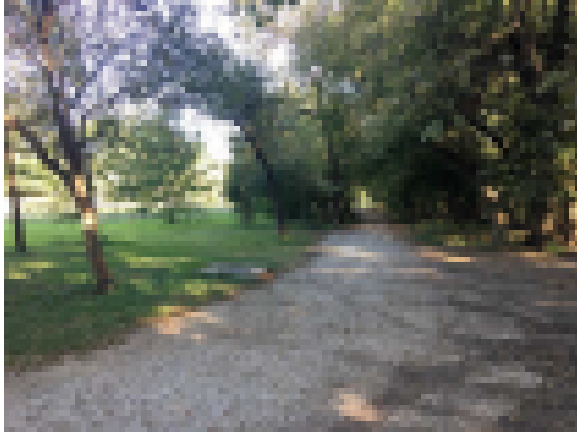


South Vista Lawn

The entire lawn and soil beneath it should be excavated and reconstructed using a structural soil that is free draining and more capable of supporting the weight of heavy foot traffic and occasional service vehicle use without creating ruts or other damage. This construction would be similar to an athletic field, and would also include a subsurface drainage system to evacuate water. Additionally, surface runoff upstream of the lawn will need to be collected into area drain inlets and connected to a storm drainage system that outfalls into the creek. Reconstruction would include installing new sod and irrigation system modifications (new heads, etc.).

The Service drive just east of the South Vista is utilized by staff on a daily basis but is also used during events for access to the firework launching areas or backstage areas during performances. This drive needs to be resurfaced with a gravel roadway base material and graded smooth.

Assessment – Fort Worth Botanic Garden



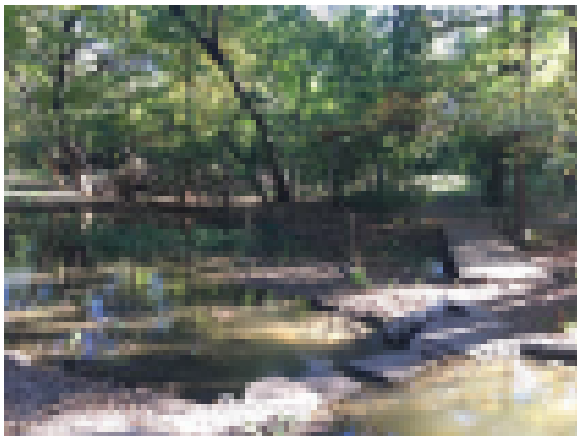
Gravel Service Drive

Opinion of Probable Construction Cost for Recommended Remediation Work:

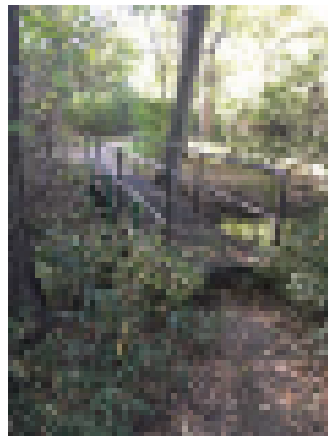
Excavation & Site Preparation	\$30,000
Subsurface Drainage Allowance	\$75,000
Install Free Drainage Fill Material	\$300,000
Replace Topsoil & Fine Grading	\$12,000
Replace Sod	\$45,000
Irrigation Modifications	\$28,000
Sub-Total	\$490,000
Contingency	\$98,000
Total Cost	\$588,000

b. Lagoon Area Site Improvements

The Lagoons adjacent to the South Vista flow from South to North through a series of impoundments created by stone weirs. These weirs also provide visitor access across the creek to the nature trails. These lagoons need to be dredged to remove the silt and sediment deposits. This dredging should be performed prior to any drainage improvements in the Perennial Garden or Rose Garden and a French drain installed in the Oval Rose Garden.

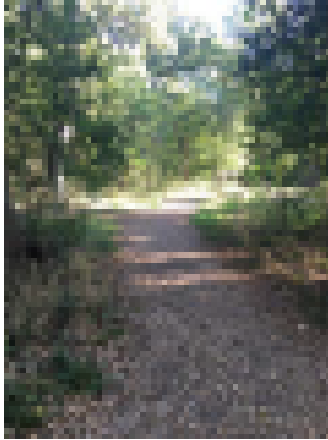


Lagoon Weir Crossing



Lagoon Loop Trail Bridge

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Lagoon Loop Trails

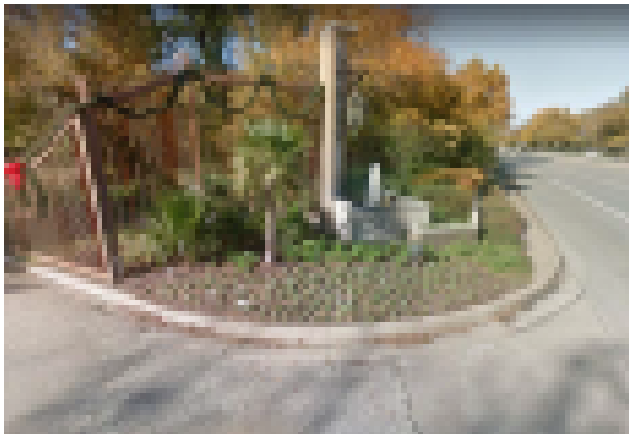
The Lagoon Loop Trails meander through the woods providing maintenance and visitor access to the heavily wooded area. The trails are primarily soft surface pathways worn by consistent foot traffic. The path crosses the creek over a steel footbridge that has been damaged beyond repair. A second footbridge once located along the eastern creek trail, was previously removed by staff due to damage. Minor grading throughout the trail should be completed to remove ruts and the two footbridges should be replaced with new prefabricated structures.

Opinion of Probable Construction Cost for Recommended Remediation Work:

Dredge Lagoons	\$25,000
Regrade Soft Trail	\$15,000
Replace 2 Trail Bridges	\$175,000
Sub-Total	\$215,000
Contingency	\$43,000
Total Cost	\$258,000

c. Fountain at South Entry

The fountain at the south entrance consists of two small basins with each with a submersible pump and a small spray that flank the entry road. Both basins leak, the leaks in this fountain will need to be identified and repaired with a combination of structural modifications and waterproofing measures. The basins shall be reconstructed to match the current appearance and the plumbing and electrical equipment upgraded to meet current requirements.



Fountain at South Entry

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Opinion of Probable Construction Cost for Recommended Remediation Work:

Fountain Improvements		\$30,000
	Sub-Total	\$30,000
	Contingency	\$6,000
	Total Cost	\$36,000

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IX. Cost Summary

To summarize the information found in this document, this section provides a cost summary by key element of the Botanic Garden. Please refer to sections AREAS OF INSUFFICIENCY for detailed information on each item. Note that if multiple options/costs were provided, then the highest of the costs are included in the numbers below.

26	Perennial Garden	\$35,100
27	Shelter House	\$43,704
28	Rose Ramp	\$246,000
29	Victor and Cleyone Tinsley Rock Springs Garden	\$797,250
30	Lower Rose Garden	\$32,356
31	Republic of Texas Garden	\$17,850
32	Oval Rose Garden	\$59,206
33	South Vista	\$887,400
	Total Zone 5	\$2,118,866

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