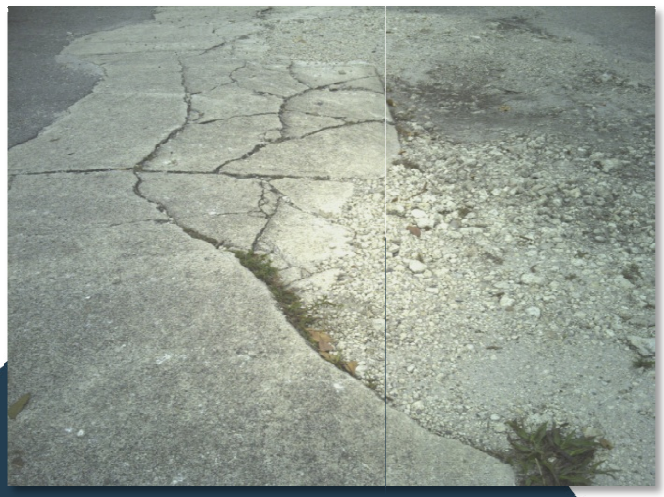
SIDEWALK INSPECTION & MANAGEMENT SYSTEM

Conclusions & Recommendations Report



City of Ft. Lauderdale, Florida

July 1, 2014
City Project No. 11762A

ATKINS

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EXECUTIVE SUMMARY

Introduction

Atkins was authorized by the City via Task Order No. 2 to conduct the visual inspection of 425 miles of existing concrete sidewalk within the City limits. The intent of this inspection was to identify areas of damaged sidewalk within the City's right-of-way and provide means to capture and manage key data associated with the existing sidewalk conditions and possible repairs, develop rough order of magnitude costs associated with the repairs and to recommend a 5-year work program to implement repairs.
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The task order provided for project initiation, a condition matrix, field work preparation, field inspection, field quality control, GPS to GIS data conversion, producing a MS Access database used to document the damaged sidewalk locations within the inspected 425 miles. The data base will be then used as a tool to develop a work plan for repair or replacement of the damaged sidewalk. The task order also provided electronic and hardcopies of the database which shall be owned, maintained and updated by the City.

For the evaluation of the sidewalk damages, the following damage category types were defined:

- Category Type 1 (C1): Large vertical displacement
- Category Type 2 (C2): Wide cracks
- Category Type 3 (C3): Small vertical displacement
- Category Type 5 (C4): Surface defects
- Category Type 5 (C5): Sidewalk damage pertaining to narrow cracks

Findings

Atkins conducted the inspection of 425 miles of sidewalk representing a gross total area of 11.2 million square feet. The inspection yielded a total of **29,058 locations** where sidewalk shows some type of damage, representing approximately a total of **2.8 million replacement square feet** (approximately 25% of the total gross area).

By reviewing the damage category types, the chart below reveals that Category Type 2 – Wide Cracks account for 42% (12,284 locations) of the conditions for damaged sidewalk, followed by Category Type 3 – Small Vertical Displacement (29% or 8,445 locations) and Category Type 5 – Narrow Cracks (20% or 5,993 locations).

Category Type	Number of Damage Locations
1 - Large vertical displacement	1,399
2 - Wide cracks	12,284
3 - Small vertical displacement	8,445
4 - Surface defects	997
5 - Narrow cracks	5,933
Grand Total	**29,058**

To determine the cost of repair or replacement for the different locations, a series of cost rules were defined and applied based on the type of damage. The cost to repair or replace damaged sidewalks in the reported 29,058 locations was estimated to be in the rough order of magnitude of $15.2 million dollars (construction costs for year 2014). The initial cost breakdown for the recommended repairs is as follows:

Recommended Repairs	Estimated Costs
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	$1,092,150
Full Concrete Panel Replacement to Nearest Joint	$8,844,000
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$2,861,310
Grinding Down Separation	$2,406,900
Grand Total	**$15,204,360**

A brief description of the recommended repairs is as follows:

50% No Repairs/50% Future Repair: This cost classification pertains to Category Type 5 – Narrow Cracks that was reported in **5,933 locations**, with a total estimated 2014 cost of approximately **$1.1 million dollars.** For purposes of the cost estimate, it has been assumed that 50% of the sidewalks may need to be replaced in the future with the 6" thick sidewalk typical section, while the other 50% may continue to be function "as is". For these locations, it is strongly recommended that the City implements a program of periodic inspection (at least annual) to monitor the conditions of these locations, and proceed to implement repairs when additional deterioration occurs.

Full Panel Replacement to Nearest Joint: This cost classification involves **13,529 locations** of Category Types C1, C2 and C4 where the sidewalk shows significant damage that requires a full replacement without the need to add base material. Using the 6" thick sidewalk typical section, the total estimated 2014 replacement cost was calculated to be approximately **$8.8 million dollars.** Costs were based on replacement square footages that were calculated by rounding the measured damage area up to the next multiple of 25 square feet representing the standard 5' by 5' concrete sidewalk panel.

Full Panel Replacement to Nearest Joint with Alternate Base: This cost classification involves **1,151 locations** of Category Levels C1, C2 and C4 where the sidewalk shows significant damage that requires a full replacement with alternate base material to correct sub-grade conditions. Furthermore, at some of these locations additional work pertaining to tree root pruning may be necessary. Using the 6" thick sidewalk typical section, the total estimated 2014 replacement cost was calculated to be approximately **$2.8 million dollars.**

Grinding Down Separation: This cost classification pertains to Category Type 3 - Small vertical displacement that was reported in **8,445 locations.** This repair consists of grinding down the existing vertical displacement to eliminate it. The total estimated 2014 repair cost was calculated to be approximately **$2.4 million dollars**. The cost of this repair is mostly labor.

Recommendation for Implementation of the Five-Year Work Plan for Sidewalk Repairs

A proposed Five-Year Work Plan was developed for the implementation of the repairs as follows:

- In years one and two the locations with most serious sidewalk damage would be addressed. From the cost perspective, the highest initial sidewalk replacement costs would be incurred.
- In year three, locations with small vertical separations would be addressed.
- In year four, locations with surface defects would be addressed.
- In year five, locations with narrow cracks showing additional deterioration would be addressed (estimated that 50% of these locations would need future repair). Periodic inspection of these locations would need to be performed by the City.

The table below summarizes the yearly funding requirements over the Five-Year Work Plan as outlined above. This work plan includes an escalation factor of 3% per year starting in the second year of the work program.

Year	Category	Estimated Costs
1	1 - Large vertrtical displacement & 2 - Wide cracks	$5,151,480
2	2 - Wide cracks	$5,306,024
3	3 - Small vertical displacement	$2,551,314
4	4 - Surface defects	$1,528,562
5	5 - Narrow cracks	$1,223,208
Grand Total		**$15,760,588**

This work plan is intended as a high level outline which the City will need to validate and refine depending on funds availability and other criteria.

Diego J. Clavijo
Project Manager – Atkins

Fleet M. Wulf, PE
Engineer of Record, Atkins

SECTION 1

INTRODUCTION

1.0 INTRODUCTION

The City of Fort Lauderdale, Florida has contracted with Atkins North America through Task Order No. 2 to perform a sidewalk inspection and the development of a management system. The name of this project is

City of Fort Lauderdale
Sidewalk Inspection and Management System
Project No 11762A

There are approximately 425 miles of existing concrete sidewalk within the City. Of the existing sidewalks a portion have been damaged and in need of repair. However, currently the City does not have a proper and accurate mechanism to identify the damaged sidewalk areas before they pose a risk to the City. Based on the current City Code of Ordinances (Sec. 25-58 (a)), the property owner is responsible for the maintenance of the sidewalk abutting their property, therefore, currently sidewalks are only inspected and repaired based on property owner complaints received or claims through the City's Risk Management Department. The City currently budgets a portion of the annual CIP funds to repair damaged sidewalks.

1.1 Project Description

The proposed task order provides for project initiation, a condition matrix, field work preparation, field inspection, field quality control, GPS to GIS data conversion, producing an interactive dashboard database, and sidewalk defect identification for approximately 425 miles of the City. The proposed task order also provides electronic and hardcopies of the database which shall be owned, maintained and updated by the City.

1.2 Purpose

The purpose of the project is to provide identify locations for sidewalk improvements in an effort to address public health and safety issues. This work performed in this project will result in a rough order of magnitude (ROM) cost estimate for all of the sidewalk damage repairs or replacements. A 5-year work program will be developed from the (ROM) cost estimate. The purpose of this report is present conclusions and recommendations to the City of Fort Lauderdale as described in Tasks 7 & 8 below.

1.3 Scope of Services

In accordance with the Agreement between the City and Atkins, the scope of services the task order included the eight (8) tasks identified below. A summary of each task is as follows:

Task 1 – Project initiation

- Task 1: Project initiation
  - Subtask 1: Project kickoff meeting
  - Subtask 2: Inventory data collection

The CONSULTANT will work with the City and hold a project kickoff meeting to discuss the scope, objectives/goals, deliverables, and schedule. Additionally, the City will provide copies of inspections performed to date and any other relevant information available at the time of the meeting.

The inventory data will be quality checked, corrected if necessary, and used as a guide for data collection in Task 2.

Task 2 – Develop condition matrix

- Task 2: Inspection
  - Subtask 1: Identify condition matrix based on agreed upon defects
  - Subtask 2: Software coordination on matrix.

CONSULTANT will work with the city in developing a condition matrix that will be utilized for the duration of the project. Condition matrix will include:

1. Damage location (GPS location in state plane coordinates with nearest address)
2. Length of damage
3. Photo of damage
4. Damage type (swale tree root, owner's tree root, uplift, broken sidewalk, water box separation, FPL box separation, cable box separation, phone box separation, gas box separation, other box separation)

Task 3 – Preparation of MS Access application and GIS dataset development

- Task 3: Field work preparation
  - Sub Task 3.1: Database Design
  - Sub Task 3.2: Geospatial data Design
  - Sub Task 3.3: ArcPad application Design

- Sub Task 3.4: ArcPad application Development
- Sub Task 3.5: MS Access application Design
- Sub Task 3.6: MS Access application development: Create Data Edit Forms
- Sub Task 3.7: MS Access application development: Create basic Queries
- Sub Task 3.8: MS Access application development: Create basic Reports
- Sub Task 3.9: Testing of The System
- Sub Task 3.10: QC and upload inspection data
- Sub Task 3.11: Synchronize Data to Access Database
- Sub Task 3.12: Development of user manual.
- Sub Task 3.13: Create GIS dataset of sidewalk assessment

This task will consist of creating functional requirement for an ArcPad based data collection tool and a companion Access Database to host the collected data. This solution will consist of entries of defective side walk defects segments. Each defect entry will consist of multiple ArcPad data entry screens with beginning and end points, one or more images and one or more GPS coordinate. The Access database will consist in a data entry form for capturing additional comments and recommendations for the surveyed features; some predefined basic queries and, some basic reports showing a listing of all of the records containing defective sidewalks entries (developed under Task 4). Selecting a specific entry will provide the user with a page that contains the data collected associated with the entry, all of the images associated with the entry and the specific coordinate(s) associated with this entry. Sub Task 7 consists of testing the system with the goal of removing any defects encountered. Sub task 9 will allow the city to continue sidewalk assessments, produce reports and maps of sidewalks to be repairs for planning purposed, show mitigation of deficiencies, identify new sidewalk defect and load associated pictures.

Task 4 – Field inspections

- Task 4: Field inspections
  - Subtask 4.1: Train inspectors on developed application
  - Subtask 4.2: Conduct field inspections

Using the application developed under Task 3, CONSULTANT and SUBCONSULTANT (Premiere Design Solutions, Inc.) will conduct an inspection of approximately 425 miles of existing sidewalk within the limits of the City of Fort Lauderdale. This task is proposed as an hourly (not to exceed) task as there are

various unknowns that can occur during the execution of this task. Our estimated hours for this task are based on each inspector having the ability to assess approximately 8-10 miles of sidewalk per day.
Sidewalk defects will be identified and registered into the GPS Trimble unit during this task. Prior to inspection, CONSULTANT shall submit a map showing inspection schedule.

Task 5 – Field quality control

- Task 5: Field quality control
  - Subtask 1: Spot check sample points to confirm information collected on the field is accurate.

CONSULTANT and SUBCONSULTANT (Premiere Design Solutions, Inc.) will provide quality control for the work performed under Task 4. Quality control measures include but are not limited to review of inspector's daily assessment, field verification to confirm field assessment is accurate and coordination to prevent routes being duplicated. After Initial 5% of area has been inspected, CONSULTANT shall submit draft information for City review and approval. City will inspect and verify field quality inspection data within two weeks of draft information and submit comments to CONSULTANT in writing. CONSULTANT shall incorporate comments into 90% completion submittal.

Task 6 – Conversion of field collected data to a GIS feature

- Task 6: GPS to GIS conversion and geocode
  - Subtask 1: Convert field gathered GPS data to GIS

Following field QC efforts, CONSULTANT will convert all field gathered GPS data & attributes to a GIS Polyline feature class capable of incorporation into the enterprise GIS. Perform a geoprocess to assign attribution of site address where a sidewalk deficiency has been identified by field inspectors. Utilize & incorporate observations from Task 4 and Task 5 into final GIS product & perform spot checks of address accuracy as part of the GIS data development (Quality Assurance) QA process. The GPS field data collector will be designed to capture all of the required attributes needed to gather, verify sidewalk condition (As previously defined by city staff). The GIS data will be used to assist in criticality evaluation by city staff, as well as for use with the database.

Task 7– Conclusions and Recommendations Report

- Task 7: Format and deliver data
  - Subtask 7.1: Provide electronic and hard copies of the database

- Subtask 7.2: Prepare and finalize a 5-yearwork plan with costs.

CONSULTANT will provide electronic database (in PDF and raw data format) along with a hard copy of the dashboard elements from the damaged inspections identified in Task 3 and 4. Additionally,
CONSULTANT will prepare a summary report with following categories:

- Location of damaged sidewalk (nearest address based on data collection)
- Cause of damage (determination to be made by Consultant)
- Weighted sidewalk score (based on condition matrix developed by Consultant)
- Type of repair required (replacement or local repair)
- Approximate square footage of damage (based on data collected during inspection)
- Cost of repair (determination to be made by Consultant)
- Recommendation for implementation of 5-year workplan based on cost estimate from inspections (determination to be made by Consultant)
- Access Database that will allow the user to continue with the sidewalk assessment and maintenance of the program. Consultant will also give “All rights reserved” to the city on all the field data collected and developed software and computer programs.

Task 8– Sustainability Evaluation

- Research, review, evaluate, and determine cost associated with items and recommendation of alternative materials for sidewalk replacement.
- CONSULTANT will research alternative sustainable materials in the industry and identify parameters for most efficient use within the City. This evaluation will consist of recycled material, porous pavement, and other sustainable systems. CONSULTANT will incorporate the options into the recommendations for the improvements.

1.4 Summary of Inspection

Table 1.1 and the corresponding pie charts in Figure 1.1 below summarize the total number of locations, replacement square footage and estimated costs in each commissioner district and the total city wide. Further breakdowns including for each recorded neighborhood throughout the City are located in the remainder of the report.

District	Number of Damage Locations	Replacement Square Footage	Estimated Cost
District 1	3,482	317,900 s.f.	$1,486,935
District 2	6,566	745,100 s.f.	$4,196,400
District 3	9,865	863,900 s.f.	$4,552,800
District 4	9,145	868,575 s.f.	$4,968,225
Grand Total	**29,058**	**2,795,475 s.f.**	**$15,204,360**

Table 1.1: Summary by District of Locations, Replacement Square Footage and Estimated Costs

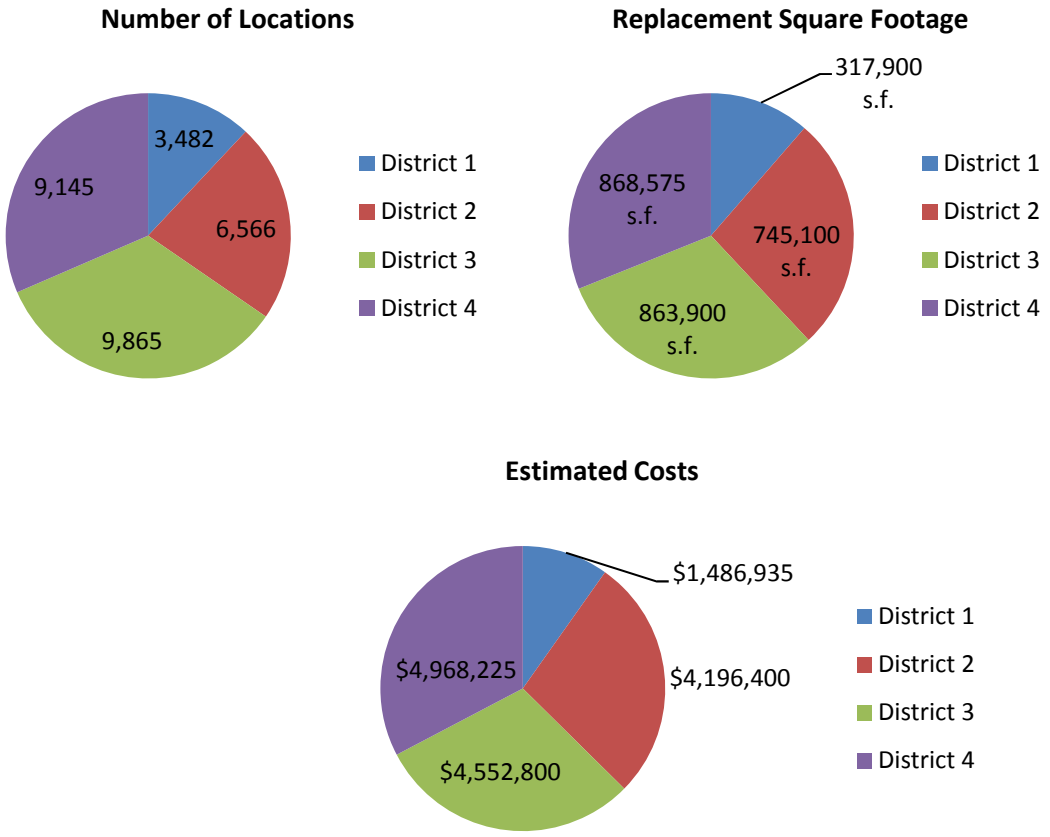

Figure 1.1: Summary of Number of Damage Locations, Replacement Square Footage and Estimated Costs

1.5 Curb Cut Ramps and Detectable Warning

The inspection process included a count of how many sidewalks terminating at intersections either provided or were missing curb cut ramps and of those provided, which ones were missing detectable warnings. A breakdown of curb cut ramps per neighborhood is located in Appendix.

District	Number of Curb Cut Ramps Provided	Number of Curb Cut Ramps Missing	Number of Curb Cut Ramps Provided but without Detectable Warnings
District 1	232	228	4
District 2	806	771	35
District 3	994	992	3
District 4	864	846	18
Grand Total	**2,897**	**2,837**	**60**

Table 1.2: Summary of Curb Cut Ramps by Commissioner District

1.6 Paver and Asphalt Sidewalk Damage

The data yielded from the inspection process includes that for paver and asphalt surfaced sidewalks. As the amount of these types of surfaces in incredibly small compared to the preponderance of concrete sidewalks (less than 1%) and the cost of repair or replacement similar to that of concrete, these damage locations, types and category were included with the same determinations of recommended repairs or replacement cost as that of concrete sidewalk.

SECTION 2

LOCATION OF DAMAGED SIDEWALK

2.0 LOCATION OF DAMAGED SIDEWALK

As previously stated, there is approximately 425 miles of concrete sidewalk with 29,058 damage locations throughout the City. Besides City-wide tabulations of the inspection, repair and cost, the data was grouped within the four City Commission Districts (See Figures 2.1-5) and by neighborhood (see neighborhood maps in the appendix) as they were listed in the provided GIS database.

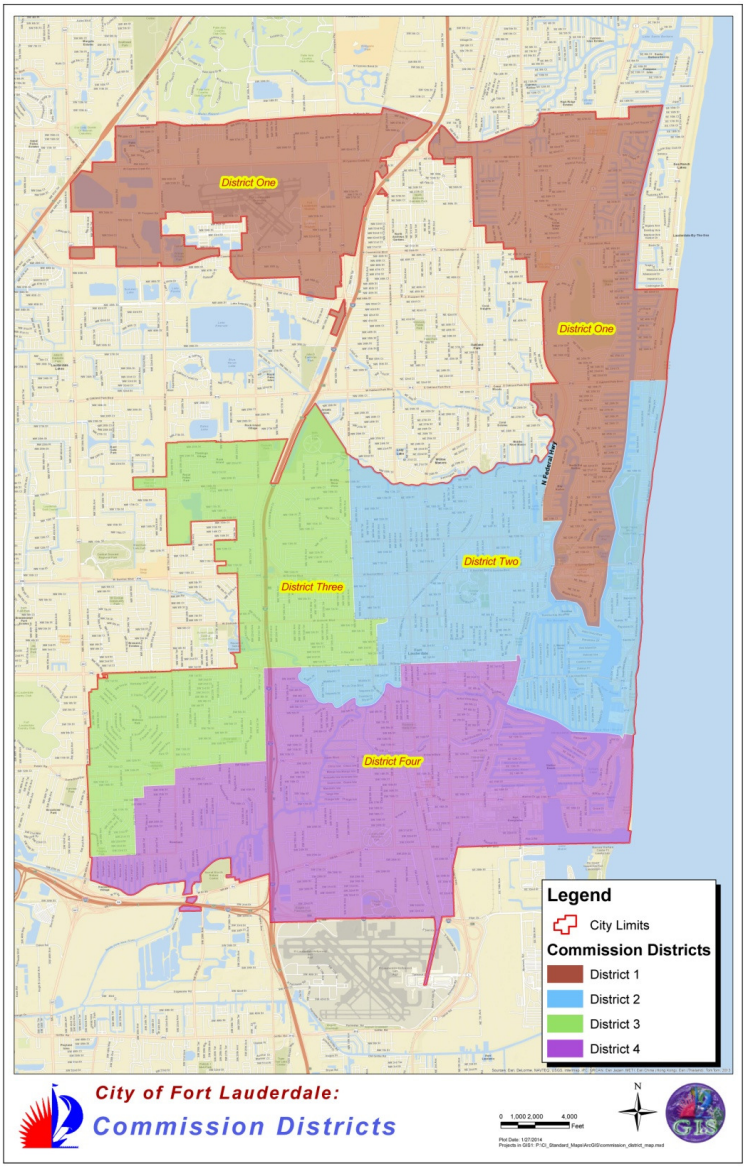

Figure 2.1: Overall Commission District Map

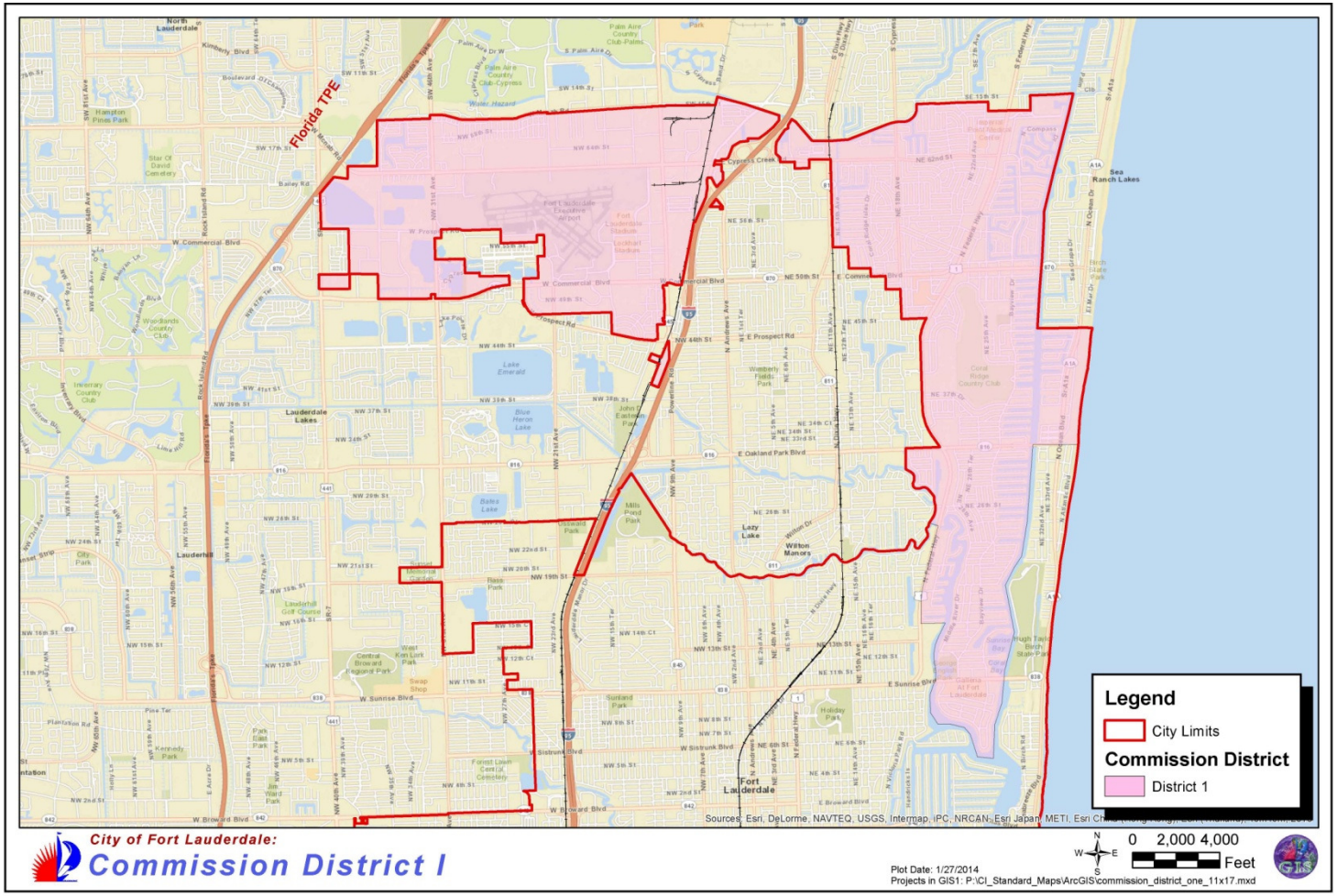

Figure 2.2: Commission District 1 Map

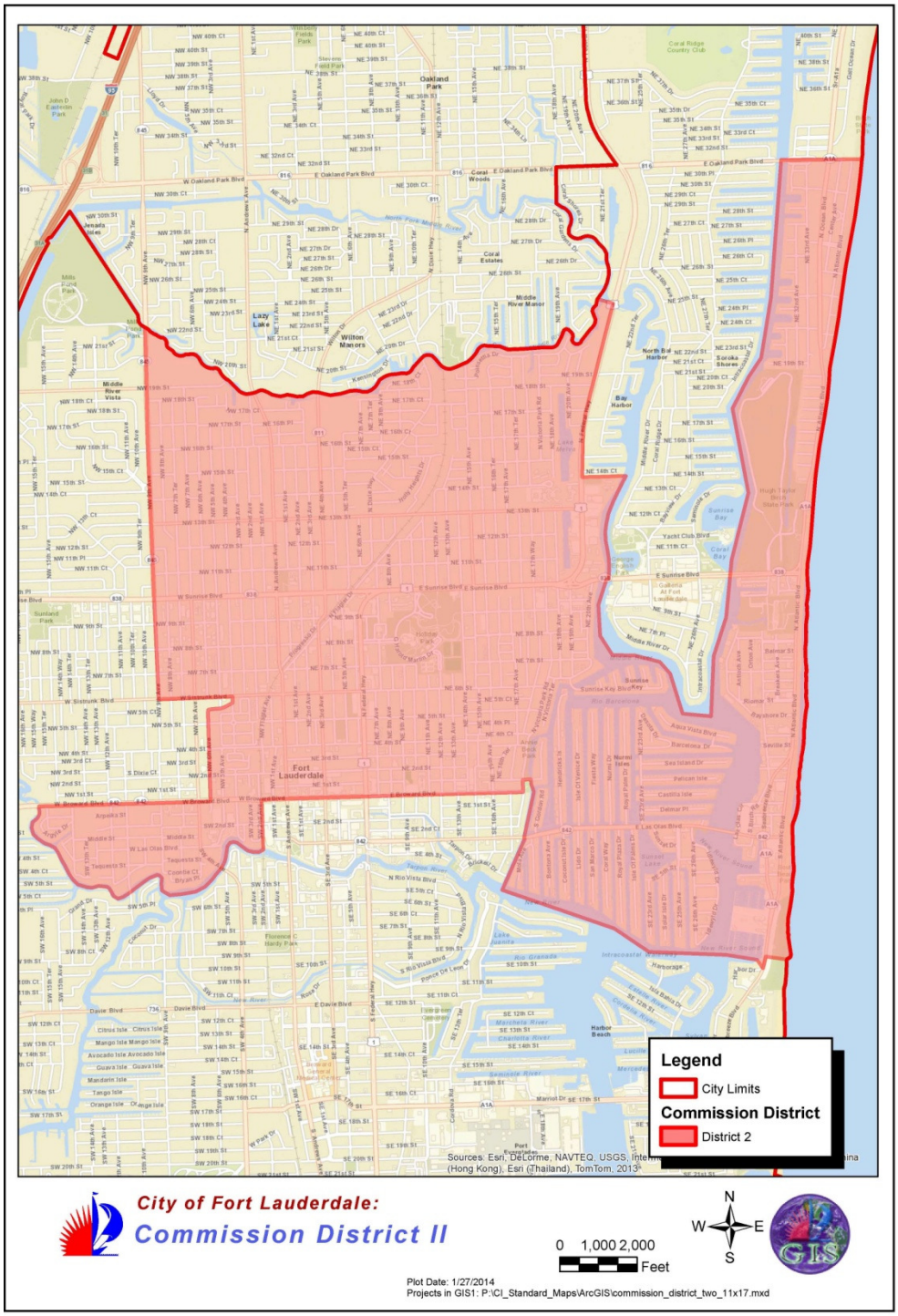

Figure 2.3: Commission District 2 Map

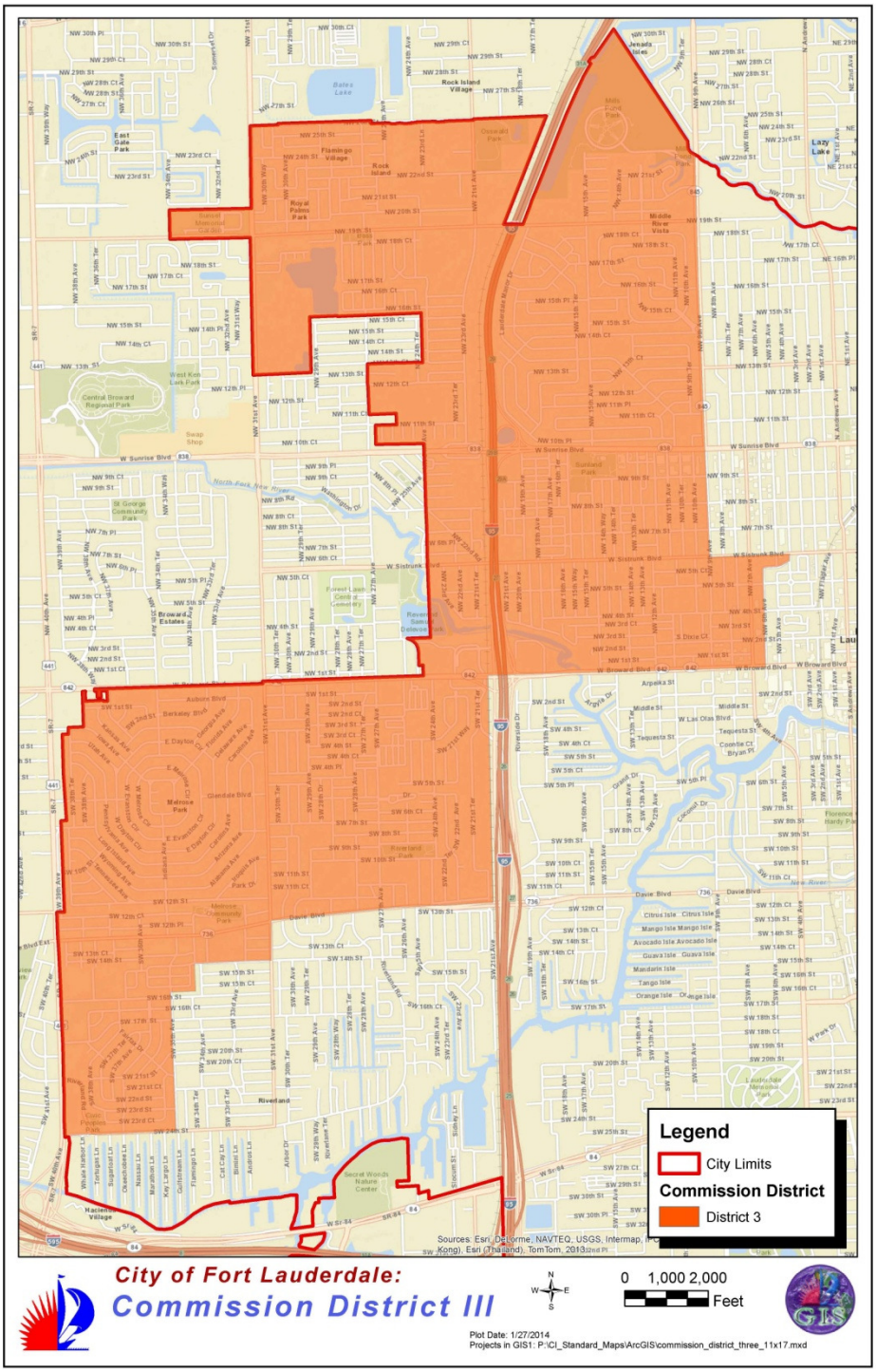

Figure 2.4: Commission District 3 Map

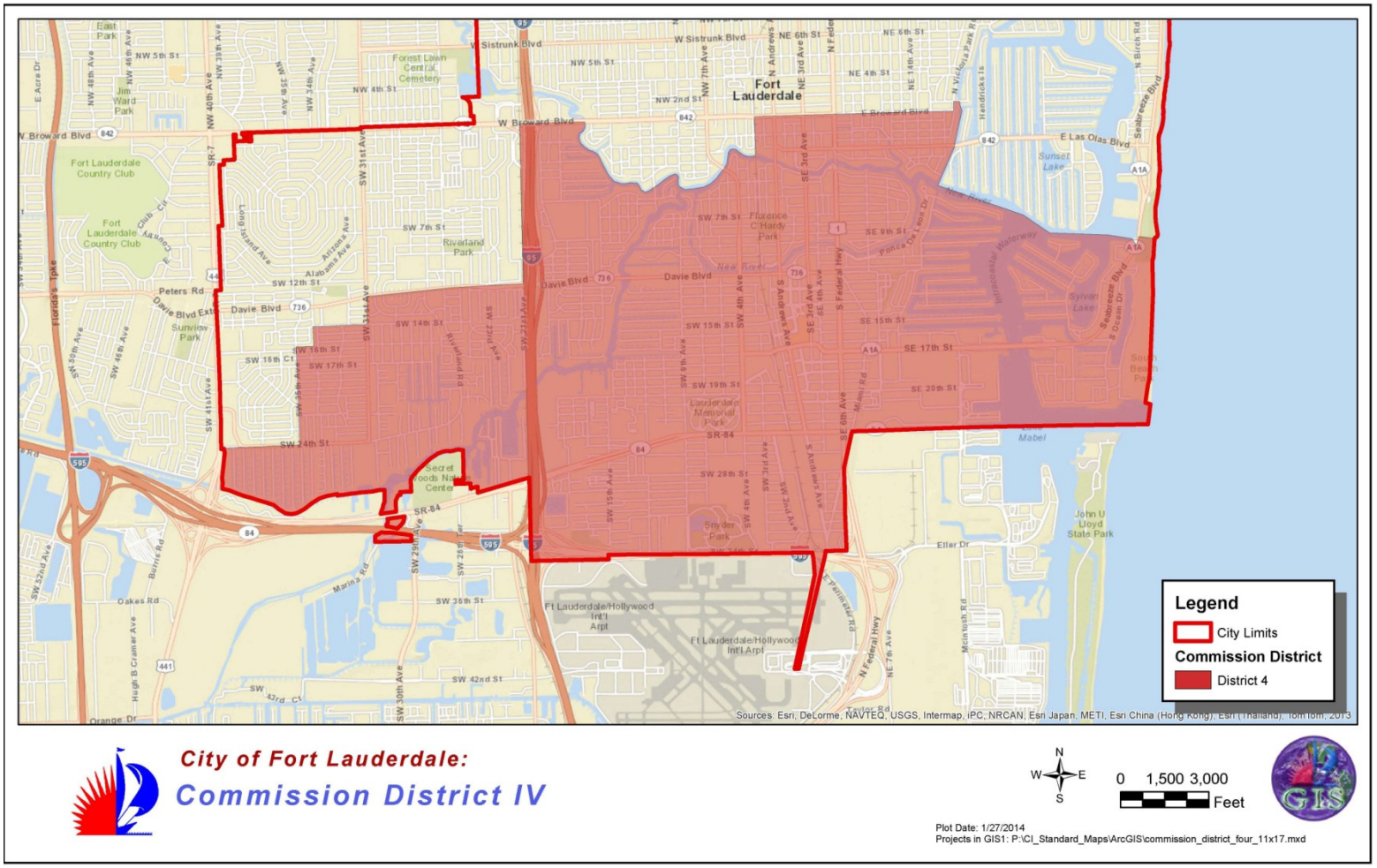

Figure 2.5: Commission District 4 Map

2.1 Location of Damage by Commission District

Table 2.1 and Figure 2.6 show the number of damaged sidewalk locations with each Commission District and City-wide.

District	Number of Damage Locations
District 1	3,482
District 2	6,566
District 3	9,865
District 4	9,145
Grand Total	**29,058**

Table 2.1: Damage Locations by District

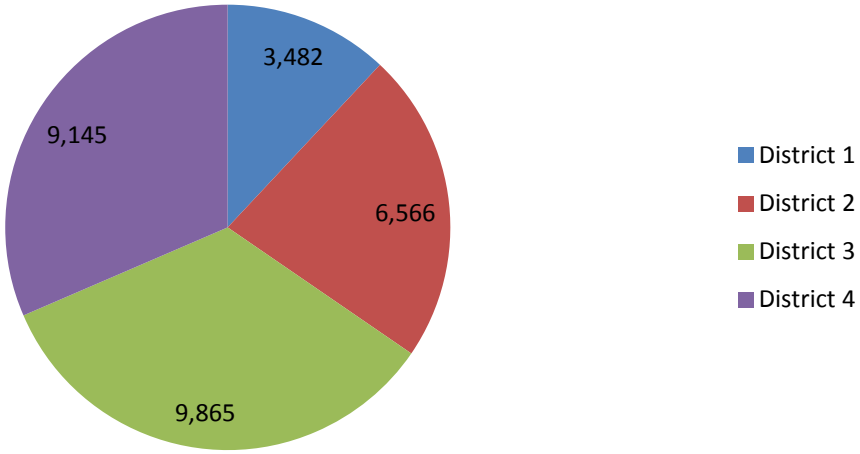

Figure 2.6: Damage Locations by District

2.2 Location of Damage by Neighborhood

Table 2.2 indicates the number of sidewalk damage locations within each Neighborhood in the City. Maps included in the Appendix present where the damage locations are including their category within each neighborhood.

Neighborhood	Number of Damage Locations
Bermuda Riviera Assoc.	11
Beverly Heights	153
Birch Park Finger Sts. Assoc.	91
Boulevard Park Isles HOA	26
Breakwater Surf Homes	11
Central Beach Alliance	1,029
Chula Vista	37
City View Townhomes Assoc.	17
Colee Hammock HOA	234
Coral Ridge Association Inc.	390
Coral Ridge Country Club Estate	147
Coral Ridge Isles Assoc.	307
Croissant Park Civic Assoc.	925
Dillard Park HOA	111
Dorsey-Riverbend HOA	762
Downtown Fort Lauderdale Civic Assoc.	376
Durrs Homeowners Assoc.	85
Edgewood Civic Assoc.	377
Flagler Village Civic Assoc.	571
Flamingo Park Civic Assoc.	547
Galt Mile Community Assoc.	64
Golden Heights Neighborhood	82
Harbor Beach HOA	36
Harbor Drive Assoc.	1
Harbordale Civic Assoc.	403
Harbour Inlet Assoc.	386
Harbour Isles of Fort Lauderdale	12
Hendricks and Venice Isles	63
Home Beautiful Park Civic Assoc.	41
Idlewyld Improvement Assoc.	331
Imperial Point Association	1,626
Knoll Ridge HOA	119
Lake Aire Palm View HOA	477
Lake Ridge Residents Assoc.	243

Neighborhood	Number of Damage Locations
Landings Residential Assoc.	2
Lauderdale Beach HOA	6
Lauderdale Harbours Assoc.	39
Lauderdale Isles	33
Lauderdale Manors HOA	2,937
Lauderdale West Assoc.	24
Melrose Manors HOA	1,096
Melrose Park	1,052
Middle River Terr. Neighbor	384
NH-01	8
NH-04	52
NH-05	102
NH-06	21
NH-08	25
NH-09	42
NH-10	112
NH-11	1
NH-12	328
NH-17	34
NH-18	2
NH-19	16
NH-20	38
NH-21	24
NH-22	240
North Golf Estates HOA	2
Nurmi Isles Homeowners Assoc.	12
Oak River Homeowners Assoc.	29
Palm Aire Village (WEST)	3
Palm-Aire Village HOA (EAST)	395
Poinciana Park Civic Assoc.	1,105
Poinsettia Heights Civic Assoc.	245
Progresso Village	356
Rio Vista Civic Assoc.	757
River garden Sweeting Estate	103
River Oaks Civic Assoc.	1,011
River Run Civic Assoc.	232
Riverland Civic Assoc.	1,011
Riverland Village	552
Riverside Park Residents Assoc.	666
Riviera Isles Improvement Assoc.	27

Neighborhood	Number of Damage Locations
Rock Island Neighborhood Assoc.	160
Sailboat Bend Civic Assoc.	592
Seven Isles Homeowners Assoc.	78
Shady Banks Civic Assoc.	176
South Middle River Civic Assoc.	675
Sunset Civic Assoc.	1,750
Tarpon River Civic Assoc.	531
Twin Lakes North Homeowners Assoc.	31
Victoria Park Civic Assoc.	1,801
NS – Not Specified	49
Grand Total	**29,058**

Table 2.2: Number of Damage Locations by Neighborhood

SECTION 3

CAUSE OR TYPE OF DAMAGE

3.0 CAUSE OR TYPE OF DAMAGE

Table 3.1 lists the 8 different types or causes of sidewalk damage considered and classified for the inspection. Also included in the table and in Figure 3.1 is the number of locations for each cause or type of damage.

The cause or type of damage is an input to the conditions matrix used to determine the outputs of recommended repair or replacement and the estimated cost of repair or replacement for a given location.

Damage Type	Number of Damage Locations
Broken Sidewalk	23,808
Cable Box Separation	10
FPL Box Separation	118
Other Box Separation	260
Owner's Tree Root Damage	1,482
Phone Box Separation	12
Swale Tree Root Damage	1,534
Water Box Separation	1,834
Grand Total	**29,058**

Table 3.1: Number of Damage Locations by Damage Type

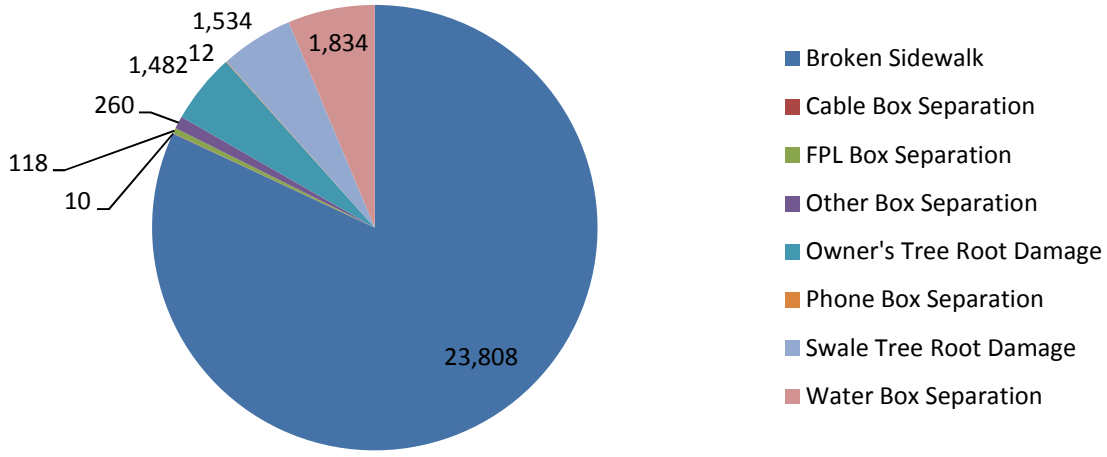

Figure 3.1: Number of Damage Locations by Damage Type

3.1 Cause or Type of Damage by Commission District

Table 3.2 and Figure provides the number of damage locations for each cause or type within each Commission District.

District Number	Number of Damage Locations
District 1	**3,482**
Broken Sidewalk	2,741
Cable Box Separation	2
FPL Box Separation	10
Other Box Separation	85
Owner's Tree Root Damage	122
Phone Box Separation	3
Swale Tree Root Damage	235
Water Box Separation	284
District 2	**6,566**
Broken Sidewalk	5,461
Cable Box Separation	2
FPL Box Separation	31
Other Box Separation	22
Owner's Tree Root Damage	332
Phone Box Separation	2
Swale Tree Root Damage	453
Water Box Separation	263
District 3	**9,865**
Broken Sidewalk	8,006
Cable Box Separation	1
FPL Box Separation	41
Other Box Separation	96
Owner's Tree Root Damage	583
Phone Box Separation	6
Swale Tree Root Damage	462
Water Box Separation	670
District 4	**9,145**
Broken Sidewalk	7,600
Cable Box Separation	5
FPL Box Separation	36
Other Box Separation	57

District Number	Number of Damage Locations
Owner's Tree Root Damage	445
Phone Box Separation	1
Swale Tree Root Damage	384
Water Box Separation	617
Grand Total	**29,058**

Table 3.2: Cause or Type of Damage by District

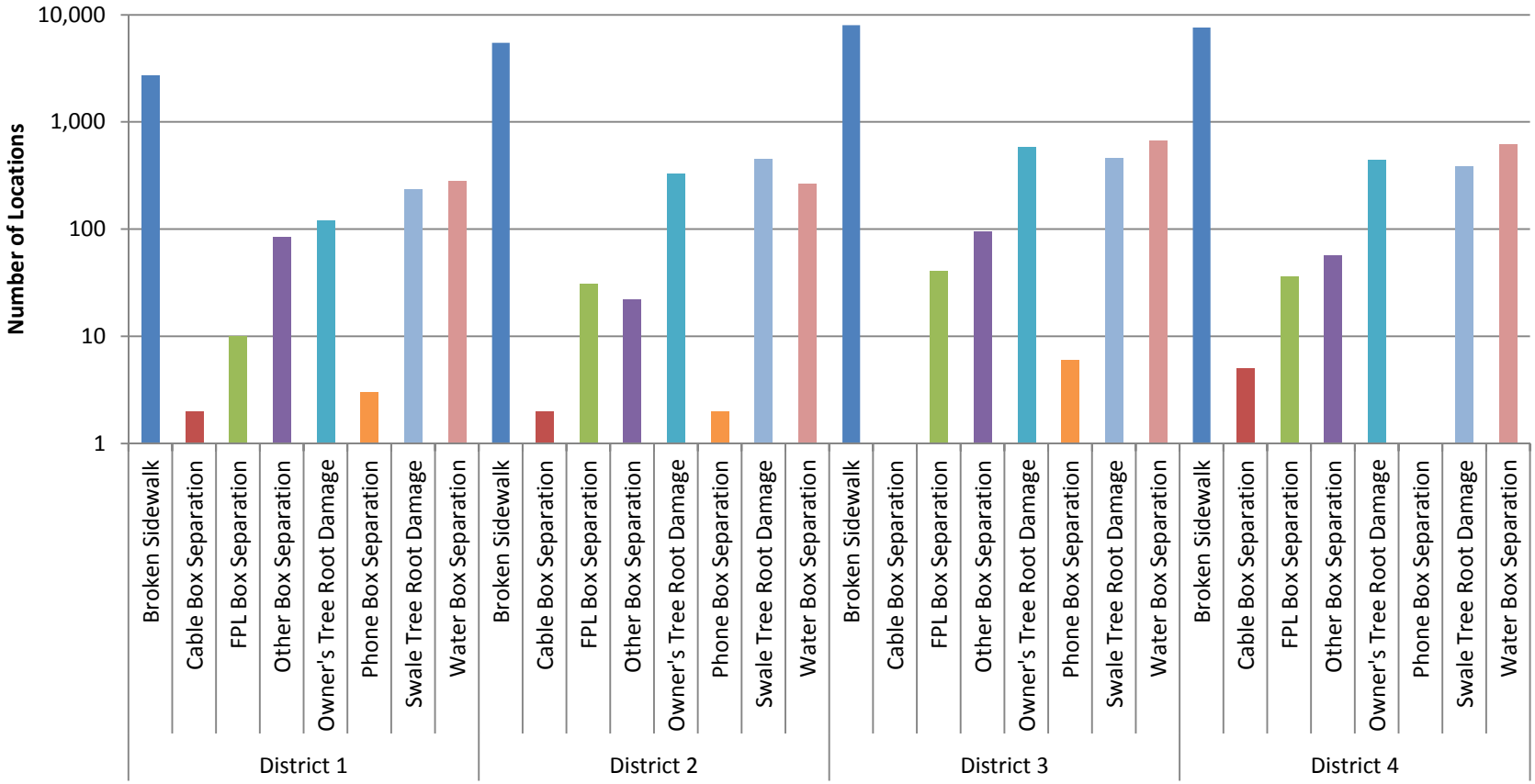

Figure 3.2: Cause of Type of Damage by District

3.2 Cause or Type of Damage by Neighborhood

Table 3.3 lists the number of damage locations for each cause or type within each neighborhood.

Neighborhood	Broken Sidewalk	Cable Box Separation	FPL Box Separation	Other Box Separation	Owner's Tree Root Damage	Phone Box Separation	Swale Tree Root Damage	Water Box Separation	Grand Total
Bermuda Riviera Assoc.	8						3		11
Beverly Heights	119		3	1	3	1		26	153
Birch Park Finger Sts. Assoc.	91								91
Boulevard Park Isles HOA	21			5					26
Breakwater Surf Homes	11								11
Central Beach Alliance	1,029								1,029
Chula Vista	30							7	37
City View Townhomes Assoc.	12				2		2	1	17
Colee Hammock HOA	166			7	32		11	18	234
Coral Ridge Association Inc.	390								390
Coral Ridge Country Club Estate	115	1	1	3	8		13	6	147
Coral Ridge Isles Assoc.	207			29	24		22	25	307
Croissant Park Civic Assoc.	763		2		50		83	27	925
Dillard Park HOA	91				18		1	1	111
Dorsey-Riverbend HOA	497		26	18	44	3	77	97	762
Downtown Fort Lauderdale Civic Assoc.	317	2	2	26	8		3	18	376
Durrs Homeowners Assoc.	56		6	4	6		2	11	85
Edgewood Civic Assoc.	301			19	23		14	20	377
Flagler Village Civic Assoc.	444	2		3	53		34	35	571
Flamingo Park Civic Assoc.	481				24		15	27	547
Galt Mile Community Assoc.	44	1	2	10	3	1	1	2	64
Golden Heights Neighborhood	73						1	8	82

Neighborhood	Broken Sidewalk	Cable Box Separation	FPL Box Separation	Other Box Separation	Owner's Tree Root Damage	Phone Box Separation	Swale Tree Root Damage	Water Box Separation	Grand Total
Harbor Beach HOA	36								36
Harbor Drive Assoc.	1								1
Harbordale Civic Assoc.	293	1	4	1	48		12	44	403
Harbour Inlet Assoc.	386								386
Harbour Isles of Fort Lauderdale	12								12
Hendricks and Venice Isles	63								63
Home Beautiful Park Civic Assoc.	32		1	2				6	41
Idlewyld Improvement Assoc.	331								331
Imperial Point Association	1,279		5	8	41		112	181	1,626
Knoll Ridge HOA	84			10	5		12	8	119
Lake Aire Palm View HOA	358				30		38	51	477
Lake Ridge Residents Assoc.	240				1		2		243
Landings Residential Assoc.	1				1				2
Lauderdale Beach HOA	6								6
Lauderdale Harbours Assoc.	39								39
Lauderdale Isles	25				1		1	6	33
Lauderdale Manors HOA	2,305		5		334		153	140	2,937
Lauderdale West Assoc.	20							4	24
Melrose Manors HOA	985			13	21	2	23	52	1,096
Melrose Park	775			59	25		55	138	1,052
Middle River Terr. Neighbor	384								384
NH-01	8								8
NH-04	52								52
NH-05	100			1				1	102
NH-06	21								21
NH-08	17				6			2	25
NH-09	41							1	42
NH-10	67				37		2	6	112
NH-11							1		1

Neighborhood	Broken Sidewalk	Cable Box Separation	FPL Box Separation	Other Box Separation	Owner's Tree Root Damage	Phone Box Separation	Swale Tree Root Damage	Water Box Separation	Grand Total
NH-12	293	1	1		9		9	15	328
NH-17	26			4	3		1		34
NH-18	2								2
NH-19	10				1		5		16
NH-20	38								38
NH-21	17			2			4	1	24
NH-22	181		2	13	15	2	10	17	240
North Golf Estates HOA	2								2
Nurmi Isles Homeowners Assoc.	12								12
Oak River Homeowners Assoc.	25				2			2	29
Palm Aire Village (WEST)	1			1	1				3
Palm-Aire Village HOA (EAST)	288				18		52	37	395
Poinciana Park Civic Assoc.	1,103						1	1	1,105
Poinsettia Heights Civic Assoc.	176		1	12	4		31	21	245
Progresso Village	262				44		23	27	356
Rio Vista Civic Assoc.	529		1	1	42		94	90	757
River garden Sweeting Estate	68				9		15	11	103
River Oaks Civic Assoc.	847	1	1	1	49		61	51	1,011
River Run Civic Assoc.	214				2		2	14	232
Riverland Civic Assoc.	920	1			21	1	40	28	1,011
Riverland Village	356				28		5	163	552
Riverside Park Residents Assoc.	524		20		42		29	51	666
Riviera Isles Improvement Assoc.	27								27
Rock Island Neighborhood Assoc.	99		2		3		5	51	160
Sailboat Bend Civic Assoc.	461		24	5	12		22	68	592

Neighborhood	Broken Sidewalk	Cable Box Separation	FPL Box Separation	Other Box Separation	Owner's Tree Root Damage	Phone Box Separation	Swale Tree Root Damage	Water Box Separation	Grand Total
Seven Isles Homeowners Assoc.	78								78
Shady Banks Civic Assoc.	148				11		13	4	176
South Middle River Civic Assoc.	675								675
Sunset Civic Assoc.	1,603		1		29		52	65	1,750
Tarpon River Civic Assoc.	413		1		62		28	27	531
Twin Lakes North Homeowners Assoc.	22				2			7	31
Victoria Park Civic Assoc.	1,116		6	2	225	2	339	111	1,801
N/S – Not Specified	45		1					3	49
Grand Total	**23,808**	**10**	**118**	**260**	**1,482**	**12**	**1,534**	**1,834**	**29,058**

Table 3.3: Cause or Type of Damage by HOA

SECTION 4

CATEGORY OF DAMAGE

4.0 CATEGORY OF DAMAGE

Table 4.1 lists the 5 categories of sidewalk damage considered and classified for the inspection. Also included in the table and in Figure 4.1 is the number of locations for each category of damage.

The category of damage is an input to the conditions matrix used to determine the outputs for recommended repairs and for estimated cost of repairs or replacement for a given location.

The following category types are used for the sidewalk damage assessment:

- **Category Type 1.** Large vertical displacement: panel is not flushed with adjacent panels and shows a vertical displacement that is estimated to exceed 1/4". Underside of panel may be visible in some instances.
- **Category Type 2.** Wide sidewalk cracks: cracks running across the surface that are estimated to exceed 1/8" in width.
- **Category Type 3.** Small vertical displacement: panel not flushed with adjacent panels and shows a vertical displacement that is estimated to be less than or equal to 1/4".
- **Category Type 4.** Surface Defects – Sidewalks showing general surface deterioration such as excessive spalling or cracking.
- **Category Type 5.** Narrow sidewalk cracks: cracks running across the surface that are estimated to be less than or equal to 1/8"in width.

These categories were established by the City and Atkins and used on a qualitative basis by the field data collection team. Damage locations were categorized based on estimations of displacement as determined thru visual inspections rather than physical measurements. It is possible that several locations may deviate from the general damage criteria listed above; furthermore, the conditions observed during the inspection may change over time and consequently the City may need to perform additional inspections at the time of repair to validate that the conditions have not significantly changed.

Category Type	Number of Damage Locations
1 - Large vertical displacement	1,399
2 - Wide cracks	12,284
3 - Small vertical displacement	8,445
4 - Surface defects	997
5 - Narrow cracks	5,933
Grand Total	**29,058**

Table 4.1: Types of Category of Damage - City Wide

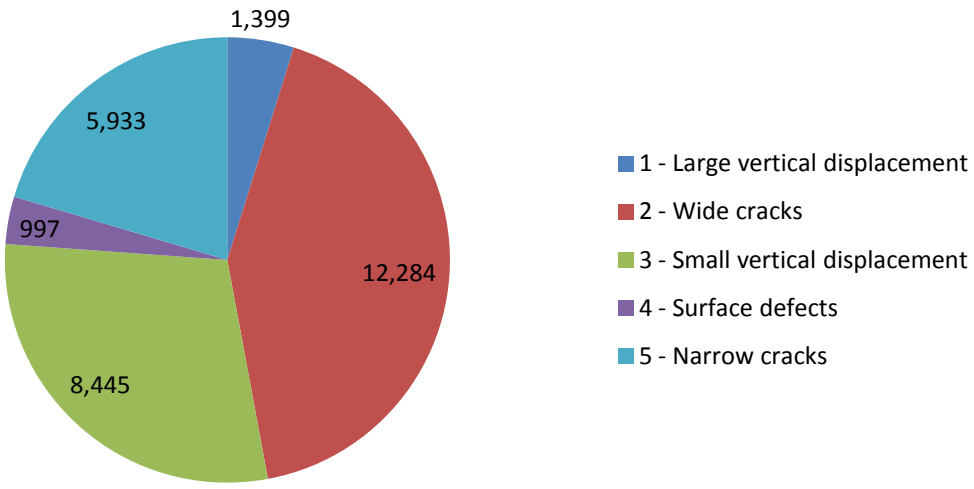

Figure 4.1: Category of Damage - City Wide

4.1 Category of Damage by Commissioner District

Table 4.2 and Figure 4.2 provide the number of damage locations for each category of damage within each Commission District.

District Number	Number of Damage Locations
District 1	**3,482**
1 - Large vertical displacement	130
2 - Wide cracks	878
3 - Small vertical displacement	733
4 - Surface defects	48
5 - Narrow cracks	1,693
District 2	**6,566**
1 - Large vertical displacement	278
2 - Wide cracks	3,685
3 - Small vertical displacement	2,100
4 - Surface defects	173
5 - Narrow cracks	330
District 3	**9,865**
1 - Large vertical displacement	401
2 - Wide cracks	3,484
3 - Small vertical displacement	2,978
4 - Surface defects	464
5 - Narrow cracks	2,538
District 4	**9,145**
1 - Large vertical displacement	590
2 - Wide cracks	4,237
3 - Small vertical displacement	2,634
4 - Surface defects	312
5 - Narrow cracks	1,372
Grand Total	**29,058**

Table 4.2: Category of Damage by District

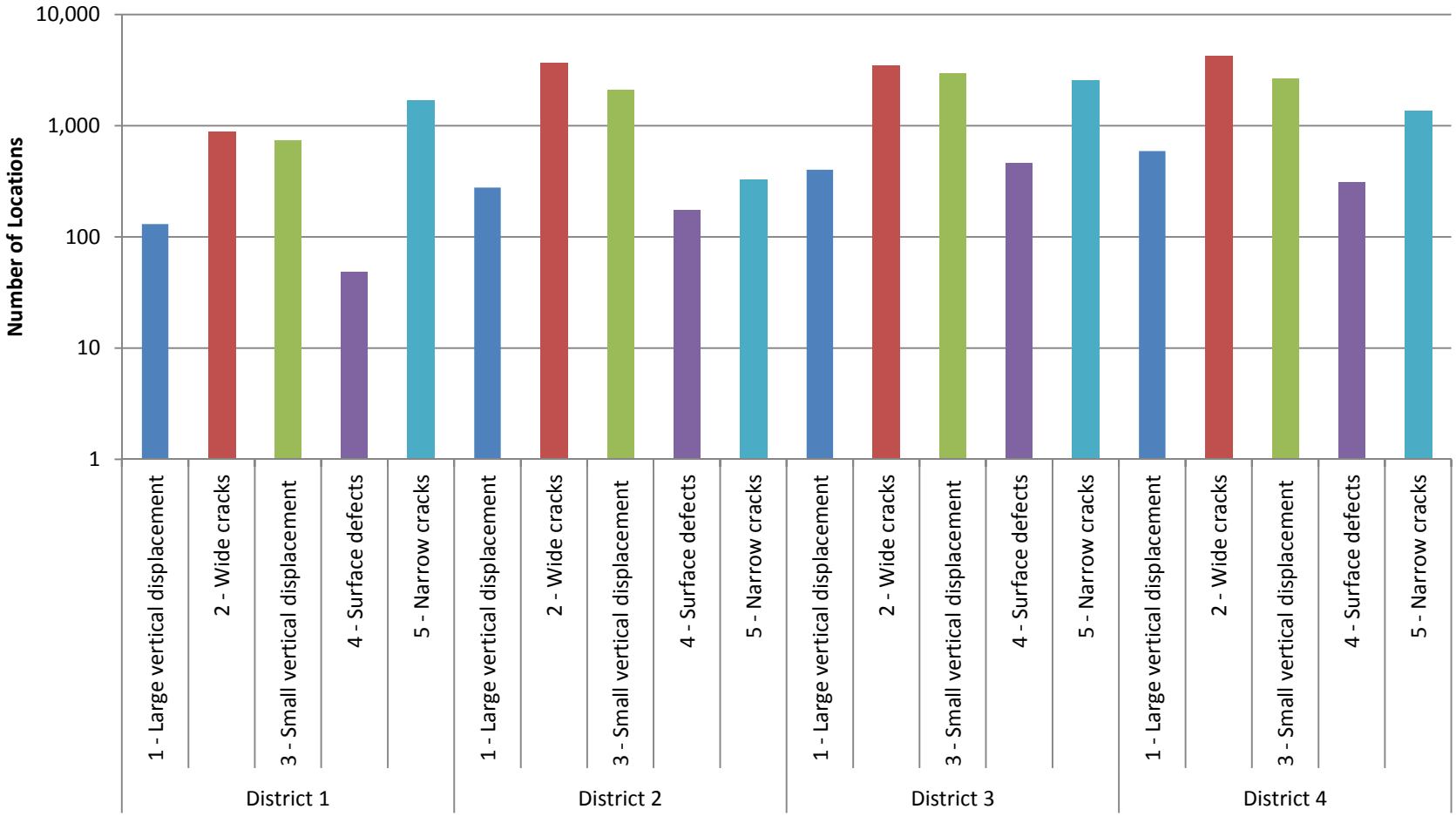

Figure 4.2: Category of Damage by District

4.2 Category of Damage by Neighborhood

Table 4.3 provides the number of damage locations for each category of damage within each Neighborhood.

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
District 1						
Bermuda Riviera Assoc.			2		9	11
Boulevard Park Isles HOA		19	3		4	26
Coral Ridge Association Inc.	18	251	107		14	390
Coral Ridge Country Club Estate	2	18	23	1	103	147
Coral Ridge Isles Assoc.	11	66	62	3	165	307
Galt Mile Community Assoc.		8	4	1	51	64
Imperial Point Association	69	270	322	19	946	1,626
Knoll Ridge HOA	14	64	18		23	119
Landings Residential Assoc.		1			1	2
NH-17	1	11	11		11	34
NH-18		1			1	2
NH-19		3	8		5	16
NH-20	2	29	6		1	38
NH-21		1	7		16	24
NH-22	8	57	46	13	116	240
North Golf Estates HOA		1			1	2
Palm Aire Village (WEST)	1	2				3
Palm-Aire Village HOA (EAST)	4	72	109	11	199	395
Twin Lakes North Homeowners Assoc.		2	3		26	31
N/S - Not Specified		2	2		1	5
District 1 Total	**130**	**878**	**733**	**48**	**1,693**	**3,482**
District 2						
Birch Park Finger Sts. Assoc.	1	74	9		7	91
Central Beach Alliance	23	753	206		47	1,029
City View Townhomes Assoc.		6	9		2	17
Flagler Village Civic Assoc.	15	287	201	30	38	571
Hendricks and Venice Isles	2	40	18		3	63
Idlewyld Improvement Assoc.	22	160	131		18	331
Lake Ridge Residents Assoc.	8	161	57		17	243
Lauderdale Beach HOA	1	2	3			6

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
Middle River Terr. Neighbor	19	242	113		10	384
NH-04		38	10		4	52
Nurmi Isles Homeowners Assoc.		9			3	12
Poinsettia Heights Civic Assoc.	40	120	62	1	22	245
Progresso Village	12	155	126	22	27	342
Riviera Isles Improvement Assoc.	1	15	10		1	27
Sailboat Bend Civic Assoc.	13	338	195	20	26	592
Seven Isles Homeowners Assoc.	1	56	7		14	78
South Middle River Civic Assoc.	64	402	186		23	675
Victoria Park Civic Assoc.	56	818	756	100	68	1,798
N/S - Not Specified		9	1			10
District 2 Total	**278**	**3,685**	**2,100**	**173**	**330**	**6,566**
District 3						
Dillard Park HOA	19	19	71	2		111
Dorsey-Riverbend HOA	26	97	122	25	492	762
Durrs Homeowners Assoc.	1	12	11	1	60	85
Golden Heights Neighborhood	5	25	36	12	4	82
Home Beautiful Park Civic Assoc.		7	3		31	41
Lake Aire Palm View HOA	13	185	250	15	14	477
Lauderdale Manors HOA	251	1,163	1,315	167	41	2,937
Lauderdale West Assoc.	1	15	5	3		24
Melrose Manors HOA	16	253	165	30	632	1,096
Melrose Park	4	98	209	42	699	1,052
NH-09		24	10	1	7	42
NH-10	3	29	76		4	112
NH-11		1				1
Progresso Village		3	9		2	14
River garden Sweeting Estate		70	29		4	103
Riverland Civic Assoc.	17	438	192	44	320	1,011
Rock Island Neighborhood Assoc.	1	32	18		109	160
Sunset Civic Assoc.	44	1,004	452	122	112	1,734
N/S - Not Specified		9	5		7	21
District 3 Total	**401**	**3,484**	**2,978**	**464**	**2,538**	**9,865**
District 4						
Beverly Heights	5	99	8	7	34	153
Breakwater Surf Homes		9	1		1	11
Chula Vista		16	13	2	6	37

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
Colee Hammock HOA	18	154	21	1	40	234
Croissant Park Civic Assoc.	103	368	326	60	68	925
Downtown Fort Lauderdale Civic Assoc.	38	113	103	6	116	376
Edgewood Civic Assoc.	50	263	39	2	23	377
Flamingo Park Civic Assoc.	16	212	136	16	167	547
Harbor Beach HOA		22	13		1	36
Harbor Drive Assoc.					1	1
Harbordale Civic Assoc.	17	179	141	26	40	403
Harbour Inlet Assoc.	34	221	118		13	386
Harbour Isles of Fort Lauderdale		8	4			12
Lauderdale Harbours Assoc.	3	21	13		2	39
Lauderdale Isles	1	16	8		8	33
NH-01		6			2	8
NH-05	2	59	17	2	22	102
NH-06		17	4			21
NH-08	3	11	7		4	25
NH-12	8	142	124	11	43	328
Oak River Homeowners Assoc.		10	14	4	1	29
Poinciana Park Civic Assoc.	68	698	269		70	1,105
Rio Vista Civic Assoc.	37	289	171	33	227	757
River Oaks Civic Assoc.	72	337	279	51	272	1,011
River Run Civic Assoc.	9	96	90	12	25	232
Riverland Village	10	232	181	8	121	552
Riverside Park Residents Assoc.	53	366	202	29	16	666
Shady Banks Civic Assoc.	14	52	76	18	16	176
Sunset Civic Assoc.		9	7			16
Tarpon River Civic Assoc.	29	202	244	23	33	531
Victoria Park Civic Assoc.		1	2			3
N/S - Not Specified		9	3	1		13
District 4 Total	**590**	**4,237**	**2,634**	**312**	**1,372**	**9,145**
Grand Total	**1,399**	**12,284**	**8,445**	**997**	**5,933**	**29,058**

Table 4.3: Type of Category of Damage by HOA

* See Table 4.2 for definition of Category

SECTION 5

TYPE OF REPAIRS REQUIRED

5.0 TYPE OF REPAIRS REQUIRED

Four alternatives have been considered for addressing damaged sidewalk for this project. Those alternatives are:

1. No repair with periodic inspections. This would be in areas where only hairline cracks have occurred.
2. Full panel replacement with use of existing base material.
3. Full panel and base replacement. Base material would be of a type that discourages or prevents root growth closely under the sidewalk.
4. Mechanical grinding down of sidewalk at joints and crack locations where only small vertical displacements have occurred.

Table 5.1 is a matrix that matches up each of the different types or causes of damage with each of the different levels of category of damage to yields one of the four alternatives as a recommended repair.

For damaged areas with narrow cracks it has been assumed that up to one half of those damaged areas may develop larger cracks that will necessitate replacement over the course of a 5-year period.

Category	Narrow Cracks	Wide Cracks	Small Vertical Displacements	Large Vertical Displacements	Surface Defects
Damage Type	**Recommended Repair**				
Swale or Tree Root Damage	50% No Repairs/50% Future Repair	Full Panel Replacement w/Alt Base	Grinding	Full Panel Replacement w/Alt Base	Full Panel Replacement w/Alt Base
Broken Sidewalk	50% No Repairs/50% Future Repair	Full Panel Replacement	Grinding	Full Panel Replacement	Full Panel Replacement
Grade separation for any type of utility box	50% No Repairs/50% Future Repair	Full Panel Replacement	Grinding	Full Panel Replacement	Full Panel Replacement

Table 5.1: Determination of Recommended Repairs

Table 5.2 presents the number of locations for each given recommended repair City-wide.

Recommended Repairs	Number of Damage Locations
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	5,933
Full Concrete Panel Replacement to Nearest Joint	13,529
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	1,151
Grinding Down Separation	8,445
Grand Total	**29,058**

Table 5.2: Types of Repairs Required - City Wide

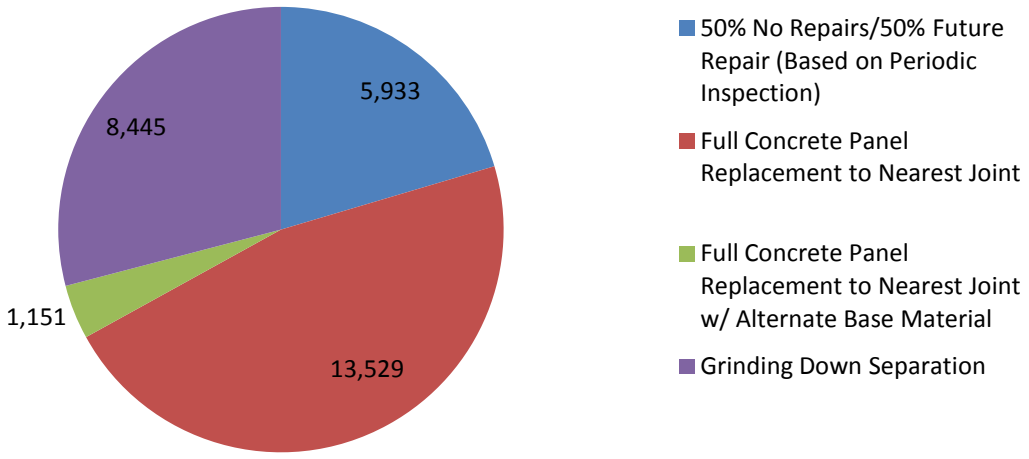

Figure 5.1: Types of Repairs Required - City Wide

5.1 Recommend Repairs by Commission District

Table 5.3 and Figure 5.2 presents the number of locations for each given recommended repair within each Commission District.

Recommended Repair	Number of Damage Locations
District 1	
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	1,693
Full Concrete Panel Replacement to Nearest Joint	975
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	81
Grinding Down Separation	733
District 1 Total	**3,482**
District 2	
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	330
Full Concrete Panel Replacement to Nearest Joint	3,796
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	340
Grinding Down Separation	2,100
District 2 Total	**6,566**
District 3	
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	2,538
Full Concrete Panel Replacement to Nearest Joint	3,974
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	375
Grinding Down Separation	2,978
District 3 Total	**9,865**
District 4	
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	1,372
Full Concrete Panel Replacement to Nearest Joint	4,784
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	355
Grinding Down Separation	2,634
District 4 Total	**9,145**
Grand Total	**29,058**

Table 5.3: Recommended Repairs by Commission District

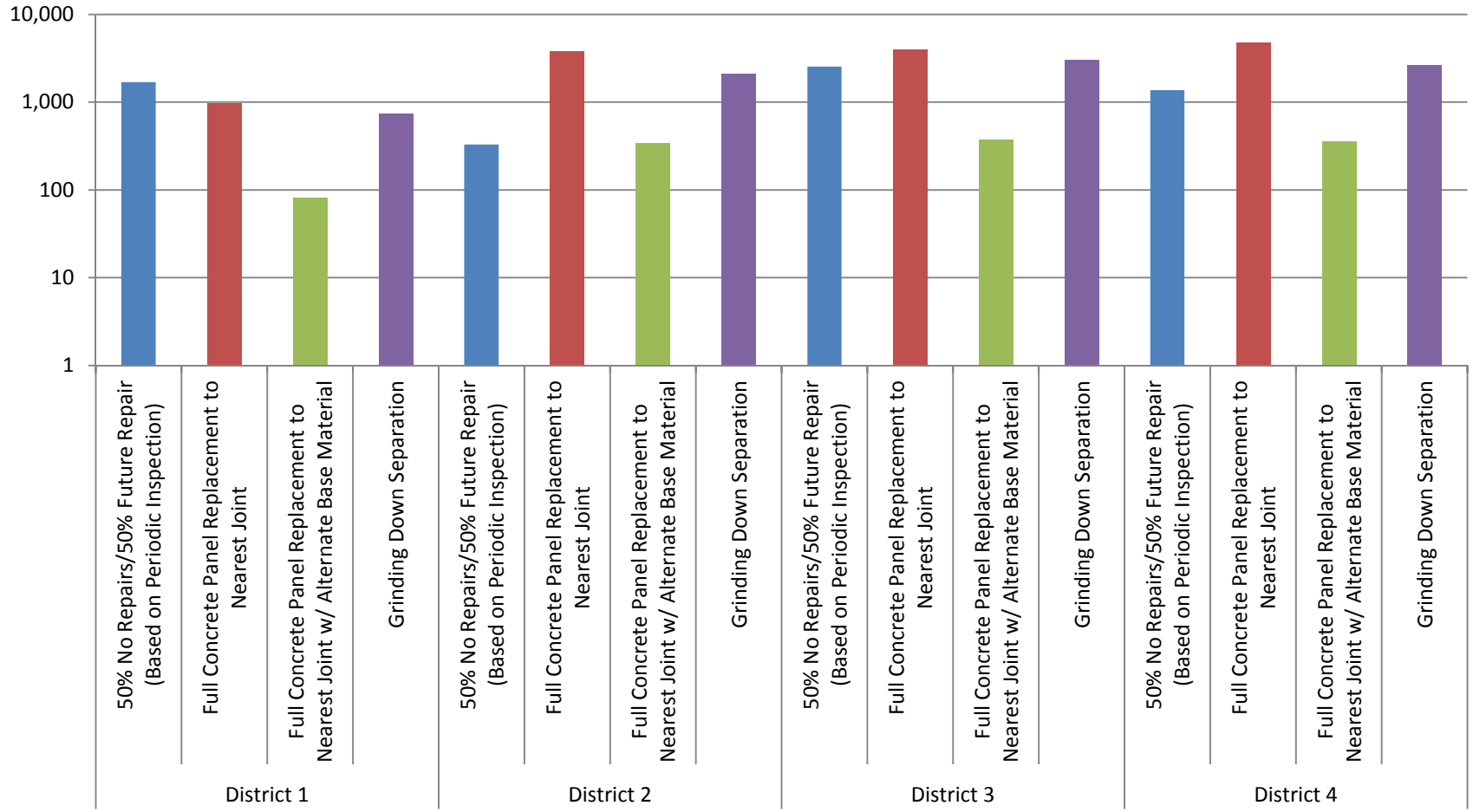

Figure 5.2: Recommended Repairs by District

5.2 Recommend Repairs by Neighborhood

Table 5.5 presents the number of locations for each given recommended repair within each neighborhood.

Recommended Repairs				
Neighborhood	**50% No Repairs/50% Future Repair (Based on Periodic Inspection)**	**Full Concrete Panel Replacement to Nearest Joint**	**Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material**	**Grinding Down Separation**
District 1				
Bermuda Riviera Assoc.	9			2
Boulevard Park Isles HOA	4	19		3
Coral Ridge Association Inc.	14	269		107
Coral Ridge Country Club Estate	103	19	2	23
Coral Ridge Isles Assoc.	165	74	6	62
Galt Mile Community Assoc.	51	8	1	4
Imperial Point Association	946	320	38	322
Knoll Ridge HOA	23	66	12	18
Landings Residential Assoc.	1		1	
NH-17	11	10	2	11
NH-18	1	1		
NH-19	5	3		8
NH-20	1	31		6
NH-21	16	1		7
NH-22	116	70	8	46
North Golf Estates HOA	1	1		
Palm Aire Village (WEST)		2	1	
Palm-Aire Village HOA (EAST)	199	77	10	109

Recommended Repairs				
Neighborhood	**50% No Repairs/50% Future Repair (Based on Periodic Inspection)**	**Full Concrete Panel Replacement to Nearest Joint**	**Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material**	**Grinding Down Separation**
Twin Lakes North Homeowners Assoc.	26	2		3
N/S – Not Specified	1	2		2
District 1 Total	**1,693**	**975**	**81**	**733**
District 2				
Birch Park Finger Sts. Assoc.	7	75		9
Central Beach Alliance	47	776		206
City View Townhomes Assoc.	2	6		9
Flagler Village Civic Assoc.	38	291	41	201
Hendricks and Venice Isles	3	42		18
Idlewyld Improvement Assoc.	18	182		131
Lake Ridge Residents Assoc.	17	167	2	57
Lauderdale Beach HOA		3		3
Middle River Terr. Neighbor	10	261		113
NH-04	4	38		10
Nurmi Isles Homeowners Assoc.	3	9		
Poinsettia Heights Civic Assoc.	22	134	27	62
Progresso Village	27	170	19	126
Riviera Isles Improvement Assoc.	1	16		10
Sailboat Bend Civic Assoc.	26	347	24	195
Seven Isles Homeowners Assoc.	14	57		7
South Middle River Civic	23	466		186

Recommended Repairs				
Neighborhood	**50% No Repairs/50% Future Repair (Based on Periodic Inspection)**	**Full Concrete Panel Replacement to Nearest Joint**	**Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material**	**Grinding Down Separation**
Assoc.				
Victoria Park Civic Assoc.	68	747	227	756
N/S – Not Specified		9		1
District 2 Total	**330**	**3,796**	**340**	**2,100**
District 3				
Dillard Park HOA		36	4	71
Dorsey-Riverbend HOA	492	136	12	122
Durrs Homeowners Assoc.	60	13	1	11
Golden Heights Neighborhood	4	41	1	36
Home Beautiful Park Civic Assoc.	31	7		3
Lake Aire Palm View HOA	14	197	16	250
Lauderdale Manors HOA	41	1,375	206	1,315
Lauderdale West Assoc.		19		5
Melrose Manors HOA	632	285	14	165
Melrose Park	699	135	9	209
NH-09	7	25		10
NH-10	4	26	6	76
NH-11			1	
Progresso Village	2	3		9
River garden Sweeting Estate	4	62	8	29
Riverland Civic Assoc.	320	457	42	192
Rock Island Neighborhood Assoc.	109	33		18
Sunset Civic Assoc.	112	1,115	55	452
N/S – Not Specified	7	9		5
District 3 Total	**2,538**	**3,974**	**375**	**2,978**

Recommended Repairs				
Neighborhood	**50% No Repairs/50% Future Repair (Based on Periodic Inspection)**	**Full Concrete Panel Replacement to Nearest Joint**	**Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material**	**Grinding Down Separation**
District 4				
Beverly Heights	34	108	3	8
Breakwater Surf Homes	1	9		1
Chula Vista	6	18		13
Colee Hammock HOA	40	147	26	21
Croissant Park Civic Assoc.	68	465	66	326
Downtown Fort Lauderdale Civic Assoc.	116	156	1	103
Edgewood Civic Assoc.	23	291	24	39
Flamingo Park Civic Assoc.	167	227	17	136
Harbor Beach HOA	1	22		13
Harbor Drive Assoc.	1			
Harbordale Civic Assoc.	40	202	20	141
Harbour Inlet Assoc.	13	255		118
Harbour Isles of Fort Lauderdale		8		4
Lauderdale Harbours Assoc.	2	24		13
Lauderdale Isles	8	15	2	8
NH-01	2	6		
NH-05	22	63		17
NH-06		17		4
NH-08	4	13	1	7
NH-12	43	148	13	124
Oak River Homeowners Assoc.	1	12	2	14
Poinciana Park Civic Assoc.	70	765	1	269
Rio Vista Civic Assoc.	227	336	23	171
River Oaks Civic Assoc.	272	408	52	279
River Run Civic Assoc.	25	113	4	90
Riverland Village	121	229	21	181

Recommended Repairs				
Neighborhood	**50% No Repairs/50% Future Repair (Based on Periodic Inspection)**	**Full Concrete Panel Replacement to Nearest Joint**	**Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material**	**Grinding Down Separation**
Riverside Park Residents Assoc.	16	412	36	202
Shady Banks Civic Assoc.	16	66	18	76
Sunset Civic Assoc.		6	3	7
Tarpon River Civic Assoc.	33	232	22	244
Victoria Park Civic Assoc.		1		2
N/S – Not Specified		10		3
District 4 Total	**1,372**	**4,784**	**355**	**2,634**
Grand Total	**5,933**	**13,529**	**1,151**	**8,445**

Table 5.4: Types of Repairs by Neighborhood

SECTION 6

APPROXIMATE SQUARE FOOTAGE OF SIDEWALK REPAIR OR REPLACEMENT

6.0 APPROXIMATE SQUARE FOOTAGE OF SIDEWALK REPAIR OR REPLACEMENT

Square footages were determined by field measurements of the linear footage of damage to a given area of sidewalk then multiplied times the typical width of 5 feet common throughout the City of Ft. Lauderdale. As most repairs involve the replacement of full 5'-feet long by 5-foot wide panels. The measured areas of damaged sidewalk were rounded up to the nearest multiple of 25 square feet and are referred to as replacement square footage or area.

The replacement square footages or areas will be one the inputs for the cost matrix that will be used to determine the costs of repair (or replacement).

Table 6.1 and Figure 6.1 show the approximate sidewalk repair or replacement square footages by type or cause, category City-wide.

Damage Type	Category Type				
	1	2	3	4	5
Broken Sidewalk	180,200 s.f.	1,083,750 s.f.	624,475 s.f.	130,825 s.f.	317,450 s.f.
Cable Box Separation	50 s.f.	125 s.f.	50 s.f.		275 s.f.
FPL Box Separation	750 s.f.	2,750 s.f.	950 s.f.	50 s.f.	1,075 s.f.
Other Box Separation	1,875 s.f.	12,475 s.f.	8,475 s.f.	125 s.f.	6,250 s.f.
Owner's Tree Root Damage	29,750 s.f.	22,875 s.f.	71,925 s.f.	10,925 s.f.	3,275 s.f.
Phone Box Separation		325 s.f.	25 s.f.	550 s.f.	125 s.f.
Swale Tree Root Damage	46,100 s.f.	23,650 s.f.	77,675 s.f.	21,825 s.f.	3,700 s.f.
Water Box Separation	4,950 s.f.	52,925 s.f.	18,725 s.f.	2,275 s.f.	31,900 s.f.
Grand Total	**263,675 s.f.**	**1,198,875 s.f.**	**802,300 s.f.**	**166,575 s.f.**	**364,050 s.f.**

Table 6.1: Sidewalk Replacement Square Footage Type/Cause and Category - City Wide

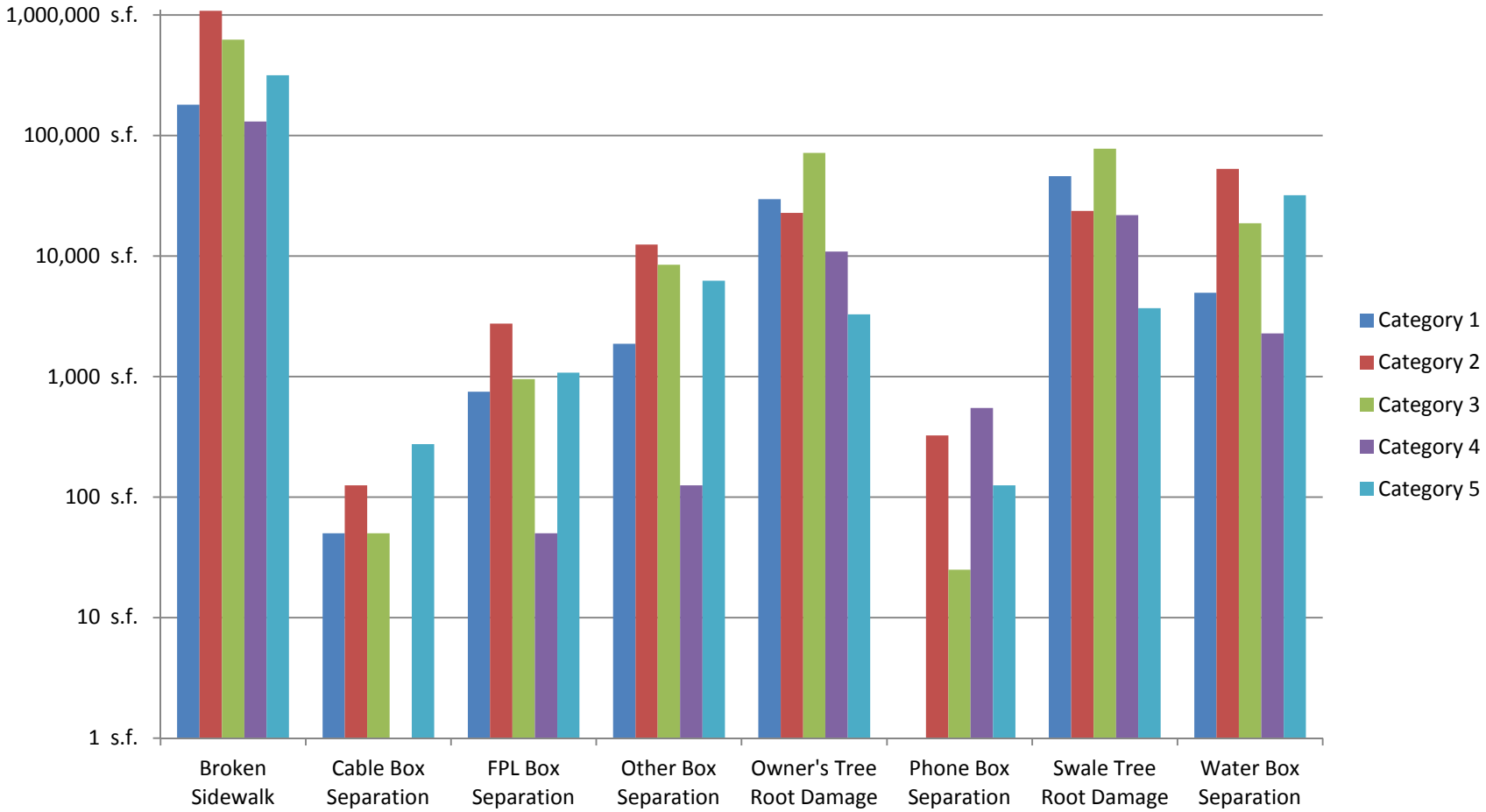

Figure 6.1: Chart of Sidewalk Replacement Square Footage by Type and Category - City Wide

6.1 Approximate Sidewalk Repair or Replacement Square Footages by Type or Cause, Category, and Commission District

Table 6.2, Figures 6.2 and Figure 6.3 show approximate sidewalk repair or replacement square footages by type or cause, category, and commission district.

Damage Type	Category Type					Grand Total
	1	2	3	4	5	
District 1						
Broken Sidewalk	12,900 s.f.	91,350 s.f.	40,625 s.f.	6,075 s.f.	96,525 s.f.	247,475 s.f.
Cable Box Separation					50 s.f.	50 s.f.
FPL Box Separation	150 s.f.	25 s.f.	200 s.f.		175 s.f.	550 s.f.
Other Box Separation	1,300 s.f.	5,425 s.f.	2,125 s.f.	25 s.f.	2,375 s.f.	11,250 s.f.
Owner's Tree Root Damage	2,575 s.f.	950 s.f.	9,000 s.f.		750 s.f.	13,275 s.f.
Phone Box Separation			25 s.f.		75 s.f.	100 s.f.
Swale Tree Root Damage	4,425 s.f.	2,700 s.f.	16,200 s.f.	225 s.f.	1,550 s.f.	25,100 s.f.
Water Box Separation	1,000 s.f.	3,400 s.f.	3,675 s.f.	100 s.f.	11,925 s.f.	20,100 s.f.
District 1 Total	**22,350 s.f.**	**103,850 s.f.**	**71,850 s.f.**	**6,425 s.f.**	**113,425 s.f.**	**317,900 s.f.**
District 2						
Broken Sidewalk	54,600 s.f.	351,125 s.f.	205,925 s.f.	17,100 s.f.	18,725 s.f.	647,475 s.f.
Cable Box Separation	50 s.f.	100 s.f.				150 s.f.
FPL Box Separation		1,025 s.f.	200 s.f.	50 s.f.	25 s.f.	1,300 s.f.
Other Box Separation		2,025 s.f.	1,475 s.f.		100 s.f.	3,600 s.f.
Owner's Tree Root Damage	4,150 s.f.	5,575 s.f.	13,000 s.f.	1,650 s.f.	75 s.f.	24,450 s.f.
Phone Box Separation		50 s.f.				50 s.f.
Swale Tree Root Damage	15,850 s.f.	7,775 s.f.	21,125 s.f.	6,600 s.f.	75 s.f.	51,425 s.f.

Damage Type	Category Type					Grand
	1	2	3	4	5	Total
Water Box Separation	850 s.f.	11,500 s.f.	2,625 s.f.	425 s.f.	1,250 s.f.	16,650 s.f.
District 2 Total	**75,500 s.f.**	**379,175 s.f.**	**244,350 s.f.**	**25,825 s.f.**	**20,250 s.f.**	**745,100 s.f.**
District 3						
Broken Sidewalk	47,725 s.f.	270,725 s.f.	214,225 s.f.	59,950 s.f.	127,125 s.f.	719,750 s.f.
Cable Box Separation					25 s.f.	25 s.f.
FPL Box Separation		325 s.f.	400 s.f.		775 s.f.	1,500 s.f.
Other Box Separation	125 s.f.	1,275 s.f.	3,400 s.f.	50 s.f.	1,850 s.f.	6,700 s.f.
Owner's Tree Root Damage	11,825 s.f.	5,900 s.f.	29,175 s.f.	5,075 s.f.	800 s.f.	52,775 s.f.
Phone Box Separation		225 s.f.		550 s.f.	50 s.f.	825 s.f.
Swale Tree Root Damage	9,500 s.f.	6,275 s.f.	21,950 s.f.	11,825 s.f.	1,575 s.f.	51,125 s.f.
Water Box Separation	1,375 s.f.	10,725 s.f.	6,475 s.f.	1,150 s.f.	11,475 s.f.	31,200 s.f.
District 3 Total	**70,550 s.f.**	**295,450 s.f.**	**275,625 s.f.**	**78,600 s.f.**	**143,675 s.f.**	**863,900 s.f.**
District 4						
Broken Sidewalk	64,975 s.f.	370,550 s.f.	163,700 s.f.	47,700 s.f.	75,075 s.f.	722,000 s.f.
Cable Box Separation		25 s.f.	50 s.f.		200 s.f.	275 s.f.
FPL Box Separation	600 s.f.	1,375 s.f.	150 s.f.		100 s.f.	2,225 s.f.
Other Box Separation	450 s.f.	3,750 s.f.	1,475 s.f.	50 s.f.	1,925 s.f.	7,650 s.f.
Owner's Tree Root Damage	11,200 s.f.	10,450 s.f.	20,750 s.f.	4,200 s.f.	1,650 s.f.	48,250 s.f.
Phone Box Separation		50 s.f.				50 s.f.
Swale Tree Root Damage	16,325 s.f.	6,900 s.f.	18,400 s.f.	3,175 s.f.	500 s.f.	45,300 s.f.
Water Box Separation	1,725 s.f.	27,300 s.f.	5,950 s.f.	600 s.f.	7,250 s.f.	42,825 s.f.
District 4 Total	**95,275 s.f.**	**420,400 s.f.**	**210,475 s.f.**	**55,725 s.f.**	**86,700 s.f.**	**868,575 s.f.**
Grand Total	**263,675 s.f.**	**1,198,875 s.f.**	**802,300 s.f.**	**166,575 s.f.**	**364,050 s.f.**	**2,795,475 s.f.**

Table 6.2: Square Footage of Sidewalk Repair or Replacement by Type/Cause and Category – Commission District and City Wide

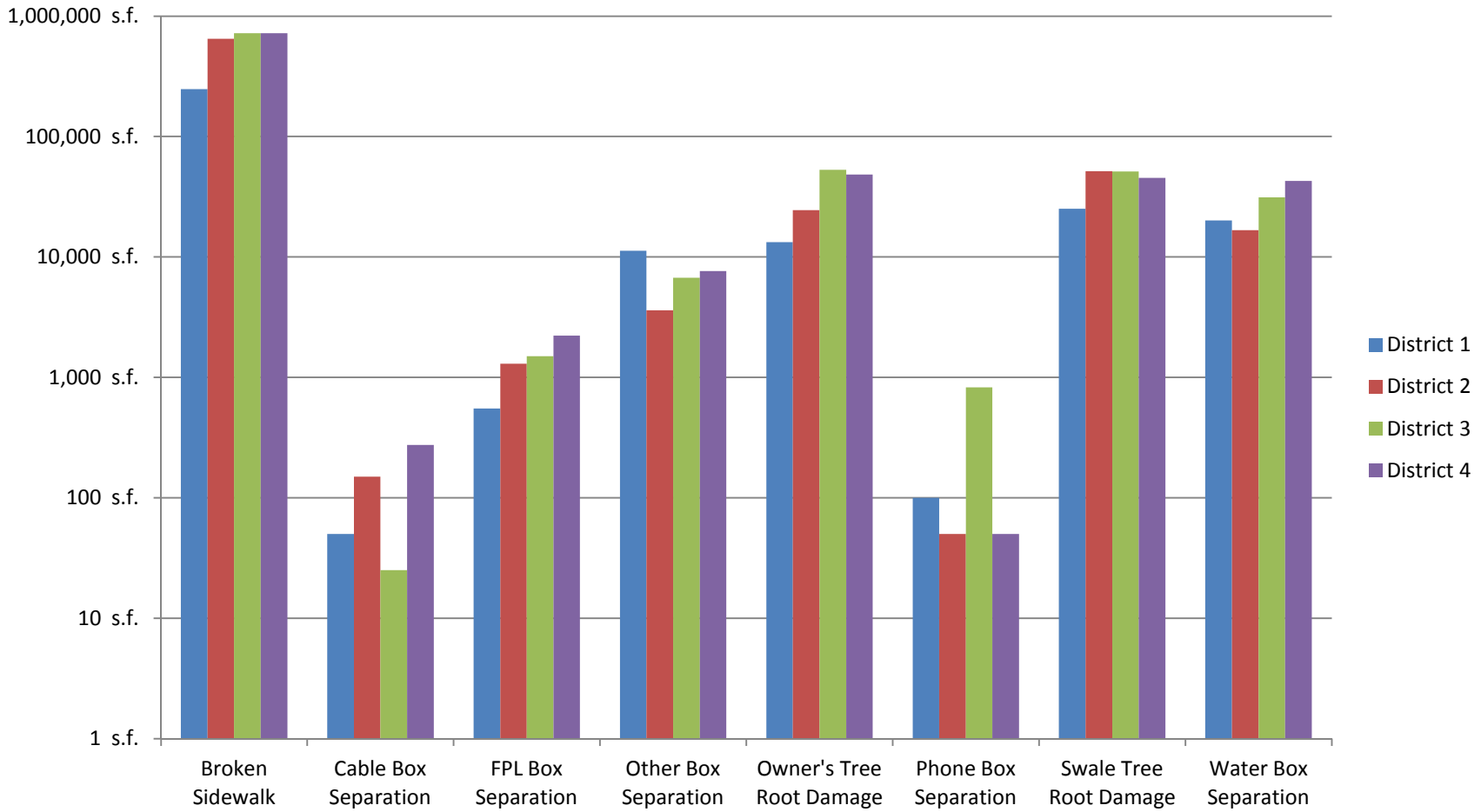

Figure 6.2: Chart of Square Footage of Sidewalk Repair or Replacement by Type of Cause and by Commission District

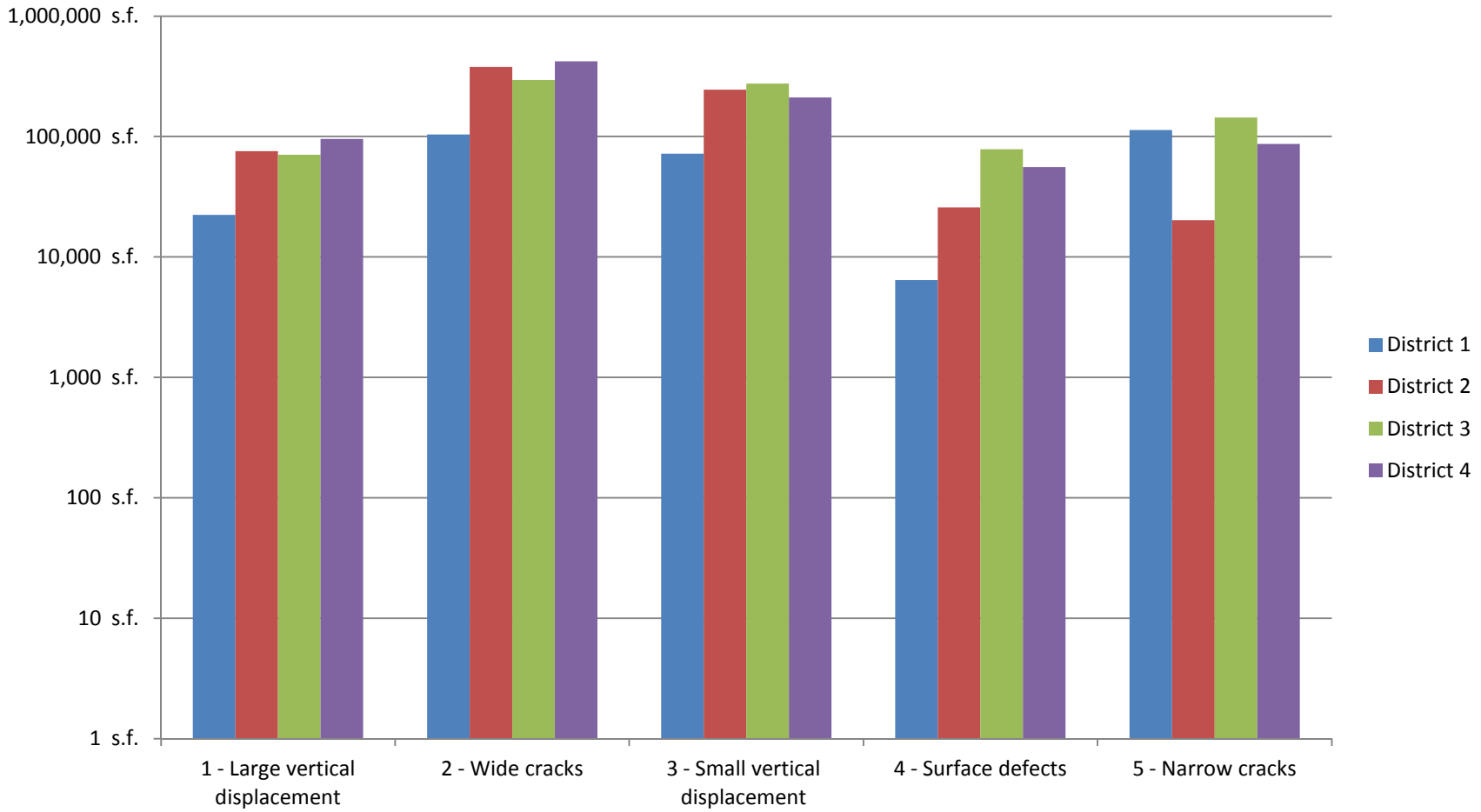

Figure 6.3: Chart of Square Footage of Sidewalk Repair or Replacement Category and Commission District

6.2 Approximate Repair or Replacement Square Footage of Damage by Neighborhood

Table 6.3, lists the approximate sidewalk repair or replacement square footages by type or cause, category, and commission district.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
Bermuda Riviera Assoc.			50 s.f.		225 s.f.	275 s.f.
Boulevard Park Isles HOA		1,800 s.f.	700 s.f.		300 s.f.	2,800 s.f.
Coral Ridge Association Inc.	4,500 s.f.	36,850 s.f.	13,475 s.f.		650 s.f.	55,475 s.f.
Coral Ridge Country Club Estate	50 s.f.	2,075 s.f.	1,225 s.f.	25 s.f.	5,600 s.f.	8,975 s.f.
Coral Ridge Isles Assoc.	3,475 s.f.	6,175 s.f.	4,725 s.f.	375 s.f.	8,400 s.f.	23,150 s.f.
Galt Mile Community Assoc.		700 s.f.	625 s.f.	175 s.f.	2,000 s.f.	3,500 s.f.
Imperial Point Association	9,025 s.f.	25,425 s.f.	28,500 s.f.	1,900 s.f.	68,300 s.f.	133,150 s.f.
Knoll Ridge HOA	2,025 s.f.	8,475 s.f.	3,100 s.f.		2,075 s.f.	15,675 s.f.
Landings Residential Assoc.		300 s.f.			75 s.f.	375 s.f.
NH-17	400 s.f.	1,925 s.f.	1,100 s.f.		1,625 s.f.	5,050 s.f.
NH-18		400 s.f.			100 s.f.	500 s.f.
NH-19		150 s.f.	1,150 s.f.		300 s.f.	1,600 s.f.
NH-20	700 s.f.	7,375 s.f.	600 s.f.		50 s.f.	8,725 s.f.
NH-21		200 s.f.	200 s.f.		500 s.f.	900 s.f.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
NH-22	1,225 s.f.	6,275 s.f.	5,500 s.f.	3,125 s.f.	10,375 s.f.	26,500 s.f.
North Golf Estates HOA		75 s.f.			75 s.f.	150 s.f.
Palm Aire Village (WEST)	125 s.f.	1,050 s.f.				1,175 s.f.
Palm-Aire Village HOA (EAST)	825 s.f.	4,300 s.f.	10,525 s.f.	825 s.f.	10,700 s.f.	27,175 s.f.
Twin Lakes North Homeowners Assoc.		200 s.f.	150 s.f.		1,950 s.f.	2,300 s.f.
N/S - Not Specified		100 s.f.	225 s.f.		125 s.f.	450 s.f.
District 1 Total	**22,350 s.f.**	**103,850 s.f.**	**71,850 s.f.**	**6,425 s.f.**	**113,425 s.f.**	**317,900 s.f.**
District 2						
Birch Park Finger Sts. Assoc.	125 s.f.	14,250 s.f.	1,200 s.f.		425 s.f.	16,000 s.f.
Central Beach Alliance	6,675 s.f.	103,075 s.f.	43,300 s.f.		2,900 s.f.	155,950 s.f.
City View Townhomes Assoc.		300 s.f.	425 s.f.		50 s.f.	775 s.f.
Flagler Village Civic Assoc.	1,400 s.f.	19,000 s.f.	14,050 s.f.	3,600 s.f.	1,750 s.f.	39,800 s.f.
Hendricks and Venice Isles	200 s.f.	4,150 s.f.	2,025 s.f.		150 s.f.	6,525 s.f.
Idlewyld Improvement Assoc.	2,500 s.f.	11,675 s.f.	11,400 s.f.		1,025 s.f.	26,600 s.f.
Lake Ridge Residents Assoc.	2,875 s.f.	19,475 s.f.	8,150 s.f.		1,250 s.f.	31,750 s.f.
Lauderdale Beach HOA	100 s.f.	4,475 s.f.	225 s.f.			4,800 s.f.
Middle River Terr.	8,875 s.f.	30,100 s.f.	22,375 s.f.		700 s.f.	62,050 s.f.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
Neighbor						
NH-04		3,050 s.f.	775 s.f.		425 s.f.	4,250 s.f.
Nurmi Isles Homeowners Assoc.		2,200 s.f.			200 s.f.	2,400 s.f.
Poinsettia Heights Civic Assoc.	20,475 s.f.	21,325 s.f.	15,075 s.f.	100 s.f.	2,125 s.f.	59,100 s.f.
Progresso Village	975 s.f.	9,625 s.f.	6,775 s.f.	3,050 s.f.	1,300 s.f.	21,725 s.f.
Riviera Isles Improvement Assoc.	100 s.f.	975 s.f.	1,175 s.f.		75 s.f.	2,325 s.f.
Sailboat Bend Civic Assoc.	1,325 s.f.	19,650 s.f.	12,250 s.f.	2,025 s.f.	975 s.f.	36,225 s.f.
Seven Isles Homeowners Assoc.	250 s.f.	8,050 s.f.	675 s.f.		1,850 s.f.	10,825 s.f.
South Middle River Civic Assoc.	22,550 s.f.	50,600 s.f.	45,225 s.f.		1,250 s.f.	119,625 s.f.
Victoria Park Civic Assoc.	7,075 s.f.	56,100 s.f.	59,200 s.f.	17,050 s.f.	3,800 s.f.	143,225 s.f.
N/S - Not Specified		1,100 s.f.	50 s.f.			1,150 s.f.
District 2 Total	**75,500 s.f.**	**379,175 s.f.**	**244,350 s.f.**	**25,825 s.f.**	**20,250 s.f.**	**745,100 s.f.**
District 3						
Dillard Park HOA	1,925 s.f.	1,500 s.f.	4,050 s.f.	375 s.f.		7,850 s.f.
Dorsey-Riverbend HOA	5,050 s.f.	9,825 s.f.	5,150 s.f.	3,450 s.f.	19,575 s.f.	43,050 s.f.
Durrs Homeowners Assoc.	25 s.f.	1,625 s.f.	1,200 s.f.	200 s.f.	2,500 s.f.	5,550 s.f.
Golden Heights Neighborhood	425 s.f.	1,450 s.f.	2,600 s.f.	1,325 s.f.	225 s.f.	6,025 s.f.
Home Beautiful Park Civic Assoc.		200 s.f.	100 s.f.		2,200 s.f.	2,500 s.f.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
Lake Aire Palm View HOA	1,475 s.f.	9,975 s.f.	17,075 s.f.	1,975 s.f.	675 s.f.	31,175 s.f.
Lauderdale Manors HOA	47,150 s.f.	81,000 s.f.	157,225 s.f.	34,875 s.f.	1,975 s.f.	322,225 s.f.
Lauderdale West Assoc.	50 s.f.	950 s.f.	250 s.f.	700 s.f.		1,950 s.f.
Melrose Manors HOA	2,825 s.f.	32,100 s.f.	13,500 s.f.	7,550 s.f.	47,925 s.f.	103,900 s.f.
Melrose Park	300 s.f.	7,575 s.f.	15,425 s.f.	2,075 s.f.	39,025 s.f.	64,400 s.f.
NH-09		3,375 s.f.	525 s.f.	125 s.f.	375 s.f.	4,400 s.f.
NH-10	350 s.f.	1,450 s.f.	4,050 s.f.		225 s.f.	6,075 s.f.
NH-11		50 s.f.				50 s.f.
Progresso Village		100 s.f.	400 s.f.		75 s.f.	575 s.f.
River garden Sweeting Estate		3,050 s.f.	1,400 s.f.		150 s.f.	4,600 s.f.
Riverland Civic Assoc.	1,875 s.f.	39,400 s.f.	12,500 s.f.	8,125 s.f.	16,625 s.f.	78,525 s.f.
Rock Island Neighborhood Assoc.	25 s.f.	1,500 s.f.	1,100 s.f.		4,850 s.f.	7,475 s.f.
Sunset Civic Assoc.	9,075 s.f.	99,775 s.f.	38,575 s.f.	17,825 s.f.	6,725 s.f.	171,975 s.f.
N/S - Not Specified		550 s.f.	500 s.f.		550 s.f.	1,600 s.f.
District 3 Total	**70,550 s.f.**	**295,450 s.f.**	**275,625 s.f.**	**78,600 s.f.**	**143,675 s.f.**	**863,900 s.f.**
District 4						
Beverly Heights	1,200 s.f.	21,050 s.f.	925 s.f.	3,200 s.f.	3,250 s.f.	29,625 s.f.
Breakwater Surf Homes		625 s.f.	150 s.f.		75 s.f.	850 s.f.
Chula Vista		950 s.f.	750 s.f.	250 s.f.	525 s.f.	2,475 s.f.
Colee Hammock HOA	6,025 s.f.	31,225 s.f.	3,300 s.f.	100 s.f.	4,350 s.f.	45,000 s.f.
Croissant Park Civic Assoc.	13,950 s.f.	34,175 s.f.	23,500 s.f.	9,225 s.f.	3,000 s.f.	83,850 s.f.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
Downtown Fort Lauderdale Civic Assoc.	4,700 s.f.	19,950 s.f.	11,100 s.f.	675 s.f.	11,125 s.f.	47,550 s.f.
Edgewood Civic Assoc.	18,650 s.f.	51,075 s.f.	7,250 s.f.	125 s.f.	2,400 s.f.	79,500 s.f.
Flamingo Park Civic Assoc.	1,275 s.f.	15,500 s.f.	7,600 s.f.	1,625 s.f.	9,025 s.f.	35,025 s.f.
Harbor Beach HOA		1,275 s.f.	875 s.f.		50 s.f.	2,200 s.f.
Harbor Drive Assoc.					150 s.f.	150 s.f.
Harbordale Civic Assoc.	1,600 s.f.	10,825 s.f.	9,375 s.f.	3,225 s.f.	1,875 s.f.	26,900 s.f.
Harbour Inlet Assoc.	4,200 s.f.	18,600 s.f.	13,100 s.f.		700 s.f.	36,600 s.f.
Harbour Isles of Fort Lauderdale		650 s.f.	275 s.f.			925 s.f.
Lauderdale Harbours Assoc.	625 s.f.	3,225 s.f.	1,750 s.f.		100 s.f.	5,700 s.f.
Lauderdale Isles	100 s.f.	1,000 s.f.	500 s.f.		325 s.f.	1,925 s.f.
NH-01		375 s.f.			100 s.f.	475 s.f.
NH-05	100 s.f.	6,600 s.f.	1,925 s.f.	100 s.f.	900 s.f.	9,625 s.f.
NH-06		825 s.f.	650 s.f.			1,475 s.f.
NH-08	1,450 s.f.	1,425 s.f.	1,275 s.f.		225 s.f.	4,375 s.f.
NH-12	800 s.f.	8,500 s.f.	7,400 s.f.	1,375 s.f.	1,900 s.f.	19,975 s.f.
Oak River Homeowners Assoc.		650 s.f.	825 s.f.	625 s.f.	25 s.f.	2,125 s.f.
Poinciana Park Civic Assoc.	12,300 s.f.	54,975 s.f.	31,050 s.f.		4,200 s.f.	102,525 s.f.
Rio Vista Civic Assoc.	12,325 s.f.	50,500 s.f.	17,975 s.f.	13,500 s.f.	16,725 s.f.	111,025 s.f.
River Oaks Civic Assoc.	6,475 s.f.	29,475 s.f.	19,450 s.f.	10,075 s.f.	17,125 s.f.	82,600 s.f.

Neighborhood	Category Type					
	1	2	3	4	5	Grand Total
River Run Civic Assoc.	475 s.f.	5,775 s.f.	4,100 s.f.	1,175 s.f.	1,175 s.f.	12,700 s.f.
Riverland Village	850 s.f.	13,125 s.f.	9,675 s.f.	525 s.f.	4,525 s.f.	28,700 s.f.
Riverside Park Residents Assoc.	4,400 s.f.	20,825 s.f.	12,925 s.f.	3,700 s.f.	725 s.f.	42,575 s.f.
Shady Banks Civic Assoc.	1,175 s.f.	5,100 s.f.	6,575 s.f.	3,175 s.f.	800 s.f.	16,825 s.f.
Sunset Civic Assoc.		500 s.f.	350 s.f.			850 s.f.
Tarpon River Civic Assoc.	2,600 s.f.	11,100 s.f.	15,625 s.f.	2,850 s.f.	1,325 s.f.	33,500 s.f.
Victoria Park Civic Assoc.		75 s.f.	75 s.f.			150 s.f.
N/S - Not Specified		450 s.f.	150 s.f.	200 s.f.		800 s.f.
District 4 Total	**95,275 s.f.**	**420,400 s.f.**	**210,475 s.f.**	**55,725 s.f.**	**86,700 s.f.**	**868,575 s.f.**
Grand Total	**263,675 s.f.**	**1,198,875 s.f.**	**802,300 s.f.**	**166,575 s.f.**	**364,050 s.f.**	**2,795,475 s.f.**

Table 6.3: Repair of Replacement Square Footage Category and Neighborhood.

SECTION 7

COST OF REPAIRS

7.0 COST OF REPAIRS

A rough order of magnitude cost estimate has been prepared for budgeting and planning purposes. There are many variables to be considered that effect that precision of a cost estimate including the Contractor doing the work, the contract size, the current cost of construction materials, etc.

For the purposes of this estimate, the unit costs for repairs or replacements were derived from the Florida Department of Transportation Area 5 - 12-month average historical cost data and past project cost experience by Atkins' cost estimators. Table 7.1 lists the unit cost for the different repair or replacement alternatives as discussed in Section 5.

To determine the cost of repair or replacement for a given area of sidewalk, Table 5.1 was used to establish which alternative would be selected to address the damage. Once the appropriate type of repair or replacement was determined then the square footage of the area could simply be multiplied by the corresponding unit cost.

Tables 7.2, 7.3 and 7.4 list the cost for repairs or replacements by category for the City, each Commission District and each neighborhood, respectively.

The following are lists of assumptions regarding the cost estimate:

- Sidewalk replacement cost estimate is based on 6" thick sidewalk typical side section provided by the City
- Intent of cost estimate is to establish a rough-order of magnitude cost for the repairs and sidewalk replacement.
- Estimate excludes soft cost such as permits, design fees, CEI fees, and City's project administration costs.
- Estimate excludes environmental remediation, if needed.
- Ultimate costs may vary depending on the City's procurement method, number and type of category type locations grouped under a single construction contract.
- Excludes costs for periodic inspections of Category Type 1 locations.
- For locations with root tree damage, cost estimate includes root pruning, and additional base material to correct sub-base. The cost excludes any other cost associated with tree maintenance except for those specifically stated.
- Cost for resetting, repositioning or replacement of utility boxes to be incurred by respective utility companies.
- Initial costs calculated to present day.

Type of Recommended Repair or Replacement	Unit Cost of Repair or Replacement	Comment
50% No Repairs/50% Future Repair	$6.00 x 1/2 per square feet to be replaced	Assumes that perhaps ½ of this square footage may need be replaced over 5 years and that cost can be spread as desired across the 5-year work plan
Full Panel Replacement	$6.00 per square feet to be replaced	Cost for 6" thick concrete sidewalk per the standard detail included in the report
Full Panel Replacement w/Alt Base	$18.00 per square feet to be replaced plus $60.00 root pruning per location	Alternate base shall be pea gravel, 57 stone or material effective in discouraging root growth. Root barrier may be considered depending on application
Grinding	$3.00 per square feet to be replaced	Cost for grinding will dependent on the number and proximity of the locations to be grinded. The more locations grouped closer together to be grinded in one contract the less the unit cost for grinding.

Table 7.1: Determination of Costs for Recommended Repair

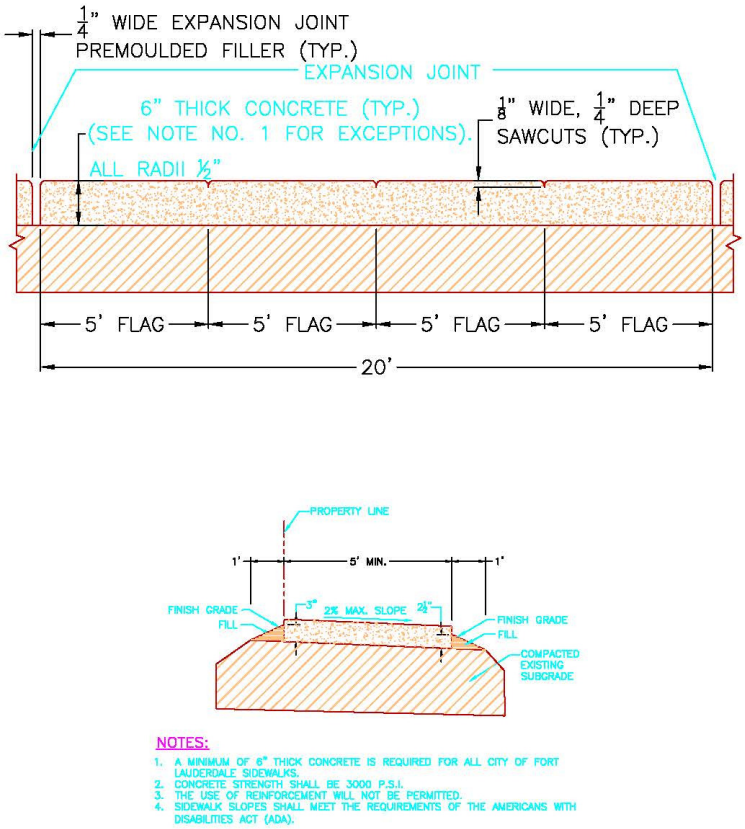

Figure 7.1Sidewalk Detail

Recommended Repairs	Estimated Costs
50% No Repairs/50% Future Repair (Based on Periodic Inspection)	$1,092,150
Full Concrete Panel Replacement to Nearest Joint	$8,844,000
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$2,861,310
Grinding Down Separation	$2,406,900
Grand Total	**$15,204,360**

Table 7.2: Estimated Costs Based on Recommended Repairs – City Wide

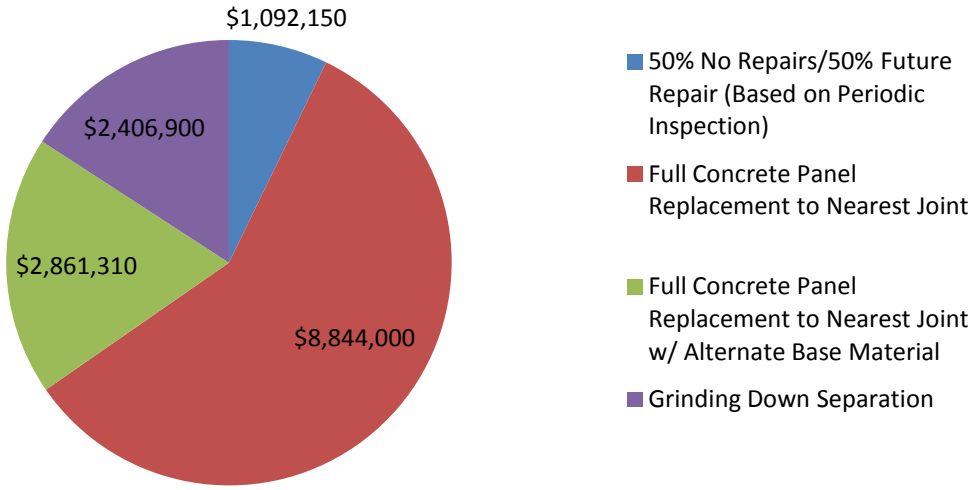

Figure 7.2: Estimated Costs Based on Recommended Repairs – City Wide

7.1 Cost of Repairs by Commission District

Recommended Repair	Category Type*					
	1	2	3	4	5	Grand Total
District 1						
50% No Repairs/50% Future Repair (Based on Periodic Inspection)					$340,275	$340,275
Full Concrete Panel Replacement to Nearest Joint	$92,100	$601,200		$37,200		$730,500
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$128,760	$67,740		$4,110		$200,610
Grinding Down Separation			$215,550			$215,550
District 1 Total	**$220,860**	**$668,940**	**$215,550**	**$41,310**	**$340,275**	**$1,486,935**
District 2						
50% No Repairs/50% Future Repair (Based on Periodic Inspection)					$60,750	$60,750
Full Concrete Panel Replacement to Nearest Joint	$333,000	$2,194,950		$105,450		$2,633,400
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$364,560	$253,500		$151,140		$769,200
Grinding Down Separation			$733,050			$733,050
District 2 Total	**$697,560**	**$2,448,450**	**$733,050**	**$256,590**	**$60,750**	**$4,196,400**

Recommended Repair	Category Type*					
	1	2	3	4	5	Grand Total
District 3						
50% No Repairs/50% Future Repair (Based on Periodic Inspection)					$431,025	$431,025
Full Concrete Panel Replacement to Nearest Joint	$295,350	$1,699,650		$370,200		$2,365,200
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$392,070	$229,050		$308,580		$929,700
Grinding Down Separation			$826,875			$826,875
District 3 Total	**$687,420**	**$1,928,700**	**$826,875**	**$678,780**	**$431,025**	**$4,552,800**
District 4						
50% No Repairs/50% Future Repair (Based on Periodic Inspection)					$260,100	$260,100
Full Concrete Panel Replacement to Nearest Joint	$406,500	$2,418,300		$290,100		$3,114,900
Full Concrete Panel Replacement to Nearest Joint w/ Alternate Base Material	$505,350	$320,880		$135,570		$961,800
Grinding Down Separation			$631,425			$631,425
District 4 Total	**$911,850**	**$2,739,180**	**$631,425**	**$425,670**	**$260,100**	**$4,968,225**
Grand Total	**$2,517,690**	**$7,785,270**	**$2,406,900**	**$1,402,350**	**$1,092,150**	**$15,204,360**

Table 7.3: Cost of Repairs or Replacements by Category for each District

* See Table 4.2 for definition of Category

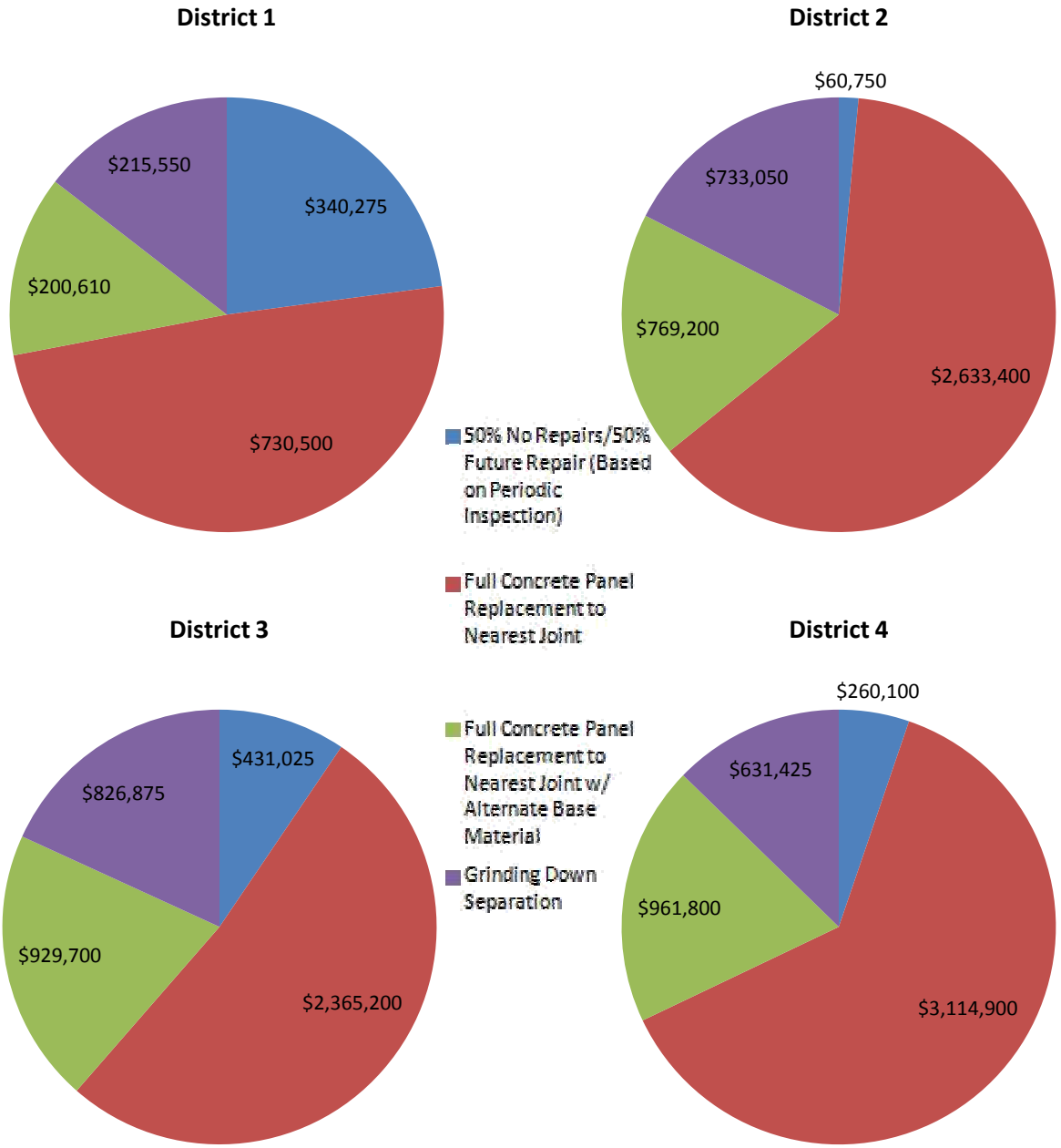

Figure 7.3: Cost of Repairs or Replacements by Category for each District

7.2 Cost of Repairs by Neighborhood

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
District 1						
Bermuda Riviera Assoc.			$150		$675	$825
Boulevard Park Isles HOA		$10,800	$2,100		$900	$13,800
Coral Ridge Association Inc.	$27,000	$221,100	$40,425		$1,950	$290,475
Coral Ridge Country Club Estate	$1,020	$12,450	$3,675	$150	$16,800	$34,095
Coral Ridge Isles Assoc.	$28,290	$37,770	$14,175	$2,250	$25,200	$107,685
Galt Mile Community Assoc.		$4,560	$1,875	$1,050	$6,000	$13,485
Imperial Point Association	$94,830	$171,150	$85,500	$11,400	$204,900	$567,780
Knoll Ridge HOA	$30,750	$56,070	$9,300		$6,225	$102,345
Landings Residential Assoc.		$5,460			$225	$5,685
NH-17	$7,260	$14,010	$3,300		$4,875	$29,445
NH-18		$2,400			$300	$2,700
NH-19		$900	$3,450		$900	$5,250
NH-20	$4,200	$44,250	$1,800		$150	$50,400
NH-21		$1,200	$600		$1,500	$3,300
NH-22	$13,470	$46,410	$16,500	$18,750	$31,125	$126,255
North Golf Estates HOA		$450			$225	$675
Palm Aire Village (WEST)	$2,310	$6,300				$8,610
Palm-Aire Village HOA (EAST)	$11,730	$31,860	$31,575	$7,710	$32,100	$114,975
Twin Lakes North Homeowners Assoc.		$1,200	$450		$5,850	$7,500
N/S - Not Specified		$600	$675		$375	$1,650
District 1 Total	**$220,860**	**$668,940**	**$215,550**	**$41,310**	**$340,275**	**$1,486,935**

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
District 2						
Birch Park Finger Sts. Assoc.	$750	$85,500	$3,600		$1,275	$91,125
Central Beach Alliance	$40,050	$618,450	$129,900		$8,700	$797,100
City View Townhomes Assoc.		$1,800	$1,275		$150	$3,225
Flagler Village Civic Assoc.	$14,940	$139,140	$42,150	$25,680	$5,250	$227,160
Hendricks and Venice Isles	$1,200	$24,900	$6,075		$450	$32,625
Idlewyld Improvement Assoc.	$15,000	$70,050	$34,200		$3,075	$122,325
Lake Ridge Residents Assoc.	$29,670	$116,850	$24,450		$3,750	$174,720
Lauderdale Beach HOA	$600	$26,850	$675			$28,125
Middle River Terr. Neighbor	$53,250	$180,600	$67,125		$2,100	$303,075
NH-04		$18,300	$2,325		$1,275	$21,900
Nurmi Isles Homeowners Assoc.		$13,200			$600	$13,800
Poinsettia Heights Civic Assoc.	$282,150	$131,370	$45,225	$600	$6,375	$465,720
Progresso Village	$12,150	$63,330	$20,325	$30,360	$3,900	$130,065
Riviera Isles Improvement Assoc.	$600	$5,850	$3,525		$225	$10,200
Sailboat Bend Civic Assoc.	$15,570	$128,820	$36,750	$18,750	$2,925	$202,815
Seven Isles Homeowners Assoc.	$1,500	$48,300	$2,025		$5,550	$57,375
South Middle River Civic Assoc.	$135,300	$303,600	$135,675		$3,750	$578,325
Victoria Park Civic Assoc.	$94,830	$464,940	$177,600	$181,200	$11,400	$929,970
N/S - Not Specified		$6,600	$150			$6,750
District 2 Total	**$697,560**	**$2,448,450**	**$733,050**	**$256,590**	**$60,750**	**$4,196,400**

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
District 3						
Dillard Park HOA	$14,670	$9,360	$12,150	$4,710		$40,890
Dorsey-Riverbend HOA	$46,620	$64,590	$15,450	$23,160	$58,725	$208,545
Durrs Homeowners Assoc.	$150	$9,750	$3,600	$3,660	$7,500	$24,660
Golden Heights Neighborhood	$2,550	$8,700	$7,800	$8,610	$675	$28,335
Home Beautiful Park Civic Assoc.		$1,200	$300		$6,600	$8,100
Lake Aire Palm View HOA	$18,510	$63,450	$51,225	$22,650	$2,025	$157,860
Lauderdale Manors HOA	$430,260	$559,560	$471,675	$324,990	$5,925	$1,792,410
Lauderdale West Assoc.	$300	$5,700	$750	$4,200		$10,950
Melrose Manors HOA	$33,450	$199,980	$40,500	$47,160	$143,775	$464,865
Melrose Park	$4,020	$49,650	$46,275	$17,070	$117,075	$234,090
NH-09		$20,250	$1,575	$750	$1,125	$23,700
NH-10	$6,480	$10,380	$12,150		$675	$29,685
NH-11		$960				$960
Progresso Village		$600	$1,200		$225	$2,025
River garden Sweeting Estate		$23,280	$4,200		$450	$27,930
Riverland Civic Assoc.	$22,470	$262,860	$37,500	$69,690	$49,875	$442,395
Rock Island Neighborhood Assoc.	$150	$9,000	$3,300		$14,550	$27,000
Sunset Civic Assoc.	$107,790	$626,130	$115,725	$152,130	$20,175	$1,021,950
N/S - Not Specified		$3,300	$1,500		$1,650	$6,450
District 3 Total	**$687,420**	**$1,928,700**	**$826,875**	**$678,780**	**$431,025**	**$4,552,800**
District 4						
Beverly Heights	$7,200	$134,880	$2,775	$19,200	$9,750	$173,805
Breakwater Surf Homes		$3,750	$450		$225	$4,425
Chula Vista		$5,700	$2,250	$1,500	$1,575	$11,025

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
Colee Hammock HOA	$97,590	$251,970	$9,900	$600	$13,050	$373,110
Croissant Park Civic Assoc.	$116,400	$249,690	$70,500	$80,970	$9,000	$526,560
Downtown Fort Lauderdale Civic Assoc.	$29,760	$119,700	$33,300	$4,050	$33,375	$220,185
Edgewood Civic Assoc.	$191,760	$311,430	$21,750	$750	$7,200	$532,890
Flamingo Park Civic Assoc.	$12,810	$100,860	$22,800	$19,950	$27,075	$183,495
Harbor Beach HOA		$7,650	$2,625		$150	$10,425
Harbor Drive Assoc.					$450	$450
Harbordale Civic Assoc.	$18,660	$78,270	$28,125	$23,670	$5,625	$154,350
Harbour Inlet Assoc.	$25,200	$111,600	$39,300		$2,100	$178,200
Harbour Isles of Fort Lauderdale		$3,900	$825			$4,725
Lauderdale Harbours Assoc.	$3,750	$19,350	$5,250		$300	$28,650
Lauderdale Isles	$1,860	$6,660	$1,500		$975	$10,995
NH-01		$2,250			$300	$2,550
NH-05	$600	$39,600	$5,775	$600	$2,700	$49,275
NH-06		$4,950	$1,950			$6,900
NH-08	$8,700	$9,810	$3,825		$675	$23,010
NH-12	$11,700	$58,260	$22,200	$11,370	$5,700	$109,230
Oak River Homeowners Assoc.		$3,900	$2,475	$8,370	$75	$14,820
Poinciana Park Civic Assoc.	$87,960	$329,850	$93,150		$12,600	$523,560
Rio Vista Civic Assoc.	$122,070	$309,960	$53,925	$81,000	$50,175	$617,130
River Oaks Civic Assoc.	$74,970	$191,070	$58,350	$76,530	$51,375	$452,295
River Run Civic Assoc.	$3,810	$34,650	$12,300	$12,330	$3,525	$66,615
Riverland Village	$9,600	$91,650	$29,025	$4,710	$13,575	$148,560
Riverside Park Residents Assoc.	$40,740	$145,350	$38,775	$25,620	$2,175	$252,660
Shady Banks Civic Assoc.	$17,850	$32,220	$19,725	$31,110	$2,400	$103,305
Sunset Civic Assoc.		$5,880	$1,050			$6,930

Neighborhood	Category Type*					
	1	2	3	4	5	Grand Total
Tarpon River Civic Assoc.	$28,860	$71,220	$46,875	$22,140	$3,975	$173,070
Victoria Park Civic Assoc.		$450	$225			$675
N/S - Not Specified		$2,700	$450	$1,200		$4,350
District 4 Total	**$911,850**	**$2,739,180**	**$631,425**	**$425,670**	**$260,100**	**$4,968,225**
Grand Total	**$2,517,690**	**$7,785,270**	**$2,406,900**	**$1,402,350**	**$1,092,150**	**$15,204,360**

Table 7.4: Cost of Repairs or Replacements by Category for Each Neighborhood.

* See Table 4.2 for definition of categories

SECTION 8

RECOMMENDATIONS FOR IMPLEMENTATION OF THE 5-YEAR WORKPLAN

8.0 RECOMMENDATIONS FOR IMPLEMENTATION OF THE 5-YEAR WORKPLAN

The following 5-year work plan is proposed considers the health safety and welfare of the public while at the same time spreading the large expenditures required to perform all the necessary repairs or replacements over a 5-year period.

In years one and two the most serious sidewalk damage would be addressed and would incur the highest costs.

Small vertical separations could be grinded down in the third year and any surface defects which vary widely would be addressed in year 4. Narrow or hairline cracks could be addressed in the fifth year or as needed.

Periodic inspection of damage locations with Category Level 1 should be performed throughout the 5 year duration to insure minor damage has not developed into major damage.

Table 8.1 and Figure 8.1 summarize the yearly funding requirements over the 5-year plan duration. This work plan includes an escalation factor of 3% per year starting in the second year of the work program

Year	Category	Estimated Costs
1	1 - Large vertical displacement & 2 - Wide cracks	$5,151,480
2	2 - Wide cracks	$5,306,024
3	3 - Small vertical displacement	$2,551,314
4	4 - Surface defects	$1,528,562
5	5 - Narrow cracks	$1,223,208
Grand Total		**$15,760,588**

Table 8.1: Proposed Five Year Work Plan

This work plan is intended as a high level outline which the City will need to validate and refine depending on funds availability and other criteria.

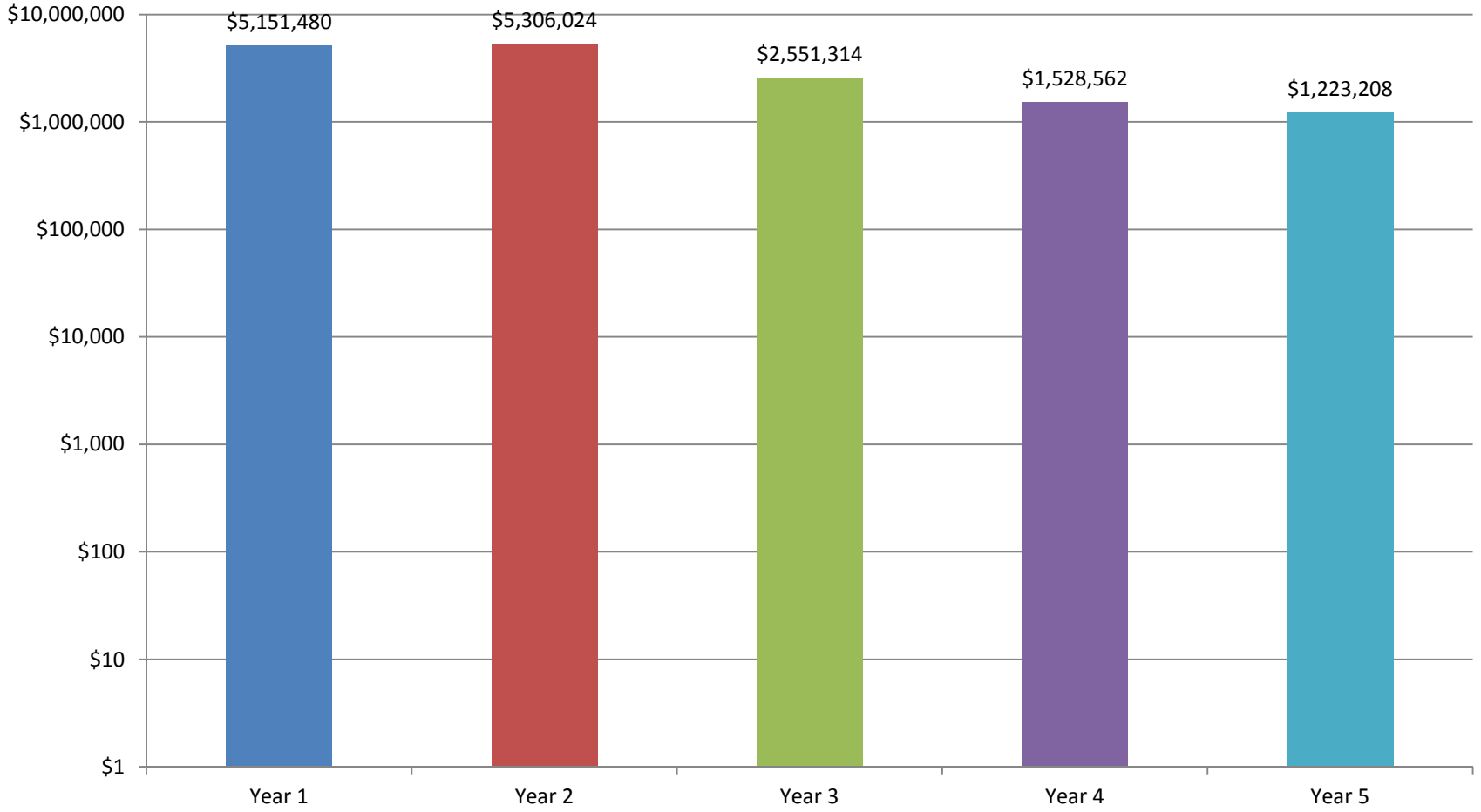

Figure 8.1: Estimated Costs for Proposed Five Year Work Plan

SECTION 9

SUSTAINABLE SIDEWALKS

9.0 SUSTAINABLE SIDEWALKS

Sidewalks are basically a paved or improved pedestrian path, usually constructed adjacent to a roadway to provide a safe and comfortable space for pedestrian traffic. Well designed sidewalks are also attractive and interesting and help contribute to the overall safety and aesthetics of the neighborhood.

In this context, the word sustainable is defined as a material, process or design strategy that ensures or contributes to a sidewalk that is long lasting and provides a positive function or contribution to the ecosystem within which the sidewalk is located. The goal of sustainable sidewalks is in concert with other sustainable elements to support the broad sustainable agenda of the three E's: Environment, Equity and Economy.

Examples of sustainable goals for sidewalk include reducing the heat island effect from pavement, improving water quality and stormwater infiltration, preserving existing vegetation and trees, reducing the use of non sustainable materials, improve the visual image of a city or neighborhood, reducing vehicle congestion and contributing to the public health by encouraging walking, jogging and other similar activities.

Strategies to achieve these goals include sidewalk material selection, sidewalk alignment and sidewalk construction practices. The use of sustainable sidewalk materials is the focus of this task and is further discussed below.

Conventional Sidewalk Materials

Sidewalks are normally constructed of either Portland cement concrete or asphaltic cement concrete. Within the city of Ft. Lauderdale the standard sidewalk design section consists of a 6" thick Portland cement concrete section constructed on compacted existing subgrade. Unit costs associated with this type of sidewalk construction are approximately $4.00 to $6.00 per square foot. While concrete sidewalks are typically constructed adjacent to roadways , asphalt sidewalks are normally constructed within parks or alongside a roadway surface where there is enough room to provide separation from the roadway and other existing surface features such as power poles and fire hydrants that would restrict the use of paving equipment used to construct the asphalt sidewalk.

The use of standard concrete and asphalt materials for sidewalk construction does not met some of the sustainable goals because the surface is non porous, additionally asphalt surfaces tend to contribute to the heat island effect due to the dark surface color. However, by using variations of these materials, or using alternative materials, the sustainability of a sidewalk can be increased.

9.1 Sustainable Sidewalk Materials

Material 1: Pervious Concrete

General Description:
Pervious concrete is Portland cement concrete with reduced sand and/or fines which allows water to drain through the concrete. The infiltration of stormwater runoff reduces the load on the adjacent stormwater system by reducing the volume and rate of stormwater and associated pollutants that are discharged into the system. Pervious concrete is durable, low maintenance, and has a low life cycle cost.

Advantages:

- Stormwater Treatment: Used to reduce combined sewer overflows and minimize localized flooding by infiltrating and treating stormwater on site.
- Potential to reduce additional expenditures and land consumption for conventional collection, conveyance, and detention stormwater infrastructure.
- Environmental benefits: Light color of concrete is cooler than conventional asphalt and helps to reduce urban temperatures and improve air quality
- Safety: Surface texture of pervious concrete is slightly rougher, providing more traction to vehicles and pedestrians.
- Longevity: Permeable concrete can last 20 to 40 years

Disadvantages:

- Clogging: A maintenance concern is the potential clogging of the pervious concrete pores. Clogging will increase with time and use.
- When clogged, surface infiltration rates decrease but are still sufficient in most circumstances for the surface to effectively manage intense stormwater events.
- Cost factor compared to concrete (concrete = 1.0; $6.00 /SF) is 1.10 – 1.20; $6.60/SF - $7.20/SF

Material 2: Porous Asphalt Pavement

General Description:
Porous asphalt is standard hot-mix asphalt with reduced sand or fines and allows water to drain through it. Porous asphalt can be utilized for municipal stormwater management programs and private development applications. The porous asphalt reduces stormwater runoff volume, rate, and pollutants by infiltrating stormwater through the interconnected void spaces within the asphalt pavement section. Crushed stone aggregate bedding layer and base supports asphalt while

providing storage and runoff treatment. The thickness of porous asphalt ranges from 2 to 4 inches depending on the expected loads.

Advantages:

- The same equipment can be utilized for mixing and laying permeable asphalt as conventional asphalt.
- Stormwater Treatment: Runoff volume and rate control, plus pollutant reductions, allow municipalities to improve the quality of stormwater discharges.
- Reduces combined sewer overflows by infiltrating and treating stormwater on site.
- Reduces Land Expenditures: Reduces additional expenditures and land consumption for conventional collection, conveyance, and detention stormwater infrastructure.
- Safety: The surface texture of porous asphalt is slightly rougher, providing more traction to vehicles and pedestrians.
- Maintenance: When cracking and potholes do occur, a conventional patching mix can be used to fix the damage.

Disadvantages:

- Minimal Loading: Porous asphalt has reduced strength compared to conventional asphalt and will not be appropriate for applications with high volumes and extreme loads.
- Cross Slopes Limits: For slopes greater than 2 percent, terracing of the soil subgrade base is likely necessary to slow runoff from flowing through the pavement structure.
- Clogging: Fine particles can clog the pores on the surface due to vehicles, the atmosphere, and runoff from adjacent land surfaces.
- Clogging will increase with time and use. When clogged, surface infiltration rates decrease but are still sufficient in most circumstances for the surface to effectively manage intense stormwater events.
- Permeability can be increased with vacuum sweeping.
-
- Cost factor compared to concrete (concrete = 1.0; $6.00/SF) is 1.05 – 1.10; $6.30/SF - $6.60/SF

Material 3: Rubber Sidewalks

General Description:
Rubber sidewalks are sidewalks constructed with a mixture of recycled rubber materials and a binder material. They are usually either constructed on –site or

purchased as paver type units that have been manufactured. Rubber sidewalks provide a flexible and porous alternative which is also an environmentally friendly solution to cracked sidewalks. There are also decorative options that allow the design of a variety of patterns and colors options. Rubber sidewalks can be installed directly over tree roots without damaging them or hindering growth, this encourages deep rooting, making the tree stronger and less likely to blow over in strong wind gusts.

Advantages:

- Cost-effective and LEED accredited alternative to asphalt, concrete, and preformed pavers.
- Reduces the impact of damage by tree roots and vehicular traffic.
- Permeable in order to provided added stormwater treatment and reducing stormwater runoff.
- Sustainability: made from recycled rubber from tires, shoe soles or industrial rubber.
- Recyclable: At the end of its life the sidewalk material can be recycled and used again

Disadvantages:

- Requires special construction practices to construct correctly.
- Cost
- Cost factor compared to concrete (concrete = 1.0; $6.00/SF) is 1.50 – 2.50; $9.00/SF - $15.00/SF

Note that cost factors are for sidewalk construction only and do not consider maintenance costs. Maintenance costs are typically site specific based on the sidewalk location and exposure.

Data Sources include the following:

http://www.sciencedirect.com/science/article/pii/S1687404813000102
http://greenindustryresource.com/category/building-products/pavement-and-sidewalks.html
http://sustainablesurfacing.com/products/porous-rubber-surfaces/rubber-sidewalks-1
http://terrecon.com/
http://www.unh.edu/unhsc/
http://www.fcpa.org/
http://www.perviouspavement.org/index.html

APPENDICES

NEIGHBORHOOD DAMAGE LOCATIONS AND CATEGORY

SUSTAINABLE SIDEWALKS PRODUCT INFORMATION

Diego Clavijo
Atkins North America
Miami, Florida

Diego.Clavijo@atkinsglobal.com

(305) 514-3579