City of Portsmouth Conditional Sidewalk Assessment

Report of Findings

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Department of Public Works

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Introduction

The City of Portsmouth Department of Public Works conducted a conditional sidewalk assessment on City maintained sidewalks during the summer of 2015. Applicable sidewalks were evaluated on their usability and mapped out using Trimble handheld Global Positioning System (GPS) units. Vanasse Hangen Bustlin, Inc. (VHB) project manager Lance Baden trained employees on the fundamentals of performing conditional assessments prior to the start of the project. The purpose of this project was not to identify specific points of impairments or access ADA compliance, but rather to provide a baseline for conducting such surveys in the future.

The assessment provides City staff with detailed information regarding it's sidewalks including: sidewalk and curb material, width, major distresses, estimated percent repair, and a ranking of each individual sidewalk's condition. The conditions were classified as excellent, good, fair, or poor. Through the assessment, a database was established within a Geographic Information System (GIS) inclusive of all information collected in the field. The data collected provides staff and decision-makers with a clearer depiction of the overall conditions of the City's sidewalks and offers detailed information to aid in the implementation of Portsmouth's Bicycle and Pedestrian Plan.

This report will describe the methodology of the assessment, outline the results of field evaluations which will include detailed maps and figures, as well as provide the cost estimations from a detailed budget analysis.

Methodology

This survey was carried out to establish current information and maps concerning the status of City maintained infrastructure. The assessment was broken into three areas of interest: the Historic District, Non-Historic District, and Pease International Tradeport (Figure 1). Sidewalks located in parks, fields, and various other City maintained facilities where sidewalks do not directly border roads such as those surrounding schools, the Portsmouth Public Library, and Public Works, were collected, however, excluded from this report. The information collected will aid in future projects and serve as a guide for future sidewalk maintenance, repair, and replacement.

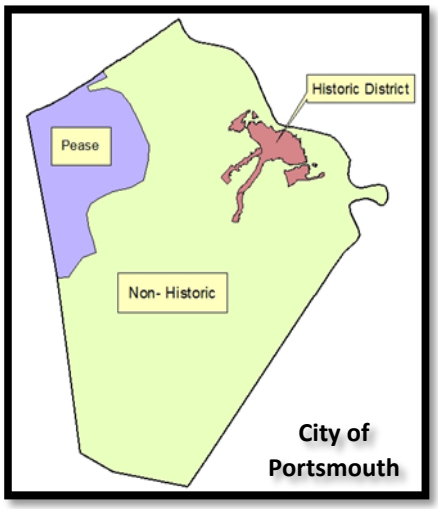


Figure 1. *The three study areas.*

The processes used to conduct the assessment include: identifying the location of City maintained sidewalks, developing data dictionaries to aid in GPS field collection, implementation of the assessment, post processing and downloading of data collected, followed by data management and analysis.

Network Identification

An investigation prior to data collection was conducted to identify where City maintained sidewalks were located in order to narrow and define survey areas. To do this, the City's most current sidewalks layer within the GIS was used to locate all streets without sidewalks. Field

reconnaissance of these areas took place to verify the information. Maps were then made throughout the data collection process of only the areas documented as having sidewalks. Eliminating roads with no sidewalks allowed for more efficient planning of daily routes.

Data Dictionary

The initial step in the assessment was the creation of a data dictionary which was uploaded into the GPS units to aid in the collection of field data. A data dictionary is a custom made database created to fit any individual project requirements. It simplifies the collection process and stores data in a format easy to transfer and analyze. The data dictionary for this project was built using Pathfinder Office software. Two features, a line for sidewalk segments, and a point for ramps, were created. Under each feature various attributes were added thus serving as an outline for data to be collected in the field. The line feature attributes include: sidewalk type, sidewalk material, width, condition, percent repair, and two distresses most impacting the usability of the sidewalk. Certain attributes contain several options to further detail the information for each segment. These can be viewed in Figure 2. Further information was gathered such as curb material, structural impacts caused by trees, and general maintenance issues such as excessive overgrowth or dirt and gravel build up.

Sidewalk Type	Sidewalk Material	Distress
•Sidewalk •Path •Stairs	•Concrete (PCC) •Asphalt (HMA) •Brick (BR) •Stone •Stone Dust •Dirt •Pavers •Composite •Gravel •Wood	•Broken (BR) •Missing (BR) •Fractured (PCC) •Uneven (PCC) •Surface Wear (PCC) •Alligator Cracking (HMA) •Linear Cracking (HMA) •Potholes (HMA) •Distortion (All Materials)

Figure 2 *Subcategories for sidewalk attributes.*

The ramp point feature includes type, material, if the ramp had a warning strip and if so, what the panel material was. Figure 3 shows more detailed options for each attribute collected. For both features, photos were taken to help document current conditions of the infrastructure. A comment field was also included to make note of any unique abnormalities or materials to later be edited within the GIS.

Material	Type	Panel Material	Panel Texture
• Concrete • Asphalt • Brick • Stone • Composite • Pavers	• Tapered • Other • Flared • Parallel • Return Curb	• Plastic • Dyed • Metal • Other	• Bumps • Grooved • Other

Figure 3 *Subcategories for ramp attributes.*

Data Management

At the end of each day, data collected was transferred from the GPS units onto GPS Pathfinder software and then exported into the GIS. Once in the GIS, data features and attributes are able to be edited to fix, for example, incorrect geometry. The data were also reviewed for accuracy and completeness.

In-Field Procedures

Maps were created in advance of field work to guide the routes taken by each individual assessor. A ramp point feature was typically recorded at the beginning and end of each street. In the collection of a sidewalk segment, the assessor walked along the center of a sidewalk while the GPS collected points at every 5 feet, creating the line segment. A line feature's information can be filled out before the assessor starts walking, or at the end of the segment. Overgrowth along the edges can affect the accuracy of the measurement. Therefore, the sidewalk was measured at a point that seemed most characteristic of its true width. A photo was taken at the beginning and end of each line segment and at all ramps. A new line segment was taken at every block, when the sidewalk changed material, or when the sidewalk significantly changed in width. One sidewalk, for example, stretching the length of a street could have several individual line segments based on material or width variation. Data was collected in this way so that more accurate sums of each material type could be calculated. Further, separating line segments by material aids in more accurately assigning distresses and percent repair because distresses vary based on material type.

Conditional Assessment

For each line segment, up to two distresses were chosen representing what the sidewalk's most disabling characteristics to usability were. A percent repair needed to remediate problem areas was estimated based on the distresses' severity and frequency. For example, an estimation of 25% would indicate one quarter of that sidewalk as requiring repair.

Usability was the leading factor in ranking the sidewalks by condition. For example, if a segment of asphalt had several thin linear cracks not affecting usability, the condition would be considered good because usability was not being significantly impacted. Conversely, a segment having only one or two linear cracks that caused lift or significant separation would be considered fair because

of it's impacts on usability. By this logic, the percent repair estimation might not always reflect the conditional ranking a segment of sidewalk was assigned. Continuing with the previous example, the sidewalk with more frequent, but thin, linear cracks, might have a higher percent repair due to the frequency of the cracks, while the sidewalk with only one linear crack and significant lift would have a much less percent repair, despite its lower conditional ranking.

Findings

Assessors collected detailed information on 76 miles of sidewalk throughout the City, not including those within parks, fields and other City maintained facilities. Table 1 provides a breakdown of material lengths found in each area of interest.

Table 1 *Length of sidewalk materials in feet and miles*

Materials	Non-Historic	Historic	Pease	Total (ft)	Total (miles)
Asphalt	137,242	15,272	28,846	152,514	29
Concrete	114,410	26,185	16,377	140,595	27
Brick	3,374	53,993	0	57,367	11
Dirt	1,124	0	3,040	1,124	0.2
Composite	715	273	0	988	0.2
Stone	45	555	0	600	0.1
Stone Dust	541	0	0	541	0.1
Pavers	39	0	0	39	0.01
Total (ft)	257,490	96,278	48,263	353,768	----
Total (miles)	49	18	9	----	76

Figures 4, 6, and 8 illustrate the total miles of each sidewalk material type within the three areas of interest. Each material type is further broken down into total miles of conditional ranking. In Figure 4, for example, asphalt makes up 26 miles of all the sidewalks in the Non-Historic section of the City, of which 12.3 miles are ranked in good condition. These graphs are useful in displaying which material types are in best and worst conditions through separating the material lengths by overall condition. Figures 5, 7, and 9 illustrate the total miles of sidewalk in each percent repair range. Each column is further broken down into miles of material type. Figure 5, for example, shows that 17 miles of all the sidewalk in the Non-Historic area of the City require no repair at all, of which 14.5 miles are concrete. These figures are helpful in displaying which section of the City, as well as what material types, requires the most repair.

Data was collected on 49 miles of sidewalk within the Non-Historic areas of the City. According to Figure 4, asphalt sidewalks, making up 26 miles of sidewalk, prevail throughout the area. The majority of which are ranked in fair or poor condition. Comparatively, concrete sidewalks, which trail behind asphalt's total by only four miles, are predominantly ranked in excellent condition. Figure 5 shows that the majority, or approximately 34 miles of sidewalk, require less than 20% repair, of which, concrete sidewalks account for 21 miles. Further, five miles of sidewalk are shown as requiring 50% repair or greater, the majority of which are made from asphalt.

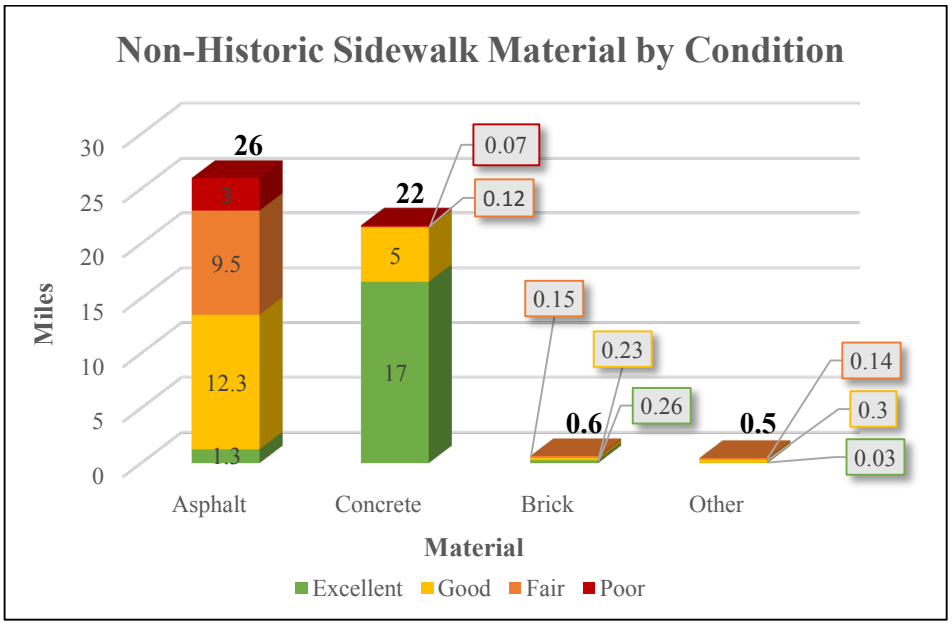


Figure 4 *Non-Historic sidewalk material by miles of conditional ranking.*

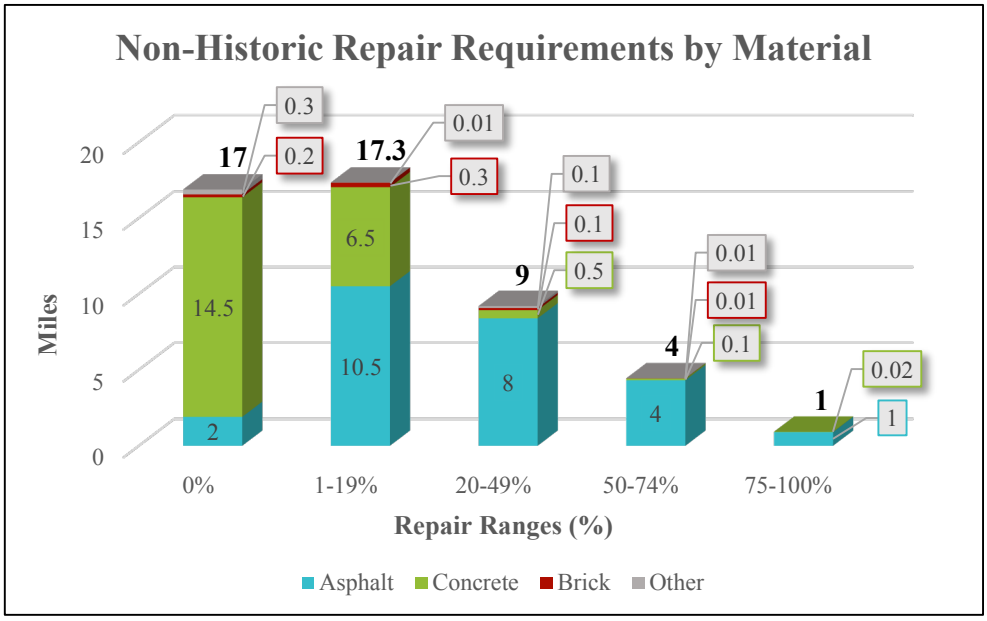


Figure 5 *Percent repair requirements for Non-Historic sidewalks by miles of material type.*

A separate analysis was prepared for the 18 miles of sidewalks located within Portsmouth's Historic District. Figure 6 illustrates that the overwhelming majority of sidewalks found in the area are brick ranked in excellent condition. Asphalt sidewalks only account for three miles of sidewalks collected in the area, of which, over half are ranked as either poor of fair. Conversely, concrete sidewalks in the Historic District, which make up five miles of the sidewalk in the area, are ranked mostly in excellent or good condition. Furthermore, Figure 7 shows nine miles of sidewalk, or half the total amount of sidewalk collected in the area, require no repair at all with brick representing the majority of the column. Sidewalks requiring 50% repair or greater accounted for only one mile of sidewalks in the area.

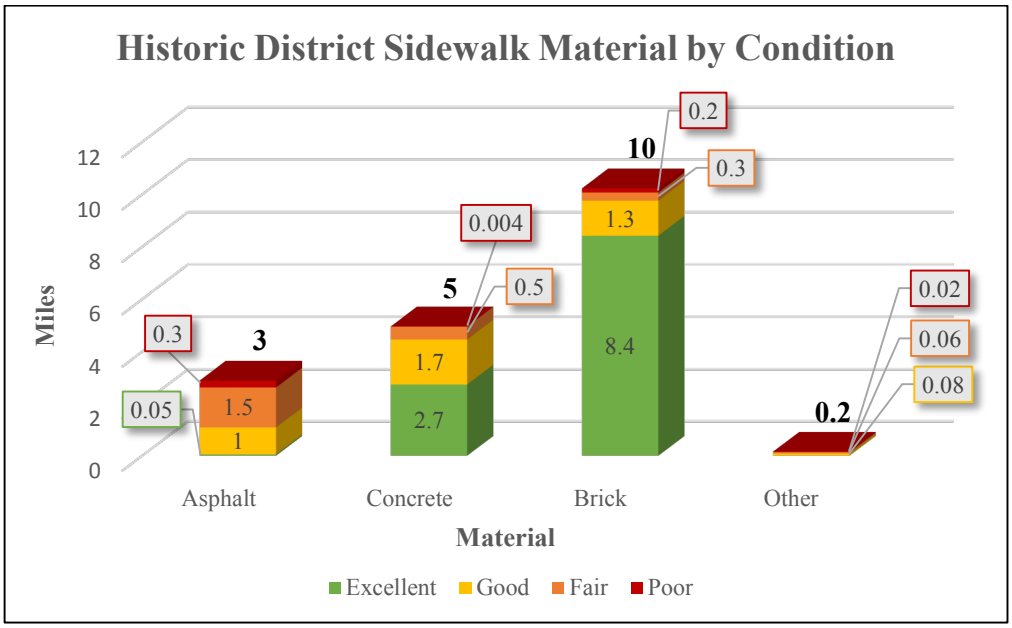


Figure 6 *Portsmouth's Historic District sidewalk material by miles of conditional ranking*

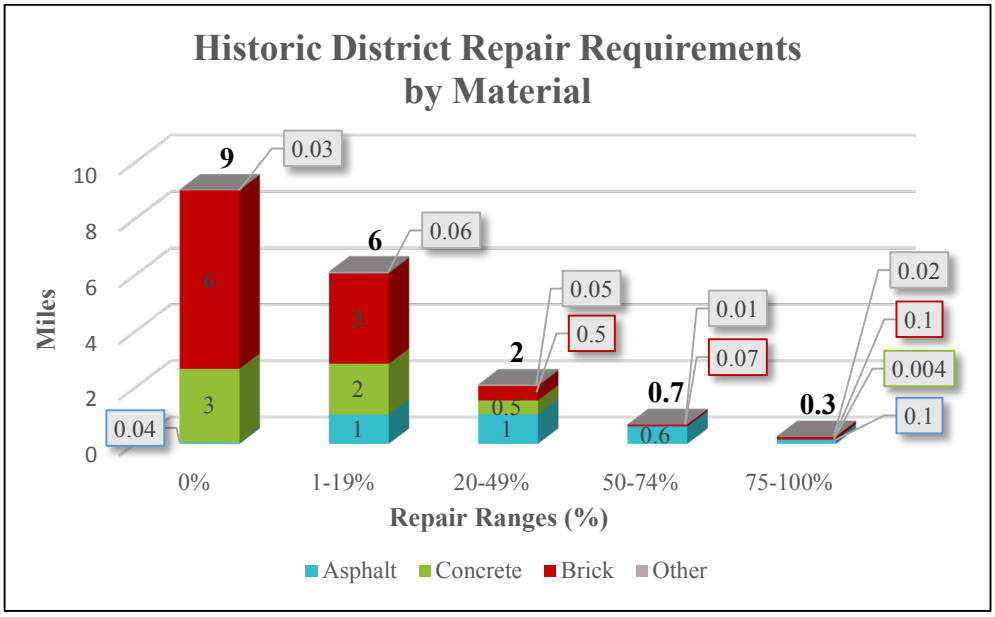


Figure 7 *Percent repair requirements for Portsmouth's Historic District sidewalks by miles of material type.*

Sidewalks within Pease International Tradeport totaled nine miles. Figure 8 illustrates that the majority of sidewalks within Pease are made of asphalt ranked in equal parts excellent, good, and fair. Of the three miles of concrete sidewalks throughout Pease, approximately three quarters are ranked in excellent condition with the remaining ranked in good condition. Repair requirements, illustrated in Figure 9, show 4.8 miles of sidewalk as requiring no repair at all, over half of which are concrete. Sidewalks requiring 50% repair or greater only surmount to .34 miles of sidewalk in the area.

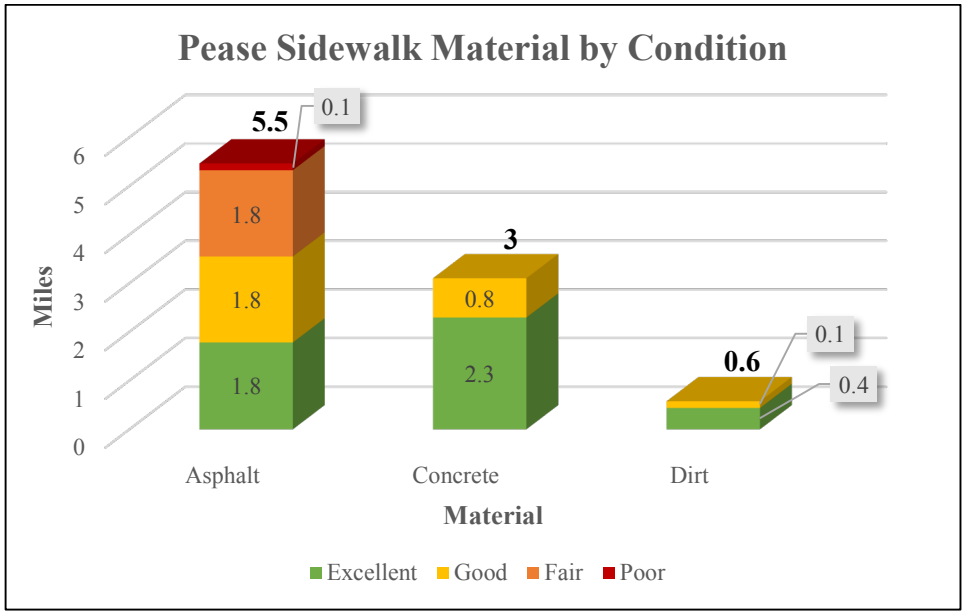


Figure 8 *Pease sidewalk material by miles of conditional ranking.*

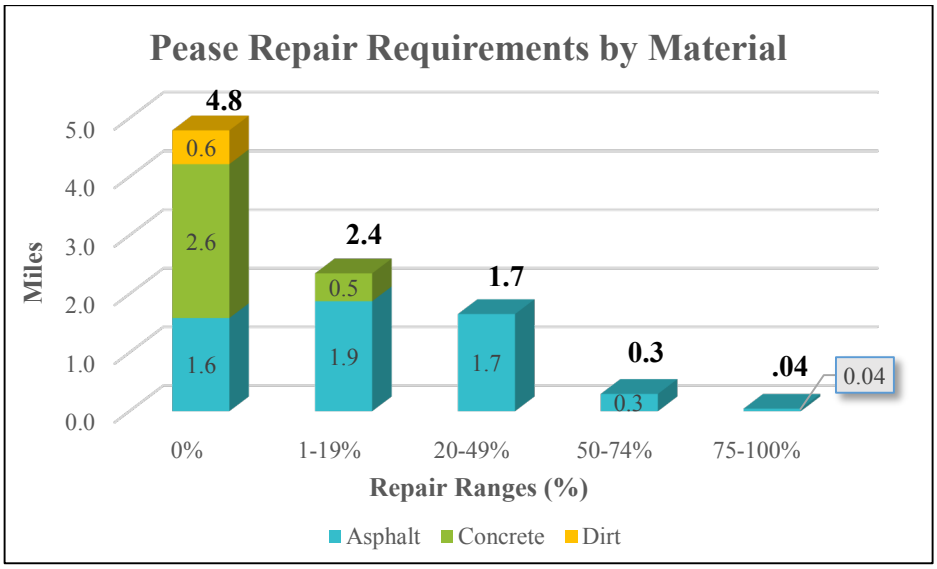


Figure 9 *Pease percent repair requirements by miles of material type.*

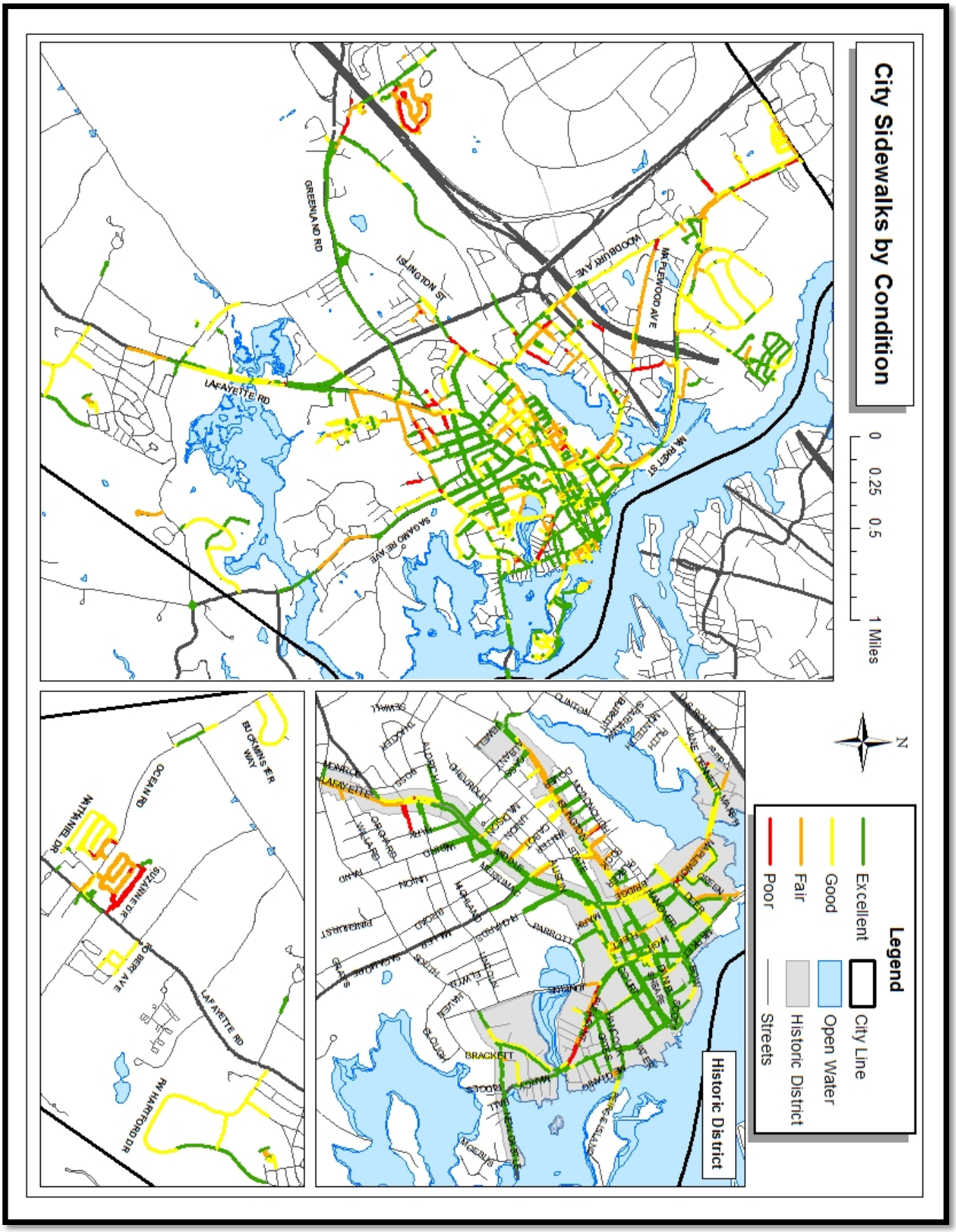
Lengths of sidewalk segments were organized by what street they were located on, their corresponding material type, and condition, as seen in Appendices A, B, and C. Appendices D, E, and F provide examples of the four conditional rankings for concrete, asphalt, and brick sidewalks.

Data Analysis

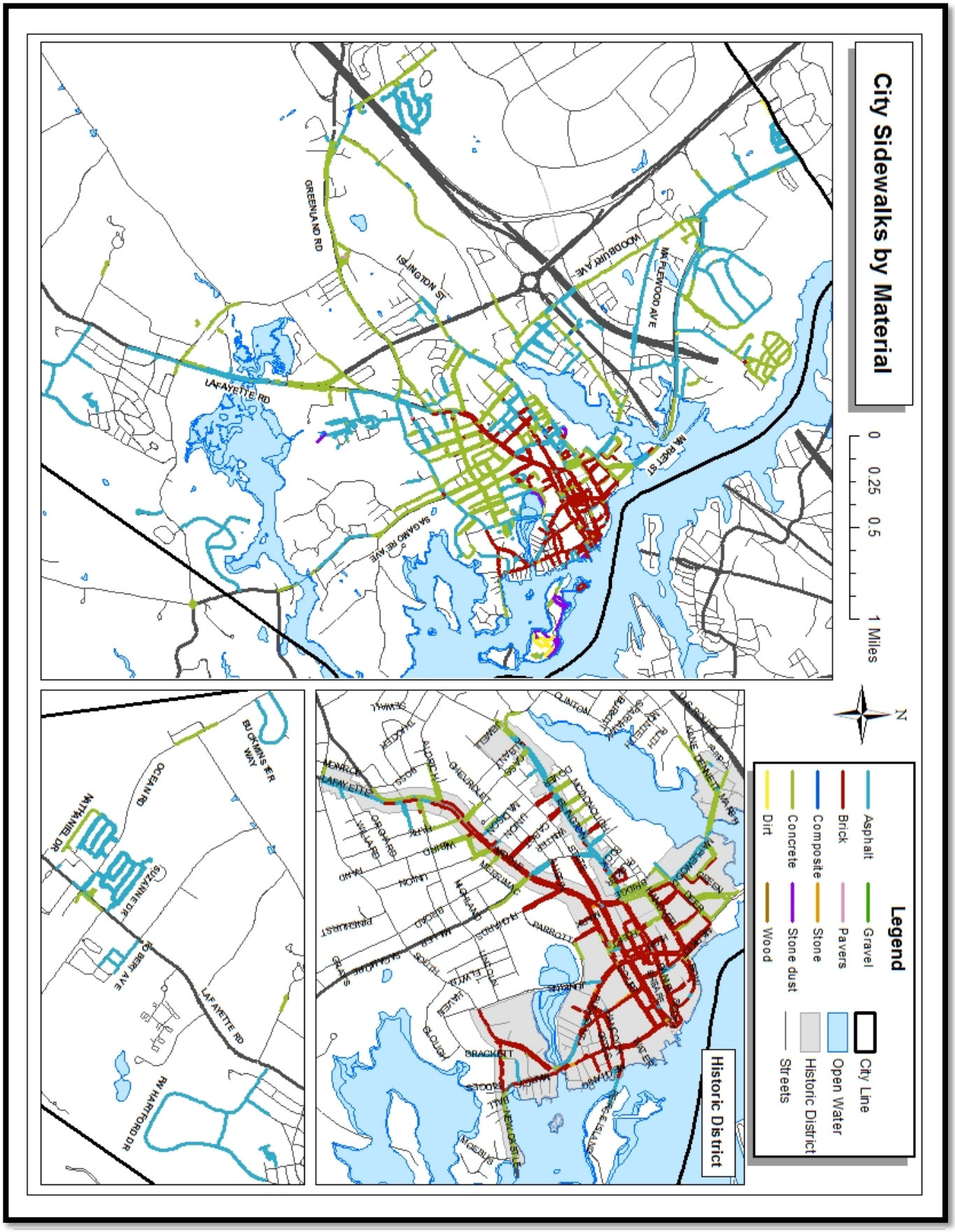
A series of maps were created in order to develop a better understanding of trends throughout the City regarding sidewalk conditions, materials, and overall usability. Separate maps were created for sidewalks within the Historic District and Pease International Tradeport. These maps provide a visual and spatial reference of areas throughout the City that have the potential to cause significant constraints on usability. Map 1 illustrates the conditional rankings of each sidewalk segment throughout the Non-Historic areas of the City, and, for those within the Historic District, outlined in grey. Although a majority of sidewalks are in excellent condition, certain areas are in need of greater attention. The majority of both Panaway Manor and Maple Haven residential areas sidewalks were consistently ranked as either poor or fair. Aside from these examples and a few other poor-rated segments, a large majority of sidewalks are in excellent or good condition. The materials of City sidewalk segments are shown in Map 2.

Similar to City sidewalks, the majority of Pease sidewalks were ranked as either excellent or good, as seen in Map 3, which shows sidewalk conditions and materials. Comparison of the condition and material maps for the three areas of the City show that sidewalks ranked as poor correlate with those having asphalt material. Further, sidewalks ranked in excellent condition were found to correlate with concrete or brick sidewalks.

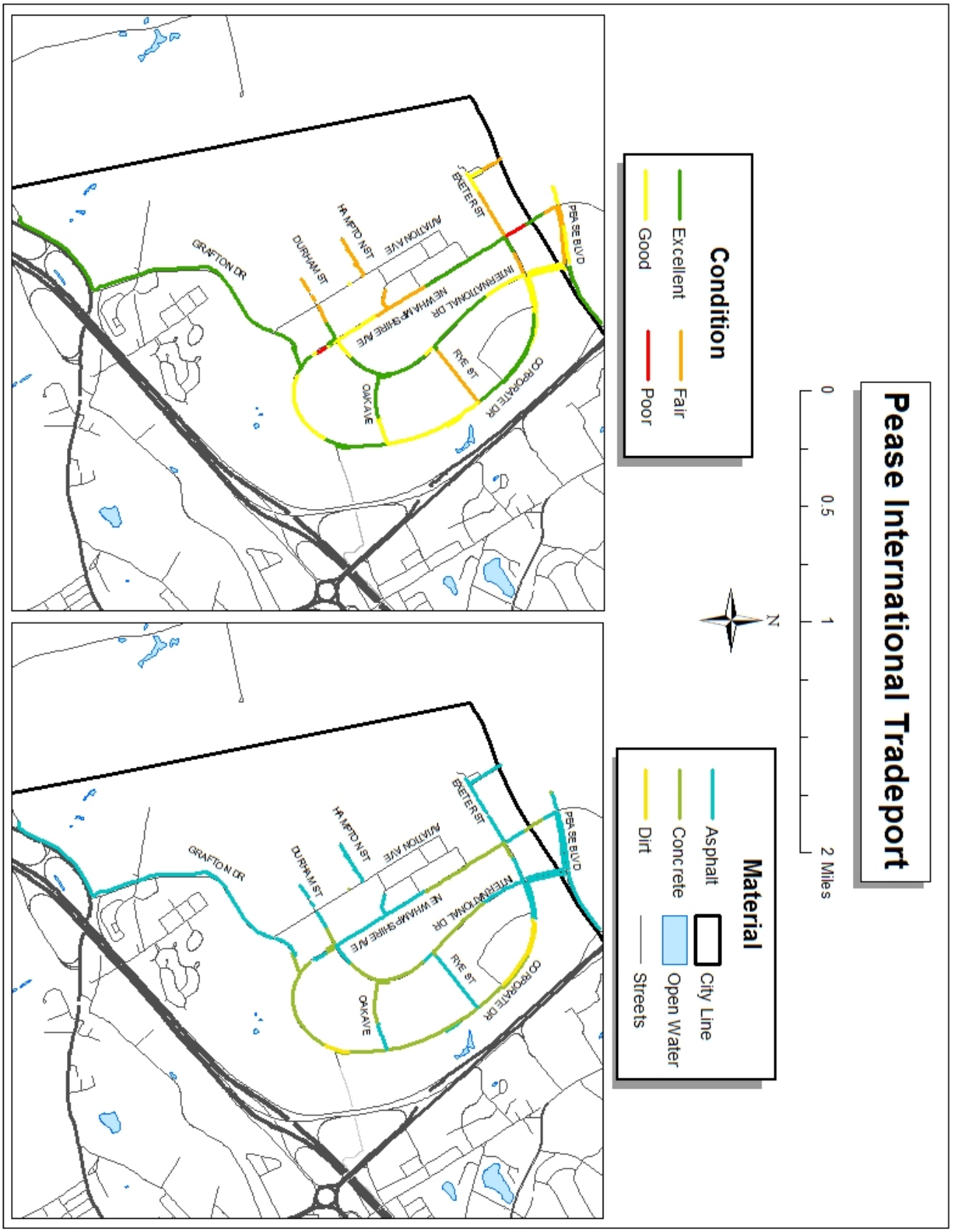
Map 1


City Sidewalks by Condition
Legend
Excellent
Good
Fair
Poor
City Line
Open Water
Historic District
Streets
0
0.25
0.5
1 Miles
N
Historic District
GREENLAND RD
ISLINGTON ST
WOODBURY AVE
MAPLEWOOD AVE
LAFAYETTE RD
MA RIVET ST
SAGAMORE AVE
BRACKETT
BLOCKMINSTER WAY
OCEAN RD
NATHANIEL DR
SUZANNE DR
ROBERT AVE
LAFAYETTE RD
FW HARTFORD DR

Map 2


City Sidewalks by Material
0 0.25 0.5 1 Miles
N
Legend
Asphalt
Brick
Composite
Concrete
Dirt
Gravel
Pavers
Stone
Stone dust
Wood
City Line
Open Water
Historic District
Streets
Historic District
GREENLAND RD
ISLINGTON ST
WOODBURY AVE
MAPLEWOOD AVE
LAFAYETTE RD
MARKET ST
SAGAMORE AVE
BUCKMINSTER WAY
OCEAN RD
NATHANIEL DR
SUZANNE DR
ROBERT AVE
LAFAYETTE RD
RW HARTFORD DR
BRACKETT
PARROTT
CLINTON
MONROE
LAFAYETTE
PINEHURST
MERRIMAC
MICHIGAN
GLOUCH
HAVEN
NEW CASTLE
MOEBUS
BALL
SCOTT
KANE
DENNETT
MARSH
GREEN
DEER
BRIDGE
MAPLEWOOD
MONROE
ALDRICH
CHEVROLET
MADISON
UNION
WALTER
CARTER
WILLARD
ORCHARD
WIBIRD
PAHO
LINCOLN
BROAD
MILLER
SAGAMORE
HUNTER
ELWYN
HAVEN
GLOUCH
SEWALL
THACKER
BOSS
ALDRICH
CHEVROLET
MADISON
UNION
WALTER
CARTER
MERRIMAC
MICHIGAN
RICHARDS
PARROTT
JUNIPER
BRIDGE
MAPLEWOOD
DEER
GREEN
KANE
DENNETT
MARSH
MONROE
LAFAYETTE
PINEHURST
MILLER
SAGAMORE
HUNTER
ELWYN
HAVEN
GLOUCH
BRACKETT
SCOTT
BALL
MOEBUS
NEW CASTLE

Map 3


Pease International Tradeport
0
0.5
1
2 Miles
N
Condition
Excellent
Fair
Good
Poor
Material
Asphalt
City Line
Concrete
Open Water
Dirt
Streets
PEASE BLVD
EXETER ST
HAMPTON ST
AVIATION AVE
INTERNATIONAL DR
DURHAM ST
GRAFTON DR
NEW HAMPSHIRE AVE
RYE ST
CORPORATE DR
OAK AVE

Budget Analysis

A budget was estimated outlining approximate costs for repairing or replacing existing sidewalks throughout the City, a summary of which can be seen in Table 2. Calculations were based on a number of factors. City policy mandates that sidewalks within the Historic District be constructed from brick while new sidewalks to be established outside the Historic District be installed as concrete. Calculations and cost estimates reflect these criteria. Estimates for the Historic District also include partial reconstruction for any brick sidewalks requiring 35% repair or less, while sidewalks requiring 40% repair or greater incorporate full replacement costs. The same criteria were used in calculating spot repair and full replacement costs for concrete sidewalks. The cost to widen sidewalks to the City standard of 5 feet was also incorporated into the budget for sidewalks already in disrepair requiring full replacement. Material and widening costs, outlined in Table 3, were used in the estimations. Calculations based on these criteria estimate it will cost the City of Portsmouth approximately $5.7 million to repair or replace sidewalks throughout the Non-Historic and Historic District ranked poor or fair with the appropriate materials and width.

Table 2 *Repair/replacement cost estimations for sidewalks in Non-Historic and Historic areas of the City*

	City	Historic	Total
Asphalt	4,157,757	880,120	5,037,877
Concrete	77,080	328,581	405,661
Brick	56,284	152,494	208,778
Composite	45,272	46,295	91,567
Stone		11,885	11,885
Pavers	2,302		2,302
Total	4,338,695	1,419,375	5,758,070

Table 3 *Material, replacement, and widening costs used in budget calculations*

	Removal Costs / Sq.ft.	Widening Costs / Sq.ft.	Material Costs / Sq.ft.
Asphalt	$2.00	$5.00	$6.50
Concrete	$4.00	$5.00	$10.00
Brick	$3.00	$5.00	$14.00
Composite	$4.00	$5.00	
Stone	$3.00	$5.00	
Pavers	$4.00	$5.00	

Calculations for replacement and spot repair were completed for the entire data set, where applicable. Information was placed in a pivot table using Excel Office where it can be sorted and filtered based on individual project requirements.

Conclusion

The City of Portsmouth Department of Public Works created and conducted a conditional sidewalk assessment of City maintained sidewalks. The assessment provides the City with an updated GIS layer of sidewalk centerlines consisting of observed and estimated attributes. Results from the assessment showed that for each of the three areas of the City, the majority of sidewalks were ranked as either in excellent or good overall condition with a large majority of each requiring no repair. Through comparison of the condition and material maps, sidewalks ranked as poor consistently correlated with asphalt material while those ranked as excellent correlated with concrete or brick material. The budget analysis estimated it would cost the City approximately $5.7 million to repair or replace poor and fair rated sidewalks within the Historic District and Non-Historic areas of the City. The results from the assessment give City staff a clear depiction of the overall conditions of the City's sidewalks. Data collected can also supplement future construction projects and cost analyses. Furthermore, it will help guide where work needs to, or could be done, thus aiding in infrastructure up keep.

Appendices

Appendix A – City Sidewalk Lengths (ft)

Street/Material	Excellent	Good	Fair	Poor	Total
ALBACORE WAY					**708**
concrete	708				708
ALDRICH RD					**2652**
concrete	2652				2652
ANDREW JARVIS DR					**799**
asphalt			799		799
ANNE AVE					**368**
asphalt		368			368
ARTHUR F BRADY DR					**920**
asphalt			169	479	648
concrete	273				273
ASH ST					**433**
concrete	433				433
AUSTIN ST	**672**	**1075**			**1950**
asphalt		723		202	926
brick	299				299
concrete	373	352			726
BARTLETT ST		**916**			**2880**
asphalt		644	1565	336	2545
concrete	64	192			256
dirt		79			79
BEDFORD WAY					**374**
asphalt			374		374
BLUE HERON DR					**2208**
asphalt		1853	355		2208
BORTHWICK AVE		**545**			**3967**
asphalt		106			106
concrete	3423	439			3861
BOSS AVE					**625**
asphalt			272		272
concrete	353				353
BRACKETT RD					**221**
concrete	221				221
BREWERY LN	**289**				**576**
asphalt	45				45
concrete	245	287			531
BREWSTER ST					**259**
asphalt			259		259

Street/Material	Excellent	Good	Fair	Poor	Total
BRIDGE ST	**269**				**369**
brick	199				199
concrete	70		100		170
BRIGHAM LN					**436**
concrete	436				436
BROAD ST					**3464**
concrete	1213	2251			3464
BUCKMINSTER WAY					**3008**
asphalt		3008			3008
BURKITT ST					**97**
asphalt		84			84
concrete	13				13
CABOT ST	**120**	**661**			**780**
brick	49	597			646
composite		63			63
concrete	71				71
CAMPUS DR					**434**
concrete	434				434
CARDINAL LN					**112**
asphalt	112				112
CASS ST					**1522**
concrete	1522				1522
CHASE DR					**874**
asphalt			874		874
CHATHAM ST		**326**			**326**
asphalt		42			42
concrete		284			284
CLINTON ST					**747**
asphalt			77	670	747
CLOUGH DR					**1853**
asphalt		1448			1448
concrete	404				404
COAKLEY RD					**217**
concrete	217				217
COLONIAL DR					**7337**
asphalt			4618	2381	6999
concrete	338				338
COLUMBIA CT					**23**
asphalt		23			23
COLUMBIA ST					**543**
asphalt		347	196		543

Street/Material	Excellent	Good	Fair	Poor	Total
COMMERCE WAY					**400**
asphalt		400			400
CONCORD WAY					**1252**
concrete	1252				1252
CORNWALL ST					**132**
concrete	132				132
COTTAGE ST	**1210**				**1361**
asphalt				84	84
concrete	1181	66			1247
dirt	29				29
CRESCENT WAY					**1094**
concrete	339	755			1094
CUTTS ST					**881**
asphalt				881	881
DECATUR RD					**1754**
asphalt			1754		1754
DENISE ST					**1592**
asphalt		1592			1592
DENNETT ST					**2419**
concrete	881	1538			2419
DOVER ST					**87**
concrete	87				87
DUNLIN WAY					**1048**
asphalt	466	583			1048
DURGIN LN					**748**
asphalt		572	176		748
ECHO AVE					**71**
concrete	71				71
ELWYN AVE					**2060**
concrete	2060				2060
ELWYN RD					**340**
concrete	340				340
ESSEX AVE					**96**
concrete	96				96
FALKLAND PL					**285**
concrete	20	264			285
FILLMORE RD					**313**
asphalt		313			313
FRANKLIN DR					**643**
asphalt			643		643
FRENCHMAN'S LN					**178**
concrete	178				178

Street/Material	Excellent	Good	Fair	Poor	Total
FRIEND ST					**131**
concrete	131				131
FW HARTFORD DR					**6879**
asphalt	2534	4345			6879
GEORGES TER					**434**
asphalt			434		434
GOSLING RD		**685**			**1851**
asphalt		126	1165		1291
dirt		559			559
GOSPORT RD					**2735**
asphalt	176	2559			2735
GRANITE ST					**1273**
asphalt		168			168
concrete	1105				1105
GREENLAND RD			**713**		**5331**
asphalt			483	632	1115
composite			230		230
concrete	3986				3986
GREENLEAF AVE					**1641**
concrete		1641			1641
GREENSIDE AVE					**89**
concrete			89		89
GRIFFIN RD					**211**
asphalt		138			138
concrete	72				72
HALL CT					**320**
asphalt			320		320
HANOVER ST		**666**			**1664**
asphalt		142	728	270	1140
concrete		479			479
stone		45			45
HAVEN RD					**1143**
concrete	1143				1143
HAWTHORNE ST	**496**				**496**
brick	82				82
concrete	414				414
HIGHLAND ST					**1273**
concrete	910	363			1273
HOOVER DR					**774**
asphalt		774			774

Street/Material	Excellent	Good	Fair	Poor	Total
ISLINGTON ST		**2204**		**1299**	**4773**
asphalt		2037	92	999	3128
concrete	1178	168		300	1645
JOAN AVE					**453**
asphalt		453			453
JUNKINS AVE					**2217**
asphalt		1894	323		2217
KEARSARGE WAY		**1965**			**2910**
asphalt		1540			1540
concrete	945	425			1370
KENSINGTON RD					**464**
asphalt		254			254
concrete				210	210
KENT ST					**828**
concrete	828				828
LAFAYETTE RD	**6204**				**13862**
asphalt	312	4972	2677	9	7970
concrete	5892				
LANGDON ST					**64**
asphalt			64		64
LAUREL CT					**941**
concrete	941				941
LAWRENCE ST					**329**
asphalt				329	329
LEDGEWOOD DR					**352**
concrete	352				352
LINCOLN AVE					**5649**
concrete	4908	741			5649
LONGMEADOW RD					**286**
concrete	286				286
LOVELL ST					**303**
concrete	303				303
MADISON ST					**375**
asphalt		375			375
MAPLEWOOD AVE				**373**	**4294**
asphalt	170	574	3178	258	4180
concrete				115	115
MARCY ST	**184**				**219**
brick	26				26
concrete	158	35			193
MARIETTE DR					**4835**
asphalt		3797	565	474	4835

Street/Material	Excellent	Good	Fair	Poor	Total
MARKET ST	**2006**	**6487**	**1006**		**9499**
asphalt	641	5023	807		6470
brick	54		119		173
composite		17			17
concrete	1310	1448			2758
dirt			81		81
MASON AVE					**1138**
asphalt			1138		1138
MCDONOUGH ST			**559**		**2082**
asphalt			559		559
concrete	1524				1524
MELBOURNE ST					**413**
asphalt			370	44	413
MENDUM AVE				**37**	**37**
asphalt				37	37
MERRIMAC ST					**827**
concrete	827				827
MICHAEL SUCCI DR					**198**
asphalt			198		198
MIDDLE RD					**5020**
concrete	5020				5020
MILLER AVE					**3125**
concrete	3125				3125
MIRONA RD	**385**				**385**
asphalt	220				220
concrete	165				165
MONROE ST					**296**
asphalt			255		255
concrete	40				40
MYRTLE AVE					**435**
asphalt				435	435
NATHANIEL DR					**1457**
concrete		1457			1457
NEW CASTLE AVE					**1804**
asphalt		123			123
concrete	1682				1682
NEW HAMPSHIRE AVE					**72**
asphalt			72		72
OAKWOOD DR					**940**
asphalt			940		940

Street/Material	Excellent	Good	Fair	Poor	Total
OCEAN RD		**893**			**2136**
asphalt		547	477		1024
concrete	766	346			1112
ODIORNE POINT RD					**3277**
asphalt	1718	1559			3277
ORCHARD ST		**78**			**580**
asphalt			333	169	503
brick		46			46
concrete		32			32
OSPREY DR					**1876**
asphalt		1876			1876
PAMELA ST					**949**
asphalt			949		949
PARK ST					**634**
concrete	634				634
PARROTT AVE	**1672**	**1966**	**780**		**4418**
asphalt	227	967	681		1875
brick	41				41
concrete	1403	222	99		1724
dirt		237			237
stone dust		541			541
PATRICIA DR					**27**
concrete		27			27
PEARL ST					**275**
asphalt			106	169	275
PEIRCE ISLAND RD					**786**
concrete	63	723			786
PEVERLY HILL RD					**1771**
concrete	368	1403			1771
PINE ST					**712**
asphalt		712			712
PINEHURST RD					**383**
asphalt				383	383
PLAINS AVE					**422**
concrete	422				422
PORPOISE WAY					**553**
concrete	553				553
PORTSMOUTH BLVD					**2151**
asphalt		2012			2012
dirt	140				140
PREBLE WAY					**426**
concrete	426				426

Street/Material	Excellent	Good	Fair	Poor	Total
RALEIGH WAY					**1223**
concrete	1223				1223
RANGER WAY					**750**
concrete	750				750
RICCI AVE					**388**
asphalt		388			388
RICHARDS AVE					**3443**
concrete	3443				3443
ROBERT AVE					**907**
asphalt		907			907
ROCK ST					**225**
asphalt			138	87	225
ROCKINGHAM AVE					**154**
concrete	154				154
ROCKLAND ST					**1922**
concrete	1922				1922
ROGERS ST					**155**
concrete	155				155
RUTLAND ST					**58**
asphalt			58		58
RYE TRAFFIC CIRCLE - SAGAMORE AVE					**443**
concrete	443				443
SAGAMORE AVE					**5291**
asphalt			1626		1626
concrete	3664				3664
SANDERLING WAY					**663**
asphalt		618			618
concrete	46				46
SARATOGA WAY					**682**
concrete	382	300			682
SCHURMAN AVE					**228**
asphalt			228		228
SHEARWATER DR					**1181**
asphalt		166	1014		1181
SHEFFIELD RD					**219**
asphalt		42	177		219
SHERBURNE AVE					**1329**
concrete	786	543			1329
SHERBURNE RD			**300**		**3165**
asphalt			199		199
composite			101		101
concrete	2404	462			2865

Street/Material	Excellent	Good	Fair	Poor	Total
SIMONDS RD					**1637**
asphalt			1469	168	1637
SOUTH ST		**1931**			**5347**
asphalt		1874	2476	127	4477
brick		57			57
concrete	813				813
SPARHAWK ST			**769**		**769**
asphalt			769		769
SPINNAKER WAY					**3325**
concrete	42	3283			3325
SPRING ST					**170**
concrete	170				170
STARK ST			**387**		**831**
asphalt			82		82
composite			305		305
concrete	359	85			444
STATE ST	**561**	**1339**	**885**		**2785**
asphalt		657	441		1098
brick	438	474	444		1356
concrete	123	208			331
STAYSAIL WAY		**197**			**764**
asphalt		43			43
concrete	566	154			720
SUDBURY ST			**235**		**333**
asphalt			105	99	203
brick			130		130
SUMMER ST		**234**			**798**
asphalt		221	362		583
brick		13			13
concrete	202				202
SUMMIT AVE					**553**
asphalt			553		553
SUNSET DR					**828**
asphalt		828			828
SUZANNE DR					**7309**
asphalt			3798	3511	7309
TAFT RD					**699**
asphalt		699			699
TANNER ST					**44**
asphalt			44		44
THAXTER RD					**1321**
concrete	116	1205			1321

Street/Material	Excellent	Good	Fair	Poor	Total
THORNTON ST					**1397**
asphalt		164	1211	21	1397
TJ GAMESTER AVE					**915**
asphalt		915			915
UNION ST	**2491**		**877**		**3887**
asphalt		519	809		1328
brick	135		68		203
concrete	2355				2355
VICTORY RD					**125**
asphalt		73	52		125
WALLIS RD					**1504**
asphalt			1504		1504
WARD PL					**24**
concrete	24				24
WEALD RD					**655**
asphalt		655			655
WEDGEWOOD RD					**2635**
asphalt		2635			2635
WHIPPLE CT					**432**
asphalt				432	432
WIBIRD ST	**2454**				**2454**
brick	57				57
concrete	2397				2397
WILLARD AVE			**1354**		**1801**
asphalt			1177	448	1625
brick			45		45
concrete			92		92
pavers			39		39
WILSON RD					**93**
asphalt		93			93
WINCHESTER ST					**157**
concrete	157				157
WINSOR RD					**660**
asphalt		660			660
WINTER ST					**332**
concrete		332			332
WOODBURY AVE		**7052**			**14040**
asphalt		3401	2872	1548	7821
concrete	2569	3651			6220
WORTHEN RD					**99**
asphalt		99			99
Grand Total	**95,417**	**93,617**	**52,150**	**16,306**	**257,490**

Appendix B – Pease Sidewalk Lengths (ft)

Street/Material	Excellent	Good	Fair	Poor	Total
AIRLINE AVE					**745**
asphalt		280	465		745
AVIATION AVE					**24**
concrete		24			24
CORPORATE DR	**5773**	**6966**			**12969**
asphalt		2032		230	2262
concrete	3459	4209			7667
dirt	2315	725			3040
DURHAM ST					**1274**
asphalt			824		824
concrete	450				450
EXETER ST					**1550**
asphalt		493	1057		1550
GRAFTON DR	**8346**				**8346**
asphalt	7868				7868
concrete	478				478
HAMPTON ST					**1032**
asphalt			1032		1032
INTERNATIONAL DR					**7366**
asphalt		3553			3553
concrete	3813				3813
MANCHESTER SQ					**916**
asphalt			518		518
concrete	398				398
NEW HAMPSHIRE AVE					**5750**
asphalt		1068	1628	505	3201
concrete	2549				2549
OAK AVE					**1589**
asphalt		654			654
concrete	935				935
PEASE BLVD		**1279**			**4622**
asphalt	1541	1253	1802		4597
concrete		25			25
ROCHESTER AVE					**485**
asphalt			485		485
RYE ST					**1596**
asphalt			1559		1559
concrete	37				37
Grand Total	**23,842**	**14,317**	**9,370**	**735**	**48,264**

Appendix C – Historic District Sidewalk Lengths (ft)

Street/Material	Excellent	Good	Fair	Poor	Total
ALDRICH RD					**938**
concrete	938				938
ATKINSON ST					**302**
brick	302				302
AUSTIN ST					**505**
brick	63	442			505
BARTLETT ST					**365**
concrete	365				365
BOW ST	**1121**	**257**			**1378**
asphalt		73			73
brick	1105	184			1289
concrete	16				16
BRACKETT RD					**550**
asphalt		550			550
BREWSTER ST					**474**
asphalt			474		474
BRIDGE ST					**1104**
concrete	99	332	672		1104
CABOT ST					**2111**
brick		1011	484		1495
concrete	616				616
CASS ST					**1254**
concrete	1254				1254
CERES ST	**372**				**372**
brick	303				303
concrete	69				69
CHAPEL ST					**426**
brick	426				426
CHAUNCEY ST					**577**
concrete	577				577
CHESTNUT ST					**315**
brick	315				315
CHURCH ST					**363**
brick	335	28			363
COLUMBIA ST					**221**
asphalt		221			221
COMMERCIAL ALY					**193**
brick	193				193
CONGRESS ST					**1498**
brick	1498				1498

Street/Material	Excellent	Good	Fair	Poor	Total
CORNWALL ST					**309**
concrete	309				309
COURT PL					**302**
asphalt		152			152
concrete			150		150
COURT ST		**1203**			**4068**
brick	2864	958			3823
concrete		245			245
DANIEL ST	**1668**				**1873**
brick	1620				1620
concrete	48	205			252
DEER ST		**1679**			**2283**
asphalt		325			325
brick	603	125			729
concrete		1229			1229
DENNETT ST					**1434**
concrete	337	1097			1434
DOVER ST					**340**
concrete	340				340
DUTTON AVE	**396**				**396**
brick	369				369
concrete	28				28
FLEET ST		**746**	**592**		**1511**
asphalt		36			36
brick	173	37	93		303
concrete		673	473		1146
stone			27		27
GARDNER ST					**283**
brick	283				283
GATES ST					**932**
brick	932				932
GREEN ST					**170**
brick	170				170
HANCOCK ST					**1130**
brick	1130				1130
HANOVER ST		**715**			**2210**
brick	1402	157			1559
concrete		558	93		651
HIGH ST		**702**			**1195**
brick	493	349			841
concrete		353			353
HIGHLAND ST					**402**
concrete	402				402

Street/Material	Excellent	Good	Fair	Poor	Total
HUMPHREY'S CT					**400**
asphalt		339			339
concrete			61		61
ISLINGTON ST	**997**	**1225**	**3563**		**5785**
asphalt	200	860	3236		4296
brick	194	35	53		282
composite			273		273
concrete	604	330			934
JUNKINS AVE					**257**
asphalt			257		257
LADD ST					**432**
brick	432				432
LAFAYETTE RD					**1357**
asphalt		351	1005		1357
LANGDON ST			**286**		**618**
asphalt		101	79		181
brick			207	231	438
LINCOLN AVE	**652**				**652**
brick	41				41
concrete	611				611
LIVERMORE ST					**224**
asphalt				35	35
brick	56	133			189
MADISON ST	**332**				**859**
asphalt		488			488
brick	67		38		105
concrete	265				265
MANNING ST					**45**
brick	45				45
MAPLEWOOD AVE	**601**	**2248**	**1834**		**4803**
asphalt		44	1530	120	1694
brick	373				373
concrete	228	2204	303		2735
MARCY ST	**3204**	**227**			**3431**
asphalt		161			161
brick	3127				3127
concrete	76				76
stone		65			65
MARK ST					**219**
brick			219		219
MARKET SQ					**318**
brick	106	211			318

Street/Material	Excellent	Good	Fair	Poor	Total
MARKET ST	**2429**				**2429**
brick	1988				1988
concrete	441				441
MECHANIC ST					**470**
asphalt			157		157
brick	312				312
MENDUM AVE					**667**
asphalt				667	667
MIDDLE RD					**150**
concrete	150				150
MIDDLE ST		**1648**	**274**		**8080**
asphalt		179	95	44	318
brick	6113	497	179		6789
concrete		905			905
stone		67			67
MILLER AVE					**1134**
concrete	1134				1134
NEW CASTLE AVE	**2184**				**2184**
brick	932				932
concrete	1252				1252
PARK ST					**553**
concrete	553				553
PARKER ST					**186**
brick	186				186
PARROTT AVE					**310**
concrete	310				310
PEIRCE ISLAND RD					**657**
asphalt		483			483
brick	175				175
PENHALLOW ST		**346**			**1104**
asphalt		221	91		311
brick	667	125			792
PLEASANT ST		**1038**	**418**	**1199**	**4526**
asphalt		140	84	523	747
brick	1871	864	284	588	3608
concrete		34	50		84
stone				88	88
PORTER ST					**891**
brick	823		68		891
PORTWALK PL					**821**
brick	821				821
PROSPECT ST					**102**
asphalt		102			102

Street/Material	Excellent	Good	Fair	Poor	Total
RAYNES AVE					**390**
concrete	173	217			390
RICHARDS AVE					**1359**
brick	1359				1359
ROCK ST					**237**
asphalt			237		237
ROCKINGHAM AVE					**307**
concrete	307				307
ROGERS ST					**708**
brick	708				708
RUSSELL ST					**1263**
concrete	471		792		1263
SALEM ST					**590**
concrete	590				590
SCOTT AVE	**223**				**223**
brick	200				200
concrete	22				22
SOUTH MILL ST					**32**
brick	32				32
SOUTH SCHOOL ST					**105**
brick	43				43
concrete		61			61
SOUTH ST	**1315**				**2500**
brick	1127	1185			2312
concrete	188				188
STATE ST	**5847**				**5856**
asphalt	72	9			81
brick	5734				5734
concrete	41				41
SUMMER ST					**1170**
asphalt		652	480		1132
brick	38				38
TANNER CT					**171**
brick	171				171
TANNER ST					**194**
brick	194				194
UNION ST					**1519**
asphalt			145		145
brick		740			740
concrete	635				635

Street/Material	Excellent	Good	Fair	Poor	Total
VAUGHAN ST					**1240**
brick	609				609
concrete		631			631
WALKER ST					**23**
concrete				23	23
WASHINGTON ST					**1616**
asphalt			81		81
brick	1227				1227
stone		308			308
WIBIRD ST	**1158**				**1158**
brick	113				113
concrete	1045				1045
WILLARD AVE					**171**
asphalt			171		171
Grand Total	**59,233**	**22,083**	**12,644**	**2,319**	**96,279**

Appendix D – Concrete Conditional Ranking Examples

Excellent

Good

Fair

Poor

Appendix E– Asphalt Conditional Ranking Examples

Excellent

Good

Fair

Poor

Appendix F – Brick Conditional Ranking Examples

Excellent

Good

Fair

Poor