GENERAL AVIATION
NEW ENGLAND
Regional Airport System Plan

Task C-6 – *Assessment of System Maintenance Costs*

The **Louis Berger Group, Inc.**

In Association With:

Airport Solutions Group

ICF SH&E

GENERAL AVIATION
NEW ENGLAND
Regional Airport System Plan

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Section 1

Scope

Scope

Scope of Task C-6: Assessment of System Maintenance Costs

The goal of this task is to develop an assessment of the runway and taxiway pavement conditions which currently exists in the New England general aviation airport system, as well as the projected costs associated with rehabilitating the same. The assessment is specifically targeted at runways and taxiways because they typically consume the largest portion of AIP funding every year. The overall results of this system assessment can broadly, but effectively, be used to:

- *Provide an understanding of future funding levels that may be required to rehabilitate the runway/taxiway pavements of the New England general aviation airports;*
- *Provide a comparison of these costs to projected future FAA AIP funding levels;*
- *Provide an understanding of the potential shortfall in funding levels;*
- *Provide a metric in developing funding priorities;*
- *Provide state and local officials with a long-range budget outlook to rehabilitate the runway and taxiway infrastructure for their state system of general aviation airports; and*
- *Provide a perspective of the New England funding capabilities and requriements on a national level.*

Scope *(continued)*

Scope of Task C-6: Assessment of System Maintenance Costs (continued)

While the results of this assessment of the New England general aviation airports provides a "macro" view of the regional system, this task was actually completed utilizing a "micro" or "bottom-up" approach. Specifically, each system airport's existing airfield conditions served as the basis of the analysis for establishing a planning level cost forecast to maintain those airports' runway and taxiway pavement surfaces in a state of good repair. An assessment of unit costs associated with system pavement maintenance was also developed. Estimates assumed one major capital reconstruction project and three major maintenance projects (at 5-year, 10-year, and 15-year intervals) during a typical 20-year life-cycle period. Capital reconstruction costs were developed for both partial and full depth scenarios to provide for a reasonable range and to account for the fact that either application could be utilized based on specific site conditions.

It is important to note that the runway and taxiway rehabilitation costs provided do not include any costs for meeting new airport design standards, obstruction clearing, drainage, airfield lighting signs, NAVAIDS, Runway Safety Area construction, etc. Estimating these costs requires detailed analyses of site-specific conditions, which are beyond the focus of this study effort. Notwithstanding these points, this assessment nevertheless provides an effective snapshot of the potential future cost burden associated with simply sustaining the existing airfield pavement in the New England GA system.

Section 2

Methodology

Methodology

Methodology – Survey and Cost Calculations

In order to project future maintenance costs, the initial phase of the costing methodology included an inventory of the current year (2012) pavement conditions and pavement areas. Airport Solutions Group, LLC (ASG), with the assistance of the respective New England states, conducted a regional inventory of the pavement condition at the study airports. The focus of the inventory targeted conditions for paved runways and taxiways (i.e. asphalt and concrete). Turf runways in the system were not included in this assessment.

Currently, there are a total of 368 landing sites (excluding heliports and seaplane bases) in New England. Of these, 156 are included in the National Plan of Integrated Airport Systems (NPIAS), making these publicly or privately-owned facilities eligible to apply to the FAA for financial assistance under the FAA's Airport Improvement Program (AIP). It should be noted that the NPIAS is structured to categorize airports into commercial service airports (identified in the plan as either Commercial Service or Non-Primary) and general aviation airports (identified in the plan as either Reliever or General Aviation). It is also important to recognize that airports that accommodate commercial service activities also commonly accommodate general aviation activities, and that the number and impact of those general aviation activities often far outweigh that of the commercial service activities. Since the focus of this study is general aviation, it is critical that those commercial service airports that also accommodate general aviation activities to a significant level (in total number of operations and/or percent of airport operations) also be considered.

Therefore, since this study's focus is on general aviation activities and the airports that accommodate them, this assessment must consider the maintenance costs associated not just with those airports singularly dedicated to general aviation, but also those commercial service airports that provide important access and capacity for the general aviation industry. Specifically, this assessment considers those study airports (both commercial and general aviation) having paved runway and/or taxiway surfaces. Application of these criteria resulted in a total of 100 New England study airports included in this assessment - twelve (12) Connecticut airports, thirty-three (33) Maine airports, twenty-seven (27) Massachusetts airports, thirteen (13) New Hampshire airports, five (5) Rhode Island airports, and ten (10) Vermont airports.

The data collection effort conducted for each runway and taxiway produced an inventory of information related to the type(s) of pavement, the pavement dimensions (length and width), the current age of the pavement (based on the last major construction or reconstruction project), past maintenance history, and the current condition for the runway and taxiway pavements.

Since the study program did not require on-site inspections of every airport, data was collected primarily through desktop research and the distribution of survey questionnaires. Specifically, ASG developed, produced, and distributed a pavement-focused questionnaire to each study airport for completion. Airport managers were encouraged to seek input and assistance from

Methodology *(continued)*

their respective engineering consultants to ensure a complete and accurate response. State aviation offices also served as effective facilitators of the data collection effort, providing additional information to supplement data obtained from the airports.

Since site-specific pavement maintenance needs at each system airport could not be evaluated in depth, assumptions were defined for strength requirements and appropriate methods of reconstruction. A conservative approach was taken in the costing methodology in order to ensure that projected costs were not underestimated. All runways and taxiways were assumed to require reconstruction with bituminous concrete during their typical 20-year life-cycle period. Additionally, it was assumed that all runways and taxiways would receive three cycles of maintenance (at years 5, 10 and 15) during that same time period. Through ASG's experience and feedback from state aviation agencies and the FAA, it was determined that costs for both partial depth and full depth reconstruction would be included in the final estimate.

Standard life-cycle costs for construction and maintenance were developed for the purpose of understanding order-of-magnitude funding needs. Note that these costs are not intended to replace more detailed Capital Improvement Program (CIP) cost estimates for a given airport. Nevertheless, the "bottom up" approach using the actual pavement dimensions at each study airport provides a reasonable level of confidence in the assessment of cost for the state and the regional system.

That primary costing methodology was further enhanced by incorporating other considerations and variables to better approximate "real world" conditions. For example, in lieu of implementing one costing standard across the entire system, airports were further categorized by their FAA airport design classification (i.e. Airport Reference Code or ARC) since pavement demands at airports vary directly with the size and type of aircraft that they regularly service. For each classification, specific unit costs were developed to reflect their real world application in that airports that accommodate larger aircraft will generally require a more robust pavement structure, while smaller aircraft would typically require a less robust and, consequently, less expensive one.

Additionally, contingency factors were applied in order to ensure that any extenuating circumstances known to be present at a given airport could be considered and factored in to its cost assessment. For example, a contingency factor was applied to Martha's Vineyard Airport and Nantucket Memorial Airport in Massachusetts, as well as Block Island Airport in Rhode Island since construction costs on islands are typically higher than that on the mainland. This is due, in part, to the increased costs associated with transporting raw materials and labor to the airport during construction. Another example included a contingency factor that was applied to the Westfield-Barnes Regional Airport in Massachusetts, since it was known that a significant section of Runway 2-20 would likely remain with Portland Cement Concrete, a more costly alternative to bituminous concrete. Cost contingencies for airports were only applied in situations that were viewed as professionally reasonable and defensible.

Section 3

Survey / Research

Survey / Research

The survey was distributed to each study airport in order to determine existing pavement conditions; definitions of condition assessments and visual examples of different types of cracks were included on the survey form. The total survey response was 89%. The amount of information gathered from airports varied based on input from consultants, airport managers, and others affiliated with airport operations.

The survey form included the following information request:

- Airport Name
- Identifier
- Part 139 Certified *(Y/N)*
- Airport Reference Code *(ARC)*
- Runway / Taxiway surface Dimensions (length & width)
- Surface Type
  - Asphalt
  - Concrete
  - Turf
  - Gravel
- Year Surface Last Constructed / Reconstructed
- Method of Last Construction
  - Full Depth
  - Partial Depth
  - Mill / Inlay
  - Overlay
- Overall Pavement Quality
  - Excellent: No maintenance required
  - Good: Minor routine maintenance, minor crack sealing
  - Fair: Major crack sealing and miscellaneous patching
  - Poor: Structural improvement and major patching/ repairs needed
  - Failure: Reconstruction required
- Shoulder Width
- Severity of Cracks
  - None: No cracks
  - Small: <1”
  - Medium: 1”-3”
  - Large: >3”
- Type of Cracks *(example photos provided on survey form)*
  - Alligator
  - Longitudinal
  - Transverse
- Pavement Rutting *(surface depression, typically in wheel path)*
  - None
  - Minimal
  - Moderate
  - Many
  - Excessive

Survey / Research *(continued)*

When a survey response was not provided, ASG determined conditions by the most accurate methods available. Specifically, runway pavement areas and conditions were taken from FAA 5010 data forms, and taxiway pavement areas were determined from Google Earth images. The Maine DOT provided a list of all runway and taxiway dimensions along with a list of pavement condition index (PCI) for the Maine study airports. When not provided with a survey response, Airport Reference Codes (ARC) were taken from the most recent Airport Layout Plans (ALPs) and State System Plans available on the internet. Using the data collected for each airport, the condition of the runway and taxiway pavements were then tabulated. The survey form used is shown to the right.

2012 New England General Aviation Airport System Study
Airport Pavement Data Survey

Airport Name:	3-letter Identifier:	Part 139 Certified? Yes / No
Survey Completed by:		
Name:	Business Phone:	
Organization:	Email Address:	

Enter Runway / Taxiway (RW/TW) Information Below							
RW / TW Designation (Example: RW 14-32, TW A)							
RW Airport Reference Code (ARC)							
Surface Length / Width (Enter Length x Width)	x	x	x	x	x	x	x
Surface Type (Enter: Asphalt, Concrete, Turf, Gravel)							
Year Last Constructed / Reconstructed							
Method of Last Major Construction [1] (Example: Full Depth, Partial Depth, Mill/Inlay, Overlay, etc.)							
Overall Pavement Quality (Enter One: Excellent, Good, Fair, Poor, Failed)							
Paved Shoulders / Width (Circle Yes or No) (Enter current width of shoulder surface, in feet, if applicable)	Yes / No feet	Yes / No feet	Yes / No feet	Yes / No feet	Yes / No feet	Yes / No feet	Yes / No feet
Rate Current Conditions							
Severity of cracks? Small (<1"), Medium (1"-3"), Large (>3")							
General Cracking? (Examples: Alligator, Longitudinal, Transverse)							
Rutting from excessive loading? (None, Minimal, Moderate, Many, or Excessive)							

Notes:
1. If a pavement section was constructed, reconstructed, and/or overlayed in sections please evaluate separately. (For example, if TW A was originally constructed in 1984 and then extended to the north in 1992, indicate conditions for TW A South and TW A North in separate columns.)

Terms and Definitions for Condition Assessments:
Pothole: Small, bowl-shaped depressions in the pavement surface that penetrate all the way through the HMA layer down to the base course.
Fatigue (Alligator) Cracking: Series of interconnected cracks caused by fatigue failure of the HMA surface (or stabilized base)
Rutting: Surface depression, typically in the wheel path.
Longitudinal Cracking: Cracks parallel to the pavement's centerline or laydown direction.
Transverse Cracking: Cracks perpendicular to the pavement's centerline or laydown direction.

Excellent – No Maintenance Required
Good – Minor routine maintenance, minor crack sealing
Fair – Major crack sealing and miscellaneous minor patching
Poor – Structural improvement and major patching/repairs
Failure - Reconstruction

2012 New England General Aviation Airport System Study
Airport Pavement Data Survey

Examples of Cracking for Reference:

Terms and Definitions for Condition Assessments:
Pothole: Small, bowl-shaped depressions in the pavement surface that penetrate all the way through the HMA layer down to the base course.
Fatigue (Alligator) Cracking: Series of interconnected cracks caused by fatigue failure of the HMA surface (or stabilized base)
Rutting: Surface depression, typically in the wheel path.
Longitudinal Cracking: Cracks parallel to the pavement's centerline or laydown direction.
Transverse Cracking: Cracks perpendicular to the pavement's centerline or laydown direction.

Excellent – No Maintenance Required
Good – Minor routine maintenance, minor crack sealing
Fair – Major crack sealing and miscellaneous minor patching
Poor – Structural improvement and major patching/repairs
Failure – Reconstruction


FIGURE A: Fatigue (Alligator) Cracking


FIGURE B: Longitudinal Cracking


FIGURE C: Transverse Cracking


FIGURE D: Rutting

Section 4

Survey Results

Survey Results

Airport Reference Codes (ARC) were tabulated as part of the survey and included in the cost analysis calculations. The ARC is a coding system developed by the FAA to relate airport design standards to the operational and physical characteristics of the most demanding aircraft type projected to regularly operate at a particular airport. For this study, the ARC was utilized as a means of categorizing airports in order to better reflect cost estimates of capital reconstruction. While not a definitive determinant, the approach speed component of the ARC (also known as the Aircraft Approach Category or AAC) generally approximates the type and size of aircraft. In essence, categories "A" through "D" reflect aircraft approach speeds from slowest to fastest with larger aircraft typically having faster approach speeds. (It should be noted that there is also an AAC category "E"; however, it does not include aircraft ordinarily considered to be general aviation – they are typically military aircraft and there are no airports within the New England region classified as category "E"`.) The following depicts a summary breakdown of the AACs, their approach speeds and example aircraft.

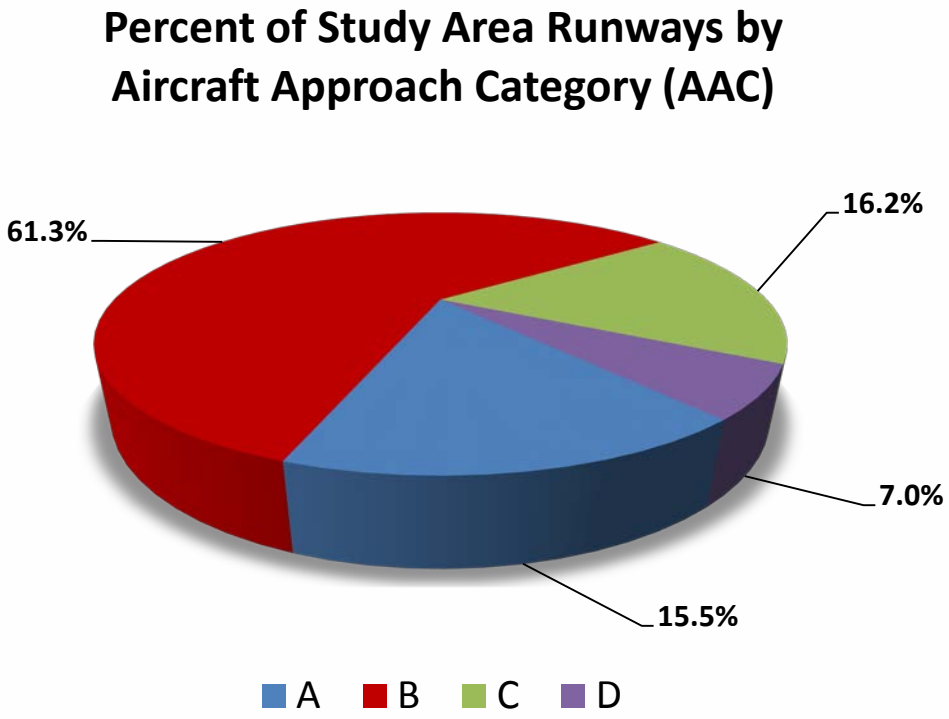
Aircraft Approach Categories

AAC	Approach Speeds
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots

***BLUE** represents the prevailing AAC range for general aviation aircraft*

Survey Results *(continued)*

Beyond the airports themselves, Aircraft Approach Category (AACs) can also reasonably be used as a metric to reflect pavement strength requirements for individual runways. For example, it is generally understood that pavement reconstruction requirements at category "A" airports and runways are generally less demanding than those at category "C" airports and runways; so, it is reasonable to assume that construction unit costs associated with category "A" infrastructure may vary from that of other categories, given similar pavement areas. Therefore, individual construction cost estimates were developed for each AAC in lieu of utilizing one standard across the entire regional airport system, regardless of aircraft operational types. The graphic below depicts a summary breakdown of AACs for all study airport runways.

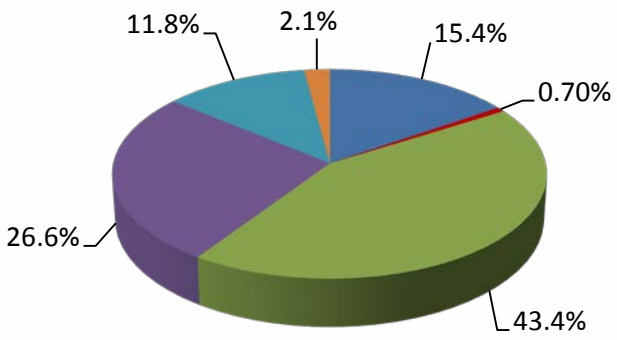


Survey Results *(continued)*

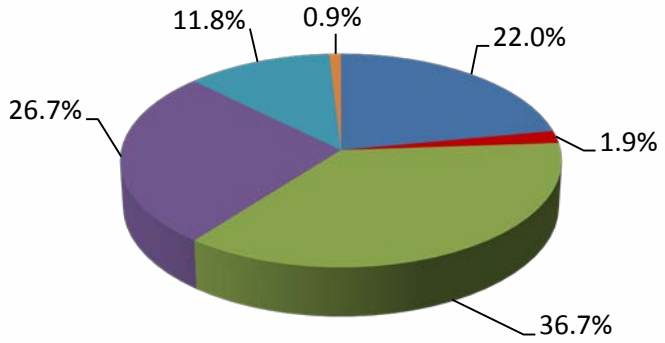
Pavement Conditions

The graphic below depicts a summary of overall pavement condition as reported within the survey responses. As shown below, approximately 60 percent of system airports reported a condition rating of "good" to "excellent" for their runways and taxiways. Such positive ratings likely reflect a regional priority in providing funding for capital reconstruction projects over the last 20 years, as well as a commitment to pavement maintenance.

Runway Condition Rating



Taxiway Condition Rating



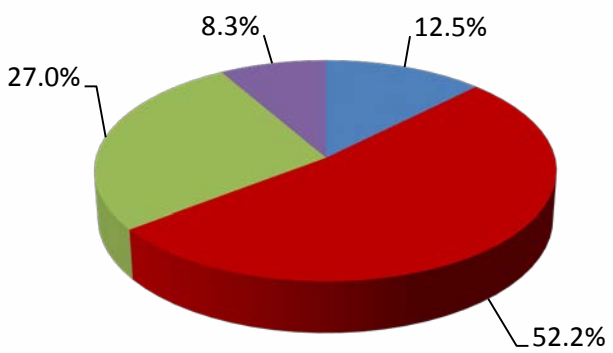
Note: The current operational status of pavement surfaces identified as "failed" has not been verified.

Survey Results *(continued)*

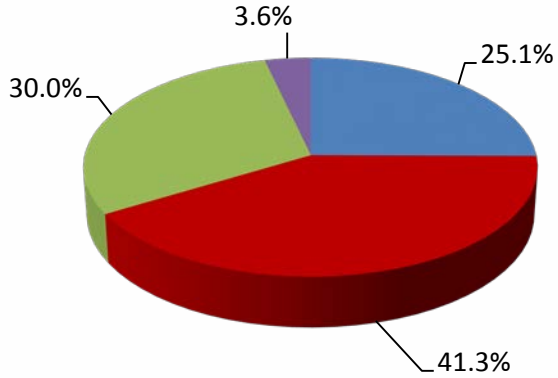
Pavement Cracking

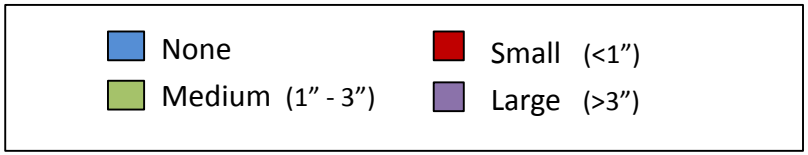
The graphic below depicts a summary of pavement cracking across the regional system, as reported through the survey responses. Similar to the graphic of overall pavement condition, approximately 65 percent of airports reported either no cracking or small pavement cracks for runways and taxiways.

Runway - Size of Cracks



Taxiway - Size of Cracks



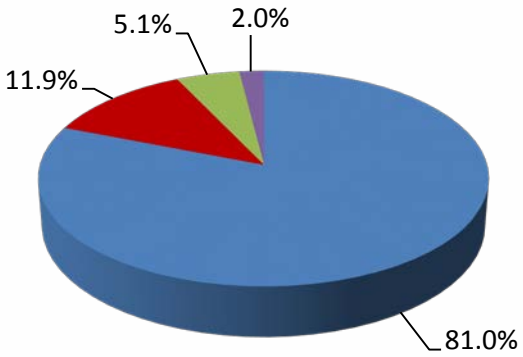


Survey Results *(continued)*

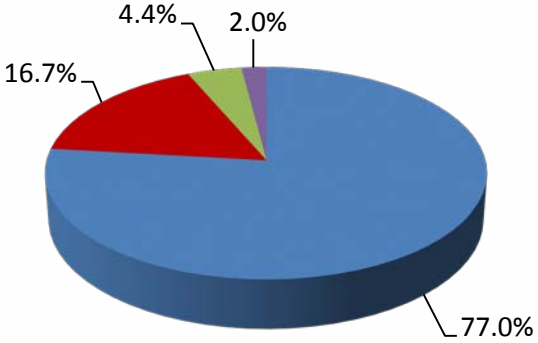
Pavement Rutting

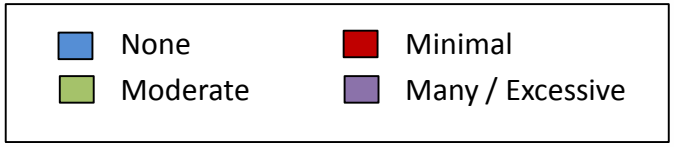
The graphic below depicts a summary of pavement rutting across the regional system, as reported through the survey responses. Given the results of the overall pavement condition and cracking, it is not surprising that few airports reported excessive rutting.

Runway - Rutting Information



Taxiway – Rutting Information

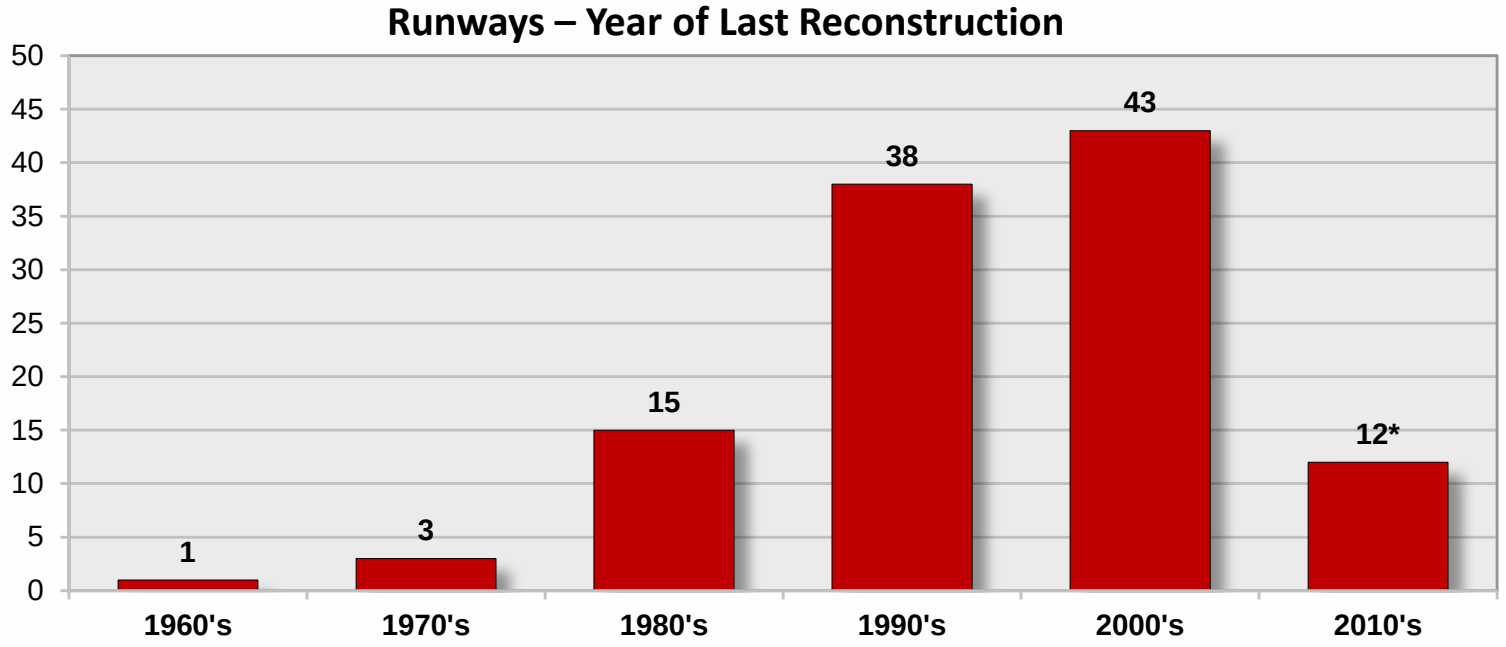




Survey Results *(continued)*

Runway Pavement Age

The airport survey also included a request for the year of the last reconstruction of the runways and taxiways. ASG had intended to address which year in the 20-year life-cycle that each pavement surface would require reconstruction. However, even with the survey, collecting accurate and complete information on the year of last reconstruction for every airport became difficult in that returned surveys had varying levels of detail and accuracy - in some cases, no information at all was provided. Additionally, many runways and taxiways were reconstructed in multiple phases and segments. Ultimately, extrapolating this information from the survey results proved to be not feasible. This directly resulted in the Project Management Team's (PMT) decision to tabulate the costs without specific years for reconstruction. Shown below are the results of the survey responses collected on the date of last runway reconstruction. This graphic reflects the regional priority on pavement reconstruction in the last twenty years, and explains the positive response by airports regarding their current pavement condition. (Note that taxiway information was not provided in most circumstances and therefore it was not feasible to quantify and depict graphically.)



* Reflects partial listing through FY2012 as reported through surveys

Section 5

Cost Analysis Assumptions

Cost Analysis Assumptions

The cost assessment assumptions were identified through close coordination with the Project Management Team throughout the process of developing the analysis. Based on that coordination, two primary factors were used to determine the projected cost for reconstruction and maintenance of airport runways and taxiways: actual areas of pavement surface and unit costs (calculated for each AAC). The areas of pavement were determined from the survey responses (runways and taxiways), the 5010 Master Record (runways), or Google Earth (taxiways). Unit costs were calculated using the consultant's professional experience with actual construction costs, along with feedback from the state aviation agencies and the FAA. All costs were based on current-day (2012) dollars.

Pavement maintenance assumed varying levels of crack sealing and repair, plus pavement markings. Type I crack repair assumed sealing of small cracks; Type II crack repair assumed pavement repair for large cracks. Type I crack repair was measured by the linear foot; Type II crack repair was measured by the square foot. Other assumptions were made regarding the severity of cracks requiring repair at each phase of maintenance. Calculations were developed on an airport level; however, the cost data summarized herein is provided on a state and regional basis.

The 5-year maintenance cost schedule assumed a minor amount of Type I crack sealing, pavement markings and mobilization. The actual runway and taxiway pavement areas were used in the calculation.

In lieu of assessing the actual area of pavement markings at each airport, the following assumptions were employed for quantifying markings by AAC for each airport:

- AAC "A" – Visual
  - Runway: Numerals, Centerline
  - Taxiway: Centerline, Runway Hold Lines
- AAC "B" – Non-Precision
  - Runway: Numerals, Aiming Points, Centerline, Threshold Stripes
  - Taxiway: Centerline, Runway Hold Lines
- AAC "C" – Precision
  - Runway: Numerals, Aiming Points, Centerline, Threshold Stripes, Threshold Bars, Touchdown Zone Stripes, Edge Stripe
  - Taxiway: Centerline, Runway Hold Lines
- AAC "D" – Precision
  - Runway: Numerals, Aiming Points, Centerline, Threshold Stripes, Threshold Bars, Touchdown Zone Stripes, Edge Stripe
  - Taxiway: Centerline, Runway Hold Lines

Cost Analysis Assumptions *(continued)*

The 10-year maintenance cost schedule assumed remarking of the pavement with the same assumptions as noted in the 5-year plan, only with a greater amount of Type I Crack Repair. The actual dimensions of the runways and taxiways were used in the calculation after the unit cost for maintenance was developed. Type I Crack Repair assumed that 50 percent of the pavement would have longitudinal joints, transverse cracks every 250 feet, and a small percentage of the total pavement area would have miscellaneous cracks requiring repair. A cost for mobilization was also included in the total cost.

The 15-year maintenance cost schedule assumed a greater amount of Type I, plus Type II crack repair, and remarking of the pavement with the same assumptions as in year five. The actual dimensions of the runways and taxiways were used after the unit cost for maintenance was developed. Type I assumed that 75 percent of the pavement length would have longitudinal joints requiring repair, transverse cracks every 250 feet, and that a slightly higher percentage (than year 10) of total area will have miscellaneous cracks. Type II assumed repair requiring 12-inch wide excavation and patch repair, and that 50 percent of the total area would have miscellaneous cracks. Mobilization was assumed to be seven percent of the total cost.

Cost Analysis Assumptions *(continued)*

Full Depth Reconstruction Costing Assumptions

The capital cost for full depth reconstruction assumed complete pavement reconstruction for both runways and taxiways. This took into consideration the depth of pavement for the different AACs. The pavement areas for runways were taken from the survey responses or 5010 Master Records. Runways at AAC D airports were further divided into two different categories: Non-Military Use and Joint Military Use. Joint Military Use airports assumed a thicker layer of P-401 Hot Mix Asphalt, as shown to the right. Complete reconstruction was assumed to include excavation, subbase course, base course, hot mix asphalt, prime coat, tack coat, pavement markings, erosion control, topsoil, and seed. The major assumptions made for unit costs of full depth reconstruction are reflected to the right.

Full Depth Reconstruction Assumptions

- **Unclassified Excavation**
  - AAC A Depth: 18”
  - AAC B Depth: 24”
  - AAC C Depth: 30”
  - AAC D Non Military Use: 36”
  - AAC D Joint Military Use Depth: 36”
- **P-154 Subbase Course**
  - AAC A Depth: 9”
  - AAC B Depth: 14”
  - AAC C Depth: 17”
  - AAC D Non Military Use Depth: 22”
  - AAC D Joint Military Use Depth: 16”
- **P-208 Base Course**
  - AAC A Depth: 6”
  - AAC B Depth: 6”
  - AAC C Depth: 8”
  - AAC D (Both) Depth: 8”
- **P-401 Hot Mix Asphalt**
  - AAC A Depth: 3”
  - AAC B Depth: 4”
  - AAC C Depth: 5”
  - AAC D Non Military Depth: 6”
  - AAC D Joint Military Use Depth: 12”
- **Pavement Markings** (2 Coats)
- **Mobilization**

Cost Analysis Assumptions *(continued)*

Partial Depth Reconstruction Costing Assumptions

Through the consultant's professional experience and through feedback from the state aviation agencies and the FAA, partial depth reconstruction was added as an alternative to full depth reconstruction to represent a lower range cost for reconstruction. For the purpose of this analysis, partial depth reconstruction was assumed to include reclaiming to varying depths by AAC, supplemental aggregate, fine grading, excavation, and compaction.

The assumptions made for unit costs of partial depth reconstruction are reflected to the right.

Partial Depth Reconstruction Assumptions

- **Reclaim / Supplemental Aggregate / Fine Grading / Excavation / Compaction**
  - AAC A Depth: 9"
  - AAC B Depth: 10"
  - AAC C Depth: 13"
  - AAC D Non Military Depth: 14"
  - AAC D Joint Military Use Depth: 20"
- **P-401 Hot Mix Asphalt**
  - AAC A Depth: 3"
  - AAC B Depth: 4"
  - AAC C Depth: 5"
  - AAC D Non-Military Depth: 6"
  - AAC D Joint Military Use Depth: 12"
- **P-602 Prime Coat**
- **P-603 Tack Coat**
- **Pavement Markings** (2 coats)
- **Mobilization**

Section 6

Cost Analysis Results

Cost Analysis Results

Cost Analysis Results by State

The results of the Study analysis conclude that the total system-wide cost of maintenance and reconstruction in a 20-year life cycle will range from approximately $776 million to $968 million. Of this amount, approximately $617 million to $809 million (including contingencies) is required for actual runway and taxiway reconstruction, with approximately $159 million required for regular runway and taxiway maintenance.

The total cost range for reconstruction and maintenance for each state (rounded to the nearest ten thousand) is presented in the following table.

		Reconstruction Cost Range		
State	**Airports**	**Partial Depth**		**Full Depth**
Connecticut	12	$94,550,000	to	$120,070,000
Maine	33	$231,300,000	to	$282,380,000
Massachusetts	27	$275,580,000	to	$345,930,000
New Hampshire	13	$98,870,000	to	$124,180,000
Rhode Island	5	$36,940,000	to	$46,770,000
Vermont	10	$38,810,000	to	$48,630,000
	100	**$776,050,000**	**to**	**$967,960,000**

The following tables and charts depict detailed cost calculation results for runways and taxiways in the New England Regional system of study airports.

Cost Analysis Results *(continued)*

Pavement Data Table – Partial Depth Reconstruction Cost Breakdown - *By State*

State	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 1,256,000	$ 1,664,000	$ 10,935,000	$ 13,855,000	$ 47,692,000	$ 61,548,000	$ 5,129,000
Maine	33	$ 3,564,000	$ 4,633,000	$ 29,821,000	$ 38,018,000	$ 139,010,000	$ 177,025,000	$ 5,364,394
Massachusetts	27	$ 3,465,000	$ 4,421,000	$ 27,220,000	$ 35,106,000	$ 114,728,000	$ 163,698,000	$ 6,062,889
New Hampshire	13	$ 1,444,000	$ 1,840,000	$ 11,378,000	$ 14,662,000	$ 46,994,000	$ 62,078,000	$ 4,775,231
Rhode Island	5	$ 424,000	$ 582,000	$ 4,330,000	$ 5,336,000	$ 17,747,000	$ 23,594,000	$ 4,718,800
Vermont	10	$ 689,000	$ 897,000	$ 5,853,000	$ 7,439,000	$ 23,023,000	$ 30,462,000	$ 3,046,200
Total	100	$ 10,842,000	$ 14,037,000	$ 89,537,000	**$ 114,416,000**	**$ 389,194,000**	**$ 518,405,000**	**$ 5,184,050**

State	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 314,000	$ 498,000	$ 5,252,000	$ 6,064,000	$ 26,936,000	$ 33,000,000	$ 2,750,000
Maine	33	$ 427,000	$ 714,000	$ 7,428,000	$ 8,569,000	$ 45,709,000	$ 54,278,000	$ 1,644,788
Massachusetts	27	$ 969,000	$ 1,592,000	$ 16,194,000	$ 18,755,000	$ 87,120,000	$ 111,882,000	$ 4,143,778
New Hampshire	13	$ 349,000	$ 589,000	$ 5,823,000	$ 6,761,000	$ 30,035,000	$ 36,795,000	$ 2,830,385
Rhode Island	5	$ 125,000	$ 193,000	$ 2,079,000	$ 2,397,000	$ 10,769,000	$ 13,345,000	$ 2,669,000
Vermont	10	$ 87,000	$ 131,000	$ 1,379,000	$ 1,597,000	$ 6,754,000	$ 8,350,000	$ 835,000
Total	100	$ 2,271,000	$ 3,717,000	$ 38,155,000	**$ 44,143,000**	**$ 207,323,000**	**$ 257,650,000**	**$ 2,576,500**

State	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 1,570,000	$ 2,162,000	$ 16,187,000	$ 19,919,000	$ 74,628,000	$ 94,548,000	$ 7,879,000
Maine	33	$ 3,991,000	$ 5,347,000	$ 37,249,000	$ 46,587,000	$ 184,719,000	$ 231,303,000	$ 7,009,182
Massachusetts	27	$ 4,434,000	$ 6,013,000	$ 43,414,000	$ 53,861,000	$ 201,848,000	$ 275,580,000	$ 10,206,667
New Hampshire	13	$ 1,793,000	$ 2,429,000	$ 17,201,000	$ 21,423,000	$ 77,029,000	$ 98,873,000	$ 7,605,615
Rhode Island	5	$ 549,000	$ 775,000	$ 6,409,000	$ 7,733,000	$ 28,516,000	$ 36,939,000	$ 7,387,800
Vermont	10	$ 776,000	$ 1,028,000	$ 7,232,000	$ 9,036,000	$ 29,777,000	$ 38,812,000	$ 3,881,200
Total	100	$ 13,113,000	$ 17,754,000	$ 127,692,000	**$ 158,559,000**	**$ 596,517,000**	**$ 776,055,000**	**$ 7,760,550**

Cost Analysis Results *(continued)*

GENERAL AVIATION
NEW ENGLAND
Regional Airport System

Pavement Data Table – Full Depth Reconstruction Cost Breakdown - *By State*

State	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 1,256,000	$ 1,664,000	$ 10,935,000	$ 13,855,000	$ 64,143,000	$ 77,999,000	$ 6,499,917
Maine	33	$ 3,564,000	$ 4,633,000	$ 29,821,000	$ 38,018,000	$ 178,280,000	$ 216,294,000	$ 6,554,364
Massachusetts	27	$ 3,465,000	$ 4,421,000	$ 27,220,000	$ 35,106,000	$ 152,944,000	$ 205,765,000	$ 7,620,926
New Hampshire	13	$ 1,444,000	$ 1,840,000	$ 11,378,000	$ 14,662,000	$ 62,533,000	$ 77,723,000	$ 5,978,692
Rhode Island	5	$ 424,000	$ 582,000	$ 4,330,000	$ 5,336,000	$ 23,708,000	$ 29,660,000	$ 5,932,000
Vermont	10	$ 689,000	$ 897,000	$ 5,853,000	$ 7,439,000	$ 30,677,000	$ 38,116,000	$ 3,811,600
Total	100	$ 10,842,000	$ 14,037,000	$ 89,537,000	**$ 114,416,000**	**$ 512,285,000**	**$ 645,557,000**	**$ 6,455,570**

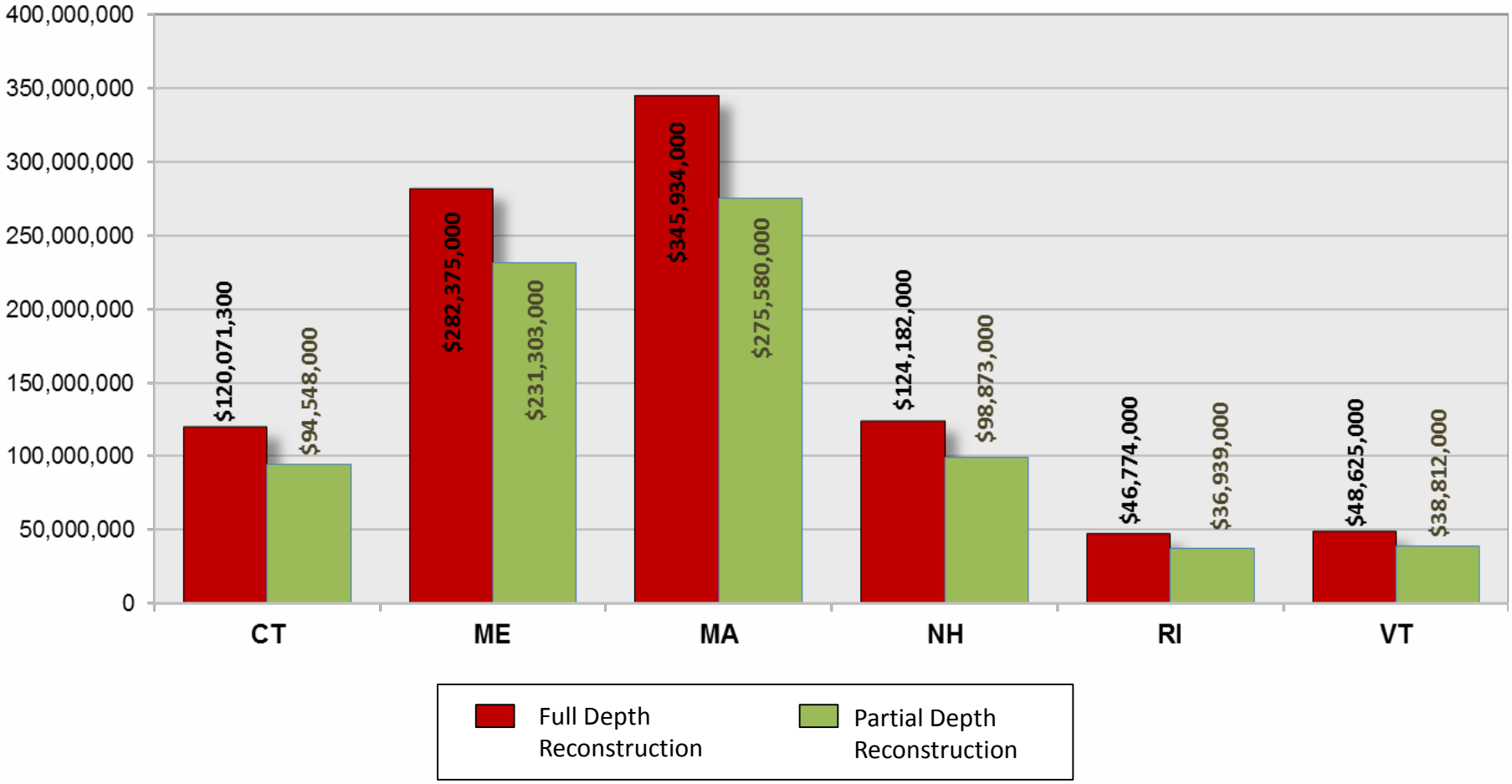
State	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 314,000	$ 498,000	$ 5,252,000	$ 6,064,000	$ 36,008,000	$ 42,072,000	$ 3,506,000
Maine	33	$ 427,000	$ 714,000	$ 7,428,000	$ 8,569,000	$ 57,512,000	$ 66,081,000	$ 2,002,455
Massachusetts	27	$ 969,000	$ 1,592,000	$ 16,194,000	$ 18,755,000	$ 113,483,000	$ 140,169,000	$ 5,191,444
New Hampshire	13	$ 349,000	$ 589,000	$ 5,823,000	$ 6,761,000	$ 39,699,000	$ 46,459,000	$ 3,573,769
Rhode Island	5	$ 125,000	$ 193,000	$ 2,079,000	$ 2,397,000	$ 14,506,000	$ 17,114,000	$ 3,422,800
Vermont	10	$ 87,000	$ 131,000	$ 1,379,000	$ 1,597,000	$ 8,913,000	$ 10,509,000	$ 1,050,900
Total	100	$ 2,271,000	$ 3,717,000	$ 38,155,000	**$ 44,143,000**	**$ 270,121,000**	**$ 322,404,000**	**$ 3,224,040**

State	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
Connecticut	12	$ 1,570,000	$ 2,162,000	$ 16,187,000	$ 19,919,000	$ 100,151,000	$ 120,071,000	$ 10,005,917
Maine	33	$ 3,991,000	$ 5,347,000	$ 37,249,000	$ 46,587,000	$ 235,792,000	$ 282,375,000	$ 8,556,818
Massachusetts	27	$ 4,434,000	$ 6,013,000	$ 43,414,000	$ 53,861,000	$ 266,427,000	$ 345,934,000	$ 12,812,370
New Hampshire	13	$ 1,793,000	$ 2,429,000	$ 17,201,000	$ 21,423,000	$ 102,232,000	$ 124,182,000	$ 9,552,462
Rhode Island	5	$ 549,000	$ 775,000	$ 6,409,000	$ 7,733,000	$ 38,214,000	$ 46,774,000	$ 9,354,800
Vermont	10	$ 776,000	$ 1,028,000	$ 7,232,000	$ 9,036,000	$ 39,590,000	$ 48,625,000	$ 4,862,500
Total	100	$ 13,113,000	$ 17,754,000	$ 127,692,000	**$ 158,559,000**	**$ 782,406,000**	**$ 967,961,000**	**$ 9,679,610**

Cost Analysis Results *(continued)*

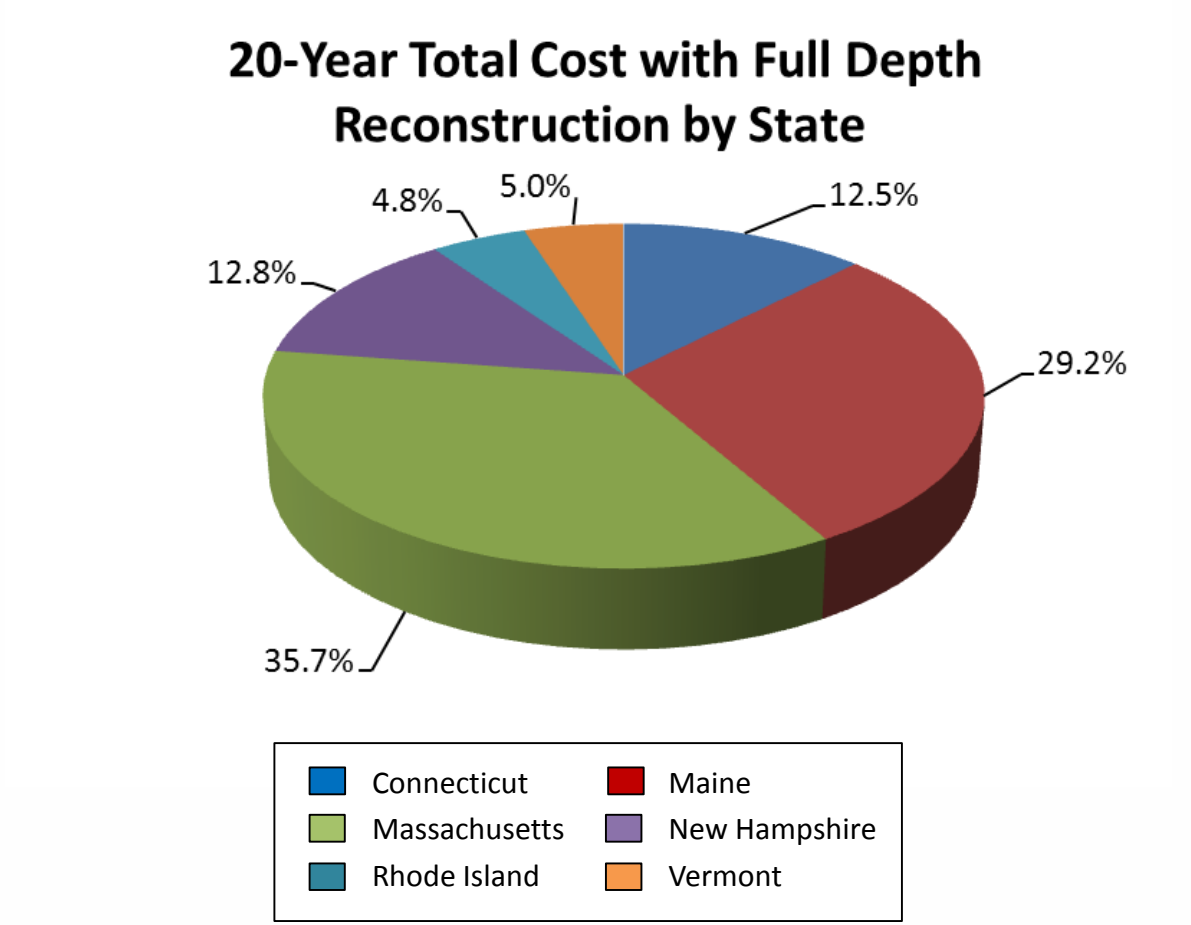
Comparison of 20-Year Pavement Costs

(including reconstruction and maintenance)



Cost Analysis Results *(continued)*

The graphic below depicts a pie chart summary of percentage breakdown for full depth reconstruction of the regional airport system, by state. Calculations for partial depth reconstruction reveal similar percentages.



Cost Analysis Results *(continued)*

Cost Analysis Results by AAC

Study results conclude that the total cost range for reconstruction and maintenance for airports grouped by their respective AAC category in a 20-year life cycle (rounded to the nearest ten thousand) is reflected in the following table.

		Reconstruction Cost Range		
AAC Category	**Airports**	**Partial Depth**		**Full Depth**
A	20	$33,490,000	to	$40,120,000
B	54	$268,850,000	to	$336,360,000
C	19	$325,640,000	to	$410,710,000
D	7	$148,070,000	to	$180,770,000
	100	**$776,050,000**	**to**	**$967,960,000**

The following tables and charts depict detailed cost calculation results for runways and taxiways in the New England Regional system of study airports.

Cost Analysis Results *(continued)*

Pavement Data Table – Partial Depth Reconstruction Cost Breakdown - *By AAC*

AAC Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 256,000	$ 428,000	$ 5,473,000	$ 6,157,000	$ 18,812,000	$ 25,480,000	$ 1,274,000
B	54	$ 4,129,000	$ 5,433,000	$ 36,593,000	$ 46,155,000	$ 140,817,000	$ 187,394,000	$ 3,470,259
C	19	$ 5,264,000	$ 6,512,000	$ 36,216,000	$ 47,992,000	$ 160,189,000	$ 212,716,000	$ 11,195,579
D	7	$ 1,191,000	$ 1,666,000	$ 11,256,000	$ 14,113,000	$ 69,374,000	$ 92,815,000	$ 13,259,286
Total	100	$ 10,840,000	$ 14,039,000	$ 89,538,000	**$ 114,417,000**	**$ 389,192,000**	**$ 518,405,000**	**$ 5,184,050**

AAC Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 114,000	$ 159,000	$ 1,431,000	$ 1,704,000	$ 6,131,000	$ 8,014,000	$ 400,700
B	54	$ 916,000	$ 1,260,000	$ 13,977,000	$ 16,153,000	$ 65,303,000	$ 81,457,000	$ 1,508,463
C	19	$ 960,000	$ 1,783,000	$ 17,010,000	$ 19,753,000	$ 91,908,000	$ 112,920,000	$ 5,943,158
D	7	$ 280,000	$ 513,000	$ 5,737,000	$ 6,530,000	$ 43,980,000	$ 55,260,000	$ 7,894,286
Total	100	$ 2,270,000	$ 3,715,000	$ 38,155,000	**$ 44,140,000**	**$ 207,322,000**	**$ 257,651,000**	**$ 2,576,510**

AAC Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 370,000	$ 587,000	$ 6,904,000	$ 7,861,000	$ 24,943,000	$ 33,494,000	$ 1,674,700
B	54	$ 5,045,000	$ 6,693,000	$ 50,570,000	$ 62,308,000	$ 206,120,000	$ 268,851,000	$ 4,978,722
C	19	$ 6,224,000	$ 8,295,000	$ 53,226,000	$ 67,745,000	$ 252,097,000	$ 325,636,000	$ 17,138,737
D	7	$ 1,471,000	$ 2,179,000	$ 16,993,000	$ 20,643,000	$ 113,354,000	$ 148,075,000	$ 21,153,571
Total	100	$ 13,110,000	$ 17,754,000	$ 127,693,000	**$ 158,557,000**	**$ 596,514,000**	**$ 776,056,000**	**$ 7,760,560**

Cost Analysis Results *(continued)*

Pavement Data Table – Full Depth Reconstruction Cost Breakdown - *By AAC*

ARC Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 256,000	$ 428,000	$ 5,473,000	$ 6,157,000	$ 23,942,000	$ 30,715,000	$ 1,535,750
B	54	$ 4,129,000	$ 5,433,000	$ 36,593,000	$ 46,155,000	$ 187,593,000	$ 234,277,000	$ 4,338,463
C	19	$ 5,264,000	$ 6,512,000	$ 36,216,000	$ 47,992,000	$ 213,585,000	$ 267,272,000	$ 14,066,947
D	7	$ 1,191,000	$ 1,666,000	$ 11,256,000	$ 14,113,000	$ 87,160,000	$ 113,292,000	$ 16,184,571
Total	100	$ 10,840,000	$ 14,039,000	$ 89,538,000	**$ 114,417,000**	**$ 512,280,000**	**$ 645,556,000**	**$ 6,455,560**

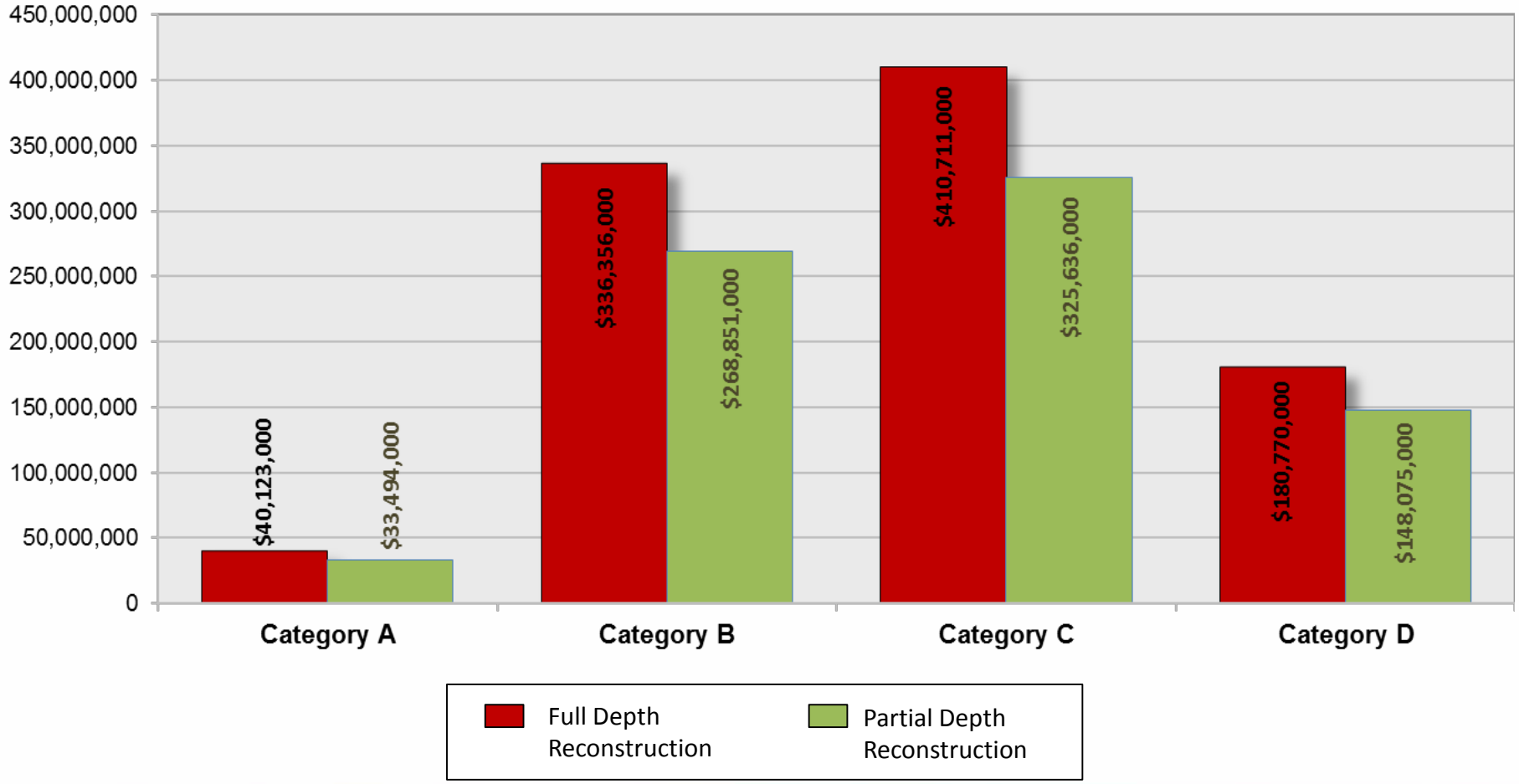
ARC Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 114,000	$ 159,000	$ 1,431,000	$ 1,704,000	$ 7,493,000	$ 9,408,000	$ 470,400
B	54	$ 916,000	$ 1,260,000	$ 13,977,000	$ 16,153,000	$ 85,926,000	$ 102,079,000	$ 1,890,352
C	19	$ 960,000	$ 1,783,000	$ 17,010,000	$ 19,753,000	$ 122,087,000	$ 143,439,000	$ 7,549,421
D	7	$ 280,000	$ 513,000	$ 5,737,000	$ 6,530,000	$ 54,615,000	$ 67,478,000	$ 9,639,714
Total	100	$ 2,270,000	$ 3,715,000	$ 38,155,000	**$ 44,140,000**	**$ 270,121,000**	**$ 322,404,000**	**$ 3,224,040**

ARC Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
A	20	$ 370,000	$ 587,000	$ 6,904,000	$ 7,861,000	$ 31,435,000	$ 40,123,000	$ 2,006,150
B	54	$ 5,045,000	$ 6,693,000	$ 50,570,000	$ 62,308,000	$ 273,519,000	$ 336,356,000	$ 6,228,815
C	19	$ 6,224,000	$ 8,295,000	$ 53,226,000	$ 67,745,000	$ 335,672,000	$ 410,711,000	$ 21,616,368
D	7	$ 1,471,000	$ 2,179,000	$ 16,993,000	$ 20,643,000	$ 141,775,000	$ 180,770,000	$ 25,824,286
Total	100	$ 13,110,000	$ 17,754,000	$ 127,693,000	**$ 158,557,000**	**$ 782,401,000**	**$ 967,960,000**	**$ 9,679,600**

Cost Analysis Results *(continued)*

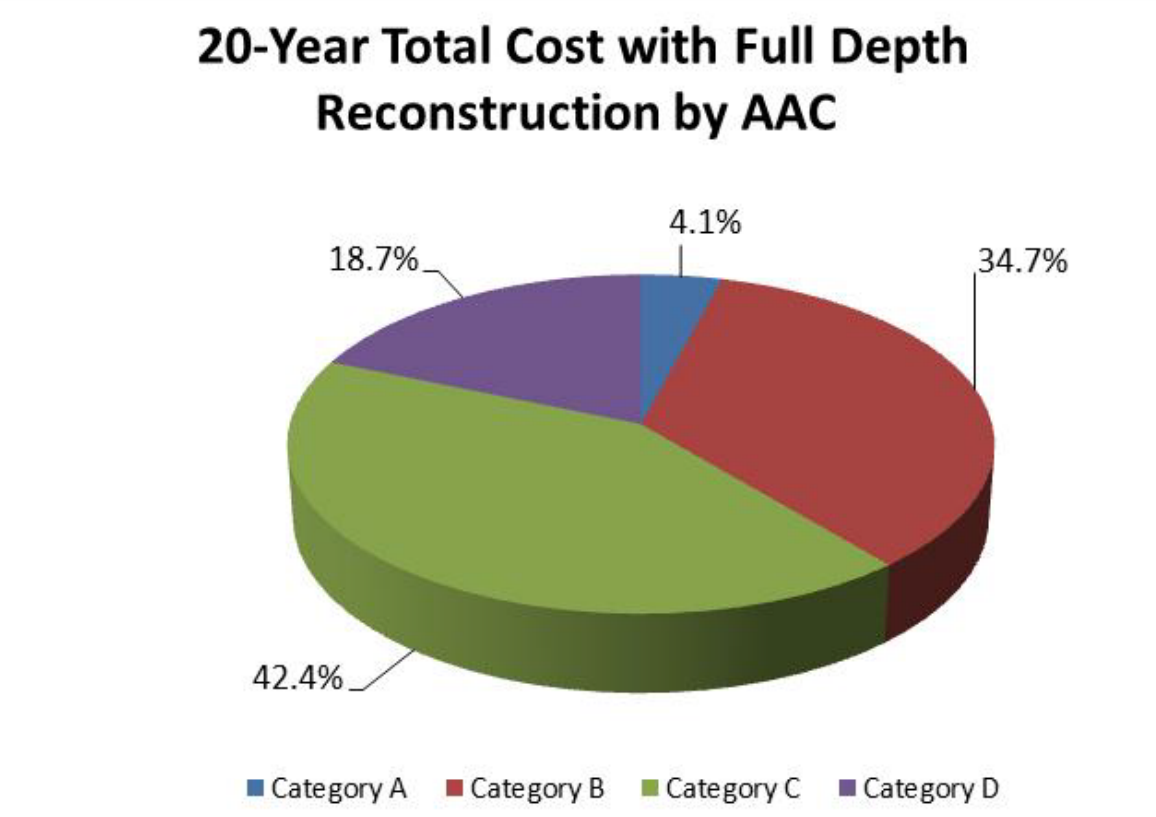
Comparison of 20-Year Pavement Costs

(including reconstruction and maintenance)



Cost Analysis Results *(continued)*

The graphic below depicts a pie chart summary percentage breakdown for full depth reconstruction of the regional airport system, by AAC. Calculations for partial depth reconstruction reveal similar percentages.



Cost Analysis Results *(continued)*

Cost Analysis Results by NPIAS Category

Study results conclude that the total cost range for reconstruction and maintenance for airports grouped by their respective NPIAS category in a 20-year life cycle (rounded to the nearest ten thousand) is reflected in the following table.

		Reconstruction Cost Range		
NPIAS Category	**Airports**	**Partial Depth**		**Full Depth**
Non-Hub Primary	14	$241,720,000	to	$295,900,000
Nonprimary Commercial Service	4	$68,550,000	to	$86,550,000
Reliever	11	$112,860,000	to	$142,960,000
General Aviation	71	$352,920,000	to	$442,550,000
	100	**$776,050,000**	**to**	**$967,960,000**

As described previously, the NPIAS categorizes airports into commercial service and general aviation airports, although nearly all airports commonly accommodate general aviation activities. In fact, at most commercial service airports, the number and impact of general aviation activities often far outweigh that of the commercial service activities. Therefore, it is reasonable for commercial service airports identified in the NPIAS as “Non-Hub Primary” and “Nonprimary Commercial Service” to have been included in this assessment due to their important roles in accommodating general aviation.

The following tables and charts depict detailed cost calculation results for runways and taxiways in the New England Regional system of study airports.

Cost Analysis Results *(continued)*

Pavement Data Table – Partial Depth Reconstruction Cost Breakdown - *By NPIAS Category*

NPIAS Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 2,841,000	$ 3,629,000	$ 21,631,000	$ 28,101,000	$ 110,113,000	$ 150,320,000	$ 10,737,143
Nonprime Com Svc	4	$ 950,000	$ 1,179,000	$ 6,627,000	$ 8,756,000	$ 29,065,000	$ 37,819,000	$ 9,454,750
Reliever	11	$ 1,470,000	$ 1,931,000	$ 12,562,000	$ 15,963,000	$ 52,127,000	$ 68,090,000	$ 6,190,000
GA	71	$ 5,581,000	$ 7,300,000	$ 48,718,000	$ 61,599,000	$ 197,886,000	$ 262,175,000	$ 3,692,606
Total	100	$ 10,842,000	$ 14,039,000	$ 89,538,000	**$ 114,419,000**	**$ 389,191,000**	**$ 518,404,000**	**$ 5,184,040**

NPIAS Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 632,000	$ 1,129,000	$ 11,379,000	$ 13,140,000	$ 72,066,000	$ 91,394,000	$ 6,528,143
Nonprime Com Svc	4	$ 264,000	$ 491,000	$ 4,682,000	$ 5,437,000	$ 25,297,000	$ 30,735,000	$ 7,683,750
Reliever	11	$ 447,000	$ 661,000	$ 7,289,000	$ 8,397,000	$ 36,376,000	$ 44,773,000	$ 4,070,273
GA	71	$ 926,000	$ 1,435,000	$ 14,804,000	$ 17,165,000	$ 73,584,000	$ 90,748,000	$ 1,278,141
Total	100	$ 2,269,000	$ 3,716,000	$ 38,154,000	**$ 44,139,000**	**$ 207,323,000**	**$ 257,650,000**	**$ 2,576,500**

NPIAS Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 3,473,000	$ 4,758,000	$ 33,010,000	$ 41,241,000	$ 182,179,000	$ 241,714,000	$ 17,265,286
Nonprime Com Svc	4	$ 1,214,000	$ 1,670,000	$ 11,309,000	$ 14,193,000	$ 54,362,000	$ 68,554,000	$ 17,138,500
Reliever	11	$ 1,917,000	$ 2,592,000	$ 19,851,000	$ 24,360,000	$ 88,503,000	$ 112,863,000	$ 10,260,273
GA	71	$ 6,507,000	$ 8,735,000	$ 63,522,000	$ 78,764,000	$ 271,470,000	$ 352,923,000	$ 4,970,746
Total	100	$ 13,111,000	$ 17,755,000	$ 127,692,000	**$ 158,558,000**	**$ 596,514,000**	**$ 776,054,000**	**$ 7,760,540**

Cost Analysis Results *(continued)*

Pavement Data Table – Full Depth Reconstruction Cost Breakdown - *By NPIAS Category*

NPIAS Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 2,841,000	$ 3,629,000	$ 21,631,000	$ 28,101,000	$ 140,323,000	$ 183,904,000	$ 13,136,000
Nonprime Com Svc	4	$ 950,000	$ 1,179,000	$ 6,627,000	$ 8,756,000	$ 38,753,000	$ 47,507,000	$ 11,876,750
Reliever	11	$ 1,470,000	$ 1,931,000	$ 12,562,000	$ 15,963,000	$ 69,920,000	$ 85,883,000	$ 7,807,545
GA	71	$ 5,581,000	$ 7,300,000	$ 48,718,000	$ 61,599,000	$ 263,285,000	$ 328,261,000	$ 4,623,394
Total	100	$ 10,842,000	$ 14,039,000	$ 89,538,000	**$ 114,419,000**	**$ 512,281,000**	**$ 645,555,000**	**$ 6,455,550**

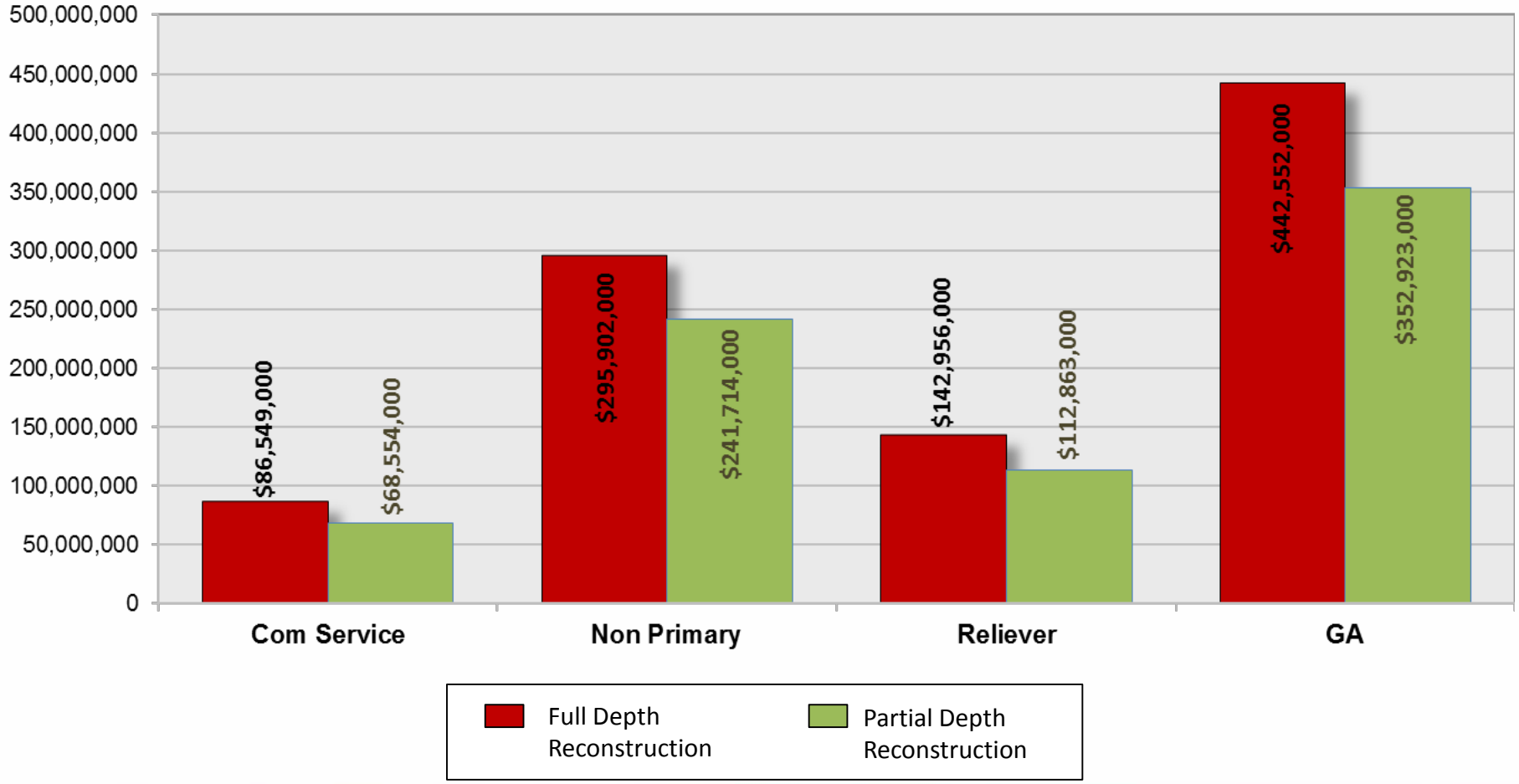
NPIAS Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 632,000	$ 1,129,000	$ 11,379,000	$ 13,140,000	$ 90,715,000	$ 111,998,000	$ 7,999,857
Nonprime Com Svc	4	$ 264,000	$ 491,000	$ 4,682,000	$ 5,437,000	$ 33,604,000	$ 39,042,000	$ 9,760,500
Reliever	11	$ 447,000	$ 661,000	$ 7,289,000	$ 8,397,000	$ 48,675,000	$ 57,073,000	$ 5,188,455
GA	71	$ 926,000	$ 1,435,000	$ 14,804,000	$ 17,165,000	$ 97,127,000	$ 114,291,000	$ 1,609,732
Total	100	$ 2,269,000	$ 3,716,000	$ 38,154,000	**$ 44,139,000**	**$ 270,121,000**	**$ 322,404,000**	**$ 3,224,040**

NPIAS Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
NonHub Primary	14	$ 3,473,000	$ 4,758,000	$ 33,010,000	$ 41,241,000	$ 231,038,000	$ 295,902,000	$ 21,135,857
Nonprime Com Svc	4	$ 1,214,000	$ 1,670,000	$ 11,309,000	$ 14,193,000	$ 72,357,000	$ 86,549,000	$ 21,637,250
Reliever	11	$ 1,917,000	$ 2,592,000	$ 19,851,000	$ 24,360,000	$ 118,595,000	$ 142,956,000	$ 12,996,000
GA	71	$ 6,507,000	$ 8,735,000	$ 63,522,000	$ 78,764,000	$ 360,412,000	$ 442,552,000	$ 6,233,127
Total	100	$ 13,111,000	$ 17,755,000	$ 127,692,000	**$ 158,558,000**	**$ 782,402,000**	**$ 967,959,000**	**$ 9,679,590**

Cost Analysis Results *(continued)*

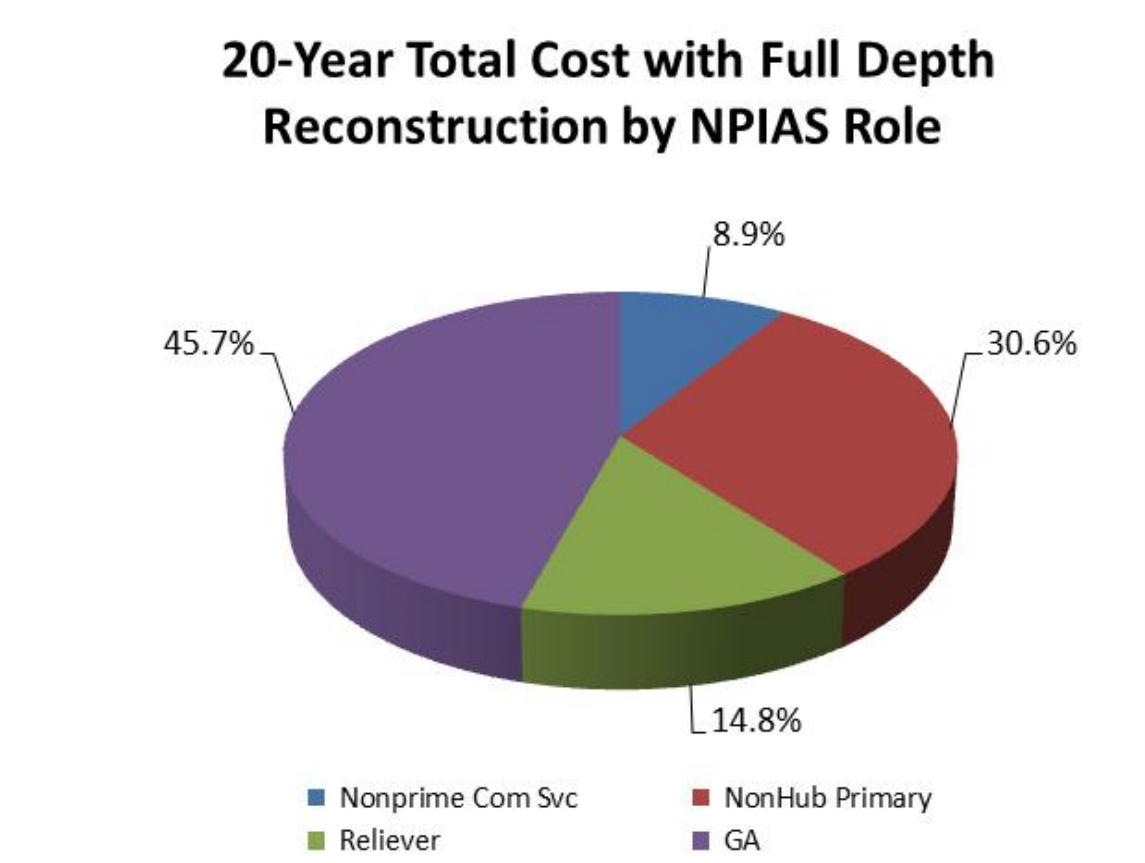
Comparison of 20-Year Pavement Costs

(including reconstruction and maintenance)



Cost Analysis Results *(continued)*

The graphic below depicts a pie chart summary of total cost for full depth reconstruction of the regional airport system, broken down by NPIAS role category. Calculations for partial depth reconstruction reveal similar percentages.



Cost Analysis Results *(continued)*

Cost Analysis Results by FAA Asset Study Category

Study results conclude that the total cost range for reconstruction and maintenance for airports grouped by their respective FAA Asset Study category in a 20-year life cycle (rounded to the nearest ten thousand) is calculated as follows (partial depth to full depth):

		Reconstruction Cost Range		
Asset Category	**Airports**	**Partial Depth**		**Full Depth**
National	8	$155,020,000	to	$196,980,000
Regional	15	$153,240,000	to	$190,700,000
Local	42	$189,390,000	to	$237,770,000
Basic	9	$20,230,000	to	$24,960,000
Primary*	12	$207,160,000	to	$253,970,000
Unclassified*	14	$51,010,000	to	$63,580,000
	100	**$776,050,000**	**to**	**$967,960,000**

** "Primary" and "Unclassified" are not actually categories included in the Asset Study, which is strictly focused on dedicated general aviation airports. A "primary" airport is a commercial service airport having at least 10,000 annual enplanements, while "unclassified" airports are those general aviation airports that do not meet the threshold for inclusion in the Asset Study. Primary and Unclassified airports have been included here to provide a complete picture of the study airports.*

The following tables and charts depict detailed cost calculation results for runways and taxiways in the New England Regional system of study airports.

Cost Analysis Results *(continued)*

GENERAL AVIATION
NEW ENGLA
Regional Airport Syste

Pavement Data Table – Partial Depth Reconstruction Cost Breakdown - *By FAA Asset Study Category*

FAA Asset Study Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 2,049,000	$ 2,595,000	$ 15,019,000	$ 19,663,000	$ 68,935,000	$ 90,867,000	$ 11,358,375
Regional	15	$ 2,121,000	$ 2,720,000	$ 17,039,000	$ 21,880,000	$ 69,144,000	$ 91,957,000	$ 6,130,467
Local	42	$ 2,802,000	$ 3,731,000	$ 26,037,000	$ 32,570,000	$ 102,778,000	$ 135,349,000	$ 3,222,595
Basic	9	$ 337,000	$ 464,000	$ 3,736,000	$ 4,537,000	$ 13,848,000	$ 18,385,000	$ 2,042,778
Primary*	12	$ 2,556,000	$ 3,281,000	$ 19,735,000	$ 25,572,000	$ 101,291,000	$ 138,458,000	$ 11,538,167
Unclassified*	14	$ 976,000	$ 1,247,000	$ 7,971,000	$ 10,194,000	$ 33,194,000	$ 43,389,000	$ 3,099,214
Total	100	$ 10,841,000	$ 14,038,000	$ 89,537,000	**$ 114,416,000**	**$ 389,190,000**	**$ 518,405,000**	**$ 5,184,050**

FAA Asset Study Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 551,000	$ 998,000	$ 9,776,000	$ 11,325,000	$ 52,828,000	$ 64,152,000	$ 8,019,000
Regional	15	$ 569,000	$ 885,000	$ 9,290,000	$ 10,744,000	$ 50,361,000	$ 61,285,000	$ 4,085,667
Local	42	$ 563,000	$ 824,000	$ 8,915,000	$ 10,302,000	$ 43,737,000	$ 54,039,000	$ 1,286,643
Basic	9	$ 24,000	$ 33,000	$ 327,000	$ 384,000	$ 1,462,000	$ 1,845,000	$ 205,000
Primary*	12	$ 483,000	$ 844,000	$ 8,607,000	$ 9,934,000	$ 52,766,000	$ 68,708,000	$ 5,725,667
Unclassified*	14	$ 81,000	$ 132,000	$ 1,240,000	$ 1,453,000	$ 6,169,000	$ 7,622,000	$ 544,429
Total	100	$ 2,271,000	$ 3,716,000	$ 38,155,000	**$ 44,142,000**	**$ 207,323,000**	**$ 257,651,000**	**$ 2,576,510**

FAA Asset Study Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 2,600,000	$ 3,593,000	$ 24,795,000	$ 30,988,000	$ 121,763,000	$ 155,019,000	$ 19,377,375
Regional	15	$ 2,690,000	$ 3,605,000	$ 26,329,000	$ 32,624,000	$ 119,505,000	$ 153,242,000	$ 10,216,133
Local	42	$ 3,365,000	$ 4,555,000	$ 34,952,000	$ 42,872,000	$ 146,515,000	$ 189,388,000	$ 4,509,238
Basic	9	$ 361,000	$ 497,000	$ 4,063,000	$ 4,921,000	$ 15,310,000	$ 20,230,000	$ 2,247,778
Primary*	12	$ 3,039,000	$ 4,125,000	$ 28,342,000	$ 35,506,000	$ 154,057,000	$ 207,166,000	$ 17,263,833
Unclassified*	14	$ 1,057,000	$ 1,379,000	$ 9,211,000	$ 11,647,000	$ 39,363,000	$ 51,011,000	$ 3,643,643
Total	100	$ 13,112,000	$ 17,754,000	$ 127,692,000	**$ 158,558,000**	**$ 596,513,000**	**$ 776,056,000**	**$ 7,760,560**

Cost Analysis Results *(continued)*

GENERAL AVIATION
NEW ENGLAND
Regional Airport System

Pavement Data Table – Full Depth Reconstruction Cost Breakdown - *By FAA Asset Study Category*

FAA Asset Study Category	Number of Airports	RUNWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Runway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 2,049,000	$ 2,595,000	$ 15,019,000	$ 19,663,000	$ 92,587,000	$ 115,099,000	$ 14,387,375
Regional	15	$ 2,121,000	$ 2,720,000	$ 17,039,000	$ 21,880,000	$ 92,125,000	$ 115,149,000	$ 7,676,600
Local	42	$ 2,802,000	$ 3,731,000	$ 26,037,000	$ 32,570,000	$ 136,821,000	$ 169,392,000	$ 4,033,143
Basic	9	$ 337,000	$ 464,000	$ 3,736,000	$ 4,537,000	$ 18,185,000	$ 22,721,000	$ 2,524,556
Primary*	12	$ 2,556,000	$ 3,281,000	$ 19,735,000	$ 25,572,000	$ 128,627,000	$ 169,064,000	$ 14,088,667
Unclassified*	14	$ 976,000	$ 1,247,000	$ 7,971,000	$ 10,194,000	$ 43,936,000	$ 54,131,000	$ 3,866,500
Total	100	$ 10,841,000	$ 14,038,000	$ 89,537,000	**$ 114,416,000**	**$ 512,281,000**	**$ 645,556,000**	**$ 6,455,560**

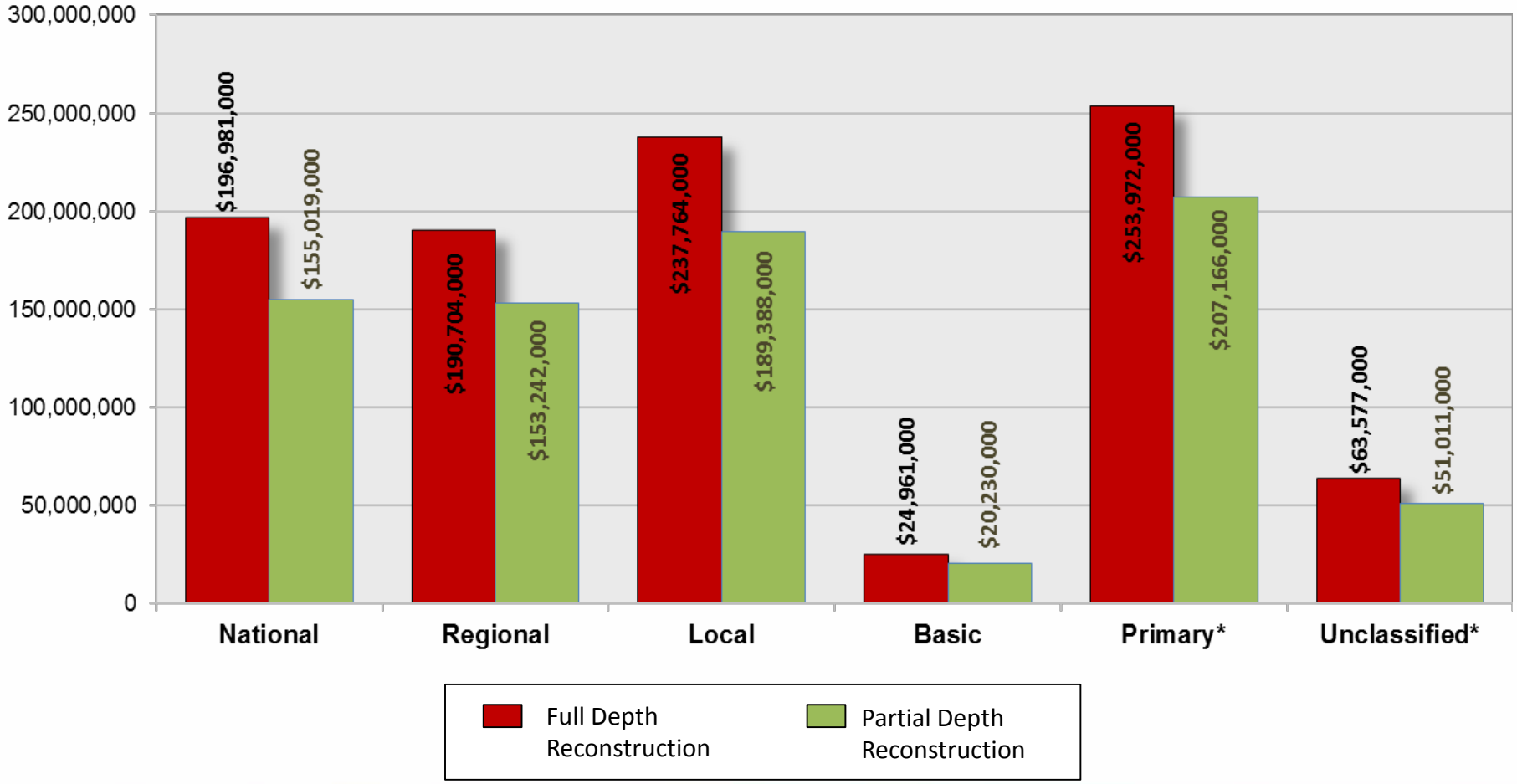
FAA Asset Study Category	Number of Airports	TAXIWAY COSTS						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Taxiway Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 551,000	$ 998,000	$ 9,776,000	$ 11,325,000	$ 70,558,000	$ 81,882,000	$ 10,235,250
Regional	15	$ 569,000	$ 885,000	$ 9,290,000	$ 10,744,000	$ 64,600,000	$ 75,555,000	$ 5,037,000
Local	42	$ 563,000	$ 824,000	$ 8,915,000	$ 10,302,000	$ 58,070,000	$ 68,372,000	$ 1,627,905
Basic	9	$ 24,000	$ 33,000	$ 327,000	$ 384,000	$ 1,857,000	$ 2,240,000	$ 248,889
Primary*	12	$ 483,000	$ 844,000	$ 8,607,000	$ 9,934,000	$ 67,043,000	$ 84,908,000	$ 7,075,667
Unclassified*	14	$ 81,000	$ 132,000	$ 1,240,000	$ 1,453,000	$ 7,993,000	$ 9,446,000	$ 674,714
Total	100	$ 2,271,000	$ 3,716,000	$ 38,155,000	**$ 44,142,000**	**$ 270,121,000**	**$ 322,403,000**	**$ 3,224,030**

FAA Asset Study Category	Number of Airports	COST SUMMARY						
		Maintenance Costs				20-Year Reconstruction *(Capital Cost)*	Total Costs *(with contingencies)*	Average Cost per Airport
		5-Year	10-Year	15-Year	Total			
National	8	$ 2,600,000	$ 3,593,000	$ 24,795,000	$ 30,988,000	$ 163,145,000	$ 196,981,000	$ 24,622,625
Regional	15	$ 2,690,000	$ 3,605,000	$ 26,329,000	$ 32,624,000	$ 156,725,000	$ 190,704,000	$ 12,713,600
Local	42	$ 3,365,000	$ 4,555,000	$ 34,952,000	$ 42,872,000	$ 194,891,000	$ 237,764,000	$ 5,661,048
Basic	9	$ 361,000	$ 497,000	$ 4,063,000	$ 4,921,000	$ 20,042,000	$ 24,961,000	$ 2,773,444
Primary*	12	$ 3,039,000	$ 4,125,000	$ 28,342,000	$ 35,506,000	$ 195,670,000	$ 253,972,000	$ 21,164,333
Unclassified*	14	$ 1,057,000	$ 1,379,000	$ 9,211,000	$ 11,647,000	$ 51,929,000	$ 63,577,000	$ 4,541,214
Total	100	$ 13,112,000	$ 17,754,000	$ 127,692,000	**$ 158,558,000**	**$ 782,402,000**	**$ 967,959,000**	**$ 9,679,590**

Cost Analysis Results *(continued)*

Comparison of 20-Year Pavement Costs

(including reconstruction and maintenance)



Cost Analysis Results *(continued)*

The graphic below depicts a pie chart summary of total cost for full depth reconstruction of the regional airport system, broken down by FAA Asset Study role category. Calculations for partial depth reconstruction reveal similar percentages.