Developing of Pavement Management System (PMS) for EMU Campus Pavement in GIS Environment

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Submitted to the Institute of Graduate Studies and Research in partial fulfillment of the requirements for the Degree of

> Master of Science in Civil Engineering

Eastern Mediterranean University January 2013 Gazimağusa, North Cyprus Approval of the Institute of Graduate Studies and Research

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ABSTRACT

Systematic processes such as a pavement management system (PMS) are commonly utilized for assisting the decision making process in terms of finding a proper maintenance and rehabilitation (M&R) treatment for the pavement network. This kind of process usually can make sure of the effectiveness for funds that allocated for the treatment action. In this study PMS has been established for Eastern Mediterranean University (EMU) campus pavement network for both roadways and parking lots, which can be considered as a first step that carried out to establish this system for the campus. In this research, pavement evaluation study was undertaken in the context of phase a pavement condition survey producing pavement condition index (PCI) according to ASTM D6433 standard. PCI has been determined for every campus pavement section according to the existing pavement distress type, severity and quantity. MicroPAVER PMS software was utilized for computing PCI and for demonstrating when and which section of pavement network required (M&R) action. A total of 79 sections of the campus network were inspected and assessed in June 2012, it can be remarked that 37 sections are in Excellent condition, 15 sections are classed as Very Good, 21 are classed as Good, 4 of sections are in Fair condition and 2 sections are classed as Poor. Moreover, there is no section observed in Very Poor or Failed condition, and also the average PCI for the whole pavement network is 79. Therefore, the entire campus pavement health can be classified as Very Good.

The proposed plan was conducted for the coming 5 years which starts from 2013 to 2017. Additionally, the determined analytical results in PMS have been stored and displayed in Geographic Information System (GIS). This system is one of the latest

techniques followed by using computers to save huge amount of data with large areas of the maps that cannot be saved properly on a paper. In this research ArcGIS10 was integrated with EMU campus PMS, GIS was utilized to assist in the preparation of a suitable database for the campus pavement network. For this reason a shapefile was created and an attribute table has been established. This table includes collected and computed pavement data such as: inventory, present and future condition, suggested treatments alongside costs for each individual section that required a treatment action. Finally, several reports, charts and thematic maps are produced.

Keywords: Pavement Management System, Campus Pavement Network, Pavement Condition Index, Pavement Distress, MicroPAVER, Geographic Information System.

Sistemli işlemler kategorisinde olan üstyapı yöneticilik sistemi (ÜYS) yol üstyapı ağının bakım, onarım seçiminde ve karar verme işleminde sık sık kullanılmaktadır. Bu tür işlemler üst yapı bakımında bütçenin etkin kullanımını sağlamaktadır.

Bu çalışmada ÜYS Doğu Akdenız Üniversitesi (DAÜ) kampüsü üstyapı ağında bulunan yol ve otoparklar için oluşturuldu.ASTM D6433 standardında belirtilen PCI değeri için üstypı durum gözlemi yapılmıştır. Her üstyapı kısmındaki üstyapı sorun türü miktar ve şiddetti belirlenecek kısmın PCI değeri hesaplandı.Bu hesaplama ve üstyapı kısımlarının bakım ve onarım ihtiyaçlarınıntespitiMicroPAVER yazılımı ile yapıldı.

Haziran 2012'de toplam 79 üstyapı kısmı incelendi ve değerlendirildi. Bu kısımlardan 37 tanesi mükemmel, 15 tanesi çok iyi, 21 tanesi iyi, 4 tanesi zayıf ve 2 tanesi de kötü olarak sınıflandırılmıştır.Ayrıca hiç bir kısım çök kötü veya yetersiz olarak belirlenmiştir. Bu nedenle, tüm kampüs üstyapı durumu çok iyi olarak sınıflandırılabilir.

Önerilen plan 2013 ile 2017 arasındaki beş yıl için uygulanmıştır. Ayrıca ÜYS'de yapılan analiz sonuçları Coğrafi Bilgi Sisteminde (CBS) depolanmış ve görüntülenmiştir. Bu yöntem yüksek miktarda verilerin depolanması için kullanılan bir tekniktir.Bu araştırımda kampüs üstyapı ağına uygun bir veritabanı oluşturulmasında CBS kullanmak için ArcGIS 10 DAÜ ÜYS ile birleştirilmiştir. Bu nedenle shapefile ve ilgili öznitelikler tablosu ile oluşturulmuştur.Bu tablo hep üstyapı kısmı için envanter, güncel ve gelecek durumlar, tavsiye edilen iyileştirmeler

ve ilgili maliyetleri içermektedir.Son olarak, çeşitli rapolar, tablolar ve tematik haritalar üretilmiştir.

Anahtar kelimeler: Üstaypı Yönetim Sistemi, Kampüs Üstaypı Ağı, Üstaypı Durumu dizini, Üstaypı Sorunları, MicroPAVER, Coğrafi Bilgi Sistemi. To the person who shaped my future (my dear father)

ACKNOWLEDGMENT

I would like to take this opportunity to thank my supervisor Asst. Prof. Dr. Mehmet M. Kunt, for his unfailing support and guide. I wish to thank, the EMU staff for their efforts and contribution during the study terms.

I owe my greatest gratitude to God for his mercy and replying my prayers and also great thanks to my family for their continuous support and wish them all the best.

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LIST OF ABBREVIATIONS

AC	Asphalt Concrete
APWA	American Public Works Association
ASTM	American Society for Testing and Materials
DOTD	Louisiana Department of Transportation and Development
DV	Deduct Values
EMU	Eastern Mediterranean University
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
ID	Identification
LB	Limited Budget
M&R	Maintenance and Rehabilitation
PCI	Pavement Condition Index
PMS	Pavement Management System
SQL	Structural Query Language
TxDOT	Texas Department of Transportation
UB	Unlimited Budget
US	United States
USA	United States of America

Chapter 1

INTRODUCTION

1.1 General

Nobody denies that pavement network is one of the crucial infrastructure assets for community. It acts as a life-blood of a healthy community. Maintenance and preservation of these important transportation assets will be helpful to achieve more safety, comfort and economy in the transportation field for public. Therefore, their correct maintenance management is essential for community.

Pavement Management System (PMS) is a tool or systematic method that can provide an inclusive inventory for pavement network and organize the work with saving time and effort. The system also provides the data that refer to the current condition of the pavement network with the ability to store the historical data which helps to predict the future pavement condition. In addition, the system can evaluate the pavements and find out a desirable maintenance needs with priorities under the available funds (Shahin, 2005a).

Geographic Information System (GIS) is the scientific tool which assists in the planning, implementation and managing PMS. GIS within PMS are used for storing, analyzing and displaying the pavement data in a color-coding like thematic maps.

There are rare studies on integrating GIS with PMS for University campus roadway and parking lots. Implementing successful PMS for University campus pavement network needs a closer method to this method that is used for small cities and towns.

This research is about developing of pavement management system for Eastern Mediterranean University campus by utilizing GIS and MicroPAVER software. In this study, MicroPAVER was used as pavement management software by entering the pavement condition data that visually collected in the campus for both asphalt roadway and parking lots, ArcGIS is also used for spatial analyzing, demonstrating pavement data and displaying forecasting maintenance work for campus pavement network. The available or limited budget may not be enough to maintain campus pavements. Thus, GIS based PMS becomes a competent and an ideal solution for this situation.

1.2 Needs for the Study

1.2.1 About Eastern Mediterranean University

Eastern Mediterranean University (EMU) is one of the best Universities in the Mediterranean region. It is established in 1979. It has a cosmopolitan environment as students are from 68 countries, and a highly-educated eligible staff from 35 different nations.

EMU campus is located in the Famagusta city in North Cyprus, it was built on an area of 2200 acre. Campus physical infrastructure has been finished; roadway and parking lots can be counted as valuable assets of campus infrastructure which are about 9 km long roadway and 20 parking lots. According to the records of EMU Transportation Unit, the University has 10 mini buses (capacity 35 person) and 4 big

buses (capacity 80 person). The campus has well-founded educational services contain contemporary classrooms, conference rooms, library, computer laboratories, and dormitories (Eastern Mediterranean University, 2012).

1.2.2 The Current status

Nowadays, The EMU campus is developing rapidly. Roadway and parking lots on the campus play an effective role in safety, efficient travel of people and goods on campus, which they were constructed about 20-25 years ago and some of the streets are being resurfaced about 10 years ago. EMU campus can be categorized as a town because of the population and area. Pavement deteriorates over time as a result of loading traffic, environment and aging so it requires proper and timely maintenance. When timely maintenance is not carried out distress severity increases. For instance, cracks may progress to become a small pothole and small pothole quickly becomes a large pothole. Presently paved roadway and parking lots on the EMU campus faced with some problems. These problems can be caused by the following factors:

- Shortcomings in current maintenance practice.
- Pavement deterioration increase.
- Increasing traffic with increasing campus population.
- Lack of documentation and pavement history data(indirect cause).
- Lack of using a database for storing and managing (indirect cause).
- Drainage problem in some pavement sections.
- Mismanagement during maintenance projects.
- Relying only on personal judgment and experience for maintenance decisions.
- There is no systematic approach for producing future maintenance work plan.

Figures 1.1 to 1.6 show EMU campus pavement maintenance process in 12/06/2012 at section ACA 05 and S 08.



Figure 1.1:Excavating base of selected area.



Figure 1.2: Alligator cracks not maintained. Figure 1.3: Cutting deteriorated area.



Figure 1.4: Patching work.





Figure 1.5: Compacting asphalt concrete patch.

Figure 1.6: Compacting base.

1.3 Goals and Objectives of the Study

The primary goal of this research is to develop a PMS for EMU campus pavement in GIS environment which gives a systematic approach of maintaining, enhancing and controlling campus pavements as well as to fulfill one of the University proposed plans towards enhancing and developing campus infrastructure as mentioned in the EMU strategic plan in (2012-2015). In order to accomplish these aims, it is necessary to find the pursuing objectives:

- Establishing an inventory for campus pavement (roadway and parking lots).
- Creating georeferenced GIS shapefile with a suitable database capable of updating.
- Choosing an evaluation approach for analyzing campus pavements.
- Integrating pavement management software such as MicroPAVER with ArcGIS software to display, explicate and assess the data for assisting decision making.
- Suggesting maintenance treatment selections and estimating the future maintenance works with prioritization.
- Determining local maintenance costs for each pavement segments and calculating a total budget required for the whole pavement network.
- Evaluating the effect of the different budget programs on the campus pavement performance.
- Documenting and reporting the analytical results with presenting different graphs, charts and thematic maps.

1.4 Research Organization

The flowchart in Figure 1.7 describes the research organization presented in this thesis.

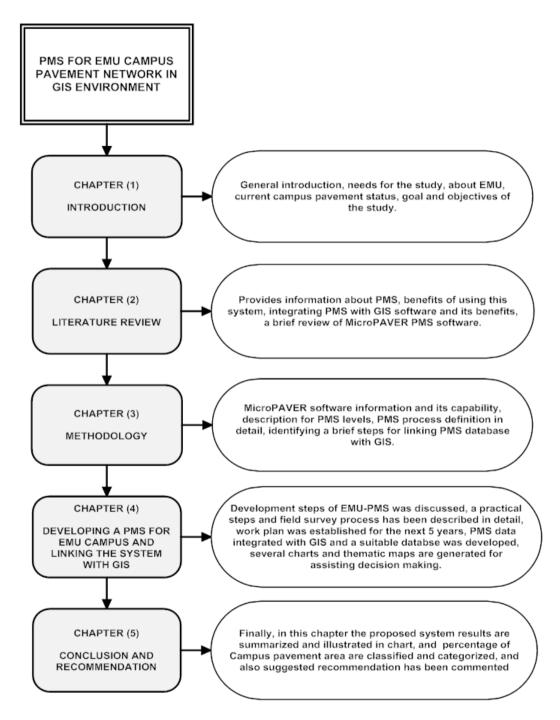


Figure 1.7: Research organization.

Chapter 2

LITERATURE REVIEW

2.1 Pavement Management Systems (PMS)

Pavement management system (PMS) is described as: "a set of tools or methods that can assist decision makers in finding cost-effective strategies for providing, evaluating, and maintaining pavement in a serviceable condition" (AASHTO, 1990).

Based on the above description PMS can address the following questions:

- What maintenance and rehabilitation (M&R) strategies should be the most cost effective?
- Where (which pavement segments) are M&R treatments required?
- When would be the most suitable time (condition) to plan a treatment?

The concept of PMS took root in the USA during the recent period of economic environment. The early PMS model was industrialized by the Washington State Department of Highways in the mid-seventies. This model encompassed a progress of performance forecasting model and a cost model on the basis of a databank of data gathered in the State of Washington over time (6 to 8 years). Later on several state departments of transportation have originated their own PMS procedures desirable to their own needs and necessities (Niju, 2006). Sims and Zhang (2007) conducted a study and found out that managing the biggest pavement network in the U.S. alongside exceeding 193,000 miles¹ of road under its power, Texas Department of Transportation (TxDOT) was the main champion of the pavement management and has long been looking into the use of PMS for the Texas pavement network. The large size of this network and its corresponding needs have always crafted an incentive for the thought of such systems for extra competent and effective decision making, besides that TxDOT until 2007 paid \$2.7 billion annually in M&R actions for pavements.

In Louisiana Department of Transportation and Development (DOTD) the comprehensive pavement distress data collection system has considerably developed from windshield surveys in the main 1970s to videotaping in 1992 then to the Automatic Road Analyzer in 1995. Up to 2008, the pavement network is surveyed after every two years of applying those methods (Khattaket al., 2008).

Broten (1996) argued that PMS cannot make the final decision the decisions can be made by the engineers or people who are utilizing the data provided by this system. In other words, PMS is acting as a roadmap for assisting the decisions to be made.

2.2 Benefits of utilizing PMS

Under the light of an expression "good roads cost less" over time, associations might save a huge amount of money to go towards upcoming development of the network (Vasquez, 2011). And also Tavakoliet al. (1992) indicated that "without using an effective preventive and routine maintenance program, the average city or county

 $^{^{1}}$ 1 mile = 1.609344 kilometers

may see the cost of maintaining their transportation system increase in the future to four or five times what it would cost if the proper maintenance were done now".

Shahin et al. (2003) reported some benefits of utilizing PMS after implementing this system by several agencies; these benefits can be listed below:

- Providing a comprehensive database encompassing data associating to inventory data, pavement condition, construction information, traffic, maintenance and rehabilitation (M&R).
- Showing the present condition of the pavement network and ability to predict the future condition over time.
- Defining approximate budgets to maintain a pavement network at specific levels of performance and creating a priority plan for 5 years.
- Acting as a center which contacts groups such as planning, design, construction, and maintenance groups inside an agency.
- Producing a list of M&R projects. This list will assist the system in final undertaking selection (as cited in Shahin, 2005a).

PMS advantages are endless for the community; the above points were just a few of them.

2.3 PMS Integration with Maps

Implementing a successful PMS for a specific pavement network should be clear and updatable. In this situation linking PMS with maps can be helpful to meet these requirements.

There are two basic choices for agencies to show PMS information on maps. The first one is to originate an interface to the pavement database utilizing one of the mapping software, like AutoCAD. This method is cheap and simple, helps to demonstrate PMS data on a map. However, it cannot provide complete support for analyzing data. Integrating PMS with Geographic Information System (GIS) is the second choice. GIS-based-PMS can display both pavement network map and pavement condition with the ability to analyze the data and create spatial queries (Broten, 1996).

It is highly significant to mention that integrating PMS with GIS requires additional expertise and needs more cost than an automated mapping of AutoCAD. GIS technology and its explanation are detailed below.

2.4 GIS Technology

"A Geographic Information System (GIS) is a computer based tool for the input, storage, management, retrieval and output of information" (Sikder et al., 2003). This information refers to the features of geographic position or specific place. One could also say, GIS will address the inquiries concerning where things are or concerning what is situated in a given location.

A GIS comprises two broad sorting of information, geocoded spatial data and attribute data. Geocoded spatial data delineates objects that have an orientation and connection in two or three-dimensional spaces. Attributes associated alongside road segment could contain its width, number of lanes, pavement condition, construction history and the traffic data. An accident recorded data might include fields for vehicle type, weather condition, time of day and injuries. This attribute data is linked with a topologic object (point, line or polygon) that has position somewhere on the surface of the earth; a well-designed GIS permits the integration of these data. The sophisticated database in a GIS has the ability to associate and control variable sets of spatially referenced data that has been geocoded to the public referencing system (Jain et al., 2003).

As indicated in Figure 2.1, GIS comprises two kinds of spatial data, raster and vector. A raster data is any kind of digital image, such as an aerial photograph or representation of topography. The data drawn as rows and columns of cells, every single cell has its value. Then, these data cells are utilized in GIS for creating different thematic maps. On the other hand the vector data is the common method data which displayed in GIS. Vectors are denoted as shapefile and constituted of points, lines, and polygons. A point in GIS represents a position of a feature on the geographic control grid, such as bridge location. A line is used to demonstrate linear features such as a road or stream. In addition, a polygon is used to show a two dimensional feature like an area of specific part of the earth or boundaries of countries. Figure 2.1 illustrates both raster and vector data.

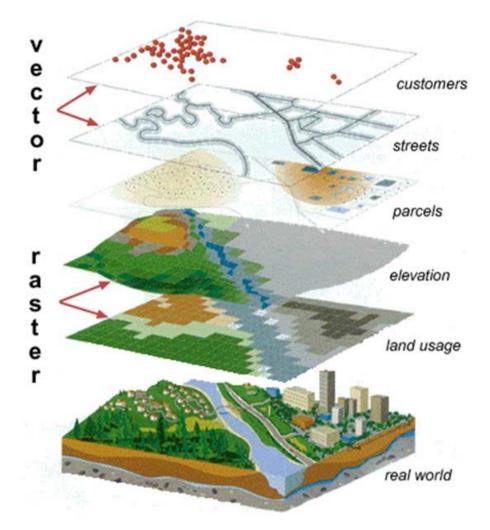


Figure 2.1: Example of raster and vector data (Hill, 2006).

2.5 GIS within PMS

As in each management system, pavement management requires a decision support system to be effective. GIS can be a vital decision support system element by facilitating the preparation, analysis, display, and management of geographical data. In PMS, GIS can considerably enhance the analysis and present the information. Figure 2.2displays the normal PMS formation for the local position (Jain et al., 2003).

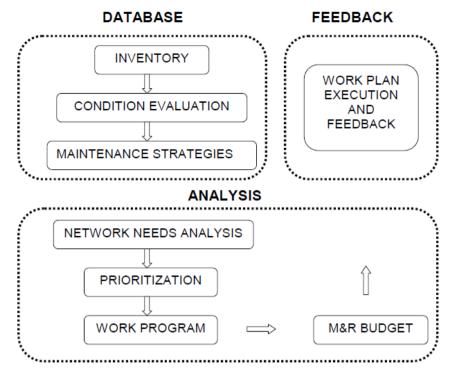


Figure 2.2: Normal PMS formation for a local position (Jain et al., 2003).

Since the mid 1990s, GIS has been applied in many areas that deal with information comprises a spatial entity, so using GIS in PMS was one of these applications. For instance, it provides the skill to visualize spatially connected pavement information on a map to rapidly assess the condition of a network. Due to the fact that, transportation agencies have accumulated vast amounts of data regarding the pavement condition; GIS became a utilitarian tool for the management plan. This has made it imperative for associations to find out a method firstly to save and manage such a huge number of data, and secondly to have the skill to employ these data efficiently to make appropriate and cost competent decisions in the M&R process (Grass, 2007). On the other hand, in 1997 the Public Services Department in the city of High Point, North Carolina enforced a PMS at the network level that gave it the skill to carry out all the data collection and rating alongside the assistance of GIS. The presented data were significant when giving data to the Mayor and Metropolitan Council associates, Citizen Commissions, and non-expert people (Thomas, 1998).

It is important to realize that the agencies in US are not the only ones who are utilizing GIS for pavement management. Grass (2007) mentioned that this concept has been requested and learned in both Japan and India. The city of Nagoya in Aichi Region of central Japan, applied GIS as a tool within their freeways PMS. The GIS plan was produced for its spatial analysis capabilities, which contained GIS presentations of the selected pavement road network and region limits.

2.6 Benefits of GIS/PMS Integration

Some of the advantages of GIS/PMS integration are:

- Ability to examine Pavement Management (PM) data on the basis of geographic location.
- Demonstrating the results of the database queries and PM studies on the network map.
- Demonstrating pavement conditions and forecast work plans on a roadway network map.
- Ability to display pavement conditions across other georeferenced information, for instance, traffic and zoning.
- Ability to update and edit pavement network map.

In addition, it can assist PM information by utilizing a format that is effortlessly understood by the managers and public (Broten, 1996).

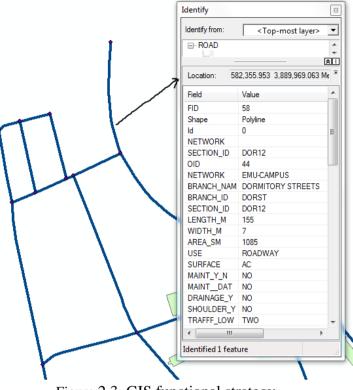


Figure 2.3: GIS functional strategy.

2.7 MicroPAVER

MicroPAVER is a software developed primarily for pavement management use, it is produced by US Army Corps of Engineers in Champaign, Illinois. In 1979 the American Public Works Association (APWA) across its research foundation commenced a technology transfer budget for this activity was a \$250,000 concerted effort of 80 local offices in the US and Canada who participated in testing and assessing the PAVER software. In the beginning, a mainframe time-sharing established system PAVER has been adjusted for use on microcomputers and then renamed to MicroPAVER.

Until now MicroPAVER is being utilized by more than 600 cities, regions, airports and private consulting firms. The American Society for Testing and Materials (ASTM) standard D6433-99 obtained by MicroPAVER's Pavement Condition Index (PCI) methodology. This standard can be described as the only pavement rating procedure that realized for rating pavement roads and parking. Moreover, ASTM D6433-99 jointly with MicroPAVER's preceding receipt of ASTM D5340-93 for rating airfield pavement condition makes MicroPAVER's PCI the standard for defining the condition of most pavement projects (APWA, 2011).

This software has been projected to make optimal budgets allocated for pavement M&R works. It applies inspection data and PCI result to delineate pavement conditions so as to predict its M&R needs in the future. The main capabilities of the software are listed below:

- Creates pavement inventory and computing PCI.
- Models pavement condition deterioration over time.
- Estimates the required budget to maintain pavements at a given condition.
- Permits the database to be split or join.
- Ability to store field collected photos in a database.
- Ability to integrate with GIS to present different data on the map.

Chapter3

PAVEMENT MANAGEMENT: MicroPAVER, LEVELS, PROCESS AND LINKING WITH GIS

3.1 PMS Software: MicroPAVER

MicroPAVER is Pavement Management software, in the beginning it was developed to serve the Department of Defense for studying the pavement condition of airfield and then for roads and parking lots. This program is most functional for small cities pavement network and limited size projects which can establish a plan for future pavement treatment. MicroPAVER provide engineers with a systematic approach for finding maintenance and rehabilitation (M&R) needs and priorities for the projects. Shahin and Walther (1990) stated that the PAVER has been used as a mainframe version and the next step MicroPAVER carried out on a microcomputer.

Field inspection data from the pavement network are inserted into the system's database then the software computes the Pavement Condition Index (PCI). The PCI information is utilized to predict the whole health of the pavement network. According to the software manual MicroPAVER capabilities involve: Inventory, PCI computation, Work plan, Condition Analysis, Condition Prediction, Maintenance and Rehabilitation (M&R) Plan and Report generation. Moreover, the system can create some queries which they are used for listing inventory, summarizing of work history and arranging PCI reports.

3.2 PMS Management Levels

Pavement management can take place at two main levels: network and project level. The network level focuses on creating the competent use of budgetary resources for the whole pavement network. On the other hand, project level is specific to a given pavement segment that has been recognized for possible rehabilitation.

Network level includes the assessment of all pavements below an agency's jurisdiction. The analysis of this level is best utilized for complete budget estimates, projected considerations, or for conducting "what if" forms of questions. The network level requires aggregated information. Thus, this level has more interest to use by the manager.

Project level focuses on a particular pavement segment and normally comes afterward network level in local agencies. This level is a sequence of steps to find out the cause, extent of pavement deterioration and analyzing life cycle cost. Additionally, it attempts to establish an accurate deterioration model. In order to make detailed design decisions and to provide additional knowledge about pavement condition and causes of deterioration for an individual project, it must collect more data than the network level and performing a detailed evaluation with additional testing such as: coring, material and nondestructive testing (Broten, 1996).

3.3 PMS Process

The implementation of PMS to a particular pavement network is carried through a systematic operation that includes several tasks on a periodic basis. This system is used universally with a very slight difference, as covered in the following steps.

19

3.3.1 Network Definition

The primary step in establishing a PMS is the network identification. A network is a consistent combination of pavements for M&R management. The pavement manager could be responsible for managing the pavement. The pavement network firstly, must be divided into branches and then into a unique section. A section can be defined as a smallest management unit while considering the selection of M&R treatments. Several factors should be taken into account as dividing branches into sections; these factors are pavement structure, traffic, construction history, surface type, and pavement condition (Shahin, 2005a).

3.3.2 Pavement Inventory

Pavement inventory is the basis of each PMS, usually contains the physical characteristics of the pavements and normally these data do not change amid maintenance actions.

The main intention of the inventory is to provide data for identifying the pavement's physical features. The minimum information needs for establishing pavement inventory are listed below (Washington State Department of Transportation, 1994):

- Pavement section ID and name.
- Starting and ending location for each pavement section.
- Functional classification.
- Number of lanes.
- Pavement rank.
- Pavement surface.
- Pavement thickness.
- Pavement width.

- Pavement length.
- Pavement surface area
- Construction date (last surface).
- Average Daily Traffic (ADT).

It is important to mention that the precise type of inventory data needed is reliant on the agency and the PMS software necessities. Sometimes in inventory data collection more information are being collected such as: drainage condition, sidewalk condition, and number of traffic signs which may be used at project level that usually comes after network level.

3.3.3 Pavement Condition Evaluation

After preparing the pavement inventory for the whole network pavement condition evaluation can be set out. Pavement inspection is one of the vital steps in PMS that encompasses distresses survey. The inspection can be carried out manually or utilizing automated data collection vehicles. The vehicle may comprise cameras, profiling devices, and laser sensors, the collected data are changed to a tape for more processing, either by a software program or by individuals (WSDT, 1994). Manual visual inspections are usually carried out by one or two people involving driving pavement sections at slow speeds and stopping from time to time, or by walking through the whole sections. Data collection by walking is more accurate than driving but it is costly and needs more time.

The distresses survey is according to the PCI method which is developed by the U.S. Army Corps of Engineers, and delineated in the ASTM D6433 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys". This standard defines distress types, severity levels and methods for measuring and recording distresses for both roadway and parking lots. For flexible pavement a total 19 distresses have been tabulated in MicroPAVER system, as displayed in Table 3.1.

Once the field inspection process has been finished the data recorded on the special forms, these data are utilized to calculate the PCI for the pavement sections. PCI can be computed either manually or automatically. The below points describe the steps for achieving the condition survey and calculating PCI manually (Shahin, 2005a):

- 1. Dividing pavement into sections (segments).
- 2. Dividing every pavement segment into sample unit.
- 3. Inspect sample units by determining distress types, severity and density (extend).
- 4. Determine deduct values (DV) for each distress type.
- 5. Compute the Total Deduct Value (TDV) which is equal to the sum of all DV.
- 6. Adjust TDV to get Corrected Deduct Value (CDV).
- 7. Compute PCI for each inspected sample unit by using equation 3.1:

$$PCI = 100 - CDV \tag{3.1}$$

 Compute PCI for the whole section, which is equal to the average of PCI's of all sample units.

Code	Distress Name	(Units)
1	Alligator Cracking	Sq. m
2	Bleeding	(Sq.m)
3	Block Cracking	(Sq. m)
4	Bumps & Sags	(L.m)
5	Corrugation	(Sq. m)
6	Depression	(Sq. m)
7	Edge Cracking	(L.m)
8	Reflection Cracking	(L.m)
9	Lane/Shoulder Drop Off	(L.m)
10	Long & Trans Cracking	(L.m)
11	Patching	(Sq.m)
12	Polished Aggregate	(Sq. m)
13	Potholes	(Number)
14	Railroad Crossing	(Sq. m)
15	Rutting	(Sq.m)
16	Shoving	(Sq. m)
17	Slippage Cracking	(Sq. m)
18	Swell	(Sq.m)
19	Weathering & Raveling	(Sq. m)

Table 3.1: Flexible pavement distresses with measurement units (MicroPAVER 5.3)

On the other hand, PCI can be calculated automatically by entering the distress information into the MicroPAVER software. This kind of calculation saves time and decreases errors but needs experience and computer software skills.

As reported in ASTM D 6433, PCI is numerically scaled from 0 to100. It is a measure of the pavement surface functional condition. This index indicates the current health of pavement. Standard PCI scale assesses pavements within seven different classes. Besides, various colors have been utilized by MicroPAVER to delineate different states inside the standard scale. As demonstrated in Figure 3.1, current condition or pavement quality can be presented by utilizing words "Excellent" to "Failed".

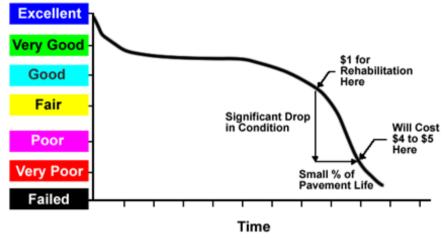


Figure 3.1: Pavement condition criteria (US Army Corps of Engineers, 2012)

3.3.4 Condition Prediction

It is well known there is no single prediction model that will apply and work in all situations and conditions. An extensive study program was carried in the U.S. ensued in the development of what is called the Family Method (Shahin and Walther, 1990). A pavement family is defined as a number (group) of pavement segments with similar deterioration, regardless of age. The Micro PAVER permits the user to determine a family based on various factors encompassing use, rank, zone, surface type, segment category, last surface construction date and PCI. MicroPAVER software has a prediction modeling engine which is utilized to create various models for different situation and conditions.

Both levels (network and project) in PMS are utilized prediction model. In network level models are utilized to examine the condition and to find out required treatment. In project level models are utilized to choose specific rehabilitation options to meet anticipated traffic and climatic issues, the models offer the main input to executing cost analysis to equate the economics of several M&R options. Thus, the accuracy of prediction is more important for project level analysis than network level analysis (Shahin, 2005b).

3.3.5 Typical Treatment Requirements

MicroPAVER contains the suggested annual M&R work level for each pavement segment across the network optimization. These M&R works are (Shahin, 2005a):

- Localized stop-gap (filling potholes).
- Localized preventative (crack filling).
- Global preventative (surface treatment).
- Major (overlay or reconstruction).

The optimization at the network is carried out by utilizing the critical PCI method. The critical PCI is "the PCI value at which the rate of PCI loss increases with time or the cost of applying localized preventive maintenance increases significantly" (Shahin, 2005a). Figure 3.2 shows critical PCI level.

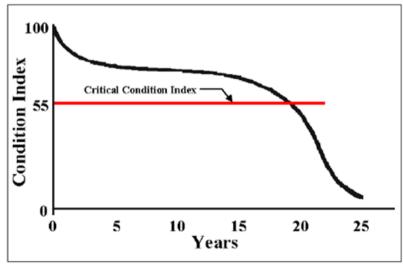


Figure 3.2:Critical PCI (Shahin, 2005a).

M&R decisions are related to the section PCI level comparable with the critical PCI level. If the section PCI is greater than the critical PCI, localized preventive and/or global preventive M&R are applied. Major M&R are applied only if the pavement segment is structurally deficient as demonstrated in Figure 3.3.

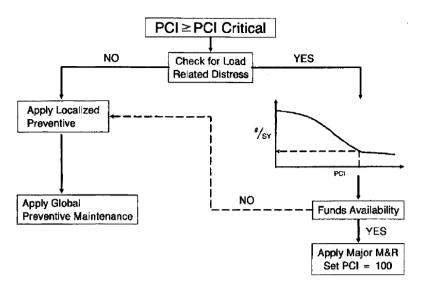


Figure 3.3: M&R decision for sections with $PCI \ge critical PCI$ (Shahin, 2005a).

If the section PCI is smaller than the level of the critical PCI, localized safety or major M&R are applied as shown in Figure 3.4.

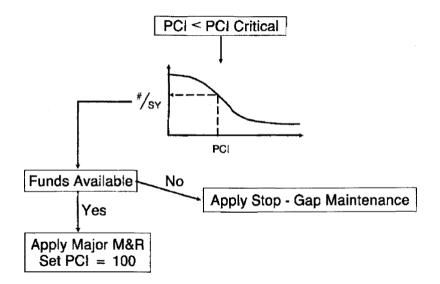


Figure 3.4: M&R decision for sections with PCI <critical PCI (Shahin, 2005a).

3.3.6 Maintenance Prioritization

After suggesting the treatment and finding costs for each pavement section, in the limited funded program the pavement manager should find a method to prioritize pavement projects.

Smith (2011) reported some possible concepts in prioritization, these concepts are:

- Worst first.
- Least Life-cycle Costs.
- Best Benefit-cost Ratio.
- Best Effectiveness-cost Ratio.

In MicroPAVER system, one of the factors that considered in prioritization is the critical PCI, which is based on the concept that is more economic to preserve and maintain the pavement segments in which they are above the critical PCI level than those segments below the critical level. Therefore, those pavement sections which are greater than the critical PCI should get a higher priority than those sections at or smaller than the critical PCI. It is important to note that those segments greater than the critical PCI. It is should get a higher priority than the critical PCI and they display structural distress should get a higher priority than the the other sections, so as to decrease the cost before the rate of deterioration increases by fixing the deterioration and bringing back the pavement segment to good condition. The remaining pavement segments can be prioritized regards to the PCI and pavement rank (Shahin and Walther, 1990).

After tabulating suggested projects for M&R, in network level, agencies can use this candidate project list as a link with project level. It is important to realize that the PCI is not only the factor for establishing prioritization, there are other factors that can be taken into account such as: pavement rank, use, drainage condition, and friction.

3.3.7 Linking PMS with GIS

With the increase of Geographic Information System (GIS) knowledge, PMS in GIS environment has come to be effective in practice. One of the key of success in implementing PMS is the data presentation. PMS results should be clear, confident and updatable. GIS as a scientific tool can be used to assist this process.

According to the database integration method, there are three approaches for linking PMS with GIS (Zhang et al. 2002):

- 1. Seamless integration: The PMS is carried out inside the GIS by sharing a common database.
- Database linkage: Exporting PMS data then importing it into the GIS for demonstrating or querying.
- Exporting of map: Exporting map from the GIS then importing it into the PMS for utilizing it in the map presentation.

Database linkage can be considered as a cheaper method among the abovementioned approaches. In this method data are exported from one of the databases such as: Structural Query Language (SQL), Microsoft Access or Microsoft Excel then imported into the attribute table in GIS. Each pavement section is linked with one row in the attribute table. Figure 3.5 shows GIS and database integration. Database linkage is a suitable way for an agency where they want to update the databases (GIS database and PMS database) separately.

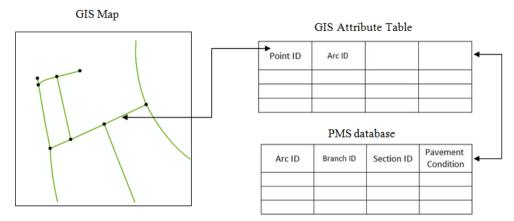


Figure 3.5: GIS- PMS database integration.

The following points are briefly describing GIS/ PMS integration:

- 1. Importing a base map (scanned or raster map) to ArcGIS.
- 2. Georeferencing the imported map.
- 3. Creating and editing pavement network (shapefile).
- 4. Adding and joining PMS database with the created shapefile.
- 5. Creating thematic maps, reports, and queries.

GIS provides the pavement manager with the ability to produce queries, reports, and performing statistical analysis. Moreover, it will let the user to update the database at any time if required. Integrating GIS with PMS will be discussed in details in Chapter 4.

Chapter 4

DEVELOPMENTOF THE PMS FOR EMU CAMPUS PAVEMENT NETWORK

4.1Developing a PMS for EMU Campus Pavement Network

Shahin and Walther (1990) remarked that "a PMS provides a systematic, consistent method for selecting maintenance and rehabilitation (M&R) needs, priorities and determining the optimal time of repair by predicting future pavement condition". In this research, a PMS for Eastern Mediterranean University campus (EMU-PMS) was developed on the basis of the systematic process as demonstrated in Figure 4.1. In this process, the two main software are utilized, these software are MicroPAVER and Geographic Information System (GIS) software, the first one is used for storing and evaluating the PMS data and the second one (GIS) has been used as an intelligent software for presenting PMS results on a geographic map. Figure 4.1 shows a proposed system that can be explained in the following sections.

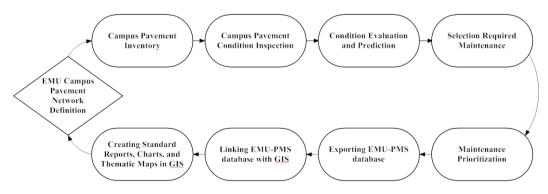


Figure 4.1: EMU-PMS Process.

4.1.1 EMU Campus Pavement Network Definition

Eastern Mediterranean University (EMU) campus pavement network includes about 9 km length of roadway and 20 parking lots. Figure 4.2 indicates the asphalt concrete surface area of roadway and for parking lots.

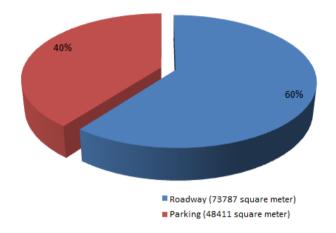


Figure 4.2: EMU campus pavement network surface area.

It is well known, for defining a pavement network a suitable referencing system should be chosen. The main purpose of a referencing system is to delineate one pavement section in the network from other sections. In the campus there is no referencing system of roadways and parking lots. In other word, there is no existing systematic road numbering. Therefore, a new system has been developed for coding and numbering roads and parking.

In this study, campus network is represented by using nodes and lines. For instance, between every two nodes there is one line which is representing the pavement segment. In this network identification, nodes are usually located at the road conjunctions. Based on the numbering progression system nodes are being numbered from east to west.

In order to manage the pavement network properly, the network should be broken into branches then the branches should be divided into smaller units which are called sections (segments). In this study, branches are divided into sections based on change in:

- Functional classification.
- Lane numbers.
- Pavement rank.
- Surface type.
- Pavement width.
- Construction date.

The campus pavement network was divided into four major branches for roadways (Academic Street, Dormitories Street, Sport Street and South Street) and also each parking is considered as a single branch. Table 4.1shows a sample of branch and section coding system.

Table 4.1: Sample of campus pavement network coding.

Branch Name	Branch ID	Section ID
Academic Street	ACAST	ACA 01, ACA 02,ACA 39
Dormitories Street	DORST	DOR 01, DOR 02,DOR 12
Sport Street	SPST	SP 01, SP 02,SP 06
South Street	SST	S 01, S02,S08
Parking of Civil DPT	PCIVIL	PCIVIL 01
Parking of Rector Office	PRECT	PRECT01

As demonstrated in Figure 4.3 campus roadways contained 59 sections and parking lots contained 20 sections.

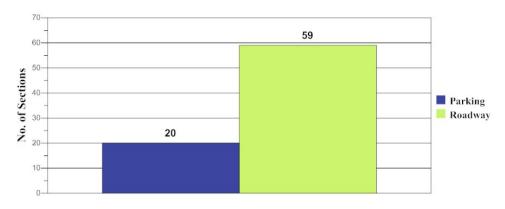


Figure 4.3: EMU campus pavement section distribution.

4.1.2 Pavement Inventory and Condition Survey

The EMU campus pavement network includes both paved roadway and parking lots. In this study, about 122,198 square meters of asphalt concrete surface have been surveyed. Firstly, inventory data collected then pavement condition inspected section by section finally recorded in the special form as presented in appendix A.

4.1.2.1 Pavement Inventory

The primary function of the pavement inventory survey is to provide data to identify the pavement physical features, in this study some of the collected inventory data are:

- Pavement section ID and name.
- Starting and ending of sections (From, To)
- Construction date (last construction).
- Functional classification.
- Pavement rank.
- Pavement surface.
- Pavement width.
- Pavement length.
- Pavement surface area.

- Maintenance date.
- Sidewalk exists.
- Drainage exists.
- Number of lanes.
- Traffic flow (One/ Two direction).

A number of tools have been used for this purpose, such as a manual odometer (measuring wheel), three-meter straight-edge, tape measure, ruler and digital camera. The measuring wheel was used to measure the length of the road and also to measure the lengths or areas of existing distresses. The three-meter straight-edge and ruler were used to measure pothole depth and other depressions, and the digital camera was used for capturing. Figures 4.4 to 4.6 demonstrate an inventory survey process.



Figure 4.4: Measuring section geometry





Figure 4.5:Measuring Wheel.

Figure 4.6:Tape measure.

A part of inventory data is shown in Table 4.2and a detailed inventory is attached in

Appendix B.

Branch ID	Branch Name	Section ID	Use	Length (m)	Width (m)	Section Area (m ²)
SST	SOUTH STREET	S06	ROADWAY	100.00	9.00	900.00
SST	SOUTH STREET	S01	ROADWAY	138.00	6.00	828.00
SST	SOUTH STREET	S02	ROADWAY	70.00	8.60	602.00
SST	SOUTH STREET	S03	ROADWAY	84.00	8.60	722.40
SST	SOUTH STREET	S04	ROADWAY	98.00	9.00	882.00
SST	SOUTH STREET	S05	ROADWAY	213.00	9.00	1,917.00
SST	SOUTH STREET	S07	ROADWAY	160.00	8.50	1,360.00
SST	SOUTH STREET	S08	ROADWAY	157.00	9.00	1,413.00
ACAST	ACADEMIC STREET	ACA23	ROADWAY	136.00	8.80	1,196.80
ACAST	ACADEMIC STREET	ACA32	ROADWAY	60.00	10.00	600.00
ACAST	ACADEMIC STREET	ACA18	ROADWAY	42.00	11.00	462.00
ACAST	ACADEMIC	ACA19	ROADWAY	136.00	9.50	1,292.00

Table 4.2: Part of EMU campus pavement inventory.

Branch ID	Branch Name STREET	Section ID	Use	Length (m)	Width (m)	Section Area (m ²)
ACAST	ACADEMIC	ACA20	ROADWAY	50.00	9.50	475.00
ACAST	STREET ACADEMIC	ACA16	ROADWAY	85.00	9.50	807.50
ACAST	STREET ACADEMIC STREET	ACA22	ROADWAY	98.00	8.00	784.00
ACAST	ACADEMIC STREET	ACA15	ROADWAY	75.00	9.50	712.50
ACAST	ACADEMIC STREET	ACA24	ROADWAY	78.00	9.00	702.00
ACAST	ACADEMIC STREET	ACA25	ROADWAY	67.00	9.00	603.00
ACAST	ACADEMIC STREET	ACA26	ROADWAY	76.00	6.00	456.00
ACAST	ACADEMIC STREET	ACA27	ROADWAY	85.00	6.00	510.00
ACAST	ACADEMIC STREET	ACA28	ROADWAY	62.00	7.20	446.40
ACAST	ACADEMIC STREET	ACA29	ROADWAY	101.00	7.40	747.40
ACAST	ACADEMIC STREET	ACA30	ROADWAY	387.00	10.00	3,870.00
ACAST	ACADEMIC STREET	ACA21	ROADWAY	123.00	8.80	1,082.40
ACAST	ACADEMIC STREET	ACA07	ROADWAY	77.00	8.60	662.20
ACAST	ACADEMIC STREET	ACA01	ROADWAY	53.00	7.80	413.40
ACAST	ACADEMIC STREET	ACA02	ROADWAY	212.00	9.00	1,908.00
ACAST	ACADEMIC STREET	ACA03	ROADWAY	245.00	5.80	1,421.00
ACAST	ACADEMIC STREET	ACA04	ROADWAY	116.00	9.00	1,044.00
ACAST	ACADEMIC STREET	ACA17	ROADWAY	98.00	8.70	852.60
ACAST	ACADEMIC STREET	ACA06	ROADWAY	55.00	9.00	495.00
ACAST	ACADEMIC STREET	ACA33	ROADWAY	126.00	9.00	1,134.00
ACAST	ACADEMIC STREET	ACA08	ROADWAY	139.00	11.50	1,598.50
ACAST	ACADEMIC STREET	ACA09	ROADWAY	47.00	8.00	376.00
ACAST	ACADEMIC STREET	ACA10	ROADWAY	90.00	6.00	540.00
ACAST	ACADEMIC STREET	ACA11	ROADWAY	61.00	5.70	347.70
ACAST	ACADEMIC STREET	ACA12	ROADWAY	100.00	3.45	345.00
ACAST	ACADEMIC STREET	ACA13	ROADWAY	89.00	6.00	534.00
ACAST	ACADEMIC STREET	ACA14	ROADWAY	73.00	6.00	438.00

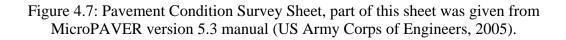
Branch ID	Branch Name	Section ID	Use	Length (m)	Width (m)	Section Area (m ²)
ACAST	ACADEMIC STREET	ACA05	ROADWAY	124.00	8.50	1,054.00
ACAST	ACADEMIC STREET	ACA31	ROADWAY	309.00	8.70	2,688.30
SPST	SPORT STREET	SP05	ROADWAY	420.00	10.00	4,200.00
SPST	SPORT STREET	SP03	ROADWAY	157.00	6.60	1,036.20
SPST	SPORT STREET	SP02	ROADWAY	354.00	6.60	2,336.40
SPST	SPORT STREET	SP01	ROADWAY	97.00	7.80	756.60
SPST	SPORT STREET	SP06	ROADWAY	403.00	8.70	3,506.10
SPST	SPORT STREET	SP04	ROADWAY	197.00	10.00	1,970.00
DORST	DORMITORY STREET	DOR05	ROADWAY	273.00	9.40	2,566.20
DORST	DORMITORY STREET	DOR11	ROADWAY	100.00	6.00	600.00
DORST	DORMITORY STREET	DOR10	ROADWAY	160.00	7.00	1,120.00
DORST	DORMITORY STREET	DOR09	ROADWAY	152.00	6.00	912.00
DORST	DORMITORY STREET	DOR06	ROADWAY	267.00	7.00	1,869.00
DORST	DORMITORY STREET	DOR04	ROADWAY	314.00	9.00	2,826.00
DORST	DORMITORY STREET	DOR03	ROADWAY	372.00	7.00	2,604.00
DORST	DORMITORY STREET	DOR08	ROADWAY	60.00	7.00	420.00
DORST	DORMITORY STREET	DOR01	ROADWAY	282.00	10.00	2,820.00
DORST	DORMITORY STREET	DOR12	ROADWAY	155.00	7.00	1,085.00
DORST	DORMITORY STREET	DOR07	ROADWAY	81.00	7.00	567.00
DORST	DORMITORY STREET	DOR02	ROADWAY	337.00	10.00	3,370.00
PREGIST	PARKING OF REGISTER	PREGIST01	PARKING	42.00	17.00	714.00
PSERV	PARKING OF SERVICE BUILD	PSERV01	PARKING	318.00	12.60	4,006.80
PACTIV1	PARKING OF ACTIVITY C1	PACTIV11	PARKING	53.00	30.00	1,590.00
PACTIV2	PARKING OF ACTIVITY C2	PACTIV21	PARKING	59.00	23.00	1,357.00
PSABAN	PARKING OF SABANCI	PSABAN01	PARKING	114.00	22.00	2,508.00
PPOST	PARKING OF POST OFFICE	PPOST01	PARKING	232.00	14.80	3,433.60
PIT	PARKING OF IT DPT	PIT01	PARKING	39.00	17.50	682.50

Branch ID	Branch Name	Section ID	Use	Length (m)	Width (m)	Section Area (m ²)
PLIB	PARKING OF LIBRARY	PLIB01	PARKING	145.00	5.70	826.50
PBUSIN	PARKING OF BUSINESS DPT	PBUSIN01	PARKING	132.00	22.00	2,904.00
РМЕСН	PARKING OF MECHANICAL DPT	PMECH01	PARKING	56.00	12.80	716.80
PRECT	PARKING OF RECTOR	PRECT01	PARKING	40.00	28.00	1,120.00
PCC	PARKING OF CC	PCC01	PARKING	58.00	21.60	1,252.80
PLALA	PARKING OF LALA HALL	PLALA01	PARKING	65.50	12.00	786.00
PARCH	PARKING OF ARCH DPT	PARCH01	PARKING	285.00	25.00	7,125.00
PLAW	PARKING OF LAW DPT	PLAW01	PARKING	300.00	9.20	2,760.00
PEMC	PARKING OF EMC	PEMC01	PARKING	424.00	15.00	6,360.00
PCIVIL	PARKING OF CIVIL DPT	PCIVIL01	PARKING	237.00	12.70	3,009.90
PHEALTH	PARKING OF HEALTH CENTER	PHEALTH01	PARKING	47.00	40.00	1,880.00
PFANATIC	PARKING OF FANATIC	PFANATIC01	PARKING	308.00	15.00	4,620.00
PIND	PARKING OF INDUSTRIAL DPT	PIND01	PARKING	33.00	23.00	759.00

4.1.2.2 Pavement Condition Survey

Field walking condition survey of the pavement sections was carried out in June 2012 to collect and assess the existing condition of the pavement network. This survey was conducted by using "Paver Asphalt Distress Manual" which is evolved by the US Army Corps of Engineers(US Army Corps of Engineers, 1997). A range of distress types was measured and assessed according to their severity level. Records from these measurements and assessments were registered in the survey sheet as shown in Figure 4.7, and all sheets are outlined in Appendix A.

PMMS FOR EMU		T CONDIT	TION SURV	EY SHEET	SHEET NO. 31
BRANCH N	AME: ACA	DEMIC S	TREST	BRANCH ID: AGAST	DATE: \8/6/20\2
SECTION II	D: ACA.	20	NO. OF LA	NES: 2	INSPECTOR: Bygar A
FROM:	36	-	TO:	37	FUNCTIONAL CLAS
SECTION L	ENGTH:	50	SECTION	WIDTH: 9.5	Secondary
	SUF	FACE DIS	STRESS T	YPE	TRAFFIC FLOW:
1. Alligator (Cracking Sq	m	11. Patching &	t Util Cut Patching Sqm	ONE DIRECTION
2. Bleeding S			12. Polished	d Aggregate Sq m	TWO DIRECTION
3. Block Cra	17.00 March 19.00 March 19.		13. Pothole	s Count	SURFACE TYPE:
4. Bumps an			14. Railroa	d Crossing Sq m	
5. Corrugatio			15. Rutting	Sqm	LAST CONSTRUCTION
6. Depression	1077-11		16. Shoving	g Sq m	DATE: 191 7/1989
7. Edge Crac			17. Slippag	e Cracking Sq m	
	ion Cracking	g m	18. Swell S	qm	MAINTENANCE: Y N
. Lane/Shou	Ilder Drop O	off m	19. Weathe	ring/Ravelling Sq m	MAINTENANCE DATE:
10. Long & '	Trans Crack	ing m		×.	
DISTRESS CODE	10	6	11	1	SHOULDER: Y X N
CODE	25 L	2.5 M	4.5 M	5M	DRAINAGE: Y
	35 L		7 H		DRAINAGE: I
					PHOTOGRAPH .jpg
					1199
					1201
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					-
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	60				m
EVER EVER		2.5	4.5	5	m
H			7		2×
COMMENT	:		1		
					RA
C					- N
	~		2	CRARK X	N A
		5	2	KAYS	



The most common distresses which were surveyed in the EMU campus pavement network are illustrated in Figures 4.8 to 4.16.



Figure 4.8: Alligator Cracking. (sect. ACA 01).Figure 4.9: Pothole (sect. DOR02).



Figure 4.10: Block Cracking (sect.ACA 16).



Figure 4.11: Depression (sect.SP 05).



Figure 4.12: Edge Cracking (sect. ACA 02).



Figure 4.13: Bumps and Sags (sect. ACA 15).



Figure 4.14: Patching (sect. SP 03).Figure 4.15: Longitudinal Cracking (sect.ACA 20).



Figure 4.16: Transverse cracking (sect.ACA 31).

4.1.3 Condition Evaluation and Prediction

Once an inventory and condition survey completed, the recorded results entered to the MicroPAVER database, this software calculates the Pavement Condition Index (PCI) for each individual sections. The PCI is derived from the critical score, from a combination of the quantities of different types of distress and their severity. Table 4.3 shows the PCI results for each pavement section.

Branch ID	Section ID	Use	Length	Width	Area	PCI
Dranch ID	Section ID	Use	(m)	(m)	(\mathbf{m}^2)	ru
SST	S06	ROADWAY	100.00	9.00	900.00	82.00
SST	S01	ROADWAY	138.00	6.00	828.00	63.00
SST	S02	ROADWAY	70.00	8.60	602.00	77.00
SST	S03	ROADWAY	84.00	8.60	722.40	63.00
SST	S04	ROADWAY	98.00	9.00	882.00	100.00
SST	S05	ROADWAY	213.00	9.00	1,917.00	82.00
SST	S07	ROADWAY	160.00	8.50	1,360.00	57.00
SST	S08	ROADWAY	157.00	9.00	1,413.00	45.00
ACAST	ACA23	ROADWAY	136.00	8.80	1,196.80	85.00
ACAST	ACA32	ROADWAY	60.00	10.00	600.00	93.00
ACAST	ACA18	ROADWAY	42.00	11.00	462.00	65.00
ACAST	ACA19	ROADWAY	136.00	9.50	1,292.00	58.00
ACAST	ACA20	ROADWAY	50.00	9.50	475.00	64.00
ACAST	ACA16	ROADWAY	85.00	9.50	807.50	54.00
ACAST	ACA22	ROADWAY	98.00	8.00	784.00	100.00
ACAST	ACA15	ROADWAY	75.00	9.50	712.50	64.00
ACAST	ACA24	ROADWAY	78.00	9.00	702.00	100.00
ACAST	ACA25	ROADWAY	67.00	9.00	603.00	100.00
ACAST	ACA26	ROADWAY	76.00	6.00	456.00	100.00
ACAST	ACA27	ROADWAY	85.00	6.00	510.00	100.00
ACAST	ACA28	ROADWAY	62.00	7.20	446.40	63.00
ACAST	ACA29	ROADWAY	101.00	7.40	747.40	67.00
ACAST	ACA30	ROADWAY	387.00	10.00	3,870.00	96.00
ACAST	ACA21	ROADWAY	123.00	8.80	1,082.40	82.00
ACAST	ACA07	ROADWAY	77.00	8.60	662.20	78.00
ACAST	ACA01	ROADWAY	53.00	7.80	413.40	30.00
ACAST	ACA02	ROADWAY	212.00	9.00	1,908.00	99.00
ACAST	ACA03	ROADWAY	245.00	5.80	1,421.00	47.00
ACAST	ACA04	ROADWAY	116.00	9.00	1,044.00	92.00
ACAST	ACA17	ROADWAY	98.00	8.70	852.60	86.00
ACAST	ACA06	ROADWAY	55.00	9.00	495.00	100.00
ACAST	ACA33	ROADWAY	126.00	9.00	1,134.00	92.00
ACAST	ACA08	ROADWAY	139.00	11.50	1,598.50	100.00
ACAST	ACA09	ROADWAY	47.00	8.00	376.00	89.00
ACAST	ACA10	ROADWAY	90.00	6.00	540.00	98.00

Table 4.3: PCI value of EMU campus pavement in 2012.

Branch ID	Section ID	Use	Length (m)	Width (m)	Area (m ²)	PCI
ACAST	ACA11	ROADWAY	61.00	5.70	347.70	61.00
ACAST	ACA12	ROADWAY	100.00	3.45	345.00	64.00
ACAST	ACA13	ROADWAY	89.00	6.00	534.00	100.00
ACAST	ACA14	ROADWAY	73.00	6.00	438.00	88.00
ACAST	ACA05	ROADWAY	124.00	8.50	1,054.00	31.00
ACAST	ACA31	ROADWAY	309.00	8.70	2,688.30	100.00
SPST	SP05	ROADWAY	420.00	10.00	4,200.00	67.00
SPST	SP03	ROADWAY	157.00	6.60	1,036.20	62.00
SPST	SP02	ROADWAY	354.00	6.60	2,336.40	68.00
SPST	SP01	ROADWAY	97.00	7.80	756.60	84.00
SPST	SP06	ROADWAY	403.00	8.70	3,506.10	95.00
SPST	SP04	ROADWAY	197.00	10.00	1,970.00	56.00
DORST	DOR05	ROADWAY	273.00	9.40	2,566.20	74.00
DORST	DOR11	ROADWAY	100.00	6.00	600.00	99.00
DORST	DOR10	ROADWAY	160.00	7.00	1,120.00	93.00
DORST	DOR09	ROADWAY	152.00	6.00	912.00	89.00
DORST	DOR06	ROADWAY	267.00	7.00	1,869.00	94.00
DORST	DOR04	ROADWAY	314.00	9.00	2,826.00	59.00
DORST	DOR03	ROADWAY	372.00	7.00	2,604.00	50.00
DORST	DOR08	ROADWAY	60.00	7.00	420.00	84.00
DORST	DOR01	ROADWAY	282.00	10.00	2,820.00	75.00
DORST	DOR12	ROADWAY	155.00	7.00	1,085.00	93.00
DORST	DOR07	ROADWAY	81.00	7.00	567.00	89.00
DORST	DOR02	ROADWAY	337.00	10.00	3,370.00	57.00
PREGIST	PREGIST01	PARKING	42.00	17.00	714.00	100.00
PSERV	PSERV01	PARKING	318.00	12.60	4,006.80	89.00
PACTIV1	PACTIV11	PARKING	53.00	30.00	1,590.00	81.00
PACTIV2	PACTIV21	PARKING	59.00	23.00	1,357.00	100.00
PSABAN	PSABAN01	PARKING	114.00	22.00	2,508.00	90.00
PPOST	PPOST01	PARKING	232.00	14.80	3,433.60	92.00
PIT	PIT01	PARKING	39.00	17.50	682.50	86.00
PLIB	PLIB01	PARKING	145.00	5.70	826.50	60.00
PBUSIN	PBUSIN01	PARKING	132.00	22.00	2,904.00	62.00
PMECH	PMECH01	PARKING	56.00	12.80	716.80	88.00
PRECT	PRECT01	PARKING	40.00	28.00	1,120.00	86.00
PCC	PCC01	PARKING	58.00	21.60	1,252.80	63.00
PLALA	PLALA01	PARKING	65.50	12.00	786.00	80.00
PARCH	PARCH01	PARKING	285.00	25.00	7,125.00	83.00
PLAW	PLAW01	PARKING	300.00	9.20	2,760.00	90.00
PEMC	PEMC01	PARKING	424.00	15.00	6,360.00	73.00
PCIVIL	PCIVIL01	PARKING	237.00	12.70	3,009.90	63.00
PHEALTH	PHEALTH01	PARKING	47.00	40.00	1,880.00	96.00
PFANATIC	PFANATIC01	PARKING	308.00	15.00	4,620.00	80.00
PIND	PIND01	PARKING	33.00	23.00	759.00	95.00

The summarized PCI results for EMU campus pavement network are shown in Table 4.4 and the detailed PCI reports are outlined in Appendix B.

Number of Branches	Number of Sections	Total Area (m ²)	Average PCI
24	79	122198	79

Table 4.4: Campus pavement branches, sections and PCI result in (2012).

As observed in Table 4.5the PCI should convert into a qualitative measure which reflects the overall conditions of each section.

PCI Range	Condition
86-100	Excellent
71 - 85	Very Good
56 - 70	Good
41 – 55	Fair
26-40	Poor
11 –25	Very Poor
0 - 10	Failed

Table 4.5: PCI Ranges (supported by the US Army Corps of Engineers)

It is important to note that the PCI method deals with surface conditions only. Surface conditions are often symptoms of underlying problems, while in many cases possible distresses may well be hidden under the pavement without inevitably indicating any visual distress signs on the surface. Thus, the PCI reports should be considered for guidance and not conclusive information on the conditions of the pavement.

The MicroPAVER software has a prediction modeling engine that is utilized to create various models and applied to those segments which they have similar characteristics. The completed historical data were not available in the campus. However, rehabilitation recommendations can be made without performing a detailed pavement testing survey on the specific pavement sections that they need rehabilitation action. Moreover, the collected and recorded data in this system can form a basis for any future update, and it will assist in establishing the prediction model with more investigation and research about the pavement network.

4.1.4 Maintenance Requirement

An assessment of the maintenance needs for the existing pavement sections in EMU campus were made by using MicroPAVER software. This software permits the user to input potential maintenance actions alongside the cost of every single activity. The next step, it links the collected data and estimates M&R plan for a specified length of time.

In this system based on the distress inspection information, critical PCI concept and the available budget the desirable M&R action is applied to the sections that need treatment (Shahin, 2005a). In this study M&R work plan has been established for the EMU campus pavement network for the next 5 years, a detailed report plan and estimation results are presented in Appendix C.

The interpretation of M&R needs in terms of Critical PCI is illustrated in Figure 4.17.

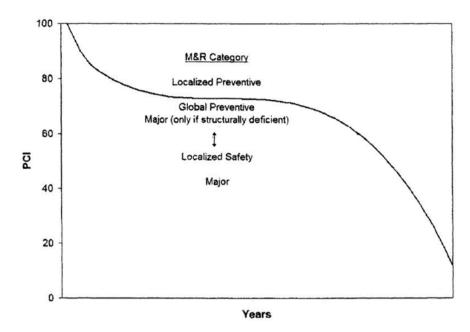


Figure 4.17: M&R Category in terms of the Critical PCI (Shahin, 2005a).

Currently, a number of global preventative actions cannot be performed in practice in the region because of the local companies' technical limitation and lack of specific machine for applying these treatments. Therefore, these treatments are not taken into account. On the other hand, the unit costs of possible M&R works are given from the local companies and entered into the software for estimating work plan costs.

The plan starts from 2013 to 2017. While applying this system for this period of time two different budget program (Limited and Unlimited) are applied in the assessment, as identified in the following sections.

4.1.4.1 Budget Program

One of the most significant functions of MicroPAVER software is the capacity to address the budget scenarios issue. A total of two work plan scenarios applied to the campus pavement to discover how the campus pavement network would enhance over the planned years (2013 – 2017): limited budget (\$50000/year) and unlimited budget.

4.1.4.1.1 Limited Budget:

Analyzing the impact of EMU available budget for maintenance actions on the campus pavement condition is addressed in this research. The limited budget is assumed to \$50000 per year. In this kind of analysis usually the prioritization created to list the sections that receive M&R actions.

4.1.4.1.2 Unlimited Budget:

In the unlimited funds, it is assumed that about all pavement segments which show deterioration would pass across the maintenance plan as there is no restriction to forbid the pavement manager from maintaining the whole network. In this situation, the total budget required can be estimated to cover all the deteriorated sections.

Figure 4.18 indicates the average PCI for the campus pavement network in 2012 and during the five year plan. No budget shows the deterioration of campus pavement within the coming five years that means there is no maintenance action during this period. On the other hand, at the campus expected pavement maintenance budget of \$50000 per year, the average PCI would be 75, and also at the unlimited budget, the average PCI would be 85 in 2017.

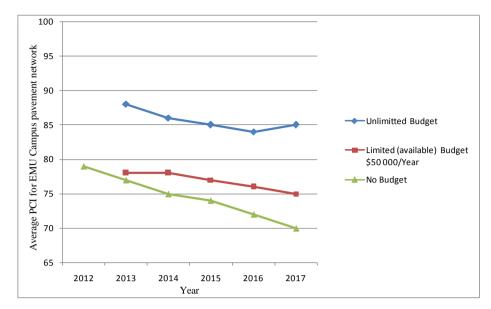


Figure 4.18: Average campus PCI within the three different budget programs.

4.1.5 Maintenance Prioritization

After generating maintenance needs for the pavement segments, MicroPAVER software makes a prioritized listing of pavement section projects on the basis of the sections PCI results and distresses information for those segments that display structural distresses, and for the remaining sections PCI and pavement rank are taken into account in priority process.

An ordered pavement project provides the user with a knowledge about where and when to spend money in a specific year. Tables 4.6 and 4.7 are summarized M&R plan and yearly estimated budget for the campus M&R action for the coming five years.

Plan Year	Sum of Stop Gap (\$)	Sum of Preventative (\$)	Sum of Major < Critical (\$)	Sum of Major ≥ Critical (\$)	Total (\$)
2013	2821.23	28138.33	0.00	18377.25	49,336.81
2014	2,937.16	22,896.61	0.00	22,067.74	47,871.51
2015	3,548.77	23,290.23	13,003.00	5,889.97	45,731.97
2016	3,920.61	24,150.58	13,974.56	0.00	42,045.75
2017	4,023.12	22,698.61	22,690.30	0.00	49,412.02

Table 4.6: EMU campus pavement M&R plan in 2013-2017 (Limited Budget)

Plan Year	Sum of Stop Gap (\$)	Sum of Preventative (\$)	Sum of Major < Critical (\$)	Sum of Major ≥ Critical (\$)	Total (\$)
2013	0.00	17,714.09	162,760.52	234,815.63	415,290.22
2014	0.00	17,395.46	0.00	0.00	17,395.46
2015	0.00	17,949.99	41,247.82	0.00	59,197.81
2016	0.00	18,239.59	46,586.02	0.00	64,825.62
2017	0.00	16,587.79	95,031.80	0.00	111,619.60

 Table 4.7: EMU campus pavement M&R plan in 2013-2017 (Unlimited Budget)

4.2 MicroPAVER performance

One of the vital steps in implementing PMS is choosing the software for data analysis purpose. In this study, MicroPAVER software has been selected as PMS software for creating a database and analyzing the data. In Figure 4.19 the flowchart indicates how this software was applied to the Eastern Mediterranean University campus Pavement Management System (EMU-PMS):

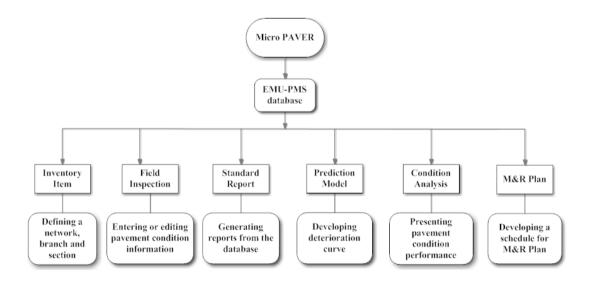


Figure 4.19: Applying MicroPAVER for the EMU campus pavement network.

The pursuing figures demonstrate the steps of applying MicroPAVER to the EMU campus pavement network:

PAVER 4.2 (EMU-P Tables Edit Prefere				_ [
Inv Items		Cond. Analys.	dni [
I nems a a inspe	Mode			 _

Figure 4.20: The main interface of MicroPAVER desktop obtained from MicroPAVER version 4.1 user manual (US Army Corps of Engineers, 1998).

A PAVER 4.2 (EMU-PMS)
File Tables Edit Preferences Window Help
Three Field Std Nodel Indext Added I and Analys Added I Analys Add
🔊 Inventory Items Descriptive Data 💦 🗖 🗙
1. Network: EMU-PMS 2. Branch: SST 3. Section: S04 4. Summary Charts
Network: EMU-PMS EMU-PMS EMU-
Network ID Name EMULPMS EMU CAMPUS PAVEMENT MANAGEMENT SYSTEM
Comments
Pictures New Copy Delete Close Help
leady

Figure 4.21: Inventory item feature.

Section D	From		To	<u> </u>	Summary Charts
onstruction	Pave Type	ment AC	- Rank	P _	
					it Shoulder St. Type
	<u>0</u> K	<u>C</u> ancel		51	A .
		P AC	2 Date 6/17/201	Method Cond	Families Method Family PCI EMU
			6/1//201		
	Sidewalk	Curb Re	veal		
	*Note: Update LCD in Work History	Comments			
		Pictures	New Copy	Delete (lose <u>H</u> elp

Figure 4.22: Creating a new pavement section.

<pre>rue control contr</pre>	PAVER 4.2 (EMU-PMS) a Tables Edit Préferences Window Help	-
S. Inspection Data Entry Network: EMU-PMS Branch: SST SST SOUTH STREET Section: SOU Inspection: SUI Inspection: SUI Surface:AC Section: R82 Sufface:AC Section: R82		
Branch: SST SOUTH STREET Section: S04 10 To: 9 Inspection: 6/20/2012 Sample: 1 Calc PCI Inspections Canditions Surface: Area: 822 SM Sample: 15 BUTING Branch: Area: OI ALLIGATOR CR 09 JT REF. CR 15 State: Use: Use: Add O 2 BLEDING 09 JT REF. CR 15 State: Use: Branch: Add O 2 BLEDING 09 JT REF. CR 15 State: Use: Branch: Add O 2 BLEDING 09 JT REF. CR 15 State: Use: Body State: Body State	Su Inspection Data Entry	
Inspection: 6/20/2012 Sample: 1 Calc PCI Inspections Conditions Surface:AC Section 882 SM Sample: 15 Eac PCI Inspections Conditions 01 ALLIGATOR CR 08 JT REF. CR 15 BUTING Use: Use: 02 ELEDING 09 LANE SH ORDOP 16 SHOVING Add 03 BLOCK CR 101 LT CR 101 LT CR Add 03 ELORKS 101 LT CR 115 SHOVING Add 04 BLUMPS/SAGS 110 LT CR 111 NEATH/RAVEL Delete 05 CORRUGATION 12 POLISHED AG 19 WEATH/RAVEL Replace 00 CER 14 RR CROSSING BUANTIV 0.00 Replace Severity Low Medum High 112/2 Quantity 0.00 Replace Next Sample Previous Sample Samples Help Close Close		
Surface:ACC Section 882 SM Sample SM Bize: SM Bize:		
Area: Size: Use: • 01 ALLIGATOR CR 08 JT REF, CR 15 RUTTING • 02 ELEDING 09 LANE SH ORDP 16 SHOVING • 03 BLOCK CR 10 L T CR 17 SLIPPAGE CR • 04 BUMPS/SAGS 111 PATCH/UT CUT 17 SLIPPAGE CR • 05 CORRUGATION 12 POLSHED AG 08 WELL Pelete • 05 CORRUGATION 12 POLSHED AG 08 WEATH/RAVEL Pelete • 07 EDGE CR 14 RR CROSSING 19 WEATH/RAVEL Replace • 07 EDGE CR 14 RR CROSSING 19 WEATH/RAVEL Replace • 08 EVENTY Low Medum High 0.00 Ref • 10 stress Severity Quantity 0.00 Ref Replace • Mext Sample Previous Sample Samples Help Close		
02 BLEEDING 09 LANE SH DROP 16 SH0VING 03 BLOCK CR 10 L, T CR 04 BUMPS/SAGS 11 PATCH/JT DJT 05 CORRUGATION 12 POLSHED AG 05 CORRUGATION 12 POLSHED AG 06 DEPRESSION 13 POTHOLE 07 EDGE CR 14 RR CROSSING Seyerity Low Medum High Distress Severity Quantity 0.00 Distress Severity Quantity Distress Severity Quantity Low Belets Close Help	Surface:AC Section 882, SM Sample B82. SM Branch ROADWAY Area: Size: Use: Use: Use: Use: SM Use: SM Use: Use: SM Use: Use: SM SM Use: SM Use: SM Use: SM Use: SM	
02 BLEEDING 09 LANE SH DROP 16 SH0VING 03 BLOCK CR 10 L, T CR 04 BUMPS/SAGS 11 PATCH/JT DJT 05 CORRUGATION 12 POLSHED AG 05 CORRUGATION 12 POLSHED AG 06 DEPRESSION 13 POTHOLE 07 EDGE CR 14 RR CROSSING Seyerity Low Medum High Distress Severity Quantity 0.00 Distress Severity Quantity Distress Severity Quantity Low Belets Close Help		
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OB DEPRESSION 13 PDTHOLE OF EDGE CR 14 RR CROSSING Seyerity Low Medum High Distress Severity Quantity 0.00 Distress Severity Quantity Units Comments Close Next Sample Previous Sample		
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	Tow anihos Texnors anihos Texnors anihos Lever anihos Lev	

Figure 4.23: Field inspection feature utilized for inputting distress information.

Network ID:	EMI	U-PMS	Branch ID:	ACAST		Section ID:	ACA12	
Branch Name:	AC/	ADEMIC STR	IEET					
ection Length:	100	. M	Section	Width: 3.45	м	Section A	rea: 345.	SM
- Percentages			nples ———	4		Inspection -		
Г	56		dom Surveyed	1		Date:	6/17/	2012
Load:	1975	Add	itional Surveye	d 0		Date.		
Climate:	3		al Samples	1		Section PCI:	64	
Other:	41			Desires		Std Dev :	10	1
			ommended For el	Project 1		Sta Dev.:	10	
Individual Dis	tress	es	Extrapol	ated Distresse	\$	Messages /	/ Sample In	fo
Sample Dist	ress	Description		Severity	Quantity	Units	Density	Deduct
1	1	ALLIGATOF	I CR	Medium	2	SM	.7	17.76
		L & T CR PATCH/UT	CUT	Low High	10	M SM	.88	1.68 23.13
li l		POTHOLE	COT	Medium	1	Count	.03	13.86

Figure 4.24: PCI Calculated for an individual segment.

Standard Reports		
C ReInspection Report		

Figure 4.25: Creating reports from the system.

Date: 11/28/2012	Pa	wement Data		h Report		PMS	1 c	of 3
Branch ID	Number of Sections	Sum Section Length (M)	Avg Section Width (M)	True Area (SM)	Use	Average PCI	PCI Standard Deviation	Weighted Average PCI
ACAST (ACADEMIC STREET)	33	3,675.00	8.18	30,598.70	ROADWAY	79.48	20.47	82.85
DORST (DORMITORY STREET)	12	2,553.00	7.70	20,759.20	ROADWAY	79.67	15.82	72.14
PACTIVI (PARKING OF ACTIVITY C1)	1	53.00	30.00	1,590.00	PARKING	81.00	0.00	81.00
PACTIV2 (PARKING OF ACTIVITY C2)	1	59.00	23.00	1,357.00	PARKING	100.00	0.00	100.00
PARCH (PARKING OF ARCH DPT)	1	285.00	25.00	7,125.00	PARKING	83.00	0.00	83.00
PBUSIN (PARKING OF BUSINESS DPT)	1	132.00	22.00	2,904.00	PARKING	62.00	0.00	62.00

Figure 4.26: An example for report outputs.

4. Options 1. Collect Model Data	5. Model Equation and Stats 6. Family Assignments 2. Review Model Data 3. Boundary Data
Select Inventory Items O All Items	Where ("&NetworkID) = 'EMU-PMS'
Build Selection: Edit Selection	
New Get Dat	a Delete Copy
	Condition Type: PCI

Figure 4.27: Predicting future pavement condition.

2. <u>T</u> iming / Options	
Where ("&NetworkID) = 'EMU-PMS'	<u>^</u>
Order By NetworkID ASC, BranchID ASC, SectionID ASC	▲ ▼
	Order By NetworkID ASC, BranchID ASC, SectionID

Figure 4.28: Condition analysis utilized for demonstrating pavement performance.

File Tables Edit Preferences Window Help Inv Field Std Std Medel Addel Hun Park Gis Medel Men Menu	
Work Plan	
1. Selection Criteria 2. Plan Options 3. Maint-Policies	
☐ Record Count	
Select Inventory Items	
All Items Where ("&NetworkID) = 'EMU-PMS'	
Build Selection: Edit Selection	
ASC	
Execute Close Help Load Parameters	
Ready	

Figure 4.29: Work Plan tool utilized for scheduling M&R actions.

Selection	Criteria	2. Plan Options	3. <u>M</u> aint.Policies	
Start Year:	7/1/2013 Ye	ears: 5		
	Budget	Unlimited by Year Budget Sca	View	
	Priority	Default Priority Table	View	
¢	Condition	Default Minimum Conditio	n 💽 View	
<	Consequence Mod	lel Report		

Figure 4.30: Inserting the budget for M&R works.

	- 🗆 ×
/Year	
EMU LIMITED BUDGET	1.0000
	Amount 🔺
	\$50,000.00
	\$50,000.00
	\$50,000.00
	\$50,000.00
	\$50,000.00
	\$50,000.00 🚽

Figure 4.31: Limited budget entered to the database.

🗎 Budgets		- • ×
1 - Funds	By Year	
Name:	Unlimited by Year	
Year		Amount 🔺
1/1/2013		\$999,999,999.00
1/1/2014		\$999,999,999,00
1/1/2015		\$999,999,999.00
1/1/2016	·	\$999,999,999.00
1/1/2017		\$999,999,999,00

Figure 4.32: Unlimited budget entered to the database.

Work Plan				×
1. <u>S</u> election Criteria	2. <u>P</u> lan Options		3. <u>M</u> aint.Policies	
	M&R Cost by Condition (Year2n)	MAJOR MP	R COST (EMU)	▼ View
Localized				
SAP Stop Gap	FETY MR (EMU) 🗾 💌	View UNI	T COST EMU	▼ View
✓ Preventative LOC	CALIZED PREVENTATIVE (EMU) 👤	View UNI	T COST EMU	View
🔽 Global		NGL	OBAL COST	▼ View
Asphalt Distress	Work Type		Interval Delta	Cost
1) Minimal	No Global M & R			
2) Climate Related	No Global M & R			
3) Skid Causing	No Global M & R			
Major M&R	Major M&R Start Year: 7/1/2013		Apply Inflation Rate	;
<u>Execute</u>	Close	<u>H</u> elp		oad Parameters

Figure 4.33: Selecting M&R policies.

4.3 EMU-PMS Database

Finally, the collected and calculated data are stored in a database, for this purpose Microsoft Excel is utilized. This simple database can be updated while the maintenance actions take steps, or in any essential time, Figure 4.34, displays database interface. The next sections in this chapter cover the integration process between EMU-PMS database and Geographic Information System (GIS).

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1	NETWORK	BRANCH_NAME	BRANCH_ID	SECTION_ID	LENGTH_M			USE	SURFACE	MAINT_Y_N	MAINT_ DATE	Y_N =	SHOULDEF Y_N
2	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA01	53.00	7.80		ROADWAY	AC		NO	NO	YES
3	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA02	212.00	9.00		ROADWAY	AC		NO	NO	YES
-4	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA03	245.00	5.80		ROADWAY	AC	YES	19/01/2012		YES
-5	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA04	116.00	9.00		ROADWAY	AC		NO	NO	YES
6	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA05	124.00	8.50		ROADWAY	AC	YES	12/06/2012		YES
7	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA06	55.00	9.00		ROADWAY	AC		NO	NO	YES
8	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA07	77.00	8.60		ROADWAY	AC		NO	YES	YES
9	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA08	139.00	11.50		ROADWAY	AC		NO	YES	YES
10	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA09	47.00	8.00		ROADWAY	AC		NO	NO	YES
11	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA10	90.00	6.00		ROADWAY	AC		NO	YES	YES
12	EMU-CAMPUS	ACADEMIC STREETS		ACA11	61.00	5.70		ROADWAY	AC		NO	NO	YES
13	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA12	100.00	3.45		ROADWAY	AC		NO	NO	YES
14	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA13	89.00	6.00		ROADWAY	AC		NO	YES	YES
15	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA14	73.00	6.00	438.00	ROADWAY	AC		NO	YES	YES
16	EMU-CAMPUS	ACADEMIC STREETS	ACAST	ACA15	75.00	9.50	712.50	ROADWAY	AC	NO	NO	NO	YES

Figure 4.34: EMU-PMS database.

4.4 PMS and GIS Integration

GIS is one of the latest techniques followed by using computers to save quantities massive tabular data with large areas of the maps that cannot be saved properly on a paper. The data are saved with maps in a consistent type so it is easy for the user to display tabular data with maps in a variety of styles, and also it allows the user to conduct computational and statistical processing to extract the results that help in making a quick and appropriate decision.

In this research GIS was utilized in the EMU campus Pavement Management System (EMU-PMS) to assist in the preparation of a suitable database of campus paved roadways and parking lots. GIS acts as a Management Information System which can be best described as a system to store and deliver reliable data, in an efficient manner to the required planning process.

4.4.1 PMS and GIS Database Linkage

As mentioned in the previous chapter the main method for linking PMS and GIS is database linkage process. In this study the latest version of GIS software has been utilized so as to establish the database and develop the system. ArcGIS 10 which is developed by "Environmental Systems Research Institute" (ESRI) was the primary GIS software utilized to perform the required integration with PMS. Figure 4.35 shows ArcGIS interface.

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Figure 4.35: The main interface of ArcGIS (ArcMAP).

Applying GIS in EMU-PMS aims to:

- Act as storage for campus pavement inventory data.
- Link the campus pavement data with the referenced map.
- Display the current and future pavement condition on a thematic map.
- Display the proposed M&R actions on a thematic map.
- Provide an easy access to the campus pavement segments.
- Assist in conducting statistical analysis.
- Assist in conducting "what if" queries to the pavement segments.
- Assist in decision making process.
- Act as a tool in monitoring and updating campus pavement maintenance process.

In order to link (EMU-PMS) data with GIS, and also to accomplish the above objectives, the following steps should be performed properly.

- 1. Importing a base map (scanned map or satellite image).
- 2. Georeferencing the imported map.
- 3. Creating a pavement network (shapefile).
- 4. Adding the PMS data and join it with a shapefile.
- 5. Creating queries, reports, standard charts and thematic maps.

1. Importing a base map

In this process a base map for EMU campus was obtained from the GoogleMap (Google Maps, 2012) then imported into the ArcMap by using add tool, as shows in Figure 4.36 and 4.37.

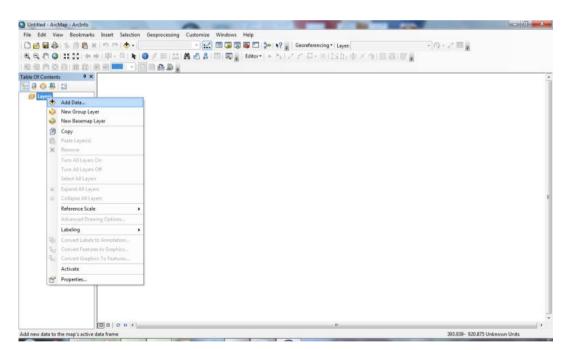


Figure 4.36: Importing EMU campus map to ArcMap

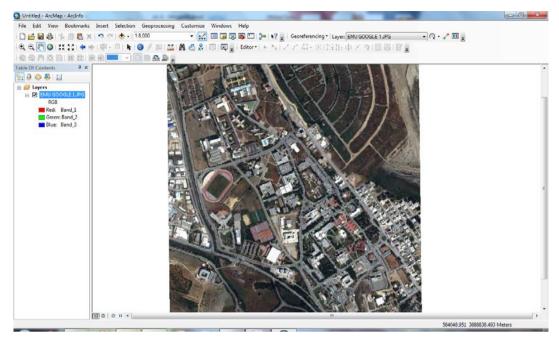


Figure 4.37: EMU campus map imported

2. Georeferencing campus Map

After adding the campus map to ArcMap, the raster image (EMU GOOGLE) should be georeferenced in ArcGIS as indicated in Figure 4.38 (ESRI, 2012).

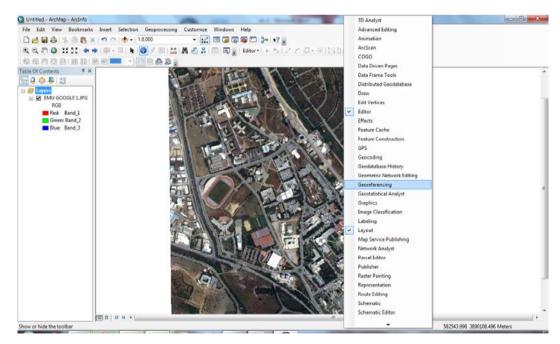


Figure 4.38: Georeferencing EMU campus Map

3. Creating a shapefile

Once step one and two are finished, the pavement network was saved in a shapefile format (*.shp) in ArcGIS (ArcCatalog) by creating points, lines and polygons. This step is shown in Figure 4.39, and described below:

Point: indicates nodes for campus network definition.

Line: indicates roadway center lines, which is usually between two nodes there is one line (section).

Polygon: indicates parking lots inside the campus.



Figure 4.39: Pavement sections, parking layer and nodes are created.

4. Joining PMS data with a shapefile

One of the essential steps in this process is integrating PMS data with GIS attribute table. In this step PMS data in database (*.dbf) format which was prepared in PMS process are added and joined with the attribute table. Figure 4.40 and Figure 4.41 demonstrate the databases linkage steps.

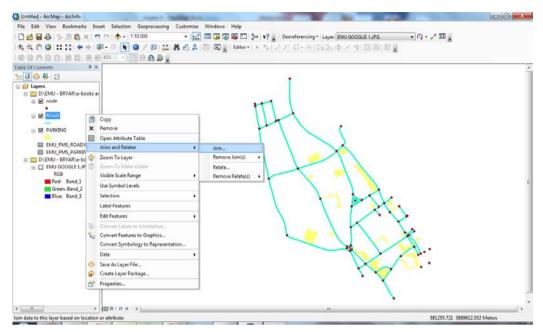


Figure 4.40: EMU-PMS data joined in the system.

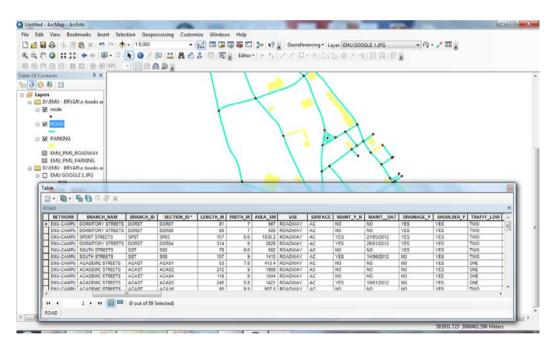


Figure 4.41: Attribute table after joining.

In the above integration one row in GIS attribute table represents one pavement section with its data.

5. Documenting and mapping

Finally, various reports, queries, charts, thematic maps with legends and symbols are produced. Figure 4.42 shows a simple created query, in Appendix D mapped data are outlined which shows the study analysis and results on GIS maps.

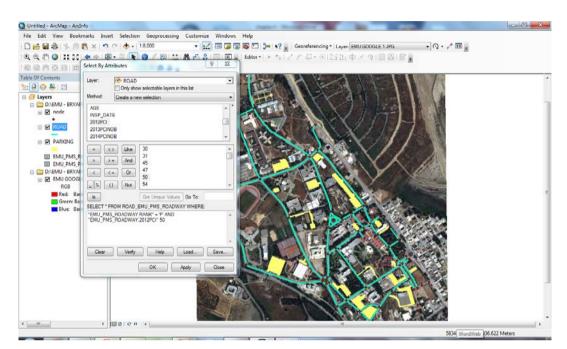


Figure 4.42: Simple query created.

4.5 Discussion

 In Figure 4.43 the percentages of campus paved surface area are classified based on the present (2012) condition, it can be seen that 41 % of the pavement surfaced area are in (Excellent) condition, 27 % are in (Very Good), 26 % are classed as (Good), 5 % are classed as (Fair), 1% classed as (Poor) condition and also there are no (Very Poor) and (Failed) condition classification.

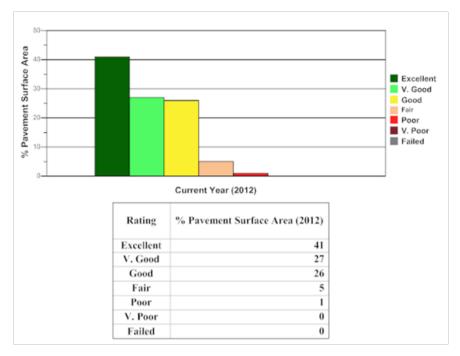


Figure 4.43: Classification of campus pavement area in 2012.

2. The percentage of campus pavement surface area classified during applying the three analyzing assumptions (No Budget, Limited Budget and Unlimited Budget) for the five planned years. Figure 4.44 indicates the analyzing assumption in 2013, in (No Budget) assumption it can be noted that 38 % of the campus pavement area will be in (Excellent) condition that means decreasing 3% of pavement area in this condition in one year if there is no maintenance action. On the other hand, in (Limited Budget) assuming 40 % of pavement area in (Excellent) condition, it indicates that the allocated budget increased PCI of the pavement network. Moreover, in (Unlimited Budget) 63% are classed in (Excellent) condition which shows dramatic increase in this condition because in this situation most of the sections are passed across the maintenance process.

There is no change in (Fair) condition between (No Budget and Limited Budget) assumption because in the limited budget program the high priority offered to those sections that do not require too much cost. In other word, the system attempt to keep the majority segments in excellent condition. The rest conditions are illustrated in Figure 4.44 and the complete campus pavement area classification from 2013 to 2107 are provided in appendix D.

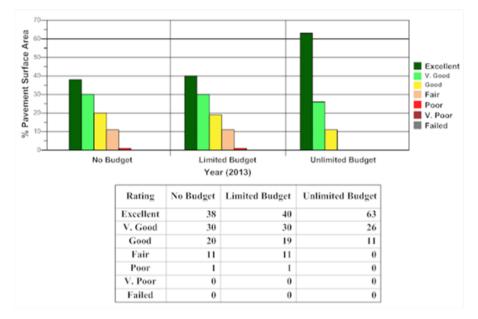


Figure 4.44: Pavement area classified with the three budget program in 2013.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In this research, campus pavement network was inspected and analyzed for both roadway and parking based on the existing surface condition. As a conclusion from the accomplished analytical results the following observations can be drawn:

- 1. The campus pavement network has been identified and all pavement sections have been inspected. Moreover, PCI computed for each individual section.
- 2. A suitable treatment with cost of application has been suggested for each pavement section.
- 3. A GIS database has been created and section's PCI value was displayed on a thematic map with different legends and symbols. Additionally, various reports and charts have been generated.
- 4. Finally, the proposed plan was established for five years from 2013 to 2017 and for each planned year a work plan has been constructed for both campus roadway and parking.

5.2 Recommendations

- Setting up a consistent numbering system for the campus pavement network to be suited to the future projects.
- 2. Continue to update and develop the GIS database and performing further studies such as: travel time, delay time and bus stop study.
- 3. Re-inspecting campus pavement segments in the future to observe the deterioration rate of the sections and continue to do further investigation on the campus pavement in terms of material and structural tests.
- 4. In case of cut in assumed budget, the university administration is recommended to carry out only the stop-gap and do nothing activities.

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APPENDICES

Appendix A: Pavement Condition Survey Sheets

PMMS FOR EM		NT CONDI	TION SURV	YEY SHEET		SHEET NO.
BRANCH	DATE: 17/6/2012					
SECTION I	D: ACA 3	INSPECTOR: Bryar A.				
FROM:	50		TO:	46		FUNCTIONAL CLASS
SECTION I	LENGTH:	126	SECTION	WIDTH:	9	Primary
	SUF	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m 			 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $5 1 \beta 1 2000$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: 1β
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COMMENT	ſ:					
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PMMS FOR EMU		IT CONDIT	TION SURV	EY SHEET		SHEET NO. 2
BRANCH N	DATE: 17/6/2012					
SECTION ID: ACA 30 NO. OF LANES: 2						INSPECTOR: BRYAR A.
FROM:	46		TO:	38		FUNCTIONAL CLASS
SECTION L	ENGTH:	387	SECTION	WIDTH:	0	Primary
	SUF	RFACE DIS	STRESS TY	YPE		TRAFFIC FLOW:
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m 			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 18 / 8 / 2003 MAINTENANCE: Y NX MAINTENANCE DATE: / /
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PMMS FOR EMU		IT CONDI	TION SURV	YEY SHEET	SHEET NO.		
BRANCH N	ST DATE: 17/6/2012						
SECTION I	SECTION ID: ACA 22 NO. OF LANES: 2						
FROM:	38		TO:	33	FUNCTIONAL CLASS		
SECTION L	SECTION LENGTH: 98 SECTION WIDTH: 8						
	SUF	RFACE DI	STRESS T	YPE	TRAFFIC FLOW:		
 SURFACE DIS Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m Long & Trans Cracking m 			 Polishe Pothole Pothole Railroa Rutting Shovin Slippag Swell S 	id Crossing Sq m 3 Sq m g Sq m 3e Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 17/8/2003 MAINTENANCE: Y NM MAINTENANCE DATE: / /		
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LENGTH:	75	SECTION	WIDTH: 9	7.5	Secondary
SUR	FACE DIS	STRESS T	YPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			d Aggregate S s Count d Crossing Sq Sq m g Sq m e Cracking Sc q m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $5/7/1989$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /	
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PMMS FOR EM		IT CONDI	TION SURV	/EY SHEET	SHEET NO. 5
BRANCH	DATE: 17/6/2012				
SECTION I	D: ACA 14	ļ	NO. OF L	ANES: 2	INSPECTOR: Brywer A,
FROM:	33		TO:	24	FUNCTIONAL CLASS
SECTION I	LENGTH:	73	SECTION	WIDTH: 6	Primary
	SUF	RFACE DIS	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m 			11. Patching 12. Polishe 13. Pothole 14. Railroa 15. Rutting 16. Shovin 17. Slippag 18. Swell S	& Util Cut Patching Sqm ed Aggregate Sq m es Count ad Crossing Sq m g Sq m g Sq m ge Cracking Sq m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $1 \square / \& / 2 \circ \circ \Im$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /
	Trans Crack	ing m			
DISTRESS CODE	10	1	7		SHOULDER: Y N
	2.5 L	0.8 L	5.8L		DRAINAGE: Y 🛛 N 🗌
					PHOTOGRAPH .jpg
					\095 \096 \097
TOTAL SEVERITY H Z T	2.5	0,8	5.8		m m
TOTA SEVER		0.55			- W
COMMENT	C:				
		QJA			
\$				>	

PMMS FOR EMU CAMPUS PAVE	MENT COND	TION SURV	VEY SHEET		SHEET NO. 6	
BRANCH NAME: A	DATE: 17/6/2012					
SECTION ID: AG	ECTION ID: ACA 13 NO. OF LANES: 2					
FROM: 2	14	TO:	22		FUNCTIONAL CLASS	
SECTION LENGTH	I: 89	SECTION	WIDTH:	6	Primary	
	SURFACE D	ISTRESS T	YPE		TRAFFIC FLOW:	
 Alligator Cracking Bleeding Sq m Block Cracking Sq Bumps and Sags r Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking Lane/Shoulder Dr 	 Patching Polishe Polishe Pothole Railroa Rutting Shovin Shovin Slippag Swell S 	& Util Cut Patchi ed Aggregate S es Count ad Crossing So g Sq m g Sq m ge Cracking So	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $ \mathcal{U} \ g \ / \ 2 \circ \circ 3$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /			
10. Long & Trans C	racking m		3			
DISTRESS CODE					SHOULDER: Y N	
01	4L				DRAINAGE: Y 🛛 N 🗌	
					PHOTOGRAPH .jpg	
					1098	
					2 M M M	
COMMENT:						
				<u>-</u>		

PMMS FOR EM		IT CONDIT	TION SURV	EY SHEET	[SHEET NO. 7
BRANCH	DATE: 17/6/2012					
SECTION I	D: ACA	I)	NO. OF LA	NES: 2		INSPECTOR: Bryan A,
FROM:	2	2	TO:	20		FUNCTIONAL CLASS
SECTION I	LENGTH:	61	SECTION	WIDTH: 5.7	7	Secondary
	SUF	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m 			ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: \6/ 7/ 1989 MAINTENANCE: Y NX MAINTENANCE DATE: / /
DISTRESS		10	6	17	-	SHOULDER: Y 🔀 N
CODE	6.9 L 3 H	5.7L 2 L	. 1 L	17 0.4L		
	3 H 3 M	3.5L 6 L				PHOTOGRAPH .jpg
						1099
						1100
						1101
						1102
TOTAL SEVERITY	6.9 3 \0.8	17.2	1	0.4		€€€ S M
COMMENT	C:					
				0) 	

	T CONDI	TION SURV	EY SHEET		SHEET NO. 8	
AME: ACA	DEMICS	TR EET	BRANCH II	D: ACAST	DATE: 17/ 6/2012	
D: ACA	+12	NO. OF LA	INES:		INSPECTOR: Bryar A.	
2	3	TO:	21		FUNCTIONAL CLASS	
ENGTH:	100	SECTION	width: 3	.45	Tertiary	
SUR	FACE DI	STRESS TY	YPE		TRAFFIC FLOW:	
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			I Aggregate S s Count d Crossing Sq Sq m g Sq m e Cracking Sc q m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: \6 / 7 / \989 MAINTENANCE: Y N MAINTENANCE DATE: / /		
11	10	1	12	1	SHOULDER: Y N	
3 H	3 L	2.4/			DRAINAGE: Y 🗌 N 🔀	
511 11	4 L 2 L				PHOTOGRAPH .jpg	
					1103 1104 1105 1106 1107	
6.1	10	2.4	1		S C C	
: И		2.1	<<>>	~		
		~~			0 1 X	
	AME: A CA D: A CA 2 J ENGTH: SUR Cracking Sq m Cracking Sq m d Sags m on Sq m n Sq m cking m ion Cracking ulder Drop O Trans Cracking U 3 H 3, 1 H 3, 1 H	PAVEMENT CONDITIONE: A CA D E MIC S TAME: A CA D E MIC S D: A CA 12 23 ENGTH: \00 SURFACE DIS Cracking Sq m Sq m cking Sq m d Sags m on Sq m n Sq m cking m ion Cracking m alder Drop Off m Trans Cracking m 11 10 3 H 3 L 3.1 H 1 L 4 L 2 L 10 3 H 3 L 3.1 H 1 L 4 L 10 10 10 10 10	PAVEMENT CONDITION SURV AME: $A CA D E MIC STR ET A CA 12 NO. OF LA D: A CA 12 NO. OF LA 23 TO: ENGTH: 100 SECTION SURFACE DISTRESS TY Cracking Sq m 11. Patching & Cracking Sq m 14. Railroad Colspan="2">Colspan="2">Colspan="2">Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" Colspan="2" $	PAVEMENT CONDITION SURVEY SHEETIRANCH IIIRANCH IIIRANCH IIPACA 12NO. OF LANES:2 3TO: 2 12 3TO: 2 1ENGTH: 100SECTION WIDTH: 3SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patchin12. Polished Aggregate SSURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patchin12. Polished Aggregate SSurFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patchin12. Polished Aggregate SIS. Rutting Sq m16. Shoving Sq mSting mIS. Rutting Sq mIS. Rutting Sq mIS. Swell Sq mIS. Swell Sq mIS. Swell Sq mIS. A. 3 L2. 4MI. 1I. 10I. 10 <th co<="" td=""><td>PAVEMENT CONDITION SURVEY SHEETBRANCH ID: ACASTAME: <math>ACA DEMIC STRESTREST BRANCH ID: ACASTD: $A CA 12$NO. OF LANES: 123TO: 21ENGTH: 100SECTION WIDTH: 3.45SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patching SqmSURFACE DISTRESS TYPECracking Sq m10. Polished Aggregate Sq m13. Potholes Count14. Railroad Crossing Sq m15. Rutting Sq m16. Shoving Sq m17. Slippage Cracking Sq m18. Swell Sq m19. Weathering/Ravelling Sq mTag111101102111101101111111111111111<tr <td="">2</tr></math></td></th>	<td>PAVEMENT CONDITION SURVEY SHEETBRANCH ID: ACASTAME: <math>ACA DEMIC STRESTREST BRANCH ID: ACASTD: $A CA 12$NO. OF LANES: 123TO: 21ENGTH: 100SECTION WIDTH: 3.45SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patching SqmSURFACE DISTRESS TYPECracking Sq m10. Polished Aggregate Sq m13. Potholes Count14. Railroad Crossing Sq m15. Rutting Sq m16. Shoving Sq m17. Slippage Cracking Sq m18. Swell Sq m19. Weathering/Ravelling Sq mTag111101102111101101111111111111111<tr <td="">2</tr></math></td>	PAVEMENT CONDITION SURVEY SHEETBRANCH ID: ACASTAME: $ACA DEMIC STRESTREST BRANCH ID: ACASTD: A CA 12NO. OF LANES: 123TO: 21ENGTH: 100SECTION WIDTH: 3.45SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patching SqmSURFACE DISTRESS TYPECracking Sq m10. Polished Aggregate Sq m13. Potholes Count14. Railroad Crossing Sq m15. Rutting Sq m16. Shoving Sq m17. Slippage Cracking Sq m18. Swell Sq m19. Weathering/Ravelling Sq mTag1111011021111011011111111111111112$

PMMS FOR EM	SHEET NO. 9					
BRANCHN	DATE: 17/6 / 2012					
SECTION ID: ACA 10 NO. OF LANES: 2						INSPECTOR: BryarA.
FROM: 22			TO:		14	FUNCTIONAL CLASS
SECTION I	LENGTH:	90	SECTION	WIDTH:	6	Primary
	SUR	FACE DI	STRESS T	YPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $17/8/2003$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /
DISTRESS	7	10				SHOULDER: Y N
CODE	4.5 L	2.4 L				drainage: y 🛛 n 🗌
						PHOTOGRAPH .jpg
						1108 1109 1110 1111 1112
TOTAL SEVERITY ⊥ ≤ □	4,5	2.4				2 The so
COMMENT					/	

PMMS FOR EMU CAMPUS PAVEMENT CONI	DITION SURVEY SHEET	SHEET NO. \O
BRANCH NAME: ACADEN	DATE: 17/6/2012	
SECTION ID: ACA 09	INSPECTOR: Bryar A.	
FROM: 19	то: \ 8	FUNCTIONAL CLASS
SECTION LENGTH: 47	SECTION WIDTH: 8	Primary
SURFACE I	DISTRESS TYPE	TRAFFIC FLOW:
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m Long & Trans Cracking m 	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: 22/ 7-1 1992 MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /
DISTRESS		SHOULDER: Y X N
CODE 7.5L 3.6M		DRAINAGE: Y N
		PHOTOGRAPH .jpg
		1114 1115 1116 1117
L 7-5 SEVERITY 3.6 H		s S M
COMMENT:		

PMMS FOR EMU		T CONDI	TION SURV	EY SHEET		SHEET NO.
BRANCH N	IAME: ACA	DATE: 17/6/2012				
SECTION I	D: ACA	01	NO. OF LA	NES:	2	INSPECTOR: BryarA.
FROM:	12		TO: 13			FUNCTIONAL CLASS
SECTION I	ENGTH:	53	SECTION	WIDTH:	7.8	Primary
	SUR	FACE DIS	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugati Depression Edge Craat Jt. Reflect Lane/Shot 	acking Sq m ad Sags m on Sq m n Sq m	, m ff m	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $231 - 71 1992$. MAINTENANCE: Y \square N \square MAINTENANCE DATE: 1 - 71 1992.
DISTRESS	1	11			T	SHOULDER: Y 🗙 N
CODE	15.7H	3.3 H			-	DRAINAGE: Y 🗌 N 🔀
	12 H	8.3M 23 H				PHOTOGRAPH .jpg
						1119 1120 1118 1121 1122 1123 1124
TOTAL SEVERITY T Z T	27,7	8.3 26.3				$\mathcal{M} \xleftarrow{\mathcal{S}}_{\mathcal{S}} \mathcal{S}$
COMMENT			A		4	
		{				<u>A</u>

PAVEMEN	IT CONDI	TION SURV	EY SHEET		SHEET NO. 12
AME: ACAL	DEMIC S	TREET	BRANCH ID:	ACAST	DATE: 17/ 6/20 12
D: ACA O		INSPECTOR: Bryar A.			
13		TO:	15		FUNCTIONAL CLASS
ENGTH:	212	SECTION	WIDTH:	9	Primary
SUR	FACE DI	STRESS TY	YPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			l Aggregate Sq s Count d Crossing Sq n Sq m g Sq m e Cracking Sq n q m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $5 / 8 / 2 \circ \circ 3$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /	
7	3	17	10		SHOULDER: Y N
4.7L	18 L	0.3 L	2.5L		DRAINAGE: Y 🗌 N 🔀
					PHOTOGRAPH .jpg
					1125 1126 1127 1128 1128
4.7	18	0,5	2.5		$m \stackrel{\sim}{\longleftrightarrow} \leq$
ŧ .					
		<u>}</u>			
	AME: AGA D: $AGA \circ J$ 13 ENGTH: SUR Cracking Sq m d Sags m on Sq m n Sq m n Sq m n Sq m n Sq m ion Cracking ulder Drop O Trans Cracking 7 $4 \cdot 7L$ $4 \cdot 7L$ $4 \cdot 7$	AME: $AAD EMIC S$ D: $AA O 2$ 13 ENGTH: 212 SURFACE DI Cracking Sq m Sq m cking Sq m d Sags m on Sq m n Sq m n Sq m ion Cracking m ider Drop Off m Trans Cracking m 7 3 $4 \cdot 7L$ 18 L 4 · 7L 18 L 4 · 7 18 4 · 7 18	AME: AGAD EMIC STRESTD: AGA 02NO. OF LA13TO:ENGTH: 212 SURFACE DISTRESS TYCracking Sq m11. Patching &Sq m12. Polishedcking Sq m14. Railroadon Sq m15. Ruttingn Sq m16. Shovingion Cracking m18. Swell Sidder Drop Off m19. WeatherTrans Cracking m177 $4 \cdot 7L$ 18 L0. 3 L $4 \cdot 7-1$ 18 L0. 3 L $4 \cdot 7-1$ 18 L0. 5	AME: $ACADEMIC STREET$ BRANCH ID:D: $ACA \circ 2$ NO. OF LANES: 213TO: 15ENGTH: 2.12SECTION WIDTH:SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut PatchingSq m12. Polished Aggregate Sqd Sags m14. Railroad Crossing Sq mon Sq m15. Rutting Sq mion Cracking m16. Shoving Sq mider Drop Off m19. Weathering/Ravelling S 7 3 17 10 $4 \cdot 7L$ 18 $0.3 \perp$ $2.5 \perp$ 18 $0.3 \perp$ $2.5 \perp$ 10 10 10 7 3 17 10 $4 \cdot 7$ 18 $0.5 \leq$ $2.5 \perp$ 18 18 17 18 17 18 17 18 17 18 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 17 18 18 19 19 10 10 10 10 10 10 10	AME: $ACADEMIC STREET$ BRANCH ID: $ACAST$ D: $ACA \circ 2$ NO. OF LANES: 213TO:13TO:15ENGTH: 212SECTION WIDTH: 9SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut Patching SqmSq m12. Polished Aggregate Sq mcking Sq m13. Potholes Countd Sags m14. Railroad Crossing Sq mn Sq m15. Rutting Sq mn Sq m16. Shoving Sq mnon Sq m17. Slippage Cracking Sq mion Cracking m18. Swell Sq minder Drop Off m19. Weathering/Ravelling Sq mTrans Cracking m17. 10 $4 \cdot 7L$ 18 L $0.3 L$ $2.5 L$ $4 \cdot 7L$ 18 L a <td< td=""></td<>

PMMS FOR EM	J CAMPUS PAVEMENT CONDI	TION SURV	EY SHEET		SHEET NO. 13
BRANCHN	IAME: AGADEMIC	STREET	BRANCH I	D: ACAST	DATE: 17/6/2012
SECTION I	D: ACA 04	NO. OF LA	NES: 2	_	INSPECTOR: Bryar A.
FROM:	15	TO:	16		FUNCTIONAL CLASS
SECTION I	LENGTH: 116	SECTION	WIDTH:	9	Primary
	SURFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding 5 Block Cra Block Cra Bumps ar Corrugati Depression Edge Craw Jt. Reflect Lane/Sho Long & 	acking Sq m ad Sags m on Sq m n Sq m	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $5 1 \ 8 1 \ 2003$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: $1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \$
DISTRESS	11	1			SHOULDER: Y 🛛 N
CODE	7.2M				DRAINAGE: Y 🗌 N 🔀
					PHOTOGRAPH .jpg
					- 1129
					1130
					1131
					-
	7.2				m
COMMENT					

PMMS FOR EMU CAMPUS PAVEMENT CONDI	TION SURV	EY SHEET	SHEET NO. 14
BRANCH NAME: ACADEMIC	STREET	BRANCH ID: ACAST	DATE: 17/6/2012
SECTION ID: ACA 66		INES: 2	INSPECTOR: BryarA,
FROM: 16	TO:	17	FUNCTIONAL CLASS
SECTION LENGTH: 55	SECTION	WIDTH: 9	Primary
SURFACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m 	 11. Patching & 12. Polisher 13. Potholer 14. Railroad 15. Rutting 16. Shoving 17. Slippag 18. Swell S 	t Util Cut Patching Sqm 1 Aggregate Sq m s Count d Crossing Sq m Sq m g Sq m e Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 51812003 MAINTENANCE: Y NM MAINTENANCE DATE: / /
10. Long & Trans Cracking m			
DISTRESS CODE \ 6			SHOULDER: Y N
6.5L			DRAINAGE: Y 🗌 N 🔀
			- PHOTOGRAPH .jpg
			1132 1133 1134
L 6.5 M H COMMENT:			M M Z
	<u>}</u>		

PMMS FOR EMU		IT CONDI	TION SURV	/EY SHEET		SHEET NO. 15	
BRANCH N	BRANCH NAME: ACADEMIC STREET BRANCH ID: ACA ST						
SECTION I	D: ACA	INSPECTOR: Bryar A.					
FROM:	13	7	TO:	11		FUNCTIONAL CLASS	
SECTION L	ENGTH:	Primary					
	SUE	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:	
 Alligator (Bleeding S Block Cra Bumps an Corrugati Depressio Edge Crac Jt. Reflect 	Sq m locking Sq m d Sags m on Sq m n Sq m cking m		 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 			ONE DIRECTION	
9. Lane/Sho	ulder Drop C	off m	A REAL PROPERTY AND A REAL	ering/Ravellin	g Sq m	MAINTENANCE DATE:	
10. Long &	Trans Crack	ing m					
DISTRESS CODE	1	3				SHOULDER: Y X N	
	1 M 0.5 L	1.5 L				DRAINAGE: Y 🔀 N 🗌	
	4.7M					PHOTOGRAPH .jpg	
						1135	
	0.5 7	1.5				2	
COMMENT	•					4 gunna - Anna	
			A	XD			
				\rightarrow			

PMMS FOR EMU	PAVEMENT COND	TION SUR	VEY SHEET	SHEET NO. 16
BRANCH N	DATE: 17/ 6/2012			
SECTION I	INSPECTOR: Bry or A			
FROM:	29	TO:	17	FUNCTIONAL CLASS
SECTION I	ENGTH: 139	SECTION	WIDTH: 11.5	Primary
	SURFACE D	ISTRESS 7	TYPE	TRAFFIC FLOW:
 Bleeding 5 Block Cra Bumps and Corrugati Depression Edge Craw Jt. Reflect Lane/Sho 	Cracking Sq m Sq m acking Sq m ad Sags m on Sq m n Sq m	11. Patching12. Polish13. Pothol14. Railro15. Ruttin16. Shovir17. Slippa18. Swell	& Util Cut Patching Sqm ed Aggregate Sq m es Count ad Crossing Sq m g Sq m ng Sq m ge Cracking Sq m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $171 7 1 1989$ MAINTENANCE: Y \square N \boxtimes MAINTENANCE DATE: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
DISTRESS	3	1		SHOULDER: Y 🔀 N
CODE	2.4L			DRAINAGE: Y 🕅 N 🗌
				– PHOTOGRAPH .jpg
				1137
SEVERITY T ST T	2.4			≥
COMMENT				
-++	-	-		

PMMS FOR EM		IT CONDI	TION SURV	EY SHEET		SHEET NO. 17-
BRANCHN	IAME: ACA	DATE: 17/6/2012				
SECTION I	D: ACA 21		NO. OF LA	NES:	2	INSPECTOR: Bryar A.
FROM:	26		TO: 37			FUNCTIONAL CLASS
SECTION I	ENGTH:	123	SECTION	WIDTH:	8.8	Primary
	SUF	FACE DIS	STRESS TY	(PE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $ 3 g 2003$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE:
DISTRESS	17	1	10	7		SHOULDER: Y N
CODE	0.5L	0.5 M	4.2L	2.7 L 2.5 L		DRAINAGE: Y 🛛 N 🗌
		2.2 H				PHOTOGRAPH .jpg
						1142 1143 1144 1145
TOTAL SEVERITY T Z T	0,5	0.6 0.5 2.2	4.2	5.2		$\sim \stackrel{\times}{\longleftrightarrow} \leq$
COMMENT						
~	Ĺ			~ @	9	

PMMS FOR EM		IT CONDIT	TON SURV	EY SHEET		SHEET NO. 18
BRANCHN	IAME: ACAD	ACAST	DATE: 17-16/2012			
SECTION I	D: ACA2	3	NO. OF LA	NES: 2		INSPECTOR: Bryar A.
FROM:	37		TO:	41		FUNCTIONAL CLASS
SECTION I	ENGTH:	136	SECTION	WIDTH: 8	.8	Primary
	SUF	FACE DIS	STRESS TY	<i>Y</i> PE		TRAFFIC FLOW:
 Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m 			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m 			ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 14/ 8 / 200 3 MAINTENANCE: Y N
	ulder Drop O		18. Swell Solution 19. Weather	ring/Ravelling S	Sqm	MAINTENANCE DATE:
	Trans Crack					1 1
DISTRESS CODE	10	7	ł			SHOULDER: Y 📉 N
	2.1 L	6.6L	5 M			DRAINAGE: Y 🛛 N 🗌
						PHOTOGRAPH .jpg
						1146 1147 1148
TOTAL SEVERITY T	2.1	6.6	5			$\sim \xrightarrow{\varepsilon} \sim \sim$
COMMENT	:					

SECTION ID: ACA 26 NO. OF LANES: 2 INSPECTOR: BryarA FROM: 41 TO: 40 FUNCTIONAL CLAS SECTION LENGTH: 76 SECTION WIDTH: 6 Frimary SURFACE DISTRESS TYPE TRAFFIC FLOW: 1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm ONE DIRECTION 2. Bleeding Sq m 12. Polished Aggregate Sq m TWO DIRECTION 3. Block Cracking Sq m 13. Potholes Count SURFACE TYPE: 4. Bumps and Sags m 14. Railroad Crossing Sq m SURFACE TYPE: 5. Corrugation Sq m 16. Shoving Sq m LAST CONSTRUCTION 6. Depression Sq m 17. Slippage Cracking Sq m DATE: 157 8 / 2.00 7. Edge Cracking m 18. Swell Sq m MAINTENANCE: Y NE 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: 10. Long & Trans Cracking m SHOULDER: Y N DRAINAGE: Y N		PAVEMENT CON	DITION SURV	VEY SHEET	SHEET NO. 19
FROM: 41 TO: 40 FUNCTIONAL CLAS SECTION LENGTH: 76 SECTION WIDTH: 6 Frimary SURFACE DISTRESS TYPE TRAFFIC FLOW: TRAFFIC FLOW: ONE DIRECTION X 1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm ONE DIRECTION X Wo DIRECTION X 2. Bleeding Sq m 13. Potholes Count 13. Potholes Count SURFACE TYPE: AC X PCC AAC Ac X PCC AAC Ac X PCC AAC Astronomy Astronomy <td< td=""><td>BRANC</td><td>HNAME: ACADEMIC</td><td>STREET</td><td>BRANCH ID: ACA ST</td><td>DATE: 18/ 6/2012</td></td<>	BRANC	HNAME: ACADEMIC	STREET	BRANCH ID: ACA ST	DATE: 18/ 6/2012
ENDM. 977 I.O. 90 SECTION LENGTH: 76 SECTION WIDTH: 6 Primary SURFACE DISTRESS TYPE TRAFFIC FLOW: ONE DIRECTION X 1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm ONE DIRECTION X 2. Bleeding Sq m 12. Polished Aggregate Sq m SURFACE TYPE: AC IMAFELETION X 3. Block Cracking Sq m 13. Potholes Count IX Railroad Crossing Sq m IX Ratting Sq m IX CONSTRUCTION 5. Corrugation Sq m 16. Shoving Sq m IX Reflection Cracking m IX Reflection Cracking m DATE: 157 & 1 & 2000 8. Jt. Reflection Cracking m 19. Weathering/Ravelling Sq m IX SHOULDER: Y IMATENANCE DATE: N 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m IX RAINENANCE DATE: N IDISTRESS IMAINTENANCE: Y IMAINENAL IMAINTENANCE N III S IDISTRESS IMAINTENANCE IMAINTENANCE III S III S IDISTRESS IMAINTENANCE III S III S III S IMAINTENANCE III S III S III S III S III S III S	SECTIO	NID: ACA 26	NO. OF L	ANES: 2	INSPECTOR: BryarA
SURFACE DISTRESS TYPE TRAFFIC FLOW: 1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sq m ONE DIRECTION INE DIRECTION 2. Bleeding Sq m 12. Polished Aggregate Sq m SURFACE TYPE: AC Image: Comparison of the Direction	FROM:	41	TO:	40	FUNCTIONAL CLASS
SURFACE DISTRESS TYPE TRAFFIC FLOW: 1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm ONE DIRECTION INOULDERCTION 2. Bleeding Sq m 12. Polished Aggregate Sq m SURFACE TYPE: AC INFORMATION INOULDERCTION 3. Block Cracking Sq m 13. Potholes Count INOULDERCTION SURFACE TYPE: 4. Bumps and Sags m 14. Railroad Crossing Sq m INOULDERCTION SURFACE TYPE: 5. Corrugation Sq m 15. Rutting Sq m IAST CONSTRUCTION DATE: 151 & 1 & 2∞ 6. Depression Sq m 16. Shoving Sq m IAST CONSTRUCTION DATE: 151 & 1 & 2∞ 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: N 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m DRAINAGE: Y □ N IN DISTRESS INCODE INCODE INCODE INCODE INCO	SECTIO	N LENGTH: 7-6	SECTION	WIDTH: 6	Primary
1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm ONE DIRECTION 2. Bleeding Sq m 12. Polished Aggregate Sq m TWO DIRECTION 3. Block Cracking Sq m 13. Potholes Count SURFACE TYPE: 4. Bumps and Sags m 14. Railroad Crossing Sq m SURFACE TYPE: 5. Corrugation Sq m 15. Rutting Sq m LaST CONSTRUCTION 6. Depression Sq m 16. Shoving Sq m DATE: 151 & 1 2.00 7. Edge Cracking m 18. Swell Sq m DATE: 151 & 1 2.00 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m Image: Shoulder DATE: 10. Long & Trans Cracking m DRAINAGE: Y □ N ⊠ DISTRESS CODE DRAINAGE: Y □ N ⊠ Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V Image: V <t< td=""><td></td><td>1 -</td><td>DISTRESS T</td><td>YPE</td><td>TRAFFIC FLOW:</td></t<>		1 -	DISTRESS T	YPE	TRAFFIC FLOW:
2. Bleeding Sq m 12. Polished Aggregate Sq m 3. Block Cracking Sq m 13. Potholes Count 4. Bumps and Sags m 14. Railroad Crossing Sq m 5. Corrugation Sq m 15. Rutting Sq m 6. Depression Sq m 16. Shoving Sq m 7. Edge Cracking m 17. Slippage Cracking Sq m 8. Jt. Reflection Cracking m 18. Swell Sq m 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m DISTRESS CODE Image: Cool image Image: Shoulder Y m Image: Cool image: Shoulder Drop Off m Image: Shoulder Drop Off m 10. Long & Trans Cracking m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m Image: Shoulder Y m Image: Shoulder Drop Off m <td>1. Alliga</td> <td></td> <td></td> <td>1. 199 (M. 17. 1997)</td> <td>-</td>	1. Alliga			1. 199 (M. 17. 1997)	-
3. Block Cracking Sq m 13. Potholes Count SURFACE TYPE: 4. Bumps and Sags m 14. Railroad Crossing Sq m I.AC □ PCC□ AAC □ 5. Corrugation Sq m 15. Rutting Sq m I.AST CONSTRUCTION 6. Depression Sq m 16. Shoving Sq m I.AST CONSTRUCTION 7. Edge Cracking m 17. Slippage Cracking Sq m I.AST CONSTRUCTION 8. Jt. Reflection Cracking m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: 11. Suppose 11. Suppose SHOULDER: Y □ N 11. Suppose 11. Suppose I.AST CONSTRUCTION 12. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m I.AST CONSTRUCTION 13. Suppose I.AST CONSTRUCTION I.AST CONSTRUCTION 14. Railroad Cracking m 19. Weathering/Ravelling Sq m I.AST CONSTRUCTION 15. Rutting So m I.AST CONSTRUCTION (I.ST NOT CRAPH I.ST NOT C			1.73		TWO DIRECTION
4. Bumps and Sags m 14. Railroad Crossing Sq m 5. Corrugation Sq m 15. Rutting Sq m 6. Depression Sq m 16. Shoving Sq m 7. Edge Cracking m 17. Slippage Cracking Sq m 8. Jt. Reflection Cracking m 18. Swell Sq m 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m DISTRESS CODE SHOULDER: Y □ N □ 0. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 11. Structure DRAINAGE: Y □ N □ 0. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m DRAINAGE: Y □ N □ 0. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m DRAINAGE: Y □ N □ 0. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 11. Structure DRAINAGE: Y □ N □ 0. Lane/Shoulder Drop Off m 19. Unit Date: 15. N □ 10. Long & Trans Cracking m Drainage: Y □ N □ 11. Structure 11.5 □ 11. Structure 11.5 □ 11. Structure 11.5 □ 11. Structure 11.5 □ 11. Struc					
5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m DISTRESS CODE SHOULDER: Y N PHOTOGRAPH .jpg 11.5 Rutting Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m DISTRESS CODE SHOULDER: Y N PHOTOGRAPH .jpg 11.5 [11.5]			14. Railro	ad Crossing Sq m	
7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m DISTRESS CODE			15. Rutting	g Sq m	
8. Jt. Reflection Cracking m 18. Swell Sq m MAINTENANCE: Y INP 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m MAINTENANCE DATE: DISTRESS SHOULDER: Y INP NI CODE DRAINAGE: Y INP NI Interview Interview Interview Interview	6. Depre	ession Sq m	16. Shovir	ng Sq m	DATE: 151 8 / 2003
8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m DISTRESS CODE	7. Edge	Cracking m	17. Slippa	ge Cracking Sq m	
9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m DISTRESS CODE					
DISTRESS CODE SHOULDER: Y N N DRAINAGE: Y N N PHOTOGRAPH .jpg 115 115 115 115			19. Weath	ering/Ravelling Sq m	
CODE SHOULDER: Y N DRAINAGE: Y N PHOTOGRAPH.jpg 1151 Image: N 1151 Image: N Image: N Image: N </td <td></td> <td></td> <td></td> <td>0*1</td> <td></td>				0*1	
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PMMS FOR EM		JT CONDII	TION SURV	EY SHEET		SHEET NO. 20
BRANCH	NAME: ACA	DEMIC S	TREET	BRANCH I	D: ACA ST	DATE: 181 612012
SECTION I	D: ACA	28	NO. OF LA	ANES: 2		INSPECTOR: BrywrA,
FROM:	44		TO:	40		FUNCTIONAL CLASS
SECTION I	LENGTH:	62	SECTION	WIDTH:	7.2	Primary
	SUF	RFACE DIS	STRESS T	YPE		TRAFFIC FLOW:
1. Alligator	Cracking Sq	m	11. Patching &	& Util Cut Patchin	ng Sqm	ONE DIRECTION
2. Bleeding			1	d Aggregate S	q m	TWO DIRECTION
	acking Sq m		13. Pothole			SURFACE TYPE:
4. Bumps an	A second first and a second first second		Contraction of the second second	d Crossing So	l m	AC X PCC AAC
5. Corrugat	· · · · · · · · · · · · · · · · · · ·		15. Rutting			LAST CONSTRUCTION
6. Depressio			16. Shoving			DATE: 151711995
7. Edge Cra	-			e Cracking So	l m	MAINTENANCE: Y NX
	tion Cracking		18. Swell S		a	MAINTENANCE DATE:
	oulder Drop C		19. Weathe	ering/Ravelling	g Sq m	/ /
	Trans Crack	ing m				
DISTRESS CODE	3	10	1			SHOULDER: Y X N
	1.8 L	2.8 M	5.32 H			DRAINAGE: Y N X
		1.8 L	1.6 H			
-						PHOTOGRAPH .jpg
						1152
						1153
						1154
						1155
	<u> </u>					-
JÈL	10	10				E
AL	1.8	1.8				
TOTA SEVER		2.8				N C S
H SH			6.92			Ŵ
COMMEN	-		0.77			
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PMMS FOR EMU CAMPUS PAVEME	NT CONDIT	TION SURV	EY SHEET		SHEET NO. 21
BRANCH NAME: AG	ADEMIC	STREET	BRANCH I	D: ACA ST	DATE: 18/6/2012
SECTION ID: ACA	27	NO. OF LA	NES: 2		INSPECTOR: Bryan A.
FROM: 4//		TO:	44		FUNCTIONAL CLASS
SECTION LENGTH:	85	SECTION	WIDTH:	6	Primary
SU	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Alligator Cracking Sq. Bleeding Sq m Block Cracking Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking Lane/Shoulder Drop 0 Long & Trans Crack 	g m Əff m	 Polished Pothole Pothole Railroad Rutting Shoving Slippag Swell S 	d Crossing So Sq m g Sq m e Cracking S	Sq m q m q m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 718/2003 MAINTENANCE: Y NM MAINTENANCE DATE: / /
DISTRESS		1			SHOULDER: Y 🗙 N
CODE				 	DRAINAGE: Y 🖾 N 🗌
					PHOTOGRAPH .jpg
					1156
					S C Z
COMMENT:					

PMMS FOR EMU	PAVEMENT CON	DITION SURV	YEY SHEET	SHEET NO. 22
BRANCH N	AME: ACADEMI	C STREET	BRANCH ID: ACA ST	DATE: 18/6/2012
SECTION I	D: ACA 29	NO. OF L	ANES:	INSPECTOR:
FROM:	43	TO:	43	FUNCTIONAL CLASS
SECTION I	ENGTH: \O	SECTION	WIDTH: 7.4	Primar y
	SURFACE	DISTRESS T	YPE	TRAFFIC FLOW:
 Bleeding S Block Cra Bumps and Corrugati Depression Edge Crack Jt. Reflect Lane/Shot 	icking Sq m d Sags m on Sq m n Sq m	 Polishe Pothole Railroa Rutting Shovin Slippag Swell 5 	nd Crossing Sq m 3 Sq m g Sq m 3ge Cracking Sq m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: 17171995 MAINTENANCE: Y \square N \square MAINTENANCE DATE: 1
DISTRESS	10 13	3 3	T	SHOULDER: Y N
CODE	10 L 15 L 1 6 L 1	H 23 L L 50 N		DRAINAGE: Y N
	12 L	14 L 120 L	n	PHOTOGRAPH .jpg
				1/57 1158 1159 1160 1164 1163
TOTAL SEVERITY T Z T	33 1	157 50		\leftrightarrow
COMMENT	: This section is	i a vound obc	int "low deti"	

PMMS FOR EMU CAMPUS PAVEMENT COND	ITION SURV	EY SHEET	SHEET NO. 23
BRANCH NAME: ACA DEMIC	STIREET	BRANCH ID: ACAS	T DATE: 18 / 6 / 2012
SECTION ID: ACA 31	NO. OF LA	INES: 2	INSPECTOR: Bryan A.
FROM: 44	TO: 4	17	FUNCTIONAL CLASS
SECTION LENGTH: 309	SECTION	WIDTH: 8.7	Primary
SURFACE D	ISTRESS T	YPE	TRAFFIC FLOW:
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m Long & Trans Cracking m 	 Polished Pothole Pothole Railroa Rutting Shoving Slippag Swell S 	d Crossing Sq m Sq m g Sq m e Cracking Sq m	ONE DIRECTION Image: Construction TWO DIRECTION Image: Construction SURFACE TYPE: AC AC PCC AAC LAST CONSTRUCTION DATE: 2003 MAINTENANCE: Y NIM MAINTENANCE DATE: /
DISTRESS			SHOULDER: Y X N
CODE 7.5 L 4 L			DRAINAGE: Y X N
3 M 7.2 L			PHOTOGRAPH .jpg
8,5 L			1165 1166 1167 1168
L 27.2 H 3 H			S C C C C C C C C C C C C C C C C C C C
COMMENT:			

	PAVEMENT CONE	DITION SURV	VEY SHEET	SHEET NO. 24
BRANC	CH NAME: ACADEMIC	STREET	BRANCH ID:	DATE: 18/6/2012
SECTIC	IN ID: ACA 32	NO. OF L	ANES: 2	INSPECTOR: Bryar A
FROM:	46	TO:	47	FUNCTIONAL CLASS
SECTIC	ON LENGTH: 60	SECTION	WIDTH: \0	Primary
	SURFACE I	DISTRESS T	YPE	TRAFFIC FLOW:
 Bleed Block Block Bump Corru Depre Edge Jt. Re Lane/ 	ator Cracking Sq m ing Sq m c Cracking Sq m os and Sags m agation Sq m ession Sq m Cracking m effection Cracking m Shoulder Drop Off m	 11. Patching 12. Polishe 13. Pothol 14. Railros 15. Rutting 16. Shovir 17. Slippa 18. Swell 	& Util Cut Patching Sqm ed Aggregate Sq m es Count ad Crossing Sq m g Sq m ng Sq m ge Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 5/8/2000 MAINTENANCE: Y NE MAINTENANCE DATE: / /
10. Long DISTRE	g & Trans Cracking m	-		
CODE				SHOULDER: Y X N
	2.9 L			DRAINAGE: Y 🗌 N 🔀
		_		PHOTOGRAPH .jpg
				1170
TOTAL SEVERITY	L			$m \leftrightarrow \Sigma$
СОММ	ENT:	2		
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PMMS FOR	R EMU CA P		NT CONDI	TION SURV	EY SHEET		SHEET NO. 25
BRANC	CH NAM	AE: ACAL	DEMIC S	TREET	BRANCH II	ACA ST	DATE: 18/6/2012
SECTIC	ON ID:	ACA	25	NO. OF LA	ANES: 2		INSPECTOR: Bryar A
FROM:		40	>	TO:	39		FUNCTIONAL CLASS
SECTIO	ON LEN	IGTH:	67	SECTION	WIDTH: 9	7	Primary
		SUI	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleed Block Block Bump Corru Corru Depre Depre Edge Jt. Re Lane/ 	ling Sq Cracking Igation Cracking Cracking flection	ng Sq m ags m Sq m q m	g m Off m	 Polishe Pothole Pothole Railroa Rutting Shoving Shoving Swell S 	d Crossing Sq 5 Sq m g Sq m 3 Cracking Sq	q m m m	ONE DIRECTION
DISTRE			10				SHOULDER: Y N
CODI	E		6.2L				DRAINAGE: Y IN X
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							1172 1173 1174
TOTAL	L M		6.2				$\mathcal{E} \longleftrightarrow \mathcal{W}$
the state of the state of the	Η			1			
COMM	ENT:	3					

PMMS FOR EMU CAMPUS PAVEME	NT CONDI	ΓΙΟΝ SURV	EY SHEET		SHEET NO. 26
BRANCH NAME: ACA	ADEMIC.	STREET	BRANCH I	D: ACAST	DATE: 18/6/2012
SECTION ID: ACA	24	NO. OF LA	NES:	2	INSPECTOR: Bryow A.
FROM: 39		TO: 3	8		FUNCTIONAL CLASS
SECTION LENGTH:	78	SECTION	WIDTH:	9	Primary
SU	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Alligator Cracking Sq Bleeding Sq m Block Cracking Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking Lane/Shoulder Drop Long & Trans Crack 	ųm ng m Off m	11. Patching & 12. Polished 13. Pothole 14. Railroa 15. Rutting 16. Shoving 17. Slippag 18. Swell S	t Util Cut Patchi I Aggregate S s Count d Crossing So Sq m g Sq m e Cracking S	Sq m q m q m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $ \downarrow / \& / 2 \circ 3$ MAINTENANCE: Y \square N \boxtimes MAINTENANCE DATE: / /
DISTRESS	T				SHOULDER: Y 🗙 N
CODE					DRAINAGE: Y 🗌 N 🔀
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TOTAL SEVERITY T Z T					€ ← → m
COMMENT:					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

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SECTION ID: $A (A 7)$ NO. OF LANES: 2 INSPECTOR: $B \vee M A$ FROM:3.9TO:3.4FUNCTIONAL CLASSECTION LENGTH:9.8SECTION WIDTH: 8.7 SecondarySURFACE DISTRESS TYPE1. Alligator Cracking Sq m11. Patching & Util Cut Patching Sqm2. Bleeding Sq m12. Polished Aggregate Sq m3. Block Cracking Sq m13. Potholes Count4. Bumps and Sags m14. Railroad Crossing Sq m5. Corrugation Sq m16. Shoving Sq m6. Depression Sq m17. Slippage Cracking Sq m9. Lane/Shoulder Drop Off m19. Weathering/Ravelling Sq m10. Long & Trans Cracking m14. LDISTRESS14. 140.57.5 L2.0 L0.70.757.5 L2.0 L0.750.752.0 L0.757.5 L2.0 L0.750.757.5 L2.0 L0.750.757.5 L2.0 L0.750.757.5 L2.0 L0.750.751.0	PMMS FOR EMU		NT CONDI	TION SURV	EY SHEET	SHEET NO. 27
FROM:GFUNCTIONAL CLASFROM:GFUNCTIONAL CLASSECTION WIDTH:9.4FUNCTIONAL CLASSECTION WIDTH:9.4FUNCTIONAL CLASSURFACE DISTRESS TYPETRAFFIC FLOW:1. Alligator Cracking Sq m11. Patching & Util Cut Patching SqmONE DIRECTION \boxtimes 2. Bleeding Sq m12. Polished Aggregate Sq mTWO DIRECTION \boxtimes 3. Block Cracking Sq m13. Potholes CountSURFACE TYPE:4. Bumps and Sags m14. Railroad Crossing Sq mSURFACE TYPE:4. Bumps and Sags m15. Rutting Sq mLAST CONSTRUCTION6. Depression Sq m16. Shoving Sq mDATE: $ / / / 1/99'$ 7. Edge Cracking m19. Weathering/Ravelling Sq mDATE: $ / / / 1/99'$ 9. Lane/Shoulder Drop Off m19. Weathering/Ravelling Sq mMAINTENANCE DATE:10. Long & Trans Cracking m19. Weathering/Ravelling Sq mMAINTENANCE TATE:0.35200.350.35911/761111/7611/7611/7611/7711/7911/79	BRANCH N	IAME: ACAT	DEMIC S	TREET	BRANCH ID: ACAS	T DATE: 18/6/2012
INOM. 3	SECTION I	D: ACA	17	NO. OF LA	ANES: 2	INSPECTOR: By your A,
SURFACE DISTRESS TYPE TRAFFIC FLOW: I. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm 2. Bleeding Sq m 11. Patching & Util Cut Patching Sqm 3. Block Cracking Sq m 12. Polished Aggregate Sq m 3. Block Cracking Sq m 13. Potholes Count 4. Burnps and Sags m 14. Railroad Crossing Sq m 5. Corrugation Sq m 15. Rutting Sq m 6. Depression Sq m 16. Shoving Sq m 7. Edge Cracking m 17. Slippage Cracking Sq m 8. Jt. Reflection Cracking m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m DISTRESS 1/1 1/4 CODE 1/1 1/4 0.3 5 2/9 1 1/4 DrannaGE: Y 8 2.9 1/4 0.3 5 1/4 0.3 5 1/4 1 1/4 1/7/6 1/17/8 1/1 1/1 1 1 1/1 0.3 5 1/4 1 1 1/1 1 1/1 <td< td=""><td>FROM:</td><td>39</td><td>9</td><td>TO:</td><td>34</td><td></td></td<>	FROM:	39	9	TO:	34	
1. Alligator Cracking Sq m 11. Patching & Util Cut Patching Sqm 2. Bleeding Sq m 11. Patching & Util Cut Patching Sqm 3. Block Cracking Sq m 12. Polished Aggregate Sq m 4. Bumps and Sags m 13. Potholes Count 5. Corrugation Sq m 15. Rutting Sq m 6. Depression Sq m 16. Shoving Sq m 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 19. Uat L 0.STRESS 1/1 0.ODE 3 0.Strees 1/1 0.S. 7.5 L 2.0 L 0.3 5 L PHOTOGRAPH .jpp 1<1	SECTION L	ENGTH:	98	SECTION	WIDTH: 8.7-	Secondary
1. Angled Creating Sq m 1. Polished Aggregate Sq m 2. Bleeding Sq m 13. Potholes Count 3. Block Cracking Sq m 13. Potholes Count 4. Bumps and Sags m 14. Railroad Crossing Sq m 5. Corrugation Sq m 15. Rutting Sq m 6. Depression Sq m 16. Shoving Sq m 7. Edge Cracking m 17. Slippage Cracking Sq m 8. Jt. Reflection Cracking m 18. Swell Sq m 9. Lane/Shoulder Drop Off m 19. Weathering/Ravelling Sq m 10. Long & Trans Cracking m 14. L DISTRESS 1/1 0.0 CODE 8 2.9 14 0.3 5 0.3 5 0.3 5 0.3 5 0.3 5 1 14 1 14 0.3 5 0.3 5 1 14 1 14 1 14 1 14 1 16 1 176 1 177 178 1 <td></td> <td>SUI</td> <td>RFACE DI</td> <td>STRESS T</td> <td>YPE</td> <td>TRAFFIC FLOW:</td>		SUI	RFACE DI	STRESS T	YPE	TRAFFIC FLOW:
CODE (1) 10 3 SHOULDER: Y [] N [] 8 29 L 14 L DRAINAGE: Y [] N [] 0.5 7.5 L 20 L DRAINAGE: Y [] N [] 0.3 5 L PHOTOGRAPH .jp; 6 1 1176 1 1 1176 1 1178 1178 1179 1179 1179 1179 2400 1179 2400	 Bleeding S Block Cra Bumps an Corrugation Depression Edge Cract Jt. Reflect Lane/Shou Long & 	Sq m lacking Sq m ld Sags m on Sq m n Sq m cking m tion Cracking ulder Drop C	g m Dff m	 Polishe Pothole Pothole Railroa Rutting Shoving Slippag Swell S 	d Aggregate Sq m ss Count d Crossing Sq m s Sq m g Sq m ge Cracking Sq m 5q m	TWO DIRECTIONSURFACE TYPE:ACPCCAACLAST CONSTRUCTIONDATE: $1/7/1992$ MAINTENANCE:YNAINTENANCE DATE:
8 29 14 DRAINAGE: Y N 0.5 7.5 20 DRAINAGE: Y N 0.3 5 L PHOTOGRAPH.jpg 6 L II 1 II III 1 II III 1 III IIII 1 IIIII 1 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	175 7 5 6 5 6 6 6 6 6 6	11	10	3		SHOULDER: Y 📉 N
0.3 5 L PHOTOGRAPH.jpg 6 L 1 1 1 L 1176 1 L 1177 1 L 1178 1 L 1178 1 L 1179	CODE	8	29 L	14 L		DRAINAGE: Y 🗌 N 🔀
			5 L			PHOTOGRAPH .jpg
			1 L			
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COMMENT:		9	48,5	34		≥ M M M
E B.	COMMENT	3				
						- JE JXF
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PAVEMEN	T CONDIT	TION SURV	EY SHEET	SHEET NO. 28
IAME: ACA	DEMIC S	TREST	BRANCH ID: ACA	DATE: 18/6 / 2012
D: ACAN 8		NO. OF LA	ANES: 2	INSPECTOR: Bryan A.
3!	5	TO:	31	FUNCTIONAL CLASS
ENGTH:	42	SECTION	WIDTH: \[Secondary
SUF	FACE DIS	STRESS T	YPE	TRAFFIC FLOW:
Cracking Sq Sq m ucking Sq m ud Sags m on Sq m on Sq m cking m tion Cracking ulder Drop C	m g m ff m	 Patching & Polishe Pothole Railroa Rutting Shoving Slippag Swell S 	& Util Cut Patching Sqm d Aggregate Sq m s Count d Crossing Sq m s Sq m g Sq m ge Cracking Sq m oq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 157 71 1989 MAINTENANCE: Y NM MAINTENANCE DATE: 1 1
11	Ц	19	NO	SHOULDER: Y 📈 N
44M	5.3M	100 L	3 L	DRAINAGE: Y 🔀 N 🗌
				PHOTOGRAPH .jpg
				1180 1181 1182 1183 1183
44	5.3	100	3	2 m m
	IAME: ACA D: ACA 8 ENGTH: SUF Cracking Sq m acking Sq m acking Sq m acking m tion Cracking ulder Drop O Trans Cracking Ulder Drop O Trans Cracking	IAME: $ACAD & MTC & S$ D: $ACAN & S$ 35 LENGTH: 42 SURFACE DIS Cracking Sq m Sq m acking Sq m acking Sq m acking m tion Cracking m ulder Drop Off m Trans Cracking m 11 44 5.3 	IAME: ACAD & MTC STRSST D: ACAN 8 NO. OF LA 35 TO: LENGTH: $4/2$ SECTION SURFACE DISTRESS T Cracking Sq m Sq m acking Sq m 11. Patching & 12. Polishe 13. Pothole 14. Railroa on Sq m 15. Rutting n Sq m 16. Shoving 17. Slippag 18. Swell S 19. Weather Trans Cracking m 10. $4/4$ 5.3 100 L 10.	D: ACAN 8 NO. OF LANES: 2 25 TO: 31 LENGTH: 42 SECTION WIDTH: 11 SURFACE DISTRESS TYPE 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m Sags m 13. Potholes Count 14. Railroad Crossing Sq m acking Sq m 15. Rutting Sq m 15. Rutting Sq m acking m 16. Shoving Sq m 16. Shoving Sq m acking m 17. Slippage Cracking Sq m 19. Weathering/Ravelling Sq m tion Cracking m 19. Weathering/Ravelling Sq m 11. 44 19 10 11. 44 19 10 11. 44 19 10 12. 44 19 10 13. 7000 00000000000000000000000000000000

	PAVEMEN	T CONDIT	TION SURV	EY SHEET		SHEET NO. 29
BRANCH N	IAME: ACA	DEMIC	STREET	BRANCH ID	:AGA ST	DATE: 186 / 2012
SECTION I	D: ACA	16	NO. OF LA	NES: 2		INSPECTOR: Brywr A.
FROM:	32	3	TO:	35		FUNCTIONAL CLASS
SECTION I	ENGTH:	85	SECTION	WIDTH: 9	1.5	Primary
	SUF	FACE DIS	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding 3 Block Cra Bumps ar Corrugati Depression Edge Crassion It. Reflect Lane/Sho 	Cracking Sq Sq m acking Sq m ad Sags m on Sq m on Sq m cking m tion Cracking ulder Drop O	m g m ff m	 Patching & Polisher Pothole Pothole Railroa Rutting Shoving Slippag Swell S 	e Util Cut Patching d Aggregate So s Count d Crossing Sq Sq m g Sq m g Sq m e Cracking Sq	lm m m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 7/7/1989 MAINTENANCE: Y NE MAINTENANCE DATE: / /
10. Long & DISTRESS	Trans Crack					
CODE	10	11	3			SHOULDER: Y 📉 N
	19L 4 M	120M 9.5L	150 M			DRAINAGE: Y 🗌 N 🔀
	30 L	7.5 -				- PHOTOGRAPH .jpg
						1185 1186 1187 1188 1189
TOTAL SEVERITY T ST T	49 4	9.5 120	11			m t
COMMENT						
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PMMS FOR EMU		IT CONDII	TION SURV	EY SHEET		SHEET NO. 30
BRANCHN				BRANCHI	D:ACAST	DATE: 18/ 6/2012
SECTION I	D: AC	A 19	NO. OF LA	NES: 2		INSPECTOR: Bryar A.
FROM:	143	:5	TO:	36		FUNCTIONAL CLASS
SECTION I	ENGTH:	136	SECTION	WIDTH:	9,5	Secondary
	SUR	FACE DIS	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding S Block Cra Bumps and Corrugati Depression Edge Crack Jt. Reflect Lane/Short 	Cracking Sq Sq m acking Sq m ad Sags m on Sq m on Sq m cking m tion Cracking ulder Drop O	m ; m ff m	 Patching & Polisher Pothole Pothole Railroa Rutting Shoving Slippag Swell S 	e Util Cut Patchin d Aggregate S s Count d Crossing So Sq m g Sq m e Cracking So	4 m 1 m 1 m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 17-1 7-1 1989 MAINTENANCE: Y N MAINTENANCE DATE: / /
	Trans Cracki	ng m				
DISTRESS CODE	//	16	N	13	3	SHOULDER: Y 📉 N
	3 H 10 M	45L	6.5M 3 L	1 H 1 H	9L	drainage: y 🗌 n 🔀
		10 L	1 M 3.5H			PHOTOGRAPH .jpg
						1191 1192 1193 1194 1195 1196 1197 1198
TOTAL SEVERITY T Z T		100	3		9	S ∧
M	10		7.5			$m \leftrightarrow \epsilon$
H 8ª	3		3.5	2		.Z
COMMENT					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
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	PAVEMEN	T CONDIT	TION SURVI	EY SHEET	SHEET NO. 31
BRANCH N	DATE: \8/6/20\2				
ECTION I	D: ACA.	INSPECTOR: Bygar A			
ROM:	36		TO:	37	FUNCTIONAL CLAS
ECTION L	ENGTH:	50	SECTION V	WIDTH: 9.5	Secondary
	SUR	FACE DIS	STRESS TY	PE	TRAFFIC FLOW:
. Alligator (Cracking Sq	m	11. Patching &	Util Cut Patching Sqm	ONE DIRECTION
. Bleeding S			12. Polished	Aggregate Sq m	TWO DIRECTION
. Block Cra	cking Sq m		13. Potholes	Count	SURFACE TYPE:
. Bumps an	d Sags m		14. Railroad	l Crossing Sq m	
. Corrugatio	on Sq m		15. Rutting		LAST CONSTRUCTION
. Depressio			16. Shoving		DATE: 19/7/1989
. Edge Crac	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			e Cracking Sq m	MAINTENANCE: Y
	ion Cracking		18. Swell So		MAINTENANCE DATE:
	ulder Drop O		19. Weather	ing/Ravelling Sq m	/ /
	Trans Cracki	ng m		2	
DISTRESS	10	6	11	1	SHOULDER: Y X N
CODE		2.5 M		C AA	
	25 L	2.5 14	4.5 M	5M	DRAINAGE: Y 🗌 N 🔀
	35 L		7 H		
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					1200
					1201
					1202
_} L	60				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
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COMMENT	:		T		
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PMMS FOR EM	J CAMPUS PAVEMEN	T CONDI	TION SURV	EY SHEET	SHEET NO. 32	
BRANCHN	ST DATE: 18/6/2012					
SECTION I	SECTION ID: ACA 03 NO. OF LANES: 2					
FROM:	36	-	TO:	15	FUNCTIONAL CLASS	
SECTION I	ENGTH:	245	SECTION	WIDTH: 5,8	Secondary	
	SUR	FACE DI	STRESS T	YPE	TRAFFIC FLOW:	
 Bleeding S Block Cra Bumps and Corrugati Depression Edge Craat Jt. Reflect Lane/Sho Long & 	acking Sq m ad Sags m on Sq m on Sq m	m ff m	 Polisher Pothole Pothole Railroa Rutting Shoving Shippag Swell S 	d Crossing Sq m Sq m g Sq m te Cracking Sq m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $ 3/8/1992$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: 9/1/2012	
DISTRESS	II.	N	10		SHOULDER: Y 🔀 N	
CODE	4.5 H 2.9 H	1.2 H 7 M	15 L 9 1		DRAINAGE: Y 🗌 N 🔀	
	10 H 5.8 M	7 M 1 L 20 H	71		PHOTOGRAPH .jpg	
	7 H 6 M 2.4 L 6 H 3.5 L 6 M	3 L 1 M 1 M			1203 1204 1205 1206 1207	
TOTAL SEVERITY T Z T	5.9 17.8 30	4 9 21	31		2 M M M	
COMMENT	1					

PMMS FOR EMU		T CONDII	TION SURVE	EY SHEET		SHEET NO. 33	
BRANCHN	DATE: 19/6/20	12					
SECTION I	ECTION ID: DOR 02 NO. OF LANES: 2						VA.
FROM:	FROM: 47 TO: 51						ASS
SECTION L		337	SECTION W		10	Primary	
	SUR	FACE DIS	STRESS TY	PE		TRAFFIC FLOW:	_
1. Alligator 2. Bleeding	Cracking Sq 1 Sq m	n	11. Patching & 12. Polished			ONE DIRECTION TWO DIRECTION	
3. Block Cra	acking Sq m		13. Potholes	Count		SURFACE TYPE:	
4. Bumps an	nd Sags m		14. Railroad	Crossing Sc	[m		
5. Corrugati	on Sq m		15. Rutting	Sq m		LAST CONSTRUCTION	
6. Depressio	on Sq m		16. Shoving	Sq m		DATE: 16 / 7/ 199	15
7. Edge Crad			17. Slippage	Cracking So	n p	MAINTENANCE: Y	
8. Jt. Reflect	tion Cracking	m	18. Swell Sc	m		MAINTENANCE: Y	
9. Lane/Sho	ulder Drop O	ff m	19. Weather	ing/Ravelling	g Sq m	271 120	
10. Long &	Trans Cracki	ng m		8			-
DISTRESS CODE	()	13	10	1		SHOULDER: Y 📉 N	
	8.5 M	1 L	2.8 M	3.2H		DRAINAGE: Y 🕅 N	
	2.84	IM	2.5 M	3 M			
	5.4M	1 4	5 L	3 M		PHOTOGRAPH .j	ing
	1.5 L		6 M	10 M			FB
	3 H		42 L	5 L		1212	
	5.6 #		4 L			1214	
	8.5 H	_	25 L				
	3.5L		24 L			1217	
-	40 M		30 L			1218	
	28 L		BM			1220	
	8.3 L			1.4		1221 1222	
_	2.9 M						
JA L	41.3		130	5		V.	
TOTAL SEVERIT	56.8	1	19.3	16		$5 \leftrightarrow 2$	
H 8 ⁴	19.9	F		3.2		M	
COMMENT						<u>.</u>	
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PAVEMEN	T CONDI	TION SURV	EY SHEET	SHEET NO. 34		
BRANCH NAME: DORMITORY STREET BRANCH ID: DORST						
D: DORC	5	NO. OF LA	NES: 2	INSPECTOR: Bryon A.		
51		TO: 55	5	FUNCTIONAL CLASS		
ENGTH:	273	SECTION	WIDTH: 9.4	Primary		
SUF	FACE DI	STRESS TY	YPE	TRAFFIC FLOW:		
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m 			t Util Cut Patching Sqm d Aggregate Sq m s Count d Crossing Sq m Sq m g Sq m g Sq m g Cracking Sq m q m	ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: 201711995 MAINTENANCE: Y \square N \square MAINTENANCE DATE:		
		19. Weathe	ring/Ravelling Sq m	1 1		
-	a literative at a coost	11		SHOULDER: Y N		
15 L	I H	1 H		DRAINAGE: Y 🗌 N 🔀		
5 L			,	PHOTOGRAPH .jpg		
				1223 1224 1225		
34	1	10		S C Z		
Γ:			*			
	PAVEMEN IAME: DOR D: DOR C 51 ENGTH: 2 SUR Cracking Sq m acking Sq m acking Sq m acking Sq m acking m tion Cracking ulder Drop C Trans Cracking Ulder Drop C Trans Cracking 15 L 12 M 5 L 14 L 3 4	PAVEMENT CONDITIONE: DORMITORY TAME: DORMITORY D: DOR 05 51 LENGTH: 2.7.3 SURFACE DIS Cracking Sq m Sq m acking Sq m ad Sags m on Sq m n Sq m cking m tion Cracking m ulder Drop Off m Trans Cracking m 10 13 15 L 1 H 12 M 1 L 5 L 14 L 14 L 12 I 14 L 12 I 15 L 14 L 14 L 12 I 15 L 14 L	PAVEMENT CONDITION SURV TAME: DORMITORY STREET D: DOR 05 NO. OF LA 51 TO: 55 ENGTH: 273 SECTION SURFACE DISTRESS TY Cracking Sq m 11. Patching & Sq m 12. Polished acking Sq m 13. Pothole 14. Railroad on Sq m 15. Rutting n Sq m 16. Shoving cking m 17. Slippag tion Cracking m 18. Swell S 19. Weather Trans Cracking m 10 13 11 15 L 1 H 1 H 12 M 1 L 10 L 5 L 14 L 34 1 10 12 I I T:	PAVEMENT CONDITION SURVEY SHEET AME: $DORMITORY STREET$ BRANCH ID: $DORST$ BRANCH ID: $DORST$ D: $DOR OS$ NO. OF LANES: 2 51 TO: 55 ENGTH: 273 SECTION WIDTH: 9.4 SURFACE DISTRESS TYPE Cracking Sq m 10. Polished Aggregate Sq m 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 19. Weathering/Ravelling Sq m 10 13 11 15 L 1 H 1 H 12 M 1 L No L 5 L 14 L 14 L 14 L 15 L 1 H 1 H 12 M 1 L No L 5 L 14 L 14 L 15 L 14 L 14 L 15 L 14 L 15 L 14 L 15 L 14 L 15 L 14 L 15 L 14 L 14 L 15 L 14 L 15 L 14 L 15 L 14 L 16 Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 10 13 11 15 L 14 L 14 L 15 L 14 L 15 L 14 L 15 L 14 L 14 L 14 L 15 L 14 L 14 L 14 L 14 L 15 L 14 L 14 L 15 L 14 L 15 L 14 L 14 L 15 L 15 L 15 L 16 L 16 L 17 L 16 L 17 L 17 L 17 L 16 L 17 L 1		

PMMS FOR EM	U CAMPUS PAVEMENT CONDI	FION SURV	EY SHEET		SHEET NO. 35		
BRANCH	BRANCH NAME: DORMITORY STREET BRANCH ID: DORSTI						
SECTION I	D: DOR 06	NO. OF LA	ANES:	2	INSPECTOR: Bryour A.		
FROM:	51	TO:	9	52	FUNCTIONAL CLASS		
SECTION I		SECTION		7	Primary		
	SURFACE DI	STRESS T	YPE		TRAFFIC FLOW:		
 Bleeding Block Cra Bumps ar Corrugati Depression Edge Cra Jt. Reflect Lane/Shot 	acking Sq m nd Sags m ion Sq m on Sq m	 Polished Pothole Pothole Railroa Rutting Shoving Slippag Swell S 	d Crossing So Sq m g Sq m ge Cracking So	ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $(3/7/200)$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: / /			
DISTRESS			T	1			
CODE					SHOULDER: Y 🔀 N		
	7-M				DRAINAGE: Y 🗌 N 🔀		
					PHOTOGRAPH .jpg		
					1226 1227 1228		
AL RUTY					∽ ,		
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COMMENT	E E	1		1			
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PMMS FOR EMU			TION SURV	EV QUEET	-	SHEET NO. 36
				1		
			1	1	ID: DORST	
SECTION II	D: DOR	07	NO. OF LA	NES:	2	INSPECTOR: Bryan A.
FROM:	52		TO: 53			FUNCTIONAL CLASS
SECTION L	ENGTH:	81	SECTION	WIDTH:	7	Primary
	SUR	FACE DIS	STRESS T	YPE		TRAFFIC FLOW:
1. Alligator	Cracking Sq	m	11. Patching &	t Util Cut Pate	ching Sqm	ONE DIRECTION
2. Bleeding S	Sq m		12. Polished		e Sq m	TWO DIRECTION
3. Block Cra	cking Sq m		13. Pothole			SURFACE TYPE:
4. Bumps an			14. Railroa		Sq m	
5. Corrugation			15. Rutting			LAST CONSTRUCTION
6. Depressio			16. Shoving		0	DATE: 22/ 7/ 1995
7. Edge Crac			17. Slippag		Sqm	MAINTENANCE: Y NX
8. Jt. Reflect			18. Swell S	*		MAINTENANCE DATE:
9. Lane/Shot			19. Weathe	ring/Ravell	ing Sq m	1 1
	Trans Crack	ing m		1		
DISTRESS CODE	11	6				SHOULDER: Y 🔀 N
	3.5 L	8 M				DRAINAGE: Y 🔀 N 🗌
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						PHOTOGRAPH .jpg
						1229
						1230
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PMMS FOR EMU		T CONDI	TION SURV	EY SHEET	r.	SHEET NO. 37
BRANCH NA	DATE: 19/6 / 2012					
SECTION ID	: Dok	209	NO. OF LA	NES:	2	INSPECTOR: Bryar A.
FROM:	5	57	FUNCTIONAL CLASS			
SECTION LE	ENGTH:	152	SECTION '	WIDTH:	6	Secondary
	SUR	FACE DI	STRESS TY	(PE		TRAFFIC FLOW:
 Alligator C Bleeding So Block Crace Bumps and Corrugation Depression Edge Crack Jt. Reflection Lane/Shoul Long & T 	racking Sq q m king Sq m Sags m n Sq m Sq m cing m on Cracking lder Drop O	m ; m ff m	 STRESS TYPE 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			IRAFFIC FLOW: ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 5 MAINTENANCE: Y NX MAINTENANCE DATE: Y
DISTRESS	1	10			2	SHOULDER: Y N
CODE	10 L	10L				DRAINAGE: Y 🔀 N 🗌
						PHOTOGRAPH .jpg
						1231 1232 1233
TOTAL SEVERITY T Z T	10	10				
COMMENT:						

PMMS FOR E	EMU	PAVEMENT CONDI	TION SURV	EY SHEET		SHEET NO. 38
BRANCH	IN	AME: DORMSTORY		1	D: DOR ST	DATE: 19/ 6/2012
SECTION	N IE	DOR 11	NO. OF LA	ANES:	2	INSPECTOR: Bryon A.
FROM:		56	TO: 50	8		FUNCTIONAL CLASS
SECTION	I L		Primary			
	_	SURFACE DI	STRESS T	YPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m			 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 			ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 6 / 8 / 2007 MAINTENANCE: Y NX MAINTENANCE DATE:
		lder Drop Off m	19. Weathe	ering/Ravellin	ig Sq m	1 1
DISTRES CODE	SS	Trans Cracking m				SHOULDER: Y 🔀 N
CODE		31				DRAINAGE: Y 🔀 N 🗌
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PMMS FOF	EMU		IT CONDI	TION SURV	EY SHEET		SHEET NO. 39
							DATE: 19/6/2012
SECTIC	N II	D: DOF	210	NO. OF LA	NES:	2	INSPECTOR: Bryar A.
FROM:		59		TO:	L	54	FUNCTIONAL CLASS
SECTIC	NL	ENGTH:	160	SECTION		7	Secondary
	SURFACE DISTRESS TYPE						TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $F \land \beta \land 2 \circ \circ 3$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: \land \land	
DISTRE		1					SHOULDER: Y N
CODI	3	4.5 M					DRAINAGE: Y 🗌 N 🔀
							PHOTOGRAPH .jpg
							1235
							1236
							-
ury	L						TT:
TOTAL	M	4.5					>
N a	H						٤
COMM	ENT	:					
	CT D						

PMMS FOR EMU	PAVEMENT COND	ITION SURV	EY SHEET	SHEET NO. 40
BRANCH N	DATE: 19/6/2012			
SECTION II	D: DOR 08	INSPECTOR: Bryan A		
FROM:	53	54	FUNCTIONAL CLASS	
SECTION L	ENGTH: 60	SECTION	WIDTH: 7-	Secondary
	SURFACE D	DISTRESS T	YPE	TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugation Depression 	cking Sq m d Sags m on Sq m n Sq m	 Polisher Pothole Pothole Railroa Rutting Shoving 	d Crossing Sq m Sq m g Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 22/ 7-1 1995
9. Lane/Shou 10. Long & '	king m ion Cracking m Ilder Drop Off m Trans Cracking m	18. Swell S	e Cracking Sq m q m ring/Ravelling Sq m	MAINTENANCE: Y \square N \boxtimes MAINTENANCE DATE: / /
DISTRESS CODE	6			SHOULDER: Y 🔀 N
	6 L 12 M			DRAINAGE: Y 🛛 N 🗌
				PHOTOGRAPH .jpg
				1237
				1238
				_
	6 12			M CAR E
COMMENT	:		· · · · ·	
		(22)		

 \rightarrow

PMMS FOR EMU		T CONDI	TION SURVI	EY SHEET		SHEET NO. 41
BRANCH N	DATE: 19/6/2012					
SECTION II	D: DOR O	INSPECTOR: Bryar A.				
FROM:	54	FUNCTIONAL CLASS				
SECTION L	ENGTH:	314	SECTION V	VIDTH:	9	Secondary
	SUR	FACE DIS	STRESS TY	PE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m 			ONE DIRECTION \square TWO DIRECTION \boxtimes SURFACE TYPE: $AC \square$ AC $PCC \square$ $AAC \square$ LAST CONSTRUCTION $DATE: 261 \nexists 11995$ MAINTENANCE: Y N \square
8. Jt. Reflect 9. Lane/Shou			18. Swell Sc 19. Weather		g Sq m	MAINTENANCE DATE: 26/1/2012
10. Long & '	-					26 11 12012
DISTRESS CODE	11	6	1	10		SHOULDER: Y N
CODE	108 H 7.5 M	21 M	I L 6 M	18 L 25 L		DRAINAGE: Y 🔀 N 🗌
	15 L 32 M		1.8 L			PHOTOGRAPH .jpg
		-				1239 1240 1241 1242 1243 1243 1243 1243 1243
	15 39,5 108	21	3	43		
COMMENT						
(c)	L'L' E	CONTRACTOR IN	Contraction of the second seco			

PMMS FOR EM		T CONDI	TION SURV	/EY SHEET	SHEET NO. 42
BRANCH	ST DATE: 19/6/2012				
SECTION I	D: SPO	INSPECTOR: Bryan A.			
FROM:	4	FUNCTIONAL CLASS			
SECTION I	LENGTH:	420	SECTION	WIDTH: 10	Primary
	SUF	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding Block Cra Bumps ar 	acking Sq m nd Sags m	m	12. Polishe 13. Pothole 14. Railroa	nd Crossing Sq m	ONE DIRECTION
5. Corrugati 6. Depressio 7. Edge Cra	on Sq m	m	 Rutting Shovin Slippag Swell S 	g Sq m ge Cracking Sq m	LAST CONSTRUCTION DATE: 16171995 MAINTENANCE: Y \square N
9. Lane/Sho 10. Long &	ulder Drop O Trans Crack	ff m	and the second	ering/Ravelling Sq m	MAINTENANCE DATE: 26 / 1 / 2012
DISTRESS CODE	11	10	1		SHOULDER: Y N
CODE	25L 33L	30 L 12 M	19 H 3 L		DRAINAGE: Y 🛛 N 🗌
	10 M	30 L 10 L	10 H 0.5 L	-	PHOTOGRAPH .jpg
		3 M 5 L 25 L	2.5L		1248 1249 1250 1251 1252
TOTAL SEVERITY T Z T	58 10	100	6		
COMMENT	Γ:				
1 5 Z,					

PMMS FOR EMI	D CAMPUS PAVEMENT CONDI	TION SURV	YEY SHEET		SHEET NO. 43
BRANCH N	NAME: SPORT ST	DATE: 19/ 6/2012			
SECTION I	D: SPOG	NO. OF LA	ANES:	2	INSPECTOR: Bryan A.
FROM:	42	TO:	28		FUNCTIONAL CLASS
SECTION I	LENGTH: 403	SECTION	WIDTH:	8.7	Primary
_	SURFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding 1 Block Cra Bumps ar Corrugati Depression Edge Craw Jt. Reflect Lane/Sho Long & 	acking Sq m nd Sags m on Sq m on Sq m	 Polishe Pothole Pothole Railroa Rutting Shovin Slippag Swell S 	d Crossing S g Sq m g Sq m ge Cracking S	Sqm qm Sqm	ONE DIRECTION \Box TWO DIRECTION \blacksquare SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $201 \ g \ 1 \ 2003$ MAINTENANCE: Y \square N \blacksquare MAINTENANCE DATE: $1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \$
DISTRESS CODE	11				SHOULDER: Y 🔀 N
CODE	9 M				DRAINAGE: Y 🛛 N 🗌
					PHOTOGRAPH .jpg
					1253 1254
TOTAL SEVERITY T Z T	9				m
COMMENT	· · · · · · · · · · · · · · · · · · ·				

PMMS FOR EMU		IT CONDI	TION SURVE	Y SHEET		SHEET NO. 44
BRANCH N	IAME: DOK	DATE: 19/6/2012				
SECTION I	D: DOR	INSPECTOR: Bryon A.				
FROM: 47 TO: 48						FUNCTIONAL CLASS
SECTION L	ENGTH:	282	SECTION W	/IDTH: \	0	Primary
	SUF	FACE DI	STRESS TY	PE		TRAFFIC FLOW:
 Bleeding S Block Cra Bumps and Corrugati Depression Edge Craw Jt. Reflect 	Cracking Sq Sq m acking Sq m ad Sags m on Sq m on Sq m	m g m	11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m			INAPPLE PLOW. ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 3 7 995 MAINTENANCE: Y NX MAINTENANCE DATE:
	Trans Crack			0 0		/ /
DISTRESS	10	3	1	11	-	SHOULDER: Y 🔀 N
CODE	35 L 16 L	22 M	3 M 1 H	9 M 18 M		drainage: y 🗌 n 🔀
	25 M 15 L		6 M 3 L			PHOTOGRAPH .jpg
	13 L 15 L 17 L 2.5 M 3 L					1255 1257 1258 1259 1260
	114	22	3 9 1	27		$m \scriptstyle \scriptstyle$
	Γ:	a konstanten sota a parti 64		IBA	5	
					Arr	

PMMS FOR EM		r condii	TION SURVE	Y SHEET		SHEET NO. 4	5
BRANCHN	DATE: 191 61	2012					
SECTION I		INSPECTOR: By	<u></u>				
FROM:	52		TO:	48	8	FUNCTIONAL	CLASS
SECTION I	ENGTH: 3		SECTION V		7	Primary	
	SUR	FACE DIS	STRESS TY	PE		TRAFFIC FLOW:	
 Alligator Bleeding S Block Cra Bumps an Corrugati Depression 	acking Sq m ad Sags m on Sq m	1	 Patching & Polished Potholes Railroad Rutting S Shoving 	Aggregate S Count Crossing Sq Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE AC PCC LAST CONSTRUC DATE: 14/7/	AAC TION	
7. Edge Cra			17. Slippage		ı m		0.00
	tion Cracking	m	18. Swell Sq		1	MAINTENANCE: Y	N 🗌
	ulder Drop Of		19. Weatheri		Sam	MAINTENANCE D	
	Trans Crackir		19. Weather	ing/itavening	5 9 m	14161	2012
DISTRESS CODE		<i>D</i>	I	6		SHOULDER: Y 🔀] N []
	0.8L 3.5L	1.5L 5L	10 H 12 M	15 H 10 M		DRAINAGE: Y 🔀] n []
	8.5 M 7 H	-	1 L 2.5 M			PHOTOGRAF	PH .jpg
	23 M 2 L		20 M 15 L			1261	
	and the second sec		12 -			1262	
	3.5 H 10 L					1263	
	17 L 12 L 23 L			e e		1265 1266 1267 1268	
	80 31.5	6.5	1 6 34.5	\D		2	S
COMMENT	3.5		\0	15		٤	
					111/1/11		1111111111

PMM5 FOR EM	U CAMPUS PAVEMEN	T CONDI	TION SURV	EY SHEET	SHEET NO. 46
BRANCHN	ST DATE: 1916/2012				
SECTION I	D: SP04	INSPECTOR: Byyar A.			
FROM:	48		TO:	49	FUNCTIONAL CLASS
SECTION I	LENGTH:	197	SECTION	WIDTH: 10	Primary
	SUF	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding Block Cra Bumps and Corrugation Depression Edge Cra Jt. Reflect Lane/Shoo 	Cracking Sq Sq m acking Sq m ad Sags m ion Sq m on Sq m	m ; m ff m	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 		TWO DIRECTIONSURFACE TYPE:ACPCCAACLAST CONSTRUCTIONDATE: 221 71 1995 MAINTENANCE:YNX
DISTRESS	10	١	11	13	SHOULDER: Y 📉 N
CODE	20 L 7 L	20 M 8L	31	1 H 2 L	DRAINAGE: Y 🛛 N 🗌
		5 H 7 L 10 M		1 M	PHOTOGRAPH .jpg 12 69 12 71
					1273 1274 1275 1276
TOTAL SEVERITY T S	27L	15 30 5	3	2	m $\overleftarrow{\xi}$
COMMENT	C:				

PMMS FOR EMU		T CONDI	TION SUR	VEY SHEET		SHEET NO. 47
BRANCH N	IAME: SPO	ORT STR.	EET	BRANCH	ID: SPST	DATE: 19/6/2012
SECTION ID: $SPO3$ NO. OF LANES: 2						INSPECTOR: Bryour A.
FROM:	48		TO:	L	15	FUNCTIONAL CLASS
SECTION L	ENGTH: /	57	SECTION	WIDTH:	6.6	Primary
-	SUR	FACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugation Depression Edge Crac 	Cracking Sq 1 Sq m Icking Sq m Id Sags m In Sq m In Sq m	n	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $ 3 \neq 1 \mid 995$ MAINTENANCE: Y \square N
	ulder Drop O			ering/Ravellir	ng Sq m	MAINTENANCE DATE: 21/5/2012
	Trans Cracki					21 1 3 12012
DISTRESS CODE	11)				SHOULDER: Y N
CODL	9 L 1.5 L	0.8L 8L				DRAINAGE: Y 🔀 N 🗌
	4 L 3.5 L	21 M				PHOTOGRAPH .jpg
	37 L 15 M 15 L	1 L 8.5 M 6 L 4 L				1277 1278 1279 1280 1281
	70 15	14.8 29.5				S
COMMENT		2			k	11110
	<u> </u>	3				

PMMS FOR EM		IT CONDI	TION SURV	VEY SHEET	SHEET NO. 48
BRANCHN	NAME: SP	PST DATE: 19/6/2012			
SECTION I	D: SPE	INSPECTOR: Bryar A.			
FROM:	43	FUNCTIONAL CLASS			
SECTION I	LENGTH:	354	SECTION	WIDTH: 6,6	Primary
	SUF	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding 1 Block Cra Bumps ar Corrugati Depression Edge Crainer Jt. Reflect Lane/Sho 	acking Sq m ad Sags m ion Sq m on Sq m	g m bff m	 Polishe Pothole Railroa Rutting Shovin Slippa Swell S 	ad Crossing Sq m g Sq m g Sq m ge Cracking Sq m	TWO DIRECTION \boxtimes SURFACE TYPE:ACACPCCAACLAST CONSTRUCTIONDATE: $ 3/7/1995$ MAINTENANCE:YN
DISTRESS	11	1	3	10	SHOULDER: Y N
CODE	12 L 2.5 H	14 L 8 M	19L	20 L 5 M	DRAINAGE: Y N
	10 M 33 L	2 H		5 11	PHOTOGRAPH .jpg
	5 L 15 H 4 H				1282
	2 M				12834
TOTAL SEVERITY T SE	55	14	25	20	
SEVERI	12 21.5	8		5	Z C S S S S S S S S S S S S S S S S S S
COMMENT					
		27/2	<u>ezza</u> 7) ₁₂₂₃		

J CAMPUS PAVEMEN	T CONDIT	TION SURV	EY SHEET		SHEET NO. 49
IAME: SPOR	T STRE	FET	BRANCH II	D: SPST	DATE: 20/ 6/2012
D: SPa	o/	NO. OF LA	NES:		INSPECTOR: Bryar A
25	-	TO:			FUNCTIONAL CLASS
ENGTH:	97	SECTION	WIDTH: 7	Z. 8	Primary
SUR	FACE DIS	STRESS TY			TRAFFIC FLOW:
Cracking Sq n Sq m ucking Sq m ad Sags m on Sq m on Sq m cking m tion Cracking ulder Drop O	n m ff m	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 14/ 8/2003 MAINTENANCE: Y NM MAINTENANCE DATE: / /
		11	1		SHOULDER: Y N
3.5L	3.5 M	9 L	2.5 M		DRAINAGE: Y
5 6					PHOTOGRAPH .jpg
					12 <i>86</i> 1287 1288 1289
8,5	3.5	9	2.5		\leftrightarrow
This see	flon is ro	und about a	closer to L	ala Mus	tula pasha Hall.
(c c c c c c c c c c c c c c c c c c c)]			
	PAVEMEN IAME: $SPOR$ D: SPC 25 ENGTH: SUR Cracking Sq m d Sags m on Sq m n Sq m cking m cion Cracking ulder Drop O Trans Cracking ulder Drop O Trans Cracking 10 3,5L 5L 5L 5K 8,5	PAVEMENT CONDITION TAME: SPORT STRE D: SPO/ 2.5 ENGTH: 97 SURFACE DIS Cracking Sq m Sq m toking Sq m d Sags m on Sq m n Sq m tion Cracking m udder Drop Off m Trans Cracking m 10 4 3.5L $3.5M5L5L5L5L55555555$	PAVEMENT CONDITION SURVATION SURVATION SURVATION SURVATION STREETIAME: SPORT STREETD: $SPORT STREETD: SPORT STREETCONSTRESS TOSURFACE DISTRESS TYCracking Sq m11. Patching &12. PolishedCracking Sq m11. Patching &12. PolishedCracking Sq m11. Patching &12. PolishedCracking Sq m13. Potholes14. RailroadOn Sq m15. Rutting16. ShovingCracking m16. Shoving19. WeatherTrans Cracking m10. 10. 10. 10. 10. 10. 10. 10. 10. 10. $	PAVEMENT CONDITION SURVEY SHEETIAME: SPORT STREETBRANCH IIIAME: SPORT STREET2.5TO:SECTION WIDTH: 7SECTION WIDTH: 7SURFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut PatchinSQUEFACE DISTRESS TYPECracking Sq m11. Patching & Util Cut PatchinSection WIDTH: 7SURFACE DISTRESS TYPECracking Sq m10. Patching & Util Cut PatchinSection Aggregate SI. Patching & Util Cut PatchinSq n1. Patching & Util Cut PatchinSection Sq m1. Patching & Q m1. Patching & Q mIS Rutting Sq mIS Rutting Sq mIS Soving SqIS Soving SqIS Soving SqIS Soving SqIS Soving SqIS Soving Sq <t< td=""><td>PAVEMENT CONDITION SURVEY SHEETBRANCH ID: SPSTIAME: SPORT STREETBRANCH ID: SPSTD: $SPOI$NO. OF LANES:2.5TO:SECTION WIDTH: 7,8SURFACE DISTRESS TYPECracking Sq m10. Patching & Util Cut Patching SqmSQRFACE DISTRESS TYPECracking Sq mSURFACE DISTRESS TYPECracking Sq mSURFACE DISTRESS TYPECracking Sq m10. Potholes Count14. Railroad Crossing Sq mSolution Sq mSolution Sq m16. Shoving Sq mSolution Cracking m16. Shoving Sq mNo. Off MTans Cracking mIS $SSM 9 L 25M$S LImage: Cracking Sq mImage: Cracking Sq m<t< td=""></t<></td></t<>	PAVEMENT CONDITION SURVEY SHEETBRANCH ID: SPSTIAME: SPORT STREETBRANCH ID: SPSTD: $SPOI$ NO. OF LANES:2.5TO:SECTION WIDTH: 7,8SURFACE DISTRESS TYPECracking Sq m10. Patching & Util Cut Patching SqmSQRFACE DISTRESS TYPECracking Sq mSURFACE DISTRESS TYPECracking Sq mSURFACE DISTRESS TYPECracking Sq m10. Potholes Count14. Railroad Crossing Sq mSolution Sq mSolution Sq m16. Shoving Sq mSolution Cracking m16. Shoving Sq mNo. Off MTans Cracking mIS $SSM 9 L 25M$ S LImage: Cracking Sq mImage: Cracking Sq m <t< td=""></t<>

PMMS FOR EM		IT CONDII	TION SURV	YEY SHEET		SHEET NO. 50
BRANCHN	DATE: 20/ 6/2012					
SECTION I	D: ACA 0.	INSPECTOR: Bry ar A.				
FROM:	30		FUNCTIONAL CLASS			
SECTION I	LENGTH:	124	SECTION	WIDTH: 8	8.5	Primary
	SUR	FACE DIS	STRESS T			TRAFFIC FLOW:
 Bleeding Block Cra Bumps ar Corrugati Depressic Edge Cra Jt. Reflec Lane/Sho 	Cracking Sq Sq m acking Sq m ad Sags m aon Sq m on Sq m	m ; m ff m	 STRESS TYPE 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			IRAFFIC FLOW: ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: $8 / 8 / 2 \infty^3$ MAINTENANCE: Y N MAINTENANCE DATE: $1 / 2 / 6 / 2 o / 2$
DISTRESS	1	11	10	3		SHOULDER: Y 📈 N
CODE	4 H 1.5 M	30 L 10.5 L	11 L 7.5 L	20 L		
	1.5 M 4 H	24 L 4 L 2 M				PHOTOGRAPH .jpg
	28 H 4 M 24 M 15 M 6 M 2,2 H	20 M 24 L 7.5 L 8 M 8 L				1291 1292 1293 1294 1297 1298 1302 1302
TOTAL SEVERITY H	52 38,2	108 30	18	20		$S \stackrel{\tilde{\xi}}{\longleftrightarrow} \infty$
			P			

PMMS FOR EMU CAMP PAV		T CONDI	TION SURV	/EY SHEET		SHEET NO. 51	
BRANCH NAME	: Sout	TH STR	EET	BRANCH	ID: SST	DATE: 20/ 6/2012	
SECTION ID:	Soe	3	NO. OF L	ANES:	2	INSPECTOR: Bryav A.	
FROM:	TROM: 16 TO: 8						
SECTION LENG	TH:	57	SECTION	WIDTH:	9	Primary	
		- 1.	I STRESS T	YPE	/	TRAFFIC FLOW:	
1. Alligator Crack			1	& Util Cut Patch	ing Sqm	ONE DIRECTION	
2. Bleeding Sq m				d Aggregate		TWO DIRECTION	
3. Block Cracking	Sqm		13. Pothole			SURFACE TYPE:	
4. Bumps and Sag	State of the state		14. Railroa	d Crossing S	qm		
5. Corrugation Sq			15. Rutting			LAST CONSTRUCTION	
6. Depression Sq 1			16. Shovin			DATE: 1 / 7/1992	
7. Edge Cracking				ge Cracking S	Sq m	A	
8. Jt. Reflection C		m	18. Swell S		-	MAINTENANCE: Y N	
9. Lane/Shoulder			19. Weath	ering/Ravellin	ng Sq m	MAINTENANCE DATE: 14 1 6 12012	
10. Long & Trans				74		19 10 12012	
DISTRESS)	11				SHOULDER: Y 🔀 N	
CODE	5 M	65M					
2	IM	38 L				DRAINAGE: Y 🗌 N 🔀	
6		32 M					
	YM	GOL			-	PHOTOGRAPH .jpg	
15		110 L				12.11	
	7-1					1304	
		58L				- 1305	
-		57L				1307	
						1308	
JÈ L	-	323				m	
SEVER F	52	97				$\leq \Leftrightarrow \circ$	
COMMENT:							
	P				D	2 4 6	
	F						
-H-	-2	T-\$		A-A-			
	K			G A	K		
\leq	C						
X	1/	1					

	PAVEMEN	T CONDI	TION SURV	EY SHEET	SHEET NO. 52
BRANCH N	AME: SC	DATE: 20/ 6/20/2			
SECTION II	D: 507	INSPECTOR: Bryan			
FROM:	8	FUNCTIONAL CLAS			
SECTION L	ENGTH:	60	SECTION	WIDTH: 8.5	Primary
	SUR	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugation Depression Edge Crack Jt. Reflect Lane/Shot 	Cracking Sq 1 Sq m cking Sq m d Sags m on Sq m n Sq m	n m ff m	11. Patching & 12. Polishe 13. Pothole 14. Railroa 15. Rutting 16. Shovin 17. Slippag 18. Swell S	& Util Cut Patching Sqm d Aggregate Sq m es Count d Crossing Sq m g Sq m g Sq m ge Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 1 / 7/ 1992 MAINTENANCE: Y NE MAINTENANCE DATE: / /
DISTRESS	17	13	1		SHOULDER: Y 🔀 N
CODE	35 M 56 L	L L	7 L 7.5 L		DRAINAGE: Y 🛛 N
	30 L	I M	8.5 M 30 M		PHOTOGRAPH .jpg
			5 M		1309
					1310
					1311
			2		1312
JÈ L	56	2	14.5		173
TOTAL SEVERIT	35	1	43.5		$\sum \longleftrightarrow \infty$
COMMENT	:				
	00				

PMMS FOR EMU		IT CONDI	TION SURV	YEY SHEET	SHEET NO. 53
BRANCH N	AME: SOU	DATE: 20/ 6/2012			
SECTION II	D: 505	INSPECTOR: Bryar A			
FROM:	8	FUNCTIONAL CLASS			
SECTION L	ENGTH:	213	SECTION	WIDTH: 9	Secondary
	SUF	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
1. Alligator (Cracking Sq	m	11. Patching	& Util Cut Patching Sqm	ONE DIRECTION
2. Bleeding S			12. Polishe	d Aggregate Sq m	TWO DIRECTION
3. Block Cra	cking Sq m		13. Pothole		SURFACE TYPE:
4. Bumps an	d Sags m			nd Crossing Sq m	
5. Corrugatio			15. Rutting		LAST CONSTRUCTION
6. Depression			16. Shovin		DATE: 2/18/1995
7. Edge Crac	· · · · · · · · · · · · · · · · · · ·			ge Cracking Sq m	MAINTENANCE: Y 🛛 N
8. Jt. Reflect	-		18. Swell S		MAINTENANCE DATE:
9. Lane/Shou			19. Weath	ering/Ravelling Sq m	14/6/2012
10. Long & '	Frans Crack	ing m			
DISTRESS CODE	1	15	3		SHOULDER: Y N
CODE	3 M	26 L	4 M		
	211	14 L			DRAINAGE: Y 🗌 N 🔀
		I H			
					PHOTOGRAPH .jpg
		<u>8 H</u>			12.12
					1313
					1314
					1315
					1316
			-		1317
					1318
					1319
					120
JE L		40			2
M RERU	7		11		
02	2	-	4		
H %		9			S.
COMMENT	:				
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	KI				
	KI				
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PMMS FOR EMU CAMPUS PAVEMENT CON	DITION SUR	VEY SHEET	SHEET NO. 54	
BRANCH NAME: SOUTH S	DATE: 20/ 6/2012			
SECTION ID: SO4	NO. OF L	ANES: 2	INSPECTOR: Bryar A.	
FROM: \0	TO:	9	FUNCTIONAL CLASS	
SECTION LENGTH: 98	SECTION	WIDTH: 9	Secondary	
SURFACE	DISTRESS 7	TYPE	TRAFFIC FLOW:	
 Alligator Cracking Sq m Bleeding Sq m Block Cracking Sq m Bumps and Sags m Corrugation Sq m Depression Sq m Edge Cracking m Jt. Reflection Cracking m Lane/Shoulder Drop Off m Long & Trans Cracking m 	 Patching Polish Polish Pothol Railro Ruttin Shovir Shovir Slippa Swell 	& Util Cut Patching Sqm ed Aggregate Sq m les Count ad Crossing Sq m g Sq m ng Sq m ge Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: Ø MAINTENANCE: Y NX	
DISTRESS CODE			SHOULDER: Y N	
			DRAINAGE: Y 🗌 N 🔀	
			1320	
TOTAL SEVERITY T			$\leq \stackrel{\circ}{\longleftrightarrow} \mu$	
COMMENT:				

PMMS FOR EM		T CONDI	TION SURV	YEY SHEET	SHEET NO. 55
BRANCH	NAME: SOU	T DATE: 20/6/2012			
SECTION I	D: 803		NO. OF LA	ANES: 2	INSPECTOR: Bryar A.
FROM:	9		TO:	14	FUNCTIONAL CLASS
SECTION I	LENGTH:	84	SECTION	WIDTH: 8.6	Secondary
	SUR	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding Block Crive Bumps and Corrugation Depression Edge Crave Jt. Reflect Lane/Short 	Cracking Sq n Sq m acking Sq m nd Sags m ion Sq m on Sq m	m ; m ff m	11. Patching 12. Polishe 13. Pothole 14. Railroa 15. Rutting 16. Shovin 17. Slippag 18. Swell S	& Util Cut Patching Sqm ed Aggregate Sq m es Count ad Crossing Sq m g Sq m g Sq m ge Cracking Sq m	ONE DIRECTION TWO DIRECTION SURFACE TYPE: AC PCC AAC LAST CONSTRUCTION DATE: 151 & 1995 MAINTENANCE: Y N MAINTENANCE DATE: 1 1
DISTRESS		10	13	1	SHOULDER: Y N
CODE	1	0.11		<u>+</u>	
	0.8 M	1.8 H	1 H		DRAINAGE: Y 🛛 N 🗌
		10 11			PHOTOGRAPH .jpg
					1321 1322 1323 1324
TOTAL SEVERITY H	2.8	10.8	1		

PMMS FOR EMI	J CAMPUS PAVEMENT CO	ONDITION SUR	VEY SHEET	SHEET NO. 56
BRANCH N	DATE: 20/6/2012			
SECTION I	INSPECTOR: Bryour A.			
FROM:	7	FUNCTIONAL CLASS		
SECTION L	ENGTH: 70	SECTION	N WIDTH: 8.6	Secondary
	SURFAC	E DISTRESS	ГҮРЕ	TRAFFIC FLOW:
1. Alligator	Cracking Sq m	11. Patching	g & Util Cut Patching Sqm	ONE DIRECTION
2. Bleeding S			ed Aggregate Sq m	TWO DIRECTION
3. Block Cra	icking Sq m	13. Potho	les Count	SURFACE TYPE:
4. Bumps an	d Sags m	14. Railro	oad Crossing Sq m	
5. Corrugati	on Sq m	15. Ruttir	ng Sq m	LAST CONSTRUCTION
6. Depressio	n Sq m	16. Shovi	- Contract Contract Contract	DATE: 151 81 1995
7. Edge Crac	cking m		age Cracking Sq m	MAINTENANCE: Y D N
	tion Cracking m	18. Swell	*	MAINTENANCE DATE:
	ulder Drop Off m	Alexandre 10, 10, 100 (1990)	hering/Ravelling Sq m	MAINTENANCE DATE.
	Trans Cracking m			-
DISTRESS	11			SHOULDER: Y X N
CODE				
	8 H			DRAINAGE: Y 🛛 N 🗌
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PMMS FOR EM		NT CONDI	TION SURV	VEY SHEET		SHEET NO. 57
BRANCH	NAME: SO	NAME AND ADDRESS OF ADDRESS		BRANCH II	D: SST	DATE: 20/ 6/2012
SECTION	D: 50/		NO. OF L	ANES:	2	INSPECTOR: Bry or A.
FROM:	1	13	TO:	6		FUNCTIONAL CLASS
SECTION	LENGTH:	138	SECTION	WIDTH:	6	Secondary
	SUI	RFACE DI	STRESS T	YPE		TRAFFIC FLOW:
 Bleeding Block Cr Bumps at Corrugat Depression Edge Crassion Jt. Reflect Lane/Shot 	Cracking Sq Sq m acking Sq m nd Sags m ion Sq m on Sq m	m g m Dff m	 Patching Polishe Polishe Pothole Railroa Rutting Shovin Shovin Slippa Swell S 	& Util Cut Patchin ed Aggregate S es Count ad Crossing Sq g Sq m ng Sq m ge Cracking Sq	ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $20 / 7 / 2\infty$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: / /	
DISTRESS	11					SHOULDER: Y 🕅 N
CODE	40 H					
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						1327
						1328 1329 1330
	40					Z C S
COMMENT	1.1					-
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PMMS FOR EMU CAMPUS PAVEMENT CONDITION SURVEY SHEET SHEET NO. 58								
BRANCH N	IAME: PARK	ING OF	cc	BRANCH II	D: PCC	DATE: 20/6/2012		
SECTION I	D: PCC 0	/	NO. OF LAI	VES:		INSPECTOR: Bryar A.		
FROM:			TO:			FUNCTIONAL CLASS		
SECTION L	ENGTH:	58	SECTION V	IDTH: 2	1.6			
	La contra tra		STRESS TY			TRAFFIC FLOW:		
 Bleeding S Block Cra Bumps and Corrugati Depression Edge Craw Jt. Reflect Lane/Sho Long & 	acking Sq m ad Sags m on Sq m n Sq m	g m off m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \Box PCC \Box AAC \Box LAST CONSTRUCTION DATE: $6 \mid 8 \mid 1992$ MAINTENANCE: Y \Box N \Box MAINTENANCE DATE: \mid \mid		
DISTRESS CODE	13	1	11	10	Ц	SHOULDER: Y 📉 N		
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TOTAL SEVERITY T	4	4.5	Β	88	18	$\langle \downarrow \rangle$		
COMMENT	2							
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	SHEET NO. 59				
BRANCHN	AME: PARK	ING-OF	RECTOR	BRANCH ID: PRECT	DATE: 20/ 6/2012
SECTION II	PRECTO	1	NO. OF L	ANES:	INSPECTOR: Bryar A
FROM:			TO:		FUNCTIONAL CLAS
SECTION L	ENGTH:	40	SECTION	WIDTH: 28	
	SUR	FACE DI	STRESS T	YPE	TRAFFIC FLOW:
1. Alligator C				& Util Cut Patching Sqm	ONE DIRECTION
2. Bleeding S			1 0.00 C C C C C C C C C C C C C C C C C	d Aggregate Sq m	TWO DIRECTION
3. Block Cra			13. Pothole		SURFACE TYPE:
4. Bumps and			14. Railroa	ad Crossing Sq m	
5. Corrugatio			15. Rutting		LAST CONSTRUCTION
6. Depression	-		16. Shovin		DATE: 418 1 1989
7. Edge Crac				ge Cracking Sq m	
8. Jt. Reflecti		m	18. Swell S		MAINTENANCE: Y 🗌 N
9. Lane/Shou				ering/Ravelling Sq m	MAINTENANCE DATE:
10. Long & 1					1 /
DISTRESS		10	.3		SHOULDER: Y 🔀 N
CODE	2 H	100 L	30 L		
ŀ	12 L	100 L	50 -	-	DRAINAGE: Y 🗌 N 🖄
	1.				PHOTOGRAPH .jp
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TOTAI SEVERJ					$\langle \rangle$
F S H	24				
COMMENT					
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PMMS FOR EMU	SHEET NO. 60					
BRANCH N	DATE: 20/ 6/2012					
SECTION ID: PMECHOI NO. OF LANES:						INSPECTOR: Bryan A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	56	SECTION V	WIDTH:	12.8	
	SUR	FACE DI	STRESS TY	PE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $2 1 g 1 g g^2$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: / /
DISTRESS CODE	11					SHOULDER: Y N
CODE	3.6 L U M					DRAINAGE: Y 🔀 N 🗌
	4.5 M					PHOTOGRAPH .jpg
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	3.6 8.5					\leftrightarrow
COMMENT	7:					
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PMMS FOR EM	SHEET NO. 61				
BRANCH	NAME: PARK		DPT	BRANCH ID: F	
SECTION I	D: PIT a	51	NO. OF LA	NES:	INSPECTOR: Bryar A.
FROM:		_	TO:		FUNCTIONAL CLASS
SECTION	LENGTH:	39	SECTION V	WIDTH: 17,	5
	SUF	FACE DIS	STRESS TY	PE	TRAFFIC FLOW:
 Bleeding Block Cr Bumps at Corrugat Depression Edge Crassion Jt. Reflect Lane/Shot Long & 	Cracking Sq Sq m acking Sq m nd Sags m ion Sq m on Sq m	m g m þff m	 Patching & Polished Potholes Potholes Railroad Rutting Shoving Slippage Swell So 	Util Cut Patching Sq Aggregate Sq m Count Crossing Sq m Sq m Sq m cracking Sq m	TWO DIRECTIONSURFACE TYPE:ACPCCAACLAST CONSTRUCTIONDATE:231 ℓ MAINTENANCE:YNMAINTENANCE DATE:/
DISTRESS CODE	11	10	3	19	SHOULDER: Y 🔀 N
CODE	22 L 3 L	5 L 22 L	40L	30 L	DRAINAGE: Y 🗌 N 🔀
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					368 1369 1370 1371
	25	27	40	30	
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						SHEET NO. 62
BRANCH	NAME: PAR	KINGOF	REGISTER	BRANCH ID	DATE: 20/6/2012	
SECTION	D: PREG	ISTO	NO. OF LA	NES:	INSPECTOR:	
FROM:			TO:			FUNCTIONAL CLAS
SECTION	LENGTH:	42	SECTION	WIDTH: 17		
	SU	RFACE D	ISTRESS TY	(PE		TRAFFIC FLOW:
1. Alligator	Cracking Sq	m		: Util Cut Patching		ONE DIRECTION
2. Bleeding				l Aggregate So	l m	TWO DIRECTION
	acking Sq m		13. Potholes			SURFACE TYPE:
4. Bumps a				l Crossing Sq	m	
5. Corrugat	-		15. Rutting			LAST CONSTRUCTION
6. Depressi			16. Shoving			DATE: 14/7/2001
7. Edge Cra	The second s			e Cracking Sq	ш	MAINTENANCE: Y 🗌 N
	ction Crackin		18. Swell S	q m ring/Ravelling	Sam	MAINTENANCE DATE:
	oulder Drop (Trans Crack		19. weather	mg/ Kavennig	54 m	1 1
DISTRESS						
CODE					_	SHOULDER: Y N
			-			DRAINAGE: Y N
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COMMEN	T:					
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PMMS FOR EM		IT CONDII	TON SURV	YEY SHEET		SHEET NO. 63
BRANCHN	NAME: PAR	KING OF LI	BRARY	BRANCH II	D: PLIB	DATE: 20/6/2012
SECTION I	D: PLIBO	/	NO. OF LA	ANES:		INSPECTOR:
FROM:			TO:			FUNCTIONAL CLASS
SECTION I	LENGTH:	145	SECTION	WIDTH: 5	5.7	
		RFACE DIS				TRAFFIC FLOW:
 Bleeding Block Cra Bumps and Corrugation Depression Edge Cra Jt. Reflect 	acking Sq m nd Sags m ion Sq m on Sq m	g m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $ g g 995$ MAINTENANCE: Y \square N \square MAINTENANCE Y \square N \square
	Trans Crack				5-1	
DISTRESS CODE	13	1	11			SHOULDER: Y N
CODL	H H	1.5L	8 M			DRAINAGE: Y 🗌 N 🔀
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PMMS FOR	EMU		JT CONDIT	TON SURVE	EY SHEET		SHEET NO. 64	
BRANC	ΗN	DATE: 20/6/2012						
SECTIO	N IJ	D: PACTI	V21	NO. OF LA	NES:		INSPECTOR: BryarA.	
FROM:				TO:			FUNCTIONAL CLASS	
SECTIO	NL	ENGTH:	59	SECTION V	VIDTH:	23		
	_	SUI	RFACE DIS	STRESS TY	PE		TRAFFIC FLOW:	
1. Alliga	tor (Cracking Sq	m	11. Patching &	Util Cut Patchi	ng Sqm	ONE DIRECTION	
2. Bleedi				12. Polished	Aggregate S	Sq m	TWO DIRECTION	
3. Block	Cra	cking Sq m		13. Potholes	Count		SURFACE TYPE:	
4. Bump	s an	d Sags m		14. Railroad	Crossing So	q m	AC 🛛 PCC 🗌 AAC 🗌	
5. Corru	gati	on Sq m		15. Rutting	Sq m		LAST CONSTRUCTION	
6. Depre	ssio	n Sq m		16. Shoving	Sq m		DATE: 271 7-1 2003	
7. Edge	Crac	king m		17. Slippage	Cracking S	qm	MAINTENANCE: Y N	
8. Jt. Re	flect	ion Cracking	g m	18. Swell Sc			MAINTENANCE: Y	
9. Lane/	Sho	lder Drop C	Off m	19. Weather	ing/Ravelling	g Sq m	MAINTENANCE DATE:	
10. Long	&	Trans Crack	ing m					
DISTRE	SS						SHOULDER: Y 🔀 N	
CODE								
							DRAINAGE: Y 🔀 N 🗌	
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PMMS FOR EM	SHEET NO. 65					
BRANCHN			ACTIVITY CI		D: PACTIVI	DATE: 2/16/2012
	D: PAC		NO. OF LA			INSPECTOR: Bryar A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION I	ENGTH:	53	SECTION V	WIDTH: 3	30	
			STRESS TY	PE		TRAFFIC FLOW:
 Bleeding 1 Block Cra Bumps ar Corrugati Depression Edge Cra Jt. Reflect Lane/Sho Long & 	acking Sq m ad Sags m on Sq m on Sq m	g m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION
DISTRESS CODE	11	4	1.3	6	19	SHOULDER: Y N
	17M 4L	21L	1L 3L	55 L	25 M	DRAINAGE: Y 🗌 N 🗌
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COMMENT	Γ:	_				
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PMMS FOR EMU	SHEET NO. 66					
BRANCH N			TON SURVE		D: PSERV	DATE: 21/6/2012
SECTION I	D: PSERV	01	NO. OF LANES:			INSPECTOR: Bryar A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	318	SECTION V	WIDTH:	2.6	
	SUF	FACE DIS	STRESS TY	PE		TRAFFIC FLOW:
 Bleeding S Block Cra Block Cra Bumps an Corrugati Depression Edge Craat Jt. Reflect Lane/Shot Long & 	Cracking Sq Sq m acking Sq m d Sags m on Sq m n Sq m	m g m 9ff m	 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: 27171200 MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: 1
DISTRESS CODE	11	4				SHOULDER: Y N
CODE	12 M 15 M	3 M				DRAINAGE: Y 🗌 N 🔀
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						1396 1397
TOTAL SEVERITY	27	3				$\langle \uparrow \rangle$
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PMMS FOR	EMU			TION SURV	EV SHEET		SHEET NO. 67
BRANC	ΗN	Provide the second of the seco			1	D:PSARAN	DATE:21/6/2012
		D: PSABA		NO. OF LA		1-1-44	INSPECTOR: Bryour A.
	1111		M				FUNCTIONAL CLASS
FROM:				TO:		2.0	
SECTIO	NL	ENGTH:	114	SECTION		22	
		12112		STRESS TY			TRAFFIC FLOW:
		Cracking Sq	m		Util Cut Patch		ONE DIRECTION
2. Bleedi				12. Polished 13. Potholes	Aggregate S	sqm	
		cking Sq m			d Crossing S	am	SURFACE TYPE:
		d Sags m		15. Rutting	a de la companya de l	qm	AC PCC AAC
5. Corru 6. Depre				16. Shoving			DATE: 16/8/1992
7. Edge				07	e Cracking S	am	DAIL. 101 0 1 . JJC
		ion Cracking		18. Swell S		iq m	MAINTENANCE: Y \Box N
		ilder Drop C		CONTRACT CONTRACTOR CONTRACTOR CONTRACTOR	ring/Ravellin	ng Sa m	MAINTENANCE DATE:
		Trans Crack		1). Weather	mg/reavenin	6 0 q m	1 1
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		6 M	—				DRAINAGE: Y N N
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PMMS FOR EMI	J CAMPUS PAVEMEN	SHEET NO. 68				
						DATE: 21/6/2012
SECTION I	D: PPOST	01	NO. OF LANES:			INSPECTOR: Bryar A,
FROM:	FROM:					FUNCTIONAL CLASS
SECTION I	ENGTH:	232	SECTION	VIDTH: /	4.8	
	SUF	FACE DIS	STRESS TY	TPE		TRAFFIC FLOW:
SURFACE DIS 1. Alligator Cracking Sq m 2. Bleeding Sq m 3. Block Cracking Sq m 4. Bumps and Sags m 5. Corrugation Sq m 6. Depression Sq m 7. Edge Cracking m 8. Jt. Reflection Cracking m 9. Lane/Shoulder Drop Off m 10. Long & Trans Cracking m			 11. Patching & Util Cut Patching Sqm 12. Polished Aggregate Sq m 13. Potholes Count 14. Railroad Crossing Sq m 15. Rutting Sq m 16. Shoving Sq m 17. Slippage Cracking Sq m 18. Swell Sq m 19. Weathering/Ravelling Sq m 			ONE DIRECTION \square TWO DIRECTION \square SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $13 8 1992$ MAINTENANCE: Y \square N \square MAINTENANCE DATE:
DISTRESS	10				1	SHOULDER: Y N
CODE	30 L	4 M				DRAINAGE: Y N
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	30	4				$\langle \uparrow \rangle$
COMMENT	Γ:					
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PMMS FOR EMU		T CONDII	TION SURV	EY SHEET		SHEET NO. 69
BRANCH N	AME: PAR	THE OF B	SUSENESS	BRANCH ID:	PBUSIN	DATE: 21 / 6 / 20 12
SECTION II	D: PBUSI	NOI	NO. OF LANES:			INSPECTOR: Bryar A
FROM:			TO:			FUNCTIONAL CLAS
SECTION L	ENGTH:	132	SECTION	WIDTH: 2	2	
	SUR	FACE DIS	STRESS TY	(PE		TRAFFIC FLOW:
1. Alligator (Cracking Sq 1	n	11. Patching &	Util Cut Patching	Sqm	ONE DIRECTION
2. Bleeding S			12. Polished	l Aggregate Sq	m	TWO DIRECTION
3. Block Cra	cking Sq m		13. Potholes	s Count		SURFACE TYPE:
4. Bumps an	d Sags m		14. Railroad	d Crossing Sq n	n	AC PCC AAC
5. Corrugatio	on Sq m		15. Rutting	Sqm		LAST CONSTRUCTION
6. Depression	n Sq m		16. Shoving			DATE: 21811992
7. Edge Crac	king m		17. Slippag	e Cracking Sq 1	n	MAINTENANCE: Y I N
8. Jt. Reflect	ion Cracking	m	18. Swell S			MAINTENANCE DATE:
	ulder Drop O		19. Weather	ring/Ravelling S	Sq m	
	Trans Cracki	ng m				
DISTRESS CODE	11	10	.3	13		SHOULDER: Y 🛛 N
	50M	150 L	40 L	3 L		DRAINAGE: Y 🛛 N
	5.6 M	20 L	45 L	5 H		
	26 M			2 M		PHOTOGRAPH .jpg
	1.5 L					January Street
	8 L					1405
						1406
						1407
						1408
						1409
						1410
						1411
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PMMS FOR	EMU		IT CONDIT	TON SURV	EY SHEET		SHEET NO. 70
BRANCI	HN	AME: PAR				D: PEMC	DATE:2/16/2012
		D: PEMO		NO. OF LANES:			INSPECTOR: Bryar A.
FROM:	FROM:			TO:			FUNCTIONAL CLASS
SECTIO	NL	ENGTH:	424	SECTION '	WIDTH: 1	5	
		SUR	FACE DIS	STRESS TY	(PE	_	TRAFFIC FLOW:
		Cracking Sq	m	0.547	Util Cut Patchi		ONE DIRECTION
2. Bleedi	-			12. Polished	Aggregate S	sq m	TWO DIRECTION
		cking Sq m		The second second second	d Crossing So	1 m	SURFACE TYPE:
4. Bumps				14. Railload	-	4 m	AC PCC AAC
5. Corrug 6. Depres	- C - C - C - C - C - C - C - C - C - C			16. Shoving			DATE: 19/8/1995
7. Edge C					e Cracking So	a m	DATE: 1978 1 1995
		ion Cracking		18. Swell S		9 m	MAINTENANCE: Y 🗌 N
		ilder Drop O			ring/Ravelling	a Sa m	MAINTENANCE DATE:
		Trans Crack		15. Weather	ing ravening	5 0q m	
DISTRES			ing m			1	
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PMMS FOR EMU	CAMPUS PAVEMEN		SHEET NO. 7/			
BRANCH N	DATE: 21/6/2012					
SECTION II	D: PLALA	01	NO. OF LANES:			INSPECTOR: Bryar A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH: 6	15.5	SECTION V	WIDTH:	12	
			STRESS TY			TRAFFIC FLOW:
 Bleeding S Block Cra Block Cra Bumps an Corrugation Depression Edge Crace Jt. Reflect Lane/Shou Long & 	cking Sq m d Sags m on Sq m n Sq m	m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: 13171995 MAINTENANCE: Y \square N \square MAINTENANCE DATE: 1
DISTRESS CODE	17	19	3			SHOULDER: Y 🛛 N
	10 M	60 M	2 L			DRAINAGE: Y 🗌 N 🔀
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						1421 1422 1422
TOTAL SEVERITY	10	60	2			\leftrightarrow
COMMENT	`:					
4						

PMMS FOR EMU		T CONDIT	'ION SURVE	EY SHEET		SHEET NO. 7-2
BRANCH N	DATE: 21/6/2012					
SECTION II	D: PLAN	V61	NO. OF LANES:			INSPECTOR: BryarA.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	300	SECTION V	VIDTH: 9	.2	
			STRESS TY			TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugati Depressio Edge Crac Jt. Reflect Lane/Shoi Long & 	cking Sq m d Sags m on Sq m n Sq m	m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \square AAC \square LAST CONSTRUCTION DATE: $7 / 8 / 2 \infty$ MAINTENANCE: Y \square N \square MAINTENANCE DATE: / /
DISTRESS CODE	T	19	11	10		SHOULDER: Y X N
		4.6M 50 L	4 M	4 L		DRAINAGE: Y N N PHOTOGRAPH .jpg
						1425 1426 1427 1427 1428 1429 1430
TOTAL SEVERITY	1	50 4.6	4	4		\Leftrightarrow
COMMENT	<u>:</u>					
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	PAVEMEN	T CONDIT	TION SURVI	EY SHEET		SHEET NO. 73
BRANCH N					D: PFANATIC	DATE: 21/6/2012
	D: PFANATI		NO. OF LANES:			INSPECTOR:
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	308	SECTION '	WIDTH:	15	
		-	L STRESS TY			TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugati Depression Edge Crassion Jt. Reflect Lane/Sho 	ncking Sq m nd Sags m on Sq m on Sq m	m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION
DISTRESS	11	1	10	Γ		SHOULDER: Y 🔀 N
CODE	7-M	64	6 L			DRAINAGE: Y 🕅 N 🗌
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						1440 1442 1442 1443 1444 1445
T TOTAL SEVERITY H	45 7 12	6	6			\leftrightarrow
COMMENT						
			Race	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	A.	

PMMS FOR EMU		ITION SURVEY SHEET	SHEET NO. 74				
BRANCH N	BRANCH NAME: PARKING OF HEALTH CENTER BRANCH ID: PHEALTH						
SECTION II	PHEALTHOI	NO. OF LANES:	INSPECTOR: Bryar A.				
FROM:		TO:	FUNCTIONAL CLASS				
SECTION L	ENGTH: 47	SECTION WIDTH: 40					
	SURFACE D	DISTRESS TYPE	TRAFFIC FLOW:				
 Bleeding S Block Cra Bumps an Corrugation Depression Edge Crace Jt. Reflect Lane/Shou Long & 2000 	cking Sq m d Sags m on Sq m n Sq m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 	ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \Box AAC \Box LAST CONSTRUCTION DATE: $131 \ 8 \ 11995$ MAINTENANCE: Y \Box N \square MAINTENANCE DATE: $1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \$				
DISTRESS CODE	11		SHOULDER: Y 🔀 N				
	3 L 2 M		DRAINAGE: Y 🗌 N 🔀				
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			IЦИв 1447- 1448 1449				
	3		$ \longleftrightarrow $				
COMMENT							
A							

PMMS FOR EMU		T CONDIT	ION SURVE	EY SHEET	SHEET NO. 75
BRANCH N	No CONTRACTOR DE CONTRACTOR			BRANCH ID: PAR	
SECTION II	D: PARCH	01	NO. OF LA	NES:	INSPECTOR: Bryw A.
FROM:			TO:	_	FUNCTIONAL CLASS
SECTION L	ENGTH:	285	SECTION V	WIDTH: 25	
	SUR	FACE DIS	STRESS TY	TPE	TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugatio Depression Edge Cract Jt. Reflect Lane/Shot 	Cracking Sq 1 Gq m cking Sq m d Sags m on Sq m n Sq m	n m ff m	 Patching & Polished Potholes Potholes Railroad Rutting Shoving Slippage Swell So 	Util Cut Patching Sqm Aggregate Sq m Count I Crossing Sq m Sq m Sq m e Cracking Sq m	ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \Box AAC \Box LAST CONSTRUCTION DATE: 14181995 MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: 1
DISTRESS	4	3	11	19	SHOULDER: Y 📈 N
CODE	21	40L	0.6 H 2.5 H	175 M 120 L	DRAINAGE: Y N
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					1450 1452 1454 1454 1455 1457 1458
TOTAL SEVERITY T	2	40	1	120	
COMMENT	:				
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PMMS FOR EMU		T CONDIT	ION SURVE	Y SHEET		SHEET NO. 76
BRANCH N.	AME: PARK	ING-OFC	BRANCH II	PCIVIL	DATE: 21/6/2012	
SECTION II	PCIVIL	- 0	NO. OF LANES:			INSPECTOR: Bryar A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	237	SECTION W	/IDTH: 12	2.7	
	SUR	FACE DIS	STRESS TY			TRAFFIC FLOW:
 Alligator O Bleeding S Block Crait Bumps and Corrugation Depression Edge Cract Jt. Reflect Lane/Shou Long & T 	iq m cking Sq m d Sags m on Sq m n Sq m king m ion Cracking ulder Drop O	m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \Box AAC \Box LAST CONSTRUCTION DATE: $28/7/1992$ MAINTENANCE: Y \square N \Box MAINTENANCE DATE: 1/7
DISTRESS CODE	U	13	10	ч	1	SHOULDER: Y X N
	20 M	I H I M	67L 7L	21 L 15 L	1 M	DRAINAGE: Y 📉 N 🗌
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						143 1432 1436 1437 1437 1438 1439
TOTAL SEVERITY H	26 23	2	79	36	1	\Leftrightarrow
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PMMS FOR EMU		T CONDIT	TON SURVE	Y SHEET		SHEET NO. 77
BRANCH N	DATE: 21/6/2012					
SECTION II	D: PIND)	NO. OF LA	NES:		INSPECTOR: Bryan A.
FROM:			TO:			FUNCTIONAL CLASS
SECTION L	ENGTH:	33	SECTION V	VIDTH:	23	
			STRESS TY	PE		TRAFFIC FLOW:
 Bleeding S Block Cra Bumps an Corrugati Depressio Edge Crac Jt. Reflect Lane/Shot 	cking Sq m d Sags m on Sq m n Sq m	; m ff m	 Patching & Util Cut Patching Sqm Polished Aggregate Sq m Potholes Count Railroad Crossing Sq m Rutting Sq m Shoving Sq m Slippage Cracking Sq m Swell Sq m Weathering/Ravelling Sq m 			ONE DIRECTION \Box TWO DIRECTION \Box SURFACE TYPE: AC \square PCC \Box AAC \Box LAST CONSTRUCTION DATE: $221 \neq 1 2 \infty$ MAINTENANCE: Y \Box N \square MAINTENANCE DATE: 1 = 1 = 1 = 1
DISTRESS CODE	3	10				SHOULDER: Y 🔀 N
	4 L 6 L	20 L 15 L				DRAINAGE: Y 🔀 N 🗌
		6L				PHOTOGRAPH .jpg
TOTAL SEVERITY	10	41				\Leftrightarrow
COMMENT	а Г:					-
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PMMS FOR EM	U CAMPUS PAVEMENT CON	DITION SUR	VEV SHEET	SHEET NO. 78
BRANCH	NAME: SOUTH ST		BRANCH ID: SS7	
SECTION I	D: 506	NO. OF L	ANES: 2	INSPECTOR: Bryar A
FROM:	61	TO:	62	FUNCTIONAL CLASS
SECTION I	LENGTH: \ 00	SECTION	WIDTH: 9	Secondary
	SURFACE	DISTRESS T	YPE	TRAFFIC FLOW:
 Bleeding Block Crit Bumps ar Corrugati Depression Edge Crat Jt. Reflect Lane/Shot Long & 	Cracking Sq m Sq m acking Sq m ad Sags m aon Sq m on Sq m	 Patching Polishi Polishi Pothol Railro Ruttin Shovir Shovir Slippa Swell 	& Util Cut Patching Sqm ed Aggregate Sq m es Count ad Crossing Sq m g Sq m ng Sq m ge Cracking Sq m	ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: 221712003 MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: 1
DISTRESS	1			SHOULDER: Y N
CODE	5 M 4 L			DRAINAGE: Y 🗌 N 🔀
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				1400
TOTAL SEVERITY	4 5			₩
COMMENT	Γ:			

PMMS FOR EM		IT CONDI	TION SURV	EY SHEET	SHEET NO. 79
BRANCHN	NAME: D6/	RMITORY	STREET	BRANCH ID: DOR	ST DATE: 19/6/2012
SECTION I	D: DOR	12	NO. OF LA	anes: 2	INSPECTOR: BrywrA.
FROM:	5	6	TO:	60	FUNCTIONAL CLASS
SECTION I	LENGTH:	155	SECTION	WIDTH: 7	Secondary
	SUF	RFACE DI	STRESS T	YPE	TRAFFIC FLOW:
 Bleeding Block Cra Bumps ar Corrugati Depressice Edge Cra Jt. Reflec Lane/Sho 	Cracking Sq Sq m acking Sq m nd Sags m ion Sq m on Sq m	m g m off m	 11. Patching of 12. Polishe 13. Pothole 14. Railroa 15. Rutting 16. Shovin 17. Slippag 18. Swell S 	& Util Cut Patching Sqm d Aggregate Sq m es Count d Crossing Sq m g Sq m g Sq m ge Cracking Sq m	ONE DIRECTION \Box TWO DIRECTION \boxtimes SURFACE TYPE: AC \boxtimes PCC \Box AAC \Box LAST CONSTRUCTION DATE: $6 \mid 8 \mid 2007$ MAINTENANCE: Y \Box N \boxtimes MAINTENANCE DATE: \mid \mid
DISTRESS	1	10			SHOULDER: Y NX
CODE	3L	101			DRAINAGE: Y 🗌 N 🕅
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COMMENT	li .		1		
		2			
		2			

Appendix B: Pavement Inventory and PCI Reports

BRANCH NAME	BRANCH ID	SECTION ID	FROM	то	LENGTH (m)	WIDTH (m)	AREA (m ²)	CONST.DATE	SUR- FACE	RANK	DRAIN_ AGE
ACADEMIC STREETS	ACAST	ACA01	12	13	53.00	7.80	413.40	23/07/1992	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA02	13	15	212.00	9.00	1,908.00	05/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA03	36	15	245.00	5.80	1,421.00	13/08/1992	AC	S	NO
ACADEMIC STREETS	ACAST	ACA04	15	16	116.00	9.00	1,044.00	05/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA05	30	16	124.00	8.50	1,054.00	08/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA06	16	17	55.00	9.00	495.00	05/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA07	17	11	77.00	8.60	662.20	11/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA08	29	17	139.00	11.50	1,598.50	13/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA09	19	18	47.00	8.00	376.00	22/07/1992	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA10	22	14	90.00	6.00	540.00	15/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA11	22	20	61.00	5.70	347.70	16/07/1989	AC	S	NO
ACADEMIC STREETS	ACAST	ACA12	23	21	100.00	3.45	345.00	16/07/1989	AC	Т	NO
ACADEMIC STREETS	ACAST	ACA13	24	22	89.00	6.00	534.00	14/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA14	33	24	73.00	6.00	438.00	14/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA15	33	32	75.00	9.50	712.50	05/07/1989	AC	S	NO
ACADEMIC STREETS	ACAST	ACA16	33	35	85.00	9.50	807.50	07/07/1989	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA17	39	34	98.00	8.70	852.60	11/07/1992	AC	S	NO
ACADEMIC STREETS	ACAST	ACA18	35	31	42.00	11.00	462.00	15/07/1989	AC	S	YES
ACADEMIC STREETS	ACAST	ACA19	35	36	136.00	9.50	1,292.00	17/07/1989	AC	S	NO
ACADEMIC STREETS	ACAST	ACA20	36	37	50.00	9.50	475.00	19/07/1989	AC	S	NO
ACADEMIC STREETS	ACAST	ACA21	26	37	123.00	8.80	1,082.40	13/08/2003	AC	Р	YES

Table B.1.1: EMU campus pavement inventory (Roadway).

BRANCH NAME	BRANCH ID	SECTION ID	FROM	то	LENGTH (m)	WIDTH (m)	AREA (m ²)	CONST.DATE	SUR- FACE	RANK	DRAIN_ AGE
ACADEMIC STREETS	ACAST	ACA22	38	33	98.00	8.00	784.00	17/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA23	37	41	136.00	8.80	1,196.80	14/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA24	39	38	78.00	9.00	702.00	14/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA25	40	39	67.00	9.00	603.00	15/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA26	41	40	76.00	6.00	456.00	15/08/2003	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA27	41	44	85.00	6.00	510.00	17/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA28	44	40	62.00	7.20	446.40	17/07/1995	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA29	43	43	101.00	7.40	747.40	17/07/1995	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA30	46	38	387.00	10.00	3,870.00	18/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA31	44	47	309.00	8.70	2,688.30	20/08/2003	AC	Р	YES
ACADEMIC STREETS	ACAST	ACA32	46	47	60.00	10.00	600.00	05/08/2000	AC	Р	NO
ACADEMIC STREETS	ACAST	ACA33	50	46	126.00	9.00	1,134.00	05/08/2000	AC	Р	YES
DORMITORY STREETS	DORST	DOR01	47	48	282.00	10.00	2,820.00	13/07/1995	AC	Р	YES
DORMITORY STREETS	DORST	DOR02	47	51	337.00	10.00	3,370.00	16/07/1995	AC	Р	YES
DORMITORY STREETS	DORST	DOR03	52	48	372.00	7.00	2,604.00	14/07/1995	AC	Р	YES
DORMITORY STREETS	DORST	DOR04	54	49	314.00	9.00	2,826.00	19/07/1995	AC	S	YES
DORMITORY STREETS	DORST	DOR05	51	55	273.00	9.40	2,566.20	20/07/1995	AC	Р	NO
DORMITORY STREETS	DORST	DOR06	51	52	267.00	7.00	1,869.00	13/07/2001	AC	Р	NO
DORMITORY STREETS	DORST	DOR07	52	53	81.00	7.00	567.00	22/07/1995	AC	S	YES
DORMITORY STREETS	DORST	DOR08	53	54	60.00	7.00	420.00	22/07/1995	AC	S	YES
DORMITORY STREETS	DORST	DOR09	53	57	152.00	6.00	912.00	05/08/2007	AC	S	YES
DORMITORY STREETS	DORST	DOR10	59	54	160.00	7.00	1,120.00	17/08/2003	AC	S	NO

BRANCH NAME	BRANCH ID	SECTION ID	FROM	то	LENGTH (m)	WIDTH (m)	AREA (m ²)	CONST.DATE	SUR- FACE	RANK	DRAIN_ AGE
DORMITORY STREETS	DORST	DOR11	56	58	100.00	6.00	600.00	06/08/2007	AC	Т	YES
DORMITORY STREETS	DORST	DOR12	56	60	155.00	7.00	1,085.00	06/08/2007	AC	S	NO
SPORT STREETS	SPST	SP01	25	25	97.00	7.80	756.60	14/08/2003	AC	Р	NO
SPORT STREETS	SPST	SP02	45	27	354.00	6.60	2,336.40	13/07/1995	AC	Р	YES
SPORT STREETS	SPST	SP03	48	45	157.00	6.60	1,036.20	13/07/1995	AC	Р	YES
SPORT STREETS	SPST	SP04	48	49	197.00	10.00	1,970.00	22/07/1995	AC	Р	YES
SPORT STREETS	SPST	SP05	49	42	420.00	10.00	4,200.00	16/07/1995	AC	Р	YES
SPORT STREETS	SPST	SP06	42	28	403.00	8.70	3,506.10	20/08/2003	AC	Р	YES
SOUTH STREETS	SST	S01	13	6	138.00	6.00	828.00	20/07/2001	AC	S	YES
SOUTH STREETS	SST	S02	7	9	70.00	8.60	602.00	15/08/1995	AC	S	YES
SOUTH STREETS	SST	S03	9	14	84.00	8.60	722.40	15/08/1995	AC	S	YES
SOUTH STREETS	SST	S04	10	9	98.00	9.00	882.00	08/08/2003	AC	S	NO
SOUTH STREETS	SST	S05	8	10	213.00	9.00	1,917.00	21/08/1995	AC	S	NO
SOUTH STREETS	SST	S06	61	62	100.00	9.00	900.00	22/07/2003	AC	S	NO
SOUTH STREETS	SST	S07	8	3	160.00	8.50	1,360.00	01/07/1992	AC	Р	YES
SOUTH STREETS	SST	S08	16	8	157.00	9.00	1,413.00	01/07/1992	AC	Р	NO

BRANCH NAME	BRANCH ID	SECTION ID	FROM	то	AREA (m ²)	CONST- DATE
PARKING OF ACTIVITY C1	PACTIV1	PACTIV11	ACTIVITY CENTER	ACTIVITY CENTER	1,590.00	15/08/1995
PARKING OF ACTIVITY C2	PACTIV2	PACTIV21	ACTIVITY CENTER	JIMMIES CAFE	1,357.00	27/07/2003
PARKING OF ARCH DPT	PARCH	PARCH01	OPPOSITE TO ARCH DPT	OPPOSITE TO ARCH DPT	7,125.00	14/08/1995
PARKING OF BUSINESS DPT	PBUSIN	PBUSIN01	BUSINESS DPT	BUSINESS DPT	2,904.00	02/08/1992
PARKING OF COMP CENTER	PCC	PCC01	COMPUTER CENTER	COMPUTER CENTER	1,252.80	06/08/1992
PARKING OF CIVIL DPT	PCIVIL	PCIVIL01	COMPUTER DPT	CIVIL DPT	3,009.90	28/07/1992
PARKING OF EMC	PEMC	PEMC01	EMC	EMC	6,360.00	19/08/1995
PARKING OF FANATIC	PFANATIC	PFANATIC01	FANATIC RESTURANT	FANATIC RESTURANT	4,620.00	19/06/1995
PARKING OF HEALTH CENTER	PHEALTH	PHEALTH01	BESIDE HEALTH CENTER	BESIDE HEALTH CENTER	1,880.00	13/08/1995
PARKING OF INDUSTRIAL DPT	PIND	PIND01	INDUSTRIAL DPT	INDUSTRIAL DPT	759	22/07/2001
PARKING OF IT DPT	PIT	PIT01	IT DPT	IT DPT	682.5	23/06/1995
PARKING OF LALA HALL	PLALA	PLALA01	LALA M PASHA HALL	LALA M PASHA HALL	786	13/07/1995
PARKING OF LAW DPT	PLAW	PLAW01	45	OPPOSITE TO LAW DPT	2,760.00	07/08/2000
PARKING OF LIBRARY	PLIB	PLIB01	LIBRARY	LIBRARY	826.5	18/08/1995
PARKING OF MECHANICAL DPT	PMECH	PMECH01	OPPOSITE TO RECTOR OFFICE	OPPOSITE TO RECTOR OFFICE	716.8	21/08/1992
PARKING OF POST OFFICE	PPOST	PPOST01	POST OFFICE	POST PFFICE	3,433.60	13/08/1992
PARKING OF RECTOR	PRECT	PRECT01	RECTOR OFFICE	RECTOR OFFICE	1,120.00	04/08/1989
PARKING OF REGISTER	PREGIST	PREGIST01	REGISTER OFFICE	REGISTER OFFICE	714	14/07/2001
PARKING OF SABANCI	PSABAN	PSABAN01	SABANCI DORMITORY	SABANCI DORMITORY	2,508.00	16/08/1992
PARKING OF SERVICE BUILD	PSERV	PSERV01	SERVICE BUILDING	SERVICE BUILDING	4,006.80	20/07/2001

Table B.1.2: EMU campus pavement inventory (Parking).

BRANCH NAME	BRANCH ID	SECTION ID	FROM	ТО	LENGH (m)	WIDTH (m)	AREA (m ²)	CONST_ DATE	INSPECTI- ON DATE	PCI (2012)
ACADEMIC STREETS	ACAST	ACA01	12	13	53.00	7.80	413.40	23/07/1992	17/06/2012	30.00
ACADEMIC STREETS	ACAST	ACA02	13	15	212.00	9.00	1,908.00	05/08/2003	17/06/2012	99.00
ACADEMIC STREETS	ACAST	ACA03	36	15	245.00	5.80	1,421.00	13/08/1992	18/06/2012	47.00
ACADEMIC STREETS	ACAST	ACA04	15	16	116.00	9.00	1,044.00	05/08/2003	17/06/2012	92.00
ACADEMIC STREETS	ACAST	ACA05	30	16	124.00	8.50	1,054.00	08/08/2003	20/06/2012	31.00
ACADEMIC STREETS	ACAST	ACA06	16	17	55.00	9.00	495.00	05/08/2003	17/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA07	17	11	77.00	8.60	662.20	11/08/2003	17/06/2012	78.00
ACADEMIC STREETS	ACAST	ACA08	29	17	139.00	11.50	1,598.50	13/08/2003	17/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA09	19	18	47.00	8.00	376.00	22/07/1992	17/06/2012	89.00
ACADEMIC STREETS	ACAST	ACA10	22	14	90.00	6.00	540.00	15/08/2003	17/06/2012	98.00
ACADEMIC STREETS	ACAST	ACA11	22	20	61.00	5.70	347.70	16/07/1989	17/06/2012	61.00
ACADEMIC STREETS	ACAST	ACA12	23	21	100.00	3.45	345.00	16/07/1989	17/06/2012	64.00
ACADEMIC STREETS	ACAST	ACA13	24	22	89.00	6.00	534.00	14/08/2003	17/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA14	33	24	73.00	6.00	438.00	14/08/2003	17/06/2012	88.00
ACADEMIC STREETS	ACAST	ACA15	33	32	75.00	9.50	712.50	05/07/1989	17/06/2012	64.00
ACADEMIC STREETS	ACAST	ACA16	33	35	85.00	9.50	807.50	07/07/1989	18/06/2012	54.00
ACADEMIC STREETS	ACAST	ACA17	39	34	98.00	8.70	852.60	11/07/1992	18/06/2012	86.00
ACADEMIC STREETS	ACAST	ACA18	35	31	42.00	11.00	462.00	15/07/1989	18/06/2012	65.00
ACADEMIC STREETS	ACAST	ACA19	35	36	136.00	9.50	1,292.00	17/07/1989	18/06/2012	58.00
ACADEMIC STREETS	ACAST	ACA20	36	37	50.00	9.50	475.00	19/07/1989	18/06/2012	64.00
ACADEMIC STREETS	ACAST	ACA21	26	37	123.00	8.80	1,082.40	13/08/2003	17/06/2012	82.00

Table B.1.3: PCI Report (Roadway).

BRANCH NAME	BRANCH ID	SECTION ID	FROM	ТО	LENGH (m)	WIDTH (m)	AREA (m ²)	CONST_ DATE	INSPECTI- ON DATE	PCI (2012)
ACADEMIC STREETS	ACAST	ACA22	38	33	98.00	8.00	784.00	17/08/2003	17/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA23	37	41	136.00	8.80	1,196.80	14/08/2003	17/06/2012	85.00
ACADEMIC STREETS	ACAST	ACA24	39	38	78.00	9.00	702.00	14/08/2003	18/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA25	40	39	67.00	9.00	603.00	15/08/2003	18/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA26	41	40	76.00	6.00	456.00	15/08/2003	18/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA27	41	44	85.00	6.00	510.00	17/08/2003	18/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA28	44	40	62.00	7.20	446.40	17/07/1995	18/06/2012	63.00
ACADEMIC STREETS	ACAST	ACA29	43	43	101.00	7.40	747.40	17/07/1995	18/06/2012	67.00
ACADEMIC STREETS	ACAST	ACA30	46	38	387.00	10.00	3,870.00	18/08/2003	17/06/2012	96.00
ACADEMIC STREETS	ACAST	ACA31	44	47	309.00	8.70	2,688.30	20/08/2003	18/06/2012	100.00
ACADEMIC STREETS	ACAST	ACA32	46	47	60.00	10.00	600.00	05/08/2000	18/06/2012	93.00
ACADEMIC STREETS	ACAST	ACA33	50	46	126.00	9.00	1,134.00	05/08/2000	17/06/2012	92.00
DORMITORY STREETS	DORST	DOR01	47	48	282.00	10.00	2,820.00	13/07/1995	19/06/2012	75.00
DORMITORY STREETS	DORST	DOR02	47	51	337.00	10.00	3,370.00	16/07/1995	19/06/2012	57.00
DORMITORY STREETS	DORST	DOR03	52	48	372.00	7.00	2,604.00	14/07/1995	19/06/2012	50.00
DORMITORY STREETS	DORST	DOR04	54	49	314.00	9.00	2,826.00	19/07/1995	19/06/2012	59.00
DORMITORY STREETS	DORST	DOR05	51	55	273.00	9.40	2,566.20	20/07/1995	19/06/2012	74.00
DORMITORY STREETS	DORST	DOR06	51	52	267.00	7.00	1,869.00	13/07/2001	19/06/2012	94.00
DORMITORY STREETS	DORST	DOR07	52	53	81.00	7.00	567.00	22/07/1995	19/06/2012	89.00
DORMITORY STREETS	DORST	DOR08	53	54	60.00	7.00	420.00	22/07/1995	19/06/2012	84.00
DORMITORY STREETS	DORST	DOR09	53	57	152.00	6.00	912.00	05/08/2007	19/06/2012	89.00
DORMITORY STREETS	DORST	DOR10	59	54	160.00	7.00	1,120.00	17/08/2003	19/06/2012	93.00

BRANCH NAME	BRANCH ID	SECTION ID	FROM	ТО	LENGH (m)	WIDTH (m)	AREA (m ²)	CONST_ DATE	INSPECTI- ON DATE	PCI (2012)
DORMITORY STREETS	DORST	DOR11	56	58	100.00	6.00	600.00	06/08/2007	19/06/2012	99.00
DORMITORY STREETS	DORST	DOR12	56	60	155.00	7.00	1,085.00	06/08/2007	19/06/2012	93.00
SPORT STREETS	SPST	SP01	25	25	97.00	7.80	756.60	14/08/2003	20/06/2012	84.00
SPORT STREETS	SPST	SP02	45	27	354.00	6.60	2,336.40	13/07/1995	19/06/2012	68.00
SPORT STREETS	SPST	SP03	48	45	157.00	6.60	1,036.20	13/07/1995	19/06/2012	62.00
SPORT STREETS	SPST	SP04	48	49	197.00	10.00	1,970.00	22/07/1995	19/06/2012	56.00
SPORT STREETS	SPST	SP05	49	42	420.00	10.00	4,200.00	16/07/1995	19/06/2012	67.00
SPORT STREETS	SPST	SP06	42	28	403.00	8.70	3,506.10	20/08/2003	19/06/2012	95.00
SOUTH STREETS	SST	S01	13	6	138.00	6.00	828.00	20/07/2001	20/06/2012	63.00
SOUTH STREETS	SST	S02	7	9	70.00	8.60	602.00	15/08/1995	20/06/2012	77.00
SOUTH STREETS	SST	S03	9	14	84.00	8.60	722.40	15/08/1995	20/06/2012	63.00
SOUTH STREETS	SST	S04	10	9	98.00	9.00	882.00	08/08/2003	20/06/2012	100.00
SOUTH STREETS	SST	S05	8	10	213.00	9.00	1,917.00	21/08/1995	20/06/2012	82.00
SOUTH STREETS	SST	S06	61	62	100.00	9.00	900.00	22/07/2003	20/06/2012	82.00
SOUTH STREETS	SST	S07	8	3	160.00	8.50	1,360.00	01/07/1992	20/06/2012	57.00
SOUTH STREETS	SST	S08	16	8	157.00	9.00	1,413.00	01/07/1992	20/06/2012	45.00

BRANCH_NAME	BRANCH ID	SECTION ID	FROM	то	AREA (m ²)	CONST_ DATE	INSPECTI- ON DATE	PCI (2012)
PARKING OF			ACTIVITY	ACTIVITY				
ACTIVITY C1	PACTIV1	PACTIV11	CENTER	CENTER	1,590.00	15/08/1995	21/06/2012	81.00
PARKING OF			ACTIVITY					
ACTIVITY C2	PACTIV2	PACTIV21	CENTER	JIMMIES CAFE	1,357.00	27/07/2003	20/06/2012	100.00
PARKING OF			OPPOSITE TO	OPPOSITE TO				
ARCH DPT	PARCH	PARCH01	ARCH DPT	ARCH DPT	7,125.00	14/08/1995	21/06/2012	83.00
PARKING OF								
BUSINESS DPT	PBUSIN	PBUSIN01	BUSINESS DPT	BUSINESS DPT	2,904.00	02/08/1992	21/06/2012	62.00
PARKING OF			COMPUTER	COMPUTER				
COMP CENTER	PCC	PCC01	CENTER	CENTER	1,252.80	06/08/1992	20/06/2012	63.00
PARKING OF								
CIVIL DPT	PCIVIL	PCIVIL01	COMPUTER DPT	CIVIL DPT	3,009.90	28/07/1992	21/06/2012	63.00
PARKING OF								
EMC	PEMC	PEMC01	EMC	EMC	6,360.00	19/08/1995	21/06/2012	73.00
PARKING OF			FANATIC	FANATIC				
FANATIC	PFANATIC	PFANATIC01	RESTURANT	RESTURANT	4,620.00	19/06/1995	21/06/2012	80.00
PARKING OF			BESIDE HEALTH	BESIDE HEALTH				
HEALTH CENTER	PHEALTH	PHEALTH01	CENTER	CENTER	1,880.00	13/08/1995	21/06/2012	96.00
PARKING OF								
INDUSTRIAL DPT	PIND	PIND01	INDUSTRIAL DPT	INDUSTRIAL DPT	759	22/07/2001	21/06/2012	95.00
PARKING OF IT								
DPT	PIT	PIT01	IT DPT	IT DPT	682.5	23/06/1995	20/06/2012	86.00
PARKING OF			LALA M PASHA	LALA M PASHA				
LALA HALL	PLALA	PLALA01	HALL	HALL	786	13/07/1995	21/06/2012	80.00
PARKING OF				OPPOSITE TO LAW				
LAW DPT	PLAW	PLAW01	45	DPT	2,760.00	07/08/2000	21/06/2012	90.00

Table B.1.4: PCI Report (Parking).

BRANCH_NAME	BRANCH ID	SECTION ID	FROM	то	AREA (m ²)	CONST_ DATE	INSPECTI- ON DATE	PCI (2012)
PARKING OF								
LIBRARY	PLIB	PLIB01	LIBRARY	LIBRARY	826.5	18/08/1995	20/06/2012	60.00
PARKING OF								
MECHANICAL			OPPOSITE TO	OPPOSITE TO				
DPT	PMECH	PMECH01	RECTOR OFFICE	RECTOR OFFICE	716.8	21/08/1992	20/06/2012	88.00
PARKING OF								
POST OFFICE	PPOST	PPOST01	POST OFFICE	POST PFFICE	3,433.60	13/08/1992	21/06/2012	92.00
PARKING OF								
RECTOR	PRECT	PRECT01	RECTOR OFFICE	RECTOR OFFICE	1,120.00	04/08/1989	20/06/2012	86.00
PARKING OF								
REGISTER	PREGIST	PREGIST01	REGISTER OFFICE	REGISTER OFFICE	714	14/07/2001	20/06/2012	100.00
PARKING OF			SABANCI	SABANCI				
SABANCI	PSABAN	PSABAN01	DORMITORY	DORMITORY	2,508.00	16/08/1992	21/06/2012	90.00
PARKING OF			SERVICE	SERVICE				
SERVICE BUILD	PSERV	PSERV01	BUILDING	BUILDING	4,006.80	20/07/2001	21/06/2012	89.00

Appendix C: Suggested Work Plan for EMU Campus

Pavement Network

Table C.1.1: Suggested Work Plan for (Roadways) from 2013 to 2017 (Limited Budget)

		201	3	2014	1	2015	5	2016		2017	
SECTION ID		TREATME- NT ACTION	COST(\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
ACA01	413.40	Stop Gap	1,220.69	Stop Gap	311.49	Stop Gap	355.99	Major M&R < Critical	8,899.5	Do Nothing	0.00
ACA02	1,908.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA03	1,421.00	Stop Gap	1,372.37	Stop Gap	260.03	Stop Gap	290.64	Stop Gap	351.83	Stop Gap	443
ACA04	1,044.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	89.87
ACA05	1,054.00	Do Nothing	0.00	Stop Gap	737.44	Stop Gap	850.89	Stop Gap	964.35	Major M&R < Critical	22,69
ACA06	495.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA07	662.20	Preventative	392.94	Major M&R >= Critical	5,474.17	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA08	1,598.50	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA09	376.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA10	540.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA11	347.70	Preventative	562.11	Preventative	247.00	Preventative	261.97	Major M&R < Critical	5,074.9	Do Nothing	0.00
ACA12	345.00	Preventative	545.05	Major M&R >= Critical	4,307.7	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA13	534.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA14	438.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00

		201	3	2014	1	2015	5	2016		2017	
SECTION ID	-	TREATME- NT ACTION	COST(\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
ACA15	712.50	Preventative	429.97	Preventative	460.13	Preventative	490.81	Preventative	521.49	Do Nothing	0.00
ACA16	807.50	Do Nothing	0.00	Stop Gap	86.89	Major M&R < Critical	13,003	Do Nothing	0.00	Do Nothing	0.00
ACA17	852.60	Do Nothing	0.00	Preventative	73.39	Preventative	91.74	Preventative	146.82	Preventative	201.90
ACA18	462.00	Preventative	132.50	Preventative	288.42	Preventative	308.31	Preventative	328.20	Preventative	348.09
ACA19	1,292.00	Preventative	850.00	Stop Gap	139.02	Stop Gap	139.02	Stop Gap	139.02	Stop Gap	166.85
ACA20	475.00	Preventative	693.09	Major M&R >= Critical	5,930.9	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA21	1,082.40	Preventative	226.88	Preventative	186.39	Preventative	256.31	Preventative	326.24	Preventative	396.16
ACA22	784.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA23	1,196.80	Preventative	300.21	Preventative	115.90	Preventative	167.43	Preventative	244.75	Preventative	322.06
ACA24	702.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA25	603.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA26	456.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA27	510.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA28	446.40	Major M&R >= Critical	5,439.25	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA29	747.40	Do Nothing	0.00	Preventative	434.42	Preventative	466.59	Preventative	498.76	Preventative	530.95
ACA30	3,870.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	166.56
ACA31	2,688.30	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA32	600.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA33	1,134.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	97.61

		201	3	2014	l .	2015	5	2016		2017	,
SECTION ID		TREATME- NT ACTION	COST(\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
DOR01	2,820.00	Preventative	598.86	Preventative	1,123.2	Preventative	1,274.9	Preventative	1,396.3	Preventative	1,517.7
DOR02	3,370.00	Preventative	2,019.45	Stop Gap	362.61	Stop Gap	362.61	Stop Gap	398.91	Stop Gap	471.50
DOR03	2,604.00	Stop Gap	228.17	Stop Gap	392.37	Stop Gap	448.46	Stop Gap	504.55	Stop Gap	560.64
DOR04	2,826.00	Preventative	5,815.00	Preventative	2,129.2	Stop Gap	304.08	Stop Gap	304.08	Stop Gap	334.51
DOR05	2,566.20	Preventative	138.85	Preventative	1,105.0	Preventative	1,215.4	Preventative	1,325.9	Preventative	1,436.3
DOR06	1,869.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	93.00	Preventative	120.66
DOR07	567.00	Preventative	438.14	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	79.32
DOR08	420.00	Preventative	614.99	Do Nothing	0.00	Preventative	72.32	Preventative	99.46	Preventative	126.59
DOR09	912.00	Do Nothing	0.00	Do Nothing	0.00	Major M&R >= Critical	5,889.9	Do Nothing	0.00	Do Nothing	0.00
DOR10	1,120.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	90.00	Preventative	84.36
DOR11	600.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR12	1,085.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	81.72
SP01	756.60	Preventative	265.41	Preventative	81.41	Preventative	130.29	Preventative	179.16	Preventative	228.04
SP02	2,336.40	Preventative	1,632.97	Preventative	1,307.7	Preventative	1,408.2	Preventative	1,508.8	Preventative	1,609.4 5
SP03	1,036.20	Major M&R >= Critical	12,938.1 0	Do Nothing	0.00	Preventative	0.00	Do Nothing	0.00	Do Nothing	0.00
SP04	1,970.00	Do Nothing	0.00	Stop Gap	211.97	Stop Gap	213.00	Stop Gap	254.41	Stop Gap	296.84
SP05	4,200.00	Preventative	1,337.19	Preventative	2,441.2	Preventative	2,621.9	Preventative	2,802.7	Preventative	2,983.6
SP06	3,506.10	Do Nothing	0.00	Do Nothing	0.00	Preventative	0.00	Preventative	113.18	Preventative	188.10
S01	828.00	Preventative	1,780.51	Preventative	552.55	Preventative	588.20	Preventative	623.86	Stop Gap	89.09
S02	602.00	Preventative	438.14	Preventative	200.89	Preventative	239.78	Preventative	272.18	Preventative	298.09

		201	3	2014	4	2015	5	2016		2017	,
SECTION ID		TREATME- NT ACTION	COST(\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
S03	722.40	Preventative	787.12	Preventative	482.08	Preventative	513.19	Preventative	544.29	Stop Gap	77.73
S04	882.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	0.00	Do Nothing	0.00	Do Nothing	0.00
S05	1,917.00	Preventative	687.89	Preventative	330.11	Preventative	453.95	Preventative	577.78	Preventative	701.62
S06	900.00	Preventative	300.25	Major M&R >= Critical	6,354.97	Preventative	0.00	Do Nothing	0.00	Do Nothing	0.00
S07	1,360.00	Preventative	1,957.19	Stop Gap	146.34	Stop Gap	146.34	Stop Gap	160.98	Stop Gap	190.28
S08	1,413.00	Do Nothing	0.00	Stop Gap	289.00	Stop Gap	349.84	Stop Gap	441.10	Stop Gap	532.35
Тс	otal Cost	s (\$)	44,143		36,563		32,915		29,186		37,462

Table C.1.2: Suggested Work Plan for (Parking) from 2013 to 2017(Limited Budget)

	2013			2014		2015		2016		2017	
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)								
PACTIV1 1	1,590.00	Do Nothing	0.00	Preventative	325.15	Preventative	427.87	Preventative	530.58	Preventative	633.3
PACTIV2 1	1,357.00	Preventative	0.00	Do Nothing	0.00						

PARCH01	7,125.00	Preventative	208.37	Preventative	996.79	Preventative	1,457	Preventative	1,917	Preventative	2,377
PBUSIN0											
1	2,904.00	Preventative	216.84	Preventative	2,000.4	Preventative	2,125	Stop Gap	312.47	Stop Gap	312.4
PCC01	1,252.80	Preventative	833.91	Preventative	836.03	Preventative	889.98	Preventative	943.92	Stop Gap	134.8
PCIVIL01	3,009.90	Preventative	1,202	Preventative	2,008.6	Preventative	2,138	Preventative	2,267	Stop Gap	323.8
PEMC01	6,360.00	Preventative	867.48	Preventative	2,813.4	Preventative	3,149	Preventative	3,422	Preventative	3,696
PFANATI C01	4,620.00	Preventative	961.92	Preventative	1,094	Preventative	1,392	Preventative	1,690	Preventative	1,989
PHEALTH 01	1,880.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	80.92
PIND01	759.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
PIT01	682.50	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	117.53	Preventative	161.
PLALA01	786.00	Do Nothing	0.00	Preventative	186.12	Preventative	236.90	Preventative	287.68	Preventative	338.4
PLAW01	2,760.00	Do Nothing	0.00	Preventative	118.79	Preventative	178.19	Preventative	237.58	Preventative	296.9
PLIB01	826.50	Preventative	151.71	Preventative	604.93	Stop Gap	88.93	Stop Gap	110.55	Stop Gap	88.93
PMECH0 1	716.80	Do Nothing	0.00	Do Nothing	0.00	Preventative	0.00	Do Nothing	0.00	Preventative	123.4
PPOST01	3,433.60	Preventative	252.51	Do Nothing	0.00	Preventative	147.78	Preventative	221.67	Preventative	295.5
PRECT01	1,120.00	Preventative	151.94	Do Nothing	0.00	Preventative	120.51	Preventative	192.86	Preventative	265.2
PREGIST 01	714.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	0.00	Do Nothing	0.00	Do Nothing	0.00
PSABAN0 1	2,508.00	Preventative	346.94	Preventative	107.94	Preventative	161.92	Preventative	215.89	Preventative	269.8
PSERV01	4,006.80	Do Nothing	0.00	Preventative	215.57	Preventative	301.79	Preventative	388.02	Preventative	560.5
TOTAL C	OSTS (\$)		5,193		11,307		12,816		12,854		11,949

		-									
		2013	3	2014	l .	2015	5	2016	,	2017	
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
		Major M&R									
ACA01	413.40	< Critical	8,899.5	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA02	1,908.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA03	1,421.00	Major M&R < Critical	24,166	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA04	1,044.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	89.87
ACA05	1,054.00	Major M&R < Critical	22,690	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA06	495.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA07	662.20	Major M&R >= Critical	5,075	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA08	1,598.50	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA09	376.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA10	540.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA11	347.70	Preventative	562.11	Preventative	247.0	Preventative	261.97	Major M&R < Critical	5,074.9	Do Nothing	0.00
ACA12	345.00	Major M&R >= Critical	4,099.7	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA13	534.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA14	438.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00

Table C.1.3: Suggested Work Plan for (Roadways) from 2013 to 2017 (Unlimited Budget)

		2013	3	2014	ļ	2015	5	2016		2017	
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
ACA15	712.50	Preventative	429.97	Preventative	460.1	Preventative	490.81	Preventative	521.49	Major M&R < Critical	10,184
ACA16	807.50	Major M&R < Critical	12,029	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA17	852.60	Do Nothing	0.00	Do Nothing	0.00	Preventative	91.74	Preventative	146.82	Preventative	201.90
ACA18	462.00	Preventative	132.50	Preventative	288.4	Preventative	308.31	Preventative	328.20	Preventative	348.09
ACA19	1,292.00	Major M&R >= Critical Major M&R	17,689	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA20	475.00	>= Critical	5,644.5	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA21	1,082.40	Preventative	226.88	Preventative	186.3	Preventative	256.31	Preventative	326.24	Preventative	396.16
ACA22	784.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA23	1,196.80	Preventative	300.21	Preventative	115.9	Preventative	167.43	Preventative	244.75	Preventative	322.06
ACA24	702.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA25	603.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA26	456.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA27	510.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
		Major M&R									
ACA28	446.40	>= Critical	5,439.2	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA29	747.40	Do Nothing	0.00	Preventative	435.4	Preventative	466.59	Preventative	498.76	Preventative	530.95
ACA30	3,870.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	166.56
ACA31	2,688.30	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00

		2013	3	2014	ļ	2015	5	2016		2017	,
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
ACA32	600.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
ACA33	1,134.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	97.61
DOR01	2,820.00	Major M&R >= Critical	24,161	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR02	3,370.00	Major M&R >= Critical	47,156	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR03	2,604.00	Major M&R < Critical	41,931	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR04	2,826.00	Preventative	5,827	Preventative	2,129	Major M&R < Critical	41,200	Do Nothing	0.00	Do Nothing	0.00
DOR05	2,566.20	Preventative	138.85	Preventative	1,106	Preventative	1,215.4	Preventative	1,325.9	Preventative	1,436.3
DOR06	1,869.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	120.66
DOR07	567.00	Preventative	438.14	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	79.32
DOR08	420.00	Preventative	614.99	Do Nothing	0.00	Preventative	85.00	Preventative	99.46	Preventative	126.59
DOR09	912.00	Major M&R >= Critical	5,889	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR10	1,120.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	84.36
DOR11	600.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
DOR12	1,085.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	81.72
SP01	756.60	Preventative	265.41	Do Nothing	0.00	Preventative	130.29	Preventative	179.16	Preventative	228.04
SP02	2,336.40	Major M&R >= Critical	24,947	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00

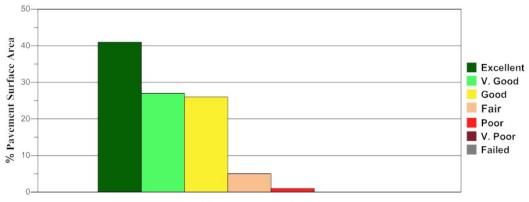
		2013	3	2014	1	2015	5	2016		2017	,
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
SP03	1,036.20	Major M&R >= Critical	12,938	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
SP04	1,970.00	Major M&R < Critical	28,160	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
SP05	4,200.00	Major M&R >= Critical	46,112	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
SP06	3,506.10	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	113.18	Preventative	188.63
S01	828.00	Preventative	1,780.8	Preventative	552.5	Preventative	588.20	Preventative	623.86	Major M&R < Critical	12,085
S02	602.00	Preventative	438.14	Preventative	200.8	Preventative	239.78	Preventative	272.18	Preventative	298.09
S03	722.40	Preventative	787.12	Preventative	482.0	Preventative	513.19	Preventative	544.29	Major M&R < Critical	10,544
S04	882.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
S05	1,917.00	Preventative	687.89	Preventative	331	Preventative	453.95	Preventative	577.78	Preventative	701.62
S06	900.00	Major M&R >= Critical	5,812.4	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
S07	1,360.00	Major M&R >= Critical	19,030	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
S08	1,413.00	Major M&R < Critical	24,882	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
Total Cos	sts (\$)		399,388		6,534		46,469		10,877		38,312

		2013	3	2014	ŀ	2015		2016		2017	
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)
PACTIV1	1,590.00	Do Nothing	0.00	Preventative	325.15	Preventative	427.87	Preventative	530.58	Preventative	633.30
PACTIV2	1,357.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
PARCH0 1	7,125.00	Preventative	208.37	Preventative	996.79	Preventative	1,457	Preventative	1,917	Preventative	2,377
PBUSIN0 1	2,904.00	Preventative	216.84	Preventative	2,000	Preventative	2,125	Major M&R < Critical	41,424	Do Nothing	0.00
PCC01	1,252.80	Preventative	833.91	Preventative	836.03	Preventative	889.98	Preventative	943.92	Major M&R < Critical	18,285
PCIVIL01	3,009.90	Preventative	1,244	Preventative	2,008	Preventative	2,138	Preventative	2,267	Major M&R < Critical	43,931
PEMC01	6,360.00	Preventative	867.48	Preventative	2,875	Preventative	3,149	Preventative	3,423	Preventative	3,696
PFANATI C01	4,620.00	Preventative	961.92	Preventative	1,094	Preventative	1,393	Preventative	1,691	Preventative	1,989
PHEALT H01	1,880.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	80.92
PIND01	759.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
PIT01	682.50	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	117.53	Preventative	161.62
PLALA01	786.00	Do Nothing	0.00	Preventative	186.12	Preventative	236.90	Preventative	287.68	Preventative	338.45
PLAW01	2,760.00	Do Nothing	0.00	Preventative	118.79	Preventative	178.19	Preventative	237.58	Preventative	296.98
PLIB01 PMECH0	826.50	Major M&R >= Critical	10,818	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
1	716.80	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Preventative	90.00	Preventative	123.43
PPOST01	3,433.60	Preventative	252.51	Do Nothing	0.00	Preventative	147.78	Preventative	221.67	Preventative	295.56

Table C.1.4: Suggested Work Plan for (Parking) from 2013 to 2017(Unlimited Budget)

		2013	3	2014	L .	2015	5	2016		2017	
SECTION ID	AREA (m ²)	TREATME- NT ACTION	COST (\$)	TREATME- NT ACTION	COST (\$)						
PRECT01	1,120.00	Preventative	151.94	Preventative	97	Preventative	120.51	Preventative	192.86	Preventative	265.22
PREGIST 01	714.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00	Do Nothing	0.00
PSABAN 01	2,508.00	Preventative	346.94	Preventative	107.94	Preventative	162.92	Preventative	215.89	Preventative	269.86
PSERV01	4,006.80	Do Nothing	0.00	Preventative	216.57	Preventative	301.79	Preventative	388.02	Preventative	560.55
ТОТА СС)STS (\$)		15,901		10,861		12,728		53,948		73,307

Appendix D: Charts and GIS Mapped data



Current Year (2012)

FigureD1.1: Rating of campus pavement area (2012).

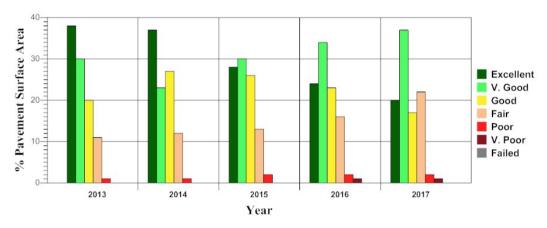


Figure D1.2: Rating of campus pavement area (No Budget).

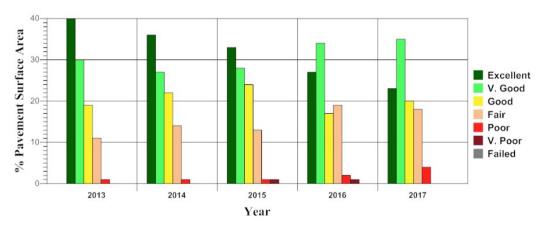


Figure D1.3: Rating of campus pavement area (Limited Budget).

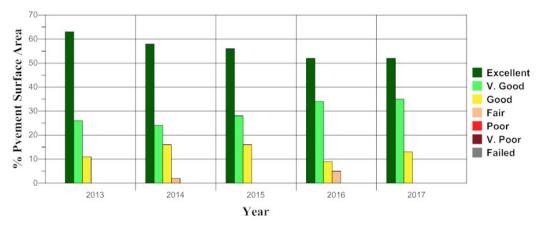


Figure D1.4: Rating of campus pavement area (Unlimited Budget).

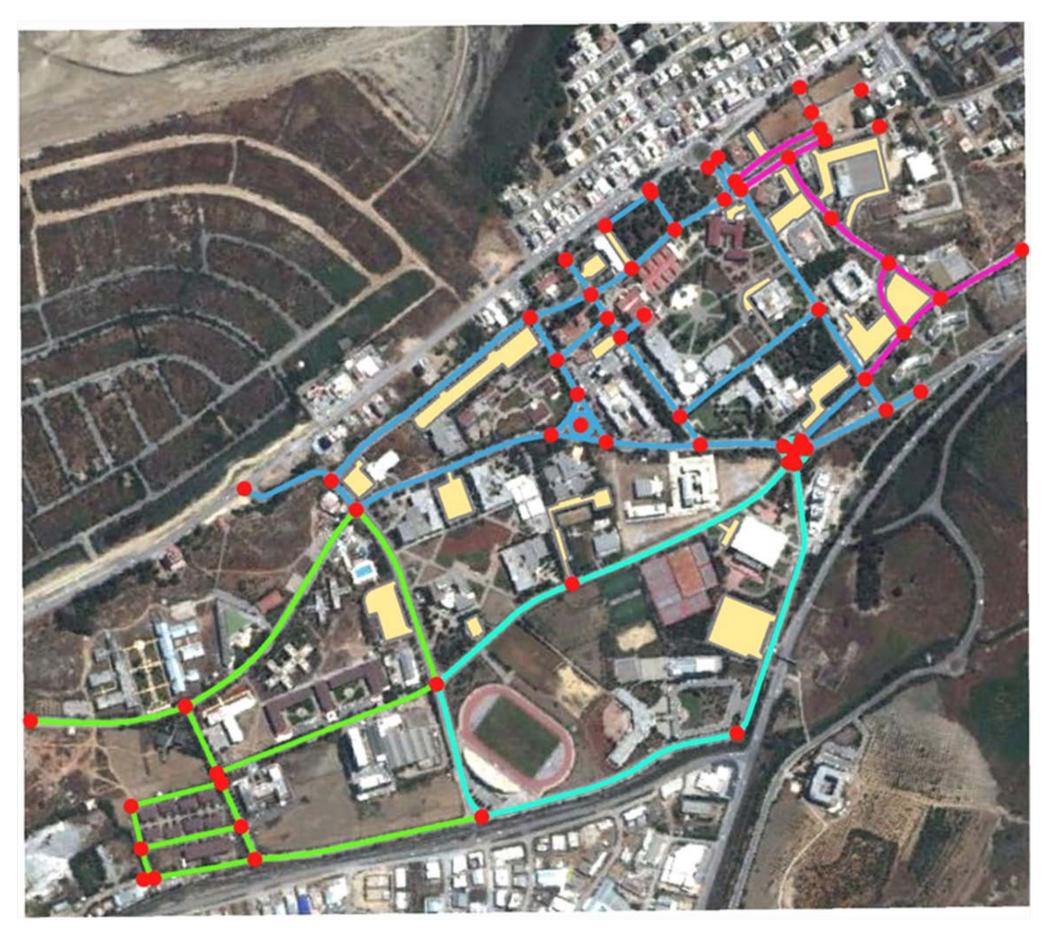


Figure D1.5: EMU Campus raster image and vector data.

