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Innovation in Transportation

CADD Content Management Feasibility Assessment, Market Study, and Implementation

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16. Abstract In an effort to maximize work flow, the New Mexico Department of Transportation (NMDOT) has recognized the need for an efficient file management software system. Selecting an effective software package should make uploading, accessing, and sharing project files as convenient as possible. The selected package should also minimize the potential for errors, such as accessing out-of-date files or overwriting another designer's work. This report focuses on selecting a file management system that will best fit the needs of the New Mexico Department of Transportation. This task is accomplished by researching several file sharing software packages. Concurrently, the requirements of the NMDOT and its employees are assessed using interviews and surveys. The best fit software package is then selected accordingly.					
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Final Report

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PREFACE

This report explores the advantages of numerous file management software packages and determines which package would best suit the needs of the NMDOT. This research project also provides a Cost-Benefit analysis and implementation strategy for the selected package. The project also explores the technological and cultural feasibility of switching to a new file management system, while evaluating the effectiveness of the current file system.

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DISCLAIMER

This report presents the results of research conducted by the authors and does not necessarily reflect the views of the New Mexico Department of Transportation. This report does not constitute a standard or specification.

ABSTRACT

In an effort to maximize work flow, the New Mexico Department of Transportation (NMDOT) has recognized the need for an efficient file management software system. Selecting an effective software package should make uploading, accessing, and sharing project files as convenient as possible. The selected package should also minimize the potential for errors, such as accessing out-of-date files or overwriting another designer's work. This report focuses on selecting a file management system that will best fit the needs of the New Mexico Department of Transportation. This task is accomplished by researching several file sharing software packages. Concurrently, the requirements of the NMDOT and its employees are assessed using interviews and surveys. The best fit software package is then selected accordingly.

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INTRODUCTION

In this project, the research team assessed the requirements of The New Mexico Department of Transportation (NMDOT) to determine which file management software would provide the best fit to NMDOT personnel and project needs. To accomplish this, the research team initially interviewed NMDOT design teams and IT groups to evaluate the effectiveness of the current file management system (Task 1). Surveys were then sent to NMDOT design teams, as well as other state DOT offices (Task 2). The Survey sent to NMDOT design teams evaluated employees' familiarity and preferences regarding file management systems. Surveys sent to other DOT offices evaluated the popularity and effectiveness of different file sharing programs. Feasibility studies: technical (Task 3) and cultural (Task 4) were then conducted. The technical study assessed if the current server equipment and planned IT upgrades could accommodate a new file management system. The cultural feasibility study determined if employees would be willing to move to a new system, and what their preferred method of learning a new system would be. By considering the data gathered during tasks 1 through 4, a market survey of CMS software was conducted in two parts (Task 5). In part 1, software packages were tested on local servers to evaluate key features, such as learning curve and method of file synching. In part 2, several of the software companies were contacted to gather more information and determine if their package would meet NMDOT requirements. Through consideration of tasks 1 through 5, the best fit software package was determined (Task 6). Task 6 also ranks the software packages and provides a list of advantages and disadvantages for the best fit package. A cost-benefit analysis (Task 7) and implementation plan (Task 8) are provided for the best fit software. This report presents the work completed in the tasks listed above (Task 9: Powerpoint Slides).

TASK 1 – PERFORM A NEEDS ASSESSMENT AND SOFTWARE/EQUIPMENT SURVEY

“The Contractor shall contact NMDOT design teams and IT groups at district offices and design centers to determine

- a) the type(s) of CADD and file management systems in use
- b) the type(s) and speeds of servers used for interdistrict communication and file access
- c) the number of projects (both total and as a percentage of design projects) for which CADD files have to be accessed and modified by different individuals
- d) the number of projects that require file access/modification from different districts/design centers
- e) the degree to which file access speed (i.e, server speed and bandwidth) affect the efficiency of the design process
- f) how many copies of a CADD file typically exist, and how much work is required to determine which one is most current and who ‘owns’ it
- g) the potential for mistakes and how to overcome such obstacles”

According to the information provided by the NMDOT design teams and IT groups either in face-to-face meetings or via email:

- a) type(s) of CADD and file management systems in use*

The CADD programs in use are “Bentley Microstation Version V8i Select Series 1 (8.11.07.180)” and “Autodesk AutoCAD Versions 2004 and 2012”.

- b) type(s) and speeds of servers used for interdistrict communication and file access*

The file management system in use is a combination of shared project folders with group permissions on local file folders as shown in FIGURE 1.

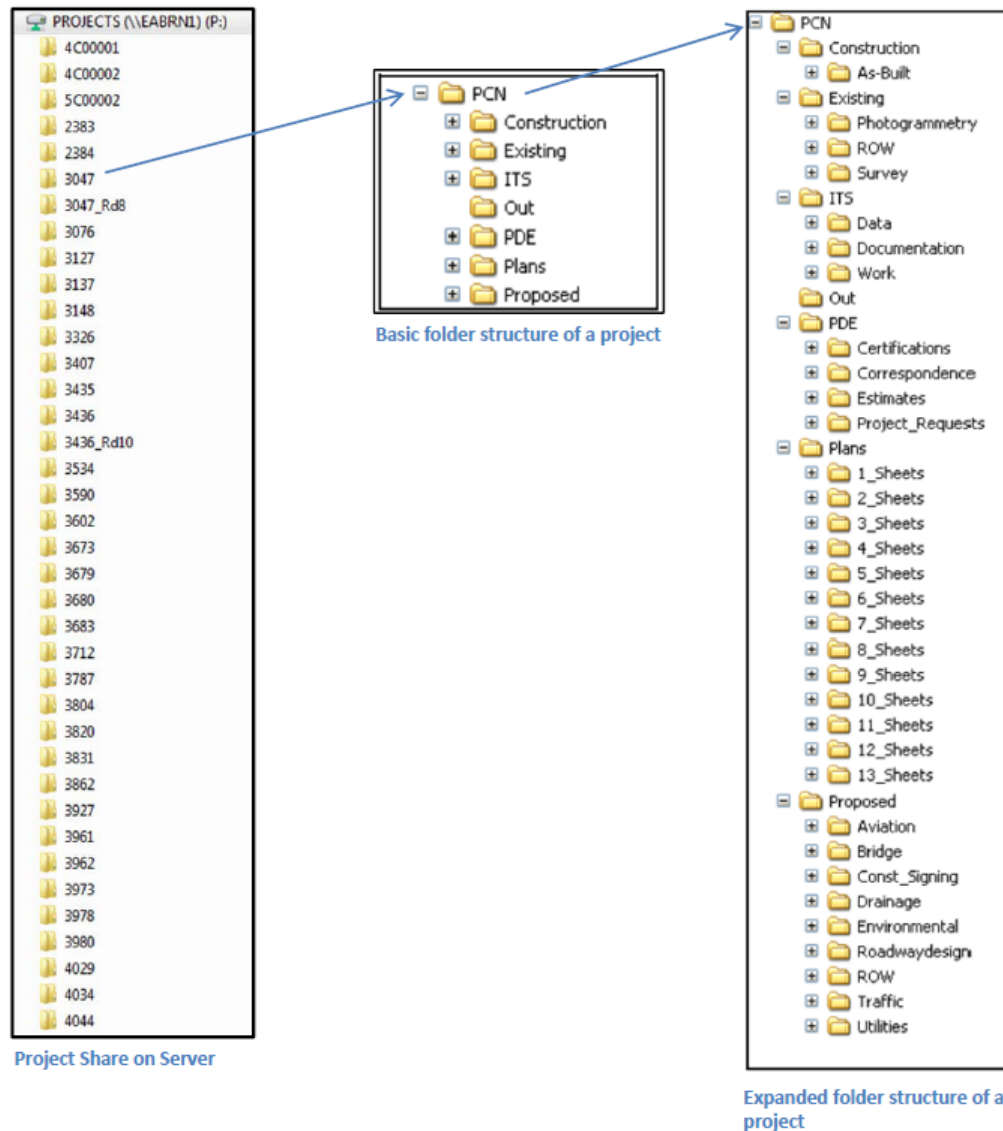


FIGURE 1 Structure of a shared folder.

c) *number of projects (both total and as a percentage of design projects) for which CADD files have to be accessed and modified by different individuals*

The number and percentage of design projects for which CADD files have to be accessed and modified by different individuals for different regions are summarized in TABLE 1.

TABLE 1 Number and percentage of design projects for different design regions.

Design Region	Number of Projects	Percentage of Design Projects
North	150	100
Central	100	100
South	100	100

- d) *number of projects that require file access/modification from different districts/design centers*

All of the projects require file access/modification from different district/design centers.

- e) *the degree to which file access speed (i.e, server speed and bandwidth) affect the efficiency of the design process*

Both server speed and bandwidth affect the efficiency of the design process significantly. However, an advanced file management/sharing program that transfers the changed bites reduces the unnecessary network traffic as well as server load.

- f) *how many copies of a CADD file typically exist, and how much work is required to determine which one is most current and who 'owns' it*

Based on the responses in the survey, most copies of CADD files are stored on the main servers. Design teams use accepted rules for file names to recognize the latest and the most recent file. However, in this current system a good communication between the individuals in different design teams is necessary to determine which file is the most current and who owns it.

- g) *the potential for mistakes and how to overcome such obstacles*

In the current file sharing system, the risk of making a mistake in sharing a file and determining the most current version or owner of the file is very high as this is a manual system defined between the individuals of a particular design team or district. Therefore, this system would not be successful if another design team or individual wanted to use a different set of rules, did not understand or did not adhere to the current system. Additionally, this system would fail if two persons work on the same file at the same time. More research is needed to determine the best ways to overcome such obstacles. However, at this point, consistent file naming, locking a file that is in use (file locking), and using an automated file sharing/management computer program seem unavoidable.

TASK 2 – ACCEPTED/STATE-OF-THE-ART PRACTICES SURVEY

“The Contractor shall determine state-of-the-art practices for the use of Content Management Systems for CADD in transportation design projects. As directed by the Technical Panel, the Contractor shall conduct surveys with the NMDOT consultant community, and states with volumes of DOT-executed transportation design work similar to that of New Mexico.”

PART I- NMDOT EMPLOYEE SURVEY

A survey form (see Appendix A) was sent to 40 individuals of NMDOT design teams. Only 23 completed forms have been received, which is almost half of the statistical sample size and it is not enough to draw a reliable conclusion. Results of the survey are shown in FIGURES 2 through 14.

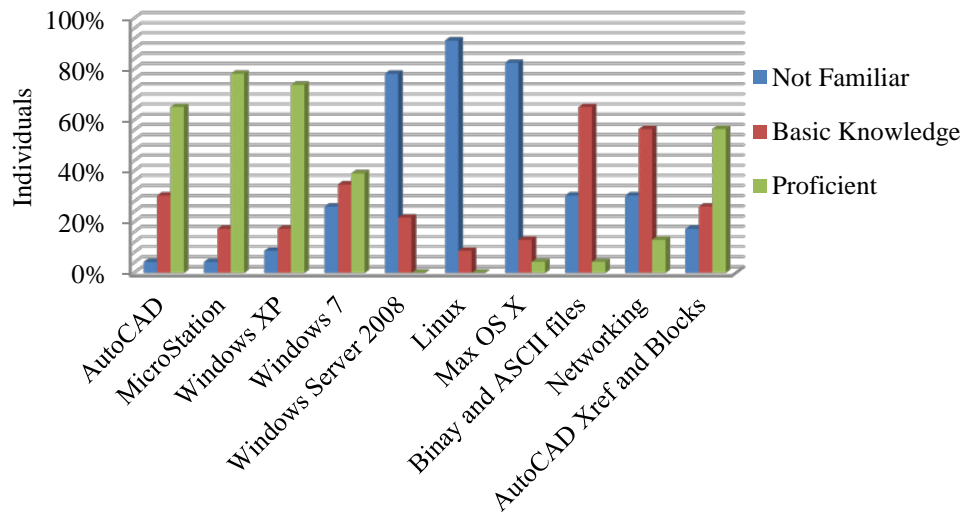


FIGURE 2 Level of computer knowledge with CADD related software.

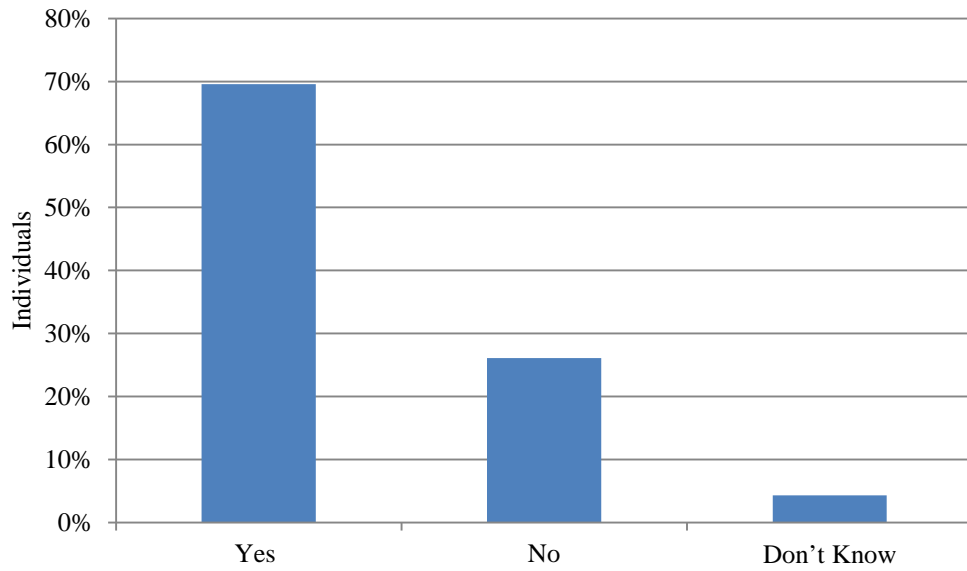


FIGURE 3 Percent of NMDOT employees with file sharing experience.

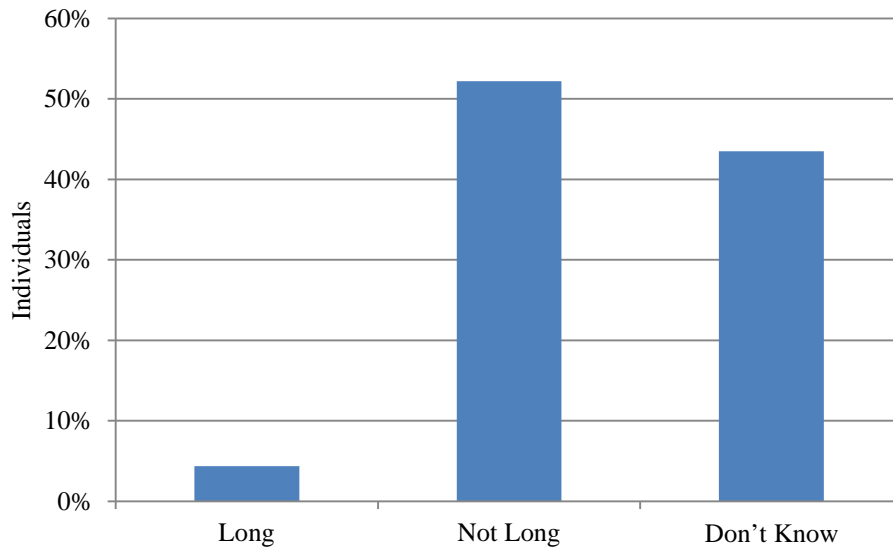


FIGURE 4 Individuals' relative feelings of access time to shared files.

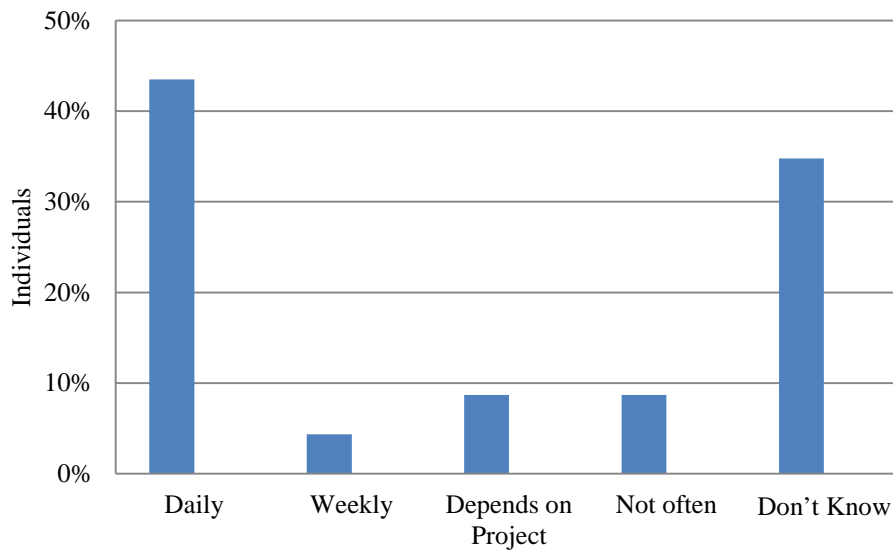


FIGURE 5 Access frequencies to shared files.

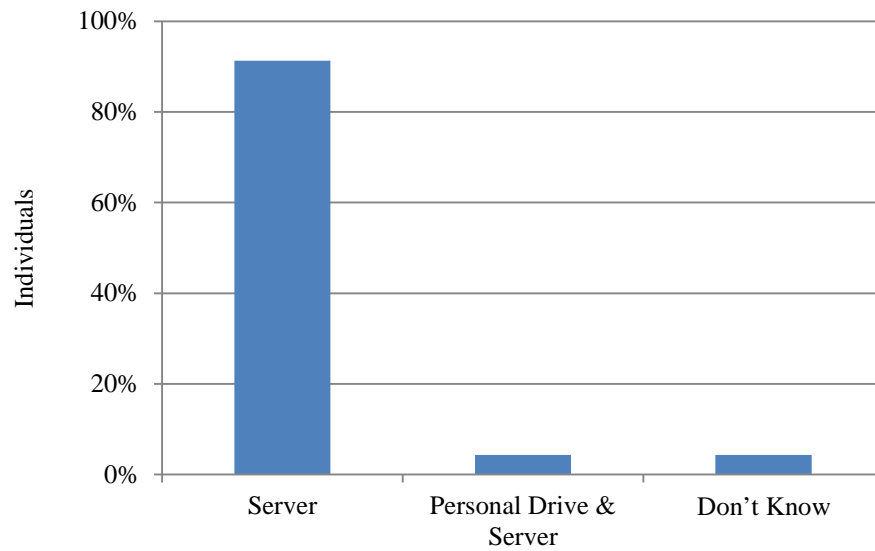


FIGURE 6 Saving location of shared files.

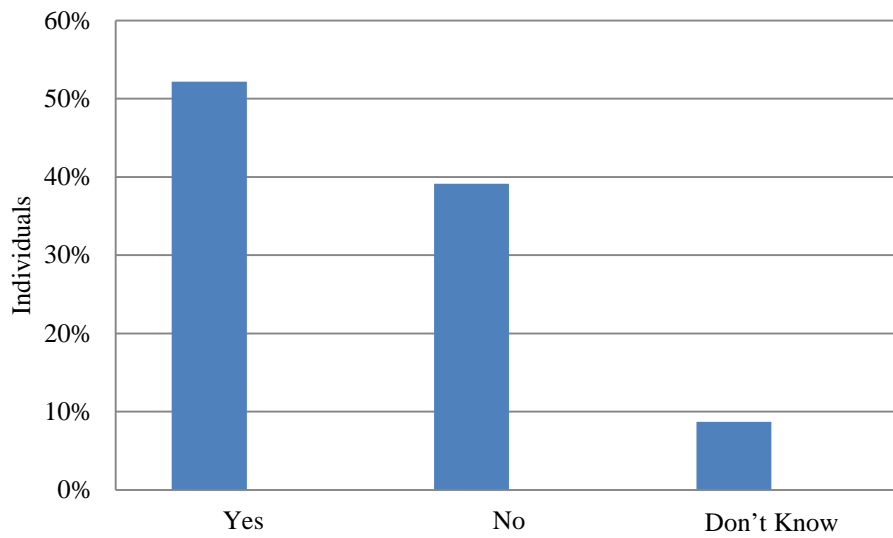


FIGURE 7 Percent of individuals familiar with a system to keep track of different versions of a file.

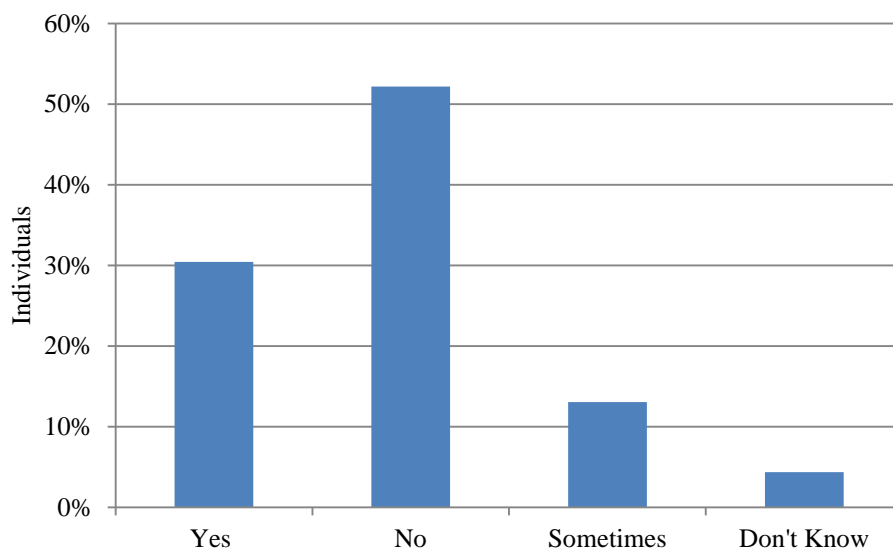


FIGURE 8 Percent of individuals who create backup files.

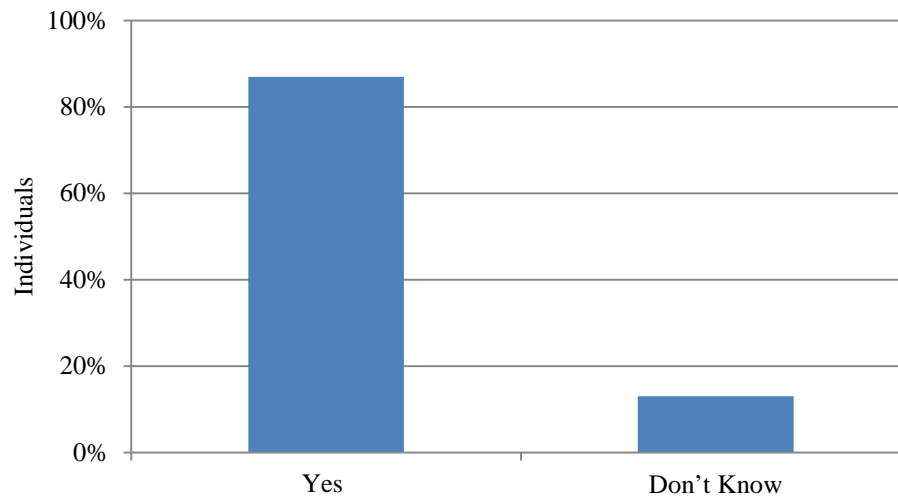


FIGURE 9 Percent of individuals who use the files on the server.

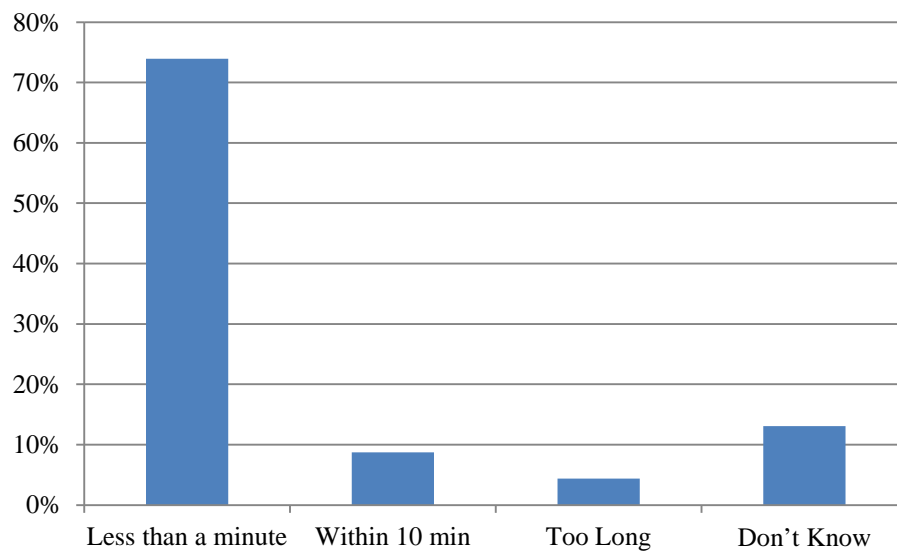


FIGURE 10 Approximate times to open a 1 MB file from the server.

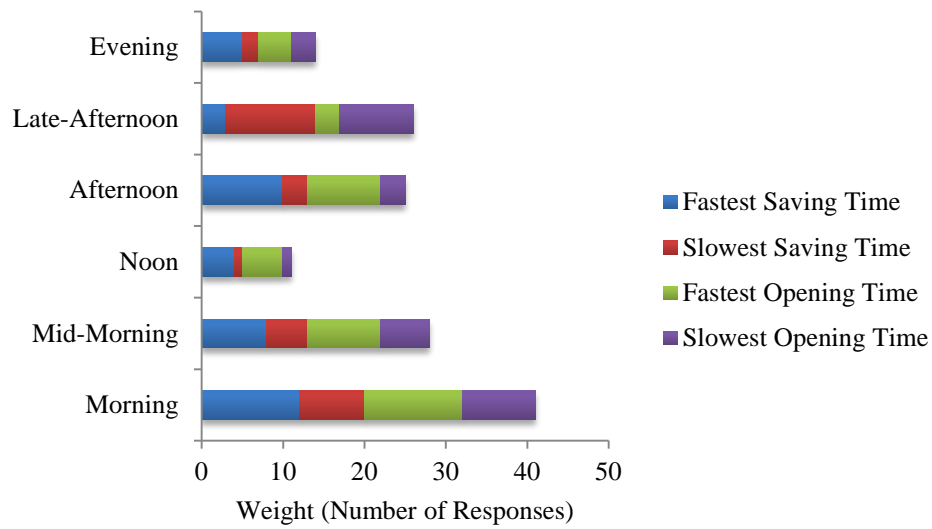


FIGURE 11 Slowest and fastest times to open and save files on the server.

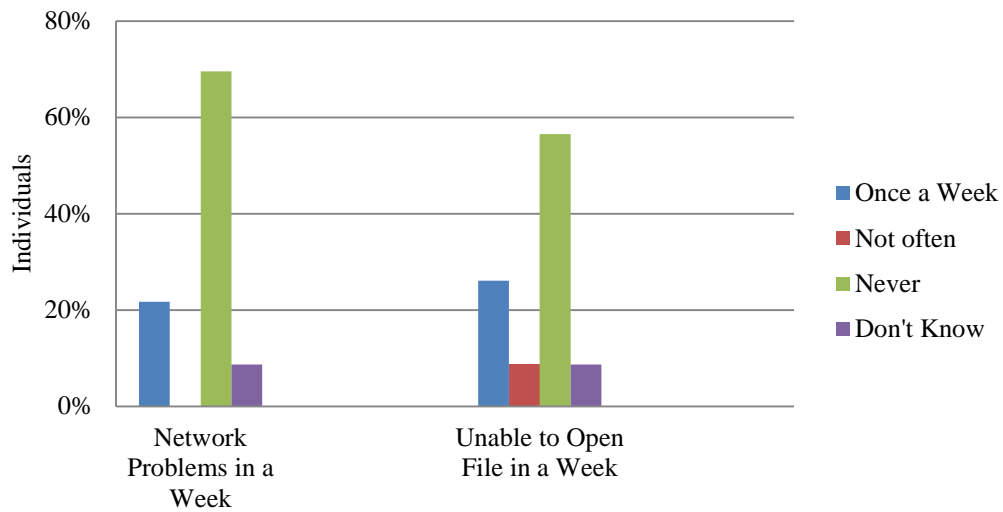


FIGURE 12 Frequency of problems associated with the NMDOT network

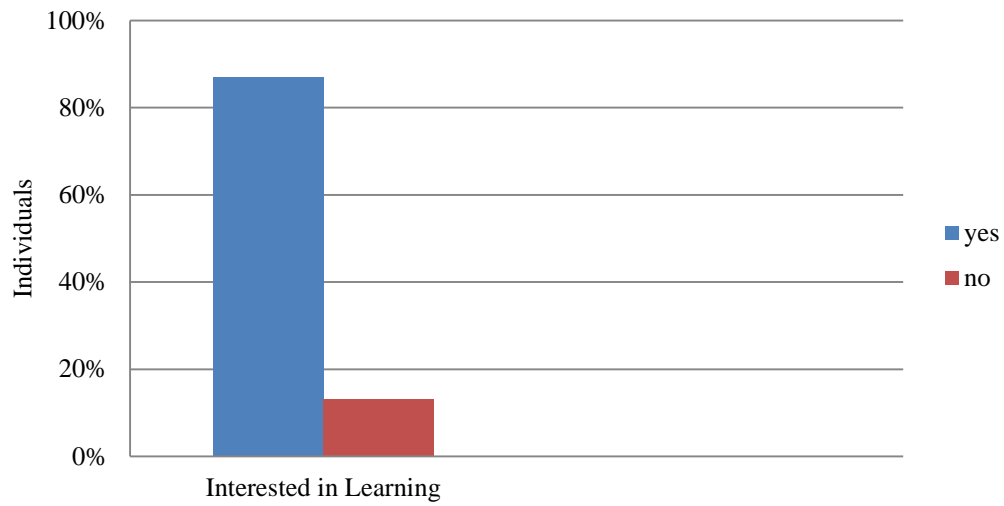


FIGURE 13 Individuals who are interested in learning a file management program.

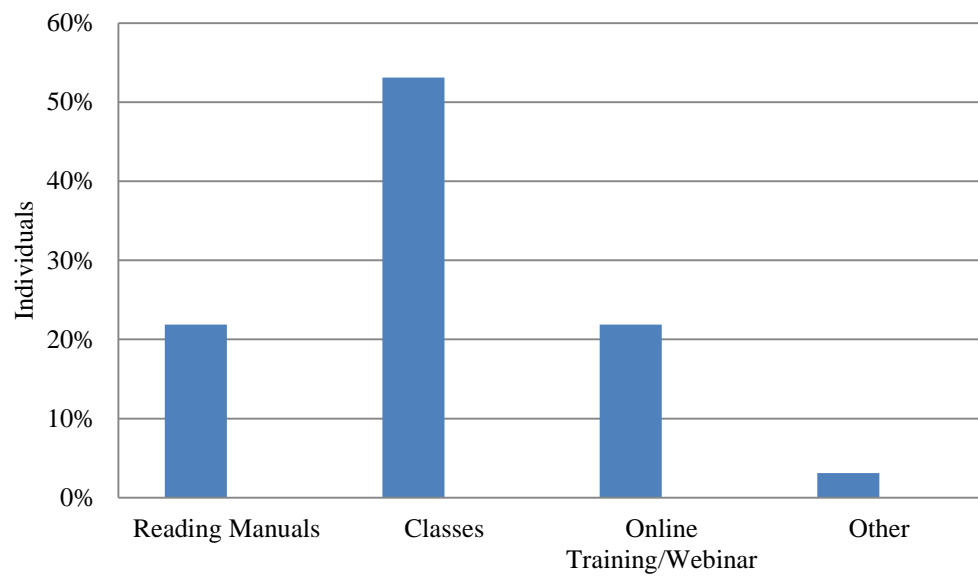


FIGURE 14 Individuals' desired method of learning a file management program.

Summary: Part I Survey

Most of NMDOT individuals feel they are proficient in using AutoCAD, MicroStation, Windows XP, and AutoCAD Xref, and blocks. However, most individuals are not familiar with Windows Server 2008, Linux, and Mac OS. They have a basic knowledge in Binary and ASCII files and Networking.

Most individuals have some experience with the use of shared files. It seems that not all employees have a consensus on how to name the shared files in order to determine which one is the most current. Most employees either use a number system or add the date to the file name.

Additionally, some employees do not save the files on the server until they are finished with the project, which can cause problems or delays since, in the meantime, there may be employees using outdated files to do their portion of the work. Regarding the back-up system, not all employees back-up their files, but trust the IT department to take care of this task.

Employees do not seem to be unsatisfied with the amount of time it takes for documents to be saved or opened; however, in recent time, they have experienced difficulty doing so in the first try. Moreover, saving or opening aerial images has proven to be more time consuming than other files. As expected, transferring files from a local server to either Santa Fe or Las Cruces takes longer than saving them to the local server. The times of day when files can be saved or opened the fastest are: morning, mid-morning, and afternoon.

Most individuals would like to gain more information about file management; the preferred delivery methods are class sessions, online training or manuals.

Conclusions: Part I Survey

It is necessary to use a file sharing/management system to determine the most recent version of a file, to make back up of important files at certain times, and to avoid mistakes. This system should be Windows based as most individuals are not familiar with any other operating system. Additionally, it should be easy to learn and use so that individuals can use this system without any major difficulties. Though the current file management system consists of rules for file naming, not all employees are aware of these rules.

At this time, bandwidth does not seem to be a major issue in file sharing though higher bandwidth is always desirable. However, a file sharing/management system that can transfer only the changed bytes of a particular file would reduce the unnecessary network traffic as well as the server loads. Training the design teams to use a file sharing/management system is the key to guarantee the effectiveness and success of the file sharing/management system.

PART II- FILE MANAGEMENT PROGRAMS USED BY OTHER DOT OFFICES

A survey was conducted to find more information about the file sharing/management computer programs that are used by department of transportation offices in different states, the efficiency of these programs, the frequency of their use, the learning curve, etc. Fourteen DOTs were selected for this survey and an electronic survey form (Appendix A) was sent to these offices. A total of twelve responses were received. It is important to note that statistically the sample size (14) is too small to draw a sound conclusion. However, the survey results would be very useful to select a file sharing/management program that meets NMDOT requirements and needs.

FIGURE 15 shows the number of users who work with a file sharing/management program in each state. As it is seen in this figure, a file sharing/management program is used by a relatively small number of users (200 users in CA DOT) as well as a large number of users (1400 users in KY DOT). The file sharing/management programs that are used by the different DOT offices are shown in FIGURE 16. A scatter is seen in the results. However, the majority of DOT offices (about 42%) use ProjectWise by Bentley. FIGURE 17 shows the number of years since each DOT office adopted a file sharing/management program. This figure shows that about 67% of the DOT offices have been using a file sharing/management program for at least 5 years.

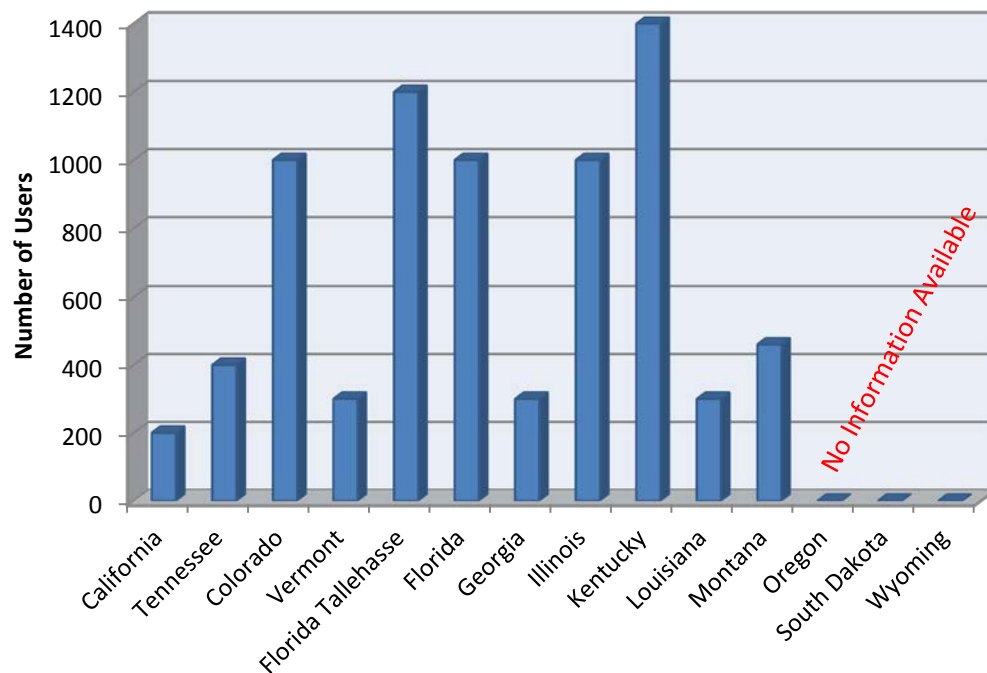


FIGURE 15 Number of users who work with a file sharing/management program for different DOT offices.

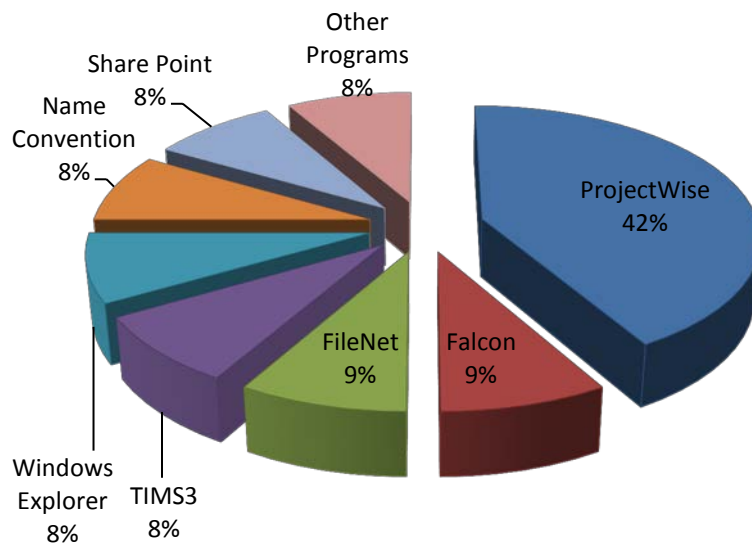


FIGURE 16 Percentage and name of the file sharing/management programs that are used by DOT offices.

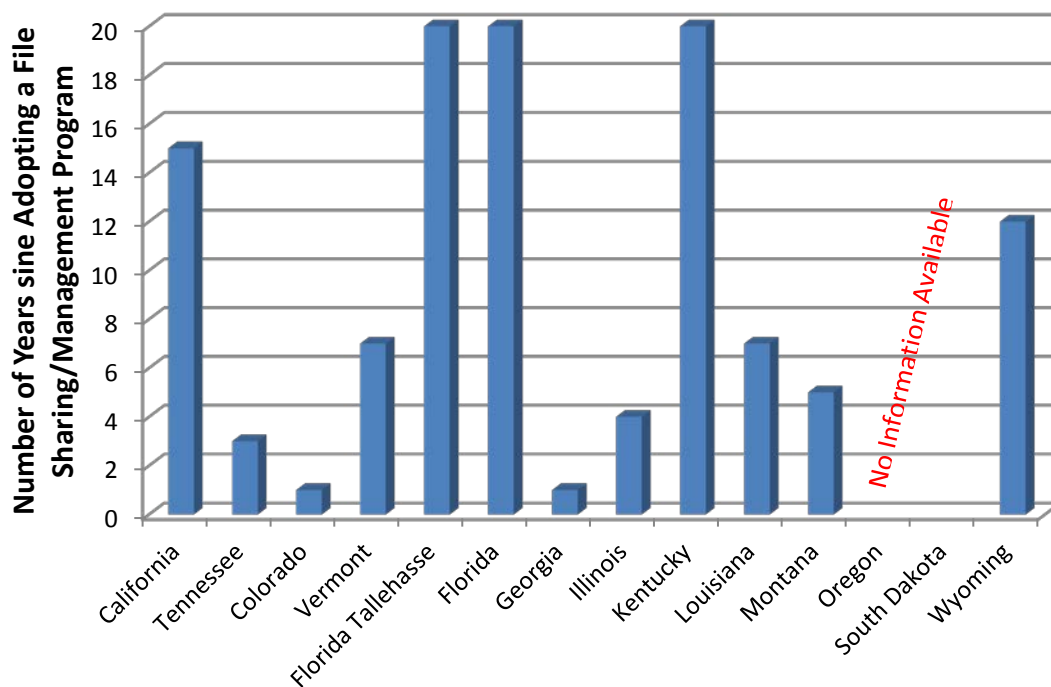


FIGURE 17 Number of years since adopting a file sharing/management program by DOT offices.

Conclusions: Part II Interview of Other DOT Offices

File sharing/management programs are used in DOT offices on a daily basis. These programs are MS-Windows based, user friendly and easy to learn. Though at the administration level good computer knowledge of networking and MS-Windows server is required, at the user level only basic computer knowledge is sufficient to work with these programs. According to the survey results, these programs increase efficiency and reduce the chance of mistakes. Most of these programs need a monthly maintenance schedule and a yearly update/upgrade. In general, use of an automated file sharing/management program is recommended by the different DOT office personnel. Among the file sharing/management programs used by DOT offices around the US, ProjectWise is the most popular program. It has been reported that ProjectWise has some issues with AutoCAD Civil 3D files and it needs further investigation.

TASK 3 – FEASIBILITY STUDY: TECHNICAL

“The Contractor shall perform a detailed examination of current Information Technology resources and future plans for upgrades. The Contractor shall develop:

- a) a detailed list of currently used servers and their performance parameters
- b) a survey of available bandwidth
- c) a survey of non-CADD related demands on bandwidth to determine the available consistent bandwidth for CADD work
- d) a comparison of available server capacity and available bandwidth to the requirements of currently available CMS software
- e) an assessment of future IT upgrade plans for the next several years
- f) an assessment of future CADD work requiring multiple file access”

As part of Task 3 on the Contract, the NMT research team contacted the NMDOT regarding available resources and future plans for upgrades. Presented below are the current findings.

a) detailed list of currently used servers and their performance parameters

There are currently 6 Dell Blade servers in use at the NMDOT, one in each of the 6 Districts. These servers are located in Deming (District 1), Roswell (District 2), Albuquerque (District 3), Las Vegas (District 4), Santa Fe (District 5), and Milan (District 6).

In addition, three 500 GB file servers are dedicated to CADD files: one in Santa Fe (EABRN 1), which serves the Northern Region and stores all software licenses, one in Albuquerque (EABRC 1), which serves the Central Region and one in Deming (EABRS 1), which serves the Southern Region of the state.

Server properties are as follows:

Type:	Dell Blade Servers
CPUs:	Quad Core Xeon Processor E5335, 2x4 MB Cache, 2.0 GHz 1333 MHz FSB, PE 1955
Memory:	8 GB 667 MHz (4x2 GB), Dual Ranked DIMMS
Ethernet:	Broadcom Dual Port TCP/IP Offload Engine Not Enabled
SCSI:	73 GB 15,000 RPM Serial-Attach SCSI 3 GBPS 2.5 in Hotplug Hard Disk Drive
Host Bus Adapter:	Qlogic Fibre Channel PCI Host Bus Adapter
Operating System:	Microsoft Windows Server 2008
Documentation:	Electronic Documentation on CD
Raid:	SAS SATA Raid 1 2 Hard Disk Drives Attached to Onboard SAS-SATA Controller

b) survey of available bandwidth

With respect to bandwidth, connections available to each of the six District Offices are 100Mb, with exception of Grants (District 6) and Deming (District 1) that have 5Mb connections.

According to Eric Roybal, Network Manager for the New Mexico Department of Transportation, each location is utilizing no more than 60% of the bandwidth available during working hours.

c) a survey of non-CADD related demands on bandwidth to determine the available consistent bandwidth for CADD work

Unfortunately, not enough information could be obtained on the non-CADD related demands on bandwidth. However, as mentioned previously, Eric Roybal, Network Manager for the NMDOT reported that each location was utilizing no more than 60% of the bandwidth available during working hours, indicating that enough bandwidth is currently available for CADD work.

Although the New Mexico Tech research team was informed that several upgrades were underway and others were planned for the near future, not enough information was available at the time of the writing of this report to complete the remaining comparison and assessments of Task 3, namely:

d) a comparison of available server capacity and available bandwidth to the requirements of currently available CMS software

e) an assessment of future IT upgrade plans for the next several years

f) an assessment of future CADD work requiring multiple file access”

TASK 4 – FEASIBILITY STUDY: CULTURAL

“The Contractor shall investigate the attitudes NMDOT IT and design personnel have toward CADD/CMS. The Contractor shall coordinate with the Technical Panel to identify appropriate personnel. This task shall include telephone and/or personal interviews, as appropriate, addressing the following topics:

- a) the perceived need for multiple CADD file access
- b) the comfort, convenience, and perceived efficiency of the currently used CADD file management systems
- c) the strengths and weaknesses of the current system
- d) willingness to change to and to learn a different system
- e) Preferred method of learning a new system (self-paced tutorials, classes, workshops)”

Task 4 of this research project consists in the investigation of NMDOT personnel attitudes towards CADD/CMS. Results from survey conducted by the NMT research team related to each of the 5 items listed on the contract are as follows:

a) perceived need for multiple CADD file access

Sharing of project files, including CADD files, are a necessity at the NMDOT. Discussion with members of the Technical Panel during quarterly meetings revealed the collaborative aspects of the design process and highlighted the importance of assuring that shared files are easily identified and assessed by the various members of the design team.

Results of the survey conducted as part of Task 1 support the view of the Technical Panel, since approximately 70% of the respondents replied that they used shared files. In addition, more than 40% of the respondents access these files on a daily basis.

b) comfort, convenience, and perceived efficiency of the currently used CADD file management systems

Results of the survey conducted in Task 1 indicate that although approximately 70% of the respondents use shared files, only half of them admitted to being familiar with a file management system. Furthermore, while approximately 90% of the respondents saved files (including CADD files) on the server, only 30% of these individuals created backup files.

This is of particular concern to the users of shared files because, to recognize the latest version of a particular file, members of design teams are currently relying on accepted rules for naming these files. As mentioned previously, this manual system of identifying the latest version of a file is very susceptible to errors. In fact, the survey mentioned above reveals that several users are not familiar with this system.

c) strengths and weaknesses of the current system

The major strengths of the system currently in place for managing shared files, that is, the use of rules for naming different versions of file as it is being updated as are follows:

- i. no additional cost to the Agency;
- ii. by saving updated files with a different name, one can easily revert to the previous version of the file should any problem arise.

The main weaknesses of the current system are:

- i. it is a manual system and therefore inherently susceptible to errors;
- ii. it relies on all members of the design team being familiar with (and consistently using) the pre-determined naming convention;
- iii. it requires the transfer of entire files from and to the server, instead of only the changed portions of the file;
- iv. it is susceptible to problems should two or more members of the design team use the file at the same time (it does not provide the option of locking the files).

d) willingness to change to and to learn a different system

Responses to the survey conducted in Task 1 indicated that approximately 90% of the respondents are interested in learning a file management program.

e) preferred method of learning a new system (self-paced tutorials, classes, workshops)

According to the results of the survey conducted in Task 1, more than 50% of the respondents prefer classes as a method of learning a new system, a little over 20% prefer reading manuals and online training/webinar is the choice of approximately another 20%.

TASK 5 – MARKET SURVEY OF CMS SOFTWARE

“The Contractor shall evaluate currently available CADD Management System (CMS) software on the basis of the present and projected future needs of the Department. The Contractor shall determine the best available software packages to fit the needs of the Department.

The Contractor, with guidance from the Technical Panel, shall choose an appropriate method to evaluate the top software packages candidates. The Contractor shall assemble a document describing the features of the top ranked packages and present them to the NMDOT Design and IT personnel for feedback.

If possible, the Contractor shall acquire evaluation versions of each software package for testing and evaluation purposes.”

PART I- GENERAL EVALUATION OF CMS SOFTWARE

In general, the available CMS programs may be divided into two major groups: open-source programs and closed-source programs. The former group of programs is (almost) free and the source files are available to the users. However, there is no customer service and the user is responsible for fixing and maintaining the program him- or herself. Closed-source programs on the other hand, are distributed without the corresponding source codes and the full versions are not free. The user pays for both the cost of ownership and support as well as maintenance. ProjectWise, Buzzsaw, and GlobalSCAPE are examples of famous commercial closed source file sharing/management computer programs and Mercurial, Bazaar, and Fosil are examples of open source programs.

For this study, the important features of nine closed-source and three open-source file sharing/management programs were investigated based on phone/email interviews. Additionally, performance and user friendliness of these programs was evaluated on a small tower server. It is important to note that the available file sharing management programs are not limited to those mentioned here. The evaluation results have been included in TABLES 1 through 12. These evaluation summaries do not necessary reflect the opinions of the project investigators.

TABLE 2 Summary of interview results for ViceVersa.

ViceVersa	
Platform	MS- Windows 7, XP, 2008, 2003
How It Works	synchronize files, replicate folders
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Entire files, need client/server solution for byte changes
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	10 years
Customers Who Can Share Their Experience	Look at forum
Total Cost (upgrade, update, maintenance, support, and number of licenses)	www.tgrmn.com/web/buy.htm maintenance is not sold but upgrades are voluntarily
Video Presentation (planned or available)	some has been provided through www.youtube.com

TABLE 3 Summary of interview results for Thru.

Thru	
Platform	Cloud based on Microsoft Net Framework
How It Works	Permissions set by admin or managers for individual users or user groups mean for example files can be read-only for all that have access to the file, editing allowed for a subset and deletion only allowed by a few. Access to files can also be expired on a time basis. This is all user-configurable.
File Locking	Thru utilizes a proprietary file acceleration methodology
Transfer of the Entire Files or Only Changed Bytes	Unknown
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Basic computer knowledge is needed; training is provided to admin and users
Learning Curve	Fast (a few hours)
Years Being in Business	10 years
Customers Who Can Share Their Experience	Reference can be proved at the appropriate point in the evolution process
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Available upon request
Video Presentation (planned or available)	Yes

TABLE 4 Summary of interview results for GlobalSCAPE.

GlobalSCAPE	
Platform	MS-Windows
How It Works	Needs a master file system, an application, and slaves
File Locking	If application support file locking then yes, AutoCAD file locking platform: yes
Transfer of the Entire Files or Only Changed Bytes	Changed bytes
Supported File Types	Any type (not database file, as long as database is open)
Computer Knowledge Needed to Install the Program	Someone familiar with MS-Windows
Learning Curve	Fast and Easy
Years Being in Business	16 years
Customers Who Can Share Their Experience	Upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	\$3000 per site (each server) + 20-30% for maintenance depends on the type of support
Video Presentation (planned or available)	Yes

TABLE 5 Summary of interview results for Software Pursuits.

Software Pursuits	
Platform	MS-Window 7, Vista, XP, 2008, 2003
How It Works	Synchronize on files and size of files, operate in 3 modes: manual, schedule base, and real time (limited to MS-Windows machines, continues replication)
File Locking	Yes, depends on application type, basic version of AutoCAD, Micro Station has to be tested, some 3D aspects do not work for AutoCAD
Transfer of the Entire Files or Only Changed Bytes	File locking is real-time and bit level, does not copy whole file (surething collaboration bundle)
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Basic install wizard, knowledge of data structure is a good thing, need some technology
Learning Curve	Fast, once after installation, go to a mini demo, some step to learn
Years Being in Business	37 years
Customers Who Can Share Their Experience	Upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	\$1200 per server = \$4800 annual maintenance (\$899 for 4 servers/year gives them priority support and free upgrades) + 30 days free +10% discount due to government, sync lock \$50 per computer, gives more transparency (optional)
Video Presentation (planned or available)	Yes

TABLE 6 Summary of interview results for YouSentIt.

YouSendIt	
Platform	MS-Windows and MAC OS
How It Works	Two main categories send, receive, and track of large files, collaboration similar to dropbox
File Locking	locking with different version, manual synchronization
Transfer of the Entire Files or Only Changed Bytes	Changed bytes
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Depends, can be used even without installation (If you can install windows media player then you can install You Send It.)
Learning Curve	Fast and easy
Years Being in Business	12 years
Customers Who Can Share Their Experience	Upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	no maintenance + support (done per user not server: 30 users for 1 year = \$5130), government discount available
Video Presentation (planned or available)	Yes

TABLE 7 Summary of interview results for repliWEB.

repliWEB	
Platform	MS-Windows, Unix, Linux, and Solaris
How It Works	Depends on the purpose
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Both options are available
Supported File Types	Any
Computer Knowledge Needed to Install the Program	Very little, easy installation script, training is provided.
Learning Curve	Easy
Years Being in Business	12 years
Customers Who Can Share Their Experience	Upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Based on type of license + annual maintenance fee. \$2500 for each server, government discounts available
Video Presentation (planned or available)	Yes

TABLE 8 Summary of interview results for Buzzsaw.

Buzzsaw	
Platform	MS-Windows
How It Works	It is an online web repository for the user to store, manage and retrieve project data for the design team.
File Locking	Yes
Transfer of the Entire Files or Only Changed Bytes	Entire file; the application facilitates the storage of files and tools to allow or restrict access. Files are created or authored with other applications like AutoCAD, Word, Adobe, etc.
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Easy
Learning Curve	Easy
Years Being in Business	IMAGINiT has been a company for about 10 years now. However, the companies that came together to form IMAGINiT have been in business for more than 20 years.
Customers Who Can Share Their Experience	Refer to Autodesk
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Buzzsaw 25-User pack will run about \$3,745.00 roughly. There may be additional costs associated. More directly from Autodesk: http://usa.autodesk.com/buzzsaw/how-to-buy/
Video Presentation (planned or available)	Ask

TABLE 9 Summary of interview results for GoodSync.

GoodSync	
Platform	MS-Windows, MAC OS, Unix, and Linux
How It Works	The program works by analyzing and syncing files from a 'source' folder to a 'destination' folder. These can be present in many different areas including the cloud, offsite or within the organization. Once a 'job' has been set up and the folders have been identified on both sides, the program will copy those files (even locked files) to the other location at either a specified time or upon changes being detected.
File Locking	Locked files are copied using VSS to leverage a shadow copy of the file and copy it to the necessary destination.
Transfer of the Entire Files or Only Changed Bytes	The software can handle both.
Supported File Types	GoodSync uploads and downloads files and folders with non-latin names just fine. It works correctly on Windows, networks, FTP, SFTP, WebDAV, S3 file servers. It uses UTF-8 to encode file and folder names in transfer and UNICODE internally.
Computer Knowledge Needed to Install the Program	A basic knowledge of Windows is sufficient; the program is very user friendly and was designed to be able to be used by the average end users.
Learning Curve	Quite fast as the user interface again was designed to be very friendly to the average user. The software does not require training to be able to navigate.
Years Being in Business	17 years (Incorporated in 1995 and began selling products in 1999)
Customers Who Can Share Their Experience	Yes (Fish and Wildlife Service, World Bank even the Pittsburgh Pirates)
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Base Price is \$995 per server with 20% annual maintenance, for the workstations they start at \$39.95 with 20% annual maintenance. Volume discounting is available as well.
Video Presentation (planned or available)	Yes

TABLE 10 Summary of interview results for ProjectWise.

ProjectWise	
Platform	Windows Server 2008 is the main server OS and Windows for the desktop.
How It Works	ProjectWise is a project collaboration and engineering information management solution developed explicitly for the design and construction of architecture, engineering, construction, and operations (AECO) of infrastructure projects. Unlike traditional document management and collaboration software, ProjectWise is a system of collaboration servers and services for AECO information for the design and construction of infrastructure projects while the work is in progress. It provides scalable, industry-proven, advantages in work sharing, content re-use, and dynamic feedback.
File Locking	Yes. It only allows for one person to edit a file at a time regardless of geography.
Transfer of the Entire Files or Only Changed Bytes	Yes. ProjectWise utilizes Delta File Transfer technology that transfers only changed bytes, which works on all file types.
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	ProjectWise client applications are simple to install. ProjectWise server applications typically require Bentley Professional Services to deploy.
Learning Curve	ProjectWise has an interface that is very similar to Windows Explorer, so the learning curve is relatively short for someone who is accustomed to using Windows.
Years Being in Business	28 years
Customers Who Can Share Their Experience	44 of the ENR Top 50 engineering firms and nearly half of all US DOTs use ProjectWise
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Depends on the number of users and servers
Video Presentation (planned or available)	Yes

TABLE 11 Summary of interview results for Mercurial.

Mercurial	
Platform	MS-Windows, MAC OS (Platform Independent)
How It Works	Mercurial is a cross-platform, distributed revision control tool for software developers. It is mainly implemented using the Python programming language, but includes a binary diff implementation written in C. It is supported on Windows and Unix-like systems, such as FreeBSD, Mac OS X and Linux. Mercurial is primarily a command line program but graphical user interface extensions are available. All of Mercurial's operations are invoked as arguments to its driver program hg, a reference to the chemical symbol of the element mercury.
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Changed Bytes
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Some knowledge of coding is required.
Learning Curve	Some
Years Being in Business	7 years
Customers Who Can Share Their Experience	N/A
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Free (Open Source)
Video Presentation (planned or available)	N/A

TABLE 12 Summary of interview results for Bazaar.

Bazaar	
Platform	MS-Windows, UNIX, and Solaris
How It Works	Unknown
File Locking	Unknown
Transfer of the Entire Files or Only Changed Bytes	Unknown
Supported File Types	Supports files with names from the complete Unicode set
Computer Knowledge Needed to Install the Program	Some knowledge of coding is required.
Learning Curve	Long
Years Being in Business	4 years
Customers Who Can Share Their Experience	N/A
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Free (Open Source)
Video Presentation (planned or available)	N/A

TABLE 13 Summary of interview results for Fossil.

Fossil	
Platform	MS-Windows, MAC OS, and Linux
How It Works	Fossil works with repository files (a database with the project complete history) and with checked-out local trees.
File Locking	Unknown
Transfer of the Entire Files or Only Changed Bytes	Keep updates and do not override files
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Some knowledge of coding is required.
Learning Curve	High
Years Being in Business	6 years
Customers Who Can Share Their Experience	N/A
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Free (Open Source)
Video Presentation (planned or available)	N/A

PART II- EVALUATION OF CMS SOFTWARE WITH SECURE/MANAGED FILE TRANSFER SOLUTIONS

As the second part of the market survey of CMS software, 9 different companies who provide secure/managed file transfer solutions were contacted to acquire more information and determine whether their programs would meet NMDOT requirements. Five companies responded and provided more details about their file transfer/management programs. The results have been summarized in TABLES 1 through 5. Although these programs transfer files from one computer to another securely, for file sharing or file management, the settings need to be changed and most parts of the file sharing/management process is done manually. Additionally, these programs transfer the entire file, not only the changed bytes of an edited file. Therefore, these programs will not speed up the file sharing/management process. Nevertheless, NMDOT may need to consider these programs for secure file transferring.

TABLE 14 Summary of interview results for Biscom Delivery Server (BDS).

Biscom Delivery Server (BDS)	
Platform	MS- Windows and Linux
How It Works	Transfer files securely using different protocols and email
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Entire files
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	26 years
Customers Who Can Share Their Experience	Available upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	Approximately \$15,000 for 100 users; 20% of that price for yearly maintenance. More information is needed for an accurate price quote.
Video Presentation (planned or available)	Yes

TABLE 15 Summary of interview results for Seeburger Business Integration Service (BIS).
Seeburger Business Integration Service (BIS)

Platform	Java/J2EE based: platform independent
How It Works	Transfer files securely using different protocols
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Entire files
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	26 years
Customers Who Can Share Their Experience	Available upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	More information is needed for an accurate price quote.
Video Presentation (planned or available)	Yes; recorded material are already available.

TABLE 16 Summary of interview results for Accellion.

Accellion	
Platform	MS-Windows, Linux, and MAC OS
How It Works	Transfer files securely using different protocols
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Entire files
Supported File Types	All Microsoft products, HTML, TEXT, and ETC
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	More than 10 years
Customers Who Can Share Their Experience	Available on www.accellion.com
Total Cost (upgrade, update, maintenance, support, and number of licenses)	More information is needed for an accurate price quote.
Video Presentation (planned or available)	Yes

TABLE 17 Summary of interview results for Diplomat Transaction Manager by Coviant.

Diplomat Transaction Manager by Coviant	
Platform	MS-Windows and Linux
How It Works	Transfer files securely using FTP
File Locking	Yes
Transfer of the Entire Files or Only Changed Bytes	Entire files
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	8 years
Customers Who Can Share Their Experience	Available upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	More information is needed for an accurate price quote.
Video Presentation (planned or available)	Yes

TABLE 18 Summary of interview results for Axway.

Axway	
Platform	MS-Windows, Linux, AIX, and Sun Solaris
How It Works	Transfer files securely using different protocols
File Locking	No
Transfer of the Entire Files or Only Changed Bytes	Entire files
Supported File Types	Any type
Computer Knowledge Needed to Install the Program	Not very much, Easy
Learning Curve	Fast
Years Being in Business	More than 10 years
Customers Who Can Share Their Experience	Available upon request
Total Cost (upgrade, update, maintenance, support, and number of licenses)	More information is needed for an accurate price quote.
Video Presentation (planned or available)	Yes

TASK 6 – RECOMMENDATION OF BEST SOFTWARE FIT FOR NMDOT

“The Contractor shall select the best software package for recommended adoption. The Contractor shall recommend the best software package on the basis of technical adequacy for current and projected future needs, smoothness of integration with current practices, and cost.

The Contractor shall rank the best candidates and provide a full list of advantages and disadvantages for each package.”

COMPARISON OF BUZZSAW AND PROJECTWISE

Based on the surveys, the features and limitations of the available file sharing/management computer programs, and NMDOT needs, two programs seem to meet NMDOT requirements: Buzzsaw and ProjectWise. Buzzsaw is a computer program developed by Autodesk to support Building Information Modeling (BIM) workflows. This program provides a secure access to information from desktop computers, laptops, and smart-phones. Buzzsaw is completely matched with all Autodesk products such as Civil 3D but cannot completely support all versions of other companies' products in older versions (1). ProjectWise is the information management and project collaboration software developed by Bentley. ProjectWise is a Microsoft Windows based program. Therefore, it has a full compatibility with MicroStation and other Bentley's products but its integration compatibility with Autodesk's products is not fully guaranteed (2).

General requirements for installation and applications for both Buzzsaw and ProjectWise are very similar. However, these two programs are not the same in structure and function. Both programs support Mac OS. In case of mobility and remote access, Buzzsaw has an application for smart-phones which works smoothly. ProjectWise has a tablet application for iPad.

Users may upload and download any file type by using either of these programs. Synchronization is done smoothly in both programs. Buzzsaw is updated automatically several times a year while ProjectWise needs to be updated manually. PIs are satisfied with the support provided by ProjectWise customer service. However, Autodesk pre-sale customer support is web-based and technical questions are not answered by phone.

Among the entire discussions on the web forums about Buzzsaw and ProjectWise, about two third of the users recommend Buzzsaw (3 and 4). The trial version provided by Autodesk at no cost for the new users has an important role in the popularity of Buzzsaw. Users first try the software before any serious decision and during this trial period, they become accustomed to the software. Another advantage of Buzzsaw is the free collaborating site of Autodesk which is quite user-friendly.

Users who share their experience on the web forums believe that Buzzsaw is much more convenient for external users. Also of interest is the independent application provided by Autodesk for AutoCAD file collaboration. This web-based CAD application called AutoCAD WS, which is similar to Buzzsaw, lets users view and edit CAD drawings online, without having

any special software. What makes AutoCAD WS different from other software at Autodesk is the fact that it is a downsized editor (for now), and it has features that accelerate the design process. For instance, it makes it possible for two users to work on a same file at the same time Autodesk User Group International (5).

Based on users' viewpoints in different forums, Autodesk is keeping its old way without any real innovation while Bentley is enhancing its product, and as a mature company, it has much more facilities for users such as better customer service (3).

ProjectWise: Reported Problems and Solutions

To download and work with large files, ProjectWise offers two new technologies called delta file transfer and data compression. Delta file transfer is the new ProjectWise technology that improves performance when sending large files over networks with high latency / low bandwidth connections by only sending the changes needed to update the file, rather than the entire file. For optimal performance, delta file transfer is used along with existing ProjectWise local file caching functionality.

Data compression is the new ProjectWise technology that improves performance over Networks with high latency / low bandwidth connections by compressing the data that is being sent to or retrieved from the ProjectWise database. The data are then compressed when it reaches its destination. Performance improvements will be most noticeable with large amounts of data (e.g., thousands of documents in a folder) across high latency / low bandwidth connections.

ProjectWise offers several different solutions for working with different file formats generated by Autodesk programs.

- X-ref Files: When a DWG is double clicked in ProjectWise, the file is copied down to a working directory and then AutoCAD opens. If the ProjectWise integration is installed, there will be a ProjectWise menu in AutoCAD. The menu will allow the user to attach X-ref files that live in ProjectWise, save files back to ProjectWise, and check them in.
- Other file types like DWF: Any file extension can be mapped to any application. In general DWF files are by default mapped to AutoCAD.
- Converting DGN's to DWG/DWF: This is a function in MicroStation.

The latest version of ProjectWise (V8i) supports all AutoCAD versions not later than 2007, Microsoft Office 2010, 2007 and 2003 and AutoCAD CIVIL 3D versions not later than 2009. No report about its compatibility with ArcMAP and ESRI products was found. A compatibility list for ProjectWise with different engineering programs has been included in appendix B.

Buzzsaw: Reported Problems and Solutions

Working with large files might cause some issues in this software as it is not possible to load a file partially and save changes just on that special part or layer. The company has not introduced any additional program to address this issue. Its mobile version has some difficulty in opening some file types such as DWF. Synchronization issues have been reported on the web. AutoVue can be used as the supplementary program which convenience CAD files conversion. However, it needs to be purchased separately from Oracle (6). Batch printing DWF files has some difficulties in Buzzsaw. To batch plot in Buzzsaw, users should use the batch plot capability of AutoCAD or any other similar software. Based on users' reports, the latest version of Buzzsaw cannot search words based on attribute in files containing text and this issue causes trouble while users are working with dozens of reports. However, Autodesk has developed a team to fix this problem in later versions.

EVALUATION OF IMPORTANT BUZZSAW FEATURES ON NMT LOCAL NETWORK

Unlike Bentley, Autodesk offers a free trial version of Buzzsaw. The installation of the program is straightforward. In addition, users can access the Buzzsaw server on the web, without any special software. Users can view all thumbnails, images, BIM models, 2D/3D DWF files, and view or edit DWG files. All of these activities are done on a designated space on the server.

Buzzsaw Sync program automatically synchronizes local files to Buzzsaw server securely with no workflow interruption. While the server is updating or a user is sharing a file, it will take more time to connect to the server or the error of inability to connect will appear on the screen.

On the web, users with file edit permission (determined by the server administrator) can upload files, while other users can only view and download files to their local machines. Any file can be uploaded to and downloaded from this area whether the users have the corresponding program or not.

Two or more users will not be able to work on a single file simultaneously. When a user is editing a file, the file is locked to be edited by other users. A temporary copy of the file is downloaded to the local machine of the user currently working with the file. Once the user closes the application that is used to edit the file, the temporary copy of the file is uploaded to the server as the new version of the file and the file is unlocked.

The required time to access the Buzzsaw server was recorded at different times in a 24 hour period. The average time to connect to the Buzzsaw server from the local NMT network is about 11 seconds. Obviously, the upload or download time depend on the file size and bandwidth available.

CONCLUSION: RECOMMENDED PROGRAM

It is important to note that the capabilities and features of these programs improve with time and for this reason this conclusion might need to be revised in the future. Among many different file sharing/management computer programs two programs better meet the NMDOT requirements: Buzzsaw by Autodesk and ProjectWise by Bentley. Buzzsaw is a file sharing program that uses a dedicated server by Autodesk. Consequently, almost no IT support by NMDOT personnel would be required. On the other hand, ProjectWise is a file sharing/management program that needs a local dedicated server and continuous IT support. However, ProjectWise can transfer only the changed bytes of a file.

Obtaining a first-hand evaluation of ProjectWise features on a local server was not possible due to lack of IT support, which shows the important role of IT support should ProjectWise be adopted. One of the advantages of Buzzsaw is its compatibility with all Autodesk products. Cost is an important factor in adopting a file sharing/management program. It is mainly a function of the number of users (or licenses) and capabilities of the program.

Both Buzzsaw and ProjectWise meet most of the NMDOT requirements. Since it may be more convenient for the NMDOT not to dedicate a server for file sharing/management, Buzzsaw is the recommended choice. However, Bentley products have been used by the NMDOT design teams for quite a long time. Therefore, switching to ProjectWise after some time might be unavoidable.

TASK 7 – COST-BENEFIT ANALYSIS OF IMPLEMENTING CADD/CMS IN NMDOT

“The Contractor shall address the costs of adopting the recommended CADD/CMS system. The analysis shall include startup and running costs, compared with projected savings of man-hours in greater efficiency of file-handling. The Contractor shall address training requirements for project retraining requirements for new releases of the CMS software.”

The cost of implementing CADD/CMS in NMDOT includes the following costs:

1. Initial cost of each license (L)
The total cost for this item depends on the number of required licenses that needs to be purchased (n).
2. Cost of hardware upgrade to meet the system requirements of the software (H)
3. Cost of training (T)
Online multimedia and webinars would reduce this cost significantly.
4. Cost of change in schedule of NMDOT personnel and working procedure (S)
Training could change the regular schedule of the NMDOT personnel and this change will result in extra costs.
5. Cost of annual maintenance/upgrade contract, which is usually considered as a percentage of the price of the licenses (M).
6. Unforeseen costs (U)

Assuming the CADD/CMS software will be used for 10 years, the total cost (C) is calculated by the following equation.

$$C = nL + H + T + S + 10M + U \quad (1)$$

Since the margin of error in Equation 1 for the unforeseen costs (U) is relatively large, U is estimated to be a percentage (λ) of the rest of the costs ($nL + H + T + S + M$). Hence, the total cost will be:

$$C = (\lambda\% / 100 + 1) (nL + H + T + S + 10M) \quad (2)$$

The monthly cost is obtained from the following equation:

$$C = (\lambda\% / 12,000 + 1/120) (nL + H + T + S + M) \quad (3)$$

The benefits of implementing CADD/CMS in NMDOT are as follows.

1. Reduce the chance of mistakes
2. Reduce the labor costs
3. Save time and increase productivity

The procedure outlined above can only quantify the benefits and costs if more accurate and reliable data becomes available. According to the survey results and NMDOT requirements, however, the benefits associated with implementing CADD/CMS in NMDOT would easily justify the costs.

TASK 8 – IMPLEMENTATION PLAN

“The Contractor shall develop a comprehensive implementation plan for the recommended ‘best fit’ software package. This shall include recommended purchasing options (e.g. what kind of license to buy), recommended training protocols (e.g. Web-based tutorial, classes, workshops), and training and implementation timeline. The Implementation Plan shall include a comprehensive list of Departmental needs for implementation such as the number of man-hours necessary to implement a CMS, necessary network upgrades (equip., software), estimated downtime for upgrade to CMS, estimated cost and justification for costs. The Implementation Plan Shall be a coordinated effort between the Contractor and the Technical Panel.”

Due to recent developments at the New Mexico Department of Transportation, including the replacement of Bentley Design and Survey Software by Autodesk products, the implementation of a full file management system does not seem feasible at this time. However, the file sharing system Autodesk Buzzsaw is recommended for immediate use, to increase data collaboration throughout the NMDOT and extended Consultant Community.

Because NMDOT is in the process of acquiring a suite of Autodesk products, the cloud storage site would be hosted by Autodesk who would also provide the necessary training to NMDOT personnel. NMDOT will only be responsible for providing information on the number of internal users and the types of permissions required for such users, as well as the number of external users along with their requested types of permissions and where applicable, the duration of these permissions. NMDOT would also be responsible for scheduling the training sessions. To avoid confusion, it is recommended that a single individual at NMDOT be in charge of coordinating the training sessions as well as keeping records of the users and their respective permissions.

Since a method will still be required to keep track of the latest version of shared files and to assure that older versions of the file are still available, should there be a need to revert to previous versions, the research team recommends widespread distribution of naming rules to be employed. This could be done via an internal memo to supervisors, where the importance of adhering to such rules would be stressed. Supervisors would then be responsible for assuring that all users are aware of the rules and consistently use them.

Should the NMDOT decide to adopt a file sharing/management system in the near future, the research team recommends Buzzsaw for immediate use. However, Buzzsaw is not a file management program, and in long term if there is no compatibility issue with Autodesk products or using a local dedicated file management/sharing server, switching to ProjectWise is recommended.

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Appendix A

Survey Questionnaire

Interview of NMDOT Personnel

This survey is part of the CADD Content Management Feasibility Assessment, Market Study, and Implementation Research Project the New Mexico Institute of Mining and Technology is conducting with the New Mexico Department of Transportation Research Bureau to improve NMDOT file sharing/management system. We hope you will take the time to complete this questionnaire. Responses will be anonymous.

1. How would you describe your knowledge of the programs listed below? Please check whether you are: not familiar with the software, have a basic understanding of the software, or are proficient with the software.

	Not Familiar	Basic knowledge	Proficient
a. AutoCAD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. MicroStation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Windows XP	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Windows 7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Windows Server 2008	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Linux	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Mac OS X	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Binary and ASCII files	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Networking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. AutoCAD Xref and Blocks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comment:

2. Have you ever worked with shared files? If yes, what process did you use to assure you (and others) were accessing the latest version of the file?

- 2.1. How long did it take to access the shared file?

- 2.2. How often do you need to access shared files?

3. Where do you save your AutoCAD and/or Microstation files (on server or on your local machine or both)?

4. Do you have a system to keep track of different versions of a particular file? Please explain below.

5. Do you create back-up of files? If yes: how often? Where are these back-up files stored? What system do you use to keep track of old versions of the same file?

6. Do you use files stored on a server? If yes, how long does it take to save a 1 MB file on the server?

7. How long approximately does it take to open a 1 MB file from the server?

8. What time of the day is saving a file on the server the fastest?

- ☐ Morning
- ☐ Mid-Morning
- ☐ Noon
- ☐ Afternoon
- ☐ Late-Afternoon
- ☐ Evening

9. What time of the day is saving a file on the server the slowest?

- ☐ Morning
- ☐ Mid-Morning
- ☐ Noon
- ☐ Afternoon
- ☐ Late-Afternoon
- ☐ Evening

10. What time of the day is opening a file on the server the fastest?

- ☐ Morning
- ☐ Mid-Morning
- ☐ Noon
- ☐ Afternoon
- ☐ Late-Afternoon
- ☐ Evening

11. What time of the day is opening a file on the server the slowest?

- ☐ Morning
- ☐ Mid-Morning
- ☐ Noon
- ☐ Afternoon
- ☐ Late-Afternoon
- ☐ Evening

12. In a week, how often are you unable to save a file on the server due to network problems?

13. In a week, how often are you unable to open a file from the server?

14. Are you interested in learning and applying a file management program?

Please Choose

14.1. If no, please explain why?

14.2. If yes, how would you prefer to learn a new file management computer program? Choose from the options given.

- ☐ Reading a manuals
- ☐ Classes
- ☐ Online training/Webinars
- ☐ Other (Please explain.)

15. Do you have any suggestions/recommendations for managing, sharing, and keeping track of different versions of AutoCAD and Microstation files?

E-Mail Survey Form

Appendix B

ProjectWise V8i Integration Compatibility

(http://communities.bentley.com/products/projectwise/content_management/m/mediagallery/177368.aspx)

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
PLATFORM APPS						
MicroStation V8i (SELECTseries 3)	08.11.09.292+	X	X	NO	NO	NO
MicroStation V8i (SELECTseries 2)	08.11.07.443+	X	X	X	X	X
MicroStation V8i (SELECTseries 1)	08.11.07.171+	X	X	X	X	X
MicroStation V8i	08.11.05.17+	X	X	X	X	X
MicroStation XM	08.09.04.51+	X	X	X	X	X
MicroStation V8 2004	08.05.02.70+	X	X	X	X	X
MicroStation J	07.01.05.03+	X	X	X	X	X
MicroStation PowerDraft V8i (SELECTseries 2)	08.11.09.308+	X	X	NO	NO	NO
MicroStation PowerDraft V8i (SELECTseries 2)	08.11.07.443+	X	X	X	X	NO
MicroStation PowerDraft V8i (SELECTseries 1)	08.11.07.172+	X	X	X	X	NO
MicroStation PowerDraft V8i	08.11.05.17+	X	X	X	X	X
MicroStation PowerDraft XM	08.09.04.88+	X	X	X	X	X
MicroStation PowerDraft J	07.01.05.03+	NO	X	X	X	X
Bentley Navigator (SELECTseries 4)	08.11.09.293+	X	X	NO	NO	NO
Bentley Navigator (SELECTseries 3)	08.11.08.43+	X	X	See Note 5	NO	NO
ProjectWise Navigator V8i (SELECTseries 2)	08.11.07.441+	NO	X	X	X	NO
ProjectWise Navigator V8i (SELECTseries 1)	08.11.07.171+	NO	NO	X	X	NO
ProjectWise Navigator XM	08.09.05.70+	NO	NO	NO	NO	X
Bentley i-model Composer (SELECTseries 4)	08.11.09.293+	X	X	NO	NO	NO
Bentley i-model Composer (SELECTseries 3)	08.11.08.43+	X	X	See Note 5	NO	NO
ProjectWise i-model Composer (SELECTseries 2)	08.11.07.441+	NO	X	X	X	NO
ProjectWise i-model Composer (SELECTseries 1)	08.11.07.171+	NO	NO	X	X	NO
ProjectWise InterPlot Server V8i (SELECTseries 4)	08.11.11.34+	X	NO	NO	NO	NO
ProjectWise InterPlot Server V8i (SELECTseries 2)	08.11.07.420+	NO	X	X	X	NA
ProjectWise InterPlot Server V8i (SELECTseries 1)	08.11.07.89+	NO	X	X	X	X
ProjectWise InterPlot Server V8i	08.11.05.42+	NO	X	X	X	X
ProjectWise InterPlot Organizer (SELECTseries 4)	08.11.11.34	X	X	NO	NO	NO
ProjectWise InterPlot Organizer (SELECTseries 2)	08.11.07.420+	X	X	X	X	X
ProjectWise InterPlot Organizer V8i (SELECTseries 1)	08.11.07.89+	NO	X	X	X	X
ProjectWise InterPlot Organizer V8i	08.11.05.08+	NO	X	X	X	X
ProjectWise Dynamic Plot V8i (SELECTseries 2)	08.11.07.426+	X	X	X	X	X
ProjectWise Dynamic Plot V8i (SELECTseries 1)	08.11.07.94+	X	X	X	X	X
Bentley View V8i (SELECTseries 3)	08.11.09.303+	X	X	NO	NO	NO
Bentley View V8i (SELECTseries 2)	08.11.07.440+	X	X	X	X	X

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
Bentley View V8i (SELECTseries 1)	08.11.07.171+	NO	X	X	X	X
Bentley View V8i	08.11.05.24+	NO	X	X	X	X
AutoCAD (See Note 14)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD	2012 (64-bit)	X	X (See Note 7)	NO	NO	NO
AutoCAD	2012 (32-bit)	X	X (See Note 7)	NO	NO	NO
AutoCAD	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD	2010 (64-bit)	X	X	NO	NO	NO
AutoCAD	2010 (32-bit)	X	X	X	X	NO
AutoCAD	2009 (32-bit)	X	X	X	X	X
AutoCAD	2008 (32-bit)	X	X	X	X	X
AutoCAD	2007	NO	NO	X	X	X
AutoCAD	2006	NO	NO	X	X	X
AutoCAD	2005	NO	NO	X	X	X
AutoCAD	2004	NO	NO	X	X	X
AutoCAD	2002	NO	NO	NO	X	X
Microsoft Office (64 bit)	2010	X (See note 13)	NO	NO	NO	NO
Microsoft Office	2010	X	X (See note 2)	NO	NO	NO
Microsoft Office	2007	X	X	X	X	X
Microsoft Office	2003	X	X	X	X	X
Microsoft Office	2002	NO	NO	X	X	X
Microsoft Office	2000	NO	NO	X	X	X
Microsoft Project	2010	NO	NO	NO	NO	NO
Microsoft Project	2007	X	X	X	X	X
Microsoft Project	2003	X	X	X	X	X
Microsoft Project	2002	NO	NO	X	X	X
Microsoft Project	2000	NO	NO	X	X	X
Microsoft Visio	2010	NO	NO	NO	NO	NO
Microsoft Visio	2007	X	X	X	X	X
Microsoft Visio	2003	X	X	X	X	X
Microsoft Visio	2002	NO	NO	X	X	X
Microsoft Visio	2000	NO	NO	X	X	X
GEO and Hydraulics APPS						

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
Bentley Map V8i (SELECTseries 3)	08.11.09.91+	X	X	X	X	X
Bentley Map V8i (SELECTseries 2)	08.11.07.425	X	X	X	X	X
Bentley Map V8i (SELECTseries 1)	08.11.07.87+	X	X	X	X	X
Bentley Map V8i	08.11.05.49+	X	X	X	X	X
CivilStorm V8i (SELECTseries 2)	08.11.02.75+	TBD	X	X	X	NO
CivilStorm V8i (SELECTseries 1)	08.11.01.36+	TBD	X	X	X	X
CivilStorm V8i	08.11.00.08+	TBD	X	X	X	X
HAMMER V8i (SELECTseries 3)	08.11.03.19+	TBD	TBD	TBD	TBD	TBD
HAMMER V8i (SELECTseries 2)	08.11.02.31+	TBD	X	X	X	NO
HAMMER V8i (SELECTseries 1)	08.11.01.32+	TBD	X	X	X	X
HAMMER V8i	08.11.00.30+	TBD	X	X	X	X
Bentley PondPack V8i (SELECTseries 3)	08.11.01.56+	TBD	TBD	TBD	TBD	TBD
Bentley PondPack V8i (SELECTseries 2)	08.11.01.54+	TBD	TBD	TBD	TBD	TBD
Bentley PondPack V8i	08.11.01.51+	TBD	X	X	X	X
SewerCAD V8i (SELECTseries 2)	08.11.02.75+	TBD	X	X	X	NO
SewerCAD V8 XM	08.11.00.48+	TBD	X	X	X	X
SewerGEMS V8i (SELECTseries 2)	08.11.02.75+	TBD	X	X	X	NO
SewerGEMS V8i (SELECTseries 1)	08.11.01.21+	TBD	X	X	X	X
SewerGEMS V8i	08.11.00.08+	TBD	X	X	X	X
StormCAD V8i (SELECTseries 2)	08.11.02.75+	TBD	X	X	X	NO
StormCAD V8i (SELECTseries 1)	08.11.00.44+	TBD	X	X	X	X
StormCAD V8i	08.11.00.24+	TBD	X	X	X	X
WaterCAD V8i (SELECTseries 3)	08.11.03.19+	TBD	TBD	TBD	TBD	TBD
WaterCAD V8i (SELECTseries 2)	08.11.02.31+	TBD	X	X	X	NO
WaterCAD V8i (SELECTseries 1)	08.11.01.32+	TBD	X	X	X	X
WaterCAD V8i	08.11.00.30+	TBD	X	X	X	X
WaterGEMS V8i (SELECTseries 3)	08.11.03.19+	X	TBD	TBD	TBD	TBD
WaterGEMS V8i (SELECTseries 2)	08.11.02.31+	TBD	X	X	X	NO
WaterGEMS V8i (SELECTseries 1)	08.11.01.32+	TBD	X	X	X	X
WaterGEMS V8i	08.11.00.30	TBD	X	X	X	X
WaterGEMS V8i	08.11.00.30+	TBD	X	X	X	X
CulvertMaster	03.03.00.04+	TBD	X	X	X	X
FlowMaster	08.11.01.03+	TBD	X	X	X	X
ProjectWise Publishing Server V8i (SELECTseries 4)	08.11.11.16+	X	NO	NO	NO	NO
ProjectWise Publishing Server V8i (SELECTseries 2)	08.11.07.406+	NO	X	X	NO	NO

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
ProjectWise Publishing Server V8i (SELECTseries 1)	08.11.07.23+	NO	NO	NO	X	NO
ProjectWise Publishing Server V8i	08.11.05.09+	NO	NO	NO	NO	X
CivilStorm V8i (SELECTseries 2)	08.11.02.75	TBD	TBD	TBD	TBD	TBD
Bentley Geospatial Management V8i (SELECTseries 4) * Future Release	08.11.11.xx	X	NO	NO	NO	NO
Bentley Geospatial Management V8i (SELECTseries 3)	08.11.09.18+	NO	X	NO	NO	NO
Bentley Geospatial Management V8i (SELECTseries 2)	08.11.07.427+	NO	NO	X	NO	NO
Bentley Geospatial Management V8i (SELECTseries 1)	08.11.07.21+	NO	NO	NO	X	NO
Bentley Geospatial Management V8i	08.11.05.10+	NO	NO	NO	NO	X
ProjectWise Connector for Oracle V8i (SELECTseries 2)	08.11.07.23+	NO	NO	X	NO	NO
ProjectWise Connector for Oracle V8i (SELECTseries 1)	08.11.07.14+	NO	NO	NO	X	NO
ProjectWise Connector for Oracle V8i	08.11.05.13+	NO	NO	NO	NO	X
ProjectWise Connector for ArcGIS V8i (SELECTseries 2)	08.11.07.21+	NO	NO	X	NO	NO
ProjectWise Connector for ArcGIS V8i (SELECTseries 1)	08.11.07.13+	NO	NO	NO	X	NO
ProjectWise Connector for ArcGIS V8i	08.11.05.10+	NO	NO	NO	NO	X
Cadastre V8i (SELECTseries 1)	08.11.08.15+	X	X	X	X	NO
Cadastre V8i	08.11.05.15+	X	X	X	X	X
Bentley Descartes V8i (SELECTseries 3)	08.11.09.263+	X	X	NO	NO	NO
Bentley Descartes V8i (SELECTseries 2)	08.11.07.426+	X	X	X	X	NO
Bentley Descartes V8i (SELECTseries 1)	08.11.07.100+	X	X	X	X	NO
Bentley Descartes V8i	08.11.05.30+	X	X	X	X	X
Bentley PowerMap V8i (SELECTseries 1)	08.11.07.97+	X	X	X	X	NO
Bentley PowerMap V8i	08.11.07.86+	X	X	X	X	X
AutoCAD Map 3D (See Note 1 & 14)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2012 (64-bit)	X	NO	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2012 (32-bit)	X	NO	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2010 (64-bit)	X	X	NO	NO	NO
AutoCAD Map 3D (See Note 1)	2010 (32-bit)	X	X	X	X	NO
AutoCAD Map 3D (See Note 1)	2009 (32-bit)	NO	X	X	X	X
AutoCAD Map 3D (See Note 1)	2008 (32-bit)	NO	X	X	X	X
ESRI ArcMAP (See note 6)	10	TBD	X	X	NO	NO
ESRI ArcMAP (See note 6)	9.3	TBD	X	X	X	X
ESRI ArcMAP (See note 6)	9.2	TBD	X	X	X	X

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
ESRI ArcMAP (See note 6)	9.1	TBD	X	X	X	X
MapInfo (See note 6)	10.5	TBD	X	X	NO	NO
MapInfo (See note 6)	10	TBD	X	X	NO	NO
MapInfo (See note 6)	9	TBD	X	X	X	NO
MapInfo (See note 6)	8.5	TBD	X	X	X	NO
CIVIL APPS						
Bentley GEOPAK Engineering Suite V8i (SELECTseries 3)	08.11.09.347+	X	X	X	NO	NO
Bentley GEOPAK Engineering Suite V8i (SELECTseries 2)	08.11.07.427+	X	X	X	X	X
Bentley GEOPAK Engineering Suite V8i (SELECTseries 1)	08.11.07.227+	NO	X	X	X	X
Bentley GEOPAK Engineering Suite V8i	08.11.05.39+	NO	X	X	X	X
Bentley GEOPAK Site V8i (SELECTseries 2)	08.11.07.536+	X	X	X	X	X
Bentley GEOPAK Site V8i (SELECTseries 1)	08.11.07.227+	NO	X	X	X	X
Bentley GEOPAK Site V8i	08.11.05.39+	NO	X	X	X	X
Bentley PowerSurvey V8i (SELECTseries 2)	08.11.07.536+	X	X	X	X	X
Bentley GEOPAK Survey V8i (SELECTseries 2)	08.11.07.427+	X	X	X	X	X
Bentley GEOPAK Survey V8i (SELECTseries 1)	08.11.07.227+	NO	X	X	X	X
Bentley GEOPAK Survey V8i	08.11.05.39+	NO	X	X	X	X
Bentley Power Civil V8i (SELECTseries 2)	08.11.07.427+	X	X	X	X	X
Bentley Power Civil V8i (SELECTseries 1)	08.11.07.244+	NO	X	X	X	X
Bentley Power Civil V8i	08.11.05.39+	NO	X	X	X	X
Bentley InRoads Suite V8i (SELECTseries 3)	08.11.09.347+	X	X	X	NO	NO
Bentley InRoads Suite V8i (SELECTseries 2)	08.11.07.428+	X	X	X	X	X
Bentley InRoads Suite V8i (SELECTseries 1)	08.11.07.69+	NO	X	X	X	X
Bentley InRoads Suite V8i	08.11.05.47+	NO	NO	NO	NO	X
Bentley Rail Track V8i (SELECTseries 2)	08.11.07.428+	X	X	X	X	X
Bentley Rail Track V8i (SELECTseries 1)	08.11.07.246+	NO	X	X	X	X
Bentley Rail Track V8i	08.11.05.47+	NO	NO	NO	NO	X
MX V8i (SELECTseries 3)	08.11.09.347+	X	X	X	NO	NO
MX V8i (SELECTseries 2)	08.11.07.427+	NO	X	X	X	NO
MX V8i (SELECTseries 1)	08.11.07.227+	NO	X	X	X	NO
MX V8i	08.11.05.22+	NO	NO	NO	NO	NO
AutoCAD Civil 3D (See Note 1 & 14)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Civil 3D (See Note 1)	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Civil 3D (See Note 1)	2012 (64-bit)	X	NO	NO	NO	NO

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
AutoCAD Civil 3D (See Note 1)	2012 (32-bit)	X	NO	NO	NO	NO
AutoCAD Civil 3D (See Note 1)	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD Civil 3D (See Note 1)	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD Civil 3D (See Note 1, 8)	2010 (32-bit)	X	X	X	X	NO
AutoCAD Civil 3D (See Note 1)	2009 (32-bit)	NO	X	X	X	X
AutoCAD Civil 3D (See Note 1)	2008 (32-bit)	NO	X	X	X	X
PLANT APPS						
AutoPlant V8i x86 (SELECTseries 4) * Future Release	08.11.09.xx	X (See Note 10)	NO	NO	NO	NO
AutoPlant V8i x64 (SELECTseries 4) * Future Release	08.11.09.xx	X (See Note 10)	NO	NO	NO	NO
AutoPlant V8i x86 (SELECTseries 3)	08.11.08.123 or 08.11.08.151	X	X	X	NO	NO
AutoPlant V8i x64 (SELECTseries 3)	08.11.08.123 or 08.11.08.151	X (See Note 11)	X (See Note 11)	X	NO	NO
AutoPlant V8i x86 (SELECTseries 2)	08.11.07.60+	NO	X	X	X	X
AutoPlant V8i x86 (SELECTseries 1)	08.11.06.30+	NO	NO	NO	X	X
AutoPlant Plant Design V8i	08.11.05.36+	NO	NO	NO	NO	X
AutoPlant P&ID V8i	08.11.05.09+	NO	NO	NO	NO	X
Bentley PlantSpace XM Edition	08.09.04.xx	NO	NO	NO	NO	NO
Bentley Open Plant Modeler V8i (SELECTseries 3)	08.11.08.311+	NO	X	X	NO	NO
Bentley Open Plant Modeler V8i (SELECTseries 2)	08.11.07.516+	NO	X	X	NO	NO
Bentley Open Plant Modeler V8i (SELECTseries 2)	08.11.07.409+	NO	X	X	NO	NO
Bentley Open Plant ModelServer V8i (SELECTseries 2)	08.11.07.515+	NO	X	X	NO	NO
Bentley Open Plant ModelServer V8i (SELECTseries 2)	08.11.07.409+	NO	NO	X	NO	NO
Bentley Open Plant Isometric Manager V8i (SELECTseries 2)	08.11.07.506+	NO	X	X	NO	NO
Bentley Open Plant Isometric Manager V8i (SELECTseries 2)	08.11.07.406+	NO	NO	X	NO	NO
Bentley Open Plant Reporting V8i (SELECTseries 2)	08.11.07.505+	NO	X	X	NO	NO
Bentley Open Plant Reporting V8i (SELECTseries 2)	08.11.07.405+	NO	NO	X	NO	NO
Bentley Open Plant Administrator (SELECTseries 2)	08.11.07.516+	NO	X	X	NO	NO
Bentley Open Plant Administrator (SELECTseries 2)	08.11.07.409+	NO	NO	X	NO	NO
Bentley Open Plant Power P&ID V8i (SELECTseries 5)	08.11.10.38+	X	X	NO	NO	NO
Bentley Open Plant Power P&ID V8i (SELECTseries 4)	08.11.09.26+	NO	X	X	NO	NO
Bentley Open Plant Power P&ID V8i (SELECTseries 3)	08.11.08.22+	NO	X	X	X	NO
Bentley Open Plant Power P&ID V8i (SELECTseries 2)	08.11.07.42+	NO	X	NO	X	NO

Application Version Compatibility with ProjectWise V8i Releases Ver 4.07

Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
Bentley Open Plant Power P&ID V8i	08.11.05.30+	NO	NO	NO	NO	NO
ProjectWise PDx Dynamic Review Service	08.11.09.09+	NO	X	X	NO	NO
Bentley Substation V8i (SELECTseries 7) * Future Release	-	X	X	X	X	NO
Bentley Substation V8i (SELECTseries 6)	08.11.11.14+	NO	X	X	X	NO
Bentley Substation V8i (SELECTseries 5)	08.11.10.26+	NO	X	X	X	NO
Bentley Substation V8i (SELECTseries 4)	08.11.09.23+	NO	NO	X	X	NO
Bentley Substation V8i (SELECTseries 3)	08.11.08.18+	NO	NO	X	X	NO
Bentley Substation V8i	08.11.07.158+	NO	NO	NO	NO	NO
promis•e Standalone (SELECTseries 6)	08.11.11.18+	NO	X	X	X	NO
promis•e for AutoCAD V8i (SELECTseries 6)	08.11.11.18+	NO	X	X	X	NO
promis•e for AutoCAD x64 V8i (SELECTseries 6)	08.11.11.18+	NO	X	X	X	NO
promis•e for AutoCAD V8i (SELECTseries 5)	08.11.10.66+	NO	X	X	X	NO
promis•e for AutoCAD x64 V8i (SELECTseries 5)	08.11.10.68+	NO	X	X	X	NO
promis•e for AutoCAD V8i (SELECTseries 3)	08.11.08.22+	NO	NO	X	X	NO
promis•e for AutoCAD V8i (SELECTseries 3)	08.11.08.14+	NO	NO	X	X	NO
promis•e for AutoCAD V8i (SELECTseries 2)	08.11.07.150+	NO	NO	NO	X	NO
promis•e for AutoCAD V8i (SELECTseries 1)	08.11.07.82+	NO	NO	NO	NO	X
promis•e for AutoCAD V8i	08.11.05.92+	NO	NO	NO	NO	X
promis•e Standalone (SELECTseries 5)	08.11.10.67	NO	X	X	X	NO
promis•e for MicroStation\PowerDraft V8i (SELECTseries 3)	08.11.11.18+	NO	NO	X	X	NO
promis•e for MicroStation\PowerDraft V8i (SELECTseries 3)	08.11.08.22+	NO	NO	X	X	NO
promis•e for MicroStation\PowerDraft V8i (SELECTseries 3)	08.11.08.14+	NO	NO	X	X	NO
promis•e for MicroStation\PowerDraft V8i (SELECTseries 2)	08.11.07.150+	NO	NO	NO	X	NO
promis•e for MicroStation\PowerDraft V8i (SELECTseries 1)	08.11.07.82+	NO	NO	NO	NO	X
promis•e for MicroStation\PowerDraft V8i	08.11.05.91+	NO	NO	NO	NO	X
AutoCAD P&ID (See Note 1)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD P&ID (See Note 1)	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD P&ID (See Note 1)	2012 (64-bit)	X	NO	NO	NO	NO
AutoCAD P&ID (See Note 1)	2012 (32-bit)	X	NO	NO	NO	NO
AutoCAD P&ID (See Note 1)	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD P&ID (See Note 1)	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD P&ID (See Note 1)	2010 (64-bit)	X	X	NO	NO	NO
AutoCAD P&ID (See Note 1)	2010 (32-bit)	X	X	X	X	NO
AutoCAD P&ID (See Note 1)	2009 (32-bit)	NO	X	X	X	X
AutoCAD P&ID (See Note 1)	2008 (32-bit)	NO	X	X	X	X

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Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
BIM\BRIM\STRUCTURAL APPS						
AECOSim building designer	08.11.09.225	X	NO	NO	NO	NO
Bentley Architecture V8i (SELECTseries 1)	08.11.07.69+	NO	X (08.11.07.87)	X (08.11.07.80)	X (08.11.07.69)	NO
Bentley Architecture V8i	08.11.05.46+	NO	NO	NO	NO	X
Structural Modeler\Bentley Structural V8i (SELECTseries 1)	08.11.07.50+	NO	X	X (08.11.07.77)	X (08.11.07.50+)	NO
Structural Modeler\Bentley Structural V8i	08.11.05.25+	NO	NO	NO	NO	X
Bentley Building Mechanical Systems V8i (SELECTseries 1)	08.11.07.21+	NO	X (08.11.07.55)	X (08.11.07.37)	X (08.11.07.21+)	NO
Bentley Building Mechanical Systems V8i	08.11.05.27+	NO	NO	NO	NO	X
Bentley Building Electrical Systems V8i (SELECTseries 1)	08.11.07.03+	NO	X	X	X	NO
Bentley Building Electrical Systems V8i	08.11.05.08+	NO	NO	NO	NO	X
Autodesk Revit Architecture (See Note 14)	2012 (32,64-bit)	X (See Note 9)	NO	NO	NO	NO
Autodesk Revit Structure (See Note 14)	2013 (32,64-bit)	X (See Note 9)	NO	NO	NO	NO
Autodesk Revit MEP (See Note 14)	2014 (32,64-bit)	X (See Note 9)	NO	NO	NO	NO
Autodesk Revit Architecture	2012 (32-bit)	X	X	NO	NO	NO
Autodesk Revit Structure	2012 (32-bit)	X	X	NO	NO	NO
Autodesk Revit MEP	2012 (32-bit)	X	X	NO	NO	NO
Autodesk Revit Architecture	2011 (64-bit)	X	X	NO	NO	NO
Autodesk Revit Structure	2011 (64-bit)	X	X	NO	NO	NO
Autodesk Revit MEP	2011 (64-bit)	X	X	NO	NO	NO
Autodesk Revit Architecture	2011 (32-bit)	X	X	NO	NO	NO
Autodesk Revit Structure	2011 (32-bit)	X	X	NO	NO	NO
Autodesk Revit MEP	2011 (32-bit)	X	X	NO	NO	NO
Autodesk Revit Architecture	2010 (64-bit)	X	X	NO	NO	NO
Autodesk Revit Structure	2010 (64-bit)	X	X	NO	NO	NO
Autodesk Revit MEP	2010 (64-bit)	X	X	NO	NO	NO
Autodesk Revit Architecture	2010 (32-bit)	X	X	X	X	NO
Autodesk Revit Structure	2010 (32-bit)	X	X	X	X	NO
Autodesk Revit MEP	2010 (32-bit)	X	X	X	X	NO
Autodesk Revit Architecture	2009 (32-bit)	NO	NO	X	X	NO
Autodesk Revit Structure	2009 (32-bit)	NO	NO	X	X	NO
Autodesk Revit MEP	2009 (32-bit)	NO	NO	X	X	NO
AutoCAD Architecture (See Note 1 & 14)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Architecture (See Note 1)	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD Architecture (See Note 1)	2012 (64-bit)	X	NO	NO	NO	NO

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Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
AutoCAD Architecture (See Note 1)	2012 (32-bit)	X	NO	NO	NO	NO
AutoCAD Architecture (See Note 1)	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD Architecture (See Note 1)	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD Architecture (See Note 1)	2010 (64-bit)	X	X	NO	NO	NO
AutoCAD Architecture (See Note 1)	2010 (32-bit)	X	X	X	X	NO
AutoCAD Architecture (See Note 1)	2009 (32-bit)	NO	X	X	X	X
AutoCAD Architecture (See Note 1)	2008 (32-bit)	NO	X	X	X	X
AutoCAD MEP (See Note 1 & 14)	2013 (64-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD MEP (See Note 1)	2013 (32-bit)	X (See Note 12)	NO	NO	NO	NO
AutoCAD MEP (See Note 1)	2012 (64-bit)	X	NO	NO	NO	NO
AutoCAD MEP (See Note 1)	2012 (32-bit)	X	NO	NO	NO	NO
AutoCAD MEP (See Note 1)	2011 (64-bit)	X	X	NO	NO	NO
AutoCAD MEP (See Note 1)	2011 (32-bit)	X	X	NO	NO	NO
AutoCAD MEP (See Note 1)	2010 (64-bit)	X	X	NO	NO	NO
AutoCAD MEP (See Note 1)	2010 (32-bit)	X	X	X	X	NO
AutoCAD MEP (See Note 1)	2009 (32-bit)	NO	X	X	X	X
AutoCAD MEP (See Note 1)	2008 (32-bit)	NO	X	X	X	X
Bentley speedikon Architectural V8i for MicroStation (SELECTseries 4)	08.11.11.16+	NO	X	X	X	NO
Bentley speedikon Architectural V8i for MicroStation (SELECTseries 3)	08.11.09.18+	NO	X	X	X	NO
Bentley speedikon Architectural V8i for MicroStation (SELECTseries 2)	08.11.09.08+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for MicroStation (SELECTseries 1)	08.11.07.18+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for MicroStation	08.11.05.10+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for MicroStation (SELECTseries 4)	08.11.11.16+	NO	X	X	X	NO
Bentley speedikon Industrial V8i for MicroStation (SELECTseries 3)	08.11.09.18+	NO	X	X	X	NO
Bentley speedikon Industrial V8i for MicroStation (SELECTseries 2)	08.11.09.08+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for MicroStation (SELECTseries 1)	08.11.07.18+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for MicroStation	08.11.05.10+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for PowerDraft (SELECTseries 4)	08.11.11.16+	NO	X	X	X	NO
Bentley speedikon Architectural V8i for PowerDraft (SELECTseries 3)	08.11.09.18+	NO	X	X	X	NO
Bentley speedikon Architectural V8i for PowerDraft (SELECTseries 2)	08.11.09.08+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for PowerDraft (SELECTseries 1)	08.11.07.18+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for PowerDraft	08.11.05.10+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for AutoCAD (SELECTseries 4)	08.11.11.17+	NO	NO	NO	NO	NO
Bentley speedikon Architectural V8i for AutoCAD (SELECTseries 3)	08.11.09.18+	NO	NO	X	X	NO
Bentley speedikon Architectural V8i for AutoCAD (SELECTseries 2)	08.11.09.08+	NO	NO	X	X	X

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Application	Application Version	ProjectWise V8i (SELECTseries 4)	ProjectWise V8i (SELECTseries 3)	ProjectWise V8i (SELECTseries 2)	ProjectWise V8i (SELECTseries 1)	ProjectWise V8i
		08.11.11.111+	08.11.09.109+	08.11.07.443+	08.11.07.107+	08.11.05.63+
Bentley speedikon Architectural V8i for AutoCAD (SELECTseries 1)	08.11.07.18+	NO	NO	X	X	X
Bentley speedikon Architectural V8i for AutoCAD	08.11.05.10+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for AutoCAD (SELECTseries 4)	08.11.11.17+	NO	NO	NO	NO	NO
Bentley speedikon Industrial V8i for AutoCAD (SELECTseries 3)	08.11.09.18+	NO	NO	X	X	NO
Bentley speedikon Industrial V8i for AutoCAD (SELECTseries 2)	08.11.09.08+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for AutoCAD (SELECTseries 1)	08.11.07.18+	NO	NO	X	X	X
Bentley speedikon Industrial V8i for AutoCAD	08.11.05.10+	NO	NO	X	X	X
Bentley Facilities V8i (SELECTseries 3)	08.11.09.65+	NO	X	NO	NO	NO
Bentley Facilities V8i (SELECTseries 2)	08.11.07.209+	NO	X	X	X	NO
Bentley Facilities V8i (SELECTseries 1)	08.11.07.69+	NO	NO	NO	X	NO
Bentley Facilities V8i	08.11.05.28+	NO	NO	NO	NO	X
RM Bridge V8i (SELECTseries 1)	08.09.86.01+	TBD	X	X	NO	NO
LEAP Bridge Suite	11.01.00.27+	X	NO	NO	NO	NO
LEAP Bridge Suite	10.0.0.3+	NO	X	X	NO	NO
Bentley i-model plug-in for Revit	08.11.07.453+	NO	NO	X	X	NO
Bentley i-model plug-in for Revit	08.11.07.443+	NO	NO	X	X	NO
Bentley i-model plug-in for Revit	08.11.05.22+	NO	NO	NO	NO	X
RAM Structural System	14.04.07.00+	X	NO	NO	NO	NO
RAM Structural System	14.00.04.01+	NO	X	X	X	X
Bentley AutoPIPE V8i (SELECTseries 4)	9.05.00.05+	X	X	X	X	NO
Bentley AutoPIPE V8i (SELECTseries 3)	9.04.01.05+	X	X	X	X	NO
Bentley AutoPIPE V8i (SELECTseries 2)	9.03.01.07+	NO	X	X	X	NO
Bentley AutoPIPE V8i (SELECTseries 1)	09.02.03.02+	NO	NO	X	X	NO
Bentley AutoPIPE V8i	09.01.01.02+	NO	NO	NO	NO	NO
Bentley Rebar V8i	08.11.07.57+	X	TBD	TBD	TBD	TBD
Bentley Rebar V8i	08.11.07.54+	TBD	X	X	X	NO
Bentley Rebar V8i	08.11.05.54+	NO	NO	NO	NO	X
Bentley Rebar V8i	08.11.07.53+	TBD	X	X	X	NO
Bentley Rebar V8i	08.11.05.53+	NO	NO	NO	NO	X
Bentley Rebar V8i	08.11.07.52+	NO	NO	NO	X	NO
Bentley Rebar V8i	08.11.05.52+	NO	NO	NO	NO	X
STAAD.PRO V8i (SELECTseries 3)	20.07.08.22+	X	NO	NO	NO	NO
STAAD.PRO V8i (SELECTseries 2)	20.07.07.32+	NO	X	X	X	X
STAAD.PRO V8i (SELECTseries 1)	20.07.06.35+	NO	X	X	X	X
STAAD.PRO V8i	20.07.04.12+	NO	X	X	X	X

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Notes:

1. The integration provided for AutoCAD-based AutoCAD verticals is the same as that provided for base AutoCAD; ProjectWise does not provide integration for the additional tools and commands unique to each vertical.
2. Microsoft Office 2010 integration is available for ProjectWise V8i (SELECTseries 3) and requires the installation of the ProjectWise V8i (SELECTseries 3) Integration Module for 32-bit Microsoft Office 2010 module. Microsoft Office 2010 is not supported by earlier versions (pre SS3) of ProjectWise.
3. Contact TSG to use the Bentley Geospatial Management V8i (SELECTseries 2) with ProjectWise Integration Server V8i (SELECTseries 3), a small patch must be applied to the Administrator client.
4. Speedikon AutoCAD 2010 products cannot be integrated with ProjectWise.
5. Bentley Navigator V8i (SELECTseries 3) and Bentley i-model Composer V8i (SELECTseries 3) will only support integration with ProjectWise Explorer V8i (SELECTseries 3), regardless of whether the Integration Server is SELECTseries 2 or 3. Bentley Navigator V8i (SELECTseries 3) and Bentley i-model Composer V8i (SELECTseries 3) integration with ProjectWise Explorer V8i (SELECTseries 2) is NOT a supported configuration. If you still chose to work with this configuration, Bentley has done some cursory testing and has noted the following issues. Bentley i-model Composer: (1) Bentley i-model Composer does not display in the list of program associations (2) Need to check "open as read only" when opening files or the file will be checked out, (3) The application association is not defined when publishing an i-model. Bentley Navigator: (1) Right click markup from ProjectWise Explorer does not launch Navigator, (2) Newly created overlay files need to be checked in after being created
6. ArcMap and MapInfo integration require the Bentley Geospatial Management Server
7. For AutoCAD 2012 support within PW SS3, The ProjectWise Integration Module for AutoCAD 2012 is required.
8. Support for Civil 3D 2010 running on a 64-bit operating system requires the ProjectWise V8i (SELECTseries 3) Integration Module for 32-bit Civil 3D 2010 for 64-bit Operating Systems.
9. For Revit 2013 support within PW SS4, The ProjectWise Integration Module for Revit 2013 is required.
10. PW Client SS4 is must however PW Server can be PW SS3 or PW SS4.
11. Supported with a registry workaround specific to the version, provided by PW team.
12. For AutoCAD 2013 support within PW SS4, The ProjectWise Integration Module for AutoCAD 2013 is required.
13. For Microsoft Office 2010 64-bit support within PW SS4, The ProjectWise Integration Module for Microsoft Office 2010 64-bit is required.
14. Includes support for the versions of these products included in the AutoDesk Suite of products.

Appendix C

Timeline and Milestone Chart

Task	Milestone	Completed as November 30, 2012	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			1st Quarter			2nd Quarter		
			2011			2011			2012			2012			2012			2012		
			July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
1	Needs Assessment and Software/Equipment Survey	x			X	X	X	X												
2	Accepted/State-of-the-Art Practice Survey	x			X	X	X	X												
3	Feasibility Study-Technical	x							X	X	X	X	X	X						
4	Feasibility Study-Cultural	x							X	X	X	X	X	X						
5	Market Survey of CMS Software	x			X	X	X	X	X	X	X	X	X	X	X	X				
6	Recommendation of the Best Software Fit for NMDOT	x															X	X		
7	Cost-Benefit Analysis of Implementing CADD/CMS in NMDOT	X															X	X		
8	Implementation Plan	X																X	X	X
9	Final Report and Multimedia Presentation	X																	X	X
Deliverables																				
Quarterly Report 1					X															
Quarterly Report 2								X												
Quarterly Report 3											X									
Quarterly Report 4														X						
Quarterly Report 5																	X			
Draft Implementation Plan																			X	
Draft Final Report																			X	
Draft Multimedia Presentation																			X	
Implementation Plan																				X
Final Report																				X
Multimedia Presentation																				X

