McDermott: Hello, I am Katie McDermott with the Center for Transportation and the Environment. This is CTE’s National Teleconference Series. The purpose of this live forum is to engage transportation and environmental professionals in a dialogue about new policies, research innovations and best practices in the field. Today’s program explores several innovative technologies that have improved decision making about environmental concerns throughout all of the core transportation business processes. These technologies and others are featured in the second phase of the National Cooperative Highway Research Program Project number 25-22. The report for that project is due soon and the first phase report is available on NCHRP’s website.

Today our panel consists of representatives from several state transportation departments and the private sector who have played instrumental roles in either helping to develop or implement these technologies. They are here today to demonstrate some of the key features of the technology applications as well as to discuss opportunities for their implementation at transportation agencies nationwide.

We invite you to discuss today’s topic and share your experiences with our panel. To do that you can use the numbers on your screen to phone or fax in your questions and comments anytime during the live broadcast. You can also email us at CTE_email@ncsu.edu. I also want to note that we have a different format this time. All of the panelists participating in the Q&A segment will be only those panelists who are presenting for that hour so we encourage you to send your questions and comments in at
the bottom half-hour for those particular panelists. Any questions that do not get on the air will be included in CTE’s After-the-Program Web discussion forum. Closed captioning for today’s program is being provided by the North Carolina Agency for Public Telecommunications, and a phone bridge for audio transmission only is also available at 919-733-2416. After the broadcast we invite you to participate in CTE’s Web-based After-the-Program discussion forum where you can continue to talk about the issues raised during the live broadcast with our panel and other audience members. The discussion forum starts at 4:00 EDT today and will remain active for two weeks.

A few more details before we get started. First I hope you have already had an opportunity to download the program handout and a copy of the panelists’ PowerPoint slides. If not, you can do so from CTE’s website and we will show the URL address on the screen for you. From this site you can also replay the broadcast in its entirety through our archive or you can order a copy of the DVD. We would also like to get your feedback on today’s program. To do that if you are located at one of the downlink sites today you can complete the form and turn it in to the site coordinator before you leave, or if you are participating via the web, please complete the online evaluation form located on CTE’s website. We thank you very much for your attention to this.

At this time it is my pleasure to introduce your moderator, Ms. Marcy Schwartz. Marcy is Senior Vice President and Director of Transportation Technology for CH2M Hill out of their Portland, Oregon office. Marcy is also the principal investigator for the NCHRP 25-22 project. She was with this just a few years ago to present the results of the first phase of the project and we are delighted to have her back again to talk about the second and final phase results. Marcy, welcome to the program.

Schwartz: Thank you, Katie, and thank you all for joining us this afternoon for what we hope will be a very lively discussion of NCHRP report 25-22, Part 2: Technologies to Improve Consideration of Environmental Concerns in Transportation Decision-making. The intent of this project is to advance the use of innovative tools to increase environmental quality in all aspects of transportation agency operations, everything from planning and project development through construction, operation and maintenance.

The teleconference is a preview of the final report that we expect to be available next year. The report is a guide to eight of the most promising of these tools: tools that have the potential to speed project delivery, reduce costs and advance environmental quality throughout transportation agency operations. These eight tools were chosen from a field of 70 based on several different criteria. First of all, successful implementation in
an agency operation, and so these tools are actually in use now, the ability to reduce environmental impacts or to improve the visibility of environmental considerations. And third, the applicability to activities in one or more of the traditional transportation agency business lines. The list was narrowed to eight, and then evaluated by a focus group of transportation agency staff for feasibility and applicability.

The report presents the results of this research process including descriptions of each tool, drivers for its implementation within that agency. Cost and implementation considerations, data and software/hardware requirements, transferability, lessons learned and suggested implementation strategies. The report also addresses general recommendations for advancing the use of these tools as a whole. The report will also contain a DVD with demonstrations of how each tool works.

But the good news is you don’t have to wait until the final report is published. Today we are going to highlight seven of the eight tools in this teleconference. And for those of you who’ve participated in CTE teleconferences before, I want to alert you that our process today is going to be a little bit different. We have divided up the three hours into three separate sets of presentations and Q&A, so there is one for each group of tools. So rather than waiting until the third hour for discussion and questions and answers, we will be having a panel discussion and responding to your questions and concerns about the tools during the last part of each hour. So please get your questions in to us immediately following the presentations so we can address them before we go on to the next set of tools.

So let’s review the agenda really quickly. In the first hour we will be highlighting three planning and project development tools: MetroQuest, Aerial Remote Sensing and Quantm. In the second hour we will present construction and maintenance tools, Maryland’s asset management digital inspection and Minnesota’s life-cycle engineering. Unfortunately, we will not be able to present Oregon DOT’s tool that provides environmental resource maps to guide maintenance fieldwork. Milt Hill was not able to join us for the presentation today. In the third hour we will discuss environmental analysis tools, Florida’s environmental screening and Pennsylvania’s expert system for the preparation of categorical exclusions and environmental assessments.

The handout materials that Katie referred to include bios of all of our presenters, but I would like to introduce briefly the first three presenters in our first hour segment. Dave Biggs joins us from British Columbia. He has over 15 years of experience in the development and use of computer tools to engage stakeholders and the public in
discussions of urban and regional planning issues. He is a co-founder of Envision, the developers of MetroQuest, a tool that evolved from over a decade of research at the University of British Columbia. And he has applied this tool all over the world in about 13 countries, if I have got that correct.

Chuck O’Hara is an Associate Research Professor at the GeoResources Institute at Mississippi State University and coordinates USDOT’s National Consortium on Remote Sensing and Transportation Recorder Planning and Environmental Assessments. He previously worked with the US Geological Survey as a Hydrologist GIS Specialist and Information Officer. His recent focus is on the use of multi-sensored data to streamline the early phases of transportation project planning and development.

And Len Bettess is the US Business Development and Engineering Manager for Quantm, the company that developed the Quantm tool. He has over 16 years of experience in roadway and rail planning and design in Australia, New Zealand, Europe and the US and has been involved in the application of the Quantm tool for about 30 projects across the US and Canada.

Again, please be ready to fax or email your questions and comments to our panelists immediately following these three presentations so we will have time for questions and answers at the end of the hour. So, Dave, we are eager to hear about MetroQuest.

Biggs: Thanks very much, Marcy. It is a pleasure to be here and thank you very much to CTE for inviting me today to talk about MetroQuest. MetroQuest was designed at the University of Waterloo over a span of 10 years really to address the kinds of challenges that are facing metropolitan regions in terms of engaging stakeholders, long range strategic planning and growth management, particularly integrating transportation and land use decision-making. Let’s go to the presentation and I will take you through a short demonstration of MetroQuest.

The interface is designed to be as easy to use and understand as possible to give people a sense of what the connection is between choices we have available and the consequences of those choices played out over 40-year future scenarios. So on the left-hand side of the interface we have a series of questions, questions about land use, transportation, resource management and, of course, population and economic growth. Beside that we have the results of those scenario choices so you can instantly make the connection between decisions that we have and the implications of those decisions over
time. Of course you have the ability to save and compare key scenarios that you find along the way to look at things side by side in comparison.

MetroQuest is designed to be used in workshop settings to engage people in discussion about what kind of desirable futures people find and what are the implications of different choices and what kind of trade-offs people would be willing to make to achieve success in their highest priority concerns. We have very small workshop settings and it ranges to very large workshop settings with many hundreds of people, really talking about priorities that they have for the future, making choices about different scenario inputs, of course then reviewing scenarios, and then discussing implementation strategies once a consensus has been reached on the desirable vision for the metropolitan area.

So typically we will begin a workshop and we’ll start off with, “What does the current trend for a particular metropolitan area look like?” That way people have some context against which to look at some alternatives. So here is the current trend; it happens to be the application that we have developed for Greater Vancouver, and if we look at what is happening within these 25 municipalities over time, under the current trend this would be 2011, and 2021, and 2031, and 2041. So you can see an enormous amount of change happens over four decades when we continue on policies. And so really what we are doing is we are engaging audiences in, “Is this the kind of future scenario that we want?”

Of course, you can go on to look at other implications of your choices. For example, transportation implications are critical. Here we see in the current trend scenario single occupant vehicle trips shown in yellow increasing exponentially, and that is because when you saw the map earlier people are living further and further away from their destinations and of course they have less and less opportunity to take alternative transportation because those areas typically aren’t well-serviced by alternatives. And so we get this exponential increasing effect in terms of single-occupant-vehicle travel.

So after you have set the context and looked at any of the outcomes that you want to look at in five categories—economy, demography, land use, transportation and environmental outcome—then you can start looking at creating an alternative to that scenario that might be seen as more positive. So we are presented with a series of questions, as I said in areas of land use and transportation and so forth. Each question has a series of options that are presented. And whatever options you pick, then you can create a future scenario, combining land use and transportation strategies to see what kind of
win-win scenarios and what kind of synergies you can create by combining land use and transportation decisions.

So if we make that question a little smaller we can then look at that question alongside of the results. And so here we are looking at the population distribution in Greater Vancouver in 2041 if we were to follow a policy of land use of favoring suburban development. We can create an alternative scenario as quickly as clicking a button. I am going to explore what a compact growth scenario would look like just by clicking here and you can see what impact it has on the map.

So instantly you can create another 40 year vision for the future just by clicking buttons. So if we go back and forth between those choices you can see the implications just of that one choice. Of course, from there we can go on and explore different plans for transportation and transportation options, as well as resource management, and to look at what kind of combinations we can put together in terms of the development strategy for a metropolitan area.

I am going to go in now and just review a couple of scenarios that we have created. Here is a two page spread in the Vancouver Sun that got people talking about different alternative strategies for the region. This became quite a public process and we figure that we have engaged about 150,000 people in this process of looking at what the desirable strategies look like for the region according to stakeholders.

So the two scenarios that I am going to be looking at are ones where we follow typical smart-growth policy patterns, which are dominated by compact development around key transit nodes and looking at more of a nodal development as opposed to a lower density sprawling development, and we are comparing that with the current trend strategy that we looked at before. So you can see two versions of this metropolitan area in 2041. According to the same population and economic growth projection, we get a completely different result in terms of the form that our metropolitan area takes. Of course green, we are seeing a lot of agricultural land preserved in the smart-growth scenario when compared with the current trend scenario.

If we go on to look at our major transit corridors, we can see how in the smart-growth scenario where we are developing compact development right around these transit nodes, and we are seeing a lot of access to transit because of that proximity. We are also seeing that the average distances between the average house and places of work will be minimized in this scenario when compared, of course, to the current trend scenario.
If we go on and look at some of the other implications of these two scenarios, we can start by looking at a summary of the scenarios, where we are summarizing ten key indicators that the community has identified as being important indicators to help them decide whether or not a scenario is doing well or doing poorly. And you can see that the smart-growth scenario is much bigger and in this diagram much better than the current trend scenario, in terms of scoring on each of these ten indicators. So we are actually seeing a win-win situation here where we are improving the financial and the economic results of a scenario. Consecutively, we are also improving livability and quality of life and environmental characteristics as well. So that comes as a big surprise to policymakers but also very rewarding to the public who understand that certain policies can lead us to a win-win future scenario. Each one of these indicators allows us to click on it and get a more detailed story of what is happening. For example, fiscal health is very different between these two scenarios. So we can click there and open up the fiscal health result and we can see the current trend results right next to the smart-growth results. What we are seeing here in the stacked bar are the expenditures by government compared with the revenues shown in purple and we can see in the current trend scenario we are going further and further into a deficit situation because expenditures are outrunning the revenues by a large margin. The opposite is happening in the smart-growth scenario. We are actually spending less than we are bringing in and that is a result of primarily the difference between the light blue bar there which is showing the spending on road and transit infrastructure.

We can go on and look at several other results. There are over 50 results that we could look at. Access to transit with the smart-growth scenario provided much more access to transit. The smart-growth scenario resulted in much more mixed mode share in terms of the kinds of transportation choices that people were making and as you see much less single occupant vehicle travel. Commute times are way down in the smart-growth scenario. There are many differences. Here we are seeing pollution emissions decreasing. That is the sort of quick run-through of showing how scenarios can differ side by side and how powerful it is to look at the implications of choices. Just to conclude here, what we are learning from municipalities and metropolitan areas in terms of the utility of the tool, MetroQuest, is really to provide support for smart plans by engaging the community and stakeholders in looking at these alternatives live. So really engaging people hands-on in scenario planning is really important. Having them
feel like they have rolled up their sleeves and co-created that future plan is very important.

Developing the results and showing the results and fostering dialogue on people’s own values and priorities is absolutely critical. Of course educating people on the key costs and benefits of different options is absolutely critical before you actually gather their feedback on what they prefer. They need to know what the questions are and so gathering that feedback within the context of that education is quite important.

And then of course once a plan has been created, reinforcing the plan during its implementation to remind people of the strategy and how it makes sense will assist people and decision makers in that implementation as changes are happening in the community. People will understand that those changes are actually part of their children’s air quality future or their own tax base and so forth. And so helping people, reminding people to put it into the context of a strategic plan has been very important.

Thank you very much, that is my quick run-through of MetroQuest and I would be happy to entertain any questions that come along in the discussion period.

Schwartz: Dave, there is one thing that would interest me a lot. I don’t know if you could quickly show an example of how you help a user to visualize the choices that they are making when they are creating a scenario or when they are seeing the outcomes of a scenario.

Biggs: Sure, I would be happy to, Marcy. If we could just go back to the presentation I will demonstrate some of that functionality. It is obviously very important since we are dealing with a lot of public groups and stakeholder groups to be able to really contextualize the choices that people are making. And so we allow these choices to expand.

So for example if we click on this choice, we can pull up a visualization of the kinds of housing, the kinds of job development that people would be looking at so people can understand the nature of the choices that people are making. Furthermore, when you are looking at the results, you might be looking at a GIS map here and you might see a lot of brown development and so you would wonder, “What does medium density really mean?” So we can click on any part of the map and bring up a visualization of what those neighborhoods look like.

If we clicked on medium density then we can bring up an idea of what that looks like in terms of the lay of the neighborhood, typical housing and streetscapes. So people understand what this development might look like into the future.
Schwartz: Thanks. That is helpful for people to get an understanding of how these scenarios are actually created.

Biggs: My pleasure.

Schwartz: Chuck, let’s go on to hear about Remote Sensing.

O’Hara: Okay. Well, I am Chuck O’Hara and I am here representing Mississippi State University and the National Consortium on Remote Sensing and Transportation Environmental Assessment. And without any further ado let’s go ahead and jump into the presentation. I will be talking today about multi-sensor aerial remote sensing for streamlining transportation corridor planning and environmental assessment.

NCRST has conducted many projects in a variety of areas from remote sensing for wetland mapping to our current topic today on multi-sensor data analysis projects for NEPA streamlining. We look at land use and land cover assessment for transportation planning, automated tools for corridor planning, large regional databases for multi-modal transportation planning. And most of our projects have been conducted with on-the-ground partners in the state DOTs in states such as Mississippi, Alabama, Iowa, North Carolina, Virginia, Washington and others.

The overall goal of our project is to collect and convert new data types, new data streams into environmental information products that are useful in transportation planning and environmental analysis processes.

So what is the application? This multi-sensor data analysis project looks to collect data, new data, early in the life cycle of the project instead of planners entering into the project with the best available data, we look at data with improved temporal, spatial and spectral characteristics that offer the opportunity to improve planning, remove bottlenecks and shorten timelines. And the benefits are that having good, high quality, current data can improve opposition, help to reduce the fieldwork, improve the ability to select and screen among alternatives and to present options to the public.

The multi-sensor data streams that we are looking at would include things like high resolution multi-spectral satellite imagery for regionalized pictures of land cover and land use analysis. Very high resolution, black and white or color infrared or true color imagery, digital orthorectified imagery as opposed to the types of photogrammetric data products that are being acquired now on photo-based emulsion material. LIDAR elevation data or terrain analysis, hydrologic analysis as well as preliminary design and early engineering analysis work. And hyperspectral image data that is useful for detailed land cover, wildlife habitat and wetlands analysis.
So why are we interested in LIDAR data? LIDAR data is an effective tool that is being used by more and more agencies and for statewide mapping for things like the digital flood information insurance rate map updates to DOT projects in statewide elevation models. It needs a single line of sight to measure through and between trees that can generate very high density measurements or observations of elevations used to create DEMs at lower cost relative to photogrammetry and it can work both day and night but not through clouds or in really bad weather.

So what are some of the uses of LIDAR data? Hydrologic analyses, riparian zone analyses, wetland analysis, floodplain analysis, cut and fill engineering analysis, vertical optimization final alignments, estimation of stream impacts as well as slope and terrain analysis.

So what are some of the things that worked very well about LIDAR data and the derived DEM products? The DEMs were analyzed for hydrology, terrain, and worked extremely well for cut-and-fill analysis for roadway construction. The synthetic stream networks that are generated from LIDAR DEMs use flow accumulation and flow directions and those allow us to generate in a very high detail how the landscape drains so we can do a better job of analyzing stream impacts of transportation projects.

Why are we interested in hyperspectral image data? Many narrow spectral bands and hyperspectral imagery offer us the ability to separate land cover features much better than just using RGB or a few colors. Hyperspectral image data provides detailed reflecting signatures for the desired terrestrial targets and therefore it allows us to better un-mix the landscape and improve the confidence of our classification results.

So what worked well? Hyperspectral imagery data worked extremely well for classifying vegetation, impervious surfaces, wetlands, habitat, all kinds of features on the landscape. Another thing that worked well is fusing the elevation data from the LIDAR and the hyperspectral imagery to create means of providing excellent views of areas of interest on the landscape whether those are views of existing or proposed infrastructure or views of wetlands features or areas of environmentally sensitive features that are desired to be avoided or to lessen the impact.

So here is another view of 3-D landscape with CASI hyperspectral data draped on top of LIDAR digital elevation data. Elevation data plus hyperspectral data worked very well in helping us to identify wetland areas. And we can see here that wetlands underneath tree canopies that would be occluded just with normal imagery, we can
improve our ability to extract those by using the elevation data plus the imagery. But you can’t just use the hyperspectral data alone and by itself. It involves a lot of field work.

Field biologists and flight planning is conducted to go out and select vegetation of interest. GPS is taken out in the field along with photography and a hand-held spectral radiometer in order to collect the spectral signature of the vegetation of interest. For that location it is treated as a training site and that information is then used to classify the location of where that vegetation or feature of interest exists across the entire study area. So there is quite a bit of fieldwork that goes into coordination.

Another thing that is of interest is high resolution color and panchromatic image data. Typically black-and-white image photography is used in transportation projects and those are giving away to digital image products. These products can deliver almost immediately and give critical data to planning environmental analysis and for public meetings.

Another thing that works well with these high resolution data is to compile data to those high resolution base maps and here is an example where national wetlands inventory data that were just scribed onto an older photo are scanned and then recompiled to the high resolution digital base map. Coordinated data collection is something that worked extremely well. Going out through an entire study area and putting together a data acquisition plan for the entire area provided data to everyone involved throughout the project from the project onset and it made everyone’s life a lot easier on most of the projects that were involved.

In order to do this, enterprise architecture is required. How do you load, process, manage, and distribute these massive data sets? It requires that the agencies adopt some kind of an information technology infrastructure that allows the effective use of the technologies.

So here is a view on the slide of an enterprise architecture at work. One of our partners is Z/I and Intergraph and here we see TerraShare as an interface to a very large ADS40 image data collection for US 49 that connects Jackson down to the US Gulf Coast. And this was the main critical lifeline that allowed people to evacuate the coastal area in Katrina. And we’re looking at improving the capacity of 49 to service people. So, partnering with industry, a variety of industry shareholders or partners were used from EarthData Technologies, image providers, hyperspectral data providers, and software providers. Working with agencies, finding on-the-ground projects, helped us to validate the process and gave us insight into agency challenges.
Factors to consider is that these are big data sets. There’s a lack of institutional knowledge. Consultants have limited knowledge about how to use the data. The data do have some issues in terms of accuracy and quality that we have to have a better understanding of. The cost of acquisition, processing, management and distribution all require a little bit better understanding on the part of the agencies and consultants. Cost benefit analysis of doing things with digital imagery and multi-sensor data, have to be compared with our traditional methods. And the technology readiness levels vary greatly among the different DOTs. So some are already using the technologies, some need to come up to speed.

There’s an ability to collect the data once and use it many times. Tech transfer is critical factor. Storage is a big need and there’s an increased need to use the imagery in GIS applications. So collecting data early is important. It’s near term, prime time technology. It’s been successfully demonstrated in many states. And it promises to bring meaningful streamlining to NEPA and to preserve the intent to consider all alternatives in transportation projects. Thank you very much.

Schwartz: Thanks Chuck. I understand that you’re using some of these applications in helping to resolve the issues resulting from the Katrina Hurricane.

O’Hara: Exactly, exactly right. One of our projects is looking at the Mississippi Gulf Coast. And I have another slide here that shows the Gulf Coast of Mississippi. And you can see that we have I-10 that traverses the Gulf Coast east and west. We have the CSX Railroad. We have US 49, which is the critical lifeline that we’re studying that allows the evacuation.

There’s an unprecedented amount of data collection going on right now. High resolution, ADS40 data, satellite providers, LIDAR is being collected by a variety of agencies. And we’re hoping to use these data both for the immediate rescue and recovery activities, as well as for the long-term visioning of how it’s going to be reconstructed, rebuilt and recover over time, some very tough issues.

Schwartz: Good luck to all of you, who are working on that. Let’s move to Len Bettess who’s going to talk with us about Quantm.

Bettess: Thank you. Thanks Marcy, and it’s great to be here today. I guess I’d like to start by saying that this probably fits in very well with Chuck’s presentation, in that some of the data that is used or that’s gathered using some of these new techniques is really important in transportation projects. And hopefully we can talk to some of those issues in the discussion later on.
Firstly, my role I guess, with Quantm is to provide training and technical support in the application of Quantm on projects, specifically in the US. And I’d like to give a brief introduction as to what Quantm is about, some of the background about Quantm. And talk specifically about one of the applications that we have in California.

So what is Quantm? Quantm is a planning system of corridor and route optimization, or route analysis. And one thing I’d like to make clear from the outset is that Quantm is not a design system. It’s not a detail design tool. It’s a planning tool for the planning process as CAD systems are for the design process. So what Quantm is, is an alternative analysis tool for corridor and route optimization. It empowers project teams with the ability to literally look at every conceivable alternative upfront and equally.

Quantm as a company provides training and technical support in the application. So we’re not consultants; we don’t do the actual project planning work ourselves. We act as the trainers for the DOT or the consultant community who would use the application.

I think the important thing about this type of technology is that it facilitates the integration of all the aspects of planning into a single analysis. So in this particular example, we have engineering inputs, we have environmental inputs such as printing endangered species, 4F properties, parks, critical habitat and those sorts of imports. Other inputs that are integrated are cost of bulk earth works and structure costs. So it’s a cost estimating tool as well. And the fact that it’s integrating all those different inputs means that it’s a very good public involvement tool, or this approach is a very good public involvement tool in that it tends to integrate the various players involved in the project.

Some of the differences between this type of approach and conventional approaches are the fact that it integrates those applications together. It also really brings the three dimensional analysis into the equation right from the get go of the project. So it provides a relative cost different, or relative differences between the different alternatives right throughout the process. It also encourages, due to the very quick turnaround in processing capability, it encourages sensitivity analysis to be conducted to produce the most cost effective solution for the project.

Some of the other differences compared to other technologies are that it provides, or some of the other approaches here is that it provides better utilization of data as Chuck mentioned in his discussion. It provides a more comprehensive investigation of alternatives, again, due to the very quick turnaround and the capability. It also provides a built in audit trial to the process so the users in the project team are able to document within the system, the various decision points that are made throughout the planning.
project. It also complements the other approaches, which I’ll discuss now. So what it can do is integrate some of the data out of the good GIS data bases that are available now. That provides a lot of two dimensional data on environmental constraint mapping and so forth. But some of the GIS approaches are very two dimensional and can be subjective in nature. So I guess that’s one of the differences that this integrated capability provides.

Compared to the manual CAD approach, I guess, or the traditional approach to alignment selection, those approaches are fairly slow and intuitive where it’s a very manual selection of individual alignment options. And to take that to a cost estimate degree can take a lot of time and resources. What this capability allows you to do is integrate some of those things in with the other constraints of the project.

Some of the types of applications where Quantm is utilized is in corridor selection and alternative analysis projects, primarily for road and rail infrastructure. The most obvious application of Quantm is for new location projects, although there are some applications for realignment projects as well. In those situations, it’s more conducive to projects that will involve more significant reconstruction of the alignment. The size of projects vary from say three to five miles up to 100 or 1,000 mile corridor studies. So it really covers quite a magnitude of different applications. Probably the most typical application would be in the probably five to 30 or 40 mile length range.

The application also has the ability to integrate the environmental issues into the equation and the public involvement concerns. So whilst the most obvious applications are in undulating or hilly terrain type of applications it’s also a very important tool in projects that are very environmentally sensitive or have political issues or time constraints due to the very quick turnaround in the capability.

Some of the examples of the applications around the US are listed there. I think that’s around 13 different states around the country now over the last three years. The specific examples I’d like to show you now--this is an example from a project in Southern California. Now there’s two types of optimization available. There’s what we call an unseated or unconstrained analysis. And that’s where we were looking at alternatives over quite a wide study area. And the objective of this unseated analysis is to find trends of alternatives. So you can see with this particular slide how you’re starting to get bands of different alternatives forming. That’s the first stage of optimization.

The next stage is where you start to look at individual alignments and you conduct a more intensive analysis along particular corridor locations. So this slide indicates the fact that it is a three dimensional analysis throughout. You are showing a
plan and profile view there, on that slide. And then, here we show one of the alternatives overlaying on the top of an aerial photograph. So that shows also the impact on the environment and the terrain, areas of cut and fill, and earthworks are shown in different colors. So it’s a very useful tool from a presentation standpoint.

Okay. This particular slide here shows one of the results of the alternatives. If I just go back to the previous slide—which I can’t get to—this shows how the alignment from this particular study has been refined around some of the environmentally sensitive areas, the wetland areas and the sensitive streams for this particular part of the study area.

The audit trail capability within the system where the user documents each step of the process is a very important one for traceability of the process, and enables the user to document the different decision points along the way, the various objectives of the project team throughout the process and assumptions that are made along the way as well, so that they can be revisited towards the end of the project to make sure that the alternatives that are being presented or recommended still meet with the original objectives of the project.

So I guess in summary, some of the benefits of this particular application is in the way that it can integrate the engineering and environmental analysis together, improved environmental and engineering collaboration of the project teams. It can save quite a lot of time in the iterative process of alignment evaluation and selection. It also is able to, or has been able to reduce impacts on sensitive species and other sensitive environmental areas. It has reduced the amount of residential displacement just by the ability to be able to conduct “what if” analyses at each step along the way. It’s also minimized impacts on utilities and the number of alternatives has been reduced, so that there’s less alternatives being presented in the draft DIS document.

In this particular application in California, the project team, or the client, had said that it potentially had saved them six to 12 months in the alternatives evaluation process. They’ve also benchmarked that against some of the alternatives that came out of the conventional approach and have documented that it saved, it can save up to $100 million in this application of a 26 mile project through fairly serious terrain. So there are a lot of benefits there in terms of the ultimate construction costs savings. So, with that, I’ll pass it back to you Marcy, thank you.

Schwartz: Thanks. I think it’s really important to note that Quantm is another example of a case in which government investment, in this case Australia’s CSRO, really was able to take an innovative idea and move it to a commercialized product that now is offered through
Quantm. But government investment in research has proven to be very valuable in this case.

We actually have a question from a viewer, so let me pose that. And actually, it’s for you Dave, on MetroQuest. And the question is, “Does MetroQuest factor affordable housing into the smart growth scenario? Or is affordable housing outside urban boundaries?”

Biggs: No, we do look at affordable housing. We in fact, look even broader than that at household affordability. It is not only the cost of housing, the affordability and the income of people in the area, but also the expenditures of those people on typical expenditures like transportation, housing, as well as goods and materials and services, to look at household affordability. So not only your income, but your expenditures as well, and we’re comparing that in different scenarios.

Schwartz: That is interesting. I hope others of you are thinking about questions you have for our three presenters now, and will get them into us very quickly. Because we’ll only be addressing these tools now for the next few minutes before we go into the best segment. And I guess I’ll address a couple of questions to you until we get some more questions from our viewers. I guess I’m curious about how agencies actually make use of these tools. I mean ways, steps that they would take to make use of them. Len, in the case of Quantm, how does that work

Bettess: Sure. There are a number of different ways that Quantm can be engaged by specific clients. In some instances we have cases where the agencies have a statewide agreement, but the majority of cases are on a project by project application. So we, they engage the Quantm capability, if you like, for a specific project application.

Schwartz: That makes sense. And Chuck, you’ve spoken about a lot of different tools. How are agencies making use of these? You alluded to a few, but I know that there might be some others.

O’Hara: Well there’s a pretty wide variety of uptake, in terms of the technologies. Some states have in-house capabilities. For instance, Florida DOT has recently acquired a very advanced digital camera system, the Z/I digital mapping camera. And they’re applying detailed photography both for their transportation projects as well as for their county update imagery. Many states are using contractors for acquiring things like statewide LIDAR data sets that are providing improved elevation base maps for the entire state. And many agencies, as Len previously said, are focusing on their needs for specific projects. And just as they would have in the past, they would go out and the contractor
would acquire imagery. In many cases these days instead of just the traditional photogrammetric products, they’re going out and they’re putting within their spec digital products, not just the panchromatic black and white material, but also color, infrared and true color data so that they can look at…

Schwartz: So they’re collecting all that data at once for a project?

O’Hara: Well, not necessarily. That’s the idea of this project, is to move all that up front. Typically, it has happened over the project life cycle. It’s our stipulation that moving that forward in the process, getting all that data early helps to make an informed choice. Many agencies are moving forward and doing it. Some of them have moved those capabilities in house, but we’re seeing much more of it.

Schwartz: Excellent. And what about MetroQuest?

Biggs: One of the projects that we’ve run recently was with the state of Idaho, where they were gathering together stakeholders from across the state and thinking about a thirty year plan looks like for the future of Idaho. And they divided the state up into several regions. And we used MetroQuest with wireless keypads where participants had wireless keypads and they were able to create and explore alternative future scenarios and look at the impact of different land use and transportation choices on several indicators that they were concerned about to try to come up with the best case scenario for those 30 year futures. And some of the comments back were very interesting from participants. They were having sort of, “Ah-ha” moments when they started to realize the synergy between some of these choices that we are making and the lack of synergy that can happen in traditional sorts of decision making, and how that could really back us into a corner.

And then, of course, the opportunities for integrating land use and transportation decision making. And, of course, gathering stakeholders together in the process to really look at the consequences and to feel a sense of buy-in over the future scenarios that were created. So we had an awful lot of fun in that process. I mean, it was fun to play with the wireless handsets, but it also allows the audience to anonymously vote for their choice. And they might vote differently than if they had to put up their hands. And it allows us a bit of that interplay but it also allows us to track, among the audience members, how different socioeconomic groups are voting on issues. And what kind of information causes different people to change their minds about things? What kinds of outcomes are important to swing people in one direction or another? So it was a very fun and interactive process that we enjoyed very much.
Schwartz: Well, we have another question from Matthew Moore in Idaho. And he is asking whether each of you, each of the presenters could give a brief, tangible example of their technologies, identifying cost, time for start up to demonstration or application, and the best use applications. So, anybody want to go first?

Bettess: Sure, I can go first…

Schwartz: Okay, go ahead.

Bettess: I guess the start up time really is dependent on—I think for each of these applications—on what data is available up front, and what stage the project is in. Certainly with the Quantm system, usually our clients use whatever currently available data is there, with the project team at the outset, at whatever stage they’re at. So, given that the data is already available and it’s available in a CAD or GIS format normally, that information is usually provided to the Quantm system and a project database can literally be created in a few days. So the project team can really be doing the evaluation within a two week period of start-up.

Schwartz: And you’re talking about thousands of alternatives are running through in that period of time?

Bettess: Certainly, yes. Just, during the very implementation period, within a week, quite a number of different alternatives can be looked at. So with some of the documentation that’s available, it’s between 20 or 50 viable alternatives returned by the system for any given scenario, or set of conditions. So during the project implementation or the training program that we take the client through, they’re looking at literally hundreds of alignment options for that given study area within that training period.

Schwartz: Uh-huh. Within a few weeks is what you’re talking about?

Bettess: Yes, yes.

Schwartz: And so, what about costs for that?

Bettess: Costs on the application?

Schwartz: I think that’s what, what Matthew’s asking.

Bettess: In the example that I quoted, the demonstration for the project in California, that’s a 15 mile project. So it’s about $150,000 application in that case. And that gives the project team an unlimited optimization capability for the duration of the project. Which typically would last from one to two years, in terms of the alignment analysis.

Schwartz: So it’s a cost per mile, kind of?

Bettess: At least for, yes, for our technology, yes.

Schwartz: Okay, good. Chuck, can you speak to those questions?
O’Hara: Yeah. Two very recent examples come to mind. Immediately after Katrina, the US Army Corps of Engineers let a contract to a company, 3001, to fly the data, to fly their ADS40 sensor and collect one foot imagery from east of Mobile Bay to west of Lake Pontchartrain. At the same time, LIDAR contracts, synthetic aperture radar contracts, hyperspectral data contracts were let, but this one image collection particular contract was for that east/west stretch up to 31 degrees north for an area covering over 12,000 square miles. And that data was flown over a period of two weeks. It’s being delivered to probably 30 or 40 agencies on Firewire drives. Everyone has access to the imagery data…

Schwartz: Really quickly.

O’Hara: Very quickly. And if you consider the processing time of being able to take the data off of a plane that has a GPS inertial measurement unit to very rapidly geo-correct it, to put it onto media, to get it out to the field for such a broad area, I think that that’s rather unprecedented. And when you think about using the imagery data as well as the LIDAR data to look at something like estimating the rubble piles and how difficult it will be to remove those, and to measure the process and the progress of that. That’s, that’s really, I think an outstanding example.

Schwartz: What about cost? Any information you could provide about that?

O’Hara: Well the cost of LIDAR vise photogrammetric analysis for elevation data—there’s a little bit of savings in terms of dollar costs. There’s a lot of savings in terms of time costs. In terms of accuracy, the photogrammetric data still probably has a little bit of an edge on the LIDAR, but it’s not that much. Now, in terms of the actual image products, the digital imagery from centers like the ZIDMC, the DSS, or the ADS40 are catching up and providing data that are of visual quality that are similar to photogrammetric products.

Schwartz: Dave, what about examples from MetroQuest?

Biggs: Well, a recent example that we’re working on right now is with the city of Calgary. The city of Calgary has just turned 100 years old and so they’re engaging us in a process where they’re, they’re calling it “Imagine Calgary.” And they’re engaging 100,000 people in the city of Calgary and the surrounding municipalities in creating a 100 year plan for the next 100 years for the city on their 100th birthday. So this project is, is really and outreach and engagement process that’s going into municipalities and their councils, as well as decision makers and stakeholders in the public over the next several months. And we’ve already run about 20 workshops in that process. And we’re going to be
running about another 20 workshops. And then we’re going to be doing some online consultation from there.

Schwartz: And in terms of cost of such an effort?

Biggs: Well, typical projects, including the development of the tool with the data for the region and the training and application of the tool in the area—typical costs range from $150,000 to about $300,000, depending on the size and the complexity of the area.

Schwartz: Okay, good. We have two questions that maybe we can get some real quick responses to. From Wesley Ratko at the Center for Sustainable Communities in Pennsylvania, on Quantm: “Is Quantm conversant with ArcGIS applications?”

Bettess: Absolutely. Quantm very well integrates with all the CAD and GIS tools so the majority of the data that comes into a Quantm analysis comes from GIS or CAD applications. So, yes.

Schwartz: Okay, good. And from Mark Cross from Missouri DOT: “What kind of responses are you getting from agencies with these tools? How are they accepted?” Could we just get a real quick response because we’re getting close to the end of our hour here?

Bettess: I think we’ve had a very good response to it. I guess it’s mixed according the types of projects different agencies have…

Schwartz: Sure.

Bettess: …across the country. So, it can vary.

Schwartz: But it’s been explored in 30 different projects or so.

Bettess: Yes.

Schwartz: So, someone who was interested in finding out, could talk with various agencies and try to, okay, so that would be helpful

Bettess: We can certainly direct people to, yeah, to people with similar applications, yeah.

Schwartz: Okay.

O’Hara: I think the agencies certainly are interested in seeing the products used. They’re also interested in seeing the states embrace photo updates, digital updates and high resolution mapping activities across the state. It would provide them with the information early on in the projects that they could then add to, with very, very high resolution data as they move into preliminary design and engineering and then further into construction phases.

Schwartz: Dave, real quick.

Biggs: I think the uptake has been very, very positive because at an opportunity to have some fun, to be really engaging and informative at the same time. And we’ve been using MetroQuest now around the world. And I think the regions that are having the most
success with it are the regions that are growing quickly, interested in engaging in some
growth management strategies, and engaging the community in looking at alternative
strategies. And those are the communities that are having the best success with the tool.

Schwartz: Responses, right. Great. Thank you all very much. And I encourage people to continue to
submit questions. We won’t be able to address them online, but we will be addressing
them. Our panelists will be calling in and writing in on the CTE site to answer other
questions. So again, thank you very much. And please stay tuned for the next hour where
we will be discussing two additional tools. Thank you.

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Schwartz: Welcome back. In the second hour of today’s teleconference, we’re going to hear
presentations on two technology applications for construction and maintenance activities
related to asset management and life cycle engineering. Let me introduce our two
speakers. Sonal Sanghavi, a professional engineer and NPDES program manager for the
Maryland Highway Administration. NPDES stands for National Pollutant Discharge
Elimination System, for those of you who aren’t familiar with it. But her application is
going to relate to many other kinds of facilities that will be of interest to you as well.
Sonal has responsibility for strategic planning and oversight of the state’s roadway
drainage infrastructure management, storm water discharge, water quality and pollution
prevention programs. She’ll describe an asset management tool that has applicability for
a broad range of transportation facility elements.

Lou Barrett is the transportation program supervisor from Minnesota DOT. She
oversees the computer-aided engineering services unit, and is responsible for Computer
Aided Drafting and Engineering design programs at MnDOT. She also leads research and
development of innovative tools, one of which she’ll be happy to discuss with us today.
So let’s begin with Sonal.

Sanghavi: It is a pleasure to be here. And this presentation that I’m going to talk about today offers
some insight into how we manage storm water access at the Maryland State Highway
Administration—integrating those with technology and custom tools and the underlying
framework is how we look at assets and using principles of asset management.

The primary driving forces are regulatory, which is the EPA-mandated MPDES
permit. And secondly it is striving for environmental stewardship, which is part of the
Maryland State Highway Administration’s Business Plan goal for Environmental

Transcript of CTE Teleconference #37:
Results of NCHRP 25-22(2) (Broadcast: Sep. 29, 2005)
Stewardship. Considering that Maryland water is eventually drained to the Chesapeake Bay, our water quality is certainly a big priority and a concern for us.

So with that, what does managing storm water assets mean? For us it really means tracking an asset related to storm water through its lifecycle, which is to identify our storm water facilities, locate them in a spatial context, inspect them, look through their condition assessments, and maintain them. We just do routine maintenance or retrofits or upgrades. We’re just really looking for opportunities for enhancement. And eventually in the broad umbrella of managing this program, which is through strategic planning and financial commitments, the overarching goal here is certainly environmental compliance.

And the Maryland State Highway Administration, through its 17,000 lane miles of roadways that we maintain and own, there are over 200,000 drainage structures, and counting, as well as over 3,000 storm water management facilities. So in just managing these assets, it is a pretty daunting task. And the need is to really streamline this effort in these four key areas of identification, inspection, maintenance and management.

So how do we approach this? It is really building the foundation which is through our inventory process, where we bring in an inventory of this drainage infrastructure in a spatial context, which is really in this GIS world. Condition assessment is to really know how well they are performing for its intended function. The third tier is maintenance and remediation, which is really to address the deficiencies of these storm water facilities that have been identified through our inspection efforts in the field.

This also helps us with our long term strategic planning, developing a year-long work plan, as well as long-term budgeting. Because once we have an idea of what needs to be done, obviously we can make some cost projections and put in for the next fiscal year’s financial budget.

And finally, for anything to be successful you need to continue to maintain it and update it. And hence, cyclical inspections are very important—keeping the GIS updated is just as critical, and the long term system maintenance is something that is very essential to the function.

And what we have done through these four building blocks is really look at where we need a very streamlined process. And the two tools that I’m going to talk about, which relate more to the condition assessment, which is work done in the field, where most of our data collection efforts happen, and the second tool, which is work done in the office, which is really to view and query your data and start looking and evaluating what
deficiencies there are identified and how we need to respond to them. That is really where most of the data is generated, and that was really what called for some streamlined and customized tools.

And really the benefit of implementing a systematic approach is that it provides us with a fact-based dialogue with the regulatory agencies and certainly with our senior management. And it allows our program managers to really build their case for what needs to be done, and actually getting work done on the ground.

Our initial inventory is really built on a relational database. This is really where we start off and use this more as a central repository where information that is collected from things like our construction plan, the drainage infrastructure and storm water facilities are identified, and we start populating our databases. And eventually something like this comes out. It is more like a line sketch of where the drainage structures are located and where generally storm water facilities are located. And you can see how the whole system is built together.

But again, this is only an initial office inventory. This information really needs to be verified in the field and especially with storm water facilities that need to be inspected for performance. This takes us to this condition assessment tool. It is a mobile inspection tool and its simplicity is just a hand-held device—a PDA which many of you use those on a pretty routine basis. Their application developed here is the NPDES Field Inspector, within which we have developed several modules related to storm water facilities to managing outfalls as well as culverts and storm drains.

The goal here is to really view the inventory that was initially collected in the office and because it is GPS-compatible what it helps the field inspectors do is take this information and navigate to a known point out in the field and then data capture all the field inspections. We have over 40 parameters that we inspect for and this will really makes it very easy to do so. And the neatest part about it is the ease with which you can synchronize that information collected in the field and bring it back to the office. Synchronize that back with the central database.

Here I will just use screen shots for what this inspector looks like. It starts off with just general information. Each storm water facility is provided with a BMP ID number and because Maryland has been constructing storm water facilities for over 20 years, we have certainly built a variety of storm water facilities, and inspections really call for some special structures, et cetera. And so the type of BMP that we are inspecting is definitely a factor in how these forms are set up. So we select the type of facility that
we are inspecting and it allows us to capture information which you see across this top row from an overall site assessment to water quality which has to do with the actual performance of its intention, the inventory data, and there are a few other tabs that you will see across as I go through the slides.

The overall site assessments and basically the readings really go from one through five so you can see it is all just a pull down menu which makes this very easy for a field inspector to enter data. If you can imagine being out in the field with traffic going 75 miles an hour you want to really be in and out of there and make it as easy as you can for the safety of our field personnel. So this tool has really been helpful for that.

It’s the same thing with water quality. Again, with the pull down menus looking at the water quality performance of the facility, things from ponding, and how much water it is holding to the debris vegetation issues that come into play. And other water quality features such as the full bay.

With inventory data, again, it has to do more with structural components like if it has a pipe and does the pipe have a cap? So it is really simple things that we capture but it has a tremendous amount of benefit when we evaluate this information back in the office.

With maintenance, as we evolved through this process over the last five years, what we did recognize is that the categories of minor maintenance like routine maintenance to do with trash removal or mowing or vegetation management versus the major maintenance that contend more with erosion pockets and those types of structured repairs. And because we did not want our field inspectors to be out there even a minute longer than they really needed to we again have a pull down menu and a select options for major and minor maintenance action items.

Also with digital cameras and because we want them to capture as many images as they can in the field, but if you can imagine an inspector conducting inspection on 10 facilities and probably five pictures for each facility, that is about 50 pictures or photos to manage at the end of the day. So what we wanted to do is once they take an image or a picture, they can just associate the photo number right in the form and that makes it very easy for them to download and synchronize back that data in the office.

And finally, again with the intent of being in and out of the area as quickly as possible, there is also an option of voice recording when comments get to be much more than just what the screen allows. Voice recording certainly has been a phenomenal tool for them to use and that can be transcribed back in the office.
And ultimately there is the overall rating. One thing I would like to mention is our storm water facility inspections are based on a two tier rating system. The first is based on performance and structural integrity of the facility and the overall inspector rating which goes through an A, B, C, D, E and that is what the field folks then provide to us. The second tier rating is to do with an ACHE [ph] rating which is really how we prioritize the facilities to address the deficiencies that have been identified for the field inspection.

So with that information collected together we basically capture all the field information and are able to bring this back to the office and just as with any hand-held device or just as an iPad you basically just cradle it and it downloads back into your desktop through an active technology. So it is pretty simple to use.

Now you have already created a lot of information in the field and you need to view all the information in the office to really make good decisions on the next action to be taken and to respond to the deficiencies, which takes us to the data management tool which is an office tool. We call it the BMP viewer. BMP, which also stands for best management practice, is used interchangeably with storm water management facilities.

The goal of this application is to really seamlessly tie and serve up the data related to information collected in the field which is non-spatial data as well as GIS layers. The spatial data, aerial imageries, photos, CAD files—anything associated with any particular storm water facility can easily be served up very seamlessly in this desktop application. I just created it using ___ [ph] map object lite version, which is very simple to use. What we do with this information basically is to evaluate all the inventory data as well as the inspection data collectively, and make a decision on what actions need to be taken which help us prioritize the facility either for maintenance, repair, remediation or even potential opportunities for upgrades or enhancements. If facilities don’t have any water quality features, we also look for those additional opportunities. And the neatest part I want to say about this tool is probably the development of work orders.

What this allows us to do with the click of a button once we have made a decision on how we want to prioritize this is to develop work orders which really is just selecting some information about the map, the image of the facilities, some inspection data, and create an action item list and then develop a work order that we can either give out to a contractor or to a design consultant depending on what action is to be taken.

This next slide is really going to show you some screen shots on how this BMP viewer tool operates. We can zoom into any county or area that we are interested in.
is a map of Anne Arundel County in Maryland. And you can see a lot of layers up here. The green ones are the drainage, the inlets, the manholes, pipes, et cetera. I believe the red lines are probably the roadway network and as we can zoom in on the right side here is where the non-spatial data that resides in our active database is served up. But this is more of the GIS and the spatial screen and this is the non-spatial area. What this also shows at the bottom left corner is that there are 457 storm water facilities in Anne Arundel County and then we can start building queries on what we are interested in. In this case our database query that we developed is based on a storm water type of retention pond that has an overall SHA rating of a C. So it is something as easy as selecting information from pull down menus and building queries. It gives you a summary of 11 facilities that meet that criteria that are retention ponds that have a rating of C because maybe we want to lump these together and have a certain contractor do a type of work to fix a deficiency because a C for us implies major maintenance activity such as erosion pocket repairs or structural repairs, et cetera.

You can also zoom in, and as you zoom in further you can see a little bit more detail. Here are the outlying storm water facilities that show once it is selected you can see the access database served up and this area on the right populated and you can also see images associated with that particular facility. And here is another close-up shot of another facility where you see the facility 2012 and all the drainage entering this facility as well as its outfall. So there is a wealth of information that is already there, through just a click of the buttons we can bring in and be able to evaluate what it means.

The right side is where the specific inventory and site features are presented and here you can also see the images and there are a few tabs up here that allow you to look at close-up details. This first close-up detail is using this tab here which is the inspection data that is served up. And the overall rating for this particular facility the inspector provided was a B rating, which is that it needs minor maintenance work done. But as we looked at the data we felt this was more appropriate for a major maintenance because of the type of erosion that it had.

You can also look at scanned images. This is an original design image--a design plan of the facility and I believe this was constructed in 1989 or 1992. So to serve up this data so very easily allows us to make some pretty good and comprehensive decisions.

You can also view other images associated with it. And really with the click of a button, while this is only screen shots, it is really as easy as this to generate an 8-½”x11”
page summary of a work order which is a maintenance action item list and this is a list of
all the work that needs to be done by our contractor.

So what we do is create a bunch of work orders and we lump them by districts
and by roadways, by geographic areas and provide our on-call contractor with a package
that they can use to pull all that information together. And what we can then do is from
this information that was collected through the field, our office inventory and field
inventory is to be able to use that information, review it and then be able to get the work
out in the field and be able to create things and install things in the ground. If it’s a design
request we can do that as well.

So it is very easy and does appear to be seamless and it really is. That is what
makes the work process so much more streamlined. And that is probably what I would
like to say in closing, that really taking an asset management approach and using these
tools help us meet our environmental commitments and goals. That you can, with all this
data collected be able to make decisions very quickly and respond to these in a very
efficient manner and be able to put these in the ground. Really good use of our taxpayer’s
dollars and certainly the environmental stewardship efforts.

And another aspect I do want to bring in is: tools are tools and process are
processes, but it is really the people behind them who make it happen. And I do want to
acknowledge the people who work with us everyday—day in and day out—Dana
Havelock [ph], Regia Tomara [ph] and Greg Keenan. These are the guys who use these
tools all the time and they make it appear very easy and seamless and that is really them
doing a fantastic job.

Schwartz: Is this being used throughout the state of Maryland now in the system?

Sanghavi: Yes, as a matter of fact it has been. When we did pilot this about three of four years ago it
seemed so successful and it obviously was. It became a part of our business plan and our
administrator, Neal Peterson, made it an environmental stewardship goal to have 90% of
our storm water facilities functioning to its intended design by 2010 and now the number
that I gave you earlier—we have over 2,000 storm water facilities statewide, which in
itself is a pretty daunting task so to pull something like that together is really with the use
of these tools and technologies. So, yes, we certainly implemented that statewide.

Schwartz: Great, let’s move on to hear about Minnesota’s tool, Life Cycle Engineering. Lou?

Barrett: Thank you. In our presentations today we have heard from people talking about Life
Cycle Engineering already. We have heard some of the underlying themes about using
data again and we also just saw Sonal talk about using some of the mobiles out in the
field. And what MnDOT does is a combination of these things and we put it all together and called it our Life Cycle e-Engineering. And what that is referring to is that it is not just life cycle. We are actually going to talk about how we can make a lot of this information electronic.

So over the past five years we have embarked on a project that is called our P69 project and we actually had three goals in mind for that. And the three goals were: to create the data once and to reuse it over and over again, to try and minimize our paper flow since we have a lot of it and we really wanted to focus on electronic data, and then the part that actually fits in with this presentation is how we got that information from our design or our hydraulics or our various functional groups out into the field and that is really the important part.

So I want to talk a little bit about what kind of information we have available and we have Life Cycle e-Engineering and in this particular case we’ve got—we start out at the very top in our work program with something that surfaces for whatever reason that we need to go out and do work on it or it looks like it is something that might fit into our long-range program. And there we do a lot of the documentation. We begin some of the feasibility studies or the actual studies. And then as we progress around we move from doing some of our studies into the planning area. And most of this part refers to usually GIS information or very general information that is gathered from a variety of either internal or external websites. GIS information usually not a lot of CAD data is available in the early stages.

But as we progress on we also have our documentation and maybe we are beginning to do some of the permitting work or some of the environmental impact studies type of work. And so once again we don’t have a lot of graphic data, but we have a compendium of different kinds of data that is available and are trying to pull up all of that together into one package. As we move farther into the design process now, we are beginning to look at some of the CAD data and so what we try to do is take our aerial photography, our GIS information and overlay it all together into our CAD realm so that we have once again the information available for use and that we are not reinventing that information.

We are also trying to stress the idea of carrying the information along so that it is not used by one particular functional group and then it is lost along the way never to surface again.
Once we have done the design work, we have done a lot of CAD work in it, now we are going out to construction. And here is where, once again, we are matching up with some of the other DOTs and looking at some of the mobile information or mobile devices that are out there. And we are also looking at how we can take some of that information and capture it again to make sure that once again we pass it along during the entire cycle.

So in addition to using mobile devices, we are also using GPS equipment so that we can gather information out in the field, particularly where it is deviated from what design had originally intended. We can never really build anything as it is designed, so in this way we can collect the information, and we have a complete set of as-built or construction drawings when we are done.

Then that information gets fed back in to do long-term planning with it. We can use it to put back to GIS or back to some of the websites to continually carry all the electronic information from one stage to another and so that is why we termed it e-Engineering.

The project we are going to talk about today was one of our pilot projects that has been done over the three few years and it is located in our Wilmer district. It is in our Highway 23 project. It was roughly a 10 mile long job, and in this case it was a very environmentally sensitive area, and so we have done a lot of work in that particular area when it was in the original stages. The GIS information was gathered for wetland information from a variety of sources and at that time once again we overlayed that on top of our aerial photography, and I have a shot of that in just a moment for you. And we do use CAD. We use MicroStation and GEOPAK for doing our pond design and in this particular project had 40 plus ponds and several expanded wetlands so we had quite a bit of work that had to be done aside from the actual road construction itself.

The important part was of course the information to be leveraged to the field and that included taking some of the graphic information out on hand-held equipment. We also could take out any kind of permitting or documentation on PDF if we wanted it and thirdly, the most important part, is the machine control which was our 3-D computer models.

Here you can see we have got the overlay of our GIS information along with our aerial photography and our CADD work and so in this case you can see three various layers of information that have been gathered as we are progressing through. And in this particular area of course we have got one of our ponds and it is actually an expansion of part of a wetland that was already there and so we were very sensitive to make sure that
we expanded that without doing any damage to it. We also wanted to make sure that we
didn’t affect any of the outlying areas while we were at it so we wanted to make sure that
we kind of kept those on the site as well.

One other important aspect is of course taking the information out to the field in
a graphical format so they can see it when they are there and we wanted to make sure that
we didn’t have what we call information overload. In other words, we provide so much
information that the field personnel could never find the right information at the right
time. So whatever we developed we wanted to make sure that it was quick, easy to use,
very small learning curve so they could come in and get a couple hours worth of training
and head back out to the field. We also wanted to make sure that we kept track of the
information. Some of our projects have GPS equipment while other projects don’t. So we
wanted to make sure that we had both applications covered.

We leveraged out to the field and you can see once again I am still zoomed in on
the same wetland that we had before and across the bottom you will see one of our GPS
units. It is difficult to see on the screen however they see the same graphic that you see
on the screen, however they don’t have to learn a sophisticated graphics package in order
to use this. So for example, there are survey people that are still using the same survey
GPS equipment that they would use prior to this project. It is just we loaded additional
software onto their equipment.

By doing that we could see exactly where the pond is. We can have the outlying
areas slightly different colors so they could tell what areas should not be impacted, that
we need to stay away from. We also have all of the associated pay items with it so for
example they could see exactly what type of temporary and permanent erosion control
should be used and then they could also keep track of the staking of that so that once it
was put in we could tell exactly where it was if it was permanent.

When we collected our as-builts, once again, those groups that had the GPS
equipment with them could collect exactly where the information was or exactly where
the pond or wetland was put in. And in that way we could keep track if again there was a
slight change from the design aspect of it. We could keep track of where it was built and
this information could be forwarded back on so that we could update the rest of our CAD
information or in the future pass it through up to the GIS information. So that was very
important to us to make sure we had some way of keeping track of that information so it
didn’t die in the field.
In the past it meant that I think our two big problems have been trying to get the electronic data from the design people out to construction and then once again you get the construction people automated and up using some of these electronic tools so that it is not just scribbled onto a piece of paper somewhere and shoved in a back pocket or in the back of the file drawer.

What I wanted to show on these three graphs is to go back to it once again is on the left hand side we are actually using the regular survey equipment. Part of this project was to evaluate the various types of hardware that we were using so we used a combination of our traditional GPS equipment. We also looked at hand-helds, we looked at the iPacs, we looked at mini-tablets, tablets, basically anything that could get carried out to the field. We looked at the ruggedized versus the non-ruggedized to see where we would get the best cost dollar for it versus how much of a beating it takes in the field when we are out there. This narrowed it down. A lot of it is personal preference. We found that of course ruggedized holds up better but there is additional cost there. And as far as which one works better we found that the hand-helds have fairly small screens on them, but they are easier to carry so there is a trade-off there. The mini-tablets have more power and work performance-wise a little better but they are more bulky to carry and so at that time we had to kind of decide what we want.

So we have narrowed it down to three or four different types of equipment that people can use in the field. The equipment in the field is straight off the shelf. We did nothing special to it. What we really did is the software development for this. So we gathered once again surveyors, inspectors and all sorts of field people over the last four or five years to determine what exactly they wanted in the field. So we avoid the information overload but we honed in on exactly what they wanted to do this.

We have also got once again on the far right hand side we show the machine control and that was another big part of our project. The machine control and that was another big part of our project. The machine control, for those who are not familiar, is GPS equipment that is mounted onto some type of earth working equipment. It can be bulldozers, graders, blades, scrapers or whatever. And then they utilize an electronic 3-D model to move the earth.

This was very important in our Wilmer project because, once again, of all the ponds they were putting in. So the original contract since this was emerging technology included five of the ponds as mandatory to use the new emerging technology and the other 35 would be done if it was deemed viable by contractor and by MnDOT that it was
a satisfactory solution. After the first couple of ponds, the contractor was so pleased with the results that it expanded out, and we did do all 40 some ponds using the machine control.

The advantages to using the machine control are many-fold. First of all we didn’t have to do any staking. And so if you have ever driven by any of the ponds and sites where you see ugly stakes and old silt fences sticking out because nobody cleaned it up afterwards, we didn’t have that problem. It was nice and neat and tidy. Another one, since it was an environmentally sensitive area, that worked out quite well was that as soon as they were done digging the pond with the machine control we could apply both temporary and permanent erosion control measures and so we got down and got those in quicker and faster to minimize the amount of environmental damage that was done.

The other option that we have for doing this is in our roadway area and the contractor once again was so pleased with the way machine control worked on doing the pond work that there was also a value in engineering part of this project where we used it for doing roadway work as well as doing the ponds. The result of part of this is that we have now expanded out at the DOT and we do pretty much all of our pond work with machine control. Our contractors have been very, very progressive and are actually pushing us into this type of technology; they feel it’s a big benefit to them; it’s very cost effective. They can get their work done faster, and it still is a quality job, so it’s kind of a benefit for all of us to do it that way.

Other issues that we have covered in this particular project can be expanded out to other areas as well, so we focused here on doing some of our pond work, and as I mentioned, kind of worked our way into our roadway, but what we did after that was expanded out into several other projects this past construction season, and next year we’re going to be actually moving our machine control into all of our grading projects we have at the DOT, or as many that have GPS coverage.

The nice thing about being able to use this technology is that we used it on ponds, but it can apply to a variety of other environmental issues that we have at our DOT and that everybody else has as well.

For example, the first slide I showed had our wetlands on it, but we could also use it for our threatened and endangered species. We can use it to show where our nesting areas are, or our contaminated hazard sites. Minnesota also has a lot of archeological sites as far as Indian burial mounds, and we want to be very sensitive to those areas, so when I showed the graphic that had the wetland on it, we could also be showing the graphic of
any of these types of critical issues that are important on your project. So by a project-by-project basis, it’s very simple for a designer to decide what information they felt was a benefit through the planning stages and through the design stages, and we can carry that information out into the field.

I also mentioned, although I didn’t I have a slide for it, is that we can carry some of the associated documentation with it, so we all know there’s lots of permitting that goes on in order to complete these projects, and quite often they’re always stuck in the last file folder in the bottom drawer in the back, and this way, by loading the information onto either our handheld equipment or some of our survey equipment, all of our field personal have ready access to whatever type of documentation they want, be it standard specs or standard plans, or NPDES permitting, any type of DNR permitting; anything we can put into PDF file we can also load onto the handhelds and have readily available.

The other nice piece of information is we can share it between all of our field personal, so if we have a crew of three or four or five surveyors and inspectors, they can stand side by side and get the information passed from one mobile device to another. And then we also have back at the field office, it’s all uploaded into a database, so we can bring it into synch with several people using it, so we have all of our information gathered at the end into one site and one project. So, I think that concludes my presentation.

Schwartz: Thanks, Lou, that’s great. And I understand you’re sharing this information with other states at this point?

Barrett: Yes, we are. As we mentioned, the program has been going on now for several years, and actually some of the original pieces that we did, as far as some of the—for example, the erosion control pay items and information going to the field was originally developed by Florida DOT and it was incorporated inside of a CAD software, which is Bentley Systems software, and right now, also, New York State DOT is doing a pilot project with the same handheld software that we are using this summer, and so it’s all being incorporated by a variety of other DOTs as well. The nice feature about it is it’s all being built into the standard software, so it’s being shared by all the DOTs who use Bentley products.

Schwartz: So I think that’s really wonderful, and Bentley worked with you in this application, and so it really will be available to all the other folks who use this, probably.
Barrett: The handheld software is actually available now, it was released commercially this past summer, and the 3D modeling software is scheduled for release later this year and is being beta tested by DOTs.

Schwartz: Excellent. Excellent. We do have one question, from Keith Miller, from North Jersey Transportation Planning Authority; it’s a really simple one for use in all—[LAUGHTER]—he wants to know what a BMP is.

Sanghavi: A BMP stands for “best management practice.” That is typically a common term used for any type for best management practice, whether it’s in context of storm water management, which is really the context I used it in, but it could also be fore erosion and sediment control, or could be whatever, technology using and best management practice related to that. So that’s what BMP stands for.

Schwartz: And you use it in terms of the name of your program and so on as meaning a facility, a BMP really relates to the particular facility.

Sanghavi: The function, really. As in storm water management, best management practice, or practices, could imply the variety of storm water facilities we have, like retention ponds, detentions ponds, etc., and BMPs in context of, say, erosion and sediment control may be sediment basins, silt fences; whatever it may be. But it’s really best management practice for that function.

Schwartz: I see. Okay. Good. We haven’t got anymore questions yet from the audience, so please folks, send us your questions. We’re eager to respond to them. So let me just ask you a question that’s come to mind while we’re waiting. Lou, you talked about the fact that your contractors were very positive about the results of this, or the ability to use the tools that you’ve described. What about the folks in the agency? What’s been the response in general to it?

Barrett: The response in the areas where we used it have been very good. Machine control aspect of it, we’re all using the same models, so we can verify and double-check what the contractor is doing. The handheld information in our pilot projects has worked out quite well. We’re finishing the development on that now, but what they’re finding out is that if it doesn’t take them any longer to collect the information to gather it, than they’re amiable to doing that. It’s when they sit down and it takes a lot longer to do it, then they have a little bit of hesitancy.

The other nice thing that we built into some of the handheld stuff is that we’ve included a lot of their customized reports, so now instead of having to sit down at the end of the day, and fill out two hours worth of paperwork, had they inputted it into the
handheld to start with, all they would have to do is print out the forms. And once again, we did it a lot like Sonal did hers, where it’s just, you fill in the blank that you need, so they don’t necessarily see their from; what they see is the information that we have to gather in order to complete the from, and so normally there’s less blanks to fill out, and then we do all the computations behind the scene. So one example is if they have to do a daily report, and then at the end of the week they have to have some type of a weekly summary of that, well, it does it automatically, and so they’re seeing the advantage of doing that for some of the paperwork.

The other thing it does is it also gives an audit trail, so it keeps track of who’s doing what work, the dates and whatever, and so for auditing purposes, it’s good because we have that information, and they can’t change it; it’s in there. They can make adjustments if they make a mistake, but they can’t go back and erase data, so from an audit standpoint that’s really good that we have it in there and available for us throughout the lifecycle of the project.

Schwartz: And Sonal, what about in Maryland, in the application of this tool, I know it’s evolved over five years or so. How has your staff reacted to having to learn these new systems and so on?

Sanghavi: Actually, they’ve taken it on very well. The fact that we have made the data entry to be so easy, and I think that is really the most, I guess, tedious part of any effort, where you have a large volume of data, and you’re talking about, say, even with these applications, one neat thing is you don’t have to be a power GIS user. It is so user-friendly, and certainly the field tools as well as the office tools. They’re very user-friendly, so in terms of our staff being able to use them, it just makes it very easy. And the fact that you have this digital version of the field form, really, and the synchronization back at the office, which allows us better quality control and better data consistency, it’s just as easy as synchronizing, cradling it, docking it on the cradle station, and it’s uploaded back into a desktop.

There is a lot of ease of use of this data and reduction in work duplication. So it makes it more streamlined, and to be able to use this data for a variety of things makes it very easy, and we’ve been able to respond very quickly to any management questions as well, when there are some environmentally sensitive projects that come about.

In the BMP viewer tool we can bring in the GIS layer of the watershed that is affected by that particular roadway project, and look at all of the storm water facilities, the road network there, everything, and even working in conjunction with local
jurisdictions where they have watershed plans because they do a lot of studies, so we know where we can work with them and partner with them.

So those opportunities are offered because we can so easily use this data. So in terms of end users, pretty much everybody, including us as program managers or the field inspectors or our facility managers. Everybody is using it easily.

Schwartz: And how many folks are using it? What numbers are we talking about?

Sanghavi: Actually, our everyday work is really being done by about five key people. We have a storm water facilities program manager. She basically makes her decisions in how all this work has to be distributed. We have one engineer, she basically looks at the information that’s coming from the field, and assigns it an SHA which then splits these facilities into different categories, maintenance or remediation, or enhancement opportunities.

And also, the coordination between getting this work done, so we have the construction connection as well. We have our construction inspector and really the construction contract manager, who worked from that phase of identifying the deficiency to getting it done in the field, so linking these key phases of what a facility would go through are really where the everyday staff works. I guess a simple answer would be that five people work on this on a daily basis.

And it’s always expanding too, the design folks, our consultants use it a lot as well, because each of them are stand-alone desk-top applications of the field application. It helps us with distributed work flow. As many DOTs are downsizing, when you’re talking about 2,000 facilities and maintenance of 1,000 of them, to generate all these work orders, it may be just as easy for us to outsource that part of the effort, because we can install BMP viewer on a desktop, and have a consultant who we can really rely on and their judgment, because it does come down to people and how they’re evaluating the data to generate work orders and make that connection back to the construction contractors.

Schwartz: Has Maryland thought about expanding this kind of asset management program to other types of roadway facilities?

Sanghavi: As a matter of fact, yes. Seeing the success of what we have with storm water facilities, we have developed similar tools to manage outfalls. Interestingly enough, as we went through our inventory process, and identified drainage infrastructure, what we found was outfalls behind noise walls along embankments we have not seen for like 50 plus years since they have been constructed. They’re quite insightful, and to be able to collect this
data, to bring in a condition assessment, and hence a rating, we know what a one through five would mean, and what we can target as potential opportunities for retrofit.

So, yes, we have expanded those to different assets, particularly the drainage assets. But if you look at its application, I can see this happening pretty much with any asset related to signs or the regulatory / non-regulatory signs, traffic signals. Another interesting thing that has come out of our SHA business plan is reduction of mowable areas. So the areas we mow, if you look at information from an aerial imagery of areas that are mowed, looking at opportunities of reduction—a tool like that would be very helpful.

Schwartz: When we had the focus group on this tool, I know many of the respondents said, “Well, we wouldn’t use it for storm water management; it’s not so important to us as it is in Maryland, but there are other types of facilities that will see this as very valuable.”

Sanghavi: Absolutely. When you are collecting a lot of data in the field, and bringing it back to the office, and then have to make decisions, I think these tools are really very helpful.

Schwartz: We do have a question now from Maria Cisneros in California. How long did it take and what was the development cost for Maryland to develop this system?

Sanghavi: The tool called the NPDS field inspector, it was really a very minimal cost. I want to say maybe, off the top of my head, maybe $10,000 or $15,000, if that. I mean, it wasn’t anything very complex from what I understand. Because there wasn’t a GIS component, which we have expanded into now using our pad, but the handheld device, the development was very minimal. The BMP viewer, also, probably I think it runs about at $25,000 or $30,000 as development cost again, in context of our savings in terms of time and resource management, that is really nothing. So you’re talking about something that’s only tens of thousands of dollars, in terms of the actual development.

Schwartz: That’s great.

Sanghavi: When I talk about simple tools, that exactly what these are. Simple tools with some very powerful functions.

Schwartz: Great. We have a question for Lou now from Norman West in Illinois. He is asking if the machine control is by linking the handheld to the machinery or is another linkage involved.

Barrett: Well, there’s actually another linkage involved. What we do is we create the 3D models in our office and then we load them onto a Flash drive, and then they’re actually loaded into the earth-moving equipment, it has specially designed software, and a computer screen on it, so what happens, is that the driver of the equipment will see this 3-D model...
on a TV screen in front of him, and then he can use that to either raise or lower the piece of equipment.

Where the handheld comes into play is we load that same 3-D model onto our handheld and then we can do our QA/QC work with it, we can hook it into our tremble [ph] equipment, so they’re all using the same data but they’re using it for different purposes. And then as well, since we have the 3D model in the handheld equipment, they can do things like staking curbs and gutters; staking the outer edges of ponds; we can use it on the total station for the same thing, so it’s the idea that we’re using the same model for a variety of different purposes is what’s really important.

Schwartz: And that’s the whole e-Engineering concept that you’re talking about?
Barrett: Absolutely.
Schwartz: Collecting data at one point and then using it throughout the whole development and delivery.
Barrett: Absolutely.
Schwartz: A question that I’ve got as we’re waiting for other questions, we have a few more minutes, how would you say that these tools have actually changed the way your organizations operate? These are pretty major things, and I assume there have been some real changes that have resulted in how you do work in the agencies, how people do their everyday kind of jobs. Can you comment?
Barrett: It has changed. In our pilot projects we’ve definitely noticed a difference. Our design people now have to be a little more computer savvy as far as how they prepare some of the data before our deliverable was strictly a paper plan, so if it looked good on paper, it didn’t matter what the electronic files in the background looked like. Now it really matters what you have on those electronic files, or how you get the 3-D model out to the field, how we actually create those models, so it’s information that’s been there before, but perhaps when it got to the field, they had to manipulate it.

So what we’re looking at in the business sense is to make sure that when we prepare the data to start with that we do it in a way that we can use it in a field, rather than us having to recreate it and say, “Well, here’s how we use it in design, here’s how we use it in hydraulics, oh, but that’s really not how they use it out in the field,” and that’s actually part of our big change, getting that climate in the…

Schwartz: In the preconstruction group.
Barrett: In design, in planning, in hydraulics or whatever it may be.
Schwartz: And so that way you’ve really eliminated a lot of the redo that you’ve had traditionally in all those different transfers from one phase to another.

Barrett: Right. And we still have a lot of old projects, so it’s an ongoing process right now, it’s not quite as easy as what Sonal had with hers where you’re starting out in inventory; we’ve got projects set up in design for several years, and that’s why we’re slowly working in the process as that old data is either used or created to something that’s useful, and then we expand it out to other projects.

Schwartz: So you are expecting to expand the use of it, though?

Barrett: Oh, we are definitely expanding the use. Next year we are expanding it on, I would say, 25 to 30 or our grading projects as far as machine control, which is a substantial portion of the grading work that MnDOT does. The handheld, we’re also doing an expanded training this winter, and they’re going to put that on more projects as well.

Schwartz: Great. Sonal, what about changes in Maryland operations?

Sanghavi: Certainly the fact that we have streamlined our process and we actually can create some defensible data that we then can take to our senior management, put in funding requests, and really make the long-term funding projections. I think that is probably the best way to describe what has happened because of these tools that as we develop a strategic plan, and we know what work lies ahead of us, we can say, “Okay, we need five more contracts to get our construction work done, or we need more design contracts.”

So it really has helped us streamline this and make this a very robust effort in improving the environmental commitments and also in terms of stewardship in terms of working with local jurisdictions like I mentioned. Now it has gone from a programmatic level even to a project level. I think that is really the highlight and, I want to say, the success of integrating a programmatic requirement that goes down to a project level. Integrating that into capital projects; integrating those into system preservation type of projects; partnerships with local jurisdictions; I mean, it really has tremendous amounts of benefits, and we definitely feel that from its simplicity it has helped us a lot.

Schwartz: Great. Well, thank you both very much for joining us today. And again, we’ll answer more questions online if you can post them from now on, this afternoon through tomorrow and the next couple of weeks. Stick around for the next hour. We have another hour to go. Thank you.

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Schwartz: Welcome back. In the third segment of our teleconference, we’re going to focus on two environmental analysis tools. And with me to present them today are Peter McGilvray, from Florida DOT’s Technical Resources Group in the environmental management office; he manages that office. He serves as the manager of the environmental screening tool that he’ll discuss today, as well as the project manager for the Florida geographic data library, a digital inventory of Florida GIS data assets on which the screening tool is based.

And Rich McQuown, from Pennsylvania DOT, is an environmental planner with the Environmental Quality Assurance Division. His office is responsible for providing project development related environmental policy, reviewing environmental documents, and development and implementation of technologies to enhance the project delivery process, including the expert system tool that he’ll be presenting today.

Please remember to submit your questions and comments immediately following the presentations, because we’ll only have about 20 minutes to address them in the segment, and we certainly would like to hear from you, so keep that in mind and you can start writing questions any time and getting them in to us. Pete, you want to give us a start on the environmental screening tool?

McGilvray: Sure, absolutely. First off, I don’t want to get anybody upset; I don’t manage the office; I’m really just one cog in the wheel. [LAUGHTER] I’m sure my boss is out there right now and I don’t want to see that as one of the calls that comes in.

Anyway, we’re here to talk about the environmental screening tool. It’s to support the efficient transportation decision-making process in Florida. Let’s go ahead go to the slide. What we’re talking about in Florida is we’re trying to move major capacity improvement projects out from concept to concrete. The problem up until this point is that in a traditional model, mobility planning is taken care of by DOT and by the MPOs and it’s sort of done silently. There’s a lot of information that gets carried on that is input into the decision-making process that never gets forwarded out to the agencies themselves. Once a project gets identified in a plan, and that is identified as a priority, it goes into the DOT work program, which is a five-year program.

So, there’s five years that pass between when a priority project is identified and when it actually gets funded and moves forward into the PD&E process. So we’ve got late agency involvement, we’ve got no inputs really moving forward, and we’ve got a long time gap in which a lot of things on the ground can change.
We’ve got the ETDM process in Florida which is designed to basically take all of those concerns and address them. The way we address them is by getting the agencies involved a lot earlier by having screening events. Now, when we have needs plans, we have a planning screen. What a planning screening event is is it’s a first look at a project by all the stakeholders. And by all the stakeholders, we’re talking about the agencies themselves, the general public, the planners, and everybody. To take a look at the project as it exists in the needs plan, and give us their assessment; what are they concerned about? What are the issues that we need to address?

After that screening event, the priorities go into the long-range cost-feasible plans. As the priorities move forward and funding becomes available, on an annual basis, we do a programming screening event, and the programming screening event, we’re looking for NEPA scoping. A programming screening event is an additional look at the projects, on a much closer time horizon. The projects have the greatest opportunity to move forward and get funded. We want to know, what are your major concerns? How does the community feel about the project? What are the large environmental issues? What are the things that need to be addressed? Are there technical studies that need to be completed? Are there permits that are going to need to be acquired? What are the conditions of those permits?

So we’re getting everybody’s feedback throughout the entire process very early on, and then of course the project moves into project development, and then you see that NEPA approvals and permits are moved up a little earlier in the process, because at this point, there’s a longevity of knowing where the project is in the entire process. There’s no education really involved. Everybody is sort of on the same page the entire time.

We use the environmental screening tool as a method to be able to get everybody on the same page, to get all the stakeholders involved, and let’s talk about who are the individuals that are involved. The individuals that are involved are ETDM coordinators, which they are like the super users or the administrators of these projects, of DOT and of the MPOs. We have community liaison coordinators; it’s their job to go and, through their normal community outreach programs, identify who are the communities that are being impacted and what are their concerns, so they can be addressed in the project delivery phases. We have the ETAT members, which are the resource agencies that log on to the system and tell us their concerns and their comments about this project as it affects the resources that they’re concerned about and then of course the general public also has access to the site itself to be able to see what are the comments, what are the
concerns, and then they can forward any information that they have access to, over to the community liaison coordinators to be input to the system as well.

So the environmental screening tool has a secure site and public access site. The public access site is where everybody in the world can go see the final products, what the concerns are, what were all the actions, commitments by the department on individual projects, and the secure site is kind of the draft area where work is being accomplished, commentary is being developed, decisions are in a draft stage being made.

So at this point, we’re going to go into the environmental screening tool itself, and we’re going to pretend that we’re an ETDM coordinator. An ETDM coordinator’s job is to move the project along in the process, and what we’re going to do is, there’s been a planner who’s input a project, they’ve described it, they have described the transportation action, and the project has gone through some QA/QC, and they’re going to go and identify the project and put it out into an active ETAT review. An ETAT review is a 45-day period that the agencies and the community liaison coordinator have to give us their agency’s response on what this particular project is going to have as a proposed or potential impact on the resources that they manage or mitigate.

So log on to the environmental screen until every person who logs on has a specific user name and password, which identifies what modules and what access they would have access to. In this case, we’re going to use a project selection wizard, and we’re going to find projects that are already in a QA status, so that we can identify which projects need to move forward. We use the selection criteria, we identify a couple projects, and it brings up this status stage form.

Right now, this is a fairly intuitive form that allows us to move a project along in the process, and as you can, the different column headings kind of going from an editing stage to a GIS analysis stage, to a GIS analysis complete. It has some QA/QC rules and roles in there, and then we move out to an active ETAT review. So at this point in the process, the project has been input. It has been looked at, it’s been reviewed. It has GIS analysis run on the project. Every project that goes into the system itself has standard a standard GIS analysis run against every one of the projects. There is about 350 different data layers that have been provided by the local entities, the MPOs, the state governments, the federal government and things like that, that have been identified and working in concert with these stakeholders as the data sets that they’d like to have access to within the tool to support their review process.
With that being said, we’ve identified GIS analysis working with them that says, “Okay, for this data set, what’s the information that’s going to be useful for you in relationship to this project? Are you looking for this type of wetland in relationship to this project? Are you looking for this type of community in relationship to this project?” And if they can identify that analysis in relationship to those data sets, we can create those results.

So at this point, the project’s going out to an ETAT review, and it’s very simple, by just selecting that radio button, we get a notification email, and then the “To” list is all the ETAT members and all the community liaison coordinators and everybody who has geographic jurisdiction in this particular project. You’ll notice the subject says, “ETAT review has begun,” and then there is some text that describes where the location of this particular project is.

At the same time this project goes out to the ETAT for review, it is also made available to the general public as well through the public access site. Now, we’re going to kind of switch gears and we’re going to flip on our hats and we’re going to be an ETAT member, so we’re going to be somebody sitting in our office who’s going to receive the email, log on to the system, and then figure out what they need to do from here.

In this particular case, I’ve received the email, I’ve logged on, it recognizes who I am, and this is sort of my “projects needing review” list. This is my to-do list. And what you see in front of you is a list of projects that are in an active review stage that I would need to go and start supplying comments on. If I had already provided a review on the project itself, it would be showing up in yellow; if it’s green, I haven’t provided a comment as of yet.

The agencies have 45 days, including the CLCs, have 45 days to perform their review. But during that 45-day review period, everything is considered a draft. So we wouldn’t want to see the project just drop off the list because you entered some information about the project. You were going to have the opportunity to continue to look and expand on your comments in your issues in relationship to that project. So in this case, we’re going to identify a project. We’re going to go through the project review itself; the first thing we do in the process is review the project description. We reviewed the purpose and need statement of the project, and as one of the action items, we will provide comments on how we feel that purpose and need statement is. Do we understand it? Do we not understand it? Do we need additional information?
So we go to the next form and we say whether or not we understand or don’t understand, we provide comments to support whatever answer or we can request additional information. Down at the bottom you see that the way that we are committing this information to the database is every ETAT member is a person recognized by their agency to speak on behalf of their agency. So they’re putting in their username and their password that says “for my agency, this is our position on this project,” or in this case, on this purpose and need statement. Once we’ve moved on into that process, we’ll get an acknowledgement. All of this stuff is printable and forwardable by PDF for download.

And the next stage in the process is to go and start describing what we think this proposed project is going to have as an impact on our resources. So in this particular case you’ll see some project heading information, you’ll notice that you can pick an alternative, and that you can answer—your comments are specific to not only alternative, but to issues within the alternatives.

Issues themselves are logical groupings of data layers about a particular concern, so wetlands might be an issue. Section 4F may be another issue. Mobility needs are another issue. Social issues are another issue. And then you are going to sign a degree of effect, and this is basically a color-coded description of whether or not this is going to have an enhanced effect on your resources that you manage or all the way up to a potential dispute. And there are definitions for each one of those as to what criteria are needed in order to select that particular degree of effect. You have access to the mapping functionality of the project itself, it is a standard GIS, you can do buffers, queries and you have access to all sorts of different data layers that are available on each one of these issues. You have obviously got imagery as background information. You can, you know, normal GIS functionality.

And what you are doing now is you are trying to assess the project; what is the impact this project is going to have? And then you are going to provide your agency’s feedback into the forms. One of the things that we like to stress about the environmental screening tools is that it is just that, it is another tool. Many professionals in the field have been doing environmental reviews or community outreach techniques for their entire life and they have access to lots and lots of other resources: expertise, walking on the ground, talking to the individual next to them. But what the environmental screening tool does is it provides a form to be able to capture all of that information regardless of where that information was derived from. And it gets stored as part of the project diary and lasts throughout the entire history of the project.
You have the ability as an agency to review what other agencies’ concerns are about that particular project on their issues. In many cases, we’ve found that some of the state agencies would defer to the federal agencies and some of the federal agencies would base their comments on what they read from the state agencies. And so during this draft status, all of the agencies get to interact and see what everybody’s concerns are about the project itself.

With all of that in mind, they come back to the form, they put in their degree of effect on which alternative on which issue that they are concerned about. They’ve got fields to identify all of the resources, provide some additional comments, we are looking for avoidance, minimization, and mitigation strategies. What are the resources that they are concerned about that are at risk? Things like that. Do we need permits? What are the conditions of the permits? Would you suggest that we need technical studies? What detail of technical study are you looking for, those types of things. And again we sign off with our electronic signature based off of who we are in the system. And again we get the confirmation page.

At this point you have this summary report. This is where the ETDM coordinators come back into the system, and what you will see is that each row, and in this case we have one row, represents a project and each one of those high-level cells is a summary degree of effect. Each one of those cells represents the fact that we have received comments from agencies on that particular issue and the concerns that they have expressed working with them in the summary report, we’ve identified what the summary degree of effect would be. Each one of these is drilled down and you can begin to see the assessment. In this particular case there were two comments on this particular issue. The ETDM coordinator in this particular case is able to drill down to each one of those comments, see what the issues are, see what the concerns are. Down a little farther towards the bottom you will see the summary degree of affect for flood plains; we are saying it is going to be substantial. And then we provide, what is the reasoning for why we’ve decided it is going to be substantial?

And again this all becomes part of the project record that can carry over into project design. And this is just an example of coming back with that summary degree of effect as well. If you drill down you can see the agencies’ full comments as well and what their issues and their concerns were. And then of course everything in the summary report is available and printable as a PDF. You can forward it in an email, you can
download it, print it, put it in hard copy, forward it out as any other part of your normal business.

And then at this point status-wise we’ve got about 165 projects through the ETAT review process. We’ve got about 500 different participants as you can read how many people have been trained and how many people are reviewing the projects actively. We’ve been through about 26 class-of-action determinations on the projects. We are working on our screening events with all of our MPOs as well and we talked a little bit about the public access site.

And with that, I just appreciate the time and the effort. Thanks for having us.

Schwartz: Great. I have just a real quick question. Can agencies respond on all issues or just the ones they have jurisdiction over?

McGilvray: They can respond on all issues. There is nothing in the application that prevents anybody from responding on any issue that they have concerns about at all.

Schwartz: Okay, we will come back and talk about some other things. But for now let’s go ahead and Rich, let’s hear about PennDOT’s Expert System tool.

McQuown: Well thank you, Marcy. Thanks to CTE for providing this forum to discuss the CE/EA Expert System. Our first question is what is the CE/EA Expert System? And what it is, it is a tool that automates and streamlines the preparation, review, approval, and archiving of NEPA documents, including CE and EA-level evaluations and CE, EA, and EIS-level scopings.

The system is designed to guide users step-by-step through the process of completing their documents through the use of “smart-form” technology. There we go. What this will do, it will tailor the forms themselves to the type of responses that the user gives to previous questions and also the type of document that is being created. There is an extensive help menu provided on all screens and there are also a number of external links that are provided on each screen.

When the document is completed and verified using the system’s automatic verification system, it enters a fully-automated review and approval process where the reviewers are notified by email and once they are notified they can elect to approve, reject, or request revisions to be made to the document electronically.

When the document is approved, alternately it is automatically transferred into an archived repository where all approved documents are stored permanently and available for public review. It is a web-based system; users can log on to any internet-equipped PC and work from there. We also have a feature where users can store their information on a
laptop, unplug from the network, and use it in the field and then later on when they go back to their office they can plug back in and upload their information.

Using the system, you will see here there is a “smart-form” technology displayed. We think this represents a fairly significant improvement over our standard paper-based processes. The forms to be included, you will see here, are dictated by the type of form, either a scope and an eval or a re-evaluation, and the project level either the CE, the EA, or the EIS for scoping. Whenever these are selected a package will be generated and the forms included. If you are doing a CE-1A, which is our lowest level you can do on this, you only have four forms, I believe, to complete. Whereas if you are doing a level 2 there are upwards of I believe about 24 forms that would need to be completed along with the associated documentation.

Information to be entered is grouped into a number of forms based on the type of data. For example, there is an air and noise form, there is a cultural resource form, a public involvement, those sorts of forms. On each of them you will see the “smart-form” technology, if you select “no” to a question, all subsequent questions in that line of questioning will automatically be filled in for “no.” But if you select “yes” to the master question, you will notice in the one on the lower right-hand corner, there are a number of questions that will need to be filled before you can verify and move on.

This slide concerns our review and approval process and our validation. There is significant effort saved in this stage as a result of the electronic transfer of information and the ability of numerous parties to be able to work concurrently on a single document saves a significant amount of time and the need to physically reproduce and transfer paper copies of the document in preparation and in the review stage. In addition, because of the business rules that are inherent to the system, form errors, administrative errors, are significantly reduced. If you miss a spot or don’t have the right documentation attached to the form, whenever you click “verify” from the buttons at the top to move on you will receive a number of errors that you can select and will automatically take you to where you need to be on the form to be correct. This allows for a greater level of access for users that perhaps don’t have as much expertise and reduces a few of the training requirements before a user can actually get on and start doing his own documents.

And I guess the bottom line is: what has this system accomplished for the Pennsylvania Department of Transportation? On the one-year anniversary of the system going mandatory use (we had it on optional use for about two years), but November 2003 we went live with it. On the one-year anniversary the results came back; about 3,000
documents were in the database. We estimate that our time savings is roughly about one-third, it was 32 point something percent. And I was using conservative figures, too. It ranged from as low as I believe 24% for the higher-level CE-2’s for example; there were some that were 63%, 64% time savings, almost a year in a number of cases was reduced off of our preparation time.

What does this translate to into dollars? Because of the expedited construction, the reduced time that it takes staff and senior management to prepare and review these documents, we estimated a $5.9 million annual savings time which is pretty significant because our entire project up to this point from start-up and conceptualization was about $1.5 million dollars. And we are, it is a work in progress, we are continuing to expand, fix a few of our earlier forms to make them more user-friendly and ultimately we’d like to have it setup where we can pull information automatically from a number of other related systems. With that I would like to open up any questions the users may have.

Schwartz: Sure. I guess I have one to start. I understand that you are able to share the software code for this with other DOTs or any agency for that matter?

McQuown: We are. Our software is basically Java and Lotus Notes and the only thing that would be required for other agencies or DOTs to use is to develop their own business rules and their regulatory requirements and it is highly adaptable. It can be pooled with minimal changes.

Schwartz: That’s great. And Pete I understand that Florida is also sharing the environmental screening tool, well, not the data so much, but the software bases with other DOTs at this point?

McGilvray: Right, in Florida we are a Sunshine State, so anything that is created with taxpayer dollars is available to anybody on request. So we’ve had lots of different DOTs that have made requests and we’ve provided everything, packaged it up, and given it to them. We figure it is a good jump-off point.

Schwartz: Sure, rather than starting from scratch. Both tools rely to some extent on underlying data and one question that we got from all of the focus group members on these tools was well, “Gee, my state doesn’t have very much information. I don’t know how useful these would be.” And more on the Florida tool certainly than the Pennsylvania tool. What is your sense of that, Pete?

McGilvray: My sense of that is that, in many cases, states have a lot more digital assets than they are aware of. In many cases talking to the different states to figure out where they are, what technologies they have available, what data sets they have available, it seems that a lot of
times people aren’t aware of the national spatial data infrastructure which was created by the federal government which anybody with state dollars using data collection processes has to make their data available. And so if you go to NSDI.org you will see what nodes are available on the network and in many cases you will find you have access to a lot of digital assets that you didn’t even—you weren’t even aware that you had access to. So I’d say start there and look there; you’d be surprised.

Schwartz: So a combination of available data from a variety of agencies and the jump-start that people could get from the Florida tool would really put people on a pretty good plain to begin thinking about this.

McGilvray: I would think it would give them a great spot to start talking, you know, what do we need to do? What do we need to do better?

Schwartz: And in the case of the PennDOT tool, is the “smart-form” technology linked to underlying databases for people to use as they are filling out the forms or how does that work?

McQuown: It is. It will pull information from a number of Pennsylvania databases such as Multimodal Project Management System, or MPMS. That will allow us to pre-fill some fields. It is obviously editable; if it is not exactly what you want you can tailor it from there. But there are probably a dozen or fifteen or so forms that the user is unburdened from having to fill because of that.

Schwartz: And what about wetland inventories or cultural resource inventories or natural wildlife?

McQuown: Those are works in progress.

Schwartz: So that is something that might be linked up in the future?

McQuown: Right, there are some issues with compatibility but it is definitely probably the next step that we are looking to take.

Schwartz: Great. Okay. I guess one thing that interests me is how you feel these tools have affected the agency operations, or the inter-agency communications? It seems like there maybe have been some changes as a result of that. Rich, you spoke about how you are saving a lot of time and money; that sounds like a good thing. But what else has changed as a result of using that tool?

McQuown: I believe that the major focus is the standardization of forms, the resource agencies and the regulatory agencies more likely to once they are familiar with the system and have bought into the concept, they are getting the same type of project, or product, coming across their desk. Before we, [ph], there was some variability often in the type of
projects we would get that now it is one neat package they can look at electronically. It seems to really reduce our time for review.

Schwartz: And so it is automatically sent to the reviewers, is that right?

McQuown: Oh yes, ma’am. They receive an email and that will have a link and they click on the link and that takes them directly to the package which is the document itself and from there they will have a button to approve, reject, or request revisions where they will auto-fill in a form and it will be sent back for revision and retransmit it to them eventually.

Schwartz: So the two tools have that part in common, the ability to electronically do reviewing, which seems really good. So what about your agency’s operations, Pete?

McGilvray: Well it is interesting because the Environmental Screen Tool was built to support a process and the process itself, the ETDM process, is new in and of itself, and so at first the changes were, “This is how we are used to doing things, we don’t want to do it a new way.” And so kind of everybody kind of gets dragged along. And what is interesting is once you get them in front of a tool and they can start using it and they can see the benefit, now if you think about ETDM it is for the major transportation actions. Well now all of the planners within DOT as well as all of our MPOs are putting much smaller projects in there because they want to see the GIS analysis, they want to run the results, they want to see their projects in relationship to the GIS assets that are available to them. So that has kind of changed.

The ETAT members themselves are using the tool for projects outside of the scope of DOT, you know, because now they can go and look at a particular area in Florida for maybe another project that they have to come up with an answer to and immediately zoom into the area and get a sense of what is going on there. So lots and lots of uses. The Federal Emergency Management Agency has also customized this application after Florida had four hurricanes go through last year. So they had to figure out some way that they could deal with staging areas, debris piles, putting up temporary housing for displaced residents and stuff.

So we customized the tool for them so they could figure out where the optimal locations were and it was really interesting because their headquarters would be able to communicate with field staff and they would log onto the computer and immediately be able to see, “This is where we should do it and here are the reasons why,” type of stuff. So it has been really beneficial.

Schwartz: That’s great.
McQuown: The one question I had for you, Pete, is how do public comments get entered into your system? Is there a forum or is there an email query or…?

McGilvray: Well the way that it works right now is we don’t want to circumvent any normal community outreach activities. So the way that it works up until this point is the community would log on, they will see the project, they will see it in relationship to all of the GIS assets, they will see the comments and the questions from all of the other agencies, and what they do is they funnel their responses to a link to the community liaison coordinator, whose job is to take all of the public comments into consideration and then do a summary of that to be able to detail what does the public-at-large feel are the issues and concerns about this individual project.

Schwartz: So those things get incorporated into the public involvement effort as a whole at some point?

McGilvray: Yes and those are issues that are evaluated actively within the Environmental Screening Tool by that community liaison coordinator. So it is maintained throughout the entire project lifecycle.

Schwartz: Is there any thought about taking the Expert system from PennDOT and expanding it to other areas of PennDOT operations? I know you are going to add databases to it, it sounds like. But is there thought about applying it to other permitting activities or other kinds of activities?

McQuown: We are examining at the moment using a similar “smart-form” technology for our cultural resource documents, still once again in the very early stages, but the architecture itself is highly adaptable. It is just a matter of deciding what you want the system to do. And once that it in place it is—

Schwartz: So it is easy to build off of?

McQuown: Yes ma’am.

Schwartz: So that is, so that is good advice for other agency folks who are listening; once you get one of these you know you can jump off of it and do other things.

McGilvray: Right, and Rich had … How do your users feel about it?

McQuown: Well they—

McGilvray: How do they like the system?

McQuown: Well they have been very receptive to it for a number of reasons, the most importantly is that we didn’t force this product on them. Through the year or two of getting it out of conceptualization, designing it, we involved our user community very heavily in that process. The second most important thing we did was we didn’t set a date where we
forced the users, you know, “You can’t use your paper forms any more; you have to drop everything you are doing and use this new electronic system.” We gave them over two years to use it as an option which was very helpful because the user was able whenever they had time they could go in and figure it out and draw on others that had used it before. It didn’t, you know, it didn’t cause delays to any documents that were already in progress. And once a few users into this search seemed to use it and they liked it, they served as motivators for others who were a little more hesitant to change.

Schwartz: That is great. Keith Miller from North Jersey Transportation Planning Agency is thinking along these same lines and he wants to know about EDTM in the sense of is there any resistance from environmental resource or advocacy organizations in use of the tool?

McGilvray: There is usually resistance until you start to use the tool. That really I think is the big thing. Everybody, I mean you are building something that has never existed before and nobody really has a basis or an experience to compare to it. But once you get trained on the tool, you have access to the tool and you see how it all works, we get nothing but rave reviews from everybody once they get onboard.

And one of the things I would stress about that is providing frequent training opportunities I would think, is one of the ways that we get the word out consistently. There are several modules within the application; the review module, the ETDM coordinator modules, there is the community liaison coordinator module, and we provide training events, both hands-on and on the internet, much like we are looking at right now, as opportunities every single month, so that we can deal with always keeping everybody up to speed, always keeping everybody trained and answer questions as things come about, so. I think that is a big way to head-off those concerns.

Schwartz: I guess one of the purposes of our NCHRP project is to improve environmental quality. And I guess I’d be interested from both of you to know: has the presence of these tools really changed the nature of the projects that are coming out? If we get early screening reviews from people, is it changing the description of projects as they move through? Is there any sense of that?

McGilvray: That is a portion where we are starting to get into right now. The Environmental Screening Tool process has only been active for about a year-and-a-half. And so at this point we are reviewing all of the projects in the planning and screening, all of the projects in the programming screening-type things. And now they are going to the point where they are actually going to be funded and they are going to move on into project development. What we are seeing is focusing of scopes at this point, so rather than
spending time and money on technical studies that don’t need to be accomplished or larger studies when really a focused one will do, or focusing on issues that aren’t really issues, we are noticing that we’re seeing that dialogue decrease, that we are focusing in a little bit more. But I still think it is going to be some time before we ultimately see the results.

Schwartz: Well we will stay tuned for future results.

McGilvray: Sounds good.

Schwartz: Norman West from Illinois has another question for Pete. What kind of public comments and participation has your system experienced? So are a lot of people from the public responding and participating?

McGilvray: Sure, a lot of times it just seems to depend on the region. In different parts of the state the general public has a different sense of how they want their community and projects to go. So I guess the answer is really very regional in nature and I am the technology manager, I am not really the individual that is reviewing all of the comments that go into there. I am really the guy that makes sure there is a spot for those comments to be stored, so I am not sure that I would be the best person to answer that.

Schwartz: Well, if someone wanted more information about the content of the comments that are coming in and how it is changing things, who would they talk to?

McGilvray: They could talk to our office, George Ballow and Wesley Animoser [ph] will be glad to provide that content information.

Schwartz: Okay, get in touch with Pete, he can forward you on to someone.

McGilvray: Absolutely.

Schwartz: Another question about the PennDOT tool that we had from the focus groups to a certain extent is really how was the tool developed? Were the actual practitioners involved in the development of these various screens and so on so that it made sense to them when they went back to use it or what kind of process was actually used in developing it?

McQuown: Originally when PennDOT was thinking about creating an electronic system for completing environmental documents we were looking at an EIS-level system but after a very, you know—

Schwartz: A very quick time.

McQuown: A very quick time we realized just by sheer numbers the effort would be better spent on CEs and EAs which are produced infinitely more often for our department. Once we realized this we set about developing our business rules, our regulatory requirements,
brought in a team of environmental specialists of highway engineers and of IT
generalists, consulting and in-house.

We designed our business needs concurrently with our IT architecture. Once that
was in place we divided up our needs and requirements, into sections for the forms. And
with help from external agencies, especially the regulators such as FHWA. Then as
soon as we had it in a beta stage we put it out for testing to all of our users and again the
regulatory agencies for their input, there were four or five variations before it went online
for use.

Schwartz: I see, so it was tested through a series of—
McQuown: Thoroughly.
Schwartz: So that would make it really helpful to others as well.
McQuown: Right, and it gave our users a stake; their feedback they gave us—it was put in place
within a matter of weeks or months. We continue on that same path. We have a tracking
system where we take the users’ input, rank it, assign it a level of effort, and as soon as
we are able to we—

Schwartz: Oh, so you are continuing to improve it and change it as you go?
McQuown: Yes.
Schwartz: Oh I see; I didn’t realize that. Pete, a question just came in from, I think it is Missouri
Department of Transportation, from a Mr. Burton. Are agencies in Florida required to use
ETDM method to process their impacts or can they respond in a different manner? So
basically do they have to use it this way or can they just respond by sending a letter or
something like that?

McGilvray: No, the way that it works is there are 26 agencies that are involved in this process. Before
the environmental screening tool or anything else ever came out to support it, we had
joint application meetings and summit meetings to get all of the agencies on board and
we signed one large memorandum of understanding. And then with each of the agencies
that memorandum of understanding was basically: we all agreed we are going to blow up
the process and when we decide what the best way to deliver these types of projects are
in Florida, we are going to work together to get it done.

And then we went around and actually had operating agreements with each one
of the agencies. So for these types of projects, these major transportation actions in
Florida, this is the way the DOT does business and as agreed upon between the agencies
and ourselves.

Schwartz: Well, thank you both very much for sharing this information with our audience.
McGilvray: Thanks for having us.

McQuown: Thank you, ma’am.

Schwartz: Okay, and in closing I appreciate all of you in the audience joining us today. And thanks again to our excellent set of participants. In addition to their participation in today’s teleconference they have also been a key part of the overall research project that we have been engaged in together. And this includes Milt Hill from Oregon DOT, who couldn’t be with us today, as well.

I also want to thank the people who are responsible for the project for their hard work and dedication; specifically, Donna Kilber Kennedy and Theresa Carr from CH2M Hill, David Fletcher from Geospatial Paradigm Computing, and Bill Hyman from ERES Consulting.

And the project panel members who have also added tremendously to the value of this work, let me tell you who they are. Wayne Kober [ph] is chair of the panel; Kathy Ames from Illinois DOT; Dick Krim [ph] from Florida DOT; John Fisher from CTE who we thank for sponsoring this event today; Mark Cross from Missouri DOT; Bill McCartney from Michael Baker; Tim Quinn from Minnesota DOT; and Brian Smith from Caltrans. Martine McCosey and Andy Lemur are our NCHRP staff who’ve also added a lot of value to the effort.

So I encourage you all to look for the final report which we expect to be out next year by going to the TRB website, and to ask any questions that have come to mind since the Q&A period has ended. Add those to the CTE website, and our panel members have promised to check in and respond over the next couple of weeks as you ask questions. So thanks again for listening in today. We really appreciate it.

McDermott: Thanks Marcy, and on behalf of CTE I’d also like to thank all of our panelists today and especially thank you for participating in this program. I’d also like to acknowledge the many downlink sites throughout the country that tuned in today including EPA’s air pollution distance learning network. I must also recognize the efforts of the Agency for Public Telecommunications, the UNC Center for Public Television, and East Bay Media, all of whom made possible today’s live broadcast and internet simulcast.

Just a few reminders before we leave you. You can continue today’s discussion as Marcie just mentioned on CTE’s after the program web discussion forum. As she said, we will post any questions that we did not get to today in that forum, and our panel as well as other audience members are welcome to reply. The web discussion forum as I mentioned will start at 4:00 p.m. today and remain active for two weeks. DVDs or written
transcripts of today’s program can also be ordered from our website, and you can view
this program in its entirety from CTE's webcast archive. The program should be available
within the next 24 to 48 hours.

Also, online versions of the handout and copies of the panelists’ PowerPoint
slides will also remain available for download from the archive. And finally, please
remember to complete the evaluation from located in the handout and turn it in to your
site coordinator today, or if you’re participating via the web, please complete the online
evaluation from. We invite you to regularly visit our website and check out our
newsletter for our schedule of broadcasts and other CTE activities throughout the year,
and we hope that you will join us on us on November 17 for our last broadcast, which
we’re pleased to say will focus on the new environmental provisions of the Federal
Transportation Bill, called SAFETEA-LU. That program is being produced in
cooperative with both the Federal Highway Administration and the Federal Transit
Administration. As I mentioned, that will be available through CTE’s National
Teleconference Series on November 17.

Well, that’s our program for today. As always, it’s been pleasure being with you.
Until next time, thank you and good day from Raleigh, North Carolina.

[END OF PROGRAM]