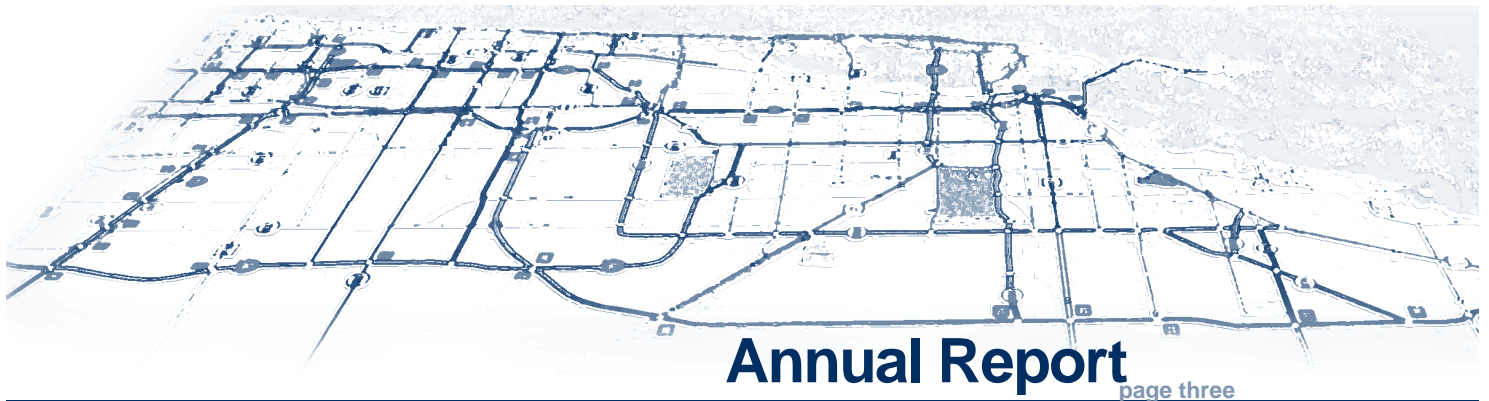




Center for Microcomputers in Transportation

Volume 17, Fall 1999 Newsletter



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HCS2000™

A McTransSM Product

The Transportation Research Board (TRB) Committee on Highway Capacity and Quality of Service has been working on an update to the Highway Capacity Manual (HCM) for the year 2000 (HCM2000). There will be numerous procedural changes and a new format, including a multimedia CD-ROM in addition to the printed manual. HCM2000 is scheduled for publication sometime early next year.

This means McTrans is already hard at work on the upgrade to the Highway Capacity Software (HCS) to implement these new procedures as HCS2000™. McTrans plans to release HCS2000™ immediately following the publication of the HCM2000. Keep an eye on the McTrans newsletter and website for future developments.

PLAN TO ATTEND

Transpo2000-The Future Is Now

Transpo2000 will be the largest celebration of Florida's transportation past, present, and future. Transpo2000 will be a technical conference covering all aspects of transportation with presentations by transportation leaders from public and private sectors. The conference will also feature an extensive exhibition displaying Florida's transportation technologies, companies and organizations that will lead us into the future. We invite others from throughout the region and nation to join us and share our vision and show us your products.

April 17-19, 2000 Hyatt Orlando, Kissimmee, Florida

Plenary Sessions

To set the stage for the conference, the opening session will be given in three parts:

- A historical perspective of transportation in Florida;
- A vision statement by an economist/demographic expert, to set the stage for the transportation needs that we must address in the 21st century;
- A response to the challenge from a noted transportation expert.

Governor Jeb Bush* will give the keynote presentation at the banquet and Senator Bob Graham* will share his views on the challenges of transportation and the environment for the closing keynote session.
*Invited

Technical Program

- Track 1: Systems Management & Operations
- Track 2: The Transportation Infrastructure
- Track 3: Innovative Transportation
- Track 4: Innovative Financing of Transportation

Exhibition

Exhibits will be open April 17-19 and will include:

- Transportation Equipment Manufacturers,
- Vendors and Resellers,
- Suppliers,
- Systems Integrators,
- Consultants,
- Planners, and
- Association & Interest Groups.

**Don't Miss This Important Event!
Register To Attend Or Exhibit Now!**

For Information

Contact: Complete Meeting Concepts (407) 425-8184
Visit us online at: <http://www.cmcmtg.com/transpo>

Presented by the Florida Department of Transportation; Florida Division, Federal Highway Administration; Florida Section, Institute of Transportation Engineers; Florida Transportation Builders Association; Intelligent Transportation Society of Florida; and University of Florida Transportation Research Center



**ANNOUNCING
THE TRANSPORTATION
RESEARCH BOARD
79TH ANNUAL
MEETING
JANUARY 9-13, 2000
WASHINGTON, D.C.**

Save with advanced registration before
November 30, 1999

For information check the TRB Internet
website:

<http://www.national-academies.org/trb/meeting>

Or call the TRB Annual Meeting

Annual Report

The McTrans Center kicked off the 1998-99 year with the long awaited release of version 3 of the Highway Capacity Software and continued throughout the remainder of the year maintaining the software with the release of patches 3.10a and b. Patch c, which will include the ability to load signals (.HC9) data files will be released very soon. All HCS3 registered users have been automatically notified of releases. Those waiting for the Windows version of TRANSYT-7F will be pleased to know that it is in final testing and is also scheduled for release this fall. Those who purchased version 8.1 will automatically receive a free upgrade.

Looking to the future, McTrans has already been hard at work on the next upgrade to the Highway Capacity Software HCS2000™ to implement the new Highway Capacity Manual (HCM) 2000 procedures. McTrans plans to release HCS2000™ immediately following the publication of the HCM2000.

Over the past year, McTrans presented 14 new software and technical resource products. We now offer our members over 500 transportation related products including demonstration software and documents. Titles and brief descriptions of the products that were introduced in our newsletters last year are shown below in their respective categories. Along with new products, 16 existing products received updates (see list below). If you are interested in learning more about any of these products, please feel free to contact Debbie Escalera or Bill Heitman, or visit our website at <http://mctrans.ce.ufl.edu>.

McTrans participated in the exhibits at the 78th Annual TRB Meeting in Washington, the ITE Annual Meeting and the 4th ITS World Congress. We introduced our services and products to new members and took suggestions on how we can improve our service from our existing members. We look forward to attending the year 2000 meetings, and greeting the new millennium with our members.

The McTrans newsletter introduced a new column entitled, "Did You Know" that provides our members with useful tips and information for our LOS 1 products including HCS, TRANSYT-7F and TSIS. If you have any questions related to the products featured in the column or would like us to address a topic you have an interest in, please contact David Hale at (352) 392-0378 ext.240.

Also during this year, McTrans published a new version of its product catalog that was mailed to all members in August. The catalog contains concise descriptions of the products we offer in an easy to read format. The full description version of products will still be available on the McTrans website if you need more detailed information. If you did not receive a printed copy of the catalog, please let us know and we will get one in the mail to you today.

If you have visited our web site recently, you may have noticed that we made a few changes. Our site has a new look and an on-line membership sign-up. Shortly, we will be placing our new easy-to-use catalog on the site that will allow you to readily access in-depth product descriptions and information. Later this Fall, we will launch our Order-On-Line feature that will allow our members the convenience of ordering over the Internet.

We have enjoyed serving you this year. If you have any questions, comments, or recommendations, please call or e-mail us. We thank you for your continuing support and look forward to another year of service to the transportation profession.

New Products Announced Last Year

Highway Engineering Highway Design

Driven Version 1.0 *A program for determining ultimate vertical static pile capacity. Announced summer 1999.*

Highway Engineering Hydraulics

CULVERT4 *Presents corrosion criteria and alternative culvert materials based on current California Department Of Traffic design manuals and test methods. Announced fall 1998.*

Drainage Requirements In Pavements

Contains all key drainage design elements and provides graphical displays of computations and results. Announced fall 1998.

HYTB *A new document that consists of HEC-14 & HEC-15. Announced spring 1999.*

HEC-HMS Version 1.1 *Supersedes HEC-1 and provides options for simulation precipitation-runoff processed. Announced summer 1999.*

Traffic Engineering Capacity Analysis

Indonesian Highway Capacity Software & Manual *Covers urban/semi-urban traffic facilities as well as inter urban roads and motorways. Announced summer 1999.*

SIGNAL97/TEAPAC *Implements the capacity analysis techniques of the 1997 update to the Highway Capacity Manual. Announced spring 1999.*

Traffic Engineering General Traffic

DELAYE Enhanced 1.2 *A Windows-based program that allows quick estimates of freeway incident congestion. Announced spring 1999.*

Sign Inventory Management System (SIMS) *A comprehensive sign management system to help maintain traffic signs. Announced spring 1999.*

Traffic Engineering Signal Timing & Warrants

NOSTOP *A Windows-based program for arterial bandwidth optimization. Announced fall 1999.*

Signal Timing Database *Maintains and organizes signal timing data using Access 97. Announced summer 1999.*

Transportation Planning Network Assignment

b-Node Model *Traffic assignment model that converts b-node of every zone centroid connector link into a subzone. Announced summer 1999.*

TP/4-in1 *Runs the 4-step travel forecasting process all in one execution on a PC. Announced summer 1999.*

General Interest Miscellaneous

Engineering Geometry Assistant *Solves engineering geometric problems. Announced spring 1999.*

Products Updated Last Year

Advanced General Network Editor, Version 6.0 (GNE)

Computer Aided Transportation Software (C.A.T.S.)

Culvert Analysis Version 6.1 (HY-8)

Highway Capacity Software (HCS3)

HYDRAIN Version 6.1 (HYDRAIN)

ITRAF Version 2.7 (ITRAF27)

MVMACH and SURVEY (MVMACH, SURVEY)

PASSER III-98 (P398)

Road Surface Management System (RSMS)

Section 15 Transit Agency Performance Data (SECT15)

SIDRA Version 5.2 (SIDRA)

Traffic Noise Model Version 1.0b (TNM)

Traffic Operations System Software (TOSS)

TRIPS/32 (TRIPS32)

VisualTraffic (VTRAF.WIN)

WSPRO (HY-7)



PLANNING seminars

Site Impact February 23-25, 2000

Access Management February 28-March 1, 2000

Travel Demand March 2, 2000

Orlando, Florida *Early registrations must be received by Jan. 31, 2000 for discount*
For more information contact:
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 Co-sponsored by the Florida
 Technology Transfer (T²) Center

SENATOR BOB GRAHAM VISITS TRC

Charles Wallace, TRC Director and Executive Director, ITS Florida

Back in May 1999, Senator Bob Graham (Democrat, Florida) was seeking information on intelligent transportation systems (ITS), specifically in Florida, and was led to contact our state chapter, ITS Florida. With the assistance of the Florida DOT and Lee County we furnished the Senator a briefing paper describing a number of statewide and regional ITS programs. Subsequently, we responded to several specific inquiries.

When the Senator came to the University of Florida on September 3, 1999, for his 40th class reunion, he asked to meet with the Transportation Research Center and others to discuss ITS. Several representatives of ITS Florida, as well as TRC, Civil Engineering and College of Engineering faculty joined Senator Graham and two of his staff for a "working" luncheon.

The ITS Florida President, Jim Reynold, provided an overview of ITS to the Senator, who is a member of the Environment and Public Works Committee and the Transportation and Infrastructure Subcommittee. Then the group exchanged views on freeway and incident management systems. The Senator was particularly interested in what conditions justify these systems and how ITS works to benefit travelers. We presented information on where Florida stands today, and where we are going, with ITS deployment.

Senator Graham was very interested in what the TRC and ITS Florida are doing and said his staff would be following up with us to obtain more information and ideas. He is considering promoting a Senate hearing on the subject and was interested in examples of effective ITS programs.

HDM-4 UPDATE

By Ana Elias, TRC Researcher, University of Florida

Since 1989 McTrans Center has been distributing and supporting the Highway Design and Maintenance Standards Model (HDM-III) developed by the World Bank. At that time, the research involved represented probably the largest effort ever made to develop a roadway surface model by capturing the relationships between costs of construction, maintenance, and the actual utilization of roads. The model is based on the premise that operating costs and speeds of vehicles are related to highway construction and maintenance standards through the effect of road geometry and pavement surface deterioration.

The HDM-III model was mainly designed to aid feasibility studies of individual projects as well as policy studies of rural highway networks having a free flow of traffic [Watanatada et al., 1987]. The implementing software underwent several upgrades over the years, such as the addition of the HDM-Q model to include the effects of traffic congestion, and the HDM Manager program to provide a more user-friendly, menu driven environment for running the program.

More than 20 years after the original development of HDM-III, the program is still widely used as a helpful road-investment analysis tool. However, and in spite of all its advantages, the model still has limitations in terms of applicability. These limitations, coupled with the fact that some technologies (such as vehicle and computer technologies) have substantially changed over that period of time, brought up the need for a redevelopment of the different models to upgrade and broaden their applicability range particularly to a broader number of pavement types and traffic conditions, and to take advantage of modern computer technology. In answer to this, the International Study of Highway Development and Management Tools (ISOHDM) undertook the development of the next generation of road-project appraisal tools: the Highway Development and Management Tool (HDM-4).

ISOHDM is sponsored by the World Bank, the Asian Development Bank, the Department for International Development (UK), the Swedish National Road Administration, among others. The study have

been coordinated by the ISOHDM Technical Secretariat at the University of Birmingham in the United Kingdom, were the actual software was developed by the Highway Research Group of the School of Civil Engineering.

Several organizations from different countries also participated in the research: the Finnish Road Administration (strategic and program analysis applications), the Intra-American Federation of Cement Producers (development of deterioration and maintenance model for cement concrete pavements), the Road Research Institute in Malaysia (updated relationships for road deterioration and road user costs), Transport Research Laboratory (review and update of flexible pavement deterioration relationships), Swedish National Road Administration (deterioration relationships for cold climates, road safety, and environment effects) [HDM-4 Overview Version HDM-4 V1.0E].

The upcoming release version of HDM-IV is a Windows 95/98/NT application with a very intuitive and user-friendly interface. In addition to the improved modeling capabilities of existing functions, the new version will also include the following additional features [HDM-IV Newsletter, January 1999]:

- A broader range of road deterioration and maintenance effects for bituminous, Portland cement concrete and unsealed roads. It also incorporates deterioration relationships for cold climates;
- A broader range of road-user models, considering traffic effects and costs for a variety of vehicle types, time costs and congestion effects;
- Models to address safety, environment and energy issues, including accident costs, emission effects and energy consumption; and
- Tools for conducting different types of analyses, from long term strategic planning, to detailed project-level studies on a single road section.

The HDM-4 products are jointly published by the World Road Associations (PIARC), and the World Bank. McTrans plans to distribute HDM-4 soon and will announce its release once it is available.

HCS

- The latest version (3.1b) of HCS-3 provides some new user-definable default parameters that can be specified during installation, and modified after installation. These include peak-hour factor (PHF), saturation flow rate (Signals), and a default path for data files.
- The latest version of HCS-3 allows the selection of U.S. customary or U.S. metric units for analysis in accordance with the 1997 HCM Metric Analysis Reference Guide.
- Depending on the existing degree of saturation (X , v/c), results from the updated 1997 HCM delay equations for signalized and unsignalized intersections may be affected by the length of analysis period, which is called "Duration" in HCS-Signals and "Length of study period" in HCS-Unsignal.
- In HCS-Signals, for the same set of conditions at a signalized intersection, the control delay reported by HCS-3 is typically higher than the stopped delay reported by HCS-2, and reflected in the revised Level of Service thresholds.
- The yellow plus all-red clearance times are part of the total lost time calculations in the 1997 HCM. In HCS-Signals, users must be aware that modifying the yellow and/or all-red values in the Phasing Design may alter the total lost time being used in subsequent calculations.
- When using HCS-Unsignal to analyze two-way stop-controlled (TWSC) intersections, it is important to understand the definition of "progressed flow" from the upstream intersection. Progressed flow is the sum of the feeding volume, from the upstream intersection, that moves during through and protected left-turn (green arrow) phases. Approach volume at the unsignalized intersection is typically higher than the upstream progressed flow. This is because the approach volume also includes upstream left- and right-turn permitted movement flow, as well as any mid-block flow, added to the progressed through and left turn flow.

TRANSYT-7F

- For each step of simulation that a link's queue exceeds its queuing capacity, saturation flow rates for the upstream links are reduced to zero. However, this also occurs for links that represent a turn bay, which is inappropriately pessimistic. Therefore, for turn bay links that may possibly experience temporary oversaturation, it is appropriate to use record type 291 to tell the model to reduce saturation flow rates for the adjacent link instead of the upstream links. In addition, if the adjacent link contains multiple lanes, it is appropriate to use record type 291 to specify the percentage reduction in saturation flow rate, e.g. 33% when there are three adjacent through lanes and only one gets blocked.
- The traditional objective functions (DI and PROS) involve measurements of delay, stops, fuel consumption, and progression opportunities. However, under severely oversaturated conditions, measurements of delay, stops, and fuel consumption are known to become less accurate, thus compromising the effectiveness of the DI objective function. Similarly, under severely oversaturated conditions, increases in progression opportunities may not address spillback problems, thus compromising the effectiveness of the PROS objective function. When traditional optimization strategies fail, involving old objective functions (DI, PROS, PROS/DI, PROS & DI), queue & stop penalties, link & node penalties, etc., the new objective functions may provide superior signal timing for severely oversaturated conditions. The new objective functions involve throughput and queuing ratio.
 - Most users accept the default optimization step sizes within the program. However, sometimes the use of alternative step sizes, available on record type 4, can provide better results.
 - Some pre-processor programs produce input files for TRANSYT-7F that request link-wise simulation. In order to access the latest features of the program, it is necessary to edit the input file so as to request step-wise simulation. This simply requires a negative sign on record type 5X.
 - Release 8.1 implements the 1994 HCM delay equation for signalized intersections, whereas release 8.2 implements the 1997 delay equation.
 - The wide, 132-column output format contains some useful results that are not displayed in the narrow, 80-column output format. For example, an output parameter called Flow indicates the number of vehicles discharged during simulation. For a given link, if Flow is lower than the input volume, this may indicate inadequate capacity due to spillback, or possibly insufficient green time.

TSIS

- TSIS 4.3 provides access to the Corsim runtime extension. This allows real-time integration of outside programs with Corsim. Currently this is a challenging programming task for the user, even with the availability of the Corsim runtime extension. However, this mechanism should continue to improve and become more intuitive within future versions of TSIS.
- The TRAFVU animation module contains some useful static graphics functionality. Double-clicking on a signal indication launches a static graphics dialog box containing information about the signal settings. Double-clicking on a vehicle generates a dialog box that shows current information about that vehicle. If a link is highlighted, then clicking on the MOE button on the edge of the screen provides access to tables and graphs that provide additional information about link performance.
- Heavy vehicles sometimes have less of a tendency to exit freeways in an urban area, relative to the passenger cars. The input file format for the new version of Corsim has a new record type for this. The new record type allows the user to specify the percentage of exiting heavy vehicles so that it may differ from the percentage of exiting passenger cars.
- TSIS 4.3 contains numerous other changes and enhancements. To learn about these, please read "Recent Enhancements and Changes to CORSIM" in the Appendix A section of the new CORSIM Users Guide.
- Corsim can perform user-optimal or system-optimal traffic assignment. Link impedance is determined for free flow conditions according to the FHWA or Davidson link impedance function. Users may optionally request for a punch file to be generated containing the turning movement percentages according to the results of traffic assignment.



CORSIM Computer Based Training Program

Strategic Solutions Group Inc. has completed development of a four course computer-based training (CBT) program on CORSIM traffic simulation software for the Federal Highway Administration. Until recently, training for traffic simulation models has been instructor-led, costly (particularly from the state and local government perspective) and limited in accessibility (subject to the availability of instructors). The goal of the FHWA is to make CORSIM training readily available to more modelers, at their convenience, and at a reasonable cost. The CORSIM CBT focuses on training users in the use of these advanced software tools and does this through the use of advanced multimedia-based training techniques including the use of 3D animation, digital video, and full stereo audio.

The CBT will introduce the CORSIM Model and will teach when and how to use CORSIM with other traffic tools for traffic analysis. This CBT covers Traffic Software Integrated System (TSIS), which includes CORSIM and TRAFVU. It also covers ITRAF, the CORSIM graphical input editor. The CBT provides a full range of traffic scenarios for practice using the CORSIM software immediately without even loading CORSIM/TSIS on to your computer!

The CBT is designed to meet the needs of: Managers and Supervisors, NETSIM users, FRESIM users, and network (NETSIM and FRESIM) users. The training content includes a CBT orientation, Traffic analysis and models, Introduction to CORSIM/TSIS, and Modeling Process Scenarios for surface street, freeway, and network applications.

Scenarios are practice problems in which the user is presented with a question that must be answered or solved. Scenarios require a number of actions on the part of the user for successful completion, involving a number of screens and actions that parallel the corresponding tutorials. The scenarios are designed to emulate the functionality of CORSIM on a limited basis, thus providing a framework that prevents the user from losing sight of the problem solution. Scenarios are accompanied by computer-based testing to measure the comprehension of the corresponding learning objectives.

With this CBT, federal, state and local governments will be able to minimize training expenditures and increase training accessibility of the CORSIM simulation model in a user friendly, self paced environment.

CORSIM CBT (#CORCBT) by Strategic Solutions Group Inc. is available at LOS 1 for \$145.

Surface-water Modeling System (SMS)

The Surface-water Modeling System (SMS) is a comprehensive graphical user environment for 2-dimensional numerical modeling of river systems, lakes, estuaries, and coastal systems. It is particularly useful for analysis of the effects of proposed highway projects on river systems where 1-dimensional analysis may be inadequate. It is developed by the Environmental Modeling Research Laboratory of Brigham Young University in cooperation with the U.S. Army Corps of Engineers Waterways Experiment Station (USACE-WES).

SMS provides tools for mesh and grid generation, data interpolation, and sophisticated tools for graphical visualization. SMS has interfaces to both the FESWMS model, developed for the Federal Highway Administration, and the RMA2 model, developed by the US Army Corps of Engineers. Both FESWMS and RMA2 are 2D finite element depth-averaged flow models.

SMS addresses two dimensional hydrodynamics problems for computing flow fields, inundated areas, sedimentation and constituent migration (water quality). SMS also has a simple interface for the WSPRO (Federal Highways) one-dimensional step backwater water surface profile model.

System Requirements: Pentium Processor, MS Windows 3.1/95/NT, 32 MB RAM, Math coprocessor, 14 MB of free disk space, 8-bit (256) Color Display.

Surface-water Modeling System (#SMS) version 6.0 by Environmental Modeling Systems Inc. is available at LOS 7 for \$3,950. Upgrade is available for \$400.

Traffic Engineering Letter Library (TELL)

Traffic Engineers are often required to answer citizen complaints and questions on various topics. This activity can consume valuable time from the busy Traffic Engineer. A library of sample letters will be a helpful resource to respond to common problems or questions. The Traffic Engineering Letter Library (TELL) contains ready to use sample letters on the following topics:

- Bikeway (Bikeway.doc)**
- Bikeway Sign (BkwySign.doc)**
- Children at Play Sign (ChldPlay.doc)**
- Curve Warning Sign (CvWarnSg.doc)**
- Dangerous Intersection (DangInt.doc)**
- Deaf Child (DeafChld.doc)**
- Duck or Turtle Crossing Sign (DuckSign.doc)**
- Flashing Beacon (FlashBcn.com)**
- Identification of Highway Hazards (IdHwyHzd.doc)**
- Mailbox Hazard (MBHazard.doc)**
- Marked Crosswalk (MarkXWlk.doc)**
- Multi-way Stop Sign (MultStop.doc)**
- No Parking Sign (NoPark.doc)**
- No Passing Zone (NoPass.doc)**
- Paved Shoulder (PavShldr.doc)**
- Pedestrian Signal (PedSgnI.doc)**
- Pedestrian Signal - Added Time (PedTime.doc)**
- Reflector Request (Reflect.doc)**
- Selective Enforcement (SelEnfor.doc)**
- Sidewalk (Sidewalk.doc)**
- Sight Distance Problem (SightDis.doc)**
- Sight Distance Notice to Trim (SightTrm.doc)**
- Signal (Signal.doc)**
- Signal Left Turn Arrow (SgnLTA.doc)**
- Signal Timing Change (SgnTime.doc)**
- Speed Bumps (SpdBumps.doc)**
- Speed Limit Too High (SpdLmHi.doc)**
- Speed Limit Too Low (SpdLmLow.doc)**
- Speeding on Street (SpdOnSt.doc)**
- Stop Sign on Reverse Street (StopRev.doc)**
- Street Light / Street Light District (StLight.doc)**
- Street Name Sign (StName.doc)**
- Traffic Safety Study (TrafStdy.doc)**
- Turn Lane (Left/Right) (TurnLane.doc)**
- WMS (Watershed Modeling System)**

Traffic Engineering Letter Library (#TELL) by 1220 Ventures, Inc. is available at LOS 6 for \$50.

The Watershed Modeling System (WMS)

A comprehensive graphical user environment for hydrologic analysis. It is developed by the Environmental Modeling Research Laboratory of Brigham Young University in cooperation with the U.S. Army Corps of Engineers Waterways Experiment Station (USACE-WES). WMS merges information obtained from digital terrain data and GIS with industry standard lumped parameter hydrologic analysis models such as HEC-1 and TR-20. Terrain models can obtain geometric attributes such as area, slope and runoff distances. Many display options are provided to aid in modeling and understanding the drainage characteristics of terrain surfaces. WMS currently has interfaces to HEC-1, TR-20, TR-55, NFF (National Flood Frequency), and the Rational Method. A beta version of an interface with the HSPF water quality model is also included.

WMS can be used for visualizing and delineating sub-basins in a watershed using digital elevation data from many different sources. WMS computes hydrologic and geometric parameters for each sub-basin, defines hydrologic parameters, and has tools for viewing the hydrographs and other results of these hydrologic models. WMS also has the capability to import and export data from Geographic Information Systems (GIS).

System Requirements: Pentium Processor, MS Windows 3.1/95/NT, 32 MB RAM, Math coprocessor, 12 MB of free disk space, 8-bit (256) Color Display.

Watershed Modeling System (#WMS) version 5.1 by Environmental Modeling Systems Inc. is available at LOS 7 for \$1,750. Upgrade is available for \$150.

Updated Products



MicroBENCOST is a computer program for analyzing benefits and costs of a wide range of highway improvements. In addition, it can allocate corridor traffic and calculate forecasted traffic volumes. There are seven general categories of projects that the program is capable of analyzing. They are: (1) added-capacity; (2) bypass; (3) intersection/interchange; (4) pavement rehabilitation; (5) bridge; (6) safety; and (7) highway-railroad grade crossing. The added-capacity category represents upgrading of an existing highway by widening or providing an HOV facility. The bypass category used in this program represents a new location facility with an existing parallel route. The intersection/interchange category is used when a proposed intersection or interchange is replacing an existing intersection or interchange, generally representing an upgrade to a higher design structure. The pavement rehabilitation category is used when comparing pavement reconstruction, rehabilitation or maintenance strategies. The bridge category is used when comparing bridge rehabilitation and replacement strategies. The safety category is used when the improvement will affect the accident rate, accident cost, or a combination of the

two. The highway-railroad grade crossing category is an upgrade to a higher control, including a grade separation. In addition to these major categories, MicroBENCOST can be used to analyze workzones and incidents in conjunction with any of the above mentioned project types.

In general, the program compares the motorist costs in the existing situation, the "without improvement" alternative, to the motorist costs if the improvement is completed, the "with improvement" alternative. In all cases, the "without improvement" alternative includes an existing route and an optional alternate route. Except for new location projects, the "with improvement" alternative includes a proposed route that replaces the existing route, and an optional alternate route. For new location projects, the "with improvement" alternative includes an existing route, a proposed route, and an optional alternate route. The proposed route does not replace the existing route in a bypass project although it may take some of the traffic off the existing route.

The MicroBENCOST software is provided in both an English unit version and a metric version. Due to the size and complexity of MicroBENCOST, these are

contained on two separate software programs. Both packages are identical with the exception of the display of the input and output data. The same analysis subroutine and most other program modules are used in both versions. The program and the default data set are provided in English units. There is not a metric version of the update program. The metric program reads the problem data set in English units and converts it to metric units for display. The problem data set is also saved in metric units. Metric data sets are provided, a metric version can read data sets in metric units, and data can be entered into the program in metric units.

In MicroBENCOST, there are two distinct user modes in the operation of the program: 1) data entry mode whereby a user creates a problem data set for a proposed project; and 2) data edit mode whereby the user uses an existing problem data set or a newly created problem data set and makes changes in it.

MicroBENCOST version 2.0 (#BENCOST) is available at LOS 3 for \$95.

PMS 4.0 FOR WINDOWS WITH GIS INTERFACE

PMS (Pavement Management System) 4.0 for Windows maintains roadway inventory and provides a pavement management system. The inventory files include a Roadway Inventory, Maintenance History and a Pavement Condition file. The Roadway Inventory file defines the physical configuration of the roadway and contains such information as segment lengths, pavement widths, traffic volumes, functional classification and other physical parameters. The Maintenance History file contains major maintenance activities performed on each roadway segment. The Pavement Condition file contains field evaluation on the condition of roadways.

PMS 4.0 uses a prioritization system developed by Rii (Resource International, Inc.) based on MUC (Maintenance Urgency Categories). MUC are defined in terms of route type, drainage, date of the most recent maintenance project, traffic, functional class and the PCR (Pavement Condition Rating). The system recommends and prioritizes maintenance actions based on MUC and maintenance strategies.

PMS 4.0 uses relational database design and modeling methodologies for rapid access, querying, programming and modularity. Reports are generated using standard report options or by querying specifying fields to view desired criteria. MAP/GIS and PMSGRAPH can be integrated to provide enhanced graphical reports and system performance feedback.

Our hand-held Data Collector with software developed by Rii can expedite data collection. PCR and inventory data collected electronically replace the need for paper forms. Updated information can be synchronized between the workstation and Data Collector. This method is faster than the conventional data entry process and reduces the chance of data entry errors.

Pavement Management System version 4.0 (#PMS) by Resource International Inc. is available at LOS 7 for \$995.

Update Watch

Package	Version	Status	Target	Distribution
HCS-3	3.1c	Under development	Fall	Automatic to registered users
TRANSYT-7F	8.1	Complete	Available	Registered users may upgrade
TRANSYT-7F	W95	Under development	Fall	Automatic to registered users
TSIS	4.3	Under development	Winter	Automatic to registered users