Rural, urban guidebooks help agencies choose work-zone layouts

The Minnesota Local Road Research Board (LRRB) has published two supplemental guidebooks to help local agencies identify the appropriate work-zone layout for low-volume urban and rural roadways. The documents are intended to supplement MnDOT's Temporary Traffic Control Zone Layouts Field Manual (last updated January 2014).

"These guidebooks will be a great resource for our maintenance staff when selecting a work-zone layout," says Lon Aune, county engineer, Marshall County.

Adds Vic Lund, traffic engineer for St. Louis County: "These guidebooks give confidence to maintenance personnel selecting a traffic control layout because they are grouped by type of activity instead of location on the roadway. More confidence equals better compliance."

The guidebooks are formatted to be printed as a booklet (printing instructions are online). The printed documents are the same size as the field manual so that they can be stored within

Work-zone layouts continued on page 1

Training available for oil and hazardous substance spills

More than two-thirds of the shale oil coming out of the Bakken formation in western North Dakota is shipped by rail, with most of it passing through Minnesota. At the height of demand, an average of 40 oil trains loaded with more than 3 million gallons of flammable crude oil moved through the state every week.

Both pipeline and rail shipments have a record of more than 99 percent safe delivery to their destinations, and efforts are under way to further limit safety risks to those living near railways and to emergency responders. The U.S. Department of Transportation (USDOT) and the rail industry recently moved to upgrade safety standards, and in 2014 Minnesota passed a comprehensive law establishing stricter oversight of railroad companies. Among the new rules comes the requirement for enhanced emergency response training and preparedness in communities across the state.

In accordance with this legislation, Minnesota Homeland Security and Emergency Management (HSEM), along with several other partners, is offering an oil and hazardous substance transportation awareness training course. This training provides information on how oil is transported through Minnesota and includes discussion of current issues, regulations, response considerations, tactics, and environmental concerns, as well as industry changes coming in the future.

More specifically, the training educates participants on the differences between the Bakken shale oil and tar sands oil from Canada that are both shipped on Minnesota's rail system, says John Kreuser, HSEM hazardous materials response planner with the Minnesota Department of Public Safety.

"Bakken oil and tar sands oil have very different properties and require different methods of
hazardous spills from page 1 of the document.

Handling them in a spill or other emergency situation, Kreuser explains. However, the required DOT hazardous material placards on oil train cars are identical for both types of oil. “First responders would have no idea which product they are dealing with simply by looking at the placard or rail car,” he adds. “Many other haz-

dards materials travel by rail, including propane, ethanol, and anhydrous ammonia. That’s where this training will participate.

Participants in the course learn how to identify hazardous materials and to understand the risks involved with each when dealing with a spill or leak. They also learn how to use available resources, including the USDOT Pipeline and Hazardous Materials Safety Administration’s Emergency Response Guidebook, and how to notify the proper authorities in the event of a hazardous material emergency. Additionally, the course provides information on the new rail tank car standards and other pending changes aimed at improving safety, and concludes with a review of recent train and pipeline events and accidents that have involved crude oil transportation and the lessons learned.

Although this ISEM training is aimed at first responders, Kreuser strongly encourages public works personnel to take the course as well, due to their key role in response and recovery.

“In the event of a catastrophic train derailment or other hazardous material incident, the local public works department will likely be called in for support,” Kreuser points out, “particularly when such incidents affect the water system and storm drains or when the situation requires certain equipment for containment and clean-up that other first respond-
ers do not have. For example, public works staff may help block roads and dam drains and dikes.”

The training is available at no charge. It’s offered to fire, EMS, and law enforcement jurisdictions throughout Minnesota, although first responders must contact Kreuser to schedule a free class; a minimum of 20 attendees are required. “For local agency staff, the class touches on their role—when they will be needed and when not, and how best to work with EMTs,” he says.

Demand for Bakken oil has fallen dramatically in recent years, and on average, 20 oil trains now pass through Minnesota each week. “Bakken is still a rich resource,” Kreuser says. “When demand changes, so will train shipments.”

For more information about the training, please contact Kreuser at john.kreuser@state.mn.us.

Related resources:

- USDOT Pipeline and Hazardous Materials Safety Administration: Emergency Responder Guidebook, including links to free mobile apps: phmsa.dot.gov/hazmat/outreach-training/erg

Steering committee welcomes new members

The Minnesota LTAP Steering Committee welcomed three new members in recent months:

- Joe Campbell, Local Programs Manager, Federal Highway Administration (FHWA)
- Mike Flaagan, County Engineer, Pennington County
- Lyndon Robjent, County Engineer, Carver County

They replace Tim Anderson (FHWA), Bruce Hasbargen (Beltrami County), and Jeff Hulsether (City of Brainerd).

Our thanks to you all! LTAP

Minnesota county engineer wins a national award

Andrew Witter, P.E., was named the National Association of County Engineers (NACE) 2015 Program/ Project Manager of the Year. Witter, assistant county engineer for Anoka County, oversaw the Armstrong Blvd./TH 10 interchange project, the first grade separation through the cities of Anoka and Ramsey.

The interchange project is a $42 million transportation improvement to relieve the bottleneck for almost 40,000 vehicles per weekday. The interchange was the first of many projects to address nearly 95 percent of safety concerns along a seven-mile corridor. Witter oversaw the project from development in 2005 through preliminary design in 2010 and final design in 2014, and served as owner for construction in 2015. The project included more than 15 construction, maintenance, and funding agree-

ments with FHWA, MnDOT, City of Ramsey, Anoka County, Regional Rail, County Transit Improvement Board, property owners, public utility compa-

nies, and consultants. LTAP

(Source: NACE)

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Minnesota LTAP

Center for Transportation Studies

University of Minnesota

201 Transportation and Safety Building

2071 Transportation Dr.

Minneapolis, MN 55455

Phone: 612-624-3931

Fax: 612-624-3931

E-mail: minnltap@umn.edu

Web: minnltap.umn.edu

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Minnesota LTAP Resource Staff

Director: Jim Grosheim, 612-624-8737, jgrothaus@umn.edu

CTAP Manager: Mindy Carlson, 612-624-0173, carlsonmn@umn.edu

Program Coordinator: Kristy Beans, 612-624-5688, kbeans005@umn.edu

CTAP Instructor: Kathy Schaefer, 612-385-0511, kathy.schaefer@bltai.umn.edu

Workshop Registration & Facilitation: Teresa Washington, 612-624-3196, vashti002@umn.edu

Managing Editor: Pamela Stroop, 612-624-0841, pembed@umn.edu

CTAP Instructor: Steve Danielson, 612-385-1033, steved005@umn.edu

CTAP Instructor: Jim Grosheim, 612-624-3931, jgrothaus@umn.edu

Student Interns: Jamie Hulkonen, Joe Glenner, Freelance writer: Nancy Strage

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David Gonzalez MnDOT (p. 6, top), Heather Holm (p. 7, top), Andrew Witter, P.E. (p. 7, bottom), Minnesota LTAP Freelancer.

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2 August 2016
Local OPERA Project: Skid loader attachment flatbed for hook truck

Project leader: Todd Fadden  
Agency: City of Golden Valley

Problem: A skid steer with the ability to use a wide range of attachments is an essential asset for the city. While the skid steer can operate multiple attachments, it is only able to transport or operate one attachment at a time. The majority of projects require multiple attachments, and transporting them to the project site has been a logistical challenge. Past practices have included staff loading the necessary attachments one at a time, securing them for transport, driving the skid to the job site, and unloading the attachments. This process may have been repeated several times a day.

Solution: The city purchased and fabricated a flatbed hook body that utilizes the SwapLoader system to transport the skid steer and all of the attachments at one time. Each attachment has its own designated spot and is already secured and ready for transport.

Procedure: The city purchased a flatbed hook body and fabricated brackets and tie-downs for each specific attachment. The hook truck had a hitch installed that can trailer the skid steer along with the attachments to the job site all at once.

Results: Using the SwapLoader system enables the division to switch between a dump body, debris box, and the attachment flatbed, which saves mobilization time and allows the truck to have several uses. Trailering the skid steer with all the required attachments to the project site reduces equipment wear and tear and increases productivity.

Approximate cost: $4,100  
OPERA funding: $1,000

Implementation: When the skid steer and attachments are required for a project, city staff connect the flatbed hook body—with the attachments already secured—to a single-axle dump truck using the SwapLoader system. Staff then hook up the trailer to the truck, load the skid steer, and drive to the project location. The skid steer can then use the necessary attachments directly from the flatbed hook body.

Status: Complete LTAP

Fact sheets and reports online

The Exchange regularly highlights projects completed under the LRRB’s Local Operational Research Assistance Program (Local OPERA). Project fact sheets, along with the full project reports, are posted on the OPERA website: mnltap.umn.edu/opera.

Work-zone layouts from page 1

One of the layouts in the Rural Maintenance – Supplemental Guidebook

Technology alternatives improve safety at rural intersections

Intersection conflict warning systems (ICWS) and flashing LED stop signs have proven effective in reducing severe crashes at rural unsignalized intersections. A new guidebook from the LRRB and MnDOT explains the use and effect of flashing LED stop signs and gives several options for ICWS deployment. A shorter, quick reference version is also available. The guidebook gives expected costs to plan, deploy, and maintain ICWS and LED stop signs. Deployment costs for ICWS range from $55,000 to $125,000; deployment costs for LED stop signs start at about $2,000 per sign and increase if additional detection and communication components are added.

Related resources at lrrb.org:
- Intersection Safety Technologies Guidebook (2016RIC10)
- Intersection Safety Technologies, Quick Reference Guidebook for Intersection Conflict Warning Systems and LED STOP Signs (2016RIC10A)

Related resources available at lrrb.org:
- Rural Maintenance – Supplemental Guidebook (2016RIC09A)
- Urban Maintenance – Supplemental Guidebook (2016RIC08B)
- Full Report: Temporary Traffic Control Layout Selection by Maintenance Activity (2016RIC09)

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A series of appendices offer resources that may be useful for Minnesota local agencies. Of particular note, eight case studies are presented that explain successes and lessons learned from installing these systems. Example plans for three specific ICWS projects are also included as a reference for future design. LTAP
Well-maintained ditches essential to good roads

Ditches are but one part of several that make up a road, along with the driving surface, shoulders, and other elements within the right-of-way, or overall width, of a road. In Minnesota, road systems are dominated by rural or ditched sections, and thus are an important component of overall road maintenance. In fact, the state has more than 130,000 miles of gravel roads on the city, township, and county systems.

“We have a culture in Minnesota of maintaining a lot of local roads, and we do a pretty darn good job of it,” said retired Crow Wing county engineer Duane Blanck, one of the instructors at Demo Day this year.

Ditches serve an important function in drainage systems and are essential for the proper design, installation, and maintenance of good roads and road sides. Specifically, a ditch supports the roadbed, conveys water, and provides for snow storage.

**Ditch maintenance: Is that permitted?**

Legal questions can arise when considering ditch maintenance and/or repair. Be proactive and request assistance from your local Soil and Water Conservation District or other appropriate authority (e.g., County Land Services, P & Z) before beginning any work, especially if there are questions. Permits may be needed. Ask these questions:

1. Is this a roadside upland ditch?
2. Does the ditch discharge to a special or impaired water?
3. Does the ditch look like a wetland (e.g., cattails, etc.), run through a wetland, or often hold water even during dry periods between rainstorms?

Since roads are designed, or at least intended, to drain water from rain and snowmelt away from the road toward the lower elevation of the roadside ditch, it is critical that the ditch functions to control moisture as a critical part of good road maintenance.

Ditches often carry water directly to public waters, too, so they also can be critical to area water quality. When ditches are unstable or when vegetation is disturbed, erosion can significantly impact water quality. Conversely, well-managed vegetated ditches slow down the flow of water.

“Three critical issues in maintaining gravel roads, in particular—and actually any type of roadway—are drainage, drainage, and drainage,” Blanck said. “You can’t say that often enough.”

According to Blanck, the best way to know if ditches are functioning properly is to observe and inspect them, especially during and after rain or snowmelt events when higher flows exist. Three critical elements or conditions suggest ditch problems: road appearance, ditch erosion or soil instability, and water flow.

Local maintenance staff may be able to address routine problems in the field without major analysis or engineering. But bigger problems or those requiring frequent routine maintenance to keep a ditch functional may necessitate a redesign and reconstruction to reduce such maintenance. Such work typically requires professional analysis or engineering and possibly one or more permits (see sidebar).

Some common problems with ditches that usually can be handled with routine maintenance include correcting sediment buildup, replacing damaged culverts, and managing vegetation.

Removing sediment buildup or washed-in excess material from a ditch is necessary to reestablish the original ditch flow or hydraulic capacity. In those situations, Blanck said, it is critical to maintain the slope to ensure ditch stability.

In many situations, maintenance staff can replace a culvert without engineering analysis if using the same material and design specifications. However, it is critical that the culvert be aligned to minimize future erosion issues.

Ditch vegetation typically provides habitat for wildlife, stabilizes soils, and increases the rate and quantity of infiltration, but it must be controlled. Ideally, a stable ditch has dense vegetation that doesn’t interfere or interrupt the water flowing through it. Common methods of control include mowing, brushing, and spraying.

Special consideration is needed for dealing with a variety of state and federally protected plants, invasive species, and noxious weeds. “The least expensive way to control invasive plants and noxious weeds is to avoid introducing them to new areas, if at all possible, and to eradicate new populations before they spread,” Blanck said.

Blanck also reminds maintenance personnel to clean up the work site when a ditch maintenance project has been completed. Leaving debris can undermine ditch maintenance efforts and eventually lead to more problems. In addition, it is important to maintain a record of routine maintenance as well as non-routine maintenance for defense of legal claims and to provide evidence in the use of right-of-way.

**Resources:**

- Field Guide for Maintaining Rural Roadside Ditches (University of Minnesota, 2014)
- Gopher State One Call (before digging to ensure safety)
- GopherRoadsConstructionMaintenanceGuide (FHWA, August 2015)

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The Minnesota Roadway Maintenance Training and Demo Day is sponsored by Minnesota LTAP, the Minnesota Department of Transportation, the Minnesota Local Road Research Board, and the Federal Highway Administration, in partnership with the Minnesota Chapter of the American Public Works Association and the Minnesota Street Superintendents Association. The University of Minnesota College of Continuing Education facilitated the event.

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A little expo humor about bridge building

**Courtesy of Duane Blanck**

Ole and Lena lived alongside a river. Clarence lived on the other side. Ole and Clarence disliked each other and regularly yelled insults at one another across the water. Ole said to Lena, ‘Boy, if I could get across the river, I’d go whip that Clarence.’ The county finally built a bridge and Ole said, ‘I’m going over there to whip Clarence.’ Ole left on his mission but returned a short time later, quickly closing the doors and windows, drawing the shades, and covering in the corner, shaking with fear. Lena asked what was the matter. Ole said, ‘I got to the bridge and on top of it the sign said, ‘Clarence 13’ 6’ … he didn’t look nearly that big to me.’
Comments from some of our new Roads Scholars:

“LTAP’s programs provide a wide variety of applicable training that I can use to do my job duties better.”
—Tom Zabinski

“Always great to get out and learn new things and meet new people in the public service area of employment. Looking forward to learning more.”
—Keith Retting

“It gave me more training and knowledge that I will use for the rest of my career.”
—Gary Guse

“The information I learned has prepared me to do my job quickly and efficiently. The classes have also helped me bring new ideas back to my organization.”
—Jim Romanik

Gravel road maintenance: Motor grader safety tips

1. Ensure road geometry lines are straight.
2. Keep ditch bottoms flat to avoid erosion.
3. Maintain the road crown optimally with a 4 percent slope from center for proper drainage and safety.
4. Be sure a grading windrow makes it across the centerline to avoid damaging the crown slope.
5. Maintain super-elevations for good curve geometry to keep traffic on the roadway.
6. Avoid depositing loose gravel on pavement to prevent vehicles from throwing rocks or experiencing braking issues.
7. Be vigilant for cross traffic, especially near train crossings and hidden intersections.

“The information I learned has prepared me to do my job quickly and efficiently. The classes have also helped me bring new ideas back to my organization.”
—Jim Romanik

—Michael McCarthy, Minnesota LTAP editor
Winter maintenance assessment tool helps reduce salt use

A first-of-its-kind Winter Maintenance Assessment tool (WMAT) is now available. The WMAT is a web-based tool that public and private winter maintenance organizations can use to find opportunities to improve practices, reduce salt use, and track progress. It’s also a comprehensive resource of all known salt-saving best management practices (BMPs).

The Minnesota Pollution Control Agency (MPCA) created the tool as part of the Twin Cities Metropolitan Area Chloride Management Plan. The tool allows users to track their progress over time and show the results of their efforts. When an assessment has been completed, a report can be generated summarizing current practices (as remedial, best, or advanced) and identifying areas for future improvement. Winter maintenance managers can then use this report to communicate about winter maintenance operations with residents, clients, or elected officials.

MPCA notes that although the WMAT was developed to help minimize the use of road salt on Minnesota parking lots, sidewalks, and roadways, it can be used for any location where road salt is used as a deicer.

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Partnerships for pollinator habitat

A new Transportation Research Synthesis from MnDOT—Partnerships for Promoting Pollinator Habitat—gives findings from a survey of selected state DOTs and Minnesota counties. Nine state DOTs describe current practices or plans to develop new pollinator-specific partnerships, existing partnerships that have been expanded to address pollinators, and Adopt-a-Highway programs that support maintenance of vegetation in the right-of-way.

Some examples from the synthesis:

- MnDOT has partnered with the Minnesota Board of Water and Soil Resources and Minnesota Department of Natural Resources to establish more than 20 native seed mixes for use on Minnesota roadsides.
- MnDOT’s online PlantSelector tool includes a seed mix tab to help designers and novices select the right seed for the right place.
- The Iowa Living Roadway Trust Fund, administered by Iowa DOT, provides grant funding to eligible cities, counties, and other applicants, for various types of roadside enhancement and maintenance.
- Ohio DOT developed a statewide network of partners to provide landscape-level conserva-
tion for all Ohio pollinators on strategic areas of ROW. Partners include state, federal, non-
profit and for-profit organizations, universities, schools, churches, and businesses.

Related resources:

- Partnerships for Promoting Pollinator Habitat: dot.state.mn.us/research/TRS/2016/TRS1601.pdf
- Partnerships for Promoting Pollinator Habitat: dot.state.mn.us/research/TRS/2016/TRS1601.pdf
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Chainsaw safety videos

Visit Minnesota OSHA’s website to watch a series of chainsaw safety videos:

- Plan an escape (1:08)
- Deal with widow-makers (0:57)
- Safely starting a chain saw (0:23)
- Spring-pole safety (2:06)
- Which way will it fall? (0:40)

The site also has links to a video series from the U.S. OSHA—Chainsaw Operation & Tree Felling Safety Awareness Training. It’s divided into four parts:

- Part 1 (53:47)
- Part 2 (47:25)
- Part 3 (35:27)
- Part 4 (36:47)

Related resource:

- Chainsaw safety videos: dll.mn.gov/WSC/LogSafeVids.asp

More fun with words!

Here are some common contractions:

Could’ve = Could have
Don’t = Do not (I, you, they)
Doesn’t = Does not (he, she, it)
It’s = It is (but it’s for possessive: “The dog protected its family”)
Let’s = Let us
There’s = There is (but there are for plural: “There’s a lot to do today, because there are so many potholes”)
They’re = They are (possessive: “They’re great at protecting their owners”)
We’ll = We will
You’re = You are

August 2016
Calendar

For details and an up-to-date list of events, please see mnltap.umn.edu/training.

Truck-Weight Compliance Training (1 RS elective credit) LTAP
Sept. 7, Mankato
Sept. 14, St. Cloud
Sept. 20, Bemidji

Fall Maintenance Expo (1 RS elective credit) LTAP
Oct. 5–6, St. Cloud

Traffic Sign Maintenance/Management and Sign Retroreflectivity Training (1 RS elective credit) LTAP
Oct. 11, Rochester
Oct. 18, Brainerd
Oct. 25, Alexandria

MnDOT’s Minnesota Snowplow and Safety Simulator Training for Local Agencies (0.5 RS elective credit) LTAP
Oct. 24–28, Arden Hills

CTS Transportation Research Conference
Nov. 1, Minneapolis

NHI training online: highway hydrology
Training Course #135092 Highway Hydrology: Basic Concepts and Methods provides training on basic hydrologic concepts that will enable users to determine peak flow for transportation hydraulic structures. More about NHI training: nhi.fhwa.dot.gov, LTAP

ONLINE TRAINING: Anytime, anywhere!
Culvert Design and Maintenance (1 RS required credit) LTAP
Sign Maintenance and Management for Local Agencies (1 RS required credit) LTAP
Gravel Road Maintenance and Design (1 RS required credit) LTAP
Work-Zone Safety Tutorial LTAP

Roads Scholar credit
You can earn credits in Minnesota LTAP’s Roads Scholar (RS) program by attending LTAP and CTAP workshops and other cosponsored events. To learn more or enroll in the program, visit mnltap.umn.edu/roadsscholar.

LTAP workshops
LTAP workshops, along with events cosponsored by Minnesota LTAP, are marked with an LTAP at left. Check the web for details and to register online: mnltap.umn.edu/training. To be added to our print or electronic mailing lists, e-mail mnltap@umn.edu or call 612-625-1813.

CTAP workshops
Circuit Training and Assistance Program (CTAP) workshops bring LTAP services to your neck of the woods. CTAP uses a fully equipped van to provide on-site technical assistance and training. Each CTAP workshop earns 0.5 RS elective credit. For more information or to schedule classes, call the CTAP instructor, Kathy Schaefer, at 651-366-3575, or e-mail Kathleen.Schaefer@state.mn.us.

NHI training online: highway hydrology
Training Course #135092 Highway Hydrology: Basic Concepts and Methods provides training on basic hydrologic concepts that will enable users to determine peak flow for transportation hydraulic structures. More about NHI training: nhi.fhwa.dot.gov, LTAP

Find the hidden answer...and win an online course registration!
Road agencies work hard to maintain visibility for drivers, battling dust on gravel roads during summer and snowflakes in winter. When you finish our summer puzzle, the letters in the shaded boxes, moving from top to bottom, will identify a famous Minnesotan who wondered about wind-blown materials. Puzzle answers are taken from articles in this issue and from our online courses, LTAP

Across
1. This part of a road stores snow.
5. The crown of a gravel road should have a 4 percent ___.
7. Find out if one is needed before beginning ditch maintenance.
9. Do this to your lawn until the ground begins to freeze.
10. Fall is a good time to control ___ weeds.
12. A road sign … not Ole’s disliked neighbor.
13. Maintenance workers are the ___ and ears of road safety.

Down
1. Don’t leave this behind after a ditch maintenance project.
2. Don’t do this while driving.
3. You don’t want this blowin’ in the wind.
4. A branch of math…and an important element of gravel road design.
6. Public works officials might be called in to help in a train ___.
8. A road closure may require one.
11. Golden Valley crews connect a _____ hook body to a dump truck.

Last issue’s answer:
The hidden answer to our spring puzzle—something as American as baseball and hot dogs—was APPLEPIE.