

Approved:

//s// Gordon Proctor  
Gordon Proctor  
Director

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Responsible Office: Traffic Engineering

Policy No.: 516-003(P)

## **TRAFFIC MANAGEMENT IN WORK ZONES INTERSTATE AND OTHER FREEWAYS**

### **POLICY STATEMENT:**

The Ohio Department of Transportation is committed to the continuous movement of traffic through all work zones by the elimination or reduction of delays. It is our goal to minimize the impacts on the traveling public resulting from the implementation of the work zone. Therefore, Districts shall analyze the projected effect of construction and force account projects on traffic flow and take the steps necessary to prevent traffic delays to the extent possible.

Compliance with this policy will benefit the traveling public, the construction industry and the business community by reducing work zone accidents and travel time. Because of its impact on project development, the determination and analysis of options for maintenance of traffic must occur at the beginning of the planning process as described herein.

This policy outlines the procedures to be followed and the parties responsible for its fulfillment. The Ohio Department of Transportation can waive mandatory conditions contained in the policy upon approval by the Assistant Director of Planning and Production and the Assistant Director of Highway Management based on sound engineering judgment.

### **AUTHORITY:**

The Director of Transportation's authority to establish rules as conferred by 5501.02 of the Ohio Revised Code.

### **REFERENCES:**

Work Zone Interstate Traffic Flow Improvements-September 8, 1995  
Traffic Management in Work Zones (TMFWZ) website  
(<http://www.dot.state.oh.us/dist12/workzone/tmwz.htm#TRAFFIC IMPACT>)  
Project Communication Manual  
Compendium of Options  
IOC Traffic Management During Construction Activities - August 14, 1998  
IOC Traffic Control Through Work Zones - April 12, 1999  
IOC Traffic Management During Construction Activities - April 16, 1998  
Highway Capacity Manual

Ohio Manual of Uniform Traffic Control Devices (OMUTCD)

**SCOPE:**

This policy applies to ODOT individuals involved in planning and performing work on interstate highways and other freeways, including District Planning, Production and Highway Management personnel, and County Managers.

Each District Deputy Director shall administer this policy.

**BACKGROUND AND PURPOSE:**

Construction and maintenance work continues to be a source of congestion on Ohio's interstate highways and other freeways. It is essential that all reasonable countermeasures to eliminate or reduce traffic delays in freeway work zones have been considered prior to implementation of the work zone.

The intent of this policy is to consolidate past work zone practices with new requirements to eliminate or reduce traffic delay caused by work zones. Guidelines will be established for developing and implementing a Traffic Management Plan for work zones. These plans will enhance our accountability and ensure that all options have been considered. Central to these plans is managing the capacity to maintain traffic flow. Ultimately this will enhance customer satisfaction while traveling through work zones.

Quality Assurance Reviews will be used to evaluate the District's compliance with this policy.

**DEFINITIONS:**

*Conceptual Maintenance of Traffic (CMT)*

A comparison of alternative work zone strategies, including but not limited to road user costs, construction costs and associated traffic queues for each alternative.

*District Work Zone Traffic Manager (DWZTM)*

The individual responsible for implementation of this policy in the District as well as the approved Traffic Management Plan.

Exception Request

The transmittal of the Conceptual Maintenance of Traffic to Central Office requesting approval of projected impacts of a work zone that exceed the allowable thresholds.

Freeway

An expressway with full access control and no at-grade intersections.

Highway Advisory Radio (HAR)

A limited range transmitter to broadcast real time traffic information reports that are too long or complex for either static or portable dynamic message signs.

Peak Hour

The period of highest hourly traffic counts during morning and/or evening rush hours, seasonal tourist and special events.

Permitted Lane Closure Map (PLCM)

A map and/or schedule of times lanes are permitted to be closed on Interstates and other freeways in a District.

Traffic Delay Study

A study to determine the amount of delay caused by the work zone.

Traffic Management Plan (TMP)

Overall strategy for accommodating traffic during construction and force account projects.

Travel Time Measurements

A measurement of time to travel a specific distance. Distances shall be total project limits plus expected length of queue.

Work Zone Incident Management

A mechanism by which the non contract related traffic disruptions are minimized through foresight. An example is the use of standby tow trucks or vehicles equipped with push bumpers on site or close at hand to minimize response time and reduce the effect which accidents or breakdowns could have on traffic flow. Such measures shall be approved by the appropriate Program Manager before they are incorporated in a project.

**POLICY:**

I. ORGANIZATION AND RESPONSIBILITIES

A. District Work Zone Traffic Manager (DWZTM)

1. This individual is appointed by the District Deputy Director. The DWZTM should possess a working knowledge of highway capacity theory; maintenance of traffic strategies and performance; ODOT manuals, standards and practices; and traffic flow modeling tools. Field experience on multi-lane construction projects is desirable.
2. The DWZTM will develop, maintain, distribute and provide guidance to District personnel, County Managers and consultants in the use of the Permitted Lane Closure Map (PLCM). This individual will revise the PLCM as needed to reflect current conditions.
3. The DWZTM will analyze any proposed lane closures on Interstates and other freeways that will be implemented outside the times allowed by the PLCM. This individual will be responsible for the development of the Traffic Management Plan. The DWZTM will submit the exception request to the Multi-Lane Coordinator for delays that exceed the allowable queue threshold.
4. The DWZTM will coordinate and monitor all projects that may affect traffic flow on Interstates and other freeways within a district. This individual will maintain communication with the DWZTM's in adjoining districts and advise them of potential impacts. The DWZTM will provide input during the development of the District Work Plan to avoid or minimize construction projects on alternate routes.
5. For any project approved by the Maintenance of Traffic Exception Committee, the DWZTM shall submit one copy of the Maintenance of Traffic Plans to the Multi-Lane Coordinator during detail design.
6. The DWZTM will coordinate with the District Public Information Officer to provide all information needed for the public relations campaign.
7. The DWZTM will ensure that permit work by local agencies on Interstates and other freeways complies with this policy.

B. County Managers

1. The County Manager will adhere to the lane closure time restrictions identified by the PLCM, except in case of an emergency.
2. The County Manager will advise the DWZTM of the need for force account lane closures outside the times permitted by the PLCM. Sufficient advance notice must be provided to the DWZTM to allow for an analysis to be performed and, if necessary, an exception request to be processed.

C. Multi-Lane Coordinator (MLC)

1. The MLC will review the exception request and solicit comments from other offices as needed.
2. The MLC will prepare a recommendation for approval or rejection and present it to the Maintenance of Traffic Exception Committee. This individual will advise the District of the committee's action typically within three weeks of receipt of the request.

D. Office of Traffic Engineering (OTE)

1. The OTE will provide training for the development and updates of the PLCMs and for queue modeling upon District request.
2. OTE will assist Districts with the analysis of work zone alternatives upon request.
3. OTE will review and comment on Maintenance of Traffic Exception requests when asked by the Multi-Lane Coordinator.
4. OTE will perform field evaluations of this policy and prepare final reports through the QAR process for conformance to policy.
5. OTE, in conjunction with the DWZTM, will determine the cause of differences between the expected queue lengths from computer models and the actual queues generated by work zones. For projects where queues are generated which exceed the acceptable thresholds, OTE will perform travel time measurements through the work zone. This will allow the Department to begin

correlating queue length to travel time increases. The District PIO can then use predicted travel time increases and expected queue length in the public relations campaign.

6. OTE will conduct internal and external research to improve the Department's ability to accurately predict work zone impacts.
7. OTE will continually monitor and improve the analysis and process of this policy.

E. Maintenance of Traffic Exception Committee (MOTEC)

1. The Maintenance of Traffic Exception Committee will consist of the Assistant Director for Planning and Production, the Assistant Director for Highway Management and the Deputy Director for Highway Operations.
2. The committee will consider the exception requests and recommendation presented by the MLC, and will approve, reject or request additional information.

## II. POLICY COMPLIANCE PROCESS

A. General

Each District shall prepare a PLCM that defines the allowable times a lane(s) may be closed on the Interstate/Freeway system within that District. Each District shall provide the OTE with the map if it is not available on the internet. Districts shall notify OTE of any revisions to their PLCM.

The District shall analyze the impact on the motoring public of any proposed lane closure not permitted by the PLCM as follows:

1. For contract work this analysis must occur during the planning process after the pavement recommendation has been formulated by the District Pavement Review Team and/or bridge work has been determined. In all cases analysis for contract projects shall occur before scoping of the final design begins.
2. For Design-Build projects the TMP must be completed, approved and reflected in the scope of services submitted to Central Office.

3. Analysis of permit or force account work zone impacts shall occur prior to the implementation of any lane restrictions.

In all cases a TMP will be formulated after completion and approval of the analysis.

## B. Analysis

A quantitative analysis shall be performed to determine queues that will be generated any time a lane(s) closure is proposed outside of the PLCM allowable times, except in case of an emergency. Where queues are normally present even without lane closures, the analysis shall compare existing queues to expected queues caused by the lane closure(s). The allowable delay thresholds are defined in Appendix "A" (Queue Thresholds). The process shall be as follows:

### 1. Contract and Design-Build Projects

#### a. Projected queue less than thresholds

The final development process may commence. Documentation of the analysis must be retained on file. The DWZTM must formulate the TMP. However, any work zone strategy chosen by the District that will result in impacts less than the allowable delay thresholds but increases the project cost by more than 20% or \$5,000,000 shall be submitted to the MLC for approval. The Conceptual Maintenance of Traffic will be included with this submission.

#### b. Projected queue exceeds thresholds

The District shall submit an exception request to the MLC. The exception request will include the Conceptual Maintenance of Traffic submission and will identify the alternative selected by the District as their preferred option and the reasoning for their selection. The exception request will also address the impact to the District's programs and goals if the request is denied. The endorsement of the District Deputy Director must accompany the preferred option submitted by the DWZTM. The District is encouraged to include the MLC in the presentation of the alternatives considered to the District Deputy Director.

Upon receiving the exception request, the MLC will distribute it to appropriate Central Office specialty sections for review and comment. The MLC will prepare and present a recommendation for approval or rejection of the request to the MOTEC. The MOTEC will typically act within three weeks of receipt of the request by the MLC. The MOTEC may approve an alternative, reject all, or request additional information, and the MLC will report their action to the

## DWZTM.

### 2. Force Account or Permit Work

The process for approving force account and permit exception requests shall be the same as the process described above for contract work with one difference. The DWZTM may approve a TMP for queues greater than the allowable thresholds if the work will last no more than one day. The District PIO must be notified by the DWZTM even for one day closures.

For work which will result in queues greater than the allowable thresholds and is considered by the District to be urgent in nature but not an emergency, the DWZTM may request an expedited review by the MOTEC. The MLC will accelerate processing of the exception request in accordance with the needs of the District.

### C. Maintenance of Traffic Plan Submittals

For projects approved by the MOTEC, the District shall submit a copy of the Maintenance of Traffic plans during detail design to the MLC for information.

The District shall submit to the MLC for concurrent review a copy of the Maintenance of Traffic plans for any project with a construction cost exceeding \$10,000,000. The purpose of this submission will be for design review comments, if desired by the District, and for validation of the analytical models. It is anticipated that the models will undergo continual validation as the technology evolves.

### D. Traffic Management Plan (TMP)

The TMP will be completed for the strategy selected and should incorporate the following additional elements as applicable:

1. Consideration of stakeholders' needs during the decision-making process (see Appendix "C" Stake Holders)
2. Incident management strategies
3. Public relations campaign (see Appendix "E" Maintenance of Traffic in Construction Work Zones - Project Communication Planning and Appendix "F" Project Communication Manual)
4. Identification of alternate routes

E. Implementation and Evaluation

The DWZTM will be responsible for assuring that the TMP is implemented as approved. Implementation of the TMP will include the following functions:

1. Maintenance of Traffic plans will be verified for conformance with the approved TMP.
2. Work zone setup will be verified for conformance with the approved TMP as well as ODOT standards, policies and the Ohio Manual of Uniform Traffic Control Devices.
3. A contractor may submit an alternate Maintenance of Traffic plan for consideration by the DWZTM prior to the start of work. Work cannot begin until the alternate plan is approved. The alternate plan shall be processed for approval in accordance with the requirements for contract and design-build projects as specified in this policy.
4. Work zone queues shall be monitored and compared against the expected queues generated by the computer model. Unless the new work zone or construction phase causes extremely long queues, the queue measurements should be made about one week after a project or phase change begins in order to allow drivers to become accustomed to navigating the new conditions. Should the project generated queues measured after one week exceed the expected queue lengths, the DWZTM shall inform the MLC of the situation and of proposed corrective action. The cause for the discrepancy between the expected queues generated by the computer model and the actual conditions will be determined by the OTE in conjunction with the DWZTM.

**TRAINING**

The Office of Traffic Engineering will provide training in the development of the Permitted Lane Closure Maps, the use of queue modeling software, and work zone traffic control and inspection upon request.

**FISCAL ANALYSIS**

In order to satisfy customer demands to eliminate or reduce delays, the Ohio Department of Transportation will be required to accept some increases in project costs. The cost increases may include permanent lane additions and/or bridge widenings in order to comply with the policy. This may also involve completion of a Major Investment Study as well as early coordination with the Transportation Review Advisory Council to request Major New funding.

The cost increases associated with this policy and the corresponding impacts to District programs and goals will be evaluated on a project by project basis. The corresponding benefit will be the elimination or reduction of delays and road user cost.

## **List of Appendix**

- 1. Appendix A**  
*Queue Thresholds*
- 2. Appendix B**  
*Compendium of Options*
- 3. Appendix C**  
*Stake Holders*
- 4. Appendix D**  
*OUEWZ -92 Program*
- 5. Appendix E**  
*Maintenance of Traffic in Construction Work Zones - Project Communication Planning*
- 6. Appendix F**  
*Project Communication Manual*

## ***Appendix A***

### ***Queue Thresholds***

The criteria used to determine the impact of proposed work zones shall be queue length. The District may use Quewz-92, Synchro/Simtraffic, Corsim or similar programs to model the expected queues that will be generated. Multiple stages of construction shall be analyzed separately, if in the opinion of the DWZTM, there will be significant changes to the geometrics or operation of the work zone that would adversely affect the flow of traffic. The speed limit used in the computer models should be the posted legal construction zone speed limit. Volume data input into the models should be current (not older than three years), should account for seasonal traffic surges that may occur during construction, and should reflect current regional traffic patterns. Traffic volumes should be expanded to construction year levels through the use of growth factors provided by the Office of Technical Services.

Districts are encouraged to use a microscopic model (Synchro/Simtraffic, Corsim, etc.) for modeling of work zone queues. The effect of significant ramp merges on queues should be included in the model.

The following thresholds shall be used for the evaluation of project queue lengths as determined by the computer model:

1. For queues less than 0.75 miles, the work zone impacts are acceptable.
2. For queues greater than 0.75 miles and less than 1.5 miles, the work zone impacts are acceptable if the queue exceeds 0.75 miles for two hours or less. Where queues are expected to exceed 0.75 miles for any period of time, additional advanced work zone warning signing should be specified.
3. For queues longer than 0.75 miles for more than two hours or longer than 1.5 miles for any period of time, the work zone impacts are unacceptable. Alternate strategies shall be considered per the provisions of this policy.
4. A vehicle will be considered part of a queue if its average operating speed is approximately 10 mph or less. Discretion is required by the District personnel during both the analysis portion and field evaluation of the implemented work zone in determining what constitutes a queue. In general a condition that causes driver frustration due to stop and go operations should be considered a queue.

## ***Appendix B*** ***Compendium of Options***

### **Options Summary**

#### **Construction/Traffic Maintenance Strategies**

Part Width  
Close & Detour  
Crossover Construction  
Temporary Pavements (Runaround)  
Temporary Structures  
Closure of 1-Direction of Mainline

#### **Administrative Options**

Traffic Management Program  
Enforcement  
Incident Management  
Demand Management

#### **Corridor Options Outside Work Zone**

Temporary Signals  
A + B Bidding  
Lane Rental  
Reversible Lanes  
Movable Barrier Systems  
Signed Alternate Routes  
Unsigned Alternate Routes  
Highway Advisory Radio  
Advanced Signing (Time or Distance)

#### **Contracting Procedures Options**

Incentive/Disincentives

#### **Traffic Flow Options Inside Work Zone**

Temporary Pavements (Widen)  
Use Existing Shoulders  
Temporary Signals  
Reversible Lanes  
Ramp Closures  
50" Barrier  
Movable Barrier Systems  
Highway Advisory Radio  
Owner Imposed Design Restrictions  
Use of Owner Supplied or Stockpiled Materials  
Control of Contractor's Access to the Work

#### **Time Limitations With Liquidated Damages Options**

Temporary Lane Closures or Restrictions  
Time Limitations  
Night Work  
Weekend Work (Only)  
Lane Rental  
Interim Completion Dates, By Phase



# CONSTRUCTION STRATEGIES & WORK ZONE TRAFFIC CONTROL OPTIONS

## CONSTRUCTION/TRAFFIC MAINTENANCE STRATEGIES

Strategy & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Part Width Construction</u></b></p>	<p>Easier design</p> <p>Cheaper MOT cost</p> <p>No detour to follow</p> <p>Ramps can remain open</p>	<p>Contractor access interference</p> <p>May sacrifice quality</p> <p>More difficult to construct</p> <p>Narrow lanes and less safe</p> <p>Longer to construct</p> <p>Barrier could still be required for some dropoffs</p>	<p>Min-lane widths sometimes tough to obtain</p> <p>Conflict between width of roadway and width needed for work</p>	<p>When existing two lanes can remain with use of shoulder</p> <p>Minor work with short duration</p> <p>One lane may handle only 20,000 ADT with normal backup</p>	<p>This is the basis of comparison for alternate strategies, the “defacto” standard.</p>
<p><b><u>Close &amp; Detour</u></b></p> <p>(Unusual on interstates and expressway routes)</p> <p>3</p>	<p>Safety/speeds up construction with full access</p> <p>Easier and better constr.</p> <p>No distracting traffic</p>	<p>Public can’t get there the “usual” way</p> <p>Access to businesses</p> <p>Cost to motorist (time &amp; fuel)</p> <p>Signing</p> <p>Lost motorists complaints/ damage of local roads</p>	<p>Short distance and ramp access</p> <p>Local agencies must accept detour and public information is emphasized (i.e. by TMP in urban area)</p> <p>Locations of ramps/intersections</p> <p>Detour must be adequately signed and may require capacity improvements</p>	<p>If it produces accelerated construction, alternates are available and drivers are fairly warned</p>	<p><b>CC↓, MTC↑, RUC↑</b></p> <p>Cheap if only signs are used; but will cost more if alternate route modifications are required</p> <p>detours- usually signed by ODOT</p>

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety

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Strategy & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Crossover Construction</u></b></p> <p>3, 4</p>	<p>Safety for workers, familiarity of motorist</p> <p>Easier and better construction</p> <p>Wider traveled lanes</p> <p>If left in place useful in emergency</p> <p>Should increase contractor productivity</p> <p>Should increase quality</p> <p>Could reduce traffic interference as a result of increased contractor productivity leading to shorter phase completion dates are mandated</p>	<p>Ramp interference</p> <p>Cost</p> <p>Requires time for X-over construction and removal</p> <p>Long crossovers less acceptable in rolling to hilly terrain</p>	<p>Duration of project</p> <p>Location of x-over depends on ramp/lighting/structure/grade</p> <p>Phasing limits many impact use.</p> <p>Length of work zone may affect acceptability</p>	<p><u>Whenever</u> possible, especially where not many ramps interfere.</p> <p>Long stretches of pavement reconstruction or rehabilitation</p> <p>Bridge work not conducive to keeping one lane open</p> <p>One lane each direction should handle about 30,000 ADT with limited backups</p>	<p><b>CC↓, MTC↑, RUC↓</b></p> <p>Min. \$¼ to ½ million per pair</p>
<p><b><u>Temporary Pavements (Runaround)</u></b></p> <p>1, 2, 3, 4</p>	<p>Separates work from traffic</p>	<p>Expensive and time consuming while constructing</p> <p>Inefficient use of materials</p>	<p>Must have sufficient right-of-way</p>	<p>No adequate detour is available</p>	<p><b>MTC↑, RUC↓</b></p>
<p><b><u>Temporary Structures</u></b></p> <p>1, 2</p> <p>Allows closure of structure, but no detour for the public</p>	<p>Traffic remains on routes</p>	<p>Cost</p> <p>Time to design and construct</p> <p>Inefficient use of materials</p>	<p>Right-of-Way</p>	<p>When volumes warrant</p> <p>No detour available</p>	<p><b>MTC↑, RUC↓</b></p>

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Strategy & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Detour of 1-Direction of Mainline</u></b></p> <p>(Assumes detour for closed direction)</p> <p>3, 4</p>	<p>Work moves faster</p> <p>Only ½ traffic detoured at anytime</p> <p>Improves safety of project personnel</p>	<p>Detour maintenance</p>	<p>Short distance and ramp access</p> <p>Local agencies must accept detour routes and public information is emphasized (i.e. by TMP in urban area)</p> <p>Locations of ramps/intersections</p> <p>Detour must be adequately signed and may require capacity improvements</p>	<p>Often Urban/suburban freeway is amenable to this when suitable detour is available</p>	<p>MTC↑ - Could require detour improvements</p>

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**CORRIDOR OPTIONS OUTSIDE WORK ZONE**

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Temporary Signals</u></b></p> <p>(At ramps and on expressways includes construction vehicle crossing and ramp metering)</p> <p>1, 2, 4</p>	<p>Helps maintain ramp/detour capacity</p>	<p>Change traffic patterns on cross roads</p>	<p>Should be warranted</p>	<p>When additional capacity is needed for the short term</p>	<p>Low</p>
<p><b><u>Reversible Lanes</u></b></p> <p>(May use moveable barriers)</p> <p>2</p>	<p>Flexible to accommodate fluctuations in traffic peak flow direction</p>	<p>Confusing to infrequent user.</p> <p>Labor intensive</p>	<p>Need majority commuting traffic</p>	<p>Large variances in directional volumes between AM &amp; PM and # of lanes limited</p>	<p>MTC↑, RUC↓</p>
<p><b><u>Movable Barrier Systems</u></b></p> <p>2, 3, 4</p>	<p>Ability to provide for peak flow capacity</p>	<p>More costly than drums and fixed barriers</p>	<p>Shift distance must be a constant</p> <p>Must determine appropriate end treatment</p>	<p>When you have a need for repeated barrier shifts</p>	<p>CC↑, RUC↓</p>
<p><b><u>Signed Alternate Routes</u></b></p> <p>(Eligible for Federal Money)</p> <p>1, 2, 4</p>	<p>Reduces congestion</p> <p>Lessen congestion on mainline</p>	<p>Hard to get people to use</p> <p>Signing</p> <p>Not always used by public</p>	<p>Must be just as quick or close</p> <p>Shouldn't go through other construction zones</p> <p>Local officials must approve</p>	<p>With good arterials (parallel)</p> <p>When construction expected to backups</p> <p>Project is of long duration</p>	<p>Low cost unless alternate route improvements are required</p>
<p><b><u>Unsigned Alternate Routes</u></b></p> <p>(Not eligible for Federal money)</p> <p>(Logical unsigned alternate may be eligible for State money)</p> <p>1, 2</p>	<p>Reduces congestion</p> <p>Lessen congestion on mainline</p>	<p>Difficult to get people to use</p>	<p>Alternate routes shouldn't go through other construction zones</p>	<p>When construction expected to produce backups and good parallel arterials are available</p>	

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Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<u>Highway Advisory Radio</u>  1	Provides real time information to motorists	Limited ranges  Low usage rate by motorists due to difficult to tune in station	Information needs to be current  May work best with repeat drivers  Should be limited to project specific information	When alternate routes are available  Long duration of construction	Low cost
<u>Advanced Signing (Time or Distance)</u>  1, 2, 4	A great tool for information to motorists  Gives public advance warning to make decisions	If project is delayed, sign is wrong	Need to keep information up to date	Anytime  Advanced warning/PR is great always	Low cost for fixed  Addition to MOT unless PCMS is used a \$3000/mo

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**TRAFFIC FLOW OPTIONS INSIDE WORK ZONE**

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Temporary Pavements (Widen)</u></b></p> <p>1, 2, 4</p>	<p>Allows for more lanes to stay open</p> <p>Creates greater capacity thru constr. Zone - less back-ups</p>	<p>Expensive and time consuming while constructing</p>	<p>Bridges and other roadway items</p>	<p>When volumes warrant, keeping all lanes open</p> <p>When construction is expected to produce backups</p> <p>When Project is of long duration</p>	<p>MTC↑, RUC↓</p>
<p><b><u>Use Existing Shoulders</u></b></p> <p>1, 2</p>	<p>Keeps flow normal</p> <p>Allows wider work area or increases capacity</p> <p>Low cost</p> <p>Quick</p>	<p>Requires more maintenance</p> <p>Trucks may damage weak shoulders</p> <p>No room for breakdowns/ emergency stops unless parking lots created</p> <p>Closer to guardrail/ embankment/piers</p>	<p>Must have full shoulder widths level bridges</p> <p>Bridges must be able to accommodate</p> <p>Put trucks in left lane if possible</p> <p>Must evaluate shoulders during design</p> <p>Should have full width approach slabs</p>	<p>High volume</p> <p>When backups expected</p> <p>Moving projects</p>	
<p><b><u>Temporary Signals</u></b></p> <p>(At ramps and on expressways includes construction vehicle crossing and ramp metering)</p> <p>1, 2, 4</p>	<p>Helps maintain ramp/detour capacity</p>	<p>Change traffic patterns on cross roads</p>	<p>Should be warranted</p>	<p>When additional capacity is needed for the short term</p>	<p>Low</p>
<p><b><u>Reversible Lanes</u></b></p> <p>(May use moveable barriers)</p> <p>2</p>	<p>Flexible to accommodate fluctuations in traffic peak flow direction</p>	<p>Confusing to infrequent user.</p> <p>Labor intensive</p>	<p>Need majority commuting traffic</p>	<p>Large variances in directional volumes between AM &amp; PM and # of lanes limited</p>	<p>MTC↑, RUC↓</p>

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<b>Option &amp; Objectives</b>	<b>Pros</b>	<b>Cons</b>	<b>Restrictions</b>	<b>When to Use</b>	<b>Cost</b>
<b><u>Movable Barrier Systems</u></b> 2, 3, 4	Ability to provide for peak flow capacity	More costly than drums and fixed barriers	Shift distance must be a constant  Must determine appropriate end treatment	When you have a need for repeated barrier shifts	<b>MTC↑, RUC↓</b>
<b><u>Ramp Closures</u></b> 2, 3, 4	Can pave/repair ramp full width  Better, faster construction  See “Close & Detour”  Reduces mainline congestion  Reduces cross road congestion  Easy to sign in rural area	Blocks traffic pattern  See “Close& Detour”  Forces new traffic pattern  Moves congestion elsewhere  In urban area, may have negative impact on next intersection	Should give definite time limit  See “Close & Detour”  Best if only two ramps at a time (to/from directional pairs)	When other ramps are close by or when bridges on mainline are too close to utilize exit ramps/entrance ramps  See “Close & Detour”  Use when you have high traffic volumes  In areas where alternate routes exists	Relatively cheap  See “Close & Detour”
<b><u>Glare/Gawk Screens</u></b> 2, 4	Effective way to separate work and keep traffic moving  Safer for work  Reduce rubbernecking	Longer to set up than drums  Higher cost than 32"  Maintenance of glare screen, if used  If present on both sides, may reduce drive speed  Barrier can interfere with wideloads	Widths in certain areas  Sight restrictions at intersections and ramps	When view of intense construction is likely to reduce capacity with all part width construction at restricted areas to control headlight glare	<b>MTC↑</b>
<b><u>Highway Advisory Radio</u></b> 1	Provides real time information to motorists	Limited ranges  Low usage rate by motorists due to difficult to tune in station	Information needs to be current  May work best with repeat drivers  Should be limited to project specific information	When alternate routes are available  Long duration of construction	<b>RUC</b>

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety

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<b>Option &amp; Objectives</b>	<b>Pros</b>	<b>Cons</b>	<b>Restrictions</b>	<b>When to Use</b>	<b>Cost</b>
<u><b>Owner Imposed Design Restrictions</b></u> 1, 3	Can reduce actual construction duration	Requires advance planning during design; could increase cost		For certain time critical phases	
<u><b>Use of Owner Supplied or Stockpiled Materials</b></u> 1, 3	Can reduce actual construction duration	Requires advance planning		For time critical phases to shorten duration	Inexpensive
<u><b>Control of Contractor's Access to the Work</b></u> (By location or time of day.) 2, 4	Eliminates potential conflicts between construction traffic and motorist  Improves through put of motorists	May reduce contractor productivity	Must provide reasonable access for contractor	Where capacity is critical, where conflicts between contractor's equipment and motorists is expected to impact capacity and safety possibly on grades or locations with poor sight distances	CC↑, RUC↓

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**TIME LIMITATIONS WITH LIQUIDATED DAMAGES OPTIONS**

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Temporary Lane Closures or Restrictions</u></b></p> <p>1, 2</p>	<p>Prevents contractor from keeping lanes closed longer than necessary</p> <p>Prevents work during specified hour</p>	<p>May surprise repeat drivers</p> <p>May be more expensive</p> <p>More setups and take downs which can reduce construction time</p>	<p>Rush hour considerations</p> <p>Use only if work will allow</p> <p>Give public notices</p>	<p>Mainline paving on basic freeway lanes</p> <p>When desired to prohibit closures during specified times</p>	<p><b>CC↑, MTC↑, RUC↓</b></p> <p>Cheap (Cone - Day) (Drums - Night)</p> <p>Possibly higher cost than permanent closure</p>
<p><b><u>Night Work</u></b></p> <p>(Hours of day a specific phase of work is or required to be performed)</p> <p>2, 3</p>	<p>Good PR</p> <p>Lower cost to motorist</p> <p>May shorten project duration</p>	<p>Costly for labor</p> <p>Lower efficiency</p> <p>Personnel are isolated</p> <p>Possible poorer quality work and inspection difficulty</p> <p>Difficult to get some materials at night</p> <p>Increased hazard potential</p> <p>Difficult access to management/supervision for problem solution</p>	<p>Residential areas</p> <p>Work must be able to be accomplished in this time</p> <p>Urban noise ordinances</p>	<p>High volume areas</p> <p>When extensive backups expected to be created</p>	<p><b>CC↑, MTC↑, RUC↓</b></p>
<p><b><u>Weekend Work (Only)</u></b></p> <p>2, 3, 4</p>	<p>Lower cost to motorist</p>	<p>Costly/needs inspection on overtime also</p> <p>Impacts traveler who is less familiar with alternate routes</p> <p>Difficult to get some materials on weekends</p>	<p>Work must be able to be accomplished in this time</p>	<p>More amenable in urban areas</p> <p>High volume of commuter traffic expected to be delayed</p>	<p><b>CC↑, RUC↓</b></p>

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Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Lane Rental</u></b></p> <p>(Many variations)</p> <p>(Contractor loses money for duration of specific lane closures)</p> <p>1, 2, 3</p>	<p>Work done in the most cost effective and timely manner</p> <p>Should minimize construction time</p> <p>Provides incentive to minimize use of road space</p>	<p>Expect disagreements</p> <p>New application in Ohio</p>	<p>Requires careful timekeeping</p> <p>Too many variables</p>	<p>Paving freeways</p>	<p>CC↑, RUC↓</p>
<p><b><u>Interim Completion Dates, By Phase</u></b></p> <p>3 (possibly 4)</p>	<p>A good tool for timeliness</p> <p>Prevents contractor from having lanes closed or restricted when not desired</p>	<p>Only works if enforced by increased liquidated damages</p>	<p>Schools, weather, plowing, etc.</p> <p>Must require early consideration <u>and</u> follow-up</p> <p>Must be updated when a sale date is established or revised</p>	<p>To open roads before winter, specified events</p>	<p>Cheap</p>

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety

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**CONTRACTING PROCEDURE OPTIONS**

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Incentive/Disincentives</u></b></p> <p>(Usually applies to a phase of a project.)</p> <p>1, 3</p>	<p>Timeliness</p> <p>Quicker construction</p>	<p>More arguments on time extension</p> <p>Our people must resolve issues quickly</p> <p>Requires CPM schedule</p>	<p>None known</p> <p>Need good plans and a project with the work well defined in advance</p> <p>Work must be able to be accomplished in allotted time - must follow I-D policy</p>	<p>High volume that truly impacts motorists without good detour or alternate route</p>	<p>CC↑, RUC↓</p> <p>Must budget for maximum incentive</p>
<p><b><u>A + B Bidding</u></b></p> <p>(Construction cost plus construction time.)</p> <p>1, 3</p>	<p>Work done in the most cost effective and timely manner</p> <p>Should minimize construction time</p>	<p>May pay more for the work</p> <p>Expect disagreements</p>	<p>Limit to high impact projects currently limited to test projects</p> <p>Need very good plans and no expected changes</p> <p>Need reasonable completion times</p>	<p>High volume that truly impacts motorists without good detour or alternate route</p>	<p>CC↑, RUC↓</p>
<p><b><u>Lane Rental</u></b></p> <p>(Many variations)</p> <p>(May be combined with A&amp;B Bidding)</p> <p>(Contractor loses money for duration of specific lane closures)</p> <p>1, 2, 3</p>	<p>Work done in the most cost effective and timely manner</p> <p>Should minimize construction time</p> <p>Provides incentive to minimize use of road space</p>	<p>Expect disagreements</p> <p>New application in Ohio</p>	<p>Requires careful timekeeping</p>	<p>Paving freeways</p>	<p>CC↑, RUC↓</p>

Legend: Objectives 1 = Reduce Complaints, 2 = Maximize Corridor Capacity, 3 = Minimize duration of motorist inconvenience, 4 = Maximize motorist/work safety

Cost      CC = Construction Cost, MTC = Maintenance of Traffic Cost, RUC = Road User Cost, ↑ = Cost Increase, ↓ = Cost Decrease; CC + MTC = Contract Cost

**ADMINISTRATIVE OPTIONS**

Option & Objectives	Pros	Cons	Restrictions	When to Use	Cost
<p><b><u>Traffic Management Program</u></b></p> <p>(Area, corridor or project)</p> <p>(May include enforcement, demand management, public info., public perception adjustment)</p> <p>1, 2, 4</p>	<p>Keeps checks on conflicts Helps with consistency</p> <p>Coordinates all projects develops a forum for discussion of construction problems</p>	<p>Not welcomed by some</p> <p>Takes extra time and planning</p> <p>Tend to be expensive</p> <p>Additional funding required from Districts and Locals</p> <p>Project outside area boundaries may cause public relation problems/ requires more staff time</p>	<p>Takes extra time and planning</p> <p>Area must be large enough to make worthwhile</p>	<p>Anytime</p> <p>Most often used in larger urban areas and particularly (8 MPO's) with large projects</p>	<p>CC↑, MTC↑, RUC↓ Personnel only (Mainly)</p> <p>Typical program is \$500,000 to \$1 million/year</p>
<p><b><u>Enforcement</u></b></p> <p>1, 2, 4</p>	<p>Expedited, orderly traffic flow, incident support</p>	<p>Cost</p>		<p>When incident support is required or enforcement presence is desired</p>	<p>Medium high</p>
<p><b><u>Incident Management</u></b></p> <p>1, 2, 3, 4</p>	<p>Minimizes effect incidents have on traffic flow</p>	<p>Cost of standby incident response personnel and vehicles administrative cost</p>		<p>Freeway sections with high v/c ratio and high likelihood of incidents</p>	<p>High</p>
<p><b><u>Demand Management</u></b></p> <p>1, 2, 3, 4</p>	<p>Shifts some demand from highway under construction</p> <p>Good PR</p>	<p>Requires advance planning and coordination</p> <p>Cost</p>	<p>Alternative routes and modes must be available</p>	<p>Large urban/suburban projects in congested corridor</p>	<p>High</p>
<p><b><u>Contractor Proposed Options</u></b></p> <p>3</p>	<p>May result in shorter construction duration</p>	<p>Contractor may not be as familiar with recommended procedure as claimed</p> <p>Usually requires rush reviews by ODOT</p>	<p>Requires adequate lead time for PR and permits</p>		<p>CC↓</p>

## Definitions

**A + B BIDDING** - the contractor bids the cost of work (“A”) and the number of days that will be required to complete the project. The time cost (“B”) is established by multiplying the time by a set rate based on roadway user costs. These two “costs” are then added together to determine the lowest total bid for the project.

**ADVANCE SIGNING** - signing is displayed well in advance (either distance or time) in order to clearly communicate what to expect in the work zone and to offer options to the motorist. When displaying distance, these signs are placed in addition to those signs specified in MT series of Standard Drawings. They are placed far enough in advance of the project to warn approaching motorists of the work zone and to permit the selection of an alternate route.

**CLOSE & DETOUR** - all through traffic is completely banned from the roadway under construction. Through traffic is rerouted on other designated routes. Closures can range from 24 hours a day, seven days a week for a phase or the entire duration of the project to limited times such as nights, weekends, specified hours during the day, etc.

**CLOSURE OF ONE DIRECTION OF THE MAINLINE** - the complete closure of one direction of the roadway with that traffic being diverted to other detour routes.

**CONTRACTOR-PROVIDED OPTIONS** - allows the contractor to propose changes in construction strategy and maintenance of traffic. This method takes advantage of the contractor’s construction knowledge and special capabilities and can result in shortened contract time.

**CONTROL OF CONTRACTOR’S ACCESS TO THE WORK** - project documents clearly spell out where and when the contractor can and cannot enter and/or exit the work site from the lanes that are available for through traffic. Examples of such control are: specified ingress/egress from adjacent routes, limits on timing such as during non-peak hours, limiting the

number of breaks in temporary concrete barriers, etc.

**CONSTRUCTION CROSSOVERS** - involves the routing of one direction of traffic across the median to the opposite lanes. If the shoulder/temporary pavement is not used for through lanes, the number of travel lanes in each direction is reduced.

**DEMAND MANAGEMENT** - through traffic is reduced through establishment of HOV lanes, mass transit, ride-sharing programs, and/or employer cooperation. Park-and-ride lots are created or expanded. Mass transit service is either modified or established within the corridor via the use of schedule changes and/or additional local or express service. Ride-sharing is promoted through the creation of van-and/or car-pools. HOV lanes are established to move mass transit vehicles, van- and car-pools through the corridor. Employers (usually, but not limited to, large) are contacted for support via adjustments to employees work schedules (staggered starting times, compressed work schedules, telecommuting, etc.) and for support of the mass transit and ride-sharing programs.

**ENFORCEMENT** - law enforcement officers (LEO’s) paid to specifically patrol the work zone to ensure speed compliance and provide emergency response support with the zone. The LEO’s can be used on alternate routes during peak hours.

**GLARE/GAWK SCREEN** - the use of vertical panels or screening on the top of 32" or 50" high portable or permanent median barriers. This practice prevents the blinding of most motorists by headlights from opposing traffic (glare), and restricts the ability of motorists on one side from viewing construction activity on the other side (gawk).

**HIGHWAY ADVISORY RADIO** - a limited range transmitter to broadcast real time traffic information reports that are too long or complex for either static or portable changeable message signs.

**INCIDENT MANAGEMENT** - a mechanism by which the non-contract related traffic disruptions are minimized through contracting agency foresight. An example is the use of to have standby tow trucks or vehicles equipped with push bumpers on site or close at hand to minimize response time and reduce the effect which accidents or breakdowns could have on traffic flow.

**INCENTIVE/DISINCENTIVE** - rewards (incentive) the contractor for completing the work ahead of schedule and assesses deductions (disincentive) to the contractor for not meeting the completion date.

**INTERIM COMPLETION DATES** - a specified date or duration of time by which a phase of the project must be completed.

**LANE RENTAL** - a charge to the contractor which is assessed whenever the contractor has a portion of the roadway obstructed. The rental charge is usually based upon road user costs for the number/configuration/length of lanes closed, the time of day the closure occurs, and the duration of the closure. The rental charge can vary within a project (i.e., one lane closed for ½ hour at rush hour could cost more than one lane closed for four hours at night). The contractor includes an estimate for the total lane rental charge for the project in the bid.

**MOVABLE BARRIER SYSTEMS** - a mechanical system by which temporary, portable, concrete barriers can be moved quickly to provide additional work space for the contractor during off-peak hours or to provide an increase in the number of lanes to accommodate peak traffic flow periods.

**OWNER IMPOSED DESIGN RESTRICTION** - construction contractors can be structured to require the contractor to perform specific activities or operations in a manner which minimizes disruption to traffic.

**NIGHT WORK** - certain phases, or perhaps the entire project, are required to be performed at night to reduce interference with normal daytime traffic volumes. Night is usually defined as beginning at the end of the evening rush hours and ending at the beginning of the following morning rush hours.

**PART WIDTH CONSTRUCTION** - one or more normal traffic lanes are closed for the work zone. The remaining lane(s) may or may not have width restrictions. This is considered ODOT's "de facto" options against which all other options are measured.

**RAMP CLOSURES** - complete closure of either, or both, entrance and exit ramps to provide smoother flow on the mainline, to encourage local traffic to use alternate routes, and/or expedite work on the ramp.

**REVERSIBLE LANES** - an existing lane or lanes that may be assigned a reversible role to accommodate the predominant flow of traffic within the corridor.

**SIGNED ALTERNATE ROUTE** - an attempt to give the public a possibly less congested routing through the corridor while maintaining traffic on the mainline through the work zone. As with a detour route, this usually involves a cost to the contracting agency for maintenance of the route.

**TEMPORARY LANE CLOSURES/RESTRICTIONS** - the contractor may utilize a traveled lane only during specified times. The contractor must complete the necessary work in the lane and re-open the lane by the specified time.

**TEMPORARY PAVEMENTS (RUNAROUND)** - a temporary roadway that is constructed parallel to the work zone within the right-of-way. The temporary roadway is used as a detour within the corridor when the mainline is closed.

**TEMPORARY PAVEMENTS (WIDENING)** - pavement is added adjacent to the existing roadway in order to maximize the number of lanes available during construction.

**TEMPORARY SIGNALS** - traffic signals are installed on entrance and exit ramps, and along detour routes to provide priority travel for through traffic.

**TEMPORARY STRUCTURES** - an appropriately sized adjacent structure is erected for the duration of the construction project only. All traffic is shifted to this

new structure to permit complete closure of the existing structure without detouring traffic to another route. This additional structure is removed once construction on the existing structure is complete.

**TRAFFIC MANAGEMENT PROGRAM (TMP)**

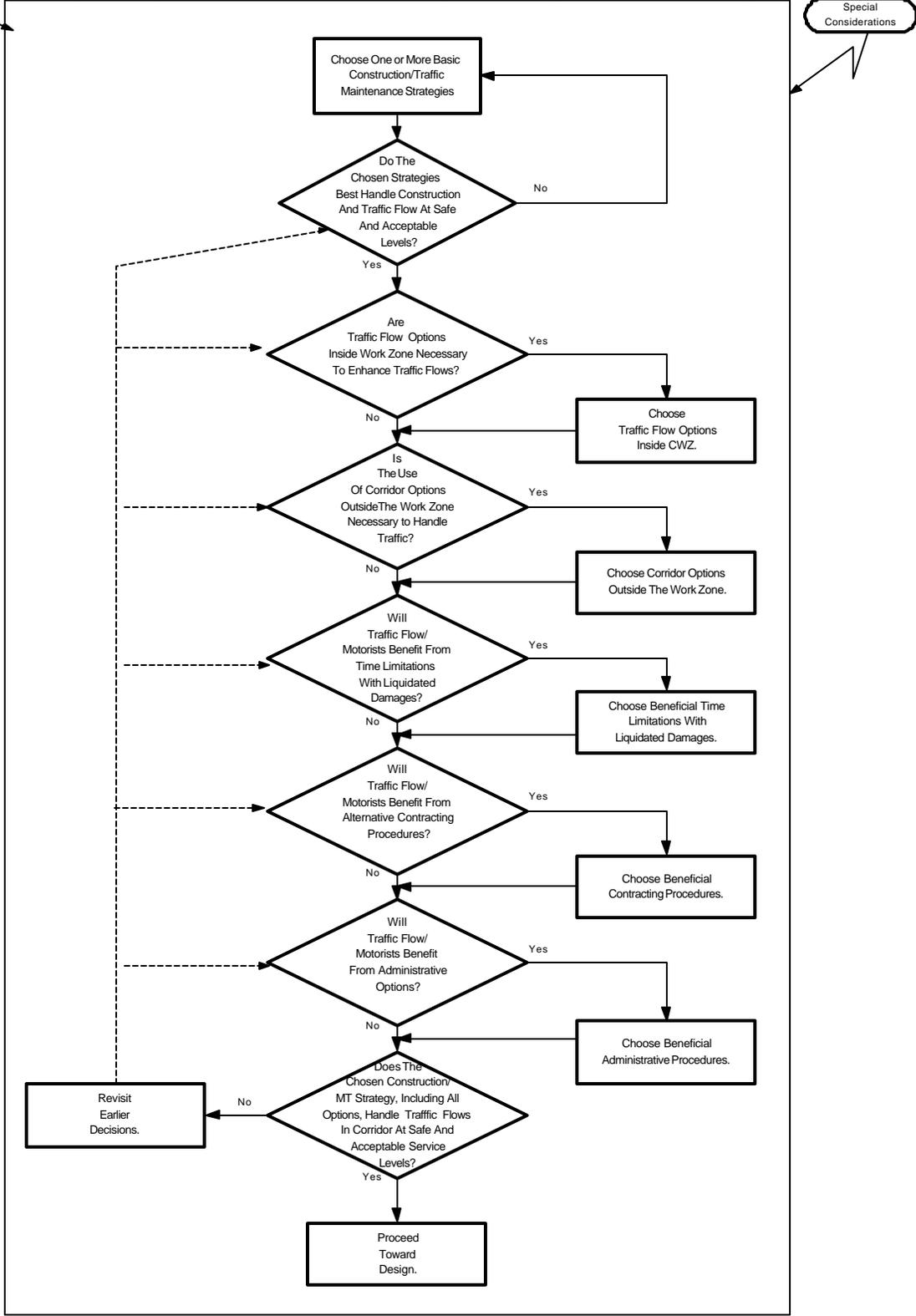
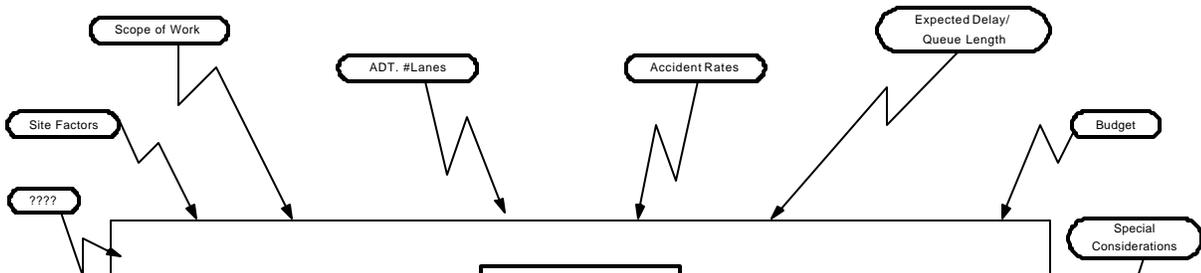
- the use of a multi-faceted and multi-jurisdictional program of operational, communications, and demand management strategies to maintain acceptable levels of traffic flow during periods of construction activities. Typically, TMP's consist of elements from each of the following areas: Public Information, Motorist Information, Incident Management, Construction Strategies, Demand Management Strategies, and Alternate Route Strategies. A TMP can be used for either single projects or for coordination of multiple projects within a given area.

**UNSIGNED ALTERNATE ROUTES** - the use of transportation system management-type improvements on streets, highways, and freeways in and adjacent to the construction corridor to augment the overall corridor capacity. Unsigned alternate routes may benefit from such improvements as signal re-timing and coordination as well as operational changes including parking and turning restrictions.

**USE OF OWNER-SUPPLIED OR STOCKPILED MATERIALS** - the shortening of actual construction time by having the project owner provide critical, hard-to-get materials with unpredictable delivery schedules. Such material can be obtained and stockpiled for ready use either by the owner, or through preceding projects.

**USING EXISTING SHOULDERS** - this involves using the existing shoulder(s) as a part of the traveled portion of the roadway, with or without upgrading the shoulder pavement to the anticipated traffic loads.

**WEEKEND WORK** - a method of restricting certain phases or all work to weekends (off peak hours). This is usually defined as beginning at the end of evening rush hours on a Friday and ending at the beginning of morning rush hours on the following Monday.



## *Appendix C*

### *Stake Holders*

Stake holder is a term applied to individuals, groups and organizations who have a "stake" in a highway improvement project. They may be immediately affected by the project because they must travel through the construction work zone. They may be more indirectly involved because of their position in the community or their job responsibilities are affected. They all share the status of "need to know."

**The traveling public** is of course *the* important stake holder. Motorists are most affected by highway improvement. They enjoy the new highway or the resurfaced highway once the project is completed and they are the ones inconvenienced when caught in the construction zone. They are also the ones ultimately paying for the improvements when they fill their vehicle's tank. They are by far, the largest and most important group a highway improvement project communication plan needs to target.

**Major businesses** in and around a project work zone are traffic generators. Employees going to and from work may travel through the zone daily. Deliveries to the businesses can create slower moving truck traffic and the timely arrival of some deliveries can be critical to some operations using JIT, just-in-time deliveries. Manufacturing and warehouse businesses also use trucking operations to transport products and goods to their customers. Informing the plant manager or business manager before construction starts not only builds good will but enables them to inform employees and adjust delivery and transport schedules.

**Other businesses** located in the immediate area of a construction project may not be major employers but may be traffic generators. Customers going to supermarkets and shoppers going to the local mall add to the traffic volumes. The proprietors may be concerned about the construction project interfering or limiting customer access and the resulting loss of business. Being in the communication loop will reassure them and allow them to let their customers and employees know what to expect.

There are other stake holders or stake holder groups who may not be directly affected by highway improvement but who should be considered when doing the construction project's communication plan. The stake holders may not be located near the work zone. They may not be traffic generators. As individuals, they may not even travel through the work zone or in anyway be inconvenienced. However, because of their position, they need to be informed. It may be as simple as sending them copies of news releases or composing a letter.

**Local government officials**, such as mayors, city managers, city council members, county commissioners and county engineers need to be informed in order to deflect complaints and feel part of the project. It is better to have them as allies. The people in these positions are after all elected officials.

**Emergency services and law enforcement agencies** have a "need to know" about highway improvement in their service areas. Often it is a matter of sending news releases to law enforcement headquarters and emergency 911 operations centers.

## *Appendix C*

### *Stake Holders*

**Legislators at both the state and federal level often** have an interest in highway projects in their respective districts. In some cases they have been involved with project funding or they have helped promote the need for projects. State legislators, using the legislative process, develop the state's transportation budget. At the national level, members of congress help decide funding and national transportation policy. An informed legislator is much more likely to answer a constituent's complaint about highway improvement in a positive tone. Also keep in mind that legislators may be interested in participating in a project's ground-breaking or ribbon-cutting event.

**Transit authorities** are very important stake holders, especially in urban areas when the roadway is closed and the zone has restricted lane widths. The project can cause delays in the timing for picking up commuters and rerouting buses. In some cases sidewalk improvements may affect bus shelters or pick up areas. Informing the agencies about project start dates, maintenance of traffic plans and an expected completion date is very important. On major projects transit authorities are often contacted in the design process but keeping them up to date with progress is important.

**Utility companies** are another stake holder that is often contacted during the design process if necessary. But keeping appropriate utility company personnel up to date on the highway improvement project will help promote the image for all parties.

Keep in mind that construction may create some special needs to contact specific individuals or organizations. The **postmaster** may need to reroute mail delivery due to a road closure or inability to access rural mail boxes. **Convention and visitor's bureaus** should have construction information to pass on to meeting planners. **Promoters and managers of special events** (local festivals, street fairs, county fairs, etc.), **entertainment venues and amusement parks** need to understand that construction could affect customer access. Look for opportunities to share construction information with **travel clubs**, such as the American Automobile Association.

Developing an all-inclusive list of stake holders who have a need to know about any given highway improvement project is dependent on the type of construction, the extent of construction, the length of the construction zone and how long the construction is expected to take. When planning communication for a construction project, consider the construction zone's geography, business and residential environment in order to begin the development of a specific list of stake holders who need information on the construction project. Remember, an informed group of stake holders not only builds good will and lessens the complaints, but the stake holders in turn become communicators to their constituents. Well planned and targeted communication will ensure a positive message is forwarded.

## ***Appendix D***

### **OUEWZ -92 Program**

On freeway projects, the Department uses the computer program QUEWZ to determine the queues and user costs that are associated with work zone lane closures. Based on the type of lane closures, traffic volumes, time schedules, etc., the program will provide the user with the expected queue length and estimated user costs.. The designer may use this program to ensure the proposed traffic control plan is still cost effective. The program user should review the user's manual to determine how to use the program.

#### **Inputs**

The user must provide the following inputs into the program:

1. lane closure configurations,
2. the schedule of work activities (e.g., work activity hours, lane constriction hours), and
3. the traffic volumes approaching the freeway segment.

The program provides default values for:

- 1 cost update factor,
2. percentage of trucks,
- 3 speeds and volumes at various points on a speed-volume curve,
4. capacity of a lane in the work zone,
5. maximum acceptable delay to motorist, and
6. critical length of queue.

To obtain meaningful results, the designer should consider revising the default values to meet the site location. For example, it should be noted that the program assumes that for queues longer than 20 minutes that some drivers will divert. To account for actual queues and the corresponding user costs, the designer may need to adjust the 20-minute time frame to meet the project situation. The designer should review the user's manual to determine if the default values are applicable to the location under consideration.

#### **Outputs**

QUEWZ has two output options - road user cost and lane closure schedule. The road user cost output option analyzes a specified lane closure configuration and schedule of work activities and provides estimates of traffic volumes, capacities, speeds, queue lengths, diverted traffic and additional road user costs for each hour affected by the lane closure. The lane closure schedule option summarizes the hours of the day when a given number of lanes can be closed without causing excessive queuing.

## ***Appendix D***

### **OUEWZ -92 Program**

In addition to the values obtained from the program, supplemental user cost calculations may be required where changes are expected based on existing traffic patterns and volumes. Supplemental calculations for detours are typically required where an exit or entrance ramp within the construction zone (including those using crossovers) will be closed and where the designer judges that the QUEWZ program is not properly estimating the full amount of diverting mainline traffic

Experience has shown that additional detour user cost calculations should be conducted for the following:

1. Where exit ramps are closed. Experience has shown that most or all of this traffic will divert from the mainline before the construction zone. Therefore, the exit ramp volumes should be deleted from the input mainline volumes before using QUEWZ and appropriate detour calculations performed.
2. Closed entrance ramps may or may not lead to changes in the input values for QUEWZ. Additional detour calculations will be required for any expected diversions.

## ***Appendix E***

### ***Maintenance of Traffic in Construction Work Zones***

#### **Project Communications Planning**

Construction project communications plans are a cooperative effort of the district PIO, the district Planning and Production administrators, the contractor's project manager, and the ODOT project engineer. Construction communications plans should be developed well in advance of the start date of a project, as much of the communications must be undertaken prior to the construction phase. Therefore, commencement of the communications plan should begin when the preliminary maintenance of traffic plan is developed during the design phase.

#### **Checklist for Project Communications Plan**

Each project communications plan should consist of the following elements:

1. Brief summary of project (situation analysis)
  - a. Project purpose and need
  - b. Project cost and funding source breakdown
  - c. Completion date
  - d. Maintenance of traffic plan. Begin with conceptual plan and update as plan develops.
  - e. Closures and detours
    - i. Official detour
    - ii. Expected local detours (to be released to local officials only)
    - iii. Time of day for lane drops and closures

## ***Appendix E***

### ***Maintenance of Traffic in Construction Work Zones***

2. List of affected stakeholders to be targeted
  - a. Municipalities, counties, townships, villages and MPOs
  - b. Local and state law enforcement
  - c. Emergency services
  - d. Affected business community
  - e. Schools
3. Actual communications plan and timeline for each aspect
  - a. Standard communications tools
  - b. Project-specific communications tools
  - c. Contact information for person responsible for each aspect
4. Schedule of communications status updates to DDD, DD of Communications, etc.
5. Means of evaluation of communications plan
  - a. In-progress
  - b. Post-construction

Some examples of communications tools are listed below. Tools one through six should be considered a minimum standard for any major construction project. The remainder of the tools can also serve to significantly aid a project communications plan, as deemed appropriate.

#### Communications Tools:

1. Press releases, media alerts, public service announcements
2. Focus group/stakeholder meetings
3. Brochures, maps
4. Public involvement meetings
5. Editorial board meetings
6. OTIS posting
7. Dedicated project Web page (I-70.org)

## ***Appendix E***

### ***Maintenance of Traffic in Construction Work Zones***

8. Changeable message board communications
9. Community and group informational talks
10. Local government and legislator meetings
11. Dedicated phone number for information (district PIO line or other)
12. Targeting tourist areas with maps and brochures (hotels, restaurants, chambers, visitor centers, etc.)
13. Business letters/brochures/maps packets to major businesses affected (hospitals, colleges, large corps)
14. Business letters to any company along a ramp or route closing (Ex: SR 256 - businesses claimed they were not given enough warning)
15. Dedicated am-band radio station with construction info on loop
16. Billboards along affected routes
17. Post “future detour” signs to allow motorists to become familiar with the route
18. Regular updates to trucking companies and largest freight carriers in area

## ***Appendix F***

### ***Project Communication Manual***

#### ***Introduction***

This manual was conceived as a tool to advise contractors' highway improvement project managers and the Ohio Department of Transportation (ODOT) project engineers on the importance of communicating, in some detail, the start, progress and completion of highway projects. The manual is intended to be a guide to the use of communication tools targeting various groups who need to know about highway improvement projects.

Communicating the details of highway improvement projects is desirable, and it is necessary. The traveling public, the affected business person, the school bus driver and community leader all have a right to know when and how a construction project will impact their lives. An informed group of stakeholders will help the communication process while adding to the safety of the work zone.

Recent surveys indicate that motorists expect to be provided with advance information about construction. Commuters express a strong need to be informed about road construction, so they can make the necessary preparations to deal with it. The driving public has accepted the facts that there will be major highway improvement projects every construction season. However, it is the unexpected, unannounced construction projects and the related lane closures, detours and delays that frustrate them.

It is this frustration that contributes to the negative image of highway improvement companies and ODOT. A commitment by project managers to communicate how and when a project will affect the traveling public will do much toward neutralizing frustrations. Communication will help build a more positive image of the organizations and the people involved in building and maintaining Ohio's highways.

#### ***Overview***

This manual was not intended to be a self-contained, "how-to-do-it" book on communication and public relations. Highway improvement project managers are always encouraged to work with ODOT's public information personnel to develop an organized approach to the communication needs of any project.

Developing a communication plan for any given highway improvement project takes cooperation among the contractors, ODOT's project engineers, district public information professionals and Traffic Management Program (TMP) personnel (if applicable). If at all possible, the communication strategy should be finalized before the project begins. As part of the strategy, the responsibility for the research and implementation of the various communication elements needs to be determined. In special cases, a communication/public relations budget may need to be developed.

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### ***Project Communication Manual***

It cannot be over emphasized that to have effective communication about a project, the parties involved must first communicate. It will be required that the contractor\* project manager and ODOT's project engineer meet with the ODOT district public information officer to the start of any project either at the preconstruction meeting or a special meeting if a significant amount of time lapses between the preconstruction meeting and the actual construction start date. If a TMP has assumed responsibility as a conveyor of information to the media and the motoring public, they should be involved in these meetings. The agenda of the meeting is to work out a communication program for the project and assignment of responsibilities.

ODOT has 12 districts and each has a public information officer who coordinates and directs the information flow to the public. Keeping the district public information officer informed in advance of project start dates, maintenance of traffic plans and completion dates has a number of advantages to those responsible for a project's progress. The public information office is equipped to handle the creation and dissemination of information. **Coordination with the public** information officer gives project supervision one contact point simplifying the process. With advance planning and accurate, timely information, the driving public can choose alternate routes or allow extra time to travel through construction zones. This creates safer conditions within the construction zone.

A communication plan has to include all the stake holders who need to be "in the loop" and which communication tools should be used to target the stake holders. The communication plan and tools used can be either simple or complex. A news release announcing the start of the project and one at the completion of the project may be all that is necessary for a resurfacing project on a two-lane highway. A two-year rehabilitation of an interstate or lane addition along a commuter route in a metropolitan area, may require news releases and media alerts updating progress and special communications with businesses and residents along the construction zone. Examples of this extensive communication effort include using standards, such as news releases and business letters but adding other tools such as billboards, PSAs and project specific pamphlets. In some situations it may be recommended that a project communications liaison or coordinator be named to work with the ODOT public information office and/or the TMP.

An informed public is usually a more understanding and patient public. The responsibility to announce the start of the project and its progress may fall to ODOT's public information people, but the burden to provide accurate and timely information falls to the project's management starting with the contractor's project superintendent and ODOT's project engineer.

## ***Appendix F***

### ***Project Communication Manual***

There are a variety of communication tools available. Any highway improvement project could use many or all of them. It depends on the need and desire to communicate. It **also depends** upon identification of the stake holders. Defining the stake holders, selecting the tools, (SEE APPENDICES A & B) developing the message, and identifying areas of responsibility is the agenda of the suggested (and hardly encouraged) meetings with contractor and ODOT project management and public information employees.

On the following pages the manual divides construction projects into three different categories: *Major Impact*, *Medium Impact* and *No Impact*. Suggested charts to help in developing a communication plan for the specific type of highway improvement projects has been developed and are published in this manual (SEE APPENDICES C, D & E). The charts identify and reference the stake holders, and tools suggested being used for each type of project.

These charts are to be used as a guideline for all interested parties to ensure that the correct stake holders, and tools are utilized when a project begins, progresses and ends. Please note that the stake holders, or tools for any construction project may vary based on input from the contractor and ODOT.

### ***Major Impact***

Definition of major impact projects for purposes of this manual are any projects that:

affects the traveling lanes of interstate or multi-lane highways

have few or no alternate routes

closes a highway

is new highway improvement

By their very nature, major projects are more complex and involved often with **numerous phases of** construction. These phases affect the traffic maintenance plan, in turn, affecting the traveling public. Major projects usually extend over at least one construction season and often longer. This increases the driving public's exposure to the possible inconvenience of the highway improvement project adding to their frustrations. People living and working in and around the construction zone are affected to an even greater extent. They may individually travel the construction area daily, joining the more transient traffic experiencing lane shifts and delays. Customers and deliveries are delayed, also adding to construction project frustrations.

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### ***Medium Impact Projects***

For use in this manual Medium Impact Projects fall into the following categories:

- two-lane resurfacing
- bridge repair with traffic maintained
- large guardrail replacement and installation
- pavement striping
- raised pavement marker installation

For the most part highway improvement projects of medium impact are shorter in duration when compared to the construction time lines of major projects. Lane closures are common and often temporary as the work zone moves.

The effects of such projects on the motoring public may **not be as great, but an agreeable** communication plan is highly advisable. Project management from the contractor and ODOT should meet or teleconference with ODOT's district public information people to work out the details at least two weeks before the project begins. Any project communication effort, minimally, should include a news release announcing the start of the project. There are exceptions, of course, requiring more extensive communication plans. A bridge repair with traffic maintained on a more rural highway will require less of a communication effort than the same type of project on a commuter route in an urban setting.

### ***No Impact Projects***

No impact projects do not affect traffic flow. They are normally within the highway right-of-way but not on the highway. The projects include:

- fence work
- mowing
- bridge painting not over traffic
- other projects not on or adjacent to the pavement

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### ***Project Communication Manual***

The only traffic implication is that motorists may inadvertently slow down in order to see what work is underway. There are situations where the work zone may be marked with signs, cones or barrels along the side of the road, raising some interest by motorists. Communication, in the form of a news release, should be done if only for informational purposes.

#### ***Communication Tools***

**News Releases** are the workhorses of the communication tools. They are used to announce the start of all types of projects. Primary targets are the news media including both print and electronic media. Traffic reporters and transportation related Internet Web Sites should be included to report progress of major impact projects and some longer term medium impact projects. Copies of releases can be sent to other interested parties such as affected businesses, various state, local and county officials, just to name a few. Normally releases are produced by ODOT district public information personnel with information provided in a timely manner by specific project management. This tool may be partnered with a local TMP.

**Media Alerts** are the first cousins to the news release. The alert is briefer than the news release and can be effectively used to notify media about **upcoming events and project** progress such as lane shifts, temporary ramp closures, etc. Coordination of media alerts are through ODOT's district public information offices.. This tool may be partnered with a local TMP.

**Business Letters** are an easy way to communicate with specific stake holders. Letters can be mass-mailed, form letters or specifically addressed and customized. Letters can be used to notify legislators, local officials and affected businesses about highway projects in advance of the project's start date. This tool may be partnered with the prime contractor.

**Newsletters** are a versatile printed piece. The newsletter can carry a number of subjects using a modified newspaper layout including columns, headlines and possibly pictures and graphics. Newsletters are effective "handouts" for businesses and residences most affected by a project. This tool may be partnered with a local TMP.

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**Diagrams and Maps** are an efficient way for stake holders. to quickly visualize the project limits, detours and maintenance of traffic plans. Diagrams and maps can be easily included with news releases, media alerts, newsletters and project business letters. This tool may be partnered with a local TMP.

The above-mentioned mediums are relatively inexpensive to produce and are effective. They are considered standard issue for most project communication efforts. There are other communication tools that are worth consideration when developing a project communication plan. Many of them take time to develop and have certain costs associated with them. If a project communication plan is to incorporate any of the following items, a time line for development and production needs to be done and a budget allotted.

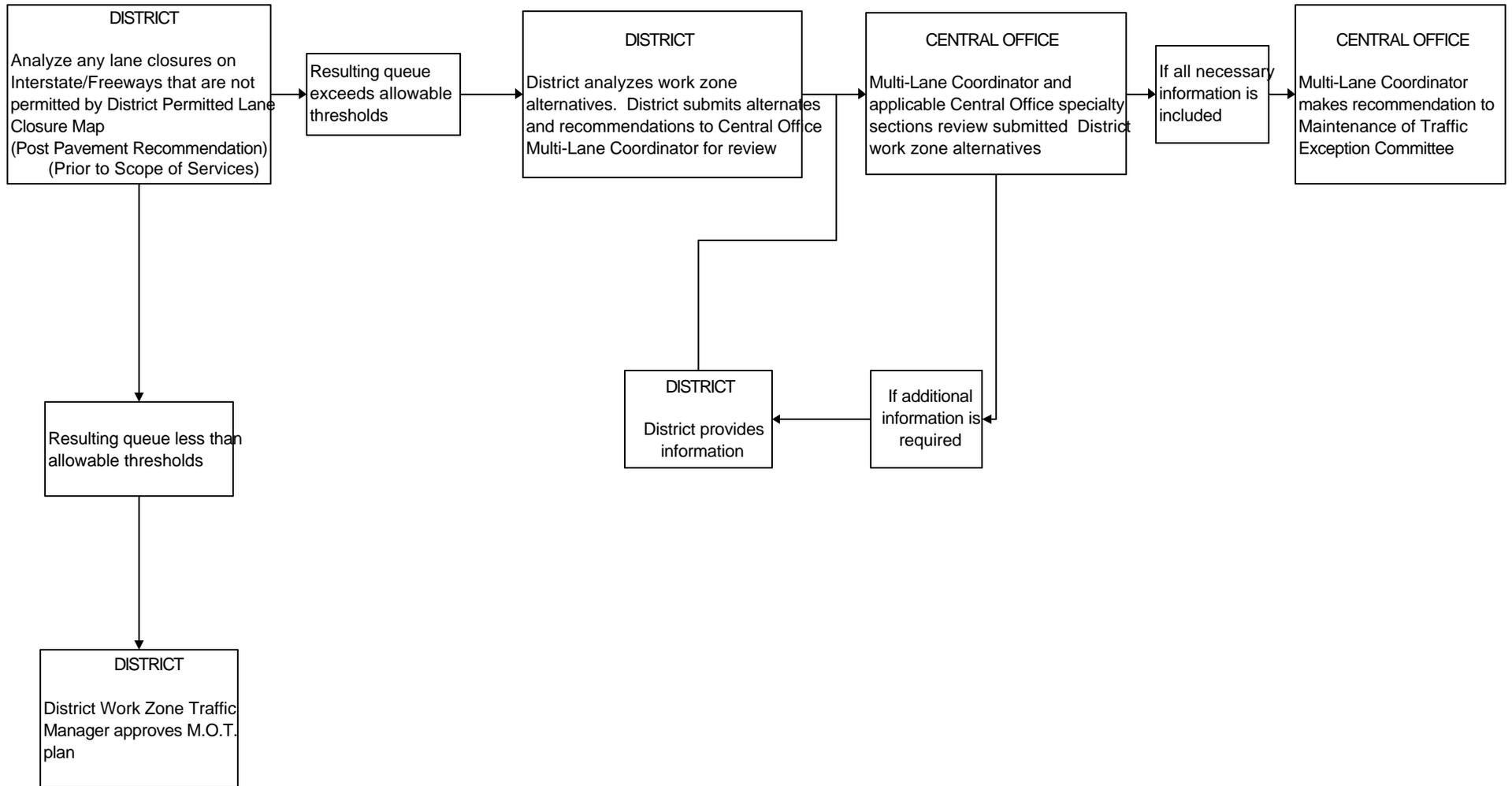
Posters can be used to announce the start of a project in advance of the start date and/or alternate routing. Posters can be provided to businesses within project limits to notify customers of construction. In certain situation posters can be placed in **rest areas near** the project. The design and printing of posters are often done by graphic design firms and commercial printers. This tool may be partnered with a local TMP.

**Flyers and Pamphlets** are used to describe a project **and its necessity and might include** maintenance of traffic plans and project diagrams. Distribution can be made through businesses adjacent to projects, travel organizations such as **automobile associations, rest areas** and Travel Information Centers to name a few. Although the design of a flyer or pamphlet may be provided by ODOT, often the printing is by commercial printer. This tool may be partnered with a local TMP.

**Billboards** are used to announce the coming of a major project. **Placement is best on arterial** routes leading to the construction area. Billboards have limited usage since messages must be extremely brief and as time passes, motorists have a tendency to ignore them. Planning is necessary, because leasing billboards must be done in advance. Design of the **message**, printing it and posting on the billboard is done by commercial firms. This tool may be partnered with a local TMP.

**Public Service Announcements** can be used to support main messages of a project's communication plan. PSA's are useful for messages about safety in the work zone. Again, a time line needs to be established to allow for the scripting of the message, recording and distribution. There are agencies which will do PSA'S packages, but funding must be considered. This tool may be partnered with a local TMP.

# CONTRACT WORK



# MAINTENANCE WORK

