INFORMATION FOR ENGINEER'S RECOMMENDATIONS FOR:

HIGHWAY WORK ZONE PRACTICES IN CHIPs OVERLAY PROJECTS,

THE INTERPRETATION OF STANDARDS,
&
THE IDENTIFICATION AND EVALUATION OF PROBLEMATIC LOCAL RURAL HIGHWAY SEGMENTS IN CHIPs OVERLAY PROJECTS

BERNE NY

Provided by
Joel Willsey
Berne Town Board Member
December 2019

The Berne Town Board is seeking the following general recommendations compiled in a report stamped by a Civil Engineer currently professionally licensed to practice in New York State:

Overlay Depth and width considerations in CHIPs funded projects:

Features like shoulders, lanes, side slopes, ditches, back slopes and guide rail cannot be adequately provided in some situations along Berne highways as the highways evolved in place; they were not designed and built so necessary right of way width was not considered in original construction. General Recommendations regarding the most economical preliminary identification and evaluation of these situations and ways to address overlay width and lift thickness variations are to be addressed

Recommendations for Work Zone Traffic Control in CHIPs funded overlay projects:

General Recommendations for Work Zone Traffic Control practices consistent with the Manual on Uniform Traffic Control Devices (as required by NY Vehicle and Traffic Law), the New York State Standard Specifications and any other applicable guidance. Two Work Zone Situations are provided in the slides that follow.

Recommendations for Improved Planning, Work Zone Safety, Economy & Quality in CHIPs overlay projects
When Utilizing Engineering services:

Overlay project recommendations for signage, devices, project scheduling order of operations etc.

Please base general recommendations on these example highways:

- Bradt Hollow Rd, Filkins Hill Rd, Stage Rd.
- Assume ADT is under 2000

Recommendations for Improved Planning, Work Zone Safety, Economy & Quality in CHIPs overlay projects When Utilizing Engineering services

1. ***Please make recommendations regarding planning, scheduling and order of operations to best accommodate work zone safety, project quality and responsible spending in CHIPS funded highway work projects under the consultation of an Engineer (generally based on the points below).***
2. ***Explore economic feasibility of consulting an Engineer to guide the administration of these CHIPS funded projects.***

- Choosing of candidate highways
- Determination of standards (widths, grades, cross slopes, curves etc)
- Identifying problem areas where non-standard or non-conforming features would exist after a simple overlay (narrow sections, excessive cross slopes, narrow structures, inadequate guide rail, sharp curves etc). Note that lanes are often widened
- Determining what work would be necessary to meet standards in targeted segments (including survey, ROW, design, WZTC, construction etc)
- Exploring costs for correction of problems in targeted segments where existing features cannot accommodate standards or truing and leveling is recommended by Engineer
- Engineering Justification of retention of non-standard and non conforming features where such work is deemed economically impractical and or safety would not be significantly improved by a targeted design project in the Engineer's opinion. These projects often widen highway overlays
- Determining what work needs to be done in targeted segment projects to accommodate Engineers recommendations
- Developing a schedule if separate projects are necessary in anticipation of the overlay.
- Performing necessary survey, design etc for targeted segment
- Determining and acquiring right of way or land owners releases if necessary
- Evaluating existing signage and recommending new and or replacement signs for the targeted segments and overall overlay project
- Scheduling operations and determining order of operations to avoid winter work zones and minimizing exposure of the public to drop off and other hazards
- Providing work Zone traffic control schemes meeting applicable standards for all phases of construction
- Providing construction inspection

CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

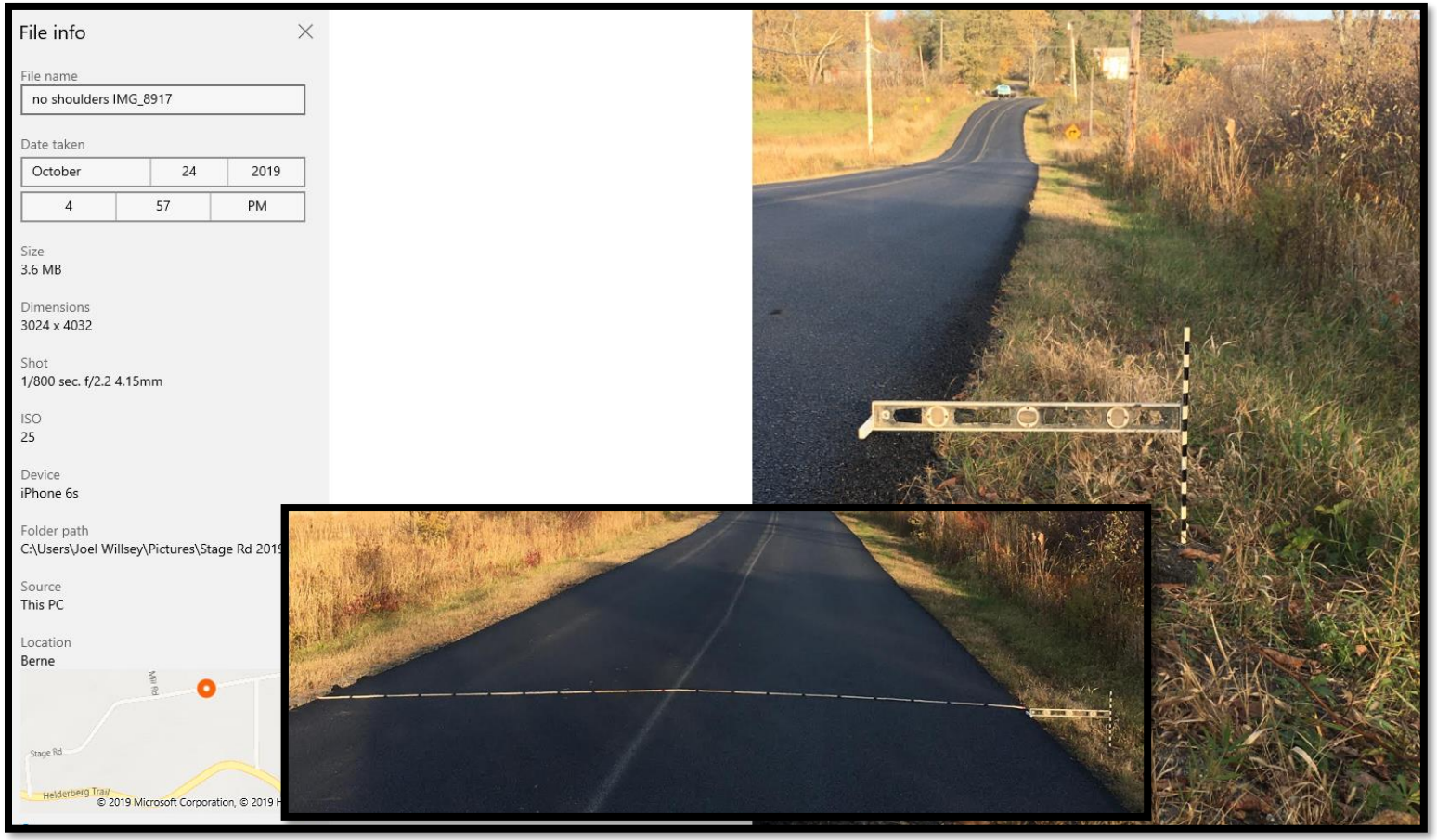
- Because there is often no survey, no engineering and no truing and leveling prior to small town overlay projects, the single asphalt lift typically varies from less than 2 inches to 8 inches or more to accommodate existing conditions. The new asphalt grades and cross slopes generally reflect acceptable standards at the surface (where practical) so the variations in the existing, underlying surface are accommodated by the varying thickness of the new, single asphalt lift. This can result in very high drop-offs at the edges in some highway segments and inadequately thin overlays in other areas.
- Adequate asphalt compaction is questionable with so much lift variation and long term integrity in thin lifts is questionable.
- The new overlay is often wider than the existing asphalt in these projects. Widening is often an understandable goal, but some existing segments cannot accommodate increased lane and shoulder width and where widened onto the unprepared shoulder the lift thickness is sometimes inadequately thin and can deteriorate very prematurely. The ditches are too close to the travel lanes in some segments of most Berne highways. Either narrower, non-standard widths could to be justified by an Engineer, with recommendations like advisory speed signs, or a project to widen the section to accommodate the standards could be proposed and estimated by an Engineer. The issue is that there is typically no Engineer involved so safety, integrity and cost considerations need improvement.
- It would appear truing and leveling of the pre-existing surface would provide a more uniform overlay thickness and therefore more uniform compaction and much less extreme drop-offs if shoulders are made to reflect anticipated surface grade in the truing and leveling operation. Ensuring that the asphalt is an adequate lift thickness would greatly improve integrity, safety and service life.
- At issue is the costs of engineering design, survey and truing and leveling weighed against a safer operation and better quality and integrity for the overlay due to more uniform lift depth. These costs would help ensure that these projects aare a good investment.
- **A targeted truing and leveling operation or widening project in specific, local areas along a highway overlay project is worthy of consideration as carry-over CHIPs and PAVENY balances have been rolling over year to year and used for equipment and trucks instead of highway work. It is clear this money is primarily intended for highway work and it is my opinion that these state funded overlay projects would benefit considerably by some state funded engineering judgement.**

1. ***Can NY CHIPS/PAVENY funding be used for truing and leveling expenses?***
2. ***Can NY CHIPS/PAVENY funding be used for Engineering design, estimate & survey?***
3. ***Is there a New York State DOT recommendation for the percentage of project cost that can be used for Engineering and Survey in CHIPS/PAVENY funded projects?***

CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

As can be seen in the left photo, the new overlay depth is to 8 inches at the edge of the 20 ft wide overlay at this location. Drop-offs like this (predominantly 4 to 6 inches) can extend for hundreds of ft. In these single lift overlays that don't include truing and leveling. The 2 ft level illustrates where a 2 ft shoulder would be assuming the standard lanes are 10 ft. The level is held in a level position with a support marked in 1 inch increments. The 20 ft rope is marked in 1 ft increments. There is no posted speed limit. If a 2 ft shoulder at a 6% cross slope were provided here, the embankment back up slope necessary would fill the ditch, or the shoulder cross slope would have to touch down in the ditch and be far too steep to be considered usable for traffic (right photo). Bicyclists and pedestrians have no refuge when 2 vehicles meet in their location. A pedestrian with a baby carriage cannot avoid the travel lane in that scenario. The right photo at Bradt Hollow Rd illustrates an inadequate shoulder cross slope that resulted from widening the 2017 overlay where section width is inadequate. This shoulder is not functional in my opinion

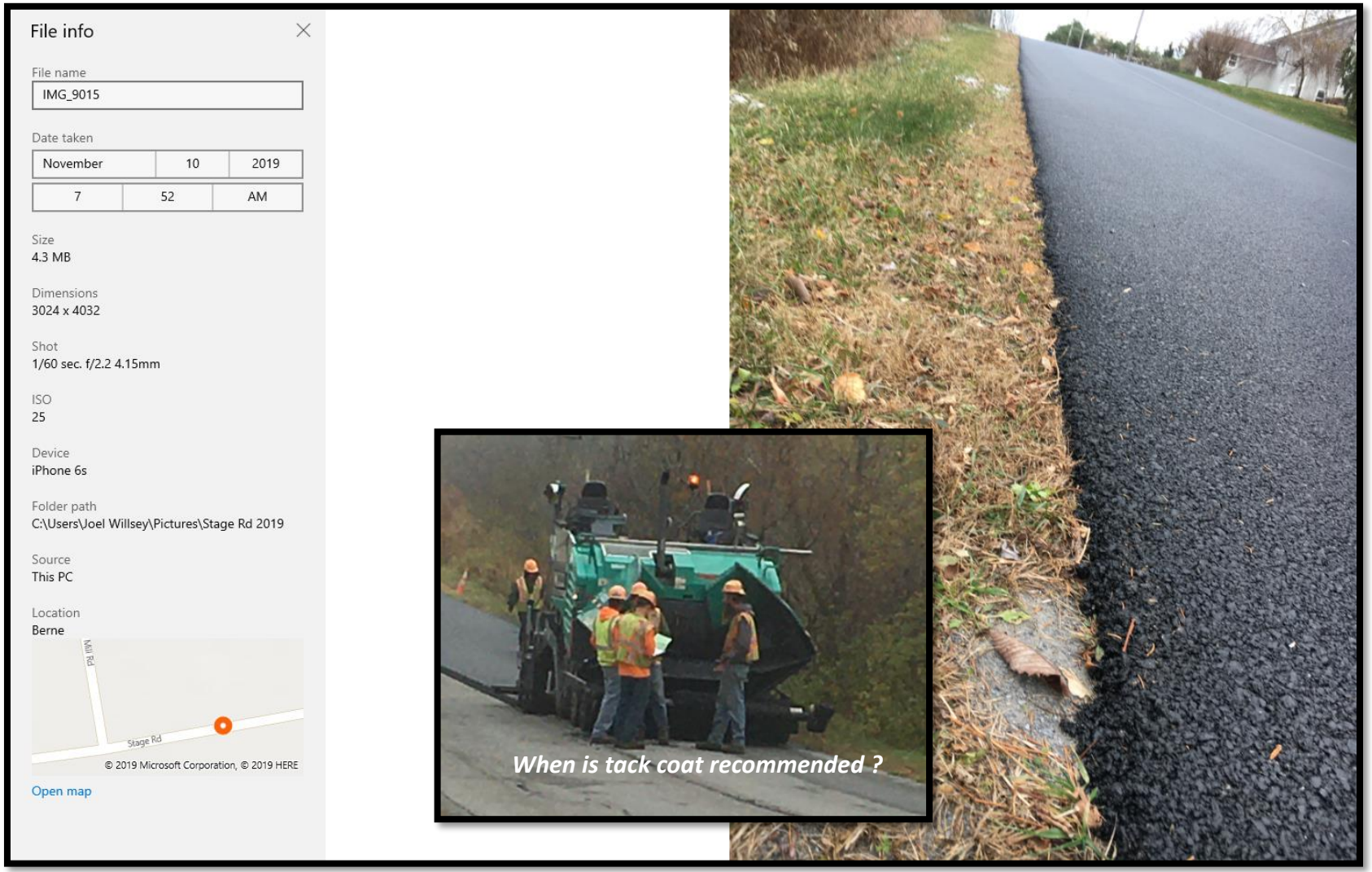
1. ***What is the most economical survey method to determine basic highway topography, (cross slopes, grades etc) given an assumed confining right of way width?***
2. ***Can these limited, local segments be identified and targeted for some survey, engineering and design work using NY CHIPs or PAVENY funding?***
3. ***Please provide Recommendations regarding the most economical identification of highway segments where inordinately high pavement edge drop-offs during construction can be predicted and where the ditch is too close to provide standard lanes and shoulders.***
4. ***Can CHIPS/PAVENY funds be used for Right of Way and or design costs as well as construction costs to widen targeted segments that are too narrow?***
5. ***Please recommend an acceptable cross slope range for shoulders in a normal crown situation with ¼ inch per ft travel lane cross slopes.***



CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

The left photo illustrates a segment of Stage Rd where the asphalt was widened onto the grassy shoulder. The lift is very thin and on grass. No tack coat was applied to the existing asphalt under this thin overlay. This is 200 ft from the 4 to 6 inch in deep overlay in the preceding slide. The right photograph is also nearby. The overlay thickness varies from just over 1 inch to about 8 inches in that photo.

1. ***Does CHIPs funding require that state specifications be followed?***
2. ***Please recommend a minimum and maximum lift thickness and roller specs to ensure adequate compaction.***
3. ***When is tack coat recommended?***



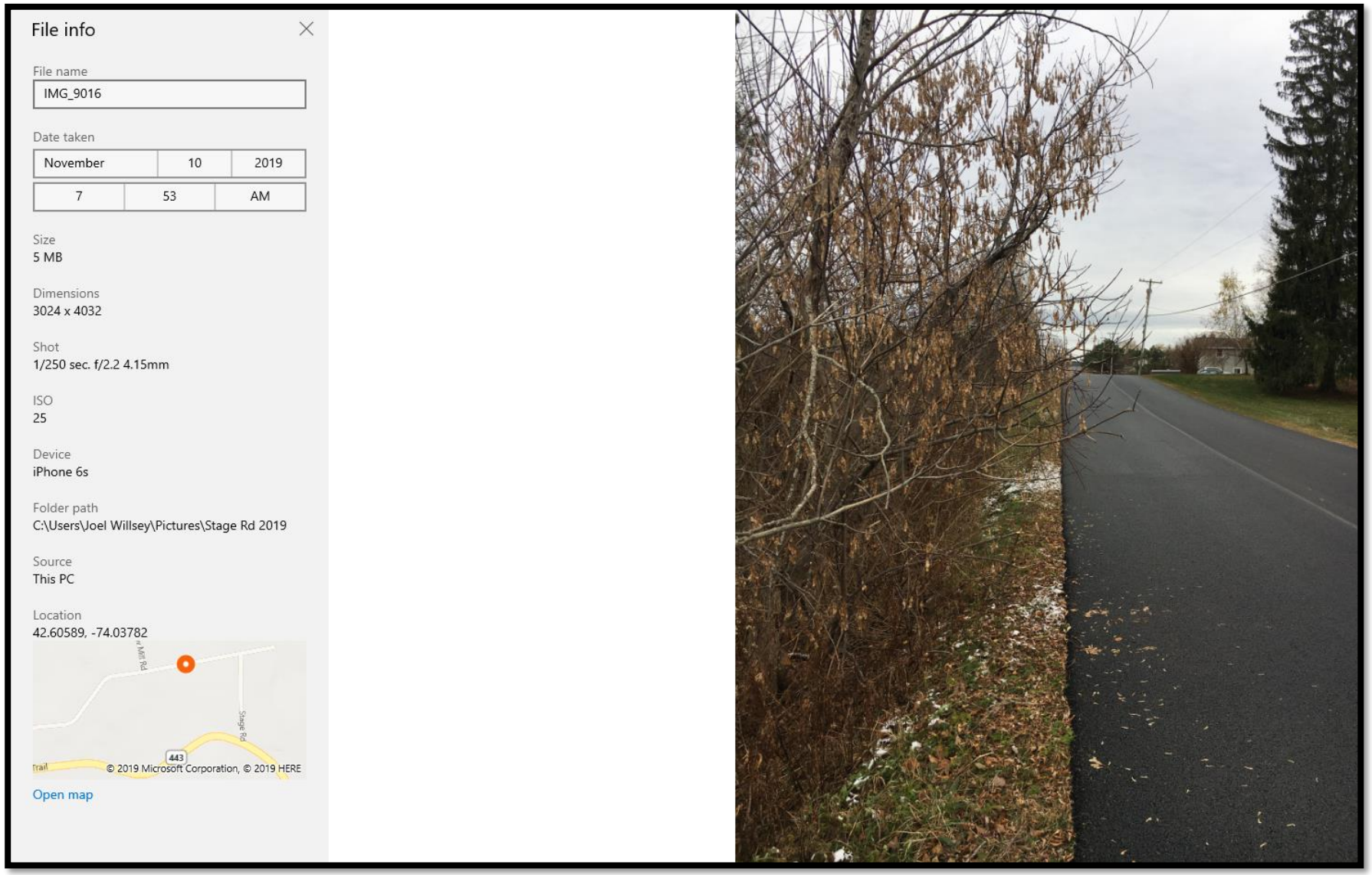
CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

It appears that Long Rd was widened onto the shoulders with an inadequately thin lift in some segments and in a manner similar to the Stage Rd (left) photo in the preceding slide. The thin asphalt in the widened travel lane failed prematurely. Drivers often crowd on-coming traffic when avoiding these raveling shoulders so this overlay failure creates a safety hazard. Considerable lane width is missing in long segments. As can be seen in the photo, the pine needle margin in the area where the overlay is missing indicates considerable traffic where the overlay has failed. This overlay was a considerable investment and this premature width failure appears to have rendered the investment prematurely inadequate.

1. ***Does NYSDOT require that standards and specifications be followed in CHIPs funded projects that would address this type of failure?***
2. ***Would a deeper asphalt lift and or truing and leveling be recommended to address this failure?***
3. ***Is construction inspection required in these state funded projects?***

CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

The Stage Rd Overlay was widened onto the grassy shoulder here and traffic is striking the now overhanging bush



CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

1. Please provide recommendations regarding determination of lane and shoulder widths for the subject highways:

While these overlays may be considered maintenance projects, they often result in wider overlays, typically 20 ft. But, assuming 10 ft lanes are the standard, there are segments where there is no room to provide shoulders. Assuming 10 ft lane widths, travel lanes can drop abruptly into ditches in some segments as illustrated in preceding slides. To evaluate non-standard features the standards that apply in each situation should be known. An Engineer should be consulted.

It appears speed limits are posted at 40 to 45 mph or are unposted (55 mph) on Berne highways . With most of the highways very similar in Berne and if no specific speed studies are available, an interpretation of what the lane and shoulder standards would be for the subject highways at assumed "design speeds" of 40, 45, 50 and 55 mph would generally reflect Berne highways and this information would provide valuable perspective for future projects.

Exhibit 2-7 Design Criteria for Non-NHS Local Rural Roads – Non-NHS

Design Speed	Travel Lane Width (ft.) Based on Design Year ADT				Turn Lane (ft.)		Max. Percent Grade			Minimum Stopping Sight Distance (ft.)	Minimum Radius Curve (ft.)	
	ADT Under 2,000	ADT 2,000-7,500[3]	ADT 7,500-10,000[4]	ADT Over 10,000[4]	Minimum	Desirable	Terrain				e max = 6 %	e max = 8 %
							Level	Rolling	Mountainous			
30	9	10	11	12	10	Match Travel Lane Width	7	11	15	175	176	167
35	9	10	11	12			7	10	14	220	247	233
40	9	10	11	12			7	10	13	271	333	314
45	10	11	11	12			7	9	12	327	435	409
50	10	11	11	12			6	8	10	387	556	521
55	11	11	12	12			6	7	10	452	695	651

Shoulder Width (ft) [1]				
All Speeds	2 [5]	4	6	6

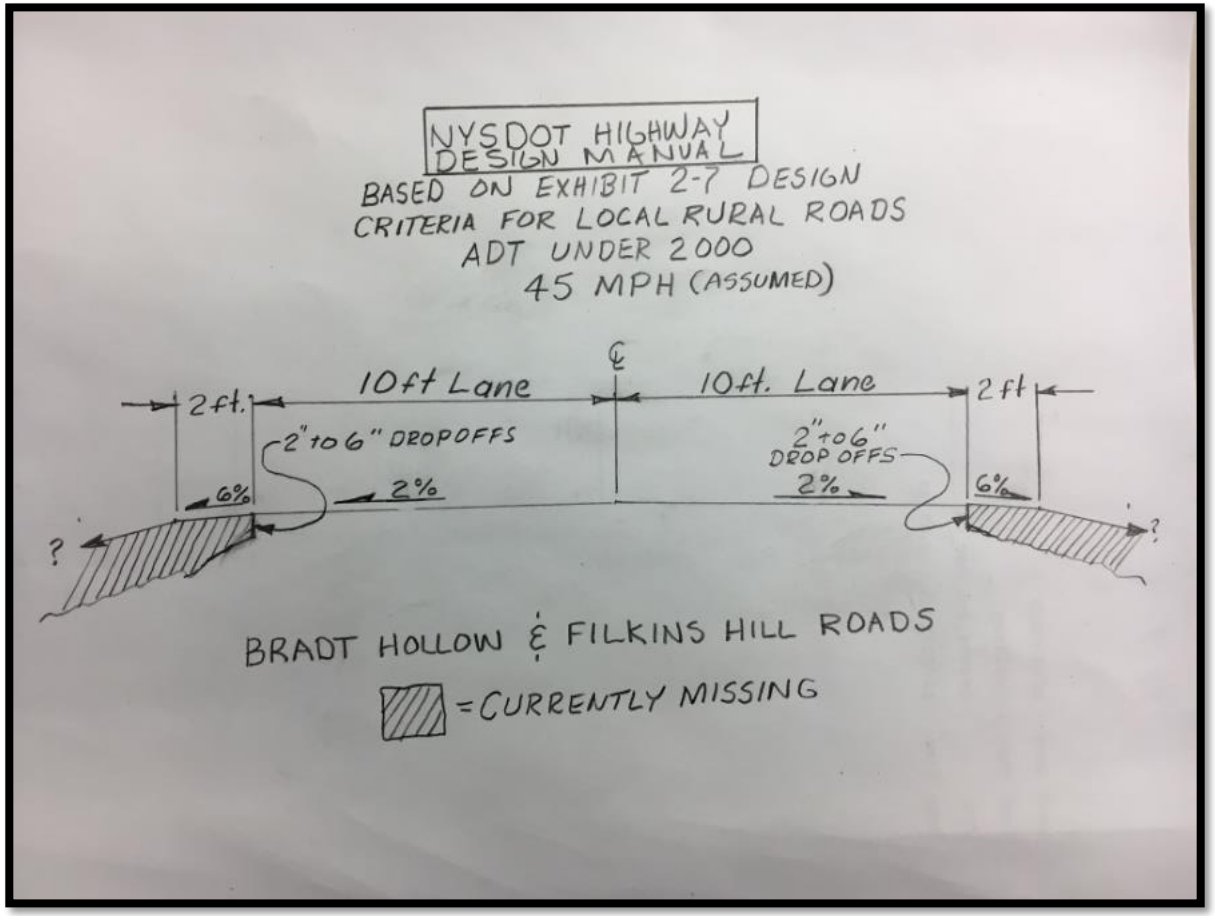
Notes:
1. For bridges, determine the lane and shoulder width from the NYSDOT Bridge Manual, Section 2.
2. Minimum travel lane width is 10 ft. for routes designated as Access Highways and for routes within 1 mile of Qualifying Highways on the National Network (1982 STAA Highways).
3. For roads in mountainous terrain with design volume of 400 to 600 ADT, use 9 ft. lanes (except where note 2 applies).
4. 11 ft. lanes may remain where the crash rate is below the statewide rate for similar facilities.
5. Minimum width is 4 ft. if roadside barrier is used on low-volume roads. Min. width is 4 ft. if shoulder is intended for occasional pedestrian and/or bicycle use. A 5 ft. width is desirable if the shoulder has vertical obstructions (e.g., curb or barrier) or vehicle speeds exceed 50 mph.

CHIPS OVERLAY DEPTH & WIDTH CONSIDERATIONS

The excessive drop-offs left for the winter in the 2017 overlay projects extended for ranges of hundreds of feet as the January 2018 photos document. The section below was provided to the Town in January 2018 to illustrate the issue. The new overlays at Filkins Hill Rd and Bradt Hollow Rd were widened without engineering judgment, without regard for the existing width restrictions and without consideration of the surface variations of the pre-existing section. There was simply no room to provide shoulders or side slopes without filling the ditches in long segments and variation of the existing cross slope resulted high drop-offs within 4 ft of the travel lanes (at the ditches). The photos illustrate this condition and document drop-offs were left long term, unprotected and in winter conditions.

If , after a licensed engineer evaluates a specific highway segment and if a lower "design speed" is determined, the NYSDOT Exhibit 2-7 table could perhaps be interpreted differently. At a lower speed this section could be interpreted as featuring 9 ft lanes with partially surfaced 2 ft shoulders. This type of engineering judgement could benefit the Town

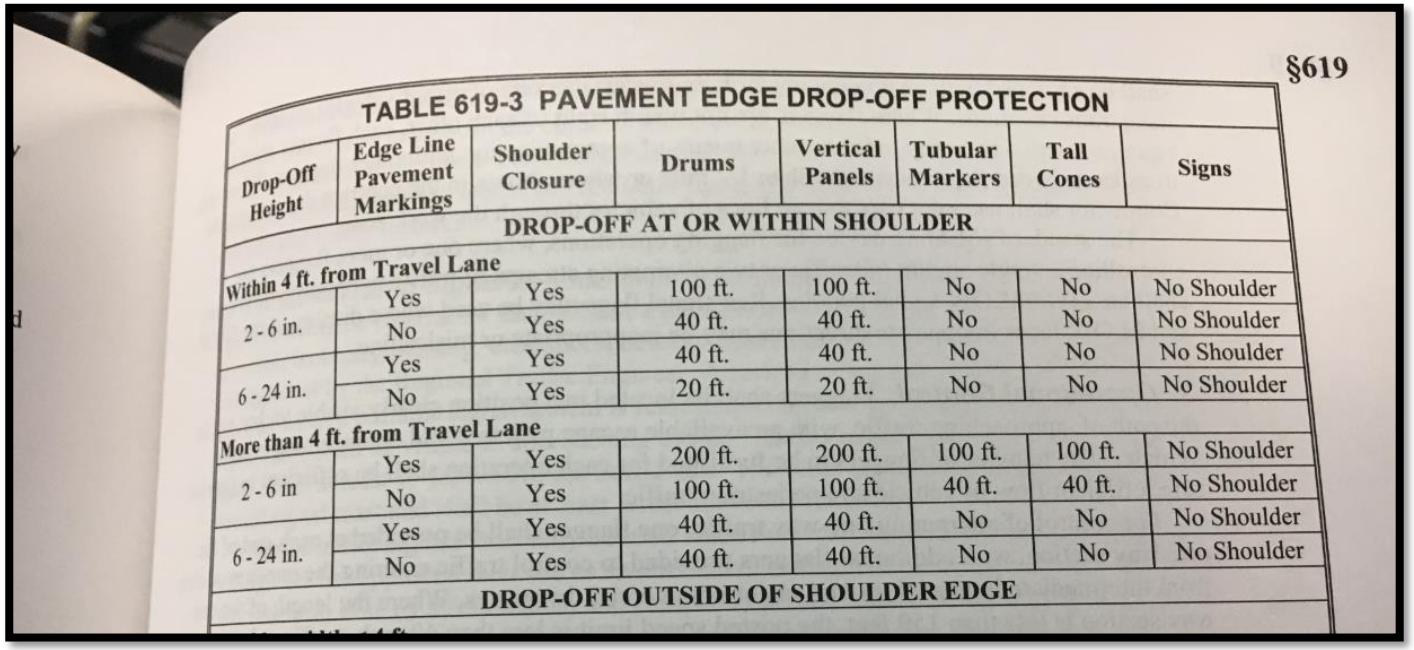
1. Should decisions like these regarding various specific highway segments be left to a licensed Engineer to reduce Town liability and improve project quality and safety?



Recommendations for Work Zone Traffic Control in overlay projects: Issue A

1. ***Please recommend a frequency of devises and signs assuming 2 to 8 in. drop offs at the edges of a theoretical 20 ft wide overlay on the subject highways.***
2. ***Do CHIPs/PAVENY funds require that any particular Work Zone Traffic Control & Safety Standards apply?***
3. ***Do NYS Vehicle and Traffic Law work zone standards 1680 (MUTCD & Supplement) apply?***
4. ***Does NYS Standard Specifications 619 apply?***
5. ***Do any other work zone standards apply?***

This situation should be evaluated by a professional Engineer, but based on my interpretation of Table 619-3 of the NYSDOT Standard specifications, our situation for Drop-off heights in the first column often exceeds 6 in and our drop off is clearly within 4 ft of the travel lane (see following slides). Our situation is reflected in the "2 -6 in" and "6-24 in" row. In the second column, at the 2-6 in row, white lines at the edge of the travel lanes reduces the number of drums or panels needed significantly. White lines improve safety in this situation by marking the location of the drop-off, but when leaving such drop-offs in winter, white lines are clearly not effective. The lines and the drop offs are not visible in snow. In the 3rd column, "yes" indicates this situation is considered a "shoulder closure". The 4th & 5th columns indicate the recommended frequency of drums or panels to channelize traffic. An engineer may consider 20 ft excessive given the situation, particularly if the shoulders are to be placed within a couple days. But as the photos indicate, Berne uses no drums or panels at all and leaves the unprotected drop offs for months and in winter conditions. The tubular markers and tall cones in columns 6 and 7 are not considered acceptable for this situation as indicated by the word "no" in those columns. Finally, column 8 indicates that the appropriate sign for our situation is "NO SHOULDER" because we are technically closing the shoulders. There is clearly no usable shoulder with these drop-offs.



§619

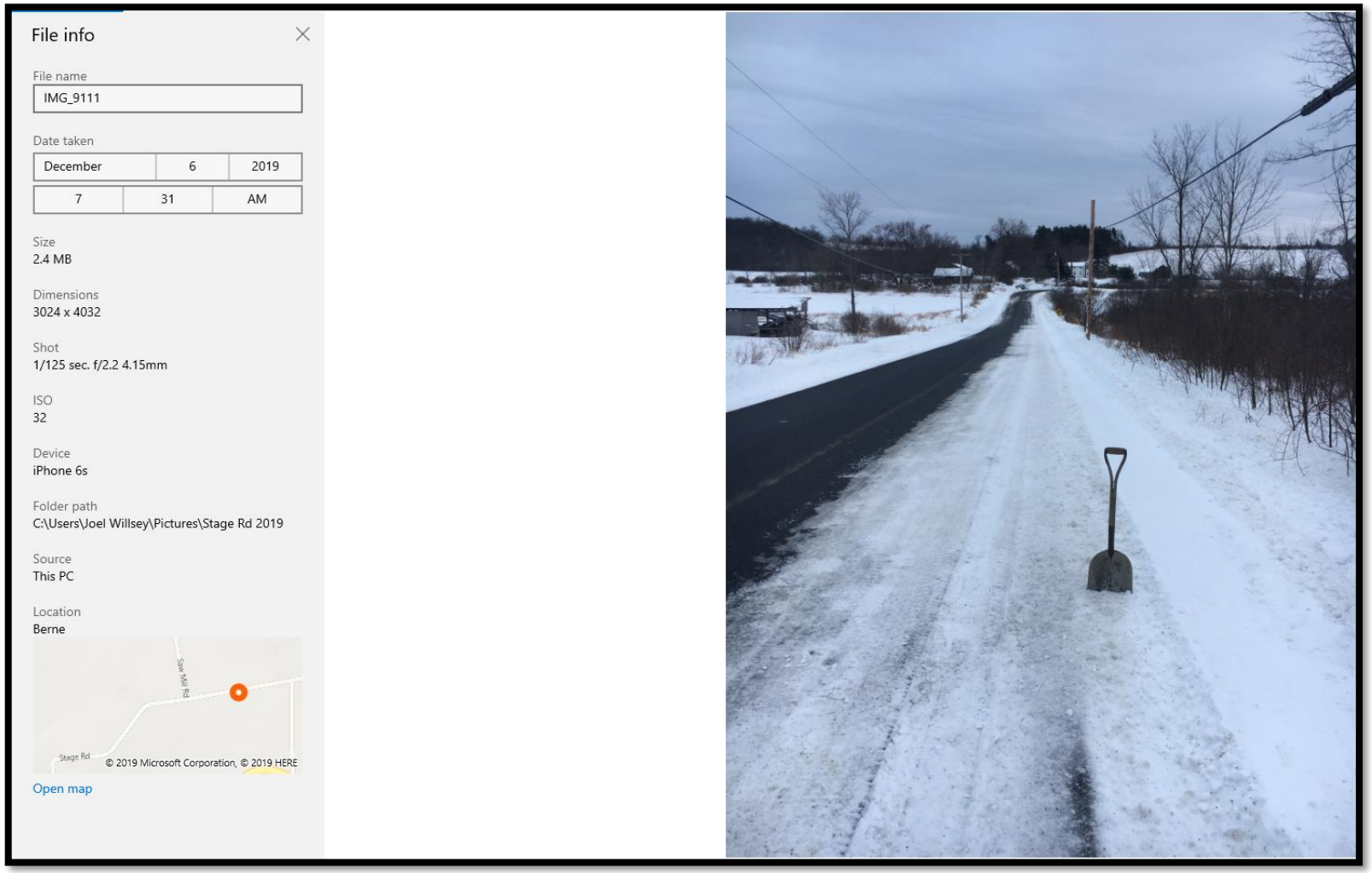
TABLE 619-3 PAVEMENT EDGE DROP-OFF PROTECTION

Drop-Off Height	Edge Line Pavement Markings	Shoulder Closure	Drums	Vertical Panels	Tubular Markers	Tall Cones	Signs
DROP-OFF AT OR WITHIN SHOULDER							
Within 4 ft. from Travel Lane							
2 - 6 in.	Yes	Yes	100 ft.	100 ft.	No	No	No Shoulder
	No	Yes	40 ft.	40 ft.	No	No	No Shoulder
6 - 24 in.	Yes	Yes	40 ft.	40 ft.	No	No	No Shoulder
	No	Yes	20 ft.	20 ft.	No	No	No Shoulder
More than 4 ft. from Travel Lane							
2 - 6 in	Yes	Yes	200 ft.	200 ft.	100 ft.	100 ft.	No Shoulder
	No	Yes	100 ft.	100 ft.	40 ft.	40 ft.	No Shoulder
6 - 24 in.	Yes	Yes	40 ft.	40 ft.	No	No	No Shoulder
	No	Yes	40 ft.	40 ft.	No	No	No Shoulder
DROP-OFF OUTSIDE OF SHOULDER EDGE							

Recommendations for Work Zone Traffic Control in overlay projects: Issue A

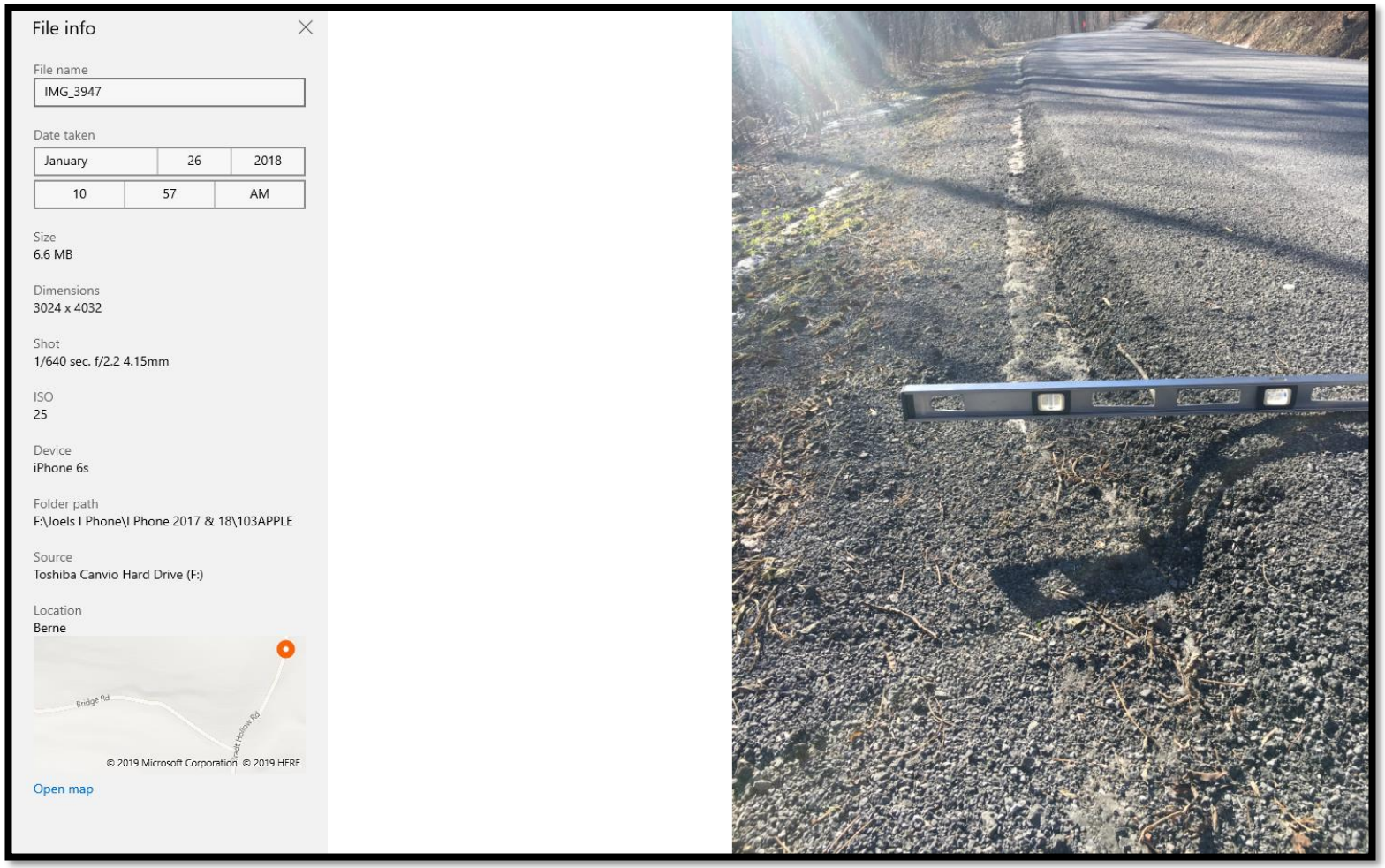
This December 2019 dated, GPS located photograph documents 4 to 6 inch unprotected drop-offs left for the winter after the Fall 2019 overlay of Stage Rd (east). Clearly, crossing these drop-offs could destabilize vehicles, draw them off the road into fixed hazards and/or roll them over. This overlay is predominantly 20 ft wide and there is no posted speed limit. It is impossible to determine where the drop-off hazard is in snowy conditions and there are no drums or panels indicating there is a hazard.

1. Please make recommendations regarding long term unprotected drop offs exceeding 2 inches and WZTC in winter conditions.



Recommendations for Work Zone Traffic Control in overlay projects: Issue A

This January 2018 dated, GPS located photograph documents 8 inch steps left for the winter after the Fall 2017 overlay of Bradt Hollow Rd. This step extended for hundreds of ft at 6 to 8 inches. Clearly, crossing these drop-offs could destabilize vehicles, draw them off the road into fixed hazards and/or roll them over. This overlay is predominantly 20 to 21 ft wide. ***Please make recommendations regarding long term 4 to 8 inch drop offs and winter conditions***



Recommendations for Work Zone Traffic Control in overlay projects: Issue A

This January2018 dated, GPS located photograph documents extreme drop-offs (for a considerable distance) left for the winter after the Fall 2017 overlay of Filkins Hill Rd. This overlay is 20 ft wide. ***Please make recommendations regarding long term 4 to 8 inch drop offs and winter conditions***

Recommendations for Work Zone Traffic Control in overlay projects: Issue A

This September 21st 2015 photo is from the 2015 Stage Road (west) project. This documents 4 years of the practice of leaving unprotected drop-offs long term. This one lift overlay was placed in summer 2015 and the excessive, unprotected drop-offs remained for over a month.

Recommendations for Work Zone Traffic Control in overlay projects: Issue B

This was an August 14, 2019 culvert replacement at Stage Rd in anticipation of the recent HMA overlay. This is the intersection of Stage and Sawmill Roads. The sign & device set ups at intersections are not handled in a uniform manner. R11-2 and R11-3a signs are used interchangeably at intersections in Berne Rd closures. Clearly road user flow beyond the R11-2 sign is necessary in this example – note mailbox and driveway beyond (6F.08). No notification was given to the residents that there would be no access to their property.

Based on the hypothetical "ISSUE B" plan provided in the last slide, assume a day long project to remove and replace a 4 ft diameter culvert.

1. ***Please recommend signage, devices and configurations necessary to comply with standards at both intersections, the point of closure and between those points. See following slide***

Standard: (6F.08)

The ROAD (STREET) CLOSED sign shall not be used where road user flow is maintained or where the actual closure is some distance beyond the sign.

Guidance:

The ROAD (STREET) CLOSED sign should be installed at or near the center of the roadway on or above a Type III barricade that closes the roadway (see Section 6F.60).

Standard:

Signs mounted on barricades, or other portable supports, shall be no less than 0.3 m (1 ft) above the traveled way.

Figure 6F-5. Regulatory Signs in Temporary Traffic Control Zones

R11-3a
1500 x 750 mm
(60 x 30 in)

?

Section 6F.09 Local Traffic Only Signs (R11-3a, R11-4)

Guidance:

(R11 – 2 used instead)

The Local Traffic Only signs (see Figure 6F-5) should be used where road user flow detours to avoid a closure some distance beyond the sign, but where local road users can use the roadway to the point of closure. These signs should be accompanied by appropriate warning and detour signing.

(Rural applications are considered in the MUTCD)

In rural applications, the Local Traffic Only sign should have the legend ROAD CLOSED XX KM (MILES) AHEAD, LOCAL TRAFFIC ONLY (R11-3a).

Option: *(No distance to point of closure is provided)*

In urban areas, the legend ROAD (STREET) CLOSED TO THRU TRAFFIC (R11-4) or ROAD CLOSED, LOCAL TRAFFIC ONLY may be used.

The words BRIDGE OUT (or BRIDGE CLOSED) may be substituted for the words ROAD (STREET) CLOSED on the R11-3a or R11-4 sign where applicable.

Section 6F.60 Type I, II, or III Barricades

Support:

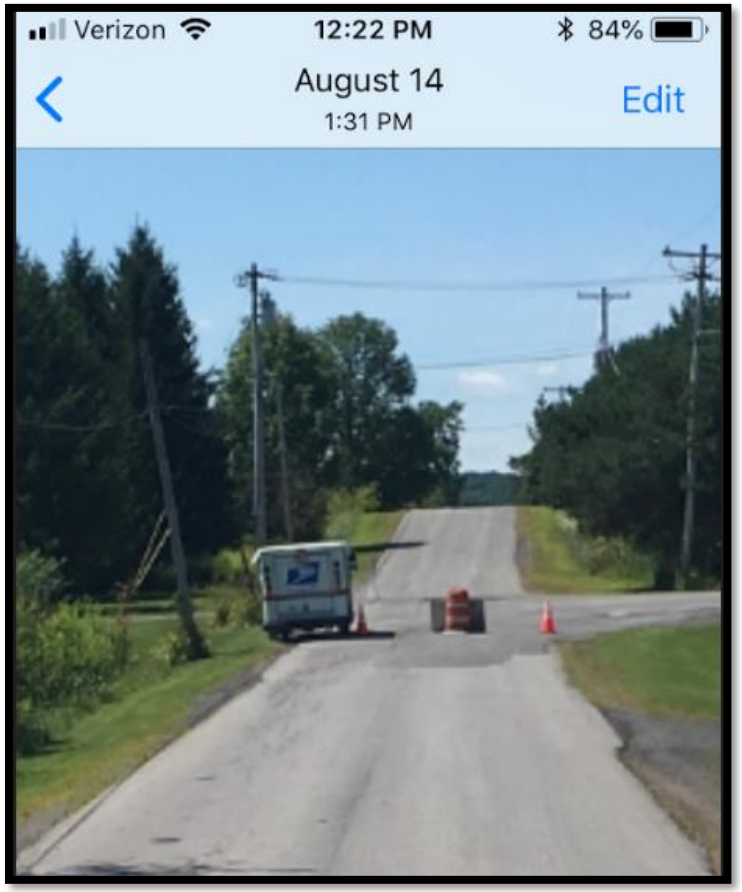
A barricade is a portable or fixed device having from one to three rails with appropriate markings and is used to control road users by closing, restricting, or delineating all or a portion of the right-of-way.

As shown in Figure 6F-14, Sheet 2, barricades are classified as either Type I, Type II, or Type III.

Recommendations for Work Zone Traffic Control in overlay projects: Issue B

AUGUST 14, 2019 CULVERT REPLACEMENT

The use of the R11-2 “ROAD CLOSED” sign at the intersection and blocking the lanes restricted access beyond the point where it was posted. This obstructed mailbox access. This truck had to leave the highway travel lanes and use the wrong side of the road for mail delivery. See also preceding slide for photo of same intersection from opposite direction.



1. ***Assuming a day long project to remove and replace a culvert in anticipation of an overlay, Please recommend specific signs and devices and where to use them at intersections when the point of closure is beyond the sign at the intersection and any residences exist between the intersection and point of closure. Also recommend specific devices and signs at the point of closure and a recommended configuration there. Please provide graphic representations. (base on hypothetical situation schematic provided in last slide)***

About 17,200,000 results (0.78 seconds)

18 U.S. Code § 1701. Obstruction of mails generally. Whoever knowingly and willfully obstructs or retards the passage of the mail, or any carrier or conveyance carrying the mail, shall be fined under this title or imprisoned not more than six months, or both.

18 U.S. Code § 1701 - Obstruction of mails generally | U.S. ...

https://www.law.cornell.edu › uscode › text › 18 › 1701

Recommendations for Work Zone Traffic Control in overlay projects: Issue B

ROAD CLOSED FOR CULVERT REPLACEMENT

Assume 2 miles along highway centerline and assume work site is 1 ¼ miles from Intersection A and ¾ miles from intersection B