

Comments on the 2022 Book 7 Office Edition

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1. Good Features of 2022 Book 7 Office Edition

- 1.1 More information and layouts on pedestrian and cyclist treatments in work zones than in previous editions.
- 1.2 There appears to be more latitude regarding the use of PDOs, as in some respects it's left up to the road authority. However, this appears to be offset by what reads like an absolute requirement on p. 199, which says that a PDO "must be used to control traffic within 30 m of an intersection with operating traffic control signals." The next sentence follows immediately, which says "If traffic does not need to be controlled at the intersection, however, paid duty officers are not required." Our interpretation is that a PDO must be used within 30 m of a signalized intersection where the signal operation has been overridden, and many layouts can be implemented without a PDO even where the traffic signals are operating. (Note: the following response was received from MTO: "Some traffic management plans can operate effectively without PDOs.")
- 1.3 There was initial concern that implementation of the 2022 Book 7, as stated by MTO, was effective as of the date of release. It would seem more appropriate to permit a phase-in period, after which the 2022 Book 7 would have to be applied. This would permit training to take place, and would give stakeholders a chance to modify or purchase equipment and traffic control devices.

MTO's first response was that they have been providing the following information about implementation: *"The newly released updated OTM Book 7 is available for use effective immediately. We are suggesting that on a go forward basis, contractors working on MTO projects (maintenance and construction) begin to use the guidance and layouts in the updated Book 7. It is suggested that you discuss and document any decisions regarding the implementation with your MTO contact. For work undertaken for municipalities, please consult with the appropriate road authority for direction on how to proceed with the implementation of the updated manual."*

Fortunately, a subsequent statement by MTO on June 21, 2022 has revised that immediate implementation date to December 16, 2022, and clarifies that the 2014 Book 7 may be used until that date.

2. Major Issues of Concern with the 2022 Book7 Office Edition

- 2.1 Requirement for the same WZ component dimensions for Short Duration as for Long Duration. This is a major departure from the previous Book 7 editions. In addition, some of the LD dimensions have also been increased. This is undesirable for the following reasons:
- a. Many people simply won't implement the longer SD dimensions. It's been hard enough getting them to implement the shorter SD dimensions.
 - b. SD signs will tend to be left in place overnight even when no work is occurring. The definition of SD states that it must be attended by workers during the closure.
 - c. Failure to comply with the 2022 SD requirements puts workers and road authorities at an increased liability risk.
 - d. Having to put up so many extra devices at longer distances extends the duration of the work to longer than it need/should be, and also increases worker exposure and hazard in installing and removing more devices.
 - e. We are unaware of any collision experience that suggests that SD and LD WZ dimensions should be the same. If we are to do a proper job of training, we need to know the rationale for the changes.
 - f. Our proposal would be to combine Mobile, ID, VSD and SD in the original 2001/2014 Table A, and LD in the original 2001/2014 Table B.
- 2.2 Table A dimensions are much longer than they were in 2014. In some cases, the corresponding dimensions in the 2022 Table A are 3-4 times as long as in 2014. In our view, this is an unworkable change. This often won't be done, leading to many of the same problems as in 2.1.
- 2.3 The new numbering system for layouts, with 17 categories, is messy and confusing, despite colour coding, although its intent is to make things clearer. This numbering system has two unfortunate consequences:
- a. It increases the risk of error, of someone getting the layout number right, but not the two-letter prefix, somehow confusing those either in the field, or when typing the number in the office.
 - b. It drastically increases the number of layouts in the Book, from 83 in 2014 to 225 in 2022. These include a lot of repetition or near-duplication. It also will drastically increase the size of the Field Edition, less convenient as a pocket-size edition as before. Previous editions combined several work durations and road types on a single typical layout, with the variations outlined in the notes or on the diagram. This was both effective and efficient.
- 2.4 Section 1.3 should address Competent Persons as well as Competent Workers, and should say that the Traffic Protection Plan (TPP) should be prepared by a Competent Person or delegated to a Competent Worker, with the Competent Person retaining responsibility for the plan. Note, however, that MLTSD places the primary responsibility for the TPP with the employer.
- 2.5 page 4 lists only three classes of Book 7 users. There are many others that should be identified, some of the most important being: signallers, the

workers in the WZ, buffer vehicle drivers, contract administrators, inspectors, to name a few.

- 2.6 p 20: A TPP is required for any work on the road, not just construction, even though the requirement is defined in the construction regulation, unless MLTSD has changed its policy (e.g., water workers, line painting, arborists, surveyors, etc).
- 2.7 pp 33, 34 state that an LBA is not required on most two-lane road situations (those controlled by TCPs, AFADs & signals), yet shows the LBA on many of the two-lane road layouts. Our view is that the LBA is not required on two-lane roads. The TCP work zone dimensions in the 2014 Book 7 were much too long in many cases. We suggest returning to the 2001 Book TCP work zone dimensions., or deleting the requirement for an LBA at the higher speeds on two-lane roads.
- 2.8 p 125: Can fines really be doubled in a construction zone even if there are no signs to that effect? That doesn't sound fair. (MTO has confirmed that this interpretation is correct, and the signs are not required for enforcement.) This would mean that drivers in a construction work zone with regulatory speed limit signs (normal or reduced) could face doubled fines at all times.
- 2.9 pp 156, 157, and many of the layouts throughout Book 7: There is inconsistent application of TC-12 flashing arrow boards, as to when the arrow and when the bar should be shown. See more detailed comments below in the section on Layouts.
- 2.10 Figure 4.7 is no longer valid (it was copied over from the 2014 Book 7) but does not correspond to the TCP position descriptions in 2022.
- 2.11 p 180 and the new AFAD regulation: both state that two TCPs need to be used with AFADs, one at each end, so as to be able to use the Stop/Slow Paddle in case the AFAD malfunctions. As a result, one would expect AFADs to get little use if 2 TCPs are always required (known cost for TCPs plus added rental cost for the AFADs). Previously, one TCP could control two AFADs if the work area was short in length. MTO's position is that the use of AFADs is a measure for safety (taking the TCP off the road), not for efficiency.
- 2.12 p 202: Use of Yield to Oncoming Traffic Sign. Note 2: To use this sign, three conditions need to be satisfied, but the note lists only two: low traffic volume and short length work zones. The note should add the third condition: and with good visibility (sight distance). All three conditions are listed on Layout TS-18, note iv, but for consistency, it would be good to show it also on p 202.
- 2.13 p 205: Book 7 appears to accept trailer-mounted TMAs, but puts no requirements on their design or application, but treats them like a truck-mounted TMA. These are usually attached to a truck by a pintle hook, and so if struck have the risk of spinning out of control. If they are to be accepted (and we are not in favour of them), then some specs need to be developed

(including anti-rotation devices) and MLTSD needs to update their regulation, which now accepts only truck-mounted TMAs. Their inspectors have been known to reject trailer-mounted TMAs.

2.14 p 240, Table A, note 5: This says that cones with reflective collars may be used for daytime or nighttime operations on non-freeways. This is in conflict with Table E. While the statement is true for two-lane roads, the use of cones on multi-lane non-freeways is permitted only where the normal posted regulatory speed is 70 km/h or lower.

2.15 p. 242, Table C: the LBA for 110 km/h should be 120 m, not 110 m.

Other Issues of Concern with the 2022 Book 7 Office Edition

We have identified numerous other issues with the 2022 Book 7. These include inconsistencies, conflicts, factual and application errors, grammatical errors and English stylistic errors, as outlined below:

General Comments

1. The original intent in the OTM was to make each Book largely stand-alone, with the main requirements described in each Book, rather than to make readers refer to other Books for needed information. It is suggested that too often in Book 7, readers are referred to other OTM Books and other documents for necessary information, such as Books 5, 6, 11, 12 and 18, to name a few.
2. On p 128, it would be helpful to explain the ruling by the Ontario Land Tribunal on a highway closure, and the extent to which this ruling has the force of law and affects the application of Book 7.

Errors, Omissions and/or Inconsistencies

1. P v, Table of Contents, and in the Book: Section 3.3.7 Rolling Closures, does not belong in Section 3.3. Its proper location is in Section 4.4.4.3, where it is also shown.
2. P vii, Table of Contents, and in the Book, Decision Matrix for Use of Devices: See comment 7 below.
3. P xvii, Signs and Devices: The Share Use Lane Single File sign is appropriately given a TC number (TC-102) and is shown in orange. However, on the Layouts using this sign, it is given a Warning Sign designation Wc-24, and is incorrectly shown in yellow.
4. P xviii, Signs and Devices, Wb-1A: In a work zone, the Yield Ahead Sign should be orange rather than yellow.
5. P 1, Introduction: Why is Book 3 Sign Installation not included in the list, although it is noted elsewhere (p 81)?
6. P 4, Section 1.2, top of page; reference to slowing upstream traffic should be to pace vehicles, not rolling closures.
7. Pp 29, 30: Again, Sec 3.3.7 should be removed from this section, since it is more appropriately and comprehensively addressed in Sec 4.4.4.3.
8. P 36, side Note: We suggest that this important information on how to estimate daily traffic volume be included in the main text of Book 7 and not just in a side Note.
9. P 38, Sec 3.5.1 Mobile Operations: The information on Devices Required seems vague: What does "where volume and/or speeds are higher" mean? Higher than what?

10. P 39, top bullet point: Should clarify whether rotating amber LED lights also need to complete a full rotation every 1.5 seconds. Also, do rotating amber LED lights replace only the rotating 360 beacon, or both the 360 beacon and the 4WF?
11. P 40, Sec 3.5.3, VSD: Definition paragraph: We suggest that the third sentence should read, "If a short stop is required at a specific location, it is ID or VSD work rather than a Mobile Operation."
12. P 41, Sec 3.5.5, LD Work: Devices: Since LD can be as short as two days, this section should clarify after how many days pavement markings should be removed and replaced with temporary markings. To require this, as the text suggests, after as little as a day seems unreasonable.
13. P 42, second last bullet point: Some clarification is desirable, as to why VMSs should not be used for one lane of a multi-lane highway. It would seem that drivers in both lanes would see the message and react accordingly. Is there empirical evidence that if used for more than one lane, speed variance is increased? Also, is this intended to apply to, say, the one open lane on a multi-lane highway?
14. P 44, Sec 3.6.1, first sentence after three numbered basic principles: we suggest that this should read: "Improving highway user safety also improves worker safety since traffic crashes or confused drivers often put workers at risk." (addition underlined).
15. P 46, Under Method column at top: we suggest that clarity would be improved by the following wording: "Used for temporary worker safety, only to be used when workers present in a designated construction zone." (addition added)
16. P 47, Table 3.9 (continued): we suggest adding to examples in middle column: "where pavement markings are in poor condition."
17. P 58, Sec 3.8.1, Night-time Provisions: we suggest that point 1 should read: "...that meet the *Occupational Health and Safety Act (OHSA)* and CSA Z96 requirements for night-time work...."
18. P 59, top bullet point 2, should probably include rotating amber LED lights, since these are indicated previously as being acceptable.
19. P 59, bullet point 7(b): this is a carryover from the 2014 Book 7, which is no longer valid since SD taper lengths now = LD taper lengths.
20. P 67, The note under Figure 4.3 is a repetition of the content in Figure 4.3
21. P 69, Traffic cones: Labelling the three devices would be helpful, TC-51A, TC-51B and TC-51C.
22. P 74, second of three bullet points: states that temporary pavement markings must be maintained in both LD and SD work zones on freeways where traffic is diverted from its normal path. Layouts FS-3 and FS-4 depict freeway situations where traffic is diverted from its normal path. Both of these layouts are designated as LD. Where would the SD situation arise, and would it even be feasible for a period as short as a day?
23. P 74, General Specifications: Reference is made to OTM Book 11. It would be helpful to include in Book 7 the main points from Book 11 on this topic, rather than require users to also obtain Book 11.
24. P 80, last paragraph, Roll-up signs: The reference to ASTM Type VI specifications does not appear consistent with the other requirement to conform to the retro-reflectivity levels specified in Table 4.3, where only two levels are specified: Type III/IV or Type VII minimum.
25. P 83, "As of January 1, 2022, newly installed temporary condition signs must meet the minimum reflectivity levels stated in OTM Book 7." The book wasn't released until nearly 5 months after this date, will a revised date be published so that organizations have the time to comply? It doesn't seem fair to make a requirement like this retroactive.

26. P 85, Figure 4.4, Typical Sign Placement: This figure carried over from the 2014 Book 7 the erroneous orientation of the two top signs. The two top sign images, for horizontal distance from edge of roadway, should be diamond-shaped, not square.
27. P 86, last two bullet points, page 87, and possibly elsewhere: reference should not be to signs 1200 mm in width, but rather, 1200 mm per side, or 1200 mm x 1200 mm. The width of a diamond-shaped sign would be the diagonal, not the edge length.
28. P 87, Portable Stands. This section states that the TC-2A is only for SD work. This is also shown on p 89, where the TC-2A and TC-2B are described. If this is the intent, it seems inconsistent on Layout US-10 (and possibly others), which is LD, to suggest that either the TC-2A or TC-2B may be used.
29. P 87, last bullet point: Is there a reason for stipulating 'small stone' for the ballast rather than 'sand'? Also, last sentence on page: we suggest that this should read, "For permanent intermediate or large sign supports refer to OTM Book 3."
30. P 88, Why would the TC-1 signs be used for SD?
31. Pp 88,89: Why are the last three bullet points on p 88 and the first one on p 89 repeated on p 89?
32. P 89, last sentence, should read: "The ROAD WORK sign informs g highway users..." (addition underlined).
33. P 91: TC-3L or TC-3R: second bullet point states: "When more than one lane is closed a TC-3 must be installed in advance of each lane closure." Should this then not be shown on Layouts US-21 and US-22, for example? (There may be others).
34. P 92, TC-3 Lane Closed Tab signs: The nomenclature is confused. Above the image, the tab is called TC-3tA, whereas in bullet point 1 under Conditions it is called TC-3t (which we believe is correct). This should also be used in bullet point 2. Under Size, the first bullet point should read: "TC-3Lt, TC-3Ct and TC-3Rt 600 mm x 600 mm" (not TC-3_t – 600 mm x 600 mm). The second bullet point should read "TC-3t" (not TC3tA).
35. P 93, TC-4 Lane Closure Arrows: Conditions, bullet point 2 states "The TC-4 must not be placed where it will direct vehicles into a lane with opposing traffic flow." But this is not consistent with TS-14, 15, 16, 19 and 20, where exactly that is shown. Also, bullet point 3 should read "On multi-lane roads, freeways, the TC-4 sign must be used...."
36. P 95, TC-7 and two tabs, Conditions: bullet point 3, the first sub-bullet is appropriate. The second sub-bullet should be prefaced with bullet point 4, to read: "A TC-7tB tab sign should be used as a separate tab when"
37. P 108, STOP/SLOW Paddle, reflectivity information under image: Type VII sheeting is correct for both sides, but the description for the STOP side should also say high reflectivity micro-prismatic fluorescent, not high intensity, as shown in Table 4.3.
38. P 115, Low clearance signs: bullet point 2 says that if the low clearance is permanent or semi-permanent, the Wa-26 and Wa-27 signs should be used (Warning signs, not temporary conditions signs). This same distinction should be made in Layouts TS-13 and TS-18, where the Yield Ahead sign should be black and orange (TC), not black and yellow (Wb-1A).
39. P 119, Pedestrian signs, Condition 1 states that the sign must be placed at locations that clearly mark the alternate pathway at all pedestrian decision points. This principle should therefore be followed in the Layouts, e.g., TI-17, UI-28, UI-29, DI-28, DI-29.
40. P 121, Share the Road signs, TC-102, Share Use Lane Single File is appropriately shown here as black and orange. This sign should be used on layouts such as TI-18, rather than the Wc-24 and Wc-24t signs, which are shown as black and yellow (permanent warning signs). The same applies to layouts UI-30 and DI-30.
41. P 124, TC-25 L and TC-25R. These are called Lane Designation Direction signs. Why is the Book 5 terminology not used "Keep Left" or "Keep Right?" These are not actually lane designation signs. It is noted that the regulatory Keep Right and Keep Left signs

- (Rb-25R and Rb-24L are included in Book 7 on p 130. Why are the TC signs not given the same name?
42. P 126, Rb-91 YIELD TO ONCOMING TRAFFIC and YIELD AHEAD sign: The YIELD AHEAD sign should be black and orange, with a TC designation, rather than the Wb-1A for a permanent yield situation, which is black and yellow. This thinking seems to have been carried over onto p 127. See point 37. Also, the reflectivity level is shown as Type IX/Xi. Is this really intended? If so, shouldn't this sign be shown in Table 4.3 in a category all its own? Why would it have to be higher than Type VII?
 43. P 156, Stationary Operations, bullet point 3: we suggest adding at the end, "on the shoulder at the start of the taper."
 44. P 156, Mobile Operations: bullet points 2 and 3: we suggest that in mobile operations on multi-lane highways, all vehicle-mounted TC-12s should be in flashing arrow mode, including the work vehicle, because there are no markers keeping vehicles out of the LIDG or other gap between vehicles, and because the arrow is useful in directing all traffic to the open lane. This seems to have been carried over from the 2014 Book 7, but the 2016 Book 7 Errata Document corrected this, e.g., see TL-22.
 45. P 160, Condition, where DSDs should not be used, bullet point 3. The text says DSDs should not be used for one lane of a multi-lane highway. Why not? This would appear to preclude their use on a four-lane highway where two lanes are reduced to one lane for a work zone. This does not seem correct.
 46. P 162, Sec 4.2.11.8, Queue-End Warning, bullet point 3: We suggest that this should read: "Queues are expected to build upstream of the approach area." (Why would one put a queue-end warning sign when queues are not expected?)
 47. P 162, Queue-End Warning, Figures 4.5 and 4.6 show two-lane road situations. It would be useful to point out that queues can also form at bottlenecks on multi-lane roads, where a TCP should not be used. Also, see point 34 above. On both of these figures, a TC-4 is used to direct traffic into an opposing lane, contrary to the guideline on p 93.
 48. P 170, Table 4.5, it's good to see this table in Book 7. However, we suggest that in the last row, under Roadway, it should say, "To permit work vehicles to enter or cross non-freeways" (addition underlined). This would make it more consistent with the tables in previous editions of Book 7.
 49. P 172, Clothing: This section lists the requirements for TCP clothing found in OSHA Ret 213/91, Section 69.1, and then makes reference to CSA Standard Z96. Since MLTSD accepts Z96 provisions, it would be more helpful to qualify the provisions listed above in accordance with that:
 - a. The garment shall be fluorescent blaze or international orange in colour, or fluorescent strong yellow-green (chartreuse) or fluorescent red. (addition underlined)
 - b. Bullet point 2 should read "On the front and back, there shall be two stripes that are 5 centimetres wide, at least 500 square centimetres on the front and at least 570 square centimetres on the back. The colour of the stripes may be yellow, or a wide yellow stripe with a silver stripe down the middle, or a wide orange stripe with a silver stripe down the middle (on a strong yellow-green garment), or silver only.
 - c. Bullet points 3 and 4 are OK.
 - d. Bullet point 5 should read: "If the garment is a vest, it shall have adjustable fit, and if it is a nylon vest, it shall also have a side and front tear-away feature." (addition underlined).
 50. P 173, Figure 4.7. This figure was carried over from the 2014 Book 7 and is no longer valid. The described distance should say, 10 m + Taper (See TCP Table).

51. P 175: TCP Positioning: bottom bullet points, bullet point 5, should read, "Stand just outside the lane of traffic until the first vehicle has stopped." (addition underlined).
52. P 176, Figure 4.8: On the Curve diagram, the rightmost dimension should extend from the work area to TCP 3. On the Hill diagram, the work area on the plan and elevation depictions should be aligned.
53. P 179, AFAD Design, para 3: The text here states that the gate arm shall be covered on both sides with alternating vertical strips of orange and black retroreflective sheeting. Actually, HTA Regulation 185/22 states that the requirement for alternating orange and black strips comes into effect on January 1, 2027. Until then, the requirement is only that the alternating strips be of contrasting colours (e.g., red and white or yellow and blue). Note also that the requirement in the regulation is that the orange strips be retroreflective. Black is not retroreflective.
54. Pp 180 & 183: Why are the required visibility distances not the same for AFADs and PLCs? (165 m for AFADs and 110-200 m, varying with speed, for PLCs in Table 4.7? Also, on p183, how does the minimum visibility requirement of 100 m relate to the values shown in Table 4.7? Also, in Figure 4.9, the three lenses and the backboard form the signal head. The signal head is not the green lens, as shown.
55. P 184, PTTs, last bullet points: "Other traffic control devices required to supplement PTTs include:" Which specific devices are required? This seems too general, and will end up with nonstandard devices in strange locations.
56. P 186, General Hardware Requirements for PTTs,, bullet point 5, requirement for PTTs to be protected by barriers appears to be a new requirement and seems excessive for ID, VSD or SD work. Why is this now a requirement, or is this an error?
57. P 193, Sec 4.4.4, bullet point 3, we suggest that this should read: "...to hold back (restrain) all upstream traffic at a lower pace or bring them to a complete halt, if necessary, to create a gap..."
58. P 198, Rolling closures, bullet point 5, insert missing word, "...and at the work area itself, must be in good communication...."
59. P 199: Sec, 4.4.5 Paid Duty Police Officers: See point 1.2 above.
60. P 201, Table 4.10: There is much in Table 4.10 that is in conflict with Table G (Decision Matrix Layouts) and with the layouts themselves. No signal system application (AFAD, PLC, PTT or TTS) can be used in ID or VSD work, because there isn't enough time to set them up and take them down. TS-19 shows that an AFAD is applicable only for SD and LD, yet it is shown in the top part of Table 4.10 as suitable for all other durations, but not LD. Note 6 says that TCPs may not be used to extend SD operations beyond one day where the NPRS is between 60 and 90 km/h, but this restriction does not apply where the NPRS is lower than or equal to 60. We suggest that note 6 should be removed, as this would appear to conflict with Sec 3.5.4.
61. P 203, 204, Table 4.11: Several table cells say "Road Authority has discretion." Discretion to do what?
62. P 205, Sec 4.5.1, second last bullet point, should read "If a BV is used on a non-freeway, the appropriate LBA and LIDG are required for stationary operations."
63. P 206, fourth bullet point: MASH TL-3 and NCHRP 350 TL-3 are essentially equivalent, referring to 100 km/h. Why does this bullet point say either MASH TL-3 or NCHRP 350 TL-2? This is confusing.
64. P 207: last full para: we suggest the following addition: "...should provide the driver with sufficient braking distance to come to a complete halt, as illustrated..."
65. Photos of the systems described in Secs 4.5.3 to 4.5.7 would be helpful.
66. P 226: Figure 5.1, Freeway Closure of Single Right or Left Lane (with Shoulders), In Steps A, B, C and D: all TC-12s should be shown as left flashing arrows, as in 2001 and 2014.

67. P 228, Figure 5.2: Freeway Closure of Two Right or Left Lanes (with Shoulders). In Step B, we believe that the TC-12 on the sign truck should be in left-flashing mode, as this is the lead vehicle in a mobile operation. The rest of Figure 5.2 looks good.
68. P 231, Figure 5.3, Freeway Closure of Two Right or Left Lanes (No Shoulder on Roadway Side where Lanes are being closed). In Steps B and D, we believe that the TC-12s on both crash trucks should be in right-flashing arrow mode, as they are both in a mobile operation. In Step B, we believe that the TC-12 on the sign truck should also be in right-flashing arrow mode, for the same reason. In Step C, we believe that all three TC-12s should be in right-flashing arrow mode, as in 2014. In Steps D and E, there should be a trailer-mounted TC-12 in right-flashing arrow mode at the end of the first taper, and the TC-12 on the crash truck immediately downstream should be in bar mode. The description for Steps D and E should be modified accordingly.
69. P 233, Figure 5.4, Removal of Single Right or Left Lane Closure (Freeway with Shoulders). In Step C, the top TC-12, shown as truck-mounted, appears to be trailer-mounted and should be so labelled..
70. P 234, Figure 5.5, Removal of Two Right or Two Left Lane Closure (Freeway with Shoulders). In Steps A and B, the TC-12 on the crash truck is at the front of the vehicle (should be at the rear), and should be in left-flashing arrow mode. In Step C, the TC-12 on the crash truck should be in left-flashing arrow mode.
71. P 236, Figure 5.6, Removal of Two Right or Two Left Lane Closure (No Shoulder on Roadway Side where Lanes are being Closed). Steps A and B should have started with a right-flashing arrow board trailer at the end of the first taper, and a CT#1 with a TC-12 in bar mode. The description in Sec 5.2.2.3 and Steps A, B, C and D should be modified accordingly. Also: (a) Step A text says the CT2 TC-12 should be in flashing arrow mode (correct), but Figure 5.6, Step A shows it in bar mode; (b) In Fig 5.6 Step B, the barrels still extend almost to the north end, which doesn't seem to match the Step B text; (c) all TC-12s in Steps C and D should be in right-flashing arrow mode; (d) Step C text should add that CT#1 reverses to the TC-12 at the end of the first taper, where CT#1 would attach the TC-12 trailer. The TC-12 on the trailer would be switched off and the TC-12 on CT#1 would be switched to right-flashing arrow. (e) Step D text should note that CT#1 moves off, towing the TC-12 trailer.
72. P 237, Sec 5.2.3, Freeway Zone Painting, bullet points 3 and 4: these gaps between CTs are very long, and are much too long to deter lateral intrusions. Their main purpose seems to be to try to keep traffic off the freshly painted lines. If that is the purpose, then sign trucks with flashing arrow boards would be just as effective, at less cost. If it is desired to use additional CTs 1 and 2 to deter lateral intrusions, then the spacings should be LIDG in each case, rather than 100-300-600 m.
73. Pp 240, 241, Tables A & B: See note 2.1 above.
74. P 242, Table C, note 5 states that cones with reflective collars may be used for daytime ID, VSD or SD operations only. This is in direct conflict with application guidelines in Table E, which state that barrels must be used for all freeway work.

Table G (Decision Matrix Layouts) and Layouts themselves

1. P 258, layout TG-2: On a two-lane road, why is the NPRS shown as 100 km/h and the reduced speed as 80 km/h. Shouldn't these be 80 and 60 km/h respectively? The label on the right should read, "Reduced Speed Zone," not "Reduce Speed Zone."
2. P 248 (Table G) and p 260 (TS-2): It is confusing to have Intermittent Work appear both as a row in the table and as a column. TS-2 is labelled Intermittent Work, but the bolded duration at the top says it's VSD. It should be one or the other, and ID is covered in TS-1. We suggest that it's the row in Table G that's confusing, as well as the larger category

- on the left, called “Shoulder/Intermittent.” The title should just be “Shoulder Work”, and let the duration look after itself in the appropriate column. Further, in TS-2, the grey area should not be called Intermittent Work Area if it’s VSD. It should just be called Work Area. The title on TS-1 and TS-2 would better be called “Shoulder/Roadway Work.”
3. P 248 (Table G) and p 261 (TS-3): The same comments apply as in (2). Again, TS-3 is labelled Intermittent Work, but the bolded duration at the top says it’s SD. If the row in Table G were properly called “Shoulder/Roadway Work,” as well as the TS-2 and TS-3 titles on the layout page, the duration columns would be appropriate.
 4. P 263 (TS-5), Shoulder Work: Note iii says that a work vehicle with a TC-12 may replace Markers for SD work. General Note #4 suggests that where a vehicle with 360/4WF or TC-12 is present, markers are not required, but only as shown on the Layouts. The question here is why is the flashing device restricted to a TC-12? Why wouldn’t a 360/4WF combination also replace the need for markers.? If one compares TS-5 (Shoulder Work) with TS-6 (Lane Encroachment), TS-6 is more intrusive onto the road than TS-5. In TS-6 360/4WF or TC-12 is acceptable, but in TS-5, only the TC-12 is acceptable to replace markers. This does not make sense. TS-2 also permits use of 360/4WF to replace markers. Also, in TS-5, why is an LBA required? Previously, these were not required for non-freeway shoulder work.
 5. P 265 (TS-7), Lane Encroachment, SD & LD. Note iv: We suggest referring users to TS-18 (Yield to Oncoming Traffic, Rb-91 SD & LD). Also, note iv states that the Rb-91 should be positioned a distance F upstream of the start of the taper. This is much too long. TS-18 shows it as 5 m upstream of the start of the taper, which is much more appropriate. Again, in note vi, a vehicle with 360/4WF should permit replacement of markers, not just the TC-12.
 6. P 248 (Table G) and p 266 (TS-8), Partial Lane Shift, SD & LD: The descriptor in Table G should say “ Partial Lane Shift,” not “Parking Lane Shift.” We suggest adding the additional descriptor, either “No Parking Lane” or “Narrow Platform,” to distinguish it from TS-9. The addition of the Narrow Lanes sign and the LBA (neither of which was required in 2014), in combination with the much longer dimensions in Table B, make for a very long work zone, unnecessarily so in our view.
 7. P 267 (TS-9), Partial Lane Shift, Wide Platform, SD & LD: If a shoulder taper of ½ A is acceptable here, why is it not also acceptable in TS-8? If the Narrow Lanes sign is not required on TS-9, why is it required on TS-8? Again, we question the need for an LBA.
 8. P 248 (Table G) and p 269 (TS-11), Zone Painting, Mobile: The descriptor of TS-11 in Table G should match the title on TS-11 (“Zone Painting,” not “Zoning Painting”). Also, under Buffer Vehicle, it states that the BV must be a CT if NPRS is 80 km/h or higher, and a BT if NPRS is lower than 80 km/h. In Sec 4.5.1 (p 205), it states that a CT should be used where the NPRS is 70 km/h or higher, on multi-lane roads. Why isn’t the breakpoint in TS-11 the same, at 70 km/h?
 9. P 270 (TS-12), Lane Closed or Occupied, Mobile Operations: Why does the note reference Table A when no work zone dimensions are shown?
 10. P 271 (TS-13), Lane Closed or Occupied (Yield to Oncoming Traffic) (Low Volume Roads), Intermittent Duration: The Wb-1A Yield Sign Ahead sign is yellow (a Book 6 Warning sign), and should be orange, for a work zone. It is suggested that a note (vii) should be added, stating that the Rb-91 mounted on the rear of the vehicle should only be displayed when the vehicle is stationary, and should be covered or folded over or rolled up when the vehicle is in motion. A further note (viii) might add that for pothole patching, the WV may have to be in or downstream of the work area. Also, where a hot mix trailer is towed by the work vehicle, the Rb-91 may have to be mounted on the trailer rather than on the truck.

11. Pp 272 & 273 (TS-14 and TS-15), Lane Closed or Occupied (Traffic Control Persons). TS-14 is for VSD and TS-15 for SD. In 2001 and 2014, the same TL applied to VSD and SD work. But now, in addition to the extra traffic control devices in TS-15, the WZ dimensions, being SD, (Table B) are much longer than for VSD (Table A). Now, for work extending for 45 minutes to an hour, we expect that people will be tempted to use TS-14 rather than TS-15, bringing them into non-compliance with Book 7.
12. P 274 (TS-16): Lane Closed (PLCS), SD: There appears to be some confusion on this layout. Is it intended to apply to both PLCS and PTTS? If yes, the layout title should state this. If no, then note ii, which states that PLCSs may be used on roads with NPRS of 90 km/h or lower is in conflict with p 182, which states that PLCSs may only be used up to a NPRS of 60 km/h. Also, there appears to be no layout that refers to how TTSS are to be applied. Should TS-16 also apply to TTSS? If so, the layout title should state this. If not, then which layout should be applied? Also, why is the Rb-31 required at all NPRSs, while in TS-15 it is required only where the NPRS is 70 km/h or higher?
13. P 275 (TS-17): Lane Closed (Yield to Oncoming Traffic) (Low Volume Roads), VSD; Again, the Yield Ahead sign should be orange rather than yellow, and should be included in the section on sign descriptions. Why is the taper A so much longer than the taper used with TCPs? Why is the YTOT sign positioned 5 m in advance of the taper, while the TCP is positioned 10 m in advance of the taper? (However, this is an improvement over 2014 where the YTOT sign was positioned at the start of the work area, at the end of the taper.)
14. P 276 (TS-18): Lane Closed (Yield to Oncoming Traffic) (Low Volume Roads), SD & LD: See comments in (12).
15. P 277 (TS-19): Lane Closed (AFAD), SD & LD: Why is the taper A so much longer than the taper used with TCPs? Why is the AFAD positioned 10-20 m in advance of the taper, while the TCP is positioned 10 m in advance of the taper? See comment 2.11 above. Note i should read, "AFADs shall not be operated unless TCPs are positioned close enough to enable them to display..." The two unnumbered notes say much the same thing. Why is there any mention of Table A when this layout is for SD and LD, not ID or VSD? Why is there any mention of Table A or Table B when the work zone dimensions are shown at the bottom of the layout? There is an error in Table G for TS-19. Table G shows it as being applicable for ID, VSD, SD and LD. It should show only SD & LD. Why is the Rb-31 sign required at all NPRSs, while in TS-15 it is required only where the NPRS is 70 km/h or higher?
16. P 278 (TS-20): Lane Closed (TCPs), SD & LD: Is the Rb-31 required at all NPRSs? In keeping with other layouts, the TC-1 signs should be labelled as required only for LD. Surely they are not required for SD? There is no need for the unnumbered note. There is an error in Table G for TS-20. Table G shows it as being applicable for LD only. It should show both SD & LD. Why is the Rb-31 sign required at all NPRSs, while in TS-15 it is required only where the NPRS is 70 km/h or higher?
17. P 280 (TS-22): Detour Signs and Devices, SD & LD. There is an error in Table G. TS-22 should be shown as SD & LD, not LD only.
18. P 281 (TS-23), SD & LD. As noted above, on p 119, Pedestrian signs, Condition 1 states that the pedestrian sign must be placed at locations that clearly mark the alternate pathway at all pedestrian decision points. This principle should therefore be followed in the Layouts, such as on TS-23 (unless the return route to the original path is obvious).
19. P 282 (TS-24): Bicycle Lane Diversion: Bicycle Lane Shift, SD. The unnumbered note appears unnecessary, since work zone dimensions are shown at the bottom of the page.
20. P 283 (TS-25): Bicycle Lane Diversion: Bicycle Lane Shift, LD. TS-24 and TS-25 could have been combined into a single layout, with the addition of the TC-1 for LD on TS-24.

The unnumbered note appears unnecessary. In TS-25, markers should be shown on the shifted centreline for the two shifted vehicle lanes.

21. P 284 (TS-26): Bicycle Lane Diversion: Bicycle Path, SD & LD. The TC-1 should be labelled as LD, otherwise it becomes necessary for SD also. The unnumbered note is unnecessary. Why is the first northbound ½ A shown, since there is no taper there?
22. P 285 (TS-27): Bicycle Lane Diversion: Single File, SD & LD. The second unnumbered note is unnecessary. The single file sign should be orange, not yellow (TC-102).
23. P 286 (TI-1): Intermittent Work: Intersection, ID. The last unnumbered note appears unnecessary, since no Table A WZ components are required.
24. P 287 (TI-2): Intermittent Work: Intersection, VSD, and p 288 (TI-3), SD. As noted before, this is confusing. If this is VSD or SD work, it should not be called Intermittent Work or labelled as such in Table G. We suggest that the entries in Table G should be on three lines, respectively Intersection Work: Intermittent; Intersection Work, VSD; and Intersection Work SD, matching TI-1, TI-2 and TI-3. The diagrams on layouts TI-2 and TI-3 should be labelled "Work Area," not "intermittent Work Area."
25. P 289 (TI-4): Zone Painting: Intersection Turn Arrows, VSD. The same title should be used in Table G (not Zoning Painting). The unnumbered note is unnecessary. This is true of many of the layouts, since the Table A or B dimensions are shown at the bottom of the page.
26. P 290 (TI-5): Zone Painting: Intersection Turn Arrows. SD. TI-4 and TI-5 could easily have been combined, noting that the TC-2s are required for SD.
27. Pp 291 & 292 (TI-6 and TI-7) Zone painting Intersection Stoplines and Crosswalks, VSD and SD: The same title should be used in Table G (Zone Painting, not Zoning Painting); these two layouts could have been combined, with the TC-2s indicated as being required for SD work.
28. P 295 (TI-10) Intersection: Far-Side Lane Closed (TCPs): note i should use the terminology AFAD rather than the older terminology Remote Control Device. This change should also be made to note i on TS-11 on p 296.
29. Pp 297 & 298 (TI-12 and TI-13): We suggest that a note ii be added, noting the need for all four TCPs to coordinate and communicate their actions. The layout title should be Work in Intersection (TCPs).
30. P 299 (TI-14) Intersection Far-Side Lane Closed (Detour), SD & LD. The ROAD CLOSED tab sign (should be TC-7tA, not TC-7TA) is identified, but not shown. Ideally, it should be shown beneath the TC-7 sign, but it is not essential.
31. P 300 (TI-15) Work in Intersection: Near-Side Lane Closed (Detour). We suggest that the eastbound sign on the west approach should be NO STRAIGHT THROUGH OR LEFT TURN (Rb-14), not NO STRAIGHT THROUGH (Rb-10).
32. P 248, Table G. There is an error in Table G. TS-15 should be shown as SD & LD, not LD only.
33. P 301 (TI-16) Pedestrian Detour Crosswalk Closure, SD & LD. As noted above, on p 119, Pedestrian signs, Condition 1 states that the pedestrian sign must be placed at locations that clearly mark the alternate pathway at all pedestrian decision points. This principle should therefore be followed in the Layouts, such as on TI-16 (unless the return route to the original path is obvious). This also applies to p 302, (TI-17) Pedestrian Detour: Crosswalk and Sidewalk Closure.
34. P 303 (TI-18) Cyclist Detour, SD & LD. The single file signs and tabs should be orange (TC-102), not yellow (Wc-24).
35. P 305 (TO-1): Roundabout: Encroachment, VSD, and p 306 (TO-2): Roundabout: Encroachment, SD & LD. Since we don't have high-speed roundabouts in Ontario, it would seem better to truncate from the table at the bottom of the page the NPRSs of 80

km/h and 90 km/h. This also applies to p 307 (TO-3), and in fact, to all roundabout layouts..

36. P 307 (TO-3): Roundabout: Quadrant Closed (Traffic Control Persons), SD & LD. There appear to be Rb directional signs for driver guidance on the westbound and northbound approaches, but none for the eastbound or southbound drivers. The combination of the Rb-44 and TC-25R signs on the northbound approach and the Rb-43 and TC-25L signs on the westbound approach, if followed as directed, would result in some unrealistic moves, for example, requiring straight-through movements to go around the island at acute angles, rather than make the more obvious straight-through movement. It is unclear why the distance $\frac{1}{2}$ E is shown between the approach tapers. The dimension E is intended where there are two successive tapers in the same direction, not where there is a return taper in the opposite direction.
37. P 308 (TO-4, also DO-9): Roundabout: One Exit Closed (Detour), SD & LD. It seems very strange that a driver entering the roundabout from the north would have to go around the roundabout, following D1, and find himself going out of the roundabout, back the way he came. If that is the intent, it appears that the first sign on the north approach should be a TC-10 with the TC-ALr sign beneath it. Perhaps he should be given a D-2 sign taking him off to the west, and not go around the roundabout. Further, it appears that the last sign on the west approach should be a TC-10, with the TC-ALr sign underneath, since drivers on this approach cannot proceed straight through. Also, why do only two of the approaches have "exit closed" signage?
38. Pp 312 and 313 (US-2 and US-3): Similar comments to those in note 2 above apply. It is confusing to have Intermittent Work appear both as a row in the table and as a column. US-2 is labelled Intermittent Work, but the bolded duration at the top says it's VSD. It should be one or the other, and ID is covered in US-1. We suggest that it's the row in Table G that's confusing, as well as the larger category on the left, called "Shoulder/Intermittent." The title should just be "Shoulder Work", and let the duration look after itself in the appropriate column. Further, in US-2, the grey area should not be called Intermittent Work Area if it's VSD. It should just be called Work Area. The title on US-1 and US-2 and US-3 would better be called "Shoulder/Roadway Work."
39. P 315 (US-5): Shoulder Work, SD & LD. Note iii says that a work vehicle with a TC-12 may replace Markers for SD work. General Note #4 suggests that where a vehicle with 360/4WF or TC-12 is present, markers are not required, but only as shown on the Layouts. The question here is why is the flashing device restricted to a TC-12? Why wouldn't a 360/4WF combination also replace the need for markers.? If one compares US-5 (Shoulder Work) with US-6 (Lane Encroachment), US-6 is more intrusive onto the road than US-5. In US-6 360/4WF or TC-12 is acceptable, but in US-5, only the TC-12 is acceptable to replace markers. This does not make sense. US-2 also permits use of 360/4WF to replace markers. Also, in US-5, why is an LBA required? Previously, these were not required for non-freeway shoulder work.
40. Pp 318 (US-8) VSD & 319 (US-9): Parking Lane Closed, SD & LD. We suggest that the TC-4 should be placed at the beginning of the taper, not at the end. It should not be an alternative to the 360/4WF or TC-12, but in addition to it. Why is the LBA required in a parking lane? This adds nothing to the safety of workers, and necessitates the clearing out of additional parking spaces. What is the maximum NPRS where parking lanes are present? Do we really have them on 70 km/h and 80 km/h roads? If not, the tables should be truncated to more realistic NPRSs.
41. P 320 (US-10): Partial Lane Shift: Narrow Lanes, LD. The layout as presented requires the TC-1A and TC-1B signs under all conditions. Is this really required? Why are there no markers to indicate/separate the shifted lanes?

42. P 322 (US-12): Zone Painting: right or Left Lane Closed, Mobile Operations. Because this is Mobile Operations, the TC-12 on all vehicles should be in left flashing arrow mode. The description under Buffer Vehicle specifies a Crash Truck or a Sign Truck. A Sign Truck is not a Buffer Vehicle. The alternative to a CT should be a BT, not a Sign Truck. We suggest that the breakpoint between CT and BT should be 70 km/h rather than 80 km/h. We suggest that the Sign Truck should trail the BV by dimension F rather than dimension A (there is no taper here).
43. P 323 (US-13): Lane Closed or Occupied, MO, ID, VSD. Since US-14 is designated as Left Lane Closed or Occupied, US-13 should be designated as Right Lane Closed or Occupied. The entry in Table G should be changed to "Right Lane Closed or Occupied." The TC-12 on the work vehicle is in left flashing arrow mode, in line with the correction made in the 2016 Errata Document to the 2014 Book 7. The TC-12 on the sign truck should be in left flashing arrow mode for all three durations, MO, ID and VSD. The flashing devices on the work vehicle should be "360/4WF or TC-12", not a requirement for all three. This appears to be a carryover from the 2016 Errata Document to the 2014 Book 7. It's the only layout in Book 7 that requires all three devices.
44. P 324 (US-14): Left Lane Closed or Occupied, MO, ID, VSD. The TC-12s should all be in right flashing arrow mode, for all NPRSs. Why is a 360/4WF not acceptable on the work vehicle, as in US-13?
45. P 325 (US-15): Two-Way Left-Turn Lane Closed, VSD. Are two work vehicles required, at all times or will one suffice?
46. P 326 (US-16): Two-Way Left-Turn Lane Closed, SD & LD. There is no indication as to where TC-12s are required, rather than 360/4WF. The 2014 Book 7 stipulated (and US-17 and US-18 also show) that the TC-12s were/are required when NPRS is 70 km/h or higher, and for LD. US-16 as presented permits the use of 360/4WF for any NPRS and for both SD & LD. Is this intended? Again, are two work vehicles required at all times, or will one suffice?
47. P 327 (US-17): Lane Closed, SD & LD. Since US-14 is designated as Left Lane Closed, US-17 should be designated as Right Lane Closed. The entry in Table G should be changed to Right Lane Closed.
48. P 328 (US-18): Left Lane Closed, SD & LD. The Lane Closed Ahead sign has the right image (TC-3L), but is incorrectly labelled as TC-3R
49. P 329 (US-19): Passing Lanes: Single-Lane Direction Closed, SD & LD. We suggest that the second northbound TC-4 with the supplemental amber beacon be replaced with a TC-12 in right flashing arrow mode, where NPRS is 70 km/h or higher, and that at lower speeds, a TC-4 without the supplemental beacon be used. The southbound TC-3L should be placed on both the right and left sides of the road, so as not to surprise southbound drivers travelling in the passing lane, as in US-20.
50. P 331 (US-21): Four Lane Road: Two Lanes Closed, SD & LD. There are four lane closures in this layout. They should all be treated in the same manner, that is, with a TC-4 at the beginning of the taper and a TC-12 in flashing arrow mode at the end of the taper if the NPRS is 70 km/h or higher. The note about NPRS of 70 km/h or higher should be added to the southbound TC-12. The northbound TC-4 with an amber beacon, at NPRS of 60 or lower, should just be the TC-4 (without the amber beacon). The northbound TC-3R is properly labelled, but is shown incorrectly as a TC-3L (left lane closed). The dimension E is properly shown in the northbound direction, but is not intended to be used as shown in the southbound direction, as it is intended to be the straight distance between two lane closure tapers in the same direction. It would better be shown as dimension F.
51. P 332 (US-22): Five-Lane Road: Two Through Lanes Closed, SD & LD. There are three northbound lane closures in this layout. They should all be treated in the same manner,

that is, with a TC-4 at the beginning of the taper and a TC-12 in flashing arrow mode at the end of the taper if the NPRS is 70 km/h or higher. The northbound TC-4 with an amber beacon, at NPRS of 60 or lower, should just be the TC-4 (without the amber beacon).

52. P 333 (US-23): Five-Lane Road: Through Lane and Left-Turn Lane Closed, SD & LD. The northbound TC-3L sign should be shown on both the right and left sides of the road, not just the left side.
53. P 334 (US-24): Six-Lane Road: Left Two Lanes Closed, SD & LD. Note (i) should clarify that TC-3L is mirror image for sign (i.e., TC-3R), and should add "...and centreline markers." (not mirror image)
54. P 335 (US-25): Route Detour (Alternative Roads), SD & LD. The entry in Table G should show US-25 as applying to SD & LD, not just LD.
55. P 337 (US-27): Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk, VSD. It would be preferable to show the 360/4WF or TC-12 at the rear of the work vehicles rather than at the front. The same comment applies to US-28 on p 338.
56. P 340 (US-30): Pedestrian Detour: Sidewalk Closure, SD & LD. For continuity of detour signing, a TC-40 sign should be posted at all right-angle pedestrian turns.
57. P 341 (US-31): Bicycle Lane Diversion: Bicycle Lane Shift, SD. Why is the work vehicle with its flashing devices positioned halfway along the lane closure taper? Why is it not positioned at the start of the work area? Why are the two additional parallelograms of markers required in advance of and beyond the lane diversion? They are not required for LD so why would they be required for SD?
58. P 342 (US-32): Bicycle Lane Diversion: Bicycle Lane Shift, LD. Why is the work vehicle with its flashing devices positioned halfway along the lane closure taper? Why is it not positioned at the start of the work area? Also, the partial lane shift for vehicles should be indicated by markers between the lanes.
59. P 343 (US-33): Bicycle Lane Diversion: Temporary Path, SD & LD. The TC-1 should be noted as being required for LD, otherwise it also becomes a requirement for SD. The sign at the end of the first taper should be identified. Why is there a dimension of $\frac{1}{2}$ A in advance of the taper, when there is no taper there?
60. P 344 (US-34): Bicycle Lane Diversion: Single File, SD & LD. The single file sign and tab should be orange (TC-102 and TC-102t), not yellow.
61. P 345 (UI-1): Zone Painting: Intersection Turn Arrows, VSD. Does the boxed note on flashing devices mean (i) a WV with 360/4WF, or a stand-alone TC-12 trailer, or (ii) a WV with 360/4WF or truck-mounted TC-12? This comment also applies to UI-2 and DI-1 and DI-2.
62. P 346 (UI-2): Zone Painting: Intersection Turn Arrows, SD. This layout could easily have been combined with UI-1.
63. P 347 (UI-3) and p 348 (UI-4): Zone Painting: Intersection Left Lane Closed, VSD or SD respectively. These two layouts could easily have been combined.. It appears doubtful that all of this work could be completed within 30 minutes.
64. P 349 (UI-5) and p 350 (UI-6): Zone Painting: Intersection Right Lane Closed, VSD or SD respectively. These two layouts could easily have been combined. It appears doubtful that all of this work could be completed within 30 minutes.
65. P 351 (UI-7): Intersection: Near-Side Right or Left Through Lane Closed, VSD. Note (i), the Right Through Lane Closed is a mirror image, except for the centreline markers.
66. P 352 (UI-8): Intersection: Near-Side Right or Left Through Lane Closed, SD & LD. Note (i) should read, "Right Through Lane Closed: mirror image (for TC-12, TC-4, TC-3 (for sign image but not location) and markers, except for centreline markers."

67. P 355 (UI-11) and p 356 (UI-12): Intersection: Left-Turn Lane Closed, VSD, and SD & LD respectively. Note (i) should read, "It may be necessary to prohibit left turns in the direction with the closed left-turn lane."
68. P 357 (UI-13) and p 358 (UI-14): Intersection: Far-Side Lane Closed, VSD, and SD & LD respectively. Note (i) should read: "Right Lane Closed: mirror image except for centreline markers." The signs at the head end of the work area should be TC-4 for NPRS of 60 km/h or lower (as shown) and TC-12 in right flashing arrow mode (not bar) for NPRS of 70 km/h or higher.
69. P 359 (UI-15): Intersection: Lane Adjacent to Right Turn Lane Closed), SD & LD. Why is $\frac{1}{2}$ E shown? This is a misinterpretation of the minimum tangent between tapers.
70. P 361 (UI-17): Intersection: Right Turn Lane (Far-Side Right Lane Closed), SD & LD. The dimension $\frac{1}{2}$ E is not needed. The TC-12 at the head end of the work area should be in left flashing arrow mode, to more closely match the message on the TC-4 at lower speeds.
71. P 362 (UI-18): Intersection: (Left-Turn Lane Open) Far-Side Left Lane Closed, SD & LD. The dimension $\frac{1}{2}$ E is not needed. The signs at the head end of the work area should be TC-4R (not TC-4L as shown) for NPRS of 60 km/h or lower and TC-12 in right flashing arrow mode (not bar) for NPRS of 70 km/h or higher.
72. P 365 (UI-21): Intersection: Left-Turn Lane and Adjacent Through Lanes Closed, VSD. Why is a southbound TC-1 shown, since this is VSD?
73. P 366 (UI-22): Intersection: Left-Turn Lane and Adjacent Through Lanes Closed, SD & LD. The southbound TC-1 should be labelled Long Duration.
74. P 367 (UI-23): Work in Intersection: Right Lane Closed, SD & LD. The eastbound TC-12 in the work area should be in right flashing arrow mode (not bar) (conveying the same message as the TC-7). Similarly, the northbound TC-12 at the work area should be in right flashing arrow mode (not bar) for the same reason.
75. P 369 (UO-7, also DI-25): Work in Intersection: Road Closed (Detour) – Option 1, SD & LD. Should there not be a TC-12 in right arrow mode for the northbound left lane closure, when the NPRS is 70 km/h or higher?
76. P 370 (UI-26): Work in Intersection: Two Lanes Closed – Option 2, SD & LD. The southbound TC-12 should be at the end of the taper, not in the middle. If northbound left turns are to be prohibited (a good idea), then the Rb-43 Sign (Straight Through or Left Turn) should be replaced with the Rb-47 Sign (Straight Through only), and a No Left Turn sign should be shown.
77. P 371 (UI-27): Pedestrian Accommodation: Intersection Sidewalk Detour onto Roadway, SD & LD. The eastbound TC-12 at the far side of the intersection should be in left flashing arrow mode (not bar) to match the lower speed TC-4 direction.
78. P 372 (UI-28): Pedestrian Detour: Crosswalk Closure, SD & LD. For continuity of detour signing, the pedestrian direction signs should be shown on all four corners, unless the intersection is so straightforward that the pedestrian detour route is obvious.
79. P 373 (UI-29): Pedestrian Detour: Crosswalk and Sidewalk Closure, SD & LD. The layout should have continuous pedestrian detour signing along the entire route, or should have a note stating that this is required.
80. 374 (UI-30): Cyclist: Detour, SD & LD. The single file sign and tab should be orange (TC-102 and TC102t) rather than yellow. However, where there are two lanes open, why is a single file sign necessary?
81. P 376 (UO-1) and p 377 (UO-2): Roundabout: Encroachment, VSD, and SD & LD respectively. If this is called Encroachment, why is the WV not shown as encroaching on a live lane? Even if the WV is encroaching, why is it necessary to close the lane? Why would a shoulder taper (dimension B) be appropriate if the lane is also being closed? In UO-2, why are there no TC-3s shown on the west and south approaches? Since we

don't have high-speed roundabouts in Ontario, it would seem better to truncate from the table at the bottom of the page the NPRSs of 80 km/h and 90 km/h. This applies to all roundabout layouts.

82. P 378 (UO-3): Roundabout: Inside Lane Partially Closed, VSD. Why would a B taper for the shoulder and an A taper for the lane closure not be required upstream of the WV?
83. P 379 (UO-4): Roundabout: Outside Lane Partially Closed, VSD. A TC-3L sign should be positioned on the southeast approach, upstream of the TC-4.
84. P 380 (UO-5): Roundabout: Left Exit or Partial Outside Lane Closed, VSD. A TC-3 sign should be positioned on the southwest approach, upstream of the TC-4. In keeping with other layouts, the taper length on the southwest approach should be indicated.
85. P 381 (UO-6): Roundabout: Inside Lane Closed, SD & LD. Why are there four dimension Es? There are no successive tapers in the layout. We suggest that the layout should show Work Area or Work Vehicle, with appropriate flashing lights.
86. P 382 (UO-7): Roundabout: Outside Lane Closed, SD & LD. Why are there three dimension Es? There are no successive tapers in the layout.
87. P 383 (UO-8): Roundabout: Left Exit or Partial Outside Lane Closed, SD & LD. Again, why are there four dimension Es? A better title for this layout would be "Roundabout: Left Exit and Entrance Lanes or Partial Outside Lane Closed."
88. P 384 (UO-9): Roundabout: One Exit Closed (Detour), SD & LD. On the west approach, the tab sign under the Detour D-1 sign should be TC-10ALr (not TC-10Cr) because the exit ahead is blocked, and drivers will have to continue around to the left. On the north approach, the direction to motorists seems inappropriate, with an arrow tab beneath the Detour D-1 sign to turn left. It would be dangerous if they tried this at the end of the entrance approach, and if they interpreted it to mean the east exit from the roundabout, they would find it blocked. They receive no further direction around the roundabout, and so they might exit to the west or the south, or by some chance follow a path all the way around the roundabout, only to find that Detour D-1 is taking them back the way they have come. It would be better to direct these drivers to a Detour D-2, with continuity signing taking them off the roundabout to the west or to the south.
89. P 385 (UR-1): Lane Closed at Exit Ramp, SD & LD. Why is dimension B shown (shoulder taper in a travel lane? This should be dimension A. There should be two EXIT signs as in the 2014 Book 7, one where shown, and the other one at the beginning of the exit taper.
90. P 386 (UR-2): Lane Closed at Exit Ramp with a Deceleration Lane, SD & LD. See comments for UR-1.
91. P 387 (UR-3): Lane Closed at Entrance Ramp, SD & LD. The Wa-16 Merge Warning Sign is a permanent sign and should not be positioned in a closed work zone lane. There should be two Wa-16 signs, one on each side of the entrance ramp, upstream of the bullnose. Alternatively, if they are temporary work zone signs, they should be orange rather than yellow. Why the dimension E? This should either be variable, or 300 m, to match the TC-3R sign and tab.
92. P 388 (UR-4): Lane Closed at Exit Ramp with an Acceleration Lane, SD & LD. See comments for UR-3.
93. P 390 (UR-6): Right Developed Lane Closed, SD & LD. Why does dimension F extend to the first cone of the shoulder taper? We suggest that the dimension B (shoulder taper length) should be part of dimension F, but not in addition to it. A TC-1 sign should be shown for Long Duration.
94. P 394 (DS-2) and p 395 (DS-3): As noted above for US-2 and US-3, it is confusing to have Intermittent Work appear both as a row in the table and as a column. DS-2 is labelled Intermittent Work, but the bolded duration at the top says it's VSD. It should be one or the other, and ID is covered in DS-1. We suggest that it's the row in Table G

that's confusing, as well as the larger category on the left, called "Shoulder/Intermittent." The title should just be "Shoulder Work", and let the duration look after itself in the appropriate column. Further, in DS-2, the grey area should not be called Intermittent Work Area if it's VSD. It should just be called Work Area. The title on DS-1 and DS-2 and DS-3 would better be called "Shoulder/Roadway Work." Again, in DS-2, VSD, why may a WV with 360/4WF or TC-12 not replace markers?

95. P 396 (DS-4): Shoulder Work, MO, ID, VSD. Why is an LBA required for shoulder work on a non-freeway?
96. P 397 (DS-5): Shoulder Work, SD & LD. Why is an LBA required for shoulder work on a non-freeway? An additional note should reference General Note #4 or specify what flashing devices are required on the WV, if present.
97. P 400 (DS-8): Parking Lane Closed, VSD. The TC-4 should be positioned at the start of the taper, not at the end, unless parked vehicles will block its visibility. We suggest that an LBA is not required in a parking lane. Also, what is the maximum NPRS on a road with parking lanes? We believe that it would probably be 60 km/h. If that is the case, the columns for 70 and 80 km/h could be removed from the table.
98. P 410 (DS-9): Parking Lane Closed, SD & LD. See comments for DS-8.
99. P 402 (DS-10): Partial Lane Shift: Narrow Lanes, LD. Are the TC-1A and TC-1B always required? If not, their use should be specified, as to where they are needed. Should markers be shown to mark the shifted lane line? If not, how is the shifted lane line to be indicated?
100. P 404 (DS-12): Zone Painting: Right or Left Lane Closed, Mobile Operations. We recommend that the TC-12s on all three vehicles should be in left flashing arrow mode, since there is no line of markers keeping drivers out of the inter-vehicle spaces. The description under Buffer Vehicle specifies a Crash Truck or a Sign Truck. A Sign Truck is not a Buffer Vehicle. The alternative to a CT should be a BT, not a Sign Truck. We suggest that the breakpoint between CT and BT should be 70 km/h rather than 80 km/h, for consistency with the rest of Book 7. We suggest that the Sign Truck should trail the BV by dimension F rather than dimension A (there is no taper here) and that dimension F be added to the table.
101. P 405 (DS-13): Lane Closed or Occupied, MO, ID, VSD. The title for this layout should be "Right Lane Closed or Occupied," since DS-14 is for the Left Lane Closed. It should be clarified that the TC-12 on the sign truck should be in left flashing arrow mode for mobile operations, and in bar mode for ID or VSD. Note iii says that the Left Lane Closed is the mirror image of the depicted Right Lane Closed. If this note is retained on DS-13, there would appear to be no need for DS-14, which is for MO, ID, VSD where the left lane is closed or occupied. But there is a discrepancy between DS-13 as applied to a left lane closure and DS-14: in DS-13, the permitted flashing devices on the work vehicle are the 360/4WF or the TC-12, while in DS-14, the only permitted flashing device on the work vehicles is the TC-12. We believe that these should be reconciled by permitting either the 360/4WF or the TC-12 on both layouts.
102. P 406 (DS-14): Left Lane Closed or Occupied, MO, ID, VSD. The TC-12 on the WV should be in right flashing arrow mode at all times, since there are no markers. In the table, dimension G should be 35 m for NPRS of 70 km/h, and 40 m for 80 km/h.
103. P 408 (DS-16): Six Lane Road: Left Two Lanes Closed, SD & LD. We suggest that the title of the layout read, "Six Lane Road: Centre Lane or Left Two Lanes Closed," to reinforce the idea that island lane closures are not acceptable, as shown in FS-9. The same change in title should also be made in the entry in Table G. Note (i) should read, "Where sufficient space permits, TC-3L, TC-2 and TC-1 should also be placed in the median." Note (ii) should read: "Right Lanes Closed: mirror image, except for TC-2 and

- TC-1. The first TC-3's image is a mirror image, but not its location. The second TC-3 is mirror image, both for image and location.”
104. P 411 (DS-19): Pedestrian Accommodation: Vehicle Encroachment on Road/Sidewalk, VSD. It would be preferable to show the 360/4WF or TC-12 at the rear of the work vehicles rather than at the front. The same comment applies to DS-20 on p 412. On DS-19, it appears unlikely or difficult that all of that work could be done in 30 minutes.
 105. P 414 (DS-22): Pedestrian Detour: Sidewalk Closure, SD & LD. For continuity of detour signing, a TC-40 sign should be posted at all right-angle pedestrian turns.
 106. P 415 (DS-23): Bicycle Lane Diversion: Bicycle Lane Shift, SD. Why is the work vehicle with its flashing devices positioned halfway along the lane closure taper? Why is it not positioned at the start of the work area? Why are the two additional parallelograms of markers required in advance of and beyond the lane diversion? They are not required for LD so why would they be required for SD? Should a TC-12 in left flashing arrow mode be shown at the end of the first taper, where the NPRS is 70 km/h or higher? Also, just under the DS-23 designation at the top of the page, it says “Multi-Lane Undivided.” This is incorrect, since the D designation and also the layout show it to be Multi-Lane Divided.
 107. P 416 (DS-24): Bicycle Lane Diversion: Bicycle Lane Shift, LD. Why is the work vehicle with its flashing devices positioned halfway along the lane closure taper? Why is it not positioned at the start of the work area? Also, the partial lane shift for vehicles should be indicated by markers.
 108. P 417 (DS-25): Bicycle Lane Diversion: Temporary Path, SD & LD. The TC-1 should be noted as being required for LD, otherwise it also becomes a requirement for SD. The sign at the end of the first taper should be identified. Why is there a dimension of $\frac{1}{2} A$ in advance of the taper, when there is no taper there?
 109. P418 (DS-26): Bicycle Lane Diversion: Single File, SD & LD. The single file sign and tab should be orange (TC-102 and TC-102t), not orange.
 110. P 421 (DI-3) and p 422 (DI-4): Zone Painting: Intersection Left Lane Closed, VSD or SD respectively. These two layouts could easily have been combined.. It appears doubtful that all of this work could be completed within 30 minutes.
 111. P 423 (DI-5) and p 424 (DI-6): Zone Painting: Intersection Right Lane Closed, VSD or SD respectively. These two layouts could easily have been combined. It appears doubtful that all of this work could be completed within 30 minutes.
 112. P 429 (DI-11) and p 430 (DI-12): Intersection: Left Turn Lane Closed, VSD, and SD & LD respectively. Note (i) should read, “It may be necessary to prohibit left turns in the direction with the closed left turn lane.”
 113. P 431 (DI-13): Intersection: Far-Side Lane Closed, VSD. The signs at the head end of the work area should be TC-4 (as shown) for NPRS of 60 km/h or lower, and TC-12 in right flashing arrow mode (not bar) for NPRS of 70 km/h or higher. It provides clearer direction to drivers, pointing them to the open lane, rather than have them wonder what to do when faced with a flashing bar.
 114. P 432 (DI-14): Intersection: Far-Side Lane Closed, SD & LD. See comments for DI-13.
 115. P 433 (DI-15): Intersection: Lane Adjacent to Right Turn Lane Closed, SD & LD. Why is $\frac{1}{2} E$ shown? This is a misinterpretation of the minimum distance between tapers. This also applies to DI-16 on p 434.
 116. P 435 (DI-17): Intersection: Right Turn Lane (Far-Side Right Lane Closed), SD & LD. The dimension $\frac{1}{2} E$ is not needed. The TC-12 at the head end of the work area should be in left flashing arrow mode, to more closely match the lower speed TC-4 (pointing to the open lane). The entry for DI-17 in Table G should say “...Far-Side Right Lane Closed,” not Far Sided.

117. P 436 (DI-18): Intersection: (left Turn Lane Open) Far-Side Left Lane Closed, SD & LD. The dimension $\frac{1}{2}$ E is not needed. The signs at the head end of the work area should be TC-4R (not TC-4L) for NPRS of 60 km/h or lower, and the TC-12 in right flashing arrow mode (not a bar) for NPRS of 70 km/h or higher. The entry for DI-18 in Table G should say "...Far-Side Left Lane Closed," not Far Sided.
118. P 441 (DI-23): Work in Intersection: Right Lane Closed, SD & LD. The eastbound TC-12 in the work area should be in right flashing arrow mode (not bar) (conveying the same message as the TC-7). Similarly, the northbound TC-12 at the work area should be in right flashing arrow mode (not bar) for the same reason.
119. P 444 (DI-26): Work in Intersection: Two Lanes Closed – Option 2, SD & LD. The southbound TC-12 should be at the end of the taper, not in the middle. If northbound left turns are to be prohibited (a good idea), then the Rb-43 Sign (Straight Through or Left Turn) should be replaced with the Rb-47 Sign (Straight Through only), and a No Left Turn sign should be shown.
120. P 445 (DI-27): Pedestrian Accommodation: Intersection Sidewalk Detour Onto Roadway, SD & LD. The eastbound TC-12 on the far side of the intersection should be in left flashing arrow mode (not bar) to match the message of the TC-4L.
121. P 446 (DI-28): Pedestrian Detour: Crosswalk Closure, SD & LD. For continuity of detour signing, the pedestrian signs should be shown on all four corners, unless the detour route is so straightforward as to be obvious.
122. P 447 (DI-29): Pedestrian Detour: Crosswalk and Sidewalk Closure, SD & LD. The layout should have continuous pedestrian detour signing throughout or should have a note stating that this is required.
123. P 448 (DI-30): Cyclist: Detour, SD & LD. The single file sign and tab should be orange (TC-102 and TC-102t) rather than yellow. However, why is a single file sign required where there are two open traffic lanes?
124. P 450 (DO-1) and p 451 (DO-2): Roundabout: Encroachment, VSD, and SD & LD respectively. If this is called Encroachment, why is the WV not shown as encroaching on a live lane? Even if the WV is encroaching, why is it necessary to close the lane? Why would a shoulder taper (dimension B) be appropriate if the lane is also being closed? In DO-2, why are there no TC-3s shown on the west and south approaches? Since we don't have high-speed roundabouts in Ontario, it would seem better to truncate from the table at the bottom of the page the NPRSs of 80 km/h and 90 km/h. This applies to all roundabout layouts.
125. P 452 (DO-3): Roundabout: Inside Lane Partially Closed, VSD. See comment 82 above for UO-3.
126. P 453 (DO-4): Roundabout: Outside Lane Partially Closed, VSD. See comment 83 above for UO-4.
127. P 454 (DO-5): Roundabout: Left Exit or Partial Outside Lane Closed, VSD. See comment 84 for UO-5.
128. P 455 (DO-6): Roundabout: Inside Lane Closed, SD & LD. See comment 85 for UO-6.
129. P 456 (DO-7): Roundabout: Outside Lane Closed, SD & LD. See comment 86 for UO-7.
130. P 457 (DO-8): Roundabout: Left Exit or Partial Outside Lane Closed, SD & LD. See comment 87 for UO-8.
131. P 458 (DO-9): Roundabout: One Exit Closed (Detour), SD & LD. See comment 88 for UO-9.
132. P 459 (DR-1): Lane Closed at Exit Ramp, SD & LD. See comment 89 for UR-1. **Note: All the descriptors for DR-1 to DR-6 in Table G are incorrect.**
133. P 460 (DR-2): Lane Closed at Exit Ramp with a Deceleration Lane, SD & LD. See comment 89 for UR-1.

134. P 461 (DR-3): Lane Closed at Entrance Ramp, SD & LD. See comment 91 for UR-3.
135. P 462 (DR-4): Lane Closed at Entrance Ramp with an Acceleration Lane, SD & LD. See comment 91 for UR-3.
136. P 464 (DR-6): Right Developed Lane Closed, SD & LD. See comment 93 for UR-6.
137. P 468 (FS-2): Shoulder Work, SD & LD. TC-1 and TC-2 should be shown on both sides of the roadway.
138. P 469 (FS-3): Partial Lane Shift: Narrow Lanes, LD. Should markers be shown for the shifted lane line? If not, how is the shifted lane line to be indicated?
139. P 471 (FS-5): Zone Painting: Right or Left Lane Closed, MO. Since this is a mobile operation, all TC-12s should be in left flashing arrow mode. The gaps between CTs are very long, and except for the one behind the striper truck, are much too long to deter lateral intrusions. Their main purpose seems to be to try to keep traffic off the freshly painted lines. If that is the purpose, then sign trucks with flashing arrow boards would be just as effective, at less cost. If it is desired to use additional CTs 1 and 2 to deter lateral intrusions, then the spacings should be LIDG in each case, rather than 100-300-600 m.
140. P 472 (FS-6): Right or Left Lane Closed or Occupied, MO. All TC-12s should be in left flashing arrow mode.
141. P 475 (FS-9): Six Lane Road: Centre Lane or Two Lanes Closed, SD & LD. All LBAs (dimension C) on freeways with NPRS of 110 km/h should be 120 m, not 110 m.
142. P 476 (FR-1): Lane Closed at Exit Ramp, SD & LD. See comment 87 for UR-1.
143. P 477 (FR-2): Lane Closed at Exit Ramp with a Deceleration Lane, SD & LD. See comment 87 for UR-1.
144. P 478 (FR-3): Lane Closed at Entrance Ramp, SD & LD. See comment 89 for UR-3.
145. P 479 (FR-4): Lane Closed at Entrance Ramp with an Acceleration Lane, SD & LD. See comment 89 for UR-3.
146. P 481 (FR-6): Right Developed Lane Closed, SD & LD. See comment 91 for UR-6.
147. General comment on layouts: On some of the typical layouts, some of the pictures of signs are shown across the typical from their actual placement as opposed to nearby open space. Why are they being placed so far away? Example, p.372-373.
148. General comment regarding pedestrian temporary conditions: what consideration is there for Accessible Pedestrian Signals (APS) for those who are blind, visually impaired, or deaf-blind? If there is work being conducted at an intersection that causes pedestrian walkways to be closed, a pedestrian detour to be created, or the permanent traffic signals to be shut down, how is this important signal feature substituted or otherwise accommodated? AODA-compliant ramps at curbs are only a partial solution.

Appendix A: Temporary Traffic Control for Unplanned Events

1. P 486, Table A.2: Upon Arrival, point 1. It is clear that the police can provide traffic control. Do road authority staff also have the authority to provide traffic control? HTA Section 134 gives a police officer or an officer appointed for carrying out the provisions of this Act authority to direct traffic and/or to close a road. Are road authority staff considered to be officers appointed for carrying out the provisions of the Act? (This seems to be clarified in Section A.2.3 on p 489.) It seems reasonable and desirable that road authority staff have the authority to provide traffic control for a collision scene or an emergency maintenance scene, and to treat a collision scene as if it were a work zone, since they are often the responders best qualified to provide

traffic control. Point 1 also says that all other response vehicles shall park in a safe location until initial traffic control is established. This seems to suggest that firefighters or emergency medical staff would have to wait for traffic control before responding to a fire or injured road user in the collision scene. This would seem to be unreasonable, if this is intended, as failure to act immediately could result in death or more serious injury or severe property damage.

2. P 490, Construction Projects regulation, bullet point 2: the requirement for a side and front tear-away feature applies only to nylon vests, not to all vests.
3. P 499, Taper, bullet point 2. Personnel should retrieve cones/flammes while facing oncoming traffic, but not when placing them, as this should be done from upstream to downstream and personnel are not facing the traffic, although of course they always have to be alert. This might be more accurately expressed as "Personnel should place cones/flammes from upstream to downstream and retrieve them from downstream to upstream."
4. P 499, Figure A.1 and last bullet point. The last bullet point states that the taper should end at the upstream end of the longitudinal buffer space. For consistency, it would be good if Figure A.1 depicted it that way.
5. P 502, last paragraph before the last four bullet points. The suggested longitudinal buffer space length is 4.0 metres for every 10 km/h of posted highway speed. This is much shorter than the LBA recommended for work zones. One can understand why the emergency longitudinal buffer space might be shorter, such as the need to set up the collision scene quickly, or the availability of cones. However, it would seem desirable to suggest a range for the longitudinal buffer which might possibly be closer to the usual LBA length, such as 4 to 8 metres for every 10 km/h of posted highway speed.
6. P 502, Figure A.2. It's been a point of discussion in the US as to whether it's prudent to use a fire truck rather than a crash truck in the fend-off position, since the fire truck may be a vehicle worth \$1 million or more, while a crash truck would cost considerably less. Discussion with US counterparts indicates that collisions with fire trucks occur more frequently than one might think. However, if the fire truck arrives first, there may be no alternative, at least until the crash truck(s) arrive.
7. P 508, Figure A.5, Step 3. Why is the TCP positioned downstream of the incident area? There would appear to be little need or function for the TCP in that position.
8. In Appendix A, initially, first responders (such as police or firefighters) will set up emergency traffic control to protect workers and separate workers from traffic, possibly assisted by the road authority or their agents (e.g., area maintenance contractors). After some time interval, it is expected that the road authority or their agents will set up work zone traffic control in accordance with the main body of OTM Book 7. What is that time period after which such full work zone traffic control should be set up? Section A2.2 suggests that that time interval should be two hours. In response to this question raised earlier with MTO, MTO's response was as follows: "The set-up of traffic control should be progressive based on critical needs, the estimated closure time, available personnel and equipment as well as the road authority's established incident command protocol. The goal is to safely secure the scene and set-up traffic control to Book 7 standards as soon as practical. As resources with traffic control devices/equipment arrive, traffic control should be adjusted to an OTM Book 7 compliant format. The steps required and the time it takes to progress from the initial traffic control to a Book 7 compliant format lies with the first responder(s) and the road authority." This outlines what we interpret to be a flexible, practical approach, rather than a rigid one, which we believe is a good thing.

Formatting, Grammatical, Typos, Spelling and English stylistic issues

1. P iv, Table of Contents, Section 2.2.3: “Develop Traffic Control Plans...” is indented too far.
2. P vii, Table of Contents, Section 4.5.1.2, Placement of Buffer Vehicles Using Longitudinal and Lateral Intrusions: This would read better as “Placement of Buffer Vehicles to Protect against Longitudinal and Lateral Intrusions.”
3. P xi, List of Figures, Figure 4.7 Title: irregular font size. Also, why is Figure 4.10 the only bolded title?
4. P 4, Section 1.3 Training, paragraph 2 should read, “To achieve safe and effective traffic control appropriate training of those involved in the ...” (addition underlined).
5. There is a general tendency in Book 7 to make no distinction between singular and plural acronyms. This is contrary to good English editorial style, which states that the plural of an acronym should be formed by adding ‘s’ to the singular form.
 - a. There are two examples on p 4 (TCPs should be used rather than TCP).
 - b. Another example is at the bottom of page 19.
 - c. Another example is at the top of p 34 (TCPs, AFADs, PLCSSs and PTTSSs).
 - d. Another example is on p 42, VMS should be VMSs, in several places, where plural VMSs is intended.
 - e. P 55: two examples, TCPs.
 - f. P 56: TC-54s, TC-52s, TCBSs.
 - g. P 71: TC-54s (two places)
 - h. P 78 TRPMs
 - i. P 104: TC-18s
 - j. P 109: PLCSSs
 - k. P 114: TC-33s (two places)
 - l. P 145, TC-64s (5 places)
 - m. P 146, PVMSs (multiple places, also on p 147), TC-12s
 - n. P 150, PVMSs (multiple places, also on pp 153 and 154)
 - o. P 155, TC-12s (several places, also on p 157)
 - p. P 159: DSDs (two places) (also on p 161 (two places)
 - q. P 161: TC-12s and PVMSs (also PVMSs on p 162)
 - r. P 170: TCPs (two places), also on p 171 (four places) and p 172 (three places)
 - s. P 173: TCPs (four places), also, last bullet point, should be AFADs and PTTSs.
 - t. P 174: TCPs (five places), also LBAs (two places).
 - u. P 175: TCPs (two places minimum)
 - v. P 177: TCPs (five places)
 - w. P 178: TCPs (once); oddly, this is an instance where the proper plural forms are used (though not consistently), shown as AFADs and TCPs.
 - x. P 180: AFADs: Here is one place where the proper plural forms are consistently used (TCPs and AFADs), so at least one of the Book 7 writers understood the proper convention.
 - y. P 181: AFADs (used correctly once and incorrectly once).
 - z. P 182, PLCSSs (ten places); PTTSSs (three places); TCPs (two places) first Note should state: “The use of PLCSs is an alternative...”

- aa. P 183: PLCSSs (three places)
 - bb. P 184: PTTSSs (14 places); TTSs (one place); TCPs (two places)
 - cc. P 185: PTTSSs (5 places); also on p 186 PTTSSs (3 places)
 - dd. P 187: PTTSSs (one place, also on p 188.
 - ee. P 188: TTSs (5 x), PTTSSs (1 x)
 - ff. P 189: PTTSSs (1 x); TTSs (1 x)
 - gg. P 193: TTSs (1 x)
 - hh. P 194: TCPs (2 x)
 - ii. P 202: TTSs (3 x), PTTSSs (3 x), setups (once); TCPs (5 x)
 - jj. P 205: BVs (1 x); LBAs (1 x)
 - kk. P 206: TMAs (4 x); CTs (1 x)
 - ll. P 207: BVs (3 x)
 - mm. P 208: LBAs (2 x); LIDGs (1 x)
 - nn. P 209: LIDGs (3 x); BVs (2 x); NPRSSs (1 x)
 - oo. P 214: TSBs (3 x); TSB systems (1 x)
 - pp. P 217: TTRSs (1 x); also on p 218 (4 x)
 - qq. P 222: TCPs (3 x), CTs (1 x)
 - rr. P 223: PLCSSs, PTTSSs
 - ss. P 237: CTs (2 x), BVs (1 x)
 - tt. P 238, PVMSs (2 x)
 - uu. P 246, Table C, TCBSs (3 x). Second one should then read, "TCBSs are required..."
 - vv. P 248, Table G, TCPs (3 x)
 - ww. P 295, TI-10, title and note ii: TCPs (2 x); this also applies to TI-11 on p 296, TI-12 on p 297 and TI-13 on p 298.
 - xx. P 299, TI-14, note ii: TCPs (1 x), also on p 300, TI-15.
 - yy. P 307, TO-3, TCPs (2 x)
 - zz. P 325, TC-12s are (1 x)
 - aaa. P 359, TC-53As, TC-53Bs and TC-54s, also on pp 360- 370, and 433 and 434 and 436 - 442.
 - bbb. P 484, second last bullet point, collisions
 - ccc. P 498, bullet point 3, PVMSs
 - ddd. P 546, Truck (or Trailer) Mounted Attenuator (TMA), para 2, TMAs (2 x)
6. P 7, Table 2.1, Worker Safety: A better description would be "the safety of workers within the highway work zone," since this should apply to both construction and maintenance workers. Also Table 2.1, Consistency and uniformity, second sentence should read, "Work zone design across the province should be kept as consistent as practicable..." (addition underlined).
 7. P 14, para 3: "Ministry of Labour" should be "Ministry of Labour, Training and Skills Development."
 8. P 20, top Note: should read: "A Traffic Protection Plan (TPP) must be prepared in advance for any highway work zone project." (not just construction).
 9. P 25, Section 3.3, Rolling closures should be removed from this section, as it's not a configuration issue.
 10. P 51, Sec 3.7.1.2, last bullet point: "detectible" should be "detectable" as shown in the last line.
 11. P 68, Sec. 4.2, last line, we suggest that the reference be to Section 4.1, not Section 4 (more specificity would be helpful).
 12. P 103, Advised Speed Tab Sign. The usual terminology is Advisory Speed Tab Sign. Why was 'advisory' changed to 'advised?' (two places). For comparison, see p 116, TC-36, Maximum Speed Advisory sign.

13. P 108, Conditions, bullet point 3, sub-bullet point, should read “flashing red LED lightbars are to be ...” (addition underlined). Bullet point 4: why not simply say that the pole length must be 1.2 m?
14. P 106, Prepare to Stop Signs, Purpose, first sentence should read: “The PREPARE TO STOP and PREPARE TO STOP (with amber flashers) signs and the WHEN FLASHING tab signs must be used....”
15. P 110, AFAD: Title above the image of the TC-23B sign should say “Automated Flagger Assistance Device Ahead,” not Remote Control Device Ahead.
16. P 110: Image of TC-24 sign should be positioned lower within the grey band.
17. P 117, Soft Shoulders Sign, title above the sign image should read Soft Shoulders sign (addition underlined), under Purpose.
18. P 122, Rb-66 etc, Conditions, bullet point 1, should read “...passing of cyclists is hazardous due to limited sight sign distance ...”
19. P 124, Speed Fines Doubled Sign, Purpose, should read “... sign informs drivers of doubled fines...” (addition underlined).
20. 152. Use of Alternate Display Techniques: line two, should read: “...highway use; however they are not allowed...” (addition underlined)
21. P 153, Signing in Designated Bilingual Areas, point 1: should read, “From a human factors perspective...” (not human factor’s).
22. P 155, TC-12s, last point 3, second line, should read: “Both arrows mode...” (addition underlined).
23. P 156, point 4 at top of page, should read, “...in a closed lane or on a shoulder...” (as written, it reads as if the shoulder is downstream of the TC-12 in arrow mode). Also, “Identify” should be “identify.”
24. P 159, Size, Freeways, bullet point 2, should read 600 mm x 1500 mm (not 600 mm x 150 mm).
25. P 159, Sec 4.2.11.6, Dynamic Speed Display Sign: It would be helpful to have a photo of such a sign. Also, under Operation, this should read “A DSD Sign (additions underlined)....has been shown in some applications...”
26. P 165, Sec 4.3.1.1, Advance Notification Signing: Why is there a departure from complete sentences? The last two lines on p 165 should read: “ANS is installed on an affected route prior to the establishment of a work zone. It is used to forewarn regular users of a route that work is planned in the near future.” (addition underlined).
27. P 166, Sec 4.3.1.2, Advance Warning Signing, similar comment as in point 26: “AWS is signing installed on an affected route to inform road users of the current scope, extent...” (additions underlined). The word ‘current’ is suggested, because the term ‘advance’ can mean advance in relation to either time or location. Similarly, on p 167, Sec 4.3.1.3, first sentence should read: “ARS is signing installed...”
28. P 166, Sec 4.3.1.2, Characteristics: last two bullet points should read “Raises...” and “Allows...” respectively. Similarly, on p 167, Sec 4.3.1.3, Characteristics, bullet point 1 should read “...allows...”; bullet point 3 should read “Intercepts...”; bullet point 4 should read “Guides drivers...”
29. P 168, last bullet point, An AWS sign is located upstream of what? Clarify.
30. P 178, Sec 4.4.3.1, AFAD, line two, should read, “...Highway Traffic Act is a self-contained...” (not ‘as’). Line 4, change plural to singular, so as to read “This device should not be confused with a Portable Lane Control Signal (PLCS).”
31. P 180, AFADs, fourth last para, should read, “A TCP responsible for operating or monitoring the AFAD should position him/herself (not themselves) off the roadway...”
32. P 182, Sec 4.4.3.2, PLCSs, bullet point 6: This should be regulation 185/22, not Regulation 606, which is revoked by regulation 185/22. The same thing occurs on p 184, bullet point 3.

33. P 188, PTTs, Do the requirements in Books 7 and 12 differ? If not, why not just include Book 7?
34. P 189, 190: Why is it called Figure 4.10 on p 189 and its continuation called Figure 4.7 on p 190?
35. P 189: Signal Timing Calculations for PTTs or TTSs: Would these not also be valid for PLCs?
36. P 190: Why do the solution steps run from 3 to 7? Where are steps 1 and 2? The bottom solution suggests that the steps should be 1 to 5 in both places.
37. P 193: bullet point 3: Why is 'rolling closure' not bolded, similar to pilot vehicles and pace vehicles?
38. P 198, bullet point 5, second line, should read "at the work area itself, should be in good communication..." (as is shown in the boxed Note). Even better, the word in both locations should be must.
39. P 211, line 1, "lightings" should be replaced with either "lights" or "lighting" or "lighting devices." (3 x)
40. P 215, bullet point 1, sub-bullet point 3: should say, "...with manufacturer's specifications.."
41. P 216, Sec 4.5.5, para 4, word missing: "...and are not to be used during winter shutdown." Also, same para, next sentence: "They include the following (not followings):..."
42. P 220: line 1, should read "...criteria ...but are not limited to:..."
43. P 223: point 6, should read "...on the inside of curves..."
44. Pp 240, 241, Tables A & B: note 4, should read, "...are not required, but are strongly recommended, at speeds of 60 km/h or lower..." Also, in Table B, why is Dimension G for Mobile work included, since mobile work would be covered by Table A?
45. Pp 253-255, General Notes to Layouts:
 - a. Note 2, second last line, should read "face down," not "faced down."
 - b. Note 11: interesting mixing of terminology. The usual term in Book 7 has been changed from 'typical layout' to 'layout.' But in note 11, the terms 'typical layout' and 'typical' are used, as well as Layouts. (We actually prefer the term 'typical layout.')
 - c. Note 12: TCBSs (4 x)
 - d. Note 13: BVs (2 x), CTs (6 x). Non-Freeways, second para: In fact, a CT is preferred over a BT at any speed (if it is desired that incoming motorists are to have a chance of survival).
46. P 248, Table G, Two-Lane Two-Way roads: In our view, a more logical sequence of rows would have been as follows, grouping 'like with like' (we realize this won't happen at this time):
 - a. Lane Closed or Occupied (Yield to Oncoming Traffic), ID (TS-13)
 - b. Lane Closed (Yield to Oncoming Traffic), VSD, SD, LD (TS-17, TS-18)
 - c. Lane Closed or Occupied (TCPs), VSD, SD (TS-14, TS-15)
 - d. Lane Closed (TCPs), SD, LD (TS-20)
 - e. Lane Closed (AFAD), SD, LD (TS-19)
 - f. Lane Closed (PLCS) SD (TS-16)
47. P 339, US-29: Note (ii): Reference should be to TC-40t, not TC-40T. The same applies to Note (ii) in layout DS-21 on p 413.
48. P 445, DI-27, layout title, should be Accommodation (not Accomodation).
49. P 482, Sec A.1, first line, last word should be audiencess, not audience; second line, should be training, not trainings.

50. P 483, Table A.1: For consistency, all bullet points should start with a verb. We suggest that in Law Enforcement, third last bullet point should read “Manage scene clearance,” or “Supervise scene clearance,” or something similar.
51. P 498, Crash Trucks, should read “...rear-mounted energy absorption attenuation equipment...” Adsorption is a chemical process not relevant here.
52. P 498, Guidelines for Use of Crash Trucks, bullet point 2, end of second line, remove one of the two ‘be’s.
53. P 512, Glossary, Advisory Speed: why is this not expressed as “..to the nearest 10 km/h...” since speeds are posted at 10 km/h hour intervals.
54. P 529 and other places, Glossary. Why has the Canadian spelling of ‘manoeuvre’ been replaced with the American spelling ‘maneuver’?
55. P 531, Glossary, Movable Barrier. The two ‘moveable’ spellings in this definition should be the same as the (correct) title.
56. P 531, Glossary, Municipalities. This is not a definition of municipalities but instead is a description of their legal authority and responsibility.
57. P 533, Glossary, Pace Vehicle (PV). We suggest that this be ‘Pace Vehicles (PVs)’, and that it read as follows: “Vehicles deployed on the approach to a work zone (one vehicle per approach lane), used to control the speed of”
58. P 534, Glossary, Partial Lane Shift. Again, the definition does not describe what a partial lane shift is, but rather what it does. The 2014 Book 7 definition of Partial Lane Shift is better.
59. P 535, Glossary, Pilot Vehicle. The definition would be improved by adding at the beginning, “A vehicle used on.....”
60. P 535, Glossary, Portable Lane Control Signal (PLCS): We suggest that this read, “A PLCS is a traffic signal system consisting of one...” We suggest that the second sentence read “PLCSs are an alternative to continuous flagging by TCPs and are not to be confused with PTTSS.” We suggest a similar change be made to the first sentence in the definition for PTTSS.
61. P 536, Glossary, PIP. The definition does not describe what a PIP is, but rather what it does.
62. P 537, Glossary, Regulatory Sign, second line, delete ‘as.’
63. P 538, Glossary, Rolling Closure. We suggest the addition as follows, “...and restrain vehicles upstream of a construction site, bringing traffic to a halt it necessary, so as to create...” (addition underlined)
64. P 543, Glossary, Temporary Construction Barrier System (TCBS) last line, “...and be placed in accordance...”
65. P 550, List of References, OTM Books 3 and 19 should also be listed.

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