

Bureau of Project Delivery Bridge Design and Technology Division

BRADD

No. 051
December 3, 2018

Release of Version 3.2.5.0

PennDOT's Bridge Automated Design and Drafting Software (BRADD) has been revised as described in the attached Summary of November 2018 Revisions - Version 3.2.5.0. This version will be available as a **free update to all existing BRADD v3.2.4.0 licensees** who access the BRADD website [Downloads page](#) and enter their Company Name, License Number and License Key that was used to license BRADD v3.2.4.0. Once the information has been submitted successfully a download link will be provided to download the BRADD v3.2.5.0 software and a new License Key will be provided to use during the installation.

Consultants and others with a license for version 3.2.0.0, 3.2.1.0, 3.2.2.0 or 3.2.3.0 can obtain BRADD Version 3.2.5.0 by paying an update license fee of \$1,590 (including tax) for Private Organizations, \$1,590 (including tax) for Educational institutions for Consulting Use, \$150 (no tax) for Educational institutions for Educational Use, \$150 (no tax) for Local Government Agencies, \$159 (including tax) for Foreign Governmental Agencies, and no fee for Department Executive Agencies and State Transportation Agencies outside Pennsylvania. Use the Update Form located in the Ordering/Updating section on the PennDOT BRADD Software website at <http://bradd.engrprograms.com/>.

Consultants and others with a license for version 3.1.6.2 and earlier can obtain BRADD Version 3.2.5.0 by paying an update license fee of \$3,180 (including tax) for Private Organizations, \$3,180 (including tax) for Educational institutions for Consulting Use, \$300 (no tax) for Educational institutions for Educational Use, \$300 (no tax) for Local Government Agencies, \$318 (including tax) for Foreign Governmental Agencies, and no fee for Department Executive Agencies and State Transportation Agencies outside Pennsylvania. Use the Update Form located in the Ordering/Updating section on the PennDOT BRADD Software website at <http://bradd.engrprograms.com/>.

Archived copies of all previously distributed e-Notifications can be obtained from the PENNDOT BRADD website at <http://bradd.engrprograms.com/home> and clicking on "e-Notification" and then "Mailing List Archives."

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Consultants and others without a license can obtain BRADD Version 3.2.5.0 by paying the license fee of \$5,300 (including tax) for private organizations and \$530 (including tax) for governmental agencies. Use the Ordering Form located in the Ordering/Updating section on the PennDOT BRADD Software website at <http://bradd.engrprograms.com/>.

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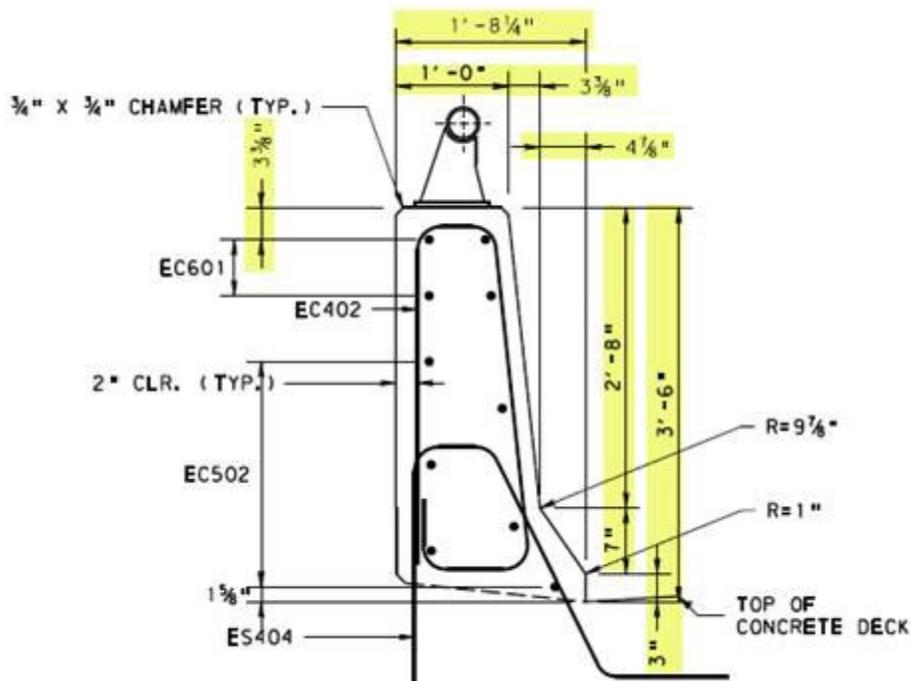
SUMMARY OF NOVEMBER 2018 REVISIONS - VERSION 3.2.5.0

Since the release of BRADD Version 3.2.4.3, several operational issues have been addressed. This release of BRADD Version 3.2.5.0 contains the following revisions:

1. The June 2016 Edition of the BD Standards (Change 1) have been incorporated into BRADD. (TFS 5425)
2. The September 2016 Edition of the BC Standards (Change 1) have been incorporated into BRADD. (TFS 5426)
3. The June 2010 Edition of the RC Standards (Change 2 & 3) have been incorporated into BRADD. (TFS 5379)
4. The 2016 Publication 408 (Change 4 & 5) has been incorporated into BRADD. (TFS 5502)
5. BRADD is now compiled using Visual Studio 2017 which requires Microsoft's .NET Framework 4.6.1 and Microsoft Visual C++ 2017 Redistributable Package (x86). During installation .NET Framework 4.6.1 and Microsoft Visual C++ 2017 Redistributable Package (x86) will be installed if they are not already present on the PC. (TFS 5438)
6. The BRADD installation program is now compiled using InstallShield 2018. (TFS 5451)
7. If OpenRoads, OpenBridge, or PowerDraft CONNECT are installed on a PC in addition to MicroStation v8i, MicroStation CONNECT or PowerDraft v8i, then the BRADD installation will not correctly configure BRADD to use MicroStation v8i, MicroStation CONNECT, or PowerDraft v8i which are the only versions that are compatible with BRADD. This issue has been fixed. (TFS 5439)
8. An option has been added to BRADD to design and detail Vertical Wall Barriers on abutment U-wings. Note: Both abutments must have U-wings in order to use Vertical Wall Barriers on U-wings. Also, BRADD does not detail on the design drawings any barriers on top of the U-wings adjacent to or on the same side of the bridge as a sidewalk. (TFS 4855)
9. For a specific Adjacent Box Beam superstructure, a Successful Design resulted in the final Analysis Run reporting a Shear rating less than 1.0. This should have resulted in an additional Analysis Run to redesign the shear reinforcement, but the shear redesign did not occur. The problem has been fixed so the shear redesign occurs, and the Shear rating is greater than 1.0. (TFS 5448)
10. For a P/S Spread Box Beam superstructure, the shear range for the shear reinforcement was revised from 0.33L to 0.35L to prevent a shear rating failure from occurring sometimes during the final Analysis Runs. These changes are documented in User Manual Chapter 3 / Compute Superstructure

/ Superstructure Controllers / Prestressed Concrete Adjacent Box Beams / Horizontal and Vertical Shear Stirrup Spacing. (TFS 5450)

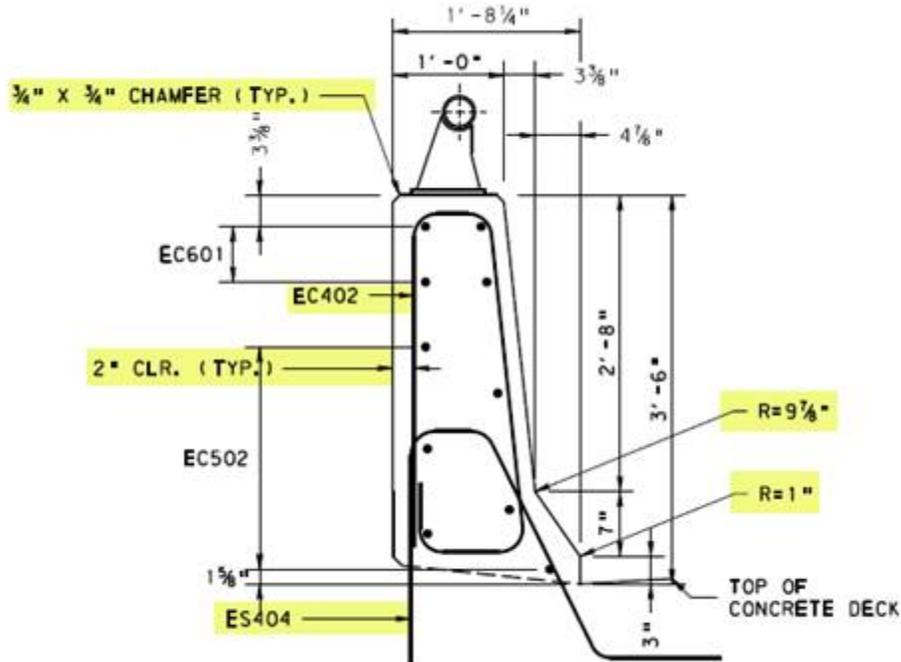
11. The calculation of the protective coating quantity for Integral Abutment approach slabs has been added to BRADD. (TFS 5050)
12. MicroStation Complex Dimension Elements have been implemented in BRADD for linear dimensions placed with text aligned with the dimension line, provided MicroStation CONNECT (version Update 9 or later) has been used to generate the drawings. Almost all of the BRADD linear dimensions have been converted (approximately 91% of the coded linear dimensions) to MicroStation Complex Dimension Elements where the components of the linear dimension act as one object making it easier to edit. Previously, all the components were placed as separate objects for all linear dimensions in BRADD. The remaining coded BRADD linear dimensions will be converted in a future BRADD release. (TFS 5119)



Example of a detail with MicroStation Complex Dimension Elements created using MicroStation CONNECT Update 9

13. The MicroStation Text Node element has been implemented in BRADD when MicroStation CONNECT (version Update 9 or later) is used to generate the drawings. This means that multiple lines of text will be treated as a single paragraph and can easily be edited in MicroStation CONNECT using the MicroStation Text Editor. Previously, each line of text was placed as a separate text element. (TFS 5120)

14. The MicroStation Place Note element has been implemented in BRADD when MicroStation CONNECT (version Update 9 or later) is used to generate the drawings. This means that a leader line with text will be treated as a single element that can easily be edited in MicroStation CONNECT. Previously, a leader line with text were placed as separate elements. (TFS 5121)



Example of a detail with MicroStation Note Elements created using MicroStation CONNECT Update 9

15. A new input value has been added to the BRADD menus to allow the user to enter the Minimum Depth of an Integral Abutment Pile Cap. The valid range for this input is 3'-3" to 4'-9". This new input can be used to lower the ground line in front of the pile cap which may allow for a shorter span length and possibly a shorter beam. This new input can also be used to allow the elevation of the bottom of the pile cap to be rounded to the tenths of a foot. (TFS 5215)
16. The Top of Deck Elevations at the Staged Construction Joint have been added to the Deck Elevations table that appears on the drawings. (TFS 5237)
17. A new Bearing Pad Menu input option called "Specify P/S Beam Lifted Only At Beam Ends" has been added to BRADD. If BRADD is unable to design a bearing pad the user can try this option. Using this option will allow the beam self-weight dead load rotation (DL1) to occur when the beam is lifted (before it is placed on the bearing pads). Thus, the DL1 rotation can be computed so it does not include the beam self-weight dead load rotation during the Bearing Pad Design. When this option is selected a note is added to the Bearing Pad Drawings to indicate the bearing pads were designed

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assuming the beams were lifted at support points directly above the centerline of bearing locations during construction. (TFS 5421)

18. For certain bridges, BRADD creates the STLRFD input file with more DLD Commands than the Engineering Assistant (EngAsst) program can handle. This will result in an error from EngAsst, if the STLRFD input file were to be opened outside of BRADD using EngAsst. BRADD has been revised to reformat the same information into less DLD Commands so the STLRFD input file is now compatible with EngAsst. (TFS 5453)
19. Additional input checks have been added to the BRADD Graphical User Interface to prevent a user from accidentally entering invalid input. For example, if only units are entered for an input field an error will now be returned. Also, entering only a number for the Bearing of Back Tangent Reference Line will now return an error. (TFS 5455)
20. The bottom of beam elevations calculated for a steel plate girder with a bottom flange thickness that changes along the girder has been corrected to account for the thickness change. Previously, the bottom of beam elevation calculation always used the bottom flange thickness at the bearing location. (TFS 5459)
21. For superstructures with Integral Abutments and PA 10M Barriers, the #4 vertical barrier bars were detailed with an incorrect bar bend type for the location over the integral abutment and part of the wingwall near the abutment. This issue has been corrected. (TFS 5460)
22. Revised BRADD to prevent the program from stopping with an error when the PG line is located at the gutterline and the shoulder width is set to 0.0 feet which results in the PG line being located in the overhang area of the exterior beam. (TFS 4141)
23. For Integral Abutment bridges with a horizontal curve, the plan view of the wingwalls have been changed to be drawn as straight lines throughout the drawings. Previously, the plan view of the wingwalls were drawn along a curve. (TFS 4152)
24. For certain bridges the transverse deck bars were detailed with a splice even though the total transverse deck width is less than the maximum bar length limit of 40 ft for a #4 bar and 60 ft for a #5 and larger bar. This issue has been corrected to eliminate the splice for this situation. (TFS 4264)
25. For Steel Beam bridges that have Integral Abutments, the Concrete End Diaphragm detail has been revised to show the bottom of the concrete end diaphragm stepped to match the Integral Abutment Elevation detail. Previously, the Concrete End Diaphragm detail always showed the bottom of the concrete end diaphragm as a sloped line. (TFS 4409)

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26. For certain bridges designed with BRADD, the Total Factored Reaction in the Geometry Output file, Sole Plate Design output table was too large to print resulting in a series of asterisk characters (*****) displaying in the file. This problem has been fixed. (TFS 4496)
27. For certain bridges skewed to the right, with U-wings and with a Staged Construction Joint, the dimensions on the Abutment Plan and Abutment Elevation details measured from the Staged Construction Joint to the work points located at the abutment corners were incorrect. These dimensions have been fixed. (TFS 4737)
28. The outline of the cheekwalls was added to the Abutment Footing Plan detail for bridges where a cheekwalls exists. (TFS 4741)
29. For certain steel bridges with a 45 degree skew and a cheekwall, BRADD reported that it successfully designed a bridge, but upon further checking it was found the edge of the bottom flange caused interference with the cheekwall and BRADD did not report this problem. A check has been added to BRADD to warning the user when a steel beam bottom flange interferes with the cheekwall. (TFS 4833)
30. For Integral Abutment, the Tapered Wingwall Vertical Bars were missing a 2'-1" splice as shown on BD-667M, Sheet 5. This has been fixed. (TFS 4848)
31. A warning has been added to the Superstructure Cost and Quantities Log file when a horizontal curve starts or ends on the bridge. In other words, the warning will be given when the horizontal curve starts or ends anywhere between the back face of the two abutments but not including the wingwalls for traditional abutments, or if the horizontal curve starts or ends between the ends of the approach slabs for integral abutments. Also, the User Manual list of Limitations, the PVI Menu Help and the Designer Checklist have been updated to clearly state that BRADD assumes that a horizontal curve starts or ends off the bridge. BRADD has always had this limitation and with this incident it has been clearly documented. Also, if the entire sweep of a horizontal curve is located off the bridge and the user has defined the bridge to have a horizontal curve, another warning has been added to the Superstructure Cost and Quantities Log file to warn that the horizontal curve should not be defined. (TFS 4860, TFS 5531)
32. The Adjacent Box Beam Plan detail note for the beam notch required for waterproofing at the end of the beam has been updated to clarify where the beam notch is needed. (TFS 4895)
33. BRADD has been updated to specify Class AAAP concrete for Concrete End Diaphragms on bridges with Steel Beams. Previously, BRADD was specifying Class AA concrete. (TFS 4930)
34. The BRADD installation program used by Consultants now asks if a BRADD icon should be created on the Windows Desktop. Note: this does not affect PennDOT installations. (TFS 4957)

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35. The calculation of the quantity of vertical bars in the 6 ft flared portion of the Safety Wings has been revised to be 13 bars. Previously, the number of bars could vary from 13 to 15 bars. (TFS 4962)
36. The 9 7/8" radius and 1" radius dimensions on the barrier front face are now called out on the Typical Barrier Section details. (TFS 4982)
37. On the Elastomeric Bearing – Section B-B detail the "***" has been removed from the steel anchor bolt nut callout for the Expansion Bearing. Also, the Bearing Details drawings has two different notes with the "***" designation. This has been corrected. (TFS 4983)
38. The width of the Intermediate Diaphragm detail and End Diaphragm details for steel diaphragms have been corrected. The End Diaphragm detail width is now longer than the Intermediate Diaphragm width when the Intermediate Diaphragm is perpendicular to the beam and the End Diaphragm is parallel to the centerline of bearings. (TFS 4998)
39. Support for MicroStation XM and MicroStation V8 has been removed from BRADD. (TFS 5003)
40. Checks have been added to BRADD to ensure the location of the Staged Construction Joint in the superstructure is compatible with the Staged Construction Joint in the abutment stem and footing. Previously, there were not checks which allowed the user to accidentally input incompatible locations for the Staged Construction Joints. (TFS 5017)
41. The Begin / End Structure Stations are now calculated along the horizontal curve for Adjacent Box Beam structures. (TFS 5033)
42. Checks have been added to prevent BRADD from designing a wingwall when the top of the end of the wingwall is lower than the top of footing. (TFS 5042)
43. The text "MAX." has been added to transverse and longitudinal deck bar spacing callouts on the Slab Reinforcing Plan detail (TFS 5048)
44. BRADD calculations were revised to no longer divide by the Tangent of an angle to prevent BRADD from crashing if the angle ever becomes 0.0. (TFS 5054)
45. BRADD was enhanced to support the mirroring of DXF cells for the drawings. (TFS 5096)
46. The incorrect barrier was displayed on the End Diaphragm detail for Bulb Tee Beams on Wall Abutments. This has been fixed. (TFS 5114)
47. When the User Defined Barrier is used, Designer Notes will now be placed on the drawings where the "PLAN – BARRIER & SLAB DETAIL", "LEFT BARRIER DETAIL" and "RIGHT BARRIER DETAIL"

would be located to remind the designer that they need to create these details for the barrier. (TFS 5122)

48. The bearing seat width calculations documented in User Manual Section 3.3.4.3 have been updated to be consistent between the different beam types. Also, a new designer note has been added to the drawings if two adjacent box beam bearings seats overlap with each other. (TFS 5129)
49. For bridges with Integral Abutments, the lap length of the #8 deck bars located above the diaphragm have been increased to 7'-1" when the girder depth is 3 feet or less because according to BD-667M, Sheet 8, Legend (16) the deck and diaphragm can be poured simultaneously when the girder depth is 3 feet or less, making the #8 bars Top Bars. (TFS 5144)
50. For a specific prestressed PA I-beam superstructure, PSLRFD successfully designed the beams, however during the analysis runs for one of the beams a Horizontal Shear specification check failure occurred. This issue has been fixed. (TFS 5203)
51. The Framing Plan detail, for spread structures, has been updated to callout the Staged Construction dimensions. (TFS 5232)
52. The BRADD Graphical User Interface has been enhanced to provide a Right-Click menu option on the "Select Job" tree to Expand All and Collapse All nodes in the tree. (TFS 5234)
53. An End of Beam callout has been added to the Structure Plan At End Of Beam detail for Spread Box Beam superstructures. (TFS 5242)
54. Beam spacing dimensions along the centerline of bearings have been added to the Abutment Plan detail for traditional abutments. (TFS 5253)
55. For prestress I-beam superstructures, the Full Depth End Diaphragm detail has been revised to callout the Construction Stage dimensions. Also, a Designer Note has been added to remind the designer to check the reinforcement splice locations relative to the Staged Construction Joint and adjust accordingly. (TFS 5271)
56. For plank beam superstructures, the SECTION C-C detail showing a section through the beam and abutment has been revised to show a plank beam. Also, the Typical Strand Confinement All Beams detail has been revised to show a plank beam. Previously, these details always showed an Adjacent Box Beam. (TFS 5344, 5359)
57. For traditional abutments with cheekwalls, the cheekwall width dimension has been added to the Abutment Plan detail. (TFS 5363)

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58. For Spread Box Beam superstructures and Adjacent Box Beam superstructures with an overhang, the drip notch is now only shown at the edge of the deck. Previously, a drip notch was also shown at the bottom of the box beam. (TFS 5377)
59. For traditional abutments the wingwall length dimension is now always called out on the Wingwall Elevation detail for abutments with U-wings. (TFS 5380)
60. The Slab Section detail was fixed to show a splice in the transverse deck bars when the bars have a splice shown on the Slab Reinforcing Plan. (TFS 5383)
61. The rebar information shown in multiple lines for a single bar now appears in the same column on the Bar Schedule detail. Previously, it was possible for the bar information for a single bar to appear in the last line of Column 1 and then continue to the first line of Column 2 of the Bar Schedule detail. (TFS 5393)
62. The “***” Note is no longer printed below the Beam Schedule detail when it is not applicable. (TFS 5394)
63. For a specific BRADD job, the Steel End Diaphragms detail called out a 0” (TYP.) dimension that pointed to nothing and had a callout to SEE NOTE “A” that did not point to anything. The two callouts have been removed for this case. (TFS 5395)
64. Linework for the Pedestrian Railing was fixed on the General Elevation detail. (TFS 5396)
65. The Section B-B detail has been moved from the Diaphragm Details 1 drawing to the Diaphragm Details 2 drawing which is the drawing that identifies where Section B-B is located. (TFS 5398)
66. The End Diaphragm Layout details and the Intermediate Diaphragm detail on the Framing Plan 2 drawing were moved to line up better. (TFS 5399)
67. For Integral Abutment approach slabs, a new detail showing the plan view of where the curb and approach slab meet has been created when Vertical Wall Barriers are used. The new detail is similar to BD-628M, Sheet 35, Detail A. (TFS 5404)
68. The Pedestrian Railing quantity was incorrectly being reported as 0 LF for an abutment of a User Defined Superstructure. For User Defined Superstructures the Pedestrian Railing quantity should not be computed for the abutment. This has been fixed. (TFS 5407)
69. The Bearing Capacity Table on the drawings was always showing Two Soil Layers of data. For the case of only One Soil Layer the data for the Second Soil Layer was filled in with “N/A”. BRADD has been revised to now show only One Soil Layer in the Bearing Capacity Table. (TFS 5408)

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70. The notes on the Full Depth End Diaphragm @ Abutment detail were revised to clarify that the reinforcement shown in the bay on this detail should be used in all bays at the abutment. (TFS 5414)
71. For the Plan – Barrier & Slab Detail for 10M Barriers, the line through the 10M Barrier near the end of the deck (shown in plan view) was removed so it will not be confused as a deflection joint. (TFS 5415)
72. For the Integral Abutment approach slab Section X-X detail, the (*) note that referred to the “Diaphragm Details At Abutment x Sheet” has been changed to “End Diaphragm Sections Abut x Sheet”. (TFS 5417)
73. For Adjacent Box Beam superstructures with an alternate raised sidewalk, a callout of the vertical U-bar that runs from the barrier to deck slab has been added to the Slab Section detail. (TFS 5428)
74. Dashed paving notch lines have been added to the Full Depth Diaphragm @ Abutment details. (TFS 5430)
75. The transverse beam slopes computed by BRADD for Adjacent Box Beam superstructures were sometimes unsymmetrical even though the typical section of the deck is symmetrical. This has been fixed. (TFS 5432)
76. For Superstructure Only jobs, the corbel width was not included when BRADD computes the coordinates for the “Abutment – Bearing Seat Location and Elevation” table that appears on the drawings. This has been fixed to include the corbel width. (TFS 5433)
77. Page Breaks are not working when using the BRADD “File / Print Input Menu(s)” tool. This issue has been fixed. (TFS 5440)
78. For traditional abutments, the Abutment Elevation detail always shows the top of the bearing seat sloped, even for P/S I-Beam or Steel Beam superstructures which have level bearing seats under each beam. As a result, a note has been added below the Abutment Elevation detail for traditional abutments to refer to the Abutment Bearing Seat Elev. sheet for locations and elevations of the abutment bearing seat and a note has been added to the Designer Checklist to inform the designer that the Abutment Elevation detail does not show the stepped bearing seat. (TFS 5445)
79. The BRADD “Tools / Options / Generate Drawings / MicroStation / Command Modifier(s)” dialog can now be used by Consultants to set MicroStation Command Modifiers to do things such as define the MicroStation Workspace folder. Previously, the Command Modifier(s) field was only available for PennDOT users. (TFS 5447)
80. For Steel Plate Girders the minimum Diaphragm Connection Plate width and the minimum Bearing Stiffener Plate width were changed in BRADD to 8.5”, per BC-754M, Sheet1. For Rolled Beams the

minimum Diaphragm Connection Plate width was changed to 7.5", per BC-754M, Sheet 2. (TFS 5454)

81. The Designer Checklist spreadsheet name has been changed to "Designer_Checklist.xlsx". (TFS 5457)
82. On the BRADD Graphical User Interface "Tools, Options, Design/Quantities" tab, the "Post process BRADD and LRFD output into PDF Format" was sometimes greyed out and could not be selected by the user. This has been fixed. (TFS 5461)
83. The Unit Costs menu field help titles for "Reinforcement Bars Epoxy" and for "Reinforcement Bars Stainless Steel" were incorrect and have been revised. (TFS 5463)
84. BRADD was revised to stop with an error if the location of the MicroStation executable was incorrectly set by the user. (TFS 5464)
85. On the Abutment Plan detail for traditional abutments, for certain situations the Vertical Wall Barrier end termination was being drawn incorrectly. This has been corrected. (TFS 5465)
86. The BRADD Graphical User Interface "File / Open Job Group / Recent" dialog has been enhanced to allow the user to double-click on a Path to open that Job Group. (TFS 5467)
87. BRADD was detailing a Mechanical Splice System across an abutment expansion joint. This is incorrect, as there should never be any type of splice across an expansion joint. This has been fixed. (TFS 5483)
88. If the path for the location of the MicroStation DGN files contains parenthesis, BRADD can generate the DGN files, but an error is returned when MicroStation tries to produce a PDF of the drawing set. A check has been added to BRADD to stop with an error if the path contains parenthesis. (TFS 5490)
89. On the Structure Plan At End Of Beam detail, the paving notch was not consistently detailed. This has been fixed. (TFS 5489)
90. BRADD Users Manual, Section 3.2.8.2.3, has been revised to describe the means by which the controlling stirrup spacing from the PSLRFD runs is applied to box beams. (TFS 5510)
91. For bridges with skew angles $> 75^\circ$ and traditional abutments, the Slab Reinforcing Plan detail where the S7 bars are parallel to the #6 bars at the end of deck, four additional S7 bars have been added to match with the #6 bars at the end of deck. (TFS 5512)
92. For Integral Abutment Rectangular Wingwalls, BRADD was detailing too many horizontal bars between the top of the pile cap and the top of the wingwall. This has been fixed. (TFS 5515)

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93. For bridges with a staged construction joint in the superstructure and certain skew angles, on the Slab Reinforcing Plan the constant width transverse steel was not being detailed on the Stage 2 side of the deck. This meant that, in some cases, the construction joint splices in the deck were not being detailed. This has been fixed. (TFS 5524)