

**Bureau of Project Delivery
Bridge Design and Technology Division**

BRADD

No. 041
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Release of Version 3.2.2.0

PennDOT's Bridge Automated Design and Drafting Software (BRADD) has been revised as described in the attached Summary of July 2015 Revisions - Version 3.2.2.0. This version will automatically be distributed as a free update to all existing BRADD v3.2.1.0 licensees.

Consultants and others with a license for version 3.1.6.2 and earlier can obtain BRADD Version 3.2.2.0 by paying an update license fee of \$1,590 (including tax) for private organizations and \$159 (including tax) for governmental agencies. Use the Update Form located in the Ordering/Updating section on the PennDOT BRADD Software website at <http://bradd.engrprograms.com/>.

Consultants and others without a license can obtain BRADD Version 3.2.2.0 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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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."

SUMMARY OF JULY 2015 REVISIONS - VERSION 3.2.2.0

Since the release of BRADD Version 3.2.1.0, many reported operational issues have been addressed. This release of BRADD Version 3.2.2.0 contains the following revisions:

1. Version 2.9.0.0 of PennDOT PSLRFD has been incorporated into BRADD. (VI 4794, VI 5127)
2. Version 2.3.0.0 of PennDOT STLRFD has been incorporated into BRADD. (VI 4795)
3. Version 1.14.0.0 of PennDOT ABLRFD has been incorporated into BRADD. (VI 4796, VI 5126)
4. Version 1.7.0.0 of PennDOT BPLRFD has been incorporated into BRADD. (VI 4125)
5. BRADD is now compiled using Visual Studio 2012 which requires Microsoft's .NET Framework 4.5. During installation .NET Framework 4.5 will be installed if it is not already present on the PC. (VI 4385, VI 4667)
6. An additional MicroStation design file has been added to the BRADD design file drawing generation process. The new file is a single design file containing all the generated sheets as reference files which are organized as a single column of sheets. The new design file is characterized by the word 'ALL' in the file name. (VI 4968)
7. For integral abutments, the straight line slope between the bearing seat elevations at each end of any beam in the cross section is computed and then compared to the maximum permissible vertical grade of 5%. If the slope for any beam exceeds 5% then BRADD stops with an error. Previously, BRADD incorrectly compared the 5% limit to the user input vertical grade before and after the point of vertical intersection (PVI) of a vertical curve. (VI 4644)
8. Publication 408/2011, Change No. 8 (April 2014) and Publication 7 (Construction Items Catalog) dated 10/21/2014 have been included in BRADD. (VI 5044)
9. The AutoTAB files have been added to the 'Design / Quantities' tab 'Total Cost / Quantity Files' list. (VI 5034)
10. Barmarks for similar integral abutment pile cap transverse reinforcement bars have been consolidated, reducing the number of different barmarks. (VI 4969)
11. A table has been added to the integral abutment 'Elevation' detail documenting the locations, numbers of bars, and the barmarks of the pile cap transverse reinforcement. (VI 4973)
12. A problem has been corrected where the shear ratings on the BRADD drawings were not representative of the actual vertical stirrup spacing detailed on the drawings. BRADD has been

updated so that the final vertical stirrup spacing which is detailed on the drawings is used in the prestressed beam analysis runs for the ratings. (VI 4734, VI 4850)

13. The ability to specify approach slab lengths for structures with integral abutments has been added to BRADD as per BD-667M, Change 3, Sheet 7. The beam angle is used as the skew angle when referencing the 'Minimum Approach Slab Length Table'. (VI 4631, VI 5031)
14. The minimum wingwall lengths and the girder depth used for determining integral abutment wingwall type were revised to reflect the updates to BD-667M, Change 3. The acute angle between the centerline of bearing and the front face of the wingwall is used as the skew angle. (VI 4630, VI 5031)
15. The check for the minimum allowable skew angle for integral abutment bridges has been changed in BRADD. Now the angle formed between the beams and the centerlines of bearing is checked against the DM-4 Appendix G1.2.2. minimum allowable skew angle. (VI 5025)
16. Corrected a problem for integral abutments where the minimum distance from the end of the beam to the rear face of the backwall (1'-0") as specified in BD-667M was not maintained in all cases. (VI 4811)
17. The approach slab quantities have been divided into separate columns for each approach slab. (VI 4413)
18. The #5 U-bar cover at the ends of the integral abutment approach slabs has been revised from 2" to 3" as per BD-628M, Change 1. (VI 3977)
19. The #4 L-bar cover at the paving notch for full depth diaphragms without a backwall has been revised from 2" to 3" as per BD-656M, Change 1. (VI 3979)
20. The 'Typical Sidewalk' has been renamed to 'Integral Sidewalk' as per BD-601M, Change 1. (VI 4264)
21. The appearance of the Designer Notes on the BRADD drawings has been refined to make them more prominent. (VI 4606)
22. Callouts have been added for the limits of the AAAP Cement Concrete and the Class A Cement Concrete for integral abutments and integral abutment wingwall section details. (VI 4415)
23. An alert window has been added and will appear when the 'Generate Drawings' tab is selected in BRADD and the current list of BRADD drawings has not been generated from the most recent design/quantity runs. (VI 4327)

- 24. A table listing the paving notch depth at the centerline of bearing for each adjacent or spread box beam has been added to the geometry output file. (VI 3959)
- 25. The PREVIEW drawing output option has been removed from BRADD 'Generate Drawings' tab. (VI 4074)
- 26. The appearance of the BRADD Graphical User Interface has been improved when running Windows with the 'Medium - 125%' text size setting. (VI 4486, VI 5009)
- 27. Notes were added to the "PIPE PILE-TO-PILE CAP CONNECTION DETAIL" and the "PLACEMENT SEQUENCE" detail to reflect updates to BM-667M, Change 3. (VI 4632)
- 28. The path lengths used on the "Generate Tab" for the following BRADD items have been increased (VI 4886):

	Old Limit	New Limit
Job Group Path	82 characters	160 characters
Sheet Sub-Path	24 characters	72 characters
Design File Path (combined Job Group path and Sheet Sub-Path)	106 characters	176 characters

- 29. The BRADD "Typical Section" detail has been updated such that the cross slope arrows always point downward and the cross slope values are always displayed as positive values. (VI 4888)
- 30. The 'Beam Dap Details' displayed on the BRADD drawings have been updated so that the Abutment 1 section is always displayed to the left of the Abutment 2 section. (VI 4889)
- 31. The top longitudinal reinforcement bars for adjacent box beam superstructures have been moved above the transverse beam reinforcement as per PennDOT BD e-Notification No. 44 and shown in BD-661M, Change 3. (VI 4890)
- 32. The BRADD 'Project Control' menu was renamed 'Reinforcement Control' and an option was added to BRADD to allow for the rounding down of straight bar reinforcement lengths to the nearest inch, and to allow for bent bar reinforcement lengths to be rounded up to the nearest inch. (VI 4891)
- 33. The High Abutment stem J-bars located at the rear face of the abutment have been modified so that they extend up to the bearing seat. This change was made to match a design assumption that is made by ABLRFD for High Abutments. (VI 4309)
- 34. The minimum haunch note located on the BRADD 'Typical Section' detail has been changed to show the required minimum haunch thickness listed in Table 1 of BD-601M, Sheet 8. Previously, BRADD displayed the actual minimum haunch value calculated by BRADD for all beams. (VI 4340)

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35. The presentation of the "DEBONDING DETAIL" which includes a debonded strand table and debonded strand detail has been updated to more clearly represent the debonding information for each debonding region. (VI 4787)
36. The procedure BRADD uses to implement crack control debonding in the PSLRFD Analysis runs has been updated to ensure that draped strands are not debonded. (VI 4989)
37. Added a menu item to the BRADD Graphical User Interface \ Help menu to link to the PennDOT 'Integral Abutment Spreadsheet' web page. (VI 4654)
38. A note has been added to the 'Geometry / Sidewalk / Use the Alternate Sidewalk Detail?' menu item help to indicate when the Alternate Sidewalk Detail may be used as specified by DM-4 C2.3.2.2.2. (VI 4750)
39. For both traditional and integral abutments, the 10° angle callout has been added to the 'Barrier Plan View' detail for flared ends. (VI 4971)
40. A display problem has been corrected with the headings in the 'Design / Quantities' tab 'Design & Quantity Calculation Files' list window. (VI 3735)
41. The steel flange diaphragm member in the BRADD 'Typical Section at Abutment' detail has been revised so the top flange is no longer embedded in the concrete deck as per the BC-767M, Change 2, Sheet 2. (VI 3893)
42. For structures with integral abutments and prestressed I-beams (which have no beam notch), a problem documented in BRADD e-Notification No. 40 has been fixed which caused the display of the shear stirrup spacing shown in the 'Prestressed I-Beam Elevation' detail to be inconsistent with the shear stirrup spacing used in the PSLRFD analysis runs. (VI 4976)
43. An incorrect dimension for the 'C' dimension in the Type 11 reinforcement bars of integral abutment wingwalls has been fixed. (VI 4977)
44. For traditional abutment superstructure only jobs, a problem has been fixed where the quantity and cost of the deck reinforcement was not being calculated. (VI 4986)
45. The longitudinal end diaphragm reinforcement has been modified for shallow box beam superstructures without a paving notch. For the case where three rows of bars will not fit, only two rows, placed at a reduced spacing, will be detailed. (VI 3705)
46. A warning has been added to the Geometry Output file 'Edge of Deck Thickness and Elevation' output table in the 'Level Overhang Edge Thickness' column for those values where the deck thickness calculated is less than the minimum allowable slab thickness. (VI 4274)

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47. For steel beam superstructures, the 'Staggered Diaphragms' menu item has been removed. BRADD has been modified to detail the diaphragms parallel to the centerline of bearing for skews 90 to 70 degrees and staggered for skews less than 70 degrees as per BC-754M. (VI 4305)
48. The 'Typical Reinforcement at Scuppers' detail has been removed from adjacent box beam superstructure jobs. (VI 4538)
49. For certain integral abutment jobs with a horizontal curve, an error has been corrected where BRADD would not calculate a valid pile spacing using the recommended pile number and spacings. (VI 4600, VI 5030)
50. A problem with the displayed length of the S7 bars on the 'PLAN – BARRIER & SLAB DETAIL' has been corrected. (VI 4603)
51. An issue has been corrected with the barrier height being drawn incorrectly on the safety wing detail. (VI 4641)
52. A designer note documenting the user-defined barrier width, height, and weight properties was added to the 'Typical Section', 'Concrete End Diaphragm', and 'Slab Section' details. (VI 4803)
53. The designer note: 'The Designer is responsible for verifying that the geometry of an Option 1 (as per BC-755M) type sole plate on the fascia beams does not interfere with the cheek walls, especially for adjacent beam structures.' was added to the Designer Checklist spreadsheet / Design Notes tab. (VI 4892)
54. Miscellaneous clarifications were made to the BRADD details including refinements to the dimensioning and line work. (VI 4557, VI 4910, VI 4595, VI 4745, VI 4985, VI 4933, VI 4503, VI 4505, VI 4548, VI 4555)
55. A problem has been fixed where BRADD would use a sidewalk depth of 0" in superstructures with a raised sidewalk and a user-defined barrier located on one side of the structure. BRADD has been modified to use the correct sidewalk depth. (VI 4982)
56. The word 'EFFECTIVE' has been added to the BRADD 'Typical Draped Strand Configuration' detail for the callout of the Center of Gravity of Strands (to match the proper terminology from the PSLRFD output table). (VI 4990)
57. For jobs where the deck is rotated about the PG line and the PG line distance from the top of the deck varies along the deck length, the location of the PG line callout has been fixed so the callout is always pointing to the top of deck. (VI 4991)

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58. An issue with integral abutments causing the steel pile orientation to be drawn incorrectly in the wingwall elevation and integral abutment elevation details has been corrected. (VI 5005)
59. An erroneous warning message related to concrete strength has been eliminated from the seismic controller log file. (VI 5001)
60. Removed 'MAY BE USED' (for Type B anchor bolts) from the anchor bolt callout note on BRADD PA Type 10M section detail as per the November 2014 CHANGE 3 updates to BD-617M. (VI 5021)
61. The number of vertical barrier reinforcement bars in the middle section of the barrier (between the 10' reduced spacing sections at each barrier end) was being calculated incorrectly for some deck geometries. The bar quantity has been fixed. (VI 5010)
62. The BRADD 'Section Thru End Diaphragm at Beams' detail has been modified to fix a problem where the paving notch depth was called out incorrectly and the ends of the paving notch were drawn in the wrong locations. (VI 5007)
63. Incorrect lengths in the Remarks field in the Rebar Schedule for some varying transverse deck reinforcement have been fixed. (VI 5011)
64. A new check and warning have been added to the BRADD installation to determine if a future, unsupported, version of the Bentley drawing generation software is installed on the user's computer in order to prevent BRADD from trying to use the unsupported Bentley drawing generation software. (VI 5042)
65. For integral abutments, the BRADD Scour Protection Detail has been updated as per the November 2014 CHANGE 3 updates to BD-667M. (VI 5028)
66. The WATERPROOFING sheet has been removed from the set of BRADD drawings due to the addition of these details to BC-751M and BC-788M. (VI 5017)
67. An issue has been corrected where the locations of the 'Begin Structure' and 'End of Structure' stations were called out incorrectly on the 'General Plan' detail for adjacent superstructures on a horizontal curve. (VI 5013)
68. A problem has been fixed with the calculation of the number of and lengths of varying transverse slab reinforcement at the acute deck corners when fanned bars exist. (VI 5012)
69. BRADD has been updated to allow the use of User-Defined Barriers if the Alternate Sidewalk option has been chosen, and the sidewalk width equals zero on the side with the User-Defined Barrier. (VI 4983)

70. An issue has been fixed where, in the obtuse deck corners with staged construction, both the top and bottom transverse deck bars were labeled with a single callout. Separate calculations and separate callouts have been added for the top bars and the bottom bars to correct this issue. (VI 4591)
71. Staged construction information has been added to the 'Placement Sequence Plan' detail, if applicable. (VI 4575)
72. Several values for Cohesion and Effective Friction Angle in the 'Bearing Capacity' table located on the drawings have been changed from '-1.0' to 'N/A' when the values are not required as input to the ABLRFD program. (VI 4515)
73. The appearance of the '1" Closed Cell Neoprene Sponge' in the BRADD Approach Slab 'Section A-A' and 'Section B-B' details has been updated to more closely match BD-628M, Sheet 35. (VI 4948)
74. Contract drawing notes from BD-628M, Sheet 2 have been added to the integral abutment approach slab plan details. (VI 4947)
75. A drawing issue with the geometry of the barrier ends when the barrier is not located at the outside edge of deck has been corrected on the BRADD 'Barrier Detail'. (VI 4617)
76. A Beam Angle callout was added to the 'End Diaphragm Layout at Abutment' details shown on 'Framing Plan 2' drawing for all Spread Beam superstructures. (VI 4846)
77. The structural steel grade General Note for H-Piles has been updated to specify Grade 50 and to remove the metric designation. (VI 5045)
78. For steel beam bridges without a backwall, the dimensions of the two reinforcement bars called out in the "Section Thru Concrete End Diaphragm" detail have been corrected to follow BD-611M. (VI 4372)
79. On the 'Full Depth End Diaphragm' detail for integral abutments, a problem has been fixed where the callouts for the diaphragm longitudinal reinforcement on the outside of the fascia beams could sometimes be transposed with the same bars from the other side of the abutment. (VI 4256)
80. The beam cross-section for all beam types, not just box beams, has been added to the 'Beam Seat Detail'. (VI 4361)
81. An incorrect dimension along the front face of the abutment at the abutment corner on the BRADD 'Section C-C' detail (abutment corner with safety wings) detail has been fixed. (VI 5000)

82. A problem where for certain conditions nearly all dimensions shown in the 'Wingwall Barrier' detail are labeled as '0"' has been fixed. (VI 4998)
83. For superstructures with prestressed I-beams, the 'Full Depth End Diaphragm' detail and the 'Intermediate Diaphragm' detail have been revised to only have one splice for the diaphragm longitudinal reinforcement to follow what is shown in BD-655M, Sheet 1. (VI 4533, VI 4994)
84. Documentation has been added to User Manual Chapter 3 to explain how BRADD assumes the top of deck is located beyond the gutterlines for calculating deck elevations. (VI 4296)
85. The 'Figure 3.5.3.1.2.1-1 Abutment/Footing Splice Lengths' and description of the reinforcement has been revised to clearly distinguish between the cutoff bar and the full height bar. (VI 5038)
86. Non-composite concrete decks are no longer an option for steel rolled beam design. (VI 4795)
87. For steel beam superstructure designs, the BRADD error message that appears in the Superstructure Controller Log file when the maximum overhang exceeds the maximum beam depth has been revised to display the maximum overhang value and the maximum beam depth values. Also, when the error message appears these two input items are now flagged as suspect input. (VI 4108)