FLH Standard Criteria Files

Section 5 –

Curb/Curb & Gutter Criteria Files

Curb/Curb & Gutter Criteria Files

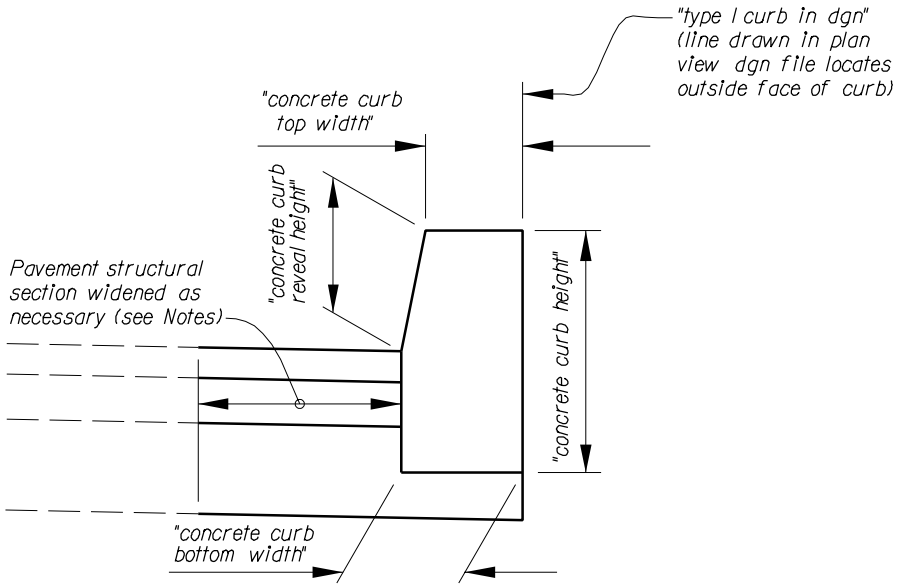
Criteria File	Elements Drawn by Criteria File
c_crb1d.x08	Full depth concrete curb plus base course layers (if any) under curb. Uses line(s) drawn in plan view dgn file to set station ranges for curb and to locate offset for outside face of curb.
c_crb1s.x08	Full depth concrete curb plus base course layers (if any) under curb. Uses exceptions data file to set station ranges for curb.
c_crb2d.x08	Concrete curb/gutter plus base course layers (if any) under curb/gutter. Uses line(s) drawn in plan view dgn file to set station ranges for curb/gutter and to locate offset for outside face of curb.
c_crb2s.x08	Concrete curb/gutter plus base course layers (if any) under curb/gutter. Uses exceptions data file to set station ranges for curb.
c_crb3d.x08	Asphalt curb plus base course layers (if any) under curb. Uses line(s) drawn in plan view dgn file to set station ranges for curb and to locate offset for outside face of curb.
c_crb3s.x08	Asphalt curb plus base course layers (if any) under curb. Uses exceptions data file to set station ranges for curb.
c_crb4s.x08	Widens pavement a fixed distance, then draws curb and curb backfill, pavement and base course layers under curb, and roadway foreslope. Station ranges for curb set using the exceptions data file. Combines the functionality of a typical curb criteria with the functionality of a roadway widening criteria and a foreslope criteria.
c_crb5d.x08	Widens pavement as necessary, then draws curb, pavement section foreslope, construction cut/fill slope, and curb backfill. Station ranges and offset from centerline for curb are set using lines drawn in plan view dgn. Combines the functionality of a typical curb criteria with the functionality of a roadway widening criteria, a foreslope criteria, and a slope selection criteria.
c_crbkfd.x08	Draws backfill embankment behind curb. Uses "in dgn" line for station ranges and hinge point offset from roadway centerline.
c_crbkfs.x08	Draws backfill embankment behind curb. Station ranges set in exceptions data file.
fh_crb1d.x08	Full depth concrete curb plus base course layers (if any) under curb. Uses lines drawn in plan view dgn file to locate station ranges for curb. Closes off any base course layers under curb with vertical lines at outside face of curb. Current point upon completion of criteria is outside top corner of curb.

fh_crb1s.x08	Full depth concrete curb plus base course layers (if any) under curb. Uses station ranges specified in exceptions data file to locate curb. Closes off any base course layers under curb with vertical lines at outside face of curb. Current point upon completion of criteria is outside top corner of curb.
fh_crb2b.x08	Bituminous curb plus pavement and base course layers under curb. Closes off all layers with vertical lines at outside face of curb. Current point upon completion of criteria is outside bottom corner of curb.
fh_crb2t.x08	Bituminous curb plus pavement and base course layers under curb. Closes off all layers with vertical lines at outside face of curb. Current point upon completion of criteria is outside top corner of curb.
c_median.x08	Post-processing criteria to draw a parking area median on top of existing parking area x-sections. Uses "in dgn" lines for station ranges, offset, and width of median. (CFL only)
median2.x08	Post-processing criteria to draw a median with full depth curb onto previously drawn proposed x-sections. Uses "in dgn" lines for station ranges, offset, and width of median. User needs to delete/re-intersect pavement structure lines in x-sections after running this criteria. (CFL only)

c_crb1d.x08

Concrete curb located using line(s) drawn in plan view dgn file. Draws the following elements:

- concrete curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines
- widens pavement structural section as necessary



define variables that must be assigned values in the input data file:

"concrete curb bottom width"
"concrete curb height"
"concrete curb reveal height"
"concrete curb top width"

define_dgn variables that must be assigned values in the input data file:

"type 1 curb in dgn"

Variables that must be defined in exceptions data file:

none

Notes for c_crb1d.x08:

1. The station ranges for the curb are determined by lines drawn in a plan view dgn file. Level/symbology for these lines is specified in the proposed cross-section input file using define_dgn variable "type 1 curb in dgn".

2. The offset distance from the roadway centerline to the "type 1 curb in dgn " lines in plan view dgn also controls the distance of the curb from the roadway centerline. The outside (back) face of the curb is placed to match the offset from centerline of the "in dgn" line; the roadway structural section is widened as necessary to accomplish this.

Notes for c_crb1d.x08 (continued):

3. An optional berm coming off the top of the curb may be drawn by setting the "~type 1 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 1 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

4. The "type 1 curb in dgn" line will be found if it is drawn anywhere from the roadway centerline out to a distance of 50 meters off the centerline; this search distance may be adjusted by defining "~max curb search dist" in the input file.

5. If the curb is to be located exactly where the preceding criteria left off, then the"type 1 curb in dgn" line may be drawn anywhere from the centerline out to the theoretical offset distance for the back face of the curb.

6. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

7. c_crb1d.x08 should always be followed by a sidewalk criteria (probably c_wlk1d.x08), or a slope selection criteria.

8. Upon completion of c_crb1d.x08, the current point is the outside top corner of the curb or, if the optional berm is used, the outside point of the berm.

9. Don't use c_crb1d.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

10. The differences between c_crb1d.x08 (this criteria file) and c_crb1s.x08 are:
    - c_crb1d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - c_crb1s.x08 uses the exceptions data file to specify the station ranges for the curb
    - c_crb1d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
    - c_crb1s.x08 always places the curb where the preceding criteria left off

11. This criteria is a modified version of fh_crb1d.x08 designed to allow more flexibility and to fix the following problems:
    - curb was drawn using same level/symbology as MSE select backfill lines
    - offset of curb from centerline wasn't controlled by the "in dgn" line
    - no distinct "in dgn" lines for different types of curb meant only one type of curb per project

12. This criteria marks a key point used by the improved sidewalk criterias c_wlk1[d,s].x08.

13. The level/symbology used to draw the curb section will allow the user to get both slope stake books and earthwork quantities. However, in order to accomplish this the earthwork input file and the slope stake report dialog must be set up exactly as follows:

Notes for c_crb1d.x08 (continued):

In the **earthwork input file**:

- Make sure there is a Proposed Undercut with soil type CONC_CURB and lv=18,19 co=18,19. Set all the multiplication factors to 0.000001.

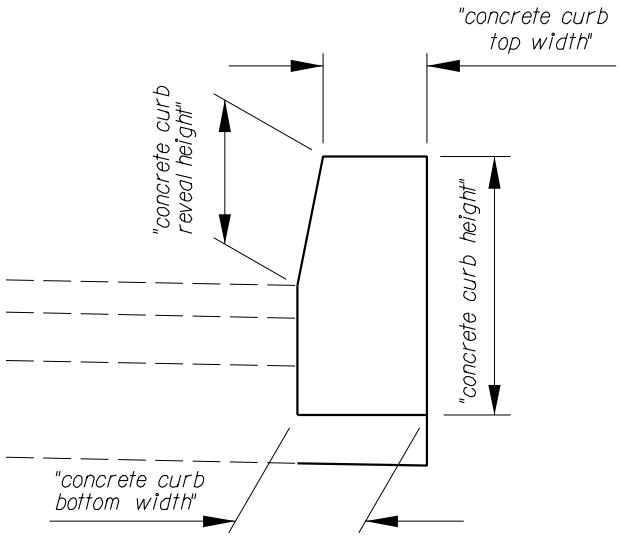
In the **slope stake report dialog** include only the following level/symbology:

- The level and color of the bottom layer of the pavement section only. Don't include the level/symbology for any of the other pavement layers.
- lv=18 and co=18. These are a part of (but not all of) the curb elements. Don't include the remaining curb elements (lv=2,19 co=0,19).
- lv=10 co=10. These are the cut/fill slope elements.
- lv=10 co=16. These are the ditch foreslope elements.
- If sidewalk is used, then add the level and color of the bottom layer of the sidewalk section. Don't include the level/symbology of any of the other sidewalk levels.
- If the curb backfill criteria was used, then add lv=20 co=20.

c_crb1s.x08

Full depth concrete curb located using station ranges in the exceptions data file.
Draws the following elements:

- concrete curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines



define variables that must be assigned values in the input data file:

"concrete curb bottom width"
"concrete curb height"
"concrete curb reveal height"
"concrete curb top width"

define_dgn variables that must be assigned values in the input data file:

none

Variables that must be defined in exceptions data file:

_d_use_type1_curb_lt
_d_use_type1_curb_rt

Notes for c_crb1s.x08:

1. The station ranges for the curb are set using the _d_use_type1_curb_[lt,rt] variables in the exceptions data file.

2. The curb is drawn at whatever distance from centerline that the preceding criteria file left off

.

3. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

Notes for c_crb1s.x08 (continued):

4. An optional berm coming off the top of the curb may be drawn by setting the "~type 1 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 1 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

5. c_crb1s.x08 should always be followed by a sidewalk criteria (probably c_wlk1s.x08), or a slope selection criteria.

6. Upon completion of c_crb1s.x08, the current point is either the outside top corner of the curb or, if the optional berm is drawn, the outside of the berm.

7. Don't use c_crb1s.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

8. The differences between c_crb1s.x08 (this criteria file) and c_crb1d.x08 are:
   - c_crb1d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
   - c_crb1s.x08 uses the exceptions data file to specify the station ranges for the curb
   - c_crb1d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
   - c_crb1s.x08 always places the curb where the preceding criteria left off

9. This criteria is a modified version of fh_crb1s.x08 designed to allow more flexibility and to fix the following problems:
   - curb was drawn using same level/symbology as MSE select backfill lines
   - no distinct _d_curb_used variable for different types of curb meant only one type of curb per project

10. This criteria marks a key point that is used by the improved sidewalk criteria files c_wlk1[d,s].x08.

11. The level/symbology used to draw the curb section will allow the user to get both slope stake books and earthwork quantities. However, in order to accomplish this the earthwork input file and the slope stake report dialog must be set up exactly as follows:
    In the **earthwork input file**:
    - Make sure there is a Proposed Undercut with soil type CONC_CURB and lv=18,19 co=18,19. Set all the multiplication factors to 0.000001.

    In the **slope stake report dialog** include only the following level/symbology:
    - The level and color of the bottom layer of the pavement section only. Don't include the level/symbology for any of the other pavement layers.
    - lv=18 and co=18. These are a part of (but not all of) the curb elements. Don't include the remaining curb elements (lv=2,19 co=0,19).

    - lv=10 co=10. These are the cut/fill slope elements.
    - lv=10 co=16. These are the ditch foreslope elements.

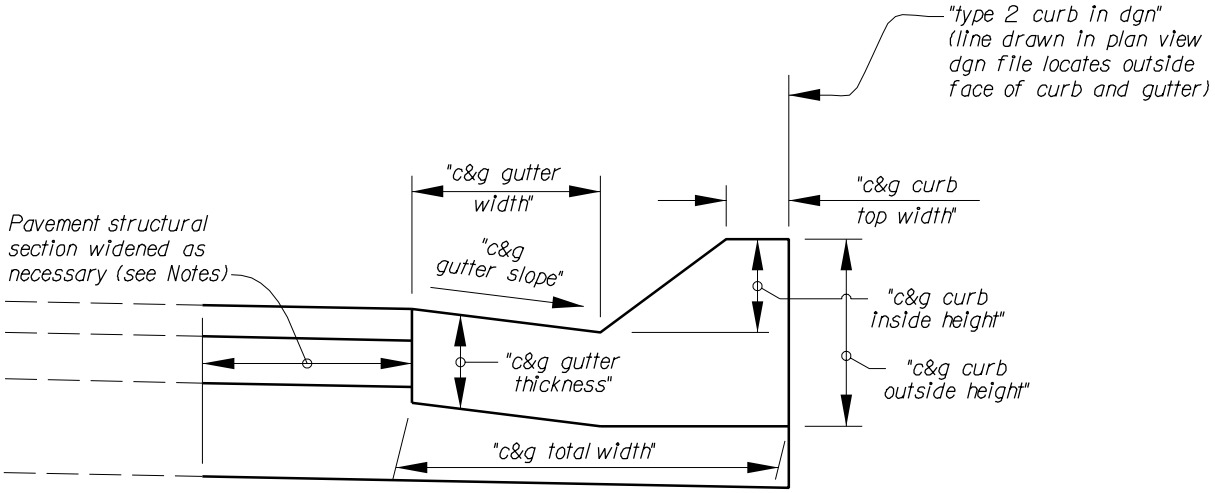
Notes for c_crb1s.x08 (continued):

- If sidewalk is used, then add the level and color of the bottom layer of the sidewalk section. Don't include the level/symbology of any of the other sidewalk levels.
- If the curb backfill criteria was used, then add lv=20 co=20.

c_crb2d.x08

Concrete curb and gutter located using lines drawn in plan view dgn file.
Draws the following elements:

- concrete curb and gutter
- base course layers (if any) under the curb and gutter
- closes off any base course layers under the curb and gutter with vertical lines
- widens pavement structural section as necessary



define variables that must be assigned values in the input data file:

"c&g curb inside height"
"c&g curb outside height"
"c&g curb top width"
"c&g gutter slope"
"c&g gutter thickness"
"c&g gutter width"
"c&g total width"
(Note: the default values for all these variables are set to match CFL standard detail M609-50)

define_dgn variables that must be assigned values in the input data file:

"type 2 curb in dgn"

Variables that must be defined in exceptions data file:

None

Notes for c_crb2d.x08:

1. The station ranges for the curb and gutter are determined by lines drawn in a plan view dgn file. Level/symbology for these lines is specified in the proposed cross-section input file using define_dgn variable "type 2 curb in dgn".

Notes for c_crb2d.x08 (continued):

2. The offset distance from the roadway centerline to the "type 2 curb in dgn " lines in plan view dgn also controls the distance of the curb and gutter from the roadway centerline. The outside (back) face of the curb is placed to match the offset from centerline of the "in dgn" line; the roadway structural section is widened as necessary to accomplish this.

3. An optional berm coming off the top of the curb may be drawn by setting the "~type 2 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 2 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

4. The "type 2 curb in dgn" line will be found if it is drawn anywhere from the roadway centerline out to a distance of 50 meters off the centerline; this search distance may be adjusted by defining "~max curb search dist" in the input file.

5. If the curb and gutter is to be located exactly where the preceding criteria left off, then the"type 2 curb in dgn" line may be drawn anywhere from the centerline out to the theoretical offset distance for the back face of the curb.

6. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

7. c_crb2d.x08 should always be followed by a sidewalk criteria (probably c_wlk2d.x08), or a slope selection criteria.

8. Upon completion of c_crb2d.x08, the current point is the outside top corner of the curb or, if the optional berm is used, the outside point of the berm.

9. Don't use c_crb2d.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

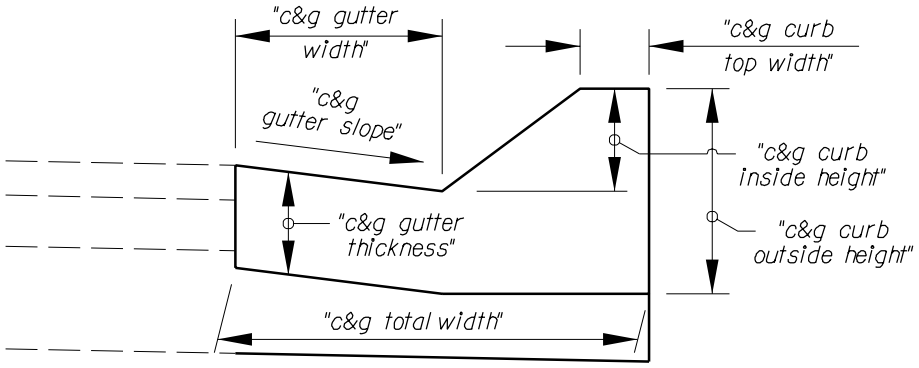
10. The differences between c_crb2d.x08 (this criteria file) and c_crb2s.x08 are:
    - c_crb2d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - c_crb2s.x08 uses the exceptions data file to specify the station ranges for the curb
    - c_crb2d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
    - c_crb2s.x08 always places the curb where the preceding criteria left off

11. This criteria marks a key point used by the improved sidewalk criterias c_wlk1[d,s].x08.

c_crb2s.x08

Concrete curb and gutter located using station ranges in the exceptions data file.
Draws the following elements:

- concrete curb and gutter
- base course layers (if any) under the curb and gutter
- closes off any base course layers under the curb and gutter with vertical lines



define variables that must be assigned values in the input data file:

"c&g curb inside height"
"c&g curb outside height"
"c&g curb top width"
"c&g gutter slope"
"c&g gutter thickness"
"c&g gutter width"
"c&g total width"
(Note: the default values for all these variables are set to match CFL standard detail M609-50)

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

_d_use_type2_curb_lt
_d_use_type2_curb_rt

Notes for c_crb2s.x08:

1. The station ranges for the curb and gutter are set using the _d_use_type2_curb_[lt,rt] variables in the exceptions data file.

2. The curb and gutter is drawn at whatever distance from centerline that the preceding criteria file left off.

3. This criteria file closes off the outside of any base course layers under the curb and gutter with vertical lines at the outside face of the curb.

c_crb2s.x08

Notes for c_crb2s.x08 (continued):

4. An optional berm coming off the top of the curb may be drawn by setting the "~type 2 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 2 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

5. c_crb2s.x08 should always be followed by a sidewalk criteria (probably c_wlk1s.x08), or a slope selection criteria.

6. Upon completion of c_crb2s.x08, the current point is either the outside top corner of the curb or, if the optional berm is drawn, the outside of the berm.

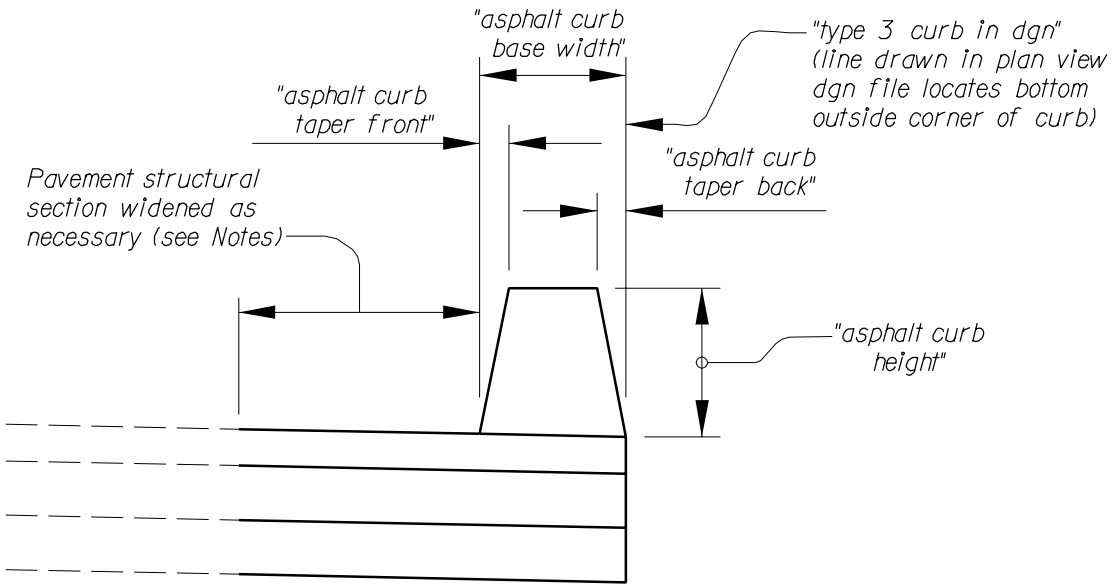
7. Don't use c_crb2s.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

8. The differences between c_crb2d.x08 (this criteria file) and c_crb2s.x08 are:
    - c_crb2d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - c_crb2s.x08 uses the exceptions data file to specify the station ranges for the curb
    - c_crb2d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
    - c_crb2s.x08 always places the curb where the preceding criteria left off
9. This criteria marks a key point that is used by the improved sidewalk criteria files c_wlk1[d,s].x08.

c_crb3d.x08

Asphalt curb located using lines drawn in plan view dgn file.
Draws the following elements:

- asphalt curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines
- widens pavement structural section as necessary



define variables that must be assigned values in the input data file:

"asphalt curb base width"
"asphalt curb height"
"asphalt curb taper back"
"asphalt curb taper front"

define_dgn variables that must be assigned values in the input data file:

"type 3 curb in dgn"

Variables that must be defined in exceptions data file:

None

Notes for c_crb3d.x08:

1. The station ranges for the curb are determined by lines drawn in a plan view dgn file. Level/symbology for these lines is specified in the proposed cross-section input file using define_dgn variable "type 3 curb in dgn".

2. The offset distance from the roadway centerline to the "type 3 curb in dgn " lines in plan view dgn also controls the distance of the curb from the roadway centerline. The outside bottom corner

Notes for c_crb3d.x08 (continued):

of the curb is placed to match the offset from centerline of the "in dgn" line; the roadway structural section is widened as necessary to accomplish this.

3. An optional berm coming off the top of the curb may be drawn by setting the "~type 3 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 3 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

4. The "type 3 curb in dgn" line will be found if it is drawn anywhere from the roadway centerline out to a distance of 50 meters off the centerline; this search distance may be adjusted by defining "~max curb search dist" in the input file.

5. If the curb is to be located exactly where the preceding criteria left off, then the"type 3 curb in dgn" line may be drawn anywhere from the centerline out to the theoretical offset distance for the back face of the curb.

6. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

7. c_crb3d.x08 should always be followed by a sidewalk criteria (probably c_wlk1d.x08), or a slope selection criteria.

8. Upon completion of c_crb3d.x08, the current point is the outside top corner of the curb or, if the optional berm is used, the outside point of the berm.

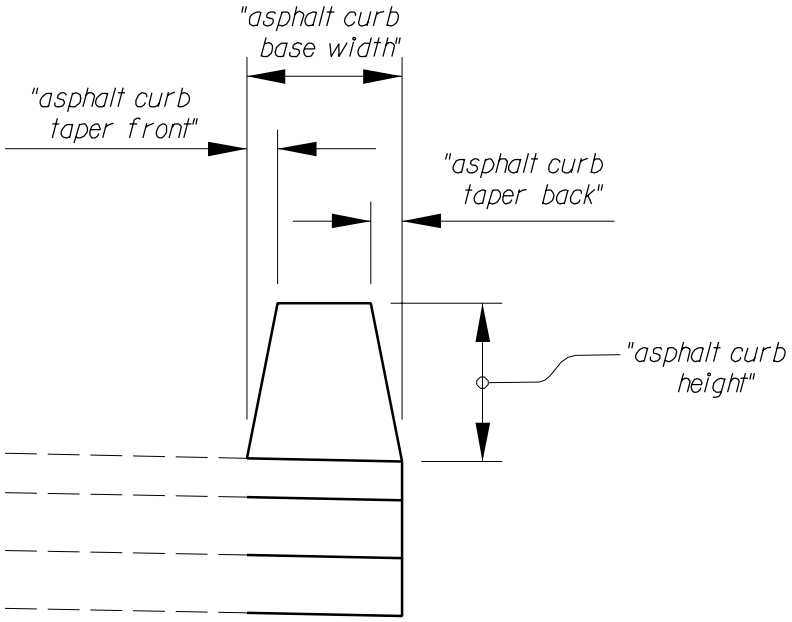
9. Don't use c_crb3d.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

10. The differences between c_crb3d.x08 (this criteria file) and c_crb3s.x08 are:
    - c_crb3d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - c_crb3s.x08 uses the exceptions data file to specify the station ranges for the curb
    - c_crb3d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
    - c_crb3s.x08 always places the curb where the preceding criteria left off
11. This criteria marks a key point used by the improved sidewalk criterias c_wlk1[d,s].x08.

c_crb3s.x08

Asphalt curb located using station ranges in the exceptions data file.
Draws the following elements:

- asphalt curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines



define variables that must be assigned values in the input data file:

"asphalt curb base width"
"asphalt curb height"
"asphalt curb taper back"
"asphalt curb taper front"

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

_d_use_type3_curb_lt
_d_use_type3_curb_rt

Notes for c_crb3s.x08:

1. The station ranges for the curb are set using the _d_use_type3_curb_[lt,rt] variables in the exceptions data file.

2. The curb is drawn at whatever distance from centerline that the preceding criteria file left off.

Notes for c_crb3s.x08 (continued):

3. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

4. An optional berm coming off the top of the curb may be drawn by setting the "~type 3 curb berm width" variable equal to the desired berm width. The slope of the berm is controlled by setting the "~type 3 curb berm slope" variable equal to the desired percent slope (up and away from centerline is a positive slope). By default this option is turned off.

5. c_crb3s.x08 should always be followed by a sidewalk criteria (probably c_wlk1s.x08), or a slope selection criteria.

6. Upon completion of c_crb3s.x08, the current point is either the outside top corner of the curb or, if the optional berm is drawn, the outside of the berm.

7. Don't use c_crb3s.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

8. The differences between c_crb3d.x08 (this criteria file) and c_crb1s.x08 are:
    - c_crb3d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - c_crb3s.x08 uses the exceptions data file to specify the station ranges for the curb
    - c_crb3d.x08 uses lines in plan view to set the distance from the roadway centerline to the curb (i.e., the distance can be variable)
    - c_crb3s.x08 always places the curb where the preceding criteria left off

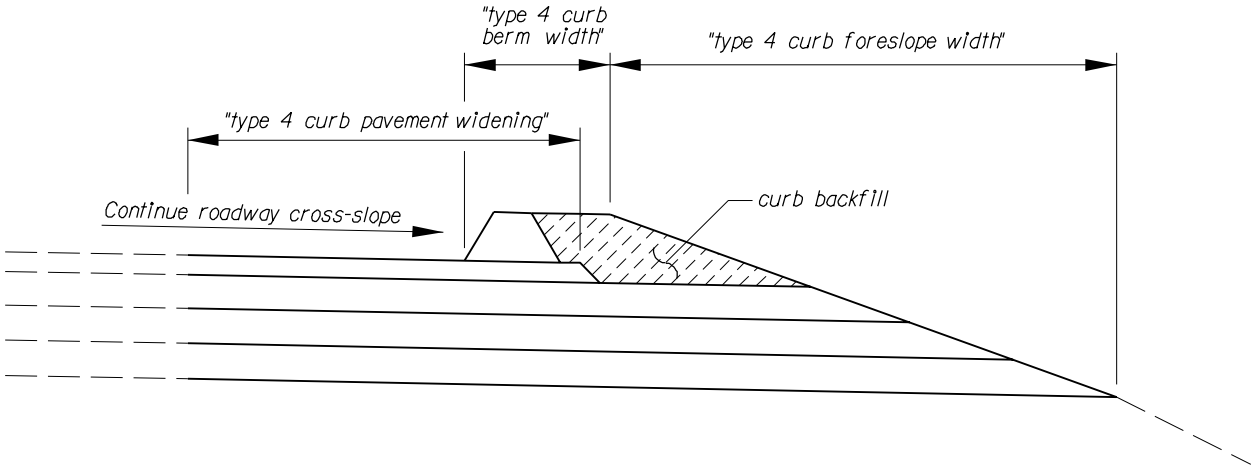
9. This criteria marks a key point that is used by the improved sidewalk criteria files c_wlk1[d,s].x08.

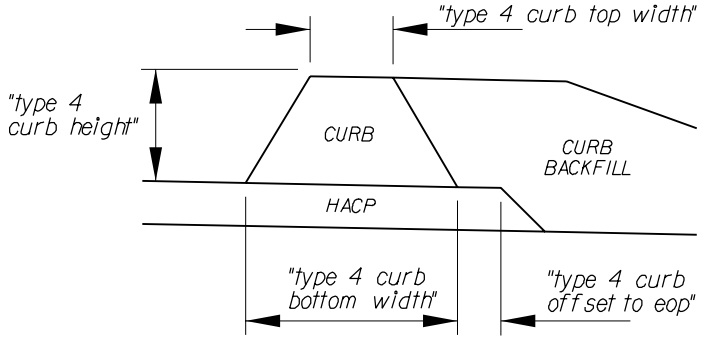
c_crb4s.x08

Asphalt curb, curb backfill, and roadway foreslope located using station range(s) in the exceptions data file.

Draws the following elements:

- widens pavement a fixed distance
- trapezoidal curb with curb backfill
- pavement and base course layers under the curb and out to roadway foreslope
- roadway foreslope





CURB DETAIL

define variables that must be assigned values in the input data file:

"type 4 curb pavement widening"
"type 4 curb berm width"
"type 4 curb foreslope width"
"type 4 curb bottom width"
"type 4 curb top width"
"type 4 curb height"
"type 4 curb offset to eop"

c_crb4s.x08

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

_d_use_type4_curb_lt
_d_use_type4_curb_rt

Notes for c_crb4s.x08:

1. This criteria was originally written to match a standard detail for Bryce Canyon NP. Default values for all the variables have been set in the criteria file to match the original detail. If the default values shown below are acceptable, then they don't have to be defined in the input file.
   "type 4 curb pavement widening" = 1.50
   "type 4 curb berm width" = 0.45
   "type 4 curb foreslope width" = 1.90
   "type 4 curb bottom width" = 0.225
   "type 4 curb top width" = 0.075
   "type 4 curb height" = 0.125
   "type 4 curb offset to eop" = 0.075

2. Combines the functionality of a typical curb criteria with the functionality of a widening criteria and a foreslope criteria.

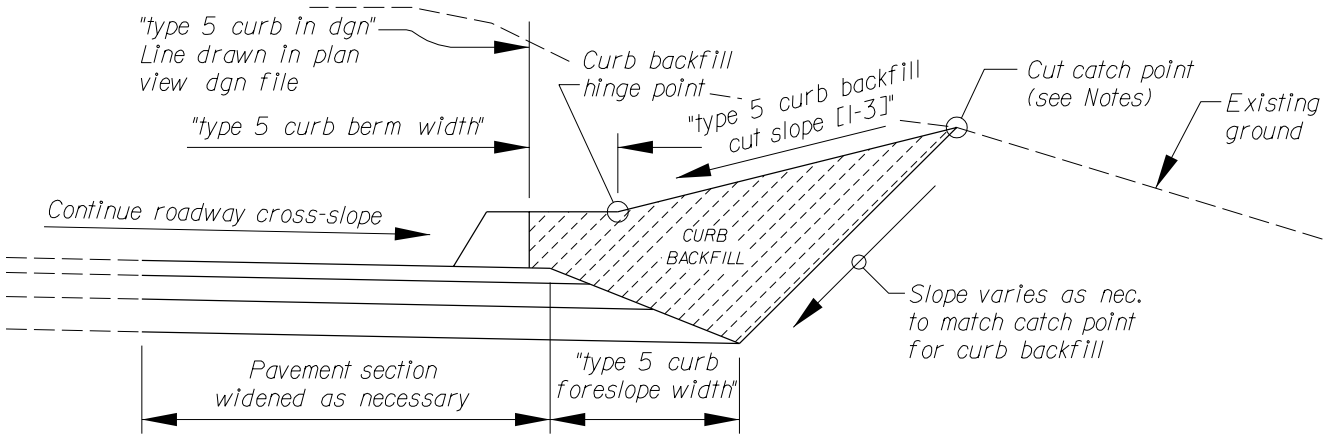
3. Station ranges for the curb are set in the exceptions data file using the following syntax:
   if sta >= 10+000 and sta =< 10+140 then
   {
   _d_use_type4_curb_lt = 1
   }

4. Must be included immediately before the foreslope criteria (fh_fs[1-5].x08) in the input file.

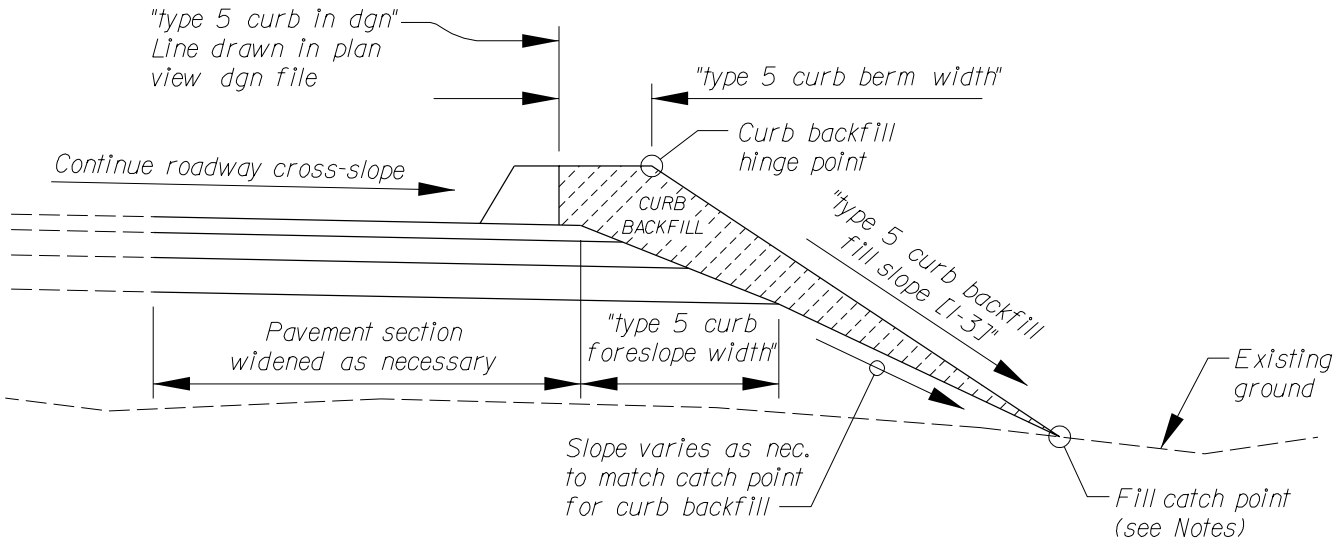
5. Level/symbology of cross-section elements drawn by this criteria is set up so that a separate quantity for curb backfill can be calculated in the earthwork procedure. (Proposed undercut, soil type = curb_backfill, lv=17, co=18)

c_crb5d.x08

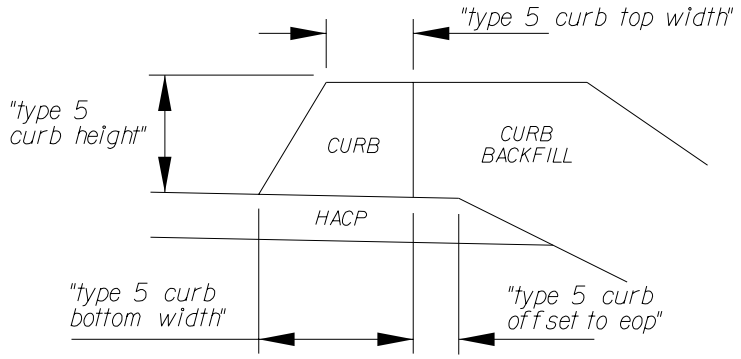
Draws asphalt curb, pavement structure widening (if any), pavement structure foreslope, cut/fill slope, and curb backfill. Station ranges for curb and distance from roadway centerline to curb are set using lines drawn in plan view dgn file. Works for both cut and fill sections.



TYPE 5 CURB DETAIL FOR CUT SECTION



TYPE 5 CURB DETAIL FOR FILL SECTION



CURB DETAIL

define variables that must be assigned values in the input data file:

"type 5 curb backfill cut slope [1-3]" (see Typical Cut Slope Details)
"type 5 curb backfill cut height [1-3]"
"type 5 curb backfill fill slope [1-3]" (see Typical Fill Slope Details)
"type 5 curb backfill fill height [1-3]"
"type 5 curb berm width"
"type 5 curb bottom width"
"type 5 curb foreslope width"
"type 5 curb height"
"type 5 curb offset to eop"
"type 5 curb top width"
"max construction cut slope" (optional, default = 1:1)
"max construction fill slope" (optional, default = 1:1)

define_dgn variables that must be assigned values in the input data file:

"type 5 curb in dgn"

Variables that must be defined in exceptions data file:

None

Notes for c_crb5d.x08:

1. Both station ranges and offset from centerline for curb are set using line(s) drawn in a plan view dgn file. Level/symbology for these lines is set in the input file with the define_dgn variable "type 5 curb in dgn".

2. Outside (back) face of curb is drawn to match the offset of the "type 5 curb in dgn" line. The pavement structure is widened as necessary to locate the curb to match the "in dgn" line.

3. When no widening of the pavement section is needed, the designer may draw the "type 5 curb in dgn" line anywhere from the centerline out to its "true" location. The "in dgn" line will be found and the curb section will be drawn from the point where the preceding criteria file left off in this situation. The criteria is written in this way in order to avoid the overlapping elements and

tolerance problems that can plague criteria files that use "in dgn" lines to locate cross-section features.

4. The "type 5 curb backfill [cut,fill] slope [1-3]" values are a single positive number corresponding to the RUN portion of a 1:RUN slope specification.

5. The "type 5 curb backfill [cut,fill] slope [1-3]" should be defined from flatter to steeper slopes. For example,
   define "type 5 curb backfill cut slope 1" 4
   define "type 5 curb backfill cut slope 2" 2
   define "type 5 curb backfill cut slope 3" 1.5

6. The "type 5 curb backfill [cut,fill] height [1-3]" values are the maximum vertical distance from the hinge point for the various slopes. If the slope doesn't catch existing ground within this vertical distance, then the next slope is checked, etc.

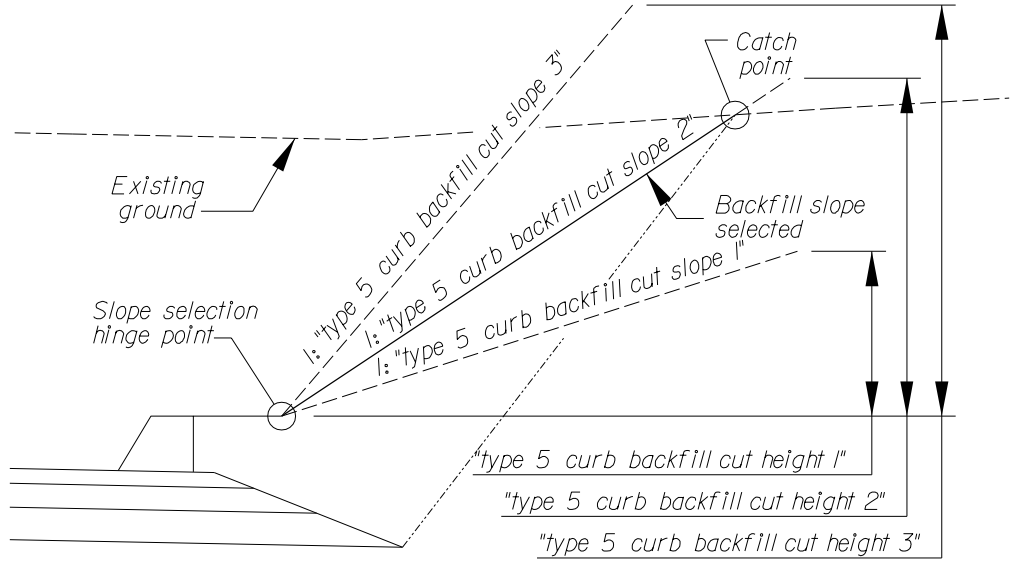
7. If the original position of the catch (as calculated with the slope/height pairs) results in a construction cut/fill slope steeper than than the "max construction [cut,fill] slope", then this criteria automatically adjusts the catch point outward so that the construction slope is equal to the maximum. By default both "max construction cut slope" and "max construction fill slope" are set to 1:1.

8. This criteria was originally written to match a standard detail for the parking areas at Joshua Tree National Park.

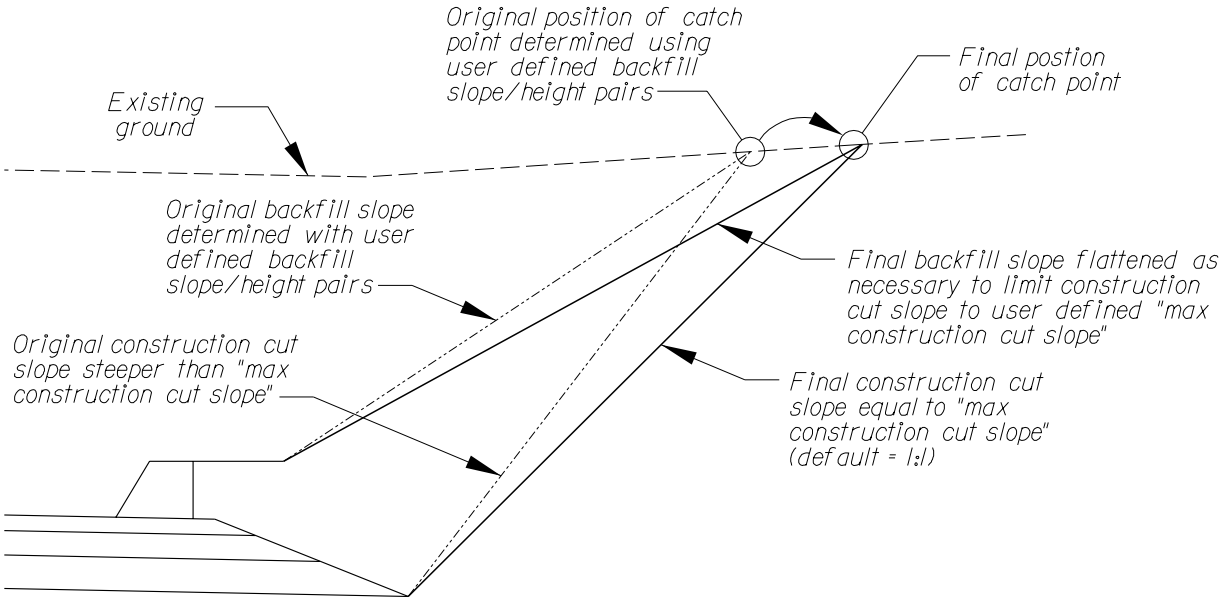
9. This criteria must be included immediately before the foreslope criteria (fh_fs[1-5].x08) and slope selection criteria (fh_ss3.x08) in the input file.

10. This criteria is not set up to calculate separate quantities for curb backfill. (Although it will work for "simple" earthwork and construction reports.)

Typical Cut Slope Selection Details

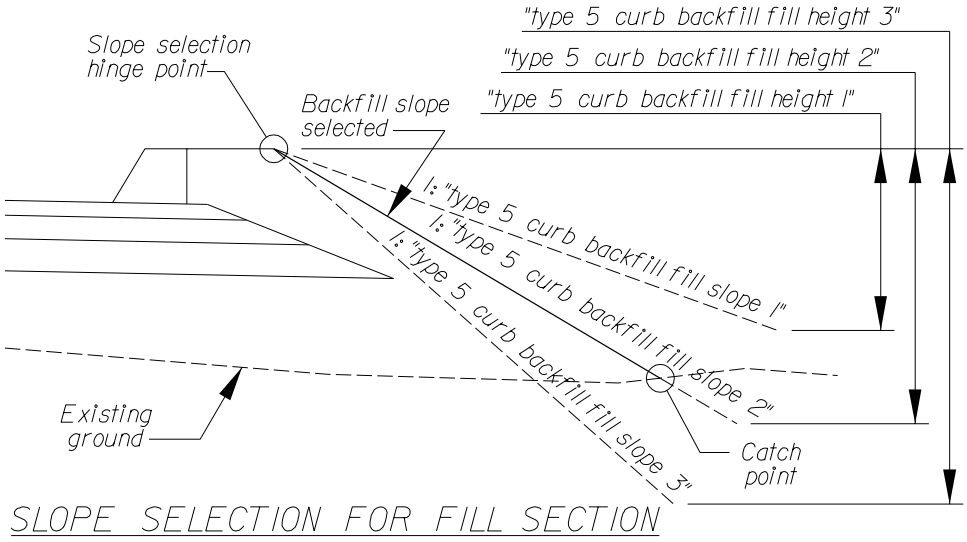


SLOPE SELECTION FOR CUT SECTION

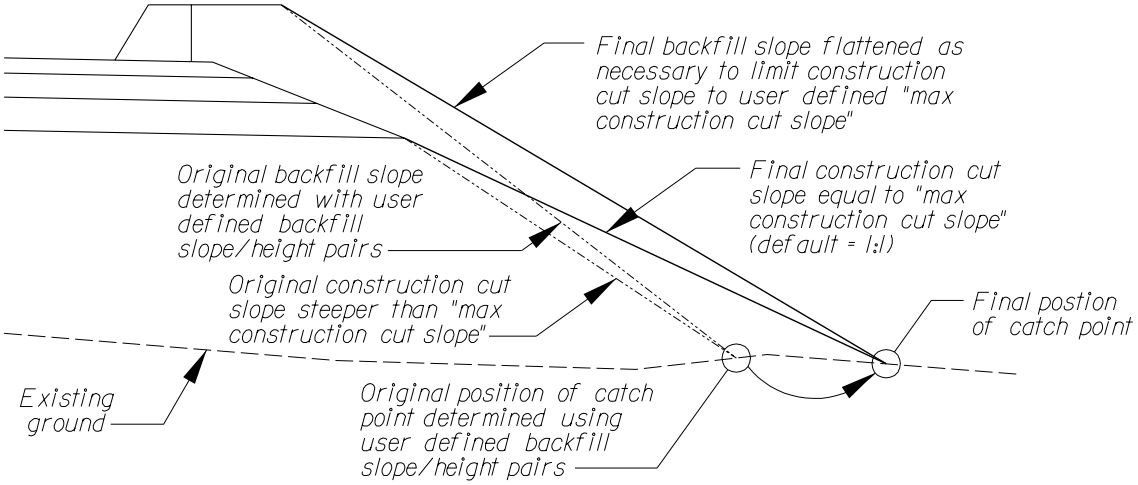


MAXIMUM CONSTRUCTION SLOPE ADJUSTMENT

Typical Fill Slope Selection Details



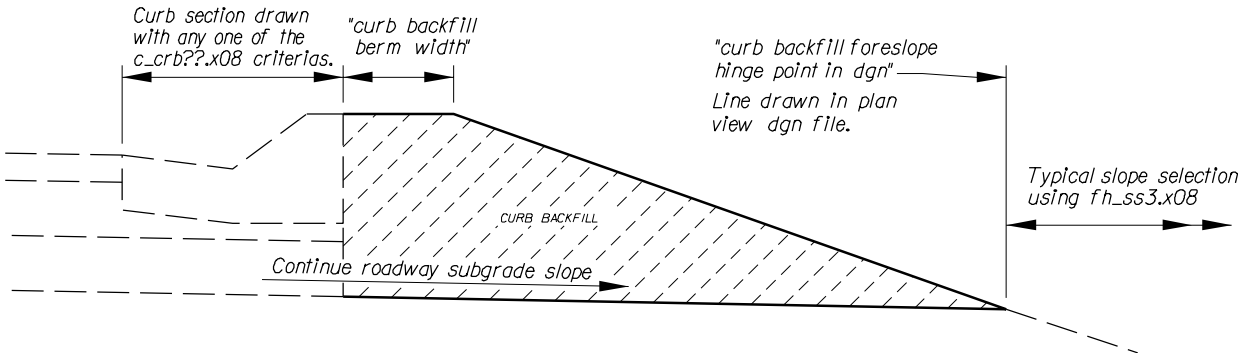
SLOPE SELECTION FOR FILL SECTION



MAXIMUM CONSTRUCTION SLOPE ADJUSTMENT

c_crbkfd.x08

Draws a backfill embankment behind curb or curb and gutter sections drawn with any of the c_crb[1-3]d.x08 criteria files. Both station range(s) for the curb backfill and the offset distance for the subgrade shoulder point are set using lines drawn in a plan view dgn file.



define variables that must be assigned values in the input data file:

"curb backfill berm width"

define_dgn variables that must be assigned values in the input data file:

"curb backfill foreslope hinge point in dgn"

Variables that must be defined in exceptions data file:

None

Notes for c_crbkfd.x08:

1. This criteria will work correctly only when it immediately follows one of the c_crb[1-3]d.x08 curb/curb and gutter criteria files. (This criteria will not work with any of the fh_crb??.x08 criterias or as a standalone criteria.)

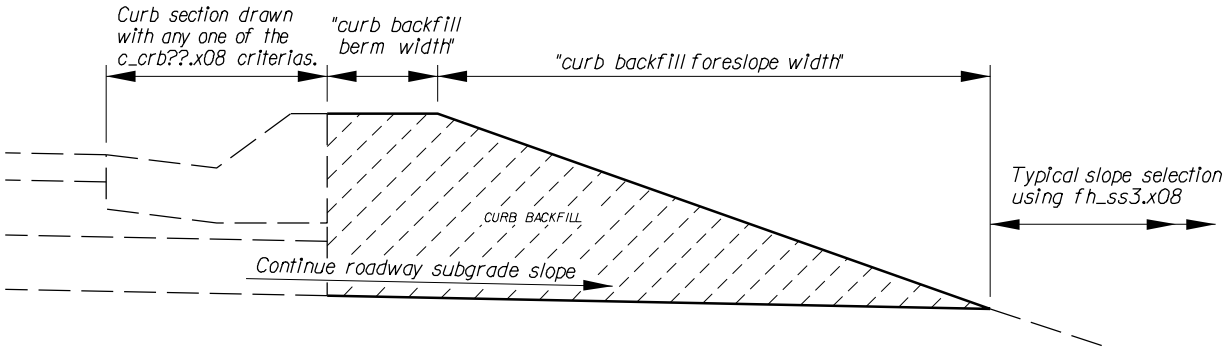
2. Both station ranges for curb backfill and the offset distance for the subgrade shoulder point are set using lines drawn in plan view dgn file.

3. The level/symbology of the elements drawn by this criteria file will allow the user to get a separate earthwork quantity for curb backfill (Proposed Undercut, lv=20 co=20) and also to get slope stake notes, etc.

4. The "curb backfill foreslope hinge point in dgn" line will be found if it is drawn anywhere from the roadway centerline out to a distance of 50 meters off the centerline; this search distance may be adjusted by defining "~curb backfill search dist" in the input file.

c_crbkfs.x08

Draws a backfill embankment behind curb or curb and gutter sections drawn with any of the c_crb[1-3]s.x08 criteria files. Station range(s) for the curb backfill are set in the exceptions data file.



define variables that must be assigned values in the input data file:

"curb backfill berm width"
"curb backfill foreslope width"

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

_d_use_curb_backfill_lt
_d_use_curb_backfill_rt

Notes for c_crbkfd.x08:

1. This criteria will work correctly only when it immediately follows one of the c_crb[1-3]d.x08 curb/curb and gutter criteria files. (This criteria will not work with any of the fh_crb??.x08 criterias or as a standalone criteria.)

2. Station ranges for curb backfill are set in the exceptions data file.

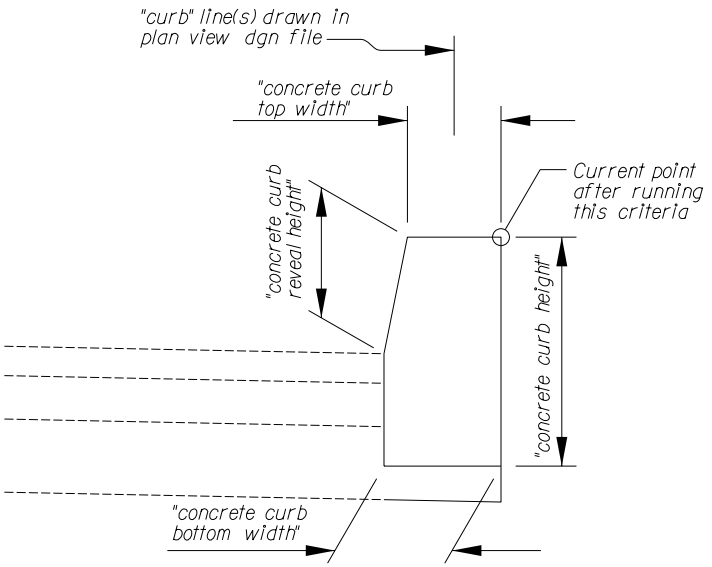
3. The level/symbology of the elements drawn by this criteria file will allow the user to get a separate earthwork quantity for curb backfill (Proposed Undercut, lv=20 co=20) and also to get slope stake notes, etc.

fh_crb1d.x08

Draws the following elements:

- concrete curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines
- leaves the current point at the outside top corner of the curb upon completion

Uses lines drawn in plan view file to locate curb.



define variables that must be assigned values in the input data file:

"concrete curb bottom width"
"concrete curb height"
"concrete curb reveal height"
"concrete curb top width"

define_dgn variables that must be assigned values in the input data file:

"curb"

Variables that must be defined in exceptions data file:

None

Notes for fh_crb1d.x08:

1. The station ranges for the curb are determined by lines drawn in a plan view dgn file. Level/symbology for these lines is specified in the proposed cross-section input file using define_dgn variable "curb".

2. The offset distance from the centerline to the "curb" lines in plan view dgn has no effect on the distance of the curb from the centerline. The "curb" lines are used only to toggle on the drawing of concrete curb on the cross-sections.

3. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

4. fh_cr1d.x08 should always be followed by a sidewalk criteria (or possibly a slope selection criteria). fh_crb1s.x08 should never be followed by a shoulder, widening, foreslope, or retaining wall criteria file; if this is done it will cause errors in the earthwork quantities because fh_crb1d.x08 closes off all the pavement and base course layers with vertical lines.

5. Upon completion of fh_crb1d.x08, the current point is the outside top corner of the curb.

6. Don't use fh_crb1d.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

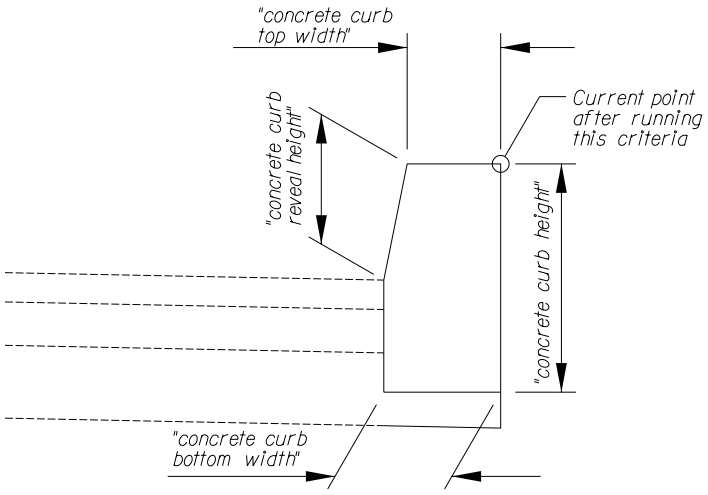
7. The only difference between fh_crb1d.x08 (this criteria file) and fh_crb1s.x08 is:
    - fh_crb1d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb
    - fh_crb1s.x08 uses the exceptions data file to specify the station ranges for the curb

fh_crb1s.x08

Draws the following elements:

- concrete curb
- base course layers (if any) under the curb
- closes off any base course layers under the curb with vertical lines
- leaves the current point at the top outside corner of the curb upon completion

Uses station ranges set in the exceptions data file to locate curb.



define variables that must be assigned values in the input data file:

"concrete curb bottom width"
"concrete curb height"
"concrete curb reveal height"
"concrete curb top width"

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

_d_curb_used_lt
_d_curb_used_rt

Notes for fh_crb1s.x08:

1. The station ranges for the curb are set in the exceptions data file using the following syntax:

```
if sta > 10+000 and sta < 10+140 then
{
_d_curb_used_lt = 1
}
```

2. This criteria file closes off the outside of any base course layers under the curb with vertical lines at the outside face of the curb.

3. fh_cr1s.x08 should always be followed by a sidewalk criteria (or possibly a slope selection criteria). fh_crb1s.x08 should never be followed by a shoulder, widening, foreslope, or retaining wall criteria file; if this is done it will cause errors in the earthwork quantities because fh_crb1s.x08 closes off all the pavement and base course layers with vertical lines.

4. Upon completion of fh_crb1s.x08, the current point is the outside top corner of the curb.

5. Don't use fh_crb1s.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

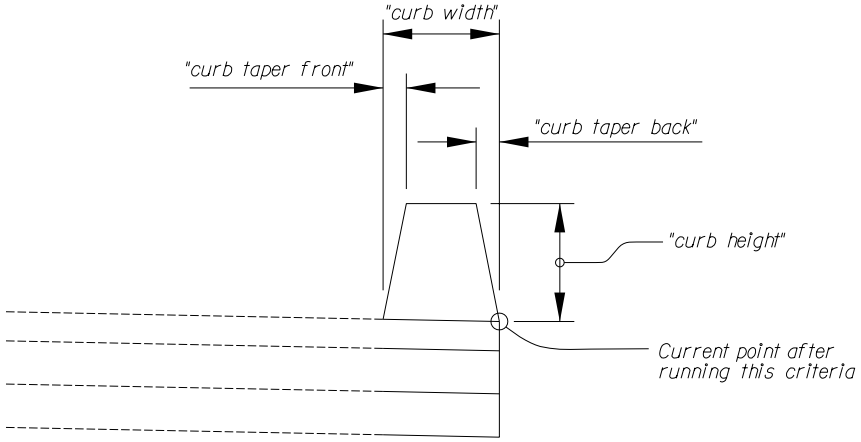
6. The only difference between fh_crb1s.x08 (this criteria file) and fh_crb1d.x08 is:
    - fh_crb1s.x08 uses the exceptions data file to specify the station ranges for the curb
    - fh_crb1d.x08 uses lines in a plan view dgn file to locate the station ranges for the curb

fh_crb2b.x08

Draws the following elements:

- bituminous curb
- pavement and base course layers under the curb
- closes off the pavement and base course layers with vertical lines
- leaves the current point at the lower outside corner of the curb upon completion (which is the only difference between this criteria and fh_crb2t.x08)

Curb is drawn for the entire length of project.



define variables that must be assigned values in the input data file:

"curb height"
"curb width"
"curb taper front"
"curb taper back"

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

None

Notes for fh_crb2b.x08:

1. There is no way to turn the curb on and off for station ranges built into this criteria. The only way the user could accomplish this would be to use multiple instances of side slope lt/rt blocks with station ranges in the proposed cross-section input file. For example, if the user wanted curb only from Stations 1+500 thru 1+600 on a project that ran from 1+000 to 2+0000 then the following syntax would have to be written into the input file:

   side slope lt where sta <1+500 r 1
   [block of include statement without fh_crb2b.x08]
   side slope lt where sta >= 1+500 r 1 and sta <= 1+600 r 1
   [block of include statements with fh_crb2b.x08]
   side slope lt where sta > 1+600 r 1
   [block of include statement without fh_crb2b.x08

2. This criteria file always closes off the outside of the pavement and base course layers with vertical lines at the outside of the curb.

3. fh_crb2.x08 should always be followed by a sidewalk criteria (or possibly a slope selection criteria). fh_crb2bt.x08 should never be followed by a shoulder, widening, foreslope, or retaining wall criteria file; if this is done it will cause errors in the earthwork quantities because fh_crb2b.x08 closes off all the pavement and base course layers with vertical lines.

4. Upon completion of fh_crb2b.x08, the current point is the outside bottom corner of the curb.

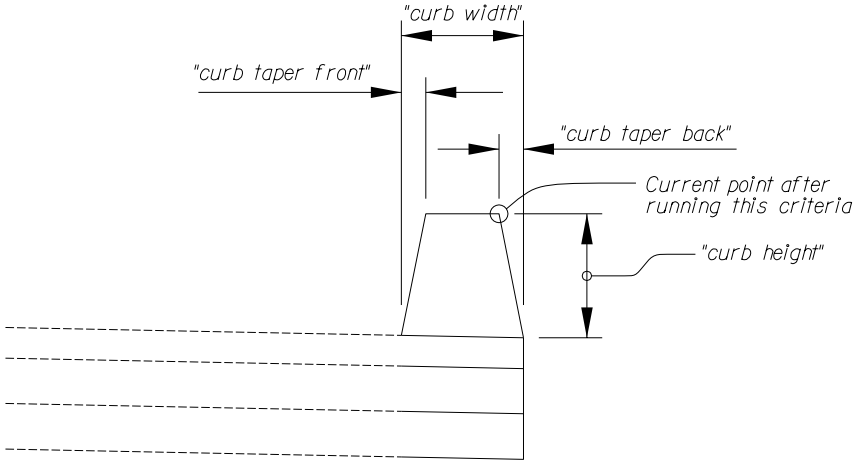
5. Don't use fh_crb2b.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

fh_crb2t.x08

Draws the following elements:

- bituminous curb
- pavement and base course layers under the curb
- closes off the pavement and base course layers with vertical lines
- leaves the current point at the lower outside corner of the curb upon completion (which is the only difference between this criteria and fh_crb2b.x08)

Curb is drawn for the entire length of project.



define variables that must be assigned values in the input data file:

"curb height"
"curb width"
"curb taper front"
"curb taper back"

define_dgn variables that must be assigned values in the input data file:

None

Variables that must be defined in exceptions data file:

None

Notes for fh_crb2t.x08:

1. There is no way to turn the curb on and off for station ranges built into this criteria. The only way the user could accomplish this would be to use multiple instances of side slope lt/rt blocks with station ranges in the proposed cross-section input file. For example, if the user wanted curb only from Stations 1+500 thru 1+600 on a project that ran from 1+000 to 2+0000 then the following syntax would have to be written into the input file:

   side slope lt where sta <1+500 r 1
   [block of include statement without fh_crb2b.x08]
   side slope lt where sta >= 1+500 r 1 and sta <= 1+600 r 1
   [block of include statements with fh_crb2b.x08]
   side slope lt where sta > 1+600 r 1
   [block of include statement without fh_crb2b.x08]

2. This criteria file always closes off the outside of the pavement and base course layers with vertical lines at the outside of the curb.

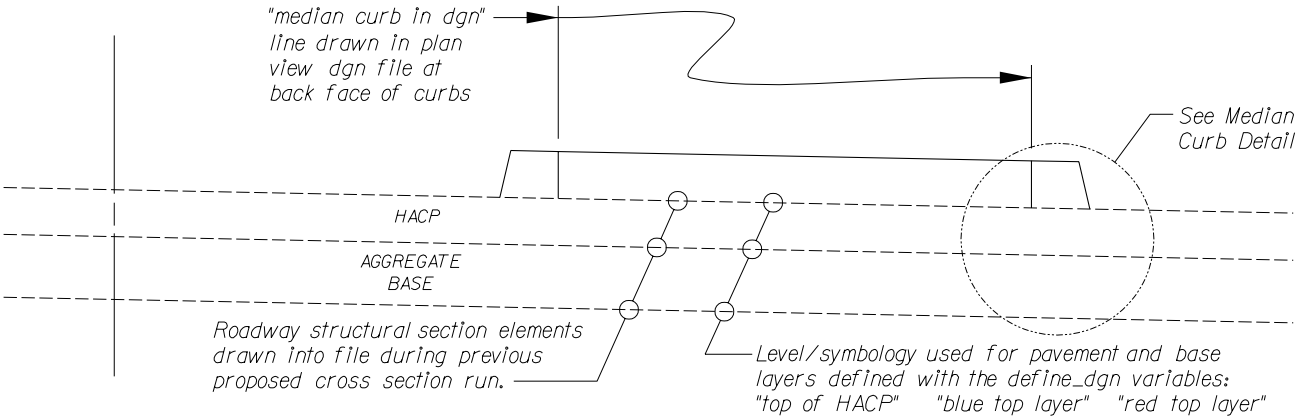
3. fh_crb2t.x08 should always be followed by a sidewalk criteria (or possibly a slope selection criteria). fh_crb2t.x08 should never be followed by a shoulder, widening, foreslope, or retaining wall criteria file; if this is done it will cause errors in the earthwork quantities because fh_crb2t.x08 closes off all the pavement and base course layers with vertical lines.

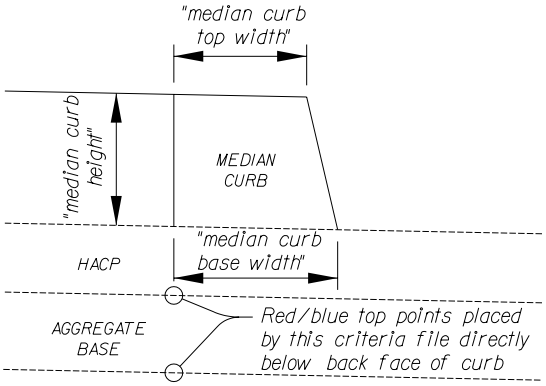
4. Upon completion of fh_crb2t.x08, the current point is the outside top corner of the curb.

5. Don't use fh_crb2t.x08 to draw paved ditch; there are standard paved ditch criteria files for that purpose.

c_median.x08

Post-processing criteria file to add a median island on top of previously drawn parking area or roadway x-sections. Station ranges for the median, width of the median, and distance from the base line to the median are set using lines drawn in plan view dgn file. Can't draw a median that straddles the baseline chain.





define variables that must be assigned values in the input data file:

"median curb base width"
"median curb top width"
"median curb height"

define_dgn variables that must be assigned values in the input data file:

"median curb in dgn" (drawn in plan view dgn file)
"top of HACP" (drawn in proposed cross-section dgn file)
"blue top layer" (drawn in proposed cross-section dgn file)
"red top layer" (drawn in proposed cross-section dgn file)

Variables that must be defined in exceptions data file:

None

c_median.x08

Notes for c_median.x08:

1 .This is strictly a post-processing criteria to add a picture of a median island to proposed x-sections that were drawn during a previous proposed x-section run.

2. Station ranges for median, width of median, and distance from base line to median are all controlled using the "median curb in dgn" lines drawn in plan view dgn file. This criteria expects a pair of "median curb in dgn" lines -- one on either side of the median.

3. The "median curb in dgn" lines should be drawn at the back face of the median curb.

4. This criteria will draw at most one median per side of centerline.

5. This criteria will not draw a median that straddles the centerline chain.

6. Red top and blue top text elements are placed directly below the back face of the median curbs at the top of base course undercut layer and at the subgrade undercut layer. Level/symbology used for the undercut layers is set using the "red top layer" and "blue top layer" define_dgn variables.

7. Red/blue top text elements are placed at the four corners of the median curb to allow the designer to pick up elevations at these points if desired.

8. Level/symbology used to draw median is lv=2 co=0 by default. The variables "median curb level" and "median curb color" may be used to override the default level/symbology.

9. Because this is a "post-processing" type criteria file it will be the only criteria in the include sequence. The following input file may be copied from this PDF document into the Windows ClipBoard, pasted into an empty file in UltraEdit, edited as necessary, and run from GEOPAK to draw the median sections.

```
/* example input file for criteria c_median.x08 */
   define_dgn "median in dgn"   dgn = PLANVIEW.DGN   lv=40   co=40
   define_dgn "top of HACP"   dgn = XS.DGN   lv = 2   co = 0
   define_dgn "blue top layer"   dgn = XS.DGN   lv = 3   co = 3
   define_dgn "red top layer"   dgn = XS.DGN   lv = 4   co = 4

   define "median curb height" 0.150
   define "median curb base width" 0.185
   define "median curb top width" 0.150

   xsection
   proposed xs
      xs dgn = XS.DGN
         existing ground line
            type=line   lv=56   co=2
      pattern dgn = PLANVIEW.DGN
         pattern set
            job number = 000
            baseline = CHAIN_NAME
            horiz scale = 1
            vert scale = 1
            type = line
            lv=50   co=0
      criteria for shape cluster
```

```
            shape cluster baseline = CHAIN_NAME
            shape cluster profile = PROFILE_NAME
            shape cluster tie = 0

         side slope lt
            include l:\criteria\c_median.x08
         side slope rt
            include l:\criteria\c_median.x08

         plot parameters
            text    lv=61   co=0   tw=0.5   th=0.5

         write xs into dgn = XS.DGN
      /* don't delete this line from input file */
```

median2.x08

Post-processing criteria file to add a median island onto previously drawn roadway x-sections. Station ranges for the median, width of the median, and distance from the base line to the median are set using lines drawn in plan view dgn file.
The intent of this criteria is only to aid the designer by drawing the median onto the x-sections at the correct locations. There is no way that this criteria can delete out the extra pavement layer lines inside the median; the designer must manually delete these lines using generic MicroStation tools.

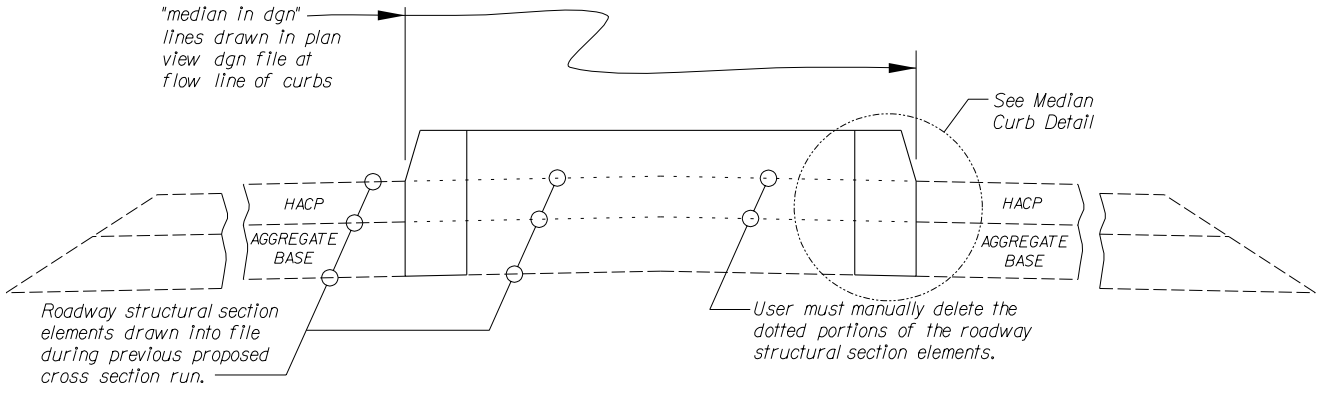


Figure 1 - Roadway cross section immediately after running this criteria file

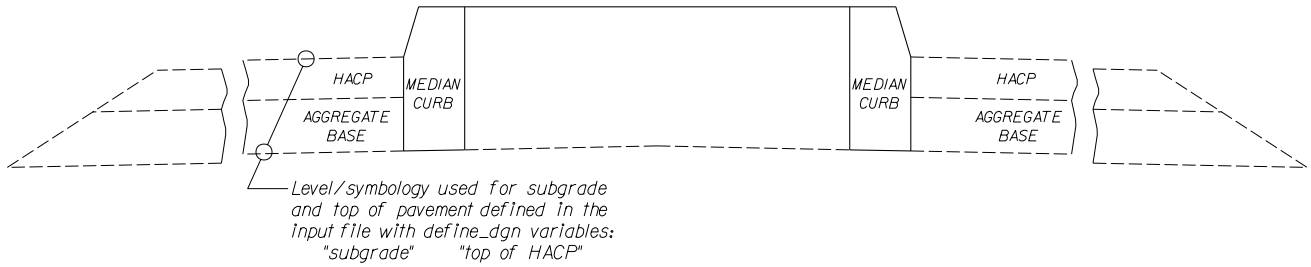


Figure 2 - Roadway cross section after user has manually deleted elements

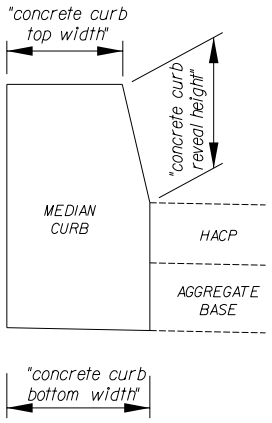


Figure 3 - Median curb detail

median2.x08

define variables that must be assigned values in the input data file:

"concrete curb bottom width"
"concrete curb top width"
"concrete curb reveal height"

define_dgn variables that must be assigned values in the input data file:

"median in dgn" (drawn in plan view dgn file)
"top of HACP" (drawn in proposed cross-section dgn file)
"subgrade" (drawn in proposed cross-section dgn file)

Variables that must be defined in exceptions data file:

None

Notes for median2.x08:

1. This is strictly a post-processing criteria designed to add a median with full depth curbs onto previously drawn proposed x-sections. The intent of this criteria is only to aid the designer by drawing the median onto the x-sections at the correct locations. There is no way that this criteria can delete out the extra pavement layer lines inside the median; the designer must manually delete and re-intersect these lines as shown above using generic MicroStation tools.

2. Station ranges for median, width of median, and distance from base line to median are all controlled using the "median in dgn" lines drawn in plan view dgn file. This criteria expects a single pair of "median in dgn" lines and won't draw the median if it doesn't find exactly two "in dgn" lines.

3. The "median in dgn" lines should be drawn at the flow line of the median curb.

4. This criteria will draw at most one median per x-section.

5. Once the median has been drawn into onto the x-sections it's time consuming to delete several of the median elements because they use the same level/symbology as other pavement layers (to facilitate extracting construction reports).

6. Red/blue top text elements are placed at each corner of the median curb to allow the designer to pick up elevations at these points if desired.

7. Assuming that the designer has deleted and re-intersected the extra pavement layer lines as outline above, earthwork and construction reports will run correctly for median x-sections when the following level/symbology is used:
   Slope stake books
   lv=4,10,18 co=4,10,16,18
   Earthwork
   Proposed undercut soil type = CONC_CURB lv=18,19 co=18,19

8. Because this is a "post-processing" type criteria file it will be the only criteria in the include sequence. The following example input file may be copied from this PDF document into the Windows ClipBoard, pasted into an empty file in UltraEdit, edited as necessary, and run from GEOPAK to draw the median sections.

```
/* example input file for criteria file median2.x08 */
   define_dgn "median in dgn"   dgn = PLANVIEW.DGN   lv=49   co=49
   define_dgn "top of HACP"   dgn = XS.DGN   lv=2   co=0
   define_dgn "subgrade"   dgn = XS.DGN   lv=4   co=4

   define "concrete curb reveal height" 0.20
   define "concrete curb bottom width" 0.15
   define "concrete curb top width" 0.10

   xsection
   proposed xs
         xs dgn = XS.DGN
            existing ground line
               lv = 56
               co = 2
         pattern dgn = PLANVIEW.DGN
             pattern set
                job number = 000
                baseline = CHAIN_NAME
                horiz scale = 10
                vert scale  = 10
                type = line, line_string
                lv = 50     co = 0
         criteria for shape cluster
            shape cluster baseline = CHAIN_NAME
            shape cluster profile  = PROFILE_NAME
            shape cluster tie      = 0

         side slope lt
            include l:\criteria\median2.x08

         plot parameters
            text lv=61   co=6   th=0.1   tw=0.1   just=lb   ft=23

         write xs into dgn = XS.DGN
   /* don't delete this line from input file */
```