CITY OF RALEIGH Standard Details



GREENWAY



BASE COURSE

EARTH MATERIAL

GEOTEXTILE FOR PAVEMENT

STABILIZATION

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V1

	GW-10.01.1
	ASPHALT TYPICAL TRAIL SE(VARIABLE WIDTH (8' MIN, 14'

SECTION

14' MAX)

ASPHALT TYPICAL TRAIL SECTION VARIABLE WIDTH (8' MIN, 14' MAX) - NOTES:

- 1. TRAIL WIDTH TO BE DETERMINED BY CITY OF RALEIGH.
- 2. WHEN CONDITIONS PERMIT, USE 6' SHOULDER IN FILL SECTIONS AND 4' SHOULDER IN CUT SECTIONS. USE MINIMUM 2' SHOULDER IN CUT AND FILL SECTIONS. FOR CUT SECTION CONDITION SHOWN IN "INSET 1," APPLY ENGINEERING JUDGMENT TO DETERMINE IF UPHILL SIDE REQUIRES A SWALE.
- 3. TRAILS OR TRAIL SEGMENTS OF ANY LENGTH MAY BE CONSTRUCTED WITH RUNNING SLOPES/VERTICAL GRADES UP TO 1:20 (5%). TO ACCOMMODATE STEEP TERRAIN, TRAILS MAY BE DESIGNED WITH STEEPER SECTIONS OF CONSTRAINED LENGTH AS SHOWN IN TABLE 1. RESTING INTERVALS WITH FLATTER GRADES ARE REQUIRED BETWEEN TRAIL SEGMENTS ANY TIME THE RUNNING SLOPE EXCEEDS 1:20 (5%). RESTING INTERVALS SHALL BE LOCATED ON UPHILL SIDE OF TRAIL IF ONLY PROVIDED ON ONE SIDE.
- 4. TO ENSURE THAT A TRAIL IS NOT DESIGNED AS A SERIES OF STEEP SEGMENTS. NO MORE THAN 30% OF THE TOTAL LENGTH OF TRAIL MAY HAVE A RUNNING SLOPE/VERTICAL GRADE of 7.5% (8.33% OR 1:12 MAX). RESTING INTERVALS MUST BE PROVIDED MORE FREQUENTLY AS THE RUNNING SLOPE INCREASES.
- 5. RUNNING SLOPE/VERTICAL GRADE RECOMMENDATIONS MAY NOT BE ABLE TO BE ACHIEVED FOR TRAIL REPLACEMENT PROJECTS. FOR THESE TYPES OF PROJECTS, REPLACEMENT OF THE EXISTING CONDITION IN KIND IS SUFFICIENT.
- 6. 1,5% (2,08% OR 1;48 MAX) CROSS SLOPE, CROSS SLOPE DIRECTION VARIES, SLOPE SHOULDERS FOR POSITIVE DRAINAGE, OFTEN REQUIRES CONTINUING PAVEMENT OR SHOULDER SLOPE UNTIL TIE-IN WITH NATURAL GROUND. SEE PLAN SHEETS AND CROSS SECTIONS.
- 7. WHEN CONDITIONS PERMIT, SHOULDERS TO MATCH CROSS SLOPE OF TRAIL AND SIDE SLOPES TO BE 3:1 OR FLATTER.
- 8. PROVIDE A SAFETY RAIL FOR THE FOLLOWING CIRCUMSTANCES WITHIN 6' OF THE EDGE OF PAVEMENT: 1) SLOPE > 3:1 AND DROP OF 6'; 2) SLOPE > 2:1 AND DROP OF 4'; 3) SLOPE > 1:1 AND DROP OF 1'. REFER TO GW-20.01 AND GW-20.02 FOR SAFETY RAIL DETAILS.
- 9. CONTRACTOR GRADE SEED SHALL BE SEWN INTO AGGREGATE BASE COURSE ON SHOULDERS AT THE SURFACE.
- 10. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED DURING CONSTRUCTION.
- 11. PROOF ROLLING SHALL OCCUR IN PRESENCE OF THE OWNER OR THE OWNER'S TESTING AGENCY AT THE FOLLOWING STAGES: 1) PRIOR TO PLACING FILL IN LOW AREAS; 2) AFTER THE PREPARATION OF SUBGRADE PRIOR TO PLACING ABC; 3) AFTER THE PLACEMENT OF ABC PRIOR TO PAVING.
- 12. PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

13. NO ABOVE-GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN THE TRAIL AND SHALL BE A MINIMUM OF 2' FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE A MINIMUM OF 4' FROM THE EDGE OF TRAIL.

			C	ITY OF RALE	IGH
M F En	RUNNING SLOPE AND GTH		REVISIONS	DATE: 12/2022	NOT TO SCALE
	MAX LENGTH OF SEGMENT	_		ASPHALT TYPICAL VARIABLE WIDTH (TRAIL SECTION 8' MIN, 14' MAX)
200 FT]	
30	FT			GW-10	.01.2



CONCRETE TYPICAL TRAIL SECTION VARIABLE WIDTH (8' MIN, 14' MAX) - NOTES:

- 1. TRAIL WIDTH TO BE DETERMINED BY CITY OF RALEIGH.
- 2. WHEN CONDITIONS PERMIT, USE 6' SHOULDER IN FILL SECTIONS AND 4' SHOULDER IN CUT SECTIONS. USE MINIMUM 2' SHOULDER IN CUT AND FILL SECTIONS. FOR CUT SECTION CONDITION SHOWN IN "INSET 1," APPLY ENGINEERING JUDGMENT TO DETERMINE IF UPHILL SIDE REQUIRES A SWALE.
- 3. TRAILS OR TRAIL SEGMENTS OF ANY LENGTH MAY BE CONSTRUCTED WITH RUNNING SLOPES/VERTICAL GRADES UP TO 1:20 (5%). TO ACCOMMODATE STEEP TERRAIN, TRAILS MAY BE DESIGNED WITH STEEPER SECTIONS OF CONSTRAINED LENGTH AS SHOWN IN TABLE 1. RESTING INTERVALS WITH FLATTER RUNNING SLOPES ARE REQUIRED BETWEEN TRAIL SEGMENTS ANYTIME THE RUNNING SLOPE EXCEEDS 1:20 (5%). RESTING INTERVALS SHALL BE LOCATED ON UPHILL SIDE OF TRAIL IF ONLY PROVIDED ON ONE SIDE.
- 4. TO ENSURE THAT A TRAIL IS NOT DESIGNED AS A SERIES OF STEEP SEGMENTS, NO MORE THAN 30% OF THE TOTAL LENGTH OF TRAIL MAY HAVE A RUNNING SLOPE/VERTICAL GRADE OF 7.5% (8.33% OR 1:12 MAX). RESTING INTERVALS MUST BE PROVIDED MORE FREQUENTLY AS THE RUNNING SLOPE INCREASES.
- 5. RUNNING SLOPE/VERTICAL GRADE RECOMMENDATIONS MAY NOT BE ABLE TO BE ACHIEVED FOR TRAIL REPLACEMENT PROJECTS. FOR THESE TYPES OF PROJECTS, REPLACEMENT OF THE EXISTING CONDITION IN KIND IS SUFFICIENT.
- 6. 1.5% (2.08% OR 1:48 MAX) CROSS SLOPE. CROSS SLOPE DIRECTION VARIES. SLOPE SHOULDERS FOR POSITIVE DRAINAGE. OFTEN REQUIRES CONTINUING PAVEMENT OR SHOULDER SLOPE UNTIL TIE-IN WITH NATURAL GROUND. SEE PLAN SHEETS AND CROSS SECTIONS.
- 7. WHEN CONDITIONS PERMIT, SHOULDERS TO MATCH CROSS SLOPE OF TRAIL AND SIDE SLOPES TO BE 3:1 OR FLATTER.
- 8. PROVIDE A SAFETY RAIL FOR THE FOLLOWING CIRCUMSTANCES WITHIN 6' OF THE EDGE OF PAVEMENT: 1) SLOPE > 3:1 AND DROP OF 6'; 2) SLOPE > 2:1 AND DROP OF 4'; 3) SLOPE > 1:1 AND DROP OF 1'. REFER TO GW-20.01 AND GW-20.02 FOR SAFETY RAIL DETAILS.
- 9. CONTRACTOR GRADE SEED SHALL BE SEWN INTO AGGREGATE BASE COURSE ON SHOULDERS AT THE SURFACE.
- 10. TRANSVERSE EXPANSION JOINTS TO BE MAXIMUM 50' APART. SAWCUT TRANSVERSE CONTROL JOINTS AT MAXIMUM 10' ON-CENTER OR AS OTHERWISE SHOWN ON PLANS.
- 11. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED DURING CONSTRUCTION.
- 12. PROOF ROLLING SHALL OCCUR IN PRESENCE OF THE OWNER OR THE OWNER'S TESTING AGENCY AT THE FOLLOWING STAGES: 1) PRIOR TO PLACING FILL IN LOW AREAS; 2) AFTER THE PREPARATION OF SUBGRADE PRIOR TO PLACING ABC; 3) AFTER THE PLACEMENT OF ABC PRIOR TO POURING CONCRETE.
- 13. NO ABOVE-GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN THE TRAIL AND SHALL BE A MINIMUM OF 2' FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE A MINIMUM OF 4' FROM THE EDGE OF TRAIL.

C	CITY OF RALEIGH STANDARD DETAIL REVISIONS DATE: 12/2022 NOT TO SCALE		
REVISIONS			
	CONCRETE TYPICAL TRAIL SECTION VARIABLE WIDTH (8' MIN, 14' MAX		
	GW-10.02.2		

SHEET 2 OF

TABLE 1 - MAXIMUM RUNNING SLOPE AND TRAIL SEGMENT LENGTH			
RUNNING SLOPE	MAX LENGTH OF SEGMENT		
1:20 (5%)	200 FT		

30 FT

1:12 (8.33%)



UNPAVED TRAIL - NOTES:

1. TRAIL WIDTH TO BE DETERMINED BY CITY OF RALEIGH.

2. TRAIL TO BE FIRM AND STABLE. MATERIALS SUCH AS PACKED CRUSHED STONE, GRAVEL FINES COMPACTED WITH ROLLER, PACKED SOIL, AND OTHER NATURAL MATERIALS BONDED WITH SYNTHETIC MATERIALS CAN BE USED TO PROVIDE THE REQUIRED DEGREE OF STABILITY AND FIRMNESS. MATERIAL SELECTION TO BE APPROVED BY THE CITY.

3. TRAILS OR TRAIL SEGMENTS OF ANY LENGTH MAY BE CONSTRUCTED WITH RUNNING SLOPES/VERTICAL GRADES UP TO 1:20 (5%). TO ACCOMMODATE STEEP TERRAIN, TRAILS MAY BE DESIGNED WITH STEEPER SECTIONS OF CONSTRAINED LENGTH AS SHOWN IN TABLE 1. RESTING INTERVALS WITH FLATTER RUNNING SLOPES ARE REQUIRED BETWEEN TRAIL SEGMENTS ANYTIME THE RUNNING SLOPE EXCEEDS 1:20 (5%).

4. TO ENSURE THAT A TRAIL IS NOT DESIGNED AS A SERIES OF STEEP SEGMENTS, NO MORE THAN 30% OF THE TOTAL LENGTH OF TRAIL MAY HAVE A RUNNING SLOPE/VERTICAL GRADE EXCEEDING 1:12 (8.33%). THE RUNNING SLOPE MUST NEVER EXCEED 1:8 (12.5%). RESTING INTERVALS MUST BE PROVIDED MORE FREQUENTLY AS THE RUNNING SLOPE INCREASES.

5. RESTING INTERVALS MAY BE PROVIDED WITHIN THE TRAIL TREAD OR ADJACENT TO THE TRAIL TREAD. WHEN THE RESTING INTERVAL IS WITHIN THE TRAIL TREAD, IT MUST BE AT LEAST 60 INCHES LONG AND AT LEAST AS WIDE AS THE TRAIL. WHEN THE RESTING INTERVAL IS ADJACENT TO THE TRAIL, IT MUST BE AT LEAST 60 INCHES LONG AND 36 INCHES WIDE. RESTING INTERVALS SHALL BE LOCATED ON UPHILL SIDE OF TRAIL IF ONLY PROVIDED ON ONE SIDE.

6. IF COMPLIANCE CANNOT BE ACHIEVED FOR NOTES 2 THROUGH 5 ABOVE DUE TO CONDITIONS SUCH AS THE EXISTING TERRAIN, PREVAILING CONSTRUCTION PRACTICES, THE FUNCTION OR PURPOSE OF THE FACILITY, OR IF THE SETTING WOULD BECOME FUNDAMENTALLY ALTERED, THEN IT MUST BE DEMONSTRATED THAT THE STANDARDS CANNOT BE ACHIEVED.

7. FIVE PERCENT MAX CROSS SLOPE. CROSS SLOPE DIRECTION VARIES TO FACILITATE POSITIVE DRAINAGE.

8. PROVIDE A SAFETY RAIL FOR THE FOLLOWING CIRCUMSTANCES WITHIN 6' OF THE EDGE OF TRAIL: 1) SLOPE > 3:1 AND DROP OF 6'; 2) SLOPE > 2:1 AND DROP OF 4'; 3) SLOPE > 1:1 AND DROP OF 1'. REFER TO GW-20.01 AND GW-20.02 FOR SAFETY RAIL DETAILS.

9. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED DURING CONSTRUCTION.

10. NO ABOVE-GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN THE TRAIL AND SHALL BE A MINIMUM OF 2' FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE A MINIMUM OF 4' FROM THE EDGE OF TRAIL.

TABLE 1 - MAXIMUM RUNNING SLOPE AND	
TRAIL SEGMENT LENGTH	
	_

RUNNING		
STEEPER THAN BUT NOT STEEPER THAN		MAX LENGTH OF SEGMENT
1:20 (5%)	1:12 (8.33%)	200 FT
1:12 (8.33%)	1:10 (10%)	30 FT
1:10 (10%)	1:8 (12.5%)	10 FT

CITY OF RALEIGH STANDARD DETAIL				
REVISIONS	DATE: 12/2022	NOT TO SCALE		
	_ UNPAVE	ED TRAIL		
	GW-1	0.03.2		



DRIVEWAY, SIDEWALK, AND TRAIL TIE-IN - NOTES:

1. THE DRIVEWAY, SIDEWALK, TRAIL TIE-IN SHALL BE BUILT IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT (ADA) AND PUBLIC RIGHT-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG).

2. THE DRIVEWAY, SIDEWALK, TRAIL TIE-IN SHALL BE PLACED PARALLEL TO THE TRAIL DIRECTION OF TRAVEL.

3. DETECTABLE WARNINGS SHALL BE INSTALLED ALONG THE BACK OF CURB COVERING THE FULL WIDTH OF THE RAMP.

4. FOR THE TRAIL APRON, USE CLASS A (3000 PSI) CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH, NONSKID SURFACE.

5. A 1/2" EXPANSION JOINT INSTALLED FULL DEPTH WILL BE REQUIRED WHERE THE CONCRETE RAMP JOINS THE CURB AND ALSO WHERE NEW CONCRETE ABUTS EXISTING CONCRETE.

6. REMOVE AND REPLACE CURB AND GUTTER TO NEAREST JOINT.

7. BOLLARDS/BOULDERS SHOULD BE SET BACK FROM THE ROADWAY EDGE A MINIMUM OF 7 FEET AND A MAXIMUM OF 30 FEET AND WILL VARY DEPENDING ON LOCATION. OWNER SHALL INDICATE WHICH OPTION IS BEST FOR THE SITE LOCATION. BOLLARD SHALL NOT BE PLACED WITHIN THE ROADWAY RIGHT-OF-WAY UNLESS AN APPROVED RIGHT-OF-WAY OBSTRUCTION PERMIT IS SECURED WITH THE CITY OF RALEIGH RIGHT OF WAY SERVICES. SEE DETAILS GW-10.06, GW-10.07, AND GW-10.08 FOR BOLLARD/BOULDER DETAILS.

8. STOP SIGN (MUTCD R1-1) AND NO MOTOR VEHICLES SIGN (MUTCD R5-3) SHALL BE 0.063 GAUGE, 3105 ALLOY ALUMINUM AND SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL GUIDELINES.

		SHEET 2 O	F 2
(DRAIN TO ROADWAY)	С	ITY OF RALEIGH	
2 CROSS SLOPE: MAXIMUM 2.00%		STANDARD DETAIL	
	REVISIONS	DATE: 12/2022 NOT TO SC	ALE
WITH A MAXIMUM CROSS SLOPE AND			
LONGITUDINAL SLOPE OF 2.00% WHERE PEDESTRIANS PERFORM TURNING		AND TRAIL TIE-IN	
MANEUVERS. SLOPE TO DRAIN CURB.			
		GW-10.04.2	





PERMANENT BOLLARD

NOTES:

1. A PERMANENT BOLLARD IS TYPICALLY USED ON THE OUTSIDE OF TRAILS TO PREVENT UNAUTHORIZED MOTOR VEHICLE ENTRY. PERMANENT BOLLARDS MAY BE USED IN COMBINATION WITH HINGED BOLLARDS. IN SOME CASES, A PERMANENT BOLLARD CAN BE USED IN THE CENTER OF THE TRAIL IN LIEU OF A HINGED BOLLARD WHEN REQUESTED BY THE OWNER. SEE DETAIL GW-10.08 FOR THE VARIOUS BOLLARD COMBINATIONS. PERMANENT BOLLARDS SHOULD BE UTILIZED AT ALL MAJOR ACCESS POINTS AND TRAIL HEADS. "NO MOTOR VEHICLES" SIGNAGE (MUTCD R5-3) MAY BE USED TO REINFORCE ACCESS RULES.

2. BOLLARDS SHOULD BE SET BACK FROM THE ROADWAY EDGE A MINIMUM OF 7 FEET AND A MAXIMUM OF 30 FEET AND WILL VARY DEPENDING ON LOCATION. OWNER SHALL INDICATE WHICH OPTION IS BEST FOR THE SITE LOCATION. BOLLARD SHALL NOT BE PLACED WITHIN THE ROADWAY RIGHT-OF-WAY UNLESS AN APPROVED RIGHT-OF-WAY OBSTRUCTION PERMIT IS SECURED WITH THE CITY OF RALEIGH RIGHT OF WAY SERVICES.

 STRIPING AN ENVELOPE AROUND THE POST IS RECOMMENDED IF THE BOLLARD IS LOCATED WITHIN THE PAVED LIMITS OF THE TRAIL (SEE DETAIL GW-10.05).
 SEE MIDDLE BOLLARD WITH TRAIL SIDE BOLLARDS DETAIL, GW-10.08, FOR TYPICAL BOLLARD PLACEMENT.

REVISIONS	DATE: 12/2022	NOT TO SCALE
	PERMANENT I	BOLLARD
	GW-10).06







TRAIL TUNNEL/UNDERPASS - NOTES:

1. 14-FOOT MINIMUM WIDTH DESIRED; GREATER WIDTHS PREFERRED FOR LENGTHS OVER 60 FEET.

2. THE UNDERPASS AS WELL AS THE TRAIL APPROACH SHOULD HAVE A CENTERLINE STRIPE EVEN IF THE REST OF THE TRAIL DOES NOT HAVE ONE.

3. UNDERPASSES SHOULD HAVE A DAYTIME ILLUMINANCE MINIMUM OF 10 FOOT-CANDLES AND A NIGHT-TIME LEVEL OF 4 FOOT-CANDLES.

4. SEALING OF FIXTURES TO BE DESIGNED IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY (IES) STANDARDS.

5. LIGHTING FIXTURE SPACING TO BE 12 FEET MINIMUM AND 15 FEET MAXIMUM.

6. CONDUIT CONNECTION TO POWER SOURCE SHALL BE DETERMINED BY THE ENGINEER AND SPECIFIED ON THE PLANS ACCORDINGLY.

7. PROPER DRAINAGE MUST BE ESTABLISHED TO AVOID POOLING OF STORMWATER; HOWEVER, SOME UNDERPASSES MAY FLOOD PERIODICALLY. WHERE APPROPRIATE, INCORPORATE TRENCH DRAINS AT THE TUNNEL ENTRANCE TO INTERCEPT WATER.

8. POST ADVANCED WARNING SIGNAGE ON OPPOSITE ENDS OF THE UNDERPASS APPROACH WITH INFORMATION ON VISIBILITY AND OTHER SAFETY REGULATIONS.

9. APPROPRIATE SIGNAGE MAY BE REQUIRED AT ENTRANCE TO INDICATE NARROWING TRAIL WIDTH AND/OR LIMITED VERTICAL CLEARANCE.

10. CONVEX MIRRORS SHOULD BE PROVIDED AT BLIND CORNERS AND AT THE APPROACHES TO UNDERPASSES WITH POOR SIGHT LINES.

CITY OF RALEIGH standard detail			
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	TRAIL TUNNE	EL/UNDERPASS	
	GW-1	0.09.2	



 TRAILS CAN MEANDER BUT SHALL BE LOCATED MINIMUM 6 FEET FROM THE BACK OF CURB. NCDOT WILL ALLOW A 3-FOOT VEGETATED BUFFER INSTEAD OF 6-FOOT UNDER CERTAIN CONDITIONS WHERE ROW IS CONSTRAINED. SPECIAL PERMISSION MUST BE GRANTED.
 IDEALLY, NO ABOVE-GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN THE TRAIL AND SHALL BE A MINIMUM OF 2 FEET FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE A MINIMUM OF 4 FEET FROM THE EDGE OF TRAIL.
 TRAIL RUNNING SLOPES/VERTICAL GRADE SHALL NOT EXCEED THE VERTICAL GRADE OF THE ROADWAY.

5. 1.5% (2.08% OR 1:48 MAX) CROSS SLOPE. CROSS SLOPE DIRECTION TYPICALLY SLOPES TOWARD ROADWAY BUT CAN VARY. SLOPE SHOULDERS FOR POSITIVE DRAINAGE. OFTEN REQUIRES CONTINUING PAVEMENT OR SHOULDER SLOPE UNTIL TIE-IN WITH NATURAL GROUND. SEE PLAN SHEETS AND CROSS SECTIONS.

6. WHEN CONDITIONS PERMIT, SHOULDERS TO MATCH CROSS SLOPE OF TRAIL AND SIDE SLOPES TO BE 3:1 OR FLATTER.

7. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED DURING CONSTRUCTION.

PROOF ROLLING SHALL OCCUR IN PRESENCE OF OWNER OR OWNER'S TESTING AGENCY AT THE FOLLOWING STAGES: 1) PRIOR TO
PLACING FILL IN LOW AREAS; 2) AFTER PREPARING SUBGRADE PRIOR TO PLACING ABC; 3) AFTER PLACEMENT OF ABC PRIOR TO PAVING.
 PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

10. UNDER SOME CIRCUMSTANCES, SIDE TRAILS MAY TRANSITION TO SIDEWALKS AND DESIGNATED BICYCLE LANES. IN THE EVENT THAT SIDE TRAILS MERGE ONTO STREETS, PROVIDE APPROPRIATE SIGNAGE AND PAVEMENT MARKINGS TO HELP SAFE MERGING.

11. ALL TRAILS WITHIN NCDOT ROADWAY ROW MUST CONSIDER THE FOLLOWING: -NCDOT REQUIRES AN ENCROACHMENT PERMIT FROM NCDOT.

-STRUCTURES, SUCH AS RETAINING WALLS AND BRIDGES, ARE TYPICALLY NOT PERMITTED IN NCDOT ROW AND MAY ONLY BE USED IN SPECIAL CONDITIONS. -NCDOT MAY REQUIRE A CLEAR RECOVERY ZONE OF 11.5 FEET TO 24 FEET (IN THE PRESENCE OF A DITCH SECTION) FROM THE EDGE OF TRAVEL LANE TO EDGE OF GREENWAY TRAIL DEPENDING ON AVERAGE DAILY TRAFFIC (ADT) AND DESIGN SPEEDS. -STORMWATER TREATMENT AND VEG. MUST BE INSTALLED PER NCDOT'S SPECS.

	GW-1	0.10
	ASPHALT M STREET SIE VARIABLE	ulti-use De trail, E width
REVISIONS	DATE: 12/2022	NOT TO SCALE



1. TRAIL WIDTH TO BE DETERMINED BY CITY OF RALEIGH. 10 FEET MINIMUM TRAIL WIDTH IS NECESSARY FOR BICYCLISTS TO PASS OTHER USERS SAFELY ON SIDE TRAILS.

 TRAILS CAN MEANDER BUT SHALL BE LOCATED MINIMUM 6 FEET FROM THE BACK OF CURB. NCDOT WILL ALLOW A 3-FOOT VEGETATED BUFFER INSTEAD OF 6-FOOT UNDER CERTAIN CONDITIONS WHERE ROW IS CONSTRAINED. SPECIAL PERMISSION MUST BE GRANTED.
 IDEALLY, NO ABOVE-GROUND UTILITIES OR UTILITY SURFACE COVERS/PLATES/MANHOLES SHALL BE LOCATED WITHIN THE TRAIL AND SHALL BE A MINIMUM OF 2 FEET FROM THE EDGE OF TRAIL. RAISED MANHOLES SHALL BE A MINIMUM OF 4 FEET FROM THE EDGE OF TRAIL.
 TRAIL RUNNING SLOPES/VERTICAL GRADE SHALL NOT EXCEED THE VERTICAL GRADE OF THE ROADWAY.

5. 1.5% (2.08% OR 1:48 MAX) CROSS SLOPE. CROSS SLOPE DIRECTION TYPICALLY SLOPES TOWARD ROADWAY BUT CAN VARY. SLOPE SHOULDERS FOR POSITIVE DRAINAGE. OFTEN REQUIRES CONTINUING PAVEMENT OR SHOULDER SLOPE UNTIL TIE-IN WITH NATURAL GROUND. SEE PLAN SHEETS AND CROSS SECTIONS.

6. WHEN CONDITIONS PERMIT, SHOULDERS TO MATCH CROSS SLOPE OF TRAIL AND SIDE SLOPES TO BE 3:1 OR FLATTER.

7. CONTRACTOR IS RESPONSIBLE FOR RE-ESTABLISHING ALL SLOPES DISTURBED DURING CONSTRUCTION.

PROOF ROLLING SHALL OCCUR IN PRESENCE OF OWNER OR OWNER'S TESTING AGENCY AT THE FOLLOWING STAGES: 1) PRIOR TO
PLACING FILL IN LOW AREAS; 2) AFTER PREPARING SUBGRADE PRIOR TO PLACING ABC; 3) AFTER PLACEMENT OF ABC PRIOR TO PAVING.
 TRANSVERSE EXPANSION JOINTS TO BE MAXIMUM 50 FEET APART.

10. UNDER SOME CIRCUMSTANCES, SIDE TRAILS MAY TRANSITION TO SIDEWALKS AND DESIGNATED BICYCLE LANES. IN THE EVENT THAT SIDE TRAILS MERGE ONTO STREETS, PROVIDE APPROPRIATE SIGNAGE AND PAVEMENT MARKINGS TO HELP SAFE MERGING.

11. ALL TRAILS WITHIN NCDOT ROADWAY ROW MUST CONSIDER THE FOLLOWING:

-NCDOT REQUIRES AN ENCROACHMENT PERMIT FROM NCDOT. -STRUCTURES, SUCH AS RETAINING WALLS AND BRIDGES, ARE TYPICALLY NOT PERMITTED IN NCDOT ROW AND MAY ONLY BE USED IN SPECIAL CONDITIONS. -NCDOT MAY REQUIRE A CLEAR RECOVERY ZONE OF 11.5 FEET TO 24 FEET (IN THE PRESENCE OF A DITCH SECTION) FROM THE EDGE OF TRAVEL LANE TO EDGE OF GREENWAY TRAIL DEPENDING ON AVERAGE DAILY TRAFFIC (ADT) AND DESIGN SPEEDS. -STORMWATER TREATMENT AND VEG. MUST BE INSTALLED PER NCDOT'S SPECS. 12. IF THE MULTI-USE PATH IS ALONG A NON-NCDOT ROAD, THEN THE CITY OF RALEIGH DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS WILL APPLY.

	GW-	10.11
	CONCRETE STREET S VARIAB	E MULTI-USE SIDE TRAIL, LE WIDTH
REVISIONS	DATE: 12/2022	NOT TO SCALE



GALVANIZED SAFETY RAILING - VARIABLE HEIGHT

NOTES:

1. PROVIDE A SAFETY RAIL FOR THE FOLLOWING CIRCUMSTANCES WITHIN 6' OF THE EDGE OF PAVEMENT, WHICH ARE CONSIDERED HAZARDOUS DROP-OFFS:

- 1) SLOPE > 3:1 AND DROP OF 6'
- 2) SLOPE > 2:1 AND DROP OF 4'
- 3) SLOPE > 1:1 AND DROP OF 1'
- 2. ALL CONCRETE TO BE CLASS 'A' AT 3000 PSI COMPRESSIVE STRENGTH.

3. TYPE OF PIPE TO BE USED IS 1' - $\frac{5}{8}$ " MAX O.D. BLACK IRON, LOW CARBON PIPE, OR GALVANIZED.

- 4. ALL JOINTS TO HAVE A $\frac{1}{2}$ " FILLET WELD.
- 5. ALL METAL SHALL BE GALVANIZED.

6. SAFETY RAIL SHALL BE UNIFORM IN HEIGHT ALONG EACH PROPOSED SEGMENT. 42" RAIL HEIGHT SHALL BE THE MINIMUM. 48" RAIL HEIGHT SHALL BE UTILIZED ALONG BRIDGES, BRIDGE APPROACHES, AND AT OTHER LOCATIONS WHERE HIGH-SPEED, STEEP-ANGLE (25 DEGREES OR GREATER) IMPACTS BETWEEN A BICYCLIST AND THE RAILING MAY OCCUR, SUCH AS AT A CURVE AT THE FOOT OF A LONG, DESCENDING GRADE WHERE THE CURVE RADIUS IS LESS THAN THAT APPROPRIATE FOR THE DESIGN SPEED OR ANTICIPATED SPEED. 54" RAIL HEIGHT SHALL BE UTILIZED IN EXTREME CONDITIONS AND WHERE CITY REGULATIONS DICTATE.

7. SAFETY RAIL LATERAL OFFSET FROM EDGE OF PAVEMENT WILL VARY BUT SHOULD BE 1' MINIMUM. THE ENDS OF THE SAFETY RAIL SHOULD BE FLARED AWAY FROM THE PATH EDGE.

CITY OF RALEIGH standard detail

	GW-2	20.01
	GALVANIZED S/ VARIABL	AFETY RAILING - E HEIGHT
REVISIONS	DATE: 12/2022	NOT TO SCALE



VINYL SAFETY RAILING - VARIABLE HEIGHT

NOTES:

1. PROVIDE A SAFETY RAIL FOR THE FOLLOWING CIRCUMSTANCES WITHIN 6' OF THE EDGE OF PAVEMENT, WHICH ARE CONSIDERED HAZARDOUS DROP-OFFS:

- 1) SLOPE > 3:1 AND DROP OF 6'
- 2) SLOPE > 2:1 AND DROP OF 4'
- 3) SLOPE > 1:1 AND DROP OF 1'

2. SAFETY RAIL TO BE THREE-RAIL WHITE VINYL WITH NOMINAL 8' SECTION LENGTH. 3. FOOTING WIDTH TO BE 2X POST WIDTH OR 1', WHICHEVER IS GREATER. MIN FOOTING DEPTH OF 30". ALL CONCRETE TO BE CLASS 'A' AT 3000 PSI COMPRESSIVE STRENGTH.

4. SAFETY RAIL SHALL BE UNIFORM IN HEIGHT ALONG EACH PROPOSED SEGMENT. 42" RAIL HEIGHT SHALL BE THE MINIMUM. 48" RAIL HEIGHT SHALL BE UTILIZED ALONG BRIDGES, BRIDGE APPROACHES, AND AT OTHER LOCATIONS WHERE HIGH-SPEED, STEEP-ANGLE (25 DEGREES OR GREATER) IMPACTS BETWEEN A BICYCLIST AND THE RAILING MAY OCCUR, SUCH AS AT A CURVE AT THE FOOT OF A LONG, DESCENDING GRADE WHERE THE CURVE RADIUS IS LESS THAN THAT APPROPRIATE FOR THE DESIGN SPEED OR ANTICIPATED SPEED. 54" RAIL HEIGHT SHALL BE UTILIZED IN EXTREME CONDITIONS AND WHERE CITY REGULATIONS DICTATE. 5. SAFETY RAIL LATERAL OFFSET FROM EDGE OF PAVEMENT WILL VARY BUT SHOULD BE 1' MINIMUM. THE ENDS OF THE SAFETY RAIL SHOULD BE FLARED AWAY FROM THE PATH EDGE.

CITY OF RALEIGH STANDARD DETAIL REVISIONS DATE: 12/2022 NOT TO SCALE

GW-20,02
VINYL SAFETY RAILING - VARIABLE HEIGHT



4. ALL CONCRETE FOOTERS AND END BLOCKS SHALL BE 3000 PSI MIN.

GW-20.03





10. BLACK VINYL COATED CHAIN LINK FENCE AND TENSION TIES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS. 11. ALL TIMBER BOARDWALK COMPONENTS AND REINFORCED CONCRETE DECK SHALL

DESIGNED IN ACCORDANCE WITH THE CURRENT EDITION OF THE AASHTO LRFD GUIDE SPECIFICATIONS FOR PEDESTRIAN BRIDGES.

12. SPAN LENGTHS, JOIST SPACING, SIZING OF MEMBERS, REINFORCED CONCRETE DECK, AND OTHER DESIGN SPECIFICS SHALL BE DETERMINED BY THE ENGINEER ON A PROJECT SPECIFIC BASIS.

13. FOUNDATION SHALL CONSIST OF DRIVEN PILES, AUGURED PILES, HELICAL PIERS, OR OTHER APPLIED FOUNDATION SYSTEM. SPECIFICS SUCH AS NUMBER OF PILES, SPACING, AND HEIGHT SHALL BE DETERMINED BY ENGINEER ON A PROJECT SPECIFIC BASIS BASED ON REQUIRED LOADING.

	GW-30.01	
	TYPICAL BOARDW	ALK SECTION
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TYPICAL PREMANUFACTURED BRIDGE SECTION

NOTES:

 1. PREMANUFACTURED PEDESTRIAN BRIDGE SECTION AND DETAILS MAY VARY BY

 PROJECT. STRUCTURAL STEEL TRUSS BRIDGE SECTION SHOWN.

 2. PREMANUFACTURED PEDESTRIAN BRIDGE SHALL BE DESIGNED AND DETAILED ON A

 PROJECT-SPECIFIC BASIS DEPENDING ON OVERALL GEOMETRY, LOADING, AND

 AESTHETIC REQUIREMENTS BY MANUFACTURER WITH INPUT FROM THE ENGINEER.

 3. CONCRETE DECKING CROSS SLOPE SHALL MATCH CROSS SLOPE OF TRAIL ON BOTH

 APPROACHES TO FACILITATE POSITIVE DRAINAGE AND PREVENT PONDING.

 4. THE MINIMUM HEIGHT OF BRIDGE/BOARDWALK RAILING SHALL BE 42", UNLESS

 OTHERWISE NOTED. THE HEIGHT CAN RANGE BETWEEN 42", 48", OR 54".

 5. A GRIP-ABLE, ROUND RAIL THAT WILL ACT AS BOTH A RUB RAIL AND HANDRAIL SHALL

 ONLY BE REQUIRED WHEN GRADES ARE GREATER THAN 5%. REFER TO DETAIL GW-30.04

 FOR BRIDGE OR BOARDWALK RUB RAIL/HANDRAIL ATTACHMENT.

 6. FOUNDATION SYSTEM SHALL BE DETERMINED BY ENGINEER ON A PROJECT SPECIFIC

 BASIS BASED ON REQUIRED LOADING.

	GW-	30.02
	TYPICAL PREN BRIDGE	IANUFACTURED SECTION
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EXAMPLE.

GW-30.05





CONSTRUCTION BARRICADE AND SIGN - NOTES:

1. CONTRACTOR TO UTILIZE PROVIDED PEDESTRIAN DETOUR PLANS TO INSTALL AND MAINTAIN PEDESTRIAN DETOUR ROUTES FOR EACH PHASE OF THE PROJECT. IF PEDESTRIAN DETOUR PLANS ARE NOT PROVIDED, CONTRACTOR IS TO DEVELOP SAID PLANS AND OBTAIN CITY APPROVAL PRIOR TO IMPLEMENTATION.

2. INSTALL DETOUR SIGNS BEFORE BARRICADES WHEN CLOSING TRAIL TO PEDESTRIAN TRAFFIC. REMOVE BARRICADES BEFORE DETOUR SIGNS WHEN OPENING TRAIL TO PEDESTRIAN TRAFFIC. INSTALL/REMOVE DETOUR SIGNS AND BARRICADES WITHIN SAME CALENDAR DAY.

3. EACH DETOUR SHALL BE ADEQUATELY MARKED. THE NUMBER OF BARRICADES AND SIGNS NEEDED WILL BE DETERMINED BY THE CONTRACTOR BASED ON THE PROPOSED PEDESTRIAN DETOUR PLANS.

4. INSTALL PEDESTRIAN BARRICADES TO BLOCK FULL WIDTH OF TRAIL DURING TRAIL CLOSURES. MORE THAN ONE BARRICADE MAY BE NEEDED TO COVER THE FULL WIDTH OF TRAIL. CHAIN BARRICADES TOGETHER AS NEEDED IF MULTIPLE BARRICADES ARE USED.

5. "TRAIL CLOSED AHEAD" SIGNS AND BARRICADES SHOULD BE USED WHERE PEDESTRIAN FLOW IS RESTRICTED SUCH AS AT THE BEGINNING AND END OF THE CLOSED TRAIL AND AT THE INTERSECTIONS PRECEDING THE CLOSED TRAIL, IF APPLICABLE.

6. MOUNT "TRAIL CLOSED AHEAD" SIGN TO BARRICADE RAILS TO ENSURE SIGN WILL NOT BECOME DETACHED DURING NORMAL WIND CONDITIONS.

7. PLACE SANDBAGS OR OTHER APPROVED BALLASTING METHODS ON THE FEET OF THE FRAME. DO NOT PLACE SANDBAGS ON TOP OF A STRIPED RAIL OR STABILIZER BAR. DO NOT BALLAST BARRICADES WITH HEAVY OBJECTS SUCH AS ROCKS, CHUNKS OF CONCRETE, OR OTHER ITEMS THAT WOULD CAUSE DAMAGE IF THE BARRICADE IS STRUCK.

CITY OF RALEIGH STANDARD DETAIL		
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	CONSTRUCT ANI	ION BARRICADE D SIGN
	GW-4	0.02.2



CONSTRUCTION PROJECT IDENTIFICATION SIGN

NOTES:

1. CONSTRUCTION PROJECT IDENTIFICATION SIGNS ARE TO BE PLACED AT EITHER END OF THE TRAIL SECTION UNDER CONSTRUCTION UNLESS OTHERWISE INSTRUCTED BY THE CITY. IF THE PROJECT IS CONSTRUCTED IN SECTIONS, THE CONSTRUCTION PROJECT IDENTIFICATION SIGNS CAN BE MOVED TO EACH SEGMENT UNDER CONSTRUCTION AS NEEDED.

2. ERECT SUPPORTS AND FRAMING ON SECURE FOUNDATION, RIGIDLY BRACED AND FRAMED TO RESIST WIND LOADINGS AND SIGN THEFT. INSTALL SIGN SURFACE PLUMB AND LEVEL.

3. REMOVE SIGN(S), FRAMING, SUPPORTS, AND FOUNDATIONS AT COMPLETION OF PROJECT AND RESTORE THE AREA.

STANDARD DETAIL REVISIONS DATE: 12/2022 NOT TO SCALE CONSTRUCTION PROJECT IDENTIFICATION SIGN

CITY OF RALEIGH

GW-40.03



5. STATIONARY TRAIL DETOUR SIGNAGE IS PREFERABLE FOR PEDESTRIAN DETOUR ROUTES THAT SHALL BE IN PLACE FOR EXTENDED DURATIONS OR IF THERE IS DEEMED TO BE A HIGH PROBABILITY OF SIGN THEFT. CONSULT WITH CITY OF RALEIGH PROJECT MANAGER TO DETERMINE IF STATIONARY OR PORTABLE SIGNS SHALL BE USED. REFER TO DETAIL GW-40.05 FOR PORTABLE TRAIL DETOUR SIGNAGE IF APPLICABLE. 6. ALL HARDWARE TO BE GALVANIZED AND FILED TO PREVENT THEFT/REMOVAL.

STANDARD DETAIL

DATE: 12/2022 REVISIONS NOT TO SCALE STATIONARY TRAIL DETOUR SIGNAGE **GW-40.04**















TRASH AND RECYCLING RECEPTACLE INSTALLATION SURFACE MOUNT - NOTES:

1. LOCATE RECEPTACLES AT EACH TRAIL HEAD OR AS DIRECTED BY THE CITY. RECEPTACLES MUST BE A MINIMUM OF 4 FEET FROM BENCHES.

2. RECEPTACLES SHOULD BE SET BACK A MINIMUM OF 3 FEET FROM THE EDGE OF THE GREENWAY TRAIL.

3. DRAINAGE SHOULD SLOPE AWAY FROM THE RECEPTACLES AND GREENWAY TRAIL. PROVIDE 2% MAX CROSS SLOPE FROM EDGE OF TRAIL TO RECEPTACLES WHERE FEASIBLE.

4. RECEPTACLE CRADLES SHALL BE CONSTRUCTED OF 1" X χ_4 " STEEL BARS.

5. FOLLOWING FABRICATION, STEEL CRADLES AND POSTS SHALL BE SEALED IN VINYL TO INHIBIT RUST AND ELIMINATE PERIODIC PAINTING.

6. A 40-GALLON LINER SHALL FIT INSIDE EACH STEEL CRADLE. LINERS AND LINER LIDS SHALL BE CONSTRUCTED OF TOUGH, ROTARY MOLDED POLYETHYLENE WITH A ROCKER BOTTOM. WEIGHT OF LINERS SHALL NOT EXCEED 12-POUNDS. LINER LIDS SHALL BE ATTACHED TO STEEL CRADLES WITH A VINYL CABLE. PROVIDE WEEP HOLE IN LINERS TO PERMIT DRAINAGE FOR OUTDOOR APPLICATION. PROVIDE TWO OPENINGS (ONE ON EACH SIDE) IN THE TRASH RECEPTACLE LID AND ONE OPENING IN THE RECYCLING RECEPTACLE LID FOR DEPOSITING LITTER AND RECYCLABLES, RESPECTIVELY.

7. RECEPTACLES ARE A COMBINATION UNIT (COMBINED UNIT SURFACE MOUNT).

8. ACCEPTABLE RECEPTACLE MANUFACTURER IS BEST LITTER RECEPTACLE, INC RTC-1000, GREEN COLOR FOR TRASH AND BLUE COLOR FOR RECYCLING OR APPROVED EQUAL BY CITY OF RALEIGH. RECYCLING RECEPTACLES SHOULD BE SIGNED AS RECYCLING AND PROVIDE INFORMATION ON WHAT RECYCLABLES ARE ACCEPTED. CONSIDER INCLUDING EDUCATIONAL SIGNAGE ABOUT THE IMPORTANCE OF RECYCLING AND THE ENVIRONMENTAL BENEFITS.

9. TRASH RECEPTACLE LID TO BE GREEN COLOR TO MATCH CRADLE. RECYCLING RECEPTACLE LID TO BE BLUE COLOR TO MATCH CRADLE.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 12/2022	NOT TO SCALE
	TRASH AND RECYCLING RECEPTACLE INSTALLATION SURFACE MOUNT	
	GW-5	50.06.2