

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MAINTENANCE AND OPERATIONS
CANAL DISTRICT



PLANS AND SPECIFICATIONS FOR
Contract Number: T201487703
Federal Aid Project Number: ESTP-2014(31)
Turned Down Guardrail, Canal District, FY15-17

PLANS PREPARED BY: *William S. Conroy*
CENTURY ENGINEERING, INC.

DATE: 3/11/15

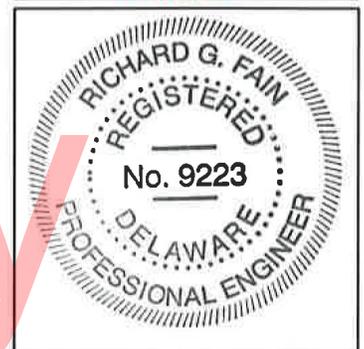
DATE RECOMMENDED: 3-19-15

John C. Fain
CANAL DISTRICT CONTRACTS ENGINEER



DATE RECOMMENDED: 3/19/15

Richard G. Fain
CANAL DISTRICT MAINTENANCE ENGINEER



DATE APPROVED: 3/19/15

Kevin T. Canning
CANAL DISTRICT ENGINEER



CONTRACT DESCRIPTION

The purpose of this Contract is to remove existing guardrail turned down ends, replace with approved attenuators as required, and to perform other guardrail component upgrades and grading, as shown on the plans or as directed in the field by the Engineer. Features requiring ADA upgrades for compliance with current standards may also be performed if within the limits of the guardrail work. Topsoil, seeding and mulching of exposed areas will be included. Maintenance of Traffic in accordance with the latest edition of the Delaware MUTCD will also be part of this Contract. The work will be performed on State Maintained roadways within Canal District as directed in the field by the Engineer. Plans detailing each location of work are included in the bid package.

PROJECT NOTES

1. Construction of this Contract shall conform to Delaware Department of Transportation Standard Specifications dated August 2001, the Supplemental Specifications, the Special Provisions, the applicable DeIDOT Standard Construction Details, the current Delaware MUTCD (including revisions up to the date of advertising), and these Project Notes.
2. The Performance Bond shall be submitted when the contract is executed. Failure on the part of the Contractor to submit the Performance Bond shall result in the Contract being cancelled. It is the Contractor's responsibility to assure that the Bond is current for the life of the contract. Costs to be included in the price bid for item 763000, Initial Expense.
3. Whenever the word "Contractor" is used in this Contract, it shall refer to the person or persons, company, or corporation furnishing the services required.
4. Whenever the word "Department" or "Engineer" is used, it shall refer to the person or persons representing the Delaware Department of Transportation (DeIDOT).
5. Unless specifically approved otherwise, there will not be a winter shutdown from December 16th to March 15th. The advertised Calendar Day contract duration includes, and has considered, the winter period.
6. Environmental permits are not required for this work provided that waters or wetlands, under the jurisdiction of the U.S. Army Corps of Engineers and/or DNREC, are not impacted. If there is a question as to whether or not a water or wetland is jurisdictional, the Engineer will contact the DeIDOT Environmental Studies Section at (302) 760-2264. In the event that a jurisdictional water or wetland is impacted, DeIDOT's Environmental Studies Section will be responsible for securing the appropriate permit authorizations.
7. It is anticipated that all work will occur within DeIDOT's existing right of way or easement areas. Should the need occur to trespass onto private property, it will be the responsibility of the Engineer to secure such trespass agreements.

8. For the purpose of this Contract, the replacement attenuator type and location shall be as shown on the plans. The plans shall also indicate what, if any, additional guardrail elements shall be replaced and/or upgraded at each location. Any guardrail elements removed and not to be reused, as determined by the Engineer, shall become the property of the Contractor. Removal and legal disposal of the unused elements, including, but not limited to, rails, posts, end attachments, excess hardware, concrete, and anchors are the responsibility of the Contractor.
9. Shop Drawings detailing the attenuator Items 720585 and 720586 shall be submitted and approved by the Department prior to any installation of these units in the field. Documentation verifying compliance with NCHRP 350 or MASH requirements should accompany the shop drawings.
10. Item 211002 (Removal of Structures and Obstructions – Guardrail) shall be utilized for, and payment shall include, the removal and disposal of existing guardrail, Turned Down Ends, and all appurtenances attached to these elements including the rails, posts, blocks, washers, reflectors, bolts, turned down rail section, and any other incidentals within the length of material being removed. Measurement shall be made for the linear feet of rail and or turned down rail actually removed from the site. Note that costs to remove any concrete anchors that are part of the turned down end sections are to be paid separately under Item 607000 (Removal of Existing Masonry).
11. At locations where 27 inch guardrail exists, a transition section shall be installed between the attenuator and existing guardrail. Standard Construction Detail sheet B-7 shows this transition. Payment for the transition will be made using Items 720050 and 720051. No additional payment, other than these unit prices, will be made to construct the transitions unless otherwise approved by the Engineer.
12. Backfill of holes created by post, turned down end, and/or anchor removal, shall be placed in compacted lifts. Should additional backfill material be required, payment will be made under Item 209006 (Borrow, Type F). Providing, installing, and setting up (if necessary) traffic cones and/or patterns is incidental to all the Bid Items. Cost for excavating and disposing of up to one (1) cubic yard of material and/or grading (up to a 6" depth) to meet the manufacturer's slope requirements is incidental to the unit price bid for Items 720585 (Guardrail Attenuator, Type 1-31) or 720586 (Guardrail Attenuator, Type 2-31). If excavation in excess of one (1) cubic yard is required, then the entire excavation necessary to meet the grading requirements at the location in question will be measured and paid for under item 202000, Excavation and Embankment. Hotmix curb shall be removed as directed in the field with payment to be made under item 202000 (if the total excavation at the location exceeds one cubic yard). If additional borrow is needed to construct the required grading zone, payment shall be made under Item 209006, (Borrow, Type F).
13. All runs of new guardrail shall utilize composite offset blocks. Payment for these blocks in new guardrail to be included in item 720050 or 720051. Composite blocks shall conform to NCHRP Report 350, Test Level 4. Unless specifically directed otherwise by the Engineer, no steel or wood blocks are to be furnished under this contract.

14. Underground utilities may be present at all locations. Therefore, all standard practices and procedures regarding utilities shall be followed. The Contractor shall contact Miss Utility of Delaware (1-800-282-8555) prior to starting each work order. The Contractor is responsible for the support and protection of all utilities when excavating. The Contractor is responsible for ensuring proper clearances, including safety clearances, from overhead utilities for construction equipment. The Contractor is advised to check the site for access purposes for his equipment, and make arrangements directly with utility companies for field adjustments for adequate clearances if necessary.
15. Excavated material not needed on the project shall become the property of the Contractor, and be removed at the Contractor's expense. Payment for removal and disposal of excess excavation is incidental to Item 202000.
16. Clearing and grubbing of vegetation including grass, weeds, trees and shrubs shall be incidental to the applicable repair or replacement item.
17. The Contractor shall provide residents 24-hour prior written notice for all phases of contract work. This notice shall be given to all residents whose property is adjacent to the street on which work is to be performed. Failure to give notice will result in a suspension of work.
18. The Contractor shall acquire all necessary equipment prior to starting work at a specific location. The material shall remain accessible and on-site until completion of work at that particular location unless prior approval from the Engineer is given.
19. Exposed soil must be stabilized with seed and mulch on this contract within seven (7) Calendar Days from the time that the excavation takes place.
20. Delete Section 104.05 of the DeIDOT Standard Specifications, and replace with the following:

The Department reserves the right to, at any time prior to completion of the contract, issue plan revisions, make adjustments in Contract item quantities, or make such alterations considered necessary to satisfactorily complete the Contract.

The Department reserves the right to increase or decrease the quantities of Pay Items specified in the Contract. Such additions or deletions shall not be cause for an increase or decrease in Contract unit bid prices. The "Change" threshold of plus or minus 25%, as described in Subsection 104.05 of the DeIDOT Standard Specifications dated August 2001 shall not apply to this Contract. Quantity increases or decreases of plus or minus 25% or greater shall not be justification for adjustments to unit prices.

The plan revisions and quantity adjustments described above do not invalidate the Contract or release the Contract surety. Payment for these changes shall exclude any amount for loss of anticipated profits alleged to result from the change.

When payment for the Contract work cannot be agreed upon by the Contractor and the Department prior to starting such work ordered, the Department may direct the Contractor to perform the work under Force Account provisions of Subsection 109.04. The Contractor will proceed immediately with the work so ordered and such direction shall neither invalidate the Contract, nor release the surety.
21. All additional work shall be performed using Contract unit bid prices. When contract unit bid prices do not apply, then prices will be negotiated or performed by Force Account procedures in accordance with Section 109.04 of the DeIDOT Standard Specifications.

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22. Payments shall be issued on a monthly basis for the amount of work completed, and verified by the Department.
23. The Contractor is reminded that Section 105.07 of the Standard Specifications requires the Contractor to maintain a competent Superintendent or Foreman on the job site at all times.
24. Construction layout for guardrail runs, approach grading areas, maintenance strips, etc. is the responsibility of the Contractor with costs incidental to the items being constructed.
25. Tapers from one height of curb to another shall be made at a rate of 12" horizontal to 1" vertical with costs incidental to the new curb being constructed.
26. The Contractor shall field verify all dimensions and curved radius sections for proper fit prior to installing the guardrail. Costs to provide curved guardrail sections, if necessary, are to be included in and measured for payment under Item 720050 or 720051.
27. The cost to fine grade, compact, and prepare existing acceptable base materials for bituminous concrete shall be incidental to the bituminous concrete item being placed on the base material.
28. Prior to the start of construction, the Contractor shall submit to the Engineer for review and approval, a Work Schedule in Bar Graph format showing the proposed sequence of the various work locations and the Calendar Day durations anticipated for each location. Work may be performed on multiple sites concurrently, provided that no Maintenance of Traffic conflicts occur as a result. Additionally, the contractor shall notify the engineer at least 10 days in advance to confirm the starting date of each location of work, in order that necessary public notice can be made by the engineer.
29. No work near or within railroad Right-of-Way is anticipated. If any railroad property or facilities are near or within the proposed limits of work or if the proposed work encroaches upon the railroad's Right-of-Way, the contractor shall be responsible for obtaining the required clearances and insurances for each involved railroad in accordance with the appropriate DelDOT Maintenance of Railroad Traffic item. DelDOT's Railroad Section Manager must be contacted at (302) 760-2183 to coordinate the execution of the appropriate agreements and authorizations required from any railroad company involved, including coordination for railroad flagging, if necessary.
30. PLEASE NOTE: For this contract, the Prime Contractor if required to perform a minimum of 30% of the bid value of the total original contract price with his/her own organization. Up to 70% of the work may be subcontracted.
31. Whenever guardrail and/or attenuators (or existing turned down end treatments) are removed from a location of work, the contractor shall perform the work continually until the replacement guardrail and/or attenuators have been installed. Protection of these areas with only cones or plastic drums is unacceptable.

MAINTENANCE OF TRAFFIC

1. The Plans will note the “Typical Applications” from the Delaware MUTCD that apply to the individual locations of work. Any additional or alternate Maintenance of Traffic measures required at specific locations shall be submitted to the Engineer and approved by DeIDOT Safety Section prior to the starting work at the location in question.
2. Prior to beginning work, the Contractor shall submit documentation to the Department verifying that all proposed Maintenance of Traffic devices meet or exceed the current NCHRP 350 and/or MASH requirements. No work requiring maintenance of traffic devices may begin until approval is received from DeIDOT Safety Section. All traffic control devices shall be in new or refurbished condition, and shall be in compliance with the Delaware Manual of Uniform Traffic Control Devices as defined in Part 6 of the Manual. The devices shall be maintained in good condition for the duration of the Contract.
3. The Department will not make payment to the Contractor for any and all temporary traffic control devices where the Contractor sets up temporary traffic control to perform work, but fails to perform any work.
4. Whenever the contractor closes a lane they shall contact DeIDOT’s TMC at (302) 659-4600 notifying them of the time the restriction is put into place, and again when the restriction has been lifted.
5. The safety measures outlined within this Contract and the Delaware MUTCD are not necessarily sufficient in every instance to guarantee the protection of the traveling public or the persons working on the project. Therefore, the provisions of this Contract do not relieve the Contractor of the sole responsibility for the safety of all persons working within or traveling through the work zone throughout the duration of the project. The Contractor shall implement any additional safety measures that are not expressly required by the Contract but are necessary to ensure the safety of all persons. The Contractor shall submit to the Engineer justification for deviations from the Traffic Control Plan or Traffic Management Plan. Final approval of the deviations or additions shall rest with the Engineer. All costs for making and complying with the proposal shall be incidental to the applicable maintenance of traffic pay items as listed in the original contract. If additional devices are required and agreed to by DeIDOT, payment will be made at the applicable unit bid prices for the devices.
6. Unless otherwise approved by the Engineer, no lane closures will be permitted on State holidays or events as listed in section 743.07 of the Standard Specifications. This requirement applies to all roads impacted in this Contract. Additional days before and/or after the dates listed may be directed by the Engineer as having no lane closures. If so directed, the Contractor shall comply with no additional cost to DeIDOT.
7. Item 743000, Maintenance of Traffic – Lump Sum, is not intended to be a bid item on this contract. Any costs related to Maintenance of Traffic that the Contractor feels would have been bid in this lump sum item shall be included in the various individual maintenance of traffic bid items proposed in the contract.

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8. All work shall be performed in a manner that will reasonably provide the least practicable obstruction to all road users, including vehicular, pedestrian, and bicycle traffic, and shall conform to the requirements of the Delaware Manual on Uniform Traffic Control Devices, Part 6, including revisions up to the date of advertisement for bids.
9. All open excavations shall be secured with plastic drums having retroreflective fluorescent orange and white prismatic sheeting and with orange plastic snow fence. Depending on the proximity of the excavation to the travelway, and its depth, steel plates may also be required. The snow fence, tie wire, steel plates, and associated items shall be incidental to the work being protected. If approved by the Engineer, Plastic Drums will be paid at the unit bid price for item 743006. Apply Delaware MUTCD, Table 6G-1, to determine proper dropoff protection.
10. Any deficiencies related to temporary traffic control that are reported to the Contractor in writing shall be corrected within 24 hours or as directed by the Engineer. Corrective actions on severe deficiencies as determined by the Engineer shall be undertaken immediately unless otherwise directed by the Engineer. Failure to comply will result in non-payment for those devices that are found to be deficient for the duration of the deficiency. Severe deficiencies that are not corrected immediately could result in possible suspension of work or holding of pay estimates until items identified are brought back into compliance.
11. At the end of each workday, the Contractor shall correct all vertical differences in accordance with the Delaware MUTCD, Table 6G-1. If temporary elimination of a vertical difference cannot be accomplished, then the area shall be properly marked and protected with additional plastic drums, barricades, warning signs, etc. as required by the Delaware MUTCD, and as approved by the Engineer. Payment will be made for Warning Signs, Plastic Drums, etc. that are agreed by the Department to be necessary.
12. All flaggers utilized by the Contractor for this project shall be ATSSA certified by a Department approved certification program. All flaggers shall have certification cards and photo identification with them while working. Absence of a certification card will be justification for flagger dismissal from the site and corresponding suspension of work. All garments worn by flaggers shall comply with applicable regulations for visibility and reflectivity. All construction and Contractor vehicles and self-propelled equipment shall be equipped with an operating roof mounted amber flashing light. For locations requiring a flagging operation, the flagger will be paid using the bid hourly rate under the applicable flagger Pay Item.
13. Work at locations 1, 2, and 3 shall be performed while nearby schools are out of session for the summer.

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14. If the Contractor does not complete the contract work within the advertised contract completion time plus any approved time extensions, the Contractor shall be responsible for providing the necessary temporary traffic control devices that are required to complete any remaining work. The cost of such temporary traffic control shall be borne by the Contractor. No additional payment will be made to the Contractor to maintain traffic in accordance with the Delaware MUTCD, specifications, and these Project Notes. Temporary traffic control items shall include, but not be limited to, warning signs, barricades, plastic drums, flaggers, traffic officers, arrow panels, message boards, and portable impact attenuators. Liquidated Damages will also be assessed as specified in Sections 108.08 and 108.09 of the Standard Specifications.
15. Costs for adjustment in position of traffic control devices within a particular location of work, due to variances from the standard Maintenance of Traffic (MOT) typical applications, or for any other reason, shall be included in the unit bid price for each respective MOT Pay Item.
16. No separate payment shall be made for use of traffic cones. Traffic cones and/or work associated with their use, such as set up, removal, cleaning, etc., shall be incidental to the work for which they protect.
17. Any existing signs that conflict with temporary or permanent construction signs shall be completely covered by the Contractor as needed, or as directed by the Engineer. Costs to furnish and install covers are considered incidental to Item 743024. The Contractor, with the Engineer's representative, shall inventory all signs on all roads subject to improvements. The cost to remove and install existing signs that are in conflict with the guardrail will be incidental to the guardrail items being installed.
18. A Truck mounted attenuator, Type II (Item 743010) shall be required on roads for shoulder work, travel lane work and other operations as outlined in the DeIDOT MUTCD, or as directed by the Engineer.
19. All construction equipment shall be removed from the job sites on a daily basis, except when approved by the Engineer. Contractor shall follow guidelines set forth in the Delaware MUTCD for storage of materials.

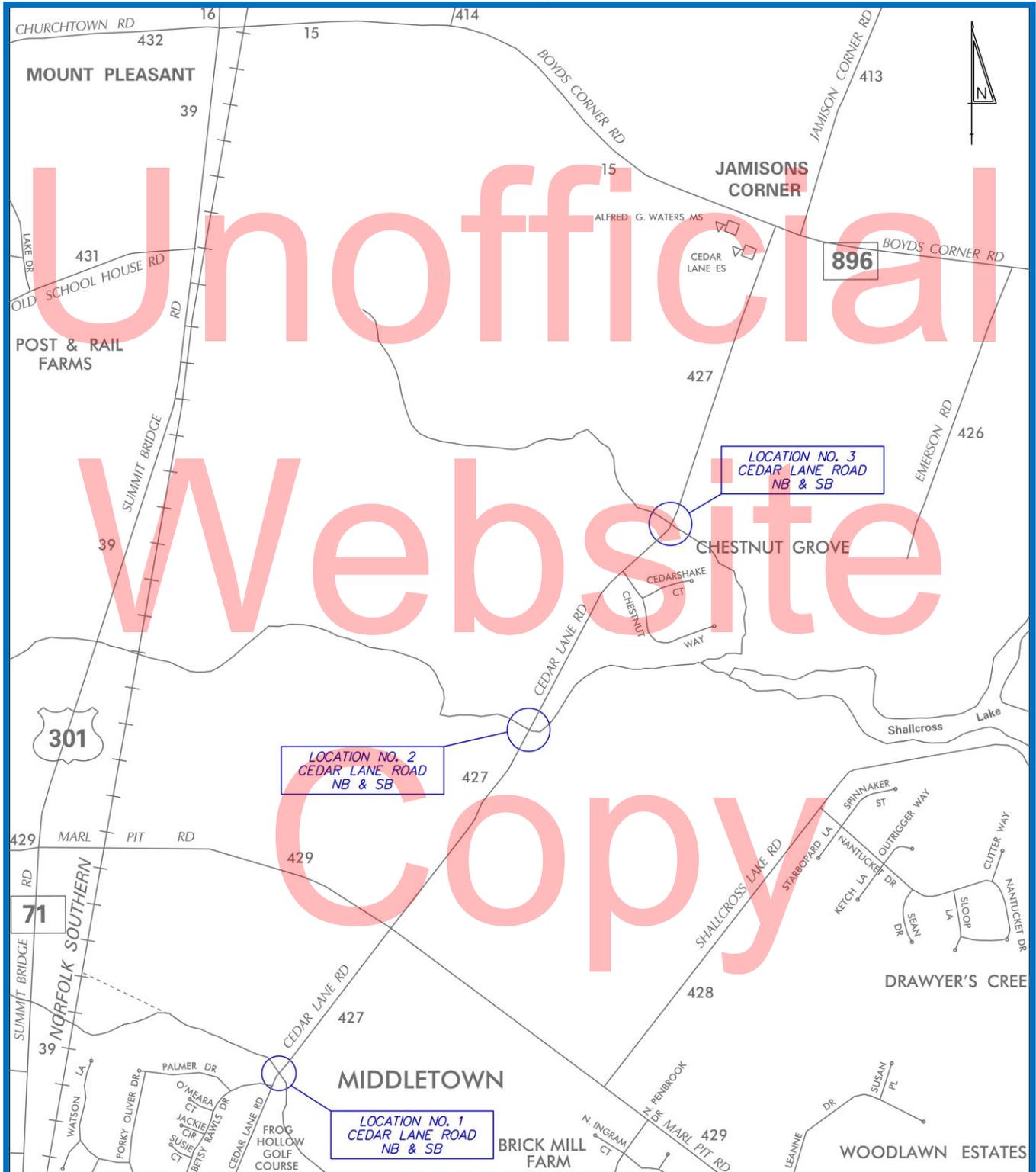
20. Pedestrian Maintenance of Traffic: This work shall consist of providing and maintaining an accessible pedestrian route throughout the project's limits in accordance with the Americans with Disabilities Act of 1990 (ADA) Title II, paragraph 35.130.

The following considerations shall be taken into account when addressing accessible pedestrian maintenance of traffic:

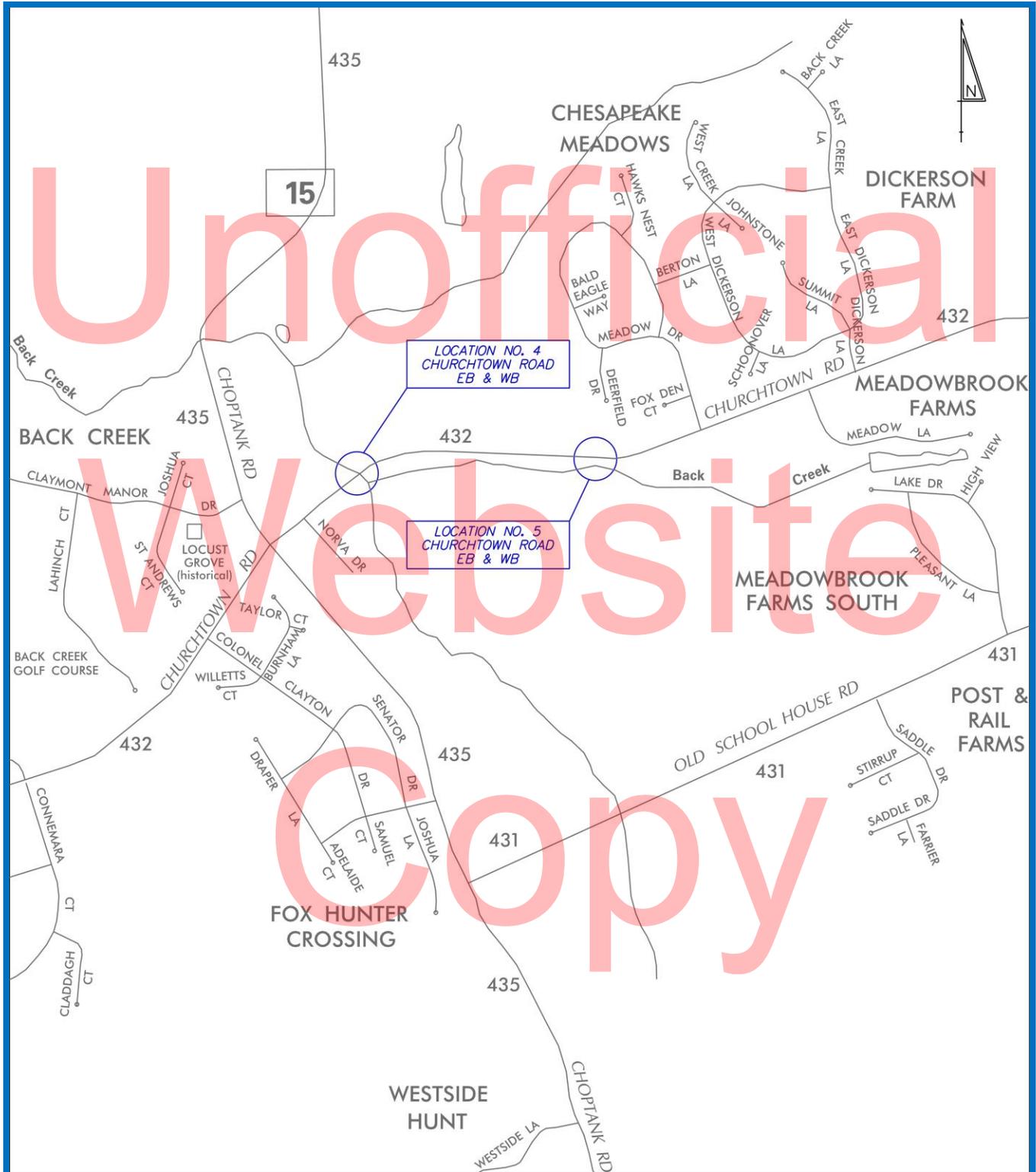
- All pedestrians, including persons with disabilities, shall be provided with a reasonably safe, convenient and accessible path that replicates as much as practicable the existing pedestrian facilities. A Flagger may be utilized during working hours to escort pedestrians through the work zone. Payment to be made under Items 743050 and 743062 as applicable.
- Maintain access to all business and residents at all times.
- Provide pedestrian access thru or around the work zone. If a detour is chosen the Contractor must submit the detour route to the Engineer for review and approval. The detour route must meet or exceed the current conditions.
- Work should be phased so that all areas of an intersection/sidewalk path are not under construction at the same time unless a clear path is provided and identified.
- Traffic control devices and other construction materials and features shall not intrude into the usable width of the sidewalk, temporary pathway or other pedestrian facility.
- Signs and other devices mounted lower than 7 ft. above the temporary pedestrian pathway shall not project more than 4 in. into accessible pedestrian route.
- A smooth, continuous hard surface shall be provided throughout the entire length and width of the pedestrian route throughout construction. If new paving and/or base course is required, payment shall be made under Items 302008 and 401821.
- There shall be no curbs or vertical elevation changes greater than $\frac{1}{4}$ in. in grade or terrain that could cause tripping or be a barrier to wheelchair use.

LOCATION MAP

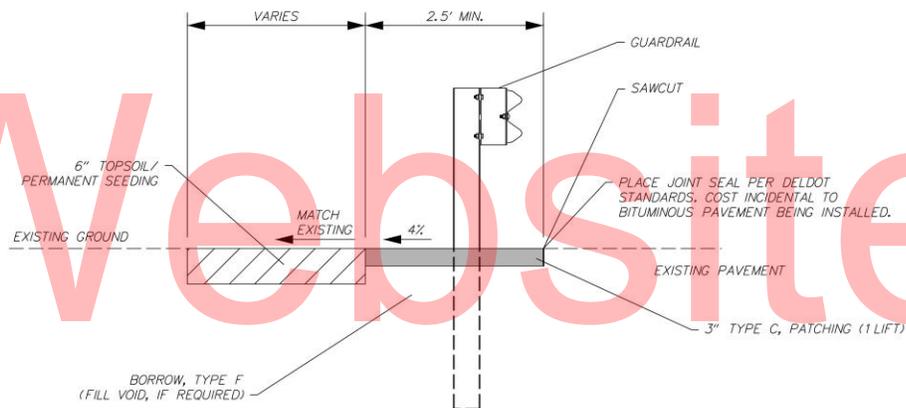
Locations 1, 2 & 3



LOCATION MAP
Locations 4 & 5



CONSTRUCTION DETAILS



BITUMINOUS CONCRETE MAINTENANCE STRIP DETAIL

Unofficial

Website

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LOCATION 1: Cedar Lane Road (N427), Northbound and Southbound, at Betsy Rawls Drive

GENERAL IMPROVEMENTS:

Guardrail safety improvements by removing turned down end treatments and other noncompliant guardrail.

DESCRIPTION OF WORK:

1. Utilize lane closure detail, TA-10, from DEMUTCD.
2. Remove entire run of guardrail on the southbound side of Cedar Lane Road.
3. Sawcut and remove existing hotmix curb.
4. Excavate for proposed maintenance strip and riprap installation, where applicable.
5. Fill existing guardrail holes with borrow, Type F.
6. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
7. Install galvanized steel beam guardrail, Type 1-31.
8. On the approach, install guardrail end treatment attenuator, Type 1-31.
9. On the exiting section, flare the guardrail outside of the clear zone and install end anchorage, Type 31. The end anchorage shall be installed so that the bus stop is not disturbed.
10. Place riprap as shown in the plans.
11. Place topsoil and permanent seeding, where applicable.
12. Remove entire run of guardrail on the northbound side of Cedar Lane Road.
13. Sawcut and remove existing hotmix curb.
14. Excavate for proposed maintenance strip and riprap installation, where applicable.
15. Fill existing guardrail holes with borrow, Type F.
16. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
17. Install galvanized steel beam guardrail, Type 1-31.
18. On the approach, install guardrail end treatment attenuator, Type 2-31. The end treatment shall be installed so that the pedestrian pathway is not disturbed.
19. On the exiting section, install end treatment attenuator, Type 1-31.
20. Place riprap as shown in the plans.
21. Place topsoil and permanent seeding, where applicable.

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ESTIMATE FOR LOCATION:

Location No. 1: Cedar Lane Road (N427) at Betsy Rawls Drive			
ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	34
209006	BORROW, TYPE F	CY	15
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	350
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	39
607000	REMOVAL OF EXISTING MASONRY	CY	6.0
712020	RIPRAP, R-4	TON	163
713003	GEOTEXTILES, RIPRAP	SY	202
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	200.0
720585	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH	2
720586	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	EACH	1
726001	END ANCHORAGE 31	EACH	1
743003	ARROW PANELS, TYPE C	EADY	10
743006	PLASTIC DRUMS	EADY	500
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	10
743023	TEMPORARY BARRICADES, TYPE III	LFDY	40
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	80
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	80
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	8
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	403
762001	SAW CUTTING, HOT MIX	LF	403
908001	TOPSOIL (TON)	TON	21
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	90

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LOCATION 2: Cedar Lane Road (N427), Northbound and Southbound, Approx. 3,200' North of Marl Pit Road

GENERAL IMPROVEMENTS:

Guardrail safety improvements by removing turned down end treatments and other noncompliant guardrail.

DESCRIPTION OF WORK:

1. Utilize lane closure detail, TA-10, from DEMUTCD.
2. On the southbound side, remove entire run of existing guardrail.
3. Excavate for proposed maintenance strip, where applicable.
4. Fill existing guardrail holes with borrow, Type F.
5. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
6. Galvanized steel beam guardrail, Type 1-31 shall be installed 2' inside of the existing guardrail location, as shown in the plans. Guardrail over culverts, Type 3-31 shall be installed where indicated on the plans.
7. Install guardrail end treatment attenuator, Type 1-31 on the approach section.
8. On the exiting section, install guardrail end treatment attenuator, Type 1-31. The attenuator shall be installed so that the mailbox is not disturbed.
9. Place topsoil and permanent seeding, where applicable.
10. On the northbound side, remove entire run of existing guardrail.
11. Excavate for proposed maintenance strip, where applicable.
12. Fill existing guardrail holes with borrow, Type F.
13. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
14. Install galvanized steel beam guardrail, Type 3-31, over culvert 2' inside of the existing guardrail location, as shown in the plans.
15. Install guardrail end treatment attenuator, Type 1-31 at the approach and exiting sections.
16. Place topsoil and permanent seeding, where applicable.

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ESTIMATE FOR LOCATION:

Location No. 2: Cedar Lane Road (N427), Approx. 3,200' North of Marl Pit Road

ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	38
209006	BORROW, TYPE F	CY	13
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	275
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	30
607000	REMOVAL OF EXISTING MASONRY	CY	6.0
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	25.0
720057	GUARDRAIL OVER CULVERTS, TYPE 3-31	EACH	2
720585	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH	4
743003	ARROWPANELS, TYPE C	EADY	10
743006	PLASTIC DRUMS	EADY	500
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	10
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	80
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	80
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	8
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	315
762001	SAW CUTTING, HOT MIX	LF	315
908001	TOPSOIL (TON)	TON	33
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	140

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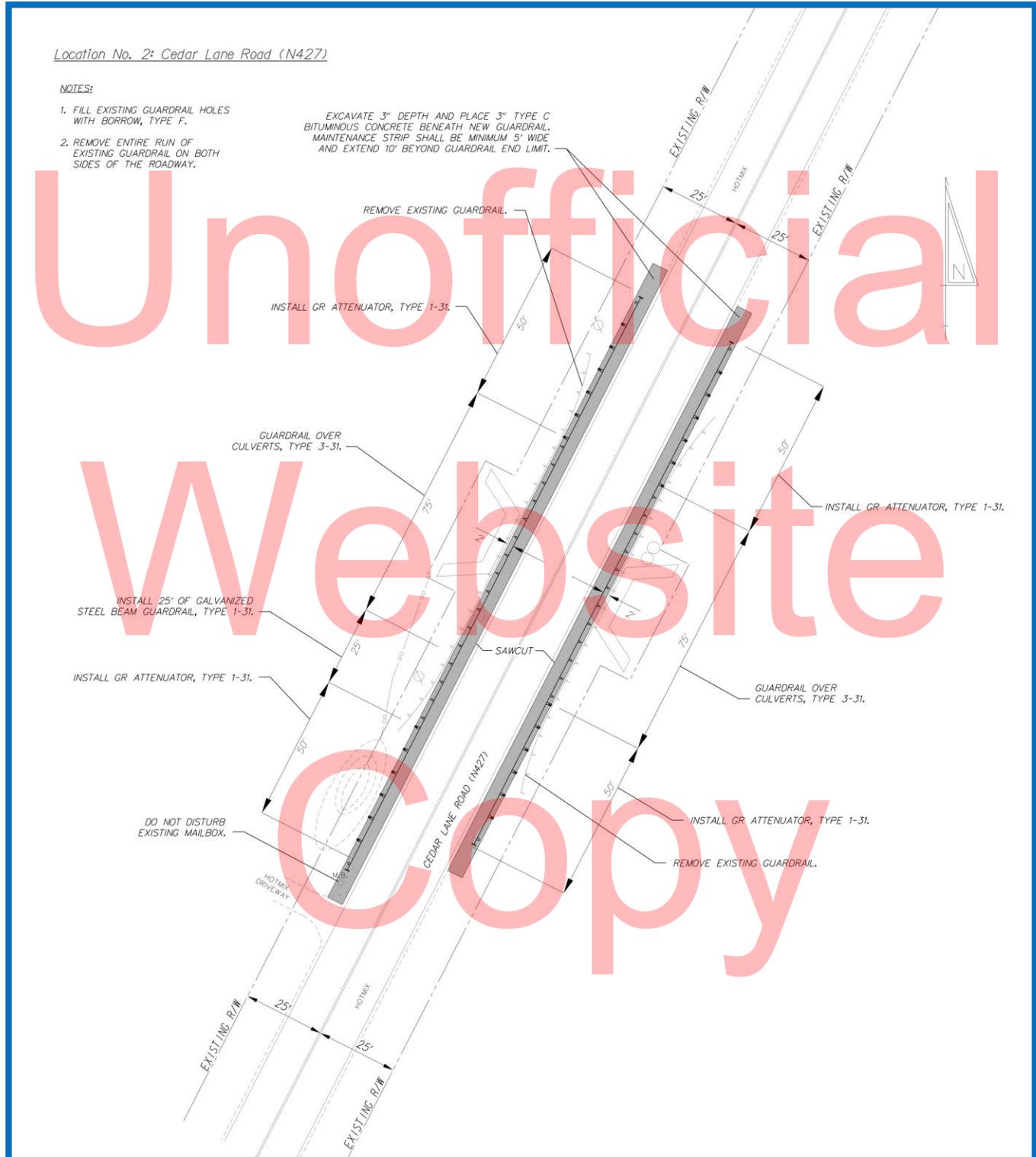
CONSTRUCTION PLAN:

Location No. 2: Cedar Lane Road (N427)

NOTES:

1. FILL EXISTING GUARDRAIL HOLES WITH BORROW, TYPE F.
2. REMOVE ENTIRE RUN OF EXISTING GUARDRAIL ON BOTH SIDES OF THE ROADWAY.

EXCAVATE 3" DEPTH AND PLACE 3" TYPE C BITUMINOUS CONCRETE BENEATH NEW GUARDRAIL. MAINTENANCE STRIP SHALL BE MINIMUM 5' WIDE AND EXTEND 10' BEYOND GUARDRAIL END LIMIT.



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LOCATION 3: Cedar Lane Road (N427), Northbound and Southbound, Approx. 4,200' South of Boyds Corner Road

GENERAL IMPROVEMENTS:

Guardrail safety improvements by removing turned down end treatments and other noncompliant guardrail.

DESCRIPTION OF WORK:

1. Utilize lane closure detail, TA-10, from DEMUTCD.
2. Clear all vegetation within the limits of construction.
3. Remove two (2) turned down end treatments on the southbound side of Cedar Lane Road. The middle section of guardrail shall remain.
4. Excavate for proposed maintenance strip, where applicable.
5. Fill existing guardrail holes with borrow, Type F.
6. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
7. On the approach, transition existing guardrail to the compliant 31" and install guardrail end treatment attenuator, Type 1-31.
8. On the exiting section, extend and flare guardrail, and install buried end section, as shown to avoid utility conflicts.
9. Place topsoil and permanent seeding, where applicable.
10. Remove two (2) turned down end treatments on the northbound side of Cedar Lane Road. The middle section of guardrail shall remain.
11. Excavate for proposed maintenance strip, where applicable.
12. Fill existing guardrail holes with borrow, Type F.
13. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
14. On the approach, extend and flare guardrail, and install buried end section.
15. On the exiting section, transition existing guardrail to the compliant 31", flare guardrail and install guardrail end treatment attenuator, Type 1-31.
16. Place topsoil and permanent seeding, where applicable.

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Turned Down Guardrail, Canal District, FY 15-17

ESTIMATE FOR LOCATION:

Location No. 3: Cedar Lane Road (N427), Approx. 4,200' South of Boyds Corner Road

ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	55
209006	BORROW, TYPE F	CY	10
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	200.0
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	57
607000	REMOVAL OF EXISTING MASONRY	CY	4.5
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	325.0
720051	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-31	LF	0.0
720585	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH	2
726002	BURIED END SECTION	EACH	2
743003	ARROWPANELS, TYPE C	EADY	15
743006	PLASTIC DRUMS	EADY	750
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	15
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	120
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	120
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	12
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	370
762001	SAW CUTTING, HOT MIX	LF	370
908001	TOPSOIL (TON)	TON	39
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	165

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CONSTRUCTION PLAN:

Location No. 3: Cedar Lane Road (N427)

NOTES:

1. FILL EXISTING GUARDRAIL HOLES WITH BORROW, TYPE F.

EXCAVATE 3" DEPTH AND PLACE 3" TYPE C BITUMINOUS CONCRETE BENEATH NEW GUARDRAIL. MAINTENANCE STRIP SHALL BE MINIMUM 8' WIDE AND EXTEND 10' BEYOND GUARDRAIL END LIMIT.

INSTALL GR ATTENUATOR, TYPE 1-31.

INSTALL 50' OF GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31. TRANSITION TO

EXCAVATE 3" DEPTH AND PLACE 3" TYPE C BIT. CONC. BENEATH NEW GUARDRAIL.

INSTALL GR ATTENUATOR, TYPE 1-31.

EXISTING GUARDRAIL TO REMAIN.

EXCAVATE 3" DEPTH AND PLACE 3" TYPE C BITUMINOUS CONCRETE BENEATH NEW GUARDRAIL. MAINTENANCE STRIP SHALL BE MINIMUM 8' WIDE AND EXTEND 10' BEYOND GUARDRAIL END LIMIT.

INSTALL 100' OF GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31.

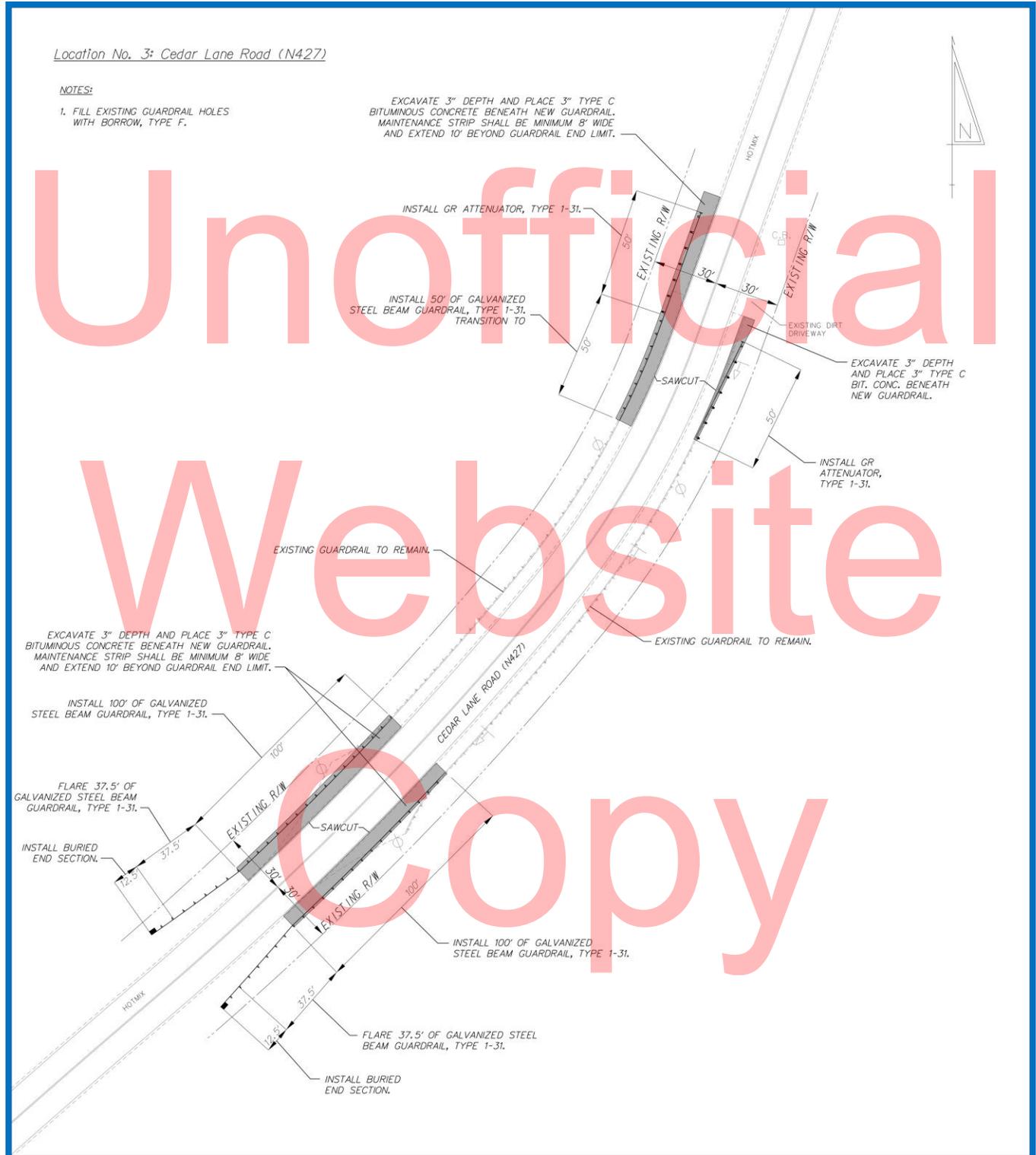
FLARE 37.5' OF GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31.

INSTALL BURIED END SECTION.

INSTALL 100' OF GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31.

FLARE 37.5' OF GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31.

INSTALL BURIED END SECTION.



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LOCATION 4: Churchtown Road (N432), Eastbound and Westbound, Approx. 1,200' East of Choptank Road

GENERAL IMPROVEMENTS:

Guardrail safety improvements by removing turned down end treatments and other noncompliant guardrail.

DESCRIPTION OF WORK:

1. Utilize lane closure detail, TA-10, from DEMUTCD.
2. Remove entire run of guardrail on the westbound side of Churchtown Road.
3. Excavate for proposed maintenance strip, where applicable.
4. Fill existing guardrail holes with borrow, Type F.
5. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
6. Install galvanized steel beam guardrail, Type 1-31, as shown in the plans.
7. Install two (2) guardrail end treatment attenuators, Type 1-31 on the approach and exiting sections.
8. Place topsoil and permanent seeding, where applicable.
9. Remove entire run of guardrail on the eastbound side of Churchtown Road.
10. Excavate for proposed maintenance strip, where applicable.
11. Fill existing guardrail holes with borrow, Type F.
12. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
13. Install galvanized steel beam guardrail, Type 1-31, as shown in the plans.
14. On the approach section, extend the guardrail twenty-five (25) feet and install guardrail end treatment attenuator, Type 1-31.
15. On the exiting section, install guardrail end treatment attenuator, Type 1-31 and the same location of the exiting turned down end.
16. Place topsoil and permanent seeding, where applicable.

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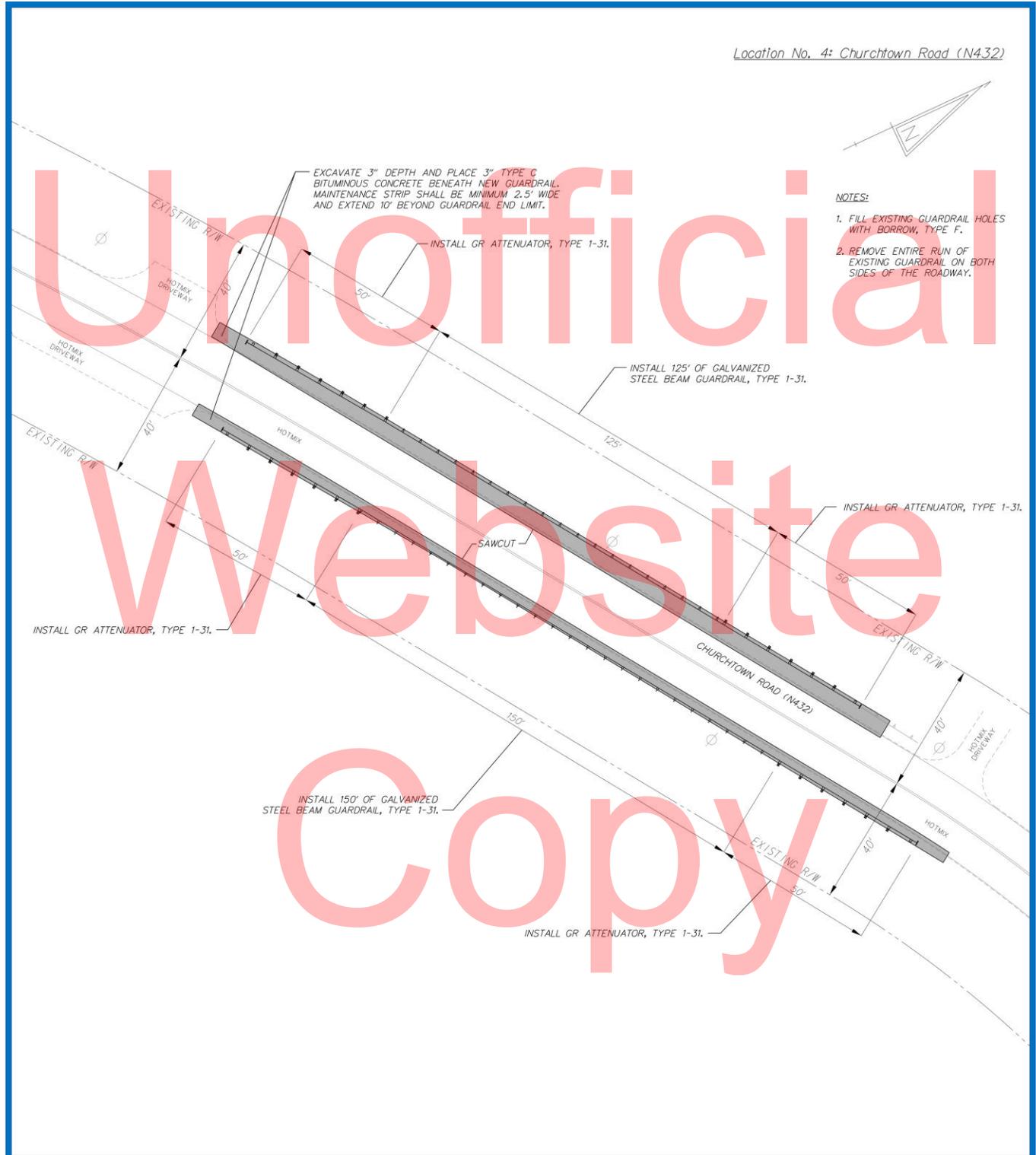
ESTIMATE FOR LOCATION:

Location No. 4: Churchtown Road (N432), Approx. 1,200' East of Choptank Road

ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	62
209006	BORROW, TYPE F	CY	18
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	487.5
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	49
607000	REMOVAL OF EXISTING MASONRY	CY	6.0
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	275.0
720586	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	EACH	4
743003	ARROWPANELS, TYPE C	EADY	5
743006	PLASTIC DRUMS	EADY	250
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	5
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	40
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	40
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	4
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	515
762001	SAW CUTTING, HOT MIX	LF	515
908001	TOPSOIL (TON)	TON	54
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	229

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CONSTRUCTION PLAN:



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Turned Down Guardrail, Canal District, FY 15-17

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LOCATION 5: Churchtown Road (N432), Eastbound and Westbound, Approx. 1,000' West of Meadow Drive

GENERAL IMPROVEMENTS:

Guardrail safety improvements by removing turned down end treatments and other noncompliant guardrail.

DESCRIPTION OF WORK:

1. Utilize lane closure detail, TA-10, from DEMUTCD.
2. Remove entire run of guardrail on the westbound of Churchtown Road.
3. Excavate for proposed maintenance strip, where applicable.
4. Fill existing guardrail holes with borrow, Type F.
5. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
6. Install galvanized steel beam guardrail, Type 2-31, as shown in the plans.
7. On approach section, install guardrail end treatment attenuator, Type 1-31.
8. On the exiting section, extend the guardrail to the location shown in the plans and install guardrail end treatment attenuator, Type 1-31.
9. Place topsoil and permanent seeding, where applicable.
10. Remove entire run of guardrail on the eastbound of Churchtown Road.
11. Excavate for proposed maintenance strip, where applicable.
12. Fill existing guardrail holes with borrow, Type F.
13. Pave maintenance strip, using bituminous concrete Type C, per the engineer in the field.
14. Install galvanized steel beam guardrail, Type 1-31 and Type 2-31, as shown in the plans.
15. On the approach section, install guardrail end treatment attenuator, Type 1-31.
16. On the exiting section, extend the guardrail to the location shown in the plans and install guardrail end treatment attenuator, Type 1-31.
17. Place topsoil and permanent seeding, where applicable.

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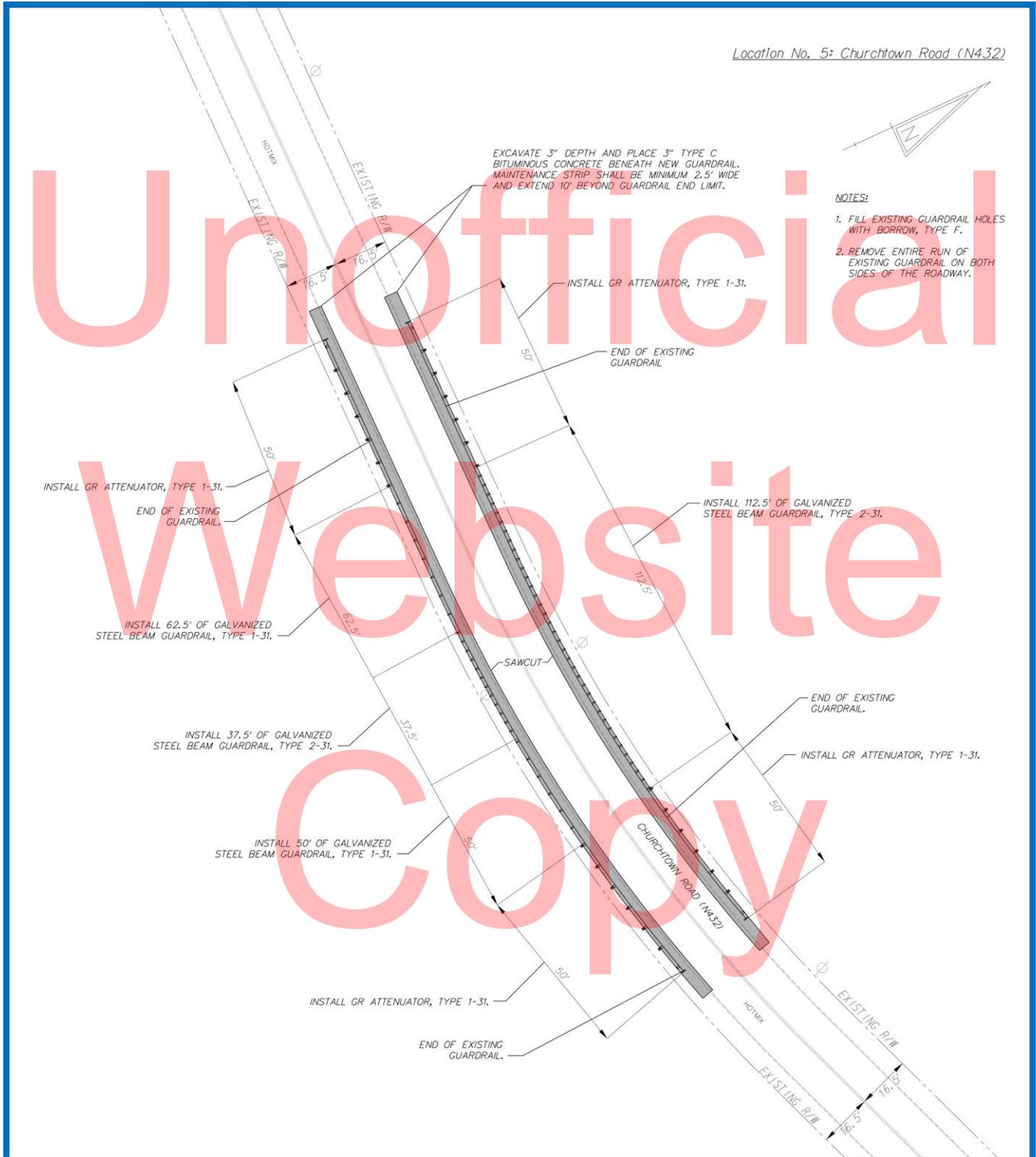
ESTIMATE FOR LOCATION:

Location No. 5: Churchtown Road (N432), Approx. 1,000' West of Meadow Drive

ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	61
209006	BORROW, TYPE F	CY	15
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	350
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	48
607000	REMOVAL OF EXISTING MASONRY	CY	6.0
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	150.0
720051	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-31	LF	112.5
720585	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH	4
743003	ARROWPANELS, TYPE C	EADY	5
743006	PLASTIC DRUMS	EADY	250
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	5
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	40
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	40
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	4
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	503
762001	SAW CUTTING, HOT MIX	LF	503
908001	TOPSOIL (TON)	TON	52
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	224

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CONSTRUCTION PLAN:



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Turned Down Guardrail, Canal District, FY 15-17

PROJECT QUANTITY SUMMARY:

Quantity Summary			
ITEM #	TITLE	UNIT	UNIT QUANTITY
202000	EXCAVATION AND EMBANKMENT	CY	250
209006	BORROW, TYPE F	CY	71
211002	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (GUARDRAIL)	LF	1,663
401821	BITUMINOUS CONCRETE, SUPERPAVE, TYPE C, 160 GYRATIONS, PG 64-22, PATCHING	TON	223
607000	REMOVAL OF EXISTING MASONRY	CY	28.5
712020	RIPRAP, R-4	TON	163
713003	GEOTEXTILES, RIPRAP	SY	202
720050	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 1-31	LF	975.0
720051	GALVANIZED STEEL BEAM GUARDRAIL, TYPE 2-31	LF	112.5
720057	GUARDRAIL OVER CULVERTS, TYPE 3-31	EACH	2
720585	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1-31	EACH	12
720586	GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2-31	EACH	5
726001	END ANCHORAGE 31	EACH	1
726002	BURIED END SECTION	EACH	2
743003	ARROWPANELS, TYPE C	EADY	45
743006	PLASTIC DRUMS	EADY	2,250
743010	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	45
743023	TEMPORARY BARRICADES, TYPE III	LFDY	40
743024	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	360
743050	FLAGGER, NEW CASTLE COUNTY, STATE	HOUR	360
743062	FLAGGER, NEW CASTLE COUNTY, STATE, OVERTIME	HOUR	36
748548	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	2,106
762001	SAW CUTTING, HOT MIX	LF	2,106
908001	TOPSOIL (TON)	TON	199
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	848
763000	Initial Expense	L.S.	1
763501	Construction Engineering	L.S.	1