

Individual Site Cost Estimates



*M-0468 Ramp Metering Feasibility Study for
Cabarrus, Gaston, Iredell and Mecklenburg
Counties*

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Table of Contents

Chapter	Pages
1 Introduction	4
2 Assumptions	5
3 Site Cost Estimates	7
3.1 Proposed One Lane Ramp Locations	8
3.1.1 Gaston County	8
3.1.2 Iredell County	32
3.1.3 Mecklenburg County	48
3.2 Proposed Two Lane Ramp Locations	191
3.2.1 Mecklenburg County	191
3.3 Proposed Two Lane Freeway to Freeway Ramp Locations	199
3.3.1 Mecklenburg County	199

1 Introduction

This report addresses the estimated costs for each of the fifty-one recommended sites moving forward. The fifty-one sites are sites that have been identified as either 'feasible' or 'review in future.' There are forty-three sites that are being recommended as a single lane ramp meter locations and eight that are being recommended as a two lane ramp meter locations. The cost estimates for each of the sites includes equipment and pavement markings needed for the installation of ramp metering on both the ramp and the mainline. If a site is recommended to be constructed as a two-lane ramp, then the associated construction costs are included in the estimate.

2 Assumptions

As the cost estimates for each individual site were developed, there were several assumptions made. Below are the general assumptions that were made or considered for each site and the associated category.

Signals –

Signal Heads:

- A minimum of two signal heads per lane with two sections per signal head
 - A minimum of two flashers per ramp with two sections per signal head *
- (* Additional flashers may be needed based upon upstream ramp configuration and freeway to freeway (F2F locations)

Supports:

- Default is a two pedestal poles
- F2F sites will utilize mast arm supports
- Three lane sites will utilize mast arm supports

Loops -

- Each mainline lane will have two loops per lane
- Each ramp lane will have a total of five detectors per lane:
 - One loop for queue detection
 - Three loops for passage detection
 - One loop for clearance detection
- The Queue detection loop will be setback 350 feet from the ramp meters

Conduit –

- Conduit will be needed for loops
- Conduit will be needed for power to ramp meter sites (will need separate pullboxes)
- Conduit will be needed for signals and flashers
- Conduit will be needed for fiber optic communications to the CCTV's

Pullboxes –

Standard:

- Install one box every 250 feet for electrical conductors
- Install one box at every sensor location
- Install two boxes at every cabinet
- Install one on each side of each directional drilled crossing

Oversized:

- Install one box at new CCTV fiber locations
- Install one box at each splice location to existing fiber if there is not one
- Install one box on each side of each direction drilled crossing

CCTV –

- Install new CCTV at locations where there is no existing coverage
- Install broadband communications if fiber-optic communications are unavailable

Roadway –

- If guardrail is lengthened or modified in anyway and the current attenuator does not meet current standards, it will be replaced
- If ramp meter equipment is located within the clear zone, guardrail and attenuator shall be installed
- New guardrail is assumed to be 250' in advance of ramp meter equipment and 50' shall be assumed for approach attenuator

Drainage –

- New pipe/Extension of existing pipe is estimated on an as needed basis per site survey/summary

Project Development –

Default Percentages:

The following default percentages were assumed for Traffic Control, Project Contingencies, Design, and Construction Administration.

- Traffic Control = 15%
- Project Contingencies = 10%
- Design = 8%
- Construction Administration = 10%

Two of the biggest contributors that impact site costs are the ramp/loop/mainline geometrics and the existing ITS infrastructure available. Another item that affected site cost was the availability of power at the site locations. The costs will vary depending on these parameters.

3 Site Cost Estimates

Each of the sites were evaluated and cost estimates were prepared looking at the following categories. As stated previously, site costs are impacted by the ramp/loop/mainline geometrics and the existing ITS infrastructure, as well as the availability of power at each of the site locations.

Categories
Earthwork and Structure
Guardrail
Paving
Drainage
Signalization
Communications
Pavement Marking
Signing
SUBTOTAL CONSTRUCTION
Traffic Control
Contingencies
TOTAL CONSTRUCTION
Design
Construction Administration
TOTAL DESIGN AND CONSTRUCTION

3.1 Proposed One Lane Ramp Locations

3.1.1 Gaston County



NCDOT Ramp Metering Feasibility Study Individual Site Cost Estimate

030

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 30 **Ramp:** Cox Rd
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2027	\$2.88	\$5,837.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,837.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 30 **Ramp:** Cox Rd
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$103,431.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 30 **Ramp:** Cox Rd
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 30 **Ramp:** Cox Rd
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION					
				\$131,421.66	
Traffic Control	15%			\$19,713.25	
Contingencies	10%			\$13,142.17	
TOTAL CONSTRUCTION				\$164,277.08	
Design	8%			\$13,142.17	
Construction Administration	10%			\$16,427.71	
TOTAL DESIGN AND CONSTRUCTION				\$193,846.95	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

032

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 032 **Ramp:** S Main St. (Gaston Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Seeding	SY	1210	\$2.88	\$3,484.80	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$3,484.80	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 032 **Ramp:** S Main St. (Gaston Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	1725	\$6.90	\$11,902.50	All purposes
- Conduit (Directional Drilled)	LF	340	\$16.10	\$5,474.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$70,607.93	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 032 **Ramp:** S Main St. (Gaston Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	640	\$0.71	\$456.32	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,284.32	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 032 **Ramp:** S Main St. (Gaston Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL CONSTRUCTION				\$94,304.55	
Traffic Control	15%			\$14,145.68	
Contingencies	10%			\$9,430.45	
TOTAL CONSTRUCTION				\$117,880.68	
Design	8%			\$9,430.45	
Construction Administration	10%			\$11,788.07	
TOTAL DESIGN AND CONSTRUCTION				\$139,099.20	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

033

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 033 **Ramp:** McAdenville Rd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1694	\$2.88	\$4,878.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$4,878.72	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 033 **Ramp:** McAdenville Rd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2450	\$6.90	\$16,905.00	All purposes
- Conduit (Directional Drilled)	LF	1120	\$16.10	\$18,032.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$89,056.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 033 **Ramp:** McAdenville Rd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 033 **Ramp:** McAdenville Rd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$123,632.07	
Traffic Control	15%			\$18,544.81	
Contingencies	10%			\$12,363.21	
TOTAL CONSTRUCTION				\$154,540.09	
Design	8%			\$12,363.21	
Construction Administration	10%			\$15,454.01	
TOTAL DESIGN AND CONSTRUCTION				\$182,357.30	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

034

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 034 **Ramp:** McAdenville Rd
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Seeding	SY	1294	\$2.88	\$3,726.72	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$3,726.72	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	2	\$1,725.00	\$3,450.00	
SUBTOTAL				\$13,450.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 034 **Ramp:** McAdenville Rd
Location: I-85 Northbound

Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	1850	\$6.90	\$12,765.00	All purposes
- Conduit (Directional Drilled)	LF	340	\$16.10	\$5,474.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1250	\$5.75	\$7,187.50	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$72,907.93	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 034 **Ramp:** McAdenville Rd
Location: I-85 Northbound

- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	640	\$0.71	\$456.32	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,284.32	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$110,296.47	
Traffic Control	15%			\$16,544.47	
Contingencies	10%			\$11,029.65	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 034 **Ramp:** McAdenville Rd
Location: I-85 Northbound

TOTAL CONSTRUCTION		\$137,870.58	
Design	8%	\$11,029.65	
Construction Administration	10%	\$13,787.06	
TOTAL DESIGN AND CONSTRUCTION		\$162,687.29	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

035

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 035 **Ramp:** Belmont-Mt. Holly Rd (Gaston Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	1	\$300.00	\$ 300.00	
- Seeding	SY	6294	\$2.88	\$18,126.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$18,426.72	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 035 **Ramp:** Belmont-Mt. Holly Rd (Gaston Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					and one clearance
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2090	\$6.90	\$14,421.00	All purposes
- Conduit (Directional Drilled)	LF	730	\$16.10	\$11,753.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1630	\$5.75	\$9,372.50	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$83,027.93	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 035 **Ramp:** Belmont-Mt. Holly Rd (Gaston Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	640	\$0.71	\$456.32	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,284.32	
Signing					

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 035 **Ramp:** Belmont-Mt. Holly Rd (Gaston Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$121,666.47	
Traffic Control	15%			\$18,249.97	
Contingencies	10%			\$12,166.65	
TOTAL CONSTRUCTION				\$152,083.08	
Design	8%			\$12,166.65	
Construction Administration	10%			\$15,208.31	
TOTAL DESIGN AND CONSTRUCTION				\$179,458.04	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

037

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 37 **Ramp:** Beatty Dr / Park St
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2402	\$2.88	\$6,917.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,917.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 37 **Ramp:** Beatty Dr / Park St
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	3500	\$6.90	\$24,150.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$111,699.15	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 37 **Ramp:** Beatty Dr / Park St
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 37 **Ramp:** Beatty Dr / Park St
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$141,491.21	
Traffic Control	15%			\$21,223.68	
Contingencies	10%			\$14,149.12	
TOTAL CONSTRUCTION				\$176,864.01	
Design	8%			\$14,149.12	
Construction Administration	10%			\$17,686.40	
TOTAL DESIGN AND CONSTRUCTION				\$208,699.53	

3.1.2 Iredell County



NCDOT Ramp Metering Feasibility Study Individual Site Cost Estimate

148

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 148 **Ramp:** Langtree Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2019	\$2.88	\$5,814.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,814.72	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 148 **Ramp:** Langtree Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$104,709.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 148 **Ramp:** Langtree Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 148 **Ramp:** Langtree Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$133,398.47	
Traffic Control	15%			\$20,009.77	
Contingencies	10%			\$13,339.85	
TOTAL CONSTRUCTION				\$166,748.09	
Design	8%			\$13,339.85	
Construction Administration	10%			\$16,674.81	
TOTAL DESIGN AND CONSTRUCTION				\$196,762.74	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

149

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 149 **Ramp:** Langtree Rd
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2952	\$2.88	\$8,501.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$8,501.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 149 **Ramp:** Langtree Rd
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	4350	\$6.90	\$30,015.00	All purposes
- Conduit (Directional Drilled)	LF	1120	\$16.10	\$18,032.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	4800	\$5.75	\$27,600.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$122,419.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 149 **Ramp:** Langtree Rd
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	2000	\$0.71	\$1,426.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	1000	\$1.09	\$1,092.50	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	1000	\$1.09	\$1,092.50	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$3,739.80	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 149 **Ramp:** Langtree Rd
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$155,601.01	
Traffic Control	15%			\$23,340.15	
Contingencies	10%			\$15,560.10	
TOTAL CONSTRUCTION				\$194,501.26	
Design	8%			\$15,560.10	
Construction Administration	10%			\$19,450.13	
TOTAL DESIGN AND CONSTRUCTION				\$229,511.49	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

150

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 150 **Ramp:** Williamson Rd / US 21 / Charlotte Hwy
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1860	\$2.88	\$5,356.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,356.80	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 150 **Ramp:** Williamson Rd / US 21 / Charlotte Hwy
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2700	\$6.90	\$18,630.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$97,681.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 150 **Ramp:** Williamson Rd / US 21 / Charlotte Hwy
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 150 **Ramp:** Williamson Rd / US 21 / Charlotte Hwy
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL CONSTRUCTION				\$125,461.53	
Traffic Control	15%			\$18,819.23	
Contingencies	10%			\$12,546.15	
TOTAL CONSTRUCTION				\$156,826.91	
Design	8%			\$12,546.15	
Construction Administration	10%			\$15,682.69	
TOTAL DESIGN AND CONSTRUCTION				\$185,055.75	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

153

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 153 **Ramp:** SR 1100 - Brawley School Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1886	\$2.88	\$5,431.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,431.68	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 153 **Ramp:** SR 1100 - Brawley School Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	2750	\$6.90	\$18,975.00	All purposes
- Conduit (Directional Drilled)	LF	1420	\$16.10	\$22,862.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1600	\$5.75	\$9,200.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$97,809.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 153 **Ramp:** SR 1100 - Brawley School Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	800	\$0.71	\$570.40	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	400	\$1.09	\$437.00	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	400	\$1.09	\$437.00	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,573.20	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$125,754.33	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 153 **Ramp:** SR 1100 - Brawley School Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$18,863.15	
Contingencies	10%			\$12,575.43	
TOTAL CONSTRUCTION				\$157,192.91	
Design	8%			\$12,575.43	
Construction Administration	10%			\$15,719.29	
TOTAL DESIGN AND CONSTRUCTION				\$185,487.64	

3.1.3 Mecklenburg County



NCDOT Ramp Metering Feasibility Study Individual Site Cost Estimate

075

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 075 **Ramp:** Mallard Creek Church Rd
Location: I-85 Northbound (Mecklenburg Co.)

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1750	\$2.88	\$5,040.00	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,040.00	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 075 **Ramp:** Mallard Creek Church Rd
Location: I-85 Northbound (Mecklenburg Co.)

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	900	\$1.73	\$1,552.50	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	2850	\$6.90	\$19,665.00	All purposes
- Conduit (Directional Drilled)	LF	1810	\$16.10	\$29,141.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	8	\$82.00	\$656.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	590	\$3.16	\$1,865.88	
SUBTOTAL				\$106,918.15	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 075 **Ramp:** Mallard Creek Church Rd
Location: I-85 Northbound (Mecklenburg Co.)

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$25,250.00	
Pavement Marking					
- Pavement Marking Removal	LF	900	\$0.71	\$641.70	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	425	\$1.09	\$464.31	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	425	\$1.09	\$464.31	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,699.13	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 075 **Ramp:** Mallard Creek Church Rd
Location: I-85 Northbound (Mecklenburg Co.)

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$151,024.78	
Traffic Control			15%	\$22,653.72	
Contingencies			10%	\$15,102.48	
TOTAL CONSTRUCTION				\$188,780.97	
Design			8%	\$15,102.48	
Construction Administration			10%	\$18,878.10	
TOTAL DESIGN AND CONSTRUCTION				\$222,761.54	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

099

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 99 **Ramp:** Arrowood Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2019	\$2.88	\$5,814.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,814.72	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 99 **Ramp:** Arrowood Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	2120	\$16.10	\$34,132.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$112,759.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 99 **Ramp:** Arrowood Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 99 **Ramp:** Arrowood Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$131,174.60	
Traffic Control	15%			\$19,676.19	
Contingencies	10%			\$13,117.46	
TOTAL CONSTRUCTION				\$163,968.24	
Design	8%			\$13,117.46	
Construction Administration	10%			\$16,396.82	
TOTAL DESIGN AND CONSTRUCTION				\$193,482.53	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

101

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 101 **Ramp:** Arrowood Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2077	\$2.88	\$5,981.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,981.76	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 101 **Ramp:** Arrowood Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	3025	\$6.90	\$20,872.50	All purposes
- Conduit (Directional Drilled)	LF	1320	\$16.10	\$21,252.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	3000	\$5.75	\$17,250.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$107,140.55	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 101 **Ramp:** Arrowood Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	1500	\$0.71	\$1,069.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	750	\$1.09	\$819.38	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	750	\$1.09	\$819.38	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$2,837.05	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 101 **Ramp:** Arrowood Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$143,611.86	
Traffic Control	15%			\$21,541.78	
Contingencies	10%			\$14,361.19	
TOTAL CONSTRUCTION				\$179,514.83	
Design	8%			\$14,361.19	
Construction Administration	10%			\$17,951.48	
TOTAL DESIGN AND CONSTRUCTION				\$211,827.49	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

102

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 102 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2077	\$2.88	\$5,981.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,981.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 102 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	3025	\$6.90	\$20,872.50	All purposes
- Conduit (Directional Drilled)	LF	1020	\$16.10	\$16,422.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$93,685.55	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 102 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 102 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$104,542.74	
Traffic Control	15%			\$15,681.41	
Contingencies	10%			\$10,454.27	
TOTAL CONSTRUCTION				\$130,678.42	
Design	8%			\$10,454.27	
Construction Administration	10%			\$13,067.84	
TOTAL DESIGN AND CONSTRUCTION				\$154,200.53	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

103

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 103 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1250	\$2.88	\$3,600.00	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$3,600.00	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	2	\$1,725.00	\$3,450.00	
SUBTOTAL				\$13,450.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 103 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2225	\$6.90	\$15,352.50	All purposes
- Conduit (Directional Drilled)	LF	1020	\$16.10	\$16,422.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1200	\$5.75	\$6,900.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$517.50	\$517.50	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$1,400.00	\$2,800.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$80,918.05	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 103 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	350	\$1.73	\$603.75	Drop cable to controller cabinet
- Tracer Wire	LF	350	\$14.00	\$4,900.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$22,891.25	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	12	\$8.05	\$96.60	
SUBTOTAL				\$1,179.90	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 103 **Ramp:** Nations Ford Rd (Mecklenburg Co.)
Location: I-77Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$125,431.70	
Traffic Control			15%	\$18,814.76	
Contingencies			10%	\$12,543.17	
TOTAL CONSTRUCTION				\$156,789.63	
Design			8%	\$12,543.17	
Construction Administration			10%	\$15,678.96	
TOTAL DESIGN AND CONSTRUCTION				\$185,011.76	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

104

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 104 **Ramp:** Tyvola Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2510	\$2.88	\$7,228.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,228.80	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 104 **Ramp:** Tyvola Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	3675	\$6.90	\$25,357.50	All purposes
- Conduit (Directional Drilled)	LF	2670	\$16.10	\$42,987.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	3000	\$5.75	\$17,250.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$133,075.93	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 104 **Ramp:** Tyvola Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	750	\$1.73	\$1,293.75	Drop cable to controller cabinet
- Tracer Wire	LF	750	\$14.00	\$10,500.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$29,181.25	
Pavement Marking					
- Pavement Marking Removal	LF	1500	\$0.71	\$1,069.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	750	\$1.09	\$819.38	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	750	\$1.09	\$819.38	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$2,837.05	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 104 **Ramp:** Tyvola Road
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$175,715.53	
Traffic Control			15%	\$26,357.33	
Contingencies			10%	\$17,571.55	
TOTAL CONSTRUCTION				\$219,644.41	
Design			8%	\$17,571.55	
Construction Administration			10%	\$21,964.44	
TOTAL DESIGN AND CONSTRUCTION				\$259,180.40	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

105

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 105 **Ramp:** Tyvola Rd (Mecklenburg Co.)
Location: I-77Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1877	\$2.88	\$5,405.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,405.76	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 105 **Ramp:** Tyvola Rd (Mecklenburg Co.)
Location: I-77Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					and one clearance
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2725	\$6.90	\$18,802.50	All purposes
- Conduit (Directional Drilled)	LF	1020	\$16.10	\$16,422.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2400	\$5.75	\$13,800.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$96,790.55	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 105 **Ramp:** Tyvola Rd (Mecklenburg Co.)
Location: I-77Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	15	\$5.18	\$77.63	
- White Edge Line	LF	2400	\$1.09	\$2,622.00	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	2400	\$1.09	\$2,622.00	110' transitions, 100' narrowed lane
- White Skip Line	LF	1200	\$0.28	\$331.20	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$6,316.38	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 105 **Ramp:** Tyvola Rd (Mecklenburg Co.)
Location: I-77Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$120,630.19	
Traffic Control	15%			\$18,094.53	
Contingencies	10%			\$12,063.02	
TOTAL CONSTRUCTION				\$150,787.73	
Design	8%			\$12,063.02	
Construction Administration	10%			\$15,078.77	
TOTAL DESIGN AND CONSTRUCTION				\$177,929.52	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

109

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 109 **Ramp:** Clanton Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2027	\$2.88	\$5,837.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,837.76	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 109 **Ramp:** Clanton Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1200	\$5.75	\$6,900.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$101,706.80	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 109 **Ramp:** Clanton Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	250	\$1.73	\$431.25	Drop cable to controller cabinet
- Tracer Wire	LF	250	\$14.00	\$3,500.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$21,318.75	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 109 **Ramp:** Clanton Rd
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$141,192.91	
Traffic Control	15%			\$21,178.94	
Contingencies	10%			\$14,119.29	
TOTAL CONSTRUCTION				\$176,491.14	
Design	8%			\$14,119.29	
Construction Administration	10%			\$17,649.11	
TOTAL DESIGN AND CONSTRUCTION				\$208,259.54	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

111

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 111 **Ramp:** Remount Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2177	\$2.88	\$6,269.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,269.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 111 **Ramp:** Remount Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	3175	\$6.90	\$21,907.50	All purposes
- Conduit (Directional Drilled)	LF	820	\$16.10	\$13,202.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2400	\$5.75	\$13,800.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$96,675.55	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 111 **Ramp:** Remount Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 111 **Ramp:** Remount Rd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL CONSTRUCTION				\$107,369.36	
Traffic Control	15%			\$16,105.40	
Contingencies	10%			\$10,736.94	
TOTAL CONSTRUCTION				\$134,211.70	
Design	8%			\$10,736.94	
Construction Administration	10%			\$13,421.17	
TOTAL DESIGN AND CONSTRUCTION				\$158,369.81	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

117

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 117 **Ramp:** West Trade St (Loop)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2502	\$2.88	\$7,205.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,205.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 117 **Ramp:** West Trade St (Loop)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	3650	\$6.90	\$25,185.00	All purposes
- Conduit (Directional Drilled)	LF	2320	\$16.10	\$37,352.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2400	\$5.75	\$13,800.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$126,304.15	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 117 **Ramp:** West Trade St (Loop)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$25,250.00	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 117 **Ramp:** West Trade St (Loop)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$163,364.51	
Traffic Control	15%			\$24,504.68	
Contingencies	10%			\$16,336.45	
TOTAL CONSTRUCTION				\$204,205.64	
Design	8%			\$16,336.45	
Construction Administration	10%			\$20,420.56	
TOTAL DESIGN AND CONSTRUCTION				\$240,962.65	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

140

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 140 **Ramp:** Gilead Street
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2769	\$2.88	\$7,974.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,974.72	
Guardrail					
- Guardrail Rail	LF	250	\$20.00	\$5,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$6,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 140 **Ramp:** Gilead Street
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	4075	\$6.90	\$28,117.50	All purposes
- Conduit (Directional Drilled)	LF	1420	\$16.10	\$22,862.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2400	\$5.75	\$13,800.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$111,551.95	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 140 **Ramp:** Gilead Street
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$23,237.50	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$153,913.22	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 140 **Ramp:** Gilead Street
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$23,086.98	
Contingencies	10%			\$15,391.32	
TOTAL CONSTRUCTION				\$192,391.53	
Design	8%			\$15,391.32	
Construction Administration	10%			\$19,239.15	
TOTAL DESIGN AND CONSTRUCTION				\$227,022.00	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

143

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 143 **Ramp:** NC 73 (Sam Furr Road)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2236	\$2.88	\$6,439.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,439.68	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$11,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 143 **Ramp:** NC 73 (Sam Furr Road)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	3275	\$6.90	\$22,597.50	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$102,926.95	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 143 **Ramp:** NC 73 (Sam Furr Road)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 143 **Ramp:** NC 73 (Sam Furr Road)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$141,050.68	
Traffic Control	15%			\$21,157.60	
Contingencies	10%			\$14,105.07	
TOTAL CONSTRUCTION				\$176,313.35	
Design	8%			\$14,105.07	
Construction Administration	10%			\$17,631.34	
TOTAL DESIGN AND CONSTRUCTION				\$208,049.75	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

145

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 145 **Ramp:** US 21 (Catawba Avenue)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1500	\$2.88	\$4,320.00	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$4,320.00	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	2	\$1,725.00	\$3,450.00	
SUBTOTAL				\$13,450.00	
Drainage					
- Pipe	LF	50	\$60.00	\$3,000.00	Extend existing
SUBTOTAL				\$3,000.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 145 **Ramp:** US 21 (Catawba Avenue)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	3900	\$6.90	\$26,910.00	All purposes
- Conduit (Directional Drilled)	LF	340	\$16.10	\$5,474.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	4	\$82.00	\$328.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$90,207.83	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 145 **Ramp:** US 21 (Catawba Avenue)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 145 **Ramp:** US 21 (Catawba Avenue)
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$115,401.88	
Traffic Control			15%	\$17,310.28	
Contingencies			10%	\$11,540.19	
TOTAL CONSTRUCTION				\$144,252.34	
Design			8%	\$11,540.19	
Construction Administration			10%	\$14,425.23	
TOTAL DESIGN AND CONSTRUCTION				\$170,217.77	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

146

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 146 **Ramp:** Goodrum Rd / Griffith St
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2586	\$2.88	\$7,447.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,447.68	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	2	\$1,725.00	\$3,450.00	
SUBTOTAL				\$13,450.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 146 **Ramp:** Goodrum Rd / Griffith St
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	3800	\$6.90	\$26,220.00	All purposes
- Conduit (Directional Drilled)	LF	340	\$16.10	\$5,474.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1200	\$5.75	\$6,900.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$85,081.83	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 146 **Ramp:** Goodrum Rd / Griffith St
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 146 **Ramp:** Goodrum Rd / Griffith St
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$125,938.56	
Traffic Control			15%	\$18,890.78	
Contingencies			10%	\$12,593.86	
TOTAL CONSTRUCTION				\$157,423.19	
Design			8%	\$12,593.86	
Construction Administration			10%	\$15,742.32	
TOTAL DESIGN AND CONSTRUCTION				\$185,759.37	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

147

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 147 **Ramp:** Goodrum Rd/Griffith St
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	1	\$300.00	\$ 300.00	
- Seeding	SY	6942	\$2.88	\$19,992.96	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$20,292.96	
Guardrail					
- Guardrail Rail	LF	250	\$20.00	\$5,000.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$5,000.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 147 **Ramp:** Goodrum Rd/Griffith St
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	3075	\$6.90	\$21,217.50	All purposes
- Conduit (Directional Drilled)	LF	1270	\$16.10	\$20,447.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$97,061.95	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 147 **Ramp:** Goodrum Rd/Griffith St
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	500	\$0.71	\$356.50	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	250	\$1.09	\$273.13	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,031.55	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 147 **Ramp:** Goodrum Rd/Griffith St
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$142,313.96	
Traffic Control	15%			\$21,347.09	
Contingencies	10%			\$14,231.40	
TOTAL CONSTRUCTION				\$177,892.45	
Design	8%			\$14,231.40	
Construction Administration	10%			\$17,789.25	
TOTAL DESIGN AND CONSTRUCTION				\$209,913.09	



NCDOT Ramp Metering Feasibility Study

Individual Site Cost Estimate

045

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 45 **Ramp:** Little Rock Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1868	\$2.88	\$5,379.84	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,379.84	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 45 **Ramp:** Little Rock Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
					and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	2700	\$6.90	\$18,630.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$99,279.15	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 45 **Ramp:** Little Rock Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$25,250.00	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 45 **Ramp:** Little Rock Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$134,784.42	
Traffic Control	15%			\$20,217.66	
Contingencies	10%			\$13,478.44	
TOTAL CONSTRUCTION				\$168,480.52	
Design	8%			\$13,478.44	
Construction Administration	10%			\$16,848.05	
TOTAL DESIGN AND CONSTRUCTION				\$198,807.01	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

064

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 064 **Ramp:** Graham St (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0.5	\$300.00	\$ 150.00	
- Seeding	SY	3838	\$2.88	\$11,053.44	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$11,203.44	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 064 **Ramp:** Graham St (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	2025	\$6.90	\$13,972.50	All purposes
- Conduit (Directional Drilled)	LF	1070	\$16.10	\$17,227.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1630	\$5.75	\$9,372.50	
- Ground Rods	EA	8	\$82.00	\$656.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$89,814.78	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 064 **Ramp:** Graham St (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	150	\$1.73	\$258.75	Drop cable to controller cabinet
- Tracer Wire	LF	150	\$14.00	\$2,100.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$19,746.25	
Pavement Marking					
- Pavement Marking Removal	LF	640	\$0.71	\$456.32	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,284.32	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 064 **Ramp:** Graham St (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$134,166.29	
Traffic Control	15%			\$20,124.94	
Contingencies	10%			\$13,416.63	
TOTAL CONSTRUCTION				\$167,707.86	
Design	8%			\$13,416.63	
Construction Administration	10%			\$16,770.79	
OTAL DESIGN AND CONSTRUCTION				\$197,895.27	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

067

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 067 **Ramp:** Sugarcreek Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1585	\$2.88	\$4,564.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$4,564.80	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 067 **Ramp:** Sugarcreek Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	900	\$1.73	\$1,552.50	Assumed setback distance 350'
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	2275	\$6.90	\$15,697.50	All purposes
- Conduit (Directional Drilled)	LF	1460	\$16.10	\$23,506.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1100	\$5.75	\$6,325.00	
- Ground Rods	EA	8	\$82.00	\$656.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	590	\$3.16	\$1,865.88	
SUBTOTAL				\$95,015.65	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 067 **Ramp:** Sugarcreek Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	150	\$1.73	\$258.75	Drop cable to controller cabinet
- Tracer Wire	LF	150	\$14.00	\$2,100.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$19,746.25	
Pavement Marking					
- Pavement Marking Removal	LF	640	\$0.71	\$456.32	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	320	\$1.09	\$349.60	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,284.32	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 067 **Ramp:** Sugarcreek Rd (Mecklenburg Co.)
Location: I-85 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$132,728.52	
Traffic Control	15%			\$19,909.28	
Contingencies	10%			\$13,272.85	
TOTAL CONSTRUCTION				\$165,910.65	
Design	8%			\$13,272.85	
Construction Administration	10%			\$16,591.07	
TOTAL DESIGN AND CONSTRUCTION				\$195,774.57	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

069

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 69 **Ramp:** University City Blvd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2710	\$2.88	\$7,804.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,804.80	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	10	\$453.68	\$4,536.75	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 69 **Ramp:** University City Blvd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	16	\$345.00	\$5,520.00	
- Conduit (Trenched)	LF	3950	\$6.90	\$27,255.00	All purposes
- Conduit (Directional Drilled)	LF	2620	\$16.10	\$42,182.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	3000	\$5.75	\$17,250.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$138,251.50	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 69 **Ramp:** University City Blvd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$25,250.00	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 69 **Ramp:** University City Blvd
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$176,181.73	
Traffic Control	15%			\$26,427.26	
Contingencies	10%			\$17,618.17	
TOTAL CONSTRUCTION				\$220,227.16	
Design	8%			\$17,618.17	
Construction Administration	10%			\$22,022.72	
TOTAL DESIGN AND CONSTRUCTION				\$259,868.04	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

072

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 072 **Ramp:** Harris Blvd (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1450	\$2.88	\$4,176.00	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$4,176.00	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	900	\$1.73	\$1,552.50	Assumed setback distance 350'

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 072 **Ramp:** Harris Blvd (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pullbox (Std.)	EA	14	\$345.00	\$4,830.00	
- Conduit (Trenched)	LF	2550	\$6.90	\$17,595.00	All purposes
- Conduit (Directional Drilled)	LF	1560	\$16.10	\$25,116.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1100	\$5.75	\$6,325.00	
- Ground Rods	EA	8	\$82.00	\$656.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$517.50	\$517.50	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$1,400.00	\$2,800.00	Breakaway pole
- Two Section Signal Head	EA	4	\$500.00	\$2,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$93,842.53	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 072 **Ramp:** Harris Blvd (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	4	\$5.18	\$20.70	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- 24" Stop Bar	LF	8	\$8.05	\$64.40	
SUBTOTAL				\$1,168.40	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$128,851.93	
Traffic Control		15%		\$19,327.79	

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 072 **Ramp:** Harris Blvd (Mecklenburg Co.)
Location: I-85 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Contingencies			10%	\$12,885.19	
TOTAL CONSTRUCTION				\$161,064.91	
Design			8%	\$12,885.19	
Construction Administration			10%	\$16,106.49	
TOTAL DESIGN AND CONSTRUCTION				\$190,056.59	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

177

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 177 **Ramp:** Steele Creek Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	100	\$25.00	\$2,500.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	1	\$300.00	\$ 300.00	
- Seeding	SY	7034	\$2.88	\$20,257.92	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$23,057.92	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1450	\$1.73	\$2,501.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 177 **Ramp:** Steele Creek Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3200	\$6.90	\$22,080.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$105,588.05	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 177 **Ramp:** Steele Creek Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$157,510.57	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 177 **Ramp:** Steele Creek Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$23,626.59	
Contingencies	10%			\$15,751.06	
TOTAL CONSTRUCTION				\$196,888.21	
Design	8%			\$15,751.06	
Construction Administration	10%			\$19,688.82	
TOTAL DESIGN AND CONSTRUCTION				\$232,328.09	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

179

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 179 **Ramp:** Steele Creek Rd (RAMP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2327	\$2.88	\$6,701.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,701.76	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 179 **Ramp:** Steele Creek Rd (RAMP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3400	\$6.90	\$23,460.00	All purposes
- Conduit (Directional Drilled)	LF	1870	\$16.10	\$30,107.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2400	\$5.75	\$13,800.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$115,736.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 179 **Ramp:** Steele Creek Rd (RAMP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$143,300.36	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 179 **Ramp:** Steele Creek Rd (RAMP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$21,495.05	
Contingencies	10%			\$14,330.04	
TOTAL CONSTRUCTION				\$179,125.45	
Design	8%			\$14,330.04	
Construction Administration	10%			\$17,912.55	
TOTAL DESIGN AND CONSTRUCTION				\$211,368.03	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

180

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 180 **Ramp:** West Blvd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2194	\$2.88	\$6,318.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,318.72	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 180 **Ramp:** West Blvd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3200	\$6.90	\$22,080.00	All purposes
- Conduit (Directional Drilled)	LF	1870	\$16.10	\$30,107.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2500	\$5.75	\$14,375.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$114,931.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 180 **Ramp:** West Blvd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$0.00	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$134,302.32	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 180 **Ramp:** West Blvd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$20,145.35	
Contingencies	10%			\$13,430.23	
TOTAL CONSTRUCTION				\$167,877.90	
Design	8%			\$13,430.23	
Construction Administration	10%			\$16,787.79	
TOTAL DESIGN AND CONSTRUCTION				\$198,095.92	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

181

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 181 **Ramp:** West Blvd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0.25	\$300.00	\$ 75.00	
- Seeding	SY	3404	\$2.88	\$9,803.52	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$9,878.52	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 181 **Ramp:** West Blvd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3200	\$6.90	\$22,080.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$104,006.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 181 **Ramp:** West Blvd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$142,472.12	

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 181 **Ramp:** West Blvd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$21,370.82	
Contingencies	10%			\$14,247.21	
TOTAL CONSTRUCTION				\$178,090.15	
Design	8%			\$14,247.21	
Construction Administration	10%			\$17,809.02	
TOTAL DESIGN AND CONSTRUCTION				\$210,146.38	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

182

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 182 **Ramp:** US 74/&S 29/Wilkinson Blvd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	3394	\$2.88	\$9,774.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$9,774.72	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 182 **Ramp:** US 74/&S 29/Wilkinson Blvd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	5000	\$6.90	\$34,500.00	All purposes
- Conduit (Directional Drilled)	LF	3120	\$16.10	\$50,232.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	3500	\$5.75	\$20,125.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$153,226.80	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	750	\$1.73	\$1,293.75	Drop cable to controller cabinet
- Tracer Wire	LF	750	\$14.00	\$10,500.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 182 **Ramp:** US 74/&S 29/Wilkinson Blvd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$14,668.75	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$182,545.70	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 182 **Ramp:** US 74/&S 29/Wilkinson Blvd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$27,381.85	
Contingencies	10%			\$18,254.57	
TOTAL CONSTRUCTION				\$228,182.12	
Design	8%			\$18,254.57	
Construction Administration	10%			\$22,818.21	
TOTAL DESIGN AND CONSTRUCTION				\$269,254.90	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

229

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 229 **Ramp:** E John St
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2386	\$2.88	\$6,871.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$6,871.68	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 229 **Ramp:** E John St
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3500	\$6.90	\$24,150.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	2000	\$5.75	\$11,500.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$108,504.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 229 **Ramp:** E John St
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$138,250.43	

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 229 **Ramp:** E John St
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$20,737.56	
Contingencies	10%			\$13,825.04	
TOTAL CONSTRUCTION				\$172,813.04	
Design	8%			\$13,825.04	
Construction Administration	10%			\$17,281.30	
TOTAL DESIGN AND CONSTRUCTION				\$203,919.38	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

230

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 230 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	3686	\$2.88	\$10,615.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$10,615.68	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 230 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	5450	\$6.90	\$37,605.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$115,059.45	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	2500	\$1.73	\$4,312.50	Drop cable to controller cabinet
- Tracer Wire	LF	2500	\$14.00	\$35,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 230 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$42,187.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$180,463.06	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 230 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$27,069.46	
Contingencies	10%			\$18,046.31	
TOTAL CONSTRUCTION				\$225,578.82	
Design	8%			\$18,046.31	
Construction Administration	10%			\$22,557.88	
TOTAL DESIGN AND CONSTRUCTION				\$266,183.01	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

231

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 231 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2786	\$2.88	\$8,023.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$8,023.68	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 231 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	4100	\$6.90	\$28,290.00	All purposes
- Conduit (Directional Drilled)	LF	2120	\$16.10	\$34,132.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$114,944.45	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	1500	\$1.73	\$2,587.50	Drop cable to controller cabinet
- Tracer Wire	LF	1500	\$14.00	\$21,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 231 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$26,462.50	
Pavement Marking					
- Pavement Marking Removal	LF	400	\$0.71	\$285.20	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	200	\$1.09	\$218.50	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	200	\$1.09	\$218.50	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$851.00	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$153,674.13	

**Typical Design and Construction Costs
Single Lane Ramp Meter**

Log No.: 231 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$23,051.12	
Contingencies	10%			\$15,367.41	
TOTAL CONSTRUCTION				\$192,092.66	
Design	8%			\$15,367.41	
Construction Administration	10%			\$19,209.27	
TOTAL DESIGN AND CONSTRUCTION				\$226,669.34	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

232

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 232 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1786	\$2.88	\$5,143.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,143.68	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 232 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	2600	\$6.90	\$17,940.00	All purposes
- Conduit (Directional Drilled)	LF	1420	\$16.10	\$22,862.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$93,324.45	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	250	\$1.73	\$431.25	Drop cable to controller cabinet
- Tracer Wire	LF	250	\$14.00	\$3,500.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 232 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	0	\$4,600.00	\$0.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	0	\$3,300.00	\$0.00	
- CCTV Assembly	EA	0	\$4,600.00	\$0.00	
SUBTOTAL				\$6,806.25	
Pavement Marking					
- Pavement Marking Removal	LF	400	\$0.71	\$285.20	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	200	\$1.09	\$218.50	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	200	\$1.09	\$218.50	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$851.00	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$109,517.88	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 232 **Ramp:** NC 16 (Providence Rd) (LOOP)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$16,427.68	
Contingencies	10%			\$10,951.79	
TOTAL CONSTRUCTION				\$136,897.35	
Design	8%			\$10,951.79	
Construction Administration	10%			\$13,689.74	
TOTAL DESIGN AND CONSTRUCTION				\$161,538.87	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

233

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 233 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2686	\$2.88	\$7,735.68	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$7,735.68	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 233 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3950	\$6.90	\$27,255.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$108,734.45	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	1000	\$1.73	\$1,725.00	Drop cable to controller cabinet
- Tracer Wire	LF	1000	\$14.00	\$14,000.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 233 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$33,112.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$162,183.06	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 233 **Ramp:** NC 16 (Providence Rd)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$24,327.46	
Contingencies	10%			\$16,218.31	
TOTAL CONSTRUCTION				\$202,728.82	
Design	8%			\$16,218.31	
Construction Administration	10%			\$20,272.88	
TOTAL DESIGN AND CONSTRUCTION				\$239,220.01	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

234

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 234 **Ramp:** Rea Rd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2019	\$2.88	\$5,814.72	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,814.72	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 234 **Ramp:** Rea Rd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$97,809.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 234 **Ramp:** Rea Rd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$133,772.10	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 234 **Ramp:** Rea Rd
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Traffic Control	15%			\$20,065.81	
Contingencies	10%			\$13,377.21	
TOTAL CONSTRUCTION				\$167,215.12	
Design	8%			\$13,377.21	
Construction Administration	10%			\$16,721.51	
TOTAL DESIGN AND CONSTRUCTION				\$197,313.84	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

235

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 235 **Ramp:** Rea Rd. (Loop)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1852	\$2.88	\$5,333.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,333.76	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	2700	\$6.90	\$18,630.00	All purposes

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 235 **Ramp:** Rea Rd. (Loop)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$96,084.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 235 **Ramp:** Rea Rd. (Loop)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$131,566.14	
Traffic Control	15%			\$19,734.92	
Contingencies	10%			\$13,156.61	
TOTAL CONSTRUCTION				\$164,457.67	
Design	8%			\$13,156.61	
Construction Administration	10%			\$16,445.77	
TOTAL DESIGN AND CONSTRUCTION				\$194,060.05	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

236

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 236 **Ramp:** Rea Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1500	\$2.88	\$4,320.00	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$4,320.00	
Guardrail					
- Guardrail Rail	LF	250	\$20.00	\$5,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$6,725.00	
Drainage					
- Pipe	LF	50	\$60.00	\$3,000.00	Extend existing
SUBTOTAL				\$3,000.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	
- Conduit (Trenched)	LF	2950	\$6.90	\$20,355.00	All purposes
- Conduit (Directional Drilled)	LF	1370	\$16.10	\$22,057.00	Five ramp crossings, multiple conduits

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 236 **Ramp:** Rea Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$98,716.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	

Typical Design and Construction Costs Single Lane Ramp Meter

Log No.: 236 **Ramp:** Rea Rd (LOOP)
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$134,913.90	
Traffic Control			15%	\$20,237.09	
Contingencies			10%	\$13,491.39	
TOTAL CONSTRUCTION				\$168,642.38	
Design			8%	\$13,491.39	
Construction Administration			10%	\$16,864.24	
TOTAL DESIGN AND CONSTRUCTION				\$198,998.00	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

237

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 237 **Ramp:** Rea Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	2052	\$2.88	\$5,909.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,909.76	
Guardrail					
- Guardrail Rail	LF	150	\$20.00	\$3,000.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$3,000.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	4	\$453.68	\$1,814.70	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	10	\$345.00	\$3,450.00	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 237 **Ramp:** Rea Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Trenched)	LF	3000	\$6.90	\$20,700.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1600	\$5.75	\$9,200.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$102,754.45	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 237 **Ramp:** Rea Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	750	\$0.71	\$534.75	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	375	\$1.09	\$409.69	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,482.93	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$134,087.14	
Traffic Control	15%			\$20,113.07	
Contingencies	10%			\$13,408.71	
TOTAL CONSTRUCTION				\$167,608.92	

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 237 **Ramp:** Rea Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Design	8%			\$13,408.71	
Construction Administration	10%			\$16,760.89	
TOTAL DESIGN AND CONSTRUCTION				\$197,778.52	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

238

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 238 **Ramp:** US 521 (Johnston Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	3027	\$2.88	\$8,717.76	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$8,717.76	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	4450	\$6.90	\$30,705.00	All purposes
- Conduit (Directional Drilled)	LF	3120	\$16.10	\$50,232.00	Five ramp crossings, multiple conduits

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 238 **Ramp:** US 521 (Johnston Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	5000	\$5.75	\$28,750.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$158,056.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 238 **Ramp:** US 521 (Johnston Rd)
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Pavement Marking					
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,934.30	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$197,373.86	
Traffic Control	15%			\$29,606.08	
Contingencies	10%			\$19,737.39	
TOTAL CONSTRUCTION				\$246,717.33	
Design	8%			\$19,737.39	
Construction Administration	10%			\$24,671.73	
TOTAL DESIGN AND CONSTRUCTION				\$291,126.44	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

239

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 239 **Ramp:** US 521/Johnston Rd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1960	\$2.88	\$5,644.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,644.80	
Guardrail					
- Guardrail Rail	LF	150	\$20.00	\$3,000.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$3,000.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2850	\$6.90	\$19,665.00	All purposes

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 239 **Ramp:** US 521/Johnston Rd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$102,741.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	

**Typical Design and Construction Costs
 Single Lane Ramp Meter**

Log No.: 239 **Ramp:** US 521/Johnston Rd.
Location: I-485 Outer

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
SUBTOTAL				\$17,547.50	
Pavement Marking					
- Pavement Marking Removal	LF	600	\$0.71	\$427.80	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	300	\$1.09	\$327.75	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,212.10	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$133,538.70	
Traffic Control	15%			\$20,030.81	
Contingencies	10%			\$13,353.87	
TOTAL CONSTRUCTION				\$166,923.38	
Design	8%			\$13,353.87	
Construction Administration	10%			\$16,692.34	
TOTAL DESIGN AND CONSTRUCTION				\$196,969.58	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

250

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 250 **Ramp:** Briar Creek Rd
Location: US 74 - Independence Blvd WB

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	
- Seeding	SY	1960	\$2.88	\$5,644.80	Seeding around trench, conduit runs, pull box, clear/grub area, and foundation areas.
SUBTOTAL				\$5,644.80	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	5	\$453.68	\$2,268.38	One queue, three passage and one clearance
- Detector Lead-in Cable	EA	1200	\$1.73	\$2,070.00	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	2850	\$6.90	\$19,665.00	All purposes
- Conduit (Directional Drilled)	LF	1620	\$16.10	\$26,082.00	Five ramp crossings, multiple conduits

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 250 **Ramp:** Briar Creek Rd
Location: US 74 - Independence Blvd WB

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	630	\$3.16	\$1,992.38	
SUBTOTAL				\$102,741.80	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For Direction Drill on Mainline/Splice Enclosures
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	45' Mounting height
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$17,547.50	
Pavement Marking					

Typical Design and Construction Costs
Single Lane Ramp Meter

Log No.: 250 **Ramp:** Briar Creek Rd
Location: US 74 - Independence Blvd WB

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Pavement Marking Removal	LF	900	\$0.71	\$641.70	40 MPH design speed. 110' transitions, 100' narrowed lane
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	
- White Edge Line	LF	450	\$1.09	\$491.63	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	450	\$1.09	\$491.63	110' transitions, 100' narrowed lane
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	16	\$8.05	\$128.80	
SUBTOTAL				\$1,753.75	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	1	\$201.25	\$201.25	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	1	\$201.25	\$201.25	Pedestal mounted
SUBTOTAL				\$3,392.50	
SUBTOTAL CONSTRUCTION				\$131,080.35	
Traffic Control	15%			\$19,662.05	
Contingencies	10%			\$13,108.04	
TOTAL CONSTRUCTION				\$163,850.44	
Design	8%			\$13,108.04	
Construction Administration	10%			\$16,385.04	
TOTAL DESIGN AND CONSTRUCTION				\$193,343.52	

M-0468 Ramp Metering Feasibility Study for Cabarrus, Gaston, Iredell, and Mecklenburg Counties
Final Individual Site Cost Estimate Report

3.2 Proposed Two Lane Ramp Locations

3.2.1 Mecklenburg County



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

093

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 093 **Ramp:** Westinghouse Blvd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	Assumed 6'x1300
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	Assumed 12'x1000'x6'
- Supp Clearing and Grub	AC	0	\$300.00	\$ 0.00	Assumed 25'x1000'
- Seeding	SY	1755	\$2.88	\$5,054.40	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$5,054.40	
Guardrail					
- Guardrail Rail	LF	350	\$20.00	\$7,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$8,725.00	
Paving					
- Ramp Widening	SY	3140	\$62.50	\$196,250.00	includes both asphalt and binder
- Pavement Resurfacing	SY	4225	\$13.50	\$57,037.50	
SUBTOTAL				\$253,287.50	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 093 **Ramp:** Westinghouse Blvd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Signalization					
- 6x6' loops - Mainline	EA	8	\$453.68	\$3,629.40	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	10	\$453.68	\$4,536.75	Two queue, six passage and two clearance
- Detector Lead-in Cable	EA	900	\$1.73	\$1,552.50	Assumed setback distance 350'
- Pullbox (Std.)	EA	19	\$345.00	\$6,555.00	
- Conduit (Trenched)	LF	2500	\$6.90	\$17,250.00	All purposes
- Conduit (Directional Drilled)	LF	1360	\$16.10	\$21,896.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1500	\$5.75	\$8,625.00	
- Ground Rods	EA	8	\$82.00	\$656.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	4	\$500.00	\$2,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	540	\$3.16	\$1,707.75	
SUBTOTAL				\$102,093.40	
Communications					
- Splice Enclosure	EA	0	\$1,150.00	\$0.00	Link to SMFO
- Pullbox (Special Size)	EA	0	\$2,012.50	\$0.00	For splice enclosure
- Interconnect Center	EA	0	\$1,725.00	\$0.00	In cabinet

**Typical Design and Construction Costs
 Two Lane Ramp Meter**

Log No.: 093 **Ramp:** Westinghouse Blvd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Fiber-optic Drop Cable (six strands)	LF	0	\$1.73	\$0.00	Drop cable to controller cabinet
- Tracer Wire	LF	0	\$14.00	\$0.00	
- Broadband Internet Service	LS	1	\$1,080.00	\$1,080.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	45' Mounting height
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$15,535.00	
Pavement Marking					40 MPH design speed. 110' transitions, 100' narrowed lane
- Pavement Marking Removal	LF	2000	\$0.71	\$1,426.00	Along skip line only
- Raised Pavement Markers	EA	12	\$5.18	\$62.10	110' transitions, 100' narrowed lane
- White Edge Line	LF	1000	\$1.09	\$1,092.50	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	1000	\$1.09	\$1,092.50	
- White Skip Line	LF	900	\$0.28	\$248.40	
- 24" Stop Bar	LF	24	\$8.05	\$193.20	
SUBTOTAL				\$4,114.70	
Signing					Sign and post only
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Pedestal mounted
- R10-6R and R10-6L, Stop Here on Red	EA	2	\$201.25	\$402.50	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	2	\$201.25	\$402.50	

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 093 **Ramp:** Westinghouse Blvd (Mecklenburg Co.)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- W4-1L, Merge Left	EA	1	\$747.50	\$747.50	
SUBTOTAL				\$4,542.50	
SUBTOTAL CONSTRUCTION				\$393,352.50	
Traffic Control	15%			\$59,002.88	
Contingencies	10%			\$39,335.25	
TOTAL CONSTRUCTION				\$491,690.63	
Design	8%			\$39,335.25	
Construction Administration	10%			\$49,169.06	
TOTAL DESIGN AND CONSTRUCTION				\$580,194.94	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

175

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 175 **Ramp:** Arrowood Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Seeding	SY	2314	\$2.88	\$6,664.32	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$6,664.32	
Guardrail					
- Guardrail Rail	LF	0	\$20.00	\$0.00	
- Guardrail Approach End Treatment	EA	0	\$1,725.00	\$0.00	
SUBTOTAL				\$0.00	
Paving					
- Ramp Widening	SY	3140	\$62.50	\$196,250.00	includes both asphalt and binder
- Pavement Resurfacing	SY	4225	\$13.50	\$57,037.50	
SUBTOTAL				\$253,287.50	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection two loops per lane
- 6x6' loops - Ramp	EA	10	\$453.68	\$4,536.75	Two queue, six passage and two clearance

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 175 **Ramp:** Arrowood Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	850	\$1.73	\$1,466.25	Assumed setback distance 350'
- Pullbox (Std.)	EA	17	\$345.00	\$5,865.00	
- Conduit (Trenched)	LF	3350	\$6.90	\$23,115.00	All purposes
- Conduit (Directional Drilled)	LF	2370	\$16.10	\$38,157.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	0	\$5.75	\$0.00	
- Ground Rods	EA	6	\$82.00	\$492.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	2	\$3,650.00	\$7,300.00	Breakaway pole
- Two Section Signal Head	EA	4	\$500.00	\$2,000.00	Two each pedestal pole
- One Section Signal Head	EA	2	\$575.00	\$1,150.00	Ramp meter advance signal
- Signal Cable	LF	190	\$3.16	\$600.88	
SUBTOTAL				\$112,639.93	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For splice enclosure
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	750	\$1.73	\$1,293.75	Drop cable to controller cabinet
- Tracer Wire	LF	750	\$14.00	\$10,500.00	
- Broadband Internet Service	LS	0	\$1,080.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	45' Mounting height

**Typical Design and Construction Costs
 Two Lane Ramp Meter**

Log No.: 175 **Ramp:** Arrowood Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$29,181.25	
Pavement Marking					40 MPH design speed. 110' transitions, 100' narrowed lane
- Pavement Marking Removal	LF	1000	\$0.71	\$713.00	Along skip line only
- Raised Pavement Markers	EA	0	\$5.18	\$0.00	110' transitions, 100' narrowed lane
- White Edge Line	LF	500	\$1.09	\$546.25	110' transitions, 100' narrowed lane
- Yellow Edge Line	LF	500	\$1.09	\$546.25	
- White Skip Line	LF	0	\$0.28	\$0.00	
- 24" Stop Bar	LF	24	\$8.05	\$193.20	
SUBTOTAL				\$1,998.70	
Signing					Sign and post only
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Pedestal mounted
- R10-6R and R10-6L, Stop Here on Red	EA	2	\$201.25	\$402.50	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	2	\$201.25	\$402.50	
- W4-1L, Merge Left	EA	1	\$747.50	\$747.50	
SUBTOTAL				\$4,542.50	
SUBTOTAL CONSTRUCTION				\$408,314.20	
Traffic Control	15%			\$61,247.13	
Contingencies	10%			\$40,831.42	
TOTAL CONSTRUCTION				\$510,392.74	

Typical Design and Construction Costs
Two Lane Ramp Meter

Log No.: 175 **Ramp:** Arrowood Rd
Location: I-485 Inner

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Design	8%			\$40,831.42	
Construction Administration	10%			\$51,039.27	
TOTAL DESIGN AND CONSTRUCTION				\$602,263.44	

3.3 Proposed Two Lane Freeway to Freeway Ramp Locations

3.3.1 Mecklenburg County



NCDOT Ramp Metering Feasibility Study Individual Site Cost Estimate

097

Typical Design and Construction Costs Two Lane Freeway to Freeway Ramp Meter

Log No.: 97 **Ramp:** I-485 (F2F)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Seeding	SY	3160	\$2.88	\$9,100.80	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$9,100.80	
Guardrail					
- Guardrail Rail	LF	300	\$20.00	\$6,000.00	
- Guardrail Approach End Treatment	EA	1	\$1,725.00	\$1,725.00	
SUBTOTAL				\$7,725.00	
Paving					
- Ramp Widening	SY	0	\$62.50	\$0.00	includes both asphalt and binder
- Pavement Resurfacing	SY	0	\$13.50	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					

**Typical Design and Construction Costs
 Two Lane Freeway to Freeway Ramp Meter**

Log No.: 97 **Ramp:** I-485 (F2F)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- 6x6' loops - Mainline	EA	6	\$453.68	\$2,722.05	Mainline detection
- 6x6' loops - Ramp	EA	10	\$453.68	\$4,536.75	two queue, six passage and two clearance
- Detector Lead-in Cable	EA	390	\$1.73	\$672.75	Assumed setback distance 350'
- Pullbox (Std.)	EA	17	\$345.00	\$5,865.00	
- Conduit (Trenched)	LF	4625	\$6.90	\$31,912.50	All purposes
- Conduit (Directional Drilled)	LF	3620	\$16.10	\$58,282.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	5	\$82.00	\$410.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	1	\$17,250.00	\$17,250.00	
- Pedestal Pole (Type III with Foundation)	EA	0	\$3,650.00	\$0.00	
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	
- One Section Signal Head	EA	6	\$575.00	\$3,450.00	Ramp meter advance signal
- Signal Cable	LF	190	\$3.16	\$600.88	
SUBTOTAL				\$157,686.93	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For splice enclosure
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	

**Typical Design and Construction Costs
 Two Lane Freeway to Freeway Ramp Meter**

Log No.: 97 **Ramp:** I-485 (F2F)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Broadband Internet Service	LS	0	\$500.00	\$0.00	
- Ethernet Switch	EA	0	\$1,955.00	\$0.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$25,250.00	
Pavement Marking					
- Pavement Marking Removal	LF	2000	\$0.71	\$1,426.00	To narrow lanes, 50 PMH design speed, maintain one edgeline, pave over other edgeline
- Raised Pavement Markers	EA	3	\$5.18	\$15.53	Along skip line only
- White Edge Line	LF	400	\$1.09	\$437.00	200' transitions, 100' narrowed lane, 50 MPH
- Yellow Edge Line	LF	600	\$1.09	\$655.50	200' transitions, 100' narrowed lane, 50 MPH
- White Skip Line	LF	200	\$0.28	\$55.20	
- 24" Stop Bar	LF	24	\$8.05	\$193.20	
SUBTOTAL				\$2,782.43	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	2	\$201.25	\$402.50	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	2	\$201.25	\$402.50	Pedestal mounted
- W4-1L, Merge Left	EA	2	\$747.50	\$1,495.00	

**Typical Design and Construction Costs
 Two Lane Freeway to Freeway Ramp Meter**

Log No.: 97 **Ramp:** I-485 (F2F)
Location: I-77 Southbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Sign Structure (Cantilever)	EA	2	\$57,500.00	\$115,000.00	
- Ramp Meter On Sign (Message A)	EA	1	\$5,750.00	\$5,750.00	
- Ramp Meter On Sign (Message B)	EA	1	\$5,750.00	\$5,750.00	
SUBTOTAL				\$131,790.00	
SUBTOTAL CONSTRUCTION				\$334,335.15	
Traffic Control	15%			\$50,150.27	
Contingencies	10%			\$33,433.52	
TOTAL CONSTRUCTION				\$417,918.94	
Design	8%			\$33,433.52	
Construction Administration	10%			\$41,791.89	
TOTAL DESIGN AND CONSTRUCTION				\$493,144.35	



NCDOT Ramp Metering Feasibility Study
Individual Site Cost Estimate

129

Typical Design and Construction Costs
Two Lane Freeway to Freeway Ramp Meter

Log No.: 129 **Ramp:** I-85 Southbound
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
Earthwork and Structure					
- Retaining Wall	SF	0	\$85.00	\$0.00	
- Excavation	CY	0	\$25.00	\$0.00	
- Fill	CY	0	\$22.00	\$0.00	
- Seeding	SY	2409	\$2.88	\$6,937.92	Seeding around trench, conduit runs, pull box, and foundation areas.
SUBTOTAL				\$6,937.92	
Guardrail					
- Guardrail Rail	LF	500	\$20.00	\$10,000.00	
- Guardrail Approach End Treatment	EA	2	\$1,725.00	\$3,450.00	
SUBTOTAL				\$13,450.00	
Paving					
- Ramp Widening	SY	0	\$62.50	\$0.00	includes both asphalt and binder
- Pavement Resurfacing	SY	0	\$13.50	\$0.00	
SUBTOTAL				\$0.00	
Drainage					
- Pipe	LF	0	\$60.00	\$0.00	Extend existing
SUBTOTAL				\$0.00	
Signalization					
- 6x6' loops - Mainline	EA	10	\$453.68	\$4,536.75	Mainline detection
- 6x6' loops - Ramp	EA	10	\$453.68	\$4,536.75	two queue, six passage and two clearance

**Typical Design and Construction Costs
 Two Lane Freeway to Freeway Ramp Meter**

Log No.: 129 **Ramp:** I-85 Southbound
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Detector Lead-in Cable	EA	390	\$1.73	\$672.75	Assumed setback distance 350'
- Pullbox (Std.)	EA	12	\$345.00	\$4,140.00	
- Conduit (Trenched)	LF	3535	\$6.90	\$24,391.50	All purposes
- Conduit (Directional Drilled)	LF	340	\$16.10	\$5,474.00	Five ramp crossings, multiple conduits
- Electrical Service	EA	1	\$1,500.00	\$1,500.00	
- Electrical Conductors	LF	1000	\$5.75	\$5,750.00	
- Ground Rods	EA	4	\$82.00	\$328.00	
- ATC/2070E Controller and Cabinet	EA	1	\$16,100.00	\$16,100.00	
- Firmware/Calibration	EA	1	\$6,095.00	\$6,095.00	
- Cabinet Foundation	EA	1	\$1,540.00	\$1,540.00	
- 45' Mast Arm Poles and Foundation	EA	0	\$17,250.00	\$0.00	
- Pedestal Pole (Type III with Foundation)	EA	0	\$3,650.00	\$0.00	
- Two Section Signal Head	EA	2	\$500.00	\$1,000.00	
- One Section Signal Head	EA	6	\$575.00	\$3,450.00	Ramp meter advance signal
- Signal Cable	LF	190	\$3.16	\$600.88	
SUBTOTAL				\$80,115.63	
Communications					
- Splice Enclosure	EA	1	\$1,150.00	\$1,150.00	Link to SMFO
- Pullbox (Special Size)	EA	1	\$2,012.50	\$2,012.50	For splice enclosure
- Interconnect Center	EA	1	\$1,725.00	\$1,725.00	In cabinet
- Fiber-optic Drop Cable (six strands)	LF	500	\$1.73	\$862.50	Drop cable to controller cabinet
- Tracer Wire	LF	500	\$14.00	\$7,000.00	
- Broadband Internet Service	LS	0	\$500.00	\$0.00	
- Ethernet Switch	EA	1	\$1,955.00	\$1,955.00	
- CCTV Pole (55' Wood)	EA	1	\$4,600.00	\$4,600.00	

**Typical Design and Construction Costs
 Two Lane Freeway to Freeway Ramp Meter**

Log No.: 129 **Ramp:** I-85 Southbound
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- CCTV Cabinet (Pole Mount, Type 336)	EA	1	\$3,300.00	\$3,300.00	
- CCTV Assembly	EA	1	\$4,600.00	\$4,600.00	
SUBTOTAL				\$27,205.00	
Pavement Marking					
- Pavement Marking Removal	LF	0	\$0.71	\$0.00	To narrow lanes, 50 PMH design speed, maintain one edgeline, pave over other edgeline
- Raised Pavement Markers	EA	3	\$5.18	\$15.53	Along skip line only
- White Edge Line	LF	400	\$1.09	\$437.00	200' transitions, 100' narrowed lane, 50 MPH
- Yellow Edge Line	LF	600	\$1.09	\$655.50	200' transitions, 100' narrowed lane, 50 MPH
- White Skip Line	LF	200	\$0.28	\$55.20	
- 24" Stop Bar	LF	32	\$8.05	\$257.60	
SUBTOTAL				\$1,420.83	
Signing					
- W3-7, Ramp Meter Ahead	EA	2	\$747.50	\$1,495.00	Sign and post only
- W3-8, Ramp Metered When Flashing	EA	2	\$747.50	\$1,495.00	Sign and post only
- R10-6R and R10-6L, Stop Here on Red	EA	2	\$201.25	\$402.50	Pedestal mounted
- R10-28, One Vehicle Per Green	EA	2	\$201.25	\$402.50	Pedestal mounted
- W4-1L, Merge Left	EA	2	\$747.50	\$1,495.00	
- Sign Structure (Cantilever)	EA	2	\$57,500.00	\$115,000.00	

Typical Design and Construction Costs
Two Lane Freeway to Freeway Ramp Meter

Log No.: 129 **Ramp:** I-85 Southbound
Location: I-77 Northbound

Categories Descriptions	Unit	Quantity	Unit Cost	Total Cost	Assumptions
- Ramp Meter On Sign (Message A)	EA	1	\$5,750.00	\$5,750.00	
- Ramp Meter On Sign (Message B)	EA	1	\$5,750.00	\$5,750.00	
SUBTOTAL				\$131,790.00	
SUBTOTAL CONSTRUCTION				\$260,919.37	
Traffic Control	15%			\$39,137.91	
Contingencies	10%			\$26,091.94	
TOTAL CONSTRUCTION				\$326,149.21	
Design	8%			\$26,091.94	
Construction Administration	10%			\$32,614.92	
TOTAL DESIGN AND CONSTRUCTION				\$384,856.07	