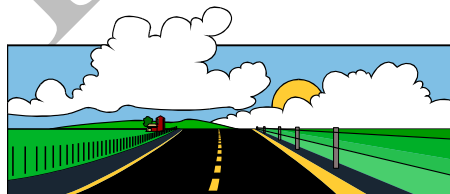


Construction Cost Estimation Preparation Manual for Preliminary Design (English Units)



July 2002

**Prepared by Construction Cost Estimating Unit
Program Support Services**

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1.0 Introduction

For use by the Designer's Cost Estimators in developing Construction Cost Estimates (referred to within as the estimate) for NJDOT Capital Program Projects at Preliminary Design (PD). PD estimates are based on the project's type, length, pavement type, and types of bridges, and are used for the 5-year Program and involves the Metropolitan Planning Organizations, and the Transportation Improvement Program. The Cost Estimating Unit has been placed outside of the rest of the production units in order to provide independent estimates used in the financial programming.

Other information provided by this office available on the NJDOT Website includes:

Bid Price Report for Standard Items

Price information used to develop Construction Cost Estimate (Final Engineer's Estimates) and Proposals. The database files are for use with the Contractor Payment System Front End program (CPSFE).

Issued annually and updated quarterly.

Standard Item List

A list of all the Standard Items used to Construction Cost Estimate (Final Engineer's Estimates) and Proposals. The database files are for use with the Contractor Payment System Front_End program (CPSFE).

It is updated when needed - about once a year, but not necessarily annually.

Contacts

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Glenn Lawrence	Support Group	609-530-5639

1.1 Definitions

- Engineer's Estimate - an estimate of the reasonable cost of a NJDOT construction project.
- Contractor's Payment System Front End (CPSFE) - the NJDOT's computer program for developing the Engineer's Estimate and the Proposal for NJDOT construction projects
- Transport Bid Analysis Management System/ Decision Support System (BAMS/DSS) - a system developed by AASHTO and InfoTech Inc that helps to analyze bids.

1.2 Submittal

The PD submission shall include preliminary plans, estimate sheets and transmittal letter with a date for completion review.

Revised estimates are also submitted annually by September 1st.

2.1 Prepare PD (Activity 1810)

- A. Determine which of the seven classifications most nearly represents the type of work to be performed.
- B. Use the forms for that classification to estimate the construction cost. Also available is an Excel spreadsheet called PD Estimate.xls.
- C. For projects that do not fit into any of the seven classifications, the best results are usually obtained by searching out a previously completed project of a similar nature and adjusting its cost to reflect and scope differences and price escalation.
- D. Those seven Construction Classifications (Work Types) are:
 - 1. **NEW CONSTRUCTION**
New construction or major reconstruction of divided or undivided highways. Includes all major phases of construction site preparation, earthwork, drainage, structures, paving, etc. whether contracted separately or as a complete project. Minor items such as signing, landscaping and guardrail are included unless they are in separate specialty contracts. If Maintenance of Traffic will include 2 or more stages or if extensive Maintenance of Traffic equipment is needed, use Class 2.
 - 2. **RECONSTRUCTION, WIDENING AND DUALIZATION**
The removal and replacement, rebuilding or upgrading of an existing facility, including intersections. There may be grade changes but normally the changes will not be significant. Includes all phases of construction. May include short relocations. Includes widening equivalent to one lane width or wider. Includes structures when decks are replaced on existing substructures or decks are widened and substructures extended. Includes intersection improvements when roadway area is also rebuilt.
 - 3. **WIDENING AND RESURFACING**
Widening and resurfacing of existing highway facilities when the total added width is equivalent to less than one lane width in each direction and grades are not changed. Includes minor grading, extending culverts, curb and gutter, etc. Includes bridge deck widening possibly without substructure changes.
 - 4. **RESURFACING**
Overlaying existing highways, and surfacing or overlaying existing shoulders with asphaltic material. Includes joint repair, minor widening with asphaltic materials, some base corrections or asphaltic base, curb and gutter replacement, and adjustments at structures, drives and street returns. Does not include extensive reconstruction, pavement replacement or construction of new pavements, excavation, utility or sewer work.
 - 5. **BRIDGE REPAIR**
Repair of bridges, includes repairs to decks, curbs, rails, beams and structures. If total deck removal and replacement is required, the contract should be classified as reconstruction.
 - 6. **INTERSECTION IMPROVEMENTS**
Minor construction or reconstruction of street or highway intersections. Normally

includes some removal, grading, drainage and paving. May include curb and sidewalk along with traffic signals installed at the intersection. If intersection pavement is to be rebuilt, the contract should be classified as reconstruction.

7. SAFETY AND TRAFFIC CONTROL

Placement or replacement of guide rail, signs, striping, lighting, traffic signals, and other safety and traffic control devices, along streets and highways, when let on a specialty contract basis. If safety and traffic control devices are included as part of a major contract type, they should be included under the Miscellaneous activities for that type.

- E. The costs shown on the calculation forms are for the date shown on the forms. Updates will be issued to reflect changes in costs and conditions. If the Estimator feels that the cost shown on the calculation forms do not accurately reflect the cost of the work for his particular project, he may adjust the cost accordingly. The cost changed and the reason for the cost change shall be submitted in a letter attached to the PD estimate.
- F. For some types of work only a range of unit prices could be determined. The Estimator must determine which unit price is most appropriate.
- G. Provisions are included on the Summary Sheet for contingencies and to adjust estimated costs to the anticipated midpoint of construction time.
- H. When there is proposed work to existing structures within the limits of the proposed project, the Bureau of Structural Engineering shall be contacted to determine the estimated cost of that work.
- I. The Summary Sheet includes provisions for adding other work types. Examples of possible additions are wetland mitigation, garbage dump removal, toxic waste removal, etc. Costs for these work types are best determined as stated in Paragraph C above.
- J. For work which must be constructed at night or done on overtime, increase the Estimate for that work by 30%.
- K. This procedure does not include engineering design costs.
- L. The percentages shown for the Utilities (Relocation Companies/Owners) costs are "averages" for each classification of project. Unusual conditions such as power stations, sewerage plants, high-tension lines and pumping stations must be taken into account. If any unusual condition is encountered, the designer must contact the Bureau of Utility and Railroad Engineering for guidance in determining the PD utility cost. The Bureau of Utility and Railroad Engineering must also be contacted when there is "railroad" involvement. All utility costs must be updated whenever the estimates are updated. If detailed cost estimates are available they should be used instead of the percentages.
- M. When there is R.O.W. involvement, Mr. Edward Nyzio of the R.O.W. Division must be contacted at (609) 530-2188 to obtain a R.O.W. cost which should be added to the Summary Sheet.

All R.O.W. costs shall be updated whenever the estimates are updated.

- N. Federal Non-Participating Construction Cost Work Sheets labeled Attachment No. 2 (located at the end of the section), listing anticipated items of work that FHWA will not participate in, shall be completed and included as the last page of each classification even if the non-participating amount is zero. This total shall already be included in the Construction Cost for the project and will only be used for programming purposes.
- O. Context sensitive Design (CSD) - A new area has been added for CSD work. There is currently no historical data available to estimate this work. A space has been added to include the costs for the CSD. And additional sheets should be attached to the estimate that details the items of work and costs that were used to determine the CSD total amount. CSD work can include any additional landscape plantings above normal requirements, architectural treatments, or structural work, special types of curb or sidewalk, park areas, etc.

Superseded

3.1.1 Classification Number 1 - NEW CONSTRUCTION -ENGLISH
Work Type - EARTHWORK (must be calculated)

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

	Unit	Quantity	x Unit Price	= Amount
Stripping (4"-6" Depth)	Acre		4,050	
Roadway Exc. Unclassified	C.Y.		See (J)	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		11.2-12.5 See (K)	
Channel Excavation	C.Y.		12.25	
Ditch Excavation	C.Y.		10.00	
Borrow Excavation Zone 3	C.Y.		See (J)	
EARTHWORK TOTAL				=

Suggested procedure for calculating earthwork:

- A) Determine Typical section (number of lanes, median widths, side slopes, etc.).
- B) Get latest topography map available.
- C) Plot proposed alignment on topo map.
- D) Develop profile using topo controls such as existing roads, streams, rivers and design manual.
- E) Calculate Areas for the typical section in 1 foot increments of cut or fill.
- F) At 10 to 60 foot intervals (depending on frequency of X-section changes) calculate the earthwork.
- G) Calculate any other significant earthwork (ramps, crossroads, etc.).
- H) Make appropriate earthwork corrections for the pavement box and striping. Use 21 inch depth for rigid pavement, 26 inch depth for all flexible pavement and 4 inch depth for striping.
- I) Deduct any roadway excavation from borrow required to calculate Borrow Excavation Zone 3.
- J) See Construction Cost Estimate Work Sheet (Attachment 1). This worksheet must be utilized for the most recent price information.
- K) Based on the quantity, location and type of project.

Classification No. 1 - NEW CONSTRUCTION - Work Type – PAVEMENT - ENGLISH

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156

Computation Table for Pavement. Cost

Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

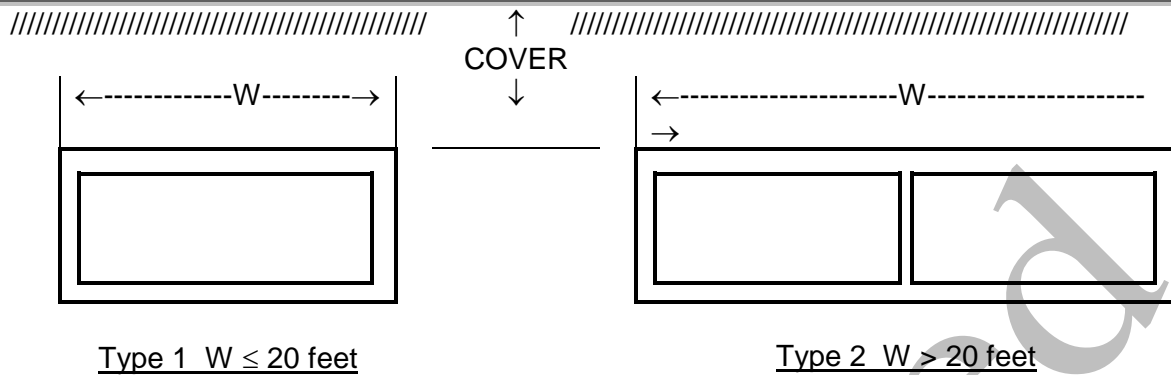
*Width Factors = Ratio of 12 foot wide lane to actual pavement width.

Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification No. 1 - NEW CONSTRUCTION - Work Type - CSD - ENGLISH

Context Sensitive Design – Attach additional sheet detailing items and costs of context sensitive design work

Classification No. 1 - NEW CONSTRUCTION - Work Type - CULVERTS - ENGLISH



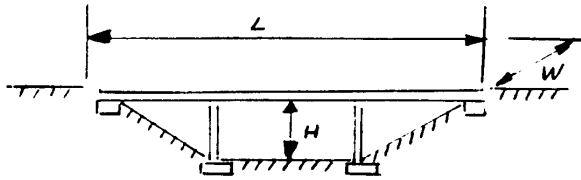
Type	Layout (3)	Skew (1)	Cover (2)	Cost Per Sq. Foot
Type 1	Area W x L exceeds 1000 Sq. Feet	0-60 degrees	0 to 10'	114.75
	Short Culverts Difficult Conditions under Square Meters	0-60 degrees	10' to 20'	147.25
			0 to 10'	203.50
	10' to 20'	235.00		
Type 2	Area W x L exceeds 1000 Sq. Feet	0-60 degrees	0 to 10'	121.75
	Short Culverts Difficult Conditions under Square Meters	0-60 degrees	10' to 20'	152.50
			0 to 10'	203.50
	10' to 20'	235.00		

For skews over 60 degrees it will be necessary to make a special analysis and establish a square foot price comparable to above.

Description	Area Computation	x Cost per Sq. Foot	= Amount
CULVERT TOTAL			=

Classification No. 1 - NEW CONSTRUCTION - Work Type - BRIDGES - ENGLISH (1 of 3)

1 to 3 spans and 2 side spans (Max. Span 100 feet)

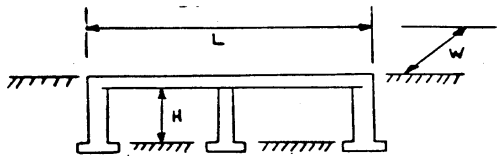


H - Clear Height 14 to 23 feet⁽⁴⁾

L - 100 to 400 feet & all Viaducts Over 400 feet⁽⁵⁾

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
I	Width at Least 45 Feet	0 Degrees-40 Degrees	No Piles	134.75
			Piles at Stub Abut.	159.75
			Piles at Piers & Stub Abut.	174.75
		40 Degrees-60 Degrees	No Piles	145.00
			Piles at Stub Abut.	168.25
			Piles at Piers & Stub Abut.	181.25

1 to 3 Main Spans (Max. Span 100 Feet ⁽³⁾)

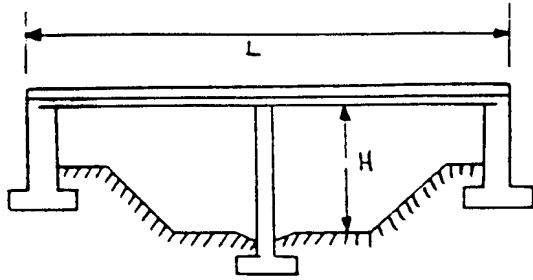


H - Clear Height 14 feet ⁽⁴⁾

L - Length Under 400 feet

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
II	L exceeds W Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	176.50
			On Piles	187.25
		40 Degrees- 60 Degrees	No Piles	219.75
			On Piles	273.25
III	W exceeds L Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	226.75
			On Piles	299.25
		40 Degrees- 60 Degrees	No Piles	241.50
			On Piles	310.00
IV	Width 30 - 45 feet Area W x L under 4500 Sq. Foot	0 Degrees- 40 Degrees	No Piles	295.50
			On Piles	396.75
		40 Degrees- 60 Degrees	No Piles	318.25
			On Piles	416.25

Classification No. 1 - NEW CONSTRUCTION - Work Type - BRIDGES - ENGLISH (2 of 3)



1 to 2 Main Spans (Max. Span 125 feet)

H - Clear Height 14 feet

L - 100 – 250 feet

Layout	Skew (1)	Foundation (2)	Cost Per Sq. Foot
Width at Least 40 feet	0 Degrees to 40 Degrees	No Piles	157.00
		Piles at Semi-Stub Abut.	182.00
		Piles at Piers & Semi Stub Abut.	204.50
Minimum Length 100 feet	40 Degrees to 60 Degrees	No Piles	166.50
		Piles at Semi-Stub Abut.	194.75
		Piles at Piers & Semi Stub Abut.	217.50

Length	x	Width	x	=	Bridge Total

Supersced

Classification No. 1 - NEW CONSTRUCTION - Work Type - BRIDGES - ENGLISH (3 of 3)

1. For skews over 60 degrees it will be necessary to make a special analysis and establish a square meter price comparable to above.
2. For very bad foundation conditions requiring unusual lengths or spacing of piles, it will be necessary to establish a square foot price.
3. For longer spans, adjust the cost per square foot to reflect increased cost of structural members.
4. For span bridges, it is expected the length of the side span will be increased in proportion to any increase in height. Because of the resultant increase in deck area, the square foot price will remain approximately the same in the range of heights shown. For extremely high structures (particularly for viaducts), square foot prices will have to be increased.
5. For structures over 400 foot long (viaducts), reduce the cost per square foot if repetitive span length and forming can be used. Reduce by \$0.50 for lengths from 400 to 600 feet and by \$1.00 for lengths over 600 feet. (Do not forget the adjustments (3) and (4) above on viaducts).
6. For statically indeterminate structures, square meter prices will have to be established.

Structure Description	Calculated Sq. Foot of Bridge Deck	x Cost Per Sq. Foot	= Amount
		Sub Total	=
Clearing Site Bridge *0-3% of Sub Total =			+
*Pick appropriate percent based on the size, type and materials of existing structure		BRIDGE TOTAL	=

Classification No. 1 - NEW CONSTRUCTION - ENGLISH
Work Type - DRAINAGE (includes inlets and cross drains)

	Project Length (miles)	x Cost per Mile	= Amount
Rural		364,356	
Urban		544,280	

The above are the total costs of basins, manholes, longitudinal and transverse pipes, underdrains, headwalls, protecting curbs, aprons, etc. for a divided highway with a depressed median. The costs are assumed to apply to 4, 6 or 8 lane sections since there will be no appreciable difference in the number of basins or the sizes or lengths of pipes.

Frontage Road & Ramp Drainage

Length of Ramp or Frontage Road (feet)	x Cost per Foot	= Amount
	55.00	

DRAINAGE TOTAL

=

Classification No. 1 - NEW CONSTRUCTION - Work Type - INCIDENTAL ITEMS - ENGLISH

Item	Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
Sign Bridge		308,000	
Cantilever Sign Structure		60,500	
INCIDENTAL ITEMS TOTAL			=

Classification No. 1 - NEW CONSTRUCTION - Work Type - LANDSCAPE - ENGLISH

	Quantity	x Unit Price	= Amount
Topsoil and Seeding (Mainline) Length of Project in miles		112,815	
Planting (Mainline) Length of Project in miles		64,500	
Topsoil, Seeding, Planting (Finger Ramp) Number of Finger Ramps		12,500	
Topsoil, Seeding, Planting (Loop Ramp) Number of Loop Ramps		20,000	
Topsoil, Seeding (Access Road) Length of Access Road in Feet		7.90	
LANDSCAPE TOTAL			=

Classification No. 1 - NEW CONSTRUCTION - Work Type - NOISE ABATEMENT MEASURES - ENGLISH

	Unit	Quantity	x Unit Price	= Amount
Noise Wall	L.F.		305	
NOISE ABATEMENT MEASURES TOTAL				=

Classification No. 1 - NEW CONSTRUCTION - Work Type - GENERAL ITEMS - ENGLISH

Item	Project Length (miles)	x Cost/mile	= Amount
Field Office		44,260	
Materials Field Laboratory		28,970	
Erosion Control during Construction		64,375	
GENERAL ITEMS TOTAL			=

Classification No. 1 - NEW CONSTRUCTION - ENGLISH – SUMMARY Page 2 of 3

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Construction Layout	Project Cost(Mil.)	\$	
	Less than 1.0	7,000	
	1.0 to 2.0	20,000	
	2.0 to 5.0	42,000	
	5.0 to 10.0	87,000	
	10.0 to 20.0	160,000	
	20.0 to 30.0	220,000	
	30.0 to 40.0	490,000	
	40.0 & above	890,000	
PROJECT TOTAL		=	

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C)	$1 + [0.01 (Y+1) (Y-2)]$	Construction Estimate for FSD
Contingencies		Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required. Maximum value = 10%.	

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-10	3%	1
10-20	2.5%	2
20-50	2%	3
Over 50	1.5%	4

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	28.4%
1.0 to 5.0	17.6%
5.0 to 10.0	12.2%
10.0 & above	9.5%
CONSTRUCTION ENGINEERING AMOUNT	

Classification No. 1 - NEW CONSTRUCTION - ENGLISH – SUMMARY Page 3 of 3

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000

For State Funded Projects, Contingencies for Change orders = 0
 CHANGE ORDER CONTINGENCIES

=

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

	x 0.09 or	
	+ Estimate	=

Construction Cost for FSD Estimate Use % or utilities detailed estimate Utility Relocation Cost for FSD Estimate

If there are no utility relocations on the project indicate "No Utilities" in the box above.

RIGHT OF WAY COST

If there is no ROW cost on the project indicate "No ROW" the box

--

SUMMARY

Construction Estimate for FSD	
Construction Engineering (CE)	
Contingencies	
Utilities: Relocations By Companies/Owners	
<hr/>	
Total Estimate	
Right of Way	

2.1.2 Classification Number 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - EARTHWORK (must be calculated) - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

	Unit	Quantity	x Unit Price	= Amount
Stripping (4"-6" Depth)	Acre		4050	
Roadway Exc. Unclassified	C.Y.		See (J)	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		15.00	
Channel Excavation	C.Y.		12.25	
Ditch Excavation	C.Y.		10.00	
Borrow Excavation Zone 3	C.Y.		See (J)	
EARTHWORK TOTAL				=

Suggested procedure for calculating earthwork:

- A) Determine typical section (number of lanes, median widths, side slopes, etc.).
- B) Get latest topography map available.
- C) Plot proposed alignment on topo map.
- D) Develop profile using topo controls such as existing roads, streams, rivers and design manual.
- E) Calculate Areas for the typical section in 1 foot increments of cut or fill.
- F) At 10 to 60 foot intervals (depending on frequency of X-section changes) calculate the earthwork.
- G) Calculate any other significant earthwork (ramps, crossroads, etc.).
- H) Make appropriate earthwork corrections for the pavement box and striping. Use 21 inch depth for rigid pavement, 26 inch depth for all flexible pavement and 4 inch depth for striping.
- I) Deduct any roadway excavation from borrow required to calculate Borrow Excavation Zone 3.
- J) See Construction Cost Estimate Work Sheet (Attachment 1). This worksheet must be utilized for the most recent price.

Classification Number 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - PAVEMENT - ENGLISH

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement. Cost

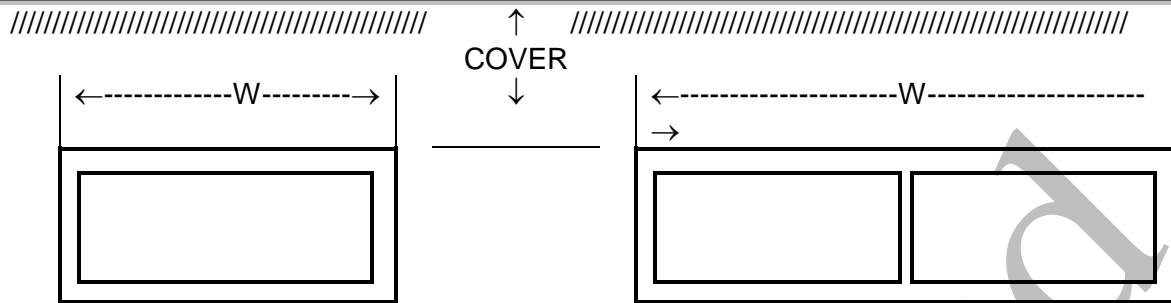
Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.
 Example = actual pavement width = 25 feet = $\frac{25}{12} = 2.08$ W.F.

Classification No. 2 - RECON, WIDENING & DUALIZATION - Work Type - CSD - ENGLISH

Context Sensitive Design – Attach additional sheet detailing items and costs of context sensitive design work

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - CULVERTS - ENGLISH



Type 1 $W \leq 20$ Feet

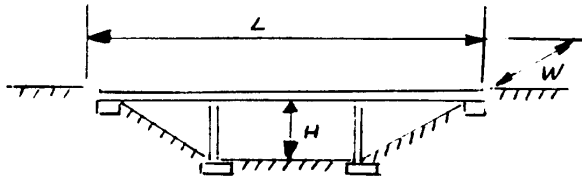
Type 2 $W > 20$ Feet

Type	Layout (3)	Skew (1)	Cover (2)	Cost Per Sq. Foot
Type 1	Area $W \times L$ exceeds 1000 Sq. Feet	0-60 degrees	0 to 10'	114.75
	Short Culverts Difficult Conditions under Square Meters	0-60 degrees	10' to 20'	147.25
			0 to 10'	203.50
	10' to 20'	235.00		
Type 2	Area $W \times L$ exceeds 1000 Sq. Feet	0-60 degrees	0 to 10'	121.75
	Short Culverts Difficult Conditions under Square Meters	0-60 degrees	10' to 20'	152.50
			0 to 10'	203.50
	10' to 20'	235.00		

For skews over 60 degrees it will be necessary to make a special analysis and establish a square foot price comparable to above.

Description	Area Computation	x Cost per Sq. Foot	= Amount
CULVERT TOTAL			=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - BRIDGES (1 of 3) - ENGLISH

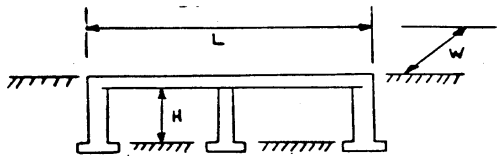


1 to 3 spans and 2 side spans (Max. Span 100 feet)

H - Clear Height 14 to 23 feet⁽⁴⁾

L - 100 to 400 feet & all Viaducts Over 400 feet⁽⁵⁾

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
I	Width at Least 45 Feet	0 Degrees-40 Degrees	No Piles	134.75
			Piles at Stub Abut.	159.75
			Piles at Piers & Stub Abut.	174.75
		40 Degrees-60 Degrees	No Piles	145.00
			Piles at Stub Abut.	168.25
		Piles at Piers & Stub Abut.	181.25	



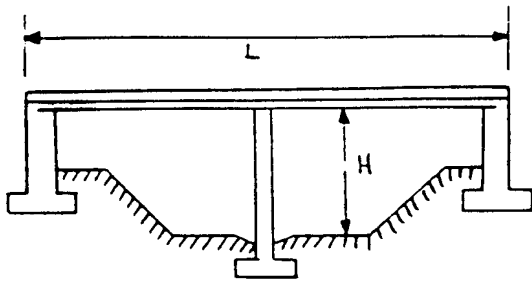
1 to 3 Main Spans (Max. Span 100 Feet ⁽³⁾)

H - Clear Height 14 feet ⁽⁴⁾

L - Length Under 400 feet

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
II	L exceeds W Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	176.50
			On Piles	187.25
		40 Degrees- 60 Degrees	No Piles	219.75
			On Piles	273.25
III	W exceeds L Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	226.75
			On Piles	299.25
		40 Degrees- 60 Degrees	No Piles	241.50
			On Piles	310.00
IV	Width 30 - 45 feet Area W x L under 4500 Sq. Foot	0 Degrees- 40 Degrees	No Piles	295.50
			On Piles	396.75
		40 Degrees- 60 Degrees	No Piles	318.25
			On Piles	416.25

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - BRIDGES cont'd (2 of 3) - ENGLISH



1 to 2 Main Spans (Max. Span 125 feet)

H - Clear Height 14 feet

L - 100 – 250 feet

Layout	Skew (1)	Foundation (2)	Cost Per Sq. Foot
Width at Least 40 feet	0 Degrees to 40 Degrees	No Piles	157.00
		Piles at Semi-Stub Abut.	182.00
		Piles at Piers & Semi Stub Abut.	204.50
Minimum Length 100 feet	40 Degrees to 60 Degrees	No Piles	166.50
		Piles at Semi-Stub Abut.	194.75
		Piles at Piers & Semi Stub Abut.	217.50

	x		x	=	
Length		Width			Bridge Total
		Cost per SF			

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - BRIDGES cont'd (3 of 3) - ENGLISH

1. For skews over 60 degrees it will be necessary to make a special analysis and establish a square foot price comparable to above.
2. For very bad foundation conditions requiring unusual lengths or spacing of piles, it will be necessary to establish a square foot price.
3. For longer spans, adjust the cost per square foot to reflect increased cost of structural members.
4. For span bridges, it is expected the length of the side span will be increased in proportion to any increase in height. Because of the resultant increase in deck area, the square foot price will remain approximately the same in the range of heights shown. For extremely high structures (particularly for viaducts), square foot prices will have to be increased.
5. For structures over 400 foot long (viaducts), reduce the cost per square foot if repetitive span length and forming can be used. Reduce by \$0.50 for lengths from 400 to 600 feet and by \$1.00 for lengths over 600 feet. (Do not forget adjustments (3) and (4) above on viaducts).
6. For statically indeterminate structures, square foot prices will have to be established.

Structure Description	Calculated Sq. Foot of Bridge Deck	x Cost Per Sq. Foot	= Amount
		Sub Total	=
Clearing Site Bridge *0-3% of Sub Total =			+
*Pick appropriate percent based on the size, type and materials of existing structure		BRIDGE TOTAL	=

Classification No.2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - DRAINAGE (includes inlets and cross drains) - ENGLISH

	Project Length (miles)	x Cost per Mile	= Amount
Rural		364,356	
Urban		544,280	

The above are the total costs of basins, manholes, longitudinal and transverse pipes, underdrains, headwalls, protecting curbs, aprons, etc. for a divided highway with a depressed median. The costs are assumed to apply to 4, 6, or 8 lane sections since there will be no appreciable difference in the number of basins or the sizes or lengths of pipes.

Frontage Road & Ramp Drainage

Length of Ramp or Frontage Road (feet)	x Cost per Foot	= Amount
	55.00	

DRAINAGE TOTAL

=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION - Work Type - LANDSCAPE - ENGLISH

	Quantity	x Unit Price	= Amount
Topsoil and Seeding (Mainline) Length of Project in miles		112,815	
Planting (Mainline) Length of Project in miles		64,500	
Topsoil, Seeding, Planting (Finger Ramp) Number of Finger Ramps		12,500	
Topsoil, Seeding, Planting (Loop Ramp) Number of Loop Ramps		20,000	
Topsoil, Seeding (Access Road) Length of Access Road in Feet		7.90	
LANDSCAPE TOTAL			=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - Work Type - INCIDENTAL ITEMS

Item	x Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
Sign Bridge		308,000	
Cantilever Sign Structure		60,500	
INCIDENTAL ITEMS TOTAL			=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION - Work Type -
NOISE ABATEMENT MEASURES - ENGLISH

	Unit	Quantity	x Unit Price	= Amount
Noise Wall	L.F.	305		
NOISE ABATEMENT MEASURES TOTAL				=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - GENERAL ITEMS

Item	Project Length (miles)	x Cost/mile	= Amount
Field Office		44,260	
Materials Field Laboratory		28,970	
Erosion Control during Construction		64,375	
GENERAL ITEMS TOTAL			=

Class. No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION – SUMMARY Page 1 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Work Type	Totals from previous pages
Earthwork	
Pavement	
Culverts	
Bridges	
Drainage	
Incidental Items	
Landscape	
Noise Abatement	
General Items	
Context Sensitive Design	
PROJECT SUBTOTAL	=

Other Items	Proj. Subtotal Range	Choice	Amount
Lighting, Traffic Stripes, Signs and Delineators		3% of Proj. Subtotal	
Maintenance of Traffic		7% of Proj. Subtotal	
Training		1% of Proj. Subtotal	
Mobilization	Project Cost(Mil.)	% of Proj. Subtotal	
	Less than 5.0	9% of Proj. Subtotal	
	5.0 & above	10% of Proj. Subtotal	
Progress Schedule	Project Cost(Mil.)	\$	
	Less than 2.0	0	
	2.0 to 5.0	6,000	
	5.0 to 10.0	8,000	
	10.0 to 20.0	15,000	
	20.0 to 30.0	30,000	
	30.0 to 40.0	40,000	
	40.0 & above	58,000	
Clearing Site	Project Cost (Mil.)	\$	
	Less than 1.0	15,000	
	1.0 to 2.0	30,000	
	2.0 to 5.0	45,000	
	5.0 to 10.0	115,000	
	10.0 to 20.0	220,000	
	20.0 to 30.0	240,000	
	30.0 to 40.0	250,000	
40.0 & above	490,000		

Continued on next page

Class. No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION – SUMMARY Page 2 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Construction Layout	Project Cost(Mil.)	\$	
	Less than 1.0	7,000	
	1.0 to 2.0	20,000	
	2.0 to 5.0	42,000	
	5.0 to 10.0	87,000	
	10.0 to 20.0	160,000	
	20.0 to 30.0	220,000	
	30.0 to 40.0	490,000	
	40.0 & above	890,000	
PROJECT TOTAL		=	

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C)	$1 + [0.01 (Y+1) (Y-2)]$	Construction Cost for FSD Estimate
Contingencies		Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-5	3%	1
5-20	2.5%	2
Over 20	2%	3

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	31.1%
1.0 to 5.0	20.3%
5.0 to 10.0	16.2%
10.0 & above	12.2%
CONSTRUCTION ENGINEERING AMOUNT	

Class. No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION – SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0

CONTINGENCIES =

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

* =

Construction Cost for FSD Estimate *for Urban use 12%, Rural 5.5% Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.
 If there are no utility relocations on the project indicate "No Utilities" in the box above.

RIGHT OFWAY COST

If there is no ROW cost on the project indicate "No ROW" the box

SUMMARY

Construction Estimate for FSD	<input style="width: 150px; height: 20px;" type="text"/>
Construction Engineering (CE)	<input style="width: 150px; height: 20px;" type="text"/>
Contingencies	<input style="width: 150px; height: 20px;" type="text"/>
Utilities: Relocations By Companies/Owners	<input style="width: 150px; height: 20px;" type="text"/>
Total Estimate	<input style="width: 150px; height: 20px;" type="text"/>

Right of Way

2.1.3 Classification Number 3 - WIDENING & RESURFACING - ENGLISH
Work Type - EARTHWORK (must be calculated)

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

	Unit	Quantity	x Unit Price	= Amount
Stripping (4"-6" Depth)	Acre		4050	
Roadway Exc. Unclassified	C.Y.		See (J)	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		15.00	
Channel Excavation	C.Y.		12.25	
Ditch Excavation	C.Y.		10.00	
Borrow Excavation Zone 3	C.Y.		See (J)	
EARTHWORK TOTAL				=

Suggested procedure for calculating earthwork:

- A) Determine typical section (number of lanes, median widths, side slopes, etc.).
- B) Get latest topography map available.
- C) Plot proposed alignment on topo map.
- D) Develop profile using topo controls such as existing roads, streams, rivers and design manual.
- E) Calculate Areas for the typical section in 1 foot increments of cut or fill.
- F) At 10 to 60 foot intervals (depending on frequency of X-section changes) calculate the earthwork.
- G) Calculate any other significant earthwork (ramps, crossroads, etc.).
- H) Make appropriate earthwork corrections for the pavement box and striping. Use 21 inch depth for rigid pavement, 26 inch depth for all flexible pavement and 4 inch depth for striping.
- I) Deduct any roadway excavation from borrow required to calculate Borrow Excavation Zone 3.
- J) See Construction Cost Estimate Work Sheet (Attachment 1). This worksheet must be utilized for the most recent price information.

Classification Number 3 - WIDENING & RESURFACING - ENGLISH
Work Type - PAVEMENT

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement. Cost

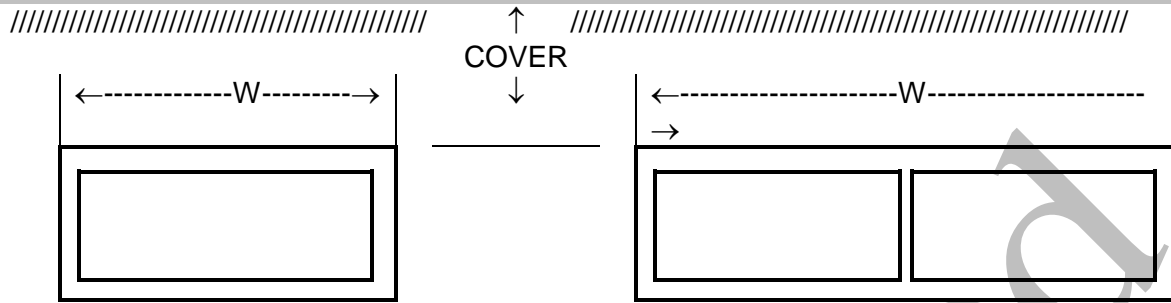
Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.
 Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification No. 3 - WIDENING & RESURFACING - Work Type - CSD - ENGLISH

Context Sensitive Design – Attach additional sheet detailing items and costs of context sensitive design work

Classification No. 3 - WIDENING & RESURFACING - Work Type - CULVERTS - ENGLISH



Type 1 $W \leq 20$ feet

Type 2 $W > 20$ feet

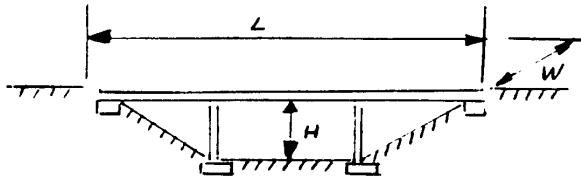
Type	Layout (3)	Skew (1)	Cover (2)	Cost Per Sq. Foot
Type 1	Area $W \times L$ exceeds	0-60	0 to 10'	114.75
	1000 Sq. Feet	degrees	10' to 20'	147.25
	Short Culverts Difficult	0-60	0 to 10'	203.50
	Conditions under Square Meters	degrees	10' to 20'	235.00
Type 2	Area $W \times L$ exceeds	0-60	0 to 10'	121.75
	1000 Sq. Feet	degrees	10' to 20'	152.50
	Short Culverts Difficult	0-60	0 to 10'	203.50
	Conditions under Square Meters	degrees	10' to 20'	235.00

For skews over 60 degrees it will be necessary to make a special analysis and establish a square foot price comparable to above.

Description	Area Computation	x Cost per Sq. Foot	= Amount
CULVERT TOTAL			=

Classification No. 3 - WIDENING & RESURFACING - Work Type - BRIDGES - ENGLISH (1 of 3)

1 to 3 spans and 2 side spans (Max. Span 100 feet)

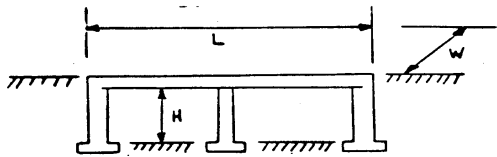


H - Clear Height 14 to 23 feet⁽⁴⁾

L - 100 to 400 feet & all Viaducts Over 400 feet⁽⁵⁾

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
I	Width at Least 45 Feet	0 Degrees-40 Degrees	No Piles	134.75
			Piles at Stub Abut.	159.75
			Piles at Piers & Stub Abut.	174.75
		40 Degrees-60 Degrees	No Piles	145.00
			Piles at Stub Abut.	168.25
			Piles at Piers & Stub Abut.	181.25

1 to 3 Main Spans (Max. Span 100 Feet ⁽³⁾)

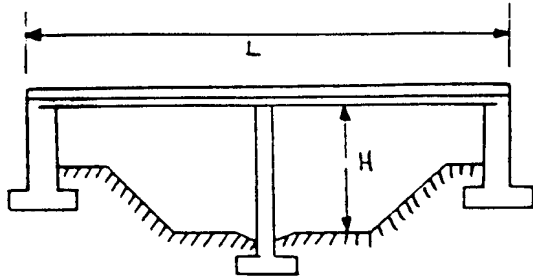


H - Clear Height 14 feet ⁽⁴⁾

L - Length Under 400 feet

Class	Layout	Skew ⁽¹⁾	Foundation ⁽²⁾	Cost Per Sq. Foot
II	L exceeds W Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	176.50
			On Piles	187.25
		40 Degrees- 60 Degrees	No Piles	219.75
			On Piles	273.25
III	W exceeds L Area L x W exceeds 4500 Sq. Feet	0 Degrees- 40 Degrees	No Piles	226.75
			On Piles	299.25
		40 Degrees- 60 Degrees	No Piles	241.50
			On Piles	310.00
IV	Width 30 - 45 feet Area W x L under 4500 Sq. Foot	0 Degrees- 40 Degrees	No Piles	295.50
			On Piles	396.75
		40 Degrees- 60 Degrees	No Piles	318.25
			On Piles	416.25

Classification No. 3 - WIDENING & RESURFACING - Work Type - BRIDGES - ENGLISH (2 of 3)



1 to 2 Main Spans (Max. Span 125 feet)

H - Clear Height 14 feet

L - 100 – 250 feet

Layout	Skew (1)	Foundation (2)	Cost Per Sq. Foot
Width at Least 40 feet	0 Degrees to 40 Degrees	No Piles	157.00
		Piles at Semi-Stub Abut.	182.00
		Piles at Piers & Semi Stub Abut.	204.50
Minimum Length 100 feet	40 Degrees to 60 Degrees	No Piles	166.50
		Piles at Semi-Stub Abut.	194.75
		Piles at Piers & Semi Stub Abut.	217.50

	x	x	=
Length	Width	Cost per SF	Bridge Total

Classification No. 3 - WIDENING & RESURFACING - Work Type - BRIDGES - ENGLISH (3 of 3)

1. For skews over 60 degrees it will be necessary to make a special analysis and establish a square meter price comparable to above.
2. For very bad foundation conditions requiring unusual lengths or spacing of piles, it will be necessary to establish a square foot price.
3. For longer spans, adjust the cost per square foot to reflect increased cost of structural members.
4. For span bridges, it is expected the length of the side span will be increased in proportion to any increase in height. Because of the resultant increase in deck area, the square foot price will remain approximately the same in the range of heights shown. For extremely high structures (particularly for viaducts), square foot prices will have to be increased.
5. For structures over 400 foot long (viaducts), reduce the cost per square foot if repetitive span length and forming can be used. Reduce by \$0.50 for lengths from 400 to 600 feet and by \$1.00 for lengths over 600 feet. (Do not forget the adjustments (3) and (4) above on viaducts).
6. For statically indeterminate structures, square meter prices will have to be established.

Structure Description	Calculated Sq. Foot of Bridge Deck	x Cost Per Sq. Foot	= Amount
		Sub Total	=
Clearing Site Bridge *0-3% of Sub Total =			+
*Pick appropriate percent based on the size, type and materials of existing structure		BRIDGE TOTAL	=

Classification No.3 - WIDENING & RESURFACING - ENGLISH
Work Type - DRAINAGE (includes inlets and cross drains)

(PER DIRECTION OF WIDENING)	Cost per foot	Amount
feet	x 55	=
DRAINAGE TOTAL		

Classification No.2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - Work Type - LANDSCAPE

The meter measurement is for each side of the roadway or ramp that requires landscaping. For example: If a road is widened on one side only the cost = 4.00 per foot. If the road is widened on both sides the cost is 8.00 per foot. If a dualized roadway is widened into the median for each direction of traffic and both outside edges, the cost = 16.50 per foot. When more than one-half of the profile changes by 1.00 feet, the above costs will increase by 25 percent.

Pavement Edge Length in Feet	Cost per pavement edge for Topsoil & Seeding	Amount
	X 4.00	
LANDSCAPE TOTAL		=

Classification No. 2 - RECONSTRUCTION, WIDENING & DUALIZATION
Work Type - Work Type - INCIDENTAL ITEMS

Item	x Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
Sign Bridge		308,000	
Cantilever Sign Structure		60,500	
INCIDENTAL ITEMS TOTAL			=

Classification No. 3 - WIDENING & RESURFACING - ENGLISH
Work Type - NOISE ABATEMENT MEASURES

	Unit	Quantity	x Unit Price	= Amount
Noise Wall	L.F.		305	
NOISE ABATEMENT MEASURES TOTAL				=

Classification No. 3 - WIDENING & RESURFACING - Work Type - GENERAL ITEMS

Item	Project Length (mile)	X Cost/mile	= Amount
Field Office		44,260	
Materials Field Laboratory		28,970	
Erosion Control during Construction		64,375	
GENERAL ITEMS TOTAL			=

Classification No. 3 - WIDENING & RESURFACING- SUMMARY Page 2 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C) Contingencies	1 + [0.01 (Y+1) (Y-2)] Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	Construction Cost for FSD Estimate

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-10	3%	1
Over 10	2.5%	2

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	27.0%
1.0 to 5.0	14.9%
5.0 to 10.0	13.5%
10.0 & above	12.2%

CONSTRUCTION ENGINEERING AMOUNT

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0

CONTINGENCIES

=

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

	*	=
Construction Cost for FSD Estimate	*for Urban use 12%, Rural 5.5%	Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.

If there are no utility relocations on the project indicate "No Utilities" in the box above.

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

Classification No. 3 - WIDENING & RESURFACING- SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
PM _____ UPC No. _____

SUMMARY

Construction Estimate for FSD	
Construction Engineering (CE)	
Contingencies	
Utilities: Relocations By Companies/Owners	
Total Estimate	

Right of Way

--

Superseded

2.1.4 Classification Number 4 - RESURFACING - ENGLISH
Work Type - EARTHWORK (must be calculated)

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

	Unit	Quantity	x Unit Price	= Amount
Roadway Exc. Unclassified	C.Y.		See (A)	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		15.00	
EARTHWORK TOTAL				=

A) See Construction Cost Estimate Work Sheet (Attachment 1) for the method to utilize the most recent price information available.

Work Type - GENERAL ITEMS

Item	Project Length (mile)	x Cost/mile	= Amount
Field Office		44,264	
Materials Field Laboratory		28,970	
GENERAL ITEMS TOTAL			=

Classification Number 4 - RESURFACING - Work Type - DRAINAGE

Item	Unit	Quantity	x Unit Price	Amount
Reset Casting	Unit		425	=
Inlet *	Unit		2,865	
Pipe *	L.F.		104	
DRAINAGE TOTAL				

* Any drainage problems to be corrected should be estimated and included.

Classification Number 4 -RESURFACING - Work Type - PAVEMENT - ENGLISH

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement. Cost

Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.

Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification No. 4 - RESURFACING - Work Type - INCIDENTAL ITEMS - ENGLISH

Item	x Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
Sign Bridge		308,000	
Cantilever Sign Structure		60,500	
INCIDENTAL ITEMS TOTAL			=

Work Type - Work Type - LANDSCAPE

The meter measurement is for each side of the roadway or ramp that requires landscaping. For example: If a road is widened on one side only the cost = 4.00 per foot. If the road is widened on both sides the cost is 8.00 per foot.

Pavement Edge Length in Feet	Cost per pavement edge for Topsoil & Seeding	Amount
	X 4.00	
LANDSCAPE TOTAL		=

Classification No. 4 - RESURFACING – SUMMARY Page 1 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Work Type	Totals from previous pages
Earthwork	
Pavement	
Culverts	
Bridges	
Drainage	
Incidental Items	
Landscape	
Noise Abatement	
General Items	
PROJECT SUBTOTAL	=

Other Items	Proj. Subtotal Range	Choice	Amount
Lighting, Traffic Stripes, Signs and Delineators		2% of Proj. Subtotal	
Maintenance of Traffic		7% of Proj. Subtotal	
Training		1% of Proj. Subtotal	
Mobilization	Project Cost(Mil.)	% of Proj. Subtotal	
	Less than 1.0	8% of Proj. Subtotal	
	1.0 to 5.0	8% of Proj. Subtotal	
	5.0 & above	8% of Proj. Subtotal	
Progress Schedule	Project Cost(Mil.)	\$	
	Less than 2.0	0	
	2.0 to 5.0	6,000	
	5.0 & above	8,000	
Clearing Site	Project Cost (Mil.)	\$	
	Less than 1.0	10,000	
	1.0 to 2.0	30,000	
	2.0 to 5.0	45,000	
	5.0 & above	50,000	
Construction Layout	Project Cost(Mil.)	\$	
	Less than 1.0	6,000	
	1.0 to 2.0	8,000	
	2.0 to 5.0	26,500	
	5.0 & above	31,000	
		PROJECT TOTAL	=

Classification No. 4 - RESURFACING – SUMMARY Page 2 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C) Contingencies	1 + [0.01 (Y+1) (Y-2)] Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	Construction Cost for FSD Estimate

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-20	3%	1
Over 20	2%	2

CONSTRUCTION ENGINEERING AMOUNT

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	20.3%
1.0 to 5.0	14.9%
5.0 to 10.0	10.8%
10.0 & above	9.5%

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0

CONTINGENCIES =

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

	x 0.025	=
--	---------	---

Construction Cost for FSD Estimate Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.
 If there are no utility relocations on the project indicate "No Utilities" in the box above.

Classification No. 4 - RESURFACING – SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
PM _____ UPC No. _____

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

--

SUMMARY

Construction Estimate for FSD

Construction Engineering (CE)

Contingencies

Utilities: Relocations By Companies/Owners

Total Estimate

Right of Way

--

Superseded

2.1.5 Classification Number 5 -BRIDGE REPAIR - Work Type - PAVEMENT - ENGLISH

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement. Cost

Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.

Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification No. 5 - BRIDGE REPAIR - ENGLISH
Work Type - INCIDENTAL ITEMS

Item	x Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
INCIDENTAL ITEMS TOTAL			=

Work Type - BRIDGE

Cost to be provided by BUREAU OF STRUCTURAL ENGINEERING

Superseded

Classification No. 5 - BRIDGE REPAIR- SUMMARY Page 1 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Work Type	Totals from previous pages
Earthwork	
Pavement	
Culverts	
Bridges	
Drainage	
Incidental Items	
Landscape	
Noise Abatement	
General Items	
PROJECT SUBTOTAL	=

Other Items	Proj. Subtotal Range	Choice	Amount
Lighting, Traffic Stripes, Signs and Delineators		1% of Proj. Subtotal	
Maintenance of Traffic		7% of Proj. Subtotal	
Training		1% of Proj. Subtotal	
Mobilization	Project Cost(Mil.)	% of Proj. Subtotal	
	Less than 1.0	8% of Proj. Subtotal	
	1.0 to 5.0	5% of Proj. Subtotal	
	5.0 & above	5% of Proj. Subtotal	
Clearing Site	Project Cost (Mil.)	\$	
	Less than 1.0	2,000	
	1.0 & above	3,000	
Construction Layout	Project Cost(Mil.)	\$	
	Less than 1.0	4,000	
	1.0 & above	6,000	
PROJECT TOTAL			=

continued on next page

Classification No. 5- BRIDGE REPAIR- SUMMARY Page 2 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C) Contingencies	1 + [0.01 (Y+1) (Y-2)] Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	Construction Cost for FSD Estimate

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-5	3%	1
Over 5	2.5%	2

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	14.9%
1.0 to 5.0	12.2%
5.0 to 10.0	10.8%
10.0 & above	9.5%

CONSTRUCTION ENGINEERING AMOUNT

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0
 CONTINGENCIES

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

<input style="width: 150px; height: 20px;" type="text"/>	x 0.085	= <input style="width: 150px; height: 20px;" type="text"/>
Construction Cost for FSD Estimate		Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.
 If there are no utility relocations on the project indicate "No Utilities" in the box above.

Classification No. 5- BRIDGE REPAIR- SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
PM _____ UPC No. _____

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

--

SUMMARY

Construction Estimate for FSD

Construction Engineering (CE)

Contingencies

Utilities: Relocations By Companies/Owners

Total Estimate

Right of Way

--

Superseded

2.1.6 Classification Number 6 - INTERSECTION IMPROVEMENT - ENGLISH
Work Type - EARTHWORK (must be calculated)

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

	Unit	Quantity	x Unit Price	= Amount
Roadway Exc. Unclassified	C.Y.		See (A)	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		15.0	
Borrow Excavation, Zone 3	C.Y.		See (A)	
EARTHWORK TOTAL				=

A) See Construction Cost Estimate Work Sheet (Attachment 1) for the method to utilize the most recent price information available.

Work Type - Work Type - LANDSCAPE

The meter measurement is for each side of the roadway or ramp that requires landscaping. For example: If a road is widened on one side only the cost = 4.00 per foot. If the road is widened on both sides the cost is 8.00 per foot.

Pavement Edge Length in Feet	Cost per pavement edge for Topsoil & Seeding	Amount
	X 4.00	
LANDSCAPE TOTAL		=

Classification Number 6 -INTERSECTION IMPROVEMENT - ENGLISH
Work Type - PAVEMENT

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement. Cost

Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.

Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification Number 6 -INTERSECTION IMPROVEMENT – ENGLISH
Work Type - DRAINAGE

Item	Unit	Quantity	x Unit Price	Amount
Reset Casting	Unit		425	
Inlet *	Unit		2,865	
Pipe *	L.F.		104	
DRAINAGE TOTAL				

* Any drainage problems to be corrected should be estimated and included.

Work Type - INCIDENTAL ITEMS

Item	x Quantity	x Unit Price	= Amount
Beam Guide Rail		16.75/L.F.	
Fence 6 Foot High		18.25/L.F.	
9" X 16" Conc. Vertical Curb		13.75/L.F.	
15" X 41" Conc. Barrier Curb		50.25/L.F.	
24" X 41" Conc. Barrier Curb		73.25/L.F.	
24" X Variable Conc. Barrier Curb		46/L.F.	
Lighting Assembly (Includes wire, junction box, etc.) *		9,500/Unit	
Meter Cabinet (Lighting one per cross road)		11,000 Unit	
Complete Traffic Signal Installation at Typical Intersection		165,000	
INCIDENTAL ITEMS TOTAL			=

* For estimating purposes space lights 18 feet apart.

Route _____

Section/Contract _____

PM _____

UPC No. _____

Construction Layout	Project Cost(Mil.)	\$	
	Less than 1.0	7,000	
	1.0 to 2.0	20,000	
	2.0 to 5.0	42,000	
	5.0 to 10.0	87,000	
	10.0 to 20.0	160,000	
	20.0 to 30.0	270,000	
	30.0 to 40.0	490,000	
	40.0 & above	890,000	
PROJECT TOTAL		=	

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C)	$1 + [0.01 (Y+1) (Y-2)]$	Construction Cost
Contingencies		Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	for FSD Estimate

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-5	3%	1
Over 5	2.5%	2

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	36.5%
1.0 to 5.0	35.1%
5.0 to 10.0	12.2%
10.0 & above	10.5%
CONSTRUCTION ENGINEERING AMOUNT	

Classification No. 6 - INTERSECTION IMPROVEMENT – SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0
 CONTINGENCIES =

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

x 0.015 =

Construction Cost for FSD Estimate Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.
 If there are no utility relocations on the project indicate "No Utilities" in the box above.

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

SUMMARY

Construction Estimate for FSD	<input style="width: 100%; height: 20px;" type="text"/>
Construction Engineering (CE)	<input style="width: 100%; height: 20px;" type="text"/>
Contingencies	<input style="width: 100%; height: 20px;" type="text"/>
Utilities: Relocations By Companies/Owners	<input style="width: 100%; height: 20px;" type="text"/>
Total Estimate	<input style="width: 100%; height: 20px;" type="text"/>

Right of Way

2.1.7 Classification Number 7 - SAFETY & TRAFFIC CONTROL - ENGLISH
Work Type - PAVEMENT

12 FOOT WIDE LANE (from subgrade up)

Pav't. Type	Description of Pavement	Cost/Linear Foot
A	10 inch R.C. Pavement	= 156
B	2 inch HMA Surf. Course & 8 inch HMA Base Course	= 61
C	3 inch HMA Surf. Course & 4 inch HMA Base Course	= 46
D	2 inch HMA Surf. Course & 2 inch HMA Base Course	= 22
E	Bridge Approach & Transition Slabs	= 156
	(Resurfacing Portion only F & G)	
F	2 inch HMA Surface Course	= 8.25
G	3 inch HMA Surface Course	= 12
H	Milling 2 inch	= 3

Computation Table for Pavement Cost

Type	Cost	X Length	X Pavement *W.F.	= Amount
PAVEMENT TOTAL				=

*Width Factors = Ratio of 12 foot wide lane to actual pavement width.

Example = actual pavement width = 25 foot = $25/12 = 2.08$ W.F.

Classification No. 7 - SAFETY & TRAFFIC CONTROL - ENGLISH
Work Type - INCIDENTAL ITEMS

Item	x Unit Price	x Quantity	= Amount
Beam Guide Rail	16.75/L.F.		
Fence 6 foot High	18.25/L.F.		
QuadGuard	27,500/Unit		
Sign Bridge	308,000		
Cantilever Sign Structure	60,500		
Lighting Assembly (Includes wire, junction box, etc.) *	9,500/Unit		
Meter Cabinet (Lighting one per cross road)	11,000/Unit		
Complete Traffic Signal Installation at Typical Intersection	165,000		
INCIDENTAL ITEMS TOTAL			=

* For estimating purposes space lights 18 feet apart.

Work Type - EARTHWORK & LANDSCAPE

	Unit	Quantity	x Unit Price	= Amount
Roadway Exc. Unclassified	C.Y.		26.75	
Removal of Conc. Base & Conc. Surface Courses	S.Y.		15.00	
Borrow Excavation, Zone 3	C.Y.		15.25	
EARTHWORK TOTAL				=

Roadway Excavation Unclassified and Borrow Excavation Zone 3 should be calculated on a job-to-job basis depending on need. The prices include Topsoil and Seeding required.

Classification No. 7 - SAFETY & TRAFFIC CONTROL – SUMMARY Page 1 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

Work Type	Totals from previous pages
Earthwork	
Pavement	
Culverts	
Bridges	
Drainage	
Incidental Items	
Landscape	
Noise Abatement	
General Items	
PROJECT SUBTOTAL	=

Other Items	Proj. Subtotal Range	Choice	Amount
Lighting, Traffic Stripes, Signs and Delineators		3% of Proj. Subtotal	
Maintenance of Traffic		7% of Proj. Subtotal	
Training		1% of Proj. Subtotal	
Mobilization	Project Cost (Mil.)	% of Proj. Subtotal	
	Less than 1.0	8% of Proj. Subtotal	
	1.0 to 5.0	8% of Proj. Subtotal	
	5.0 & above	8% of Proj. Subtotal	
Progress Schedule	Project Cost (Mil.)	\$	
	Less than 2.0	0	
	2.0 to 5.0	6,000	
	5.0 & above	8,000	
Construction Layout	Project Cost (Mil.)	\$	
	Less than 1.0	6,000	
	1.0 to 2.0	8,000	
	2.0 to 5.0	26,500	
	5.0 & above	31,000	
		PROJECT TOTAL	=

continued on next page

Classification No. 7 - SAFETY & TRAFFIC CONTROL - SUMMARY Page 2 of 3 - ENGLISH

Route _____ Section/Contract # _____
 PM _____ UPC No. _____

CONTINGENCIES & ESCALATION

	x	X	=
Project Total	(1+ C) Contingencies	1 + [0.01 (Y+1) (Y-2)] Y = Number of Years until midpoint of construction duration. If midpoint is less than 2 years no escalation is required.	Construction Cost for FSD Estimate

Project Cost(Mil.)	Contingencies (C) Percent	Average Construction Duration in Years
0-5	3%	1
Over 5	2.5%	2

CONSTRUCTION ENGINEERING (CE)

Project Cost (Mil.)	% of Construction Cost
Less than 1.0	21.6%
1.0 to 5.0	12.2%
5.0 to 10.0	12.2%
10.0 & above	12.2%

CONSTRUCTION ENGINEERING AMOUNT

CONTINGENCIES FOR CONSTRUCTION CHANGE ORDER

Total Federal Participating Items in Millions of \$	Construction Change Order Contingency Amount
\$0 to 0.1	\$6,000
0.1 to 0.5	25,000
0.5 to 5.0	25,000 + 4% of amount in excess of \$500,000
5.0 to 10.0	205,000 + 3% of amount in excess of \$5,000,000
10.0 to 15.0	355,000 + 2% of amount in excess of \$10,000,000
15.0 and Above	500,000 Maximum

For State Funded Projects, Contingencies for Change orders = 0

CONTINGENCIES =

UTILITIES RELOCATIONS BY COMPANIES/OWNERS

	x 0.10	=
Construction Cost for FSD Estimate		Utility Relocation Cost for FSD Estimate

or use utilities detailed estimates as soon as available.
 If there are no utility relocations on the project indicate "No Utilities" in the box above.

Classification No. 7 - SAFETY & TRAFFIC CONTROL - SUMMARY Page 3 of 3 - ENGLISH

Route _____ Section/Contract # _____
PM _____ UPC No. _____

ROW COST

If there is no ROW cost on the project indicate "No ROW" the box

--

SUMMARY

Construction Estimate for FSD

Construction Engineering (CE)

Contingencies

Utilities: Relocations By Companies/Owners

Total Estimate

Right of Way

--

Superseded

Attachment 1

CONSTRUCTION COST ESTIMATE WORK SHEET

Utilize the Bid Price Report to complete

Route _____

Section/Contract # _____

		Reference Project Information			
		Route & Section			
		Municipality			
		County			
		Total Bid Price			
Item No.	Item Description	Bid Date			
		Work Class			
		Quantity			
	Unit Price for Estimating	Unit Price			
		Total Price			
		Quantity			
	Unit Price for Estimating	Unit Price			
		Total Price			
		Quantity			
	Unit Price for Estimating	Unit Price			
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	Unit Price for Estimating	Unit Price			
		Total Price			
		Quantity			
	Unit Price for Estimating	Unit Price			
		Total Price			
		Quantity			
	Unit Price for Estimating	Unit Price			
		Total Price			

Attachment 2

Federal Non-Participating Construction Cost Estimation Work Sheet - English

Items of Work

Amount

Approach slabs with any of the following conditions:

- (a) if one-way traffic loading is less than 500 80-kN equivalent single axle load applications per day;
- (b) posted speed limit is less than 35 m.p.h.;
- (c) the abutments are not supported on pile foundations.

= _____

Fishing piers (or bridges) and pedestrian walkways for recreational access.

= _____

Greater than a 2 to 1 ratio of mitigation for wetland sites. FHWA sometimes participates in greater than 2 to 1 replacement if the impact is significant. Contact Project Manager for guidance.

= _____

Sometimes the use of liners for Wetland Mitigation Sites as they do not permit ground water recharge. Contact Project Manager for guidance.

= _____

Waterway openings and net fill requirements mandated by NJDEP when they differ from FHWA. requirements.

= _____

Structures less than 20 feet in span if BR/BH funds are being utilized for the project.

= _____

Sidewalks on bridges when there are no sidewalks on the approaches for pedestrians. Contact Project Manager for guidance.

= _____

Maintenance dredging if the dredged material is not used as a fill.

= _____

Maintenance operations such as cleaning existing pipes, drainage structures, ditches, repairing impact attenuators, mowing etc. FHWA sometimes participates in this work. Contact Project Manager for guidance.

= _____

Items of work paid for by other agencies or private developers.

= _____

Sometimes Memorial and/or Vanity Plaques on structures.

= _____

Type II Noise Barriers

= _____

BR/BH funds for approach work past the touchdown points for new / rehabilitated structures.

= _____

Proprietary items without proper justification. Contact Project Manager for guidance.

= _____

Additional items not listed above. (see next page)

= _____

= _____

Revision History - A Summary of all changes to this Manual
For master copy of electronic file only

This manual incorporates and eliminates the following ADUs and APCs.

A	March 22, 1971	APC	Quarterly Updates of Engineers Estimates
A	March 19, 1971	APC	Quarterly Updates of Engineers Estimates

Superseded