

Connecticut DOT

2017 Cost Estimating Guidelines

I. PURPOSE

These guidelines provide basic cost estimating information for Department construction projects and recent cost information for several common construction items. These guidelines do not provide guidance on estimating preconstruction (engineering design) costs. An explanation of construction cost elements follows.

II. GENERAL

The Department's cost estimating process is heavily reliant on "AASHTOWare Project Estimator" (Estimator®) a widely-used software adapted specifically for Department use. The [CTDOT AASHTOWare Project Estimator® Procedures Guide](#) provides detailed guidance on using the software for Department projects and should be referenced in conjunction with these guidelines.

Total project cost includes pre-construction and construction phase expenditures. The following is a general framework of project costs:

- **PRECONSTRUCTION**
 - Project planning,
 - Design (State or consultant),
 - Design management, liaison and review/support (Department units),
 - Permit application preparation,
 - Engineering by utilities and municipalities, and
 - Right of Way appraisal, acquisition and relocations.
- **CONSTRUCTION**
 - Contract,
 - Non-contract,
 - Construction inspection and contract administration (materials testing, design support),
 - Work and inspection by utilities and municipalities,
 - Work and inspection by railroads, and
 - State Police.
 - Contingency (generally added separately to Contract and Non-contract costs)

In addition to the above, other project-related costs (e.g., adjustment of traffic signals by state forces) are sometimes incurred.

An example estimate covering various phases and cost categories is provided as Attachment 1.

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CONTRACT ITEMS are the individual “pay items” performed by the Department’s contractor. During the bidding process, bidders submit prices for unit-based (i.e., paid for by cubic yard, each, ton, linear foot, etc.) and lump sum items. Some contracts also include one or more Estimated amount (EST) items. For these items, the Department designates the contract amount, generally because the required work is not sufficiently defined to solicit binding bids. The established amount is included on the bid proposal form and part of each bidder’s bid amount. The actual amount paid for an Estimated amount item is determined during construction based on actual requirements.

Estimator® is the principal tool used to estimate contract unit-based items. Much of the procedural detail associated with using Estimator® is provided in the [CTDOT AASHTOWare Project Estimator® Procedures Guide](#). Estimator® has several limitations, including:

- It does not generate estimated prices for lump sum or Estimated (EST) items.
- It does not generate estimated non-contract costs (e.g., utilities, state police).
- It does not generate estimated prices for unit-based items unless the item was used in at least two previous construction contracts within the selected catalog.
- If the selected bid history catalog has between 2 and 14 occurrences of the same item, the Estimator® price will be the average of those prices. No project-specific factors are accounted for.
- If the selected bid history catalog includes 15 or more occurrences of the same item, the Estimator® price will be a regression on several factors (quantity, location, letting date, work type). However, other factors affecting bidder prices (e.g., schedule constraints, difficult site conditions) are not accounted for.

Because of these limitations, the estimator needs to prepare some prices using other information. Additionally, sometimes the estimator should override the price generated by **Estimator®**.

NON-CONTRACT ITEMS represent Department expenses for work required to complete the project but not included in the contract. Specific elements comprising this category are discussed below.

Incidentals – the cost of Construction Engineering (CENG), which consists of the various activities required to administer the construction contract, including inspection, materials testing, construction phase design support and other functions. It includes state and consultant forces, when applicable. For state-awarded construction contracts, this “Incidental Cost” is estimated using a sliding scale percentage of the contract cost in accordance with a Chief Engineer’s memorandum (dated January 10, 2014), provided as Attachment 2. Include the estimated amount in the Estimator® file. For contracts awarded by local public agencies, refer to the Chief Engineer’s memorandum dated August 14, 2009 (Attachment 3).

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Utility Agreements and Railroad Relocation and Protection – the cost to the Department by public utilities and railroads required by the project, such as for relocation of public utilities or interference with railroads (by physical alteration or occupation of their property). During project development, written agreements between the Department and each affected utility and railroad are developed and executed to cover the estimated cost of relocation and protection. The Department's share of the cost is governed by State statute, as summarized in the [Utility Manual for Documenting and Billing Highway Relocation Work](#) (Exhibit 1-1). The Utilities Section of the Division of Facilities and Transit will, upon request, prepare estimated utility costs during project development; that unit also coordinates preparation and execution of utility agreements. Beginning with the Preliminary Design (or Rehabilitation Study Report) submission, the lead design unit should request an estimate of the State's share of utility relocation costs, in addition to comments, from the Utilities Section at milestone submissions. The estimated State share of utility relocations should be included in the total estimated construction cost. At FDP, this amount is included in the Estimator® file as a non-contract cost.

State Police – dedicated State Police patrol and traffic control are used for selected projects, primarily involving work on limited access highways and ramps. The Division of Traffic Engineering (for State –designed projects) or consultant (for consultant designs), in consultation with District Construction, determines which projects require dedicated State Police. When its need is anticipated, the lead design unit should include this item in the cost estimate. For projects designed by Department design units, the Division of Traffic Engineering will, upon request, provide an estimated State Police cost. For consultant designed projects, the consultant should make an estimate; the Division of Traffic Engineering will comment on the estimate as part of design milestone reviews. The cost of State Police is attributable to the project but is not a contract item or cost. The cost is paid by the Department through an interagency Memorandum of Understanding. The estimated amount should be included in the total estimated construction cost. At FDP, this amount is included in the Estimator® file as a non-contract cost.

Estimator® (software) provides no assistance in estimating the three cost categories noted above. The estimated costs for these items should be developed 'offline' and entered into Estimator®

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CONTINGENCY is an element of estimated cost included to account for risk and uncertainty. It is usually estimated as a percentage of anticipated costs. Uncertainty and risk diminish as development progresses toward design completion, so contingency also decreases as design development advances. Contingencies are applicable to both contract and non-contract costs. However, these guidelines only provide specific guidance on establishing contingency values for contract costs. See the next section “Cost Estimates During Project Development” for specific guidance.

III. COST ESTIMATES DURING PROJECT DEVELOPMENT

All construction cost estimates should be updated twice per year, at major design milestones (Preliminary Design, Semi-Final Design, Final Design for Review and Final Design Plans) and when the scope is changed significantly.

The various elements of the estimated contract cost are shown in the figure below. The **base estimate** is composed of what can be reasonably ‘known’ about the cost of construction when the estimate is prepared. This base estimate includes the cost of individual work items that have been identified, at current/recent prices. Additionally, in early phases of development, a **minor item** allowance is included to account for items that are known to be needed but are too small to identify and estimate individually. The minor item allowance is part of the base estimate. As previously noted, **contingency** is the cost associated with risk and uncertainty. A contingency amount is computed and included in the estimate to cover the probable cost of work that cannot be reasonably known – but may well be needed.

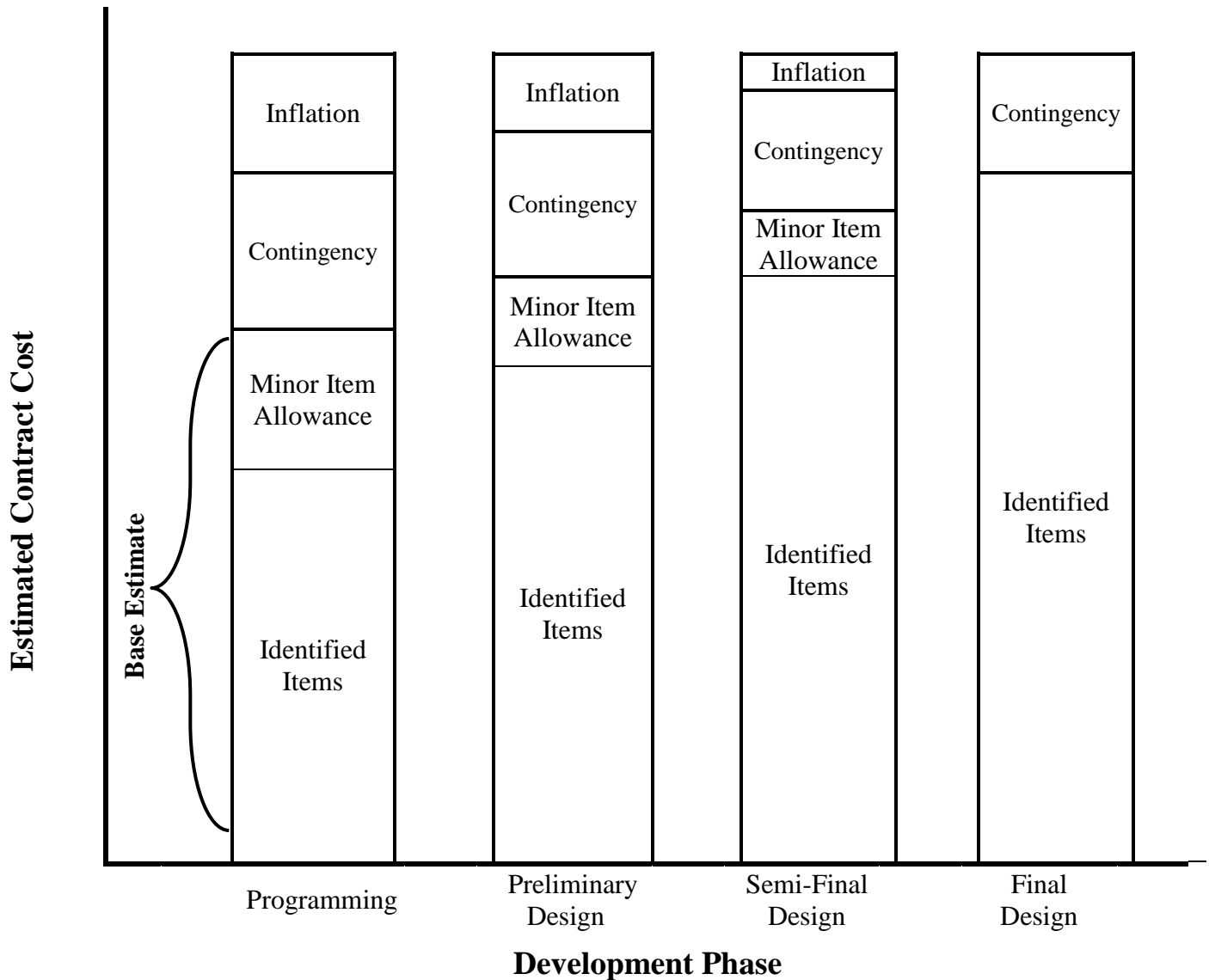
Construction cost estimates are intended to represent Department disbursements (amounts paid out) to construct a project. As labor and material costs change over time, the cost of construction also changes. All estimates should identify a corresponding reference time (month and year). For fiscal management and capital planning purposes, anticipated disbursements (dollars paid out) should be shown in the “year of expenditure.” **Inflation** refers to the general trend of increasing cost with time. An adjustment is generally needed to account for inflation between the cost computed using current/recent prices and future (i.e., year of expenditure) disbursements.

The various elements of a construction contract cost estimate in relation to major project development milestones are shown in Figure 1. The minor item allowance, contingency and inflation adjustment decrease as project definition is completed, all payment items are identified and costs reflect current prices. Further guidance on estimating individual elements of the construction contract cost follows.

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Figure 1. Components of construction contract cost by development phase.



The **base estimate** is the estimated cost of anticipated contract work, as contemplated at the time of the estimate and in the current price environment. The estimator may use individual “catalog pay items” found in the Department’s bid history (available through Estimator®), aggregate cost factors (e.g., cost/unit of area) or other methods (e.g., cost basis). Aggregate cost factors are discussed in a subsequent section. Additionally, a **minor item allowance** should be included using the factors indicated in Table 1. The estimator uses judgement to select a value from within the noted range. The selected percent value is multiplied by the cost of identified items as noted in the table. No minor item allowance is included in the final estimate, since all work should be covered by individual catalog items and quantities.

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Table 1. Minor item and contingency factor guidance.

Phase	Minor Item Allowance		Contingency	
	Factor (%)	Multiply by	Factor (%)	Multiply by
Programming	15 - 30	Roadway & Structure items	20 - 30	Base
Preliminary Design	10 - 20	Roadway, Structure, Environmental Compliance & Traffic items	15 - 25	Base
Semi-Final Design	5 - 10	All identified items	10 - 20	Base
Final Design	0	Not applicable	10	Base

The **contingency** element of contract cost is computed by applying the selected contingency percentage to the base estimate (identified items plus minor item allowance). Table 1 indicates a range of recommended contingency factors. The ranges shown are associated with project complexity. The lower end of the range is appropriate for low-complexity projects and vice versa. Typical risk factors include uncertain scope, subsurface work and mitigation measures. At final design, a contingency factor of 10 percent is used in accordance with a Chief Engineer’s memorandum (January 10, 2014), and included in the Estimator® file.

Estimates are usually based on recent bid prices. Unless inflation is rampant (more than 10 percent annually), prices based on the most-recent three years are generally adequate for contracts with an imminent letting (i.e., bid opening). However, when the letting is more than a year from when the estimate is prepared, an **inflation** adjustment should be included.

There are basically two methods that can be used to adjust cost based on timing. One is through Estimator®. This software is most useful when all of the contract items and quantities are defined. When this information and the scheduled letting date are available and entered in Estimator®, the estimated costs generated by Estimator® will automatically factor time into estimated cost (i.e., account for inflation). Estimator® computes price trends for individual items and projects costs up to the specified “base date.” This adjustment is made automatically only for the unit-based items estimated by Estimator®. This approach is generally not workable for preliminary estimates.

The second method, and the one recommended for preliminary estimates, is to adjust for **inflation** by direct calculation. Except for contracts with durations of three years or more, the inflation adjustment factor is computed by determining the number of years between the estimate date (when estimate is prepared) and scheduled bid opening and multiplying this number by the annual inflation factor. For contracts with durations of three years or longer, compute the number of years from the estimate date to the mid-point of construction. An annual inflation rate of 3.5 percent per year (simple, not compound) should be used for 2017 and subsequent years. Example computations follow.

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Inflation Example 1 (construction duration less than 3 years)

Estimate date: January 15, 2017

Scheduled bid opening (letting) date: November 16, 2018

Duration of construction contract: 2 years (midpoint: April 2020)

Estimated cost: \$1,500,000

Inflation: 3.5 percent

Estimated future/inflated cost = $\$1,500,000 \times (1.0 + 1.83 \times 0.035) = \mathbf{\$1,596,075}$

Inflation Example 2 (construction duration more than 3 years)

Estimate date: January 15, 2017

Scheduled bid opening (letting) date: December 14, 2018

Duration of construction contract: 4 years (midpoint: April 2021)

Estimated cost: \$15,000,000

Inflation: 3.5 percent

Estimated future/inflated cost = $\$15,000,000 \times (1.0 + 4.25 \times 0.035) = \mathbf{\$17,231,250}$

It should also be noted that inflation affects various project cost categories (e.g., rights of way, construction) differently since they are incurred at different points in time and have unique cost trends. The guidance and examples in this section apply only to construction contracts.

IV. AGGREGATE COSTS FOR PRELIMINARY ESTIMATES.

This section provides guidance for the preliminary estimation of several common construction features that are comprised of many individual contract items. The cost of these construction features cannot be obtained directly from bid history or Estimator®.

The advantage of using these aggregate average costs is that they capture many individual contract items without preparing a detailed design and computing the specific items and quantities that will be required. However, it should be recognized that costs vary significantly by project. Some costs are far higher than the average and some are significantly less. These average costs are most appropriate for scoping estimates.

Bridges

Table 2, and associated notes, provide average costs for various categories of bridge work. Most of the information was developed by the Department's Bridge Management unit.

Table 2. Estimated cost of common bridge work.

Description of Work	Estimating Units	Unit Cost (\$)
Total Replacement of Bridge to New Standards: Deck Area <1600 square feet	square feet of replacement bridge (2)	550
Total Replacement of Bridge to New Standards: 1,600 sq ft < Deck Area < 11,000 sq ft	square feet of replacement bridge (2)	420
Total Replacement of Bridge to New Standards: Deck Area > 11,000 square feet	square feet of replacement bridge (2)	365
Removal of Superstructure (over roadway)	square feet of deck removed (3)	50
Removal of Superstructure (over water or rail)	square feet of deck removed (3)	70
Replacement of Bridge Superstructure: Deck Area <1600 square feet	square feet of deck area replaced	360
Replacement of Bridge Superstructure: 1,600 sq ft < Deck Area < 11,000 sq ft	square feet of deck area replaced	300
Replacement of Bridge Superstructure: Deck Area > 11,000 square feet	square feet of deck area replaced	160
Rehabilitation of Existing Superstructure	square feet of deck area rehabilitated	140
Replace Bridge Girder(s)	linear feet of girder replaced	900
Repair or Modify Bridge Substructure	square feet of substructure repair	230
Replace Bridge Deck	square feet of deck area replaced	145
Rehabilitate Bridge Deck	square feet of deck area rehabilitated	125
Replace Bridge Joints	linear feet of joints repaired	230
Repair Bridge Beam Ends	each beam end repaired	5,000
Bridge Touch Up Painting	square feet of area repainted	70
Blast Cleaning and Field Painting of Bridge	square feet of steel area cleaned	30
Replace Bridge Bearings	Each bearing replaced	3,000
Install or Replace Bridge Bit Wearing Surface and Waterproof Membrane	square feet of deck area	8
Repair/Rehabilitate Culvert	square feet of deck area (4)	125
Replace Culvert	square feet of deck area (4)	240

Notes:

1. On-system means the bridge is on a Federal-aid route, which are all roads except those functionally classified as a local road or rural minor collector (use functional classification maps, not state/municipal ownership). Off-system includes everything that is not “On-system”. The costs are for the replacement bridge only and do *not* include other work such as demolition of existing structures, constructing approaches, retaining walls, traffic control and other general contract items (e.g., mobilization, construction staking).
2. Compute the area by multiplying the out-to-out width times the length of the new/replacement (i.e., not existing) bridge.
3. Use the area of the existing bridge.
4. Compute the area for culverts by multiplying the entire end-to-end (direction of flow) length times the inside dimension width (perpendicular to flow).

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Retaining Walls

The average unit costs are based on lump sum costs for wall divided by the area (length times height, measured from the top of footing to the top of wall). The unit cost is inversely proportional to the wall's area. Table 3 provides the recommended unit cost ranges, based on the size of individual walls.

Table 3. Recommended unit cost ranges for retaining walls.

Area of Wall (square feet)	Unit Cost Range (\$/square feet)
<100	\$300 - \$600
100 - 500	\$150 - \$300
500 - 1,000	\$125 - \$175
> 1,000	\$75 - \$125

Roadway Lighting

Expressway: \$60/linear foot

Ramps: \$45/linear foot

Individual Highway Pole & Light: \$10,000

Signalization

Permanent Signal Systems

State Highway \$180,000 - \$220,000/intersection

Locally-owned Signal System \$225,000 - \$250,000/intersection

Accessible pedestrian signal (APS) and sidewalk ramp upgrade \$55,000 - \$75,000/intersection

Minor Modification \$30,000/intersection

Major Modification \$80,000/intersection

Temporary Signalization

M&PT Bridge Projects \$50,000/intersection

Existing Signal \$2,500/intersection

Utility Relocation for Signalization Projects \$7,000/intersection

Rectangular Rapid Flashing Beacon (RRFB) \$10,000 - \$20,000/crossing location

HAWK \$90,000/location

Temporary Detection \$2,500/intersection

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V. LUMP SUM CONTRACT ITEMS

This section provides guidance for several common construction features that are typically bid as lump sum items.

Structural Steel

The prices of lump sum structural steel items [e.g., Structural Steel, Structural Steel (Site No. _)] includes both material and its installation. Cost is estimated on the basis of weight, using the values (which include material and cost):

Average: \$2.50/lb

Above 10,000 lbs and favorable site conditions: \$2.25/lb

Below 10,000 lbs or less-than favorable site conditions: \$3.00 - \$8.00/lb

Recurring Lump Sum Items

The four items addressed in this section are included in many projects. For a specific contract, individual bids for these items often vary widely. Given the variability in bidding strategies along with the requirements for specific projects, average dollar values should not be used for contract estimates. Instead, the cost of these items should be estimated as a percentage of total project cost. Table 4 summarizes recent bid history for single-location highway and bridge construction contracts. These percentages are not necessarily representative of contracts primarily or exclusively for area-wide specialty work (bridge repair, pavement marking, rumble strips, signing, signals), building construction or aviation. When estimating these types of contracts, review previous similar contracts.

Table 4. Range and average percentage for recurring lump sum item costs.

Item		Percent of total bid	
Number	Description	Average	Range
0201001	Clearing and Grubbing	2.0	0.5 – 6.0
0971001	Maintenance and Protection of Traffic	3.0	0.5 – 6.0
0975002	Mobilization and Project Closeout	6.5	3.5 – 10.0
0980001	Construction Staking	1.0	0.2 – 3.0

Accurate estimation of these items is difficult since bidders' prices often reflect factors not directly related to the work entailed by the item. Consequently, average values are often appropriate. However, prices should also consider certain historical trends and practical considerations as discussed below.

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The estimated cost of **Clearing and Grubbing** should reflect the extent of the effort. Some project types (e.g., realignment) inherently involve more clearing effort than others (e.g., IMS). Some types of work (bridge rehabilitation) vary widely within the same category. The estimator should select a percentage that is representative of the clearing and grubbing effort, generally within the range shown in Table 4.

Bid prices for **Maintenance and Protection of Traffic** tend to be high (more than 10 percent of total bid) for multi-location bridge repair contracts (e.g., expansion joint, plug joints, beam end). Traffic signal, pavement preservation, intersection improvement and single-location bridge rehabilitation contracts tend to be on the lower end of the range (2 percent or less of the total bid).

Bids for **Mobilization and Project Closeout** (as a percent of total bid) are less volatile than the other recurring lump sum items. Multi-location bridge repair contracts (beam ends, bearings, joints) tend to be higher (10 percent and above). Mobilization for these contracts should be estimated at 10 percent of the total contract and the average value (6.5 percent) is recommended for all other contracts.

Bids for **Construction Staking** tend to be fairly logical, generally related to the level of effort. This item is generally 2 percent or more of the total bid for realignment and widening of existing facilities and bridge replacement contracts. For pavement preservation, bridge rehabilitation and traffic signal contracts, this item is generally around 0.5 percent of the contract. For all other contracts, the average (1 percent) is recommended.

VI. OTHER COSTS

This section provides guidance on several common miscellaneous cost items.

Railroad Protection

Flagging:

Metro North and Amtrak: \$1,000/man/shift (not a contract item)

Other railroads: \$800/man/shift (not a contract item)

De-energizing: \$5,000/Flagman and groundman/shift (not a contract item)

On-site Traffic Control Personnel

State Police Officer: \$85/hour (not a contract item)

Town (City) Police Officer: \$75/hour (contract item, Estimated amount)

Uniformed Flagger: \$ 55/hour (contract item, bid unit price)

For preliminary estimating guidance on other construction costs, consult with relevant functional divisions and units (Traffic Engineer, Utilities, Environmental Compliance).

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VII. FINAL ESTIMATES

Final Estimates serve as the basis for detailed fiscal actions (e.g., obligating federal and matching funds) and for analyzing contractor bid proposals. Final Design Plan (FDP) estimates should identify contract costs, non-contract costs and a contingency as shown under the “Construction” heading in the “General” section (p. 1).

The [Digital Project Development Manual](#) and the [CTDOT AASHTOWare Project Estimator® Procedures Guide](#) provide detailed information related to the submission of FDP estimates. This guide also includes guidance on how a “lead” unit (e.g., Highway Design, Bridges) can assemble a project-level estimate by adding together discipline subsets (i.e., roadway, bridge, traffic) and electronic processing options (Estimator® direct entry, uploading Excel files).

VIII. RECENT BID PRICES FOR COMMON CONTRACT ITEMS

Estimator® is the best source of estimated unit prices. If a unit-based item is included in a sufficient number of recent contracts (3 or 5 years, depending on the selected catalog), the software will develop a unit price as described in the “General” section of these guidelines. Therefore, Estimator® is the generally preferred source of unit costs. However, Attachment 4 is provided as a quick source of ‘ball park’ unit price ranges. The ranges provided reflect expected range, as opposed to the absolute range (minimum and maximum bids) for these items. It is not unusual for a bid to fall outside the ranges shown. Typically, unit prices decline as quantities increase. Factors such as site constraints, schedule and location also affect bid prices and should be considered in estimating unit costs. This information (i.e., Attachment 4) should never be used as the primary basis for developing final estimates.

Attachments

1. Example Estimate
2. Chief Engineer Memorandum, January 10, 2014
3. Chief Engineer Memorandum, August 14, 2009
4. General Price Ranges of Common Items

PROJECT NO. 123-456						
Anticipated year of expenditure:		2019	Inflation (%) 3.5			
Base year (cost, if expenditures were in this year):		2017				
Phase of Development:		Preliminary Design				
TOTAL COST SUMMARY						
PHASE	ACTIVITY	ESTIMATED COST	STATE SHARE			YEAR OF EXPENDITURE
PE	PRELIMINARY DESIGN	110,000	100	%	110,000	2014
PE	RIGHT OF WAY (PRE-ACQUISITION)	26,000	100	%	26,000	2014
PE	UTILITIES (ENGINEERING) *	18,000	50	%	9,000	2014
PE	RAILROAD (ENGINEERING)	23,000	100	%	23,000	2015
PE	FINAL DESIGN	325,000	100	%	325,000	2015
RW	RIGHT OF WAY (ACQUISITION)	150,000	100	%	150,000	2016
CN	CONSTRUCTION CONTRACT	4,363,747	100	%	4,363,747	2019
CN	UTILITIES (CONSTRUCTION) *	632,000	50	%	316,000	2019
CN	RAILROAD (CONSTRUCTION)	128,000	100	%	128,000	2019
CN	INCIDENTALS (CENG)	1,090,937	100	%	1,090,937	2019
CN	STATE POLICE	187,000	100	%	187,000	2019
<p>* See Guidelines narrative (p. 3) regarding State's share of utility relocation cost</p> <p>All costs include contingencies and inflation to year of expenditure</p>						
CONTRACT COST SUMMARY						
			%			
ROADWAY (See breakout, separate sheet)					1,660,049	
STRUCTURES (See breakout, separate sheet)					894,950	
ENVIRONMENTAL COMPLIANCE (See breakout, separate sheet)					26,100	
TRAFFIC (See breakout, separate sheet)					127,000	
SUBTOTAL (IDENTIFIED WORK)					2,708,099	
MINOR ITEMS			15		406,215	
IDENTIFIED WORK + MINOR ITEM ALLOWANCE					3,114,314	
Estimated based on % total contract cost			%			
CLEARING & GRUBBING			3		111,225	
M & P OF TRAFFIC			5		185,376	
CONSTRUCTION STAKING			1		37,075	
MOBILIZATION			7		259,526	
CONTRACT WORK					\$3,707,516	
CONTINGENCY (as % of CONTRACT)			10		370,752	
CONTRACT, INCLUDING CONTINGENCY, IN BASE YEAR					\$4,078,268	
CONTRACT, INCLUDING CONTINGENCY AND INFLATION					\$4,363,747	
CONSTRUCTION (CN) PHASE TOTAL					\$6,085,684	
ESTIMATED BY: Tom Smith		REVIEWED BY: John Brown				
DATE: 3/20/2017		DATE: 4/4/2017				

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Attachment 1 - Example Estimate

PROJECT NO. 123-456				
ROADWAY				
DESCRIPTION	BASIS FOR ESTIMATE		COST	
	UNITS	# OF UNITS	UNIT COST	COST
EARTH EXCAVATION	CY	5,089	22	111,958
CHANNEL EXCAVATION	CY	345	40	13,800
ROCK EXCAVATION	CY	312	70	21,840
FORMATION OF SUBGRADE	SY	8,976	3	26,928
SUBBASE	CY	2,620	45	117,900
HMA S0.5	TON	4,890	105	513,450
CONCRETE CURBING	LF	1,635	35	57,225
STAMPED CONCRETE (TRUCK APRON)	SF	3,430	25	85,750
TEXTURED CONCRETE MEDIAN	SF	4,305	30	129,150
CONCRETE SIDEWALK	SF	2,680	15	40,200
DETECTABLE WARNING STRIP	EA	6	190	1,140
METAL BEAM RAIL (TYPE R-B 350)	LF	300	25	7,500
PAVEMENT FOR RAILING	SY	100	40	4,000
BITUMINOUS CONCRETE DRIVEWAY	SY	295	50	14,750
FURNISHING AND PLACING TOP SOIL	SY	3,221	12	38,652
MILLING OF HMA (0" TO 4")	SY	1,223	10	12,230
REMOVAL OF CONCRETE PAVEMENT	SY	2,934	14	41,076
CATCH BASINS	EA	16	3,300	52,800
15" RCP	LF	340	75	25,500
18" RCP	LF	420	85	35,700
18" RCCE	EA	2	1,300	2,600
RIPRAP	CY	150	70	10,500
TRENCH EXCAVATION 0'-10' DEEP	CY	540	20	10,800
FIELD OFFICE, MEDIUM	MO	16	3,100	49,600
LANDSCAPING	PROJECT	1	110,000	110,000
ILLUMINATION	PROJECT	1	25,000	25,000
WETLAND MITIGATION	PROJECT	1	100,000	100,000
ROADWAY SUBTOTAL				1,660,049

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Attachment 1 - Example Estimate

PROJECT NO. 123-456					
STRUCTURE					
DESCRIPTION	BASIS FOR ESTIMATE			COST	
	LENGTH	WIDTH	# OF UNITS	UNIT COST	COST
REPLACE BRIDGE 1234 (Estimate SF)	47	28	1,316	550	723,800
RETAINING WALL (Estimate SF)			1,630	105	171,150
STRUCTURE SUBTOTAL					894,950
TRAFFIC					
DESCRIPTION	BASIS FOR ESTIMATE			COST	
	DAYS	HOURS/DAY	# OF UNITS	UNIT COST	COST
UNIFORMED FLAGGER	175	8	1,400	55	77,000
TEMPORARY SIGNALIZATION (LS)			1	50,000	50,000
TRAFFIC SUBTOTAL					127,000
ENVIRONMENTAL COMPLIANCE					
DESCRIPTION	BASIS FOR ESTIMATE			COST	
	UNITS		# OF UNITS	UNIT COST	COST
RSA/WSA EQUIPMENT OPERATOR	HR		120	80	9,600
DISPOSAL OF CONTROLLED MATERIALS	TON		200	70	14,000
CONTROLLED MATERIALS HANDLING	CY		100	25	2,500
ENVIRONMENTAL COMPLIANCE SUBTOTAL					26,100

memorandum

date: January 10, 2014

to:

Mr. James H. Norman
Engineering Administrator

from:

Thomas A. Harley, P.E.
Chief Engineer
Bureau of Engineering and Construction

Following a review of incidental costs and final construction costs for various sizes and types of projects, it has been determined that the initial estimated amount for construction incidentals should be based upon a percentage of the estimated construction cost (contract items). The incidental percentages to be applied for the respective categories of projects shall be as follows:

Project Size/Type	Incidental Percentage
Less than \$1 Million	40%
\$1 Million to \$5 Million	25%
\$5 Million to \$20 Million	20%
\$20 Million to \$50 Million	15%
> \$50 Million	10%
Resurfacing, Safety Improvements	30%
Traffic, Incident Management	30%

The incidental percentages shown above should be used for budgeting purposes, as well as all PS&E's and project initiation documents. The Construction Districts will continue to prepare the incidental budget for the units involved in construction support. The incidental establishment memo will be produced after the low bid and consultant fees, if any, are known and will be incorporated into the project budget with the first Project Modification. The contingency amount for construction contracts should be uniformly set at 10 percent (10%) of the contract cost (contract items) at PS&E. Estimating guidance for contingencies during the planning and design phases is unaffected.

cc: Amy Jackson-Grove (FHWA)

Wally Lugli – Christian Davis – Carl Belina – Office of Financial Services

Thomas A. Harley

Scott Hill

Tim Wilson

James Fallon

Lewis S. Cannon – James P. Connery – Liaisons

Ravi V. Chandran – Dean P. Cerasoli – Lynn Cichowski – Frank Kaminski

Carl E. Nelson – Robert Obey – James Paul

Mark D. Rolfe – Domenic LaRosa – Brian Mercure – Rob Wiecki

Kenneth E. Fagnoli – John Dunham – John Lee

Robert Lauzon

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
OFFICE OF CONSTRUCTION

memorandum

subject: Calculations for Incidental Costs
Associated with Municipal Systems Projects

date: August 14, 2009

to: DISTRIBUTION

from: Thomas A. Harley, P.E.
Chief Engineer
Bureau of Engineering and Construction

Below is a proposed change to the calculations for Incidental Costs associated with Municipal Systems Projects. This revision is in response to clarification prompted by a memorandum from Mr. Mark Rolfe to Mr. James Norman regarding Incidental Costs on Department Projects.

After considerable review of historical data and in discussions with Office of Engineering staff and District Municipal Teams, it was determined to revisit the method of calculation for the initial Incidental Costs establishment.

Please see below:

Project Type	MSAT	Lab	Town/City	Total	Contingency
Less than \$1 Million	7%	3%	15%	25% + \$7,000+/- [^] for auditor reviews	10%
\$1 Million to \$5 Million	5%	2%*	14%	21%* + \$7,000+/- [^] for auditor reviews	10%
\$5 Million to \$10 Million	5%	2%*	8%	15%* + \$7,000+/- [^] for auditor reviews	10%
\$10 Million to \$20 Million	5%	2%*	5%	12%* + \$7,000+/- [^] for auditor reviews	7%
> \$20 Million	Projects meeting this type will be reviewed with the District and Municipality on a case by case basis.				

*Bridge projects will increase to 3% for Lab Incidentals.

[^] External Audits: \$2,500 for State/Town Agreements, \$3,000 for Town/CE Agreements, \$1,500 for Office of Quality Assurance Audit

All projects advertised after August 31, 2009 will follow this new format.

Mary K. Baier/mkb/kab

cc: Comr. Marie – Dep. Comr. Martin – Dep. Comr. Parker

James H. Norman, Acting Engineering Administrator

~~Lewis S. Cannon – Liaisons~~

David C. Lavado – James E. Hamilton

Carl E. Nelson – ADE

Mark D. Rolfe – Jo Ann Devine

Daniel P. Foley – Kenneth E. Fagnoli

Ravi V. Chandran

Connecticut DOT
2017 Cost Estimating Guidelines
Attachment 4 - General Price Ranges of Common Items

Item No.	Item Description	Units	Unit Price Range	
0101117	CONTROLLED MATERIALS HANDLING	c.y.	8.00	50.00
0202000	EARTH EXCAVATION	c.y.	13.00	48.00
0202100	ROCK EXCAVATION	c.y.	50.00	160.00
0202315	DISPOSAL OF CONTROLLED MATERIALS	ton	50.00	90.00
0202502	REMOVAL OF CONCRETE PAVEMENT	s.y.	6.00	20.00
0202529	CUT BITUMINOUS CONCRETE PAVEMENT	l.f.	2.00	10.00
0203000	STRUCTURE EXCAVATION - EARTH (COMPLETE)	c.y.	30.00	90.00
0203100	STRUCTURE EXCAVATION - ROCK (COMPLETE)	c.y.	75.00	200.00
0204001	COFFERDAM AND DEWATERING	l.f.	145.00	460.00
0205003	TRENCH EXCAVATION 0'-10' DEEP	c.y.	15.00	40.00
0207000	BORROW	c.y.	13.00	42.00
0209001	FORMATION OF SUBGRADE	s.y.	1.50	5.00
0210100	ANTI-TRACKING PAD	s.y.	20.00	30.00
0212000	SUBBASE	c.y.	25.00	60.00
0213100	GRANULAR FILL	c.y.	40.00	90.00
0216000	PERVIOUS STRUCTURE BACKFILL	c.y.	50.00	80.00
0219001	SEDIMENTATION CONTROL SYSTEM	l.f.	4.00	12.00
0304002	PROCESSED AGGREGATE BASE	c.y.	35.00	80.00
0406157	PMA S0.35	ton	100.00	150.00
0406159	PMA S0.5	ton	90.00	150.00
0406170	HMA S1	ton	90.00	140.00
0406171	HMA S0.5	ton	95.00	110.00
0406172	HMA S0.375	ton	100.00	200.00
0406173	HMA S0.25	ton	140.00	240.00
0406236	MATERIAL FOR TACK COAT	gal.	5.00	15.00
0406267	MILLING OF HMA (0" TO 4")	s.y.	4.00	18.00
0406275	FINE MILLING OF BIT. CONCRETE (0" - 4")	s.y.	2.50	15.00
0507001	TYPE "C" CATCH BASIN	ea.	2,700.00	4,300.00
0507771	RESET CATCH BASIN	ea.	700.00	1500.00
0520036	ASPHALTIC PLUG EXPANSION JOINT SYSTEM	c.f.	250.00	350.00
0601000	CLASS "A" CONCRETE	c.y.	650.00	1,200.00
0601201	CLASS "F" CONCRETE	c.y.	500.00	2,500.00
0601318	PARTIAL DEPTH PATCH	c.f.	160.00	280.00
0602000	DEFORMED STEEL BARS	lb.	1.20	2.50
0602006	DEFORMED STEEL BARS - EPOXY COATED	lb.	1.50	3.20
0651001	BEDDING MATERIAL	c.y.	40.00	80.00
0651012	15" R.C. PIPE	l.f.	45.00	90.00
0651013	18" R.C. PIPE	l.f.	60.00	100.00
0651015	24" R.C. PIPE	l.f.	60.00	120.00
0651017	30" R.C. PIPE	l.f.	90.00	180.00
0703012	MODIFIED RIPRAP	c.y.	65.00	85.00
0707009	MEMBRANE WATERPROOFING (COLD LIQUID ELASTOMER)	s.y.	60.00	90.00
0714050	TEMPORARY EARTH RETAINING SYSTEM	s.f.	20.00	60.00

Connecticut DOT
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Attachment 4 - General Price Ranges of Common Items

Item No.	Item Description	Units	Unit Price Range	
0751711	6" UNDERDRAIN	l.f.	22.00	38.00
0751821	6" STRUCTURE UNDERDRAIN	l.f.	19.00	35.00
0811001	CONCRETE CURBING	l.f.	25.00	45.00
0813031	6" GRANITE STONE CURBING	l.f.	65.00	110.00
0815001	BITUMINOUS CONCRETE LIP CURBING	l.f.	5.00	20.00
0822001	TEMPORARY PRECAST CONCRETE BARRIER CURB	l.f.	25.00	50.00
0822002	RELOCATED TEMPORARY PRECAST CONCRETE BARRIER	l.f.	5.00	15.00
0910170	METAL BEAM RAIL (TYPE R-B 350)	l.f.	20.00	35.00
0910173	R-B 350 BRIDGE ATTACHMENT - VERTICAL SHAPE	ea.	2,300.00	3,400.00
0910174	R-B 350 BRIDGE ATTACHMENT - JERSEY SHAPE	ea.	2,600.00	3,600.00
0911924	R-B END ANCHORAGE-TYPE II	ea.	1,300.00	1,600.00
0912503	REMOVE METAL BEAM RAIL	l.f.	6.00	10.00
0921001	CONCRETE SIDEWALK	s.f.	10.00	23.00
0921005	CONCRETE SIDEWALK RAMP	s.f.	15.00	30.00
0921039	DETECTABLE WARNING STRIP	ea.	150.00	280.00
0922501	BITUMINOUS CONCRETE DRIVEWAY	s.y.	37.00	71.00
0925201	PAVEMENT FOR RAILING	s.y.	30.00	60.00
0939001	SWEEPING FOR DUST CONTROL	hr.	40.00	110.00
0944000	FURNISHING AND PLACING TOPSOIL	s.y.	7.00	18.00
0949000	WOOD CHIP MULCH	s.y.	7.00	13.00
0950005	TURF ESTABLISHMENT	s.y.	1.20	4.00
0969060	CONSTRUCTION FIELD OFFICE, SMALL	month	2,300.00	4,400.00
0969062	CONSTRUCTION FIELD OFFICE, MEDIUM	month	2,800.00	4,400.00
0970007	TRAFFICPERSON (UNIFORMED FLAGGER)	hr.	31.00	55.00
0974001	REMOVAL OF EXISTING MASONRY	c.y.	120.00	500.00
0976002	BARRICADE WARNING LIGHTS – HIGH INTENSITY	day	0.85	1.10
0978002	TRAFFIC DRUM	ea.	50.00	80.00
0981100	42" TRAFFIC CONE	ea.	25.00	40.00
1001001	TRENCHING AND BACKFILLING	l.f.	20.00	60.00
1008115	2" RIGID METAL CONDUIT IN TRENCH	l.f.	10.00	18.00
1111451	LOOP DETECTOR SAW CUT	l.f.	12.00	21.00
1130000	HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARR	day	15.00	40.00
1131002	REMOTE CONTROL CHANGEABLE MESSAGE SIGN	day	40.00	90.00
1208932	SIGN FACE – SHEET ALUMINUM (TYPE IV RETRO SHEETING)	s.f.	30.00	50.00
12091X4	HOT APPLIED PAINTED PAVEMENT MARKINGS 4" (Y OR W)	l.f.	0.15	0.20
1210101/2	4" WHITE/YELLOW EPXOY RESIN PAVEMENT MARKINGS	l.f.	0.28	0.40
1210105	EPXOY RESIN PAVEMENT MARKINGS, SYMBOLS	s.f.	3.00	4.25
1211001	REMOVAL OF PAVEMENT MARKINGS	s.f.	0.60	1.00
1220027	CONSTRUCTION SIGNS	s.f.	15.00	25.00
180701X	TEMPORARY IMPACT ATTENUATION SYS MODULE XXXX LB	ea.	350.00	500.00