

How to Estimate the Cost of a Parking Lot at the Conceptual Level

Table of Contents

Section 1 - Introduction	page 3
Section 2 - Types of Methods of Measurements	page 5
Section 3 - Specific Factors to Consider in Take-off and Pricing	page 6
3.1 - Site Visit	page 6
3.2 - Assumptions	page 7
3.3 - Existing Site Conditions	page 9
3.4 - Site Considerations	page 12
Section 4 - Overview of Labor, Material, Equipment, Indirect Costs and Approach to Markups	page 14
Section 5 - Special Risk Considerations	page 17
Section 6 - Ratios and Analysis – Testing the Bid	page 17
Section 7 - Miscellaneous Pertinent Information	page 18
Section 8 - Sample Plan	page 20
Section 9 - Results from Site Visit	page 21
Section 10 - Sample take-off and pricing sheets	page 22
10.1 - Quantity Take-Offs from Owner/Designer Supplied Plans and Information	page 22
10.2 - Quantity Take-Offs from Estimator Knowledge of Construction Process	page 22
10.3 - Cost Estimate	page 24
Section 11 - Copy of Topic Approval Letter from ASPE Certification Board	page 27
Section 12 - Terminology – Glossary	page 28

Section 1 - Introduction

The professional estimator will be expected to provide conceptual estimates of construction costs before the detail plans and specifications are prepared. These conceptual estimates are used by the owner of a property or asset to determine if the project costs are within their budget prior to commencing with full design, as well as to explore the cost of alternate designs and concepts. In order to obtain a general knowledge of how to prepare a conceptual estimate this technical paper will address the process while estimating the cost of a proposed parking lot with limited information provided by the owner and designer.

The intent of this technical paper is to discuss the process of preparing and writing a conceptual estimate. There are several different conditions and scopes of work that combine to create a conceptual estimate. This paper will address the subject matter with an overview perspective as there is not enough space in this paper to fully address how to estimate and price every scope and area of work that is required in a full conceptual estimate. It is assumed that the reader possesses the skills and knowledge to perform take offs and create pricing for the work at hand.

Major CSI (Construction Specifications Institute 2004 Master Format) Division

Division 31 00 00 – Earthwork

Division 32 00 00 – Exterior Improvements

Major and Minor CSI (Construction Specifications Institute 2004 Master Format) Subdivisions

Major Subdivision 31 11 00 – Clearing and Grubbing

Major Subdivision 31 14 00 – Earth Stripping and Stockpiling

Major Subdivision 31 22 00 – Grading

Major Subdivision 31 23 00 – Excavation & Fill

Minor Subdivision 32 11 23 – Aggregate Base Courses

Minor Subdivision 32 12 16 – Asphalt Paving

Major Subdivision 32 16 00 – Curbs and Gutters

Minor Subdivision 32 17 23 – Pavement Markings

Major Subdivision 32 90 00 - Planting

Brief Description

As will be noted in Section 8 – “Sample Plan” the owner’s designer has provided a one page hand drawn document showing the conceptual design of a new parking lot addition. As part of the conceptual design the owner’s designer also provided some information helpful in determining the anticipated specifications of the final parking lot design. The information provided at the conceptual phase is usually very limited. For this project the designer has provided the following specifications:

- Construct a 24 Stall Parking Lot next to an existing street in a vacant lot
- Pavement Thickness is 2.5” Class B Asphalt over 4” of 1-1/2” minus Crushed Rock Base
- Install 18” Vertical Curbs
- This parking lot is an expansion or additional parking being added to an existing facility.
- No handicap access will be required as it is already provided for in the existing parking lot.
- No Parking Lot lighting is required.
- Hand Drawn to scale drawing, see “Section 8 Sample Plan”.

It is the estimator’s responsibility to incorporate this information into a completed conceptual estimate that will closely reflect the actual cost of construction once the parking lot design is complete.

The designer has provided drawings that could be interpreted as a fifteen percent design development drawing. This level of design is used to give the owner of the project an idea of what the project will include. The estimator’s responsibility is to provide the probable cost from these drawings for the owner’s review and acceptance. This level of estimate preparation is also known as ASPE’s “Schematic/Conceptual Design or Level Two Estimate”.

All project types differ somewhat in how the construction project is specified and constructed throughout the continental United States of America. These differences can be attributed to building codes, regional preferences, material availability, and site conditions. One example of regional preferences can be found in what type of material is used for parking lot surfaces. Asphalt is a very common surfacing material; however, in some regional areas the preference is concrete. In Section 3 “Specific Factors to Consider in Take-off and Pricing” a discussion on site conditions can be found.

Building codes also have regional preferences. Federal law requires handicap access and parking, but it is up to the local governmental agencies as to how this is to be implemented. Parking lots for example are required to have a specific amount of parking spaces per code determined by the size and occupancy of the building. These amounts can be increased per local code. For the purposes of this discussion on conceptual estimating an expansion parking lot was chosen that does not need to include any handicap parking spaces, because the requirement has been met in the main parking lot, which simplifies the process of this discussion. There could be other requirements required in some regions of the country which also are not discussed and included in this paper.

Section 2 - Types of Methods of Measurements

Conceptual plans are provided to the estimator in varying levels of documentation completion. The drawings can range from hand drawn sketches with some measurements for distance to properly scaled computer generated drawings. Most conceptual drawings will be somewhere in between these two extremes. For the purpose of this technical paper the conceptual drawing is drawn by hand to scale with some measurements of distance.

The estimator must carefully check the drawing’s scale and verify actual distances to ascertain the accuracy of the drawings prior to any quantity takeoffs. Three different types of measuring devices could be used: hand scaling, computer aided digitizer or computer on screen takeoff. The latter two

methods are very helpful if the designer provided drawings are not drawn to scale. Either of these computer aided take off systems will solve the problem of listed measurements not matching a hand held scale.

Due to printing or copying methods the drawing received by the estimator sometimes does not scale correctly (or match a hand held scale). If the takeoff is done by hand and the scale does not match the estimator must mathematically correct the measurement for each item. This can be avoided by using computer aided takeoff systems. Computer aided takeoff systems will automatically do the measurement and computations for each measurement decreasing the chance of a miscalculated adjustment to a measurement. Most takeoff systems will require the estimator to tell the system what is the correct measurement for the drawing at the start of the takeoff process. Use of these take-off systems will increase the accuracy of the estimate.

Section 3 - Specific Factors to Consider in Take-off and Pricing

3.1 - Site Visit

In order for the estimator to understand and ascertain the full scope of constructing a parking lot at this location a site visit must be undertaken. As shown in “Section 9 - Site Visit,” considerable items of work were found that will impact the completed design and thus the cost. Some of these items are:

- The existing street curb and gutter has no existing curb cut for access into the new parking lot. The curb and gutter will need to be demolished and new curb approach constructed.
- The existing lot is grass covered with no trees to remove, resulting in light clearing.
- There are no visible conflicts of utilities running across or through the site, resulting in no anticipated extra costs for utility relocations.

- The existing soils condition appears to be adequate for support of the parking lot. There is no standing water or wetland vegetation that would warrant concerns regarding inadequate soil conditions.

If a site visit cannot be conducted the estimator must obtain the needed information from the designer and owner through conversation and/or written questions. Asking pointed questions to the designer and owner about the site will help them to explain the site and the proposed design in more detail. Ask questions in regards to the site conditions such as;

- Are there any large trees on the site?
- Ask if any pictures of the site have been taken and if a copy can be sent. Also use internet mapping services to view the site in satellite and or street mode.
- During construction of the neighboring building and parking lot were there any problems with the existing soil's geology that required; special treatments, removal and replacement, or blasting?

It is recommended that conceptual estimates of more complicated or larger projects receive both a site visit and a conversation with the designer. Do not hesitate to ask the owner and designer any specific questions that may affect the cost of the project.

3.2 - Assumptions

The estimator must make assumptions of the design in order to complete a conceptual estimate of the parking lot. One such assumption is storm drainage; the drawing does not address any storm drainage. Thus the estimator must anticipate some storm drainage and will need to design a simple system so that a cost can be applied. This technical paper anticipates that a storm catch basin will be designed in the southwest corner of the parking lot and tied into the existing catch basin found in the street.

During the site visit it was noted that the existing curb and gutter had a vertical rise and did not provide access onto the property. The conceptual drawing does not address this existing condition. The estimator should assume the need that this existing curb will need to be demolished and replaced with a new curb approach. The estimator's knowledge of construction methods and processes becomes an important part of a conceptual estimate as this knowledge must be used to accomplish a new curb installation. Demolition of the curb must also include demolition of the asphalt in front of the curb and the saw cutting of the asphalt and curb. Along with the new curb approach the street asphalt and base gravel must be replaced. In order to install the new base gravel the street sub grade must be excavated and prepared for installation of the new pavement and gravel section. All of the required steps of construction must be addressed in the conceptual estimate even if not shown on the drawings.

Conceptual drawings seldom include all of the scopes of design that will be included in the final drawings. "Section 10 – Sample Take-Offs and Pricing Sheets" is split into two separate areas of takeoff; quantities taken off from the owner/designer supplied plans, and information and quantities taken off from the estimator's knowledge of the construction process. The entire scope of work for a parking lot final design is not provided by the designer at the conceptual level and is always more than what is provided in the drawings and specifications. On this parking lot the list of items needed for this work not provided by the designer which the estimator will be making assumptions on is as follows;

- Area of Disturbance
- Silt Fence / Erosion Control
- Dust Control
- Traffic Control
- Grade Surveying
- Topsoil/Grass Stripping
- Haul & Dispose Topsoil/Grass

- Demo Existing Street Curb
- Demo Existing Street Asphalt
- Saw Cut Asphalt and Curb for Demo
- Excavate for Asphalt and Gravel Placement
- Haul & Dispose Excess Soil created during the Excavate for Asphalt and Gravel Placement process above
- Excavate and Backfill for Vertical Curbs
- New Type 1 Catch Basin and Cover
- New 12" Storm Pipe
- Connect to Existing Storm Structure
- Excavate for Street Asphalt Repair including Gravel Placement
- Haul & Dispose Excess Soil crated during the Excavate for Street Asphalt Repair including Gravel Placement process above
- 1-1/2" Minus Crushed Rock Base under Street Asphalt Repair
- Repair Street Asphalt
- Landscape

Conceptual estimates must consider and take into account the size of the project. Is it large yet easy to construct, or is it small and difficult to construct? A large project will have a total cost per square foot price lower than the square footage price of a small project due to the economy of size. However a large difficult project could cost more per square foot than a small project due to site, weather and location conditions.

3.3 - Existing Site Conditions

The estimate must consider the cost of location and season of work. This parking lot will be constructed atop of existing soils. An estimator should ask themselves whether or not these soils are sensitive to rain or freezing and as such cannot be worked on during the winter months? The estimator must know

what the anticipated schedule of construction is from the owner and price the work contingent upon working during dry months or add extra costs to pay for performing the work in the winter. The condition of the existing site will affect the cost of the project.

As in all site related construction the existing soils conditions can become the largest cost of a project if any adverse conditions exist, such as:

- The existing soils consist of expansive clays; these clay soils may need to be removed and replaced with non-expansive soils or gravel materials on average of two to three feet thick in some regions of the country.
- The existing soils are compressible and will not supply a stable sub surface for the parking lot. There are numerous methods of dealing with this soil condition depending on the type of soil and regional means and methods, some of these are:
 - Removal and Replacement of the compressible soil.
 - In-place compaction of the soils using standard compaction methods.
 - In-place compaction of the soils using dynamic soil compaction methods.
- The existing soils are shallow and cover rock that must be removed for placement of the asphalt and gravel layers. The hardness of the rock becomes critical; can it be removed with the use of machinery, or does it need to be blasted prior to removal.
- The existing soils are moisture sensitive and the schedule requires the earthwork to be conducted during the rainy season. There are a ways to deal with this situation, some of these are:
 - Removal and Replacement of the moisture sensitive soils.
 - Treatment of the existing soils by mixing in, Cement, Lime, Kiln Dust or combinations of these or others per the recommendations of the Geotechnical Engineer.

This list of potential soil conditions is not a complete list; it is intended to state the most common types of existing soils problems that could be an existing condition that will affect the cost of construction. If the estimator is not familiar with the soils in the location of a project questions need to be asked to the owner and designer regarding the existing soils. If the owner and designer cannot answer this question further investigation by the estimator may be warranted by contacting local Geotechnical Engineers, Contractors, or Gravel Suppliers.

There is also the condition of the load bearing capacity of the existing soils. The parking lot being discussed in this paper has a light duty pavement because there is no anticipated heavy traffic loads passing through or on this parking lot. If there are anticipated heavy loads such as for delivery trucks it may be required to have thicker sections of gravel base and asphalt if the existing soils cannot provide enough load bearing capacity. Some parking lots are designed with a combination of heavy paving sections in the drive lanes and light pavement sections in the parking stalls. This condition can be regional or site specific, and maybe another question that needs to be asked of the designers.

When performing earthwork the need for erosion and dust control will arise. Erosion and dust control will be a requirement of the construction permit whether the work is performed in dry or wet weather. The most common type of erosion control is the silt fence and catch basin protection. Water spraying is very common for dust control. There are other products and methods for both depending on soil types and anticipated regional rainfall. The following is a partial list of products/materials used for these purposes;

- Double Silt Fence
- Straw / Mulch; Hand Spread or Machine Blown
- Grass Seed; Hand Spread or Machine Blown
- Core Logs

- Straw Bales
- Jute Mesh, or other Geo Fabrics
- Soil Tackifiers / Stabilizers

3.4 - Site Considerations

There are other potential site specific conditions which could affect the cost of the project that must be considered by the estimator. Some of these potential conditions are but are not limited to;

- Labor shortages can be caused by many different situations of which some could be; the remoteness of the site, labor strikes, or other large higher paying projects drawing the skilled labor away from the construction industry. Labor shortages could affect the length of time needed to complete the project, or could cause the cost of labor to increase. These are extra costs that will need to be included in the estimate.
- Material shortages have many causes and will affect the cost of construction. Shortages can be caused by natural disasters, labor shortages, and economy fluctuations just to name a few. Anticipated material shortages that could affect the cost of construction need to be included in the estimate. This type of anticipated cost should be shown as a separate line item in the estimate.
- Long lead time of material acquisition could occur on many different types of material that will need to be incorporated into the site. For example in a parking lot the storm system may require a special water treatment device or filter that may not be readily available locally. When this is known the estimate should reflect the anticipated extra costs of project delay or early ordering of the item.
- Confined or congested areas of work can occur for many reasons such as working inside of a large metropolitan area where space is limited to the project area only. Or areas inside of an

industrial area where other work is being performed by others at the same time. Confined or congested areas many times go in conjunction with limited laydown areas which limits delivery times. When these situations exist carefully analyzing the impacts to the cost is recommended.

- Limited laydown areas at the site: some sites are large with plenty of space to store construction material on site prior to incorporation into the project. The parking lot in this example has limited space as the project is using most of the site. This parking lot does have limited space but due to its scope of work and progress flow it will not cause any cost impacts that will need to be accounted for in the estimate.
- Limited times of material deliveries could impact this project if conditions or permitted approvals prohibited the delivery of concrete, gravel, asphalt, or other materials to the job site. If this is a known factor the estimate cost should reflect this expense.
- Limited hours of work; many municipalities limit the daily start and stop times of construction projects. Most of the time this is not a cost issue. However, sometimes the work day is shortened to less than 8 hours due to site congestion, this will lengthen the amount of time to complete the project which will increase overhead head costs and decrease daily productivity.
- Limited days of work could occur for many reasons that could stop the progress of work on the site, such as; holidays, parades, festivals or school conflicts. If these are known and could cause a cost impact of increased overhead or decreased productivity the costs need to be captured in the estimate.
- Traffic Control could be as simple as a temporary one lane closure with flaggers or a complicated re-routing of traffic onto other roads. If the site is at or near an intersection controlled by a traffic light off duty Police Officers may be required as traffic control.

- Pedestrian Control could be an issue depending on the amount of pedestrian traffic that will exist during construction. This could be due to the location being in a metropolitan area, or close to shopping or schools.
- Soil Treatments could include treating for moisture sensitivity but there could also be a requirement to treat the subgrade under the asphalt with a soil sterilizer to prevent plant growth under the pavement.
- Site is sloped, not flat. This will require either soil to be removed from the site if a portion of the site is above grade, or soil to be imported and placed on the site if a portion of the site is below grade. During the take-off phase of earthwork grading a determination should be made in the estimate if the site is in need of more or less soil to obtain the required finished grades.
- Retaining walls could be needed if there is not adequate space on the property to slope up from a lowered grade or down from a raised grade.

In “Section 10 – Sample Take-Offs and Pricing Sheets” the reader should review the processes taken to obtain the non-shown quantity take-offs of the portions of the project not shown on the conceptual drawing. For example the estimator made the assumption that the disturbed area of the site would be the entire parking lot area plus five feet on each side equaling 9,030 square feet. From this quantity the estimator determined the amount of topsoil stripping and grading. From this same quantity the estimator subtracted the pavement area and obtained the square footage of the landscape area. The mathematical process to obtain these aforementioned quantities will be found in “Section 10 – Sample Take-Offs and Pricing Sheets”.

Section 4 - Overview of Labor, Material, Equipment, Indirect Costs and Approach to Markups

Conceptual Estimates normally do not contain a full break down of labor, materials and equipment in the pricing section. The estimator should show the major items of scope with compiled unit prices to

the owner as the basis of the conceptual estimate. This is the proof to the owner and designer that the estimator has provided a thoroughly thought out conceptual estimate.

The estimator's professional knowledge, experience and research are essential to applying contractor and owner markups at the conceptual level. The contractor's usual markups should be shown after the subtotal of the project's hard costs. The markups for the contractor should be accumulative, meaning each new percentage is added to the total plus the last percentage.

At the conceptual level there are many unknown impacts that could affect the overall cost of the project. Thus percentages are used to show the owner that there are still unknown costs. These unknown costs fit within two main categories; Design Contingency and Owner's Construction/Change Order Contingency. Design Contingency is used to cover items of scope that are not anticipated by the estimator or the designer. As an example the estimator included in the conceptual estimate a simple storm system of one catch basin plus piping. However, during the design process it is determined by the designer that a larger storm system is needed than what the estimator assumed. The design contingency will cover this added cost. Design Contingency is only used for conceptual estimates, if design development estimates are requested the design contingency would be lowered at each design development phase and then disappears at the final or bid estimate.

The Owners Construction/Change Order Contingency is for design changes or changed conditions after the parking lot construction begins. As with the owner construction/change order contingency the owners design cost and fees can be added to the estimate or excluded from the estimate. These design costs and fees are paid by the owner to the designer and others, thus are not a part of the contractor's costs of construction. The items included in the "design costs and fees" are typically the architectural and engineering costs plus other fees paid by the owner such as testing, street use fees, connection

fees, permits, etc. For that reason it is optional to include the owners design costs and fees in the estimate. Owner's markups are typically not cumulative.

Owners design costs and fees are typically priced as a percentage of the cost because of its unknown cost at the conceptual level two estimate. These costs and fees can be broken out further by the estimator contingent upon the owner's wishes and standard practices in the region the estimate is being written. One such example would be to break design costs and fees into separate categories such as; Design Costs, Testing Fees, Street Use Fees, Utility Fees and Permit Fees. Street Use, Utility and Permit Fees are difficult to determine during a "Schematic/Conceptual Design or Level Two Estimate".

Additionally many municipalities will not provide all of the fee information until after plan review for permitting has been completed. The owner or designer may also provide the amount that they wish to have included in this same category of "Owners Design Costs and Fees".

As discussed above there are costs that the owner may or may not want to have listed on the estimate. Depending upon regional preferences and agreements these costs would be listed after the total contractor bid amount, some of these are:

- Owner Construction/Change Order Contingency
- Owner Design Costs and Fees
 - Design Fee
 - Testing Fees
 - Street Use Fees
 - Utility Fees
 - Permit Fees
- Owner Construction and Project Management Cost
- Mitigation Costs

- Property/Right-Away Costs

Section 5 - Special Risk Considerations

If there are some unique risks that are considered in the conceptual estimate a well written narrative would help identify how these items are addressed in the estimate. Conceptual estimates are often provided a year or more before a project is constructed. During this time inflation can occur, also known as escalation. The owner should be told what the ramifications to the overall cost of the project will be if it is constructed one year or more later than the conceptual estimate is written. An Escalation line item can be added to the estimate if the estimator or owner deems it necessary.

Another risk to the accuracy of the estimate is in design changes. The estimator must keep good documentation during the estimating process so that a thorough comparison of the provided conceptual documentation and estimator assumptions can be compared to the final drawings. Design changes such as increasing the parking lot size will cause the conceptual estimate to appear underpriced. The design contingency may cover this expense and may not if the change is significant. The estimator must be able to explain to the owner if there is a price discrepancy or increase due to design changes or additions.

Section 6 - Ratios and Analysis – Testing the Bid

Analyzing a conceptual estimate at the early stages of design as this paper has been discussing can be difficult. There are published price books available that show the average cost of parking lots and other types of projects by the square foot or other means of measurement. These can be helpful in determining if the estimate is within the proper price range.

Some projects are not easily checked against the published cost books. Sometimes this is due to; differing conditions, weather, size of project, difficulty, or uniqueness of the project. In these instances cost books can be used to check portions of the project.

Obtaining conceptual or non-binding quotes from suppliers is a good method of insuring that the final price of the estimate is accurate. By obtaining quotes for the major or most expensive portions of the work the estimator and owners confidence in the major cost portions of the estimate increases.

Specialty contractors can also be contacted to assist in the compilation of costs for special or difficult scopes of work. Such as if dynamic compaction or blasting is required. This provides another level of confidence in the estimate.

The estimate should be reviewed by the estimator for accuracy in pricing, spelling and format. Most importantly the estimator must check the math formulas used to compile the take-offs and the pricing. It is always recommended to have the estimate reviewed by a peer prior to finalizing the estimate. All of these processes of analyzing the estimate will provide the estimator with a good test of the conceptual estimate.

Section 7 - Miscellaneous Pertinent Information

It should be the goal of the estimator to have the total price of the conceptual estimate about three percent higher than the contractor's bid. The result of reaching this means that the owner was able to use the estimators conceptual cost to budget the project successfully within the owners price range. It could be unfortunate to the owner to have the bid price exceed the conceptual price. It could mean that the owner would not be able to construct the project.

Conceptual estimates are used by Architects, Engineers and many Government Agencies during the design stages. If the conceptual estimate is too high in cost it could cause the designers to needlessly

down grade the design to stay within an inaccurate budget. Another effect of an overpriced conceptual estimate is that it could cause the project owner to cancel the project all together.

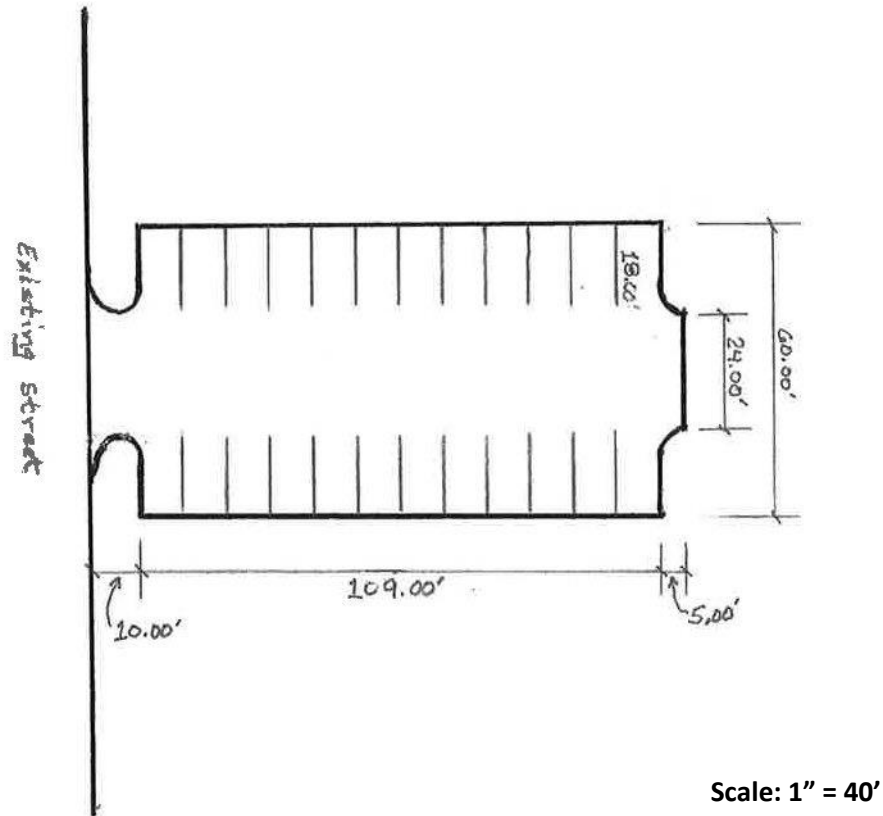
If the conceptual estimate is underpriced it could cause the opposite effect of allowing the design to increase beyond the budget. Then once the project goes to bid and the bid price exceeds the conceptual estimate the project could be canceled or the designers maybe required to re-design the project within budget at their own expense.

An estimator conducting conceptual estimates must accomplish three goals with each estimate:

- The owner must be satisfied with the estimate and how it is presented.
- The estimate must reflect all information provided by the owner and the designer. And all required scope of work to complete the project once it is completely designed.
- Third, the estimate must equal or be slightly higher in price than the bid from the contractor.

Keeping the third goal of being equal to or slightly higher in price during the estimate preparation will help the estimator from becoming too aggressive or overly conservative in the pricing. If any of these goals are not met the estimate may not be a true probable cost of construction.

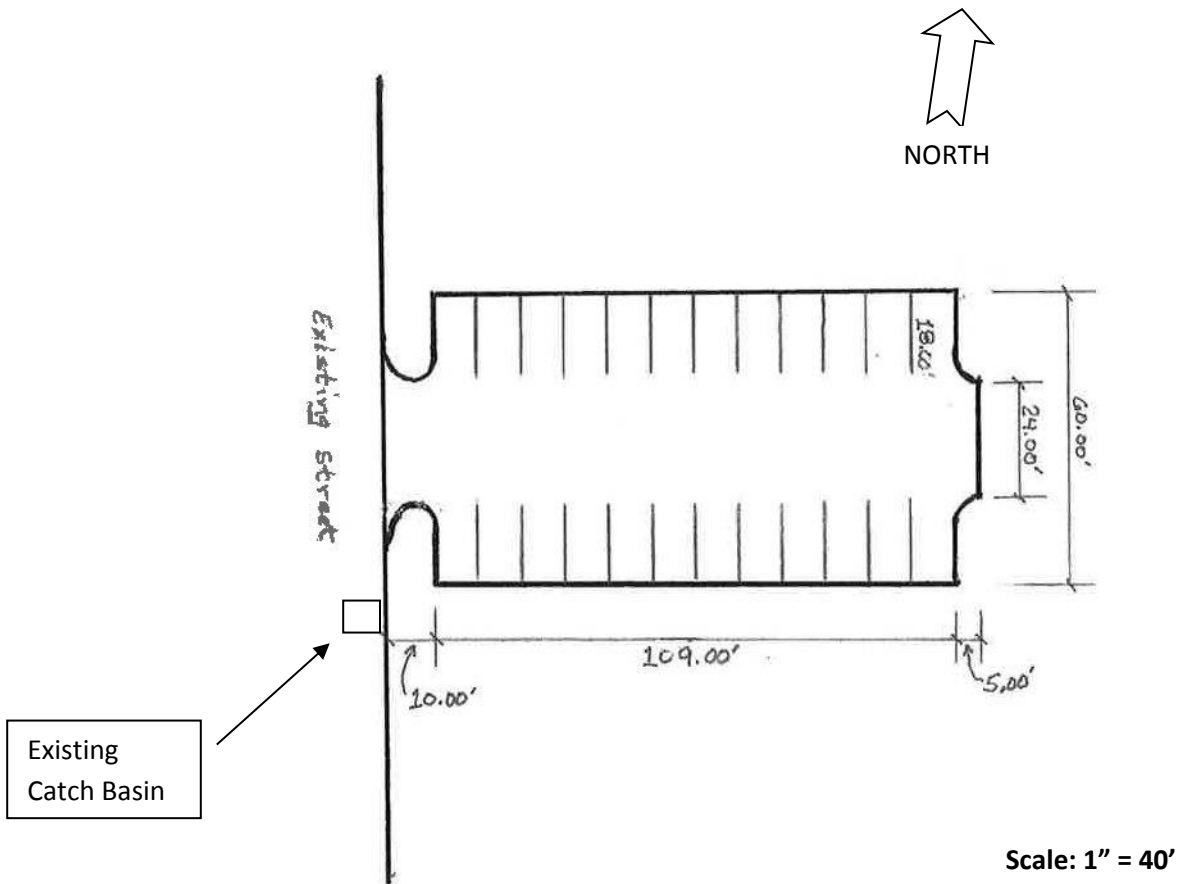
Section 8 - Sample Plan



Owner/Designer Provided Information:

- Construct a 24 Stall Parking Lot next to an existing street in a vacant lot
- Pavement Thickness is 2.5" Class B Asphalt over 4" of 1-1/2" minus Crushed Rock Base
- Install 18" Vertical Curbs
- This parking lot is an expansion or additional parking being added to an existing facility.
- No handicap access will be required as it is already provided for in the existing parking lot.
- No Parking Lot Lighting is required

Section 9 - Results from Site Visit



Estimator's Site Visit Results:

- Existing Street Curb and Gutter
- No Existing Curb Cut.
- Asphalt Street.
- No Existing Sidewalk.
- Vacant Lot;
 - Grass Covered.
 - No Trees.
 - No Visible Utility Conflicts.
 - Grade mostly flat – Slight Slope towards Street.
- Storm Drain in Street close to site on South West of New Parking Lot.
- No standing water or wetland vegetation present.
- Street Traffic is light; no Special Traffic Control measures will be needed.
- Noted Magnetic North.

Section 10 - Sample take-off and pricing sheets

10.1 - Quantity Take-Offs from Owner/Designer Supplied Plans and Information

Asphalt Pavement Area = 6,783 square feet

Measure the area of the onsite asphalt, per the drawing.

Asphalt Material = 108 tons

Area of Asphalt Pavement 6,783 times 0.208 (2.5 inches divided by 12 inches = 0.208 feet) divide by 27 to obtain in place cubic yards, multiply by 2.055 to obtain tonnage of asphalt. Round up to nearest whole number.

Note; rounding up to the nearest whole number is the preferred method for quantities. Rounding down would cause the finished quantity to be short, thus the estimate would be underpriced.

1-1/2" Minus Crushed Rock Base under Asphalt = 118 tons

Area of Asphalt Pavement 6,783 times (4 inches divided by 12 inches = 0.333 feet) divide by 27 to obtain in place cubic yards times 1.4 to obtain tonnage of gravel in place. Round up to nearest whole number.

Straight Vertical Curb = 287 lineal feet

Radius Vertical Curb = 53 lineal feet

Parking Lot Striping = 396 lineal feet

Parking Stall striping 18 lineal feet long times 22 each

10.2 - Quantity Take-Offs from Estimator Knowledge of Construction Process

Area of Disturbance = 9,030 square feet

Multiply the width of Site, 70 feet (Width of Parking Lot 60' plus 5' on each side) times the Length of Site, 129 feet (total length of Parking Lot 124' plus 5' on end). This will provide a buffer area in which to perform the construction of the parking lot.

Silt Fence / Erosion Control = 398 lineal feet

Perimeter of the area of disturbance, 70 feet times 2 sides plus 129 feet times 2 sides.

Dust Control = 8 days or 64 hours

Approximate days of earthwork on site; strip topsoil 1 day plus excavate 1 day plus fine grade site 2 days plus place gravel 1 day add 50 percent of total for unforeseen needs. Round up to nearest whole day.

Traffic Control / Flagger = 4 days or 32 hours

Approximate days of work in street; saw cut / demo / earthwork 1 day plus new curb prep and place 1 day plus fill and asphalt prep 1 day plus asphalt placement 1 day. Round up to nearest whole day.

Topsoil/Grass Stripping = 168 cubic yards

Area of Disturbance times 6 inches deep divided by 27 to obtain 167.23 in place cubic yards. Round up to nearest whole number.

Haul & Dispose Topsoil/Grass = 218 loose cubic yards

167.23 cubic yards of Stripped Topsoil/Grass times 1.3 to obtain loose cubic yards. Round up to nearest whole number.

Demo Existing Street Curb = 45 lineal feet

Demo Existing Street Asphalt = 135 square feet

Existing Street Curb Demo: 45 lineal feet times 2 feet wide of asphalt.

Saw Cut Asphalt and Curb for Demo = 51 lineal feet

Excavate for Asphalt and Gravel Placement = 136 cubic yards

Asphalt Pavement area of 6,783 square feet times 0.541 (2.5 inches of asphalt depth plus 4 inches of gravel base divide by 12 inches = 0.541 feet) divide by 27 to obtain the in place cubic yards of existing soil material to be removed. Round up to nearest whole number.

Haul & Dispose Excess Soil from "Excavate for Asphalt and Gravel Placement" = 177 loose cubic yards

135.91 cubic yards of Excavated Soils times 1.3 to obtain loose cubic yards. Round up to nearest whole number.

Excavate and Backfill for Vertical Curbs = 12 cubic yards

Total Length of Vertical Curbs, 340 lineal feet times 0.458 feet (5.5 inches divided by 12 inches = 0.458 feet) times 2 feet wide divide by 27 to obtain in place cubic yards of material to be excavated. This is the amount of soil required to be removed to reach sub grade for the 18 inch high Vertical Curb. Round up to nearest whole number.

New Type 1 Catch Basin and Cover = 1 each

New 12" Storm Pipe = 14 lineal feet

Connect to Existing Storm Structure = 1 each

Excavate for Street Asphalt Repair including Gravel Placement = 3 cubic yards

Asphalt Pavement area of 135 square feet times 0.541 (2.5 inches of asphalt depth plus 4 inches of gravel base divide by 12 inches = 0.541 feet) divide by 27 to obtain the in place cubic yards of existing soil material to be removed. Round up to nearest whole number.

Haul & Dispose Excess Soil from "Excavate for Street Asphalt Repair including Gravel Placement" = 4 loose cubic yards

2.705 cubic yards of Excavated Soils times 1.3 to obtain loose cubic yards. Round up to nearest whole number.

1-1/2" Minus Crushed Rock Base under Street Asphalt Repair = 2.5 tons

Area of Asphalt Pavement: 135 square feet times 0.333 (4 inches divided by 12 inches = 0.333 feet) divide by 27 to obtain in place cubic yards times 1.4 to obtain tonnage of gravel in place. Round to nearest half number.

Repair Street Asphalt = 2.5 tons

Area of Street Asphalt: 135 square feet times 0.208 (2.5 inches divided by 12 inches = 0.208 feet) divide by 27 to obtain in place cubic yards, multiply by 2.055 to obtain tonnage of asphalt. Round to nearest half number.

Area of Landscape = 2,247 square feet

Area of Disturbance: 9,030 square feet less the area of Asphalt, 6,783 square feet.

10.3 - Cost Estimate

Cost Item	Quantity	Unit of Measure	Unit Cost	Total Cost
Saw Cut Asphalt & Curb	51	lf	1.35	68.85
Demo Asphalt	135	sf	0.45	60.75
Demo Street Curb	45	lf	3.48	156.60
Strip Topsoil/Grass	168	cy	5.75	966.00
Silt Fence	398	lf	3.85	1,532.30
Catch Basin Protection	1	ea	150.00	150.00
Dust Control / Water Truck	64	hr	174.00	11,136.00

Traffic Control / Flagger	32	hr	56.00	1,792.00
Haul & Dispose Topsoil/Grass	218	lcy	10.80	2,354.40
Grade Surveying	24	hr	105.00	2,520.00
Haul & Dispose of Excavated Soil	177	lcy	10.80	1,911.60
Install Type 1 Catch Basin	1	ea	1,200.00	1,200.00
Install 12" Storm Pipe	14	lf	12.54	175.56
Connect to Existing Storm Structure	1	ea	1,600.00	1,600.00
Excavate Vertical Curbs, stockpile	12	cy	8.50	102.00
Fine Grade Curbs	340	lf	3.50	1,190.00
Install Vertical Curb, Straight	287	lf	7.34	2,106.58
Install Vertical Curb, Radius	53	lf	11.70	620.10
Backfill Vertical Curbs, from stockpile	12	cy	15.50	186.00
Fine Grade Asphalt Area	6,783	sf	0.17	1,153.11
Import/Place 1-1/2" Crushed Rock Base	118	ton	26.00	3,068.00
Install Asphalt Material	108	ton	67.92	7,335.36
Excavate for Street Asphalt & Gravel	3	cy	8.50	25.50
Haul & Dispose of Excavated Street Soil	4	lcy	10.80	43.20
Fine Grade Street Asphalt Repair	135	sf	0.51	68.85
Import/Place 1-1/2" CSBC Street Repair	2.5	ton	28.00	70.00
Install Asphalt Material Street Repair	2.5	ton	110.00	275.00
Parking Lot Striping	396	lf	0.23	91.08
Fine Grade Remaining Disturbed Area	2,247	sf	0.51	1,145.97
Landscape Remaining Disturbed Area	2,247	sf	2.50	5,617.50

Subtotal				48,722.31
General Conditions			10.0%	4,872.23
Mobilization / Demobilization			8.0%	3,897.78
Subtotal				57,492.33
Contractor Overhead			15.0%	8,623.85
Contractor Insurance			4.5%	2,975.23
Contractor Performance Bond			1.5%	1,036.37
Contractor Profit			8.0%	5,610.22
Design Contingency			20.0%	15,147.60
Total Contractor Bid Amount				90,885.59
Project Cost per Square Foot of parking lot		6,783	square foot	13.40
Owner Construction/Change Order Contingency*			15.0%	13,632.84
Owner Design Costs and Fees*			25.0%	22,721.40
Total Cost to Owner				127,253.23

* Owner's costs are optional; they may be included or excluded upon regional and owner preferences.

Section 11 - Topic Approval Letter



**American Society of
Professional Estimators**

CERTIFICATION

Mailing & Administrative Office:

2525 Perimeter Place Drive, Ste. 103 • Nashville, TN 37214 • 615-316-9200 • Fax 615-316-9800 •

Summary Certification Cycle/Topic Acceptance Form

August 15, 2012

Candidate Number: 0712003 Chapter Number: 45 Region: NW

Workshop Completed by: **September 30, 2012** Selected workshop format: **Online**

Technical Paper Topic: HTETCO a Parking Lot at the Conceptual Level

Technical Paper Due Date: **December 15, 2012.**

Late papers are subject to penalty of score as stated in the "Technical Paper" booklet.

Testing: **Schedule test dates during the month of March, 2013. If submitting Q&P in lieu of DST, The complete set of questions and problem will be due by March 31, 2013.**

Provide the Society Business Office with proctor information and schedule test dates 15 business days prior to testing.

Certification Discipline: 1.4 General Construction

Contact Email Address: ebenton@prodims.com

Online Workshop link: http://cei2.com/SCRIPT/805/scripts/serve_home

Online Workshop User ID: **CB25** Online Workshop Password: **812cp**

I agree to the selected topic and will prepare my technical paper according to the format stated for the ASPE Certification Program.

I will meet the deadlines for the completion of the workshop, submittal of my technical paper, and testing. If I do not meet these deadlines, I understand that this certification cycle will terminate and I will need to submit a new application.

I have read the above information and by signing below agree to meet the requirements of the ASPE Certification Program and adhere to the guidelines of the program.

Signature: _____

Date: 8-21-12

*Please retain a copy of this form for your records and technical paper. Return this form to the Society Business Office
Fax: 615-316-9800 or email tanya@aspenational.org*

Section 12 - Glossary

Accumulative: each new percentage is added to the total plus the last percentage to obtain the total.

Compiled Unit Price: consists of labor plus equipment plus materials for one specific item of work.

Dynamic Soil Compaction: these are methods used to compact soils that cannot be directly accessed by excavation. This may be due to high water tables, or excavation difficulties.