



**Escola de Camins**

Escola Tècnica Superior d'Enginyeria de Camins, Canals i Ports  
UPC BARCELONATECH

## PROJECTE O TESINA D'ESPECIALITAT

**Títol**

Constructive project of building the Welch Rd Bridge in  
Dallas, TX

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Estructures

**Data**

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UPC

# Document No 4: Budget

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## 1 Introduction

The purpose of this document is to give an exact amount of the total cost that the project will have.

In Texas, to be awarded with a project, all the contractors that want to participate in a bidding have to give price of a number of bid items that comes given by TxDOT. This items and the scope of work that have subsidiary are explained in the Maroon Book and have been presented in the previous document. Once a bidding takes place, the project is predesigned with a given quantities. That way, the only thing that the contractors have to do is give the unit prices for the standardized bid items and try to get the best price in order to be awarded with the project.

This system is quite different that the one that is used in Spain. Is because of that that in our case, a state of measurements will be given in addition to the unit prices of the bid items. This bid items are quite general items compared with the normal bid items in Spain, is because of that and because anything similar to a “Cuadro de precios numer 2” is done in the United States, that a more exhaustive breakdown of the items will be done and analyzed as well. Furthermore, this breakdown can be used for the contractor in case that the project is awarded for the cost control of the job while is in construction.

## 2. TxDOT Bid Items

### 2.1 Quantities justification (Takeoffs)

To do these takeoffs, I have used the software Excel.

| DRILLSHAFTs 36 IN |      |        |               |                  |               |                         |
|-------------------|------|--------|---------------|------------------|---------------|-------------------------|
|                   | DS # | D (in) | Top Elev (ft) | Bottom Elev (ft) | Length (ft)   | Volum (CY)<br>15% Yield |
| Abutment 1        | 1    | 38     | 624.327       | 600.590          | 23.74         | 7.96                    |
|                   | 2    | 38     | 624.601       | 600.864          | 23.74         | 7.96                    |
|                   | 3    | 38     | 624.875       | 601.138          | 23.74         | 7.96                    |
|                   | 4    | 38     | 625.148       | 601.411          | 23.74         | 7.96                    |
|                   | 5    | 38     | 625.422       | 601.685          | 23.74         | 7.96                    |
|                   | 6    | 38     | 625.696       | 601.959          | 23.74         | 7.96                    |
|                   | 7    | 38     | 625.689       | 601.952          | 23.74         | 7.96                    |
|                   | 8    | 38     | 625.403       | 601.666          | 23.74         | 7.96                    |
|                   | 9    | 38     | 625.117       | 601.380          | 23.74         | 7.96                    |
|                   | 10   | 38     | 624.831       | 601.094          | 23.74         | 7.96                    |
|                   | 11   | 38     | 624.545       | 600.808          | 23.74         | 7.96                    |
|                   | 12   | 38     | 624.259       | 600.522          | 23.74         | 7.96                    |
|                   | 13   | 38     | 623.973       | 600.236          | 23.74         | 7.96                    |
|                   |      |        |               | <b>TOTAL</b>     | <b>308.58</b> | <b>103.51</b>           |

| DRILLSHAFTs 48 IN |      |        |               |                  |               |                         |
|-------------------|------|--------|---------------|------------------|---------------|-------------------------|
|                   | DS # | D (in) | Top Elev (ft) | Bottom Elev (ft) | Length (ft)   | Volum (CY)<br>15% Yield |
| Bent 2            | 1    | 48     | 578.468       | 561.631          | 16.84         | 9.01                    |
|                   | 2    | 48     | 578.713       | 561.876          | 16.84         | 9.01                    |
|                   | 3    | 48     | 578.959       | 562.122          | 16.84         | 9.01                    |
|                   | 4    | 48     | 579.206       | 562.369          | 16.84         | 9.01                    |
|                   | 5    | 48     | 579.541       | 562.704          | 16.84         | 9.01                    |
|                   | 6    | 48     | 579.542       | 562.705          | 16.84         | 9.01                    |
|                   | 7    | 48     | 579.207       | 562.370          | 16.84         | 9.01                    |
|                   | 8    | 48     | 578.960       | 562.123          | 16.84         | 9.01                    |
|                   | 9    | 48     | 578.715       | 561.878          | 16.84         | 9.01                    |
|                   | 10   | 48     | 578.470       | 561.633          | 16.84         | 9.01                    |
| Abutment 3        | 1    | 48     | 623.907       | 590.717          | 33.19         | 17.76                   |
|                   | 2    | 48     | 624.187       | 590.997          | 33.19         | 17.76                   |
|                   | 3    | 48     | 624.467       | 591.277          | 33.19         | 17.76                   |
|                   | 4    | 48     | 624.747       | 591.557          | 33.19         | 17.76                   |
|                   | 5    | 48     | 625.027       | 591.837          | 33.19         | 17.76                   |
|                   | 6    | 48     | 625.027       | 591.837          | 33.19         | 17.76                   |
|                   | 7    | 48     | 624.747       | 591.557          | 33.19         | 17.76                   |
|                   | 8    | 48     | 624.187       | 590.997          | 33.19         | 17.76                   |
|                   | 9    | 48     | 624.187       | 590.997          | 33.19         | 17.76                   |
|                   | 10   | 48     | 623.907       | 590.717          | 33.19         | 17.76                   |
| <b>TOTAL</b>      |      |        |               |                  | <b>500.27</b> | <b>267.76</b>           |

| COLUMNS      |          |        |               |                  |             |                       |
|--------------|----------|--------|---------------|------------------|-------------|-----------------------|
|              | Column # | D (in) | Top Elev (ft) | Bottom Elev (ft) | Length (ft) | Volum (CY)<br>5%Yield |
| Bent 2       | 1        | 48     | 624.968       | 578.468          | 46.50       | 22.72                 |
|              | 2        | 48     | 625.213       | 578.713          | 46.50       | 24.89                 |
|              | 3        | 48     | 625.459       | 578.959          | 46.50       | 24.89                 |
|              | 4        | 48     | 625.706       | 579.206          | 46.50       | 24.89                 |
|              | 5        | 48     | 626.041       | 579.541          | 46.50       | 24.89                 |
|              | 6        | 48     | 626.042       | 579.542          | 46.50       | 24.89                 |
|              | 7        | 48     | 625.707       | 579.207          | 46.50       | 24.89                 |
|              | 8        | 48     | 625.460       | 578.960          | 46.50       | 24.89                 |
|              | 9        | 48     | 625.215       | 578.715          | 46.50       | 24.89                 |
|              | 10       | 48     | 624.970       | 578.470          | 46.50       | 24.89                 |
| <b>Total</b> |          |        |               |                  |             | <b>246.72</b>         |

ABUTMENTS

|            |        | Length | Width | Height       | Volumn (CY)<br>5% Yield |
|------------|--------|--------|-------|--------------|-------------------------|
| Abutment 1 | Abut   | 176.75 | 3.50  | 3.00         | 72.17                   |
|            | Bwall  | 178.75 | 1.00  | 4.63         | 32.15                   |
|            | Wwall  | 1.00   | 5.50  | 4.63         | 1.98                    |
| Abutment 4 | Abut   | 176.75 | 3.50  | 3.00         | 72.17                   |
|            | Bwall  | 178.75 | 1.00  | 4.63         | 32.15                   |
|            | Chwall | 1.00   | 5.50  | 4.63         | 1.98                    |
|            |        |        |       | <b>TOTAL</b> | <b>212.60</b>           |

CAP

|          | Length | Height A | Width | Volumn (CY)<br>5% Yield |              |
|----------|--------|----------|-------|-------------------------|--------------|
| Bent 2   | 130.96 | 4.00     | 4.50  | 91.67                   |              |
| Ear wall | 1.13   | 9.00     | 4.50  | 7.76                    |              |
|          |        |          |       | <b>TOTAL</b>            | <b>99.43</b> |

APPROACH SLAB

|            | Length (ft) | Width (ft) | Depth (in) | Area (SF)    | Volumn (CY)<br>5% Yield |
|------------|-------------|------------|------------|--------------|-------------------------|
| Abutment 1 | 20.00       | 176.83     | 13.00      | 3536.60      | 141.90                  |
| Abutment 4 | 20.00       | 176.83     | 13.00      | 3536.60      | 141.90                  |
|            |             |            |            | <b>TOTAL</b> | <b>283.80</b>           |

**PRESTR CONC GIRDER (TX54)**

|               | <b>Girder</b> | <b>Length (LF)</b> |
|---------------|---------------|--------------------|
| <b>SPAN 1</b> | 1             | 126.658            |
|               | 2             | 126.760            |
|               | 3             | 126.880            |
|               | 4             | 127.017            |
|               | 5             | 127.170            |
|               | 6             | 127.339            |
|               | 7             | 127.591            |
|               | 8             | 127.779            |
|               | 9             | 127.968            |
|               | 10            | 128.155            |
|               | 11            | 128.326            |
|               | 12            | 128.479            |
|               | 13            | 128.632            |
|               | 14            | 128.785            |
|               | 15            | 128.968            |
|               | 16            | 129.179            |
|               | 17            | 129.483            |
|               | 18            | 129.880            |
|               | 19            | 130.369            |
|               | 20            | 130.949            |
|               | 21            | 131.619            |
|               | 22            | 132.378            |
| <b>SPAN 2</b> | 1             | 116.845            |
|               | 2             | 116.804            |
|               | 3             | 116.772            |
|               | 4             | 116.736            |
|               | 5             | 116.700            |
|               | 6             | 116.639            |
|               | 7             | 116.600            |
|               | 8             | 116.560            |
|               | 9             | 116.520            |
|               | 10            | 116.498            |
|               | 11            | 116.493            |
|               | 12            | 116.489            |
|               | 13            | 116.484            |
|               | 14            | 116.477            |
|               | 15            | 116.472            |
|               | 16            | 116.468            |
|               | 17            | 116.464            |
|               | 18            | 116.459            |
|               | <b>TOTAL</b>  | <b>4928.84</b>     |



**REINF CONC SLAB (BRIDGE DECK)**

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|               | Length (ft) | Width (ft)   | Area (SF)       |
|---------------|-------------|--------------|-----------------|
| <b>SPAN 1</b> | 128.80      | 152.00       | <b>19577.92</b> |
| <b>SPAN 2</b> | 116.95      | 131.82       | <b>15416.70</b> |
|               |             | <b>TOTAL</b> | <b>34994.62</b> |

**SEALED EXPANSION JOINT (4IN) (SEJ-A)**

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|                   | Length (ft)   |
|-------------------|---------------|
| <b>Abutment 1</b> | 181.00        |
| <b>Abutment 3</b> | 181.00        |
| <b>TOTAL</b>      | <b>362.00</b> |

**ROCK NAIL**

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|               | Height | Length | Width | Concrete (CY) | Total (SF)    |
|---------------|--------|--------|-------|---------------|---------------|
| <b>Wall 1</b> | 18.5   | 245    | 0.5   | 83.9          | 4532.5        |
| <b>Wall 2</b> | 18.5   | 196    | 0.5   | 67.1          | 3626          |
|               |        |        |       | <b>TOTAL</b>  | <b>8158.5</b> |

**EXCAVATION**

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|                   | Height | Length | Width        | Excavation (CY) |
|-------------------|--------|--------|--------------|-----------------|
| <b>Abutment 1</b> | 18.50  | 245.00 | 22.00        | 3,693.15        |
| <b>Abutment 3</b> | 18.50  | 196.00 | 10.00        | 1,342.96        |
|                   |        |        | <b>TOTAL</b> | <b>5,036.11</b> |

With these as main quantities of our project, we can now present a summary table:

| TxDOT Code | Code     | Item                                   | Quantity  | Unit |
|------------|----------|--|-----------|------|
| 110        | 110100 R | EXCAVATION                             | 5,270.44  | CY   |
| 416        | 416100 R | DRILL SHAFT (36 IN)                    | 308.58    | LF   |
| 416        | 416200 R | DRILL SHAFT (48 IN)                    | 500.27    | LF   |
| 420        | 420100 R | CL C CONC (ABUT)                       | 212.60    | CY   |
| 420        | 420200 R | CL C CONC (BENT)                       | 346.15    | CY   |
| 420        | 420300 R | CL S CONC (APPR SLAB)                  | 283.80    | CY   |
| 422        | 422100 R | REINF CONC SLAB (CL S)                 | 34,994.62 | SF   |
| 423        | 423100 R | ROCK NAIL WALL                         | 8,158.50  | SF   |
| 425        | 425200 R | PRESTR CONC GIRDER (TX54)              | 4,928.84  | LF   |
| 428        | 428100 R | CONC SURF TREAT (CLASS II)             | 9,348.40  | SY   |
| 450        | 450100 R | RAIL (TY C221)                         | 987.00    | LF   |
| 454        | 454100 R | SEALED EXPANSION JOINT                 | 362.00    | LF   |
| 496        | 496600 R | REMOV STR (BRIDGE 100-499 FT LENGTH)   | 2.00      | EA   |
| 512        | 512100 R | PORT CTB (FUR & INST)(SAFETY SH)(TY 1) | 362.00    | LF   |
| 531        | 531300 R | CONC SIDEWALKS (5")                    | 124.24    | SY   |
| 536        | 536100 R | CONC MEDIAN                            | 432.00    | SY   |
| 552        | 552100 R | WIRE FENCE                             | 415.00    | LF   |
| 540        | 540100 R | AESTHETIC COLUMNS                      | 16.00     | EA   |
| 644        | 644100 R | INSTALL SMALL SIGNS                    | 8.00      | EA   |
| 681        | 681100 R | TRAFFIC SIGNALS                        | 2.00      | EA   |
| 644        | 644100 R | PERMANENT STRIPING                     | 2,976.00  | LF   |

## 2.2 Unit prices

In order for developers to use accurate and up to date bid prices in their Proposals, the Texas Department of Transportation (TxDOT) publishes past bid unit prices both statewide and per countries. For this project, last year average bid prices for Texas state have been used.

Unit prices for bid items encompass everything included under the corresponding Standard Specification for that Item. The Technical Specifications Document contains a description of all elements included into the Item, the way the Item is supposed to be executed, and accounted for.

As part of the elements needed for that Item to be executed, Health and Safety elements are included too. Therefore, Health and Safety costs that a selected item may have associated are already included into the unit bid price. This is the reason why a Healthy and Safety report is not mandatory for projects to be built in Texas.

In the table above we can see the unit prices for these bid items

| TxDOT Code | Code     | Item                                   | Unit | Unit Cost    |
|------------|----------|--|------|--------------|
| 110        | 110100 R | EXCAVATION                             | LF   | \$ 1.55      |
| 416        | 416100 R | DRILL SHAFT (36 IN)                    | LF   | \$ 98.93     |
| 416        | 416200 R | DRILL SHAFT (48 IN)                    | LF   | \$ 131.60    |
| 420        | 420100 R | CL C CONC (ABUT)                       | LF   | \$ 693.25    |
| 420        | 420200 R | CL C CONC (BENT)                       | LF   | \$ 895.47    |
| 420        | 420300 R | CL S CONC (APPR SLAB)                  | LF   | \$ 370.48    |
| 422        | 422100 R | REINF CONC SLAB (CL S)                 | LF   | \$ 13.71     |
| 423        | 423100 R | ROCK NAIL WALL                         | LF   | 67.69        |
| 425        | 425200 R | PRESTR CONC GIRDER (TX54)              | LF   | \$ 134.94    |
| 428        | 428100 R | CONC SURF TREAT (CLASS II)             | LF   | \$ 2.81      |
| 450        | 450100 R | RAIL (TY C221)                         | LF   | \$ 64.09     |
| 454        | 454100 R | SEALED EXPANSION JOINT                 | LF   | \$ 71.02     |
| 496        | 496600 R | REMOV STR (BRIDGE 100-499 FT LENGTH)   | LF   | \$ 25,000.00 |
| 512        | 512100 R | PORT CTB (FUR & INST)(SAFETY SH)(TY 1) | LF   | \$ 27.92     |
| 531        | 531300 R | CONC SIDEWALKS (5")                    | LF   | \$ 31.00     |
| 536        | 536100 R | CONC MEDIAN                            | LF   | \$ 31.00     |
| 552        | 552100 R | WIRE FENCE                             | LF   | \$ 12.98     |
| 540        | 540100 R | AESTHETIC COLUMNS                      | LF   | \$ 4,547.00  |
| 644        | 644100 R | INSTALL SMALL SIGNS                    | LF   | \$ 378.84    |
| 681        | 681100 R | TRAFFIC SIGNALS                        | LF   | \$ 14,789.00 |
| 644        | 644100 R | PERMANENT STRIPING                     | LF   | \$ 1.08      |

## 2.3 Budget

With both the detailed quantities and the unit prices we are in disposition to get the final budget of our project.

| TxDOT Code | Code   | Item                                     | Quantity  | Unit | Unit Cost    | Amount          |
|------------|--------|--|-----------|------|--------------|-----------------|
| 110        | 110100 | R EXCAVATION                             | 5,270.44  | CY   | \$ 1.55      | \$ 8,169.19     |
| 416        | 416100 | R DRILL SHAFT (36 IN)                    | 308.58    | LF   | \$ 98.93     | \$ 30,527.30    |
| 416        | 416200 | R DRILL SHAFT (48 IN)                    | 500.27    | LF   | \$ 131.60    | \$ 65,834.53    |
| 420        | 420100 | R CL C CONC (ABUT)                       | 212.60    | CY   | \$ 693.25    | \$ 147,386.97   |
| 420        | 420200 | R CL C CONC (BENT)                       | 346.15    | CY   | \$ 895.47    | \$ 309,969.31   |
| 420        | 420300 | R CL S CONC (APPR SLAB)                  | 283.80    | CY   | \$ 370.48    | \$ 105,142.68   |
| 422        | 422100 | R REINF CONC SLAB (CL S)                 | 34,994.62 | SF   | \$ 13.71     | \$ 479,744.99   |
| 423        | 423100 | R ROCK NAIL WALL                         | 8,158.50  | SF   | 67.69        | \$ 552,248.87   |
| 425        | 425200 | R PRESTR CONC GIRDER (TX54)              | 4,928.84  | LF   | \$ 134.94    | \$ 665,098.21   |
| 428        | 428100 | R CONC SURF TREAT (CLASS II)             | 9,348.40  | SY   | \$ 2.81      | \$ 26,269.01    |
| 450        | 450100 | R RAIL (TY C221)                         | 987.00    | LF   | \$ 64.09     | \$ 63,256.83    |
| 454        | 454100 | R SEALED EXPANSION JOINT                 | 362.00    | LF   | \$ 71.02     | \$ 25,709.24    |
| 496        | 496600 | R REMOV STR (BRIDGE 100-499 FT LENGTH)   | 2.00      | EA   | \$ 25,000.00 | \$ 50,000.00    |
| 512        | 512100 | R PORT CTB (FUR & INST)(SAFETY SH)(TY 1) | 362.00    | LF   | \$ 27.92     | \$ 10,107.04    |
| 531        | 531300 | R CONC SIDEWALKS (5")                    | 124.24    | SY   | \$ 31.00     | \$ 3,851.44     |
| 536        | 536100 | R CONC MEDIAN                            | 432.00    | SY   | \$ 31.00     | \$ 13,392.00    |
| 552        | 552100 | R WIRE FENCE                             | 415.00    | LF   | \$ 12.98     | \$ 5,386.70     |
| 540        | 540100 | R AESTHETIC COLUMNS                      | 16.00     | EA   | \$ 4,547.00  | \$ 72,752.00    |
| 644        | 644100 | R INSTALL SMALL SIGNS                    | 8.00      | EA   | \$ 378.84    | \$ 3,030.72     |
| 681        | 681100 | R TRAFFIC SIGNALS                        | 2.00      | EA   | \$ 14,789.00 | \$ 29,578.00    |
| 644        | 644100 | R PERMANENT STRIPING                     | 2,976.00  | LF   | \$ 1.08      | \$ 3,214.08     |
|            |        | R TOTAL                                  |           |      |              | \$ 2,003,001.83 |

### 3. Breakdown of the Bid Items

In order to have a better understanding of which is going to be the real cost of every bid item and also to give an approach on how the items are performed, a breakdown in subsidiary items have been performed.

| TxDOT Code | Code              |   | Item                             |
|------------|-------------------|---|----------------------------------|
|            | <b>EARTHWORK</b>  |   |                                  |
| <b>110</b> | <b>110100</b>     | R | <b>EXCAVATION</b>                |
|            | 110101            |   | Excavation                       |
|            | <b>STRUCTURES</b> |   |                                  |
| <b>416</b> | <b>416100</b>     | R | <b>DRILL SHAFT (36 IN)</b>       |
|            | 416101            |   | Drill shafts 36"                 |
|            | 416102            |   | Purchase Steel                   |
|            | 416103            |   | Tie Steel Rebar                  |
|            | 416104            |   | Assist drill shaft spoils        |
| <b>416</b> | <b>416200</b>     | R | <b>DRILL SHAFT (48 IN)</b>       |
|            | 416201            |   | Drill shafts 48"                 |
|            | 416202            |   | Purchase Steel                   |
|            | 416203            |   | Tie Steel Rebar                  |
|            | 416204            |   | Assist drill shaft spoils        |
| <b>420</b> | <b>420100</b>     | R | <b>CL C CONC (ABUT)</b>          |
|            | 416201            |   | Prefab/Modify Forms - Abut       |
|            | 416202            |   | F&S Abutments                    |
|            | 416203            |   | P&F/Cure Abutment                |
|            | 416204            |   | P&P Abutments                    |
|            | 416205            |   | Purch Reinf Steel - Plain (abut) |
|            | 420101            |   | Tie Reinf Steel - Plain (abut)   |
| <b>420</b> | <b>420200</b>     | R | <b>CL C CONC (BENT)</b>          |
|            | 420201            |   | Prefab/Modify Column Forms       |
|            | 420202            |   | F&S Columns                      |
|            | 420203            |   | P&F/Cure Columns                 |
|            | 420204            |   | Prefab/Modify Cap Forms          |
|            | 420205            |   | F&S Caps                         |
|            | 420206            |   | P&F/Cure Caps                    |

|            |               |                                     |
|------------|---------------|-------------------------------------|
|            | 420207        | P&P Substructure                    |
|            | 420208        | Purch Reinf Steel - Plain (bents)   |
|            | 420209        | Tie Reinf Steel - Plain (bents)     |
| <b>420</b> | <b>420300</b> | <b>R CL S CONC (APPR SLAB)</b>      |
|            | 420301        | Frm/Plc/Cure Appr Slabs             |
|            | 420302        | Appr Slab Purch Reinf               |
|            | 420303        | Appr Slab Tie Reinf - Sub           |
| <b>422</b> | <b>422100</b> | <b>R REINF CONC SLAB (CL S)</b>     |
|            | 422101        | Prefabricate Forms                  |
|            | 422102        | F&S Overhangs/Edge Forms            |
|            | 422103        | F&I Precast Deck Panels             |
|            | 422104        | Purch PMD                           |
|            | 422105        | Install PMD                         |
|            | 422106        | Setup/Dry Run Bidwell               |
|            | 422107        | P&F/Cure Deck                       |
|            | 422108        | Pump Concrete - Sub                 |
|            | 422109        | P&P Superstructure                  |
|            | 422110        | Purch Reinforcing Steel - Plain     |
|            | 422111        | Tie Reinforcing Steel - Plain       |
| <b>423</b> | <b>423100</b> | <b>R ROCK NAIL WALL</b>             |
|            | 423101        | NAIL INSTALL                        |
|            | 423102        | SHOT CONC                           |
|            | 423103        | FASCIA PANNELS                      |
| <b>425</b> | <b>425200</b> | <b>R PRESTR CONC GIRDER (TX54)</b>  |
|            | 425201        | Prestr conc girder (Tx54)           |
|            | 425202        | Crane OSR (TX54)                    |
| <b>428</b> | <b>428100</b> | <b>R CONC SURF TREAT (CLASS II)</b> |
|            | 428101        | Grooving                            |
|            | 428102        | Conc surf treat (Class II)          |
| <b>450</b> | <b>450100</b> | <b>R RAIL (TY C221)</b>             |
|            | 450101        | Acquire rail (Ty C221)              |
|            | 450102        | Concrete                            |
|            | 450104        | Slipform Ty C221                    |
| <b>454</b> | <b>454100</b> | <b>R SEALED EXPANSION JOINT</b>     |

|            |   |   |   |
|------------|---|---|---|
|            | 454101  |   | Sealed expansion joint                            |
| <b>496</b> | <b>496600</b>                                 | R | <b>REMOV STR (BRIDGE 100-499 FT LENGTH)</b>       |
|            | 496601  |   | Bridge Demlition                                  |
|            | <b>MISCELLANEOUS OF CONSTRUCTION</b>          |   |   |
| <b>512</b> | <b>512100</b>                                 | R | <b>PORT CTB (FUR &amp; INST)(SAFETY SH)(TY 1)</b> |
|            | 512101  |   | Port CTB (Install)                                |
| <b>531</b> | <b>531300</b>                                 | R | <b>CONC SIDEWALKS (5")</b>                        |
|            | 531301  |   | <b>Concrete sidewalks</b>                         |
| <b>536</b> | <b>536100</b>                                 | R | <b>CONC MEDIAN</b>                                |
|            | 536101  |   | Concrete median                                   |
| <b>552</b> | <b>552100</b>                                 | R | <b>WIRE FENCE</b>                                 |
|            | 552101  |   | Wire fence  |
| <b>540</b> | <b>540100</b>                                 | R | <b>AESTHETIC COLUMNS</b>                          |
|            | 540101  |   | Aesthetic columns                                 |
|            | <b>LIGHTING, SIGNING MARKINGS AND SIGNALS</b> |   |   |
| <b>644</b> | <b>644100</b>                                 | R | <b>INSTALL SMALL SIGNS</b>                        |
|            | 644101  |   | Install small signs                               |
| <b>681</b> | <b>681100</b>                                 | R | <b>TRAFFIC SIGNALS</b>                            |
|            | 681101  |   | Temporary traffic signs                           |
| <b>644</b> | <b>644100</b>                                 | R | <b>PERMANENT STRIPING</b>                         |
|            | 644101  |   | Aesthetic columns                                 |

Of this subsidiary items I have also compute his quantities and give it a unit price. That way the budgeted cost of the project can be known in the new total of quantities. Obviously, the sum of all the subsidiary items under a bid item is equal to the amount budgeted in the bid item.

The table above shows that new budget with the subsidiary quantities, unit costs and total costs. Also a cost by categories is showed. The different categories are:

- Earthwork
- Structures
- Miscellaneous of construction
- Lighting, signing markings and signals

| TxDOT Code | Code     | Item  | Quantity         | Unit      | Unit Cost           | Amount                 |
|------------|----------|---|------------------|-----------|---------------------|------------------------|
|            |          | <b>EARTHWORK</b>                            |                  |           |                     | <b>\$ 8,169.19</b>     |
| 110        | 110100 R | <b>EXCAVATION</b>                           | <b>5,270.44</b>  | <b>CY</b> | <b>\$ 1.55</b>      | <b>\$ 8,169.19</b>     |
|            | 110101   | Excavation                                  | 5,270.44         | CY        | \$ 1.55             | \$ 8,169.19            |
|            |          | <b>STRUCTURES</b>                           |                  |           |                     | <b>\$ 2,521,187.93</b> |
| 416        | 416100 R | <b>DRILL SHAFT (36 IN)</b>                  | <b>308.58</b>    | <b>LF</b> | <b>\$ 98.93</b>     | <b>\$ 30,527.30</b>    |
|            | 416101   | Drill shafts 36"                            | 308.58           | LF        | \$ 68.78            | \$ 21,224.20           |
|            | 416102   | Purchase Steel                              | 16,245.68        | LB        | \$ 0.40             | \$ 6,497.64            |
|            | 416103   | Tie Steel Rebar                             | 16,245.68        | LB        | \$ 0.13             | \$ 2,111.94            |
|            | 416104   | Assist drill shaft spoils                   | 80.83            | CY        | \$ 8.58             | \$ 693.51              |
| 416        | 416200 R | <b>DRILL SHAFT (48 IN)</b>                  | <b>500.27</b>    | <b>LF</b> | <b>\$ 131.60</b>    | <b>\$ 65,834.53</b>    |
|            | 416201   | Drill shafts 48"                            | 500.27           | LF        | \$ 101.45           | \$ 50,752.39           |
|            | 416202   | Purchase Steel                              | 26,337.42        | LB        | \$ 0.40             | \$ 10,533.95           |
|            | 416203   | Tie Steel Rebar                             | 26,337.42        | LB        | \$ 0.13             | \$ 3,423.87            |
|            | 416204   | Assist drill shaft spoils                   | 131.04           | CY        | \$ 8.58             | \$ 1,124.32            |
| 420        | 420100 R | <b>CL C CONC (ABUT)</b>                     | <b>212.60</b>    | <b>CY</b> | <b>\$ 693.25</b>    | <b>\$ 147,386.97</b>   |
|            | 416201   | Prefab/Modify Forms - Abut                  | 1,539.19         | SF        | \$ 2.40             | \$ 3,694.05            |
|            | 416202   | F&S Abutments                               | 6,035.89         | SF        | \$ 11.91            | \$ 71,887.45           |
|            | 416203   | P&F/Cure Abutment                           | 212.60           | CY        | \$ 169.12           | \$ 35,955.44           |
|            | 416204   | P&P Abutments                               | 6,035.89         | SF        | \$ 1.39             | \$ 8,389.89            |
|            | 416205   | Purch Reinf Steel - Plain (abut)            | 46,542.61        | LB        | \$ 0.46             | \$ 21,409.60           |
|            | 420101   | Tie Reinf Steel - Plain (abut)              | 46,542.61        | LB        | \$ 0.13             | \$ 6,050.54            |
| 420        | 420200 R | <b>CL C CONC (BENT)</b>                     | <b>346.15</b>    | <b>CY</b> | <b>\$ 895.47</b>    | <b>\$ 309,969.31</b>   |
|            | 420201   | Prefab/Modify Column Forms                  | 860.52           | SF        | \$ 15.02            | \$ 12,924.44           |
|            | 420202   | F&S Columns                                 | 3,443.46         | SF        | \$ 21.60            | \$ 74,394.41           |
|            | 420203   | P&F/Cure Columns                            | 346.15           | CY        | \$ 160.17           | \$ 55,443.92           |
|            | 420204   | Prefab/Modify Cap Forms                     | 1,113.53         | SF        | \$ 9.85             | \$ 10,968.46           |
|            | 420205   | F&S Caps                                    | 4,394.34         | SF        | \$ 17.30            | \$ 76,003.31           |
|            | 420206   | P&F/Cure Caps                               | 179.33           | CY        | \$ 177.66           | \$ 31,859.52           |
|            | 420207   | P&P Substructure                            | 7,837.80         | SF        | \$ 1.37             | \$ 10,773.84           |
|            | 420208   | Purch Reinf Steel - Plain (bents)           | 64,205.14        | LB        | \$ 0.49             | \$ 31,180.89           |
|            | 420209   | Tie Reinf Steel - Plain (bents)             | 64,205.14        | LB        | \$ 0.10             | \$ 6,420.51            |
| 420        | 420300 R | <b>CL S CONC (APPR SLAB)</b>                | <b>283.80</b>    | <b>CY</b> | <b>\$ 370.48</b>    | <b>\$ 105,142.68</b>   |
|            | 420301   | Frm/Plc/Cure Appr Slabs                     | 283.80           | CY        | \$ 242.00           | \$ 68,679.90           |
|            | 420302   | Appr Slab Purch Reinf                       | 56,973.10        | LB        | \$ 0.51             | \$ 29,056.28           |
|            | 420303   | Appr Slab Tie Reinf - Sub                   | 56,973.10        | LB        | \$ 0.13             | \$ 7,406.50            |
| 422        | 422100 R | <b>REINF CONC SLAB (CL S)</b>               | <b>34,994.62</b> | <b>SF</b> | <b>\$ 13.71</b>     | <b>\$ 479,744.99</b>   |
|            | 422101   | Prefabricate Forms                          | 492.88           | SF        | \$ 10.94            | \$ 5,390.60            |
|            | 422102   | F&S Overhangs/Edge Forms                    | 985.76           | LF        | \$ 63.57            | \$ 62,666.28           |
|            | 422103   | F&I Precast Deck Panels                     | 34,240.94        | SF        | \$ 5.97             | \$ 204,337.44          |
|            | 422104   | Purch PMD                                   | 2,082.17         | SF        | \$ 6.38             | \$ 13,276.23           |
|            | 422105   | Install PMD                                 | 2,082.17         | SF        | \$ 6.59             | \$ 13,729.87           |
|            | 422106   | Setup/Dry Run Bidwell                       | 1.00             | EA        | \$ 6,215.14         | \$ 6,215.14            |
|            | 422107   | P&F/Cure Deck                               | 530.37           | CY        | \$ 161.64           | \$ 85,726.13           |
|            | 422108   | Pump Concrete - Sub                         | 567.00           | CY        | \$ 8.35             | \$ 4,731.83            |
|            | 422109   | P&P Superstructure                          | 2,957.29         | SF        | \$ 1.51             | \$ 4,469.43            |
|            | 422110   | Purch Reinforcing Steel - Plain             | 118,858.71       | LB        | \$ 0.57             | \$ 67,316.26           |
|            | 422111   | Tie Reinforcing Steel - Plain               | 118,858.71       | LB        | \$ 0.10             | \$ 11,885.79           |
| 423        | 423100 R | <b>ROCK NAIL WALL</b>                       | <b>8,158.50</b>  | <b>SF</b> | <b>\$ 67.69</b>     | <b>\$ 552,248.87</b>   |
|            | 423101   | NAIL INSTALL                                | 8,158.50         | SF        | \$ 20.14            | \$ 164,312.19          |
|            | 423102   | SHOT CONC                                   | 8,158.50         | SF        | \$ 16.87            | \$ 137,633.90          |
|            | 423103   | FASCIA PANNELS                              | 8,158.50         | SF        | \$ 30.68            | \$ 250,302.78          |
| 425        | 425200 R | <b>PRESTR CONC GIRDER (TX54)</b>            | <b>4,928.84</b>  | <b>LF</b> | <b>\$ 134.94</b>    | <b>\$ 665,098.21</b>   |
|            | 425201   | Prestr conc girder (Tx54)                   | 4,928.84         | LF        | \$ 122.94           | \$ 605,952.08          |
|            | 425202   | Crane OSR (TX54)                            | 4,928.84         | LF        | \$ 12.00            | \$ 59,146.13           |
| 428        | 428100 R | <b>CONC SURF TREAT (CLASS II)</b>           | <b>9,348.40</b>  | <b>SY</b> | <b>\$ 2.81</b>      | <b>\$ 26,269.01</b>    |
|            | 428101   | Grooving                                    | 42,067.82        | SF        | \$ 0.25             | \$ 10,516.95           |
|            | 428102   | Conc surf treat (Class II)                  | 4,674.20         | SY        | \$ 3.37             | \$ 15,752.06           |
| 450        | 450100 R | <b>RAIL (TY C221)</b>                       | <b>987.00</b>    | <b>LF</b> | <b>\$ 64.09</b>     | <b>\$ 63,256.83</b>    |
|            | 450101   | Acquire rail (Ty C221)                      | 987.00           | LF        | \$ 19.87            | \$ 19,611.69           |
|            | 450102   | Concrete                                    | 987.00           | LF        | \$ 9.21             | \$ 9,090.27            |
|            | 450104   | Slipform Ty C221                            | 987.00           | LF        | \$ 35.01            | \$ 34,554.87           |
| 454        | 454100 R | <b>SEALED EXPANSION JOINT</b>               | <b>362.00</b>    | <b>LF</b> | <b>\$ 71.02</b>     | <b>\$ 25,709.24</b>    |
|            | 454101   | Sealed expansion joint                      | 362.00           | LF        | \$ 71.02            | \$ 25,709.24           |
| 496        | 496600 R | <b>REMOV STR (BRIDGE 100-499 FT LENGTH)</b> | <b>2.00</b>      | <b>EA</b> | <b>\$ 25,000.00</b> | <b>\$ 50,000.00</b>    |
|            | 496601   | Bridge Demolition                           | 2.00             | EA        | \$ 25,000.00        | \$ 50,000.00           |



|     |   |   |   |                 |           |                      |                        |
|-----|---|---|---|-----------------|-----------|----------------------|------------------------|
|     | <b>MISCELLANEOUS OF CONSTRUCTION</b>          |   |   |                 |           | <b>\$ 105,489.18</b> |                        |
| 512 | <b>512100</b>                                 | R | <b>PORT CTB (FUR &amp; INST)(SAFETY SH)(TY 1)</b> | <b>362.00</b>   | <b>LF</b> | <b>\$ 27.92</b>      | <b>\$ 10,107.04</b>    |
|     | 512101  |   | Port CTB (Install)                                | 362.00          | LF        | \$ 27.92             | \$ 10,107.04           |
| 531 | <b>531300</b>                                 | R | <b>CONC SIDEWALKS (5")</b>                        | <b>124.24</b>   | <b>SY</b> | <b>\$ 31.00</b>      | <b>\$ 3,851.44</b>     |
|     | 531301  |   | Concrete sidewalks                                | 124.24          | SY        | \$ 31.00             | \$ 3,851.44            |
| 536 | <b>536100</b>                                 | R | <b>CONC MEDIAN</b>                                | <b>432.00</b>   | <b>SY</b> | <b>\$ 31.00</b>      | <b>\$ 13,392.00</b>    |
|     | 536101  |   | Concrete median                                   | 432.00          | SY        | \$ 31.00             | \$ 13,392.00           |
| 552 | <b>552100</b>                                 | R | <b>WIRE FENCE</b>                                 | <b>415.00</b>   | <b>LF</b> | <b>\$ 12.98</b>      | <b>\$ 5,386.70</b>     |
|     | 552101  |   | Wire fence  | 415.00          | LF        | \$ 12.98             | \$ 5,386.70            |
| 540 | <b>540100</b>                                 | R | <b>AESTHETIC COLUMNS</b>                          | <b>16.00</b>    | <b>EA</b> | <b>\$ 4,547.00</b>   | <b>\$ 72,752.00</b>    |
|     | 540101  |   | Aesthetic columns                                 | 16.00           | EA        | \$ 4,547.00          | \$ 72,752.00           |
|     | <b>LIGHTING, SIGNING MARKINGS AND SIGNALS</b> |   |   |                 |           |                      | <b>\$ 35,822.80</b>    |
| 644 | <b>644100</b>                                 | R | <b>INSTALL SMALL SIGNS</b>                        | <b>8.00</b>     | <b>EA</b> | <b>\$ 378.84</b>     | <b>\$ 3,030.72</b>     |
|     | 644101  |   | Install small signs                               | 8.00            | EA        | \$ 378.84            | \$ 3,030.72            |
| 681 | <b>681100</b>                                 | R | <b>TRAFFIC SIGNALS</b>                            | <b>2.00</b>     | <b>EA</b> | <b>\$ 14,789.00</b>  | <b>\$ 29,578.00</b>    |
|     | 681101  |   | Temporary traffic signs                           | 2.00            | EA        | \$ 14,789.00         | \$ 29,578.00           |
| 644 | <b>644100</b>                                 | R | <b>PERMANENT STRIPING</b>                         | <b>2,976.00</b> | <b>LF</b> | <b>\$ 1.08</b>       | <b>\$ 3,214.08</b>     |
|     | 644101  |   | Permanent striping                                | 2,976.00        | EA        | \$ 1.08              | \$ 3,214.08            |
|     | <b>R TOTAL</b>                                |   |   |                 |           |                      | <b>\$ 2,003,001.83</b> |

Finally, we can also analyze the budget of our project depending on the category that we are. If we run this analysis we obtain:

|   |                        |
|---|------------------------|
| <b>EARTHWORK</b>                              | <b>\$ 8,169.19</b>     |
| <b>STRUCTURES</b>                             | <b>\$ 2,521,187.93</b> |
| <b>MISCELLANEOUS OF CONSTRUCTION</b>          | <b>\$ 105,489.18</b>   |
| <b>LIGHTING, SIGNING MARKINGS AND SIGNALS</b> | <b>\$ 35,822.80</b>    |
| <b>TOTAL</b>                                  | <b>\$ 2,003,001.83</b> |

As we can see, and how it was expected, the majority of the budgeted cost for the project is going to be in structures.

## **4. Budget Summary**

In order to do the next budget of execution by contract we will need to take into account that in Texas, the projects are tax exempt, that way when a bidding is taken place, the contractor bid without apply any tax.

**BUDGET OF EXECUTION PER CONTRACT**

|  |                           |
|--|---------------------------|
| BUDGET DIRECT COST                         | \$2,003,001.83            |
| 13% INDIRECT COSTS OVER THE \$2,003,001.83 | \$260,390.24              |
| 6% GROSS PROFIT OVER THE \$2,003,001.83    | \$120,180.11              |
| <b>Subtotal</b>                            | <b>\$2,383,572.17</b>     |
| <br><b>TOTAL BUDGET PER CONTRACT</b>       | <br><b>\$2,383,572.17</b> |

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This budget of execution per contract is

(TWO MILLION THREE HUNDRED EIGHTY THREE THOUSAND FIVE HUNDRED AND SEVENTY TWO WITH SEVENTEEN CENTS)

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Barcelona, February 2015  
Adria Benages Curell  
Civil Engineer