

# Downtown-Uptown-Oakland-East End Bus Rapid Transit Project Pittsburgh, Pennsylvania Capital Cost Methodology

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This memo provides a description of the methodology used to develop the Downtown-Uptown-Oakland-East End Bus Rapid Transit (BRT) Project capital cost estimate in support of the Small Starts submittal. It is intended as a supplement to the Federal Transit Administration's (FTA) Standard Cost Categories (SCC) spreadsheet and Opinion of Probable Construction Costs (OPCC) spreadsheet.

## Overview

The project includes changes to both physical infrastructure and transit operations along the Downtown-Uptown-Oakland portion of the corridor (BRT Core) along with changes to transit operations in the East End portion of the corridor – Highland Park, Squirrel Hill, and the East Busway BRT Branches – and provision of stations in Highland Park and Squirrel Hill. These improvements will improve transit travel time, reduce transit travel time variability, and provide greater mobility in a crowded transit corridor. Fast, reliable transit investment in this corridor will support integrated transportation, land use, and economic goals in the region in a cost-effective manner that maximizes existing capacity along the corridor.

The proposed BRT Core improvements extend a total of 7.4 miles using existing surface streets with an additional 3.8 miles of the existing East Busway (each direction). The portion of the BRT Core in the uptown section requires reconstruction of the pavement due to its poor existing condition. The Highland Park BRT Branch extends 3.4 miles (each direction) and the Squirrel Hill BRT Branch extends 2.9 miles (each direction), both of which would remain mixed-flow. The project will include 44 stations/pairs (72 platforms) with enhanced/branded stations, dedicated transit lanes, transit signal priority, curb bump outs, a real-time bus arrival information system, and the purchase of 25 branded battery electric articulated buses and rebranding 34 diesel buses. The project's current estimated capital cost is \$195.5 million.

## Capital Cost Methodology

The capital costs for the project were developed in a bottom-up process based upon quantities and unit rates appropriate for the scope of work. The capital costs were estimated by treating project work elements into two methods. The first method is used for typical Pennsylvania Department of Transportation (PennDOT) pay items, such as concrete curb or full-depth pavement. Quantities for these items were tabulated from the preliminary 30% plans prepared for the corridor. The second method is used for broad "assembly" items, such as site work for a station location or a new signal location. To assign unit prices to these assembly items work elements were then further broken down into component items; most of these items used cost estimates, which are generally PennDOT standard pay

items. Typical quantities for these component items were estimated by a sample unit area or typical section. The unit costs for the assembly items were then estimated using these unit prices and quantities for each component. Quantities for each of the assembly items were developed using the preliminary 30% plans prepared for the corridor. Items from both methods were assigned to an FTA SCC. Refer to the OPCC spreadsheet for the list of items, their components, quantities, and unit costs used to estimate the capital costs found in the capital cost section of the Small Start documents.

## Contingencies

In accordance with the FTA SCC, contingencies were included for each cost category to address lack of scope and quantity definition during this early phase of the project. The amount of contingency depends on the complexity of any particular item as well as the stage of engineering completion. The allocated contingencies ranged from 1 percent to 15 percent. For construction categories 10 to 50, a 15 percent allocated contingency was applied plus an additional 4.2 percent of unallocated contingency.

Unallocated contingency is intended to address “u unknowns”, or to simply reflect a prudent amount to cover unanticipated events, including political events, labor strife, weather, differing site conditions, variable commodity pricing, unfavorable market conditions, bid risk, etc. This results in a total contingency for construction categories 10 to 50 of 19.2 percent which is within the acceptable range for this design (see Design Contingency Graph). An allocated contingency of 5 percent was applied to professional services except for National Environmental Policy Act (NEPA) activities and preliminary engineering identified in project development. As actual contract values are used for this item, no contingency was applied to project development. Right-of-way needs for the project are limited because narrow sliver takes are anticipated. A 10 percent contingency is applied to right-of-way. For vehicles, the Port Authority of Allegheny County routinely procures new and refurbished buses through on-going contracts and a 1 percent allocated contingency was used.

## Inflation

The Year of Expenditure is determined by applying an inflation rate to the base year capital cost. For this project, the inflation rate of 3.0 percent is used based on the most recent available “Construction Cost Index in Pittsburgh” by Engineering News Record (attached). An average of inflation prices over the past year was used as a base, then rounded up to the nearest half percent. This inflation rate is calculated with a weighted mean that utilizes common labor rates in conjunction with steel, cement, and lumber prices, and is appropriate for this project.