

CITY OF PEORIA
TRANSPORTATION NEEDS STUDY
PHASE I AND II CONCEPT DRAWINGS AND COST ESTIMATES
FINAL REPORT

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SECTION 1 – PRELIMINARY ENGINEERING AND CAPITAL COST ESTIMATES

1.0 INTRODUCTION

The purpose of the Peoria Transportation Needs Study is to perform transportation planning, preliminary engineering, capital cost estimating, operation and maintenance cost estimating, and pavement management system evaluation that will assist the City of Peoria in establishing a multi-year transportation improvement program. Historically, growth and development in Peoria has been concentrated in the southern and central sections of the City. Thus current population and employment concentrations occur primarily north of Northern Avenue and south of Happy Valley Road. Existing and future transportation/circulation system needs in these two sections of the community are the focus of this study. The documentation for these activities is included in three volumes of the Transportation Needs Study as follows. Volume 1 – Circulation System Evaluation provides an evaluation of existing and future conditions and the identification of improvement projects. Volume II – Phase I and II Concept Drawings and Cost Estimates provides concept drawings, capital cost estimates and long term operation and maintenance costs for the improvement projects recommended in the circulation system evaluation. Volume III – Review of Pavement Management System and Roadway Operation and Maintenance Costs in the City of Peoria provides an evaluation of current pavement management procedures, makes recommendations for improvements to the City’s pavement management system and reviews the City’s operation and maintenance cost database.

This report encompasses the preliminary engineering and cost estimating for the City of Peoria Transportation Needs Study Phase I and II Projects. This report consists of the scope of services for report preparation, the list of Phase I and II projects, concept designs, project data sheets, capital cost estimates and operation and maintenance costs.

1.1 SCOPE OF SERVICES

The scope of services for completion of the engineering studies for the Phase I and II projects is as follows:

- Complete sufficient preliminary engineering and technical analysis to develop conceptual design drawings for the Phase I and II projects identified in the City of Peoria Transportation Needs Assessment.
- Use the conceptual design drawings, site visits and other available information to develop preliminary cost estimates for the Phase I and II projects identified in the City of Peoria Transportation Needs Assessment.
- Lists and explain the design concept methodologies used to develop the conceptual drawings and cost estimates.

- Develop long-term operation and maintenance costs for the Phase I and II projects.
- Prepare a brief summary report with approach and criteria, conceptual design drawings, preliminary cost estimates, and operation and maintenance costs. The report is to include working project files assembled in a notebook for submittal to the City of Peoria.

1.2 LISTS OF PROJECTS

The following Phase I and II project lists were developed and prioritized through discussions with City of Peoria staff.

**Table 1
Phase I Project Priority List**

1.	67 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2)
2.	Deer Valley Road – 83 rd Avenue to 91 st Avenue (2:1:2 w/ bike lanes)
3.	Peoria Avenue – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes) and 91 st Avenue/Peoria Intersection
4.	91 st Avenue and Olive Avenue
5.	91 st Avenue – Olive Avenue to Peoria Avenue (2:M:2)
6.	Northern Avenue – 107 th Avenue to 115 th Avenue (2:1:2)
7.	Thunderbird Road and 83 rd Avenue
8.	Thunderbird Road – 83 rd Avenue to Loop 101 (3:M:3 w/ bike lanes)
9.	91 st Avenue – Grand Avenue to Cactus Road (3:M:3) and 91 st Avenue and Cactus Road Intersection
10.	91 st Avenue and Northern Avenue
11.	91 st Avenue – Northern Avenue to Olive Avenue (3:M:3)
12.	Thunderbird Road – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes)
13.	67 th Avenue and Cactus Road (west leg only)
14.	67 th Avenue – Peoria Avenue to Cactus Road (west back of curb improvements)
15.	67 th Avenue and Thunderbird Road (west leg only)
16.	67 th Avenue – Cactus Road to Thunderbird Road
17.	67 th Avenue – Thunderbird Road to ACDC
18.	Thunderbird Road – 91 st Avenue to 99 th Avenue (3:M:3)
19.	67 th Avenue and Peoria Avenue (west leg only)
20.	67 th Avenue – Olive Avenue to Peoria Avenue (west back of curb improvements)
21.	99 th Avenue – Northern Avenue to Olive Avenue (2:1:2 realign back to original alignment with bridge)
22.	75 th Avenue and Peoria Avenue
23.	83 rd Avenue and Olive Avenue

Table 2
Phase II Project Priority List

1.	83 rd Avenue and Cactus Road Intersection
2.	83 rd Avenue and Deer Valley Intersection
3.	83 rd Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)
4.	Thunderbird and 75 th Avenue Intersection
5.	Thunderbird Road – 75 th Avenue to 83 rd Avenue (3:M:3 w/ bike lanes)
6.	Thunderbird Road – 67 th Avenue to 75 th Avenue (3:M:3 w/ bike lanes 71 st Avenue to 75 th Avenue)
7.	Union Hills Drive and 91 st Avenue Intersection
8.	Union Hills Drive – 83 rd Avenue to 91 st Avenue (3:M:3 w/ bike lanes)
9.	Peoria Avenue – 67 th Avenue to 75 th Avenue (3:M:3)
10.	75 th Avenue and Cactus Intersection
11.	Cactus Road – 67 th Avenue to 75 th Avenue (3:M:3)
12.	Peoria Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)
13.	Olive Avenue – 83 rd Avenue to Loop 101 (3:M:3)
14.	83 rd Avenue – Northern Avenue to Olive Avenue (2:1:2)
15.	Cactus Road – 75 th Avenue to 83 rd Avenue (3:M:3)
16.	83 rd Avenue – Olive Avenue to Grand Avenue Bypass (2:1:2)
17.	83 rd Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
18.	Olive Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)
19.	Olive Avenue – 67 th Avenue to 75 th Avenue (3:M:3)
20.	107 th Avenue – Union Hills Drive to Beardsley Road (2:1:2)
21.	Peoria Avenue – 83 rd Avenue Bypass to 83 rd Avenue (3:M:3 w/ bike lanes)
22.	Pinnacle Peak Road – 107 th Avenue to Lake Pleasant Road (2:1:2 w/ bike lanes)
23.	107 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
24.	107 th Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)
25.	91 st Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
26.	Happy Valley Road and 67 th Avenue Intersection

Several of these projects initially started as three or four mile corridors but were divided into one-mile segments at the direction of the City. The list contains a combination of arterial segment improvements and intersection improvement projects. The project development methodology assumes the intersection projects will be built first and the arterial segment adjacent to the intersection will follow.

1.3 CONCEPT DESIGN METHODOLOGIES

The methodologies used in preparing the geometric concepts included field reviews of the project sites, a conflict review of surface utility features, use of aerial photos as a base map, use of the Peoria Street Classification Map for determining intersection configurations and number of lanes, engineering constraints analysis, and consultation with Peoria staff for local knowledge related to traffic movement and congestion.

1.3.1 Field Review

The preliminary engineering process began with a field review of the project sites. During the field review, several locations were videotaped to record project features to provide site information while the design concepts were being prepared. The arterials were videotaped in both directions. Intersections were videotaped at all four corners by rotating the camera view in a counter clockwise direction. The field reviews assisted in identifying important project elements such as neighborhood type, presence of irrigation canals, terrain characteristics and existing operating conditions.

1.3.2 Surface Utility Evaluation

Specific attention was given to the project sites for above ground utilities and relocation requirements to accommodate the propose roadway improvements. The predominant utilities identified during the field reviews were overhead power, irrigation facilities and fire hydrants.

1.3.3 Aerial Photographs

Aerial photos for the project sites were provided by the City of Peoria. The photos provide the background for the existing sites and the base map for the developed geometric concepts. The aerial photos worked well in combination with the videotaping since items that appeared on the photos that could not be distinguished were verified by viewing the videotapes. The aerial photos also included section lines and right of way information.

1.3.4 Peoria Street Classification Map

The Peoria Street Classification Map was used to identify the intersection configurations for the intersections studied including single/dual left turn lanes, right turn lanes, number of through lanes. The intersection configurations determined from the street classification map were the starting point for determining the actual configuration that would be analyzed. The engineering constraints analysis was used in conjunction with discussions with City staff to arrive at the final intersection configuration to be implemented.

1.3.5 Number of Lanes

Existing lanes for individual project sites were verified during the field reviews. This information was also discernable, in most cases, on the aerial photos provided by the City. The desired number of lanes was determined by the street classification. The recommended number of lanes for the arterials was determined through the engineering constraints analysis and discussions with the City of Peoria. The arterial improvement projects were coordinated closely with the intersection improvement project for compatibility at the project match points.

1.3.6 Engineering Constraints Analysis

During the preliminary engineering evaluation phase, existing constraints were identified and documented. The constraints analysis was performed to identify items or features that could affect project constructability, schedule, and costs. Some of the major constraints identified are right of way impacts, impacts to residences and businesses, impacts to existing utilities and access to neighborhoods and businesses. Meetings were conducted with City staff to discuss the identified constraints and to resolve issues affecting intersection configurations and number of lanes.

1.3.7 City Review

During the preliminary engineering the project team met weekly with the key City staff assigned to the project. The meetings served as a review of the preliminary design concepts by the City which assisted the project team in expediting design decisions related to the constraints analysis. During the review sessions, the project team explained issues encountered, discussed significant project impacts and obtained direction from the City staff.

1.3.8 Documentation

Project documentation includes the project data sheets that identify the issues and impacts associated with each project. The data sheets also provide a project overview; design assumptions, constraints and

other information that will be useful as design concept reports and final designs are prepared for the sites. Further documentation includes the preliminary engineering drawings for each of the Phase I and II projects.

1.4 CAPITAL COST ESTIMATES

A preliminary cost estimate was prepared for each project. The cost estimates include a list of items associated with the work and their applicable units, quantities and unit prices. The estimates were divided into two sections: the first section consists of items that were priced based on industry average unit prices, and the second section of the estimates consists of work tasks and administrative costs that were estimated as a percentage of construction cost.

1.4.1 Quantities

Quantities were developed for the items of work listed on the cost estimate sheets. The quantities requiring area measurements were measured using from the concept drawings using AutoCAD software. Assumptions were made on the proposed pavement section and are indicated in the cost estimate. The only underground item that was included in the cost estimates is the SRP irrigation relocation. Requirements for storm drainage were not considered in the development of the projects. The City is preparing estimates for storm drainage separately. All undergrounding of electric lines that are less than 69kv was included in the arterial segment projects. For the intersection improvement projects, the electric lines were assumed to be relocated on poles and then would be undergrounded when the adjacent arterial segment was improved.

1.4.2 Unit Prices

The unit prices used for the project work items are based on average unit prices and bid tabs from recent, similar projects in the Phoenix metropolitan area. In some cases, unit prices were either increased or decreased based on the associated quantities.

1.4.3 Contingencies

Most project estimates included a 20% contingency factor to account for the preliminary nature of the cost estimates. These items include the adjustment of manholes and valves within the pavement, filling in existing swales and other project elements that may not be visible until a detailed survey is conducted.

1.4.4 Construction Survey

Construction survey was estimated to be between 2% and 4% of the construction cost. The assigned percentage was based on the amount of construction staking that is anticipated for a particular project. If very little construction staking is anticipated in relation to the construction cost then 2% was used. For a project that had a small construction cost and required extensive construction staking the survey was estimated to be 4% of the construction cost.

1.4.5 Project Administration

The cost estimates also include costs for anticipated design services, construction administration and engineering administration. The engineering administration is an estimate of the costs that would be associated with the City of Peoria administering a project from the design concept report phase through final design and construction.

1.4.6 Phase I and II Projects Cost Summary

Preliminary estimates of construction cost for Phase I and II projects are summarized in the following tables.

Table 3
Phase I Projects Construction Cost Summary *

Project Construction Year	Project	Total per Year
2008	67 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2)	\$6,016,701
2009	Deer Valley Road – 83 rd Avenue to 91 st Avenue (2:1:2 w/ bike lanes)	\$4,490,907
2010	Peoria Avenue – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes) and 91 st Avenue/Peoria Intersection	\$3,234,940
2011	91 st Avenue and Olive Avenue	\$3,150,140
2012	91 st Avenue – Olive Avenue to Peoria Avenue (2:M:2)	\$5,532,914
2013	Northern Avenue – 107 th Avenue to 115 th Avenue (2:1:2)	\$2,532,634
2014	Thunderbird Road and 83 rd Avenue	\$4,093,328
2015	Thunderbird Road – 83 rd Avenue to Loop 101 (3:M:3 w/ bike lanes)	\$1,868,890
2016	91 st Avenue – Grand Avenue to Cactus Road (3:M:3) and 91 st Avenue and Cactus Road Intersection	\$3,052,940
2017	91 st Avenue and Northern Avenue	\$3,384,070
2018	91 st Avenue – Northern Avenue to Olive Avenue (3:M:3)	\$6,503,030
2019	Thunderbird Road – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes)	\$6,811,205
2020	67 th Avenue and Cactus Road (west leg only)	\$1,128,805
2021	67 th Avenue – Peoria Avenue to Cactus Road (west back of curb improvements)	\$2,279,250
2022	67 th Avenue and Thunderbird Road (west leg only)	\$1,238,580
2023	67 th Avenue – Cactus Road to Thunderbird Road	\$2,549,375
2024	67 th Avenue – Thunderbird Road to ACDC	\$1,146,315
2025	Thunderbird Road – 91 st Avenue to 99 th Avenue (3:M:3)	\$3,312,806
2026	67 th Avenue and Peoria Avenue (west leg only)	\$476,615
2027	67 th Avenue – Olive Avenue to Peoria Avenue (west back of curb improvements)	\$2,341,615
2028	99 th Avenue – Northern Avenue to Olive Avenue (2:1:2 realign back to original alignment with bridge)	\$8,535,316
2029	75 th Avenue and Peoria Avenue	\$3,084,580
2030	83 rd Avenue and Olive Avenue	\$2,329,525
	Total	\$79,094,481

* all costs were determined in 2004 dollars.

Table 4
Phase II Projects Construction Cost Summary *

Project Construction Year	Project	Total per Year
2018	83 rd Avenue and Cactus Road Intersection	\$6,391,054
2019	83 rd Avenue and Deer Valley Intersection	\$4,430,729
2020	83 rd Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)	\$5,104,015
2021	Thunderbird and 75 th Avenue Intersection	\$4,886,626
2022	Thunderbird Road – 75 th Avenue to 83 rd Avenue (3:M:3 w/ bike lanes)	\$6,020,790
2023	Thunderbird Road – 67 th Avenue to 75 th Avenue (3:M:3 w/ bike lanes) 71 st Avenue to 75 th Avenue)	\$4,706,788
2024	Union Hills Drive and 91 st Avenue Intersection	\$3,962,599
2025	Union Hills Drive – 83 rd Avenue to 91 st Avenue (3:M:3 w/ bike lanes)	\$4,611,183
2026	Peoria Avenue – 67 th Avenue to 75 th Avenue (3:M:3)	\$5,717,378
2027	75 th Avenue and Cactus Intersection	\$4,729,066
2028	Cactus Road – 67 th Avenue to 75 th Avenue (3:M:3)	\$5,348,620
2029	Peoria Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)	\$5,244,502
2030	Olive Avenue – 83 rd Avenue to Loop 101 (3:M:3)	\$4,840,171
2031	83 rd Avenue – Northern Avenue to Olive Avenue (2:1:2)	\$4,218,852
2032	Cactus Road – 75 th Avenue to 83 rd Avenue (3:M:3)	\$5,398,959
2033	83 rd Avenue – Olive Avenue to Grand Avenue Bypass (2:1:2)	\$1,493,489
2034	83 rd Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$7,387,863
2035	Olive Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)	\$3,606,907
2036	Olive Avenue – 67 th Avenue to 75 th Avenue (3:M:3)	\$4,666,630
2037	107 th Avenue – Union Hills Drive to Beardsley Road (2:1:2)	\$2,950,345
2038	Peoria Avenue – 83 rd Avenue Bypass to 83 rd Avenue 3:M:3 w/ bike lanes)	\$8,754,810
2039	Pinnacle Peak Road – 107 th Avenue to Lake Pleasant Road (2:1:2 w/ bike lanes)	\$4,875,813
2040	107 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$7,181,340
2041	107 th Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)	\$5,820,979
2042	91 st Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$7,598,525
2043	Happy Valley Road and 67 th Avenue Intersection	\$3,140,270
	Total	\$133,086,263

* all costs were determined in 2004 dollars

1.4.7 Phase I and II Projects CIP Cost Summary

The costs of the phase I and II projects were broken down into categories that are used in the City of Peoria’s CIP budget. The categories of cost are as follows: right of way, design, construction and post construction/administration. The cost breakdown is shown in Tables 5 and 6.

Table 5
Phase I CIP Cost Summary

Project Name	Right-of-Way	Design	Construction	Post Construction / Administration	Total
67 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2)	\$572,000	\$266,156	\$4,734,952	\$443,593	\$6,016,701
Deer Valley Road – 83 rd Avenue to 91 st Avenue (2:1:2 w/ bike lanes)	\$0	\$314,057	\$3,653,422	\$523,428	\$4,490,907
91 st Avenue and Peoria Intersection	\$654,000	\$147,970	\$2,141,356	\$291,614	\$3,234,940
91 st Avenue and Olive Avenue Intersection	\$515,000	\$174,446	\$2,169,950	\$290,744	\$3,150,140
91 st Avenue – Olive Avenue to Peoria Avenue (2:M:2)	\$172,400	\$286,281	\$4,597,098	\$477,135	\$5,532,914
Northern Avenue – 107 th Avenue to 115 th Avenue (2:1:2)	\$0	\$128,819	\$2,189,117	\$214,698	\$2,532,634
Thunderbird Road and 83 rd Avenue	\$596,000	\$220,678	\$2,908,853	\$367,797	\$4,093,328
Thunderbird Road – 83 rd Avenue to Loop 101 (3:M:3 w/ bike lanes)	\$148,630	\$116,683	\$1,409,105	\$194,472	\$1,868,890
91 st Avenue and Cactus Road Intersection	\$375,000	\$141,970	\$2,299,353	\$236,617	\$3,052,940
91 st Avenue and Northern Avenue	\$1,028,560	\$149,848	\$1,955,915	\$249,747	\$3,384,070
91 st Avenue – Northern Avenue to Olive Avenue (3:M:3)	\$478,400	\$255,832	\$5,342,412	\$426,386	\$6,503,030
Thunderbird Road – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes)	\$306,184	\$444,326	\$5,320,152	\$740,543	\$6,811,205
67 th Avenue and Cactus Road (west leg only)	\$119,500	\$72,501	\$815,969	\$120,835	\$1,128,805
67 th Avenue – Peoria Avenue to Cactus Road (west back of curb improvements)	\$0	\$53,369	\$2,136,932	\$88,949	\$2,279,250
67 th Avenue and Thunderbird Road (west leg only)	\$272,000	\$70,095	\$779,660	\$116,825	\$1,238,580
67 th Avenue, Cactus Road to Thunderbird Road	\$0	\$70,118	\$2,362,394	\$116,863	\$2,549,375
67 th Avenue, Thunderbird Road to ACDC	\$0	\$33,043	\$1,058,200	\$55,072	\$1,146,315
Thunderbird Road – 91 st Avenue to 99 th Avenue (3:M:3)	\$29,164	\$246,004	\$2,627,631	\$410,007	\$3,312,806
67 th Avenue and Peoria Avenue (west leg only)	\$0	\$34,465	\$384,708	\$57,442	\$476,615
67 th Avenue – Olive Avenue to Peoria Avenue (west back of curb improvements)	\$0	\$50,340	\$2,207,375	\$83,900	\$2,341,615
99 th Avenue – Northern Avenue to Olive Avenue (2:1:2 realign back to original alignment with bridge)	\$102,800	\$530,055	\$7,019,036	\$883,425	\$8,535,316
75 th Avenue and Peoria Avenue	\$243,220	\$188,550	\$638,560	\$2,014,250	\$3,084,580
83 rd Avenue and Olive Avenue	\$327,000	\$134,873	\$1,642,864	\$224,788	\$2,329,525
Grand Total:					\$79,094,481

Table 6
Phase II CIP Cost Summary

Project Name	Right-of-Way	Design	Construction	Post Construction / Administration	Total
83 rd Avenue and Cactus Road Intersection	\$492,300	\$360,134	\$4,938,397	\$600,223	\$6,391,054
83 rd Avenue and Deer Valley Intersection	\$340,500	\$291,744	\$3,312,245	\$486,240	\$4,430,729
83 rd Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)	\$84,480	\$222,442	\$4,426,356	\$370,737	\$5,104,015
Thunderbird and 75 th Avenue Intersection	\$752,000	\$242,723	\$3,487,273	\$404,630	\$4,886,626
Thunderbird Road – 75 th Avenue to 83 rd Avenue (3:M:3 w/ bike lanes)	\$156,000	\$274,761	\$5,133,094	\$1,000,000	\$6,020,790
Thunderbird Road – 67 th Avenue to 75 th Avenue (3:M:3 w/ bike lanes 71 st Av to 75 th Av)	\$187,600	\$209,135	\$3,961,494	\$348,559	\$4,706,788
Union Hills Drive and 91 st Avenue Intersection	\$599,000	\$229,380	\$2,751,879	\$382,300	\$3,962,559
Union Hills Drive – 83 rd Avenue to 91 st Avenue (3:M:3 w/ bike lanes)	\$104,000	\$308,574	\$3,684,319	\$514,290	\$4,611,183
Peoria Avenue – 67 th Avenue to 75 th Avenue (3:M:3)	\$25,800	\$279,369	\$4,946,594	\$465,615	\$5,717,378
75 th Avenue and Cactus Intersection	\$519,500	\$254,871	\$3,527,910	\$424,785	\$4,727,066
Cactus Road – 67 th Avenue to 75 th Avenue (3:M:3)	\$133,600	\$228,140	\$4,606,647	\$380,233	\$5,348,620
Peoria Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)	\$50,760	\$211,385	\$4,630,048	\$352,309	\$5,244,502
Olive Avenue – 83 rd Avenue to Loop 101 (3:M:3)	\$11,040	\$228,965	\$4,218,557	\$381,609	\$4,840,171
83 rd Avenue – Northern Avenue to Olive Avenue (2:1:2)	\$8,800	\$172,514	\$3,750,015	\$287,523	\$4,218,852
Cactus Road – 75 th Avenue to 83 rd Avenue (3:M:3)	\$26,280	\$237,300	\$4,739,879	\$395,500	\$5,398,959
83 rd Avenue – Olive Avenue to Grand Ave Bypass (2:1:2)	\$0	\$172,237	\$1,034,190	\$287,062	\$1,493,489
83 rd Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$598,000	\$347,828	\$5,862,322	\$579,713	\$7,387,863
Olive Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)	\$10,680	\$143,138	\$3,214,525	\$238,564	\$3,606,907
Olive Avenue – 67 th Avenue to 75 th Avenue (3:M:3)	\$10,680	\$216,031	\$4,079,868	\$360,051	\$4,666,630
107 th Avenue – Union Hills Drive to Beardsley Road (2:1:2)	\$19,000	\$216,714	\$2,353,441	\$361,190	\$2,950,345
Peoria Avenue – 83 rd Avenue Bypass to 83 rd Avenue (3:M:3 w/ bike lanes)	\$654,000	\$452,240	\$6,894,837	\$753,733	\$8,754,810
Pinnacle Peak Road – 107 th Avenue to Lake Pleasant Road (2:1:2 w/ bike lanes)	\$1,639,200	\$299,040	\$2,555,839	\$381,734	\$4,875,813
107 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$1,110,812	\$263,585	\$5,367,635	\$439,308	\$7,181,340
107 th Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)	\$308,000	\$289,909	\$4,739,888	\$483,182	\$5,820,979
91 st Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)	\$686,000	\$397,242	\$5,853,213	\$662,070	\$7,598,525
Happy Valley Road and 67 th Avenue Intersection	\$404,000	\$191,944	\$2,032,475	\$511,851	\$3,140,270
Grand Total:					\$133,086,263

1.5 DELIVERABLES

The project deliverables include concept drawings, data sheets and cost estimates.

The concept drawings show plan view geometrics for the design with the use of aerial photograph as a base map. The geometric concepts identify the roadway/intersection configuration, impacts to adjacent properties, right of way constraints/requirements and above ground utility impacts.

The project data sheets consist of an overview, assumptions, and constraints. The overview typically provides summaries of important project features involving number of lanes, right of way and the general characteristics of the project limits. The assumption section lists all assumptions used during the development of the geometric concepts. The constraints section identifies project constraints encountered while developing the geometric concepts. There is a miscellaneous section that consists of any project related notes that does not match the three other categories indicated.

Capital cost estimates are included for all Phase I and II projects. As previously indicated the preliminary estimates include a contingency factor, and costs for anticipated right of way, landscaping, traffic control, street lighting, and traffic signals if applicable. The cost estimates will provide a reasonable indication of the budget that is required to execute any individual project. All costs were calculated in 2004 dollars.

Project Data Sheet

PRELIMINARY COST ESTIMATE

Project No. 1 – Phase I

Project Name: 67th Avenue, Pinnacle Peak Road to Happy Valley Road (No Bike Lanes)

Proposed Typical Section: 2 lanes in each direction plus a continuous center turn lane

Overview:

1. The design concept utilized all of the roadway improvements constructed by developers along 67th Avenue. In some areas, the development assumed ultimate conditions for a 3:1:3.
2. Where the roadway has not been improved, existing pavement section is typically one lane in each direction.
3. Existing right of way varies along the corridor.
4. New traffic signals are being proposed at Parkside and Calle Lejos intersections.
5. The traffic signal pole at the southwest quadrant of Happy Valley Road and 67th Avenue intersection will require relocation to accommodate the roadway improvements.

Assumptions:

1. In the already developed areas, 3 through lanes can be accommodated. This area is evident along the northbound direction from Soft Wind Dr to Happy Valley Road.
2. The street lights were estimated based on 200-ft spacing throughout the project limits.

Constraints:

1. No constraints.

Miscellaneous:

1. Improvements to the intersection of 67th Avenue and Happy Valley Road are included in Phase II, Project No. 26
2. Drainage facilities including those that are recommended in the Glendale / Peoria Area Master Plan and Master Plan Update are necessary for the implementation of the roadway project. These drainage facilities are not specifically identified and are not included in the cost estimate. Please refer to the ADMP and the ADMP update for additional information.

Project No. 1 - Phase I

City of Peoria Transportation Needs Study
Phase I: 67th Ave, Pinnacle Peak Road to Happy Valley Road

ITEM	UNIT	UNIT PRICE	QUANTITY	COST
Coldmilling	SQ FT	\$1.50	337,550.00	\$506,325
NPDES	LS	\$3,000.00	1.00	\$3,000
Pavt Sawcut	LF	\$1.15	1,050.00	\$1,208
Removal of AC	SQ YD	\$1.50	50.00	\$75
Removal of Curb & Gutter	LF	\$2.00	4,000.00	\$8,000
Removal of Sidewalk	SQ FT	\$1.50	3,600.00	\$5,400
Removal of Sidewalk Ramp	EA	\$400.00	2.00	\$800
Asphaltic Concrete (3.5 inch)	SQ YD	\$6.75	14,200.00	\$95,850
Subgrade Preparation	SQ YD	\$4.50	14,600.00	\$65,700
Asphalt Rubber Overlay (1.5 inch)	SQ YD	\$4.55	51,600.00	\$234,780
Aggregate Base Course (12 inch)	SQ YD	\$7.00	14,600.00	\$102,200
Vertical Curb & Gutter	LF	\$9.50	8,150.00	\$77,425
Sidewalk, 6 feet	SQ FT	\$2.75	52,000.00	\$143,000
Sidewalk Ramp	EA	\$1,200.00	20.00	\$24,000
Driveway	EA	\$2,000.00	7.00	\$14,000
Noise Wall (8ft)	LF	\$150.00	2,600.00	\$390,000
Street Lighting (including trench/conduit)	EA	\$4,000.00	24.00	\$96,000
Miscellaneous Utility Work	LS	\$5,000.00	1.00	\$5,000
Modify Existing Traffic Signal	LS	\$30,000.00	1.00	\$30,000
Signing & Striping	LS	\$40,000.00	1.00	\$40,000
Traffic Control	LS	\$75,000.00	1.00	\$75,000
Construction Survey	LS	\$50,000.00	1.00	\$50,000
Signal Interconnect Conduit	LF	\$13.00	5,400.00	\$70,200
Install New Traffic Signal	EA	\$90,000.00	2.00	\$180,000
Sub Total				\$2,217,963
Landscape, Streetscape & Irrigation	SQ FT	\$2.50	193,400.00	\$483,500
Mobilization (5%)				\$110,898
Project Design (12%)				\$266,156
Construction Administration (12%)				\$266,156
Engineering Administration (8%)				\$177,437
Contingencies (20%)				\$443,593
Right of Way Acquisition	SQ FT	\$4.00	143,000.00	\$572,000
Direct Costs: Bury Electric Lines	LF	\$255.00	5,800.00	\$1,479,000
Total Construction Cost				\$6,016,701

Project Data Sheet

Project No. 23– Phase I

Project Name: 83rd Avenue & Olive Avenue Intersection (No Bike Lanes Required)
Type 1 Intersection, Category B

Overview:

1. The proposed configuration does not significantly impact adjacent properties.

Assumptions:

1. 11' lanes were used to minimize right of way takes. 12' lanes could be used without apparent conflicts except for the additional right of way.

Constraints:

1. Additional right of way will be required in the four quadrants. However, it appears that adequate right of way is present along the west side of 83rd Avenue within the southwestern quadrant.
2. The intersection improvements will impact an open canal within the southeastern quadrant. Our recommendation is to enclose the affected portions of the canal.
3. The raised median will impact access to the existing gas station within the northwestern quadrant.

Miscellaneous:

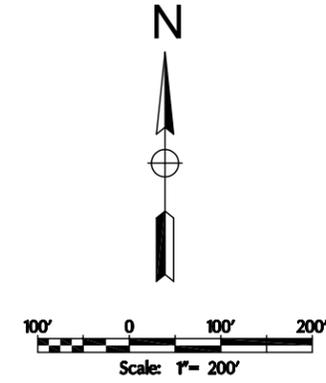
1. The following design features and elements should be considered: Street Lighting, Design turning vehicles and sight triangles.
2. The east and west legs will be improved to 3:M:3 in Phase II, Project No. 13.
3. Drainage facilities including those that are recommended in the Glendale / Peoria Area Master Plan and Master Plan Update are necessary for the implementation of the roadway project. These drainage facilities are not specifically identified and are not included in the cost estimate. Please refer to the ADMP and the ADMP update for additional information.

PRELIMINARY COST ESTIMATE

Project No. 23 - Phase I

City of Peoria Transportation Needs Study
Phase I: Olive Ave & 83 - Intersection

ITEM	UNIT	UNIT PRICE	QUANTITY	COST
Coldmilling	SQ FT	\$1.50	144,500.00	\$216,750
Pipe Existing Tailwater Ditch	LF	\$90.00	620.00	\$55,800
NPDES	LS	\$3,000.00	1.00	\$3,000
Pavt Sawcut	LF	\$1.15	6,500.00	\$7,475
Removal of AC	SQ YD	\$1.50	2,200.00	\$3,300
Removal of Curb & Gutter	LF	\$2.00	100.00	\$200
Removal of Sidewalk	SQ FT	\$2.00	350.00	\$700
Removal of Sidewalk Ramp	EA	\$400.00	3.00	\$1,200
Asphaltic Concrete (3.5 inch)	SQ YD	\$6.75	4,440.00	\$29,970
Subgrade Preparation	SQ YD	\$4.50	4,880.00	\$21,960
Asphalt Rubber Overlay (1.5 inch)	SQ YD	\$4.55	20,500.00	\$93,275
Aggregate Base Course (12 inch)	SQ YD	\$7.00	4,880.00	\$34,160
Vertical Curb & Gutter	LF	\$9.50	6,400.00	\$60,800
Single Curb	LF	\$7.00	6,000.00	\$42,000
Sidewalk, 6 feet	SQ FT	\$2.75	38,400.00	\$105,600
Sidewalk Ramp	EA	\$1,200.00	4.00	\$4,800
Concrete Driveway	EA	\$2,000.00	2.00	\$4,000
Intersection Lighting (including trench/conduit)	LS	\$60,000.00	1.00	\$60,000
Miscellaneous Utility Work	LS	\$10,000.00	1.00	\$10,000
Signal Interconnect Conduit	LF	\$13.00	4,150.00	\$53,950
Remove and Install New Traffic Signal	LS	\$175,000.00	1.00	\$175,000
Signing & Striping	LS	\$30,000.00	1.00	\$30,000
Traffic Control	LS	\$65,000.00	1.00	\$65,000
Construction Survey	LS	\$45,000.00	1.00	\$45,000
Sub Total				\$1,123,940
Landscape, Streetscape & Irrigation	SQ FT	\$2.50	89,975.78	\$224,939
Mobilization (5%)				\$56,197
Project Design (12%)				\$134,873
Construction Administration (12%)				\$134,873
Engineering Administration (8%)				\$89,915
Contingencies (20%)				\$224,788
Right of Way Acquisition	SQ FT	\$10.00	32,700.00	\$327,000
Direct Costs: Underground Irrigation Canal	LF	\$130.00	100.00	\$13,000
Total Construction Cost				\$2,329,525



CITY OF PEORIA
 TRANSPORTATION DEPARTMENT
 8401 W. MONROE STREET
 PEORIA, ARIZONA 85345 (623) 773-7000

PHASE 1
PROJECT 23

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City of Peoria
Transportation Needs Study
 83rd Ave / Olive Ave Intersection
DESIGN CONCEPT

URS
 7720 N. 18th Street
 Phoenix, Arizona 85020
 (602) 371-1100

263-1100
 Blue States Center
 CALL COLLECT

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 PLOTTING DATE: 08-23-04
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OF 1

Project Data Sheets

PRELIMINARY COST ESTIMATE

Project No. 14 – Phase II

Project Name: 83rd Ave., Northern Ave. to Olive Ave.

Proposed Typical Section: 2 lanes in each direction with a center left turn lane.

Overview:

- Roadway improvements consist of pavement widening, mill and overlay.
- The existing conditions for 83rd Avenue is one lane in each direction with a center turning lane. The section is widened at Northern for a right turn lane and between Las Palmaritas Dr. & Alice Ave. for an additional southbound lane.

Assumptions:

- The intersection of 83rd Ave. & Olive Ave. are programmed for construction in Phase I, Project No. 22.
- The right of way along 83rd Ave. varies between 40' and 65' from the section line.
- The additional right of way required at the intersection of Olive Ave. will be acquired during the intersection project.

Constraints:

- There are three sections that require additional rights of way. The existing rights of way in these areas vary between 40' & 43'.

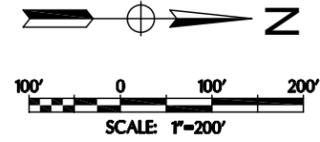
Miscellaneous:

- Drainage facilities including those that are recommended in the Glendale / Peoria Area Master Plan and Master Plan Update are necessary for the implementation of the roadway project. These drainage facilities are not specifically identified and are not included in the cost estimate. Please refer to the ADMP and the ADMP update for additional information.

Project No. 14 - Phase II

City of Peoria Transportation Needs Study
Phase II: 83rd Avenue, Northern Ave to Olive Ave

ITEM	UNIT	UNIT PRICE	QUANTITY	COST
Coldmilling	SQ FT	\$1.50	196,300.00	\$294,450
NPDES	LS	\$3,000.00	1.00	\$3,000
Pavt Sawcut	LF	\$1.15	1,000.00	\$1,150
Removal of AC	SQ YD	\$1.50	200.00	\$300
Removal of Curb & Gutter	LF	\$2.00	200.00	\$400
Removal of Sidewalk	SQ FT	\$1.50	2,950.00	\$4,425
Removal of Sidewalk Ramp	EA	\$400.00	2.00	\$800
Remove Fence	LF	\$2.50	300.00	\$750
Remove Wall	LF	\$15.00	260.00	\$3,900
Obliterate Existing Building	EA	\$4,000.00	2.00	\$8,000
Remove Fence	LF	\$2.00	120.00	\$240
Asphaltic Concrete (3.5 inch)	SQ YD	\$6.75	13,600.00	\$91,800
Subgrade Preparation	SQ YD	\$4.50	14,100.00	\$63,450
Asphalt Rubber Overlay (1.5 inch)	SQ YD	\$4.55	35,450.00	\$161,298
Aggregate Base Course (12 inch)	SQ YD	\$7.00	14,100.00	\$98,700
Vertical Curb & Gutter	LF	\$9.50	8,100.00	\$76,950
Sidewalk, 6 feet	SQ FT	\$2.75	48,800.00	\$134,200
Sidewalk Ramp	EA	\$1,200.00	4.00	\$4,800
Driveway	EA	\$2,000.00	13.00	\$26,000
Noise Wall (8 foot)	LF	\$80.00	2,100.00	\$168,000
Street Lighting (including trench/conduit)	EA	\$4,000.00	20.00	\$80,000
Miscellaneous Utility Work	LS	\$10,000.00	1.00	\$10,000
Modify Existing Traffic Signal	LS	\$40,000.00	1.00	\$40,000
Signing & Striping	LS	\$40,000.00	1.00	\$40,000
Traffic Control	LS	\$75,000.00	1.00	\$75,000
Construction Survey	LS	\$50,000.00	1.00	\$50,000
Sub Total				\$1,437,613
Landscape, Streetscape & Irrigation	SQ FT	\$2.50	90,000.00	\$225,000
Mobilization (5%)				\$71,881
Project Design (12%)				\$172,514
Construction Administration (12%)				\$172,514
Engineering Administration (8%)				\$115,009
Contingencies (20%)				\$287,523
Right of Way Acquisition	SQ FT	\$4.00	2,200.00	\$8,800
Direct Costs: Bury Overhead Electric Lines	LF	\$255.00	6,600.00	\$1,683,000
Encasement of Irrigation Canal	LF	\$150.00	300.00	\$45,000
Total Construction Cost				\$4,218,852



CITY OF PEORIA
 TRANSPORTATION DEPARTMENT
 8401 W. MONROE STREET
 PEORIA, ARIZONA 85345 (623) 773-7000

PHASE 2
 PROJECT 14

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	REVISIONS

City of Peoria
Transportation Needs Study
 83rd Ave, Northern Ave to Olive Ave
 DESIGN CONCEPT

URS
 7720 N. 18th Street
 Phoenix, Arizona 85020
 (602) 371-1100

263-1100
 Blue States Center
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FILE NAME: L089C_PCP_HVR_PLN01
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 OF 1

Project Data Sheets

Project No. 16 – Phase II

Project Name: 83rd Ave., Olive Ave. to Grand Ave. Bypass

Proposed Typical Section: 2 lanes in each direction with a center left turn lane.

Overview:

1. Roadway improvements will consist of pavement widening, mill and overlay.
2. The existing conditions for 83rd Ave. is one lane in each direction with a center turning lane between Olive Ave. and Hatcher Rd. The section is widened for a right turn lane, between Hatcher Rd. & Mountain View Rd on the east side.
3. The roadway section between Hatcher and Mountain View does not require additional widening.
4. The project will match the 83rd Avenue Realignment project at Mountain View.

Assumptions:

1. The intersection of 83rd Ave. & Olive Ave. is included in Phase I, Project No. 22.
2. The right of way along 83rd Ave. varies between 55' and 65'.
3. The north end of this project will tie into the 83rd Realignment Project.
4. The additional right of way required at the intersection of Olive Ave. will be acquired as part of the intersection improvements.

Constraints:

1. The total improvement width using a 2:1:2 roadway section is 61' from face of curb to face of curb.

Miscellaneous:

1. No additional right of way is needed.
2. Drainage facilities including those that are recommended in the Glendale / Peoria Area Master Plan and Master Plan Update are necessary for the implementation of the roadway project. These drainage facilities are not specifically identified and are not included in the cost estimate. Please refer to the ADMP and the ADMP update for additional information.

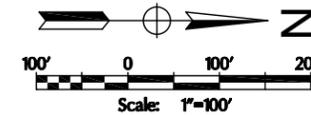
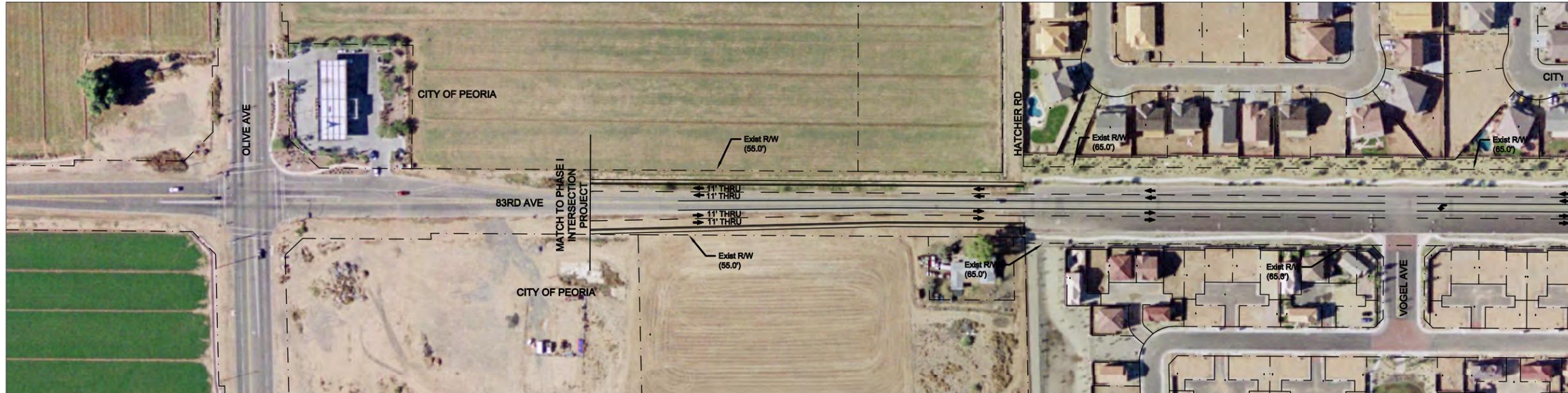
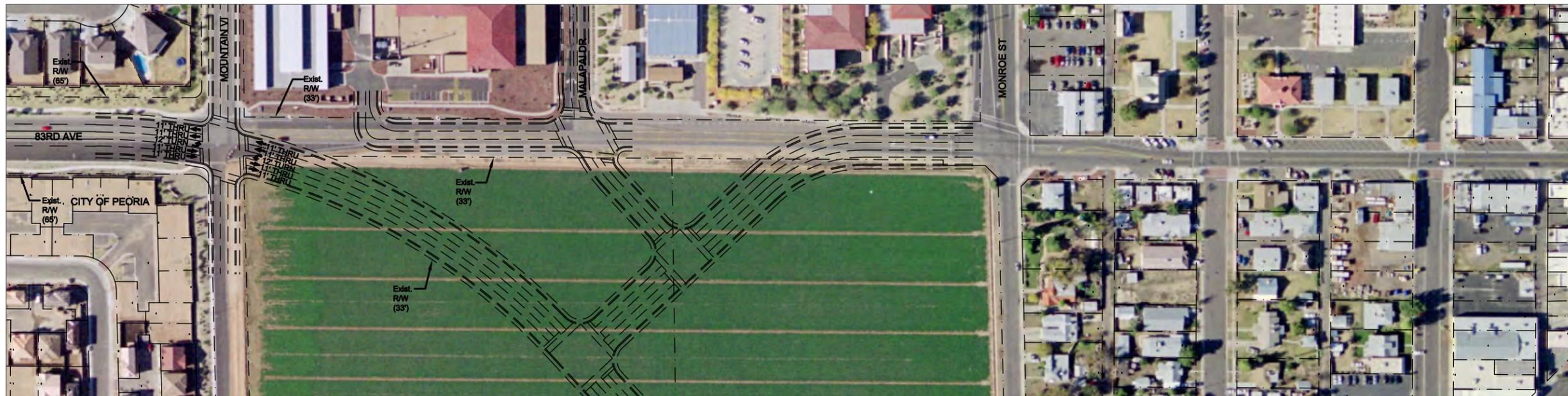
PRELIMINARY COST ESTIMATE

Project No. 16 - Phase II

City of Peoria Transportation Needs Study

Phase II: 83rd Avenue, Olive Ave to Grand Ave Bypass

ITEM	UNIT	UNIT PRICE	QUANTITY	COST
Coldmilling	SQ FT	\$1.50	109,800.00	\$164,700
Relocate Existing Irrigation Pipe	LF	\$130.00	600.00	\$78,000
NPDES	LS	\$3,000.00	1.00	\$3,000
Pavt Sawcut	LF	\$1.15	1,700.00	\$1,955
Removal of AC	SQ YD	\$1.50	1,000.00	\$1,500
Asphaltic Concrete (3.5 inch)	SQ YD	\$6.75	3,080.00	\$20,790
Subgrade Preparation	SQ YD	\$4.50	3,200.00	\$14,400
Asphalt Rubber Overlay (1.5 inch)	SQ YD	\$4.55	15,300.00	\$69,615
Aggregate Base Course (12 inch)	SQ YD	\$7.00	3,200.00	\$22,400
Vertical Curb & Gutter	LF	\$9.50	2,000.00	\$19,000
Sidewalk, 6 inch	SQ FT	\$2.75	11,800.00	\$32,450
Street Lighting	EA	\$4,000.00	9.00	\$36,000
Miscellaneous Utility Work	LS	\$10,000.00	1.00	\$10,000
Noise Wall (8 foot)	LF	\$150.00	2,500.00	\$375,000
Sub Total				\$848,810
Landscape, Streetscape & Irrigation	SQ FT	\$2.50	23,600.00	\$59,000
Signing & Striping (4%)				\$33,952
Traffic Control (5%)				\$42,441
Mobilization (5%)				\$42,441
Construction Survey (3%)				\$25,464
Project Design (12%)				\$101,857
Construction Administration (12%)				\$101,857
Engineering Administration (8%)				\$67,905
Contingencies (20%)				\$169,762
Direct Cost: Bury OH Electric Lines	LF	\$255.00	2,300.00	\$586,500
Total Construction Cost				\$1,493,489



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City of Peoria
Transportation Needs Study
 83rd Ave, Olive Ave to Grand Ave Bypass
 DESIGN CONCEPT

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PHASE 2
PROJECT 16

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 TRANSPORTATION DEPARTMENT
 8401 W. MONROE STREET
 PEORIA, ARIZONA 85345 (623) 773-7000

SECTION 2 – OPERATION AND MAINTENANCE COSTS FOR PHASE I AND II PROJECTS

2.0 INTRODUCTION

The City of Peoria has requested estimates of future operation and maintenance (O&M) costs for the projects identified in the Peoria Transportation Needs Assessment. The following O&M estimates include the projects identified as the Phase I and II projects in the needs assessment. The Phase I projects are listed as follows:

**Table 7
Phase I Projects Priority List**

1.	67 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2)
2.	Deer Valley Road – 83 rd Avenue to 91 st Avenue (2:1:2 w/ bike lanes)
3.	Peoria Avenue – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes) and 91 st Avenue/Peoria Intersection
4.	91 st Avenue and Olive Avenue
5.	91 st Avenue – Olive Avenue to Peoria Avenue (2:M:2)
6.	Northern Avenue – 107 th Avenue to 115 th Avenue (2:1:2)
7.	Thunderbird Road and 83 rd Avenue
8.	Thunderbird Road – 83 rd Avenue to Loop 101 (3:M:3 w/ bike lanes)
9.	91 st Avenue – Grand Avenue to Cactus Road (3:M:3) and 91 st Avenue and Cactus Road Intersection
10.	91 st Avenue and Northern Avenue
11.	91 st Avenue – Northern Avenue to Olive Avenue (3:M:3)
12.	Thunderbird Road – Loop 101 to 91 st Avenue (3:M:3 w/ bike lanes)
13.	67 th Avenue and Cactus Road (west leg only)
14.	67 th Avenue – Peoria Avenue to Cactus Road (west back of curb improvements)
15.	67 th Avenue and Thunderbird Road (west leg only)
16.	67 th Avenue – Cactus Road to ACDC (west back of curb improvements)
17.	Thunderbird Road – 91 st Avenue to 99 th Avenue (3:M:3)
18.	67 th Avenue and Peoria Avenue (west leg only)
19.	67 th Avenue – Olive Avenue to Peoria Avenue (west back of curb improvements)
20.	99 th Avenue – Northern Avenue to Olive Avenue (2:1:2 realign back to original alignment with bridge)
21.	75 th Avenue and Peoria Avenue
22.	83 rd Avenue and Olive Avenue

**Table 8
Phase II Projects Priority List**

1.	83 rd Avenue and Cactus Road Intersection
2.	83 rd Avenue and Deer Valley Intersection
3.	83 rd Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)
4.	Thunderbird and 75 th Avenue Intersection
5.	Thunderbird Road – 75 th Avenue to 83 rd Avenue (3:M:3 w/ bike lanes)
6.	Thunderbird Road – 67 th Avenue to 75 th Avenue (3:M:3 w/ bike lanes) 71 st Avenue to 75 th Avenue)
7.	Union Hills Drive and 91 st Avenue Intersection
8.	Union Hills Drive – 83 rd Avenue to 91 st Avenue (3:M:3 w/ bike lanes)
9.	Peoria Avenue – 67 th Avenue to 75 th Avenue (3:M:3)
10.	75 th Avenue and Cactus Intersection
11.	Cactus Road – 67 th Avenue to 75 th Avenue (3:M:3)
12.	Peoria Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)
13.	Olive Avenue – 83 rd Avenue to Loop 101 (3:M:3)
14.	83 rd Avenue – Northern Avenue to Olive Avenue (2:1:2)
15.	Cactus Road – 75 th Avenue to 83 rd Avenue (3:M:3)
16.	83 rd Avenue – Olive Avenue to Grand Avenue Bypass (2:1:2)
17.	83 rd Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
18.	Olive Avenue – 75 th Avenue to 83 rd Avenue (3:M:3)
19.	Olive Avenue – 67 th Avenue to 75 th Avenue (3:M:3)
20.	107 th Avenue – Union Hills Drive to Beardsley Road (2:1:2)
21.	Peoria Avenue – 83 rd Avenue Bypass to 83 rd Avenue 3:M:3 w/ bike lanes)
22.	Pinnacle Peak Road – 107 th Avenue to Lake Pleasant Road (2:1:2 w/ bike lanes)
23.	107 th Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
24.	107 th Avenue – Deer Valley Road to Pinnacle Peak Road (2:1:2 w/ bike lanes)
25.	91 st Avenue – Pinnacle Peak Road to Happy Valley Road (2:1:2 w/ bike lanes)
26.	Happy Valley Road and 67 th Avenue Intersection

2.1 EXISTING CITY OF PEORIA MAINTENANCE COSTS

The Public Works Department Streets Division staff provided historical, average maintenance cost data for streets. The information provided to URS included:

5-Year Pavement Management Plan, July 2003

City of Peoria Detail Budget, Fiscal Year 2004

City of Peoria Public Works Department Streets Division Pavement Management Program Strategy Plan Fiscal Year 2004

Average Maintenance Cost for Streets Spreadsheets, Fiscal Year 2003

A review of the Average Maintenance Cost for Streets Fiscal Year 2003 spreadsheets was conducted in conjunction with a review of the City of Peoria Expenditure Report to ensure that the maintenance costs included items such as equipment, manpower, materials and related overhead costs. The appropriate costs were verified and included. Landscape maintenance costs were obtained from the City and incorporated into the overall O&M cost evaluation.

2.2 DERIVATION OF UNIT COSTS FOR OPERATION & MAINTENANCE

The O&M cost data provided by the City was broken down into average cost per linear mile for various lane configurations. Each O&M task was further analyzed resulting in the following cost breakdown:

Street Maintenance - The annual cost of street maintenance was broken down by cost per lane-mile. This calculated to be \$4780.00 per lane mile per year for arterials. The cost derivation is obtained from dividing the total annual cost of maintenance for arterial streets by the total lane miles of arterial streets (\$1,244,671 / 260 lane miles).

Street Sweeping and Pavement Markings - For street sweeping and pavement markings, an annual cost per lane-mile of \$820.00 and \$1,734.50 respectively, was calculated. The cost derivation for street sweeping is obtained by dividing the annual cost of all sweeping by the total lane miles of sweeping (\$213,397 / 260). The annual cost for pavement markings is obtained by taking 85% of the total annual cost of pavement marking and dividing by the total linear miles of arterial streets which is multiplied by the average number of lanes per arterial mile ($\$531,368 * 0.85 / (62 * 4.2)$).

Discussion with the Public Works Department Streets Division staff indicates that 85 percent of the total cost for pavement marking is expended on arterial streets followed by 10 percent and 5 percent respectively for collector and residential streets.

Signs - The annual O&M cost for signs was broken down by cost per mile and therefore an annual cost per mile of \$1104.00 was established. The cost derivation is the cost of all signs for arterials divided by the miles of arterials. $\$68,465/62$.

Street Lighting - Streetlight O&M costs were analyzed on an individual unit basis since the proposed improvements would be adding additional individual units of streetlights. This resulted in an annual O&M cost of \$91.74 per unit per year. The annual O&M cost for streetlights is calculated as the O&M cost of all streetlights for arterials divided by the total number of streetlights for all arterials ($\$183,482 / 2000$).

Traffic Signals - The annual O&M cost for traffic signals is calculated per intersection for 4 legs of signalization at \$12547.90. The cost was calculated as the annual O&M cost of all traffic signals divided by the number of signalized intersections ($\$777,970 / 62$).

2.3 APPLICATION OF DERIVED MAINTENANCE COSTS TO FUTURE OPERATION & MAINTENANCE COSTS

A preliminary construction cost estimate for each of the projects identified in the City of Peoria Transportation Needs Assessment has been prepared. These estimates have been created using conventional construction bid pay units such as lineal feet, square yards, square feet, tons, lump sum and cubic yard. In order to make use of the cities historical maintenance costs and to provide a useful future O & M cost estimate, the preliminary engineering cost estimate quantities were converted into the units used in the annual O&M costs identified above.

The unit of "lane-mile" was assigned to street sweeping, street maintenance and pavement markings. The unit of "per mile" was assigned to signs. The unit of "each" was assigned to street lighting and traffic signals. For the lane-mile items, the preliminary engineering cost estimate quantities are in units of square yards. These were converted to lane-miles by multiplying by 9 and dividing by 5280 and then dividing by 12 feet to generate the number of lanes.

Each arterial project was approximately 1 mile long allowing for the sign units to be "per mile" as was the case for the existing O&M data. The legs of the intersection projects were approximately ¼ mile in length so the intersection projects were generally, with a few exceptions, a mile each.

2.4 PROJECT SUMMARY ANALYSIS

The anticipated life expectancy for a new roadway as described in the City of Peoria Public Works Department FY04 Pavement Management Program Strategy Plan was used. For the proposed projects, the City is not expected to incur any maintenance costs in the first year since the projects will be under contractor warranty.

For the first 8 years following the contractor warranty period, the maintenance costs are assumed to increase linearly up to the annual rate currently being observed by Peoria.

For the remaining years, the maintenance costs will level off at the current costs being observed by the City and continue constant at that rate for the 20-year life of the project.

The O&M costs per annum per project listed in ascending order of construction year are shown in the attached maintenance and operating costs table that is sorted by project.

2.5 CONSTRUCTION SEQUENCING

In discussions with the City of Peoria, project priorities were established with respect to year of design, right of way acquisition and construction. The table below shows the projects involved and the year of construction.

**Table 9
Phase I Projects Year of Construction**

Phase I	
Project Number	Year of Construction
1 through 4	2007
5 through 8	2008
9 through 12	2010
13 through 16	2011
17 through 20	2013
21 and 22	2014

**Table 10
Phase II Projects Year of Construction**

Phase II	
Project Number	Year of Construction
1 and 2	2017
3 through 6	2018
7 through 10	2019
11 through 14	2021
15 through 18	2022
19 through 22	2024

The fiscal year projects and associated cost with cost totals per project are presented in the attached maintenance and operating costs table sorted by year.

2.6 FISCAL YEAR TOTALS

In order to assess the impact to Peoria’s annual O & M budget, a spreadsheet was created to show chronologically for each year, the projects O&M costs. As time moves forward additional projects are constructed and accordingly the O&M costs increase. By year 2015 all Phase 1 projects are expected to have been constructed and out of contractor warranty. By year 2024 all Phase II projects are expected to have been constructed and out of contractor warranty. In year 2023 all projects in Phase 1 will be experiencing the full historical O&M costs. In year 2033 all projects in Phase II will be experiencing full O&M costs. The cost of O&M at this point will have leveled off and be at a constant rate. Cumulative cost data showing each fiscal year’s expected O&M expenditure follows a typical S-Curve for cash flow. These figures are not adjusted for inflation and are expressed in year 2004 dollars. For Phase I, 2035 is the last year tracked as that represents the 20-year mark of the final two projects constructed as part of the Phase 1 program. For Phase II, 2046 is the last year tracked as that represents the 20-year mark of the final projects constructed as part of the Phase II program.