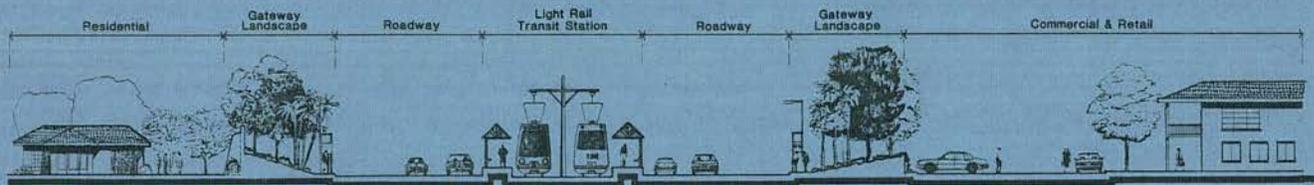


HURVIE E. DAVIS

CORRIDOR CONCEPT PLAN

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Broadway Corridor Transportation Study



**The City of Tucson
Department of Transportation**

Submitted by :
**Parsons Brinckerhoff
Quade & Douglas, Inc.**

In association with:
**Rillito Consulting Group, Inc.
COMSIS Corporation
Rogers, Gladwin & Harmony, Inc.
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RGA Engineering Corporation**

BROADWAY BOULEVARD CORRIDOR CONCEPT PLAN

Introduction

This document presents the Corridor Concept Plan for Broadway Boulevard in Tucson, Arizona. It is intended to guide the urban design context of Broadway while meeting the transportation needs of the corridor through the year 2005. The corridor plan is based on an 18-month study and evaluation of transportation alternatives and design concepts. It is also the culmination of a public involvement process which included over 50 meetings throughout the course of the study.

The purpose of the plan is to identify solutions to meet the anticipated travel demands in the corridor through the year 2005. The Broadway Corridor has also been identified as the priority corridor in the Tucson metropolitan area for consideration of a major transportation capital investment. It is the highest transit usage corridor with from 12,000 to 18,000 daily transit riders depending on the corridor limits used. The Broadway Corridor serves the Tucson downtown, the University of Arizona, two major regional shopping centers, an increasing number of office related jobs, and growing residential developments.

By the year 2005, the population of the Tucson metropolitan area is anticipated to increase by 648,000 (118%), and employment is projected to increase by 280,000 (158%). In the Broadway Corridor, as defined by the bounds of the Central Business District, Houghton Road, and a one-half mile area north and south of Broadway, anticipated growth in population is projected at 19,000 (44%), and an employment increase of 37,000 (106%) jobs is also forecasted. Since over 70% of the trips on Broadway have either an origin or destination within this narrowly defined corridor, the need for existing and future transportation improvements is high.

The public involvement process in the Broadway Corridor Study was extensive and will continue with review and action on the Corridor Concept Plan. In the course of the study, over 50 meetings were held with affected neighborhoods, neighborhood representatives, and the public at large in order to receive their input.

The Corridor Concept Plan is comprised of four major elements:

- 1) Widening of Broadway to provide a minimum 150 feet of right-of-way;
- 2) Buffering of adjacent residential areas;
- 3) Grade separations at warranted locations; and (7)
- 4) Further study of a major transit capital investment component.

Alternatives

From an initial list of 15 alternatives, detailed study was conducted for nine transportation alternatives identified in Table 1. The estimated total capital cost for each alternative is shown in Table 2. The capital costs include the right-of-way needed, buffering and landscaping, roadway construction, and transit capital items. For a detailed explanation of each alternative and the analysis process, refer to the Broadway Corridor Transportation Study, Draft Final Report.

The nine alternatives developed for detailed study included a "Do Nothing" alternative, four transit-only alternatives, three roadway-only alternatives, and one transportation systems management (TSM) alternative. The "Do Nothing" alternative assumed implementation of the transit levels identified in the Sun Tran Short Range Transit Plan (SRTP). For the other eight alternatives, a "Base" condition consisting of intensified bus service (expanded above the SRTP levels), minor access and intersection modifications to increase roadway capacity, and transportation demand management (TDM) options to reduce peak-hour auto vehicles was assumed and included in the analysis process.

TABLE 1
ALTERNATIVES STUDIED

| | | |
|----|---|----------------|
| 1. | Do Nothing - Implement SRTP Transit Levels | (SRTP) |
| 2. | Base Conditions - High Bus/TSM/TDM | (High Bus) |
| 3. | Reversible Operation 5th/6th Plus Base | (5th/6th) |
| 4. | Widen Intersections Where Necessary Plus Base | (Widen Int.) |
| 5. | Widen Broadway Where Necessary Plus Base | (Widen B'Way.) |
| 6. | Series of Grade Separations Plus Base | (GSI) |
| 7. | High Occupancy Vehicle Lanes Plus Base | (HOV) |
| 8. | Light Rail Transit Plus Base | (LRT) |
| 9. | Automated Guideway Transit Plus Base | (AGT) |

TABLE 2
TOTAL CAPITAL COSTS
(1986 \$ Thousands)

| ALT | ROW & RELOCATION | ROADWAY & LANDSCAPING COST | TRANSIT CAPITAL COST | TOTAL CAPITAL COST |
|------------------|---------------------|----------------------------------|----------------------------|--------------------------|
| 1 - SRTP | \$ 0 | \$ 0 | \$ 8,400 | \$ 8,400 |
| 2 - High Bus | 0 | 0 | 28,700 | 28,700 |
| 3 - 5th/6th | 0 | 800 | 29,200 | 30,000 |
| 4 - Widen Int. | 32,700 | 35,700 | 28,700 | 97,100 |
| 5 - Widen B'Way. | 44,500 | 34,900 | 28,700 | 108,100 |
| 6 - GSI | 1,000 | 64,100 | 28,700 | 93,800 |
| 7 - HOV | 44,500 | 54,400 | 32,800 | 131,700 |
| 8 - LRT, U of A | 44,500** | 57,200 | 144,500 | 246,200 |
| 9 - AGT, U of A | 44,500** | 54,000 | 229,000 | 327,500 |

**Transitway from Broadway to the U of A assumed to occur within existing ROW.

Environmental Considerations

Two key environmental considerations were analyzed in the course of this study; noise and air quality. The projected noise impacts were identified for eight locations along Broadway. Projected future noise levels will not exceed existing levels by more than three (3) decibels (dBA), which falls into the "barely noticeable" category. Future levels are projected to exceed FHWA guidelines for "B" types of land uses along the corridor irrespective of the alternative. Therefore, walls and berms are an integral part of the total package.

As part of the Broadway Corridor Study, the air quality implications of each of the alternatives were identified. Two types of analyses can be conducted for air quality: a microscale (localized); or a macroscale (regional) analysis. For this level of study, a microscale analysis was conducted in an effort to compare the effects associated with one alternative vis-a-vis another on the adjacent neighborhoods. Carbon monoxide (CO) concentrations were used as a measure in this localized analysis. The analysis results are presented in Table 3. Since CO levels are directly related to congestion, the alternative that does the most to reduce intersection congestion, is the implementation of grade separations.

TABLE 3
PREDICTED WORST CASE CARBON MONOXIDE LEVELS (PPM)¹

Location: Intersection of Broadway and Alvernon

| <u>ALTERNATIVE</u> | <u>ONE-HOUR</u> | <u>EIGHT-HOUR</u> |
|------------------------|-----------------|-------------------|
| 1985 Existing | 20.6 | 10.6 |
| 2005 No-Build (Alt. 1) | 11.7 | 6.0 |
| 2005 ALT 2 | 10.4 | 5.3 |
| 2005 ALT 3 | 10.0 | 5.1 |
| 2005 ALT 4 | 5.9 | 3.1 |
| 2005 ALTS 5,7,8,9 | 10.2 | 5.2 |
| 2005 ALT 6 | 5.4 | 2.8 |

The second type of air quality study is a macroscale analysis which looks at regional air quality concerns and generally focuses on ozone levels. Since ozone levels are related to the vehicle miles traveled (VMT), any alternative which reduces VMT will also reduce ozone levels as compared to the other alternatives. For each alternative analyzed in the Broadway Corridor Study, the exact same number of regional "person trips" were assigned to the various roadway and transit components in the corridor. Since the trips were either assigned to a transit or roadway component and the total remained constant. It can be assumed, therefore, that an increase in transit ridership results in a decrease in VMT for the region. So while the macroscale analysis was not conducted for this level of study, it can be inferred that the alternative with the highest transit ridership (Alternative 8) has the lowest VMT associated with it and the most positive impact on ozone levels. If further analysis in the Broadway Corridor occurs, both the localized and regional air quality impacts will be addressed in much greater detail.

Results

As documented in the Broadway Corridor Transportation Study report, no single alternative meets the future transportation needs of the corridor. However, combination of the alternatives analyzed will meet the needs of the Broadway Corridor through the year 2005. This combination of alternatives includes: 1) the inclusion of a major transit investment component (Express Bus-Alternative 2, High Occupancy Vehicle Lanes-Alternative 7, Light Rail Transit-Alternative 8) or Automated Guideway Transit - Alternative 9); which requires 2) the widening of Broadway (Alternative 5) in order to operate efficiently; and 3) the provision of a series of grade-separated intersections (Alternative 6).

Widening of Broadway

Broadway Boulevard should be widened between Downtown and Camino Seco (approximately 10 miles) to a minimum 150-foot right-of-way as is typically found east of Columbus Boulevard. The widening would require the purchase of commercial and residential properties on the north side of Broadway between Euclid and Randolph Way and on the south side between Alvernon and Columbus and between Wilnot and Jessica.

Urban Design Concepts

The implementation of the urban design and landscaping concepts which were presented in the draft Broadway Corridor Transportation Study report are an integral part of the Corridor Concept Plan. The design elements consist of four main components which include areas for transit system users and pedestrians; a landscape theme consisting of drought tolerant materials, which connects these areas; walls and berms to buffer the residential neighborhoods; and an overall design concept which accentuates the mountain views. The buffering of neighborhoods will occur in all areas where existing commercial or residential frontage along Broadway will be removed to accommodate the widening. Any areas where there is residual right-of-way, such as on the south side of Broadway, east of Country Club, the above-mentioned concepts should be employed to provide adequate buffering to the adjacent neighborhood. The landscaping concepts were developed with extensive public involvement and input and are consistent with those concepts developed by the joint ULI/AIA study and the PC Urban Design Commission.

Transit Considerations

The widening of Broadway to a 150-foot minimum right-of-way distance throughout the length of Broadway from Downtown to Camino Seco is necessary for the implementation of any of the transit components as well as to meet the automobile needs of the future. The widening does not preclude any options. Rather, it provides the opportunity for continued study and public involvement of the future transit options while maintaining the opportunity for future implementation if so desired.

As discussed in the study report, one option available to the City of Tucson is to explore the feasibility of continuing the federal involvement in further planning, design, and construction of a major transit capital investment project in the Broadway Corridor. In order to accomplish this, a clearly defined process must be undertaken with the support of the Federal Urban Mass Transportation Administration (UMTA). The study has documented that the Broadway Corridor meets the two threshold criteria established under UMTA's Major Capital Investment Policy. The study demonstrated that there are approximately 15,000 daily transit riders in the corridor and that the preliminary total cost-effectiveness index is not excessive.

Grade Separated Intersections

The candidate locations for grade separations are Euclid, Campbell, Alvernon, Swan, Craycroft, Wilmot, and Kolb. A projected 80,000 approach vehicle warrant must be met, and a positive vote of the electorate is required before any of the grade separated intersections are constructed.

Implementation Plan

The Corridor Concept Plan for the Broadway Corridor consists of four major elements:

- o Widening the existing narrow areas.
- o Buffering adjacent residential areas.
- o Grade separations at warranted locations.
- o Further study of transit components.

For a variety of reasons including costs, near-term need, and requirements to meet specified warrants, this plan will be implemented in increments over a 20-year period. The plan should and will be subject to continual review and technical and public input, and is, therefore, intended as a course of action, rather than a specific statement of what should occur when.

The recommended staged Implementation Plan for the Broadway Corridor is divided into five-year periods as follows:

- 1-5 Years:
- o Refine right-of-way needs and begin advanced ROW purchases.
 - o Further study of transit elements following UMTA criteria and leading to preparation of a federally sponsored Alternatives Analysis/Draft Environmental Impact Statement.
 - o Identify dedicated funding source and/or public approval of a budget override for transit funding.
 - o Preliminary design of roadway components.
 - o Public approval of grade-separated intersections.

- 5-10 Years:
 - o ROW acquisition.
 - o Final design and construction of roadway components.
 - o Preliminary engineering and design of transit components.
 - o Construction of landscaping and buffering components.
 - o Programming of grade separations.

- 10-15 Years:
 - o Construction of transit components.
 - o Construction of grade separations.

- 15-20 Years:
 - o Monitor and modify improvements as necessary.

Recommended Actions

From the outcome of the Broadway Corridor Transportation Study, the following items are recommended to the City of Tucson for the Broadway corridor:

1. Approve the Corridor Concept Plan and Draft Final Report for the Broadway Corridor Transportation Study as valid, appropriate, and proper.

2. Approve the key items of the Corridor Concept Plan which are:
 - o Minimum 150 feet of right-of-way between Euclid and Camino Seco; and a minimum 120 feet of right-of-way between Camino Sec and Houghton Road.

 - o Buffering of adjacent residential areas as outlined in the Broadway Corridor Transportation Study Draft Final Report.

 - o Landscaping and urban design concepts as identified in the Broadway Corridor Transportation Study Draft Final Report.

 - o Grade separations at warranted locations.

 - o Reaffirm Broadway Boulevard as a priority transit corridor for further study of transit options.

3. Approve the recommendation that a major transit capital investment project be pursued in conjunction with the Federal Urban Mass Transportation Administration.
4. Develop a Phase II Work Program requesting UMTA's participation and consent in the next phase of the major transit capital investment process, Alternatives Analysis and Draft Environmental Impact Statement (AA/DEIS).
5. Develop an advanced right-of-way acquisition plan for the Broadway Corridor.