# CHURCHMAN'S CROSSING STUDY

## April 1, 1997

NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

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## Introduction

*The purpose of the Churchman's Crossing Study is to develop a transportation/land use plan that supports the vision for Churchman's Crossing. The Phase II Study began in the summer of 1995 with the collection of technical data and the development of a proposed vision. The proposed vision was guided by three principals:*

- *Enhance the area's quality of life;*
- *Plan for sustainable growth and development; and*
- *Provide an opportunity for transportation choices.*

*The vision was presented at a public workshop on July 19, 1995. The public workshop involved the following:*

- *Phase I study results were reviewed;*
- *Public Input was solicited on the vision for Churchman's Crossing; and,*
- *The public was informed of the Phase II Study Milestones and Schedule.*

*The public workshop was well attended and input focused on quality of life, land use and transportation issues. The initial Phase II study effort and the results of the public workshop were summarized in a newsletter that was distributed following the public workshop.*

*Taking into consideration the results of the public workshop, the study effort then focused on:*

- *Land use*
- *Transit*
- *Travel Demand Management*
- *Roadways*

*A second Public Workshop was held on February 15, 1996 to present land use and transportation options and the preliminary results of the initial testing. The material presented was summarized in a public handout that included a summary of the study effort and results to date along with several supporting graphics.*

*The initial testing results indicated that several intersections in Churchman's Crossing still experienced serious congestion, even after the provision of enhanced transit service, transportation demand management measures and additional roadway connections. A significant portion of the congestion is caused by through traffic in the area, i.e., traffic with neither an origin or destination in Churchman's Crossing. This large portion of through traffic is due to the heavy demand to access I-95 (Delaware Turnpike) and SR 1.*

*The recent study effort involved a more detailed analysis of the problem intersections, the testing of additional land use scenarios, i.e., less development, slightly reconfigured development and a slower rate of growth. The study effort also included the development of capital and operating cost estimates for the various improvements. A package of recommended land use and transportation improvements, including phasing and costs, was developed and presented at a third public workshop on November 20, 1996 at Del Tech (Stanton Campus).*

*This document provides a summary of the Churchman's Crossing Infrastructure Investment Study findings and recommendations. It begins with an Executive Summary of the four major focus areas and a summary of the recommended multi-modal improvement program, including estimated capital and operating costs and an implementation schedule, based on current projections, for three time periods: 1996-2000, 2001-2005 and 2006-2020. The Executive Summaries are followed by a more detailed presentation of the study effort including findings and recommendations for each of the four focus areas.*

*The recommendations include a package of suggested improvements in the land use process and land use design guidelines, enhanced transit service, travel demand management (TDM) measures, various intersection improvements and new roadway connections. With the implementation of these land use and multi-modal transportation improvements, adequate infrastructure would be available to reasonably support existing, and committed/approved development. It is recommended however that requested rezonings and other land use proposals be required to include a detailed transportation analysis as part of their formal request, to assure that they do not result in unacceptable congestion.*

*To account for the unknown of "when will development actually occur", the study provides indicators that DelDOT, New Castle County and WILMAPCO would monitor closely in the future to determine when certain improvements should be implemented, assuming funding is available.*

*The study recommendations will be considered in the development of Del DOT's Capital Improvement Program (CIP), WILMAPCO's Transportation Improvement Program (TIP) and Metropolitan Transportation Plan (MTP) and the New Castle County Comprehensive Development Plan Update. The Study recommendations provide both a short term and long range conceptual plan for dealing with land use and transportation issues in Churchman's Crossing. The recommendations have not been assessed or tested with respect to federal, state and local environmental requirements. That analyses / evaluation will occur during the next phase of the project.*

*The recommendations should help retain the quality of life for the residents of Churchman's Crossing. The suggested improvements to the land use process and land use design guidelines will reduce the impact of future development. The recommendations are not meant to be "picked and chosen from" but complement each other as a package. The components are all necessary to maximize the potential for efficiently meeting the needs of the Churchman's Crossing area.The recommended solution is a package of improvements that will generally accommodate local traffic and through traffic while providing transportation choices to the residents, employees and shoppers in Churchman's Crossing.*

*The implementation of the package of improvements will require careful coordination between DelDOT, New Castle County, WILMAPCO, and the residents, employers and employees of Churchman's Crossing. The recommendations in this document are a starting point for that cooperative effort.*

*The next phase of the Churchman's Crossing effort will involve the identification and implementation of transit and travel demand management (TDM) early action items, along with the development of preliminary construction contract documents (20% complete) for the recommended intersection improvements and roadway connections (Churchman's Road Extension from SR4 to SR2 and Ramp from Churchman's Road to Northbound I-95, only). Implementation - Phase I will be coordinated with the public through a Steering Committee of representatives of local communities, employers and land owners and public workshops.*

# Executive Summary - Land Use

*The balancing and coordination of land use and transportation in the Churchman's Crossing Area is important to the quality of life for residents and businesses. The land use portion of this Study (1) examines land use planning and regulations, (2) analyzes options for change, and (3) recommends specific approaches to better balance and coordinate land use and transportation.*

*How people and business use their land is their choice, as long as these activities conform to laws, regulations and public policies designed to protect the public interest. How people and business use the publicly provided parts of the transportation system is also their choice. However, this study recognizes that public policies, which express the public interest in land use planning, land use regulations, and in planning and operating transportation systems, influence those choices. The public interest and policies are set through three basic land use planning activities: the Comprehensive Development Plan, Zoning and Subdivision Regulations (the Code), and Processes for Zoning and Subdivision Reviews --which reflect the responsibility of governments to protect the public health, safety, and welfare. In this area these responsibilities are shared by:*

- *County Council with the recommendation of the Planning Board, enacts code changes and approves rezonings.* ***New Castle County*** *(NCC) through the Department of Planning, prepares and updates the Comprehensive Plan, administers regulations, and reviews Traffic Impact Studies for rezoning and subdivision proposals.*
- ***Delaware Department of Transportation*** *(DelDOT), provides transportation facilities and services within public right-of-ways, coordinates its Long Range Plan and Capital Improvement Program with NCC and WILMAPCO, and reviews New Castle County Traffic Impact Studies.*
- ***Wilmington Area Planning Council****, (WILMAPCO) prepares the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) cooperatively with NCC and DelDOT.*

*The study found that a large proportion of the Churchman's Crossing area is already developed. The area north of I-95 is a major regional employment center and the area south of I-95 is a major regional commercial center. The overall area consists of self-contained, single use developments. The major arterials often provide the only access to the commercial offices and institutions, and the regional shopping center, the Christiana Mall.*

*Public transit service is provided mostly along the major arterials. The lack of convenient pedestrian access to adjoining commercial properties or residential neighborhoods contributes to the underutilization of existing transit. Pedestrian and bicycle access between the different land uses is also very limited, resulting in an over-dependence on automobile use. That, combined with the limited secondary arterials, forces local automobile trips onto the major arterials, mixing with regional through traffic. This current situation lowers the quality of life of the residents and businesses of Churchman's Crossing. At the two workshops, the public expressed their frustrations with policies on land use and transportation. The many bills introduced during the spring 1996 session of the State Legislature are also an indication of the desire for changes to public policies.*

*The study found that nearly 3/4 of the undeveloped land is already committed to development with about 3/4 of that controlled by major employers. In addition, there are a significant number of active requested rezonings of land in the area, much of it for commercial development. Another finding of the Study is that it would be difficult to make enough major changes in the short-term, to the current and committed land uses, to significantly (a) change people's local travel decisions based solely on the changed land use and development policies, and (b) lower their cumulative automobile use for local travel. In the long-term, such changes in land use and policies can help lessen local traffic. However, it was also found that a high proportion of traffic adding to congestion in the area is through traffic, which is not affected by local land use policies.*

*Therefore, the land use portion of the study explored alternatives along two parallel avenues -- options for better managing growth in the short and near-term, and options for better land use patterns and site design guidance for the near and long-term. The land use recommendations are grouped according to the three activities of Land Use Planning and Regulation. The key aspects are:*

***Recommendations Related to the Comprehensive Development Plan Update:*** *The Comprehensive Development Plan should (1) reestablish a balance between transportation capacity and development including (a) develop a process for proactive rezonings, (b) establish new performance measures that define overall transportation capacity, and (c) set the total development amount of the proactive rezoning to match the total transportation capacity from DelDOT's Long Range Plan. (2) Reinforce established growth areas and develop land use planning tools to better contain growth in growth areas. (3) Provide for a new zoning classification of Transit Overlay District. (4) Recognize and confirm the basic office and commercial land use patterns which emphasize (a) the area north of I-95 as a major employment center and (b) the area south of I-95 as a commercial area. and (5) Provide opportunities for improved residential land use patterns including adding residentially zoned property, encouraging "mixed use" development near the core of the proposed commuter rail station, planning for a broader range of housing types, and encouraging infill and redevelopment. (6) Improve monitoring of development status and congestion trends.*

***Recommendations Related to Zoning and Subdivision Regulations:*** *New laws and/or agreements should be enacted (1) Provide tighter linkages to the DelDOT Plan, CIP Schedule, and/or to private funding. (2) Require sunsetting legislation to place time limits on new and previously recorded but unbuilt record plans, and (3) Apply the Transit Overlay District Zoning Classification to sites in the vicinity of the planned commuter rail station.*

***Recommendations Related to Zoning and Subdivision Reviews:*** *These include (1) Adopt design guidelines to be used in subdivision reviews, in triggering actions to provide new TDM and transit services, and in identifying improvements to existing access to transit, (2) Enhance the use of Traffic Mitigation Agreements to fund roadway, transit, transportation demand management (TDM), and access and circulation Improvements, and Improve monitoring of development status and congestion trends.*

# Executive Summary - Transit

*The development pattern of the Churchman's Crossing area makes it difficult to serve with traditional public transit. Population and employment densities are generally too low to efficiently provide traditional bus service. The focus of transit service in Churchman's Crossing is the Christiana Mall transit center and park-and-ride lot, which is served by most bus routes that serve the area. The development of this transit center as DART's mid-county transfer hub underscores the growing importance of Churchman's Crossing as a commuter destination. However, the area's transit service is still primarily oriented to serving commuters to Wilmington. Mid-day service remains relatively minimal, and circulation within Churchman's Crossing rermains a low priority (due to continued low ridership potential). Amenities at bus stops are few, and pedestrian connections to some neighborhoods and workplaces are poor.*

*Given anticipated development, Churchman's Crossing will need more and better transit service to provide for travel needs and mitigate expected traffic congestion. Two packages of future public transit services were tested for Churchman's Crossing. The first is a package of new services and service charges recommended in the WILMAPCO metropolitan transportation plan (MTP). These included more frequent service on existing bus routes, development of park-and-ride lots, transit centers, the commuter rail station (on Churchman's Road north of SR 4), and new bus routes operating on US 40, SR 1, Old Baltimore Pike and other travel corridors. The second package tested was a set of new bus routes developed to specifically serve the travel needs of Churchman's Crossing. These services included a new express bus route to operate in the developing Newtown Road corridor; local bus service for the US 40 / US 13 corridor's planned bus lane; and five new shuttle bus routes that would circulate small buses through employment areas and neighborhoods before meeting at the commuter rail station. The shuttles would transport employees on their midday errands, area residents for day and evening shopping trips, and would serve the commuter rail users who live or work in Churchman's Crossing.*

*Many of these new services, including the shuttle routes, could use transit innovations like point-deviation service, where travellers phone from their homes or offices and request that the bus deviate from its normal route into a subdivision or employment center to pick them up at their door.*

*Estimates indicate that implementation of the WILMAPCO MTP transit service recommendations could reduce peak hour commuter vehicle trips in the Churchman's Crossing area by nearly 5%. The additional services recommended in this study, including the shuttles, could reduce peak hour commuter vehicle trips up to an additional 4%.*

*For transit service to achieve these reduction levels in an auto-oriented area such as Churchman's Crossing, a number of elements must be in place.*

- *Higher population and employment densities in transit corridors.*
- *Buildings should be placed near the roads, where they can be easily approached by buses and pedestrians.*
- *Parking lots need to be located behind the buildings.*
- *Bus stop access should be improved (with sidewalks, crosswalks, etc.) to permit transit users to walk safely and comfortably to bus stops.*
- *Employers should support employee transit use by, for example, subsidizing employee transit fares permitting buses to operate on their property.*
- *The transit agency should develop a comprehensive marketing plan to improve public knowledge and understanding of existing and new services.*
- *The transit agency should develop a system development plan to insure that bus services are operating in the most efficient and effective manner possible.*

*This study recommends*

- *Implementing a bus system service plan to provide for continuous improvement of bus system operations and operating conditions for transit.*
- *Implementing transit-supportive pedestrian improvements (bus stop pads, benches, shelters, upgraded lighting and landscaping, and sidewalks) in areas served by public transit service.*
- *Implementing the bus system improvements (new bus routes, park-and-ride lots, transit center) recommended in the MTP.*
- *Implementing new bus routes on Newtown Road, US 40 / US 13, and five new shuttle routes serving the Churchman's Crossing area.*
- *Implementing transit innovations such as demand-responsive and point-deviation service.*

*The implementation of these recommendations over the next 25 years is subject to a number of indicators that will determine when the improvements would be put in place. For example, the implementation of new bus routes would be determined by the residential and employment density along the proposed route, or by requests for service from residents or employees along the proposed route. These indicators will help insure that services are implemented when demand and conditions are most favorable for their success.*

# Executive Summary - Travel Demand Management

*Travel Demand Management (TDM) strategies are an important component in the mix of infrastructure improvements and policies needed to relieve congestion and provide alternatives to driving alone. TDM strategies include a mixture of incentives and disincentives, which are designed to encourage automobile drivers to travel during less congested times or to find an alternative mode of travel.*

*Groups of TDM strategies were selected for Churchman's Crossing which support the TDM assumptions contained in the MTP and provide additional incentives to increase transit use and reduce traffic congestion.They were:*

- *Systems Management --increases the effective capacity of facilities by improving the efficiency of the transportation system using techniques such as incident management, variable message signs, enhanced traffic signals, ramp metering, and congestion pricing.*
- *Traveler information--allows for better informed travel decisions by providing both public transit and roadway congestion information using techniques such as transit schedule signage, telephone services, and radio station announcements.*
- *Commuter services --provide support for commuters using HOV and transit by making available services such as transportation coordinators, guaranteed ride home programs, ride share matching services, etc..*
- *Alternative work schedules --eliminate some trips and makes others more compatible with transit using techniques such as a compressed work week, staggered work hours, alternative work hours, and telecommuting.*
- *Parking Management--provides incentives to carpool or use transit through preferential parking and parking charges.*

*The Travel Demand Management strategies were tested in "packages" or levels of implementation. The TDM measures that were suggested in the MTP comprised one package which would reduce peak hour commuter vehicle trips in the Churchman's Crossing core by about 4 percent. The implementation of additional strategies in the "low-impact program" would provide an additional 2.5 percent reduction in trips and the implementation of the "high-impact program", which is anticipated after the year 2005, would provide an additional 6.9 percent reduction in trips. All in all, the TDM measures could, in the long run, reduce peak hour commuter vehicle trips in the Churchman's Crossing core by about 13 percent.*

*The TDM testing provided three valuable insights. First, since nearly 60 percent of the existing traffic is through traffic--it neither starts nor stops within the Churchman's Crossing area--less than half of the vehicular traffic is susceptible to TDM initiatives which are based on employer and work trip initiatives. Second, the TDM testing indicated that effectiveness is adversely influenced by the low residential and employment densities. Third, the private and public sectors are already involved in a range of TDM activities designed to increase ridesharing and transit use and reduce auto use during peak hours.*

*The level of participation and the intensity of the TDM programs may be varied according to the congestion found in the Churchman's Crossing area. A series of indicators were identified which could trigger the implementation of TDM programs. These include site specific, intersection-specific, and area-wide indicators of congestion levels and usage of alternate commute options. Through ongoing measurement and monitoring activities, the TDM program may be tailored to fit the needs and the level of congestion mitigation required to achieve acceptable levels of service on the primary roads and intersections in Churchman's Crossing.*

*This study recommends that, in the short term, through private and public participation among employers and through the Transportation Management Association and DelDOT, measures should be implemented which support increased transit use and ride sharing and provide other encouragement to choose a mode other than single-occupant vehicles. The recommended strategies include providing more access to transit schedules, opening a transit store in Churchman's Crossing, increasing transportation coordination, and expanding flexible work hours. Rideshare matching and guaranteed ride home services should be included in the employer support programs for carpools and van pools. DelDOT should plan for and design implementation of congestion management facilities including HOV lanes on I- 95, ramp metering, an enhanced traffic signal control system, and a Transportation Management Center. It will be necessary to explore funding options for $20 million in TDM capital expenses and an annual operating budget of $3.5 million, (by 2005).*

*In the long term, the study recommends implementing "high impact" TDM measures which would, in addition to providing an on-line advisory service, provide disincentives to driving alone through the implementation of ramp metering, congestion pricing, and possibly parking pricing. Structured parking and maximum parking limits should be encouraged, particularly in areas with good transit service. The use of transit should be further encouraged through the creation of better information, easier fare and schedule options, integration of fares, and enhanced accessibility to transit. Sources of revenue must be explored to provide an additional $2.2 million in capital costs for strategies implemented between 2005 and 2020. Funding will also be required to support an annual operating cost which is expected to increase to $5 million per year by 2020.*

# Executive Summary - Roadways



*The roadway analyses started with the fine tuning of the Metropolitan Transportation Plan (MTP) traffic model in the Churchman's Crossing Study Area. Two land use options were initially developed for testing. Option 1 included existing and committed/approved development, while Option 2 included existing and committed/approved development and Requested Rezonings / Other Proposals. Four additional land use options were subsequently developed for testing. Options 1A and 2A assumed that development for Options 1 and 2 would occur at a slower rate, while Options 1B and 2B, assumed the same rate of growth as Options 1A and 2A but provided somewhat more residential development and somewhat less commercial development. The rate of development for these four options was considered to be more realistic than options 1 and 2, i.e.,, more consistent with current and projected market conditions.*

*The roadways tested in the model included existing roadways plus those contained in DelDOT's current Capital Improvement Program (CIP) for 1997-2002 and the potential "candidate projects" included in the MTP (1995-2020). In addition, nine new roadway connections were tested in an attempt to improve the levels of service at key intersections in the area. Of the nine potential roadway connections initially tested, only 4 warranted further consideration and were included in the final testing, namely:*

- *Churchman's Road Extension, SR 4 to SR 2*
- *Christiana Bypass, I-95 to Road A, including new I-95 Ramp*
- *Ramp from Churchman's Road to northbound I-95*
- *Newtown Road Extension, SR 7 to SR 1 with North Serving Ramps*

*Peak hour traffic projections were developed for the six land use options for years 2000, 2005, and 2020. These roadway volumes were then analyzed to determine the potential reduction in peak hour volumes that would result from the provision of enhanced transit service and travel demand management (TDM) measures in the Churchman's Crossing area.*

*Testing identified several important findings. First, through traffic which has neither an origin nor destination in Churchman's Crossing represents a significant portion of the traffic on local roadways - 30% to 70%, depending on the roadway segment, due to the strong desire to access SR 1 and I-95 (Delaware Turnpike). Second, Transit and TDM Measures reduce congestion at key intersections, but not significantly, due in part to the large volumes of through traffic and the design of existing, committed and proposed development in the Churchman's Crossing area. Third, the new roadway connections tested provided relief for some intersections, while making other intersections more congested.*

*Land use Options 1A and 2A, which implement development at a slower pace, delay congestion somewhat. Land Use Options 1B and 2B have little effect on overall congestion, due in part to the large volumes of through traffic and the large amount of existing and committed development.*

*Sixteen key intersections in the Churchman's Crossing Area were analyzed for level of service (LOS) and volume to capacity ratios (V/C). The analysis assumed Land Use Options 1A and 2A, the provision of enhanced transit service and TDM measures, and the four potential roadway connections noted above, plus the dualization of Road A over SR 1.*

*Six of the fifteen key intersections will operate satisfactorily, i.e.,, LOS D or better in 2020:*

- *SR 7 / Road A*
- *Road A / northbound SR 1 Ramps*
- *Churchman's Road / northbound SR 7 Ramps*
- *SR 2 / Harmony Road*
- *SR 2 / St. James*
- *SR 7 / St James (Telegraph)*

*One Intersection Requires Construction of New Roadway Connections to Operate Satisfactorily (LOS D or Better) in 2020:*

*SR 273 / Chapman / Eagle Run Road - Requires Construction of the Christiana Bypass from East of I-95 to Road A at SR 7 (including New I-95 Ramp)*

*Nine of the intersections will operate at level of Service E or F in the year 2020. However, with intersection improvements, 7 of the 9 intersections will operate at LOS D or better. These intersection improvements are presented on page 38 along with their costs and projected implementation schedule, based on current traffic projections.*

- *SR 4 / Harmony Road*
- *SR 4 / Churchman's Road*
- *SR 4 / SR 7 / Christiana Center (J.P. Morgan)*
- *SR 2 / Churchman's Road Extended*
- *SR 273 / SR 7*
- *SR 7 / SR 4 (Split at Stanton)*
- *Road A / southbound SR 1 Ramps*

*Two will operate at LOS F in 2020, even with intersection improvements. However, these two intersections will operate at a LOS in 2020 that is generally equivalent to their existing LOS:*

- *SR 7 / Churchman's Road, southbound On Ramp*
- *SR 2 / SR 7*

*SR 7 / Churchman's Road, southbound On Ramp - Although an interchange will be constructed at Churchman's Road and SR 7, projected growth in traffic results in a LOS F at this intersection in 2020. The overall 1.27 V/C in 2020 is about the same as today's conditions (LOS F - V/C 1.25).*

*SR 2 / SR 7 - will operate at LOS F (V/C = 1.04) in 2020. This LOS is generally the same as today's LOS F (V/C = 1.09).*

*In summary, with the provision of the complete package of multi-modal transportation improvements including enhanced transit service, TDM measures, roadway connections and intersection improvements, 14 of the 16 key intersections will operate at LOS D or better in 2020 with existing and committed/approved development. Two of the key intersections are projected to operate below LOS D. These two intersections will operate at a LOS in year 2020 that is generally equivalent to their LOS today. The proposed package of multi-modal transportation improvements will accommodate existing and committed development reasonably well.* ***Requested rezonings and other proposals should be reviewed by DelDOT and New Castle County on a case by case basis, to assure they do not result in unacceptable levels of congestion.***

# Executive Summary - Recommended Improvements Package

## Introduction

*The land use and transportation recommendations provide a planning guide / concept for this important growth area over the next 25 years. The study results indicate that with the implementation of the package of land use and transportation recommendations, approved / committed development in the area can be generally accommodated. All intersections would operate at a satisfactory level of service, except two, SR 2 at SR 7 and the Ramp from Churchman's Road to southbound SR 7. These two intersections would experience the same level of congestion in 2020 as they do today. The study also recommends that requested rezonings and other development proposals, should require separate detailed technical submissions to New Castle County and DelDOT to determine whether the proposals can be implemented without creating unacceptable congestion.*

## Land Use Recommendations

*The recommendations include land use process and land use design guidelines. The land use recommendations include, items such as a stronger tie between adequate public facilities and land use approvals, sunsetting legislation to place time limits on new and previously recorded but unbuilt record plans, a transit overlay district / mixed use development in the vicinity of the proposed commuter rail station, proactive rezoning to balance transportation capacity with development, design guidelines to provide transit supportive development, expanded use of traffic mitigation agreements and a better system to monitor the status of development and congestion. These recommendations have been carefully coordinated with New Castle County and are consistent with and are, for the most part, included in the comprehensive development plan update, currently underway.*

## Transportation Recommendations

*The package of multi-modal transportation improvements include enhanced transit service, travel demand management (TDM) measures, intersection improvements and new roadway connections. The table on the page to the right includes preliminary cost estimates for most parts of the package. More detailed cost estimates will be developed during the next phase of the project. The table also provides an approximate implementation schedule, assuming adequate funding is available. The time frames shown were based on an estimate of when development would occur and the facilities / services required.*

### *Implementation Indicator*

*To account for the unknown of "when will the development actually occur", the study recommends indicators that DelDOT, New Castle County and WILMAPCO should monitor closely in the future to determine when certain services and improvements should be implemented, again, assuming funding is available.*

### *Enhanced Transit Service / Travel Demand Management Measures*

*The implementation of certain bus routes may depend in some cases, on the building of new developments where potential transit customers will live and work and on the building of roadway connections on which the bus will operate. The level of the Travel Demand Management (TDM) measures may vary according to the congestion in the Churchman's Crossing area. A series of indicators have been provided that will assist in determining when to implement the transit and TDM recommendations, see 24 to 26 and 34.*

### *Intersection Improvements*

*Yearly traffic and accident data counts should be collected by DelDOT at critical intersections in Churchman's Crossing, development approvals and construction should be monitored by New Castle County and DelDOT and level of service (LOS) projections updated yearly to determine when the intersection improvements should be constructed to avoid an unacceptable LOS.*

*A detailed engineering study of the nine critical intersections should be undertaken to determine the right-of-way requirements for the potential intersection improvements. The necessary rights-of-way should be preserved to accommodate the anticipated improvements (See page 38). Design, right-of-way and construction activities for the intersection improvements should be scheduled to provide full implementation prior to reaching an unacceptable LOS.*

### *New Roadway Connections*

*Similar to intersection improvements, the implementation of new roadway connections are dependent in part on the actual rate at which development occurs, the actual traffic growth in the Churchman's Crossing area and the availability of funding. Congestion levels should be closely monitored and appropriate lead time provided that would result in the implementation of the new roadway connections to accommodate traffic demands.*

## Project Next Steps

*The next phase of the Churchman's Crossing effort will involve the identification and implementation of transit and travel demand management (TDM) early action items, along with the development of preliminary construction contract documents (20% complete) for the recommended intersection improvements and roadway connections (Churchman's Road Extension from SR4 to SR2 and Ramp from Churchman's Road to Northbound I-95, only). Implementation - Phase I will be coordinated with the public through a Steering Committee of representatives of local communities, employers and land owners and public workshops.*

# Recommended Multi-Modal Transportation Improvements

| | IMPROVEMENT | 1996-2000 CAPITAL COST (1) | 1996-2000 OPERATING COST (2) | 2001-2005 CAPITAL COST (1) | 2001-2005 OPERATING COST (2) | 2006-2020 CAPITAL COST (1) | 2006-2020 OPERATING COST (2) | |
|---|---|---|---|---|---|---|---|---|
| Enhanced Transit Service | Doubling DART Bus Service Frequencies | $2.30 | $0.56 | $2.80 | $1.95 | $15.20 | $4.75 | Enhanced Transit Service |
| | MTP New Local Bus Routes | $2.60 | $1.29 | $2.60 | $3.45 | $5.80 | $4.31 | |
| | MTP New Express Bus Routes | $1.10 | $0.22 | $1.10 | $0.59 | $2.30 | $0.74 | |
| | Churchman's Crossing Commuter Rail Station | | | (7) | $0.01 | | $0.07 | |
| | Park-and-Ride Lots | | | $0.30 | | $0.50 | | |
| | New Local Bus Routes | | | | | $4.20 | $1.36 | |
| | New Express Bus | | | | | $1.60 | $0.24 | |
| | Shuttle Route System | $0.40 | $0.61 | | $1.02 | $0.50 | $1.02 | |
| | Transit-Supportive Pedestrian Improvements | $1.50 | $0.05 | $0.40 | $0.13 | | $0.13 | |
| | Subtotal | $7.90 | $2.73 | $7.20 | $7.15 | $30.10 | $12.64 | |
| Travel Demand Management (TDM) Measures | **System Management** | | | | | | | Travel Demand Management (TDM) Measures |
| | Transportation Management Center | | | $7.40 | $2.04 | | $2.04 | |
| | - Incident Management | | | $6.00 | $.60 | | $.60 | |
| | - Variable Message Signs | $4.00 | $0.40 | | $.40 | | $.40 | |
| | Enhanced Traffic Signals | | | $2.50 | $.25 | $7.50 | $1.00 | |
| | Transit Oriented Development | | | | | $.15 | | |
| | Ramp Metering | | | | | $.68 | $.07 | |
| | Congestion Pricing | | | | | $8.40 | $.84 | |
| | **Traveler Information** | | | | | | | |
| | Transit Schedule at Workplace | $0.01 | | | | | | |
| | Telephone Service | | | $0.20 | $0.05 | | $0.04 | |
| | Public Timetable at Bus Stops | | | $0.05 | $0.02 | | $0.02 | |
| | Real-Time Schedule Information at Bus Stops | | | | | $1.28 | $0.13 | |
| | - GPS Equipped Buses | | | | | $1.00 | $0.10 | |
| | Travel Advisory Radio | | | | | $0.12 | $0.03 | |
| | On-Line Service | | | | | $0.03 | $0.03 | |
| | **Commuter Service** | | | | | | | |
| | Transportation Coordinators | | $0.12 | | $0.12 | | $0.12 | |
| | Guaranteed Ride Home Program | | $0.18 | | $0.18 | | $0.18 | |
| | Ride Share Matching Service | $0.90 | $0.30 | | $0.30 | | $0.30 | |
| | Electronic Payment Systems | | | | | $0.75 | $0.08 | |
| | Intermodal Fare Integration | | | | | $0.03 | $0.05 | |
| | Vanpool Service | $0.50 | $0.33 | $0.50 | $0.65 | $1.50 | $1.00 | |
| | Transit Retail Services | | | $0.10 | $0.13 | | $0.13 | |
| | Transit Pass | | | | | $0.15 | $0.05 | |
| | **Alternative Work Schedule** | | | | | | | |
| | Telecommuting | | | | | $0.15 | $0.02 | |
| | Flexible Work Hours | | $0.02 | | $0.02 | | $0.02 | |
| | Compressed Work Week | | | | $0.02 | | $0.02 | |
| | Staggered Work Hours | | | | $0.02 | | $0.02 | |
| | **Parking Management** | | | | | | | |
| | Preferential Parking | | | $0.01 | $0.03 | | $0.03 | |
| | Parking Pricing | | | | | $0.25 | $0.13 | |
| | Subtotal | $5.41 | $1.35 | $16.76 | $4.83 | $21.99 | $7.45 | |
| Intersection Improvements (9) | SR 4 / Harmony Road | $2.50 | | | | | | Intersection Improvements (9) |
| | SR 4 / Churchman's Road | | | $2.20 | | | | |
| | SR 4 / SR 7 Christiana Center | $2.50 | | | | | | |
| | SR 273 / SR 7 | | | $0.50 | | | | |
| | SR 7 / SR 4/7 Split (Stanton) | $1.70 | | | | | | |
| | Road A / South Bound SR 1 Ramps (Dual) | | | $4.00 | | | | |
| | SR 7 / Churchman's Road / South bound SR 7 Ramps | | | | | | | |
| | SR 2 / Churchman's Road Extended | | | $0.80 | | | | |
| | SR 2 / SR 7 | $2.00 | | | | | | |
| | Subtotal | $8.70 | (8) | $7.50 | (8) | | (8) | |
| New Roadway Connections (9) | Churchman's Road Extension, SR 4 to SR 2 | | | $30.00 | | | | New Roadway Connections (9) |
| | Ramp from Churchman's Road to North Bound I-95 | | | $2.50 | | | | |
| | Christiana Bypass, I-95 to Road A | | | $5.00 | | | | |
| | Newtown Road Extensions SR 7 to SR 1, including North Serving Ramps | | | (7) | | | | |
| | SR 7 / SR 58 Interchange | $25.00 | | | | | | |
| | Subtotal | $25.00 | (8) | $37.50 | (8) | | (8) | |

# Related Regional Projects

| IMPROVEMENT | 1996-2000 CAPITAL COST (1) | 1996-2000 OPERATING COST (2) | 2001-2005 CAPITAL COST (1) | 2001-2005 OPERATING COST (2) | 2006-2020 CAPITAL COST (1) | 2006-2020 OPERATING COST (2) |
|---|---|---|---|---|---|---|
| I-95 HOV lane (not barrier separated) | | | | | $50.00 | |
| SR 1 / I-95 Interchange Improvements | | | | | $45.00 | |
| Subtotal | | | | | $95.00 | |

# Land Use Recommendations

1. Implement new processes and procedures to re-establish a balance between transportation capacity and development.
2. Reinforce established growth areas and better contain growth.
3. Provide for a new zoning classification of Transit Overlay District
4. Recognize and confirm the basic office and commercial land use patterns of the Churchmans Crossing area.
5. Provide opportunities for improved residential land use patterns.
6. Provide tighter links to the DelDOT CIP.
7. Enact sunsetting Provision to place time limits on all recorded plans
8. Enhance agreements for traffic mitigation
9. Improve monitoring of development status and congestion trends.
10. Adopt design guidelines for the Churchmans Crossing area.
11. Apply the Transit overlay District Zoning to sites in the vicinity of the planned commuter rail station.

## Notes:

(1) "Capital Cost" refers to total capital cost of implementation for time period, in millions of 1996 dollars.

(2) "Operating Cost" refers to average annual operating cost, in millions of 1996 dollars. For TDM programs, it is assumed that given programs are operating throughout period shown.

(3) Does not include costs of Churchman's Crossing Commuter Rail Station.

(4) All costs are in 1996 dollars.

(5) Costs are approximate and quantities reflect sketch-planning nature of study. Detailed plans will be required to refine quantities and cost estimates. No revenue streams have been calculated, e.g. self-financing vanpool program.

(6) Cost figures include both public and private sources.

(7) Cost Estimates are currently being developed.

(8) Operating costs for roadway improvements are currently being developed.

(9) See page 38 for implementation schedule for intersection and roadway improvements.

NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# Churchman's Crossing Study

## Purpose of Study

- *Clarify the vision for Churchman's Crossing*
- *Develop a transportation / land use plan that supports the vision*
- *Assess the creation of a transportation improvement district to:*
  - *Meet the unique needs of the area*
  - *Augment public sector investment*
- *Continue the public / private partnership*

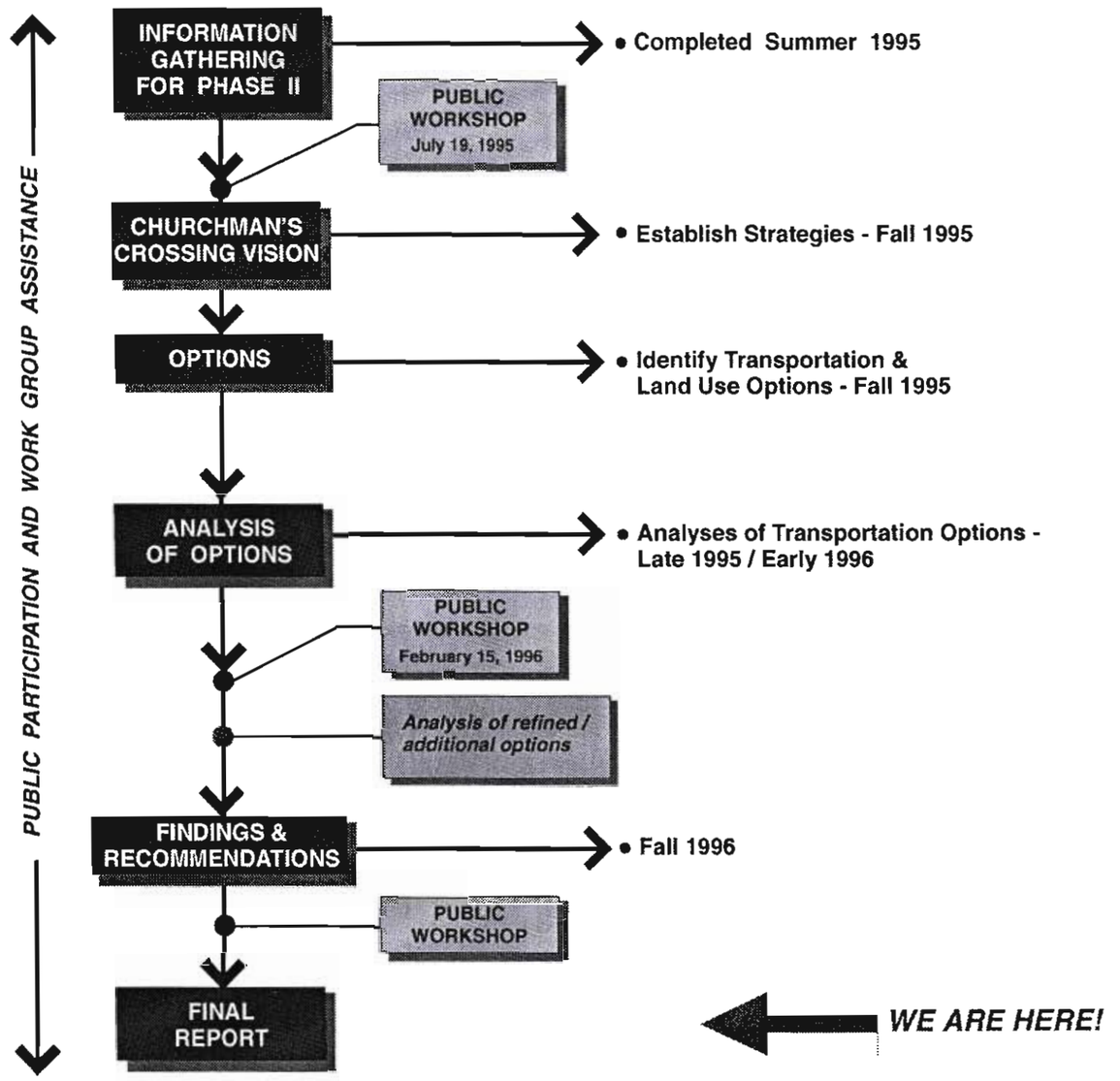
## Study Recommendations

- *Will be considered in the development of DelDOT's Capital Improvement Program (CIP), WILMAPCO's Metropolitan Transportation Plan (MTP) and the New Castle County Comprehensive Development Plan Update.*

## CIP Projects / MTP Projects

- *The graphic on the opposite page indicates the projects funded in DelDOT's current Capital Improvement Program (1997-2002), and the candidate projects contained in the Metropolitan Transportation Plan (MTP). The MTP projects are not funded but are considered potential "Candidate Projects" for the long range planning period (prior to 2020).*

# Milestones and Schedule




NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# CAPITAL IMPROVEMENT PROGRAM (CIP) PROJECTS

## Roadway Capacity Improvements

1 *Churchman's Crossing /Turnpike*
Includes new interchange at SR 7 /Churchman's Road, Churchman's Road Bridge over I-95 and the I-95 Interchange with SR 1/SR 7.

2 *SR 273, I-95 to Ogletown*
Resurfacing and minor capacity improvements.

3 *US 40 /SR 7 Capacity Improvements*

## Transit Service Improvements

3 *Churchman's Road*
Continental Drive intersection upgrades to DART bus stop, sidewalks, and pedestrian crosswalks.

4 *Intermodal Rail Passenger Transfer Facilities*
Transit Facilities system expansion (New Service to Newark, Churchman's Crossing and Claymont).

## Roadway Resurfacing Projects

5 *I-95*
Resurfacing from SR 896 to SR 141.

6 *Turnpike Plaza Rehabilitation*

## Bridge Rehabilitation Projects

7 *I-95 over SR 7 ( BR716, 716A and 717 )*
Bridge rehabilitation.

8 *SR 7*
Bridge 257 over Christina River rehabilitation.

9 *BR 255 and BR 647 on SR 273*
Bridge replacements.

# METROPOLITAN TRANSPORTATION PLAN (MTP) CANDIDATE PROJECTS

*(IN ADDITION TO CIP PROJECTS LISTED ABOVE)*

## Candidate Public Transportation Improvements :

10 *SEPTA and MARC Commuter Rail Service*

11 *Old Baltimore Pike Express Bus*

12 *SR 1 Express Bus*

13 *Old Baltimore Pike Local*

14 *Old Baltimore Pike – SR 273 /7 Local*

15 *SR 141 /48 /37 /273 Local*

16 *SR 72 /Polly Drummond Hill Road Local*

17 *Park-and-Ride Lots at the Following Locations :*
- SR 4 /Harmony Road
- SR 273 /Old Baltimore Pike
- Christiana Mall
- Churchman's Crossing Commuter Rail Station

## Candidate Highway Capacity Improvements :

18 *I-95 from Maryland Line to the I-95 /I-495 /I-295 Interchange, widening for HOV lanes*

19 *SR 58 (Churchman's Road) from SR 7 to SR 273*

20 *Red Mill Road from SR 2 to SR 4*

21 *Churchman's Road Extension from SR 4 to SR 2*

## Candidate Transportation Demand Management (TDM) Measures :

22 *High Occupancy Vehicle lanes on I-95* (See Item 19)

23 *Ramp metering at the SR 273 interchange with I-95*

24 *Signal coordination along SR 7 from Pennsylvania Line to US 13*

25 *Freeway Incident management along I-95 from Md. 272 to Pennsylvania Line (See Items 19 and 23)*

26 *Seasonal Service Patrol on SR 1 from SR 7 to Kent County Line*

## Candidate Bikeway and Walkway Improvements :

**Class I Greenways /Bikeways :** *A bike trail located along a completely separate right-of-way, exclusively for biking, hiking and jogging.*

27 *SR 7 from Limestone Road to SR 4*

28 *SR 4 from Elkton Road to SR 7*

29 *Along Pike Creek from SR 2 to SR 72*

**Class II Bikeways :** *A bike lane located along a portion of the roadway designated for bikes only (cross-traffic permitted).*

30 *Milltown Road from Old Milltown Road to SR 7*

31 *Old Milltown Road from Milltown Road to Walaston Road*

32 *Walaston Road from Old Milltown Road to SR 2*

33 *Mitch Road from SR 7 to SR 4*

34 *Airport Road from Churchman's Road to SR 273*

35 *SR 58 (Churchman's Road) from SR 4 to SR 273*

36 *SR 7 from SR 273 to US 13*

37 *SR 273 from SR 9 to SR 2*

38 *Chapman Road from SR 273 to Salem Church Road*

39 *Salem Church Road from US 40 to Chapman Road*

40 *Harmony Road from Ruthar Drive to Rosewood Drive*

41 *Ruthar Drive from Harmony Road to Red Mill Road*

42 *Red Mill Road from Ruthar Drive to SR 2*

43 *School Bell Road from SR 7 to US 40*

44 *Appleby Road from SR 273 to US 40*

**Class III Bikeways :** *A bike route located along a roadway that may be shared with other traffic. Provides continuity to other bike facilities.*

45 *Regal/Brownleaf Way from Chapman Road to Harmony Road*

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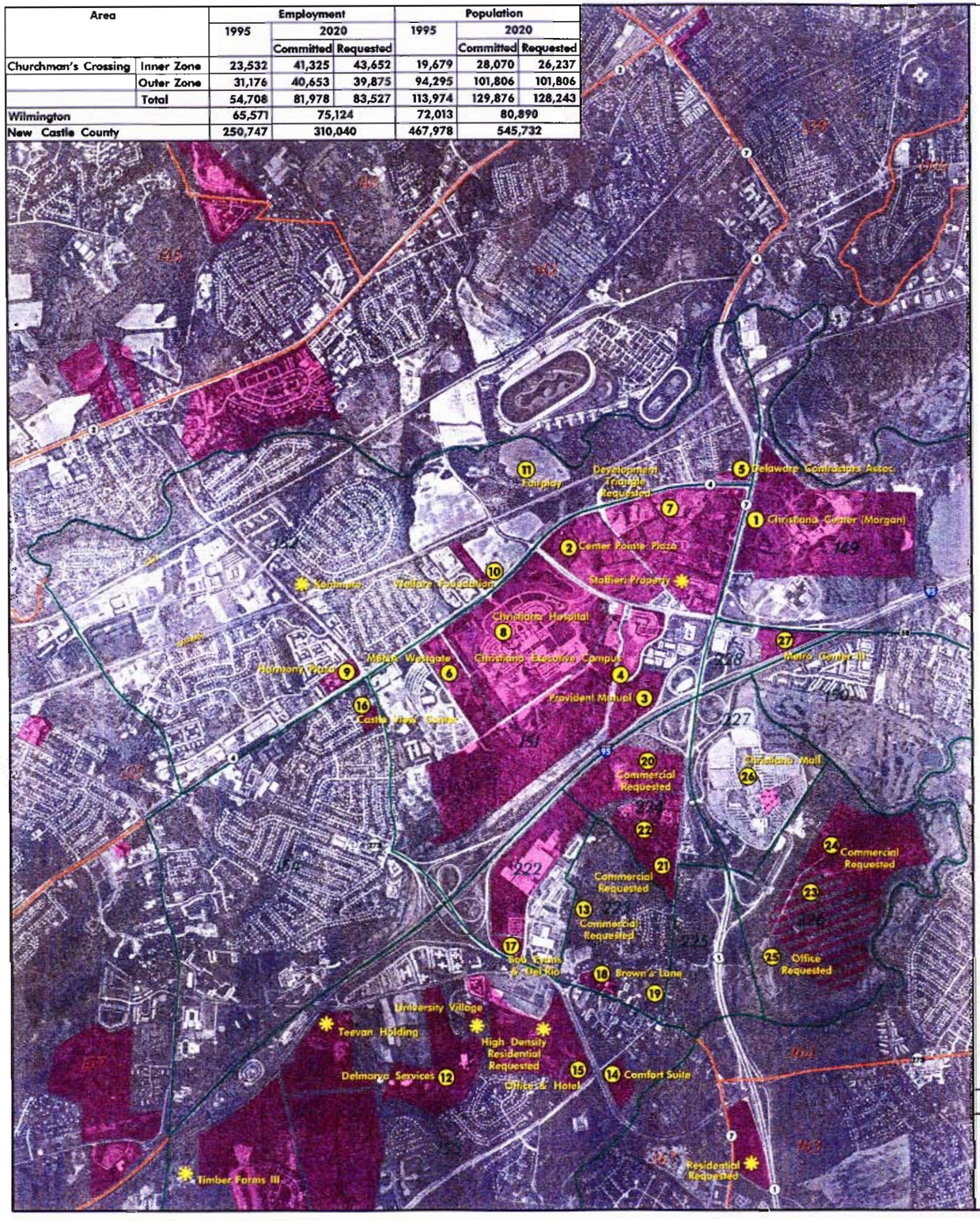
SCALE

November 20, 1996

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation

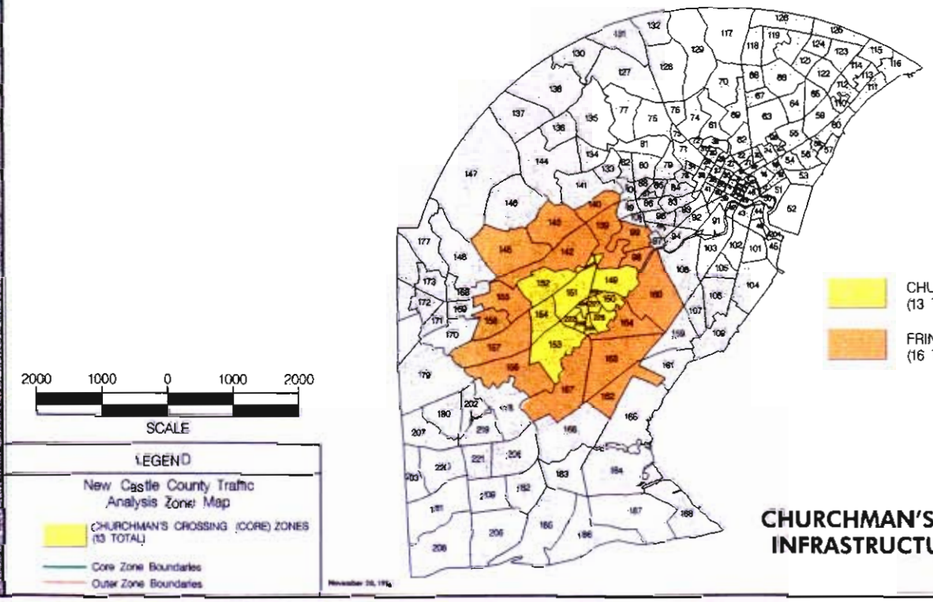
| Area | | Employment | | | Population | | |
|---|---|---|---|---|---|---|---|
| | | 1995 | 2020 | | 1995 | 2020 | |
| | | | Committed | Requested | | Committed | Requested |
| Churchman's Crossing | Inner Zone | 23,532 | 41,325 | 43,652 | 19,679 | 28,070 | 26,237 |
| | Outer Zone | 31,176 | 40,653 | 39,875 | 94,295 | 101,806 | 101,806 |
| | Total | 54,708 | 81,978 | 83,527 | 113,974 | 129,876 | 128,243 |
| Wilmington | | 65,571 | 75,124 | | 72,013 | 80,890 | |
| New Castle County | | 250,747 | 310,040 | | 467,978 | 545,732 | |




# DEVELOPMENT SUMMARY TABLE

The following table notes the major non - residential development in the Churchman's Crossing Core Zones, see yellow map area below, and the development status, i.e. existing, committed / approved and requested rezonings / other proposals as of October 1996.

| Number | Developments | Existing | Committed Development | Requested Rezonings / Other Proposals |
|---|---|---|---|---|
| 1 | Christiana Center (Morgan Bank) | • | • | • |
| 2 | Center Pointe Plaza | | • | • |
| 3 | Provident Mutual | • | • | |
| 4 | Christiana Executive Campus | • | • | |
| 5 | Delaware Contractors Association | • | • | |
| 6 | MBNA Westgate | • | • | |
| 7 | Development "Triangle" | | | • |
| 8 | Christiana Hospital | • | • | |
| 9 | Harmony Plaza | | • | |
| 10 | Welfare Foundation | | • | • |
| 11 | Fairplay | | | • |
| 12 | Delmarva Services | | • | |
| 13 | Delmarva Services | | | • |
| 14 | Comfort Suites | | • | |
| 15 | Nowakowski Property | | • | |
| 16 | Castle View Center | | • | • |
| 17 | Bob Evans /Del Rio | • | • | |
| 18 | Brown's Lane | | • | |
| 19 | 273 Mall | | • | |
| 20 | 16 DE Seven J.V. (Budovitch) | | • | |
| 21 | Christiana Park (Goggin) | | | • |
| 22 | Faith City | | | • |
| 23 | Marta /Acierno | | • | |
| 24 | Marta | | | • |
| 25 | Acierno | | | • |
| 26 | Christiana Mall | • | • | |
| 27 | Metro Center III | • | • | |

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LEGEND

New Castle County Traffic Analysis Zone Map

CHURCHMAN'S CROSSING (CORE) ZONES (13 TOTAL)

Core Zone Boundaries

Outer Zone Boundaries

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

# Churchman's Crossing Vision
# Public Workshop Comments

## Quality of Life / Land Use

- *Preserve natural resources*
- *Preserve / enhance / connect greenways - make accessible*
- *Developers should set aside more land for open space / greenways*
- *Manage growth*
- *Provide adequate facilities - then development*
- *Provide mixed use development*
- *Provide transit friendly development*
- *Pay special attention to pedestrians*
- *Continue community outreach*

## Transportation

- *Provide transportation choices*
- *Improve bus service - provide additional service*
- *Bus service - address business and community needs*
- *Provide commuter rail - support with local shuttle*
- *Concern over traffic impact from commuter rail station*
- *Roads / neighborhood streets should be pedestrian and bicycle friendly*
- *Extend Churchman's Road to SR 2*
- *Reduce dependency on SOV*
- *Provide park and ride facilities*
- *Increase use of SR 1 and I-95,*
- *Decrease traffic on neighborhood streets*
- *Focus on using existing roads more efficiently*
- *Expand existing roads before building new roads*





# Land Use Planning and Regulation

## Overview of Current Land Use Activities, Patterns and Plans

**Existing Land Use Planning Activities and Characteristics:**

- *New Castle County's responsibility for land use planning is carried out through three basic planning activities:*
  1. *The Comprehensive Development Plan*
  2. *Zoning and Subdivision Regulations (The Code)*
  3. *The Zoning and Subdivision Review Processes*
- *New Castle County uses these basic planning elements to influence or regulate development and land use related activity regarding the following four land use characteristics:*
  *Location of land uses*
  *Types of land use in specific areas*
  *Density/Intensity of land uses*
  *Timing through limited phasing of proposed development to planned public facilities and services*
- *New Castle County's Development Plan is coordinated to WILMAPCO's Metropolitan Transportation Plan (MTP), DelDOT's Long Range Transportation Plan (LRTP) and the State's goals and objectives as articulated in "Shaping Delaware's Future".*
- *DelDOT participates in New Castle County's Zoning and Subdivision review processes through the Preliminary Transportation Analysis (PTA), Traffic Impact Study (TIS) procedures and the Subdivision Advisory Committee (SAC).*
- *Several aspects of land use planning, focusing on the linkages to transportation planning and improvements, are presented and illustrated here.*

**General Land Use Patterns:**

- *Churchman's Crossing is a five to six square mile suburban activity center strategically located in New Castle County at the crossroads of I-95, SR 1 and AMTRAK's Northeast Corridor.*
- *The area north of I-95 is a major employment center, home to MBNA, J.P. Morgan, the Christiana Hospital and Provident Mutual Insurance, among others.*
- *The area south of I-95 is a major regional retail center with the Christiana Mall as its hub.*
- *There is a general lack of residential development in close proximity to the commercial areas.*
- *Existing residential development tends to be low density in character, i.e.,, 3 to 4 dwelling units per acre.*

**Current Land Use and Land Use Plans:**

- *A large portion of the area is already developed and a significant level of additional development is anticipated to occur.*
- *A significant portion of the anticipated future development is committed, i.e., has received some form of approval.*
- *A significant proportion of the committed development involves major employers / sites - including MBNA, JP Morgan, Christiana Hospital, Centre Point, and the Christiana Mall.*
- *There are currently approximately 2.3 million square feet in requested rezonings, a large portion of which is requested Commercial, south of I-95.*
- *The projected land use reflects nearly all of the development anticipated over the next 25 years. All major parcels have been accounted for with the exception of major changes to Delaware Park or Bread and Cheese Island.*

**Conclusion Regarding General Land Use Patterns:**

- *Significant changes to land use will be difficult to make.*



# Findings Regarding Land Use Planning and Regulation

**Zoning and Subdivision Regulations and Their Suitability for Efficient Transit Accessibility:**

- *Current regulations generally provide little accessibility to public transit.*
- *Current regulations do not encourage pedestrian or bicycle travel.*
- *Current regulations do not encourage connections within or between land uses.*
- *Current regulations facilitate an automobile orientation to the detriment of all other modes of travel.*

**The Comprehensive Development Plan Update**

- *The Comprehensive Development Plan Update is mandated by the State Quality of Life Act, and is subject to review by the State.*
- *The Comprehensive Development Plan Update is a countywide policy document which is used to make changes to the County's Subdivision and Zoning Codes and, more generally, as a guide to the appropriateness of rezoning requests.*
- *The Comprehensive Development Plan Update must address many issues of importance to land use in New Castle County including: Natural Resources, Intergovernmental Coordination, Economic Development, Housing, Historic Preservation, and Transportation among others.*
- *The Comprehensive Plan Update must be approved legislatively by the New Castle County Council. The New Castle County Planning Board (a citizen review board) makes recommendations to the Council prior to approval.*
- *The Comprehensive Plan does not currently proactively rezone County lands, although proactive zoning is proposed in the Comprehensive Development Plan Update.*
- *In addition to the Countywide policy document, three geographic subareas of the County are undergoing more intensive study.*
  - *Churchman's Crossing*
  - *Central Pencader*
  - *Southern New Castle County*
- *The Comprehensive Development Plan Update is scheduled for completion and Council approval in the spring of 1997.*

### Zoning and Subdivision Review Process

- *New Castle County has two review processes through which to manage development:*
  *-Rezoning Process*
  *-Subdivision Review Process*
- *These two processes provide some opportunity to influence the location, mix, density, and timing of proposed private development.*
- *The preparation of a Traffic Impact Study (TIS) has been required since 1992 for all major proposed rezonings and subdivision proposals.*

### Rezoning Process

- *All property has an existing zoning classification. Private property owners can initiate a rezoning request subject to approval by the New Castle County Council, who receive recommendations from the Planning Board.*
- *Rezoning requests are reviewed on a case-by-case basis, using the Comprehensive Plan as a guide.*
- *Changes in density, phasing of development, and traffic mitigation agreements can be negotiated during the rezoning process.*
- *Restrictions on the timing of development to prevent construction without adequate facilities, or an agreement to contribute to the cost of the infrastructure as a condition for record plan approval are appropriate measures which can be, and currently are, negotiated at the zoning level through deed restrictions.*
- *If a rezoning request is denied, then the owner or developer may still develop the property, by right, under the existing zoning.*

### Subdivision Review Process

- *The purpose of the subdivision review process is to prove that the proposed plan conforms to the County Code.*
- *The subdivision review process provides a context for DelDOT to negotiate site specific issues related to the availability and adequacy of the transportation infrastructure.*
- *Where deed restrictions are in place, development construction can be phased to transportation improvements, or improvements to be made by the developer.*

### Current Land Use and Transportation Linkage

- ***The Land Development Process*** *consists of a sequential series of administrative procedures starting with the Comprehensive Development Plan and leading to the occupancy and use of buildings. The process takes a number of years, with the pace generally set by the decisions of the land owner.*
- ***The Transportation Improvement Process*** *is a multi- year process starting with the Metropolitan Transportation Plan (MTP) and leading to the operation and management of the transportation system. The implementation process takes many years with the pace generally set by the level of public investment.*

- ***Land Use and Transportation Planning:*** *There are several opportunities in each process to creates a balance between the travel demand generated by land use activity and transportation capacity.*

**Current Approach to Managing Congestion**

- *Ordinance 90-218 stipulates roadway LOS D in growth areas like Churchman's Crossing as the threshold at which mitigation measures are required.*
- *If the TIS identifies that unacceptable LOS will result from the proposed development, then mitigation strategies are proposed by the developer in the TIS, which DelDOT and New Castle County may consider. DelDOT makes its recommendation after reviewing the TIS. New Castle County reviews the DelDOT recommendation(s) and makes the final decision.*
- *If the TIS is conducted during the zoning process, mitigations may be imposed in the form of Deed Restrictions to:*
    - *Phase development to the completion of transportation improvements scheduled in DelDOT's Capital Improvement Program (CIP).*
    - *Construct (by the developer) off-site transportation improvements.*
    - *Contribute a fair share sum of money to the construction of offsite improvements by others.*
    - *Enter into a Traffic Mitigation Plan by agreement with the County.*

# Alternatives for Managing Growth

**Increase Reliance on TDM Improvements to Manage Growth and Congestion**

- *Program a series of Transportation Demand Management (TDM) strategies which can be implemented quicker than major transportation improvements. Their smaller scale can be geared to specific area needs. The resulting reductions in traffic and congestion during peak periods creates available capacity to serve the demand generated by proposed development, or other development that is yet to be proposed, and still have acceptable LOS.*
- *TDMs are more effective when done in conjunction with transit projects and other TDM projects because people have a larger set of viable options from which to choose. The cumulative effect can be to attain and maintain LOS standards through the short and near-term periods. The effectiveness of this approach is considered in the subsequent sections on TDM and Transit.*

**Growth Management Through Increased Transportation Investment, Proactive Rezoning, & Adequate Facilities**

- *Establish procedures for a proactive rezoning by NCC to be applied on an area-by-area basis following Council approval of the Comprehensive Development Plan Update. The County should approve only those rezoning requests for which the MTP will provide sufficient capacity.*
- *Increase investment levels to construct projects from the Metropolitan Transportation Plan (MTP).*
- *Phase the approval of subdivision requests through an Adequate Facilities Ordinance that links those approvals to a specific set of transportation improvements, which are sufficiently committed in DelDOT's CIP.*
- *Continue to provide developers the opportunity to accelerate CIP projects, and/or to construct or contribute to other transportation projects, through improvements and private funding.*

**Reliance on Developer Participation in Growth Management**

- *For requested rezonings, continue to require developers to make commitments to fund on-site and off-site improvements when LOS is expected to be E or less.*
- *Increase the use of Transportation Mitigation Agreements to lessen commuter traffic during peak periods.*

# Land Use Alternatives and Options

**The Land Use Options Tested for Transportation Impact**

- ***Land Use Option 1:*** *Existing and Committed Development*

- ***Land Use Option 2:*** *Existing and Committed Development plus Requested Rezonings and Other Current Proposals.*

**Four Additional Land Use Options**

- ***Land Use Options 1A and 2A:*** *Options 1 and 2 implemented over a longer period of time (note: Options 1 and 2 assumed a very aggressive implementation schedule, while options 1A and 2A are considered to have a more realistic implementation schedule.*

- ***Land Use Options 1B and 2B:*** *Development was adjusted to provide somewhat more residential development and somewhat less commercial development. Options 1B and 2B are based on an implementation schedule that is similar to Options 1A and 2A.*

# Land Use and Development Recommendations

**Recommendations Related to the Comprehensive Development Plan**

- ***Implement New Processes and Procedures to Reestablish a Balance Between Transportation Capacity and Development***

  - *Develop a Process for Proactive Rezonings: New Castle County should enact a proactive Zoning Plan to better ensure meeting the public interest and the objectives of the adopted Comprehensive Development Plan Update. Such proactive rezonings would be applied on an area-by-area basis following council approval of the Comprehensive Development Plan Update.*
  - *Establish New Performance Measures that Define Overall Transportation Capacity: WLMAPCO and DelDOT are initiating studies to define new ways to estimate the overall performance of the transportation system. Through these and other studies of transportation system performance and capacity, a better balanced multi-modal transportation system can be achieved.*
  - *Set the Total Development for the Proactive Rezoning: New Castle County should match the total development in the proactive rezoning to the transportation capacity, not simply highway capacity, derived from DelDOT's Long Range Transportation Plan However, criteria other than transportation factors may have more influence in setting the total development for the proactive rezoning.*

- ***Reinforce Established Growth Areas and Better Contain Growth:*** *The Comprehensive Development Plan identifies the general area of Churchman's Crossing as a growth area. Additional land use planning tools are developed in the Comprehensive Plan to contain and manage the location, timing and character of growth.*

- ***Provide for a New Zoning Classification of Transit Overlay District:*** *that would include interconnected street and sidewalk systems, appropriate mixed use land uses, and transit supportive densities.*

- ***Recognize and Confirm the Basic Office and Commercial Land Use Patterns of the Churchman's Crossing Area***

    - *The area North of I-95: This area within Churchman's Crossing should retain its current emphasis as a major employment center for the region. The employment activities North of I-95 associated with the office and institutional land uses are more critical to the basic regional economy than the commercial activities that tend to be concentrated South of I-95, and should be given priority for the limited available transportation capacity serving the overall area. The employees there have less discretion as to when they travel to work, more options regarding transit and ridesharing alternatives, and longer distances to travel, on average, than retail shoppers. Thus, it is more critical to give access and circulation priority to the office, institutional, and supportive commercial land uses North of I-95 than it is to serve the commercial areas South of I-95.*

    - *The area South of I-95: should retain the emphasis as a regional commercial area, The overall amount of commercial activity may be limited by environmental and/or other constraints, and not just transportation capacity.*

- ***Provide Opportunities for Improved Residential Land Use Patterns***

    - *Add Residentially Zoned Properties: at appropriate densities in the immediate vicinity of the office and commercial areas North and South of I-95. This will improve the balance of overall land uses, provide more opportunities for walking and biking, and reduce the need for automobile travel.*

    - *Encourage Development around the proposed commuter rail station that consists of buildings with residential uses mixed with commercial uses -- a mixed use development.*

    - *Plan for a Broader Range of Housing Types: to provide higher density housing within walking distance of major transit facilities and services.*

    - *Encourage Infill and Redevelopment: in areas along transit corridors where appropriate.*

**Recommendations Related to Zoning and Subdivision Regulations**

***Provide Tighter Linkages to the DelDOT CIP:*** *Link approval of Rezonings and Subdivision Reviews to appropriate stages of the DelDOT LRTP, CIP schedule, and/or to private funding.*

***Enact Sunsetting Provisions to Place Time Limits on All Recorded Plans:*** *Time limits for record land plans need to be established to better ensure that development projects are in compliance with the Comprehensive Development Plan, current Zoning and Subdivision Codes, and the MTP. The same duration of approval should be applied to new requests as well as to prior approved rezonings and subdivisions that have not yet been recorded.*

***Enhance Agreements for Traffic Mitigation:*** *Continue to use developer agreements to fund roadway, transit, demand management, access and circulation improvements, similar to existing agreements with MBNA, J.P.Morgan, and Provident Mutual Life Insurance Company.*

***Improve Monitoring of Development Status and Congestion Trends:*** *Support efforts to better track the status of proposed and approved development as well as congestion and mobility trends, including improved performance measures of roadway and transit use.*

**Recommendations Related to Zoning and Subdivision Reviews**

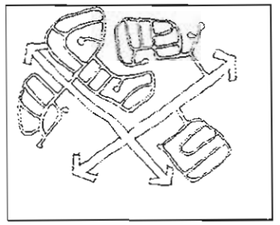
***Adopt Design Guidelines for the Churchman's Crossing Area:*** *A set of recommended Design Guidelines applicable to the area are presented on the following pages. The guidelines should be used to:*

- *Revise Zoning and Subdivision Regulations: This would provide more opportunity to consider transit, walking, and bicycle supportive features in the review of subdivision plans.*
- *Assist DelDOT to Monitor Triggering Actions: DelDOT's criteria for providing TDM and transit services, as well as to modify existing public right-of-ways and connections to adjacent land uses, should be closely linked to standards that are applied in the review of proposed development. (See the TDM and Transit pages for specific triggers.)*
- *Recognize Distinctions Among Land Uses: Different land uses may require specific guidance for access improvements to transit service. (See following pages on each land use type.)*

***Apply the Transit Overlay District Zoning Classification to Sites in the Vicinity of the Planned Commuter Rail Station:*** *Site specific guidelines and recommendations are presented as part of the recommended new zoning classification for the Transit Overlay District. These would require a detailed land use plan, including street and sidewalk systems supportive of pedestrian accessibility to the station area, and would account for feeder bus and parking at the station. (See the appropriate page in the Recommended Design Guidelines.)*

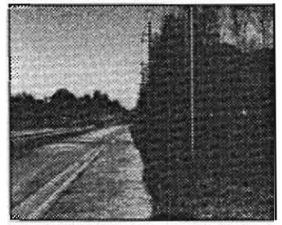
# Residential Land Use - Findings and Recommendations

## Findings :



Existing Street and Block Pattern

* Neighborhood street and block systems include landscaping and sidewalks that promote internal pedestrian activity, but no interconnectivity among communities.



Existing Transit Stop

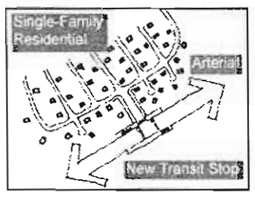
* Neighborhood streets and blocks constrain efficient pedestrian and bicycle access to public transit.
* The intersections between neighborhood streets, arterials, and collectors are awkward and unfriendly to pedestrians.

Existing Single-Family Community

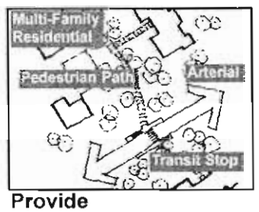
Existing Multi-Family Community

* Communities are generally self contained to minimize through traffic and emphasize security for families.
* Common open space in residential communities is used for site specific recreation or landscape purposes.

## Recommendations :
## Existing Developments :

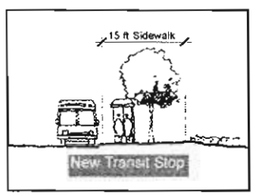


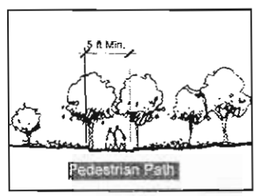

**Connect Local Sidewalks to Arterials**




**Provide Pedestrian Paths in Common Open Space**

* Upgrade appropriate transit stops at intersections of local streets and arterials & collectors to provide shelter, benches, trash receptacles, lighting and landscaping.
* Expand and connect local sidewalks to meet transit stops.
* Add signalization and crosswalks to permit pedestrians to cross the arterials & collectors.
* Encourage owners to add pedestrian paths leading to transit stops in the common open space of higher density communities.

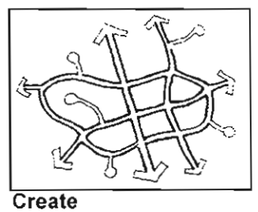



## New Communities :


**Transit Supportive Residential along Transit Corridor**


**Neighborhood Scale Retail in Proximity to Residential**

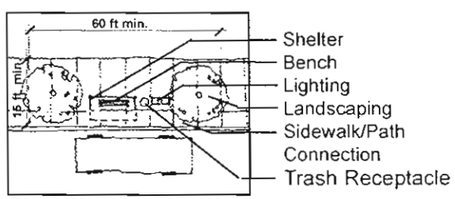


**Create Street and Block Pattern Connectivity**


**Create Open Space Connections as Neighborhood Amenities**

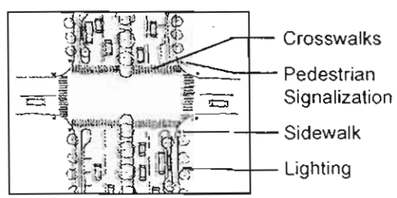
* Promote higher density communities with multiple housing types within walking distance of transit stops.
* Encourage retail and residential uses in closer proximity to each other to permit pedestrian trips.
* Encourage neighborhood street and block patterns to be interconnected, to allow direct connections from communities to transit, and reduce the need for autos to make local trips on major arterials.
* Link neighborhood open space to regional open space. Provide pedestrian links to transit through neighborhood and regional open space.
* Require pedestrian and bicycle connections to the greenway system where appropriate.

## All Transit Stops:




* Upgrade appropriate bus tops to conform to transit stop design guidelines.
* Standard transit stops should include: shelter, bench, trash receptacles, lighting and landscaping.

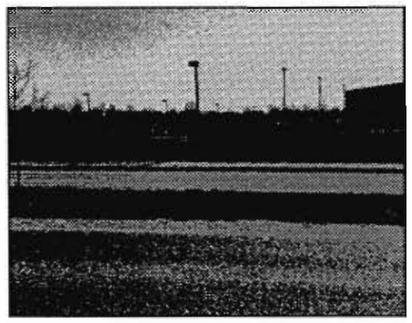
## Intersections :




* Upgrade appropriate intersections on transit corridors to conform to design standards.
* Intersections should facilitate both pedestrian and vehicular movement.

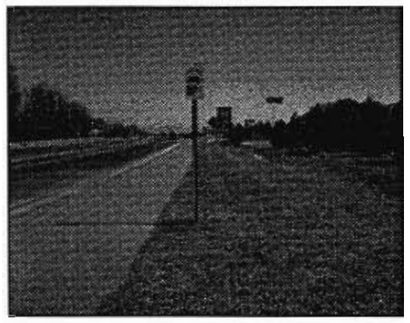
# Office/Employment Land Use - Findings and Recommendations

**Findings :**



**Existing Office Campus**

* Single purpose development is designed exclusively for automobile access.
* Buildings are set back from the arterials and collectors and are surrounded by at-grade parking lots with minimal landscaping or secure pedestrian paths.

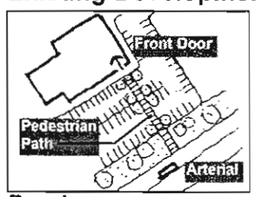


**Existing Transit Stops**

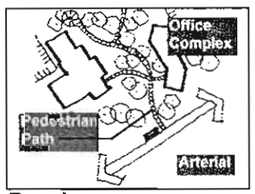
* Transit stops are difficult to locate and difficult for pedestrians to reach from the work place.

**Recommendations :**

## Existing Development :

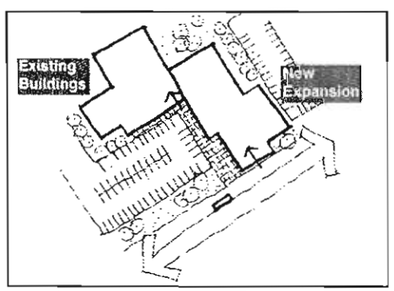



**Require Pedestrian Paths through Parking Lots**

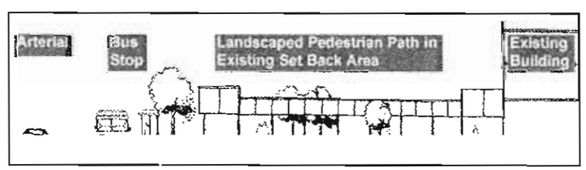



**Require Pedestrian Paths through Setbacks**

* Improve selected bus stops by providing shelter, benches, trash receptacles, lighting and landscaping.
* Locate improved bus stops adjacent to arterials and collectors with secure, landscaped pedestrian paths to building entrances.
* Encourage owners to provide pedestrian connections to individual buildings through parking lots.
* Encourage expansion through infill development in parking lots closer to transit stops.

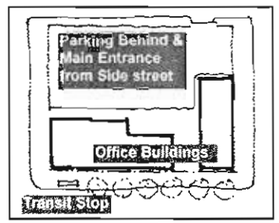



**Create Infill Development in Parking Lots**

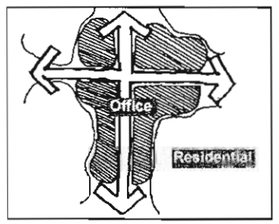



**A Covered Walkway through a Parking Lot**

## New Development :

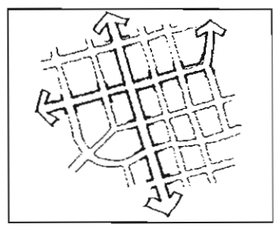



**Place Buildings Closer to the Street with Parking to the Rear**

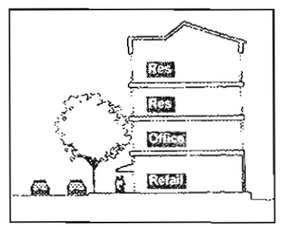



**Place Residential Uses Closer to Employment Uses**

* Encourage office development to be clustered with buildings and entrances located close to streets and transit stops.
* Encourage residential uses in closer proximity to office uses to permit pedestrian movement between the two.
* Encourage parking to be located to the rear of buildings and in parking structures to conserve land.
* Place buildings closer to the street.
* Require buildings to have pedestrian scale details such as windows and entrances which provide visual interest to pedestrians.
* Encourage appropriate mixed uses such as service retail and residential.
* Require pedestrian and bicycle connections to the greenway system where appropriate.



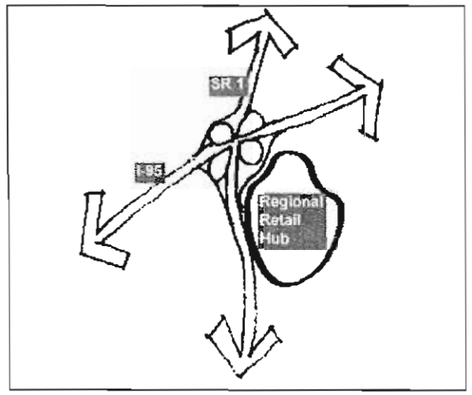
**Create a Grid-based Street and Block Pattern**




**Include Appropriate Mixed Uses on Site**

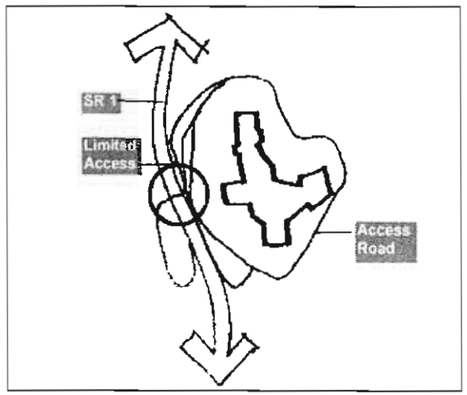
# Regional Commercial Land Use - Findings and Recommendations

## Findings :




**Regional Retail Hub General Location**

* The Christiana Mall is a regional retail destination.
* Due to its use and location, vehicular access is the only means of transportation.

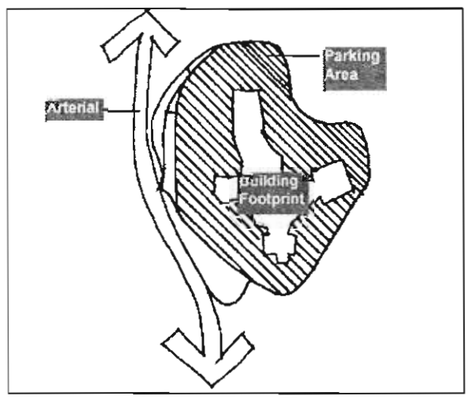



**Limited Access**

* The access road from SR-1 serves the entire commercial center.
* Local roadways are designed as ramps for SR 1 with no provisions for pedestrians or bicycles.

**Boxy Architecture**

* Buildings reflect the auto-orientation of the design. Exterior treatments are limited to entrances.
* Entrances are only from parking lots.

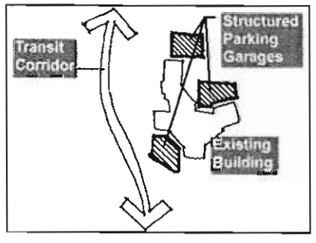



**Parking Dominates Land Use**

* Parking visually dominates the site.
* Site design sends the message: "Come by car only".

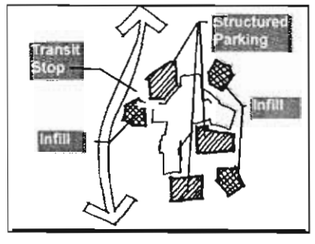
## Recommendations :

### Existing Development




**Build Parking Garages**

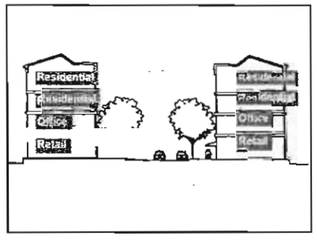
* Encourage reuse of parking areas by building parking structures.




**Mixed-Use Infill Development in Parking Areas**

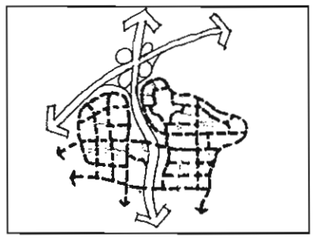
* Permit infill redevelopment in existing parking areas to bridge the gap between the transit corridor and entrances.
* Introduce non-retail uses adjacent to existing retail to take advantage of shared parking opportunities.

### New Development :




**Mixed Use Upper Floors**

* Encourage residential and office uses above ground floor retail to promote around-the-clock use and shared parking opportunities.
* Buildings, paving and land-scaping should create a safe, pleasant walking environment to reinforce transit use.

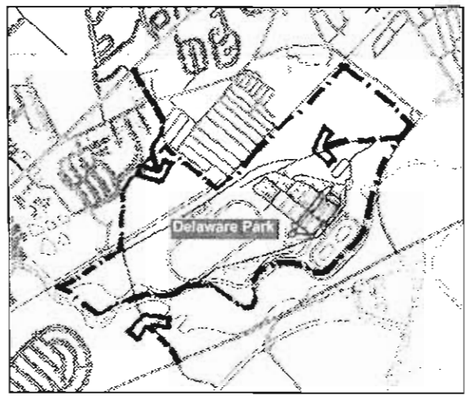


**Grid-Based Street and Block**

* Encourage appropriate mixed-use and higher density development along transit corridors.
* Require a grid-based secondary road network for development connectivity.

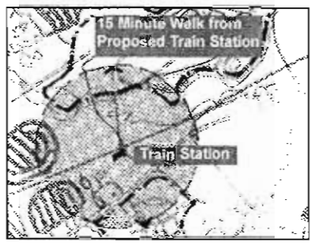
# Sports/Entertainment and Institutional Land Use - Findings and Recommendations

## Findings :



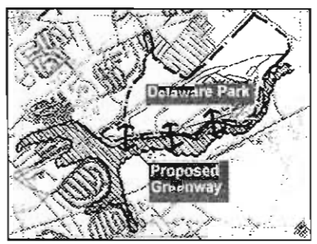

**Auto-Oriented Single Use**

* Delaware Park is an auto-oriented regional recreation center with restricted accessibility.
* The Christiana Hospital is an auto-oriented regional healthcare institution.
* Both uses have primary buildings located a significant distance from the street.



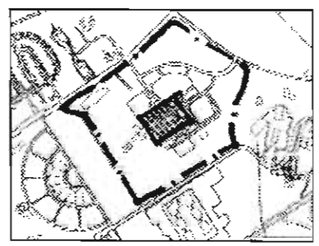

**Within Walking Distance of the Proposed Train Station**

* Both are within walking distance of the proposed train station.




**Adjacent to Greenway but Not Connect**

* The greenway is a major Churchman's Crossing amenity which is currently underutilized.

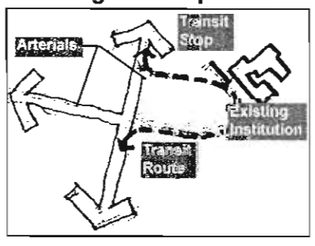


**Deep Setback from the Street**

* Parking surrounds the buildings and the entrances are a long walk from the streets.

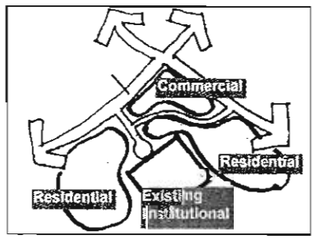
## Recommendations :

### Existing Development




**Improve Transit Connections**

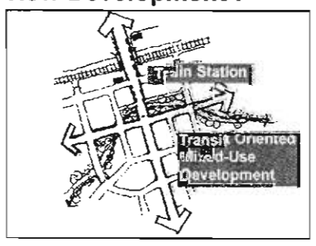
* Improve bus stops with shelter, benches, trash receptacles, lighting and landscaping. Locate bus stops closer to the main entrances of the buildings.




**Future Infill Developments**

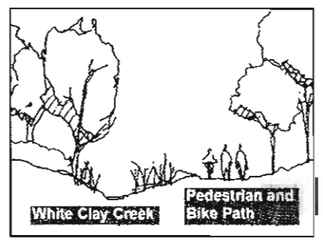
* Promote residential and commercial uses in close proximity to existing institutions so that pedestrian and bicycle linkages can be made.

### New Development :



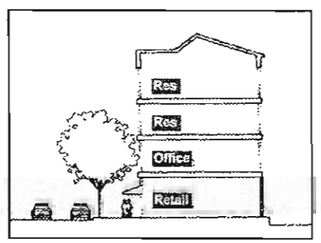

**Intermodal District**

* Proximity to rail offers an opportunity to integrate residential, commercial and open space with the sports / entertainment facility.




**Provide Pedestrian Paths and Bike Trails through the Greenway**

* Encourage pedestrian and bicycle connections between the train station and other uses through the greenway.




**Mixed-Use Plan**

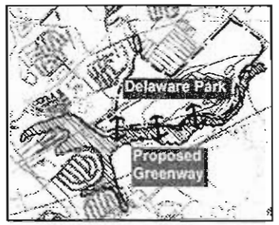
* Encourage appropriate mixed uses at stops.

# Greenways and Open Space - Findings and Recommendations

## Findings :


**Limited Access to Greenway**

* The County's greenway plan preserves sensitive habitat, wetlands, and major wooded areas and is achievable over an extended period of time.
* There are parts of the County's greenway plan that could be implemented today.

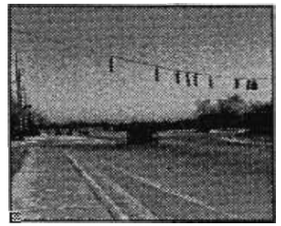



**No Pedestrian or Bicycle Connections**

* Existing open spaces are underutilized due to limited accessibility and few programmed activities.
* There are few pedestrian or bicycle connections between open spaces.

**Common Spaces**

* Some open spaces developed in older communities remains residual and unimproved.



**No Landscaping on Arterials**

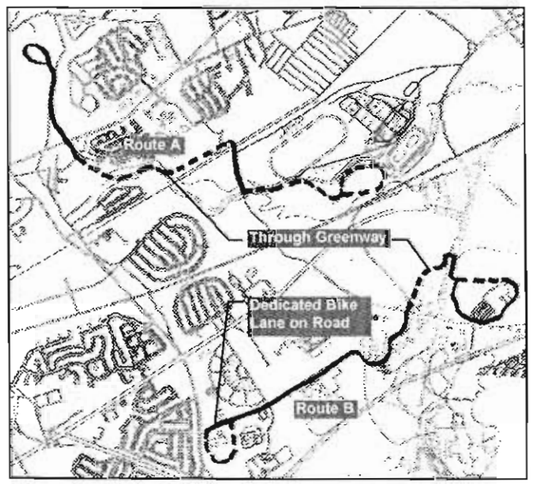
* State arterials lack landscaping.
* Arterials are barriers to pedestrian activity due to their width and lack of pedestrian facilities.

**Poor Visual Aesthetics**

* Arterials detract from neighborhood identity through overhead utility lines, large curb radii, and extra wide paving.

## Recommendations :

### Existing Development :



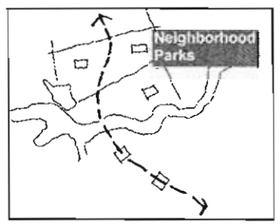

**Provide Bike Trails Through Greenways**

* Create a comprehensive design strategy for the regional open space system that addresses greenways, water resource protection areas, wetlands, and natural waterways.
* Provide pedestrian and bike access through the region, connecting open spaces and employment sites to residential areas.

**Create a Landscape Program for Transportation Corridors**

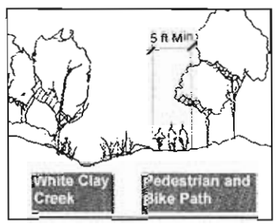
* Create landscape programs for existing aterials to be implemented over time.
* Improve sidewalks and pedestrian access to encourage pedestrian activity.
* Provide landscaping in medians and along sidewalks.
* Design new arterials as connectors of regional open space such as parkways and boulevards.
* Create a unified image between new and existing arterials.

### New Communities :



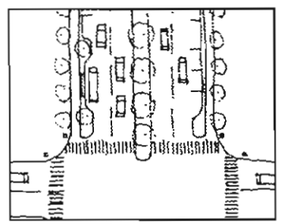

**Create a Regional Park System**

* Create a regional park system that will link neighborhood parks to greenways, services and transit.
* Provide pedestrian and bike linkages from neighborhood parks to commercial areas and transit corridors.
* Design the park system so that it can be programmed for both active and passive uses.
* Design these public open spaces with appropriate trees and plants for an integrated image with the protected areas.




**Provide Trails and Paths through Greenways**

* Provide pedestrian and bike trails through proposed greenways. Link local neighborhood destinations such as schools, shops and recreation areas.
* Design greenways as an integral element of the local community.

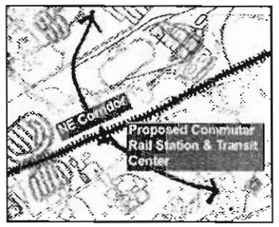


**Provide Dedicated Bike Lanes**

* Design proposed arterials with dedicated bicycle lanes in both directions as connectors to regional bike trails.
* Provide bike parking facilities at local destinations, such as transit stops, schools, parks and shops.
* Landscape new arterial streets as open space connectors linking neighborhood parks to regional greenways.

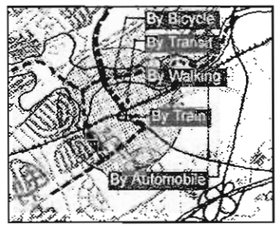
# Proposed Rail Station - Site Specific Transit District - Findings and Recommendations

## Findings :



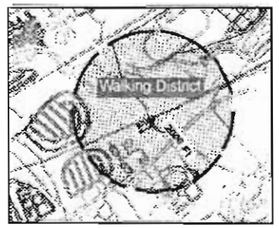

**Proposed Transit Hub**

* The site is at the crossing of the Northeast Corridor and the extension of Churchman's Road.
* The site, undeveloped today, is an opportunity to create a Transit Oriented Community.



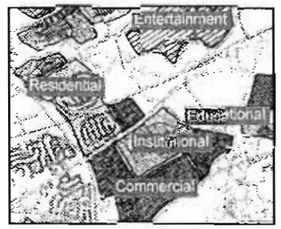

**To be Accessible by all Modes of Transportation**

* The site will be well supported by rail, roadways, and transit opportunities.



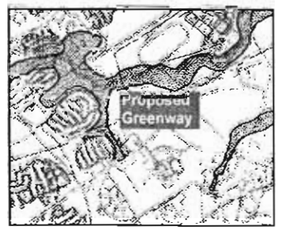

**Create a Walkable District**

* The proposed train station is within walking distance of the hospital to the south and Delaware Park to the north.



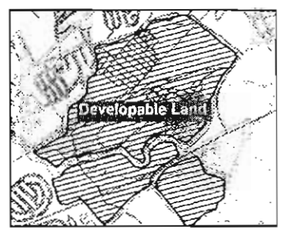

**Existing Mixed Uses**

* Within walking distance of the site, there are already multiple uses: institutional, residential, entertainment, commercial office, and retail uses.




**The County's Proposed Greenway**

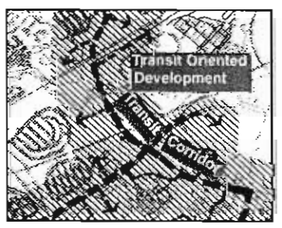
* The White Clay Creek runs through the center of this site, allowing an opportunity to integrate open space and greenway design.



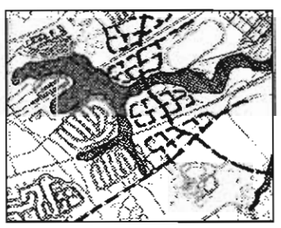

**Potential Development**

* Delaware Park will most likely remain a regional sports or entertainment center.
* Delaware Park remains the largest undeveloped parcel of land in this area. Commercial and residential uses are permitted today, by right, under the existing zoing.

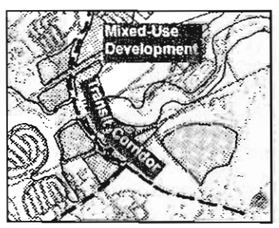
## Recommendations :



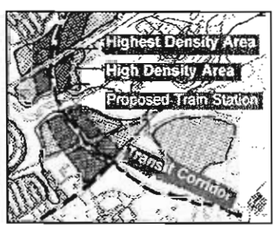

**Transit Oriented Development**



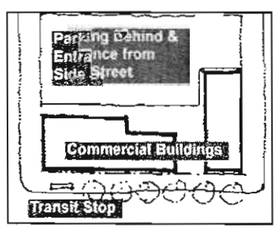
**Street and Block Pattern**



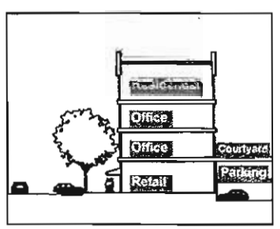

**Mixed-Uses**



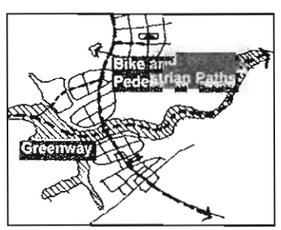

**Mixed Density**



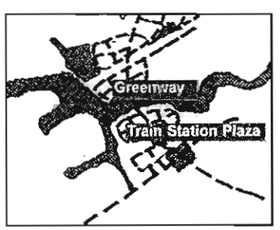

**Parking Location and Structures**




**Building on Street Property Line**




**Open Space Connections**




**Open Spaces**

### Transportation Access and Street Design :

* The street and block pattern at this site should be more grid like to provide connectivity. The streets should be designed to provide for local trips within the area without getting onto an arterial roadway. The suburban character need not be lost.
* The street design should have a hierarchy of arterial roadways (Churchman's Road being the North-South arterial and Route 4 being the East-West arterial). Both arterials should be landscaped as boulevards.
* Streets for local traffic include avenues and neighborhood streets. They provide frontage for residential and community land uses.

### Mixed Land Use and Density:

* The area immediately adjacent to the train station (within 1,000 ft) should be predominantly employment uses with some residential and neighborhood uses.
* "Walkable" is the key concept within this district.
* The secondary areas (within 2,500 ft of the train station) should be an equal mix of commercial and residential uses.
* The surrounding district should be mostly residential.

### Building Orientation and Parking:

* Parking requirements should be reduced for commercial and residential uses to take advantage of shared parking opportunities. This would support district wide parking rather than individual on-site facilities.
* Parking garages should be encouraged, rather than at grade parking, to make better use of land.
* Parking garage entrances should be placed on side streets and sited to serve multiple uses.
* Parking at the station and in the district should be managed to complement rather than conflict with each other.
* Street walls should be required along 70% of the front property line, with extensive fenestration to ensure a friendly relationship with the sidewalk and street.

### Open Space and Building Enclosures :

* Public open space of civic scale and character should be adjacent to the train station to mark it as a gateway and entrance to Churchman's Crossing.
* Public open spaces should be connected by a distinctive path to the greenways which follow the course of the White Clay Creek where pedestrian and bicycle trails are provided.
* Buildings should be oriented to the adjacent public open space.

# How Land Use Recommendations Reinforce and Support Public Transit Service:

| Changes in Land Use | Benefits to Transit | Other Benefits |
|---|---|---|
| • *Mixed-use areas, a diversity of uses in close proximity* | • *Offers an opportunity to perform errands on foot, making the use of public transit a more viable choice.* | • *Reduces the need for automobiles or trips made by automobile*<br>• *Reduces required travel distances*<br>• *Improves air quality*<br>• *Provides convenience for local residents & employees* |
| • *Higher density development along transit corridors* | • *Increases the number of residents and employees with easy access to transit.*<br>• *Facilitates the provision of enhanced transit service.*<br>• *Makes the transit system more efficient* | • *Reduces auto dependancy, resulting in fewer auto trips.* |
| • *Buildings close to street with parking in the rear* | • *Reduces the walking distance between the transit stop and the destination.*<br>• *Creates a more pleasant walk from the transit stop to the destination.* | • *Enhances pedestrian orientation with landscaping, sidewalks, and building detail*<br>• *Reduces the visual dominance of cars and parking lots from the street.* |
| • *Connective, grid-based street and block pattern* | • *Eases provision of transit service*<br>• *Provides more conducive environment for pedestrian trips* | • *Reduces congestion on highways since trips can be made on local streets.* |
| • *Nodal development pattern instead of linear* | • *Allows neighborhood services and other civic amenities surrounding transit stops and train stations to become a neighborhood focus.* | • *Creates pedestrian-and transit-oriented community centers rather than auto-oriented strip development.* |
| • *Greenway linkages to other modes of transportation* | • *Promotes walk-and-ride and bike-and-ride in conjunction with park-and-ride.* | • *Increases the use of open space*<br>• *Greenways become an integral part of the community infrastructure* |
| • *Development in parking lots of existing non-residential uses* | • *Shortens the walking distance between transit stops and destinations.*<br>• *Increases residential and employment density.* | • *Decreases the size of asphalt parking areas* |
| • *Pedestrian-friendly street design (sidewalks, narrow streets, small curb radii, curb cuts)* | • *Promotes walking in the community. The fundamental prerequisite for a successful transit system is the ability to walk. The street environment is the key to walkability.* | • *Improves neighborhood character and identity*<br>• *Incorporates the elements of a successful pedestrian orientation. A successful pedestrian orientation is safe, interesting, pleasant, interconnected and designed at a human scale.* |
| • *Integrated open space, greenways, and streets* | • *Reinforces transit use when bicycle and pedestrian facilities connect neighborhood and amenities.* | • *Creates a more pleasant community* |

# Requirements for Peak Transit Performance

### Transit Supportive Land Use

- *Increase residential and employment in Transit Overlay Districts. Achieve a minimum of 7 dwelling units / acre, or 50 employees / acre.*
- *Locate commercial building entrances near the street, with retail stores at street level and parking in the rear.*
- *Limit the number of permitted parking spaces in office and retail developments in areas served by transit*
- *Locate important services such as childcare, drug and convenience stores, dry cleaners, post offices and banks within walking distance of employment centers, residences, and bus stops.*

### Transit-Supportive Pedestrian Facilities

- *Sidewalks and direct pedestrian paths which connect bus stops to homes and workplaces.*
- *Crosswalks at major intersections serving bus stops.*
- *Bus stop pads with curb cuts at all bus stops.*
- *Benches and shelters at bus stops with significant bus boardings.*
- *Pedestrian amenities such as lighting and landscaping at bus stops and along pedestrian paths.*
- *Schedule and route information posted at bus stops and shelters.*
- *Smart bus stops with real-time bus schedule information.*

### Employer Support

- *Subdizide employee transit passes.*
- *Have transit and rideshare information available in the workplace.*
- *Allow flextime for employees who use transit and ride sharing options.*
- *Employer support of other TDM measures.*
- *Create disincentives to providing free employee parking.*

### Marketing and Public Information

- *Make extensive use of up-to-date market research methods such as surveys, focus groups and market segmentation analysis to develop new bus services.*
- *Increase use of media advertising to market new and existing transit services.*
- *Develop and implement a comprehensive marketing plan to launch major new services and service changes.*
- *Improve customer service to provide information and assistance to customers. Excellent customer service is a marketing tool.*
- *Conduct an aggressive public outreach and information effort, aimed at employees and residents of Transit Overlay Districts.*

### Transit System Operating Plan

- *Develop recommendations for transit-supportive pedestrian improvements and a program to implement bus stop improvements.*
- *Develop a program to increase employer support of transit service through employee pass subsidies and other transit supportive TDM programs.*
- *Develop an aggressive marketing program to better inform potential bus service users and to better target development of new services for specific transit markets.*
- *Develop programs to improve bus system performance (such as on-time performance and service reliability).*
- *Develop service performance standards to evaluate route performance and make adjustments to service. For example, increase service frequencies on well-performing routes, and aggressively market or modify poorly performing routes.*
- *Develop programs to improve transit vehicle and facility maintenance.*
- *Improve security at park-and-ride lots and other transit facilities.*

# Two Transit Packages Tested

*The two packages of transit improvements described below were tested to determine their effectiveness in reducing peak hour vehicle trips. The results are reported on page 33. The improvements listed in Transit Package 2: Additional Transit Improvements, assume the implementation of the MTP-recommended improvements listed in Transit Package 1, and are meant to complement those improvements.*

## Transit Package 1: MTP Transit Improvements

- *Transit Centers (Commuter Rail Station, SR 273 & 7 Park-and-Ride)*
- *Changes to Existing Services (Double DART Bus Frequencies)*
- *New Commuter Rail Service (SEPTA, MARC, Wilmington-Dover)*
- *New Express Bus Routes (Old Baltimore Pike, US 40 / US 13 Bus Lane, SR 1)*
- *New Local Bus Routes (Old Baltimore Pike)*
- *New Park-and-Ride Facilities*

## Transit Package 2: Additional Transit Improvements

- **Changes to Existing Service**
  - *Increase Service between People's Plaza and Christiana Mall via US 40 and SR 7*
- **New Express and Local Bus Routes**
  - *Newtown Road local and express bus routes*
  - *US 40 / US 13 local bus route*
- **Shuttle Services**
  - *Routes meet at the proposed commuter rail station transit center*
  - *Markets include rail and bus commuters into-and-out of Churchman's Crossing, and employee and resident mid-day trips*
- **Shuttle Route Alignments**
  - *Prices Corner Shuttle (Churchman's Road Extension)*
  - *Medical Shuttle (Continental / Samoset "Transit Only" Connection)*
  - *University Plaza Shuttle (Road "A" - Chapman Road Connection)*
  - *MBNA Shuttle*
  - *US 40 Shuttle*


# EXISTING BUS NETWORK

DART's June 17, 1996 service changes introduced a new park–and–ride lot and transit center at Christiana Mall that will serve as DART's mid–county transfer hub. The majority of bus routes that serve the Churchman's Crossing area pass through or terminate at the transit center. A number of routes from Wilmington, the US 40 corridor and Newark terminate at the mall, acknowledging the Churchman's Crossing area's status as a major employment center. New bus service on Old Baltimore Pike begins the implementation of recommendations from the Metropolitan Transportation Plan (MTP).

**301** **Route 301**
*Market:* Primarily, commuters and inter–urban travelers between Wilmington, Dover, and the southern beach areas (Rehoboth, Lewes). Also provides limited stop service to Newark and the Churchman's Crossing area.

**5** **Route 5**
*Market :* Travelers between Wilmington and Churchman's Crossing (Christiana Mall, Delaware Park).

**6** **Route 6**
*Market :* Travelers from the Kirkwood Highway (SR 2) corridor to Newark and Wilmington and between Wilmington and Newark. Users of the Prices Corner park–and–ride lot.

**7** **Route 7**
*Market :* Travelers between downtown Wilmington and the Marshallton and Eastburn Acres area.

**15** **Route 15**
*Market :* Travelers between Churchman's Crossing, New Castle and Wilmington.

**16** **Route 16**
*Market :* Commuters from Newark to downtown Wilmington.

**18** **Route 18**
*Market :* Travelers between Eastburn Acres, the Milltown Road area, Prices Corner, and Wilmington.

**19** **Route 19**
*Market :* Travelers between Polly Drummond and Pike Creek Shopping Centers, the Mermaid area, Prices Corner, and Wilmington.

**Route 22** *(Not Shown)*
*Market :* Travelers between Wilton and Airport Plaza and the Dupont Highway Corridor and downtown Wilmington.

**23** **Route 23**
*Market :* Commuters and travelers between Churchman's Crossing and downtown Wilmington. Users of the park–and–ride lot at SR 273 & SR 7.

**26** **Route 26**
*Market :* Travelers between Wilmington / via the Kirkwood Highway corridor and Churchman's Crossing (Christiana Mall).

**30** **Route 30**
*Market :* Travelers between Polly Drummond and Pine Creek Shopping Centers, Mermaid Area, Prices Corner, and Wilmington.

**33** **Route 33**
*Market :* Travelers between Downtown Wilmington, Churchman's Crossing (Christiana Mall, Christiana Hospital, MBNA), and Newark.

**33** **Route 33 (Limited Peak – Only Service)**
*Market :* Commuters from Newark and Western Churchman's Crossing to Wilmington.

**34** **Route 34**
*Market :* Travelers between Churchman's Crossing ( Christiana Mall, University Plaza), and Newark

**40** **Route 40 (Peak)**
*Market :* Commuters to downtown Wilmington from the US 40 corridor west of SR 1.

**40** **Route 40 (Off Peak)**
*Market :* Mid–day travelers and off–peak commuters to downtown Wilmington and Churchman's Crossing (Christiana Mall) from neighborhoods between US 40 and Old Baltimore Pike.

**54** **Route 54**
*Market :* Travelers between Christiana Mall and the Wilton / US 40 and US 40 / Smalley's Dam Road / SR 7 area.

**55** **Route 55**
*Market :* Travelers to Christiana Mall from the Old Baltimore Pike Corridor and Glasgow Areas.

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SCALE

## LEGEND

- Bus Stop in the Churchman's Crossing Area
- (P) Park–and–Ride Lot

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation
WILMAPCO

# CANDIDATE MTP TRANSIT SERVICE

The WILMAPCO Metropolitan Transportation Plan (MTP) recommends improvements to transit service in Cecil and New Castle Counties to be implemented over the next 25 years. These improvements include doubling existing service frequencies on DART bus routes; implementing new express and local bus routes, many of which would serve the Churchman's Crossing area; and new Park-and-Ride lots and a commuter rail station in the Churchman's Crossing area.

## New Local and Express Bus Routes :

1. *SEPTA and MARC Commuter Rail*
2. *Old Baltimore Pike Express*
3. *SR 1 Express*
4. *Old Baltimore Pike Local*
5. *Old Baltimore Pike – SR 273 /7 Local*
6. *SR 141 /48 /37 /273 Local*
7. *SR 72 /Polly Drummond Hill Road Local*

## New Park-and-Ride Lots

8. SR 4 /Harmony Road
9. SR 273 /Old Baltimore Pike
10. Christiana Mall

## Other Improvements

11. Churchman's Crossing Commuter Rail Station

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SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation

WILMAPCO


# RECOMMENDED NEW BUS ROUTES

The new bus services recommended in this study are meant to complement the bus system envisioned in the Metropolitan Transportation Plan. A major addition includes new bus service on Newtown Road, which is to be completed, possibly for bus–only operations on some portions, from SR 896 to SR 1. The other major new services are a series of five all–day shuttles which would primarily provide circulation throughout the Churchman's Crossing area. These shuttles, which would operate from a transit center located at the Churchman's Crossing commuter rail station site, would distribute commuters from the commuter rail station during the peak period and would permit employees and residents to travel around during midday without their cars, to run personal or work–related errands or make lunch or shopping trips to restaurants or shopping centers.

## Shuttle Bus Routes

**MBNA Shuttle**

*Markets :* Peak and mid–day travel for employees of MBNA and other employers along the route, transfers to other shuttle routes, commuters and reverse commuters (Philadelphia /Wilmington to Churchman's Crossing) using the Churchman's Crossing commuter rail station.

*Service Justification :* Connects commuter rail station to MBNA facilities; diverts peak period auto traffic from intersections of SR 4 with SR 273, Churchman's Road.

**Medical Shuttle**

*Markets :* Peak and mid–day travel for employees of the medical facilities and office buildings in the area (Christiana Hospital, Christiana Medical Center, Omega Professional Center) and employees along Continental Drive and Samoset, transfers to other shuttle routes, commuters and reverse commuters using the Churchman's Crossing commuter rail station.

*Service Justification :* Connects commuter rail station, Christiana Hospital, Omega Office Park, offices along Samoset and Continental Drives, and Christiana Medical Center; uses proposed connection of Samoset and Continental Drives; diverts peak period auto traffic from intersections of Churchman's Road with SR 4, SR 7.

**University Plaza Shuttle**

*Markets :* Peak and mid–day travel for employees and patrons of the retail and office facilities at University Plaza, Christiana center and Christiana Mall, transfers to other shuttle routes, and commuters and reverse commuters using the Churchman's Crossing commuter rail station.

*Service Justification :* Connects commuter rail station to Christiana Mall, University Plaza and Office Park and Delmarva Power using a set of new road connections; diverts peak period auto traffic from intersections of Churchman's Road with SR 4, SR 7, and from intersections of SR 273 with SR 7 and Chapman's Road.

**US 40 – Churchman's Crossing Shuttle /Local Bus**

*Markets :* Mid–day travel for employees and residents of the US 40 at SR 7 area and the developments between US 40 and SR 273, transfers to other shuttle routes, and commuters and reverse commuters using the Churchman's Crossing commuter rail station.

*Service Justification :* Provides additional transit capacity between Churchman's Crossing and the US 40 /SR 7 area and neighborhoods west of SR 7; connects commuter rail to US 40 /SR 7 area; diverts peak period auto traffic from intersections of Churchman's Road with SR 4, SR 7, intersections of SR 7 with SR 273, US 40.

**Prices Corner – Churchman's Crossing Shuttle**

*Markets :* Mid–day travel for employees and residents of the Prices Corner area and SR 2 corridor, transfers from other shuttle routes and from reverse commuters connecting from Wilmington bus routes at Prices Corner, commuters and reverse commuters using the Churchman's Crossing commuter rail station.

*Service Justification :* Connects commuter rail station and Churchman's Crossing area to Prices Corner via new extension of Churchman's Road; diverts peak period auto traffic from intersections of SR 2 with Churchman's Road, SR 4 /SR 7.

## Local and Express Bus Routes

**SR 896 – Newtown Road Local/Express Bus**

*Markets :* Commuters and travelers from the SR 896 and US 40 park–and–ride lot and developments between US 40 and Old Baltimore Pike traveling to the Churchman's Crossing area, the commuter rail station and downtown Wilmington and Philadelphia.

*Service Justification :* Local bus connects communities in Newtown Road corridor and SR 896 /US 40 area to commuter rail station; diverts peak period auto traffic from intersections of SR 273 with SR 7, SR 4; express bus connects these communities to downtown Wilmington via SR 1, I–95; diverts peak period auto traffic from intersections of SR 273 with SR 7, SR 1.

**US 40 /US 13 Harford County Line – to – Downtown Wilmington Local Bus**

*Markets :* Travelers between Perryville, Maryland and the US 40 corridor in Cecil and New Castle Counties and downtown Wilmington. The route will also serve the proposed park–and–ride lots at the intersections of US 40 with SR 896 and SR 7.

*Service Justification :* Provides all–hour, non–limited–stop service along bus lane corridor.

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SCALE

**LEGEND**

- MBNA Shuttle
- Medical Shuttle
- University Shuttle
- Route 40 Shuttle
- Prices Corner Shuttle
- Newtown Rd.–Downtown Express
- Newtown Rd.–Rail Station Local
- Proposed Churchman's Crossing Commuter Rail Station
- Park–and–Ride lot/Transit Center /Van–pool Transfer Site

November 20, 1996

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation

WILMAPCO

# Transit Findings

## Existing Characteristics

- *The area is low density (1-3 DU / acre, fewer than 20 employees / acre), suburban in nature, and not easily served by traditional transit service.*
- *Transit access often lacks patron amenities such as sidewalks, shelters, lighting, bus stop pads and benches.*
- *Existing transit service is primarily oriented to commuter trips to Wilmington rather than service to Churchman's Crossing and service within Churchman's Crossing.*
- *Existing midday service within Churchman's Crossing is minimal. Employees who use transit or carpool are effectively stranded in their offices at midday.*
- *Existing service is traditional fixed-route service, mostly using large buses.*
- *DTC's June 17, 1996 service changes created a new secondary transit hub at the new Christiana Mall park-and-ride lot, and improved service between Churchman's Crossing, Wilmington, and Newark.*

## Planned Services

- *The MTP recommends new local and express bus routes to serve the Churchman's Crossing area, as well as new transit centers, jitney services, and the doubling of service frequencies on existing DART bus routes.*
- *Patronage within Churchman's Crossing is moderate on most existing bus routes.*
- *Increased transit ridership can be achieved through a significant increase in transit service coverage and service frequency.*
- *Midday service could be improved within Churchman's Crossing.*
- *The proposed commuter rail station can provide a focus for future transit service.*

## Program Costs

- *The estimated operating cost of existing service (bus routes serving Churchman's Crossing) is $6.7 million per year (1996 dollars).*
- *The estimated operating cost of the MTP transit recommendations is an additional $11.8 million per year (1996 dollars), primarily due to the recommendation that existing service frequencies be doubled.*
- *The estimated capital cost of the recommended MTP Service is $37.6 million over the 1996 to 2020 period (1996 dollars).*

# Transit Recommendations

### 1996 - 2000

- *Implement a bus service plan aimed at improving land use and pedestrian facilities in Transit Overlay Districts, improving employer support of transit and TDM measures, providing an aggressive marketing strategy for bus service, and create a mechanism for constant evaluation and improvements to service (implementing agencies: New Castle County, DelDOT, WILMAPCO, DTC).*
- *Implement a package of transit supportive pedestrian improvements to improve access to bus service and enhance the attractiveness of bus stops (DelDOT, DTC).*
- *Explore employee lunch shuttle services. Provide express bus service to shopping and eating places during the lunch hour period (DelDOT, DTC). See Indicators on pages 24, 25, and 26.*
- *Explore shuttle bus routes between Christiana Mall and Churchman's Crossing area residential and employment centers (DTC). See Indicators on pages 24, 25, and 26.*
- *Explore increased bus service frequencies in keeping with the MTP's stated goal of doubling the frequency of existing bus service by 2020. If warranted, increase service frequencies on selected routes (DTC, DelDOT). See Indicators on pages 24, 25, and 26.*

### 2001 - 2005

- *Implement the fixed-route express and local bus routes recommended in the MTP (DTC).*
- *Implement, in addition to the MTP-recommended services, new fixed-route express bus service on Newtown Road and new local bus service on US 40 (DTC).*
- *Implement the park-and-ride lots and transit centers recommended in the MTP (DelDOT, DTC).*
- *Implement a shuttle bus system to serve the Churchman's Crossing area (DTC, DelDOT).*
- *Create an intermodal transit center at the proposed Churchman's Crossing commuter rail station. Modify existing fixed-route and shuttle bus services to serve the new station (DelDOT, DTC).*
- *Implement innovative transit services including point deviation and demand-responsive services on selected existing and new bus routes, including shuttle routes (DelDOT, DTC).*
- *Explore further increases in the service frequencies of existing bus routes (DelDOT, DTC).*
- *Continue efforts to improve land use and pedestrian development for the benefit of transit users (New Castle County, DelDOT, WILMAPCO, DTC).*

### 2006 - 2020

- *Modify new and existing bus routes, including shuttle bus routes, to take advantage of new roads (DTC).*
- *Continue efforts to improve land use and pedestrian development for the benefit of transit users (New Castle County, DelDOT, WILMAPCO, DTC).*
- *Explore further increases in the service frequencies of existing bus routes with an eye toward fulfilling the MTP's goal of doubling the frequency of bus service by 2020 (DTC, DelDOT).*

NEW CASTLE COUNTY

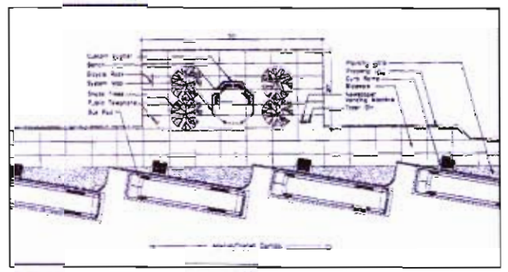
DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# ACCESS TO TRANSIT

This study proposes a comprehensive transit system be developed for the Churchman's Crossing area. Providing first–class transit service requires more than merely running buses down a road; potential passengers must also have an easy and enjoyable walk from their home or office to the bus stop, and a safe and pleasant place to wait for the bus when they get there. The Churchman's Crossing area is currently oriented to travel by automobile, not by bus or walking. Part of making the atmosphere in Churchman's Crossing more favorable for transit will require the installation of such basic amenities as sidewalks connecting neighborhoods and offices to the bus stops, crosswalks, concrete pads at bus stops, benches, bus shelters, lighting and landscaping.

## A Superstop



**Criteria :**
- More than 200 average daily boardings
- Major transfer point and collection point for bus passengers
- Located in a major retail or office area

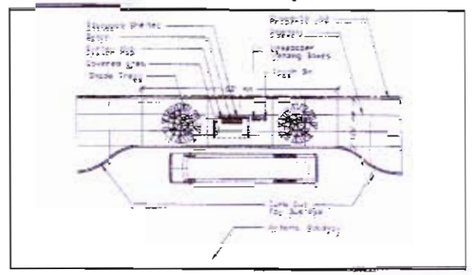
**Elements :**

*Passenger Waiting Facilities*
- Bus stop marker with bus schedule display
- Custom bus shelter with bench and system map
- Bus stop pad

*Bus Operation Improvements*
- Bus turn–out pad

*Pedestrian and Bicycle Amenities*
- Sidewalks or pedestrian paths
- Crosswalks with curb cuts and safety island
- Shade trees
- Enhanced lighting
- Trash bin
- Bicycle rack (6 Bicycle Capacity)
- Newspaper box
- Telephone

## B Transfer Stop



**Criteria :**
- More than 100 average daily boardings
- Bus route transfer point
- Adjacent to a major residential, retail or office development or other major trip generator

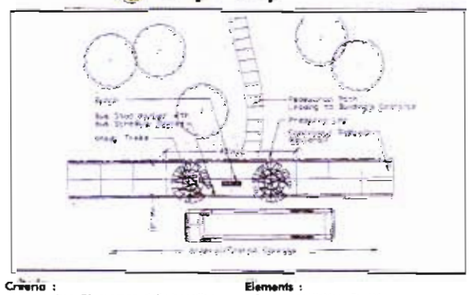
**Elements :**

*Passenger Waiting Facilities*
- Bus stop marker with bus schedule display
- Standard bus shelter with bench and system map
- Bus stop pad

*Bus Operation Improvements*
- Bus turn–out pad

*Pedestrian Amenities*
- Sidewalks or pedestrian paths
- Crosswalks with curb cuts and safety island
- Shade trees
- Trash bin
- Bicycle rack (2 Bicycle Capacity)

## C Major Stop



**Criteria :**
- More than 50 average daily boardings
- Adjacent to a major residential, retail or office development or other major trip generator

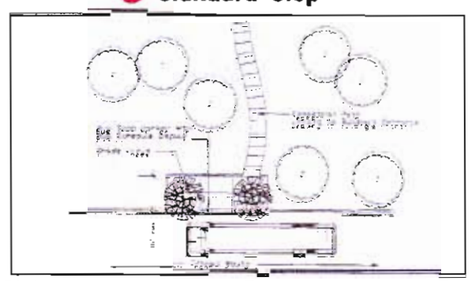
**Elements :**

*Passenger Waiting Facilities*
- Bus stop marker with bus schedule display
- Bench
- Bus stop pad

*Bus Operation Improvements*
- Bus turn–out pad

*Pedestrian and Bicycle Amenities*
- Sidewalks or pedestrian paths
- Crosswalks with curb cuts and safety island
- Shade trees

## D Standard Stop



**Criteria :**
- Fewer than 50 average daily boardings
- Not the sole bus stop for any major residential, retail or office development or other major trip generator

**Elements :**

*Passenger Waiting Facilities*
- Bus stop marker with bus schedule display
- Bus stop pad

*Pedestrian and Bicycle Amenities*
- Sidewalks or pedestrian paths
- Crosswalks with curb cuts and safety island
- Shade trees

2000 1000 0 1000 2000

SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation

# Transit Implementation Schedule and Indicators

*Implementation of the transit enhancements recommended in this study depend, in many cases, on certain underlying conditions being met. Implementation of some bus routes depends, for example, on the building of new roads on which the bus will operate and on building new development where potential transit customers will live and work. The tables on this and the next two pages show this study's transit recommendations grouped by time period of recommended implementation. The tables also list implementation indicators. These indicators will assist in determining when to implement the recommendation. If the conditions indicated are in place early, the improvement could be implemented early; if the conditions do not exist, implementation could be delayed. The table also lists the means by which the indicator is measured, and the agency responsible for monitoring the indicator measures.*

## 1996-2000

| RECOMMENDATION | INDICATOR | MEASUREMENT | RESPONSIBLE AGENCIES |
|---|---|---|---|
| Bus Service Plan | Review periodically and adjust plan according to current needs | Usage, ridership, on-time performance, other performance-based measures | DTC, NCC, DelDOT, WILMAPCO |
| Pedestrian Improvements | Presence of bus operations | Yes/No | DelDOT, DTC |
| | Minimum stop boarding criteria for each level of improvements at stop | Number of daily boardings at stop, measured with boarding counts | DTC |
| | Proximity to significant development | Number of feet from significant development | DTC, NCC |
| | Construction of new roads / improvements of existing roads | Yes/No | DelDOT, NCC |
| Employee Shuttles | Employment density | Number of employees per acre | NCC, WILMAPCO inform DTC |
| | Latent demand for service identified through public or employer requests or surveys | Level of identified latent demand compared to agency service standards | DTC |
| Shuttle Bus Routes | New development within transit overlay districts | Number of new dwelling units (DUs) or employees per acre | NCC, WILMAPCO inform DTC |
| | Density within bus route catchment areas | Total DUs or employees per acre | NCC, WILMAPCO inform DTC |
| | Congestion on selected roadway segments and intersections | Congestion measured in terms of LOS, travel delay time, signal delay time | NCC, DelDOT inform DTC |
| | Completion of transit centers and park-and-ride lots | Yes/No | NCC, DelDOT inform DTC |
| | Latent demand for service identified through public or employer requests or surveys | Level of expressed demand compared with agency service standards | DelDOT, DTC |
| | Demand for service identified through overcrowding on existing route segments | Level of demand compared to agency service standards | DTC |
| | Completion of new roads | Yes/No | DelDOT, DTC |
| Increase Bus Service Frequency | Route ridership | Number of daily passengers on route; number of passengers per trip | DTC |
| | Peak loading | Maximum number of passengers on the bus at any given time | DTC |
| Implement new express and local bus routes | New development within transit overlay districts | Number of new DUs or employees/acre | NCC, WILMAPCO inform DTC |
| | Density within transit overlay | Total DUs or employees /acre | NCC, WILMAPCO inform DTC |
| | Congestion on selected road segments and intersections | Congestion measured in terms of LOS, travel delay time, signal delay time | NCC, DelDOT inform DTC |
| | Completion of new roads | Yes/No | NCC, DelDOT inform DTC |
| | Completion of transit centers and park-and-ride lots | Yes/No | DelDOT, DTC |
| | Latent demand for service identified through overcrowding or employer requests or surveys | Level of identified latent demand compared with agency service standards | DTC |
| | Demand for service identified through overcrowding on existing route segments | Level of demand in comparison with agency service standards | DTC |

*DTC = Delaware Transit Corporation*
*TMA = Transportation Management Association*
*WILMAPCO = Wilmington Area Planning Council*
*NCC = New Castle County*
*DelDOT = Delaware Department of Transportation*

NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# Transit Implementation Schedule and Indicators



## 2001-2005

| RECOMMENDATION | INDICATOR | MEASUREMENT | RESPONSIBLE AGENCIES |
|---|---|---|---|
| Implement new express and local bus routes | New development within transit overlay districts | Number of new DUs or employees per acre | NCC, WILMAPCO inform DTC |
| | Density within bus transit overlay districts | Total DUs or employees per acre | NCC, WILMAPCO inform DTC |
| | Congestion on selected road segments and intersections | Congestion measured in terms of LOS, travel delay time, signal delay time | NCC, DelDOT inform DTC |
| | Completion of new roads | Yes/No | NCC, DelDOT inform DTC |
| | Completion of transit centers and park-and-ride lots | Yes/No | DelDOT, DTC |
| | Latent demand for service identified through overcrowding or employer requests or surveys | Level of identified latent demand compared to agency service standards | DTC |
| | Demand for service identified through overcrowding on existing route segments | Level of demand compared to agency service standards | DTC |
| Develop new park-and-ride lots and transit centers | New development in proximity to park-and-ride lots or transit centers | Number of new DUs or square feet of retail space or employees/acre | NCC, WILMAPCO inform DTC |
| | Density in proximiity to park-and-ride lots or transit centers | Total DUs or employees /acre | NCC, WILMAPCO inform DTC |
| | Latent demand for park-and-ride / transit center service identified through public or employer requests or surveys | Level of identified latent demand compared with agency service standards for development of facilities | DelDOT, DTC |
| Develop an intermodal transit center at the commuter rail station and relocate transit hub | Density of development in proximity to the commuter rail station | Number of new DUs or square feet of retail space or employee/acre | NCC, WILMAPCO inform DTC, DelDOT |
| | Demand for connections between the commuter rail station and major Churchman's Crossing area destinations | Demand identified through travel demand forecasting projections or service requests from public or employers, results of marketing surveys and focus groups, evaluated against agency standards | DelDOT, DTC |
| Implement transit service innovations (demand response, point deviation) | Identification of appropriate areas and routes for implementation of service innovations | Analysis of demographic and spatial characteristics of route catchment areas against agency and national service standards | DelDOT, DTC, NCC, WILMAPCO |
| | Cost effectiveness of new technologies | Analysis of costs of implementing new technologies against potential service benefits | DTC |
| Increase bus service frequencies | Route ridership | Number of daily passengers on route; number of passengers per trip | DTC |
| | Peak loading | Maximum number of passengers on the bus at any given time | DTC |
| Continue land use reform | Review regulations periodically and adjust to meet current needs | | NCC, DTC, DelDOT, WILMAPCO |
| Continue improving pedestrian facilities | Presence of bus operations | Yes/No | DelDOT, DTC |
| | Minimum stop boarding criteria to determine level of stop-related improvements | Number of daily boardings at stop, counted using boarding counts | DTC |
| | Proximity to significant development | Number of feet from significant development | DTC, NCC |
| | Completion of new roads | Yes/No | DTC, DelDOT, NCC |

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# Transit Implementation Schedule and Indicators



## 2006-2020

| RECOMMENDATION | INDICATOR | MEASUREMENT | RESPONSIBLE AGENCIES |
|---|---|---|---|
| Modify bus routes to take advantage of new roads | Completion of new roads | Yes/No | NCC, DelDOT inform DTC |
| | Demand for service along new road segments | Demand identified through travel demand forecasting projections or service requests from public or employers, results of marketing surveys and focus groups, evaluated against agency standards | DelDOT, DTC |
| | Time or mileage savings gained by operation on new road segments | Time and mileage savings to be gained by re-routing bus routes to operate on new road segments | DTC |
| Continue land use reform | Review regulations periodically and adjust to meet current needs | | NCC, DTC, DelDOT, WILMAPCO |
| Continue improving pedestrian facilities | Presence of bus operations | Yes/No | DelDOT, DTC |
| | Minimum stop boarding criteria to determine the level of stop-related improvements | Number of daily boardings at stop, counted using boarding counts | DTC |
| | Proximity to significant development | Number of feet from significant development | DTC, NCC |
| | Construction of new roads / improvements of existing roads | Yes/No | DTC, DelDOT, NCC |
| Increase bus service frequency | Route ridership | Number of daily passengers on route; number of passengers per trip | DTC |
| | Peak loading | Maximum number of passengers on the bus at any given time | DTC |
| Implement transit service innovations (demand response, point deviation) | Identification of appropriate areas and routes for implementation of service innovations | Analysis of demographic and spatial characteristics of route catchment areas against agency and national service standards | DelDOT, DTC, NCC |
| | Cost effectiveness of new technologies | Analysis of costs of implementing new technologies against potential service benefits | DTC |
| Implement new express and local bus routes | New development within transit overlay districts | Number of new DUs or employees per acre | NCC, WILMAPCO inform DTC |
| | Density within bus transit overlay districts | Total DUs or employees per acre | NCC, WILMAPCO inform DTC |
| | Congestion on selected road segments and intersections | Congestion measured in terms of LOS, travel delay time, signal delay time | NCC, DelDOT inform DTC |
| | Completion of new roads | Yes/No | NCC, DelDOT inform DTC |
| | Completion of transit centers and park-and-ride lots | Yes/No | DelDOT, DTC |
| | Latent demand for service identified through overcrowding or employer requests or surveys | Level of identified latent demand compared to agency service standards | DTC |
| | Demand for service identified through overcrowding on existing route segments | Level of demand compared with agency service standards | DTC |

DTC = Delaware Transit Corporation
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NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# Regional Rail Study Summary

- **Purpose of Study:**

  *To assess the potential for passenger rail transit along existing rail lines and rights-of-way in northern New Castle County.*

- **Phase I - Extension of Commuter Rail to Newark**
  - *Identified proposed Newark station location from three alternative sites*
  - *Extension of existing Wilmington to Philadelphia service along AMTRAK's Northeast Corridor*
  - *STATUS: Station under construction. Start of service anticipated Fall 1997.*

- **Phase II - Additional Commuter Rail Stations Along AMTRAK's Northeast Corridor**
  - *Identified feasibility of adding additional commuter rail stations to network*
  - *STATUS: Analysis was completed December, 1995 with the following results:*
  - *Station West (near DE/MD Line)* — *No immediate action, construct when Newark station reaches capacity*
  - *Churchman's Crossing* — *Recommended for implementation after Newark*
  - *Newport* — *Not Recommended*
  - *Edgemoor* — *Not Recommended*

- **Phase III- Additional Rail Corridors in Northern New Castle County**
  - *Identify potential for transit along rail corridors in northern New Castle County*
  - *STATUS : Analysis was completed May, 1996 with the following results:*
  - *Newark / Porter / Wilmington "U Line"* — *Recommended for further consideration of fixed guideway transit service*
  - *Porter to Wilmington Line* — *Recommended for further consideration of fixed guideway transit service*
  - *Porter to Newark Line* — *Not Recommended*
  - *Wilmington & Western Line* — *Not Recommended*
  - *CSXT Line* — *Not Recommended*
  - *Delaware Valley Line* — *Not Recommended*

# Commuter Rail Service

- **Existing Service**
  - *SEPTA Line R2 operates between Wilmington and Philadelphia on AMTRAK's Northeast Corridor*
  - *Stations in Delaware are located in Wilmington and Claymont*
  - *Service consists of 38 daily trains (19 northbound, 19 southbound) weekdays; 18 daily trains on Saturdays; No Sunday service*

- **Daily Patronage Forecasts**

| *Station* | *Existing* | *Year 2010 (Committed Development)* | *Year 2010 (Requested Rezoning)* |
|---|---|---|---|
| *Claymont* | *610* | *660* | *660* |
| *Wilmington* | *1,430* | *1,790* | *1,800* |
| *Churchman's Crossing* | *-* | *1,000* | *1,020* |
| *Newark* | *-* | *950* | *950* |

*Forecasts indicate boardings plus alightings for each station*

- **Churchman's Crossing Station**
  - *Location: west of Delaware Park Road, south of AMTRAK's Northeast Corridor*
  - *Facilities include:*
    - *Park-and-ride lot (200 to 250 spaces initial, 305 spaces ultimate)*
    - *Bus shelters*
    - *Kiss-and-ride facilities*
    - *Bicycle racks and lockers*

# Churchman's Crossing Commuter Rail Station Access

- *Data collected in a January 1995 patron survey, indicates:*
  - *Peak hour traffic volumes generated by the commuter rail station are low compared to the existing traffic volumes*
  - *Access to the station is projected via major state routes not community roadways*
  - *One exception is access via Harmony Road, south of SR 4*

    *(This roadway is proposed to be ultimately closed to through traffic)*
  - *The Metropolitan Transportation Plan (MTP) includes the future extension of Churchman's Road from SR 4 to SR 2*
  - *The future Churchman's Road Extension will divert some traffic destined to the commuter rail station from SR 2, SR 4, SR 7, and Harmony Road, north of SR 4*

NEW CASTLE COUNTY

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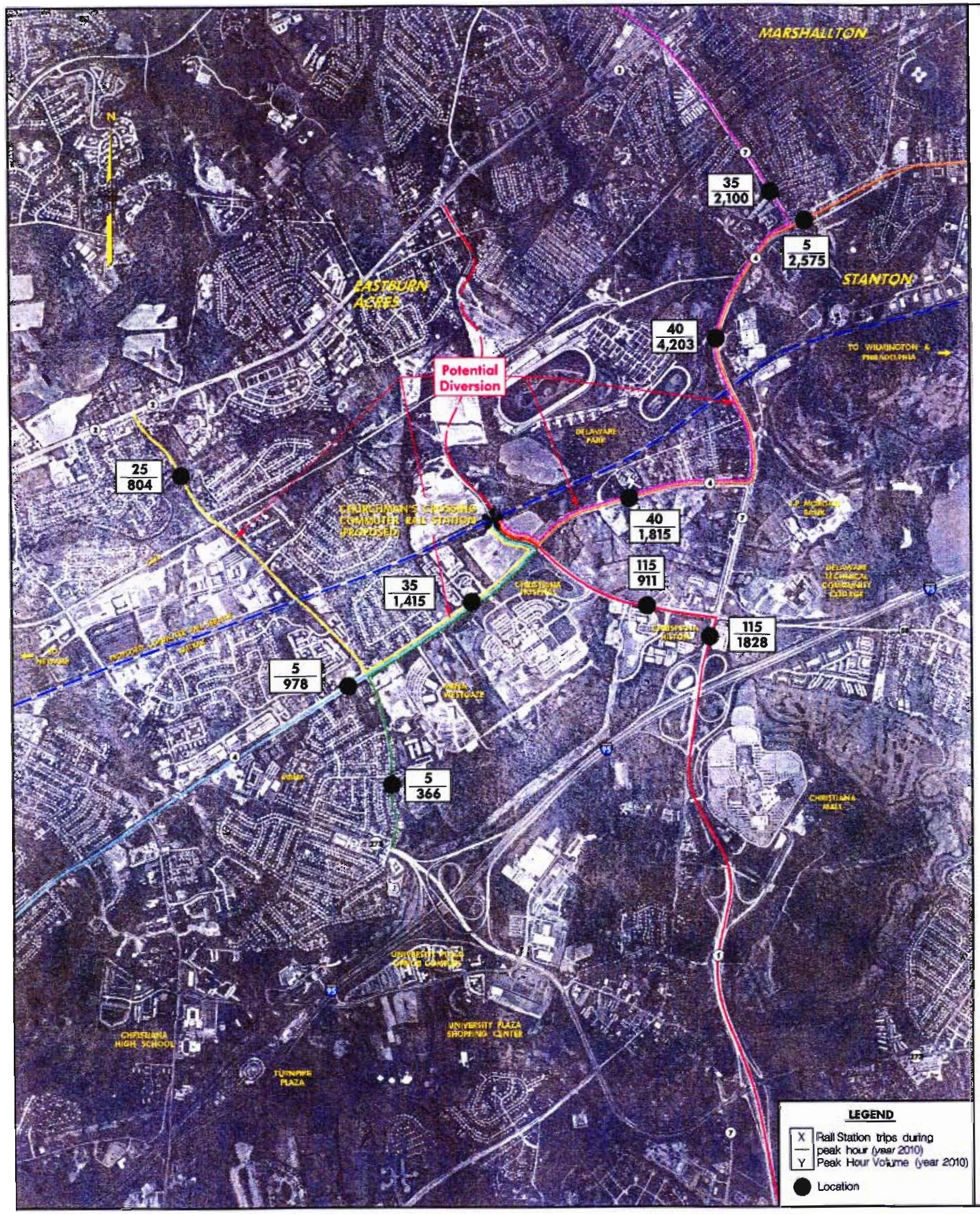
WILMAPCO




# COMMUTER RAIL SERVICE

## COMMUTER RAIL SERVICE

- **Existing**
  - SEPTA Line R2 operates between Wilmington and Philadelphia on Amtrak's Northeast Corridor
  - Stations in Delaware include Wilmington and Claymont
  - Wilmington Service consists of 38 daily trains ( 19 northbound, 19 southbound ) weekday; 18 daily trains on Saturdays

- **Proposed Commuter Rail Service Extension**
  - Newark Station, located adjacent to the Chrysler Plant on College Avenue to open fall 1997
  - Churchman's Crossing Station to be implemented after the Newark Station
  - Station west, near DE /MD line, to open when /if capacity at Newark is exceeded

- **Patronage Data**

| Station | Existing | Year 2010 ( Committed Development ) | Year 2010 ( Requested Rezoning ) |
|---|---|---|---|
| Claymont | 610 | 660 | 660 |
| Wilmington | 1,430 | 1,790 | 1,800 |
| Churchman's Crossing | – | 1,000 | 1,020 |
| Newark | – | 950 | 950 |

Note :
Patronage Data represents boardings plus alightings at each station ( i.e. individual making a round trip would contribute 2 rail trips to the station total. )

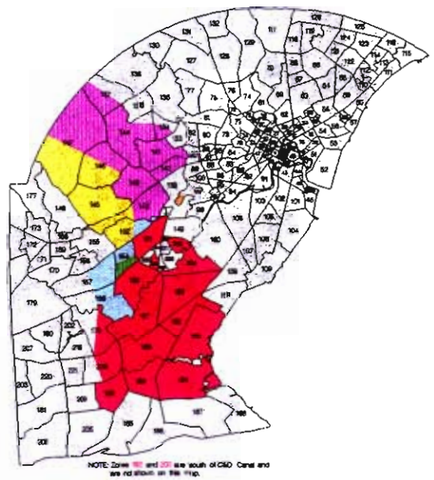
## CHURCHMAN'S CROSSING STATION

- **Location**
  - West of Delaware Park Road, south of AMTRAK'S Northeast Corridor

- **Facilities**
  - Park-and-Ride Lot ( 200 to 250 spaces initial, 305 spaces ultimate )
  - Bus shelters
  - Kiss-and-Ride area
  - Bicycle racks and lockers

## STATION ACCESS

- Zone of origin for patrons is shown shaded on the map below ( based on January '95 rail patron survey )
- Traffic volumes generated by the commuter rail station are low compared to the existing traffic volumes on the local roadways.
- Access to the station is projected via major routes not local community roads.
- One exception is access via Harmony Road south of SR 4 ( this roadway is proposed to be closed to through traffic ).
- The Metropolitan Transportation Plan (MTP) includes the future extension of Churchman's Road from SR 4 to SR 2.
- The future Churchman's Road extension will divert some traffic to the commuter rail station from SR 2, SR 4, SR 7 and Harmony Road.



| Access Route | Year 2010 Peak Hour Trips (1) | TAZ |
|---|---|---|
| A Harmony Road North of Station to SR 4 West of Station | 25 | 142, 145, 146, 147, 152 |
| B SR 4 West of Station | 5 | 152, 154, 156, 157, 166, 167, 178, 182, 206 |
| C Harmony Road South of Station to SR 4 West of Station | 5 | 154 |
| D Churchman's Road South of Station | 115 | 150, 151, 153, 162, 163, 164, 165, 166, 167, 178, 182, 183, 184, 192, 200, 206, 223, 228 |
| E SR 7 North of Station to SR 4 East of Station | 35 | 134, 137, 140, 141, 142, 143, 144, 146, 147 |
| F SR 4 East of Station | 5 | 99 |
| Total Peak Hour Trips ( Automobile ) | 190 | |

(1) These values represent the peak hour trips accessing the station by automobile. Trips accessing the station by bus, bicycle, or walking are not included in these totals. For the peak hour, approximately 60% of daily boardings use the station.

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SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

# Travel Demand Management (TDM)

*The TDM portion of the Churchman's Crossing project is focused on identifying packages of mobility enhancing measures which will improve future travel in the study area. These measures are a combination of employer actions and commuter options. As a result, they must be acceptable to a wide range of employers and attractive to many residents in the surrounding area to be effective.*

*The TDM measures are generally concerned with enhancing the efficiency of the entire transportation system. Part of this is to increase the number and kinds of options available to travelers, including transit and non-motorized modes like walking and biking. Driving alone is still an option under the TDM scenarios, but it is not as attractive or essential for individuals as it is today.*

*In summary, the TDM measures are designed to:*

*- allow more efficient use of the existing roads;*
*- improve transit services in the area;*
*- enhance options to the single occupant vehicle;*
*- reduce peak period usage of highways; and,*
*- reduce the need to use the automobile for certain trips.*

# Current TDM Activities

*The public and private sector are already involved in a range of TDM activities in the Churchman's Crossing area. However, the extent of and participation in these programs is limited. Additionally, the number of programs available has dropped since the elimination of a congressional mandate for large employers to provide commute options. Some programs continue to be provided to satisfy requirements of development agreements.*

**Operating employer-based programs include:**

- *Ride-matching services*
- *Guaranteed ride home*
- *Vanpool service*
- *Shuttle bus service*
- *Telecommuting*
- *Flexible work hours*
- *Compressed work weeks*
- *Staggered work hours*
- *Transit passes*
- *TRAVELINK*
- *Designated carpool parking*
- *Bus schedules available at workplaces*
- *Transportation coordinators*



**Operating initiatives include:**

- *The Transportation Management Association of New Castle County provides a forum for area employers to discuss transportation issues and explore solutions.*
- *The transit store in Wilmington offers personalized information and convenient sale of transit media.*
- *The DTC Ride-Matching Service provides introductions to interested commuters who travel the same route.*
- *The enhanced traffic signal control program on SR 7 and US 40 is a corridor-specific signal improvement program under design and construction.*

# TDM Analysis

- *A three phase analytical process was used to evaluate the impacts of the TDM packages:*
  - *identify complementary packages of measures;*
  - *assess potential vehicle trip reductions using computer software; and,*
  - *assess the impact of TDM's on critical intersections.*

- *The TDM Packages were constructed by combining synergistic components from several different categories:*

  - *Systems Management--increases the effective capacity of facilities by improving the efficiency of the transportation system using techniques such as incident management, variable message signs, enhanced traffic signals, ramp metering, and congestion pricing.*

  - *Traveler Information--allows for more informed travel decisions by providing both public transit and roadway congestion information using techniques such as transit schedule signage, telephone services, and radio station announcements.*

  - *Commuter Services--provides support for commuters using HOV and transit by making available services such as transportation coordinators, guaranteed ride home programs, ride share matching services, etc.*

  - *Alternative Work Schedules--eliminates some trips and makes others more compatible with transit using techniques such as a compressed work week, staggered work hours, alternative work hours, and telecommuting.*

  - *Parking Management--provides incentives to carpool or use transit with techniques such as preferential parking and parking charges.*

- *Three TDM packages were identified for testing. These packages incorporate the full range of available TDM strategies:*
  - *Metropolitan Transportation Plan (MTP)--programs outlined by WILMAPCO;*
  - *Low-Impact Option--includes additional measures which were logical extensions of the MTP level program; and,*
  - *High-Impact Option--introduces aggressive measures aimed at achieving further reductions in vehicle trips.*

# TDM Findings

## Area Characteristics

*- Only traffic to the core of the Churchman's Crossing area is susceptible to employer-based TDM iniatives. However, local-destined traffic makes up only about 30 percent of area traffic. Thus, the actual impact of TDM on area roadways is reduced.*

*- TDM programs are more likely to be offered by large employers (100+ employees). 54% of employees in Churchman's Crossing work for such employers. This is a relatively large percentage for a suburban location.*

*- Higher employer participation rates (with greater vehicle trip reductions) can be achieved when businesses are subject to trip reduction ordinances than when participation is voluntary.*

*- Rideshare programs and transit work best when many people share the same origin or destination. The low residential and employment densities in Churchman's Crossing make it difficult to provide TDM programs effectively.*

*- Additional trip reductions can be achieved when activities can be accomplished without a car. Locating residential uses near employers and service retail at employment sites can further this goal. Few such opportunities currently exist in Churchman's Crossing.*

## Model Results

*- The model suggests that the TDM measures recommended in the MTP provide a 4% reduction in peak hour commuter vehicle trips. These findings are consistent with the MTP.*

*- The Low-Impact program provides an additional 2.5% reduction in trips to the Churchman's Crossing core. Worker schedule flexibility and better marketing of services can boost usage of alternative commute options.*

*- The High-Impact program provides an additional 6.9% reduction in trips. Pricing measures have the potential to greatly influence travel decisions.*

## Program Costs

*- Some TDM measures can be self-supporting or undertaken at little cost. Vanpool programs, congestion pricing, and parking pricing can pay for themselves. Alternative work schedules can be easily accommodated by many employers.*

*- New highway facilities are the most expensive measures considered. Widening I-95 for HOV lanes would cost roughly $50 million.*

*- Private employers can offer a variety of programs in a cost-effective manner.*

# Travel Demand Management Recommendations



*Phasing in the recommended TDM programs through 2020 was examined. Measures which could likely be supported by development levels in 2000, 2005, and 2020 were identified. A concept of cost and benefits of the various programs was used in formulating the interim year packages. These packages were used in the model to estimate future-year traffic levels in the study area. However, any individual TDM measure could be implemented sooner or later than was tested, as described in the TDM Indicators section, which follows. A glossary of TDM measures is on the next page.*

## 1996 - 2000

*Implement support measures for transit*

- *Provide transit schedules at more workplaces (DTC)*

*Implement support measures for ridesharing*

- *Transportation coordinators (TMA)*
- *Guaranteed ride home program (TMA)*
- *Rideshare matching service (DTC / TMA)*
- *Regional vanpool service (DelDOT / TMA)*

*Prepare implementation plans for systems management measures*

- *Transportation Management Center (DelDOT)*
- *Incident response system (DelDOT)*
- *Variable message signs (DelDOT)*

*Explore a variety of funding options for TDM measures*

- *$4 million capital investment, $0.5 million annual operating budget by year 2000*

## 2001-2005

*Implement support measures for transit*

- *Post timetables at bus stops (DTC)*
- *Expand availability of alternative work hours (TMA)*
- *Locate Transit Store in Churchman's Crossing (DTC)**

*Implement support measures for ridesharing*

- *Telephone-based travel advisory service (DelDOT)*
- *Encourage availability of alternative work schedules (TMA)*

*Prepare implementation plans for systems management measures*

- *Enhanced traffic signal control system (DelDOT)*
- *Ramp metering (DelDOT)*

*Explore a variety of funding options for TDM measures*

- *$16 million capital investment, $3.5 million annual operating budget by 2005*

## 2006-2020

*Plan and implement HOV incentive measures*

- *HOV lanes on I-95 (DelDOT)*
- *Ramp metering with HOV incentives (DelDOT)*
- *Peak-period tolls with HOV incentives (DelDOT)*

*Provide additional traveller information*

- *Traffic advisory radio (DelDOT)*
- *On-line advisory service (DelDOT)**

*Expand support measures for transit*

- *Develop electronic payment systems (DelDOT, DTC)*
- *Institute an integrated fare system (WILMAPCO / DTC / Maryland Transit Providers)*

*Support future implementation of parking pricing*

- *Encourage parking in structures (NCC)*
- *Encourage parking maximums (NCC)*
- *Discourage excess employee parking in transit-served areas (NCC)*
- *Encourage provision of alternatives to commuting by automobile (WILMAPCO, DelDOT)*

*Explore additional sources of revenue for TDM measures*

- *$22 million additional capital costs (Does not include HOV lanes on I-95)*
- *$5 million annual operating costs by 2020*

** Recommended that the implementation of these items be accelerated to 1996-2000*

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*TMA =Transportation Management Association* *DelDOT=Delaware Department of Transportation*
*WILMAPCO = Wilmington Area Planning Council*

NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# TDM PACKAGE COMPONENTS

**Systems Management**

| Metropolitan Transportation Plan | Low – Impact Alternative | High – Impact Alternative |
|---|---|---|
| Transportation Management Center<br>Incident Management<br>Variable Message Signs<br>Enhanced Traffic Signal Control Systems<br>Traffic Calming<br>New HOV Lanes<br>Ramp Metering | Transportation Management Center<br>Incident Management<br>Variable Message Signs<br>Enhanced Traffic Signal Control Systems<br>Traffic Calming<br>New HOV Lanes<br>Additional Ramp Metering | Transportation Management Center<br>Incident Management<br>Variable Message Signs<br>Enhanced Traffic Signal Control Systems<br>Traffic Calming<br>New HOV Lanes<br>Additional Ramp Metering<br>Ramp Metering – HOV Incentives<br>Congestion Pricing<br>Congestion Pricing – HOV Incentives |

**Traveler Information**

| Metropolitan Transportation Plan | Low – Impact Alternative | High – Impact Alternative |
|---|---|---|
| Work place Schedules | Work place Schedules<br>Telephone Service<br>Public Timetable at Bus Stops<br>Real-time Schedule Information at Bus Stops | Work place Schedules<br>Telephone Service<br>Public Timetable at Bus Stops<br>Real-time Schedule Information at Bus Stops<br>Dedicated Radio<br>On-line Service |

**Commuter Services**

| Metropolitan Transportation Plan | Low – Impact Alternative | High – Impact Alternative |
|---|---|---|
| Transportation Coordinators<br>Guaranteed Ride Home Program<br>Ride Share Matching Service<br>Electronic Payment Systems<br>Intermodal Fare Integration<br>Van pool Service | Transportation Coordinators<br>Guaranteed Ride Home Program<br>Ride Share Matching Service<br>Electronic Payment Systems<br>Enhanced Intermodal Fare Integration<br>Enhanced Van pool Service<br>Transit Retail Service<br>Employer Transit Pass or Transit Check | Transportation Coordinators<br>Guaranteed Ride Home Program<br>Ride Share Matching Service<br>Electronic Payment Systems<br>Enhanced Intermodal Fare Integration<br>Enhanced Van pool Service<br>Transit Retail Service<br>Employer Transit Pass or Transit Check |

**Alternative Work Schedules**

| Metropolitan Transportation Plan | Low – Impact Alternative | High – Impact Alternative |
|---|---|---|
| Telecommuting<br>Flexible Work Hours | Telecommuting<br>Flexible Work Hours<br>Compressed Work Week<br>Staggered Work Hours | Telecommuting<br>Flexible Work Hours<br>Compressed Work Week<br>Staggered Work Hours |

**Parking Management**

| Metropolitan Transportation Plan | Low – Impact Alternative | High – Impact Alternative |
|---|---|---|
| | Preferential Parking | Preferential Parking<br>Parking Pricing |

# TDM PROGRAM GLOSSARY

## Systems Management

**Transportation Management Center**
*facilitates the coordination of day-to-day management of the transportation system; includes the closed circuit television monitors and emergency services links*

**Incident Management**
*program to allow the detection, response, and safe resolution of incidents along the roadway network to minimize non-recurring congestion*

**Variable Message Signs**
*allow information to be transmitted quickly to the traveling public about current transportation conditions, including alternate route information*

**Enhanced Traffic Signal Control Systems**
*involves the modification of traffic signal controllers to include technology that allows real-time adjustments in timing based on actual traffic conditions*

**Traffic Calming**
*techniques to slow traffic on roadways, including plantings, speed humps, traffic circles, traffic signs and paint, curb design, street parking, stricter enforcement*

**New High Occupancy Vehicle Lanes**
*provides exclusive lane for use by vehicles with desired occupancy; time-savings encourages greater vehicle occupancy—moving more people with fewer vehicles*

**Ramp Metering**
*technique to regulate the flow of vehicles entering a limited-access facility using ramp-based controls resulting in lessened delays related to merging*

**Congestion Pricing**
*charges more for trips at times of high levels of congestion than at low levels of congestion; pricing can be set to encourage car pools versus drive-alone*

## Traveler Information

**Work place Schedules**
*consists of a display with current bus schedules located in prominent locations at the Work place to contribute to increased awareness of available transit options*

**Telephone Service**
*provides simple means for determining current congestion conditions and transportation alternatives for trip planning via telephone*

**Public Timetable at Bus Stops**
*gives schedule of operation for each route serving the bus stop; part of new standard bus stop configuration*

**Real-Time Schedule Information at Bus Stops**
*uses an automated vehicle location system to provide estimates of bus arrival times as well as route planning information to customers*

**Dedicated Radio**
*enables broadcast of traveler advisories during incidents, including information about alternative transportation methods*

**On-line Service**
*allows travelers to obtain information about transportation conditions and options using a computer*

## Commuter Services

**Transportation Coordinators**
*professionals, located at the Transit Management Association or at employment sites, who provide personalized trip planning and assistance to commuters*

**Guaranteed Ride Home Program**
*provides emergency Van pool or taxi services to commuters who must return home unexpectedly during the workday, often at reduced fee*

**Ride Share Matching Service**
*matches compatible commuters to enable ride sharing*

**Electronic Payment Systems**
*permits automatic debit of transit or highway user fees from an individual's transportation account*

**Intermodal Fare Integration**
*coordinates fare handling capabilities of the different service providers in the area to enable a single fare medium to be used across different modes*

**Van pool Service**
*provides reduced-cost or no-cost vans, fuel, and insurance for individuals interested in ride sharing*

**Transit Retail Service**
*establishes a convenient retail outlet offering transit tickets, passes, and information*

**Employer Transit Pass**
*provides a mechanism for employers to provide a transit subsidy to employees*

## Alternative Work Schedules

**Telecommuting**
*allows work to be done from home or from a remote work site using advanced computer and telephone technology*

**Flexible Work Hours**
*permits employees to set work schedules which are compatible with their mode of transportation to and from work*

**Compressed Work Week**
*allows employees to work the same number of hours in fewer days each week; examples include 4/40 (4 ten-hour days) and 9/80 (80 hours in nine days)*

**Staggered Work Hours**
*refers to the deliberate staging by an employer of work start and end times to not all coincide with one another*

## Parking Management

**Preferential Parking**
*allows individuals using car pools or van pools to consistently park close to their destination*

**Parking Pricing**
*provides market-based incentives to use existing parking capacity more efficiently; differential pricing may be applied for short-term versus long-term parking or high-occupancy vehicle versus single occupancy vehicle usage*

November 20, 1996

# POTENTIAL REDUCTIONS IN PEAK – HOUR COMMUTER VEHICLE TRIPS

Transportation Demand Management package components from the MTP are expected to apply countywide. In contrast, the additional components from the "Low–Impact" and "High–Impact"options were tested as applying only to trips starting or ending in Churchman's Crossing. However, a majority of the traffic in the region neither starts nor ends in Churchman's Crossing. Table 1 shows the distribution of peak–hour commuter vehicle trips. Figure 1 identifies the "Core", "Fringe" and "External" areas. Only 16% of the region's peak–hour work trips are destined for the core of the study area.

## Table 1. Peak–Hour Commuter Vehicle Trip Distribution

| FROM | TO: Core | Fringe | External | Total |
|---|---|---|---|---|
| Core | 2% | 1% | 3% | 5% |
| Fringe | 4% | 4% | 12% | 19% |
| External | 10% | 9% | 57% | 76% |
| Total | 16% | 13% | 71% | 100% |

The core area is the primary impact area for the additional TDM and transit programs tested. This fact is illustrated in Table 2 which shows the estimated potential impact of proposed Churchman's Crossing and MTP TDM and Transit measures on the region. These figures represent reductions in tripmaking rather than reductions on individual facilities in the area.

## Table 2. Potential Reductions in Peak–Hour Commuter Vehicle Trips

| FROM | TO: Core | Fringe | External | Total |
|---|---|---|---|---|
| Core | 24% | 11% | 10% | 15% |
| Fringe | 21% | 10% | 10% | 12% |
| External | 16% | 10% | 10% | 10% |
| Total | 18% | 10% | 10% | 11% |

Figure 2 was prepared to help illustrate how the various components of the TDM and transit package contribute to the potential reductions in peak–hour commuter vehicle trips from the Core and Fringe to the Core. The contribution of TDM and additional transit programs fade as one looks outside the Churchman's Crossing area. Again, these reductions apply to tripmaking, not to number of vehicles on particular facilities.

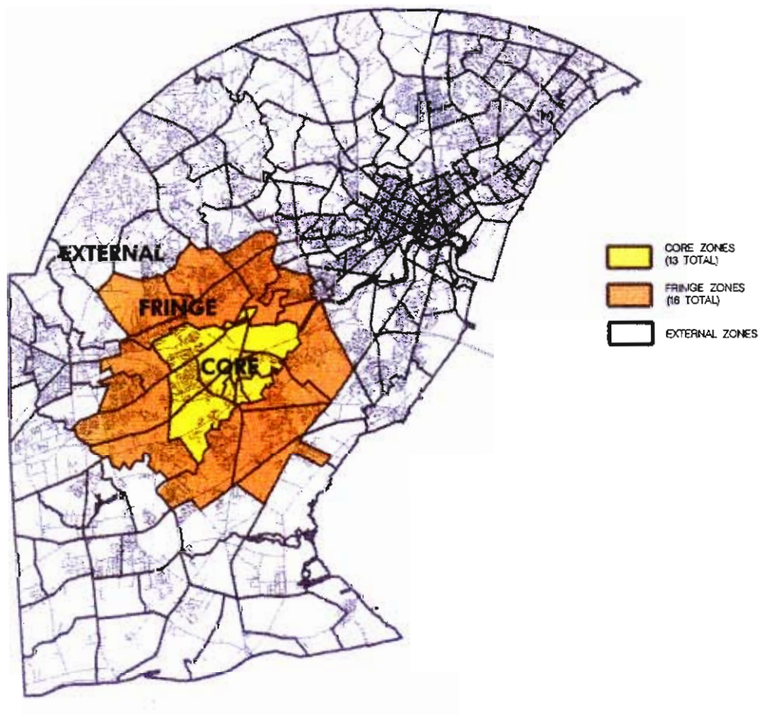



Figure 1. Core, Fringe and External Areas

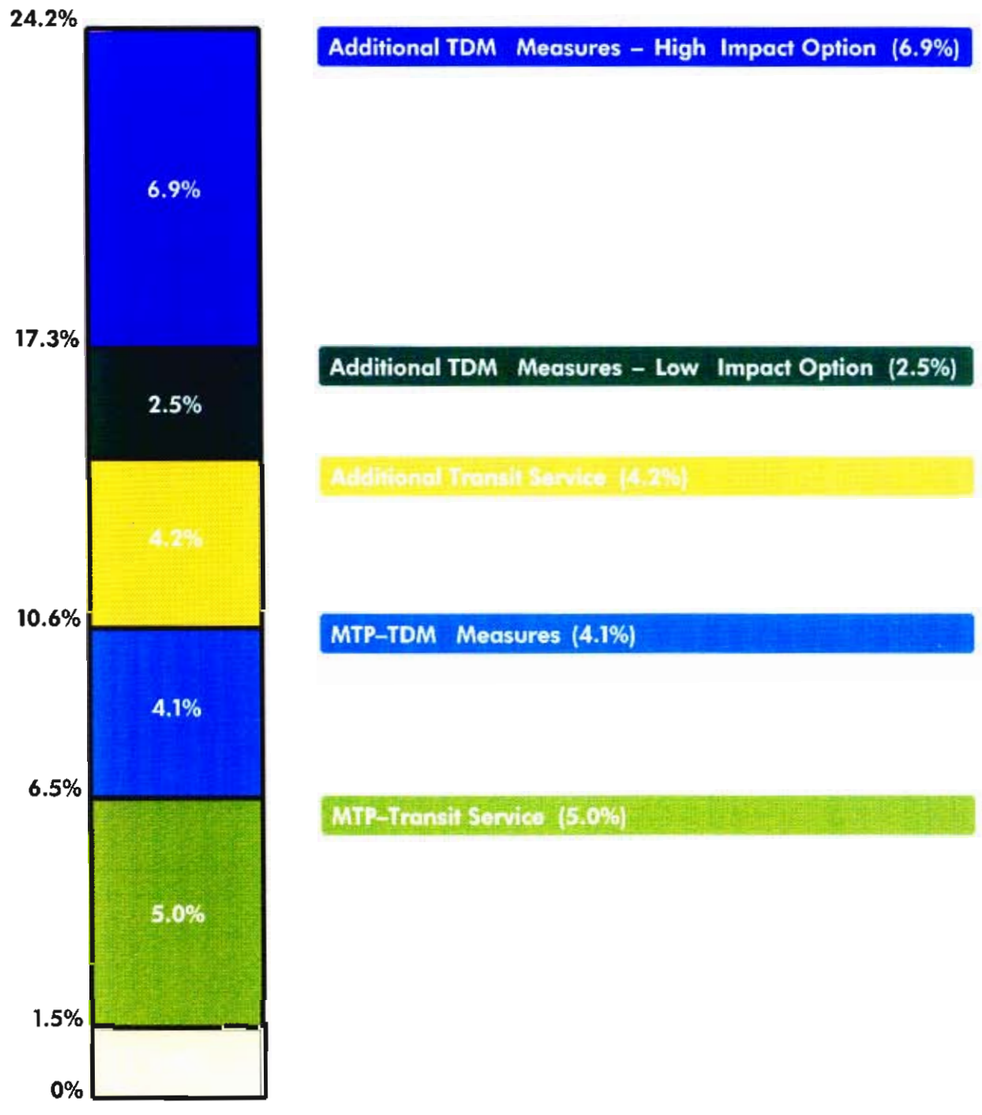



Figure 2. Maximum Reductions Within the Core

**MTP:** Metropolitan Transportation Plan – Year 2020
**TDM:** Transportation Demand Management

November 20, 1996

CHURCHMAN'S CROSSING
INFRASTRUCTURE STUDY

Delaware Department of Transportation
WILMAPCO

# TDM Indicators

*The level of participation and the intensity of the TDM programs may vary according to the congestion level found in the Churchman's Crossing area. A series of indicators were identified which could be used to trigger the implementation of TDM programs. These include site specific, intersection-specific, and area-wide indicators of congestion levels, and use of alternate commute options. Through ongoing measurement and monitoring activities, the TDM program may be tailored to fit the needs and the level of congestion mitigation required to achieve acceptable levels of service on the primary roads and intersections in Churchman's Crossing.*

| INDICATOR | MEASUREMENT | RESPONSIBLE AGENCIES |
|---|---|---|
| **Site-Specific Indicators** | | **Lead agency is listed first** |
| *Site Mode Split:*<br>*percentage of employees using various transportation modes (e.g., SOV, HOV, public transit, non-motorized) to get to and from a site* | *Employee surveys or directly observed in driveway counts* | *DelDOT, WILMAPCO, NCC* |
| *Site Average Vehicle Occupancy:*<br>*average number of persons per vehicle among the employees at a specific site* | *Employee surveys or direct observation* | *DelDOT, WILMAPCO, NCC* |
| *Site Vehicle-Miles-Travelled (VMT):*<br>*number of vehicle miles traveled to-and-from work by the tenants of a development, over a defined period* | *Employee surveys or travel demand forecasting models* | *DelDOT, WILMAPCO, NCC* |
| *Site Commuter Options:*<br>*assessment of commuter options available at a specific site performed as part of an incentive-based program* | *Periodic site assessments, information supplied by employers or developers* | *NCC, WILMAPCO* |
| **Intersection-Specific Indicators** | | |
| *Level of Service (LOS):*<br>*congestion qualified at the intersection level based on the ratio of vehicles-to-capacity* | *Intersection counts or travel demand forecasting model* | *DelDOT, NCC, WILMAPCO* |
| *Travel Delay Time Between Points:*<br>*length of time it takes to travel between selected points in the area at either micro-or macro-level* | *Observed travel time or travel demand forecasting model* | *DelDOT, WILMAPCO, NCC* |
| *Signal Delay Time:*<br>*length of time cars must wait in a queue at trtaffic signals* | *Observed delay time or using simulation models* | *DelDOT* |
| **Area-Wide Indicators** | | |
| *Area-Wide Mode Split:*<br>*percentage of travelers within a specified area using various transportation modes (e.g., SOV, HOV, public transit, non-motorized)* | *Observation, market surveys or travel demand forecasting model* | *DelDOT, WILMAPCO* |
| *Area-Wide Average Vehicle Occupancy:*<br>*average number of persons per vehicle travelling in a defined area* | *Observation or travel surveys* | *DelDOT,WILMAPCO* |
| *Area-Wide Vehicle-Miles-Travelled (VMT):*<br>*number of vehicles miles traveled in a defined area over a defined period, generally, daily or annual* | *Travel surveys or travel demand forecasting model* | *DelDOT, WILMAPCO* |

*DTC = Delaware Transit Corporation*
*TMA = Transportation Management Association*
*WILMAPCO = Wilmington Area Planning Council*
*NCC = New Castle County*
*DelDOT = Delaware Department of Transportation*

NEW CASTLE COUNTY

DELAWARE DEPARTMENT OF TRANSPORTATION

WILMAPCO

# Roadway Findings

## Findings

### Effect of New Roadways

- *Nine potential packages of roadway connections, noted on page 39, were tested. The results of the testing indicated the following four roadway connections warranted further testing:*
  - *Churchman's Road Extension, SR 4 to SR 2*
  - *New ramp from Churchman's Road to northbound I-95*
  - *Christiana Bypass, I-95 to Road A, including I-95 Ramp*
  - *Newtown Road Extension to SR 1 + New north serving ramps (not shown on page 39 figure)*
- *For testing purposes, these four improvements were assumed to be in place by 2005*
- *New roadway connections provide relief to some intersections, while making other intersections more congested*

### Effect of .Land Use

- *Land use options 1A and 2A, which implement development at a slower rate, delay only slightly, the increase in congestion.*
- *Land use options 1B and 2B, which provide somewhat less commercial development and somewhat more residential development have little effect on overall congestion, due in part to the large amount of through traffic and the large amount of existing and committed development.*
- *The requested rezonings do have some effect on intersection congestion. The requested rezonings in the southwest quadrant of I-95 / SR 7 would create serious congestion without the provision of the Christiana Bypass. The bypass would provide relief for the SR 273 / Eagle Run / Chapman Road intersection. Approval of the requested rezonings would result in additional traffic on Road A at the SR 1 ramps and on SR 7 at SR 273. A more detailed traffic analyses should be required as part of the formal rezoning request.*

### Effect of Transit and TDM

- *Even with enhanced transit service, TDM measures, and new roadway connections, congestion increases in the out years:*
  - *2005 is worse than 2000*
  - *2020 is worse than 2005*
- *Transit and TDM measures reduce congestion, but not significantly, due in part to the large volumes of through traffic and the design of existing and committed development in the area.*

### Effect of Through Traffic

- *Through traffic, which has neither an origin nor destination in Churchman's Crossing, represents a significant portion of traffic passing through Churchman's Crossing, (varying from 30% to 70% depending on the roadway segment (see page 40).*
- *Reducing development will not reduce congestion in this area because of the strong desire to access SR 1 and I-95. Were the approved / committed development in Churchman's Crossing not constructed, the peak hour trips generated by the development would be replaced with through trips.*

### Key Intersections - Level of Service (LOS) and Improvements

- *Sixteen key intersections in the Churchman's Crossing area were analyzed.*
- *With the provision of enhanced transit service, TDM measures and roadway connections, six of the sixteen intersections willl operate satisfactorily, at LOS D or Better, in 2000, 2005 and 2020:*
  - *SR 7 / Road A*
  - *Road A / northbound SR 1 ramp*
  - *Churchman's Road / northbound SR 7 ramp*
  - *SR 2 / Harmony Road*
  - *SR 2 / St. James Road*
  - *SR 4 / St. James (Telegraph) Road*
- *One intersection requires construction of new roadway connections to operate satisfactorily (LOS D or better) in 2005 and 2020:*
  - *SR 273 / Chapman / Eagle Run Road requires construction of the Christiana Bypass from east of I-95 to road A at SR 7 (including a new I-95 ramp).*
- *Nine of the intersections will operate at Level of Service E or F in 2000, 2005 and 2020. However, with intersection improvements, 7 of the 9 intersections will operate at LOS D or better: See page 38.*
  - (1) *SR 4 / Harmony Road*
  - (2) *SR 4 / Churchman's Road*
  - (3) *SR 4 / SR 7 / Christiana Center*
  - (4) *SR 273 / SR 7*
  - (6) *SR 2 / Churchman's Road Extended / Delaware Park Entrance*
  - (8) *SR 4 / SR 7 Split (Stanton)*
  - (9) *Road A / southbound SR 1 ramps*

# Roadway Findings

- *Two intersections will operate at LOS F, even with the provision of enhanced transit, TDM measures, and intersection improvements. However, these two intersections will operate at a LOS in 2020 that is generally equivalent to their existing LOS.*

  (5) *SR 7 / Churchman's Road / southbound SR 7 ramps*

  (7) *SR 2 / SR 7*

  *SR 7 / Churchman's Road, southbound on ramp - although an interchange will be constructed at Churchman's Road and SR 7, projected growth in traffic results in LOS F in 2020. The overall 1.27 V/C ratio in 2020 is about the same as today's conditions (LOS F - V/C 1.25).*

  *SR 2 / SR 7 will operate at LOS F (V/C = 1.09) in 2020. This LOS is generally the same as today's LOS F (V/C = 1.04).*

**Summary**

*In summary, with the provision of enhanced transit service, TDM measures, limited roadway connections, and intersection improvements, 14 of the 16 key intersections will operate at LOS D or better in 2020. Two of the key intersections are projected to be more congested than LOS D. These 2 intersections will operate at a LOS in the year 2020 that is generally equivalent to their LOS today. The proposed package of multi-modal transportation improvements will reasonably accommodate existing and committed development. Requested rezonings and other proposals should be reviewed by DelDOT and New Castle County on a case by case basis, to assure they do not result in an unacceptable level of congestion.*

# Roadway Recommendations

## Programmed Roadway Improvement

*Project included in the current DelDOT CIP:*

*(8) - SR 7 / SR 58 (Churchman's Road) Interchange*

## Intersection Improvements

*Congestion levels should be closely monitored and appropriate lead time provided that would result in the implementation of improvements to the following intersections to accommodate traffic demand. Based on current traffic projections, the implementation dates for the improvements are noted on the opposite page. These dates are approximate and dependent in part on the actual rate at which development occurs and the actual growth that occurs in traffic in the Churchman's Crossing area.*

- *(1) SR 4 / Harmony Road*
- *(2) SR 4 / Churchman's Road*
- *(3) SR 4 / SR 7 / Christiana Center*
- *(5) SR 273 / SR 7*
- *(14) SR 7 / SR 4 / 7 Split (Stanton)*
- *(16) Road A / southbound SR 1 ramps / - Dualization of Road A over SR 1*
- *(8) SR 7 / Churchman's Road / southbound SR 7 ramps*
- *(11) SR 2 / Churchman's Road Extended*
- *(13) SR 2 / SR 7*

## New Roadway Connections

*Congestion levels should be closely monitored, and appropriate lead time provided that would result in the implementation of the following new roadway connections, to accommodate traffic demands:*

- *(A) - Churchman's Road Extension, SR 4 to SR 2*
- *(B) - Ramp from Churchman's Road to northbound I-95*
- *(C) - Christiana Bypass, I-95 to Road A, including I-95 Ramp*
- *- Newtown Road Extension, SR 7 to SR 1, including north serving ramps (not shown on figure to right)*

*The proposed roadway and intersection improvements, in concert with enhanced transit service and TDM measures, will generally accommodate existing and committed development.*

*Requested rezonings and other proposals should be reviewed by DelDOT and New Castle County on a case by case basis, in detail, to assure they do not result in unacceptable congestion.*

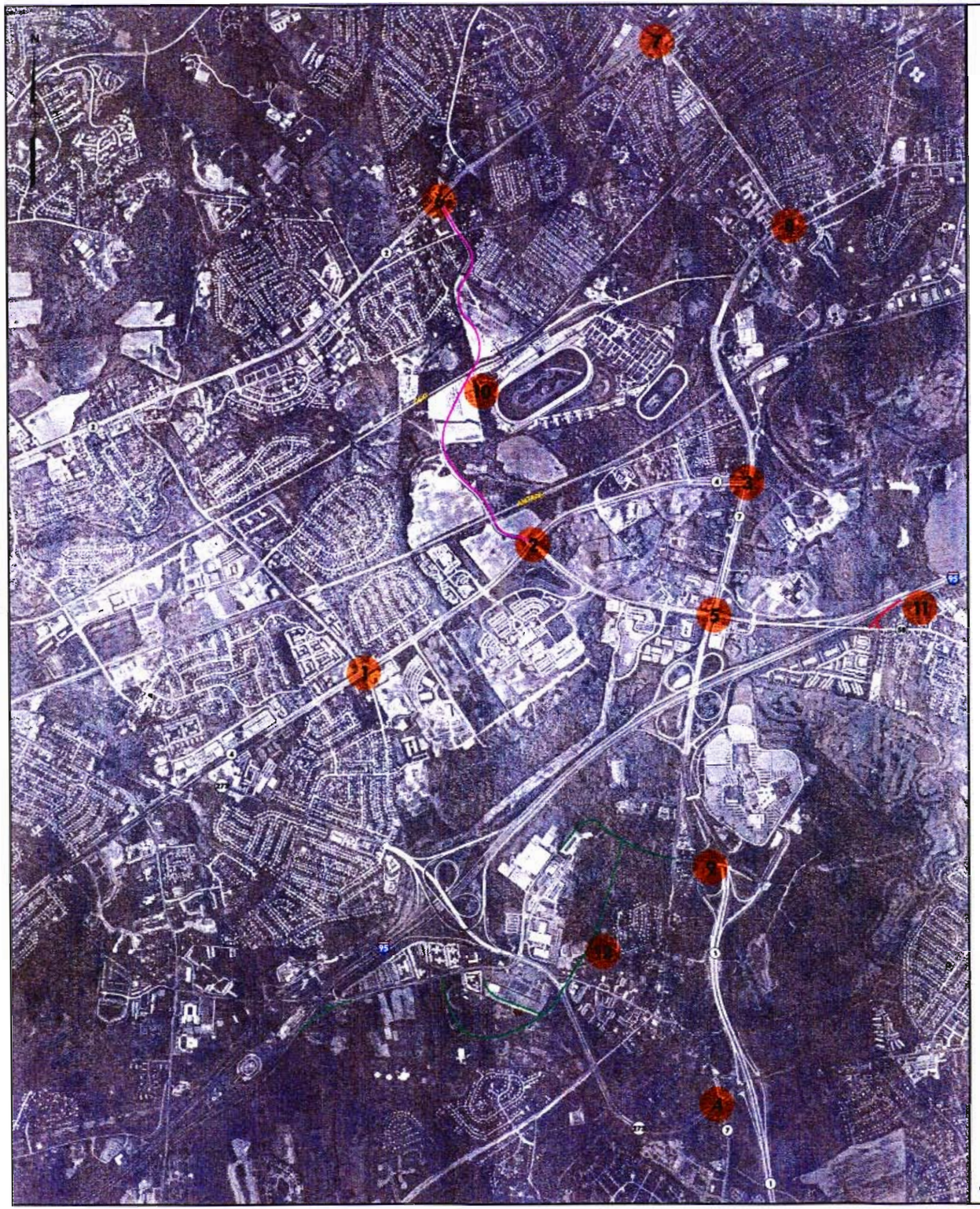
## Implementation

*DelDOT should conduct yearly traffic counts at the nine critical intersections, monitor development approvals and construction with New Castle County, and update projections yearly to determine when the intersection improvements are required to avoid LOS E and new roadway connections are required to accommodate traffic demands. Accident data for the critical intersections should also be reviewed annually and considered when determining the schedule for the improvements.*

*DelDOT should proceed with a detailed engineering study of the anticipated improvements at the nine noted intersections. These detailed studies should determine the right-of-way requirements for the improvements. DelDOT and New Castle County should take the necessary action to assure that the required rights-of-way are protected and available for the future intersection improvements.*

*Design, right-of-way and construction activities for the intersection improvements should be scheduled to provide full implementation prior to experiencing LOS E.*

*The recommendations have not been assessed or tested with respect to federal, state and local environmental requirements. The environmental analyses / evaluation will occur during the next phase of the project.*




# RECOMMENDED CHURCHMAN'S CROSSING ROADWAYS /INTERSECTION IMPROVEMENTS

| | Recommended Improvements | Cost (1) | Schedule (2) | Comments |
|---|---|---|---|---|
| **Intersections** | | | | |
| 1 | SR 4 / Harmony Road | $2.5 | 1997<br>1998<br>1999<br>2000 | • 3rd Lane Through Intersection on Eastbound SR 4<br>• 2nd Right Turn Lane on Westbound SR 4<br>• 2nd Lane through Intersection Northbound<br>• 3rd Left Turn Lane Southbound Harmony Road |
| 2 | SR 4 / Churchman's Road | $2.2 | 1997–1998<br>1999–2000<br>2001<br>2002–2003 | • Part of Churchman's Road Extension project<br>• 2nd Left Turn Lane on Eastbound SR4 and Southbound Churchman's Road<br>• 2nd Lane thru Intersection on Northbound & Southbound Churchman's Road<br>• 2nd Right Turn Lane on Southbound Churchman's Road<br>• 2nd Right Turn Lane on Eastbound SR4 |
| 3 | SR 4 / SR 7 / Christiana Center | $2.5 | 1997<br>1998<br>1999<br>2000 | • 3rd and 4th Lanes through Intersection on Northbound & Southbound SR 7 Analyses assumes that 950,000 sf of Development Triangle", Bound by SR 4 /SR 7 / Churchman's Road, has access to both SR 4 and SR 7 at Chili's / AAA Intersection |
| 4 | SR 273 / SR 7 | $0.5 | 2002<br>2003<br>2004<br>2005 | • 2nd Left Turn Lane on Westbound SR 273<br>• 2nd Left Turn Lane on Southbound SR 7 |
| 5 | SR 7 / Churchman's Road Interchange / Southbound SR 7 Ramp | – | 1993<br>1996<br>1996<br>1997 | • Interchange to replace existing intersection of SR 7 and Churchman's Road by year 2000. No improvements proposed beyond SR 7 /Churchman's Road Interchange construction. |
| 6 | SR 2 / Churchman's Road Extended | $0.8 | 1997–1998<br>1999–2000<br>2001<br>2002–2003 | • Part of Churchman's Road Project<br>• 2nd Left Turn Lane on Westbound SR 2<br>• 2nd Right Turn Lane on Northbound Churchman's Extension |
| 7 | SR 2 / SR 7 | $2.0 | 1997<br>1998<br>1999<br>2000 | • 3rd Lane through Intersection on Northbound SR 7 |
| 8 | SR 7 / SR 4 / 7 Split (Stanton) | $1.7 | 1997<br>1998<br>1999<br>2000 | • 3rd Lane through Westbound SR 4 / 7<br>• 2nd Right Turn Lane on Eastbound SR 7 |
| 9 | Road A / Southbound SR 1 Ramp | $4.0 | 1997<br>2003<br>2004<br>2005 | • Dualization of Road A over SR 1 |
| **New Roadway Connections:** | | | | **Proposed Intersection Improvements** |
| 10 | Churchman's Road Extension, SR 4 to SR 2 | $30 | 1997–1998<br>1999–2000<br>2001<br>2002–2003 | • Requires coordination with property owners, AMTRAK and CSX |
| 11 | Ramp from Churchman's Road to Northbound I–95 | $2.5 | 1997–1998<br>1999–2000<br>2001<br>2002–2003 | • Coordinate with replacement of bridge carrying Churchman's Road over I–95<br>• Requires coordination with Artesian Water Company |
| 12 | Christiana Bypass, I–95 to Road A | (3) | - | • Developer proposal tested as part of study |
| | Newtown Road Extension SR7 to SR 1, including north serving ramps | (3) | 2000<br>2001<br>2002<br>2003–2004 | • Not shown on Photograph |

(1) Costs are in millions of 1996 hours
(2) Potential Dates for:
- Planning
- Design
- Right–of–Way Acquisition
- Construction

(3) Cost Estimates Being Developed

2000 1000 0 1000 2000
SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation
WILMAPCO


# POTENTIAL ROADWAY CONNECTIONS STUDIED

## THOSE GROUPS NOT RECOMMENDED FOR FURTHER CONSIDERATION

### GROUP 1 *(Located outside the adjacent map boundary)*

**A Gender Road Extension**
Extend Gender Road west to SR 72.

**B SR 72 South–Oriented Ramps to I–95**
Construct ramps from northbound I–95 to SR 72 and from SR 72 to southbound I–95.

### GROUP 2

**C US 301 Corridor**
Construct roadway along reserved US 301 corridor between Old Baltimore Pike and SR 4.

### GROUP 3

**D Chapman Road Extension**
Extend Chapman Road from west of Salem Church Road to SR 4 (D–1), including access roads to the Todd Estates and Breezewood (D–2, D–3, D–4) communities.

### GROUP 4 (Partial)

**E-3 Christiana Mall Road "A" Extension – West**
E–3 from Eagle Run Road Extension to SR 4.

**G SR 2 /SR 4 Connector**
Construct roadway between SR 2 and SR 4. (Optional Alignment)

**H Brownleaf Road Extension**
Extend Brownleaf Road from Harmony Road to southwest of Christiana Hospital.

### GROUP 6

**M-1 I–95 /Churchmans Road Interchange**
Construct ramp to facilitate Churchmans Road to South Bound I–95.

### GROUP 7

**N New Christiana Mall Access Road**
Construct roadway from north of Christiana Mall to Cavaliers Country Club Drive for bus–only access onto Churchmans Road.

### GROUP 8

**O-1 Christiana Mall Road "A" Extension – East**
Extend Road "A" from Christiana Mall to west of the Christina River.

**O-2 Christiana Mall Road "A" Extension – East**
Extend Road "A" from west of the Christiana River to Airport Road (SR 37) south of the Oak River community.

**O-3 Christiana Mall Road "A" Extension – East**
Extend Road "A" from west of the Christiana River to Airport Road (SR 37) north of the Oak River community.

**P Cavaliers Country Club Drive Extended**
Extend Cavaliers Country Club Drive south to proposed Christiana Mall Road "A" Extension east.

## NEW ROADWAY CONNECTIONS RECOMMENDED FOR FURTHER CONSIDERATION

(SEE PAGE 38 – 10 , 11 & 12 )

### GROUP 4 (Partial)

**E-1 Christiana Mall Road "A" Extension – West**
**E-2** Extends Road "A" from SR 7 to Eagle Run Road Extended. E–1 from SR 7 to proposed Christiana Bypass, E–2 from proposed Christiana Bypass to Eagle Run Road Extension.
*This improvement would relieve SR 273 at Chapman Road / Eagle Run Road.*

**I Eagle Run Road Extension**
Extends Eagle Run Road from current terminus to proposed Road "A" extension – west.
*Provides alternative to the SR 273 /Eagle Run Road / Chapman Road intersection.*

**F Churchmans Road Extension**
Extends Churchmans Road (SR 58) from SR 4 to SR 2 near Milltown Road.
*Provides relief for Harmony Road and provides additional capacity if Harmony Road closed between SR 4 and SR 273.*

### GROUP 5

**J Ramp from Northbound I–95 to Chapman Road**
Provides ramp from northbound I–95 to Chapman Road.
*Provides alternative to weave on SR 273 from I–95 to left turn into Eagle Run Road.*

**K Christiana Bypass**
Provides bypass Road to the south of Chapman Road /Eagle Run Road. K–1 and K–2 are potential alignment options.
*Provides alternate route for Chapman Road traffic and avoids the SR 273 /Eagle Run Road /Chapman Road intersection.*

**L Christiana Bypass**
Provides a new roadway between SR 273 and Road "A" extension.
*Provides alternative to using SR 273 /Eagle Run Road / Chapman Road intersection.*

### GROUP 6

**M-2 Provides ramp from I–95 / Churchmans Road Interchange**
Churchmans Road to North Bound I–95
*Provides relief for traffic from Churchmans Road and Southbound SR7 to Northbound I–95.*

### GROUP 9 *(Located outside the adjacent map boundary)*

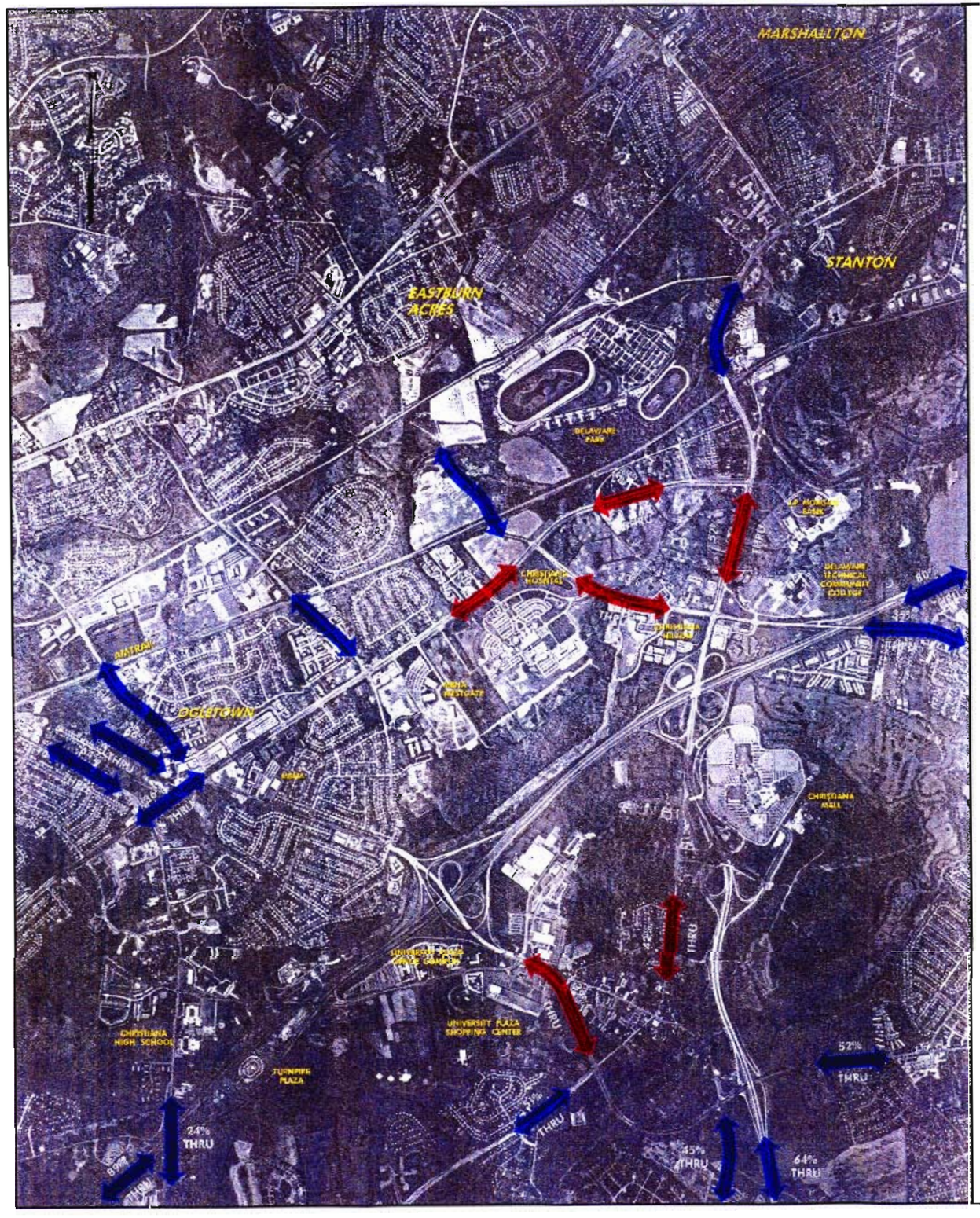
**O US 40 /SR 7 Improvements (To be Phased)**
- Extend Newtown Road from SR 7 to SR 1
- Add Southbound SR 1 to Newtown Road ramp. Add Eastbound Newtown Road to Northbound SR 1 ramp.
- Widen Westbound US 40, SR 1 to Walther Road. Signalize Southbound SR 1 to Westbound US 40 ramp. Widen Eastbound US 40, Governor Square to SR 1. Add Southbound SR 1 to SR 71 ramp.
- Provide Square Connection.
- Provide Glendale Connection.
- Provide interchange at US 40 /SR 7. (long term)
- Provide Songsmith Connection.

*Improve operations and increase capacity of existing intersection.*

2000 1000 0 1000 2000
SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation




# THROUGH TRAFFIC

In the year 2020, the majority of traffic in the Churchman's Crossing region (67%) will consist of "through" trips (trips that have origins and destinations outside of the area). As a result of a strong demand to access SR 1 and I-95. Furthermore, the vast majority (87%) of trips having their origins in Churchman's Crossing have destinations outside of the region.

***Traffic on Major Routes into Churchman's Crossing:***

| Location | % Through Churchman's Crossing (With Churchman's Extension) | % Through Churchman's Crossing (Without Churchman's Extension) (Without Proposed development) |
|---|---|---|
| | XX% THRU | |
| I-95 (East of Churchman's Crossing) | 80% | 83% |
| Churchman's Road | 35% | 46% |
| SR 273 (East of SR 1) | 52% | 65% |
| SR 1 (South of SR 273) | 64% | 79% |
| SR 273 Extension | 66% | 68% |
| Old Baltimore Pike | 51% | 61% |
| Salem Church Road | 24% | 29% |
| I-95 (West of Churchman's Crossing) | 89% | 90% |
| SR 4 | 36% | 47% |
| SR 273 (West of Ogletown) | 64% | 71% |
| Red Mill Road | 58% | 61% |
| Harmony Road | 9% | 23% |
| Churchman's Road Extension | 44% | 59% |
| SR 7 (North of SR 4) | 62% | 73% |
| **Weighted Average:** | 50,120 THRU VEHICLES / 74,690 TOTAL VEHICLES = **67%** | 55,640 THRU VEHICLES / 74,680 TOTAL VEHICLES = **75%** |

***Thru Traffic On Major Routes within Churchman's Crossing:***

| Location | % Through Churchman's Crossing (With Churchman's Extension) | % Through Churchman's Crossing (Without Churchman's Extension) (Without Proposed Development) |
|---|---|---|
| | XX% THRU | |
| Churchman's Road | 23% | |
| SR 4 (North of Churchman's Road) | 25% | 38% |
| SR 4 (West of Churchman's Road) | 25% | 39% |
| SR 7 (North of Churchman's Road) | 52% | 65% |
| SR 273 South of I-95 | 39% | 52% |
| SR 7 (South of Road A) | 42% | 48% |
| **Weighted Average:** | 8,460 THRU VEHICLES / 23,950 TOTAL VEHICLES = **35%** | 10,550 THRU VEHICLES / 22,040 TOTAL VEHICLES = **48%** |

***Destination of Trips Generated in the Churchman's Crossing Area:***

| | Zone of Origin | % Staying in Churchman's Crossing | % Leaving Churchman's Crossing | % Staying in Churchman's Crossing (Without Proposed Development) | % Leaving Churchman's Crossing (Without Proposed Development) |
|---|---|---|---|---|---|
| 152 | Delaware Park | 21% | 79% | 16% | 84% |
| 151 | MBNA, Medical Center | 9% | 91% | 8% | 92% |
| 149 | Del Tech, Morgan Bank | 10% | 90% | 7% | 93% |
| 228 | Metro Center | 9% | 91% | 9% | 91% |
| 150 | Cavaliers | 31% | 69% | 19% | 81% |
| 226 | Marta and Acierno | 10% | 90% | 3% | 97% |
| 225 | Christiana | 10% | 90% | 10% | 90% |
| 224 | Faith City Area | 5% | 95% | 2% | 98% |
| 223 | 273 Mall Area | 14% | 86% | 9% | 91% |
| 222 | Eagle Run Road | 10% | 90% | 11% | 89% |
| 153 | Old Baltimore Pike | 14% | 86% | 11% | 89% |
| 227 | Christiana Mall | 7% | 93% | 7% | 93% |
| 154 | Salem Church Road | 20% | 80% | 16% | 84% |
| | **Weighted Average:** | **13%** | 12,820 THRU VEHICLES / 14,730 TOTAL VEHICLES = **87%** | **11%** | 10,060 THRU VEHICLES / 11,470 TOTAL VEHICLES = **89%** |

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SCALE

**CHURCHMAN'S CROSSING INFRASTRUCTURE STUDY**

Delaware Department of Transportation