APPENDIX 3

Economic Impacts of Junction Improvements

Introduction

This note sets out the scheme evaluation for Worcester City Centre to support the National Productivity Investment Fund.

Worcestershire County Council have identified several junctions on a main arterial route the A44 east-west axis that suffer from congestion restricting the movements of goods and people. This note outlines the identified problems, along with the proposed improvements to Road. The OS Grid reference is SO 84644 54786

Existing Conditions and Problems Identified

The main arterial east-west A44 corridor through Worcester is essential for access, growth and vitality of the City Centre. It is constrained by one river crossing, outdated junction designs, and poor facilities for pedestrian and cyclists. The Worcester Traffic Model confirms significant delays. On the junctions along this route, there are two Air Quality Management Areas (AQMA) at St Johns (2014) and Dolday Gyratory (2009). Either side of the bridge and the A44 Deansway is expected to be an AQMA in the future. Two junctions have been identified for traffic signal upgrades through the Worcester Asset Management plan.

The problems identified are summarised in detail as follows:

St Johns Junction (St Johns/Bromyard Rd/Bull Ring) - St Johns Junction, on the western side of the study area, is a narrow junction with evolved layout and ageing signal infrastructure that cannot served present traffic volumes. In addition, St Johns Junction offers poor quality pedestrian facilities. The inefficient nature of the junction generates significant localised congestion.

Dolday Gyratory (Dolday/Bridge Street/All Saints Road/North Quay/North Parade) -The Dolday Gyratory is located immediately to the east of Worcester bridge. This Gyratory is a complex series of signalised junctions, which represents the heart of Worcester's highway network. The gyratory is heavily congested by car traffic entering the city centre in combination with buses utilising the gyratory to and from the bus station, resulting in buses become trapped in the congestion, as well as further worsening the traffic conditions. Poor pedestrian and cycling infrastructure also restricts travel by sustainable modes.

A449 Croft Road – Directly links the City and St John's University Campuses via Sabrina walking and cycling bridge over River Severn. There is poor pedestrian and cycle provision for the high level of users. This uncontrolled crossing also adds to delays on the northern section in both directions

A44 Deansway (All Saints Signals through Copenhagan Street to Sidbury Signals) - A network of signalised junctions on A44 Deansway, at the eastern end of the study area. This is a complex arrangement of signaled junctions consisted from A44/A449 All Saints junction, Copenhagen Street junction, Cathedral Square junction and Sidbury/City Walls Road junction at the eastern end. This ageing signaling infrastructure leading to inefficiencies, delays and poor quality pedestrian crossing facilities.

FIGURE 1: STUDY AREA AND IMPROVEMENT SCHEMES LOCATIONS

Proposed Improvements

The efficiency of the ageing signals infrastructure will be improved by replacing them with Microprocessor Optimised Vehicle Actuation (MOVA), which is a product developed to overcome some of the problems associated with traditional signal control system. MOVA traffic signals at each of the locations would enable more efficient demand management, smoothing traffic flow through this funnel and improving multimodal access and ambient air quality. The signals will also include provision for pedestrians and cyclist to cross, and public realm provision to facilitate improved pedestrian and cycling flow through the highway ne

Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr Weekday	PM Peak Hr Weekday	Inter-Peak Hr Weekday
	Number of highway trips affected	vehicles	3,431	3,302	2,826
	Total vehicle travelled time	vehicle-hours	282	313	153

Do-
Minimum

made. The approach followed is considered to be a conservative approach, making the assumption that both peaks are limited to an hour. The annual benefits were calculated using an annualisation factor of 253 (working days in a year).

The estimated annual benefits, based on 2010 prices, were inflated from 2010 to the estimated opening year (2019) and onwards for each year of the 60 years' appraisal period. Then the inflated benefits were discounted by 3.5% for the first 30 years and by 3% for the remaining years of the appraisal period, as per WebTag guidance.

Key Assumptions

The key assumptions adopted for this assessment are detailed below and listed in table 9.

The assumption that modal spit would be constant throughout the overall flow was made for all 3 time periods assessed. The modal split used in the calculation is based on 2016 AADT values of a DfT traffic count (CP16443) on A44, west of Worcester Bridge. The traffic count location is illustrated below.

Figure 2: CP 16443 Traffic Count location.

In addition, it was assumed that the journey purpose of car users is following the national trend based on Table NTS0409 of National Travel Survey (2015) and the journey purpose of heavy vehicle users in only work.

The assumption that the travel purpose of LGVs and HGVs is only work was made for all 3 time periods assessed. The assumption that HGV journey purpose is limited to work was made since WebTag Table 1.3.5 only provides only a work purpose price for HGV. It was assumed that LGV travel purpose would also be only work related due to the lack of more information and the insignificant price difference in WebTag Table 1.3.5 between average LGV and LGV for work.

The journey purpose proportion for car users is based on the car/van driver trips per person per year

Trips per person per year	
Purpose	Car / van driver
Commuting	79
Business	22
Education / escort education	24
Shopping	81
Other escort	47
Personal business	39
Leisure	89
Other including just walk	-
All purposes	381

TABLE 6: NATIONAL TRAVEL SURVEY TABLE NTS0409 (2015) FOR CAR/VAN DRIVER

% car trips by purpose	AM Peak Hr	PM Peak Hr	Inter-Peak Hr
Business Use	10.2%	10.2%	8.0%
Non-Business Commuting	37.7%	37.7%	29.3%
Non-Business Other	52.1%	52.1%	62.8%

TABLE 7: PROPORTION OF CAR USE BY PURPOSE

In addition, in order for the travel time benefits to reflect both car drivers and car passengers as per WebTag guidance; WebTag Table A 1.3.3 was used. The car occupancy per vehicle kilometer travell7.5(i)-.ceN2d .8eN2d .8eN

	Modelling Criteria	Value	Commentary
Scheme Details	Opening year	2019	
	Last year of initial funding	2019	
	Appraisal Period	60 years	
Road users' benefits	Traffic flow increase from Do-Nothing to Do-Something	2%	Based on DfT National Statistics for Non-Metropolitan West Midlands Urban A roads. Impacts related to additional users have not been monetised as part of this conservative assessment.
	Journey time reduction from Do-Nothing to Do-Something	5%	Based on surveys of existing SCOOT and MOVA systems on traffic lights north of Worcester City (Barbourne Rd)
	Modal split: Car LGV HGV Bus	 84.1% 1.2% 1.2% 12.5%	The modal split used in the user benefits calculation is based on AADTs from DfT Traffic Count CP16443 (2016) that is located at A44, west of Worcester Bridge.
	Car journey purpose:	Varies over time	The journey purpose percentages for car users are based on the car/van driver trips per person per year for England (2015) as presented in Tabler e j TrWo re-for DNa tim8.145456 TD.085ts

Travel Time Saving Economic Benefits

The benefits for each one of the three schemes assessed are presented in tables 10-12 and the total benefits of the three schemes in Table 13. Even though the uplift value used for the travel time savings