



CBA Builder Advanced Worksheet 1: New Trunk Road

You are required to perform a project appraisal of a proposed new trunk road. The road will be a dual lane by-pass around a town centre in Cheshire. The project is estimated to improve journey time through the county and reduce congestion problems in the town. There are some concerns which have been raised by local inhabitants including the increased noise and pollution caused by the new road, and the loss of an area of parkland which the road will cut through. The county council and UK Government's Department for Transport (DfT) require an appraisal of the project accounting for time-savings, loss of natural environment and other factors. You have been recommended to use a social discount rate of 3%.

Initial Costs

The site of the new trunk road will need to be purchased at a cost of £1.3m (using a compulsory purchase order), and the project will need to be planned at a cost of around £52,000. Both the purchase of the land and the planning agreement must be in place before construction can begin.

Construction is estimated to take three years. Initial construction costs estimated by the contractor, which occur in year 0, include site clearance estimated at around £200,000, and initial ground works at £1.1m. Other



construction costs occur in all three years (year 0, 1, and 2) and include building materials at £1.85m, and plant rental at £600,000. These costs have been fixed with the contractor and so remain the same for each year.

Wage cost are for 200 construction workers at £8 per hour, and a site manager at £22 per hour. Estimated staffing times are 45 hours per week all year (47 weeks) for the site manager, and 40 hours per week all year for the construction workers (47 weeks). The staffing times remain the same in years 1 and 2, but with a growth in wages equivalent to 1%.

The other major cost incurred in the development of the road is the loss of a natural parkland. This should be valued in the project CBA. To do this you have been recommended to use the simple zonal travel cost method, deriving average usage figures from the table below. Note there is no entry/admission cost for using the park.

Zone	Average Time (hrs)	Average Distance (km)	Average no. of visits lost (per year)
A	0.1	0.5	80,000
B	0.5	2	45,000
C	1	20	15,000

Ongoing Costs

There is a significant maintenance cost associated with the new trunk road estimated at £92,000 per annum. This cost will begin in year 4 following the completion of the road. This will need to be accounted for by lagging the growth rate for this cost. The growth rate for this cost is estimated at 1%.

Benefits

The benefits of the new trunk road including reduced congestion and subsequent time-savings, as well as some estimated accident reduction.

Time-savings should be estimated using the COBA method. Time savings are estimated at up to 10,000 hours per year for cars, broken down into work (3000 hours), commuting (6500 hours), and other (500 hours). Similarly large time savings are estimated for LGVs (9,000 work-time), and (1,000 commuting), and for OGVs (12,000 hours work-time). These savings will begin in year 4 once the road is complete, and continue until the end of the CBA appraisal period (year 20).



Estimated benefits in relation to accident reduction are as follows: a reduction in the current rate of fatalities on the road by 0.1 per year, a reduction in serious accidents by 0.5 per year, a reduction in slight accidents by 50 per year, and a reduction in damage only accidents of 90 per year. These reductions will all be made in the urban area around the town. The reductions should be included from years 4 to 20.

Questions

1. Using the data on costs and benefits provided what is the NPV and BCR associated with the project given a CBA period of twenty years?
2. Time-savings have been estimated incorrectly for OGVs. The actual time-savings should be 8,000 hours per year. How does this affect the result of the CBA?
3. Calculate a long term horizon value for the project using the simple projection method, given estimated annual long term future benefits of £0.4m, a social discount rate of 3%, and a growth rate of 1%.
4. How does the horizon value affect the CBA outcome if a value of 8,000 hours per year is used for OGV time-savings?
5. No value has been included to account for the increased noise and air pollution which will affect inhabitants close to the location of the new road. It is estimated that the average house value will decrease from its current level of £250,000 to around £190,000 as a result of the project. This will affect 100 houses close to the road. Using the asset valuation method account for this net cost. How does this affect the CBA outcome in terms of NPV, NPV + H, and BCR?
6. Given the results of the CBA with and without the horizon value, and with differing values for certain variables, do you think the project should go ahead? Explain your answer.