

Economic Analysis Summary Report
Delaware River Main Channel Deepening Project
September 2011

I. Purpose of Document

This Report presents a sensitivity analysis based on the findings of the May 2011 Updated Economic Assessment of Relevant Market and Industry Trends (the “May 2011 Report”), which was prepared in response to a Government Accountability Office (GAO) inquiry on the Delaware River Main Channel Deepening Project, and the April 2008 Economic Update Report (the “April 2008 Report”), which was generated in support of the Project Partnership Agreement (PPA). The May 2011 and the April 2008 Reports are enclosed. The sensitivity analysis consists of two possible alternative future conditions for oil-related benefits and two possible alternative future conditions for container traffic benefits resulting in four possible future scenarios for the combination of oil-related and container traffic benefits.

Each of the alternatives and scenarios is presented in turn below. In all cases, benefits derived for each specific scenario are added to the benefits presented in the May 2011 Report for dry bulk and beneficial use of dredged material (referred to as “BUDM” or “Broadkill Beach”) before being arrayed over costs to show benefit-to-cost ratios (BCRs) and remaining benefit-to-remaining cost ratios (RBRCRs) or having costs subtracted to present net benefits.

II. Alternative Conditions

Alternatives A and B

Between the publication of the April 2008 Report, which updated analyses performed between 2002 and 2004, and the May 2011 Report, there were significant changes in the operations of liquid bulk (petroleum products and crude oil) carriage on the Delaware River that had the effect of reducing benefits attributable to transportation cost savings for oil-related products. First, the new owners of the petroleum receiving facility on the Christina River, a branch of the Delaware River Main Channel, determined that the continued rapid shoaling of that area would not allow entrance of those vessels that serve that terminal. For that reason, the May 2011 Report assumed that those vessels would not benefit from main channel deepening. Second, one oil refinery has been closed permanently while a second is undergoing substantial overhaul.¹ Third, the Delaware River lightering fleet has been reconfigured with more efficient vessels to meet current

¹ It is a general practice in the oil refining business to periodically take a facility out of production to do cleaning and repair of the oil cracking apparatus. This is typically done in the spring, when the quantity demanded of heating oil begins to fall and before the summer driving season. It is for this reason that gasoline prices usually rise in the early spring. In the course of these overhauls, it is common for capacity enhancing changes to the cracking apparatus to be made. In such a case, the annual quantity of crude oil received by a refinery will typically rise even without an increase in tank capacity because the apparatus is capable of processing more crude oil in any given period of time than formerly was the case.

quantity demanded for lightering services that has, in effect, trimmed the benefit pool significantly.

Alternatives A and B consider two specific situations for crude oil-related benefits:

Alternative A: Assumes no increase in oil-related benefits as presented in May 2011 Report.

Alternative B: Uses oil-related benefits from the April 2008 Report based on the assumption that (closed) refineries will re-open in three to five years. Figures from 2008 were updated using 2011 vessel operating costs (VOCs) as supplied by the Corps Institute for Water Resources (IWR) and the current discount rate ($4\frac{1}{8}\%$).

The benefits for each alternative, presented in FY 2011 price levels, are shown in the following table.

Average Annual Benefits	<i>Alternative A</i>	<i>Alternative B</i>
($4\frac{1}{8}\%$, FY 11 P. L.)	\$6,731,797	\$14,498,203

Alternatives C and D

Between the publication of the April 2008 Report and the May 2011 Report, the Delaware River Main Channel experienced a dramatic increase in the volume of container traffic calling Philadelphia's terminals, in spite of international macroeconomic conditions.

Alternatives C and D consider two specific conditions for container traffic:

Alternative C: Assumes container benefits to be as presented in the May 2011 Report.

Alternative D: Uses container benefits from 2008 updated using IWR's 2011 VOCs and the current discount rate.

The benefits for each alternative, presented in FY 2011 price levels, are shown in the following table.

Average Annual Benefits	<i>Alternative C</i>	<i>Alternative D</i>
($4\frac{1}{8}\%$, FY 11 P. L.)	\$19,868,000	\$8,384,278

III. Additional Scenarios

The four alternatives presented above are combined into four possible future scenarios, which are enumerated below:

Scenario 1: No growth in oil-related benefits + 2011 container benefits (A+C);

Scenario 2: Updated 2008 oil-related benefits + 2011 container benefits (B+C);

Scenario 3: No growth in oil-related benefits + Updated 2008 container benefits (A+D);

Scenario 4: Updated 2008 oil-related benefits + Updated 2008 container benefits (B+D).

The results of these combinations are presented in the summary table in Section IV.

IV. Summary of Results

Scenario	Alts. Added	Oil-Related Benefits (A or B)	Container Benefits (C or D)	Dry Bulk + Petro. + BUDM Benefits	Sum of Benefits	Costs	BCR	Net Benefits	Remaining Costs	RBRCR
1	A + C	\$6,731,797	\$19,868,000	\$8,081,837	\$34,681,634	\$21,502,000	1.6	\$13,179,634	\$19,017,000	1.9
2	B + C	\$14,498,203	\$19,868,000	\$8,081,837	\$42,448,040	\$21,502,000	2.0	\$20,946,040	\$19,017,000	2.3
3	A + D	\$6,731,797	\$8,384,278	\$8,081,837	\$23,197,912	\$21,502,000	1.1	\$1,695,912	\$19,017,000	1.2
4	B + D	\$14,498,203	\$8,384,278	\$8,081,837	\$30,964,318	\$21,502,000	1.4	\$9,462,318	\$19,017,000	1.7

V. Conclusions

The Delaware River Main Channel Deepening Project proves to have robust benefits and a positive BCR in each economic reanalysis. The reanalysis conducted in 2004 resulted in a BCR of 1.2 and the 2011 reanalysis, which includes current market and operating conditions, resulted in a BCR of 1.6. In each of the four scenarios presented above, the Project remains economically justified with BCRs ranging from 1.1 to 2.0. The results of the four scenarios bracket the BCRs resulting from the extensive analyses conducted in 2004 and 2011. Even the scenarios that do not take into account current conditions and operations (scenarios 3 and 4), which are “worst case” scenarios, indicate an economically justified project. In addition, the RBRCRs for the four scenarios range from 1.2 to 2.3, which further support the economic justification of the project.

2 Encls

1. Updated Economic Assessment of Relevant Market and Industry Trends, May 2011
2. April 2008, Economic Update Report