EAD, EAB, and EEAD for the Transportation category are displayed in Tables C-15 though C-17.

3.7.5 Flood proofing Cost Savings Benefits

Currently, new development in the floodplain in Fargo and Cass County requires flood proofing to reduce the threat of flood damage in the future and meet FEMA regulations. Savings of the cost to flood proof new construction is a benefit of a flood risk management project that can reduce the footprint of the floodplain. The area benefited is that area removed from the 100-year floodplain by the project that would have been developed in the future with flood proofing measures implemented.

Urban development in the study area has been expanding and will continue to expand over the course of the planning period. Fargo's population has grown from 47,000 in 1960 to over 93,000 in 2006, an average growth rate of over 2 percent per year (straight-line growth). To accommodate this growth, Fargo development has increased in recent years at an average rate of 266 acres per year. The Fargo Planning Department has projected urban growth for the next 50 years. They use this figure of 266 acres for projecting future development demand (Source: Growth Plan 2007 – City of Fargo, North Dakota). Growth is projected to occur within two development "tiers". Tier 1, an area adjacent to the present Fargo city limits, is sized to accommodate 25 years of growth at approximately 266 acres per year. Tier 2 is comprised of areas further away from the existing city and is expected to accommodate growth 25-50 years in the future. For years 25 through 50, at is assumed that development will continue at the rate of 266 acres per year. Each tier has a spatial component on both the north and south sides of town. In both Tier 1 and Tier 2 most future growth will occur within the 100-year flood plain and, without a flood risk management project, require flood proofing. In addition, within the city limits of Fargo itself, some acreage within the 100-year floodplain is also available for future development. Growth is expected at the same rate of 266 acres per year regardless of the need for flood proofing or not. Much of the area available for future growth is within the 100-year floodplain and future development with a diversion project in place would benefit from the saving of flood proofing costs in those areas removed from the floodplain.

Flood proofing measures include raising the grade of developable land with fill, waterproofing basement foundations, and building ring dikes around developable parcels. In addition to the direct construction cost is the opportunity cost of reduced revenue in the form of lost lot sales (estimated at up to $40,000 per acre) as flood proofed land is less intensively developed from a structural standpoint than non-flood proofed land. The type of flood risk reduction provided would vary by land use. Commercial, industrial, and public/institutional land uses would most likely elevate because of the high cost of their facilities and the ability to pay for higher land costs. Cost for this measure ranges from $55,000 to $70,000, by either elevating the entire site or acquiring additional properties for fill to elevate their buildings and facilities. For instance, a new Wal-Mart in south Fargo elevated the entire site, building and parking lot. These types of land use would use approximately 42% of the projected developable land area.

Residential and park land uses would more likely ring dike because the cost would be lower and these land uses seek lower cost land to make the housing feasible. Additional cost to develop in this manner is estimated at $35,000 per acre. Costs can range higher, however, for the more expensive residential development projects that, like commercial projects, involve the placement of fill to raise the grade of their lots and adjacent ancillary uses. These land uses are estimated to use approximately 58% of the projected developable land area. The percentage estimates are based on current and projected land use in the Fargo Growth Plan. Exhibit N presents the calculation of the flood proofing cost savings benefit per acre of development on a weighted average basis. This benefit is expected for each of the diversion alternatives since each will reduce the flood plain footprint sufficiently to accommodate future demand for flood-free developable land.

Table C-14 Flood proofing Cost Savings Benefit per Acre

Type	Percent Land use	Cost per acre	Wtd average
Comm/ind/public	42%	$62,500	$26,250
Residential	58%	$35,000	$20,300
Wtd average cost / acre			$46,550

Source: Fargo Department of Planning

The savings per acre is applied to the average acres per year developed on land converted from floodplain to non-floodplain by a diversion project. Floodplain maps for without and with-project conditions were used to estimate the amount of land formerly in the floodplain that would realize the flood proofing cost savings benefit. At the rate of 266 acres per year, the future demand for developable land over the 50-year planning period is 13,300 acres. Growth is assumed at the same rate for the interim period between 2010 and the base year of 2018. Development in the floodplain within this period would require flood proofing and incur the related costs. This land (266 acres/year x 8 years = 2,128 acres) would not be expected to realize the cost savings benefit. Land within Tier 1 and the Fargo city limits would be projected to be developed before Tier 2 land regardless of its location relative to the floodplain. This is in keeping with the city's planning goal to grow in an orderly and efficient manner. There are approximately 20,000 acres within Tiers 1 and 2 and in Fargo available for future development to the year 2068 so supply exceeds demand for the foreseeable future. Of this land, approximately 14,000 acres is within the present 100-year floodplain. As expected, the larger the diversion project, the larger the area removed from the 100-year floodplain and the larger the expected annual flood proofing cost savings. Exhibit L displays the acres by plan opened up to development free of flood proofing requirements, land outside of the floodplain used to meet growth demand, and residual acreage that may still require flood proofing to meet demand. Annual benefits are also estimated by applying the weighted average flood proofing cost per acre to the average annual acres benefited by plan. Average annual benefits range from $5.4 million for the MN Short 20k cfs diversion to $10.4 million for the ND 35k cfs diversion.