SEA-TAC INTERNATIONAL AIRPORT IMPACT MITIGATION STUDY

Initial Assessment and Recommendations
February 1997
Prepared Under a Grant from the State of Washington for the:

City of Burien, Washington
City of Des Moines, Washington
City of Federal Way, Washington
City of Normandy Park, Washington
Highline School District
Highline Community Hospital

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Executive Summary

There is no doubt that the expansion of Sea-Tac International Airport will have a positive economic benefit for the region and the State. However, the costs associated with these improvements are disproportionately borne by those communities immediately surrounding the Airport. Communities such as Burien and Des Moines are projected to be impacted by noise, traffic congestion, and socioeconomic hardship merely because of their location near the Airport. Of the estimated $2.95 billion in potential mitigation costs, $2.3 billion (almost 80%) is projected to be required for Burien ' and Des Moines alone. Other environmental, transportation, and socio-economic costs have not yet been calculated.

This study does not assign mitigation costs to any particular agency. While the Port of Seattle and the Federal Aviation Administration will be financially responsible for a portion of the mitigation costs, funding from other sources is also expected. For example, increased transportation funding is available through the Washington State Department of Transportation and the Federal Highway Administration. Some environmental mitigation costs may be eligible for State and Federal EPA funding. Costs associated with acquisition and redevelopment may be shared between private and public-sector interests.

This study also does not dispute the projections included in the EIS, such as noise contours and future flight-tracks. It recommends that these projections be assumed as accurate and that any required mitigation program(s) be based on the Airport meeting - not exceeding - these projections. For example, a permanent noise monitoring program should be established to verify that the projected noise contours are not exceeded. Should these or other parameters be exceeded, the EIS should be re-conducted and additional mitigation programs be developed, This approach positively works with the Port of Seattle to assure both the Airport and Airport area communities that the EIS will be a valid document.

This study also recommends the need for an overall planning approach to development in Southern King County. The study recommends the development of a "South King County Comprehensive Plan" to weave together a plan that addresses the needs of all interests in the area - communities, residents, businesses, schools, hospitals, the environment, and the Airport.

Project Parameters

This report was produced under a grant from the State of Washington to analyze the proposed Third Runway project at Sea-Tac International Airport. The City of Burien, acting in the capacity of the grant manager, supervised the consultant team. The study examined the potential impacts of the Airport project on neighborhoods in the surrounding communities of Burien, Des Moines, Federal Way, Normandy Park, and Tukwila. Potential impacts on facilities owned and operated by the Highline School District and Highline Hospital were similarly examined.

- Mitigation of potential impacts was based on the preservation and protection of neighborhood integrity. The consultants conducted an independent investigation into the potential impacts of the proposed project and how these potential impacts could be most appropriately mitigated.
- Several other parameters guided this study: The basic premise of this study was that the Third Runway project would be constructed. This premise was clearly stipulated in the State grant which states that the funding for the study could not be *"expended directly or indirectly for litigation, public relations, or for any consulting services for the purposes of opposing the construction of the proposed Third Runway".*
- Neighborhood boundaries were established by each community through their comprehensive planning process.
- The economic importance of Sea-Tac International Airport was never questioned. The Airport is an important economic factor to the Seattle metropolitan area, the Puget Sound Region, and the State of Washington.
- Given the study's budget and schedule, the consultants agreed to utilize as much existing information as possible. No new data was developed as part of this study. Information was

primarily taken from the Master Plan Update Environmental Impact Statement, with additional information coming from other agencies including King County, the Puget Sound Regional Council, and various State and Federal agencies.

- The study investigated potential impacts associated with the proposed Third Runway and its associated facility improvements. Mitigation for existing impacts associated with the existing runways and airport operations were not included.

During the course of this study (April 1996 through March 1997), the consultants conducted over 100 meetings, interviews, presentations, workshops, and question-and-answer sessions with: local elected and appointed officials and staff members; the Port of Seattle staff and its consultants; County and State elected officials; representatives from various City, County, State, regional and Federal agencies; and the general public.

Potential Environmental Impacts

The study examined 8 general environmental areas and 26 specific potential impacts.

Potential Environmental Impacts Studied

Area	**Specific Impact**
Noise and vibration	LDN SEL Overflights (TA) Vibration
Air Quality	Air emissions (aircraft) CO emissions HC emissions Air toxics Fugitive emmissions Point source pollution
Surface water quality/hydrology	Runoff volume Erosion and sediment Spills
Ground water quality/hydrology	Acquifer recharge Contamination

Wetlands	Wetlands
Floodplains	Encroachment Reduced flow rate and volume Increased flow rate and volume
Aesthetics and visual	Ground shadow Visibility (aircraft) Visibility (fill)
Other	Special status species habitat Cultural resources Coastal zones DOT Section 4(f) resources

Of these 26 parameters, the consultants estimated the costs of mitigating the potential noise and vibration impacts. These costs are estimated to be approximately $2.4 billion, which primarily occur in 5 neighborhoods in 2 communities.

Neighborhoods Identified for
Potential Acquisition and
Redevelopment

City	**Neighborhoods**
Burien	North East
Des Moines	West Central North Central East Central South Des Moines

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Mitigation of these neighborhoods are estimated to be approximately $1.9 billion - 80% of the total environmental impacts. These 5 neighborhoods are the closest to the proposed project and will experience significant impacts, due primarily to noise and vibration of aircraft operations. The $1.9 billion figure represents the cost to relocate neighborhood residents and redevelop the area.

Acquisition and redevelopment is the most far-reaching mitigation measure for these areas, but it will

also fundamentally change these neighborhoods. The study recommends that a "specific area plan" be developed for each of these 5 neighborhoods in order to determine if other mitigation measures are appropriate. Acquisition and redevelopment is recommended only if all other mitigation measures are unsuccessful.

For the other communities, it was estimated that Federal Way would require mitigation due to LDN contours and overflights ($148 million), and that Normandy Park and Tukwila would require mitigation due to LDN and SEL noise, and overflights ($56 million and $114 million, respectively). Mitigation in these 3 communities would involve primarily sound abatement insulation and the purchasing of avigation easements.

The study also recommended the replacement or relocation of 8 schools in 3 communities.

Schools Identified for Potential Replacement or Relocation

Area	**Elementary Schools**	**Middle Schools**	**High Schools**
Burien	Sunnydale Cederhurst	(none)	(none)
Des Moines	Midway	Pacific	Mount Rainier
Unincorporated King County	Beverly Park White Center	(none)	Satellite Alternate

Twenty-six other schools in the Highline School District were identified for sound abatement insulation and avigation easements. Costs involved with both the replacement and insulation/easement programs were not estimated by this study. Additional structural studies will be required in order to determine the costs involved with school mitigation.

Given the amount of information available and the project's budget and time constraints, it was not possible to calculate the mitigation costs for potential impacts associated with the remaining environmental measures (wetlands, floodplains, aquifer, air quality, etc.). Additional studies should be commissioned to determine the potential impacts associated with the Airport's proposed project.

Potential Transportation Impacts

The study examined 4 general environmental areas and 21 specific potential impacts.

Potential Transportation Impacts Studied

Area	Specific Interest
Congestion	Level of Service Accidents School bus operations Transit bus operations Police and emergency vehicle operations Parking and pedestrian access Traffic Noise (LEQ)
Physical damage	Local Streets State roads Barge/rail/conveyor system Traffic diversion Traffic control Construction staging and phasing Work-force traffic Concurrent construction projects
Construction Impacts	Truck haul routes
Post Construction Impacts	Additional traffic Increased operation and maintenance costs Master plan update

Of these 21 parameters, potential mitigation costs are estimated to be approximately $479 million. Tukwila accounts for $192 million (40%), due primarily to the number of State jurisdiction roads and bridges in the City. Burien and Des Moines were projected to have the second and third highest mitigation costs ($117 million and $73 million respectively), due to their close proximity to the Airport's west and south sides. Normandy Park and Federal Way had the lowest potential mitigation costs due to their location relative to the Airport.

An advantage with many transportation mitigation measures is that one measure may concurrently address multiple potential impacts. For instance, improvements to a roadway to increase its capacity simultaneously addresses congestion, accident, and pollution impacts.

While the EIS did a good job of analyzing transportation impacts, it did not study a large enough area. The Airport serves the entire Central Puget Sound Region, yet the transportation impacts studied in the EIS stopped at the Airport's "driveways" - the roadways leading directly into the Airport property. Additional studies are needed to determine the true scope of the transportation-related impacts.

Given the amount of information available and the project's budget and time constraints, it was not possible to distinguish between future traffic directly associated with the expanded Airport and future traffic as a function of the region's natural growth. Additional studies - such as an origin-destination survey, a select link analysis, and a cost allocation model - are needed in order to make this distinction and to appropriately assign costs to appropriate funding sources.

Potential Socio-Economic Impacts

There is an inequity regarding the benefit of the Airport to its immediate neighbors. While the study acknowledges the benefit of the Airport to the region and the State, these benefits are not experienced locally in the 5 impacted communities. Approximately 5% of the persons utilizing the Airport live in the area most impacted. The remaining 95% of Airport passengers and employees come from elsewhere in the region.

Socio-economic impacts tend to blur across neighborhood lines and impact entire communities. In general, communities closer to the Airport are expected to experience a relative "depression" of residential property values (property values do not rise as fast relative to other similar properties in the region). This will have a cascading affect on the population mix in these areas. Single-family homes that cannot be sold will become rental properties. Studies have reported that non-owner-occupied residential areas have a lower average household income and utilize more social services than other areas. While the property value and tax revenues are depressed in these areas, the cost of providing social services increases.

Overall, the 5 communities were projected to experience a loss of $39.9 million during the period 2000 through 2020 as a result of the proposed project. The loss of these revenues is compounded with the problem of increasing demand for community and social services.

Vibration

Prior to the start of construction of activities associated with Master Plan Update implementation, additional information should be provided regarding the potential impacts of vibration from construction activities. Also expand the vibration analysis to include qualitative and quantitative information on whole body vibration, annoyance/interference to humans caused by building vibration, and building structural damage for residences, schools and hospitals in the Airport area. e discrepancy between these two trends contributes to the "blighting" of the area. This "blighting" impact has already been observed. Homes take

longer to sell in the neighborhoods adjacent to the Airport, and the local real estate market already acknowledges the impact of aviation activity on neighborhoods.

The study recommends that the Port of Seattle make partial off-setting payments to the 5 impacted communities in order to mitigate the loss of local government revenues over the project period (2000 through 2020). An analysis of similar revenue shortfalls in the Highline School District are also needed.

Principal Environmental Recommendations

The following recommendations are included in Section 7 of the study. Please refer to Section 7 for a complete description of the study's environmental recommendations.

-*Oversight Commission*- Establish a working group/oversight commission to interact with the Port of Seattle during Master Plan Update implementation.

-*Acquisition and Redevelopment Program* - A study should be conducted to consider each neighborhood and school to determine if there are other less disruptive alternatives to acquisition and redevelopment. This study should be completed prior to construction of the Third Runway.

-*Sound Insulation and Avigation Easement Program* - The neighborhoods and schools identified in Section 7 (Tables 7.03, 7.04, and 7.05) should be further studied to determine the full extent of the proposed insulation and easement program. This study should be completed prior to construction of the Third Runway.

-*Additional Noise and Vibration Recommendations*

- Run the latest version of the Integrated Noise Model.

- Show the SEL contours for the preferred alternative.

- Show the 55 LDN contour.

- Expand the permanent noise monitoring program.

- Use the Third Runway only for arrival flights during inclement weather.

- Restrict runway use between 9:00 PM and 7:00 AM.

- Provide additional information regarding the threshold above (TA) noise metric.

- Use permanent/portable "hush houses" in conjunction with engine maintenance run-ups.

- Keep departure tracks over water as much as possible.

- Re-evaluate use of noise barriers.

-*Minimize Overflights* - Minimize low-altitude overflights of residential areas as discussed in the Flight Plan Project EIS.

-*New Technologies* - Consider implementation of new technologies such as Microwave Landing System and Global Positioning Satellite System to reduce noise impacts around the Airport.

-*Aircraft Operations* - Clarify both hourly operational capacity of Airport and the calculation of existing average daily operations.

-*Reduced Noise Levels* - Provide information on the ability to maintain the Airport's reduced noise level goals. -Dust and Particulate Matter - Include a Dust Control Plan in the contractor's permit prior to construction of the Third Runway. Work with appropriate regulatory agencies to obtain PM10 data which is more representative of the Puget Sound Region. This should entail the establishment of additional air quality monitoring stations, in particular in the vicinity of the Airport.

-*Air Quality* - Add additional air quality monitors closer to the Airport. Construction vehicle air quality analysis should be re-evaluated and the dispersion analysis should be redone to better predict potential air quality impacts prior to the start of construction. As part of construction activities, PM,, and CO should be monitored in the vicinity of the fill sources, along the haul routes and in the Airport construction area. Provide information on Master Plan Update implementation and conformity with the Clean Air Act. Provide information on the State of Washington's Certification of Compliance with Air Quality Standards and a copy of Governor's Air Quality Certificate. After one year of baseline data has been collected at the new air quality monitoring sites, the area dispersion analysis should be re-evaluated for

both the existing and future conditions. Conduct additional studies regarding long-term exposure to air toxics associated with Airport operations. *Mobile Sources* - Re-evaluate the existing and future roadway intersection analysis to confirm the accuracy of the evaluation in the EIS and to correct for inconsistencies discussed by EPA. All vehicles associated with Airport operations should comply with required vehicle emissions inspections and maintenance programs.

-*Queuing and Taxiing* - Conduct a study to determine the possibility of reducing aircraft emissions by improving Airport operations associated with queuing and taxiing. *Master Plan Update* - Re-evaluate the air dispersion and roadway traffic analysis to accurately monitor potential impacts. *Geotechnical Engineer* - Hire a geotechnical engineer for the duration of construction of the Third Runway to ensure that fill is placed appropriately including compaction and to help detect and remove seismically unstable soils, such as in rill sources.

-*Toxic-Free Fill* - Provide evidence including appropriate certifications that all fill material is free of harmful levels of toxic and hazardous materials as defined by current Federal and State regulations. Prior to the start of construction, conduct baseline studies of any area surface waters and the ground water. This information should be used to describe the existing conditions and to help monitor potential changes after the earthwork activities are complete.

-*Plans for Review* - At least two months prior to construction, provide for review and approval the following:

-Construction Stormwater Pollution Prevention Plan and Erosion/Sediment Control Plan.

-Spill Prevention, Control and Countermeasure (SPCC) Plan.

-Construction Management Plan.

-Construction Waste Management Plan.

-Geotechnical report

-Reclamation plan for proposed fill sources

-Earthwork specifications and drawings, in particular for the Third Runway

-A copy of the State of Washington Governor's Water Quality Certificate which indicates

that there is reasonable assurance that the project will be designed, constructed and operated in compliance with applicable water quality standards.

-*Groundwater* - Prior to the start of construction, permanent, long term surface and groundwater monitoring stations should be established in the Airport area. The locations and number of these stations should be approved by a working group/oversight commission.

-*Highline Aquifer* - Ground water movement in the Airport area should be better defined prior to the start of construction. Additional studies should be reviewed for potential ground water contamination impacts on the Highline Aquifer and other area aquifers.

-*Miller/Des Moines Creek Monitoring Studies - Provide results of creek monitoring studies prior to the start of construction.*

-*Stormwater Detention* - If the preferred alternative is implemented, the hydrologic analysis and stormwater management facilities should be re-evaluated to support final design prior to the start of construction.

-*Wet Vaults/Biofiltration Swales* - Provide detailed information regarding the construction and operation of the wet vaults and biofiltration swales

-*Construction Fence* - Place a construction fence at the outside limits of the construction area.

-*Miller Creek Relocation* - Prior to the start of relocating any part of Miller Creek, provide information on the potential impact on the relocation of litigation concerning King County agreeing not to channelize the Creek except in limited amounts in connection with retention facilities.

-*Expansion Storm Drain System Report* - Provide a copy of the hydraulic analysis with the computer program for review and comment.

-*Surface Groundwater Monitoring* - Continue the surface and groundwater monitoring prior to the start of construction.

-*Borrow Site Hydrology* - Continue the borrow site hydrology until adequate information

-*Operations Erosion and Sediment Control Plan* - At least two months prior to the completion of

construction on the Third Runway, provide an operations erosion and sediment control plan, and a stormwater pollution prevention plan.

-*Fuel Handling System* - Upgrade and modernize the Airport's fuel handling system.

-*Floodplains* - At least two months before the start of construction, provide: information on the relationship between the 100 and 500-year floodplains, recent storms in the Puget Sound region and the Master Plan Update implementation EIS analysis; a copy of the final monitoring plan for evaluating the effectiveness of the Miller Creek and Des Moines Creek relocations; and final design information for the Miller Creek and Des Moines Creek relocations including specifications and drawings.

-*Color Photographs*- Provide color photographs taken from the EIS viewpoints and additional viewpoints which show the existing and future conditions. The additional viewpoints should be selected based on discussions with a working group/oversight commission.

-*Landscape Plans*- Landscape plans should consider: landscape requirements from the City of SeaTac; planting temporary vegetation or a cover crop as construction is completed; and should include a variety of native vegetation which requires low maintenance and has a mixture of seedlings and more mature plants in order to avoid a monoculture.

-*Coastal Zone Mitigation* - Potential point sources for pollutants should be identified and a pollution control management plan developed for the neighborhoods identified in Section 7 (Table 7.15).

-*DOT Section 4(F) Resource Mitigation* - Significant open spaces, parks, and recreational areas should be preserved and protected from potential impacts, or should be relocated and replaced if possible.

-*Sub-Regional Comprehensive Plan* - Conduct a comprehensive plan for all communities in the South King County region in order to integrate all future plans for land development, transportation, infrastructure, parks and open space, environmental protection, economic development, and other similar plans.

Principal Transportation Recommendations

The following recommendations are included in Section 8 of the study. Please refer to Section 8 for a complete description of the study's transportation recommendations.

-*Origin-Destination (0-D) Survey* - Conduct an O-D survey to determine the amount of regional traffic

attributable to Sea-Tac International Airport. The percentage of traffic attributable to the Airport should be projected to the Year 2020 in 5-year increments and be used for projecting cost-sharing of various transportation projects that serve and benefit the Airport.

-*Recalculate Mitigation Costs* - Estimated mitigation costs calculated in Section 8 of this report. should be recalculated taking into consideration the O-D information recommended above. Costs for mitigation projects should be assigned to the Port of Seattle only if those impacts are attributable to traffic as a result of the Third Runway. Other transportation projects would be implemented by the appropriate local, county, State, and/or Federal agencies.

-*Level of Service* - Areas identified in Section 8 (Table 8.03) should be mitigated prior to construction of the Third Runway.

-*School Buses* - Any additional mitigation for Highline School District school bus impacts should be assessed and completed prior to commencement of construction of the Third Runway.

-*Transit* - Any additional transit impact mitigation should be assessed and completed prior to commencement of construction of the Third Runway.

-*Public Safety* - Public safety response times in the five impacted communities should be continually monitored during the construction phase of the Third Runway. Reductions in response times should be addressed by additional equipment, personnel, or new station locations.

-*Local jurisdiction Roadways* - Areas identified in Section 8 (Table 8.04) for local street mitigation should be continually monitored for serviceability index (SI) decreases. Roadways where the Sl decrease should be reconstructed as soon as possible.

-*State Jurisdiction Roadways* - It is recommended that the areas identified in Section 8 (Table 8.05) for State street mitigation be continually monitored for SI decreases. Roadways where the SI decrease should be reconstructed as soon as possible.

-*State Jurisdiction Bridges* - Establish the baseline conditions of the bridges and pavement on the freeway routes most likely to be used from the borrow pit locations to the construction site and establish a system of monitoring prior to any truck movements.

- *Maintenance and Reconstruction* - The areas identified in Section 8 (Table 8.07) for increased

maintenance and reconstruction mitigation should be continually monitored for SI decreases. Roadways where the Sl decrease should be reconstructed as soon as possible.

-*Fill Haul* - Establish contingency plans for the various alternatives for bringing in the fill material (trucks, barge, and/or conveyor).

-*Traffic Diversion Model* - Prepare a diversion model for the project which includes the network as shown in Section 8 (Figure 8.01). Improvements to the arterial system as a result of diversion should be implemented prior to the start of the hauling activity on the freeways. An arterial improvement program should be implemented prior to the construction of the Third Runway.

-*Additional Traffic* - Areas identified in Section 8 (Table 8.10) should be monitored for additional traffic impacts after the Third Runway is operational.

-*Expand EIS Analysis* - The EIS traffic analysis should be expanded to the entire network as shown in Section 8 (Figure 8.01).

-*Accidents* - Develop a Freeway Incident Management Plan for the construction phase and impose operational restrictions on the heavy trucks involved with the haul.

-*Regulatory Compliance* - Comply with all appropriate Federal, State and local noise regulatory requirements for surface transportation of fill and other materials associated with Master Plan Update implementation.

-*Construction Restrictions* - Restrict all construction operations, including heavy equipment and trucks hauling fill, between the hours of 7:00 AM and 9:00 PM Monday through Friday and 9:00 AM to 9:00 PM on Saturdays.

-*Noise Control Devices* - Equip all construction equipment, including trucks hauling fill, with noise control devices.

-*Complaint-Driven Requirements* - If noise complaints are received during construction, implement one or more of the following:

- Relocate stationary construction equipment as far from nearby noise sensitive properties as possible.
- Shut off idling equipment.
- Re-schedule construction operations to avoid periods of noise annoyance.
- Notify nearby residents whenever extremely noisy work will be occurring.
- Install temporary/portable acoustic barriers around stationary construction noise sources.
- Place material stockpiles between crushing or screening operations and the affected dwelling(s).

-*Remodeling - When the Master Plan Update implementation is started, remodel existing surface transportation noise with the most curre*nt version of STAMINA (or the most accepted program) and compare with the 1994 existing baseline conditions and the actual conditions at the start of construction.

-*Clarify Modeled Surface Traffic Noise* - In the Integrated Noise Model, distinguish between construction and other surface traffic, in particular traffic associated with hauling fill.

Principal Socio-Economic Recommendations

The following recommendations are included in Section 9 of the study. Please refer to Section 9 for a complete description of the study's socioeconomic recommendations.

-*Additional Community Services/Facilities* - Provide additional services and facilities that match the needs of the changing residential demographic in the impacted communities.

-*Additional School Services/Facilities* - Provide additional services and facilities that match the needs of the changing residential demographic in the Highline School District.

-*Property Values* - Make a partial payment of property taxes for homeowners in the five impacted cities equal to an annuity of the present value of whose payments equal the property's loss of relative value caused by expansion of the Airport. If partial tax payments are not made, then make annual off-setting payments to each of the five impacted cities to compensate them for the relative declines in residential property values caused by construction of the Third Runway and related Airport facilities.

-*Promotion of Home Ownership* - Establish a revolving "Home Ownership Loan Fund" to facilitate the movement of persons living in Burien, Des Moines, Federal Way, Normandy Park and Tukwila from "renter" to "owner" housing tenure status.

-*School Tax Revenues* - Conduct a detailed analysis of the potential shortfall in Highline School District's property tax base that will result from construction of the Third Runway and related Airport facilities.

-*Changing Student Demographic Profile* - Additional research should be undertaken to develop quantitative estimates of the relationship between demographic shifts in the Highline School District's student population, levels of student performance and appropriate mitigation measures to maintain the District's traditional quality of education outcomes.

-*Public Safety Costs* - Establish a program which reimburses the Cities of Burien, Des Moines and Tukwila for the additional public safety requirements they will experience.

-*Cultural Resources Enhancement* - Each of the five impacted cities should develop a cultural resources enhancement plan specifically directed toward meeting the quality of life challenges that the Third Runway and related Airport facilities.

-*Social Services Plan* - Each of the five impacted communities should develop a Southwest King County integrated community social service resource and delivery plan.

-*Public Health Analysis* - It is recommended that the School of Public Health at the University be funded to conduct an Airport health impact assessment, and that if the assessment finds a positive correlation between adverse health impacts and levels of Airport operation, appropriate measures to mitigate these affects be funded.

-*Environmental Justice* - Establish a monitoring system in the area to the north of the Airport under the approach/departure flight track for the Third Runway to insure that the intent of Federal Executive Order 12898, "Environmental Justice" are met.

-*Quality of Life Indicator* - Create a quality of life indicator model for the five impacted cities and for areas in Northwest King County which are appropriate as a comparison area. The model should be used to identify changes in the impacted cities' relative quality of life over time and the major quality of life indicators which contributed to the decline.

-*Airport Operations Assessment* - Conduct an economic and engineering assessment of Airport operations to determine Airport functions which would have positive economic development benefits and could be shifted to the five impacted cities.