

PEL Benefits

Measuring the Benefits of Planning and Environmental Linkages (PEL)

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Executive Summary

The Federal Highway Administration (FHWA) created the Planning and Environmental Linkages (PEL) program to encourage transportation decisionmakers to incorporate environmental, community, and economic goals early in the transportation planning process. Decisionmakers can then use and rely on planning analysis, studies, decisions, or other information developed in planning process for the project development and environmental review processes of transportation projects. PEL aims to create a more unified decisionmaking process, reduce duplication of efforts, and more informed project-level decisions.

The five case studies in this report demonstrate the flexibility of the PEL concept. In each case, the implementation differs in order to meet the specific needs of that State, region, and/or city. In general, the five case studies use two distinct PEL strategies: (1) PEL studies and (2) electronic screening tools.

- The Regional Planning Council of Greater Birmingham’s Advanced Planning Programming and Logical Engineering (APPLE) Program helps local municipalities complete planning feasibility studies and incorporates environmental concerns into the earliest stages of planning.
- The Colorado Department of Transportation’s PEL study for the US 50 West project examined congestion in Pueblo, Colorado and helped the agency develop projects that will each increase safety and reduce congestion within the US 50 study area with minimal environmental impacts.
- The city and county of Denver’s PEL study for Federal Boulevard introduced environmental, community, and economic considerations into the planning process, allowing the project to progress toward “shovel-ready” status in advance of construction funding.
- The Utah Department of Transportation developed Utah Planning and Environmental Linkages (uPEL), an electronic screening tool that brings together environmental, community, and economic data for analysis of potential project impacts and screening of alternatives early in the planning process.
- The South Carolina Department of Transportation’s Advanced Project Planning Report (APPR) process uses PEL studies and an electronic screening tool to incorporate environmental concerns into the project prioritization and selection processes.

While the benefits of PEL vary slightly in each case study, certain benefits are clear. These include:

- Assisting the Environmental Review Process – PEL provides a strong base of information for the environmental review process making it easier to consider potential impacts and public input and to identify potential concerns early on and address them more effectively.
- Documentation – Taking a PEL approach can help to document planning information for environmental review and NEPA.
- Cost and Time Savings – In many cases, PEL lowered costs and shortened timelines for project development and environmental review.
- Proactive Consideration Allowing a Flexible Evaluation of Alternatives – PEL provides a flexible

forum for jurisdictions to develop and explore project alternatives, in advance of the more structured framework of the environment review process.

- Exporting PEL Strategies to the Local Level – Institutionalizing the PEL process can help smaller municipalities without planning resources or expertise of their own make connections between planning and the environment.
- Holistic and Flexible Approach – Taking a holistic approach in the context of a larger PEL study can improve consistency across the projects and decisionmaking that is optimal for the area.
- Enhanced Community Involvement – A PEL study can give the public an early opportunity to vet different options and direct the project in a way that is more acceptable to the community.
- Enhancing Grant Capacity – PEL studies can help to advance the projects towards being ready for construction and eligible for certain types of grants.
- Leveraging Other Opportunities – Taking a PEL approach can help agencies leverage other opportunities, saving time and money.
- Improved Relationships and Coordination – Relationships with partner agencies often improve as a result of taking a PEL approach.

I. Introduction

The Federal Highway Administration (FHWA) commissioned this report to explore and document the benefits stemming from the incorporation of Planning and Environmental Linkage (PEL) strategies into State, regional, and local planning and project development processes. This report includes five case studies from across the country that detail five different implementations of PEL strategies and their attendant benefits. The case studies include:

- The Regional Planning Council of Greater Birmingham’s Advanced Planning Programming and Logical Engineering (APPLE) Program;
- The Colorado Department of Transportation’s PEL study for the US 50 West Corridor;
- The city and county of Denver, Colorado’s PEL study for Federal Boulevard;
- The Utah Department of Transportation uPEL electronic screening tool; and
- The South Carolina Department of Transportation’s Advanced Project Planning Report (APPR) process.

FHWA developed the PEL program to help transportation decisionmakers: (1) consider environmental, community, and economic goals early in the transportation planning process, and (2) use the information, analysis, and products developed during planning to inform the environmental review process. The goal of PEL is to develop a more seamless decisionmaking process that minimizes duplication of effort, promotes environmental stewardship, and streamlines project delivery.

PEL is an umbrella term that encompasses a variety of different activities and strategies to link planning and the environmental review processes. Since coining the term about ten years ago, FHWA has advanced PEL through regulation, guidance, training, and other communication strategies. FHWA also identified PEL as a key element in the Every Day Counts (EDC) initiative. Through the PEL initiative, FHWA provides partners with decisionmaking strategies, analytical tools, and technical assistance to link the transportation planning and environmental review processes. FHWA developed a [PEL toolbox](#) that provides a variety of potential activities that agencies may undertake to strengthen planning and environment linkages.

Across the country, State departments of transportation (State DOTs), metropolitan planning organizations (MPOs), and local municipalities are using a variety of processes that all can be considered PEL strategies, implemented in different ways and observing different benefits. This report documented a small sample of those benefits based on interviews conducted for each case study.

2. Case Studies

2.1 Methodology

FHWA and the Volpe Center identified candidates for this case study report through discussions with FHWA Headquarters and Division Office staff, discussions with State DOT staff, and reviews of existing reference materials. FHWA and the Volpe Center selected the case studies based on the success of the agencies' PEL practices. FHWA and the Volpe Center conducted phone interviews with the five identified agencies and representatives from State DOTs and FHWA Division Offices, as appropriate.

Discussions during each interview followed a customized interview guide, with flexibility to explore additional topics as the interview progressed. The interviewers inquired about each organization's established PEL practices, how they affect decisionmaking, and whether each agency has a process for tracking the costs and benefits of PEL strategies, including, but not limited to, time and cost savings. Finally, the Volpe Center drafted case studies that highlight the benefits and costs of each organization's PEL practices, quantifying costs and benefits whenever possible.

2.2 Regional Planning Commission of Greater Birmingham: Advanced Planning Programming and Logical Engineering Program

2.2.1 Introduction

The Regional Planning Commission of Greater Birmingham (RPCGB) provides planning services, economic development services, and various initiatives to six counties and 84 communities in central Alabama, and administers the Birmingham MPO. The RPCGB developed the Advanced Planning Programming and Logical Engineering (APPLE) Program to help local municipalities conduct planning feasibility studies and incorporate environmental concerns into the earliest stages of planning.

The APPLE studies help the RPCGB and local sponsors assess the overall feasibility of proposed projects, identify environmental impacts, and develop the elements a project needs to successfully progress through project initiation, environmental review, and subsequent phases of project development. Armed with this information, the sponsor can evaluate whether or not projects should proceed to the project initiation phase and determine how the projects should be funded. RPCGB's APPLE process minimizes uncertainty by proactively clarifying the transportation problem, scope, purpose and need statements, and environmental and social issues prior to project initiation.

2.2.2 Context

The idea for the APPLE Program stemmed from a discussion at RPCGB's Congestion Mitigation Committee about the large number of intersection improvement projects in the Transportation Improvement Program (TIP) that had stalled and were not moving forward. Local sponsors, particularly smaller municipalities without sufficient planning staff, struggled to understand project costs and potential impacts upfront. This resulted in numerous problems as projects moved through the development process. Some projects stalled in the TIP when funds were not available to cover the actual costs, while others were found infeasible during preliminary engineering either due to higher than anticipated costs or unexpected impacts on resources. In addition to problems estimating cost, RPCGB and local sponsors struggled to identify purpose and need statements for all projects included in their Long-Range Transportation Plan (LRTP).

Members of the Birmingham MPO board decided to take action when the Cahaba Liberty Trail, a project with an initial estimated cost of \$400,000, turned into a \$4,000,000 project during preliminary engineering due to unexpected impacts on environmental resources. The MPO board members, and RPCGB, wanted to help municipalities better understand potential costs and impacts earlier in the project development process.

2.2.3 Overview

Started as a demonstration project in 2011, the initial intent of the APPLE Program was to provide planning support to local municipalities without the capacity to do the planning work themselves. Through APPLE, RPCGB funds and oversees consultants to do preliminary planning studies. These studies determine technical and financial feasibility; define transportation problems; and assist project sponsors in defining scope, purpose, need, and potential environmental impacts.

The RPCGB worked in coordination with the Alabama Department of Transportation (ALDOT) to design the template that frames each APPLE study based on FHWA guidelines and the PEL questionnaire. By clearly defining the study elements, RPCGB ensures that the data can be incorporated into and relied upon during the environmental review process.

In the first year of the APPLE Program, RPCGB and its local municipal partners completed two APPLE studies, including a study for the Cahaba Liberty Trail project that had precipitated the start of the program. In each year since, they completed two to three additional studies for a total of ten projects as of early 2015. Based on the findings of the APPLE studies, the sponsors have decided to advance six out of the ten to project initiation and to use Federal funding for two of those, while four have moved forward using only local funds.

2.2.4 Benefits

The APPLE Program generates numerous benefits for RPCGB, local municipalities, and the environment. The information provided by the APPLE studies leads to improved decisionmaking during the planning process and beyond. Armed with more comprehensive information, sponsors make more informed decisions, therefore resulting in better outcomes.

2.2.4.1 *Assisting the Environmental Review Process*

Hueytown Intersection Alignment

A planned intersection realignment project in Hueytown, Alabama raised several challenges due to the anticipated need to relocate a gas station at the intersection.

An APPLE study quickly identified additional community concerns about the originally proposed alignment's impact on a local drug store; a significant resource in the community. The APPLE study was able to evaluate and recommend an alternative scope and new alignment that eliminated the impacts on the gas station and drug store, and received community support.

The State is now pursuing Federal funding for the project.

One of the benefits of the APPLE process is its impact on the environmental review process. As mentioned above, the APPLE study design and report format use PEL concepts and the report can be incorporated into and relied on for the project's environmental review process. APPLE identifies the major issues that could arise during formal environmental review and details the in-depth studies that should be necessary. This preliminary work helps to focus the review on the most significant impacts to resources, identifies necessary studies and streamlines the review process.

According to ALDOT, projects are at an advantage when they start the environmental review process after completing an APPLE study. This stems from the fact that the studies inform and guide the consultants engaged to complete the NEPA documents and provide FHWA information to guide the environmental review process. Additionally, while many sponsors traditionally struggle to clearly define purpose and need for their projects, the APPLE process helps identify a strong, clear purpose and need statement that feeds smoothly into the environmental review process. Projects move forward with a well-crafted scope and awareness of potential impacts and feasible alternatives.

2.2.4.2 *Cost and Time Savings*

APPLE studies promote time and cost savings in a variety of ways. For example, the early information on potential impacts creates awareness to the sponsor on the level of study that could be necessary during the environmental review process. This helps to identify areas or resources that would need in-depth studies and reduces or eliminates the need to study all resources or issues at the same level, thus avoiding unnecessary spending.

APPLE studies facilitate alternatives analysis and identify scope changes that can save significant time and money when addressed early. Considerations such as gravel surface treatment instead of concrete paving for a multiuse trail saved money and reduced storm water runoff. Similar to value engineering evaluation in a later project phase, the APPLE study can develop realistic cost estimates; analyze life cycle costs, explore alternative materials and other design changes that can save money and time and

minimize impacts on environmental resources.

Armed with more accurate cost estimates and realistic budgets, sponsors make informed decisions about what projects they would like to move forward, how to fund them, and which alternatives they would like to advance forward into NEPA. This improved decisionmaking leads to a better allocation of Federal funds. Local municipalities and ALDOT can avoid advancing projects that will eventually turn out to be infeasible, requiring repayment of Federal funds. APPLE studies also help sponsors distinguish between projects that benefit from Federal funding and those that are small enough to be financed using local funds. For example, RPCGB has found that the average cost per linear foot for a federally funded sidewalk project is three times the cost per linear foot for a sidewalk project that does not use Federal funds. Armed with that information, RPCGB can steer local sponsors to use local funds for small sidewalk projects, reserving Federal funds for the most appropriate, larger scale projects.

2.2.4.3 Proactive Consideration Allowing a Flexible Evaluation of Alternatives

The low-stakes, low-cost APPLE studies offer more flexibility for studying preliminary alternatives than could be possible further along in the project development process. With APPLE studies, sponsors are able to identify and preliminary evaluate many alternatives. The studies can evaluate the benefits of several alternative scopes, funding alternatives, or design alternatives. APPLE studies provides a forum to explore and recommend which alternatives could best suit the needs of the project and the community. They can also help the agency document why certain alternatives should not move forward.

2.2.4.4 Exporting PEL Strategies to the Local Level

The RPCGB originally launched the APPLE Program to help smaller municipalities without planning resources or expertise of their own. In doing so, RPCGB was able to introduce and institutionalize the concepts of PEL, making connections between planning and environment that would not otherwise be possible, given the limited resources of smaller municipalities. RPCGB continues this effort with its “Building Communities” Program to help local governments develop comprehensive plans. RPCGB encourages cities to conduct APPLE studies for the projects that they identify through the comprehensive planning process to determine their feasibility.

Helena Comprehensive Study

After the construction of a new high school and several new sub-divisions near a key intersection in Helena, Alabama, the city requested a roadway widening project, however sufficient funds were not available. An APPLE study of the intersection identified four interim improvements to ease congestion until a roadway widening project could progress through the environmental review process for Federal-aid projects.

- The restriping of the intersection and addition of a left turn lane added capacity and significantly decreased delays.
- Installation of a new roundabout at a nearby intersection was less costly than signalization.
- A bridge widening project on country County Road 52 proceeded with a separate funding source.
- The city coordinated with a local developer to signalize a nearby intersection.

2.2.5 Funding

The MPO funds APPLE studies using Surface Transportation Program (STP) funds. Each project has a cap of \$40,000 in Federal funds, with a 20 percent local match, for an average cost of approximately \$50,000. Local governments can overmatch if they want to add additional funding. The RPCGB competitively procures the services of several planning/engineering firms to work as needed on APPLE projects.

2.2.6 Next Steps

RPCGB is eager to build on the success of the APPLE Program. The program's growing list of success stories means that more communities want to participate and reap the benefits. Originally envisioned as a resource for smaller communities, the program now attracts even the largest members of the planning commission. RPCGB is planning to do a transit-related APPLE study for the city of Birmingham, as well as a project for Shelby County, one of RPCGB's larger constituents.

The types of projects benefiting from APPLE studies have broadened as well. Initially planned as a means to improve trail projects, the program has expanded to include intersection projects and widening projects.

The RCPGB hopes to continue enhancing the APPLE Program by adding air quality hot spot analysis, linking the process more closely to the ALDOT project development process, and growing the number of MPO projects that take advantage of the program. The RPCGB would also like to share its experiences with other MPOs in the State through peer exchanges.

2.3 Colorado Department of Transportation: US 50 West PEL Study

2.3.1 Introduction

The Colorado Department of Transportation (CDOT) has embraced the PEL program and incorporates PEL strategies into its transportation planning and project development processes. According to CDOT, PEL studies are an important aspect of this effort. CDOT's PEL studies are thorough planning and feasibility studies that incorporate environmental concerns into the planning process and assist in the creation of strong transportation improvement programs. The US 50 West study in Pueblo, Colorado is one example of a successful CDOT PEL study.

2.3.2 Context

CDOT had traditionally conducted planning and feasibility corridor studies. When projects emerged from these studies and entered the environmental review process, environmental staff often redid much of the same work through the NEPA lens, resulting in duplication of effort. Per the authorities in of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, Colorado began to explore ways to incorporate PEL into planning processes. By 2008, CDOT began to transition from the use of traditional planning and feasibility studies to what the agency terms "PEL studies." CDOT planned to incorporate environmental, community, and economic concerns into the earliest stages of planning, and eliminate duplication of efforts.

2.3.3 Overview

CDOT uses three major criteria to select an area that may be appropriate for a PEL study: (1) the project cannot have identified funding yet, (2) CDOT or the sponsoring agency must be seeking or expecting funding, and (3) the study must focus on a problem area with a transportation issue. CDOT has completed PEL studies on approximately 10 percent of projects—primarily large projects—and that percentage has risen over time.

CDOT's PEL studies focus on scope, purpose, need, identifying potential flaws in the background data, screening for sensitive resources, and determining the appropriate level of NEPA documentation. To screen for sensitive resources, CDOT informs resource agencies of the PEL study and solicits input. In many cases agencies are able to provide data for the PEL study, but in some cases resource agencies face time or staff constraints and must limit the effort that they contribute prior to environmental review. CDOT supplements the data from partner agencies with additional resource information that CDOT maintains.

In 2010, CDOT signed a Memorandum of Understanding (MOU) with the city of Boulder, Pueblo West Metropolitan District, Pueblo Area Council of Governments, and the county of Pueblo, agreeing to study

east-west traffic movements in the city to determine how to best feed the Pueblo West area. At the time, many believed that a new highway proposal was the solution to the east-west congestion.

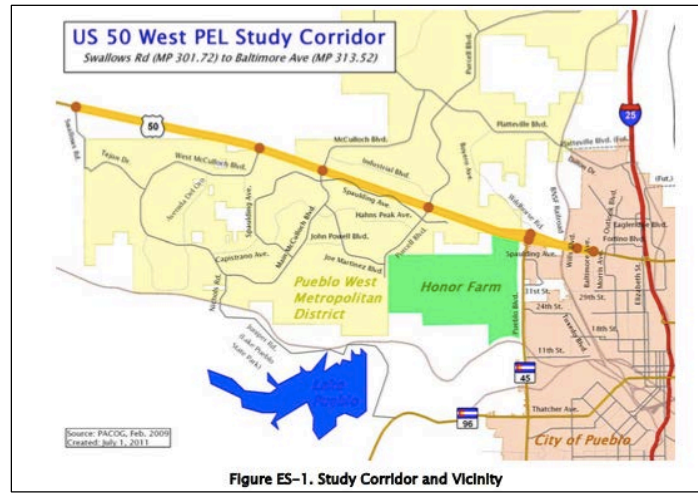


Figure 1. US 50 West PEL Study Corridor and Vicinity.

CDOT and partners initiated the US 50 West PEL study to evaluate the area, including various corridors, and determine if a newly proposed highway alignment would relieve congestion within this 12-mile section of the US 50 corridor. By the end of the study, it was clear that the new highway alignment would not relieve congestion along this section of US 50. CDOT and its partners abandoned the new alignment in favor of safety improvements and congestion mitigation measures along US 50.

The US 50 West PEL Study also included an implementation plan that acts as a guide for CDOT to follow as funds become available and smaller, independent projects move through the environmental review process. In total, the US 50 West PEL study took approximately two years to complete.

2.3.4 Benefits

While there are many specific benefits, the overall consensus at CDOT is that PEL studies spur better decisionmaking; a higher quality, faster environmental review process; and improved project and environmental outcomes.

2.3.4.1 Assisting the Environmental Review Process

By taking environmental, community, and economic factors into account during the PEL study, CDOT prepares the NEPA process for success. The environmental staff builds from the foundation of the PEL study, rather than starting from scratch. If the PEL study indicates there are limited impacts on resources, the scope for the NEPA work is smaller and more focused. Changes such as demographic shifts, design alterations, or new regulations can require new work. However, if the study areas and circumstances remain the same from the PEL study to the environmental review, the NEPA review incorporates findings from the PEL study, wherever possible. Overall, the process is more concise.

The amount of time between the PEL study and environmental review can also impact how much of the original PEL study can feed directly into the NEPA documents. If environmental review begins soon after the PEL study, the purpose, need, and alternatives analysis often can be incorporated into and relied upon in NEPA documents with more ease. For example, the purpose and need can adjust slightly for the local context if the environmental review covers a smaller area than the full PEL study. Even when items cannot be incorporated directly from the PEL study to the NEPA documents, CDOT reports that there is great benefit in working from the study rather than starting from scratch.

In some cases, such as for US 50 West, the preliminary alternatives screening in the PEL study is so exhaustive that the NEPA analysis examines only the established “build” and “no-build” alternatives. In these cases, the efforts of the NEPA analysis can focus on resource impacts and mitigation for those two alternatives, rather than wasting effort analyzing infeasible alternatives. For example, the US 50 PEL study identified a pattern of trespass by all-terrain vehicles that was impacting native plants under a bridge. Since the PEL study identified unreasonable alternatives, the NEPA review focused more thoroughly on ensuring that the design would stop the trespass and developing mitigation that would restore the native plants. According to CDOT, even though the NEPA analysis may only focus on two alternatives (“build” and “no-build”) based on the findings of the PEL study, this does not mean that the agency has circumvented the NEPA process. The NEPA documents can reference the robust analysis and public engagement from the PEL study, which subsequently led to the narrower, in-depth focus in environmental review.

The environmental review process also benefited from the public and resource agency engagement that took place during the PEL study. Agencies and communities involved in a PEL study typically end up with a fairly deep understanding of and commitment to the project. CDOT is then able to partner with these stakeholders for effective discussions and outreach during the NEPA process.

2.3.4.2 Cost and Time Savings

PEL studies can significantly shorten the timeline for environmental review. In this case, CDOT completed the environmental assessment in less than five months and issued the Finding of No Significant Impact (FONSI) in just over nine months after the start of the environmental review process. Previously in Colorado, the average for an Environmental Assessment was 32 months and 50 months for a FONSI. Aside from the PEL study, another factor that contributed to the time savings was the introduction of a new template for the Environmental Assessment. Although it is not possible at this time to parse out what portion of the savings is attributable to the PEL study and which part is attributable to the template, CDOT is confident that the PEL study contributed significantly to the shortened timeframe.

Looking back at the full timeline of the first project to emerge from the US 50 West study, the time savings does not seem quite as significant. At two years for the PEL study and nine months for the environmental review, the total time of both combined is comparable to a typical environmental review for a project involving an Environmental Assessment without a PEL study. However, the PEL evaluated a broad study area and identified independent projects that will address the needs on US 50. According to

CDOT, the real time savings will come as each subsequent US 50 West project enters environmental review and rapidly reaches “shovel ready” status.

For broad PEL studies that cover multiple independent projects (such as US 50 West), the pattern of cost savings is similar to that of time savings. Taking into account the initial expenditures on the PEL study, the total cost for the first project to emerge from the study is likely to be slightly higher than it would have been without the PEL study. However, subsequent projects are likely to achieve significant cost savings due to the comprehensive information available from the PEL study that will significantly decrease the efforts necessary to initiate future projects. CDOT also opined that in cases where a PEL study yields just a single project for the study area, the process may not realize a cost savings, although many other benefits will still apply.

In some cases, a PEL study may allow CDOT to recognize that it can address a particular transportation need with smaller, independent, incremental projects with minimal impacts that qualify for Categorical Exclusions, rather than a larger project with more impacts that would require an Environmental Assessment or Environmental Impact Statement.¹ This can also minimize the time and cost of the environmental review process. CDOT has already completed one Categorical Exclusion for a turning lane project evaluated in the US 50 PEL study, and is planning another. The process of identifying projects appropriate for Categorical Exclusion is made easier by the abundant information provided by the PEL study.

PEL studies can also achieve cost savings for the public sector by providing opportunities for private investment. In the case of US 50 West, a local bank funded a portion of an already planned installation of a left turn lane that will enhance access to the business.

According to CDOT, a local community that has the opportunity to participate early in a project through a PEL study is more likely to support the transportation improvements and often seeks out funding to support implementation. Those funding requests are more likely to be successful thanks to the planning work and coordination that has already taken place as part of the PEL study.

2.3.4.3 Proactive Consideration Allowing a Flexible Evaluation of Alternatives

CDOT’s PEL study process allows for preliminary evaluation of many options in a fast and flexible way. In the case of US 50 West, the project team and stakeholders screened a large number of preliminary alternatives. They were able to immediately eliminate many of them after discovering a fatal flaw, and they had the flexibility to abandon those alternatives and move on to evaluate others. The collaborative nature of the PEL study, with the close involvement of a large number of stakeholders, facilitated this process.

¹ See 23 CFR 771.111(f)(1-2) for more information: http://www.ecfr.gov/cgi-bin/text-idx?SID=69fa2738611d9e39a131af5a9860e963&mc=true&node=pt23.1.771&rgn=div5#se23.1.771_1111

2.3.4.4 Holistic and Flexible Approach

According to CDOT, a PEL study is particularly useful when there is a large study area and it is unlikely that funding will be available to address all the issues or the entire area in a single project. The PEL study allows the holistic evaluation of the whole study area and the identification and prioritization of smaller independent projects within the study area that the agency can then address one at a time.

With these smaller projects identified, the PEL study can create a menu of options for funding packages. For example, if a certain amount of funding becomes available, the implementation of options “a” and “b” can be supported. Conversely, if more money is available than originally expected, the agency can additionally pursue options “c” and “d.” Prioritization among options can happen in various ways, such as targeting the intersections where the study shows level of service failure will occur first, or where crash data shows the greatest number of accidents. Creating smaller independent projects in the context of the larger PEL study also ensures that there will be consistency across the projects and decisionmaking that is optimal for the area as a whole.

Early information from PEL studies also helps local governments make informed, harmonized decisions. For example, if information from a PEL study indicates that a project will require right-of-way (ROW) acquisitions, the local government can take that information into account and do better design and ROW planning.

The PEL study is flexible in its design, so CDOT can customize it to fit the particular set of circumstances, producing better information for decisionmaking and better project outcomes. For example, the US 50 West PEL study included a robust traffic analysis based on community concerns. The traffic analysis was important in the context of this project, but not appropriate for every PEL study. CDOT may also choose whether or not to include an implementation plan. CDOT included it for the US 50 West PEL study, but other PEL studies focused primarily on purpose, need, and alternatives screening and did not extend to implementation planning. In particular, the 56th Avenue PEL study in Denver presents another example of flexibility. In that case, CDOT completed an environmental assessment for a project in this area, and was able to move forward since funding was available. Afterwards, the city of Denver identified a larger need in an adjacent area, and completed a PEL study for that area in anticipation of future projects. This demonstrated the PEL studies role as a feasible option to fill the gap when a need has been identified, but a project cannot move to environmental review due to issues of fiscal constraint.²

2.3.4.5 Enhanced Community Involvement

The PEL study offers an opportunity for early and robust community involvement. Communities engage with the project team in developing project components, such as the purpose and need, logical termini, and identification of reasonable alternatives. In the case of the US 50 West PEL study, the community provided input during alternatives screening and the resulting community buy-in was essential to the success of the project. In projects with more controversy, a PEL study gives the public an early

² For more information on fiscal constraint guidance: <http://www.fhwa.dot.gov/planning/guidfinconstr.cfm>

opportunity to vet different options and direct the project in a way that is more acceptable to the community.

2.3.5 Funding

CDOT funds its State-level PEL program using State Planning and Research Program (SPR) funds. Funding for individual PEL studies come from a variety of sources, including metropolitan planning organizations and the Statewide Transportation Improvement Program. Local municipalities often provide funding as well, especially when a locality initiates a study.

2.3.6 Next Steps

PEL studies are a popular tool in Colorado, not only for CDOT, but also for local partners. As of May 2015, there were six PEL studies under way in the State, with an additional three to four scheduled to begin within the next six months.

Recently, CDOT has placed more emphasis on ensuring that partners use PEL studies appropriately. Perhaps due in part to the burgeoning success and popularity of the PEL study concept, some agencies may be tempted to initiate a PEL study without fully evaluating whether it is appropriate for the situation in question. CDOT works with local sponsors to ensure they know exactly what they hope to achieve with the PEL study. By holding scoping meetings to establish the goals of each study, CDOT ensures the efficacy of the PEL studies, redirecting resources if the PEL study is not the best mechanism to achieve the stated goals. In addition to holding scoping meetings, CDOT educates stakeholders on the use of PEL studies through trainings and conferences, all in an effort to ensure the tool is used as effectively as possible.

2.4 City and County of Denver, Colorado: Federal Boulevard PEL Study

2.4.1 Introduction

While CDOT initiates PEL studies for many projects, local jurisdictions in Colorado also initiate PEL studies. In 2009, the city and county of Denver began a PEL study to explore ways to improve safety and congestion on Federal Boulevard, a major north-south arterial in the heart of Denver.

2.4.2 Context

Many jurisdictions, including Denver, struggle to develop “shovel ready” projects without firm funding commitments.³ The CDOT works in tandem with local jurisdictions like Denver to complete PEL studies when funding is anticipated, but not yet available. The Federal Boulevard PEL study is an early example of the cooperative process between CDOT and a local jurisdiction.

By 2009, Denver identified the need for safety improvements and congestion mitigation along the Federal Boulevard Corridor, specifically from 5th Avenue to Howard Place. While they did not have construction funding, the city anticipated the funding would come soon.

In past situations like this, Denver, like many local governments, often rushed to complete the environmental review process to make the project “shovel ready” in order to attract funding. However, FHWA can only approve environmental documents when funding is reasonably available.⁴ Since this was not the case with Federal Boulevard, the FHWA Colorado Division Office encouraged Denver to consider a PEL study for the Project rather than starting the environmental review process.

2.4.3 Overview

The PEL study for Federal Boulevard began in early 2009 and was complete by October of that same year. The purpose of the study was to evaluate transportation improvements along the corridor, and to do so in a way that incorporates environmental considerations into the earliest stages of planning and decisionmaking, improving and streamlining the environmental review process.

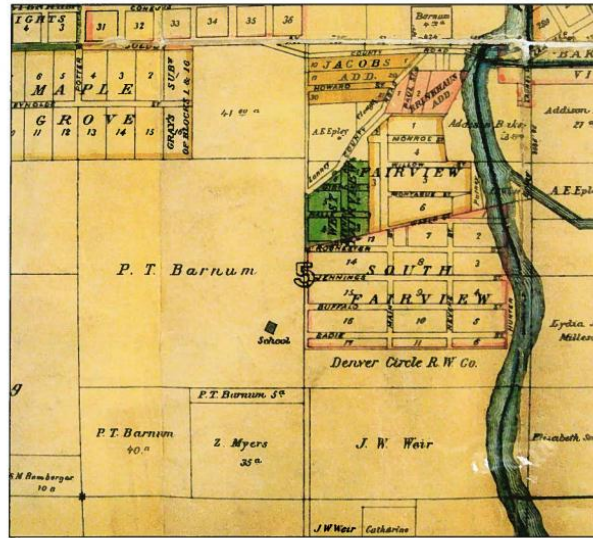
The PEL study process included development of the key elements of the eventual environmental review documents, including scope, purpose, need, and preliminary alternatives screening. The process included significant public outreach and analysis of impacts on historic resources and environmental justice issues, among other things.

Upon completion of the Federal Boulevard PEL study, construction funding for the project was not as readily available as the city had hoped. Over the next four years, the city of Denver and CDOT pursued construction funding from numerous sources. In late 2013, Denver secured funding for the project through the State of Colorado Responsible Acceleration of Maintenance and Partnerships (RAMP) Program, and the city quickly began an Environmental Assessment for the project.

³ For more information on fiscal constraint guidance: <http://www.fhwa.dot.gov/planning/guidfinconstr.cfm>

⁴ For more information on the Council for Environmental Quality regulations, see 40 CFR 1500-1508: <http://www.ecfr.gov/cgi-bin/text-idx?SID=6dd1867ff30260df48a407ab6c28147d&mc=true&tpl=/ecfrbrowse/Title40/40chapterV.tpl>

Historic Project Area Maps



Thayer's City of Denver Map
1883

Figure 2. Historic Project Area Maps – Thayer's City of Denver 1883.

2.4.4 Benefits

2.4.4.1 Assisting the Environmental Review Process

Completion of a PEL study can set the stage for a successful, streamlined environmental review process. This was certainly the case for the Federal Boulevard Program. Although the PEL study was five years old when the environmental review began, it acted as a solid foundation for the NEPA review. While Denver and CDOT had to update some elements, the scope, purpose and need, and preliminary alternatives screening from the PEL study all fed into the NEPA document. The environmental review staff was also able to update and validate the resource work started in the PEL study. Federal Boulevard itself had not changed very much in the intervening years, which helped with the use of information from the PEL study to the NEPA document.

At the start of the environmental review process, the Federal Boulevard PEL study helped Denver determine the level of NEPA review that would be required. Although Denver and CDOT previously had explored the idea of a series of Categorical Exclusions, the preferred alternative recommended in the PEL study led all parties to agree that an Environmental Assessment was necessary. Working from the PEL

Environmental Justice and the Federal Boulevard Project

- The Federal Boulevard PEL study process included a significant focus on environmental justice.
- The study involved a robust public outreach component, and identified an entirely new environmental justice population in the project area.
- Identifying this population in advance saved time and improved outreach during the environmental review process.

study, stakeholders were able to act collaboratively, facilitating the decisionmaking process.

The PEL study allowed CDOT and Denver to focus the NEPA analysis on the key issues they had identified, particularly environmental justice and historic resource impacts. This focus saved time and money during the environmental assessment and allowed for a more in-depth analysis on areas with relevant environmental effects.

Denver and CDOT found that the quality of the environmental review documents and resulting decisions was higher due to the PEL study. They report that the study contributed to a more thorough process and enhanced the outreach, analysis, conclusions, and recommendations, resulting in an overall clearer product. The PEL study revealed and documented the issues that they would need to study further, providing data and analysis for use in the environmental review process. The environmental review process for Federal Boulevard proceeded without surprises because of the information provided by the PEL study.

The information from the PEL study allowed for efficient and timely decisionmaking throughout the project development process, and specifically during environmental review. When stakeholders were faced with decision points, they could make choices quickly because everyone was already comfortable with the proposed specifics of the project.

2.4.4.2 Cost and Time Savings

The Federal Boulevard environmental review benefited from both time and cost savings as a result of the PEL study. From the start of environmental review, the information available from the PEL study allowed a focused approach on relevant environmental effects which translates to time and money savings.

The environmental assessment for the Federal Boulevard project took slightly over 10 months to complete, with a FONSI finding just three months later (i.e., a total of 13 months after the initiation of the environmental review process). As mentioned in the discussion of US 50 West PEL Study above, it is not possible to distinguish the time savings that resulted from the PEL study from those that resulted from the new environmental assessment template. However, CDOT and Denver reported that it is clear to all involved that the PEL study helped save time in environmental review process.

When the city of Denver secured RAMP funding for construction of the Federal Boulevard project, the agreement included certain commitments for project completion timeframes. This meant that the environmental review timeline was crucial. Denver had to revise the schedule when it became clear that an Environmental Assessment would be necessary in place of the originally anticipated series of Categorical Exclusions. The city was able to commit to a new timeline with confidence based on knowledge gained through the PEL study. Even though the city reported that it could not meet the original timeframe, the RAMP board agreed to the proposed extension due to the level of certainty with which the city was able to present the new timeline. Without the certainty provided by the PEL study, the funding would have been in jeopardy.

2.4.4.3 Enhancing Grant Capacity

The ability of a PEL study to help move a project toward “shovel ready” status was a clear benefit of the Federal Boulevard PEL Study and other PEL studies completed in Colorado. Since funding sources sometimes require that projects meet specific timeframes upon award, CDOT has partnered with local governments to expedite the environmental review process with the assistance of PEL studies. When entering environmental review immediately is not feasible due to lack of construction funds, for example, PEL studies provide an alternative that continues to move projects toward “shovel ready.” At the same time, CDOT and partners recognize that a PEL study is not appropriate in every situation.

2.4.4.4 Leveraging Other Opportunities

At the time of the PEL study, there were several other projects in the vicinity of Federal Boulevard. In two instances, the PEL study identified an opportunity to leverage the nearby work to save time, effort, and cost.

In the first instance, there was a partial acquisition of a parcel of land necessary for an adjacent project. The PEL study made clear that the city would eventually need to acquire the rest of the parcel. In this particular case, Denver was able to make a single contact with the property owner and acquire the whole property in one transaction, making the process much easier and more efficient for everyone. It is important to note that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) provides important protections and assistance for people affected by Federally funded projects. The law ensures that people whose real property is acquired, or who move as a result of projects receiving Federal funds, will be treated fairly and equitably and will receive assistance in moving from the property they occupy.⁵

The PEL study also proactively identified an area that needed mitigation to protect water resources. Denver was aware that the regional transit agency was already working on mitigating impacts to water resources in the same location. Therefore, they were able to partner with that agency and expand the scope of the existing work to cover the necessary mitigation for the Federal Boulevard project. This saved both time and money, and improved the outcome for water resources.

2.5 Utah Department of Transportation: Utah Planning and Environmental Linkage Tool

2.5.1 Introduction

The Utah Department of Transportation (UDOT) developed the Utah Planning and Environmental Linkage (uPEL), a geospatial tool that brings together diverse datasets to identify environmental, community, and economic considerations early in the transportation planning process.

⁵ For more information about the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act): http://www.fhwa.dot.gov/real_estate/uniform_act/

2.5.2 Context

UDOT uses a robust online mapping center called Utah Planning Network (UPLAN), which is an off-the-shelf GIS platform that houses Utah's transportation related data. After successfully implementing UPLAN, UDOT set out to create a custom-built system that would bring together resource data sets relevant to planning and environmental review and create an automated process to assist in the screening and evaluation of transportation projects with respect to potential impacts on sensitive resources.

Prior to the uPEL initiative, each time environmental review began, UDOT would approach the resource agencies to ask for data for the project area, starting from scratch for each project. It was in this environment that UDOT approached the resource agencies with a proposal to bring all their data together in one place for use in environmental review.

The largest effort associated with the development of this project was not the technical development of the tool, but rather the negotiations with the resource agencies providing the data. After much negotiation, all parties eventually signed a MOU agreeing to provide their information regularly to the Automated Geographic Reference Center (AGRC), Utah's statewide GIS agency. UDOT then signed an MOU with AGRC, which agreed to transmit the data to UDOT on a regular basis. The negotiation process took three years.

2.5.3 Overview

The uPEL system is currently in test phase, although UDOT has used it internally for several years. In its current incarnation, the user interface requires some GIS knowledge, but UDOT plans to unveil a user-friendly, web-based interface in summer 2015.

The uPEL system allows users to enter a project area into the tool through a variety of methods and to create a buffer zone around the project. The tool then automatically analyses the site in the context of 75 layers of geospatial data covering a variety of factors related to the natural and human environment such as ecology, hydrology, land use, cultural resources, housing, and population characteristics.

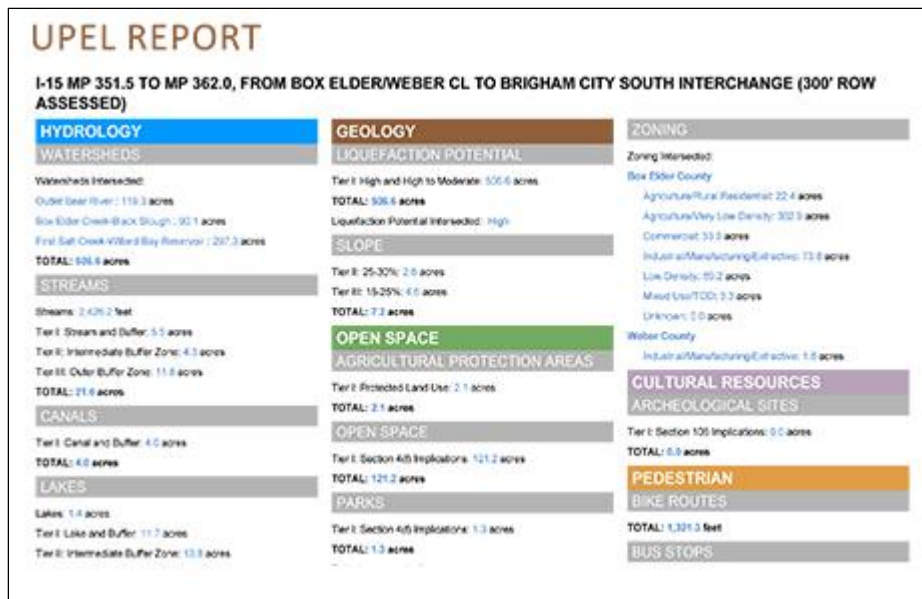


Figure 3. uPEL Report.

There are two types of datasets that populate the uPEL tool, tiered data and informational data. Tiered data fall into the categories of Tiers 1, 2, and 3, based on the sensitivity of the resources. Tier 1 data are the most sensitive, and while Tiers 2 and 3 are less sensitive, they may still require mitigation. The second broad category, informational data, provides context and understanding, but do not represent sensitive resources. The data hierarchy allows the users of the uPEL system to identify potential project impacts, analyze their severity, and understand the likelihood that a conflict could delay a project or add significant costs.

The uPEL report, the output of the uPEL system, provides an environmental inventory of the project area, details the severity of any resource impacts, and includes any relevant descriptive information. The uPEL report illustrates how a project will likely impact a project area, and how the specific resources in a particular project area could impact the timeline or cost for the project.

In addition to the uPEL reports, users can view the uPEL data directly through the UPLAN tool if they do not require a report. A PEL map on UPLAN uses the same data as uPEL, but allows users to flexibly

Uintah Basin Rail

- Politicians in eastern Utah proposed a heavy rail line to the Uintah Basin to transport oil to the main rail lines that cross Utah.
- Using uPEL, UDOT explored over 4,000 miles of vertical and horizontal alignments for 26 potential rail routes in just two months.
- Facing a price tag of close to \$5 billion, politicians abandoned the project and are exploring other options to move the oil.

evaluate preliminary projects, do alternatives screening, and generally evaluate an area without the need to actually create a uPEL report. While the uPEL tool is not open to the public, UPLAN is openly available. For this reason, some sensitive data sets are hidden or generalized on the publicly available maps.

2.5.4 Benefits

2.5.4.1 Assisting the Environmental Review Process

The uPEL Report provides a solid foundation for the start of the environmental review process by identifying the relevant resources and potential impacts, saving significant time during environmental review. As the Uintah example above shows, the tool offers a robust capacity to screen numerous preliminary alternatives, either before or during the environmental review process.

In the past, coordination with resource agencies started with the collection of baseline data about the project area. Now, armed with the PEL Report, conversations and coordination with the resource agencies starts with all parties aware of the likely resource impacts, therefore allowing project discussions to move on from there. The report even identifies where information is lacking so that stakeholders can assess whether to conduct additional surveys.

2.5.4.2 Cost and Time Savings

UDOT reported significant cost and time savings from the use of the uPEL tool. In 2012, while the uPEL tool was still in test mode, UDOT reported to the Utah State Legislature that the cost savings from the program in that year was \$100,000, stemming from reduced labor-hours required for NEPA review and preparation of categorical exclusion documents.

The Uintah Basin Rail project offers another excellent example of the opportunity for large-scale savings from the uPEL tool. In 2014, UDOT reported a savings of almost \$2,500,000 on the environmental review of the Uintah Basin and a time savings of between 22 to 28 months. The findings from the analysis resulted in a decision not to pursue the rail project, which would have had a project cost of \$5 billion for a 100-mile rail line.

In addition to the screening of alternatives for a typical improvement project, UDOT is finding ways to incorporate the tool into other work processes. A large project to install more than 400 signs across the State used the tool to determine which locations required additional screening for environmental impacts. Using uPEL, UDOT determined that three-quarters of the locations had no potential impacts and required no detailed studies or NEPA analysis, reducing the workload significantly.

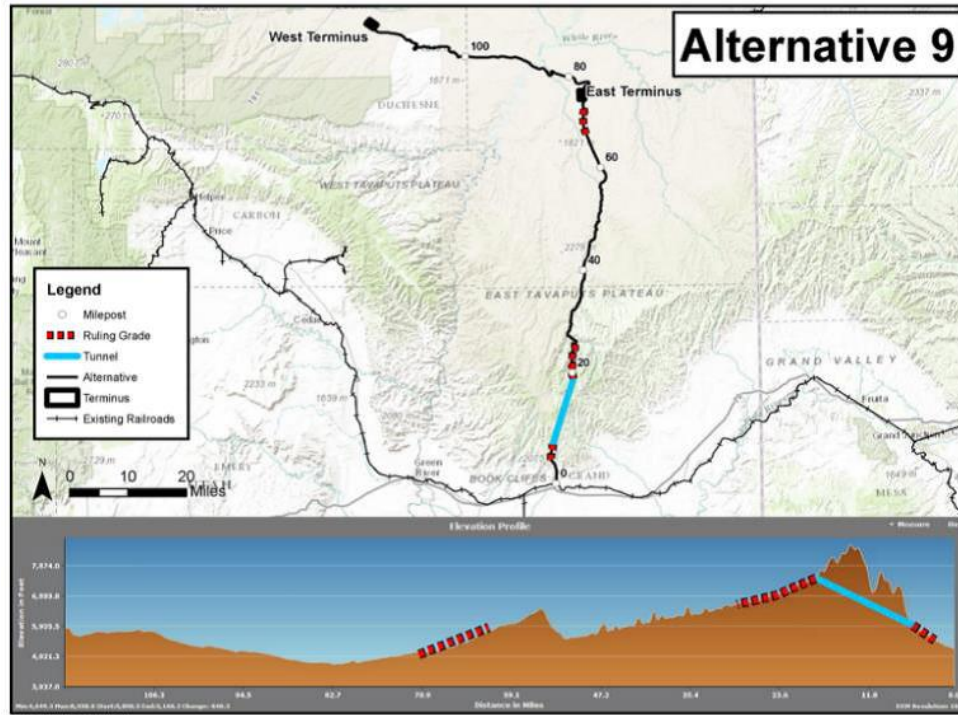


Figure 4. Alternative 9 Map from uPEL.

2.5.4.3 Improved Relationships and Coordination

UDOT worked extensively with partner resource agencies to bring the uPEL datasets together and make them more widely available. This process strengthened UDOT’s relations with the resource and regulatory agencies and started conversations across the State, bringing new awareness to the importance of collaboration and data. During the Uintah Basin rail projects, the Uintah Basin Collaborative formed to determine which data would be necessary for the analysis of the proposed rail project. After the successful use of uPEL in that case, the members of the collaborative recognized the need to continue the discussion and coordination among agencies regarding data sharing and utilization. The Uintah Collaborative became the Utah Mapping and Information Partnership (UMAP), and continues investigating these issues on a statewide level.

Implementation of uPEL has resulted in a standardization of data across UDOT and other State agencies. As data consistency has increased, UDOT and stakeholders can refer to the same data from project to project and historic data remains available and consistent. Prior to uPEL, Utah used project-specific coordinate systems. They now use the Universal Transverse Mercator (UTM) coordinate system on all projects, allowing project surveys to interrelate across projects and allowing them to re-use those surveys on future projects.

2.5.5 Funding

The development of the uPEL tool cost approximately \$4,000,000 and took several years to complete.

2.5.6 Next Steps

UDOT is poised to expand the use of uPEL with a new simplified web-based interface, which will be ready in summer 2015. At that time, uPEL will be available to all UDOT staff and consultants. Although only five percent of UDOT projects have used the uPEL tool thus far, this number should increase as the tool becomes more readily available. As word of the success of the tool and the utility of the data sets spreads, more and more agencies are likely to request access to the tool. While UDOT is happy to see the expanded use of the tool, the agency is also aware of the need to continue coordinating with resource agencies and other data providers to ensure everyone is comfortable sharing the data in ever widening circles.

2.6 South Carolina Department of Transportation: Advanced Project Planning Report

2.6.1 Introduction

The South Carolina Department of Transportation (SCDOT) developed the Advanced Project Planning Report (APPR) process to investigate the impact of proposed projects on the human and natural environments. The APPR process also carries this information through to the project initiation and environmental review phases.

2.6.2 Context

Prior to implementing the APPR Program, SCDOT followed a traditional project selection and initiation process. The previous process did not emphasize environmental impacts of proposed projects until the formal environmental review process. Engagement with resource agencies did not begin until further along in the project development process. During environmental review, SCDOT met monthly with resource agencies. It was during these meetings that SCDOT first requested input from the resource agencies on the projects already under development, and agencies raised their concerns regarding project implementation.

2.6.3 Overview

For the past 10 years, SCDOT has used the APPR process to evaluate study areas and projects, identify resource impacts, and to preliminarily screen alternatives prior to project initiation. The APPR helps SCDOT and local sponsors develop the necessary elements of a project, including identification of the transportation problem the project will address, purpose and need, scope, and budget. The process involves State and local entities, such as resource agencies, prior to the start of the formal environmental review process.

An important element of the APPR process is the Project Selection Tool (PST), a geospatial information system with a web-interface. SCDOT originally developed the PST as a way of collecting data and comments in a single place for each project reviewed through the APPR process. Resource agencies were able to provide comments and upload documents; generally it made it easier for the agencies to provide input.

Over time, the tool has grown into an important repository for resource data and an analytical tool for identifying potential resource impacts. Any agency can submit data, which is then viewable by everyone involved in the project. The agencies can provide project specific information either in the field or via the tool. In addition to collecting input on specific projects, the tool stores general resource data from agencies, which they update annually. SCDOT and other public agencies use the PST, but it is not available to the public.

The APPR process has an important role in shaping projects. The process begins with a proposed project at the MPO or council of governments (COG) level. During the APPR process, SCDOT evaluates the original proposal and examines a variety of factors, such as roadway classification or whether or not bicycle lanes or sidewalks are needed, to guide the development of the project. The APPR process also evaluates the project for potential impacts on the natural or human environment.

Not every proposed project in South Carolina goes through the APPR process. SCDOT mainly uses it for widening projects, new alignments, and large bridge projects (e.g., projects that are complex enough to require additional ROW). However, MPOs and COGs can also request that SCDOT complete an APPR for a particular project they have submitted. Thus far, SCDOT has used the APPR process for just over 100 projects. To date, 60 percent of those projects have moved forward to NEPA while 40 percent did not because of higher than estimated costs or changes in priority at the MPO or COG. Many of the projects that have moved forward pursued Federal funding, while some have not.

2.6.4 Benefits

2.6.4.1 Assisting the Environmental Review Process

The environmental review process in South Carolina is among the fastest in the country and the APPR process contributes to that speed. The State averages just 15-16 months for Environmental Assessments and 36 months for Environmental Impact Statements. This stems in part from the clarity of the projects that start environmental review having been through the APPR process.

Projects entering environmental review with an APPR have a great deal of information that facilitates the review—a strong purpose and need, logical termini, a preliminary understanding of environmental impacts, a cross section, ROW requirements, design elements, and preliminary alternatives. APPR projects are already well developed and realistic when they enter the programming phase, making it easier to scope and complete the NEPA review. Projects without the APPR process are often more ambiguous going into project initiation.

2.6.4.2 Proactive Consideration Allowing a Flexible Evaluation of Alternatives

The APPR process, the PST in particular, also allows for the evaluation of project areas without specific alignments or exact locations. In the tool, the user can select a wide area where the project may end up and automatically screen the area for potential impacts on resources. A red flag for a serious environmental impact will be evident immediately or a resource agency can submit their comments on a particular problem area, ultimately resulting in a shift of the project to an adjacent area with fewer impacts. The tool can even allow access to project information or screen alternatives for locations that are not physically accessible. In other words, GIS data can display what staff cannot access in the field.

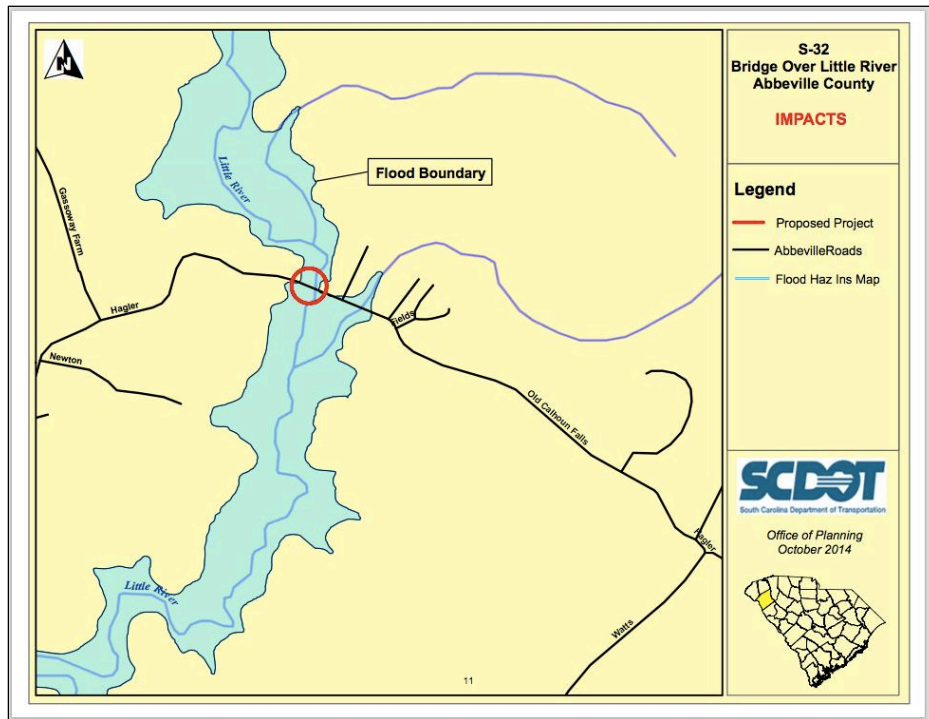


Figure 5. APPR Impacts Map.

SCDOT can also use the PST prior to the formal APPR process or in advance of a project's inclusion in the LRTP. A user can input several alignments and compare the impacts for all of them. This flexibility and ease in screening alternatives allows SCDOT to proactively evaluate projects. As APPR projects move forward to environmental review, SCDOT will have already made adjustments to avoid the most environmentally sensitive resources.

2.6.4.3 Better Decisionmaking

The APPR Program allows for improved decisionmaking throughout the project development and delivery process. The APPR process develops more realistic cost estimates, which helps the MPOs and COGs weight the value of moving forward with a project. In one example, a county faced strong political pressure to advance a particular project. An APPR identified numerous costly impacts, resulting in a cost

estimate that was ten times higher than the initial estimate. Given this information, the county abandoned the project despite the original political pressure, avoiding wasting time and money on a project that ultimately may not have been feasible.

2.6.4.4 Improved Relationships and Coordination

According to SCDOT, the APPR process has resulted in closer relationships with the State's resource agencies. This has improved the quality of the input that SCDOT receives on APPR projects, as well as the relationships and information exchange overall. The process created a more inclusive environment in which input SCDOT solicits input from the resource agencies at the earliest stages of the project development process. Everyone is able to access the same information for better decisionmaking and improved outcomes.

While the earlier involvement of the resource agencies is key to producing better projects, SCDOT cautions there are limits to the early input. When a project is less formed or final details are unclear, comments from resource agencies are often necessarily vague. Initial evaluation of impacts can also change as the regulatory landscape changes over time. So while early comments may not identify any problem, issues may emerge later if several years pass prior to environmental review.

The APPR process also acts as a means to ensure agreement between all stakeholders on priorities. The process ensures that the MPOs or COGs and SCDOT are aligned in their prioritization of projects, which is important given the frequent shifts in priority that can be typical of the project selection process. Upon completion of an APPR, the MPO or COG signs the report, reaffirming their commitment to the project.

2.6.5 Funding

SCDOT completes all APPR work using in-house resources.

2.6.6 Next Steps

SCDOT is planning several expansions to the APPR Program. In order to better connect the APPR process with the next steps for the programming phase, SCDOT plans to start tracking APPR work in the agency's project development management system. This means that any time a new project is initiated, any existing APPR will automatically link to the new project.

SCDOT is also expanding the functionality of the PST. The second phase of the tool allows environmental permitting and traffic projections. The system also pulls live data from other SCDOT systems to display traffic information, crash data, pavement, bridge and other structure conditions within the project limits. It also includes high-level reports, including a Buffer Report and a Summary Report that will offer an easy to understand, high-level review of APPR projects.

3. Significant Findings

3.1 Overarching Observations

Before addressing the specific benefits, it is important to mention two general observations that emerged in the course of the interviews. The first is that the PEL approach is inherently flexible. Each PEL implementation looks slightly different because every strategy is molded and shaped to fit the needs of a particular agency. The second observation is that PEL can add value to the project selection and development process at any level of government. The case studies touched multiple geographic scales, from the State DOTs in Colorado, South Carolina, and Utah; to the Regional Planning Commission in Birmingham, Alabama; to the city and county government in Denver, Colorado.

3.2 Common Benefits

These five case studies represent two primary types of PEL strategies: PEL studies (a type of planning feasibility study) and geographic information system (GIS)-based electronic screening tools. The benefits of implementing PEL, as shown in these five case studies, can be very different depending on the specific goals and objectives of each implementation. However, there are certain benefits that emerged in most, if not all, of the case studies. These benefits include:

- **Assisting the Environmental Review Process**

In each of the five case studies, taking a PEL approach has assisted the agency in the environmental review process. The case studies showed that more informed decisionmaking through PEL provided information to assess the overall feasibility of proposed projects, identify environmental impacts, and develop the elements a project needs to successfully progress through project initiation, environmental review, and subsequent phases of project development. The most significant PEL benefits for the environmental review process include the development of a well-defined scope, purpose, and need that could be incorporated into and relied upon in NEPA documents and the early identification of potential impacts on sensitive resources. PEL analysis also helped several of the agencies proactively clarify the transportation problem, scope, purpose and need statements, and environmental and social issues to develop a better understanding of the potential environmental challenges, benefits, and burdens prior to project initiation. PEL provides a strong base of information for the environmental review process, making it easier to consider potential impacts and public input and to identify potential concerns early on and address them more effectively.

- **Documentation**

SCDOT and UDOT demonstrated that taking a PEL approach can help to document planning

information for environmental review and NEPA. For example, SCDOT has used the APPR process to evaluate study areas and projects, identify resource impacts, and to preliminarily screen alternatives prior to project initiation under NEPA. The APPR helps SCDOT document the necessary elements of a project, including identification of the transportation problem the project will address, purpose and need, scope, and budget. The APPR documents who was involved, including State and local entities such as resource agencies, prior to the start of the formal environmental review process. Also, UDOT's uPEL documents diverse datasets that identify environmental, community, and economic considerations early in the transportation planning process. These examples demonstrate documentation of planning level analysis and decisions that can avoid duplication of work, inform the formal environmental review process, and can yield cost and time savings.

- **Cost and Time Savings**

Four of the five case studies indicated that taking a PEL approach resulted in significant cost and time savings. While these savings can be difficult to quantify, some agencies were able to determine their cost and time savings benefits. For example, Utah estimated a savings of \$2,500,000 and 22-28 months on a single PEL-assisted environmental review. In Colorado, an environmental assessment for the US 50 West project took just five months, compared to a previous average of 32 months. These examples demonstrate that considering the environment during planning can yield cost and time savings.

- **Proactive Consideration Allowing a Flexible Evaluation of Alternatives**

PEL strategies can allow for planning-level evaluation and data collection on a range of alternatives, preliminary screening of those alternatives, and elimination of unreasonable options prior to initiation of NEPA. By conducting a preliminary screening of alternatives, RPCGB, CDOT, and SCDOT considered potential sensitive environmental impacts, as well as public input, early in the process when there are more opportunities to shape the alignments and reduce environmental impacts. This resulted in more informed decisions at each step of the project development process.

- **Exporting PEL Strategies to the Local Level**

RPCGB's APPLE Program has institutionalized the PEL process to help smaller municipalities without planning resources or expertise of their own. Its "Building Communities" Program is helping local governments, many of which have limited resources, to develop comprehensive plans that make connections between planning and the environment.

- **Holistic and Flexible Approach**

Through the US 50 West PEL study, CDOT conducted an evaluation of the entire study area, allowing the agency to identify and prioritize smaller independent projects within the study area to implement individually. Taking this holistic approach in the context of the larger PEL study improved consistency across the projects and decisionmaking that is optimal for the area.

- **Enhanced Community Involvement**

In the case of the US 50 West PEL study, the community provided input during alternatives screening, and the resulting community buy-in was essential to the success of the project. In projects with more controversy, a PEL study gives the public an early opportunity to vet different options and direct the project in a way that is more acceptable to the community.

- **Enhancing Grant Capacity**

CDOT demonstrated the benefits that PEL studies can have on moving projects towards being “shovel ready.” The agency found that in some cases when entering environmental review immediately is not feasible, PEL studies can help to advance the projects towards being ready for construction and eligible for certain types of grants.

- **Leveraging Other Opportunities**

Denver’s Federal Boulevard project demonstrated how taking a PEL approach can help agencies leverage other opportunities. The Federal Boulevard PEL study helped the city of Denver decide to acquire a full parcel at once instead of doing it in separate transactions as land was needed. Also, the information collected for the PEL study helped the city partner with the transit authority to address mitigation efforts together, saving time and money.

- **Improved Relationships and Coordination**

Both SCDOT and UDOT saw their relationships with partner agencies improve as a result of their PEL approaches. SCDOT’s APPR process has helped the agency strengthen its relationships with resource agencies, which has resulted in resource agencies providing SCDOT with better input on APPR projects. UDOT’s process to assemble the uPEL datasets strengthened its relations with resource and regulatory agencies and improved coordination across the State.

4. Conclusion

As this series of case studies demonstrates, PEL is a flexible approach that offers States and MPOs the opportunity to approach planning and environmental review in an integrated, cohesive manner. Incorporating environmental, community, and economic goals early in the planning process brings a variety of cost and time savings and additional benefits to the project selection, development, and environmental review processes. With this approach, the information, analysis and products developed during the PEL planning process can inform the environmental review process and facilitate decisionmaking at every stage of project delivery.

While the benefits demonstrated in these case studies are many and varied, they all achieve the goal of PEL—incorporating environmental considerations into the planning process to reduce duplication of effort and more informed project-level decisions.

Appendix A: Acronyms

AGRC	Automated Geographic Reference Center
ALDOT	Alabama Department of Transportation
APPLE	Advanced Planning Programming and Logical Engineering
APPR	Advanced Project Planning Report
CDOT	Colorado Department of Transportation
COG	Council of Governments
DOT	Department of Transportation
EDC	Every Day Counts
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GIS	Geographic Information System
L RTP	Long Range Transportation Plan
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
PEL	Planning and Environmental Linkages
PST	Project Selection Tool
RAMP	State of Colorado Responsible Acceleration of Maintenance and Partnerships Program
ROW	Right-of-Way
RPCGB	Regional Planning Commission of Greater Birmingham
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCDOT	South Carolina Department of Transportation
SPR	State Planning and Research Program
STP	Surface Transportation Program
TIP	Transportation Improvement Program
UDOT	Utah Department of Transportation
UMAP	Utah Mapping and Information Partnership
uPEL	Utah Planning and Environmental Linkages
UPLAN	Utah Planning Network
UTM	Universal Transverse Mercator