

Risk Checklists

Risk checklists are a tool for risk identification that can be used at the earliest stages of risk identification to learn from past projects and past team member experience. The list helps Estimators to better understand the required contingency and helps Managers to more effectively control scope growth throughout the project development process. The use of a risk checklist is the final step of risk identification to ensure that common project risks are not overlooked.

What is it?

Risk checklists are a historic list of risks identified or realized on past projects. Risk checklists are meant to be shared between Estimators and discipline groups on all projects.

Why use it?

The benefit of maintaining risk checklists is to capture corporate knowledge within a state highway agency and ensure that common risks are not overlooked in the estimating or risk management process. Risk checklists are simple to maintain if the agency has a central estimating or risk management function. Risk checklists can also be maintained by individual Estimators or Project Managers.

What does it do?

Risk checklists serve as a final step in the risk identification process to ensure that common risks are not overlooked.

When to use it?

Risk checklists should be used only after the team has identified risks on its own (e.g., through an examination of scope and estimating assumptions, the brainstorming of issues and concerns, or the creation of a red flag list). Risk checklists should not be used as the first step in risk identification because they may not contain important project-specific risks. If a project team relies too heavily on a risk checklist, it could easily overlook project-specific risks, and the risks may not be phased correctly for the unique aspects of the project.

How to use it?

A risk checklist should be reviewed at the start of a project and potentially several more times throughout the project. The list should be reviewed by a project team, and the risks that may have impacts should be documented and added to the risk register and possibly marked for quantitative analysis.

Example

California DOT has developed a sample list of risks in its Project Risk Management Handbook. This sample list of risks can be used as the basis for creating a list of red flag items for an individual project. The Caltrans list is quite comprehensive, and any single project's list of risks should not include all of these elements.

Caltrans Sample Risk List (Caltrans 2007)

Technical Risks

- Design incomplete
- Right-of-Way analysis in error
- Environmental analysis incomplete or in error
- Unexpected geotechnical issues
- Change requests because of errors
- Inaccurate assumptions on technical issues in planning stage
- Surveys late and/or surveys in error
- Materials/geotechnical/foundation in error
- Structural designs incomplete or in error
- Hazardous waste site analysis incomplete or in error
- Need for design exceptions
- Consultant design not up to Department standards
- Context sensitive solutions
- Fact sheet requirements (exceptions to standards)

External Risks

- Landowners unwilling to sell
- Priorities change on existing program
- Inconsistent cost, time, scope, and quality objectives
- Local communities pose objections
- Funding changes for fiscal year
- Political factors change
- Stakeholders request late changes
- New stakeholders emerge and demand new work
- Influential stakeholders request additional needs to serve their own commercial purposes
- Threat of lawsuits
- Stakeholders choose time and/or cost over quality

Environmental Risks

- Permits or agency actions delayed or take longer than expected
- New information required for permits
- Environmental regulations change
- Water quality regulation changes
- Reviewing agency requires higher-level review than assumed
- Lack of specialized staff (biology, anthropology, archeology, etc.)
- Historic site, endangered species, wetlands present
- EIS required
- Controversy on environmental grounds expected
- Environmental analysis on new alignments is required
- Formal NEPA/404 consultation is required
- Formal Section 7 consultation is required
- Section 106 issues expected

- Project in an area of high sensitivity for paleontology
- Section 4(f) resources affected
- Project in the Coastal Zone
- Project on a Scenic Highway
- Project near a Wild and Scenic River
- Project in a floodplain or a regulatory floodway
- Project does not conform to the state implementation plan for air quality at the program and plan level
- Water quality issues
- Negative community impacts expected
- Hazardous waste preliminary site investigation required
- Growth inducement issues
- Cumulative impact issues
- Pressure to compress the environmental schedule

Organizational Risks

- Inexperienced staff assigned
- Losing critical staff at crucial point of the project
- Insufficient time to plan
- Unanticipated project manager workload
- Internal “red tape” causes delay getting approvals, decisions
- Functional units not available, overloaded
- Lack of understanding of complex internal funding procedures
- Not enough time to plan
- Priorities change on existing program
- New priority project inserted into program
- Inconsistent cost, time, scope and quality objectives

Project Management Risks

- Project purpose and need is poorly defined
- Project scope definition is poor or incomplete
- Project scope, schedule, objectives, cost, and deliverables are not clearly defined or understood
- No control over staff priorities
- Too many projects
- Consultant or contractor delays
- Estimating and/or scheduling errors
- Unplanned work that must be accommodated
- Communication breakdown with project team
- Pressure to deliver project on an accelerated schedule
- Lack of coordination/communication
- Lack of upper management support
- Change in key staffing throughout the project
- Inexperienced workforce/inadequate staff/resource availability
- Local agency issues
- Public awareness/support

- Agreements

Right-of-Way Risks

- Utility relocation may not happen in time
- Freeway agreements
- Railroad involvement
- Objections to Right-of-Way appraisal takes more time and/or money

Construction Risks

- Inaccurate contract time estimates
- Permit work windows
- Utility
- Surveys
- Buried man-made objects/unidentified hazardous waste

Regulatory Risks

- Water quality regulations change
- New permits or new information required
- Reviewing agency requires higher-level review than assumed

Sample Risk Checklist from the Minnesota DOT:

No. of lanes

- Traffic volumes
- Level of Service LOS analysis
- Lane continuity
- High-occupancy vehicle, single-occupancy vehicle, etc.
- Policies, purpose, and need

Access

- Functional classification of roadways
- Traffic volumes
- Traffic movements
- Traffic forecasts
- Right-of-way impacts
- Environmental issues
- Existing interchange/conditions
- Municipal land use planning
- Design speed/engineering standards
- Access category
- Bike/Pedestrian
- Crash data

Horizontal

- Right-of-Way impacts

- Environmental issues
- Soils
- Utilities
- Existing conditions
- Topography
- Pavement condition
- Staging/Detour
- Municipal community planning
- Design speed
- Enforcement issues
- Engineering standards
- Park & Ride
- HOV/Transit elements

Vertical

- Design speed/engineering standards
- Soils – rock, muck, water
- Utilities
- Topography
- Bridges
- Municipal community planning
- Noise
- Adjacent land use
- Drainage
- Airports

Bridge

- Cross section – mainline
- Cross section – cross street
- Profiles
- Skew
- Type selection
- Aesthetics
- Bike/Pedestrian trails
- Airport location
- Lighting & signing
- Soils/Foundations
- Waterway analysis
- Bridge clearance (overlays)
- Utilities
- Staging/Detour
- Bridge approach costs
- Temps and shoo fly

Retaining walls

- Type

- Cross sections
- Aesthetics
- Drainage
- Right-of-Way impacts
- Utilities
- Soils/Foundations

Traffic

- Design speed
- Functional classification
- Roadway type
- Access locations
- Traffic movements
- Traffic volumes
- LOS analysis
- Signal warrant analysis
- Crash data
- Safety systems
- Lighting warrants
- Signing
- Striping determination
- Airports
- Foundation analysis

WRE

- Alignments
- Profiles
- Cross sections
- Drainage areas
- Existing conditions
- Impervious areas
- Banking
- Waterway analysis
- DNR
- Corps
- Watersheds/WCA/BWSR
- NPDES/PCA/MS4
- City/County coordination
- Right-of-Way impacts
- Soils
- Drinking water areas
- Airports
- Ponding

Pavement

- Soils

- Cross sections
- Traffic volumes
- Vehicle classification
- Profiles
- Water table
- Drainage
- Pavement selection
- Shoulder use
- Traffic staging/control
- Dynamic shoulders
- Transit shoulders
- Pavement condition

Utilities

- As-builts (Mn/DOT and city)
- Surveys
- Gopher 1
- Aerial photography
- R/W maps
- Plats
- Site plans
- Coordinate with city/county
- Permits
- Alignments
- Profiles
- Cross sections
- Drainage elements
- Retaining walls
- Noise walls
- Bridges
- Construction staging

Railroad

- Aerial photos
- Alignments
- Profiles
- Cross sections
- Drainage
- Retaining walls
- Noise walls
- Bridges
- R/W maps
- Plats
- Railroad office coordination
- Construction staging

Earthwork

- Alignments
- Profiles
- Soil borings
- Intersections
- Drainage elements
- Subsurface drains
- Foundation analysis
- Contaminated soils – remediation

Noise walls

- Alignments
- Profiles
- Land use maps
- Traffic volumes
- LOS
- Traffic classifications
- Utilities
- R/W impacts
- Municipal consent
- Historic property review
- Drainage elements
- Airports
- Aesthetics
- Wall type
- Foundation analysis

Maintenance

- Maintenance elements/issues
- Drain tile
- Anti-icing
- HOV bypass
- Snow storage
- Snow control

Transportation Management System

- TMS, ITS, IVHS elements

Construction

- Innovative construction services
- Detours
- Staking
- Extraordinary enforcement
- Extraordinary public relations
- Seasonal impacts
- Vibration and noise

Surveys

- Survey

Tips

This method is only truly useful when the project team members think about every item on the list as a jumping off point for further risks. Each item must be thought about in detail to ensure that the risk is truly a project risk. The thought process should be documented in order to build on this in future discussions of the risks.

Resources

Caltrans Office of Statewide Project Management Improvement (2007). Project Risk Management Handbook: Threats and Opportunities, 2nd ed., May 2007, Caltrans, Sacramento, CA.

http://www.dot.ca.gov/hq/projmgmt/guidance_prmhb.htm.

Molenaar, K. R. (2005). "Programmatic Cost Risk Analysis for Highway Mega-Projects," Journal of Construction Engineering and Management, Vol. 131, No. 3.