User Guide for the Advance Planning Risk Analysis Tool for Transportation Projects

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Project 0-5478: Optimizing the Identification of Right-of-Way Requirements during the Project Development Process

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Chapter 1. Overview of the APRA Tool

1.1 Introduction
This document is the User Guide for the Advance Planning Risk Analysis (APRA) computer tool (program), which was developed to help participants optimize the identification of requirements during the project development process through the analysis of risk elements. This document is a companion material to the Implementation Guide submitted to the Texas Department of Transportation (TxDOT) by the Center for Transportation Research (CTR) (1). Therefore, this User Guide should be used in close conjunction with the Implementation Guide. It is assumed that those using this User Guide are familiar with the APRA method, its implementation, and terminology as described in the Implementation Guide.

1.2 System Requirements
This computer tool was developed with the Microsoft Office Excel (Excel) platform using Visual Basic for Application (VBA), a programming language. Excel is probably the most widely used spreadsheet program, and VBA is a powerful language that can implement a wide variety of tasks in Excel. Any computer running Excel is capable of using this computer tool. This tool has been tested using two versions of Microsoft Office Excel, 2003 and 2007. The tool is, therefore, recommended to be used with a computer that has one of these two versions installed. No installation is required for this tool; a user just needs to copy the file containing the tool onto a computer.

1.3 Programming Structure
In this tool, all data are stored in eleven worksheets in an Excel file, as shown in Figure 1.1. The worksheets are:
  - Element: contains information on all elements’ descriptions and weighted scores corresponding to levels of definition;
  - Subsection: contains a list of twelve categories of elements;
  - Section: contains a list of three sections of elements;
  - Attendance: contains data regarding variables used in the attendance sheet;
  - Sheet 1: contains information on the steps involved in using the tool;
  - Attendance Sheet: contains information on the attendance that users input;
  - Final Score: contains information of the project’s final score and the sections’ scores;
  - Section I: contains information on the Section I elements’ levels of definition chosen by users;
• Section II: contains information on the Section II elements’ levels of definition chosen by users;
• Section III: contains information on the Section III elements’ levels of definition chosen by users;
• Low Definition: contains information on the list of elements that have low levels of definition (in other words, elements that have high risk).

![Figure 1.1  Worksheets of the APRA Tool](image)
This tool’s code was written in 9 Forms, 3 Modules, and 4 Class Modules as shown in Figure 1.2.

Figure 1.2 Programming Structure
Chapter 2. Starting to Use the APRA

2.1 Getting Started

![Security Notice]

Every time a new analysis is conducted, all previously input data will be overwritten by the newly input data. Thus, it is strongly recommended that the user make a separate copy of the program file each time an analysis is to be conducted.

Generally, there are two ways to start the APRA tool. The user can either double click on the computer file of the tool located in a computer or start Excel and then open the computer file using Excel’s “Open” function. Originally this file was named “APRA.xls”. The program will show the Welcome Screen, allowing the user to start using the tool. Details on how to start using Welcome Screen can be found in section 2.3 (Welcome Screen). The user may encounter a security issue if this is the first time the tool is run on the computer. Please refer to section 2.2 Security Level for details.

2.2 Security Level

If the Welcome Screen does not appear when the tool is started, a notice, as in Figure 2.1, may pop up. Click “OK,” and then change the Security settings. In Excel 2003, go to the tool bar and select Tool → Macro → Security; the window shown in the screen capture in Figure 2.2 will pop up. In Excel 2007, click on the Microsoft Office icon at the top left corner of Excel, choose Excel Options, select Trust Center from the list on the left, choose “Trust Center Setting” on the right, and in the new window, choose Macro Settings from the list on the left, then select “Enable all macros” (not recommended; potentially dangerous code can run), as in Figure 2.3. Also in Excel 2007, if the file is open and there is a Security Warning, as in Figure 2.4, click on “Options” and a window as in Figure 2.5 will appear. In this case choose “Enable this content” and the Welcome Screen will appear.

![Security Notice]

Figure 2.1 Security Notice
Figure 2.2 Security Level Settings

- Very High: Only macros installed in trusted locations will be allowed to run. All other signed and unsigned macros are disabled.
- High: Only signed macros from trusted sources will be allowed to run. Unsigned macros are automatically disabled.
- Medium: You can choose whether or not to run potentially unsafe macros.
- Low (not recommended): You are not protected from potentially unsafe macros. Use this setting only if you have virus scanning software installed, or you have checked the safety of all documents you open.

Figure 2.3 Macro Settings

- Macro Settings:
  - For macros in documents not in a trusted location:
    - Disable all macros without notification
    - Disable all macros with notification
    - Disable all macros except digitally signed macros
    - Enable all macros (not recommended: potentially dangerous code can run)

- Developer Macro Settings:
  - Trust access to the VBA project object model
Figure 2.4 Security Warning

Figure 2.5 Security Alert – Macros & ActiveX

Macros & ActiveX

Macros and one or more ActiveX controls have been disabled. This active content might contain viruses or other security hazards. Do not enable this content unless you trust the source of this file.

Warning: It is not possible to determine that this content came from a trustworthy source. You should leave this content disabled unless the content provides critical functionality and you trust its source.

More information

File Path: C:\...ents\Research\APRA\Deliverables\tool\APRA_Updated_20070330.xls

- Help protect me from unknown content (recommended)
- Enable this content

Open the Trust Center
2.3 Welcome screen

The Welcome Screen offers six options for the user, shown in Figure 2.6. The options are as follows:

- **Start New Analysis**: this option allows the user to do a new analysis; details can be found in Chapter 3: “How to Do a New Analysis”;

- **Review Previous Analysis**: this option allows the user to review a previous analysis that was saved from an early use of the tool; details on how to review a previous analysis can be found in Chapter 4: “How to Review a Previous Analysis”;

- **Save As…**: this option allows the user to save the current file as a new file for a new analysis;

- **About this Research**: this option contains brief information on the research that developed the tool;

- **View User Guide**: this option links to the User Guide (this document) of this tool; this file is in PDF format and can be read by the Adobe Reader program, which is available for free from [http://www.adobe.com/](http://www.adobe.com/);

- **Exit**: this option allows the user to exit the tool; the user will have a chance to choose to save, not save, or cancel when Excel’s notice to this effect appears, as in Figure 2.7. If Cancel is selected, the user has to close the tool and open it again for the Welcome Screen to reappear.
Figure 2.6 Welcome Screen

Figure 2.7 Saving Options
Chapter 3. How to Do a New Analysis

3.1 Starting a New Analysis

Every time a new analysis is conducted, all previously input data will be overwritten by the newly input data. Thus, it is strongly recommended that the user make a separate copy of the program file each time an analysis is to be conducted.

To start a new analysis using the APRA tool, select “Start New Analysis” from the Welcome Screen as shown in Figure 3.1.
3.2 Project Information

At the beginning of each analysis, the APRA Project Information screen is shown, as shown in Figure 3.2. On the column on the right are six steps in an analysis, and the current step is highlighted in blue. Each step is done using a corresponding page (screen). Within this screen, the user can input the project information, including the project name, manager, location, status, and any notes. After entering all relevant information, the user can move to the next page, Meeting Attendance, which is detailed in section 3.3, “Meeting Attendance Information.” An APRA Project Information screen with data is shown in Figure 3.3 as an example.

At the bottom of the screen are four buttons. Selecting “Previous Page” will bring the user back to the Welcome Screen. “Next Page” will take the user to the next step, Meeting Attendance. At any time the user can delete all data that have been inputted by clicking on “Delete All Data.” At any time, the user can save the input data by clicking on “Save” and exit the program by clicking on the “X” button at the top right corner.
3.3 Meeting Attendance Information

In the screen shown in Figure 3.4, the user can key in the information of the meeting in which the analysis is to be done. Information to be filled in includes the meeting facilitator, time and date, venue, and a list of attendees (with details available regarding name, company, and role in the company.) An example with data is shown in the screen in Figure 3.5.

On the right column there is also information about the six steps in an analysis; the current step is highlighted in blue. At the bottom of the screen (as shown in Figure 3.3) are three more buttons. The “Previous Page” button will bring up the previous step, the APRA Project Information. The “Next Page” button will bring up the next step, Section I: Basis of Project Decision. At any time, the user can save the input data by clicking on “Save” and exit the program by clicking on the “X” button at the top right corner.
Figure 3.4 APRA Meeting Attendance Information – Blank
3.4 Assessing the Elements

In the screen shown in Figure 3.6, the user can enter the data for the definition level of each element in categories A, B, and C in section I. By default, all elements are set as “Not Applicable” (definition level of “zero.”) There are two ways to enter an element’s definition level, and they are:

1. The user can click on the pull-down menu indicated by the vertical arrow, as shown in Figure 3.6. A pull-down menu will pop up, as seen in Figure 3.7, for the user to select the level of definition. The score corresponding to the element’s level of definition will appear in a small box to the right of the menu (as shown in Figure 3.8.) Do this for each element. The selection of the definition level can be changed in the same way. An example with completed section I is shown in Figure 3.9.
### Figure 3.6 APRA Element Assessment – Section I – Blank

#### Section I - Basis of Project Decision

<table>
<thead>
<tr>
<th>Category</th>
<th>Element</th>
<th>(Press here for element description)</th>
<th>Definition Level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Project Strategy (Max. Score = 122)</td>
<td>A1. Need &amp; Purpose Documentation</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A2. Investment Studies &amp; Alternatives Assessments</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A3. Programming &amp; Funding Data</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A4. Key Team Member Coordination</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A5. Public Involvement</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B. Owner/Operator Philosophies (Max. Score = 70)</td>
<td>B1. Future Expansion &amp; Alteration Considerations 1</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2. Operating Philosophy</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B3. Maintenance Philosophy</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B4. Future Expansion &amp; Alteration Considerations</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>C. Project Requirements (Max. Score = 102)</td>
<td>C1. Functional Classification &amp; Use</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C2. Evaluation of Compliance Requirements</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C3. Survey of Existing Environmental Conditions</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C4. Determination of Utility Impacts</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C5. Value Engineering</td>
<td>0 = Not Applicable</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.7 Select a Definition Level for an APRA Element
Figure 3.8 Select a Definition Level for an APRA Element – Results
2. The user can click on the grey square button indicated by the horizontal arrow in Figure 3.6. A window as shown in Figure 3.10 will appear. With this window, the user can select the definition level at the button of the window. The user can: 1) move to the next element by clicking “Next Element”, 2) move to the previous element by clicking “Previous Element”, or 3) close this window to move to the window as shown in Figure 3.4. All selections of the definition level are recorded by the tool and the element’s score will appear once the user closes this window.
On the right hand side column there is also information on the six steps in an analysis; the current step is highlighted in blue. At the bottom are three buttons. The “Previous Page” will bring up the previous step. The “Next Page” will bring up the next step. “Save” will save all data that has been input. At any time, the user can exit the program by clicking on the “X” button at the top right corner.

After Section I is completed, hit the button labeled “Next Page” to move to the next step, Section II (as in Figure 3.11.) This step should be finished in a similar fashion as Section I. Similarly, move to Section III (Figure 3.13) by clicking on “Next Page” after finishing Section II. Figures 3.12 and 3.14 show examples of sections II and III with input data.
Figure 3.11 APRA Element Assessment – Section II – Blank
Figure 3.12 APRA Element Assessment – Section II – Example
Figure 3.13 APRA Element Assessment – Section III – Blank
Figure 3.14  APRA Element Assessment – Section III – Example

Each section’s total score and its corresponding maximum score are shown at the right bottom corner of the screens in Figures 3.6, 3.7, 3.8, 3.9, 3.11, 3.12, 3.13, and 3.14. The section total score is the result of summing up scores of all the elements in that section, and it is dependent upon the selection of levels of definition. The section’s maximum score is the highest score that the section can have; a section has its highest score when all elements, excluding those non-applicable to the project, have the definition level of 5. Those elements that are not applicable to the project have definition levels of “zero;” they do not contribute to the section’s total score or maximum score.

When Section III is completed, click “Next Page” to move to the Final Score screen, which is shown in Figure 3.15.

3.5 Analysis Summary

The screen in Figure 3.15 shows the summary of the results of the analysis. It contains some information on the project and the meeting. Total and maximum scores and percentage (ratio of total and maximum scores) of three sections and the project are displayed. The project’s maximum score will be lower than 1,000 points if the project has element(s) that is (are) not applicable.
High-risk items (elements) are listed in this screen together with their corresponding levels of definition and scores. Only elements that have definition levels of four or five are included. An example of the APRA Final Score screen is shown in Figure 3.16.

To go to the previous page, click “Previous Page.” Click “Save” to save all data and click on the “X” button at the top right corner to exit the program. Click “Save As…” to save the current file as a new file. To generate reports on this analysis, click “View Reports;” after generating the reports, the program will generate a notice that “Reports have been generated completely,” as shown in Figure 3.17. To print all reports, click “Print All Reports.” The user will have a chance to choose a printer when Excel’s notice appears, as in Figure 3.18. Refer to section 3.6 (Analysis Reports) for details on the reports generated by the tool.

Figure 3.15 APRA Element Assessment – Final Score Screen – Blank
3.6 Analysis Reports

After generating all reports, the program will notify the user, as shown in Figure 3.17. Click “OK” to see the reports. Six reports are generated and presented in the form of Excel sheets, as shown in Figures 3.19, 3.20, 3.21, 3.22, 3.23, and 3.24. From each of these sheets, the user can return to the tool by clicking on “Return to Tool” button as indicated by the arrows in the figures mentioned above.
Figure 3.18 Select Printer

The reports are explained in more detail in the following pages.
1. Attendance Sheet

“Attendance” sheet, as shown in Figure 3.19, provides information about the meeting attendees, including their names, company affiliation, and roles. Basic information on the project and the meeting such as project name, meeting facilitator, meeting location, and meeting date are also included.

The user can print this sheet, save the analysis, save the analysis as another file, and exit the analysis using Excel’s “Print,” “Save,” “Save As,” and “Exit” functions, respectively. The user can return to the tool by clicking on the “Return to Tool” button, as indicated by the arrows as shown in Figure 3.19. The user can also browse around other sheets by clicking on each of them.

![Figure 3.19 APRA Analysis Report – Attendance Sheet](image)
2. **APRA Overall Scores**

The sheet shown in Figure 3.20 reports on the overall scores of the project and sections in addition to basic information on the project and the meeting. The sections’ and project’s total and maximum scores are listed. A normalized score, which corresponds to a 1,000-point scale, is also calculated and presented.

The user can print this sheet, save the analysis, save the analysis as another file, and exit the analysis using Excel’s “Print,” “Save,” “Save As,” and “Exit” functions, respectively. The user can return to the tool by clicking on the “Return to Tool” button as indicated by the arrow as shown in Figure 3.20. The user can also browse around other sheets by clicking on each of them.

![Figure 3.20 APRA Analysis Report – Overall Scores](image-url)
3. Elements in Sections I, II, and III and Their Scores

The sheets, as shown in Figures 3.21, 3.22, and 3.23, report on the details of the elements’ assessments, each figure for each section. For each element, information on the definition level, score, and maximum is displayed in the corresponding row. Total and maximum scores of each category and section are also calculated and presented in the sheets.

The user can print these sheets, save the analysis, save the analysis as another file, and exit the analysis using Excel’s “Print,” “Save,” “Save As,” and “Exit” functions, respectively. The user can return to the tool by clicking on the “Return to Tool” button as indicated by the arrows as shown in Figures 3.21, 3.22, and 3.23. The user can also browse around other sheets by clicking on each of them.

![Figure 3.21 APRA Analysis Report – Section 1 Elements]
**Project: APRA Example**

**Date:** 8/24/2007

### SECTION II - BASIS OF DESIGN

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Definition Level</th>
<th>Level</th>
<th>Score</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. SITE INFORMATION (Maximum Score = 17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1. Geotechnical Characteristics</td>
<td>0 1 5 6 12 18 2</td>
<td>5</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>D2. Hydrological Characteristics</td>
<td>0 1 5 10 14 18 3</td>
<td>10</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>D3. Surveys &amp; Parameters</td>
<td>0 1 5 10 14 18 1</td>
<td>1</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>D4. Permitting Requirements</td>
<td>0 1 5 9 13 17 2</td>
<td>5</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>D5. Environmental Documentation</td>
<td>0 2 7 12 17 22 2</td>
<td>7</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>D6. Property Descriptions</td>
<td>0 1 5 8 12 15 2</td>
<td>5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>D7. Ownership Determinations</td>
<td>0 1 4 7 10 13 2</td>
<td>4</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>D8. Right-of-Way Mapping</td>
<td>0 1 5 9 12 18 3</td>
<td>9</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>D9. Constraints Mapping</td>
<td>0 1 6 10 16 18 5</td>
<td>10</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>D10. Right-of-Way Site Issues</td>
<td>0 1 6 10 16 18 4</td>
<td>15</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

**CATEGORY D TOTAL:** 98 122

### LOCATION & GEOMETRY (Maximum Score = 79)

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Definition Level</th>
<th>Level</th>
<th>Score</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1. Horizontal &amp; Vertical Alignment</td>
<td>0 1 6 11 15 20 2</td>
<td>6</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>E2. Control of Access</td>
<td>0 1 5 8 13 17 3</td>
<td>9</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>E3. Schematic Layouts</td>
<td>0 2 6 13 19 24 2</td>
<td>8</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>E4. Cross-Sectional Elements</td>
<td>0 1 5 10 14 18 2</td>
<td>5</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

**CATEGORY E TOTAL:** 20 79

### STRUCTURES (Maximum Score = 40)

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Definition Level</th>
<th>Level</th>
<th>Score</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1. Onsite Structure Elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3.22 APRA Analysis Report – Section II Elements**
**Figure 3.23** APRA Analysis Report – Section III Elements
4. High Risk Elements

The “High Risk” sheet as shown in Figure 3.24 reports on the list of high risk elements as a result of the analysis. All elements with definition levels of four and five are listed. The user can add any comments on each of these elements using the column named “Assigned to:/Comments.”

The user can print this sheet, save the analysis, save the analysis as another file, and exit the analysis using Excel’s “Print,” “Save,” “Save As,” and “Exit” functions, respectively. The user can return to the tool by clicking on the “Return to Tool” button as indicated by the arrow as shown in Figure 3.24. The user can also browse around other sheets by clicking on each of them.

![Figure 3.24 APRA Analysis Report – High Risk Elements](image)

Figure 3.24 APRA Analysis Report – High Risk Elements
Chapter 4. How to Review a Previous Analysis

To review a previous analysis using the APRA tool, select “Review Previous Analysis” from the Welcome Screen as shown in Figure 4.1. The program will show all data that have been saved from a previous analysis. All of them can be modified in the same way as when starting a new analysis. All newly input data will overwrite the data input in the previous analysis. For details of how to use the tool after choosing “Review Previous Analysis,” please refer to sections 3.2 to 3.6 in Chapter 3.

Figure 4.1 Review a Previous Analysis from Welcome Screen
4.1.1 References


