Appendix T: Layered Adobe PDF Map and Cross-Section Packets

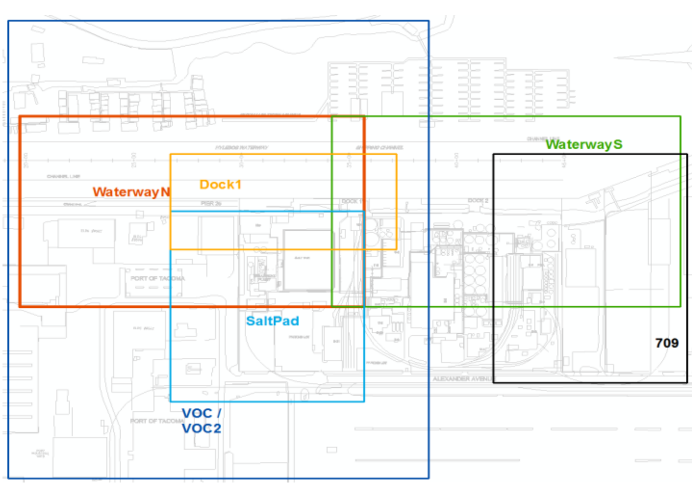
Dated 5/19/14

This appendix contains a series of digital files utilizing the portable document format (pdf) by Adobe. These files provide access to much of the content contained in the 3D site conceptual model via a universally accepted format that is both intuitive and free. They consist of both plan and cross-section views at a variety of scales containing numerous layers that allow the user to view spatial relationships between many different data types and media. One of the layers contains clickable objects that provide the user with sample attributes and data values for numerous analytes. The following sections provide a brief summary of the content provided in the packets and how to navigate them. With the exception of the residual NAPL (NSAT) layers created by Weston, all data and plumes depicted in these pdfs were extracted from the eDAT, 3D grids, or other data files supplied to Weston by CRA between November 2013 and March 2014.

Navigation

The filename informs the user as to what combination of view and site region the file contains using the convention VIEW_Mar2014_REGION. VIEW refers to either a plan (Map) or cross-section (Xsec) view and REGION refers to the regions of the site depicted in Figure 1. The use of regions was necessary to focus on different portions of the site plumes and to reduce labeling conflicts and overall figure clutter. Each file contains several pages for which the layering structure remains constant. The Map view packets contain one page per horizontal grouping plane plus a “Full” page, which is a comprehensive view of the site region from among all depths. These packets begin with the “Full” depth zone page and each subsequent page proceeds downward through the different depth zones in the following order: 25, 50, 75, 100, 130, 160 feet below ground surface. The Xsec packets contain one page per cross-section. The transect locations from which these were constructed are included as a layer in the corresponding Map packet for the site region. The difference between the VOC and VOC2 Xsec packets lies in the set of traverses used to generate them. Both are for the main CVOC plume area bounded by the dark blue box depicted in Figure 1. VOC contains orthogonal NS and EW transects while VOC2 has diagonal transects through the area. Both sets of transects comprise layers in the VOC Map packet.

Figure 1. Site regions used for organizing map and cross-section packets.



Upon opening each pdf, a single step should be performed to make subsequent navigation easier. Figure 2a below is a partial screen capture of the left-hand frame of the pdf when the file is first opened. The icons down the left show that the "layers" panel has been set as the default and that there are numerous menu items visible. These menus are layer groups for each page in the document. The icon should be clicked and the "List Layers for Visible Pages" option should be selected (Figure 2b) to hide all layer groups except that for the active page. Performing this step will eliminate a lot of confusion later when the user has changed pages and wants to toggle between layers. Clicking the icon expands the group for the active page to expose the layers (Figure 2c). This step is needed the first time a new page is activated. However, the status of the layers is preserved for each page so that this step does not need to be redone when returning to a page. In addition, the layer status for the active page is stored and used to toggle layers on the next page when the page is changed. This alleviates the user from performing numerous button clicks to compare the same view between two different depth zones or two different cross-sections in the same file.

Figure 2a

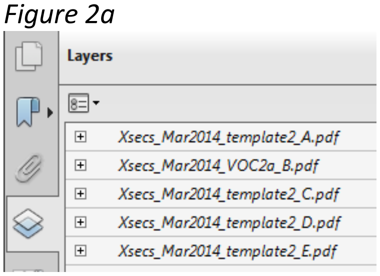


Figure 2b

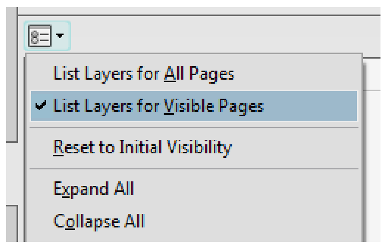
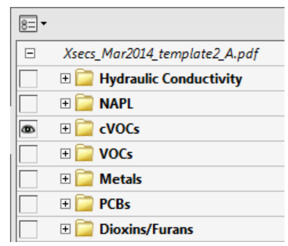


Figure 2c



The layering structure is similar, but not exactly the same, between the maps and cross-sections. Figure 3 below shows available layers for each and their respective initial visibility settings (=on, =off).

Figure 3a. Maps

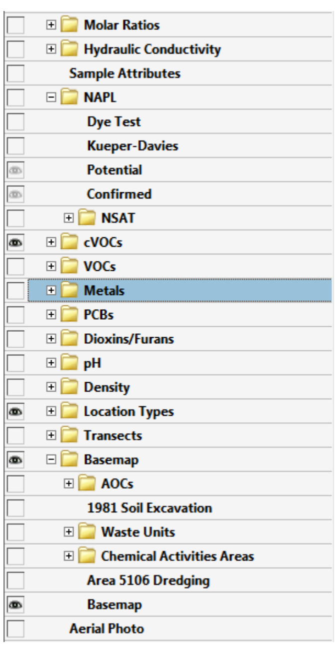
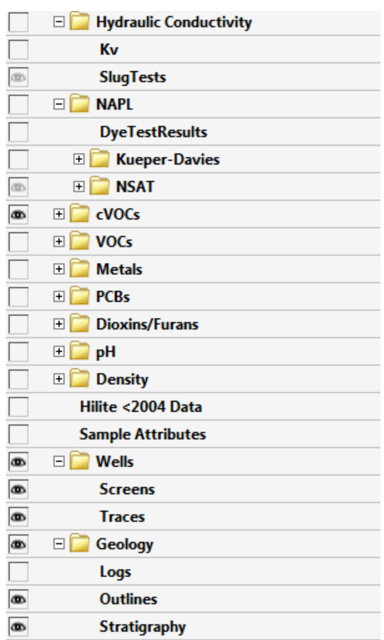


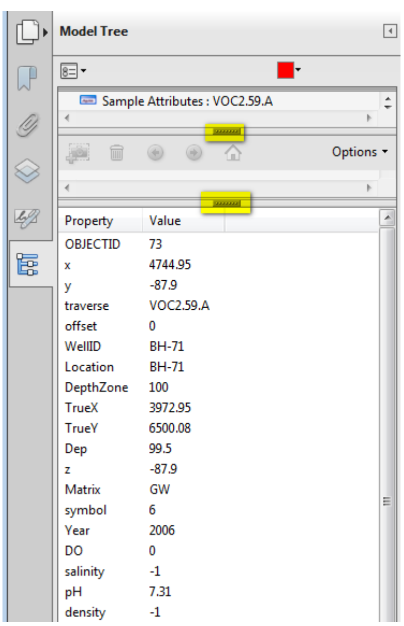
Figure 3b. Cross-sections



The presence of a ⊞ icon indicates the layer can be expanded to expose sublayers (sublayers can only be visible if their parent layer is also visible). For example, the cVOCs layer contains sublayers for the following analytes: TCVOCs, TCE, PCE, cDCE, tDCE, and VC. Each of these sublayers has a data sublayer and both soil and groundwater (GW) plume sublayers. The data sublayer contains sublayers for several different media (i.e., soil, groundwater, sediment) that can be toggled independently. The VOCs layer contains sublayers for: BTEX, Benzene, TPH, Total PAHs, Hexachlorobenzene (HCB), and Hexachlorobutadiene (HCBD). The metals layer contains sublayers for Zinc, Lead, Arsenic, and Copper. Dioxins/Furans has sublayers for Dioxins, Furans, and TEQ. All of these analytes have sublayers for the different media but, besides the cVOCs, only TPH and BTEX have associated plume layers and those are for GW only. The residual DNAPL model contours and data are contained in the NSAT layer under the NAPL layer.

The “sample attributes” layer, which is off by default, contains object data that can be used to obtain concentrations of several analytes and other sample attributes such as depth and media. Turning this layer on reveals faint outlines symbolized by sample type (eg. circles for GW and squares for soil) as depicted in the legend. This layer is off by default to reduce map clutter and confusion since not all samples were analyzed for all constituents. The object data are obtained using the “object data” button on the “analyze” toolbar, which is highlighted here, . Clicking this icon causes the mouse pointer icon to become a crosshair icon when hovering over a feature containing object data. Clicking the feature brings up the “model tree” panel, which is divided into three panes that can be adjusted using the handles highlighted in Figure 4 below. After viewing object data, the layers panel can can be re-activated using the icon. The object data may only be accessed when the “sample attributes” layer is on.

Figure 4. Object data visible in Model Tree panel



Content

The legends in these packets are consistent among files of similar type and, to the degree possible, consistent between the two different types (Map and Xsec). Due to space constraints, a few layers do not have entries on the legend. However, these are generally just plume contours and their colors are consistent with those depicted in the legend for the data from which they were produced. Soil plumes are shown as filled polygon contours whereas GW plumes (with the exception of density) are shown as contour outlines.

Several conventions were used to reduce figure clutter associated with label placement, redundant symbols, and unneccesary borehole traces on cross-sections. The conventions used and rationale behind them are listed below. An abbreviated form of this list is provided in the notes section of the Map packets.

1) Average coordinates were established for well clusters. The net result is that a single symbol and label is used for clustered wells on the maps and a single borehole trace is depicted on cross-sections with well screens and samples from the individual wells at the applicable depths.
2) Well cluster IDs were used instead of location IDs. Many prefixes and suffixes were removed from location IDs to convert them into cluster IDs. The resulting smaller labels have two primary advantages: a) they can be placed in an automated fashion according to one or more rules, and b) they do not obscure the underlying data and interpretations as much.
3) Well cluster and CMT labels were **bolded** to make these permanent wells/piezometers stand out better against temporary boreholes.
4) Sample attributes and data values were embedded in pdf as "object data" to alleviate the need for posting data values. The magnitude of concentrations or other properties are generally reflected using symbol color or size ramping. Varying symbol shapes typically reflect different sample types/media.
5) Shortened and/or colored the labels for the following location types:
    a. Upland borings - removed "WM" and new symbols/fonts.
    b. Subtidal borings - prefixes subscripted and new symbol used.
    c. 709/721 area locations - prefixes removed, labels colored.
    d. ESI-X- locations - not labeled and new symbol used.
    e. BH-X-96 locations - "-96" removed and labels colored.
    f. UST borings not labeled

Individual cross-section or map views can convey only a certain amount of data due to the amount of space available on the page and the relevance of data in the neighborhood. The cross-sections use a buffer around the transect to determine the data depicted on the section. The buffer distance varies by transect and is governed by proximity of both well/borehole locations and adjacent transects to the transect of interest. This distance is provided in the notes section on each cross-section and the buffer polygons used for each cross-section packet are included as a layer in the corresponding map packet.

Because the distance of data from the transect varies by location, the symbology of the borehole trace on the cross-section is used to depict the distance of the location and its associated data. It should be noted that although the data depicted on cross-sections could actually fall a short distance away from the transect, the associated 3D model content (contaminant plumes and stratigraphy) depicted on the cross-sections do not account for data buffering and are instead representations of what is interpreted exactly along the transect. This discrepancy can result in some apparent mismatches between observed data that fall just barely within the buffer for the transect and interpolated grid values at the point of projection for the sample onto the transect.

As previously mentioned, the data depicted in map packets are subsetted by the grouping plane dictated by the page of the pdf. Because numerous data points are present at many of the boreholes within a single grouping plane (eg. the high resolution soil data), the maximum value was selected to represent the multiple data points on a single figure for symbolization of both the data and the 3D model content. In other words, data symbol colors (and values in the object data) reflect the maximum concentration of an analyte within the grouping plane. The plume contours are similarly based on the maximum grid node values within the grouping plane. Due to variable data spacing down a borehole however, there are numerous occasions when the maximum data value within the grouping plane is not coincident with the maximum grid node value of the corresponding interpolated plume. This can result in an apparent mismatch between the data and the interpolated plume. This situation typically occurs when a borehole either just barely penetrates a grouping plane or it fully penetrates the grouping plane but has only one or two samples within it.