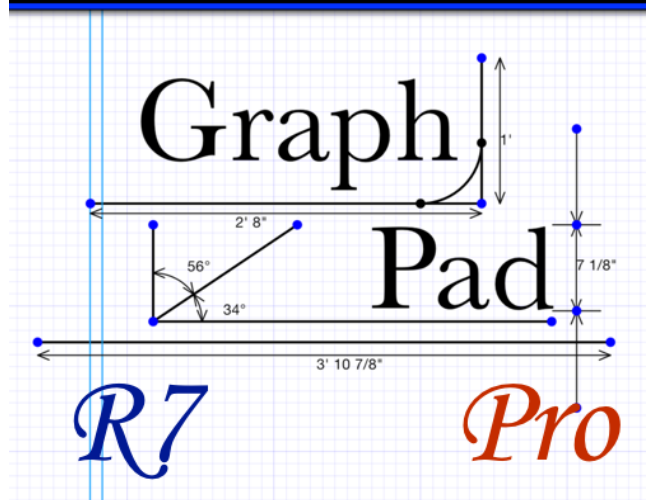


# GRAPHPAD PRO CONFIGURABLE

v7.5

*Configurable*



*USER'S GUIDE*

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## Overview

The GraphPad Pro is a touch based engineering drawing application that allows users to quickly create accurate, to scale drawings on the iPad. Draw lines, and GraphPad will automatically snap to both specified length and angle settings. Add arcs, circles and dimensions and then scale your drawing to reflect the actual dimensions for your design. Finish off your design with comments and arrows, then email it to other members of your team. Specifically designed for contractors working on-site who need to relay design information back to clients and colleagues.

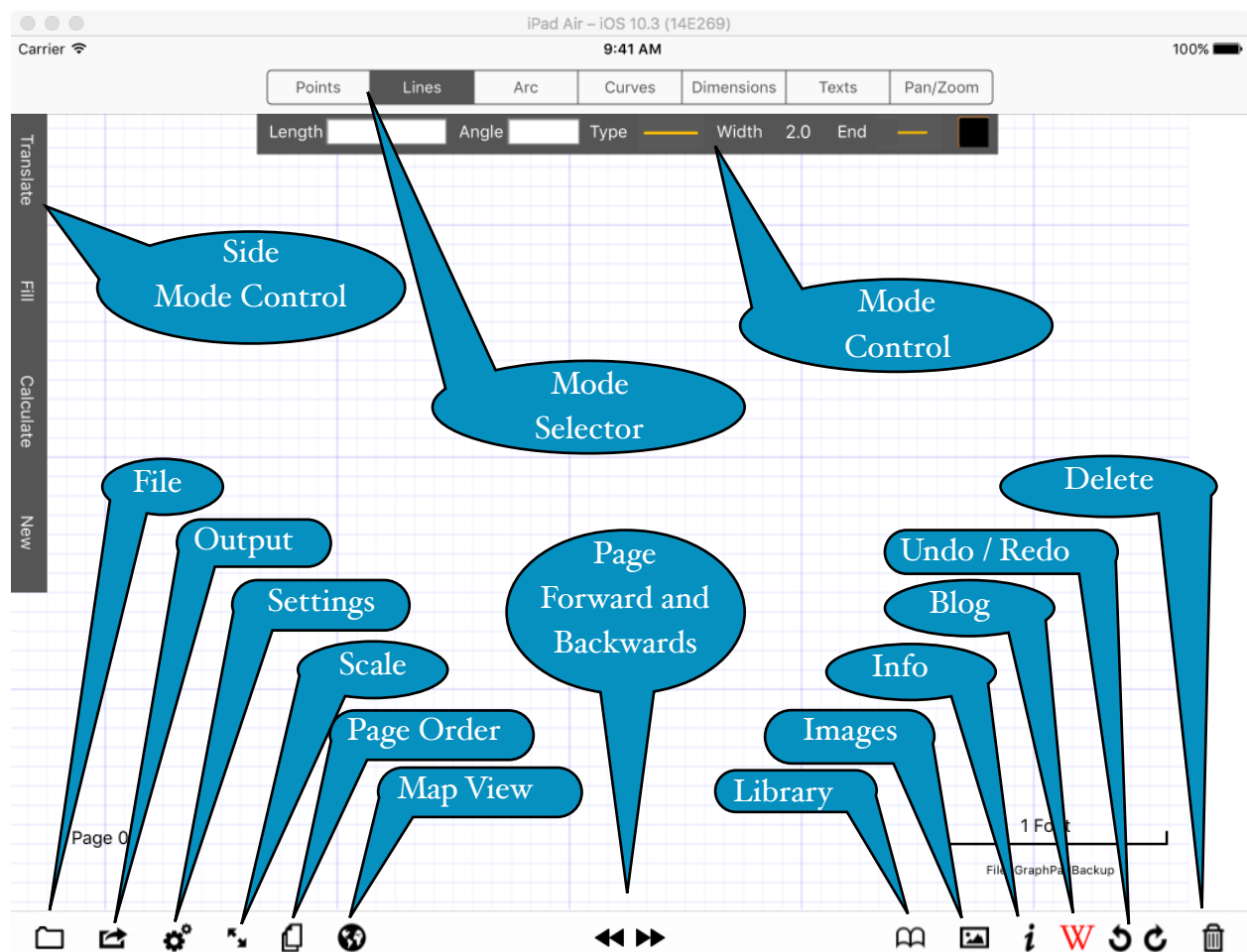
GraphPad Pro has many features specifically designed to help contractors make quick, accurate field drawings. Take a picture using the iPad and import the images directly into to a GraphPad document and scaled so they can be used as the basis for a drawing. Images of vendor products can also be clipped from the internet, scaled, and added to the library for repeated use. GraphPad Pro allows users to draw smooth continuous curves, which can be easily manipulated to accurately design landscape an other features. Connected lines can also be used to calculate estimated areas as well as filled with color.

The Configurable version of GraphPad Pro (GraphPad C) can be customized to meet a company's specific needs. Forms can be created by importing a PDF files and laying out text fields, check boxes and signature fields on top. Text fields can be named and reference lists of services and products with pricing and used in simple calculations to produce complete estimates. GraphPad supports multiple multipage business forms, allow companies to handle all their various services. Libraries of symbols, images, geometry and text can also be created so end users can quickly create professional drawings as part of any estimate or proposal.

## Interface:

GraphPad is specifically designed with simplicity and ease of use in mind. When you first open up GraphPad, you'll see a blank sheet to start your design. The top bar is a control which allows you to switch between modes. The current mode is displayed, and determines what objects will be affected by touching the screen. In addition, all modes have a control which displays when in that mode which put standard parameters right at the user's fingertips.

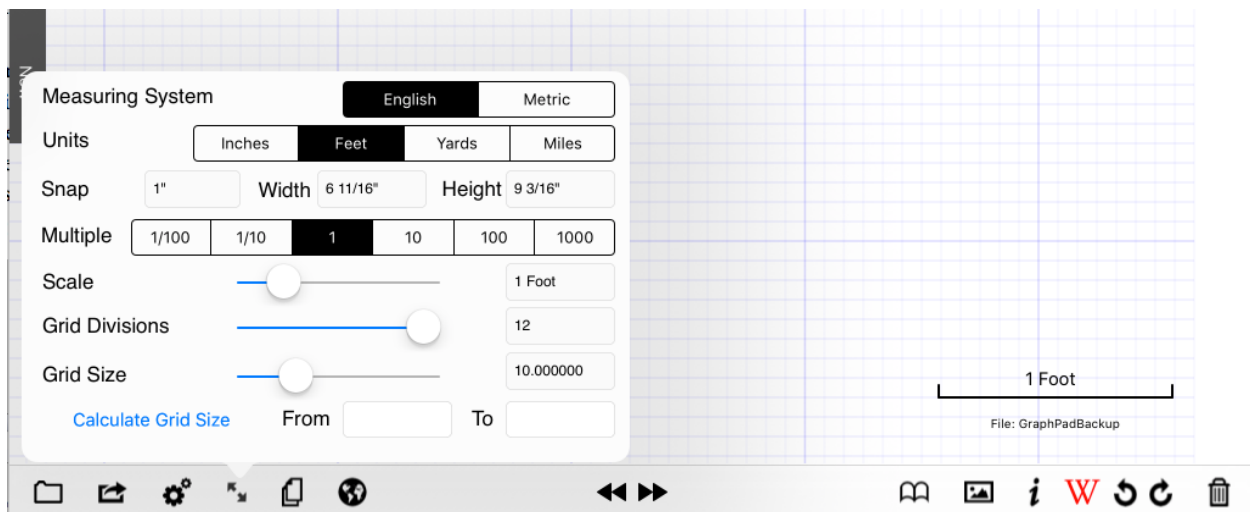
Along the bottom are the controls that work independently of the mode. These buttons allow users to save files, move between pages, undo/redo, etc - and are listed in the diagram below. The most used of these buttons is almost certainly the Undo / Redo buttons. These buttons work exclusively with the contents of the current pages drawing and makes it extremely easy to back out unwanted changes.



## Setting the scale:








The first step in creating a GraphPad drawing is to set the scale. The factors that have to be considered when selecting the scale are the overall size of the drawing, the “Snap Length” for drawing lines and the sensitivity. In order to understand how to properly set the scale, it's necessary to understand how the drawing engine works. The grid that is displayed in GraphPad is really only a visible representation of how the drawing engine attempts to snap start points, end points and line lengths. Starting a new line will cause the start point to “snap” to the nearest grid intersection and as a horizontal or vertical line is drawn, it will attempt to “snap” to the next intersection on the grid. The grid spacing, therefore, defines the sensitivity to touch of the drawing engine and is used in all of the algorithms for selecting points, snapping lengths and closing paths. The smaller the grid spacing, the more difficult it will be to select a point, or close a shape. The grid also represents the paper size of the resulting PDF document, so it's important to set the scale correctly so your drawing fits on the page.

The Scale tool is used to help users optimize the grid size for a particular drawing. The three text fields display the “snap length” and maximum width/height that can be drawn. Moving the Scale slider changes the size of the large grid from .5 to 10 times the unit of measure, which is always displayed in the lower right hand side of the drawing. The Grid Divisions specify the number of sub divisions between each large grid, and is used to define the “snap length”. When using Feet, it's often best to use 12 divisions so the snap length is an even number of inches. The Grid Size slider adjusts the size (in pixels) of the subdivisions, the maximum width and height that can be drawn, as well as the sensitivity for selecting points.



## Points:

GraphPad is fundamentally a system based on points, so logically - working with points is the most important part of the application. There are several types of points used by GraphPad which are identified by color. Points are directly manipulated in the “Points” mode, but are displayed in other modes as well so they can be used to help define other geometry. The table below shows the points and includes a brief description of each.

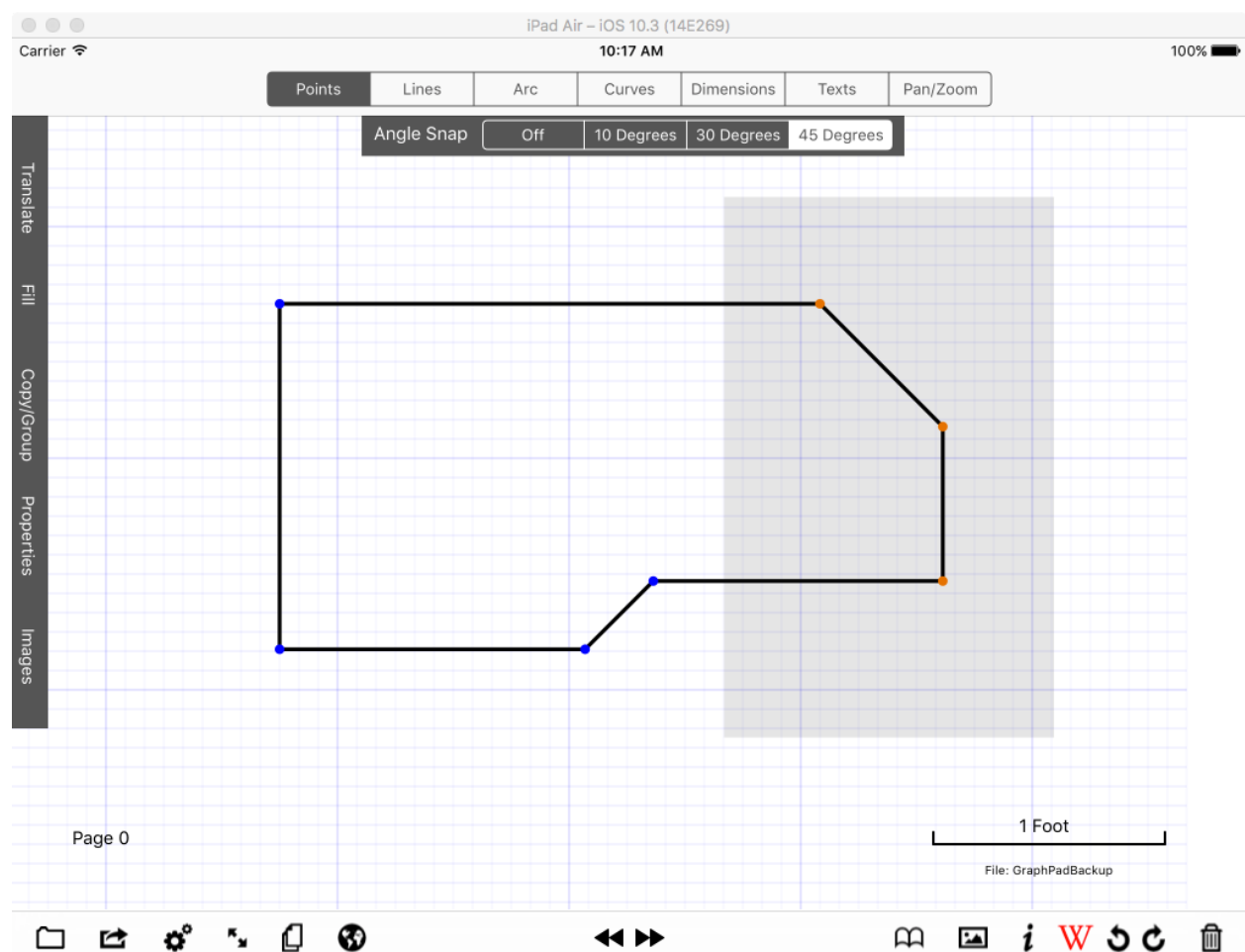
-  Construction point, can be moved directly and connected to. Defines the endpoints of lines and the center of circular arc.
-  Calculated point. Part of Group or used to construct an arc, and can not be moved directly, but can be connected to by other lines or dimensions.
-  Bezier curve control point. Moving this point alters the bezier curve. These points can not be used to create other geometry and are deleted when the curve is deleted.
-  Group or Image object handle. Moving this point moves its associated image or geometry. Pressing and holding on this point will also display the objects menu.
-  Rotation handle. Moving the second point rotates the object by the “Snap Angle”.
-  Resize point. Appears to the lower right of an object and can be used to dynamically change the objects size.
-  Active point. This point is able to be moved or manipulated.

The points mode not only allows you to move a point in GraphPad, with it automatically adjusting the geometry and dimensions accordingly, but you can also select a group of points by touching a point on the screen removed from existing points and dragging across the screen. A light grey rectangle, or selection area, is created while dragging and when you lift your finger from the screen, all the points which will be affected will be highlighted. Touching inside the grey rectangle now lets you manipulate all the points and associated lines, arcs and dimensions simultaneously. This not only allows you to move things as a group, but al-

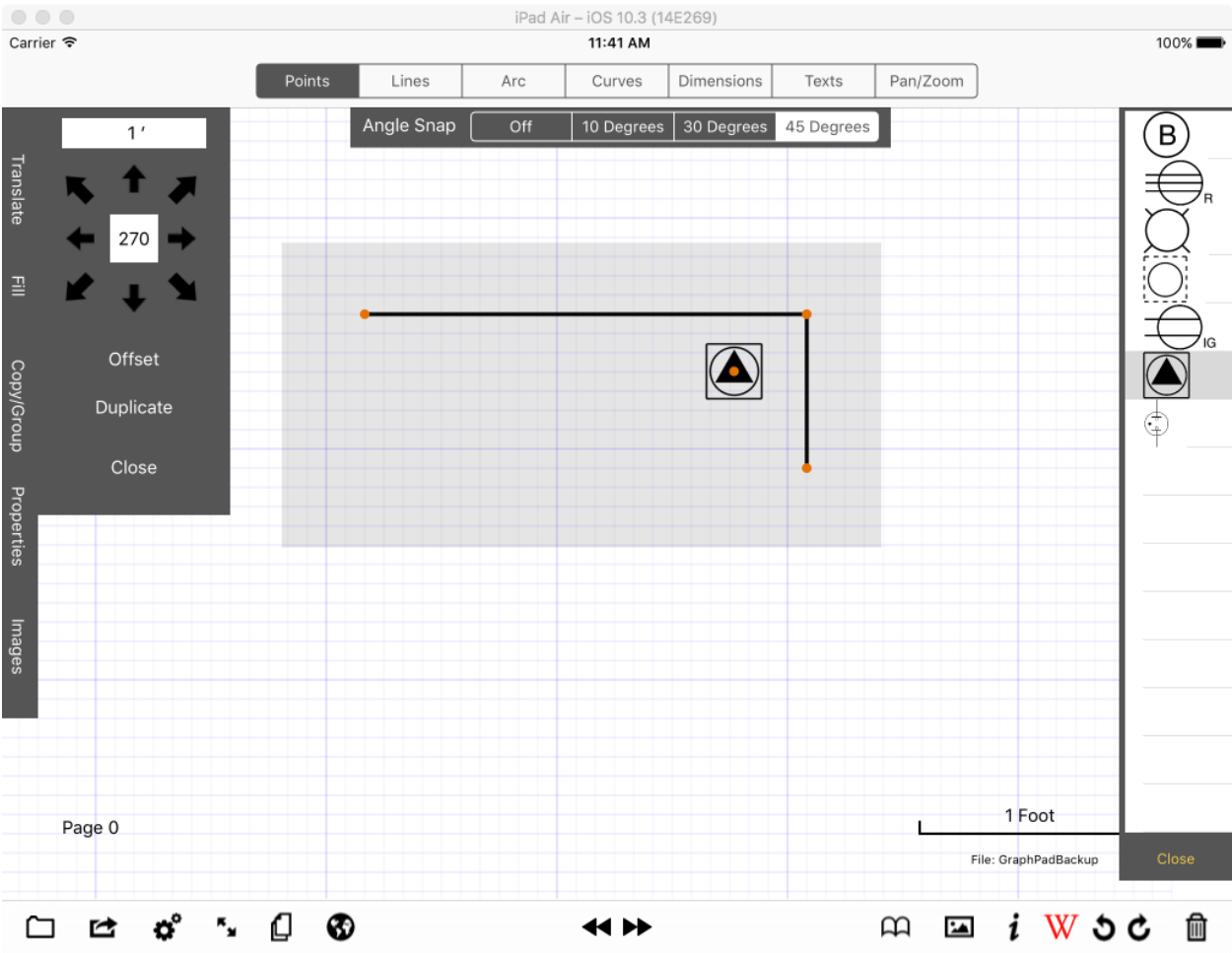


allows you to move things with great precision since you can position your finger tip away from the objects being modified. The active points in the selection area are colored bright orange to indicate that they will be moved when the area is moved. The contents of the selection area is editable, so by touching one of the active points, you can de-activate it and vice versa. You can turn all the items on or off by tapping in the selection area where there are not points. When moving, all the active points will be compared to all the inactive points with the closest vertical and horizontal alignments appearing as magenta guidelines. While Snap is set on, the active points will all shift the same amount so that the closest horizontal and vertically aligned points are exactly aligned. Images and symbols also are included in this alignment algorithm, images having hidden alignment points at each corner and the center which are used as part of this algorithm. This feature allows doors to snap to walls, outlets to snap to power lines, etc and is generally extremely useful in creating accurate drawings. This feature can also be easily turned off and on again by simply turning the “Snap” off on the points control. When the Snap is off, the magenta guidelines will still appear, however, the points won’t shift to alignment when the users finger is lifted from the screen.

The selection area is not cleared when changing between modes, allowing users to select and modify only the types of objects for the current mode while still using the selection area. For Example: Users can create a selection area in Points mode, the switch to Text mode and modify the font of all the text fields in the selection area.

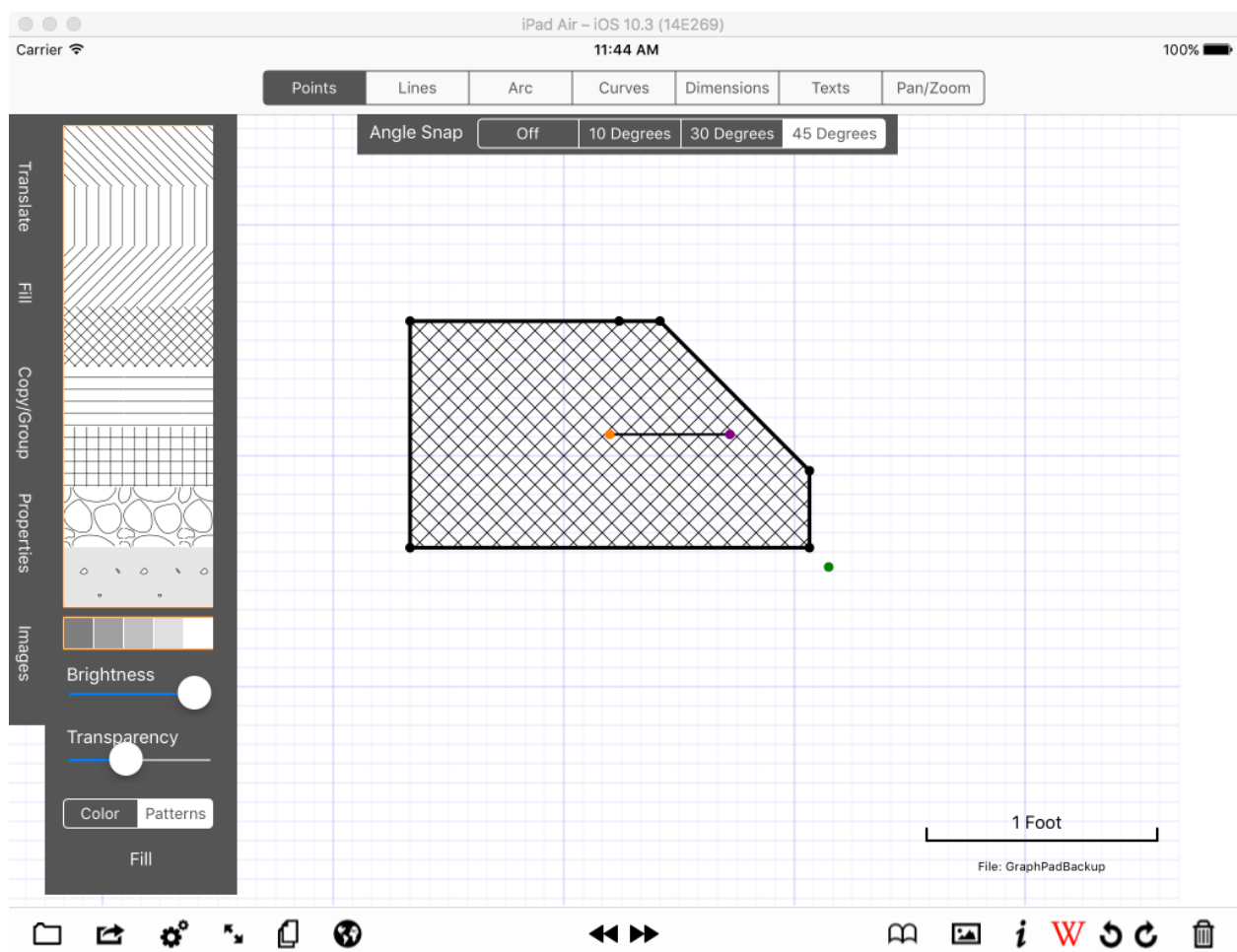


Points mode has a number of other tools which can be called from the side control and work primarily on the active items in the selection area. The translate tool enables users to translate all the items in the selection area a precise distance in the selected direction. The direction of the offset is in degrees, and has buttons for each increment of 45 degrees in a circle, but can be overwritten by entering the direction directly. Items can also be duplicated, however this feature is based on the Copy/Paste algorithm and copies all the Geometry, Text and Images in the selection area and creates a copy offset the direction and distance specified.

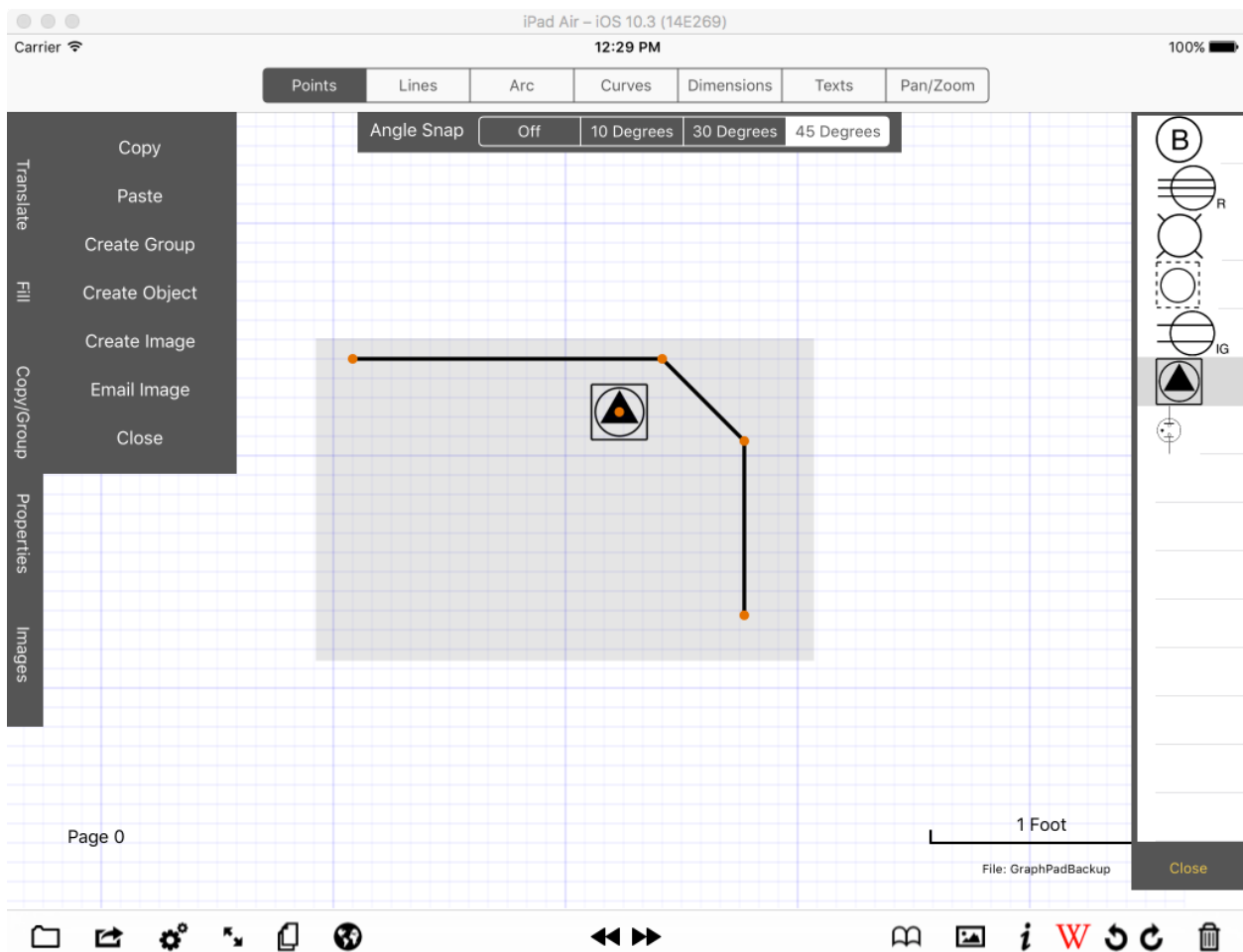


The Fill palette in Points mode allows users to change the color of a fill, but fills are created in Lines Mode. To modify the fill color, the Area handle must be selected. Only one fill color can be changed at a time, so the fill area must be selected by touching the handle (purple dot). The handle will turn orange, indicating its selected, and the user can change the fill by selecting the color or pattern desired.

**Note: Only one fill area can be changed at a time so users can not use the selection area to change fills colors.**



The Copy/Group tool is used to Copy / Paste portions of the drawing, create groups, objects for the library, images for the library and a shortcut for email an image. These features work off the selection area and only the portions of the drawing created by the user (i.e. the form fields and background images are not included). To Copy and Paste parts of the model, create a selection area that includes all the geometry desired and hit copy. To paste, hit the Paste button and touch the screen where the desired and the copied items will be pasted. The paste buffer is not flushed when moving between pages or even drawings, so users can copy parts of their drawing from one page to another, or from one drawing to another. Create Object copies the geometry to the Library for easy re-use, and Create Image creates an image of the geometry, text and images in the selection area and adds it to the library. Lastly, the Email Image creates a PNG of the geometry, text and images in the selection area, opens a new email and attaches the image.

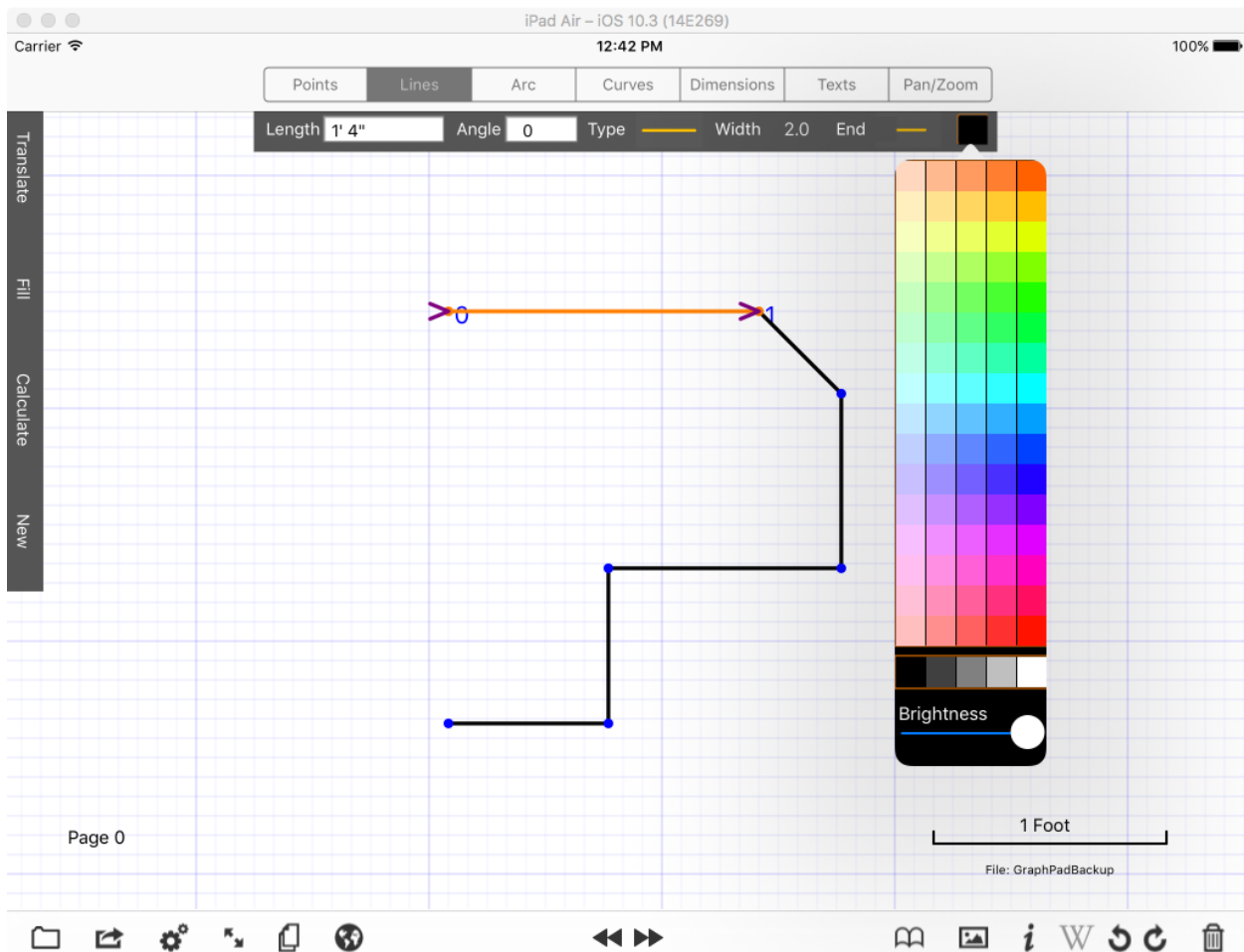


The Group Tool and Image Tool are used to modify the properties of Groups and Images and are covered in detail in other sections.

## Lines:

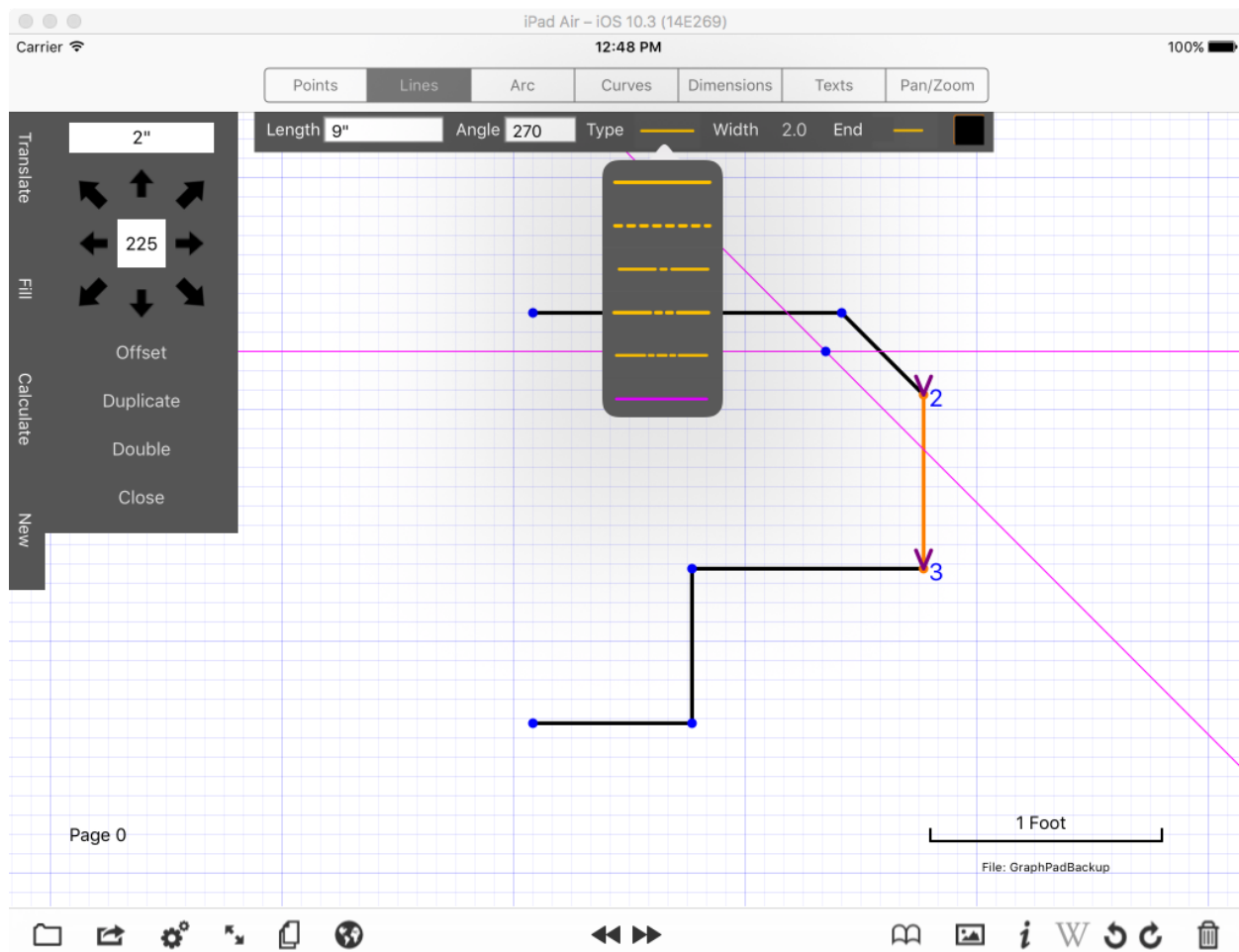
The lines mode allows you to add new lines by either touching the screen and dragging, touching two existing points or using one of the other line creation tools. When using the touch drag method, GraphPad will automatically snap to a multiple of 10, 30 or 45 degree angle and the incremental length of the grid. The Snap angle is set in the Points control, but is used throughout the App. Guidelines also help align your drawing for you, and GraphPad will automatically snap to alignment to make it easy to create accurate closed shapes. When using the two point method, the first point will highlight when selected. Touching another point, or another part of the screen will cause a line to be created. Lastly, deleting lines is done by simply double tapping on an existing line.

Lines mode has two controls, one on the top which displays and edits the current & active lines, plus a side control that allows for additional tools to be called. When drawing a new line, the length and angle will be displayed. If a line is selected, all of it's characteristics can be edited. Selected lines show their orientation, or their orientation based on the path be-



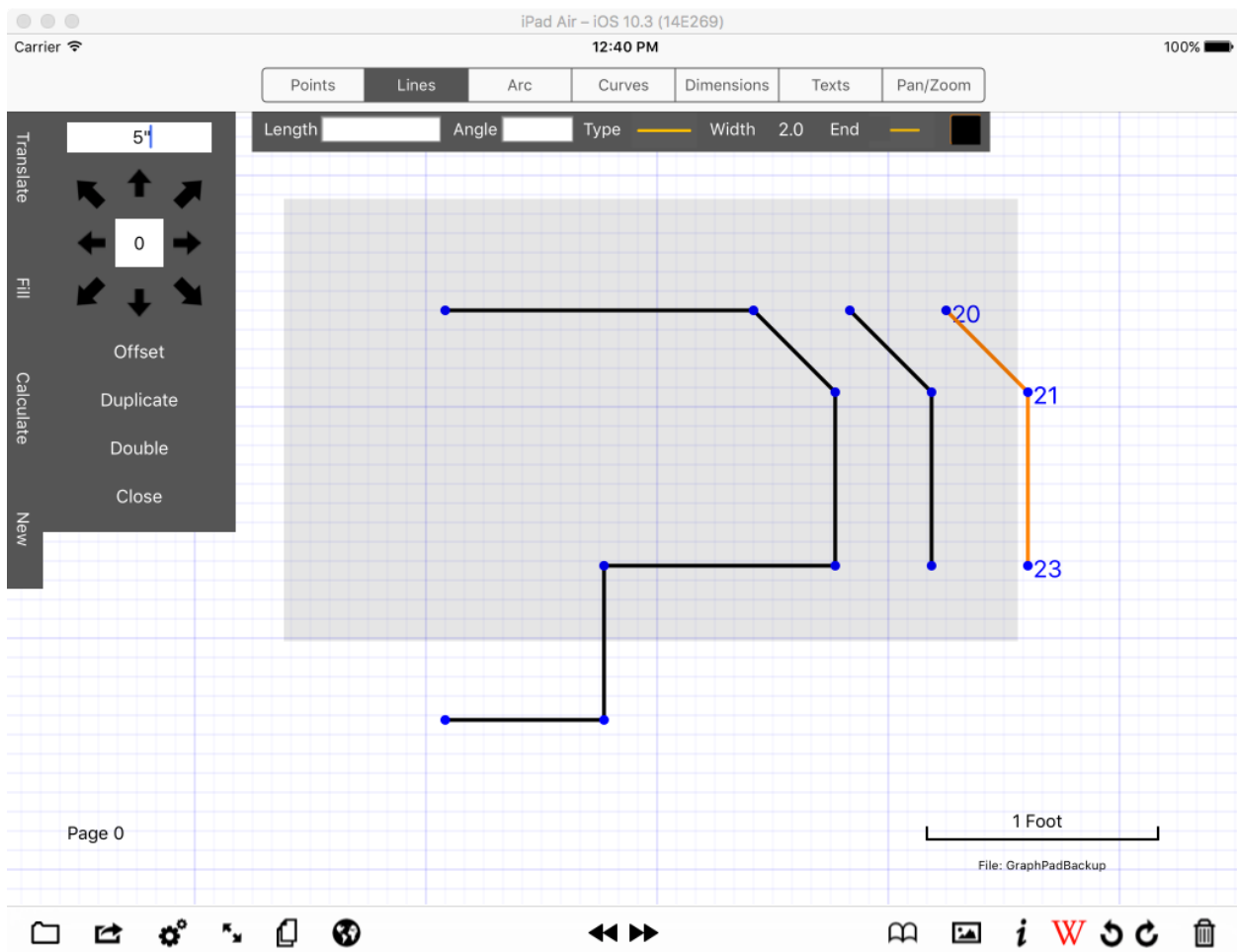
ing generated (the path of connected lines will automatically reorient from head to toe). If a single line is selected, you can change its length and angle by editing the values in the control. This makes it possible to put in precise dimensions, regardless of the snap setting. The type of line (solid, dashed, guideline) can be changed, along with the thickness, end type (point, gap, none) and color. A group containing lines, arcs and curves can all have their line type, width, end and color changed simultaneously by selecting them in lines mode and editing their properties in the top line control.

To create a point at the precise intersection of two lines, select the both intersecting lines, and switch to Points mode. A point will be created at the intersection of the two lines which can then be used to create precise geometry. An infinite length guideline can be created by selecting a single line, and selecting the Type, as shown below. Guidelines in conjunction with the 'Create Point' method described above in order to create precise geometry.

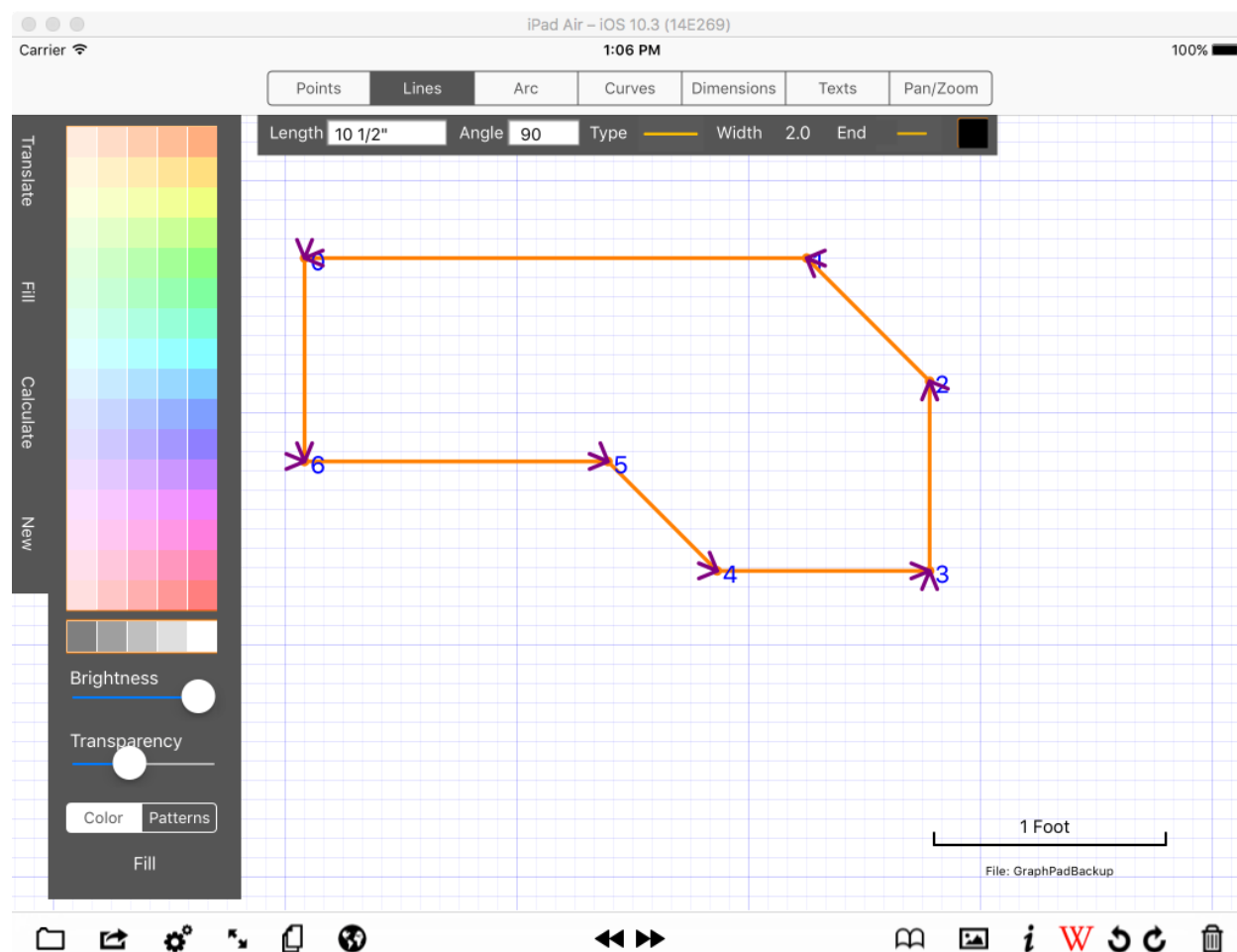


**Note:** Creating Points at the intersection of two lines, or two guidelines is a very useful tool for creating precise geometry.

The Lines Translate tool can be used to offset, duplicate and create double lines. Offset and Duplicate functions use the distance and direction specified to offset / duplicate active lines in the specified direction. Lines are activated by either being touched, or by using a selection are created in Points mode, and are indicated by being colored orange. Duplicating a set of lines automatically makes the new duplicate lines active, making it easy to quickly create a set of equally spaced lines. The Double line feature is primarily used with bezier curves and attempts to create the double lines for park paths, driveways, etc. The Double lines feature uses the orientation of the active lines to create duplicate lines at a perpendicular offset from the selected lines.



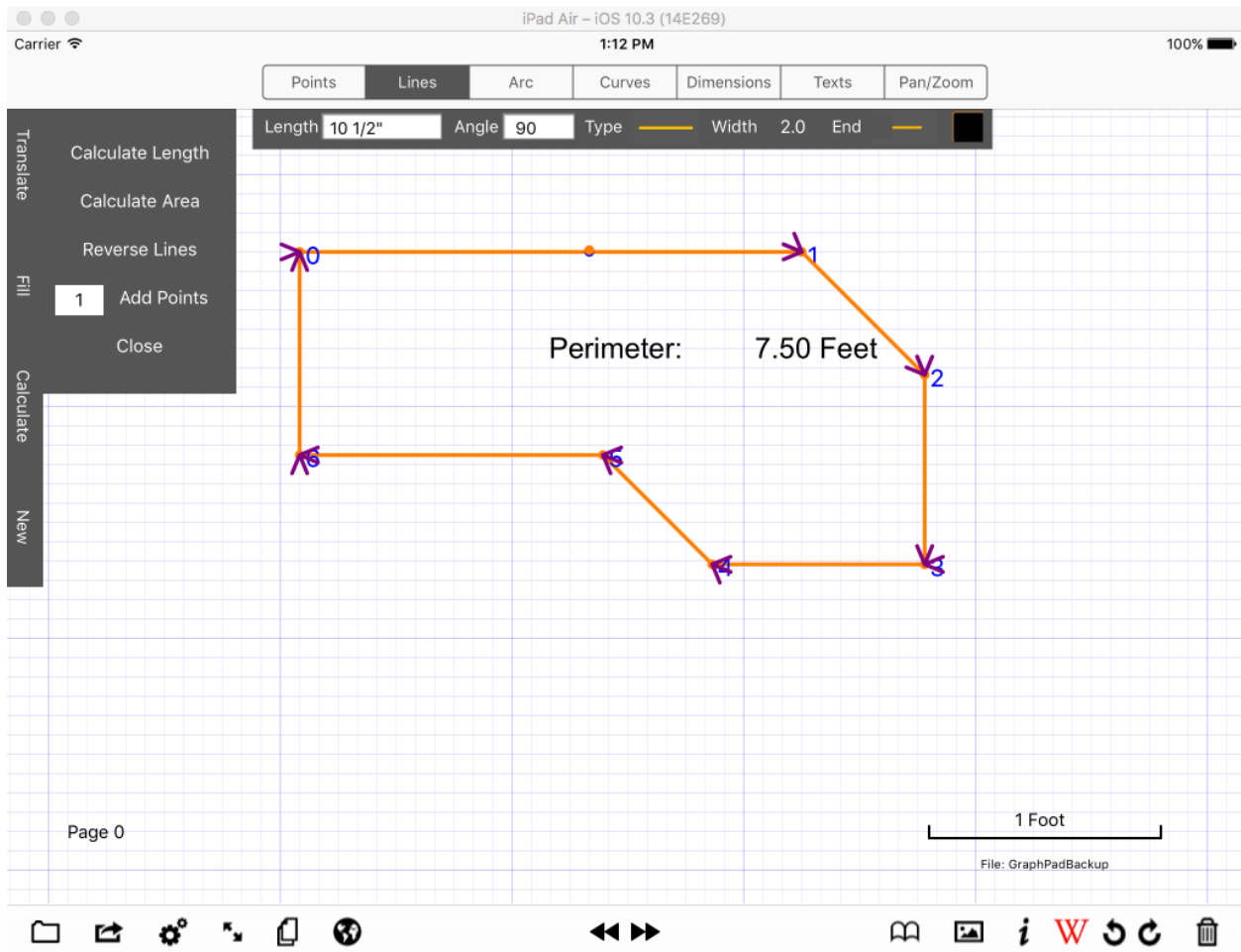
In order to fill an area with a color or pattern, select a set of connected lines in order around the perimeter and press open the Fill tool. The Fill tool allows users to select a color or pattern to fill the area created by the selected lines. Lines and curves display their orientation in the path with connected lines automatically re-aligning themselves so the fill algorithm works correctly. Unconnected lines can also be filled with color, by selecting them in order and re-orient lines manually as necessary, using the “Reverse Lines” feature under the Misc side control button.



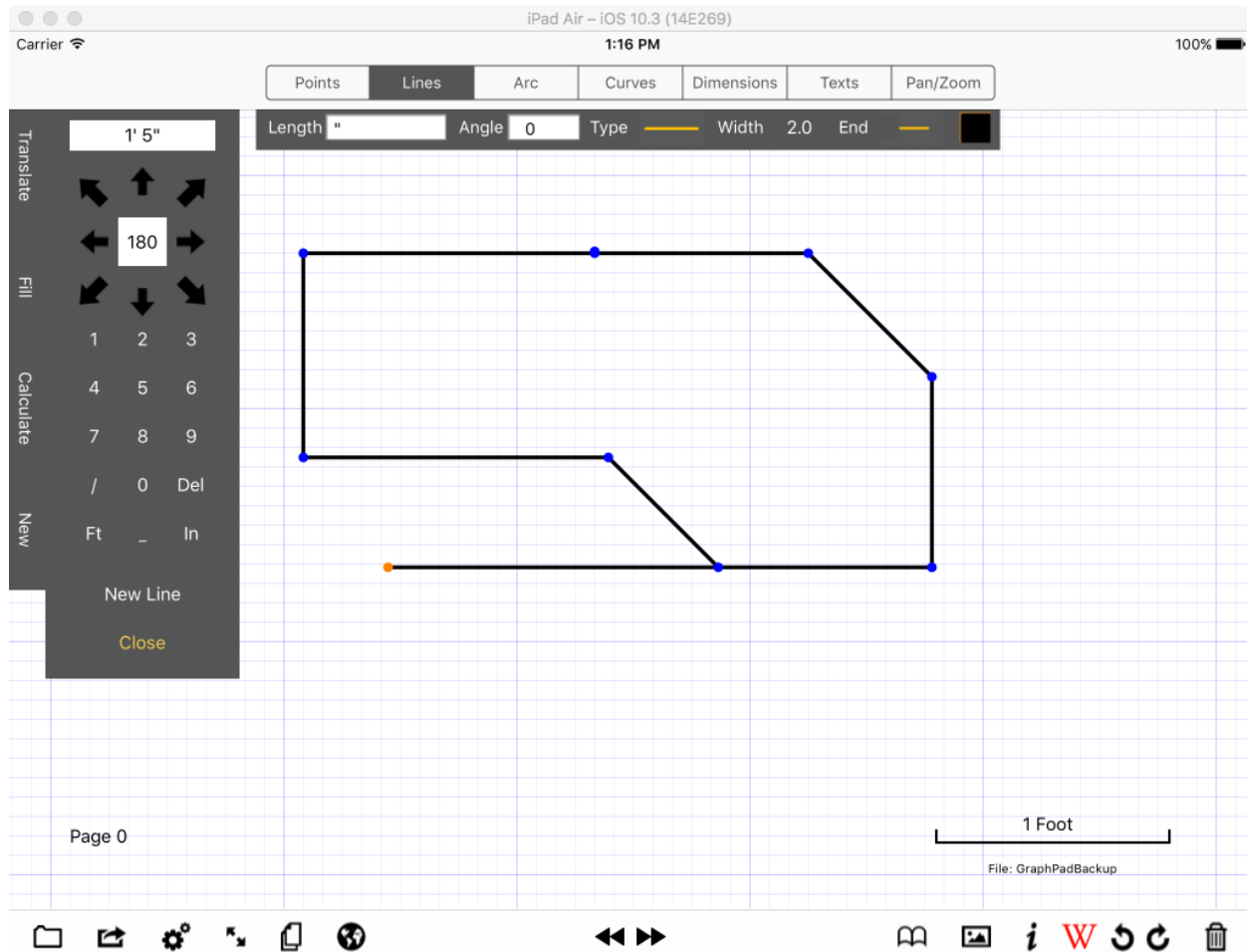
Areas and lengths can also be calculated in Lines mode and selecting a group of lines, arcs and curves and pressing calculate side menu button. The lines calculation form will appear with buttons for each both Area and Lengths. To calculate an Area, you need to select the lines defining the area, in order around the perimeter and then press “Calculate Area”. Lines must be connected to each other head to toe at the end points in order for an area to be calculated, which is why the line end point ids and the line orientation is shown when selecting lines. If there is a duplicate number at any of the intersections of lines or the lines are not all oriented the same way around the perimeter, the path around the perimeter isn’t closed



and the Area won't be calculated so as to prevent inaccurate estimations. Area calculations are based on a colored pixel count, so it's advisable to first fill an area with color to visually verify what is being calculated. While a pixel count area calculation is only an estimation, it is generally accurate enough for most construction work. Intermediate points can be added to a line by selecting the line, specifying the number of intermediary points and pressing 'Add Points'. This feature is useful for creating construction points evenly distributed along a line.



The New Points Tool is used to create a new line at the precise distance and direction for an existing point. To create a new line, select an existing point, use the tools buttons to set the precise distance and angle and press the “New Line” button. A new line will be created and the end point automatically active so users can quickly create the lines around the perimeter of an object.



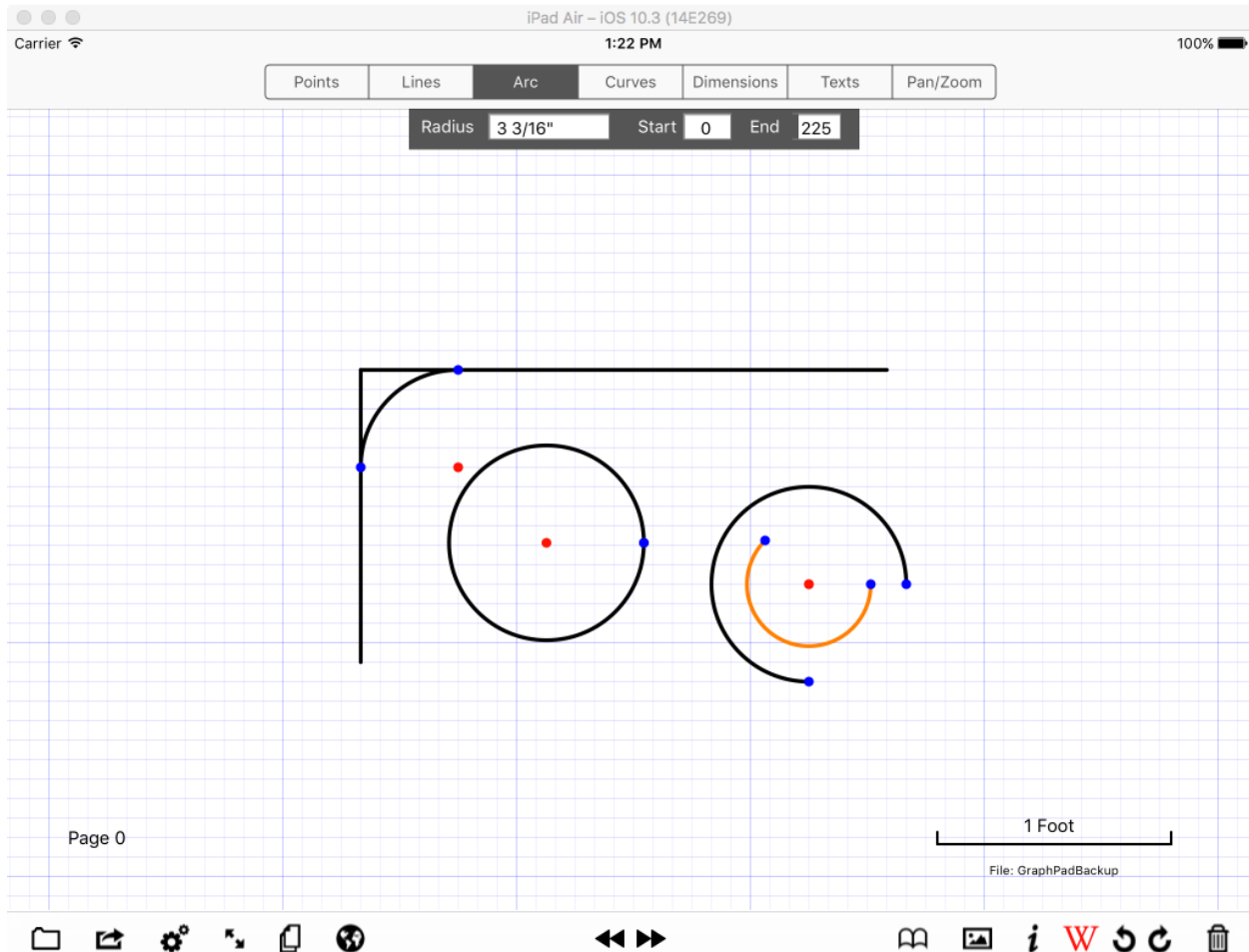
## Arcs:

Touching a point that is joined by two or more lines will create an arc. Touching a point on the screen where there are no lines will create a circle. Circles have a point at both the start and end angles. Touching either the start or end angle points allows a user to change the circle to an arc. Selecting the line of the arc allows a user to change the radius. The circle can no longer be moved by selecting the center in “Arc” mode, but is moved by selecting the center point in “Points” mode. The properties of the Arc (linethickness, line type, color, etc) are modified by selecting the Arc or group of Arcs in “Lines” mode and changing the appropriate value in the control.

When in “Points” mode, if you touch an Arc circle or segment of an Arc circle, a point is created on the arc at the nearest snap angle, and the Arc is bisected. Switching to “Arc” mode, and selecting one of the arcs allows you to modify the radius of that arc. If you then reconnect both of the two arcs, you can end up with concentric circles. It should be noted that Angle Snap is utilized by the Arc algorithms, so moving the end points will snap to the nearest angle multiple. Lastly, arcs can be deleted either by double tapping on the center point or the arc segment.

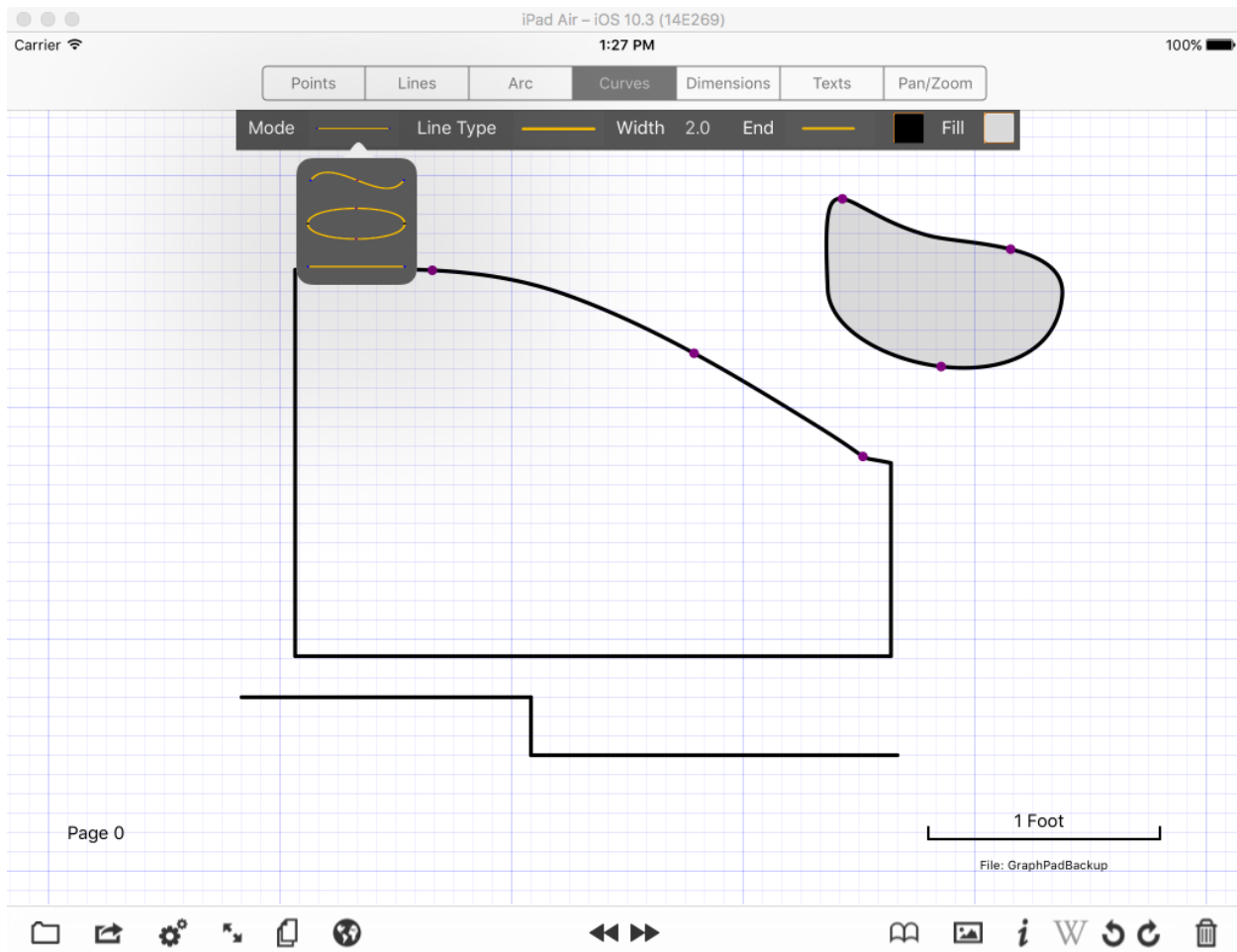
## Curves:

The Curves mode is the same as the “Sketch” mode from earlier versions of GraphPad and retains all the same features. The Curves mode is primarily used for creating free form bezier curves but still contains the Linear Sketch feature. The Curves Control allows users



to set all the features for the next curve that is created, but as in previous versions of GraphPad, curves are edited in “Lines” mode. Curves are created by touching and dragging along the screen. Lifting your finger from the iPad terminates the curve creation process, after which GraphPad uses the individual touch points as input to the “Fit Curve” algorithm as described in Graphics GEMS by Andrew S. Glassner. Switching the mode from a curved line to a loop causes the generated curve to automatically close and to be filled with the fill color displayed in the Curves control. Closed curves are also automatically grouped, and by default retain their scaled size; although this can be changed as described in the “Groups” section of this manual.

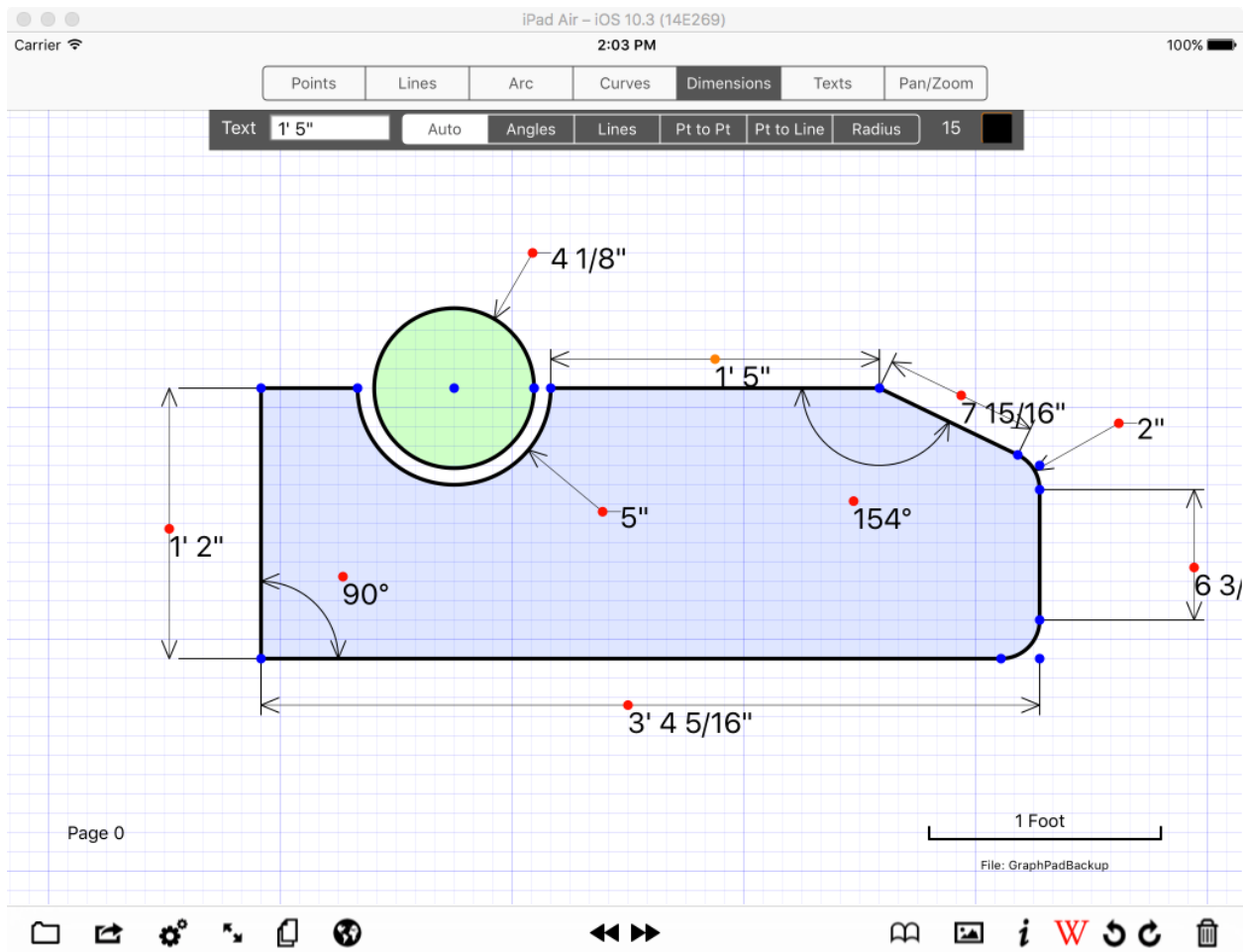
The Linear Sketch feature, while still retained, has been moved to a far less prominent place in the App to discourage its use among novice users. By switching the mode to a straight line, GraphPad will attempt to automatically straighten lines, snap to the grid and nearby points. This feature is extremely useful when attempting to draw in front of clients since it's not necessary to manually create each section of a shape. The image below shows all the types of objects that can be created in Curves mode.



*The disclaimer from previous versions of GraphPad still applies - the Linear Sketch mode, while extremely useful, is a very complex algorithm and is known to be unstable if over used.*

## Dimensions:

The dimensions mode allows you to create a dimension by selecting either points or lines. By default, selecting a line will create a dimension for the length of a line; selecting a point at the vertex of two or more lines will create an angle dimension (in degrees). Select a point not at the corner of two lines will allow you to create a distance dimension between that point and another point, or a line. Lastly, selecting an arc will create a radius dimension. The Dimension Control allows you to restrict the type of dimension to be created and is useful when there are multiple dimensions that can be created on a particular object. Specifying the type of dimension to be created is almost always necessary when creating dimen-

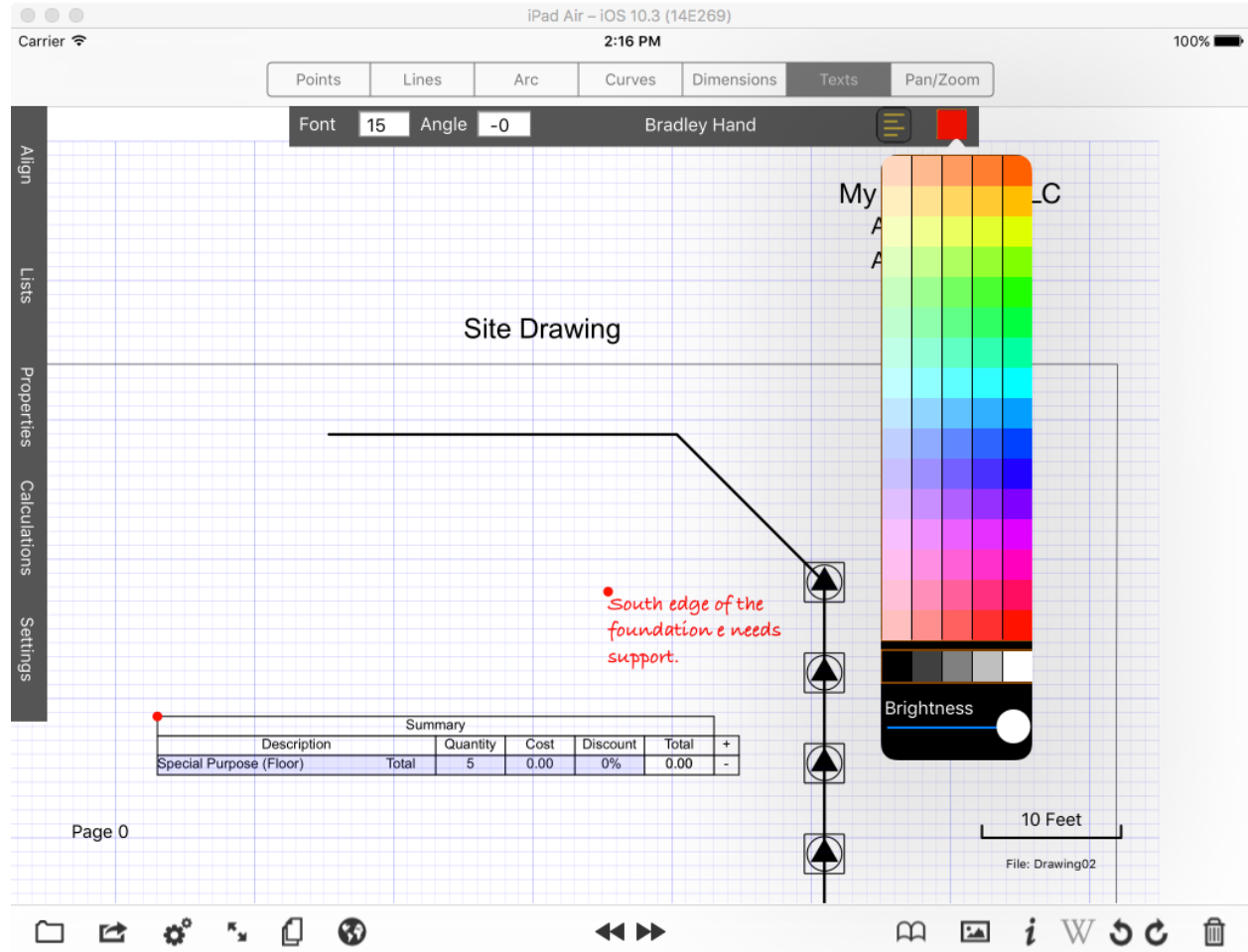


sions between points and between a point and a line, but is also often needed when creating an angle dimension. Dimensions can be moved by selecting the center red circle with your finger tip and dragging. Distance dimension lines will remain parallel to the object being

measured regardless of where the dimension value is displayed. When you touch a dimension, the dimension text, font size and color is displayed in the control where they can be changed. If the text is changed it will simply override the value calculated by GraphPad but will not affect the actual geometry. Once the text of a dimension has been modified, the dimension will no longer be updated when the geometry is changed, so it is possible to display dimensions that are not the same as what is automatically calculated.

## Text:

Text mode is needed to perform any task associated with text, from entering and editing free text on a drawing, moving and modifying text associated with Tables, as well as creating



and filling out standard and custom forms. Text can be added to a drawing by going into Text mode and touching the screen and dragging much like in the points mode. A light blue rectangle will appear while creating the text area and when the finger is lifted, the keyboard will be displayed along with a white area for entering text. Type in the desired text, complete with carriage returns, and when ready, press the keyboard button in the lower right hand corner to save the text and dismiss the keyboard. The text font size, font, alignment and color can be set and modified using the Text control. To modify the contents of Text after it's been created, select the red handle while in text mode, and press inside the light blue area of the text. The text boundaries can be modified by moving the blue size handle, and the Active text can have the font, font size alignment and color modified using the text control while the text is active. Multiple text objects can be modified simultaneously by going into Points Mode and creating a selection area around all the text of interest, then



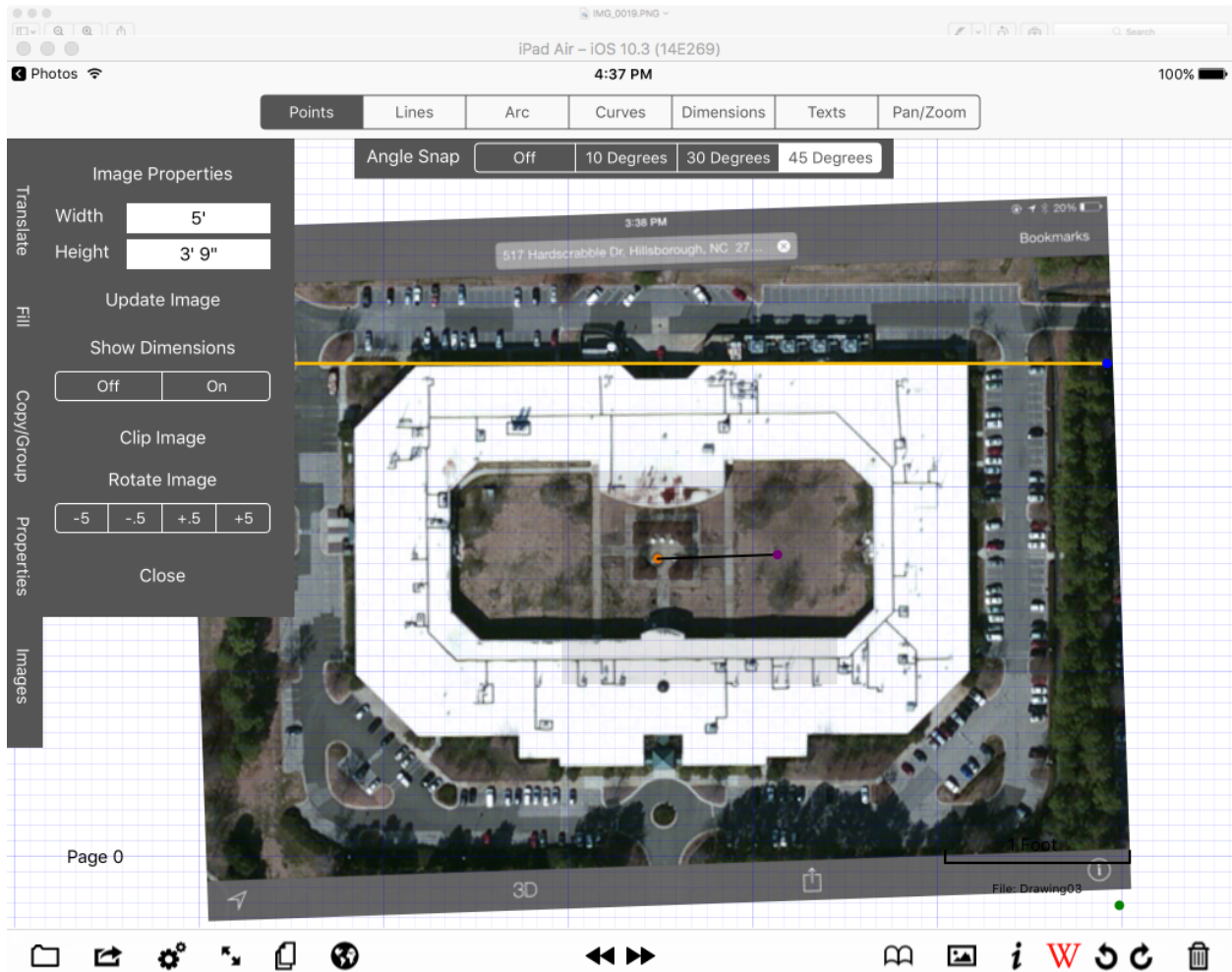
switch to Text Mode to make the modifications. Active free text entries will display an orange handle, and can be turned on or off while in the selection area. Active text can have the Font, Color, Alignment and angle modified by making changes to the Text control on the top. Active text fields can be aligned to each other by using the Alignment tool on the left hand side. Lists, Properties, Calculations and Settings are used for creating custom forms and are discussed in the following section.

Entering data is also performed in Text Mode. To enter data, scroll to where the field desired will be visible above the keyboard, go into Text Mode and press inside the light blue area. Since GraphPad only works in landscape mode, it is strongly recommended the keyboard operate in the Split Mode, as shown on the next page. Users can move between fields by either pressing on the desired field, or if setup, hitting return to tab to the next field. Fields can be associated with either a numeric or regular keyboard, lists of values (which will appear on the right side of the screen), signatures and calculations. Tables are also associated with Text Mode and the enterable fields in a table turn light blue to indicate they can be changed. Tables will also display a handle in the upper left corner to allow them to be moved and deleted as well as a “+” to enter a new empty row and a “-“ to delete a row. Table data may be automatically populated when adding objects from the library to a drawing or when calculating an area or length, depending on the table definition. The two built in tables definitions are the Summary Table and the Legend. The Summary table adds a row for every countable object from the library added, it’s price and calculates a row total (number of objects added times the price) while the Legend displays only an image of each type of object added.



## Images:

Images can be added to your GraphPad document by pressing the Images button on the bottom of the app. The iPad photo library will be displayed which allows you to select an image from images stored on the iPad. After selecting an image, the photo library will close and the next time the user touches the GraphPad drawing, the selected image will be placed where the drawing was touched. The imported image size is controlled in the Settings form and can be set to Small (300x300), Medium (600x600), and Large(1000x1000). Imported images maintain the aspect ratio of the original image and scaled so the maximum width or height does not exceed the maximum set in the settings panel. Images display handles in “Points” mode, including a purple center point and rotation handle for translating and rotating the image, and a green corner point for scaling. Images can also be clipped by creating a



selection area in the image and pressing and holding to display the clip menu. Undo and Redo functions are currently not supported for image modifications.

Images can be also be cropped, turned into an object or used to create another image. While in “Points”, if you create a selection area that includes and image, then press Image side button the Image Properties form will appear. If Clip is pressed, the image will be cropped to the size of the selection area. If one image is selected, the width and height of that image will be displayed and can be modified.

## Undo / Redo:

Easily the most requested feature for the GraphPad was the ability to undo a previous step. This was addressed via an Undo / Redo feature which maintains a history of all the elements captured at the point when a touch event ends, i.e. - when your finger lifts off the screen. It is now possible to Undo through the history of a Page all the way back to the moment the page was created, and Redo back to the last change. Only drawing changes are captured as part of the Undo/Redo history, and not Pan and Zoom operations - so it's possible to create an object, zoom in to examine the results, and Undo the change while still zoomed in. It is also important to note that the undo history is not saved when saving a document, and that loading a document flushes the undo log as the first step in the process. Users should be aware of this feature when working with GraphPad.

## Deleting:

Deleting unwanted items is almost as important as creating them and GraphPad makes this extremely simple. To delete an item, double tap on the entity's handle in the appropriate mode. Images and Groups display their handles while in "Points" mode, but Arcs are deleted in "Arcs" mode, Lines in "Lines" mode etc. Sketching only creates lines, and curves but to delete them you must switch to "Lines" mode. A selection area can also be used to delete items by pressing the trash can, however, all of the points must be contained in the area for the delete to work properly. If only one end point of a line is deleted using a selection area, the line and any attached dimensions will appear as though they are connected to a point infinitely far away. This is because points are not actually deleted, but simply moved to infinity along with any connected entities. When this happens, it's best to undo the delete and re-select the objects to be deleted.

If the trash can button is pressed without a selection area, the "Delete All" button is presented. "Deleting All" not only deletes all objects on the page, but it also flushes the redo buffer and cannot be undone. Users, therefore, should only use "Delete All" when they are certain they don't want any of the objects on the page.

## Pan / Zoom:

Panning and Zooming in GraphPad has its own mode to avoid accidentally modifying the drawing while user's are simply trying to adjust the view. While at first this may be confusing, it significantly reduces the complexity of the drawing algorithms as well as user errors. Whether the Grid is displayed or not, the edges of the page are displayed so users can tell

where the drawing will be displayed in the output pdf file. Data outside the page is not displayed in any printouts but is still included as invisible components in the pdf file - therefore users should be cautious in using off drawing comments for customer notes.

## Settings:

Clicking on the settings button at anytime adjusts the behavior of the Current page. The settings for each page in a GraphPad document are completely separate, so one graph can show lengths in miles, while the next page in a GraphPad document can have a scale of inches. Where applicable, default settings are controlled in the mode control for the particular page, while document settings are controlled in the Settings form. A brief discription of all the document settings is included in the table below.

SETTING	DESCRIPTION
Imported Image Size	Used to set the maximum width and height of an image imported from the camera roll. Small(300x300), Middium(600x600), and Large(1000x1000). Imported images maintain aspect ratio and are scaled so the maximum width or height does not exceed the maximum set for the imported image.
Show ID's	Displays the ids of the points and lines in GraphPad. This feature is extremely useful in understanding how GraphPad works and for debugging issues, for example, when Areas are not being calculated.
Show Copy/Group Menu	When working on detailed drawings, the Copy/Group and Image menus will appear when manipulating selection areas while being moved over short distances. Turning these menus off is often helpful for making detailed drawings.
Point Size	Controls the size of points and handles in GraphPad. This is only relevant while creating drawings and has no affect on the output from GraphPad.
Align Dimension Text	Toggles between Dimension Text being horizontal, or aligning with the dimension lines.

SETTING	DESCRIPTION
Background	Toggles between Clear and Opaque and is useful in creating a sketch of a large imported image by having a clear page on top. This feature is extremely useful in creating drawings based on satellite images as described in the “Tips and Tricks” section. If a pages background is clear, the layers below it are displayed, however, they are not redrawn except during Pan and Zoom operations, and only if the layers below are synced (see Zoom this page only below).
Show Grid	Toggles the display of the grid on and off. The grid is strictly a visualization of the how the drawing algorithm aligns drawing elements and is not part of the actual output.
Zoom this page only	Controls whether the Pan and Zoom of the current page is mirrored on other pages of the drawing and is defaulted to “On” or so each page Pan and Zooms independently. Turning two pages so they Pan and Zoom together is extremely useful in creating a drawing based upon an image, however, tends to significantly affect performance since both pages must be redrawn during Pan/Zoom operations.
Paper Size	Changes the current page to either Portrait or Landscape.

## Pages:

A GraphPad document consists of multiple pages, rather than a single large drawing. This is again, fundamental to the GraphPad concept, which is to replicate what one would create on a job site with a pad of graph paper. Paging backwards and forward through the document simulates the action of flipping a page on pad of graph paper back to reveal a brand new page ready to be drawn upon. As a result, the first page of a document may contain a high level drawing of the complete project, while subsequent pages cover detail drawings, tables of information and pictures. Pages can be either opaque, or transparent - allowing users to see pages below the current page. Transparent pages act like layers on top of the first opaque page or sheets of velum in top of a drawing. When generating output, Graph-

Pad draws the first opaque page, then all the transparent pages in reverse order (so the top layer is drawn last). The page order is maintained as an array while the file is open, but is used to re-order the pages during the save operation. As a result, the page labels will be different in the saved document from the original. Pages can be re-ordered in GraphPad, but discretion should be used when utilizing this feature as there are still known issues.

## Saving a GraphPad Document:

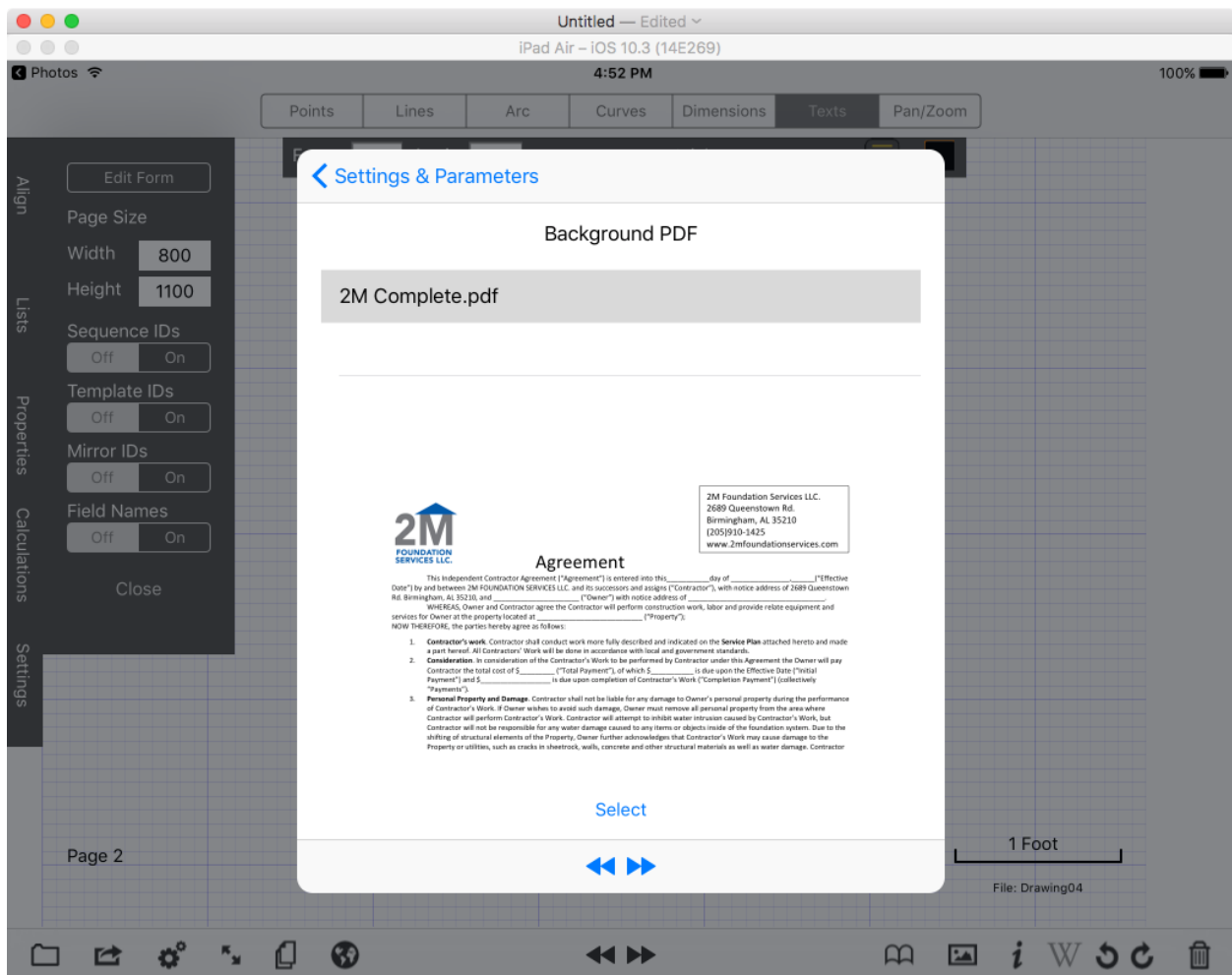
GraphPad Pro allows user's to save named copies of their GraphPad documents. User's have the option of creating a New blank document, opening an existing document, saving the current document using the current filename (which defaults to GraphPadBackup or the name of the document that was opened), saving the file under a different name, and an option to delete old GraphPad documents. GraphPad documents are saved in the Application Bundle Documents directory on the iPad which is currently not viewable outside GraphPad.

## Output:

GraphPad allows users to send emails with a pdf file attachment of the GraphPad document or print to any connected AirPrint printer. While only what is inside the boundaries of the paper size is visible in either the print job or the pdf file, GraphPad write out the entire drawing during the pdf file / print create process.

## Creating Forms:

Users can create their own custom forms based on a PDF file or one of the same forms that comes with GraphPad. Forms can consist of multiple pages of texts, lines, images as well as an optional PDF background. Forms can also reference lists, including price and service lists and perform simple calculations like multiplications and totals. To create a form based on a PDF, the PDF file must first be imported from an email attachment as described below. Users can then select the PDF and the PDF page from the settings form by pressing the PDF Background button. The Background PDF form allows users to select any PDF that has been loaded into GraphPad and set any page of the PDF as the background for the current drawing page. Setting the background PDF for a page automatically changes the page width and height to be the same as the PDF page. Changing the page width and height to something other than the background PDF will have no effect.



Text fields can then be laid out on the page as desired. By default, Text Fields are Type “o”, or labels. The types of Text fields are defined in the table below:

o	Label or Static Text. Displayed on the Form but can not be moved or altered. Labels can be set by calculations, however.
2	Normal Text Field. Can not be moved but users can enter or alter data in Text Mode.
3	Check Box. Can be checked or unchecked by pressing on the checkbox in Text Mode.
4	Numeric text. Displays a numeric keyboard when entered.
5	List Text Field. When entered, displays the associated list in a control on the right side of the screen. Users can select a member of the list, or type in a value.
7	Signature field. When entered displays a signature control. Once a signature has been saved, an image is displayed the exact size of the field.

Fields should be laid out roughly where they are desired and then use the Text Mode Alignment and Properties tools to set their properties. Setting default value while laying out the fields is helpful to insure the fields are sufficiently large. It is also recommended to set the Field Names and Sequence ID's on while creating a form to make it easy to see if the tab order is correct and that the fields are named properly for calculations.

Users can also create a new custom form based on one of the standard forms provided with GraphPad. In order to edit an existing from, users must open the page to be edited, enter Text Mode, open the Settings tool from the side control and press “Edit Form”. This transforms all the static forms objects into standard drawing entities which can be edited like a normal drawing.

Points Mode has a Translate Duplicate feature that was added specifically to assist in the creation of tabular forms. The Translate Duplicate feature copies all the object in the selection area, and duplicates them using the offset distance and angle. In addition, field names that contain a number are automatically incremented as well as sequence numbers. This greatly simplifies the task of making tabular forms with line totals. This also simplifies the use of lists in tabular forms, where the list value and cost are automatically incremented correctly for use with a list.



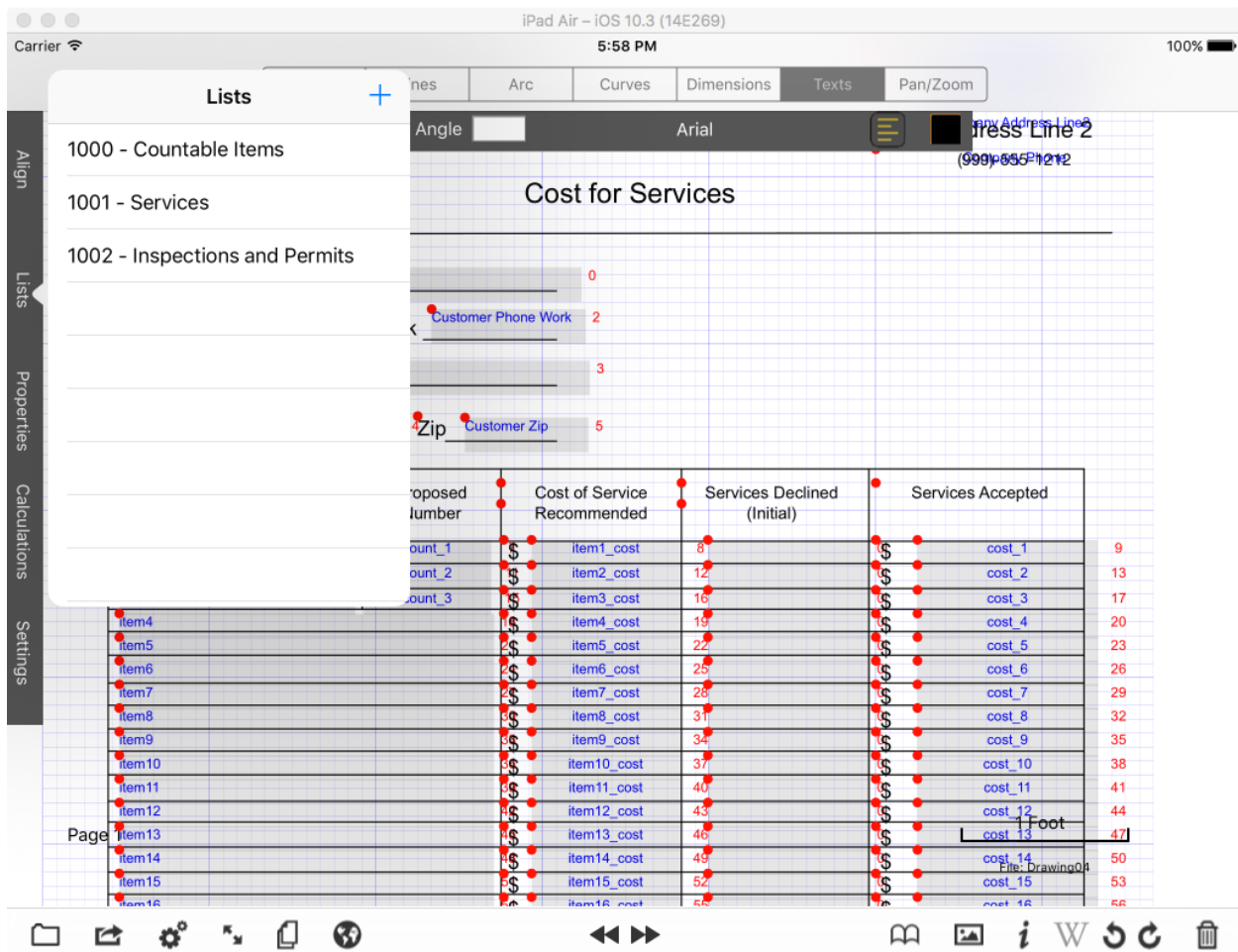
Once a form is completed, it can be saved using the File, Save Template and specify the name. To use a new template, just go to File, New and select the name of the template.

## Managing Lists:

The screenshot displays the GraphPad software interface on an iPad Air. The top status bar shows 'iPad Air - iOS 10.3 (14E269)', 'Carrier', '5:32 PM', and '100%' battery. The main toolbar includes 'Points', 'Lines', 'Arc', 'Curves', 'Dimensions', 'Texts', and 'Pan/Zoom'. A left sidebar contains 'Align', 'Lists', 'Properties', 'Calculations', and 'Settings'. The central workspace shows a form titled 'Cost for Services' with a grid background. The form includes fields for 'Installation Recommended', 'Proposed Number', 'Cost of Service Recommended', 'Services Declined (Initial)', and 'Services Accepted'. A table below the form lists items from item5 to item16 with their respective costs. The table has columns for 'Installation Recommended', 'Proposed Number', 'Cost of Service Recommended', 'Services Declined (Initial)', and 'Services Accepted'. The table data is as follows:

Installation Recommended	Proposed Number	Cost of Service Recommended	Services Declined (Initial)	Services Accepted
	count_1	item1_cost	8	cost_1
	count_2	item2_cost	12	cost_2
	count_3	item3_cost	16	cost_3
		item4_cost	19	cost_4
		item5_cost	22	cost_5
		item6_cost	25	cost_6
		item7_cost	28	cost_7
		item8_cost	31	cost_8
		item9_cost	34	cost_9
		item10_cost	37	cost_10
		item11_cost	40	cost_11
		item12_cost	43	cost_12
		item13_cost	46	cost_13
		item14_cost	49	cost_14
		item15_cost	52	cost_15
		item16_cost	55	cost_16

GraphPad allows users to add lists of products and services with costs for use with custom forms. Selecting Lists while in Text Mode will open a popover for managing the lists of prices and services. To reference a list, set a text field to type 5 and enter the list number for the List ID in the properties for the text field. If the text field has a name, and there is another corresponding text field with the same name “\_cost”, when the user selects an item from the list the cost field will automatically be populated.



## Calculations:

GraphPad uses the GCMathParser by Graham Cox to parse and process simple mathematical equations. The math parser that allows user to create simple equations based on the user input into form fields. When data is entered into a named text field it is added to a responses dictionary and all the calculations in the form are executed in order. Calculations are create in Text mode using the Calculations tool. Each calculation has a Name, an Expression or calculation and an output. The expression uses the field\_name of a text field preceded by an “&” to get the entered data. The result or output of the calculation must also be a named field but it is not preceded by any special characters. To see an example of several calculations, open the Contractor Proposal form that comes with GraphPad and

view the calculations that have been setup. The math parser supports addition, subtraction, multiplication, division, sin and log functions and several others.

The screenshot shows the GraphPad software interface on an iPad Air. The main window displays a "Cost for Services" form with a table of items and costs. A sidebar on the left contains panels for "Align", "Lists", "Properties", "Calculations", and "Settings". The "Calculations" panel shows a formula:  $\&total\_costs + \&total\_permits$ . The table below has columns for Proposed Number, Cost of Service Recommended, Services Declined (Initial), and Services Accepted. The table contains 16 rows of item costs.

Proposed Number	Cost of Service Recommended	Services Declined (Initial)	Services Accepted
count_1	8		
count_2	10		
count_3	14		
item1_cost	8		
item2_cost	12		
item3_cost	16		
item4_cost	19		
item5_cost	22		
item6_cost	25		
item7_cost	28		
item8_cost	31		
item9_cost	34		
item10_cost	37		
item11_cost	40		
item12_cost	43		
item13_cost	46		
item14_cost	49		
item15_cost	52		
item16_cost	55		

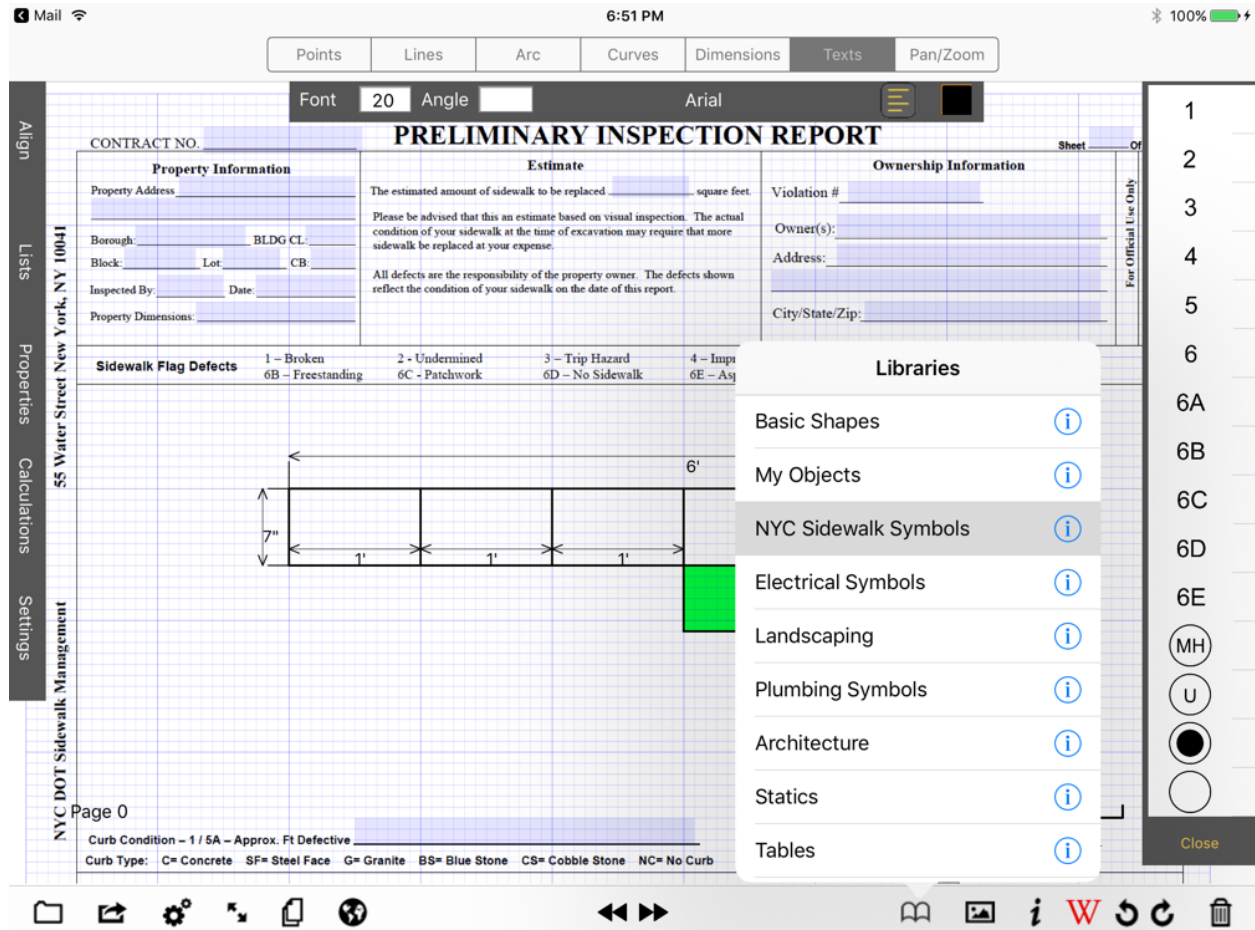
## Saving a Form:

Once all the fields and calculations have been added, the drawing can be turned into a form by going to File, Save Template. Before doing that, there are two more things to consider. Pages that are primarily composed of form fields should be made to scroll only vertically and the scale marker should be hidden in the output. These two page settings are currently in the Settings form. Each page should also get a descriptive name, which is used when adding extra pages to a document. Lastly, all the pages should be positioned on the screen exactly

as they should when a new form is created. When all the details have been completed, save the template under the desired name.

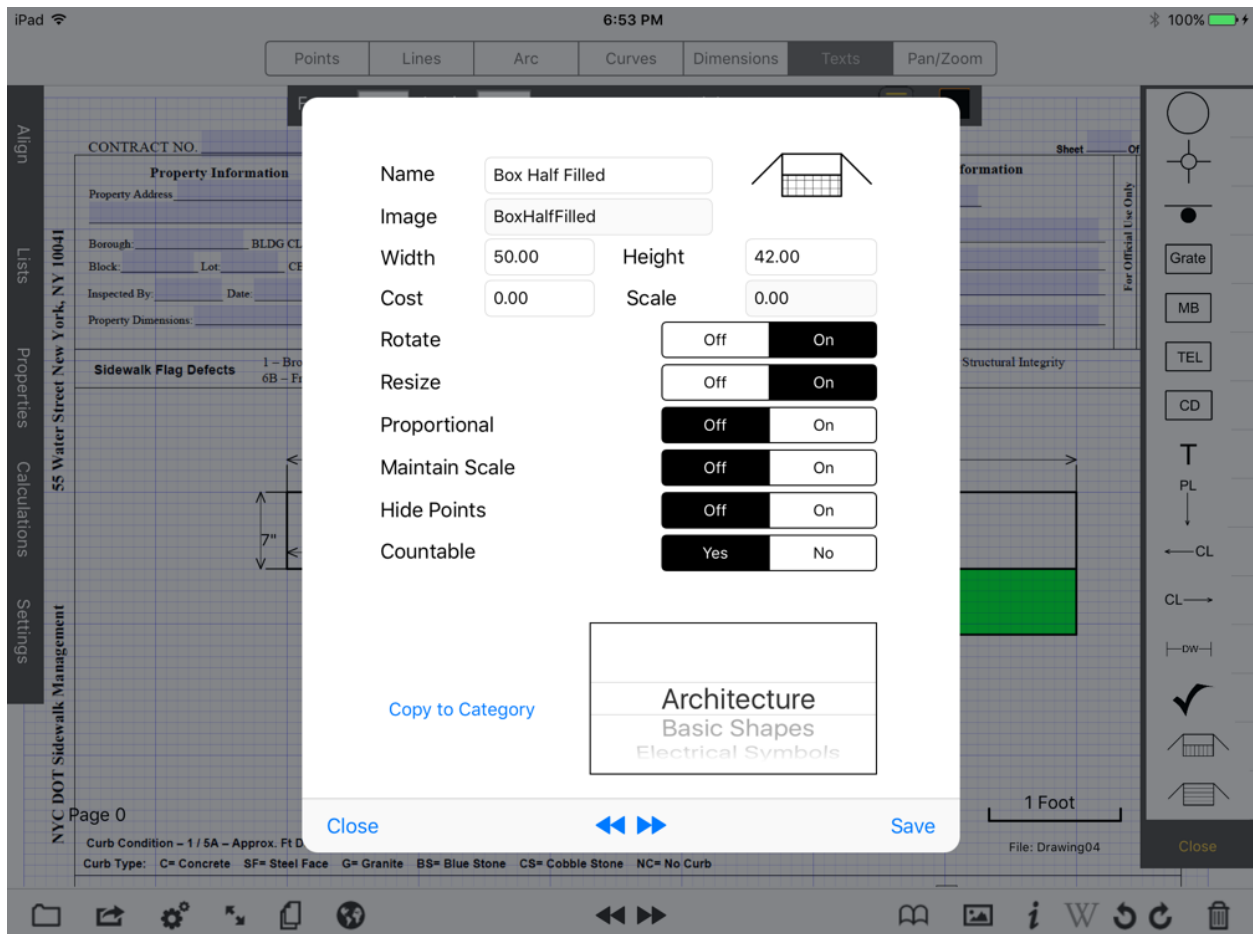
## Library:

GraphPad has a library feature that allows users to store images or geometry for repeated use. It should be noted that currently GraphPad does not allow images and geometry to be mixed, either in creating a group or in creating a library object - but will default to capturing just the image if one is in the selection area. To create an object, just go into the “Points” mode and create a selection area around the portion of the model desired and press the Copy/Group side bar menu. Pressing the Create Object will cause the contents of the selection area to be copied to the library and the My Objects library displayed. The library can be closed in order to optimize the drawing window and pressing on the Library icon once will cause the current library to re-open. Pressing on the library icon twice will cause the library selection window to open and a different library can be selected.



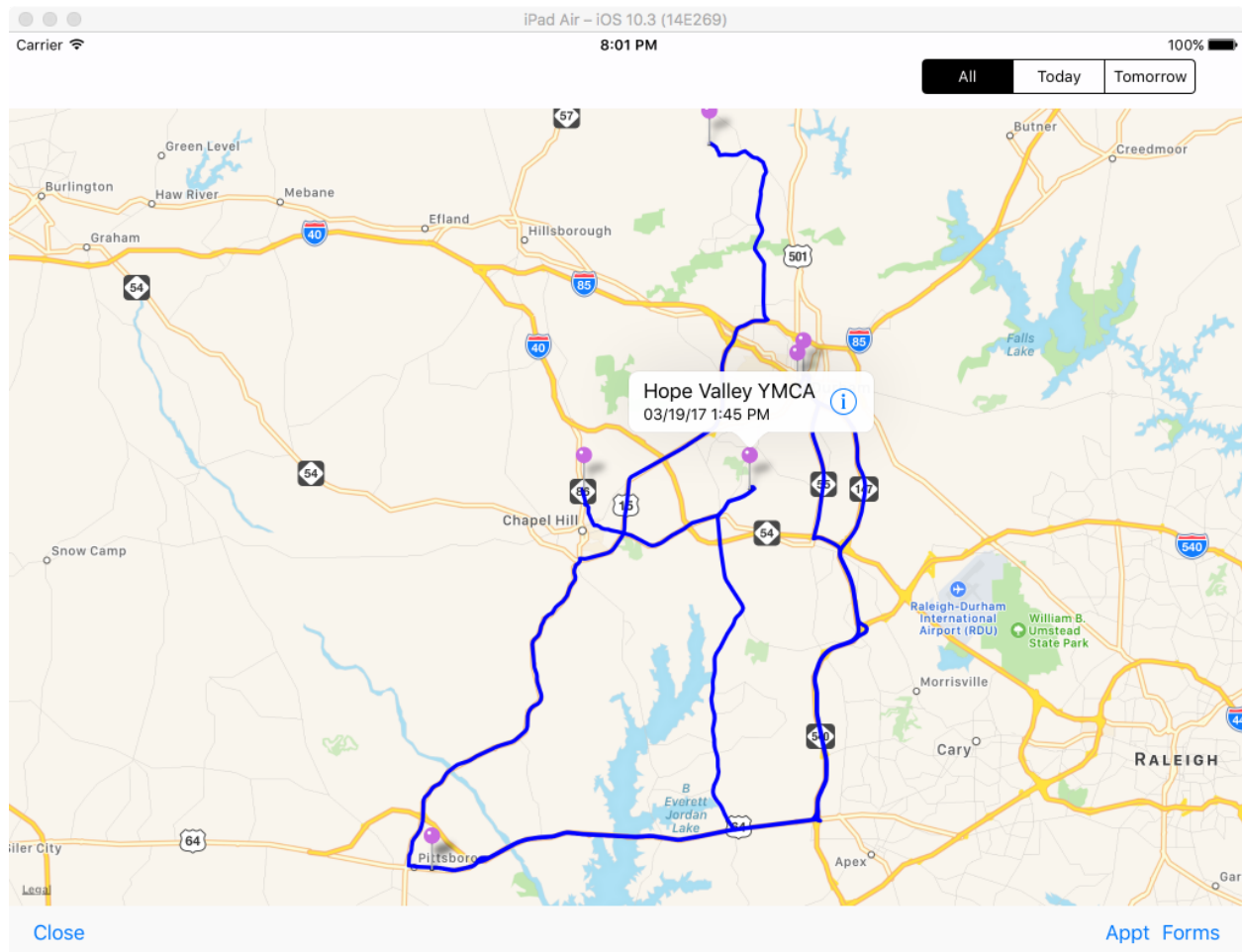
The screenshot shows the GraphPad software interface. At the top, there are tabs for 'Points', 'Lines', 'Arc', 'Curves', 'Dimensions', 'Texts', and 'Pan/Zoom'. Below these is a toolbar with 'Font' (set to 20), 'Angle', and 'Arial'. The main workspace contains a 'PRELIMINARY INSPECTION REPORT' form with sections for 'Property Information', 'Estimate', and 'Ownership Information'. A 'Sidewalk Flag Defects' table is also visible. A 'Libraries' menu is open, listing various libraries such as 'Basic Shapes', 'My Objects', 'NYC Sidewalk Symbols', 'Electrical Symbols', 'Landscaping', 'Plumbing Symbols', 'Architecture', 'Statics', and 'Tables'. The 'NYC Sidewalk Symbols' library is currently selected. The interface also shows a vertical sidebar on the left with options like 'Align', 'Lists', 'Properties', 'Calculations', and 'Settings', and a vertical ruler on the right with sheet numbers 1 through 6E.

With the library pop-over open (as shown above) pressing on the folder icon on the upper right side will slide open the library edit window. Pressing on the folder in this window will toggle the edit features on and off, and the library can be reorganized and have entries deleted. Changes to the My Objects and My Images libraries are permanent, however, changes to distributed libraries will revert to their original order and contents the next time the App reopens.



## Map View:

Users can save appointments in GraphPad which will be displayed via a Map View, displaying driving directions between appointments ordered by when they occur. Pressing on an appointment displays the description along with the data and time of the appointment. The appointment can be opened by pressing on the accessory key which displays the customer information for that appointment including the customer name, address and phone number. If a form is opened from the Map view after opening an appointment, the form will be re-populated with any appointment information that is available (see integration). In addition, new appointments can be saved and edited in GraphPad.



## Integration:

The Map View described in the previous section is the proposed way to integrate GraphPad into an existing system and process. GraphPad comes with a standard set of Web Service calls for integrating with external systems. To enable GraphPad to call an external system, enable integration in the Settings form, shown below.

The screenshot shows the 'Settings & Parameters' dialog box for GraphPad v7.4. The dialog is overlaid on a map application interface. The settings are as follows:

Field	Value
Address Line 1	
Address Line 2	
Phone	(999)-555-1212
Integration	On
Company	GraphPad
User Name	rshawhan
Password	.....
URL	http://104.131.215.131/
Content-Type	application/x-www-form-urlencoded...
HTTP Method	POST
Get Appts	ApptRead.php

With Integration enabled, GraphPad will attempt to call a service with the parameters in the Integration portion of the Settings form. The call to retrieve appointments for the map is the “Get Appts” service, which will pass the company, user name and password as a string in the body of the message using the format:

@“company=%@&password=%@&userid=%@"

The response is expected to be a JSON dictionary object containing the following key value pairs:

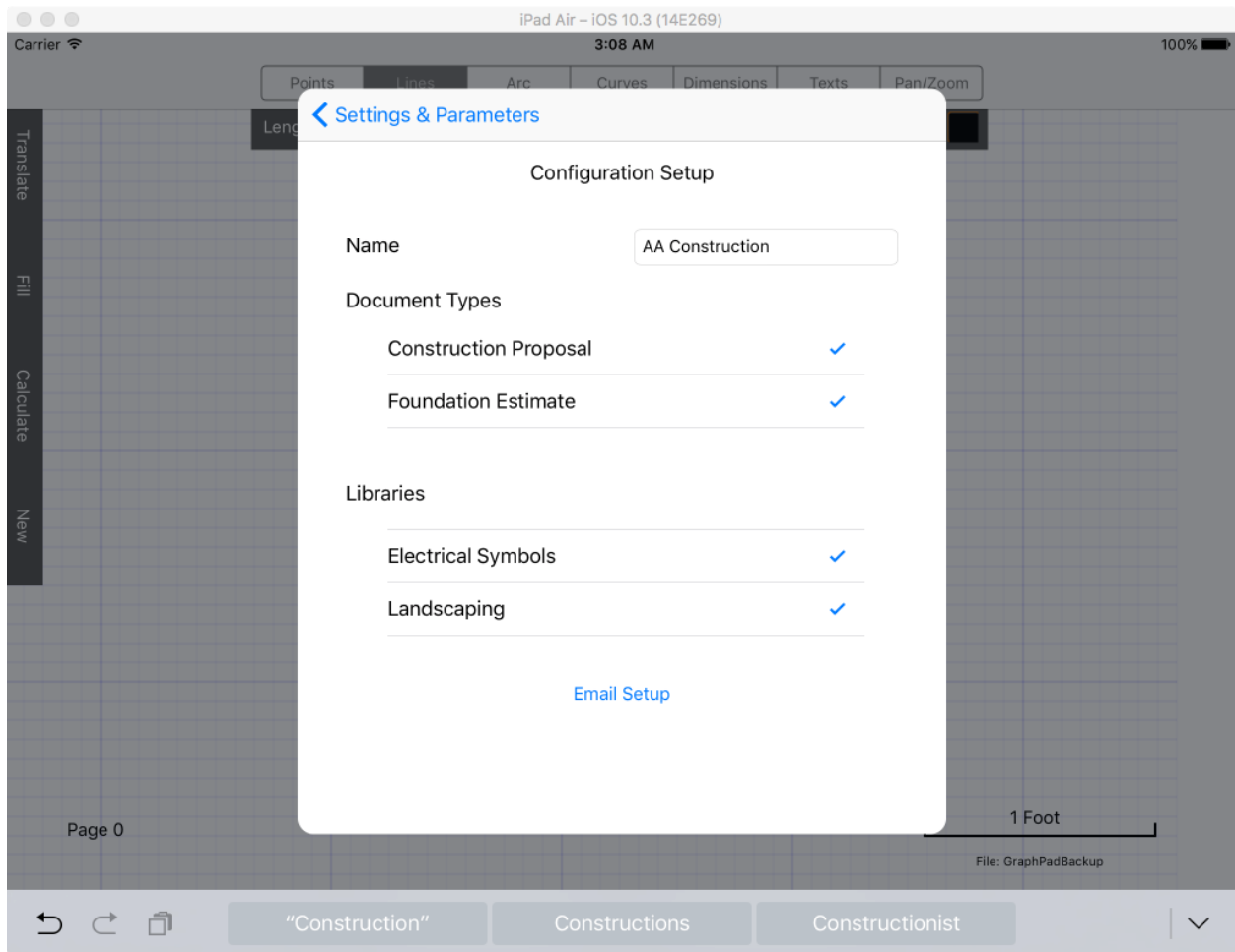
Key	Format
appt_id	
userid	
appt_dt	yyyy-MM-dd HH:mm:ss
appt_time	
appt_note	
appt_customer	
appt_phone	
appt_address	
appt_city	
appt_state	
appt_zip	
workorder	
latitude	
longitude	

These key value pairs are used to populate the data in the Appointments form and required for the integration with any custom forms to work. Additional key value pairs can be used to populate any fields in forms opened up from the Map View as long as the key is the same as the field name. Customer planning on integrating GraphPad with the backend system are encouraged to contact me if they encounter any issues or have any suggestions.

## Distributing a Setup:

Once you have all the libraries, forms, calculations, and price lists created, they can be distributed to all your employees by creating a company setup, which can be emailed to everyone who needs it. The “Export Setup” button is located at the bottom of the Settings Form and opens up the Configuration Setup form. Simply provide a name for the setup and select the Documents and Libraries to be exported. Pressing the “Email Setup” button creates the setup and attaches it to a new email for distribution. All lists, including price lists are automatically included in the setup.





## **i** Information:

Pressing the information button on in GraphPad opens a web browser to the GraphPad website, which has this users guide, videos and a link to the GraphPad Blog. While considerable effort has gone into making GraphPad intuitive and easy to use, I completely understand that some user's find it confusing. Please feel free to contact me via the Contact Page on my website, and I'll be more than happy to try and help out. I also hope to be posting more videos on my blog demonstrating tricks and techniques for using GraphPad as well as user comments and bug alerts. Although GraphPad has gone through 2 full years of development, it's still a work in progress. I'm still adding features and capabilities to GraphPad and look forward to your insights and comments on how I can make my product better.

## Blog:

The Blog button allows for instant access to the GraphPad blog which I'm using to provide user updates, bug reports and additional training. The Blog button will turn red when there is a new post that has not be viewed by the user.

## Tips and Tricks:

Understanding how the Snap feature works is very important in attempting to draw extremely fine details. Points will attempt to snap close, ie - consolidate the points and reconnect lines when drawing a line, or dragging a point. Dragging a line, however, does not cause the snap to attempt to consolidate points, so if you need a very fine "bump-out", it's easier to draw a large bump-out, then drag the line so that it's the correct distance out. Attempting to draw an very short line will cause the end point to collapse on the start point.

You can also use the line length to create a very short line. Again, draw a longer line in the desired direction, then change the length to the actual length in the "Line" control and hit return. You can now use the end point of a short line as the start point for a new line, since the Snap is only attempting to consolidate the new line's points - and not all the points in the model. Using this technique, it's easy to capture extremely small details - like a "r" bump-out on a 20' wall.

Guidelines are also extremely useful in creating geometry. Guidelines are not altered themselves when creating points - unlike a normal line which will be automatically broken in two. In creating a grid, therefore, you can use a guideline and the intersection with any other lines to create points. Combined with the Offset in the Line Modification Form, Guidelines are very useful in creating precise drawings.

It's also useful to take advantage of the paging in order isolate parts of the drawing and to trace on top of images. Many of the symbols used in GraphPad were created by taking an picture, importing it to the second page in a new drawing, then changing the background on the first page to be clear. I usually turn the grid off on the image page, and set both pages to zoom together. Once the outline of the image has been captured, the lines can be grouped and scaled precisely using the Group Form. Demonstrating this technique for a roofing contractor revealed a number of weaknesses in earlier versions of GraphPad, which have since been corrected. Specifically, Large images were difficult to rotate into precise alignment with the grid, and were generally difficult to work with. The was addressed by making the imported image size a document setting and adding the incremental image rotation feature to the image menu. I would like to note this as a prime example of how GraphPad is

actively being developed to meet the needs of construction professionals, and invite users to submit suggestions for improving my product via the contact page on my website.