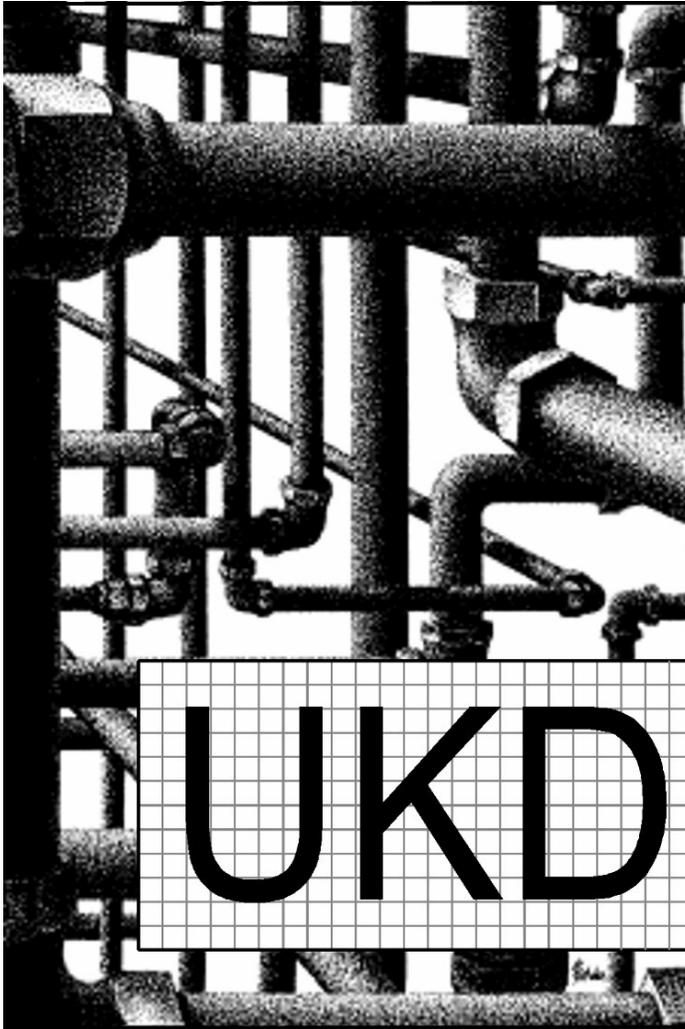


GASWorkS™ 10

UK Design Module Guide



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The information contained in this guide is intended to provide an overview of the optional UK Design Module (UKDM) associated with the GASWorkS software.

Introduction

The UK Design Module contains features developed specifically to closely support the requirements of the United Kingdom (UK) Institution of Gas Engineers guidance documents IGE/GL/1, IGE/TD/3, and IGE/TD/4. The UKDM includes various common UK specific design methods and practices, and features and routines which have been requested by past and current UK Users of GASWorkS.

The optional features associated with the UKDM include...

UKDM Features
<i>Dimensional Units Conversion Utility</i> - Allows a quantity in a specified dimensional unit (for example length in Metres) to be converted to an equivalent value in another selected dimensional unit (for example Feet).
<i>Fuel/Energy Type Comparison & Conversion Utility</i> - Allows a quantity in a specified fuel/energy type (for example KW electricity) to be converted to an equivalent value in another selected fuel/energy type (for example m3 of natural gas).
<i>Diversity Calculator Utility</i> - Allows calculation of diversified hourly loads based on specified heating type, annual heating load, and customer count.
<i>Pipe Segment Calculator</i> - Allows calculation of various hydraulic values associated with flow in a single pipe segment including pressure drop, maximum flow rate, minimum pipe size, maximum length, velocity, and more.
<i>Specialized Reports</i> - Provides four specialized reports, known as the Main and Service Authorisation Reports, and Main and Service Assumption Reports. The reports are saved in a comma separated values (.csv) format that can be viewed and manipulated in many third party spreadsheet applications.
<i>Pipe Property Table</i> - Special handling of the <i>Use When Sizing</i> and <i>Sizing Group</i> items is provided in the Pipe Property Table and Pipe Sizing routines.
<i>Pipe Attributes</i> - A custom linked pipe attribute file is provided to allow specialized handling of attributes along a pipe/main feature. A special type of pipe vertex, known as a Pipe Attribute Marker, is provided to allow segregating a pipe feature into multiple segments. Each segment can possess unique attribute values. Special commands are provided to allow manipulation and management of the attribute markers.

UKDM Features
<i>Customer Attributes</i> - A custom linked customer attribute file is provided to allow specialized handling of attributes along a customer service line and associated with a customer. A special type of service vertex, known as a Customer Attribute Marker, is provided to allow segregating a service line into multiple segments. Each segment can possess unique attribute values. Special commands are provided to allow manipulation of the attribute markers.
<i>Custom Fittings</i> - A set of specialized fittings are provided for use with the Service Sizing routines. This feature allows a fitting to be specified by type (for example a 90-degree elbow), as opposed to a specific size and type (for example a 63mm 90-degree elbow). The Sizing routine selects the appropriate size and associated equivalent length value depending on the required service size.
<i>Connections & Terminations</i> - Similar to the custom fittings, connections and terminations can be specified as a type (for example “Tapping Tee” or “House Entry”). The appropriate size and associated equivalent length value, depending on the required service size, will be used during the Sizing routine.
<i>Service Line Calculation</i> - A set of special features, attributes, commands, and Calculation routines are provided which support the calculation of the service line size, based on specified load data, configuration, and sizing criteria. The routine supports calculation of “composite” (dual sized) services.
<i>Special Graphic Display Features</i> - Attribute segment numbers and a change in size symbol for composite services can be displayed in the Graphic Data Interface (GDI) Window.
<i>Special Plotting Features</i> - A special map scale syntax is provided. A User defined Title Block can be included with the plot output. A special editor is provided for creating and revising a Title Block Definition.
<i>Bill Of Materials</i> - A routine is included to create a generic Bill Of Materials list for the associated project. The list includes User specified fittings, connections, and terminations - and automatically generated fittings, etc. The list can be viewed in GASWorkS or in any third party application that supports the “.csv” file format.

Some UK Users may be familiar with GASWorkS 8.0. This version of GASWorkS was a custom version only available to Fulcrum Connections and was never commercialized. Some of the features and data items found in the UKDM version of GASWorkS 10 are similar to features and items found in GASWorkS 8.0, however GASWorkS 10 does not wholly or completely duplicate the GASWorkS 8.0 features or data set.

In order to demonstrate and explain the features associated with the UKDM, this guide provides an example which steps the User through the creation and analysis of a “project” using the UKDM features, followed by documentation of the various UKDM features.

Hardware/Software Requirements

GASWorkS UK Design Module will operate on any device configured to run Windows™ 8 thru Windows™ 11. The GASWorkS UK Design Module software will require a minimum of 109 MB - of free hard disk space when installed with full documentation.

Useful Commands

GASWorkS provides a number of GDI Commands for entering, editing, calculating, and displaying the various model and supporting data associated with the design and analysis of a fuel piping system. Some of the GDI Commands are listed below. Those denoted with an “*” are specific to the UK Design Module. A full list of commands is included in the GASWorkS User’s Manual.

Add 2-Point Pipe	Display Isometric View
Add Feature To Group	Display Plan View
Add Polyline Pipe	Dissolve Group
Add Service Governor*	Edit User Table
Add User Graphic Line	Move Group
Add User Graphic Symbol	Move Node
Add User Text	Move Node Text
Add User Text - With Leader Line	Move Pipe Text
Copy Group	Move Polyline Pipe Vertex
Copy Pipe	Move User Graphic Line
Copy Pipe - Offset*	Move User Graphic Symbol
Copy User Graphic Line	Move User Text
Copy User Graphic Symbol	Pan GDI Image
Copy User Text	Plot GDI Image
Create Bill Of Materials*	Remove Feature From Group
Create User Table	Set Orthogonal Coordinates
Delete Bill Of Materials Table*	Set Orthogonal Coordinates - Plus
Delete Group	Snap Grid Intersections
Delete Pipe	Swap Pipe Ends
Delete Polyline Pipe Vertex	Tap Pipe
Delete Service Governor*	Trace
Delete User Graphic Line	Trace & Update Data
Delete User Graphic Symbol	Zoom To Fit
Delete User Text	Zoom Window

Getting Help - Contact Us

Hours - Our normal work hours are 8:00 A.M. to 5:00 P.M. Mountain Time, Monday through Friday. However if you have a problem, please try at any time, we may be in.

By Telephone - (719) 578-9391

By Email - help@b3pe.com

By Website - www.b3pe.com

EXAMPLE

In this example, a project will be developed for a simple piping system representing a small residential estate. Customer locations and service lines will be included. Diversified loads will be used. The service lines and main sizes will be calculated.

During the course of the example, the User will learn how to create a new project using the various UKDM commands and features. The example assumes that the User is already familiar with the various data entry, manipulation, display features, and commands associated with GASWorkS and specifically its Graphic Data Interface (GDI) Window. If you are not already familiar with these features, work the example in the GASWorkS Demonstration Guide before continuing with this example.

Note...

The model and associated attribute files will sometimes be referred to as a “project” when working with the UKDM features. As used in this example, in general, the term “model” refers to the hydraulic configuration that represents the piping configuration and connectivity, and the term “project” refers to the combination of the model data and attribute data.

Create A New Project

If GASWorkS is not already started, start it now. If a model is already open, close it now using the *Close* item from the *File* menu. The first step in creating a project is to create a new set of project files. To create a new project...

- From the *File* menu, select the *New Project* item. The Project Specifications screen will be displayed.
- Either accept the default *Model Name* or enter an appropriate name for the new project.
- Set the following values:

Template Model = **Default**
Preference Settings = **Default**
Default Settings = **ukdm**
Facility Settings = **Default**
Pipe/Main Sizing Table = **pipe_uk**
Service Sizing Table = **pipe_uk**
Attach A Linked Customer Attribute File = **Select**
File = **ukdm_def_c**
Attach A Linked Node Attribute File = **Unselect**
Attach A Linked Pipe Attribute File = **Select**
File = **ukdm_def_p**

- In the *Background Image Files* section, click the *Select From Existing DXF Files* command button.
- The File Selection screen will be displayed. Use the *Drives* and *Directories* lists to navigate to the **GASWorkS 10\Files** directory. Select the **estate_plat.dxf** file. Click the *Continue* command button.

Project Specifications...

Model Name...
ukdm_estate
Select From Existing Models

Template Model: Default
Preference Settings: Default
Default Settings: ukdm
Facility Settings: Default
Pipe/Main Sizing Table: pipe_uk
Service Sizing Table: pipe_uk

Attach A Linked Customer Attribute File: ukdm_def_c
 Attach A Linked Node Attribute File:
 Attach A Linked Pipe Attribute File: ukdm_def_p

Background Image Files...
C:\Program Files (x86)\GASWorkS 10\Files\estate_plat.dxf
Select From Existing DXF Files

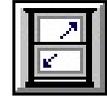
Cancel Open Save Continue...

Note...

The project specification data can be saved to a file and opened for future use. This is useful when creating a number of projects using similar default data values, etc. To save a specification, click the *Save* command button. To open a previously saved specification, click the *Open* command button.

- On the Project Specifications screen, click the *Continue* command button to create the project and open the GDI Window.

The GDI Window will display differently on different monitors. If the screen is too large or too small for your monitor, resize it now so that it fills your monitor. Click the *Maximize GDI Window* icon from the *GDI Window Controls Toolbar* to fit the window to your monitor.



The width of the Data Panel can be changed and set by the User. From the Data Panel list, select the *Settings & Actions* item, then select the *Set Data Panel Width* item. Enter a value by typing it in the GDI Prompt Line. Ensure the value is expressed as a percentage of the computer screens width.

- Click the *Zoom To Fit* icon to adjust the model display to fit the new screen size.



Set The Graphic Settings

Some graphic settings and options should be set and selected in order to efficiently work the example. To set and check the current graphic settings...

- From the *Graphics* menu, select the *Settings* item. The Graphic Settings screen will be displayed.

- In the *Settings* section, set the following values:

Customer Symbol Size = **3 % Of Display Width**

Customer Symbol Style = **Circle - Solid**

Flow Arrow Size = **2 % Of Display Width**

Node Symbol Size = **2 % Of Display Width**

Pipe Line Thickness = **3**

Pipe Symbol Size = **3 % Of Display Width**

Refresh Increment = **10 % Of Image**

- In the *Options* section, set the following options:

Allow Data Entry During New Feature Entry = **Select**

Automatically Pan & Zoom = **Select**

Display Flow Arrow Once Per Polyline Pipe = **Select**

Vary Resolution On Zoom = **Select**

- Click the *Apply* command button to close the screen and save changes.

Set The Default Data Values

By selecting the “ukdm” file for the *Default Settings* in the Project Specifications, the default data values should all be set correctly. However, it is always a good idea to check the settings before starting to enter pipe, node, and customer data. To check the current default data settings...

- From the *Utilities* menu, select the *Set Defaults* item. The Default Data Values screen will be displayed. On the *Dimensional Units* data tab, set the following:

Coordinates = Metres	Node Load = M3h
Customer Load = M3h	Pipe Flow Rate = M3h
Diameter = Millimetre	Pressure = Millibar
Efficiency = Decimal	Temperature = Celsius
Elevation = Metres	Velocity = Metres/sec
Heating Value = MJ/m3	Viscosity = Centipose
Length = Metres	

- The values on the *Hydraulic Data* tab, the *Gas Properties* data tab, and the *Miscellaneous* data tab should be correct.
- Click the *Close* command button to close the screen and save changes.

Set The Property Table Settings

The Sizing routines are dependent on having the correct Property Tables selected. To set and check the current Property Table settings...

- From the *File* menu, in the *Preferences* submenu, select the *Property Tables* item. The Property Table Selection screen will be displayed. Set the following values:

Pipe = **pipe_uk**
Regulator = **regulator**
Compressor = **compressor**
Valve = **valve**
Well = **well**
Fittings = **uk_fitting**

Pipe Sizing Group = **pipe_size_group_ukdm**

- Click the *Close* command button to close the screen and save changes.

Enter The Main Lines

The main lines will be entered by tracing over a background image. In general, the final main line configuration should be similar to that in Figure 1. In Figure 1, the dots (solid circles) reflect node locations, and the triangle symbols reflect the vertex locations (pipe deflection points).

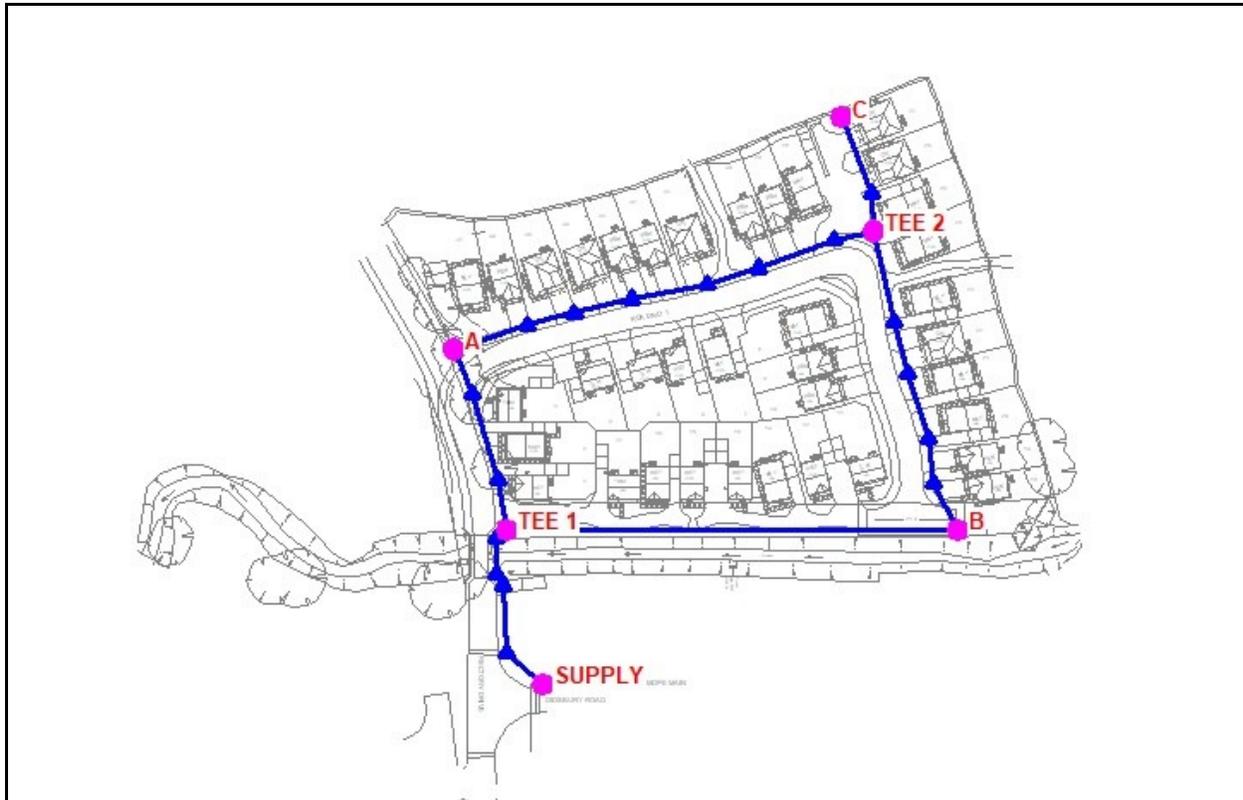
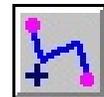


Figure 1

Enter the first pipe segment from the supply point (Node SUPPLY) to the location of the first intersection (Node TEE 1) using a polyline type pipe. See Figure 2.

- Click the *Add Polyline Pipe* icon from the *Graphic Construction Commands Toolbar*.
- For the *From Node Location*, move the mouse crosshairs to the desired location and left-click the mouse.



- The Node Data will be displayed in the Data Panel. In the *Hydraulic Data Items* section, set the following values:

Name = **SUPPLY**
Pressure = **30**
Pressure Units = **Millibar**
Pressure Known = **Yes**
Base Load = **0**
Load Units = **M3h**
Base Load Known = **No**

- Click the *Apply Data Values* command button to save and apply the changes.
- For the *Next Vertex* prompts, draw the pipe lines by moving the mouse crosshairs to the appropriate deflection points and the *To Node Location*, then left-click the mouse (see Figure 1). After the *To Node Location* has been entered, right-click the mouse to end the drawing process.
- The Node Data will be displayed in the Data Panel. In the *Hydraulic Data Items* section, set the following values:

Node Name = **TEE 1**
Pressure = **0**
Pressure Units = **Millibar**
Pressure Known = **No**
Base Load = **0**
Load Units = **M3h**
Base Load Known = **Yes**

- Click the *Apply Data Values* command button to save and apply the changes.
- The Pipe Data will be displayed in the Data Panel.

- In the *Pipe Sizing Items* section, set the following values:

Allow Sizing = **Yes**
Sizing Group = **MDPE**

- In the *Miscellaneous Data Values* section, set the following values:

Facility Type = **Main - Low Pressure**

- In the *Attribute Data Values* section, set the following values:

Link To Database = **Yes**
Address Street = **Rectory Drive**
Include In Report = **Yes**
Product Type = **Lay To New**

Segment 1 -

Surface Category - 1 = **Open Trench**
Ownership - 1 = **Public**
Orientation - 1 = **Horizontal Below Ground**
Joint Type - 1 = **Butt Fusion**
Packaging Type - 1 = **Stick - 12 Metres**
Reinstatement Method - 1 = **None**

- Click the *Apply Data Values* command button to save and apply the changes.

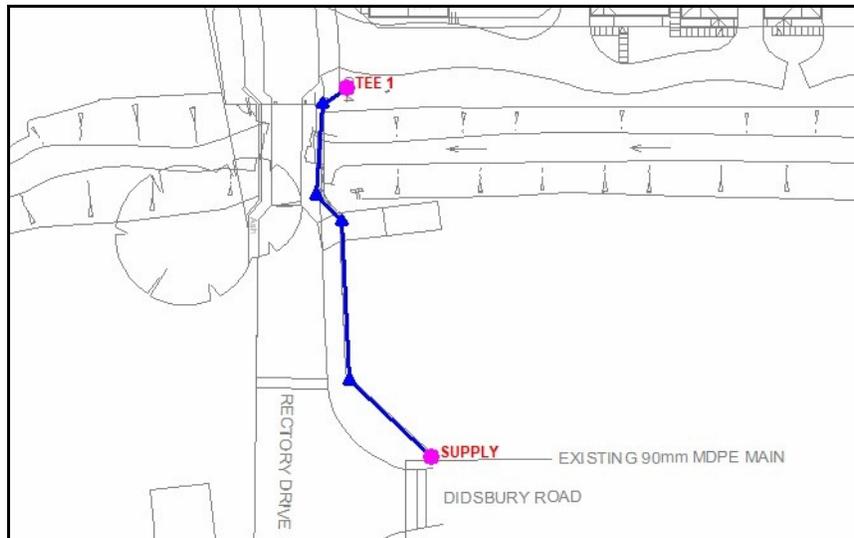


Figure 2

- Add the remaining main line piping using the various *Graphic Construction*, *Zoom*, and *Pan* commands. Ensure that the adjacent pipe ends are “snapped” together by turning “on” the Feature Snap. For now, use the default data values and settings for the remaining pipes and nodes, but change the node *Names* as displayed on Figure 1. The completed piping system should look similar to Figure 1.

- To turn “on” the Feature Snap, click the *Feature Snap* icon from the lower-left corner of the GDI Window until the icon is darkened. The Feature Snap will cause a new pipe end to be snapped a node falling within the “target” symbol. Using the Feature Snap will help ensure that the pipe ends are properly connected.



Note...

With the exception of the node names and certain attribute values, the hydraulic and attribute data values for a new pipe will default to the values entered for the last pipe in the model. When entering new pipes, since the *Allow Data Entry During New Feature Entry* graphic setting option has been selected, the appropriate values will be displayed for the Pipe Data. If for some reason the data values need to be changed, use the *Edit Pipe Data* command.



Enter Customer Locations

The customers will be entered using several techniques. A single polyline customer will be added, a set of “dual” customers will be added, and multiple customers will be added using the “*Auto Assign Main*” command. The resulting customer locations and service line configurations should be similar to Figure 3.

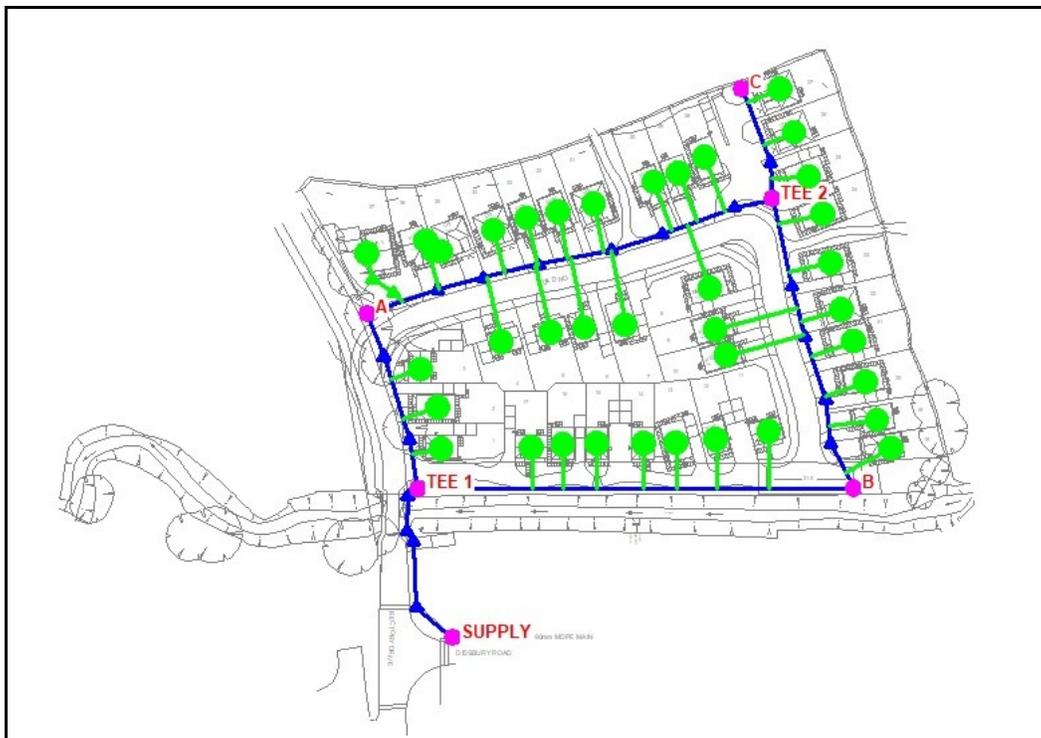


Figure 3

Add A Polyline Customer

Enter the first customer as a polyline customer service. In this case, the service to Lot 37 will be entered as a polyline type service as shown on Figure 4.

- Use the *Zoom Window* icon from the *View Controls Toolbar* to select a zoom window around Lot 37 (in the upper-left/northwest corner of the estate).
- Click the *Add Polyline Service Customer* icon from the *Customer Commands Toolbar*.
 - For the *Main Tap Location*, move the mouse crosshairs near the desired tap location and left-click the mouse.
 - For the *Next Vertex* prompts, draw the service line by moving the mouse crosshairs to the appropriate deflection points (vertices) and the meter location, then left-click the mouse (see Figure 4). After the meter location has been entered, right-click the mouse to end the drawing process.
 - The *Customer Data* will be displayed in the *Data Panel*.

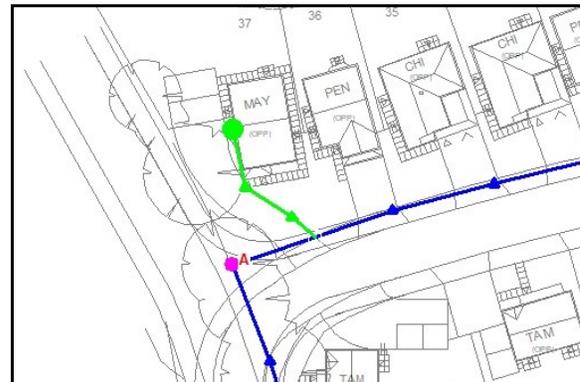


Figure 4

- In the *Hydraulic Data Items* section, set the following values:

Node Load Application = **Diversified**
 Heating Type = **Wet-Central Post 1976**
 Per Unit Load = **-17500**
 Load Units = **kWh**

- In the *Attribute Data Values* section, set the following values:

Link To Database = **Yes**
 Address Street = **Rectory Drive**
 Address Number = **1**
 Alias = **Lot 37**
 Include In Report = **Yes**
 Hourly Demand = **-3**
 Hourly Demand Units = **M3h**

Service Type = **Single Service**
Product Type = **Lay To New**
Allow Sizing Calculation = **Yes - Composite Sized Service**

Segment 1 -

Sizing Group - 1 = **MDPE**
Surface Category - 1 = **Open Trench**
Ownership - 1 = **Private**
Orientation - 1 = **Horizontal Below Ground**
Joint Type - 1 = **Butt Fusion**
Packaging Type - 1 = **Coil - 100 Metres**
Reinstatement Method - 1 = **None**

Connection Type = **Tapping Tee**
Termination Type = **House Entry**
Meter Type = **U6**
Housing Type = **None**
Allowable Pressure Drop = **2**

- Click the *Apply Data Values* command button to save and apply the changes.

Note...

If the *Use Last Record For Default Values* preference setting option is selected, when a new customer is added to the model, with the exception of certain attribute data, the default hydraulic and attribute data for the new customer is taken from the data for the last customer in the model. It is a good idea to make sure that the data for the first customer is as desired. This will save data entry and revision time when constructing the model. When entering new customers, if the *Allow Data Entry During New Feature Entry* graphic settings option has been selected, enter appropriate values when the Customer Data is displayed in the Data Panel, otherwise enter the values using the *Edit Customer Data* command.



Add Branched/Dualed Customers

Branched or dualed customers consist of a trunk and a branch customer. Dualed customers are entered by first entering the trunk customer, then entering the branch customer. In this case, the service to Lot 35 and 36 will be entered as a dualed service as shown in Figure 5. Lot 36 will be the trunk customer and Lot 35 will be the branch customer.

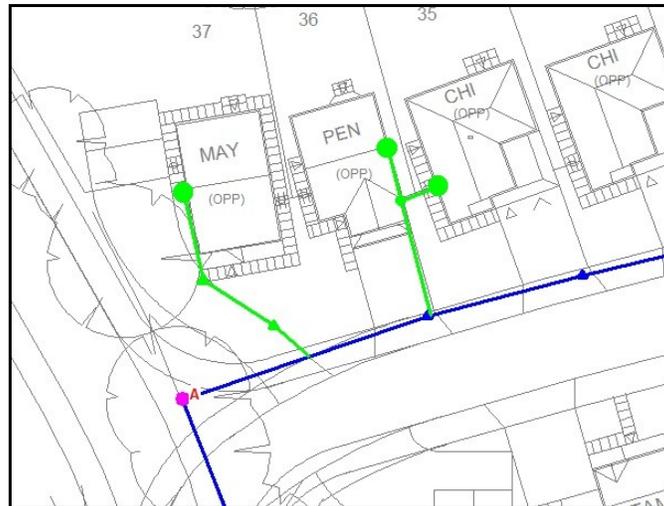
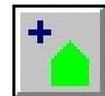


Figure 5

- Use the various *Pan* and *Zoom* commands as appropriate to make Lots 35 and 36 visible in the GDI Display.

Enter the trunk customer (Lot 36) first. In this case, we will use a simple two-point style customer type.

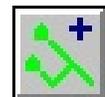
- Click the *Add Customer* icon from the *Customer Commands Toolbar*.



- For the *Customer Location* (meter), move the mouse crosshairs near the desired location and left-click the mouse.
- For the *Supply Main*, move the mouse pointer near the desired main and left-click the mouse.
- The Customer Data will be displayed in the Data Panel. The default model data values should be correct. Review and revise the attribute data as appropriate. If changes are made click the *Apply Data Values* command button, or if no changes have been made click the *Continue* command button or right-click the mouse.

Next, enter the branch customer (Lot 35).

- Click the *Add Branch Customer* icon from the *Customer Commands Toolbar*.



- For the *Branch Customer Location*, move the mouse crosshairs to the desired location and left-click the mouse.
- For the *Customer To Branch From*, move the mouse pointer near the previously entered

“trunk” customer (Lot 36) and left-click the mouse.

- For the *New Tap Location*, move the mouse crosshairs near the desired location and left-click the mouse.
- The Customer Data will be displayed in the Data Panel. The default model data values should be correct. Review and revise the attribute data as appropriate. If changes are made click the *Apply Data Values* command button, or if no changes have been made click the *Continue* command button or right-click the mouse.

Note...

- The trunk portion of the dualled service can be entered using either a single two-point style customer (as done in this example) or as a polyline style customer. If the trunk portion is entered as a two-point style customer, it will automatically be converted to a polyline style customer when the branch customer is attached to it.
- Once initially entered, vertex points can be added to either the trunk or branch portions of a dualled service to more realistically represent the actual service configuration.

Add Auto-Assigned Customers

Enter the remaining customers using the “*Auto Assign Main*” command. When using the “*Auto Assign Main*” command, the customer location is selected by the User, and the supply main is automatically assigned to the pipe geographically closest to the selected customer location. The Customer Data is only displayed for the first customer when entering customers using the “*Auto Assign Main*” command. Enter the remaining customers using the “*Auto Assign Main*” command (see Figure 3).

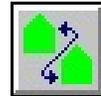
- Click the *Add Multiple Customers - Auto Assign Main* icon from the *Customer Commands Toolbar*.



- For the *Customer Location*, move the mouse crosshairs near the desired location for the first customer and left-click the mouse.
- The Customer Data will be displayed in the Data Panel. Review the data and make changes as appropriate. The model data for the new customers will be the same as the previously entered customers. If changes are made click the *Apply Data Values* command button, or if no changes have been made click the *Continue* command button or right-click the mouse.
- The *Select Customer Location* prompt will continue to be displayed. Add the locations of the remaining customers by left-clicking the desired locations. After the last customer location has been added, right-click the mouse.

Note...

- In an actual project, vertices would probably be added to all of the service lines to more closely indicate the actual service line routing and configuration. Attribute markers would probably be added to all of the service lines to indicate changes in surface type, etc.
- Once entered, the customer locations, service line tap, deflection locations, and supply mains can be altered or changed using the various *Edit Customer Data* commands.
- The graphic length of the service line is used as the basis for the base hydraulic length when performing sizing and pressure drop calculations. If the lengths are not correct, appropriate values can be manually entered for each segment of the service line using the “Pipe Length” item in the customer *Attribute Data Values*.
- The tap location of two-point and auto-assigned customers is automatically selected by GASWorkS. The location is calculated by attempting to force the service line to run perpendicular from the main to the customer symbol location. Once entered, the tap location for these types of customers can be manually relocated using the *Move Service Tap* command. The tap location of polyline type customers is selected during the entry process.



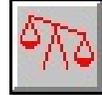
Calculate The Main Sizes

In general, the GASWorkS Pipe Sizing routine requires three steps in order to perform correctly. The steps include:

- 1) Establish which pipe sizes can be used during the Sizing process by creating a new or revising an existing Pipe Property Table. The Pipe Property Table contains information about the pipe size and material. The table entries are referenced to a Size/Type Code. A “standard” UKDM style Pipe Property Table is installed when the software is installed. The table can be copied, modified, or revised as desired by the User. The table should not need to be revised for this example. Additional information on working with the Property Tables is provided later in this guide and in the GASWorkS User’s Manual.
- 2) Establish which mains/pipes can be sized and what Sizing Group to associate them with. Individual pipe segments may be set to allow sizing or not. The Property Table Report can be used to review which sizes are allowed during the Pipe Sizing process. If a project contains both existing mains and proposed mains, the existing mains would be set so that they are not included in the Pipe Sizing process. In this example, all mains will be allowed to be sized. The *Edit Pipe Data* command or Pipe Data Report can be used to review the allow sizing and Sizing Group settings.
- 3) Establish the pressure and velocity criteria. These values are set using the *Pipe Sizing Control* data tab on the Solution Data screen.

If the previous steps and settings described in this example have been followed correctly, the first two steps should have already been completed. Use the following instructions to complete the third step, to solve and calculate main/pipe sizes.

- Click the *Solve* icon from the lower-right corner of the GDI Window. The Solution Data screen will be displayed.



- On the *Solution Data* tab, set the following values:

Convergence Tolerance = **0.1 M3h**
Reset Unknown Node Pressures To Zero = **Select**
Atmospheric Pressure = **Handbook Of Chemistry & Physics**
Diversity = **IGE/GL/1 Appendix A5.1.5**

- On the *Other Settings* data tab, set the following values:

Base Pressure = **1013.25 Millibar**
Base Temperature = **15 Celsius**

- On the *Pipe Sizing Control* data tab, set the following values:

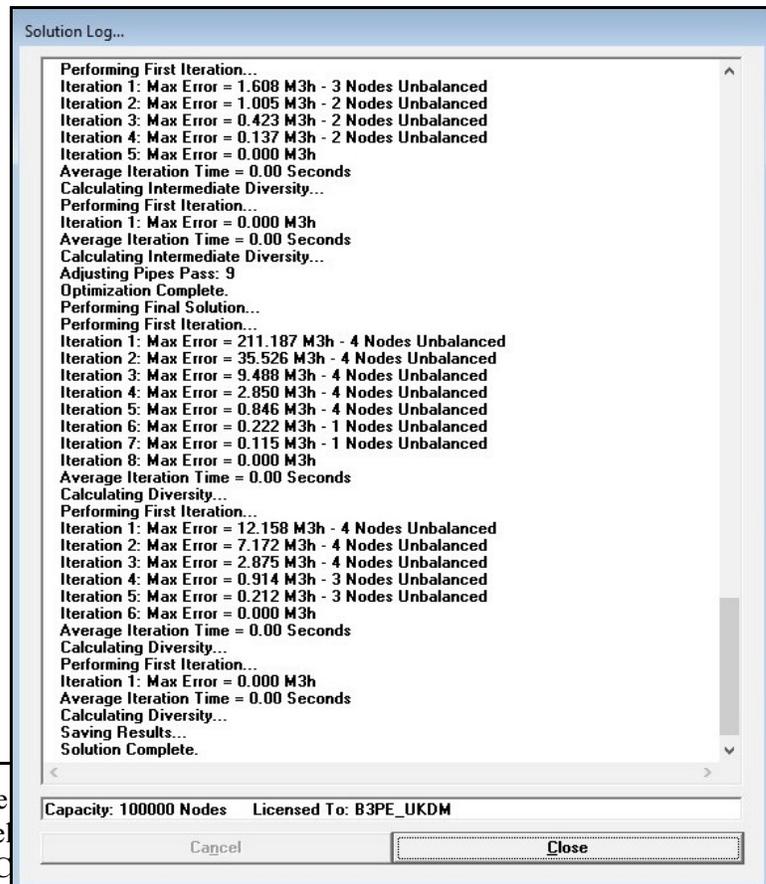
Condition Nodes = **(Empty)**
Condition Pressure = **(Empty)**
System Pressures = **22 Millibar**
Pressure Values Are = **Minimums**
Maximum Velocity = **20 Metres/sec**

Pass Limit = **100 Number Of Passes**
Path Processing = **Flow-Pressure Drop Processing**
Optimize By = **Size**
Facility Type = **Main - Low Pressure**
Reset Diameters To Minimum Size = **Select**
Pipe Sizing Table = **pipe_uk**

- Click the *Solve & Calculate Pipe Sizes* command button.

• While the solution is being performed, the Solution Log will be displayed. The Solution Log displays the solution activity and informs the User when the solution and Pipe Sizing process is complete. Upon completion of the solution, review the last few lines of the Solution Log - they should indicate that the pipe sizing was successfully completed. Click the *Close* command button to close the Solution Log and return to the GDI Window.

If the solution was successfully completed, the *Solve* icon will change when the Solution Log is closed. The balance scale image on the icon will display in a balanced position if the solution was successful, indicating that the model status is balanced.



Note...

- The Solution Log displays the node errors should start relative error is less than the specified C indicate that the pipe sizing and solution are “complete”. The last line should display “Pipe Sizing Complete”. If the solution is not complete, recheck the project/model creation steps, correct any errors you encounter, then re-solve and recalculate the model.
- The actual values reported on the Solution Log will vary from those displayed because of the different hydraulic lengths, which are a result of manually adding the pipe configuration and customer assignments.
- For more information on the Pipe Sizing process, refer to the GASWorkS User’s Manual.

View The Analysis Results

After the solution has successfully been completed, the resulting node pressure values and pipe sizes can be viewed individually using the *Edit Pipe Data* or *Edit Node Data* commands, or the values can be displayed in the GDI Window. To display the results:

- Click the *Text Display Settings* icon from the *Display Controls Toolbar*. The Text Display Settings screen will be displayed.



- On the *Pipe Items* data tab, set the following values:

Display Pipe Text Items = **Select**

Text Color = **Dark Color**

Note - To set a Color, click in the color box. The Color Palette will be displayed. Select the desired color, then click the *OK* command button.

Pipe Size/Type Code = **Select**

Pipe Velocity = **Select**

- On the *Node Items* data tab, set the following values:

Display Node Text Items = **Select**

Node Pressure = **Select**

- Click the *Apply* command button to apply the changes to the display.

To make the display of the results more readable...

- Turn “off” the customer symbol display by clicking the *Display Customer Symbols* icon on the *Customer Commands Toolbar*. Click the icon until the symbol display is turned “off”.



- If the text is not already displayed opaquely, turn “off” the transparent text display. Click the *Text Display Settings* icon from the *Display Controls Toolbar*. The Text Display Settings screen will be displayed. On the various data tabs, unselect the *Transparent Font* option. Click the *Apply* command button to save and apply the changes.



The pressure values, flow directions, and pipe sizes should be similar to those shown in Figure 6.

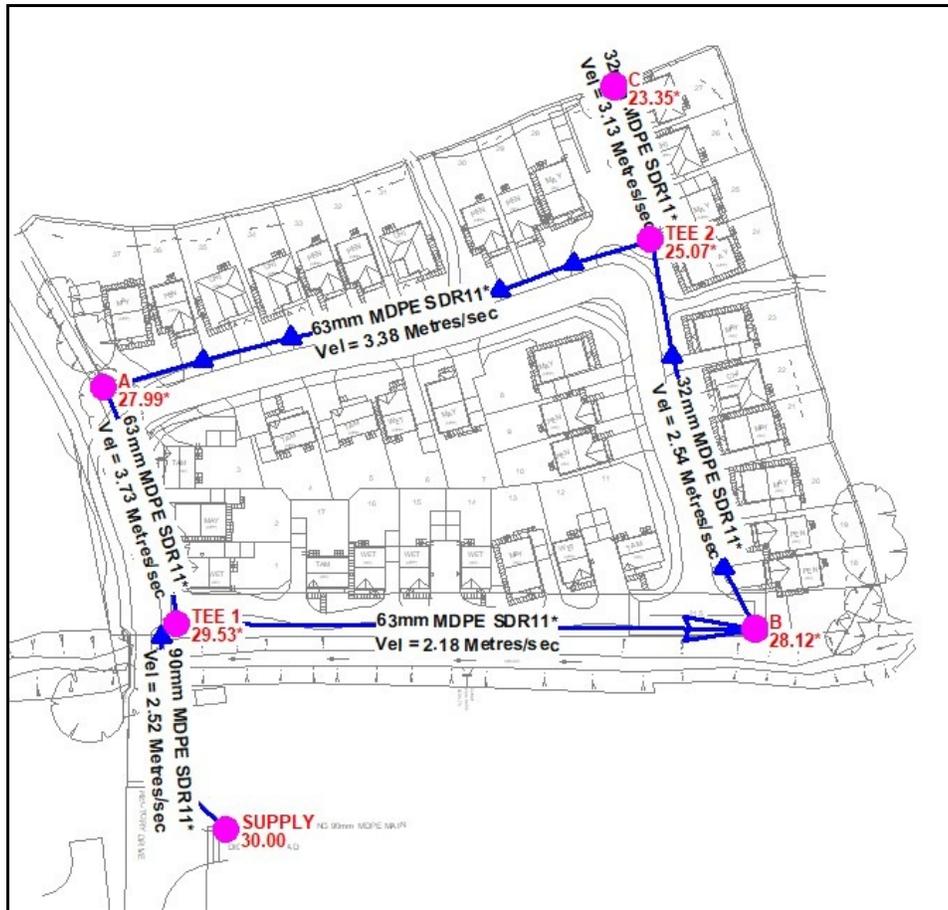


Figure 6

Note...

- As a result of the “hand drawn” pipe segments, each example model is created slightly different. Therefore the results will be slightly different for each model. The results, however, should be similar to those shown in Figure 6.
- The displayed pressure values represent the estimated pressure for each node point. The velocity values indicate the maximum estimated velocity for the associated segment.

Note...

- The pressure and velocity limits set in the Pipe Sizing Control data (Solution Data screen) establish the maximum and minimum acceptable limits for the associated values. After the Pipe Sizing routine has successfully been completed, the pressure values should all be greater than or equal to the specified system pressures value, and the velocities should all be less than or equal to the specified maximum velocity value.
- Because actual pipe sizes are used, as opposed to theoretical internal diameters, seldom will the pressures or velocities exactly equal the specified limit values.
- You may want to move the text values so the display is more readable. Use the *Move Pipe Text* or *Move Node Text* commands to reposition the associated text values.

Calculate The Service Sizes

If the results of the Pipe Sizing process are acceptable, the service sizes can then be calculated. The main sizes and system pressures should always be established before using the Service Sizing routine.

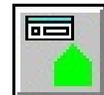
- To size all of the services, click the *Calculate All Service Sizes* icon from the lower-right corner of the GDI Window. A message may be displayed when the calculation is complete. Click the *OK* command button to clear the message.



- If the customer symbols were previously turned “off”, turn the customer symbols back “on” by clicking the *Display Customer Symbols* icon from the *Customer Commands Toolbar*. Click the icon until the customer symbols are displayed.



- View the sizing results using the *Edit Customer Data* command. If the service sizes are not as expected, double-check the customer data entry and recalculate the service sizes.



Note...

- To calculate the service size for an individual customer, select a customer, then select the *Calculate All Service Sizes* item from the *Actions* section of the Customer Data in the Data Panel.
- The services are calculated using the methods described later in this guide.
- Although the “composite size” option was set for all of the services, there were no composite results from the Pipe Sizing process because the lengths are too short.

This last task concludes the example. The remainder of this guide describes the various data screens, data items, methods, and features unique to the UKDM.

MENU ITEMS

This section provides a general description and reference for using the menu items unique to the UK Design Module. Grouped by functional topic, procedures are described for using each of the menu items available in the menu lists. Most of the menu items will launch a data screen or specification screen. Further information describing the use of those screens is provided in the following sections of this guide. *Note* - Certain menu items will not be displayed if a model is not open.

Edit - Enter & Edit Data

The following UKDM menu items are included in the *Edit* menu. The routines found in the *Edit* menu are described in the following sections.

Title Block Definition - View/Edit The Title Block Definition

The *Title Block Definition* item provides access to the Title Block Definition screen. To view or edit the Title Block Definition...

- From the *Edit* menu, select the *Title Block Definition* item.
- The File Selection screen will be displayed. Either enter the desired name in the *Filename* data field, or select an existing name from the *Files* list. If a valid file name has not been found, a message will be displayed asking to create the file - respond appropriately. When a valid file name has been entered, click the *Continue* command button.
- The Title Block Definition screen will be displayed. Make any desired changes, then click the *Close* command button to close the screen.

Notes & Considerations

- See the *Title Block Definition Screen* topic in the *Data Screens* section for a detailed description of its features.

Analysis - Calculating Values

The following UKDM menu items are included in the *Analysis* menu. The routines found in the *Analysis* menu are described in the following sections.

Calculate Conversion - Dimensional Unit & Fuel Type Conversions

The *Calculate Conversion* item displays the Conversion Calculator screen. To calculate a conversion...

- From the *Analysis* menu, select the *Calculate Conversion* item.
- The Conversion Calculator screen will be displayed.
 - For Dimensional Unit conversions, on the *Dimensional Units* data tab, enter the *Known Value* (quantity) and select the associated dimensional unit. Select the desired *Converted Value* dimensional unit. The calculation will be performed when either the *Enter* key is pressed in the *Known Value* data field, or a new dimensional unit is selected from either dimensional units list.
 - For Fuel Type conversions, on the *Fuel Types* data tab, enter the *Known Value* (quantity), select the associated dimensional unit, and select the associated fuel type. Select the desired *Converted Value* dimensional unit and fuel type. The calculation will be performed when either the *Enter* key is pressed in the *Known Value* data field, or a new dimensional unit or fuel type is selected from either of the dimensional units or fuel type lists.
- Click the *Close* command button to close the screen.

Notes & Considerations

- See the *Conversion Calculator Screen* topic in the *Data Screens* section for a detailed description of its features.

Calculate Diversity - *Calculate Hourly Usage*

The *Calculate Diversity* item displays the Diversity Calculator screen. To calculate hourly usage from annual usage data...

- From the *Analysis* menu, select the *Calculate Diversity* item.
- The Diversity Calculator screen will be displayed. Click the *Clear* command button to reset any previously entered values.
 - Select the *Annual Usage* and *Hourly Usage* dimensional units.
 - Select a *Diversity Calculation Method*.
 - For each *Housing Style*, enter the associated *Annual Usage* value and the *Customer Count*.
 - The calculation will be performed when either the *Enter* key is pressed in one of the data fields, when one of the dimensional units is changed, or when the *Calculate* command button is clicked.
- Click the *Close* command button to close the screen.

Notes & Considerations

- See the *Diversity Calculator Screen* topic in the *Data Screens* section for a detailed description of its features.

Calculate Pipe Segment Values - *Calculate Pipe Flow Values*

The *Calculate Pipe Segment Values* item displays the Pipe Segment Calculator screen. To calculate pipe flow and pressure values...

- From the *Analysis* menu, select the *Calculate Pipe Segment Values* item.
- The Pipe Segment Calculator screen will be displayed.
 - Any of the items with a red colored label may be calculated. Select the desired item to be calculated by clicking on the associated label (that label will be underlined). The item that is underlined is the item that will be calculated.

- Select the desired dimensional units. Enter the various known data values. *Note* - See the Pipe Segment Calculator screen description later in this guide for more information on the use of fittings or calculating pipe sizes.
- Click the *Calculate* command button to calculate the specified item and display the various other calculated values.
- Click the *Close* command button to close the screen.

Notes & Considerations

- See the *Pipe Segment Calculator Screen* topic in the *Data Screens* section for a detailed description of its features.

Report - Reporting Values

The following UKDM menu items are included in the *Report* menu. The routines found in the *Report* menu are described in the following sections.

Assumption & Authorisation

The *Assumption & Authorisation* item displays a specially formatted report known as the Assumption & Authorisation Report. To display the report...

- From the *Report* menu, select the *Assumption & Authorisation* item.
- The Assumption & Authorisation Report will be displayed. Select the data tab associated with the facility and report type to be viewed. The report contents can be scrolled and printed similar to other GASWorkS reports.
- Click the *Close* command button to close the report.

Notes & Considerations

- See the *Assumption & Authorisation Report* topic in the *Data Screens* section for a detailed description of its features.

Bill Of Materials

The *Bill Of Materials* item generates and displays a Bill Of Materials Report for the associated project. To display the report...

- From the *Report* menu, select the *Bill Of Materials* item.
- *Note* - If a Bill Of Materials Report already exists for the model, a message will be displayed asking whether to recreate the Bill Of Materials - respond accordingly.
- The Bill Of Materials Report will be displayed. Select the data tab associated with the materials type to be viewed. The report contents can be scrolled and printed, similar to other GASWorkS Reports.
- Click the *Close* command button to close the report.

Notes & Considerations

- See the *Bill Of Materials Report* topic in the *Data Screens* section for a detailed description of its features.

DATA SCREENS



The previous section described the function of the unique UK Design Module menu items. In that section, several data screens and specification screens were introduced. This section provides a detailed description of those screens.

Instructions for negotiating the data screens, and for entering and selecting data values, are provided in the *General Information* section of the GASWorkS User’s Manual. The following pages present a description for each of the unique screens used with the UK Design Module. The descriptions are listed in alphabetical order based on the screen name.

Assumption & Authorisation Report

The Assumption & Authorisation Report routine creates a multi-tabbed report, where each data tab represents a separate section of the report. To view the report, select the *Assumption & Authorisation* item from the *Report* menu. The features associated with the report are described as follows.

Main Assumptions Tab

From Node	To Node	Facility Type	Pipe/Conx/Gov Specification	Length	Length Unit	Pressure Tier	Surface Category	Public or Private
SUPPLY	TEE 1	Main	63mm MDPE SDR11	4287	Centimetre	LP	Open Trench	Public
TEE 1	A	Main	63mm MDPE SDR11	4366	Centimetre	LP	Open Trench	Public
TEE 1	B	Main	63mm MDPE SDR11	10914	Centimetre	LP	Open Trench	Public
B	TEE 2	Main	63mm MDPE SDR11	7651	Centimetre	LP	Open Trench	Public
TEE 2	C	Main	63mm MDPE SDR11	3085	Centimetre	LP	Open Trench	Public
TEE 2	A	Main	63mm MDPE SDR11	10366	Centimetre	LP	Open Trench	Public

Displayed Items

Facility Type - Specifies the assigned Facility Type of the main that the customer is attached to. The customer inherits the same Facility Type as the assigned main.

From Node - Specifies the name of the beginning node of the associated main feature.

Length - Specifies the hydraulic length for a main feature. The value is expressed in the *Length Unit*.

Length Unit - Specifies the length dimensional units for the associated main feature.

To Node - Specifies the name of the ending node of the associated main feature.

Service Assumptions Tab

No	Alias	Address	Service Type	Conx/Pipe/Gov Spec	Length	Length Units	Surface Category	Ownership	Jointing Type	Load
		Rectory Drive	Single Service							
			Conx	Tapping Tee						
			Source	63mm MDPE SDR11						
			Segment 1		760	Centimetre	Open Trench	Private	Butt Fusion	
		Rectory Drive	Single Service							
			Conx	Tapping Tee						
			Source	63mm MDPE SDR11						

Displayed Items

Length - Specifies the length for a service feature. The value is expressed in the *Length Units*.

Length Units - Specifies the length dimensional units for the associated service feature.

Load - Specifies the load value for each customer “unit”. A negative value indicates a demand (flow leaving the system), and a positive value indicates a supply (flow entering the system). The value is expressed in the *Load Units*.

Load Units - Specifies the dimensional units for the *Load* value.

Main Authorisation Tab

From Node	To Node	Facility Type	Main/Gov Specification	Length	Length Unit	Flow Rate	Flow Units	Velocity	Velocity Units	Inlet Pre
SUPPLY	TEE 1	Main	63mm MDPE SDR11	4287	Centimetre	39.519	M3h	5.1	Metres/sec	
TEE 1	A	Main	63mm MDPE SDR11	4366	Centimetre	24.098	M3h	3.1	Metres/sec	
TEE 1	B	Main	63mm MDPE SDR11	10914	Centimetre	21.300	M3h	2.7	Metres/sec	
B	TEE 2	Main	63mm MDPE SDR11	7651	Centimetre	12.257	M3h	1.6	Metres/sec	
TEE 2	C	Main	63mm MDPE SDR11	3085	Centimetre	6.216	M3h	0.8	Metres/sec	
TEE 2	A	Main	63mm MDPE SDR11	10366	Centimetre	-19.034	M3h	2.4	Metres/sec	

Displayed Items

Customer Count - Specifies the number of customers attached to the associated main feature.

Facility Type - Specifies the assigned Facility Type of the main that the customer is attached to. The customer inherits the same Facility Type as the assigned main.

Flow Rate - Displays the calculated flow rate value. A positive value indicates that the flow direction is from the From Node to the To Node, and a negative value indicates that the flow direction is from the To Node to the From Node. The value is expressed in the *Flow Units*.

Flow Units - Specifies the dimensional units of the flow rate value.

From Node - Specifies the name of the beginning node of the associated main feature.

Inlet Pressure - Specifies the inlet pressure value for the associated main feature. The value is expressed in the *Pressure Units*.

Length - Specifies the hydraulic length for a main feature. The value is expressed in the *Length Unit*.

Length Unit - Specifies the length dimensional units for the associated main feature.

Outlet Pressure - Specifies the outlet pressure value for the associated main feature. The value is expressed in the *Pressure Units*.

Pressure Drop - Displays the linear pressure drop across a main segment or device (the From Node Pressure minus the To Node Pressure). *Note* - When elevation differences are present along the main segment, it is possible for the downstream pressure to be larger than the upstream pressure. A positive value indicates that the From Node pressure is larger than the To Node pressure, and a negative value indicates that the To Node pressure is greater than the From Node pressure.

Pressure Units - Specifies the dimensional units of the pressure values.

To Node - Specifies the name of the ending node of the associated main feature.

Velocity - Specifies the maximum velocity of the gas flow in the main feature. The value is expressed in the *Velocity Units*.

Velocity Units - Specifies the dimensional units of the velocity value.

Service Authorisation Tab

No	Alias	Address	Service Type	Conx/Pipe/Gov Spec	Length	Length Units	Hourly Load	Hourly Load Units	Heating Type
*		Rectory Drive	Single Service						
			Conx	Tapping Tee					
			Source	63mm MDPE SDR11					
			Segment 1		760	Centimetre	3.000	M3h	Div-Wet>76
		Rectory Drive	Single Service						
			Conx	Tapping Tee					
			Source	63mm MDPE SDR11					

Displayed Items

Heating Type - Specifies the space heating type when “Diversified” is selected for the *Node Load Application*.

Hourly Load - Specifies the... The value is expressed in the *Hourly Load Units*.

Hourly Load Units - Specifies the hourly load dimensional units for the associated service feature.

Inlet Pressure - Specifies the inlet pressure value for the associated service feature. The value is expressed in the *Pressure Units*.

Length - Specifies the length for a service feature. The value is expressed in the *Length Units*.

Length Units - Specifies the length dimensional units for the associated service feature.

Outlet Pressure - Specifies the outlet pressure value for the associated service feature. The value is expressed in the *Pressure Units*.

Pressure Drop - Displays the linear pressure drop across the service main segment.

Pressure Units - Specifies the dimensional units of the pressure values.

Velocity - Specifies the maximum velocity of the gas flow in the service feature. The value is expressed in the *Velocity Units*.

Velocity Units - Specifies the dimensional units of the velocity value.

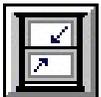
Icons



Maximize Screen Size - Increases the Assumption & Authorisation Report's size to fill the GASWorkS display.



Print - Prints the contents of the currently displayed data tab. When clicked, the Print Settings screen is displayed.



Reset Screen Size - Sets the Assumption & Authorisation Report's size to its "normal" dimensions and position.

Command Buttons

Close - Closes the Assumption & Authorisation Report.

Notes & Considerations

- The contents of the report are derived from the various hydraulic and attribute data associated with the pipes/mains and customers in the model.
- The contents of the report are saved in a comma separated values (*.csv) format file which can be opened, viewed, and edited in any third party application that supports that file type (for example, Microsoft Excel). Each section of the report is stored in an individual file. The files are named the same as the model but possess a double extension as follows:

<i>Extension</i>	<i>File Type</i>
.car.csv	Service (Customer) Authorisation Report
.cas.csv	Service (Customer) Assumption Report
.mar.csv	Main (Pipe) Authorisation Report
.mas.csv	Main (Pipe) Assumption Report



- If the contents or format of the report are changed by a third party application and saved to the original name, the contents may not be viewable in GASWorkS.
- If the report gets hidden behind another open screen or window, make the report activate (the window on the top of the report stack) by clicking on any visible portion of the report's screen, or select the report's name from the *Window* menu.
- Normally the report will contain more information than will fit on a single page. If this condition occurs when trying to print, a message will be displayed. When the message is displayed, respond appropriately. To print a report that is too wide for the printer, either set the printer to use *Landscape Orientation*, or reduce the printer font size.
- The *Include In Report* item in the *Attribute Data Values* of the associated data, controls which pipe and customer features are included in the report. Only pipes or customers where the *Include In Report* item is set to "Yes", are included in the report.



Bill Of Materials Report

The Bill Of Materials routine creates a Bill Of Materials Report and displays a multi-tabbed report, where one data tab represents the pipe/main materials and the other data tab represents the service/customer materials. To display the report, either select the *Bill Of Materials* item from the *Report* menu or select the *Create Bill Of Materials* command. The features associated with the report are described as follows.

ITEM_CODE	ITEM_TYPE	SIZE/TYPE_1	SIZE/TYPE_2	FACILITY	PRODUCT	SURFACE
MCONA		63mm MDPE SDR11	63mm MDPE SDR11			
MJNTA	Butt Fusion	63mm MDPE SDR11				
MPIPE		63mm MDPE SDR11		Main - Low Pressure	Lay To New	Open Trench
MTEEA		63mm MDPE SDR11				
MTRMA		63mm MDPE SDR11				

Displayed Items

FACILITY - Displays the *Facility Type* assigned to the associated item.

ITEM_CODE - Displays a code that identifies the type of item associated with the current record in the list. Items associated with mains begin with a “M”, and items associated with services begin with a “S”. See the following *Notes & Considerations* section for descriptions of the possible “ITEM_CODE” items.

ITEM_TYPE - Displays a short description for the associated item. For example, it might contain “Tapping Tee” for a connection type item.

JOINT - Displays the joint attribute value assigned to the associated item.

ORIENTATION - Displays the orientation attribute value assigned to the associated item.

OWNER - Displays the owner attribute value assigned to the associated item.

PACKAGE - Displays the package attribute value assigned to the associated item.

PRODUCT - Displays the product attribute value assigned to the associated item.

QUANTITY - Displays the total number of items found matching the attributes associated with the item group (ITEM_CODE). The quantity is expressed in terms of the indicated Units Of Measure (UOM).

REINSTATEMENT - Displays the reinstatement attribute value assigned to the associated item.

SIZE/TYPE_1 - Displays the primary pipe size type of the associated item as shown in the following tables in the *Notes & Considerations* section.

SIZE/TYPE_2 - Displays the secondary pipe size type of the associated item as shown in the following tables in the *Notes & Considerations* section.

SURFACE - Displays the surface attribute value assigned to the associated item.

UOM - Displays the Units Of Measure (UOM) for the associated QUANTITY data field.

Icons



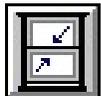
Insert As Table - Inserts the Bill Of Materials Report content as a User Table feature into the model image.



Maximize Screen Size - Increases the Bill Of Materials Report's size to fill the GASWorkS display.



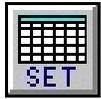
Print - Prints the contents of the currently displayed data tab. When clicked, the Print Settings screen is displayed.



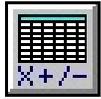
Reset Screen Size - Sets the Bill Of Materials Report's size to its "normal" dimensions and position.



Restore Columns - Restores the display of all of the columns (data items). When clicked, all of the columns associated with the current data tab will be displayed.



Set Columns - Used to specify which columns (data items) are displayed in the Bill Of Materials Report. When clicked, the Columns specification screen is displayed.



View In Spreadsheet Application - Displays the Bill Of Materials Report contents in the application currently assigned to the “.csv” file format in the default system application assigned to the “.csv” file type. When clicked, the assigned application will open and display the contents of the Bill Of Materials Report.

Command Buttons

Close - Closes the Bill Of Materials Report.

Notes & Considerations

- The contents of the report are derived from the various hydraulic and attribute data associated with the pipes, mains, customers, and services in the model.
- The contents of the report are saved in a comma separated values (.csv) format file which can be opened, viewed, and edited in any third party application that supports that file type (for example, Microsoft Excel). The file is named the same as the model but possesses a “.bom.csv” extension. The “.bom.csv” file can also be used as a source for additional processing by a third party application.
- If the contents or format of the report are changed by a third party application and saved to the original name, the contents may not be viewable in GASWorkS.
- If the report gets hidden behind another open screen, make the report activate (the window on the top of the report stack), by clicking on any visible portion of the report’s screen, or select the report from the *Window* menu.
- The columns in the Bill Of Materials Report represent the total quantity of the specified item found in the model, grouped by various attributes. For example, the total quantity of “63mm MDPE SDR...” pipe assigned to “Public” ownership (OWNER). The format of the report will vary depending on whether a UKDM attribute file is attached to the model. If a UKDM attribute file is attached, only pipe or customer features where the *Include In Report* item is set to “Yes” are included in the Bill Of Materials Report.
- Normally the report will contain more information than will fit on a single page. If this condition occurs when trying to print, a message will be displayed. When the message is displayed, respond appropriately. To print a report that is too wide for the printer, either eliminate some of the undesired columns using the Set Columns routine or by manually collapsing the undesired columns, set the printer to use *Landscape Orientation*, or reduce the printer font size.



- The meanings of the “ITEM_CODE”, “SIZE/TYPE_1”, and “SIZE/TYPE_2” items for main type features are described in the following table.

Main Materials		
ITEM_CODE	Notes	
MCOMP	Description	Compressor
	SIZE/TYPE_1	Represents the Size/Type Code of the compressor.
	SIZE/TYPE_2	Not used
	Derivation Method	This item is derived for pipes assigned as a Compressor <i>Hydraulic Type</i> .
	Notes	<ul style="list-style-type: none"> • The ITEM_TYPE column is not populated for this item. • The FACILITY column is populated for this item.
MCONA	Description	Connection - Automatic Generation
	SIZE/TYPE_1	Size/Type Code of the larger pipe.
	SIZE/TYPE_2	Size/Type Code of the smaller pipe.
	Derivation Method	<ul style="list-style-type: none"> • For a node with only two pipes connected to it, this item is derived as the connection between the two adjacent pipes. • For a node with three connections, a tee is derived for the most common or the largest size when no common sizes are present. The tee is assumed to be connected to one of the pipes. This item is derived as the connection between the two non-tee pipes to the derived tee. The tee is listed as a MTEEA. • For a node with more than three connections, a tee is derived for the largest connected pipe size. The tee is assumed to be connected to the largest pipe. This item is derived as the connection between the remaining pipes and the derived tee. The tee is listed as a MTEEA.

Main Materials		
ITEM_CODE	Notes	
MCONU	<i>Description</i>	Connection - User Assigned
	<i>SIZE/TYPE_1</i>	Represents the value assigned to the “Connection Size” attribute data item.
	<i>SIZE/TYPE_2</i>	Represents the size of the pipe that the connection is assigned to.
	<i>Derivation Method</i>	Derived from the value assigned to the “Connection Type” attribute data item.
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column indicates the assigned value (“Connection Type”). • The FACILITY column is populated for this item.
MFITU	<i>Description</i>	Fitting - User Assigned
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the assigned fitting.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	<ul style="list-style-type: none"> • Pipe <i>Hydraulic Type</i> - Derived from the fittings assigned to an attribute segment. • Valve <i>Hydraulic Type</i> - Derived from the pipes assigned to the Valve <i>Hydraulic Type</i>.
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column is not populated for this item. • The FACILITY column is populated for this item.
MJNTA	<i>Description</i>	Pipe Joint - Automatically Generated
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the associated pipe.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived as the summation of the joints required for each individual main, based on the value assigned to the “Joint Type” and “Packaging Type” attribute data items.
	<i>Notes</i>	The ITEM_TYPE column indicates the assigned value (“Joint Type”).

Main Materials		
ITEM_CODE	Notes	
MPIPE	<i>Description</i>	Pipe
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the associated pipe.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived by summing all of the main pipes with similar size and attribute values.
	<i>Notes</i>	The ITEM_TYPE column is not populated for this item.
MREG	<i>Description</i>	Governor
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the governor.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	This item is derived for pipes assigned to the Governor <i>Hydraulic Type</i> .
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column is not populated for this item. • The FACILITY column is populated for this item.
MTEEA	<i>Description</i>	Multiple Main Connection
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the associated pipe.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	<ul style="list-style-type: none"> • For a node with three connections, this item is derived for the most common, or the largest size when no common sizes are present. The tee is assumed to be connected to the largest pipe, or any one of the pipes, if all pipes have a common size and type. A MCONA item is derived for the other two pipe connections. • For a node with more than three connections, this item is derived for the largest connected pipe size. The tee is assumed to be connected to the largest pipe. A MCONA item is derived for the other connected pipes.

Main Materials		
ITEM_CODE	Notes	
MTRMA	<i>Description</i>	Main Termination
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the associated pipe.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	For a node with a single pipe connection, this item is derived as the termination of the pipe, regardless of the load value. In other words, a termination is derived for each pipe end not connected to another pipe, regardless of whether it is a load or demand point.
MVLVN	<i>Description</i>	Valve Node
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the pipe that the valve node is assigned to.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	This item is derived for each valve node assigned it a pipe.
	<i>Notes</i>	The FACILITY column is populated for this item.
MVLVU	<i>Description</i>	Valve
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the associated valve.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	This item is derived for pipes assigned to the Valve <i>Hydraulic Type</i> .
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column is not populated for this item. • The FACILITY column is populated for this item.

Main Materials		
ITEM_CODE	Notes	
MWELL	Description	Well
	SIZE/TYPE_1	Represents the Size/Type Code of the associated well.
	SIZE/TYPE_2	Not used
	Derivation Method	This item is derived for pipes assigned to the Well <i>Hydraulic Type</i> .
	Notes	<ul style="list-style-type: none"> • The ITEM_TYPE column is not populated for this item. • The FACILITY column is populated for this item.

- The meanings of the “ITEM_CODE”, “SIZE/TYPE_1”, and “SIZE/TYPE_2” items for service type features are described in the following table.

Service Materials		
ITEM_CODE	Notes	
SCONA	Description	Connection - Automatic Generation
	SIZE/TYPE_1	<ul style="list-style-type: none"> • Composite - Represents the larger composite size. • Branch - Represents the size of the trunk portion of the branch service.
	SIZE/TYPE_2	<ul style="list-style-type: none"> • Composite - Represents the smaller composite size. • Branch - Represents the size of the branch portion of the branch service.
	Derivation Method	<ul style="list-style-type: none"> • Composite - Derived as the connection between the two composite sizes. • Branch - Derived as the connection from the trunk tee to the downstream branch portion. A tee is derived for the trunk at the branch connection. The trunk tee is reported as a STEEA item.
	Notes	The ITEM_TYPE column indicates whether the item is associated with a composite or branch style service.

Service Materials		
ITEM_CODE	Notes	
SFITU	<i>Description</i>	Fitting - User Assigned
	<i>SIZE/TYPE_1</i>	Represents the size of the segment the fitting is assigned to. For composite services where the size changes along the associated segment, the value represents the larger size.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived from the fittings assigned to an attribute segment.
	<i>Notes</i>	The ITEM_TYPE column indicates the assigned value (“Attached Fittings” type).
SGOV	<i>Description</i>	Governor
	<i>SIZE/TYPE_1</i>	Not used
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived from the value assigned to the “Governor Type” attribute data item.
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column indicates the assigned value (“Governor Type”). • The FACILITY column is populated for this item.
SHSNG	<i>Description</i>	Meter Housing
	<i>SIZE/TYPE_1</i>	Not used
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived from the value assigned to the “Housing Type” attribute data item.
	<i>Notes</i>	The ITEM_TYPE column indicates the assigned value (“Housing Type”).

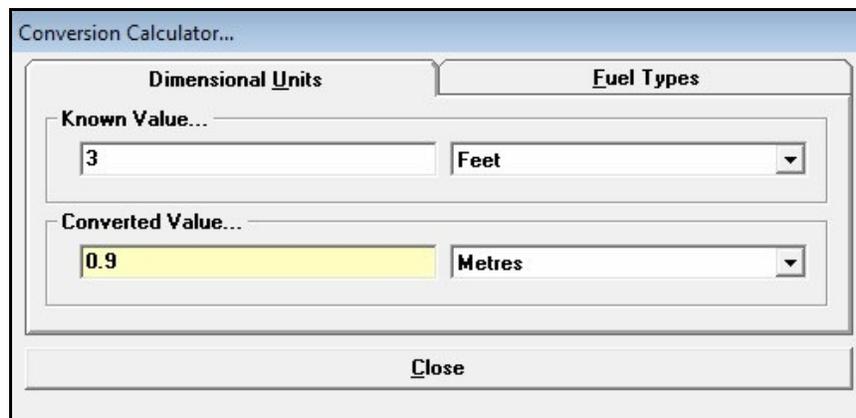
Service Materials		
ITEM_CODE	Notes	
SJNTA	<i>Description</i>	Pipe Joint - Automatically Generated
	<i>SIZE/TYPE_1</i>	Represents the value of the associated pipe.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived as the summation of the joints required for each individual service segment, based on the value assigned to the “Joint Type” and “Packaging Type” attribute data items.
	<i>Notes</i>	The ITEM_TYPE column indicates the assigned value (“Joint Type”).
SMETR	<i>Description</i>	Meter
	<i>SIZE/TYPE_1</i>	Not used
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived from the value assigned to the “Meter Type” attribute data item.
	<i>Notes</i>	<ul style="list-style-type: none"> • The ITEM_TYPE column indicates the assigned value (“Meter Type”). • The FACILITY column is populated for this item.
SPIPE	<i>Description</i>	Pipe
	<i>SIZE/TYPE_1</i>	Represents the pipe Size/Type Code.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived by summing all of the service pipes with similar sizes and attribute values.
	<i>Notes</i>	Except for the ITEM_TYPE column, all fields are populated for this item.

Service Materials		
ITEM_CODE	Notes	
STAPU	<i>Description</i>	Service To Main Connection
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the first segment of the service line.
	<i>SIZE/TYPE_2</i>	Represents the Size/Type Code of the main that the service line is connected to.
	<i>Derivation Method</i>	Derived from the value assigned to the “Connection Type” attribute data item.
	<i>Notes</i>	The ITEM_TYPE column indicates the assigned value (“Connection Type”).
STEEA	<i>Description</i>	Trunk To Branch Connection
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the segment of the trunk portion of the branch service, where the branch portion connects to the trunk.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived as the size of the trunk portion of the branch service, where the branch portion connects to the trunk.
	<i>Notes</i>	The ITEM_TYPE column indicates that the item is associated with a trunk service.
STERM	<i>Description</i>	Termination
	<i>SIZE/TYPE_1</i>	Represents the Size/Type Code of the last segment of the service line.
	<i>SIZE/TYPE_2</i>	Not used
	<i>Derivation Method</i>	Derived from the value assigned to the “Termination Type” attribute data item.
	<i>Notes</i>	<ul style="list-style-type: none"> The ITEM_TYPE column indicates the assigned value (“Termination Type”). The FACILITY column is populated for this item.

Conversion Calculator

A routine is provided to convert quantities and fuel type values from one dimensional unit to another. To perform a conversion, select the *Calculate Conversion* item from the *Analysis* menu. The features associated with the screen are described as follows.

Dimensional Units Tab



Data Items

Converted Value -

Dimensional Units - Specifies the dimensional unit to convert the known value to.

Known Value -

Dimensional Units - Specifies the dimensional unit associated with the quantity to be converted.

Quantity - Specifies the quantity to be converted.

Calculated Items

Converted Value -

Quantity - Displays the known quantity value, converted to an equivalent quantity in the specified dimensional units.

Fuel Types Tab

The screenshot shows a 'Conversion Calculator...' dialog box with two tabs: 'Dimensional Units' and 'Fuel Types'. The 'Known Value...' section contains a text box with '1', a dropdown menu set to 'Cf', and another dropdown menu set to 'Butane - Liquid'. The 'Converted Value...' section contains a text box with '235.5', a dropdown menu set to 'Cf', and another dropdown menu set to 'Butane - Gas'. A 'Close' button is located at the bottom of the dialog.

Data Items

Converted Value -

Dimensional Units - Specifies the dimensional unit to convert the known value to.

Fuel Type - Specifies the fuel type to convert the known value to.

Known Value -

Dimensional Units - Specifies the dimensional unit associated with the quantity to be converted.

Fuel Type - Specifies the fuel/energy type of the quantity to be converted.

Quantity - Specifies the quantity to be converted.

Calculated Items

Converted Value -

Quantity - Displays the known quantity value, converted to an equivalent quantity in the specified dimensional units and fuel/energy type.

Command Buttons

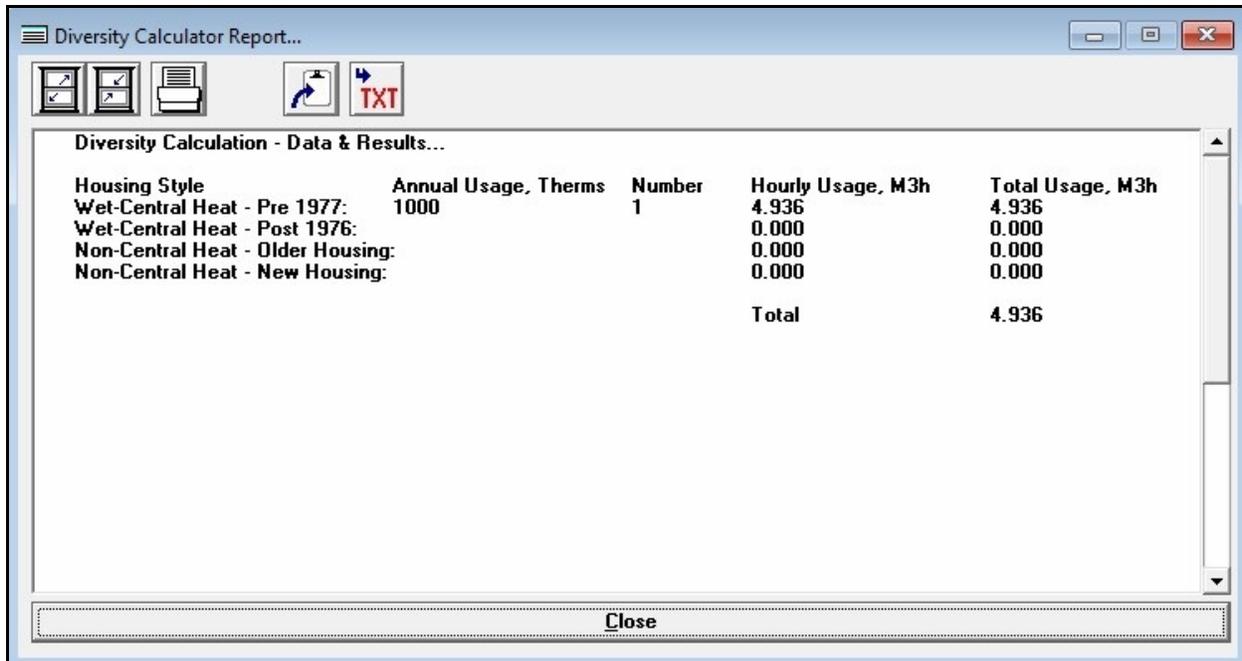
Close - Closes the screen.

Notes & Considerations

- The conversion calculation is performed when a quantity value is changed and the *Enter* key is pressed, or when a new item is selected from the dimensional units or fuel type lists.
- The number of digits displayed to right of the decimal indicator for the calculated converted quantity value is set to one more digit than the number of decimal digits entered for the known quantity value.

Diversity Calculator Report

The Diversity Calculator Report is accessed by clicking the *Print* command button on the Diversity Calculator screen. The features associated with the report are described as follows.



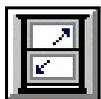
Displayed Items

Diversity Calculator Report - Displays the Diversity Calculator Report. To browse the display, adjust the vertical scroll bar adjacent to the display area.

Icons



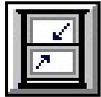
Copy To Clipboard - Copies the contents of the Diversity Calculator Report to the Windows Clipboard. Once copied, the contents may be pasted into another application.



Maximize Screen Size - Increases the Diversity Calculator Report's size to fill the GASWorkS display.



Print - Displays the Print Settings screen and allows contents of the Diversity Calculator Report to be printed.



Reset Screen Size - Sets the Diversity Calculator Report's size to its "normal" dimensions and position.

Command Buttons

Close - Closes the Diversity Calculator Report.

Notes & Considerations

- If the Diversity Calculator Report is too wide to print, set the printer to use landscape mode, and reduce the printer font size. If no adjustment is made to the report's width, the report will be printed on multiple pages.

Diversity Calculator

A routine is provided to calculate diversified load values from specified annual usage values. To use the calculator, select the *Calculate Diversity* item from the *Analysis* menu. The features associated with the screen are described as follows.

Housing Style:	Annual Usage:	Customer Count:	Hourly Usage Per Customer:	Total Hourly Usage:
Wet-Central Heat - Pre 1977:	1000 Therms	1	4.936	4.936 M3h
Wet-Central Heat - Post 1976:			0.000	0.000 M3h
Non-Central Heat - Older Housing:			0.000	0.000 M3h
Non-Central Heat - New Housing:			0.000	0.000 M3h
Diversity Calculation Method: IGE/GL/1 Appendix A5.1.5			Total:	4.936 M3h

Buttons: Calculate, Clear, Print, Close

Data Items

Annual Usage - Specifies the annual usage value for the associated housing/heating style.

Customer Count - Specifies the number of customers associated with the associated housing/heating style.

Diversity Calculation Method - Specifies the diversity calculation method.

Hourly Usage Units - Specifies the dimensional unit associated with the hourly usage value.

Calculated Items

Hourly Usage Per Customer - Displays the diversified hourly load per customer.

Total - Displays the total of all of the diversified hourly load values (summation of the total hourly load values).

Total Hourly Usage - Displays the total diversified hourly load (hourly load per customer times the number of customers).

Command Buttons

Calculate - Calculates the associated values.

Clear - Sets all of the data items to blank (null) values.

Close - Closes the screen and saves the current data values.

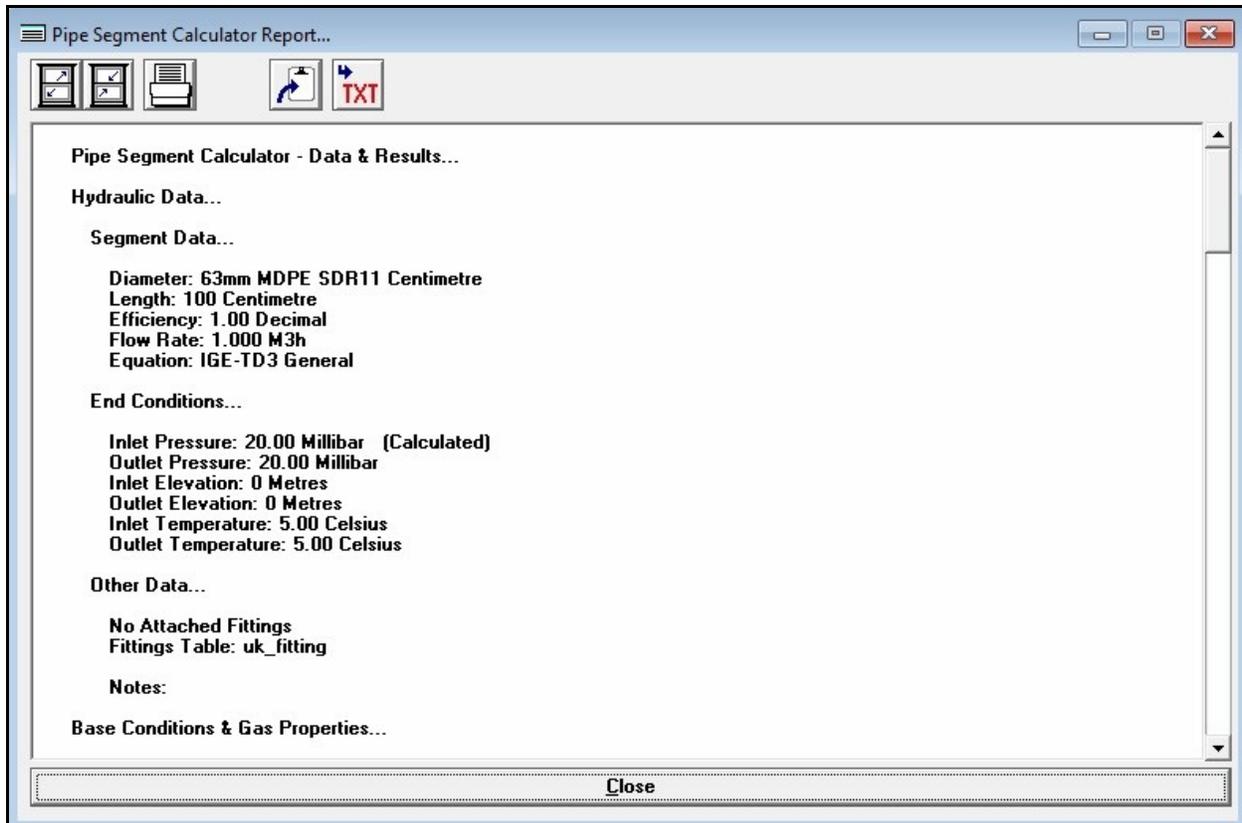
Print - Displays the Print Settings screen to print the data values and, if calculated, the results.

Notes & Considerations

- The hourly load values are calculated as described in the GASWorkS User's Manual.
- The hourly load calculation is performed when a quantity value is changed and the *Enter* key is pressed, when an item is selected from one of the dimensional units lists, or when the *Calculate* command button is clicked.
- The number of digits displayed to the right of the decimal indicator for the calculated hourly values is controlled by the *Customer Load Values* item found on the *Decimals* data tab on the Report Options screen. Select the *Report Options* item from the *Report* menu to change or view the current settings.

Pipe Segment Calculator Report

The report is accessed by clicking the *Print* command button on the Pipe Segment Calculator screen. The features associated with the report are described as follows.



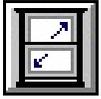
Displayed Items

Pipe Segment Calculator Report - Displays the Pipe Segment Calculator Report. To browse the display, adjust the vertical scroll bar adjacent to the display area.

Icons



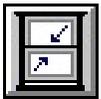
Copy To Clipboard - Copies the contents of the Pipe Segment Calculator Report to the Windows Clipboard. Once copied, the contents may be pasted into another application.



Maximize Screen Size - Increases the Pipe Segment Calculator Report's size to fill the GASWorkS display.



Print - Displays the Print Settings screen and allows contents of the Pipe Segment Calculator Report to be printed.



Reset Screen Size - Sets the Pipe Segment Calculator Report's size to its "normal" dimensions and position.

Command Buttons

Close - Closes the Pipe Segment Calculator Report.

Notes & Considerations

- If the Pipe Segment Calculator Report is too wide to print, set the printer to use landscape mode, and reduce the printer font size. If no adjustment is made to the report's width, the report will be printed on multiple pages.

Pipe Segment Calculator

A routine is provided to calculate the various hydraulic values for a single pipe segment. To perform the calculation, select the *Calculate Pipe Segment Values* item from the *Analysis* menu. The features associated with the screen are described as follows.

Pipe Data Tab

The screenshot shows the 'Pipe Segment Calculator' dialog box with two tabs: 'Pipe Data' and 'Other Data'. The 'Pipe Data' tab is active and contains the following fields:

- Segment Data...**
 - Diameter:** 63mm MDPE SDR11 (dropdown), Centimetre (dropdown)
 - Length:** 100, Centimetre (dropdown)
 - Efficiency:** 1.00, Decimal
 - Roughness:** 0.00000, Centimetre
 - Flow Rate:** 1.000, M3h (dropdown)
 - Equation:** IGE-TD3 General (dropdown)
- End Conditions...**
 - In Pressure:** 1.00, Millibar (dropdown)
 - Out Pressure:** 20.00, Millibar
 - In Elevation:** 0, Metres
 - Out Elevation:** 0, Metres
 - In Temp:** 5.00, Celsius
 - Out Temp:** 5.00, Celsius

Below the input fields is the 'Calculated Values...' section, which contains the following fields:

- Inside Diameter:** 5.090 Centimetre
- Pressure Drop:** (empty)
- Average Pressure:** (empty)
- Compressibility:** (empty)
- Line Volume:** (empty)
- Max Velocity:** (empty) Metres/sec

At the bottom of the dialog box are four buttons: Calculate, Swap Pressures, Print, and Close.

Data Items

Diameter - Specifies or displays the inside diameter value or Size/Type Code of the pipe segment.

Efficiency - Specifies or displays the hydraulic efficiency of the pipe segment.

Equation - Specifies the pipe flow equation to use to calculate the unknown values.

Flow Rate - Specifies or displays the volumetric flow rate through the pipe segment.

Inlet Elevation - Specifies the elevation at the inlet (upstream) end of the pipe segment.

Inlet Pressure - Specifies or displays the pressure at the inlet (upstream) end of the pipe segment.

Inlet Temperature - Specifies the temperature at the inlet (upstream) end of the pipe segment.

Length - Specifies or displays the base hydraulic length of the pipe segment.

Outlet Elevation - Specifies the elevation at the outlet (downstream) end of the pipe segment.

Outlet Pressure - Specifies or displays the pressure at the outlet (downstream) end of the pipe segment.

Outlet Temperature - Specifies the temperature at the outlet (downstream) end of the pipe segment.

Roughness - Specifies or displays the inside pipe wall roughness of the pipe segment. This item is only available for pipe flow equations that use roughness in their calculation.

Other Data Tab

Pipe Data	Other Data
<p>Available Fittings: <input type="text" value="L-90 16mm PE"/></p> <p>Attached Fittings: <input type="text"/></p> <p>Additional Length: <input type="text" value="0"/> Centimetre</p> <p><input type="button" value="Clear Attached Fittings List"/></p>	<p>Fittings Table: <input type="text" value="uk_fitting"/></p> <p>Notes... <input type="text"/></p>

Data Items

Attached Fittings - Displays the fittings that are attached to the pipe segment.

Available Fittings - Specifies the fittings found in the currently selected *Fittings Table*.

Fittings Table - Specifies the Fitting Property Table to use with the calculation.

Notes - Displays any descriptive notes or comments to be associated with the calculation. Enter any desired notes by typing them into the associated data panel.

Sizing Group - Specifies the “Sizing Group” type (as listed in the Pipe Property Table) to use with the calculation. This item is only displayed when the *Diameter* item is being calculated.

Sizing Type - Specifies the “Use When Sizing” type (as listed in the Pipe Property Table) to use with the calculation. This item is only displayed when the *Diameter* item is being calculated.

Calculated Values

Additional Length - Displays the additional hydraulic length associated with the equivalent length of the attached fittings. This item is displayed on the *Other Data* tab.

Average Pressure - Displays the average pressure of the pipe segment.

Composite Sizes - When the *Diameter* item is selected to be calculated, displays the composite sizes and lengths which would result in a pressure drop value that would nominally match the specified pressure values.

Compressibility - Displays the compressibility factor for the gas contained in the pipe segment. The value is based on the Average Pressure and Average Temperature values associated with the segment.

Inside Diameter - When a Size/Type Code is used for the *Diameter* item, displays the inside diameter (as listed in the current Pipe Property Table) associated with the selected Size/Type Code.

Line Volume - Displays the amount of gas contained in the pipe segment.

Maximum Velocity - Displays the maximum velocity of the gas flow through the pipe segment. This always occurs at the downstream end (outlet) of the pipe segment.

Pressure Drop - Displays the calculated pressure drop across the pipe segment.

Command Buttons

Calculate - Calculates the associated values and value of the unknown (underlined) parameter.

Clear Attached Fittings List - Removes all of the items from the *Attached Fittings* list.

Close - Closes the screen and saves the current data values.

Print - Displays the Print Settings screen to print the data values and, if calculated, the results.

Swap Pressures - Exchanges the inlet and outlet pressure values for the pipe segment.

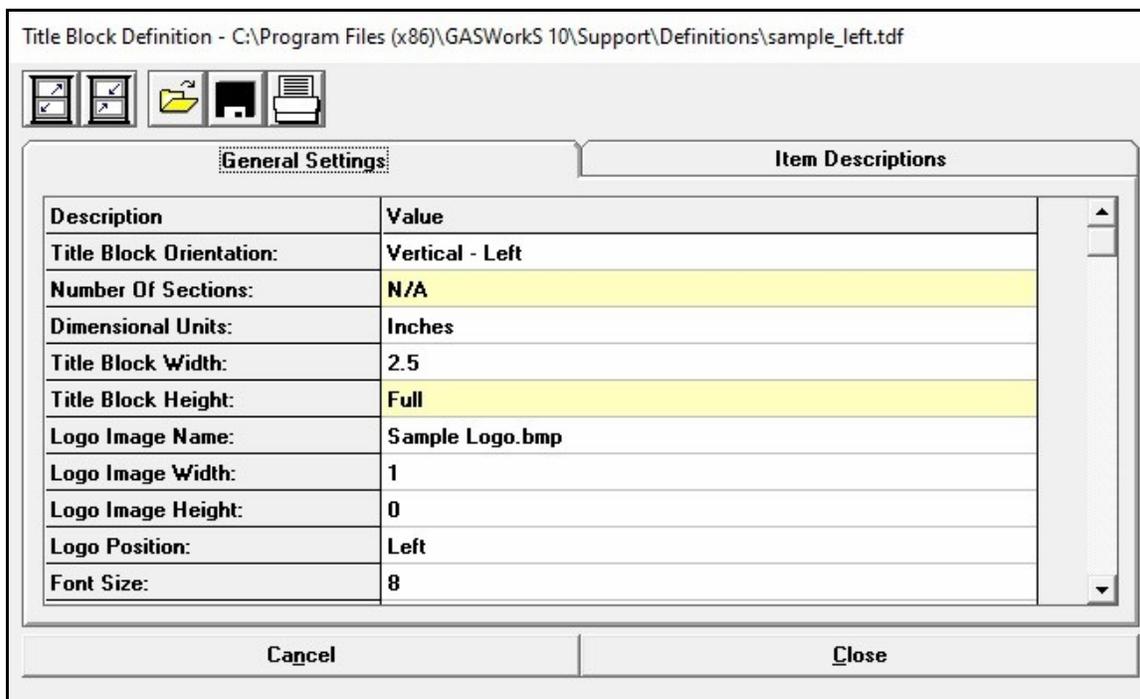
Notes & Considerations

- The item labels shown in red indicate the specific pipe items which can be calculated. The item that is underlined indicates that the item is being calculated. To change the calculated item (underlined item), click on the desired red label, until the item is underlined. Only one of the red labels can be underlined at a time.
- On the *Other Data* tab, to add an item to the *Attached Fittings*, select an item from the *Available Fittings* list. To remove an item, double-click on the desired item to be removed.
- The gas properties used by the calculation are taken from the Gas Properties values set in the Default Data Values associated with the currently open model.
- The base temperature and base pressure used by the calculation are taken from the Solution Data associated with the currently opened model.
- The calculated values are based on the equations which are described in the GASWorkS User's Manual.

Title Block Definition

The UK Design Module version of the GASWorkS software provides support for plots to be created using a User defined Title Block and a User defined sheet layout. The Title Block consists of a *General Settings* section which can include a logo and address, and an *Item Descriptions* section which can consist of a number of User defined elements. To modify the Title Block Definition, select the *Title Block Definition* item from the *Edit* menu. The features associated with the screen are described as follows.

General Settings Tab



Data Items

Dimensional Units - Specifies the dimensional units to use for the dimensional values entered in the definition.

Font Size - Specifies the size (in printer points) for the text displayed in the Title Block.

Line Spacing - Specifies the line spacing for the text displayed in the Title Block.

Logo Image Height - Specifies the height of the logo image as displayed in the Title Block. See the following *Notes & Considerations* section for additional information on setting the logo image size.

Logo Image Name - Specifies the name of the image file to use for the logo associated with the Title Block. The inclusion of a logo is optional. To unassign an logo image file, select the “empty” or blank item from the list. See the following *Notes & Considerations* section for additional information on using logo image files.

Logo Image Width - Specifies the width of the logo image as displayed in the Title Block. See the following *Notes & Considerations* section for additional information on setting the logo image size.

Logo Position - Specifies the horizontal position of the logo in relation to the Title Block or associated section of the Title Block. The available values are described in the following table:

<i>Item Value</i>	<i>Description</i>
Center	The logo will be centered in the Title Block (for vertical orientation) or the associated section of the Title Block (for horizontal orientation).
Left	The logo will be placed along the left side of the Title Block (for vertical orientation) or the associated section of the Title Block (for horizontal orientation).
Right	The logo will be placed along the right side of the Title Block (for vertical orientation) or the associated section of the Title Block (for horizontal orientation).

Logo Text - Line (1, 2, ...) - Specifies the text value to be displayed on the plot output. The number of logo text line items will vary according to the *Logo Text Line Count* value.

Logo Text Line Count - Specifies the number of lines of text to associate with the logo. See the following *Notes & Considerations* section for additional information on working with logo text.

Number Of Sections - Specifies the number of sections to be created for a horizontally oriented Title Block. A horizontally oriented Title Block can be segregated into separate “sections”. Sections are separated by a vertical line. This item is only enabled when the *Title Block Orientation* item is set to a “Horizontal” value.

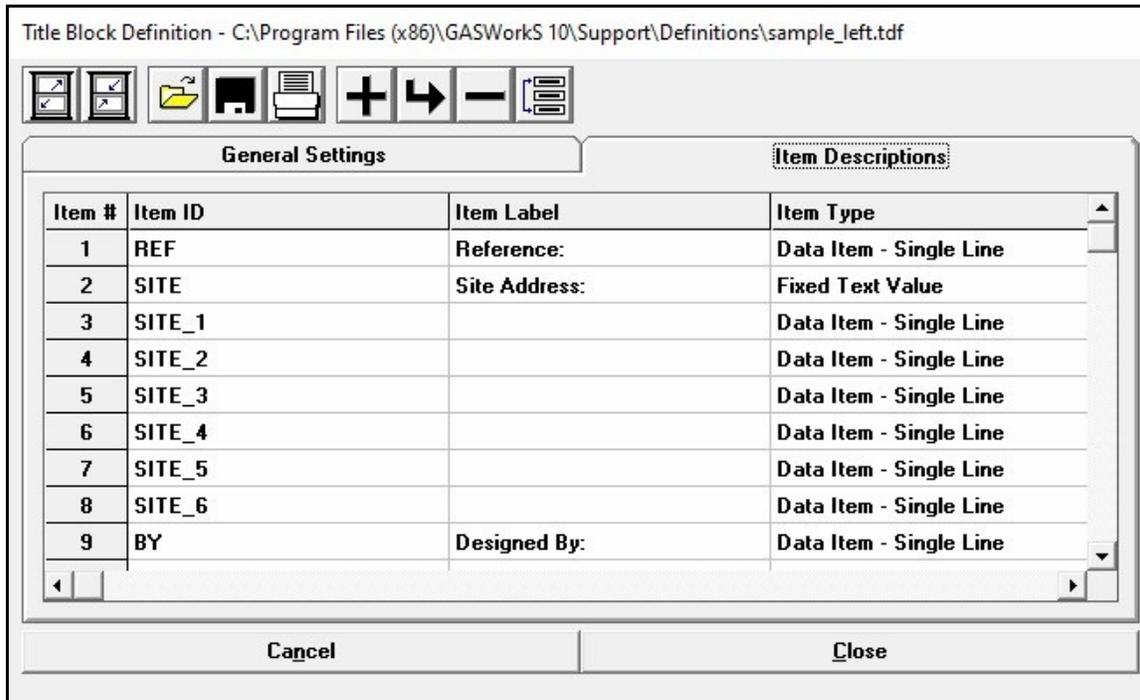
Title Block Height - Specifies the height of a horizontally oriented Title Block. This item is only enabled when the *Title Block Orientation* item is set to a “Horizontal” value.

Title Block Orientation - Specifies the orientation and location of the Title Block on the plotted sheet. The available values are described in the following table:

<i>Item Value</i>	<i>Description</i>
Horizontal - Bottom	The Title Block is oriented horizontally along the bottom of the plotted sheet.
Horizontal - Top	The Title Block is oriented horizontally along the top of the plotted sheet.
Vertical - Left	The Title Block is oriented vertically along the left side of the plotted sheet.
Vertical - Right	The Title Block is oriented vertically along the right side of the plotted sheet.

Title Block Width - Specifies the width of a vertically oriented Title Block. This item is only enabled when the *Title Block Orientation* item is set to a “Vertical” value.

Item Descriptions Tab



Displayed Items

Item # - Displays the item count number. This item is internally assigned and cannot be changed by the User.

Data Items

Display Color - Specifies the color to display the associated item with. If “Click To Select Color...” is selected, the Color Palette will be displayed. Select the desired color, then click the *OK* command button.

Fixed Text Value - Specifies the text value to be displayed adjacent to the “Fixed Text” item.

Item ID - Specifies a unique identification reference for the definition item.

Item Label - Specifies the text value to be displayed in the Title Block for the associated item. This item is applicable to all *Item Types* except “Section Break” and “Blank Line” types.

Item Type - Specifies the “type” of the associated item. The available *Item Types* are described in the following table:

<i>Item Value</i>	<i>Description</i>
Blank Line	Represents a single line entry in the Title Block. No text will be displayed. The height/spacing of the line will be as specified by the associated <i>User Graphic Line Thickness</i> value.
Current Date	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by the current operating system date. The date will be displayed in the currently selected operating system date format.
Data Item - Multiline	Represents a multiline entry in the Title Block. The specified label text will be displayed in the Title Block followed by the specified number of User entered values. During the Plot routine, a screen will be displayed to allow entry of data values for data type items.
Data Item - Single Line	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by a User entered value. During the Plot routine, a screen will be displayed to allow entry of data value for the data type items.
Fixed Text Value	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by the specified text value.
Plot Scale Value	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by the currently selected plot scale value.
Section Break	Causes a new section (column) to be created in a horizontally oriented Title Block. Ignored in a vertically oriented Title Block.
User Graphic Line	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by a horizontal line displayed using the specified <i>User Graphic Line Style</i> and <i>Thickness</i> .
User Graphic Line & Symbol	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by a horizontal line drawn using the specified <i>User Graphic Line Style</i> and <i>Thickness</i> , and a symbol displayed using the specified <i>User Graphic Symbol Style</i> , <i>Rotation</i> , and <i>Width</i> .

<i>Item Value</i>	<i>Description</i>
User Graphic Symbol	Represents a single line entry in the Title Block. The specified label text will be displayed in the Title Block followed by a symbol displayed using the specified <i>User Graphic Symbol Style, Rotation, and Width</i> .

Multiline Count - If the *Item Type* is “Data Item - Multiline”, specifies the number of text lines for the associated item.

Underline Item - Specifies the associated item will be underlined with a horizontal line.

Underline Width - Specifies the width (thickness in pixels) of the displayed line.

User Graphic Line Style - If the *Item Type* is a “User Graphic Line” or “User Graphic Line & Symbol”, specifies the line style to be used to display the User Graphic Line.

User Graphic Line Width - If the *Item Type* is “User Graphic Line” or “User Graphic Line & Symbol”, specifies the width (thickness in pixels) of the displayed User Graphic Line. If the *Item Type* is “Blank Line”, specifies the line spacing (height) of the blank line, specified as a factored line spacing (for example 0.5, 1.0, or 1.5).

User Graphic Symbol Rotation - If the *Item Type* is “User Graphic Symbol” or “User Graphic Line & Symbol”, specifies the orientation (in degrees clockwise from north) to display the User Graphic Symbol.

User Graphic Symbol Style - If the *Item Type* is “User Graphic Symbol” or “User Graphic Line & Symbol”, specifies the symbol style to be used to display the User Graphic Symbol.

User Graphic Symbol Width - If the *Item Type* is “User Graphic Symbol” or “User Graphic Line & Symbol”, specifies the width (thickness in pixels) of the line work used to display the User Graphic Symbol.

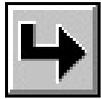
Icons



Add Item - Adds a new item to the end of the definition. This icon is only displayed when the *Item Descriptions* data tab is displayed.



Delete Item - Deletes the currently selected (highlighted) item. This icon is only displayed when the *Item Descriptions* data tab is displayed.



Insert Item - Inserts a new item just before the currently selected (highlighted) item. This icon is only displayed when the *Item Descriptions* data tab is displayed.



Maximize Screen Size - Increases the Title Block Definitions screen's size to fill the GASWorkS display.



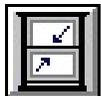
Move Item - Moves the currently selected (highlighted) item to a new location in the definition. When clicked, a message will be displayed to select the new location. Click the *OK* command button to clear the message, then select the desired location. This icon is only displayed when the *Item Descriptions* data tab is displayed.



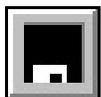
Open - Opens a previously saved Title Block Definition file (.tdf). When clicked, the File Selection screen is displayed.



Print - Prints the contents of the currently displayed data tab. When clicked, the Print Settings screen is displayed.



Reset Screen Size - Sets the Title Block Definitions screen's size to its "normal" dimensions and position.



Save - Saves the contents of the currently displayed definition. When clicked, the File Selection screen is displayed. Once saved, the file can be opened and used with other models.

Command Buttons

Cancel - Closes the screen without saving changes.

Close - Closes the screen and save changes.

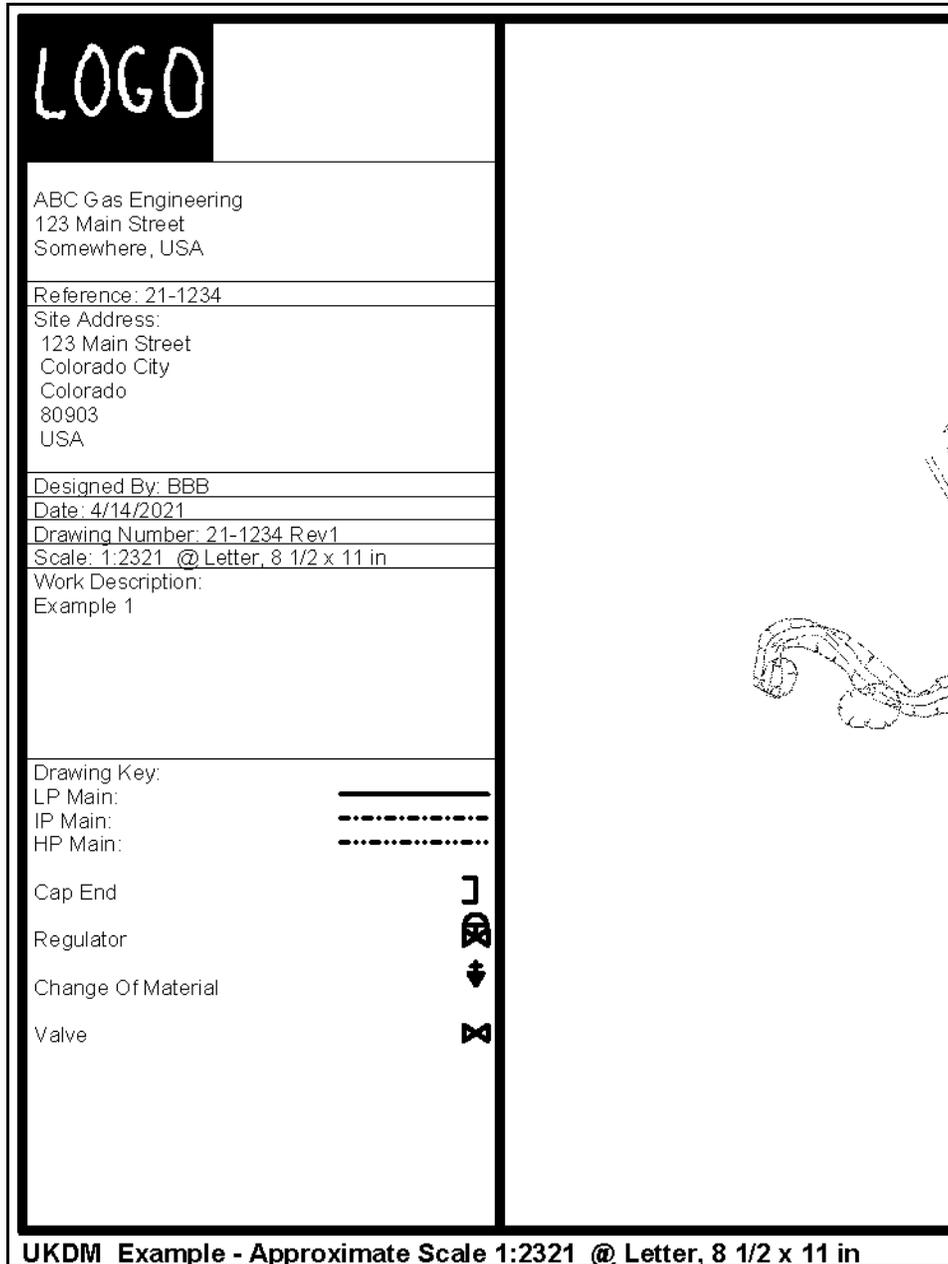
Notes & Considerations

- The following should be considered when using an image file to create a logo for a Title Block:
 - The file must be in a Windows bitmap (.bmp) or JPEG (.jpg) format. Other format files may be used, but must first be converted into a supported format.



- The image file must be saved in the currently assigned Property Tables directory. Use the *Paths* item from the *Preferences* submenu of the *File* menu to change the current setting.
- The Plot routine will shrink or stretch the specified image to fit the specified logo size dimensions. Using a large size image for a small size logo, or vice versa, can yield unattractive results. It may be necessary to manipulate the image size using a third party application before using it in the Title Block.
- If a logo image file is selected, the image size is forced to fit the specified logo size as entered in the Title Block Definition. If the height is specified and the width is not specified (set to 0), the logo will be displayed using the specified height, and the display width will be adjusted to maintain the proportions of the original image. If the width is specified and the height is not specified (set to 0), the logo will be displayed using the specified width, and the display height will be adjusted to maintain the proportions of the original image. If both the height and width are specified, the image will be stretched or shrunk to fit the specified dimensions.
- The logo text refers to a group of text to be associated with the logo position. Generally, the logo text might include a company name and address, but can include any User desired text. The specified text items will be included each time the Title Block is plotted. In that sense the logo text is considered “fixed” in the context of the Title Block Definition. To exclude the logo text from the Title Block, set the *Logo Text Line Count* to zero (0).
- Sample Title Block Definitions are provided when the UKDM software is installed. The definitions are normally installed in the standard GASWorkS Property Table directory (“support\definitions”).
- To include a Title Block in the plot results, select the *Include Title Block (Requires Title Block Definition)* item in the *Settings* data tab on the Plot Settings screen.

- Some of the various Title Block features are shown in the following figure:



Title Block Values

If the *Include Title Block (Requires Title Block Definition)* option is selected on the Plot Settings screen, the Title Block Values screen will be displayed during the Plot routine. The screen allows selection of the Title Block Definition to use and allows entry of data values if Single or Multiline data items are included in the selected Title Block Definition. The features of the screen are described as follows.

Title Block Values...

Title Block Definition Filename...
sample left

Data Values...

Item...	Value...
Reference:	21-1234
Site Address:	123 Main Street
	Colorado City
	Colorado
	80903
	USA
Designed By:	BBB
Drawing Number:	21-1234 Rev1

Cancel Open Continue...

Data Items

Data Values - If Single or Multiline data items are included in the Title Block Definition, the label associated with each data item will be listed in the *Item* column.

Title Block Definition Filename - Specifies the filename of the Title Block Definition to use during the Plot routine.

Command Buttons

Cancel - Closes the screen and returns to the Plot Settings screen.

Continue - Proceeds with the Plot routine.

Open - Opens previously saved Title Block data values from another model or project.

Notes & Considerations

- The *Title Block Definition Filename* list includes the definitions found in the currently selected Property Tables path. Use the *Paths* item from the *Preferences* submenu of the *File* menu to view or change the path settings.
- When data values are opened from another model, the data values are compared to the currently selected Title Block Definition. When a data value identification is found in the selected model that matches an data value identification in the current model, the associated data value is assigned to the current model.



DATA PANEL

Customer Data & Results

The Customer Data, as used with the UK Design Module, is essentially the same as the one used with the standard version of GASWorkS, however the *Attribute Data Values* and *Actions* sections are handled in a unique manner with the UKDM. The unique items are described as follows.

Attribute Data Values

The *Attribute Data Values* section contains items found in the linked Attribute Data file. The data values are segregated into sections. If multiple attribute segments are associated with the customer, they are listed in separate sections of the list, and each data item is followed by the associated “segment” number. The calculated data is contained in a separate section.

[-] Attribute Data Values...	
Link ID Number	1
Link To Database	Yes
Address Street	Rectory Drive
Address Number	1
Alias	Lot 37
Include In Report	Yes
Hourly Demand	-3
Hourly Demand Units	M3h
Service Type	Single Service
Product Type	Lay To New
Allow Sizing Calculation	Yes - Composite Sized
Segment 1...	
Pipe Size - 1	75mm MDPE SDR11
Pipe Length - 1, Centi	1998
Sizing Group - 1	MDPE
Surface Category - 1	Open Trench
Ownership - 1	Private
Orientation - 1	Horizontal Below Ground
Joint Type - 1	Butt Fusion
Packaging Type - 1	Coil - 100 Metres

Data Items

Address - Specifies the street name of the address for the customer. This item can contain 40 alphanumeric characters.

Address Number - Specifies the address number for the customer. This item can contain 40 alphanumeric characters.

Alias - Specifies an alternative description, name, or address for the customer. This item can contain 40 alphanumeric characters.

Allow Sizing Calculation - Specifies whether the service line for the customer can be sized or is a fixed (entered) value. If this item is set to “Yes - Single Size Service”, the service line size to be calculated uses the smallest acceptable pipe size. If this item is set to “Yes - Composite Sized Service”, the service line size to be calculated uses a combination of pipe sizes and lengths.

Allowable Pressure Drop - Specifies the maximum allowable pressure drop for the entire service line (from connection to termination). This item is required for the Service Line Sizing calculation.

Connection Type - Specifies the type of connection between the service line and the main. This item is required for the Service Line Sizing calculation.

Hourly Demand - Specifies the hourly demand value to be used to size the service line for the customer. This item is required for the Service Line Sizing calculation.

Hourly Demand Units - Specifies the dimensional units for the *Hourly Demand* value.

Housing Type - Specifies the meter housing type. This item is attribute only - there is no affect on service line sizing.

Include In Report - Specifies whether the customer feature will be included in the Assumption & Authorisation Report.

Meter Type - Specifies the meter type. This item is attribute only - there is no affect on service line sizing.

Product Type - Specifies the service type for the customer. This item is attribute only - there is no affect on service line sizing.

Service Type - Specifies the product type for the customer. This item is attribute only - there is no affect on service line sizing.

Termination Type - Specifies the type of the connection between the service line and the meter. This item is required for the Service Line Sizing calculation.

Segment Data -

Attached Fitting - Specifies the fittings that may be installed along the associated service line.

Joint Type - 1, 2... - Specifies the type of method used to join the pipe for the associated segment. This item is attribute only - there is no affect on service line sizing.

Orientation - 1, 2... - Specifies the orientation style for the associated segment. This item is attribute only - there is no affect on service line sizing.

Ownership - 1, 2... - Specifies the ownership type for the associated segment. This item is attribute only - there is no affect on service line sizing.

Packaging Type - 1, 2... - Specifies the type of pipe packaging used for the associated segment. This item is attribute only - there is no affect on service line sizing.

Pipe Length - 1, 2... - Specifies the base hydraulic length to be used for the segment in the sizing calculation. This item is required for the Service Line Sizing calculation.

Pipe Size - 1, 2... - Specifies the size of the associated service line segment. If the *Allow Sizing Calculation* item is set to “Yes” and the service line size has been calculated, specifies the resulting size. If the segment is associated with a composite service, the value will indicate the larger size of the service. This item can contain 20 alphanumeric characters.

Reinstatement Method - 1, 2... - Specifies the surface reinstatement method for the associated segment. This item is attribute only - there is no affect on service line sizing.

Sizing Group - 1, 2... - Specifies the sizing (material) group to be used when calculating the service size for the segment. This item is required for the Service Line Sizing calculation.

Surface Category - 1, 2... - Specifies the surface category for the associated segment. This item is attribute only - there is no affect on service line sizing.

Calculated Values

Calculated Values...	
Inlet Pressure, atm	0.03
Outlet Pressure, atm	0.00
Pressure Drop, atm	0.03
Maximum Velocity, Metre	0
Allowable Velocity, Metr	15

Displayed Items

Allowable Velocity - Displays the maximum allowable velocity value through the service line.

Inlet Pressure - Displays the inlet pressure for the service line (pressure at the main connection).

Maximum Velocity - Displays the maximum calculated velocity value for the service line.

Outlet Pressure - Displays the outlet pressure for the service line (pressure at the termination).

Pressure Drop - Displays the pressure drop across the entire service line.

Segment Data -

Inlet Pressure - 1, 2... - Displays the inlet pressure for the associated segment.

Outlet Pressure - 1, 2... - Displays the outlet pressure for the associated segment.

Velocity - 1, 2... - Displays the maximum velocity of the gas flow through the associated segment.

Actions

The *Actions* section contains several items which may be used to initiate a command or routine unique to UK Design Module. See the GASWorkS User's Manual for a description of the standard *Actions* associated with the Customer Data.

[-] Actions - Select One...
Add Associated User Text
Add Vertex To Selected Customer
Calculate All Service Sizes
Calculate Graphic Length
Calculate Hourly Demand
Calculate Service Size

<i>Action</i>	<i>UKDM GDI Command - See Description</i>
Calculate All Service Sizes	<i>Calculate All Service Sizes</i>

<i>Action</i>	<i>UKDM GDI Command - See Description</i>
Calculate Graphic Length	Causes the <i>Pipe Length</i> item(s) to be set to their graphic lengths. The pipe segment lengths can be manually entered. Use this item to reset the length values to the original graphic lengths.
Calculate Hourly Demand	Causes the <i>Hourly Demand</i> item to be calculated as follows. If the <i>Node Load Application</i> is set to something other than “Diversified”, the Per Unit Load is used as the basis for the Hourly Demand and converted to the specified dimensional units. If the <i>Node Load Application</i> is set to “Diversified”, the Per Unit Load and Heating Type are used to compute the Hourly Demand using the appropriate diversity calculation method and a Customer Count of one.
Calculate Service Size	Causes the <i>Pipe Size</i> item(s) to be calculated. The method used to calculate the service size is described later in this guide.

Notes & Considerations

- The UKDM data and calculated items found in the attribute data are described in the following table. The contents of the list are defined by the associated Attribute Database Definition. Information on how to view and revise the definition contents are described later in this guide.

Customer Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
<i>Miscellaneous Data Values</i>		
Pipe Facility Type	Displays the Facility Type of the main that the customer is connected to. The customer inherits the Facility Type of the main it is connected to.	Calculated Item
<i>Note</i> - If a composite service is calculated, the selected composite sizes and lengths will be displayed in the calculated data associated with the segment where the size changes, as described in the “Composite Related Items” section of this table.		



Customer Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
<u>Governor Related Items</u>		
Additional data items are included in the <i>Attribute Data Values</i> section if a governor is associated with the service line/customer. They are described as follows...		
Allowable Minimum Pressure	Specifies the minimum allowable pressure for the inlet to the governor. <u>Required</u> for Service Line Sizing calculation.	Single Precision Number
Allowable Pressure Drop - Dn	Specifies the maximum allowable pressure drop for the portion of the service line between the outlet of the governor and the service termination. <u>Required</u> for Service Line Sizing calculation.	Single Precision Number
Allowable Pressure Drop - Up	Specifies the maximum allowable pressure drop for the portion of the service line between the main connection and the inlet to the governor. <u>Required</u> for Service Line Sizing calculation.	Single Precision Number
Governor Set Pressure	Specifies the set pressure of the governor. <u>Required</u> for Service Line Sizing calculation.	Single Precision Number
Governor Type	Specifies the governor type. Attribute only - does not affect service line sizing.	Listed Item
Additional items are included in the <i>Calculated Values</i> section when a governor is associated with the service line/customer. They are described as follows...		
Allowable Pressure Drop	Displays the maximum allowable pressure drop across the entire service line.	Calculated Item
Allowable Velocity	Displays the maximum allowable velocity value through the service line.	Calculated Item
Inlet Pressure - Dn	Displays the inlet pressure for the portion of the service line downstream of the governor (pressure at the governor outlet).	Calculated Item
Inlet Pressure - Up	Displays the inlet pressure for the portion of the service line upstream of the governor (pressure at the main connection).	Calculated Item

Customer Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
Maximum Velocity - Dn	Displays the maximum velocity of the gas flow through the portion of the service line between the governor outlet and the termination.	Calculated Item
Maximum Velocity - Up	Displays the maximum velocity of the gas flow through the portion of the service line between the main connection and the governor inlet.	Calculated Item
Outlet Pressure - Dn	Displays the outlet pressure for the portion of the service line downstream of the governor (pressure at the termination).	Calculated Item
Outlet Pressure - Up	Displays the outlet pressure for the portion of the service line upstream of the governor (pressure at the governor inlet).	Calculated Item
Pressure Drop - Dn	Displays the pressure drop across the portion of the service line between the governor outlet and the termination.	Calculated Item
Pressure Drop - Up	Displays the pressure drop across the portion of the service line between the main connection and the governor inlet.	Calculated Item
<i>Composite Related Items</i>		
If a composite service is calculated, the selected composite sizes and lengths will be displayed in the calculated data associated with the segment where the size changes.		
Composite Size X.1	Specifies the larger composite size, where “X” is equal to the segment number.	Calculated Item
Composite Length X.1	Specifies the portion of the segment length associated with the larger composite size, where “X” is equal to the segment number.	Calculated Item
Composite Size X.2	Specifies the smaller composite size, where “X” is equal to the segment number.	Calculated Item
Composite Length X.2	Specifies the portion of the segment length associated with the smaller composite size, where “X” is equal to the segment number.	Calculated Item

Customer Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
If a composite service is calculated, a summary of the selected composite sizes and total lengths will be displayed in the calculated data associated with the service.		
Composite Size - 1	Specifies the larger composite size.	Calculated Item
Total Composite Length - 1	Specifies the total length of the larger composite size.	Calculated Item
Composite Size - 2	Specifies the smaller composite size.	Calculated Item
Total Composite Length - 2	Specifies the total length of the smaller composite size.	Calculated Item
<p>Notes</p> <ul style="list-style-type: none"> • The dimensional units for pressure related items are based on the dimensional unit used for the lowest pressure node associated with the pipe that the customer is connected to. • The dimensional units for velocity related items are based on the velocity unit selected in the Default Data Values dimensional units. • The dimensional units for length related items are set by the length unit selected in the Default Data Values dimensional units. • A service line can be segregated into a maximum of ten attribute segments. • The “Listed Item” data type indicates that the item’s value is selected from a data list. In the case of non-standard items, the associated list is specified in the Attribute Database Definition. • The “Calculated Item” data type refers to an item whose value is derived or calculated. 		

Pipe Data & Results

The Pipe Data, as used with the UK Design Module, is essentially the same as the one used with the standard version of GASWorkS, however the *Attribute Data Values* and *Actions* sections are handled in a unique manner with the UKDM. The unique items are described as follows.

Attribute Data Values

The *Attribute Data Values* section contains items found in the linked Attribute Data file. The data values are segregated into sections. If multiple attribute segments are associated with the pipe, they are listed in separate sections of the list, and each data item is followed by the associated “segment” number.

[-] Attribute Data Values...	
Link ID Number	2
Link To Database	Yes
Address Street	Rectory Drive
Address Number	
Alias	
Include In Report	Yes
Product Type	Lay To New
Connection Type	
Connection Size	
Segment 1...	
Pipe Length - 1, Centi	4366.499
Surface Category - 1	Open Trench
Ownership - 1	Public
Orientation - 1	Horizontal Below Grou
Joint Type - 1	Butt Fusion
Packaging Type - 1	Stick - 12 Metres
Reinstatement Method	None

Data Items

Note - See the following *Notes & Considerations* section for a table describing additional the unique UKDM *Attribute Data Values* data items.

Address - Specifies the street name of the address for the pipe/main. This item can contain 40 alphanumeric characters.

Address Number - Specifies the address number for the pipe/main. This item can contain 40 alphanumeric characters.

Alias - Specifies an alternative description, name, or address for the pipe/main. This item can contain 40 alphanumeric characters.

Connection Size - Specifies the Size/Type Code of the pipe/main that the current pipe is connected to. This item is attribute only - there is no affect on service line sizing.

Connection Type - Specifies the type/method of the connection between the current pipe/main and another pipe/main. This item is attribute only - there is no affect on service line sizing. To include the equivalent length of a connection, attach an appropriate “fitting” in the *Attached Fittings* section.

Include In Report - Specifies whether the pipe/main feature will be included in the Assumption & Authorisation Report.

Product Type - Specifies the service type for the pipe/main. This item is attribute only - there is no affect on service line sizing.

Segment Data -

Joint Type - 1, 2... - Specifies the type of method used to join the pipe for the associated segment. This item is attribute only - there is no affect on service line sizing.

Orientation - 1, 2... - Specifies the orientation style of the associated segment. This item is attribute only - there is no affect on service line sizing.

Ownership - 1, 2... - Specifies the ownership type for the associated segment. This item is attribute only - there is no affect on service line sizing.

Packaging Type - 1, 2... - Specifies the type of pipe packaging used for the associated segment. This item is attribute only - there is no affect on service line sizing.

Pipe Length - 1, 2... - Specifies the attribute length for the segment. This item is attribute only - there is no affect on service line sizing.

Reinstatement Method - 1, 2... - Specifies the surface reinstatement method for the associated segment. This item is attribute only - there is no affect on service line sizing.

Surface Category - 1, 2... - Specifies the surface category for the associated segment. This item is attribute only - there is no affect on service line sizing.

Actions

The *Actions* section contains several items which may be used to initiate a command or routine unique to UK Design Module. See the GASWorkS User’s Manual for a description of the standard *Actions* associated with the Pipe Data.

[-] Actions - Select One...
Add Associated User Text
Add To Favorite Results
Add Vertex To Selected Pipe
Calculate Graphic Length

<i>Action</i>	<i>UKDM GDI Command - See Description</i>
Calculate Graphic Length	Causes the <i>Pipe Length</i> item to be set to the graphic length. The pipe segment length can be manually entered. Use this item to reset the length values to the original graphic length.

Notes & Considerations

- The UKDM allows the length of each attribute segment to be entered individually. These values are not required to represent the base hydraulic length. The *Hydraulic Length* value entered in the *Hydraulic Data Items* section represents the base hydraulic length used with the hydraulic calculations.
- The data and calculated items found in the attribute data are described in the following table. The contents of the list are defined by the associated Attribute Database Definition. Information on how to view and revise the definition contents are described later in this guide.

Pipe Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
<i>Miscellaneous Data Values</i>		
Customer Count	Displays the number of customers attached to the pipe. This item refers to the number of actual connections, and does not include additional “customers” associated with multi-unit customers.	Calculated Item
Facility Type	Identifies the Facility Type assigned to the main.	Listed Item

Pipe Data		
<i>Item Name</i>	<i>Description</i>	<i>Data Type</i>
Notes <ul style="list-style-type: none">• The dimensional units for length related items are set by the <i>Length</i> dimensional unit selected in the Default Data Values.• A pipe/main can be segregated into a maximum of five attribute segments.• A “Listed Item” data type indicates that the item’s value is selected from a data list. In the case of non-standard items, the associated list is specified in the Attribute Database Definition.• A “Calculated Item” data type refers to an item whose value is derived or calculated.		

GRAPHIC DATA INTERFACE (GDI)



The UK Design Module uses the basic GASWorkS Graphic Data Interface (GDI) Window, and supplements it with several additional GDI Commands. See the GASWorkS User's Manual for information and descriptions for the standard GDI features. The UKDM features are described on the following pages.

GDI Commands & Icon Descriptions



Add Service Attribute Marker - Adds a vertex to an existing customer service line and sets it as an attribute marker. Executing this command will cause a series of prompts to appear to select the customer to add the service vertex to and the new vertex location.

Toolbar: Customer Commands

GDI Command Line: ADDSATT, ADDSERVICEATT

Add Service Governor - Adds a governor to an existing customer service line. Executing this command will cause a series of prompts to appear to select the customer to add the service governor to, the governor location, and then information about the governor.

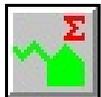
Toolbar: None

GDI Command Line: ADDSERVICE

Add User Text - Predefined - Adds a User Text feature from an ASCII text file (.txt). Executing this command will cause a series of prompts to appear to identify the User Text location, rotation, height, width, and the ASCII text file to use. *Note* - The contents of the *Predefined User Text Filename* list are those files found in the "support\images" directory (folder) of the GASWorkS root directory (folder).

Toolbar: None

GDI Command Line: ADDPREDEFINEDTEXT, ADDPT



Calculate All Service Sizes - Calculates the service line sizes for all of the customer features in the model. Executing this command will cause the service line sizes to be calculated for all of the customers in the model. A message will be displayed when the calculation is complete.

Toolbar: None - Icon in lower-right corner of GDI Window

GDI Command Line: CALCALLSIZES, CALCULATEALLSIZES

Convert DXF Line To Pipe - Converts a line displayed in a DXF background image to a pipe feature. Executing this command will cause a persistent prompt to appear to identify the DXF line(s) to convert to pipe features. To end the selection process, right-click the mouse. The selected DXF lines will be converted to pipe features. *Note* - Only Arc, Line, and Polyline type background entities may be converted to a pipe feature.

Toolbar: None

GDI Command Line: CONVERTDXF, DXF2PIPE

Convert DXF Line To Pipe - Offset - Creates a pipe feature from a line displayed in a DXF background image and allows the pipe location to be offset from the original line location. Executing this command will cause a persistent prompt to appear to identify the DXF line(s) to convert to pipes. To end the selection process, right-click the mouse. A prompt will be displayed to specify the offset distance and direction. *Note* - Only Arc, Line, and Polyline type background entities may be converted to a pipe.

Toolbar: None

GDI Command Line: CONVERTDXFOFF, DXFOFFPIPE

Copy Pipe - Offset - Copies an existing pipe feature and offsets it at a User specified value. Executing this command will cause a series of prompts to appear to identify the pipe to be copied, the offset distance, and the offset side of the original pipe. A new pipe will be placed at the offset location with the same data values as the selected “base” pipe.

Toolbar: None

GDI Command Line: OFFPIPE, OFFSETPIPE

Create Bill Of Materials - Creates a Bill Of Materials for the pipe features, fittings, valves, tees, and governors in a model. Executing this command will cause the Bill Of Materials table to be displayed.

Toolbar: None

GDI Command Line: CREATEBOM

Delete Bill Of Materials Table - Deletes the Bill Of Materials Table. Executing this command will cause a message to be displayed asking whether to really delete the Bill Of Materials Table - respond appropriately.

Toolbar: None

GDI Command Line: DELBOMT, DELETEDBOMTABLE

Delete Service Governor - Deletes an existing service governor from a customer service line. Executing this command will cause a prompt to appear to identify the customer to delete the governor from.

Toolbar: None

GDI Command Line: DELETESERVICE, DELSERV

Highlight DXF Entity - Highlights a User selected DXF entity and displays information about the selected entity. Executing this command will cause a prompt to appear to identify the DXF entity to be selected. Select an entity and a message will be displayed listing information about the selected entity. *Note* - Highlighting a DXF entity is useful to identify which layer an entity is on or when trying to determine an entities graphical type.

Toolbar: None

GDI Command Line: HIGHLIGHTDXF, HILITDXF

Match Customer Attribute Properties - Assigns the attribute data values from one customer feature to another customer feature. Executing this command will cause a series of prompts to appear to identify the “base” customer and the customer(s) to assign the base values to.

Toolbar: None

GDI Command Line: MATCHCATT, MATCHCUSTOMERATTRIBUTE

Match Pipe Attribute Properties - Assigns the attribute data values from one pipe feature to another pipe feature. Executing this command will cause a series of prompts to appear to identify the “base” pipe and the pipe(s) to assign the base data values to.

Toolbar: None

GDI Command Line: MATCHPATT, MATCHPIPEATTRIBUTE

Move Bill Of Materials Table - Moves the Bill Of Materials Table. Executing this command will cause a series of prompts to appear to identify the “base point” for the Bill Of Materials Table and the new location. The Bill Of Materials Table will be placed at the selected location.

Toolbar: None

GDI Command Line: MOVEBOM



Set Pipe Attribute Marker - Sets an existing polyline pipe vertex as a pipe attribute marker. Executing this command will cause a series of prompts to appear to identify the pipe associated with the vertex to be changed and the vertex to set as an attribute marker.

Toolbar: Graphic Edit Commands

GDI Command Line: SETPATT, SETPIPEATTRIBUTE



Set Service Attribute Marker - Sets an existing service vertex as a service attribute marker. Executing this command will cause a series of prompts to appear to identify the customer associated with the vertex to be changed and the vertex to set as an attribute marker.

Toolbar: Customer Commands

GDI Command Line: SETSERVATT, SETSERVICEATTRIBUTE

Set Service Governor Location - Sets an existing service vertex as a governor location marker. Executing this command will cause a series of prompts to appear to identify the customer to be changed, the vertex to set as a governor location, along with additional prompts for information about the governor.

Toolbar: None

GDI Command Line: SETSERVICELOC



Unset Pipe Attribute Marker - Removes the attribute marker setting from an existing pipe vertex (attribute marker). Executing this command will cause a series of prompts to appear to identify the pipe associated with the vertex to be changed and the vertex/marker to be unset.

Toolbar: Graphic Edit Commands

GDI Command Line: UNSETPATT, UNSETPIPEATT



Unset Service Attribute Marker - Removes the attribute marker setting from an existing service vertex (attribute marker). Executing this command will cause a prompt to appear to identify the customer associated with the vertex to be changed and the vertex/marker to unset.

Toolbar: Customer Commands

GDI Command Line: UNSETSATT, UNSETSERVICEATT



HELP EXAMPLES



Add A Service Attribute Marker

Summary

- Adds a vertex to an existing customer service line and sets it as an attribute marker.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one customer feature is present in the model.

- Click the *Add Service Attribute Marker* icon from the *Customer Commands Toolbar*. 
- At the *Select Customer To Add Service Vertex To* prompt, move the mouse pointer near the desired customer feature and left-click the mouse.
- If the customer feature has a polyline service line, at the *Select Service Segment To Add Vertex To* prompt, move the mouse pointer near the desired vertex and left-click the mouse.
- At the *New Vertex Location* prompt, move the mouse crosshairs to the desired location and left-click the mouse.
- A service attribute marker will be placed at the entered or selected location.

Notes & Considerations

- This command can also be executed by selecting the *Add Service Attribute Marker* item from the GDI Command List, or by typing ADDSERVICEATT or ADDSATT on the GDI Command Line and pressing the *Enter* key.
- To delete or move the location of an attribute marker, use the *Delete Service Line Vertex* or *Move Service Line Vertex* commands respectively.
- The *Display Vertex Symbols* graphic settings option can be used to turn the vertex symbols “on” or “off”.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the last data or graphic change. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Add A Service Governor

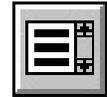
Summary

- Adds a governor to an existing customer service line.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one customer feature is present in the model.

- Select the *Add Service Governor* item from the GDI Command List.
- At the *Select Customer To Add Service Governor To* prompt, move the mouse pointer near the desired customer feature and left-click the mouse.
- If the customer feature is a polyline service line, at the *Select Service Segment To Add Governor To* prompt, move the mouse pointer near the desired service line segment and left-click the mouse.
- At the *Select Governor Location* prompt, move the mouse crosshairs to the desired location and left-click the mouse. A service governor will be placed at the entered or selected location.
- At the *Governor Type* prompt, select an item from the GDI Prompt List.
- At the *Governor Set Pressure* prompt, enter the desired value by typing it on the GDI Prompt Line and press the *Enter* key.



Notes & Considerations

- This command can also be executed by typing ADDSERVICE on the GDI Command Line and pressing the *Enter* key.
- To remove a service governor from the model, use the *Delete Service Governor* command.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Delete A Service Governor](#)

Add Predefined User Text

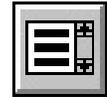
Summary

- Adds a User Text feature from an ASCII text file (*.txt).

Example

The example assumes that GASWorkS has been started, a model is open, the GDI Window is displayed, and a predefined ASCII text file (*.txt) has been saved to the “support\text” folder in the GASWorkS directory.

- Select the *Add User Text - Predefined* item from the GDI Command List.
- At the *Text Insert Location* prompt, either type a coordinate pair on the GDI Prompt Line and press the *Enter* key, or move the mouse crosshairs to a point in the GDI Display and left-click the mouse. The selected location will be the lower-left corner of the User Text Feature.
- At the *User Text Rotation* prompt, move the mouse crosshairs to a point within the GDI Display and left-click the mouse. The angle of the line that is displayed in the GDI Display indicates the orientation of the User Text feature.
- At the *User Text Height* prompt, move the mouse crosshairs to a point within the GDI Display and left-click the mouse. The text height will be set to the length of the line that is displayed in the GDI Display.
- At the *User Text Width* prompt, move the mouse crosshairs to a point within the GDI Display and left-click the mouse. The width of the User Text feature will be set equal to the length of the line that is displayed in the GDI Display.
- At the *Predefined User Text Filename*, select a Filename from the GDI Prompt List.
- The selected “.txt” file will be turned into a User Text feature and displayed at the selected location.



Notes & Considerations

- This command can also be executed by typing ADDPREDEFINEDTEXT or ADDPT on the GDI Command Line and pressing the *Enter* key.
- An ASCII text file may be created in any text editor application, such as Windows Notepad.

- To turn the display of User Text features “on” or “off”, use the *Display User Text* command.
- To change the User Text Data, either use the *Edit User Text* command or left-click on the desired User Text feature to display the data in the Data Panel.
- To create a copy of an existing User Text feature, use the *Copy User Text* command.
- To change the location of a User Text feature, either use the *Move User Text* command or grips.
- To remove a User Text feature from the model, use the *Delete User Text* command.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Calculate All Service Sizes

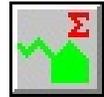
Summary

- Calculates the service line sizes for all of the customer features in the model.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one customer feature is present in the model.

- Click the *Calculate All Service Sizes* icon from the lower-right corner of the GDI Window.
- If changes have been made to the model since the last solution, a message will be displayed asking whether to continue - either click the *Yes* command button to proceed, or click the *No* command button to cancel the routine.
- A message may be displayed when the service size calculation is complete. Click the *OK* command button to clear the message.



Notes & Considerations

- This command can also be executed by selecting the *Calculate All Service Sizes* item from the GDI Command List, or by typing CALCALLSIZES or CALCULATEALLSIZES on the GDI Command Line and pressing the *Enter* key.
- If the model has not been solved since the last change was made (the model is “unbalanced”), the summation symbol on the *Calculate All Service Sizes* icon will be colored red.
- If no changes have been made to the model since the last solution (the model is “balanced”), the summation symbol on the *Calculate All Service Sizes* icon will be colored blue.



Convert A DXF Line To A Pipe

Summary

- Converts a line displayed in a DXF background image to a pipe feature.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a DXF background image is attached to the model.

- Select the *Convert DXF Line To Pipe* item from the GDI Command List. 
- At the *Select A DXF Line* prompt, move the mouse pointer to the desired DXF line and left-click the mouse.
- The *Select Another DXF Line* prompt will be displayed. Either continue to select additional DXF lines with the method described above, or if no additional DXF lines are to be converted, either right-click the mouse button or press the “E” key to end the selection process. *Note* - To unselect (unhighlight) a DXF line, move the mouse pointer near the undesired DXF line and left-click the mouse.
- A message will be displayed asking whether to convert all of the highlighted DXF lines - respond appropriately.
- *Note* - If a new node is created and the *Allow Data Entry During New Feature Entry* graphic settings option is selected, the Node Data will be displayed in the Data Panel. Right-click the mouse to accept the default data values. If changes are made, click the *Apply Data Values* command button.
- *Note* - If the *Allow Data Entry During New Feature Entry* graphic settings option is selected, the Pipe Data will be displayed in the Data Panel. Right-click the mouse to accept the default data values. If changes are made, click the *Apply Data Values* command button.

Notes & Considerations

- This command can also be executed by typing CONVERTDXF or DXF2PIPE on the GDI Command Line and pressing the *Enter* key.
- Only Arc, Line, and Polyline type background entities can be converted to a pipe feature.

- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Convert A DXF Line To A Pipe & Offset The Pipe

- Creates a pipe feature from a line displayed in a DXF background image and allows the pipe location to be offset from the original line location.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a DXF background image is attached to the model.

- Select the *Convert DXF Line To Pipe - Offset* item from the GDI Command List. 
- At the *Select A DXF Line* prompt, move the mouse pointer to the desired DXF line and left-click the mouse.
- At the *Offset Distance* prompt, enter the desired value by typing it on the GDI Prompt Line and press the *Enter* key.
- At the *Select Side To Offset To* prompt, move the mouse pointer to the desired side of the original DXF line and left-click the mouse.
- *Note* - If a new node is created and the *Allow Data Entry During New Feature Entry* graphic settings option is selected, the Node Data will be displayed in the Data Panel. Right-click the mouse to accept the default data values. If changes are made, click the *Apply Data Values* command button.
- *Note* - If the *Allow Data Entry During New Feature Entry* graphic settings option is selected, the Pipe Data will be displayed in the Data Panel. Right-click the mouse to accept the default data values. If changes are made, click the *Apply Data Values* command button.

Notes & Considerations

- This command can also be executed by typing CONVERTDXFOFF or DXFOFFPIPE. on the GDI Command Line and pressing the *Enter* key.
- Only Arc, Line, and Polyline type background entities can be converted to a pipe feature.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

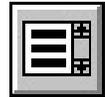
Convert Service Lines To Customers

- Converts a pipe feature assigned to a specified *Facility Type* from a DXF layer to a customer symbol and service line.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a DXF background image is attached to the model.

- Select the *Convert Service Lines To Customers* item from the GDI Command List.
- At the *Facility Type Associated With Service Lines* prompt, select the desired item from the GDI Prompt List and press the *Enter* key.
- At the *Fuzzy Tolerance* prompt, enter the desired value by typing it on the GDI Prompt Line and press the *Enter* key.
- A message may be displayed stating how many service lines were processed and the number of customers added. Click the *OK* command button to clear the message.



Notes & Considerations

- This command can also be executed by typing CONVERTSERVICE or SERVICE2CUST on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Copy A Pipe & Offset

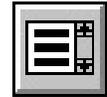
Summary

- Copies an existing pipe feature and offsets it at a User specified value.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one pipe feature is present in the model.

- Select the *Copy Pipe - Offset* item from the GDI Command List.
- At the *Select A Pipe* prompt, move the mouse pointer to the desired pipe feature to copy and left-click the mouse.
- At the *Offset Distance* prompt, enter the desired value by typing it on the GDI Prompt Line and press the *Enter* key.
- At the *Select Side To Offset To* prompt, move the mouse pointer to the desired side of the original pipe feature and left-click the mouse.
- A copy of the selected pipe will be placed at the specified offset distance from the original pipe location.



Notes & Considerations

- This command can also be executed by typing OFFPIPE or OFFSETPIPE on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Create A Bill Of Materials

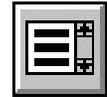
Summary

- Creates a Bill Of Materials for the pipe features, Fittings, Valves, tees, and governors in a model.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one customer service line and one pipe feature are present in the model.

- Select the *Create Bill Of Materials* item from the GDI Command List.
- If a Bill Of Materials already exists, a message will be displayed asking to recreate it now - respond appropriately.
- The Bill Of Materials Report will be displayed. Browse the contents of the Bill Of Materials and make any desired changes. When finished, click the *Close* command button.



Notes & Considerations

- This command can also be executed by typing CREATEBOM on the GDI Command Line and pressing the *Enter* key.
- To insert the Bill Of Materials into the model, use the *Insert As Table* icon on the Report.
- If the Bill Of Materials has been inserted into the model and the location needs to be changed, use the *Move Bill Of Materials Table* command.
- If the Bill Of Materials has been inserted into the model and the table needs to be removed, use the *Delete Bill Of Materials* command.

See Also

[Delete The Bill Of Materials Table](#)

[Move The Bill Of Materials Table](#)

Delete The Bill Of Materials Table

Summary

- Deletes the Bill Of Materials Table.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a Bill Of Materials Table is present in the model.

- Select the *Delete Bill Of Materials Table* item from the GDI Command List.
- The Bill Of Materials Table will be deleted.



Notes & Considerations

- This command can also be executed by typing DELBOMT or DELETEDBOMTABLE on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Create A Bill Of Material](#)

Delete A Service Governor

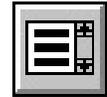
Summary

- Deletes an existing service governor from a customer service line.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one customer feature with a service governor is present in the model.

- Select the *Delete Service Governor* item from the GDI Command List.
- At the *Select Customer To Delete Governor From* prompt, move the mouse pointer near the desired customer to delete the service governor from and left-click the mouse.
- The selected service governor will be deleted from the associated customer feature.



Notes & Considerations

- This command can also be executed by typing DELETESERVICE or DELSERV on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Add A Service Governor](#)
[Unset A Service Attribute Marker](#)

Highlight A DXF Entity

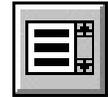
Summary

- Highlights a User selected DXF entity and displays information about the selected entity.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a DXF background image is present in the model.

- Select the *Highlight DXF Entity* item from the GDI Command List.
- At the *Select An Entity* prompt, move the mouse pointer near the desired DXF entity to highlight and left-click the mouse.
- A message will be displayed showing the DXF entity information. Click the *OK* command button to clear the message.
- The *Select Another Entity* prompt will be displayed. Either continue to select additional DXF entities with the method described above, or if no additional DXF entities are to be highlighted, either right-click the mouse button or press the “E” key to end the selection process.



Notes & Considerations

- This command can also be executed by typing HIGHLIGHTDXF or HILITDXF on the GDI Command Line and pressing the *Enter* key.

Match The Customer Attribute Properties

Summary

- Assigns the attribute data values from one customer feature to another customer feature.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, that customer attribute data is attached, and that at least one customer feature is present in the model.

- Select the *Match Customer Attribute Properties* item from the GDI Command List. 
- At the *Select Base Customer* prompt, move the mouse pointer to the desired customer feature to copy the attribute properties from and left-click the mouse.
- At the *Select Customer To Change...* prompt, either move the mouse pointer near the desired customer(s) to change and left-click the mouse, or either right-click the mouse button or press the “E” key to end the selection process.
- The associated customer attribute features will be copied to the selected customer features.

Notes & Considerations

- This command can also be executed by typing MATCHCATT or MATCHCUSTOMERATTRIBUTE on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Match The Pipe Attribute Properties

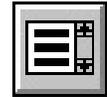
Summary

- Assigns the attribute data values from one pipe feature to another pipe feature.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, that pipe attribute data is attached, and that at least one pipe feature is present in the model.

- Select the *Match Pipe Attribute Properties* item from the GDI Command List.
- At the *Select Base Pipe* prompt, move the mouse pointer to the desired pipe feature to copy the attribute properties from and left-click the mouse.
- At the *Select Pipe To Change...* prompt, either move the mouse pointer near the desired pipe(s) to change and left-click the mouse, or either right-click the mouse button or press the “E” key to end the selection process.
- The associated pipe attribute features will be copied to the selected pipe features.



Notes & Considerations

- This command can also be executed by typing MATCHPATT or MATCHPIPEATTRIBUTE on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Move The Bill Of Materials Table

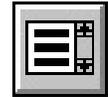
Summary

- Moves the Bill Of Materials Table.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one Bill Of Materials Table is present in the model.

- Select the *Move Bill Of Materials Table* item from the GDI Command List.
- At the *Select Base Point On Group* prompt, move the mouse crosshairs to the desired location on the Bill Of Materials Table to use as the “base” point and left-click the mouse.
- At the *Select New Location* prompt, move the mouse crosshairs to the desired location for the moved Bill Of Materials Table and left-click the mouse.
- The Bill Of Materials Table will be moved to the selected location.



Notes & Considerations

- This command can also be executed by typing MOVEBOM on the GDI Command Line and pressing the *Enter* key.
- To insert a Bill Of Materials Table into a model, use the *Create Bill Of Materials* command, then use the *Insert As Table* icon.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Create A Bill Of Materials](#)

Set A Pipe Attribute Marker

Summary

- Sets an existing polyline pipe vertex as a pipe attribute marker.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one polyline pipe feature is present in the model.

- Select the *Set Pipe Attribute Marker* icon from the *Graphic Edit Commands Toolbar*.
- At the *Select Pipe To Set Vertex For* prompt, move the mouse pointer to the desired pipe feature and left-click the mouse. The selected pipe feature will be highlighted.
- At the *Select A Vertex To Set As An Attribute Marker* prompt, move the mouse pointer to the desired vertex and left-click the mouse.
- The selected pipe vertex will now be set as an attribute marker.



Notes & Considerations

- This command can also be executed by selecting the *Set Pipe Attribute Marker* item from the GDI Command List, or by typing SETPATT or SETPIPEATTRIBUTE on the GDI Command Line and pressing the *Enter* key.
- To remove an individual pipe attribute marker, use the *Unset Pipe Attribute Marker* command.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Unset A Pipe Attribute Marker](#)

Set A Service Attribute Marker

Summary

- Sets an existing service vertex as a service attribute marker.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one polyline customer feature is present in the model.

- Click the *Set Service Attribute Marker* icon from the *Customer Commands Toolbar*. 
- At the *Select Customer To Set Service Vertex For* prompt, move the mouse pointer to the desired customer feature and left-click the mouse.
- At the *Select A Vertex To Set As An Attribute Marker* prompt, move the mouse pointer to the desired vertex and left-click the mouse.
- The selected service vertex will now be set as an attribute marker.

Notes & Considerations

- This command can also be executed by selecting the *Set Service Attribute Marker* item from the GDI Command List, or by typing SETSERVATT or SETSERVICEATTRIBUTE on the GDI Command Line and pressing the *Enter* key.
- To remove an individual service attribute marker, use the *Unset Service Attribute Marker* command.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Unset A Service Attribute Marker](#)

Set A Service Governor Location

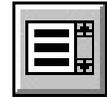
Summary

- Sets an existing service vertex as a governor location marker.

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that at least one polyline service customer feature with a service vertex is present in the model.

- Select the *Set Service Governor Location* item from the GDI Command List.
- At the *Select Customer To Assign Service Governor To* prompt, move the mouse pointer to the desired customer feature and left-click the mouse.
- At the *Select The Vertex Immediately Upstream Of The Governor Location* prompt, move the mouse pointer to the desired vertex and left-click the mouse.
- At the *Governor Type* prompt, select the desired item from the GDI Prompt List.
- At the *Governor Set Pressure* prompt, enter the desired value by typing it on the GDI Prompt Line and press the *Enter* key.
- The selected vertex will be set to a service governor.



Notes & Considerations

- This command can also be executed by typing SETSERVICELOC on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

Unset A Pipe Attribute Marker

Summary

- Removes the attribute marker setting from an existing pipe vertex (attribute marker).

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a pipe feature with a vertex set as an attribute marker is present in the model.

- Click the *Unset Pipe Attribute Marker* icon from the *Graphic Edit Commands Toolbar*.
- At the *Select Pipe To Unset Vertex For* prompt, move the mouse pointer to the desired pipe feature and left-click the mouse.
- At the *Select A Vertex To Unset As An Attribute Marker* prompt, move the mouse pointer to the desired vertex and left-click the mouse.
- The selected vertex attribute marker will now be a vertex.



Notes & Considerations

- This command can also be executed by selecting the *Unset Pipe Attribute Marker* item from the GDI Command List, or by typing UNSETPATT or UNSETPIPEATT on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Set A Pipe Attribute Marker](#)

Unset A Service Attribute Marker

Summary

- Removes the attribute marker setting from an existing service vertex (attribute marker).

Example

This example assumes that GASWorkS has already been started, that a model is open, that the GDI Window is open, and that a customer feature with a service vertex set as an attribute marker is present in the model.

- Click the *Unset Service Attribute Marker* icon from the *Graphic Edit Commands Toolbar*.



- At the *Select Customer To Unset Service Vertex For* prompt, move the mouse pointer to the desired customer feature and left-click the mouse.
- At the *Select A Vertex To Unset As An Attribute Marker* prompt, move the mouse pointer to the desired vertex and left-click the mouse.
- The selected vertex attribute marker will now be a vertex.

Notes & Considerations

- This command can also be executed by selecting the *Unset Service Attribute Marker* item from the GDI Command List, or by typing UNSETSATT or UNSETSERVICEATT on the GDI Command Line and pressing the *Enter* key.
- If the *Allow Undo Of Data/Graphic Changes* preference settings option is enabled, click the *Undo* icon to restore the original configuration. To access the option, select the *Settings* item from the *Preferences* submenu from the *File* menu.

See Also

[Set A Service Attribute Marker](#)

MISCELLANEOUS



Attribute Files

Many of the UK Design Module features rely heavily on the use of specially defined linked attribute files. Separate files are provided for the main and service features. The attribute file definition can be viewed and edited using the associated Attribute File Settings screen.

To view the Customer or Pipe Attribute File Definition associated with an open model or project, select the *Attribute File* item from the *Customer Data* or *Pipe Data* submenu of the *Utilities* menu. The associated Attribute File Settings screen will be displayed. To view the Database Definition, select the *Other* data tab on the screen, and the definition settings and assignments will be displayed.

To edit the definition, click the *Edit Attribute Database Definition* command button from the Attribute File Settings screen. The Linked Attribute Database Definition screen will be displayed. Only the items whose cell color is “white”, may be changed by the User. The UKDM expects certain fields to be present. It is not advisable to delete any of the original fields. Making a change to the definition associated with the currently open model or project, only affects that model or project.

A “seed” attribute file is used when creating a new project. The seed file contains a base definition that is used to create the definition for the new project. To make a change that will affect the definition for all new projects, the definition contained in the seed file must be changed. In the case of Customer Data, the “standard” seed file is named “ukdm_def_c”. In the case of Pipe/Main Data, the “standard” seed file is named “ukdm_def_p”. Although the “standard” seed definition may be altered by the User, it is suggested that if a change is made to the original seed definition, that it be saved to another name. The seed file is assigned to a project when it is created using the New Project routine, by selecting the *Attach A Linked Customer Attribute File* or *Attach A Linked Pipe Attribute File* item, then selecting the desired definition name from the associated list.

Additional information on working with Attribute File Definitions is contained in the GASWorkS User’s Manual.

Attribute Lists

Some of the items found in the attribute data for the pipe/mains and services is supported by use of an associated attribute list. The lists contain acceptable values for each associated item. The lists are assigned to an item using the Database Definition.

An attribute list can represent a standard GASWorkS dimensional unit list, Property Table, or custom attribute value/code list. In general, a custom attribute list is a specifically formatted ASCII text file. The format of the file contains a value to be displayed to the User and a code to be used by the software.

Special custom lists have been created and are associated with the UK Design Module. These lists can be modified by the User, however if the lists are not correctly formatted, they can become corrupt and the UKDM features may not function correctly. The GASWorkS User's Manual contains additional information on working with Attribute Lists.

Attribute Markers

Attribute markers are used to segregate a main or a service into segments. Each segment may have unique attribute values and settings. An attribute marker is a specially designated pipe or service vertex. Additional information on how they apply to main and services is described on the following pages.

The display of vertex markers for pipe/main and customer features is controlled using the *Display Vertex Symbols* item. To view or change the settings, select the *Settings* item from the *Graphics* menu.

Main Attribute Markers

As used with main features, attribute markers are used to segregate a main into a maximum of five segments, without causing the need for additional nodes. Each segment may have unique attribute values and settings. Attribute markers do not affect the sizing of pipes/mains.

Add An Attribute Marker To A Main

To set an existing pipe vertex as an attribute marker -

- Click the *Set Pipe Attribute Marker* icon from the *Graphic Edit Commands Toolbar*. Select the pipe containing the desired vertex, then select the desired pipe vertex. If the vertex markers are displayed, the vertex shape will change to a diamond (instead of a triangle) to indicate that the vertex represents an attribute marker.



To add an attribute marker at a location where a pipe vertex does not already exist -

- Click the *Add Polyline Pipe Vertex* icon from the *Graphic Edit Commands Toolbar*. Select the pipe to add the vertex to, then select the location for the vertex/marker.
- Once the vertex has been added, click the *Set Pipe Attribute Marker* icon from the *Graphic Edit Commands Toolbar*. Select the pipe containing the new vertex, then select the desired pipe vertex. If the vertex markers are displayed, the vertex shape will change to a diamond (instead of a triangle) to indicate that the vertex represents an attribute marker.



Delete An Attribute Marker From A Main

To delete an attribute marker along with its associated vertex from a main -

- Click the *Delete Polyline Pipe Vertex* icon from the *Graphic Edit Commands Toolbar*. Select the desired pipe, then select the desired vertex.



To delete an attribute marker without deleting the associated vertex from a main -

- Click the *Unset Pipe Attribute Marker* icon from the *Graphic Edit Commands Toolbar*. Select the desired pipe, then select the desired marker to unset. If the vertex markers are displayed, the vertex shape will change to a triangle (instead of a diamond).



Service Attribute Markers

As used with service features, attribute markers are used to segregate a service into a maximum of ten segments. Each segment may have unique attribute values and settings. Depending on the value of the various attribute values, attribute markers along a service may affect the sizing of the service line.

Add A Service Attribute Marker

To set an existing vertex as an attribute marker -

- Click the *Set Service Attribute Marker* icon from the *Customer Commands Toolbar*. Select the desired customer, then select the desired service vertex. If the vertex markers are displayed, the vertex shape will change to a diamond (instead of a triangle) to indicate that the vertex represents an attribute marker.



To add a vertex and automatically set it as an attribute marker -

- Click the *Add Service Attribute Marker* icon from the *Customer Commands Toolbar*. Select the desired customer, then select the location of the new vertex/marker. If the vertex markers are displayed, the new vertex location will be marked with a diamond shape to indicate that the vertex represents an attribute marker.



Delete A Service Attribute Marker

To delete an attribute marker along with its associated vertex from a service -

- Click the *Delete Service Line Vertex* icon from the *Customer Commands Toolbar*. Select the desired customer, then select the desired vertex/marker.



To delete an attribute marker without deleting the associated vertex from the service -

- Click the *Unset Service Attribute Marker* icon from the *Customer Commands Toolbar*. Select the desired customer, then select the desired vertex/marker. If the vertex markers are displayed, the vertex shape will change to a triangle (instead of a diamond).



Diversity Calculations

The diversity calculations used by the UK Design Module are the same calculations used by the standard version of GASWorkS. The calculations are based on Appendix 4 and 5 of IGE/GL/1. As implemented in GASWorkS, diversity can be used for both treed or looped piping systems, and the model can be comprised of both diversified and non-diversified customers/loads. Additional information on the use and implementation of the diversity calculations can be found in the GASWorkS User's Manual.

Facility Settings

Facility Settings can be used to segregate features based on the *Facility Type* value. The Facility Settings can only be assigned to a main feature - nodes and services inherit the value of the associated main. With respect to the UK Design Module, the most important use of the Facility Settings is with respect to the Pipe Sizing routine. Individual pipe segments may be included or excluded from the Pipe Sizing process, depending on the assigned Facility Settings. Additional information on working with Facility Settings is contained in the GASWorkS User's Manual.

Service Size Calculations

In general the service size calculation method used by the UK Design Module is similar to the method used to size pipes/mains. The process attempts to satisfy the specified pressure and velocity requirements by selecting allowable pipe sizes from the currently specified Pipe Property Table, for the services that are allowed to be calculated. The process is described more fully below.

Pipe Property Table

The currently specified Pipe Property Table is used to select the allowable pipe sizes. The Pipe Property Table is specified using the *Property Tables* item from the *Preferences* submenu of the *File* menu. Only pipes where the *Use When Sizing* item is set to “Services” or “Both” are used in the Service Sizing process, and of those pipes, only the ones that meet the specified Sizing Group assignment are used. In the UKDM, Sizing Groups (Group 1, Group 2, etc) are assigned to common group names such as MDPE, HDPE, etc. The assignment is made through the use of the Sizing Group attribute list. Additional information on the use of the attribute lists is presented later in this guide.

For example, if a service line is set to be sized (“Allow Sizing Calculation” *Customer Attribute Data Values* item is set to “Yes”) and set to use MDPE (“Sizing Group” *Attribute Data Values* item is set to “MDPE”), only pipes associated with the Sizing Group Number assigned to the MDPE attribute code (Group 1) and set to allow to use when sizing services, will be used during the Pipe Sizing process.

For an “Existing” *Sizing Group* attribute code, no assignment will be made and the associated service segment will not be sized.

Attribute Segments

The service line may be segregated into attribute segments. An attribute segment is created by adding an Attribute Marker (special service line vertex) at the location where a change in attribute information for the service line occurs. The Sizing Group may be uniquely set for each individual segment. For example, one segment could be set as “Existing” to represent a section of existing service under the street and would not be sized. Another segment could be set to “MDPE” to represent a section of new underground service, and another segment could be set to “Steel” to represent a new above ground riser section. Each segment of the service line will be sized according to its assigned Sizing Group.

Use the *Add Service Attribute Marker*, *Set Service Attribute Marker*, and *Unset Service Attribute Marker* commands to manage the attribute segments for a service line.



Design Requirements

The service line sizing is based on specified pressure and velocity requirements. The pressure requirement is set individually for each service, and can be set as either a maximum allowable pressure drop, or in the case of a service with a governor, a minimum allowable inlet pressure. The allowable pressure requirements are set using the Customer Attribute Data. The maximum velocity is set at 15 Metres/sec. The velocity limit cannot be revised by the User.

Customer Attribute Data

Several attribute items need to be set in order to facilitate the Service Sizing process. See the *Customer Data & Results* topic in the *Data Panel* section in this guide for additional information on the description and use of the various Customer Attribute Data items. The required items are described as follows.

Attached Fittings

This item establishes the type of fittings used along the associated service segment. Use of the item is optional, however if a fitting is attached, the appropriate equivalent length will be included in the overall hydraulic length during the Service Sizing process. Select an appropriate value from the associated list.

Connection Type

This item establishes the type of connection to the main line. Based on the selected type, the appropriate equivalent length will be included in the overall hydraulic length during the Service Sizing process. Select an appropriate value from the associated list.

Hourly Demand

The *Hourly Demand* item specifies the flow value to be used during the Service Sizing. Generally, the value should indicate the maximum anticipated hourly demand for the service line. If the value is not set, the Per Unit Load value in the *Hydraulic Data Items* is used during the Service Sizing process. If the *Node Load Application* is set to “Diversified”, the load value is computed as the “Diversified” load based on the specified heating type and annual usage for a customer count of one. Either enter an appropriate value, or enter an appropriate *Per Unit Load* value and select the *Calculate Hourly Demand* item from the *Actions* list.

Hourly Demand Units

The *Hourly Demand Units* item specifies the dimensional unit to be used for the flow values used during the Service Sizing. Select an appropriate dimensional unit from the associated list.

Pipe Length

The Pipe Length represents the base hydraulic length. Additional equivalent length values are added to this value as fittings, connections, and terminations are assigned to the service line. The initial value of this item is set to the graphic (scaled) length of the service line as drawn in the GDI Window. The value can be overridden by manually entering a value. The value can be reset to the graphic length by selecting the *Calculate Graphic Length* item from the *Actions* list. Either leave the assigned value, or enter an appropriate value.

Sizing Group

This item establishes the type of pipe to be used to size the associated segment of the service line. Select an appropriate value from the associated list.

Pipe Length

This item establishes the type of termination used at the meter location. Based on the selected type, the appropriate equivalent length will be included in the overall hydraulic length during the Service Sizing process. Select an appropriate value from the associated list.

Sizing Process

The sizing process varies according to the service line configuration. The general configurations supported by the sizing process are a single service line, a dual/branched service line (a single trunk line which branches into two service lines), and either a single or branched service line which has an intermediate governor installed along the line between the main connection and termination (for a single service) or the branch connection (for a branch service). The procedures used by the Sizing routine for each specific configuration are described as follows.

Single Service

- A single service refers to a service line connected to the main line, extending to a single termination, without an intermediate governor installed along the line. The procedure for sizing a single service is:
 - The lowest pressure for the nodes associated with the main that the service line is attached to is determined. This pressure is used as the inlet pressure for the service line.
 - The total hydraulic length for the service line is computed based on the service length, connection type, termination type, and any attached fittings.
 - A minimum required service line size is computed. The size is based on the velocity and pressure requirements, the hourly load value, the total hydraulic length, and the assigned Sizing Group.
 - If the minimum required size represents that smallest size available for use in the assigned Sizing Group, the service size is set to the computed minimum required size.
 - If the minimum required size is greater than the smallest size available for the assigned Sizing Group, and the total service length (not hydraulic length) is less than 63 Metres, the service size is set to the computed minimum required size.
 - If the minimum required size is greater than the smallest size available for the assigned Sizing Group, and more than one Sizing Group is assigned to the service line, the service size is set to the computed minimum required size.
 - If the minimum required size is greater than the smallest size available for the assigned Sizing Group, and the total service length (not hydraulic length) is greater than 63 Metres, and only one Sizing Group is assigned to the service line, and the next smaller available size can satisfy the velocity requirements, and the customer is set to allow calculation of a composite sized service, an attempt is made to compute a “composite service”. Otherwise, the service size is set to the computed minimum required size.

● A composite sized service is one that contains two different pipe sizes. The length of each size is computed such that the specified pressure drop requirements are nominally met. The composite service calculation is performed as follows:

- The next smaller available size for the assigned Sizing Group is determined.
 - The required length of each size is determined so that the pressure requirements are nominally satisfied. The length values are determined to within 0.1 Metre. Because of this limit, the pressure requirements may not be exactly satisfied.
 - If the length of the smaller size is less than 30% of the overall service length (not hydraulic length), the service size is set to the computed minimum required size (larger composite size).
 - If the length of the smaller size is 30% or more of the overall service length (not hydraulic length), the service sizes are set as a composite and the composite lengths are assigned.
 - If the length of the larger size is less than 0.1 Metre, it is set to 0.1 Metre.
- When a composite service is calculated, the equivalent length of the connection is based on the larger size, the equivalent length of the termination is based on the smaller size, the equivalent length of any attached fittings is based on the size for the associated segment, except where the segment corresponds to the location where the size changes (composite size transition segment). In that case, the equivalent length of the fittings attached to that segment, is based on the smaller size.

Dualed/Branched Service

- A dualed or branched service refers to a service line that has a single connection to the main, continues for some distance, then branches into two separate lines that each continue to different termination points. The portion of the main between the tap and branch connection is referred to as the “approach” or “trunk” portion of the service. The portion of the service between the branch connection and termination is referred to as the “branch” portion of the service line.
- With respect to the sizing calculations, the branches are further differentiated as the “trunk branch” and the “branch”. When a branch customer is created, the “trunk” customer is entered, then the branch customer is entered and the point where the branch customer connects to the trunk is identified. The trunk branch is that portion of the original trunk service that is downstream of the branch connection.
- The procedure for sizing a branched service is:
 - The lowest pressure for the nodes associated with the main that the service line is attached to is determined. This pressure is used as the inlet pressure for the service line.

- The total hydraulic length for each portion of the service line - trunk, trunk branch, and branch - is computed based on the service length, connection type, termination type, and any attached fittings. The connection of the branch to the trunk is assumed to be made by the branch leg of a line tee. The line tee is assumed to be the same size as the trunk portion of the service. The appropriate equivalent length value is included for the branch portions of the service line.
- A minimum required size is computed for the trunk portion of the service line. The size is based on the velocity and pressure requirements, the total hourly load value (the sum of the loads for both customers), the total hydraulic length for that portion of the service, and the assigned Sizing Group.
- The trunk branch and branch portions of the service are then sized. The size is selected based on the velocity and pressure requirements, each portion's respective load, hydraulic length, and the assigned Sizing Group. These portions of the service line are sized similar to the sizing method used for a single service.

Service With Governor

- A governor can be included in either a single or dual service. A governor is used to reduce a higher pressure supply from the main to a lower pressure on the remainder of the service downstream of the governor.
- With respect to the sizing calculations, a service containing a governor is differentiated into two portions - the high pressure portion (the portion upstream of the governor, between the main line connection and the governor inlet), and the low pressure portion (the portion downstream of the governor, between the governor outlet and the termination(s).)
- The procedure for sizing a service with a governor is:
 - The lowest pressure for the nodes associated with the main that the service line is attached to is determined. This pressure is used as the inlet pressure for the high pressure portion of the service line.
 - The total hydraulic length is calculated for each portion of the service line as described in the single and dual service line configurations.
 - The high pressure portion of the service line is sized using the associated pressure requirements, etc, similar to the method described for a single service line.
 - The set pressure for the governor is used as the inlet pressure for the low pressure portion of the service line. The low pressure portion of the service is sized using the associated pressure requirements, etc, similar to the method described for either a single or dual service line.

Fittings, Connections, & Terminations

The equivalent length values of the fittings, connections, and terminations used in the service size calculations are “hard-coded” within the GASWorkS software. The hard-coded values are equivalent to the values listed in the standard UKDM Fitting Property Table that is provided when the software is installed.

Working With GASWorkS 8.0 Data

A GASWorkS 8.0 model can be imported to a GASWorkS 10 model by opening the associated model using the *Open* item in the *File* menu. When a GASWorkS 8.0 model is detected using the Open routine, a prompt will appear requesting whether to import the file or not, respond to the prompt appropriately.

The GASWorkS 8.0 model data will be imported into the new GASWorkS 10 model format. The main and customer attribute data will be imported into the Linked UK Attribute file format. Not all GASWorkS 8.0 attribute data is supported in GASWorkS 10, some data will be lost in the translation.

Working With GASWorkS 10 Data

A GASWorkS 7.0 and 9.0 model can be imported to a GASWorkS 10 model by using the Import and Export routines, or by opening the associated model using the *Open* item in the *File* menu. When a GASWorkS 7.0 or 9.0 model is detected using the Open routine, a prompt will appear requesting whether to import the file or not, respond to the prompt appropriately. If the Open routine suspects that diversity load calculations were used with the original model, and that customer features were not used in the model, an additional prompt will appear. An affirmative response to the prompt will allow entry of the required diversity data. Diversity calculation data was not saved with the model data in GASWorkS 7.0 or 9.0.

The GASWorkS 7.0 and 9.0 model data will be imported into the new GASWorkS 10 model format. If a GASBase style attribute file was used with the original model, the main and customer attribute data will be imported into a predefined Linked Attribute file format, similar in content to the original GASBase file. The GASBase type attribute file format is not compatible with the UKDM features.

Disabling UKDM Features

For **Windows XP, 7, Vista**: Select the Windows *Start* button. The program menu list will be displayed. Select the *Run* item from the program list.

For **Windows 8**: From the Windows 8 desktop, right-click the mouse pointer in the lower-left corner of the desktop. Select the *Run* item from the menu list.

For **Windows 10**: From the Windows 10 desktop, right-click the mouse pointer on the *Windows* icon in the lower-left corner of the desktop. Select the *Run* item from the menu list.

At the *Open* prompt, type “\Program Files (x86)\GASWorkS 10\app\gasworks.exe” /-sp. Click the *OK* command button.

Note...

Include the quotation marks. There are spaces between Program and Files, between Files and (x86), between GASWorkS and 10, and between the closing quote (”) and the forward slash (/).

The described procedure will only temporarily disable the UK Design Module features. Start GASWorkS in the normal manner to enable the UKDM features again.

