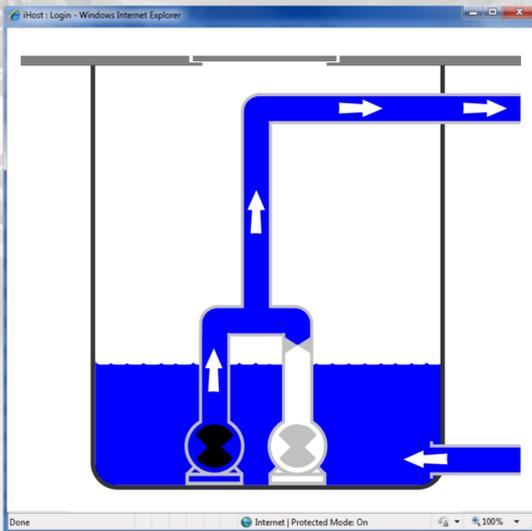


# Pump Station Remote Monitoring



If anything happens  
on site you will be  
the first to know.

Because there is simply no point in installing a system which cannot guarantee delivering every alarm.

## Peace of mind

### Reliable, dependable, scalable

The technology used to build our pump station monitoring system is designed to be bullet proof. The same technology is used by UK power and water utilities for monitoring their remote network assets.

The following are a few of the great design features that keep the system working even when the world around is falling apart.

### Alarms reported immediately

10 seconds after an alarm condition has been detected on site the Smart Box has already reported it to the central iHost Server. You have up-to-the-minute information about what's happening on site.

### Alarm acknowledgment guaranteed

When the Smart Box reports an alarm or routine data to iHost it gets a receipt. No receipt means that the Smart Box will send the data again until a receipt is received. This is the equivalent of making sure the baton is safely handed on. *This is light years ahead of the unreliable 'sending an alarm by text' systems!*

### Call Retries, forever

When a pump trips, the Smart Box on site will report this alarm to iHost, the whole process taking in the region of 10 seconds. In rare cases, when the mobile phone network is unavailable (or there is poor signal strength etc) the first attempt to report the alarm can fail. The Smart Box continues to retry until the alarm gets transferred to iHost. iHost stores the alarm using the date/time of the original event (not the time received at iHost). To help in future the Smart Box keeps a record of why each of the earlier attempts failed and these too are transferred to the iHost event log.

### Site communications links are 100% monitored

iHost maintains a list of all your pumping stations and when they are next expected to make a 'health check' contact to iHost. If any of the sites miss their slot then iHost puts an entry in the event log and (if requested) sends an email / SMS to users notifying them that the site has lost communications and is 'Late'. The Smart Box at the pumping station will continue to try and restore communications; when it does iHost resets the Late flag and, if requested, notifies users by email / SMS.

### No power, no problem

Smart Boxes are available with their own battery back-up. In most cases this provides 3 days cover. During periods of power failure all inputs continue to be monitored, all alarms reported to iHost and any incoming polling requests answered. Power failure and restorations events are treated like any other site alarms and reported to iHost in the usual way and are forwarded as an email / SMS in the normal way.



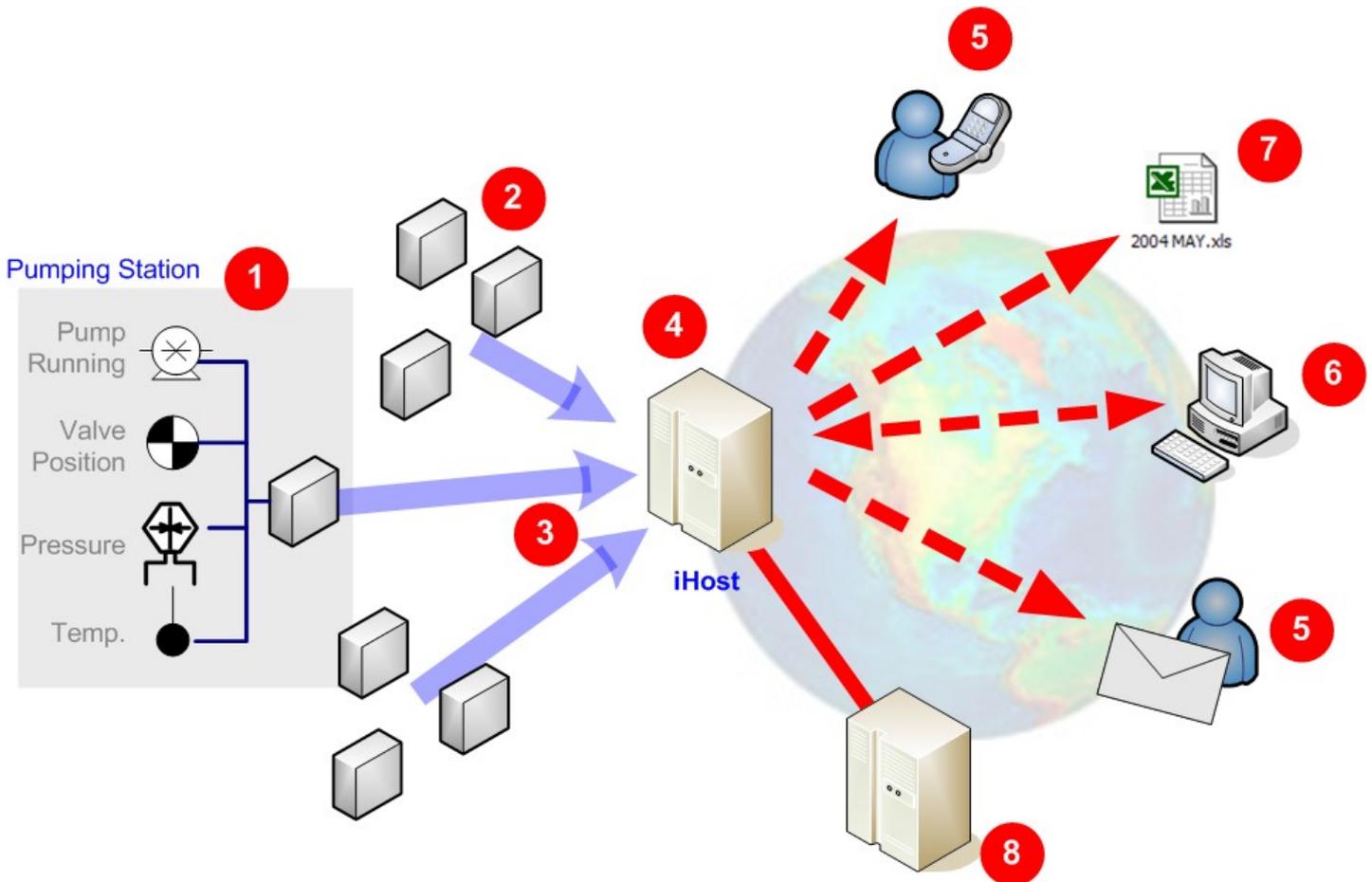
### Leaders in web-based telemetry systems

Nortech have been providing remote site monitoring technology since the early 1990's. We have delivered monitoring equipment for over 17,000 sites.

# Remote Pump Station Monitoring

Site communication links are 100% monitored, urgent alarms are reported immediately and when the power is off the system continues working.

How your system is built...



## 1: Your Pump Station

Monitor key alarms and routine data from equipment within the station.

## 2: A Smart Box

Signals from pumps, flow meters, floats etc are wired into a Smart Box which provides local processing and off-site communications. There is no limit to the number of sites you can monitor.

## 3: GPRS network

Smart Boxes are compatible with all mobile phone operators.

## 4: iHost

At the centre of the system is the iHost Platform. iHost receives incoming data from pumping stations, automatically actions alarms, displays status conditions and provides long term data storage.

## 5: Email and SMS Notifications

Any alarms from pump stations can be forwarded to as many users as needed. The format of messages is configurable and typically include Site Name, Time and Alarm descriptions.

## 6: Web Access

Users can login to the iHost web-pages from any internet connected PC. You can see several screen shots from the system throughout this brochure.

## 7: Download Data

In case you need to keep a local copy of your data, or want to include graphs in your own reports, you can download all your data in spreadsheet format.

## 8: IT Systems

iHost is easily configurable to interface with your own Network Management Systems.

Our systems are built from interlocking components to deliver a reliable, feature-rich monitoring solution.

## System building blocks

### The pumping station

The monitoring system is suitable for use on various types and sizes of pumping station. We can monitor single or multiple pumps as well as associated equipment such as flow meters, level and depth gauges, float switches etc.. If it needs to be monitored then our system will collect the information.

### The sensors and probes

Pump stations are fitted with various sensors and probes necessary for the correct operation of the equipment. These same sensors and probes are used by our system to monitor the operation of the pumps and pumping station. Pump running/stopped, Pump healthy/tripped, High level alarm are all examples of 'digital inputs' which provide information about key equipment and alarm conditions. Flow rate, well depth, temperature and vibration are all 'analogue inputs' which provide information for detecting changes in operational conditions.

### The 'Smart Box'

A Smart Box to suit the size and complexity of the installation being monitored is connected to the pump station control panel. The Smart Box continuously monitors operational parameters of the pump station. Alarm conditions are reported immediately, routine data is logged and reported at configurable intervals. Nortech manufacture a range of Smart Boxes to suit different customer applications.

### Wireless Communications

Moving the data from the Smart Box installed out on site to our central iHost servers is usually achieved using the wireless GPRS (mobile phone) network, which means no wires to install. Our equipment works with all network providers so coverage isn't a problem. In areas of poor coverage we can supply external antennae to boost signal strength.

### iHost Server

All data from all sites is reported to our dedicated servers running the **iHost Platform** software. Servers are located in a secure data centre with generator back-up in case of power cuts and multiple servers and network connections to ensure reliable service 24 hours a day, 7 days a week.

**iHost Platform** comprises various software modules, each performing a specific role and monitoring the performance of the other modules in the system. All data is stored securely and is continuously backed up off-site.

### SMS and Email alarms

When iHost receives an urgent alarm from a remote pumping station this alarm is forwarded as SMS text messages and Emails to as many users as are required. The message content includes the site name, type of alarm and the date it occurred. Messages can include other key conditions such as well levels.

### Web Pages

From any internet connected PC, without installing any software, you can access a single screen listing all your sites and their up-to-the-minute condition. Click on a site to 'drill down' to view more detailed information, alarm histories, current configuration etc...

Users can login to the iHost Web Pages at any time. You can see whether a pump has run today, how fast the well depth is increasing, which pumps have tripped, how many hours a pump has operated since last service.... The list is nearly endless.

And as the central management tool for monitoring all your remote pump station sites you can edit SMS phone numbers, create new alarm notifications, add and delete users — everything you would expect to keep the system running smoothly.



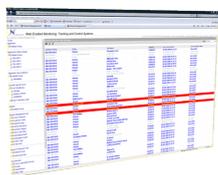
An ultrasonic probe. An accurate measurement of the depth of liquid in a wet well



NX11 Smart Box—just one of the telemetry boxes available for installation at the pump station



SMS notifications are forwarded to you within seconds of the alarm condition being detected



iHost automatically maintains a list of all your pump station sites clearly highlighting any sites with alarms

# iHost : Your view of the system

A web-based SCADA system accessed from any internet PC, by multiple users at the same time. (And no need to install any software.)

## iHost Platform

Routine data, events and alarms from all your remote pumping stations are reported to the central iHost system where users have access through a series of user-friendly, secure web (browser) pages.

## Where do you want to go today?

All your pump stations are visible on a series of well organised web pages. You can make virtual site visits without leaving your desk. You can see the current status of all pumps, flow meters, well depths and other monitored equipment. What is more, you are only a click away from opening up the searchable, filterable, sortable event log which keeps a record of everything that has happened on site.

## Different views for different users

As with everything else in life, different people need different things for their jobs, and pump station monitoring is no different. Take, for example, the screen shots shown here — the same data from the same pumping station at the same point in time. The mimic screen (top) is the perfect page for the system owner who wants reassurance that the asset is functioning as it should. The Site Overview screen (bottom) provides more detail about the site, the equipment, it's operational condition and, as such, is better suited to the needs of an engineer.

## Secure Login

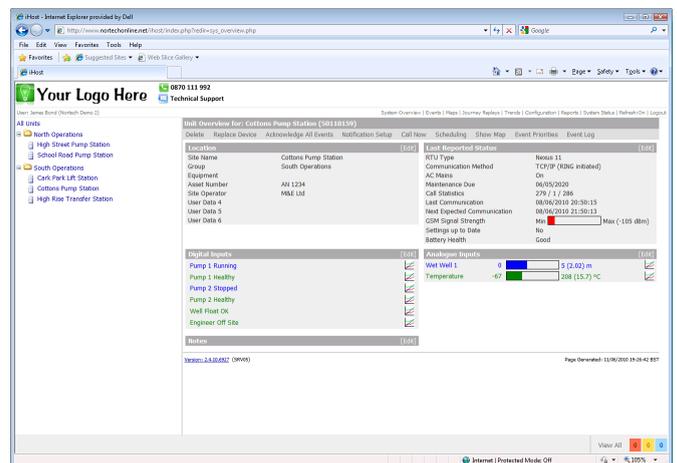
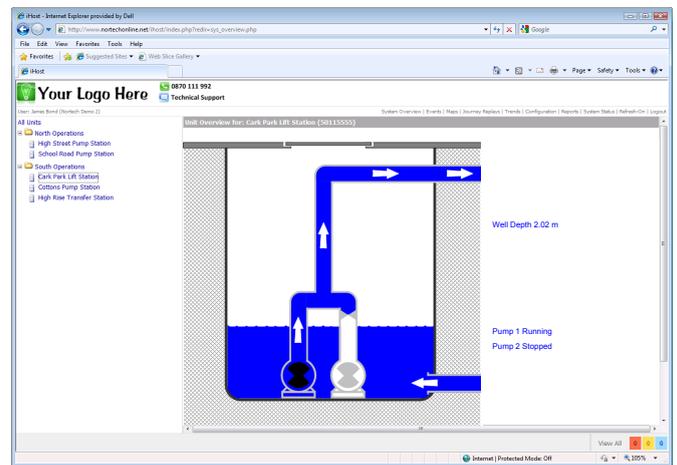
Access to the system is via secure login pages with everything you would expect from a secure user friendly web site. If you forget your password then the central server will email you a link to follow to change your password. If your organization's IT policy requires strong passwords to protect data then iHost can check pass word strengths and even initiate regular password changes.

## Export data

Whilst the iHost pages have a variety of tools to help you display the information from your pumping stations it can be necessary, from time to time, to use the data in other programs such as Excel or PowerPoint presentations. iHost provides various options for downloading data, for example on the graph pages there is a one-button link to download the data being used to plot the graph.

## Multiple users

Access to the system is from any internet connected PC, without installing any software. One powerful benefit of this is that asset owners and asset operators from different companies can log into the system from different PCs and look at the same pumping station. By giving different users different levels of access this type of joint collaboration provides a convenient and safe way of making decisions about site work.



We understand that users don't like doing the same thing over and over again. so we've designed the system to make life as simple as possible.

## iHost : Smart and User-Friendly

iHost provides lots of clever features which reduce to a minimum the amount of time users have to spend administering the system. The result is a user-friendly, intuitive and effective tool for managing your remote pumping stations.

There isn't room to list all the time-saving features, but here are a few to be going on with...

### Site Templates

To speed up installation and commissioning each new pumping station you can create 'Templates' which store all the information about how the equipment on site is wired into the Smart Box.

So you only need to enter this data once, no matter how many pumping stations you install. iHost also allows you to save an existing pumping station as a template and you can create as many templates as you need. So commissioning a new pumping station is a few simple clicks away.

### User Profiles

iHost allows you to manage your remote monitoring users quickly and effectively - change mobile phone numbers, login privileges, viewing options etc.. iHost's user friendly, intuitive screens, make managing the system simple.

### One click graphing

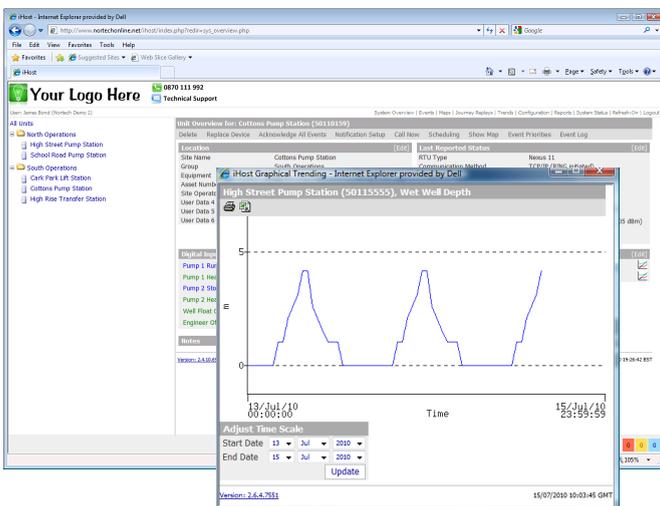
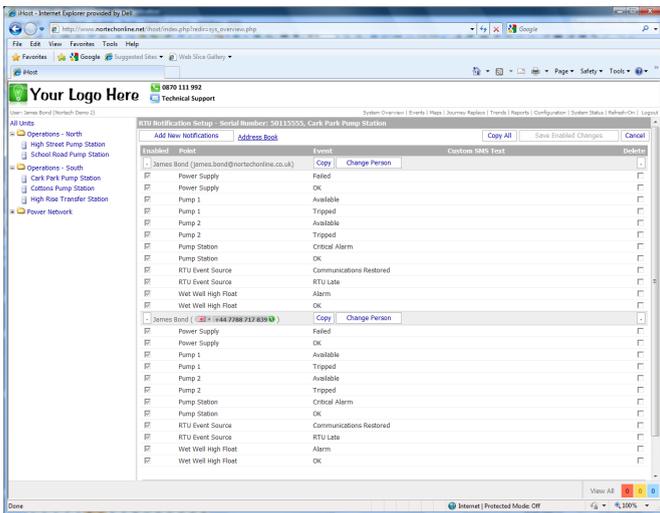
As well as displaying the last reported level for each analogue input there is a 'one click graph' button. Click the button and the graph page pops up in a new window, the graph displays all the readings for today; change the date range and press refresh to extend your search. Graph pages have a 'click to download data' button so you can save the data on your own PC for use in spreadsheets and your own reports.

### Parking Sites

From time to time site equipment or wiring can develop an intermittent fault, this could result in hundreds of nuisance false alarms. Users can 'Park' a site which stops any notifications from the site being forwarded to users as emails or SMS. Once the problem has been fixed the site can be UnParked and all notifications will automatically start again. iHost keeps a record of when a site is 'Parked' and 'Unparked' and also displays which sites are currently 'Parked'.

### Auto blocking nuisance notifications

All alarms are reported to the central iHost by the Smart Box installed on site. iHost then forwards critical alarms to users as email / SMS. But when, for example, a wiring fault develops on site that means the high-level float reports hundreds of false alarms, iHost has a method for minimising the nuisance to users... Each site has a configurable 'maximum SMS notification limit' and 'maximum email notification limit'. When this limit is reached then iHost auto disables forwarding any more notifications until a user checks the situation.



# Typical installation

Build templates to provide standard site wiring, then customise to suit where needed.

You can monitor anything you need on site. Below is an example of a popular wiring arrangement for a two-pump station.

## Two Pumps

Two pumps are installed. The minimum is to monitor 'Pump Tripped'; however it is commonplace to add 'Pump Running' and 'Operating Hours' as well.

## Wet Well

The depth of the wet well is usually monitored using a float switch, often with a back-up flat as well. Where there is a requirement to track the actual depth in the well (not just High / Not High) then an ultrasonic level sensor or a pressure sensor is usually fitted.

## Additional I/O

Where additional inputs and alarms are wanted there are plenty of spare input channels on the Smart Box to accommodate these.

**PUMP STATION TELEMTRY WIRING**

**EQUIPMENT**

- Power Supply
- Critical Alarm
- Pump 1 Running
- Pump 1 Tripped
- Pump 2 Running
- Pump 2 Tripped
- Float High Alarm
- Backup Float High Alarm
- Ultrasonic Echo Lost
- Engineer On Site
- Ultrasonic Level Sensor
- Flow Meter

**SMART BOX**

- Digital Input 1
- Digital Input 2
- Digital Input 3
- Digital Input 4
- Digital Input 5
- Digital Input 6
- Digital Input 7
- Digital Input 8
- Digital Input 9
- Digital Input 10
- Digital Input 11
- Digital Input 12
- 4 Spare Digital Inputs
- Analogue Input 1
- Analogue Input 2
- 6 Spare Analogue Inputs
- 8 Spare Control Lines

**RTU Configuration: 50115555**

Enabled	Name	Name 2	Display Type	Normally Open	Log Open	Log Close	Call On Open	Call On Close	Latched at Host	Latched Time(s)	Debounce Time(s)	Input Alarm Text	Input Healthy Text
<input checked="" type="checkbox"/>	Power Supply		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Failed	OK				
<input checked="" type="checkbox"/>	Pump Station		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Critical Alarm	OK				
<input checked="" type="checkbox"/>	Pump 1		Status	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Running	Stopped				
<input checked="" type="checkbox"/>	Pump 2		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Tripped	Available				
<input checked="" type="checkbox"/>	Pump 2		Status	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Running	Stopped				
<input checked="" type="checkbox"/>	Pump 2		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Tripped	Available				
<input checked="" type="checkbox"/>	Wet Well High Float		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input checked="" type="checkbox"/>	Wet Well Backup FH		Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input checked="" type="checkbox"/>	Ultrasonic		Status	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	Loss of Echo	OK				
<input checked="" type="checkbox"/>	Engineer		Status	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	0	on site	not on site				
<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				
<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	0	0	Alarm	OK				

**RTU Configuration: 50115555**

**Unit Setup** | **User Data** | **Limits** | **Binary Inputs** | **Counters** | **Analogue Inputs** | **Analogue Thresholds** | **Binary Outputs** | **Config Queue**

**Your Logo Here** 0870 111 992 Technical Support

Unit Overview for: KeyTec Pump Station (50115555)

Site Name: KeyTec Pump Station  
 Site Operator: MBE Ltd  
 Asset Number: AN 5552  
 User Data 4: MBE Ltd

**Digital Inputs**

- Power Supply OK
- Pump Station OK
- Pump 1 Running
- Pump 1 Available
- Pump 2 Stopped
- Pump 2 Tripped**
- Wet Well High Float OK
- Wet Well Backup Float OK
- Ultrasonic OK
- Engineer not on site

**Analogue Inputs**

- Wet Well Depth: 0 to 5 (1.23) m
- Temperature: -67 to 268 (14) °C

19/07/2010 12:13:02 GMT

Wiring on site is recorded on the iHost settings tab for each site. In many cases templates are stored to remove the need for re-entering the same information each time a new site is added to the system

iHost displays up-to-the-minute status for each site using simple colour coding and flashing icons for equipment with alarms.

iHost web pages are easy and intuitive to use. Users have their own passwords and are only granted access to pages they need for their job.

# iHost : Fine-tuning the system

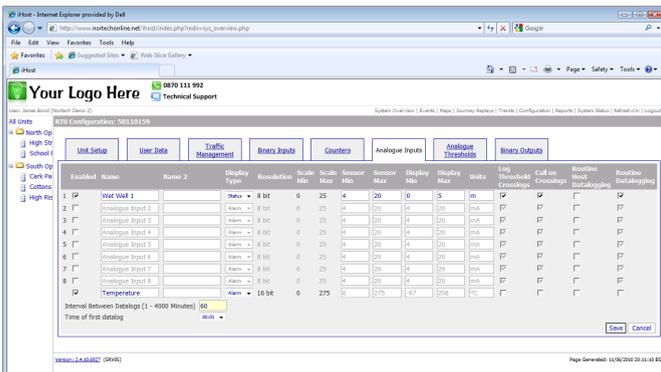
Just about everything in the system that could be configurable is configurable without needing to make site visits to implement changes.

Here are just some examples...

## How often to log wet well depth

Where a well depth sensor (ultrasonic / pressure etc) has been installed then it makes sense to keep a routine log of how the depth in the well has varied over time. Select an interval in minutes between 1 and 9999 on iHost, the Smart Box is then automatically programmed and will start keeping routine logs of the well depth. This data is automatically uploaded to iHost during every contact with the Smart Box. Graphs will be drawn automatically whenever you want to see them.

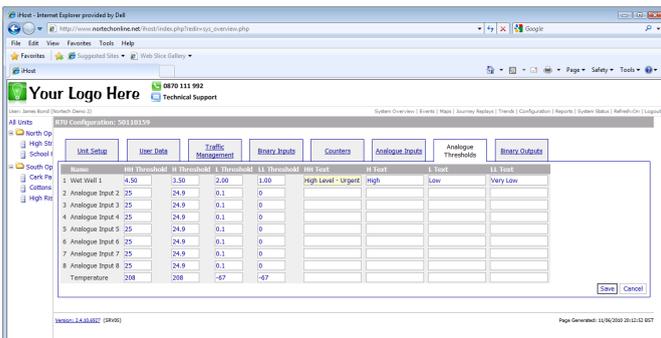
You can change the logging interval in the future, and you can have different intervals for different sites.



## Wet well depth alarm thresholds

You can configure analogue inputs (e.g. well depth, flow rate, dosing tank contents) to log and report in whenever preset thresholds are crossed. Select the thresholds (up to 4 per input) on iHost and the Smart Box will automatically be programmed with these thresholds. Analogue inputs are checked more than once per second, as soon as a threshold is crossed a log is generated and 10 seconds later the data has been reported to iHost. If you don't want to set any thresholds that's fine as well.

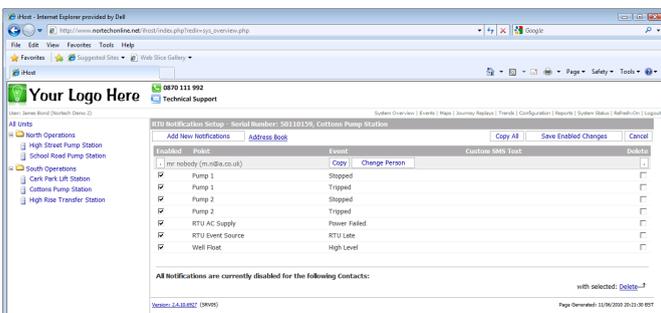
*This is in addition to the High Level float alarm which sends in an alarm as soon as the float operates.*



## Setting up Notifications

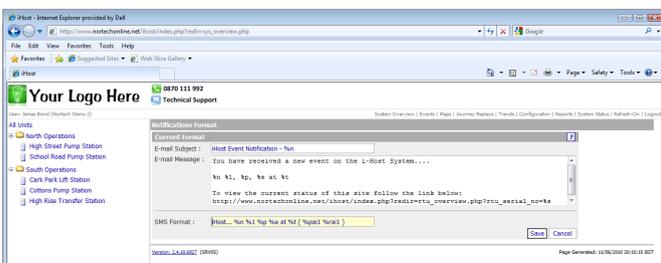
It is not always possible to sit and stare at iHost screens waiting for alarms to come in! Instead, pick which alarms you want to be notified about by Email and SMS. You can include multiple users to receive a notification and, of course, you can decide that some events are not worth being notified about (surely no one wants to get a text at 3am confirming that pumps are working normally!).

When you add a new site to the system you can copy all the notifications from an existing site, saving time and reducing the chance for mistakes.



## Notification format

Customise the message text for notifications. Pick as many options from site name, group, input name, date/time, type of alarm, analogue levels etc. You can even include your own instructions i.e. "check with the customer if they want an emergency site visit". Email notifications can include links that open your browser at the iHost site page for the pump station that generated the original alarm.



# iHost : Server licensing options

Remote Pump Station monitoring systems scalable from pilot schemes through to national deployment.

At the heart of your pump station monitoring system is the iHost Platform; comprising software modules and a comprehensive SQL database installed on one or more servers.

Our flexible licensing options mean you can confidently select the option that best meets your business needs.

We guarantee iHost remains the most economical solution for reliable remote monitoring of network assets through continued investment in product development. Our engineering team works closely with customers and end-users to make sure the product offers the functionality called for as business and regulatory drivers evolve.

## Web Service: Hosted by Nortech

Perfect for pilot schemes and systems which do not involve too many pumping stations. There is no need for you to install any software or to involve your IT department.

Nortech operate a cluster of servers in the UK which accepts data from the Smart Boxes installed at your pump stations. Emails and SMS notifications are sent to you from Nortech's servers. Your username and password gives you secure access to all your sites in a single location.

The monthly charge (much like a mobile phone contract) includes technical support from Nortech engineers. There are no lengthy contract terms and it is simple to upgrade to one of the options below as your system grows.

## Licensed: For installation on your servers

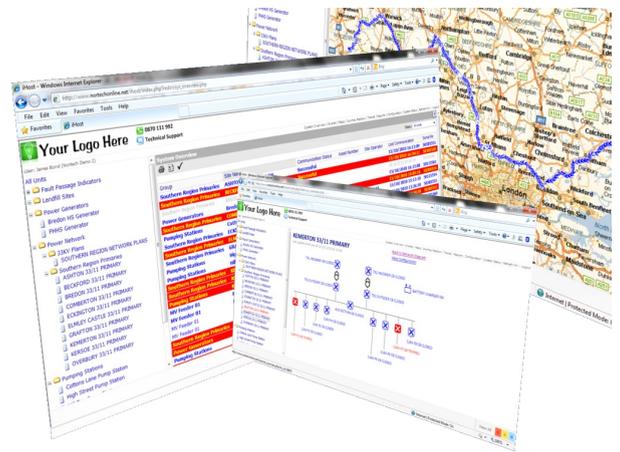
Ideal for customers who have a requirement to keep the data in-house or where the data needs to be shared in real-time with other systems such as SCADA and Network Management Systems. This option is typically the most cost effective for systems of 200+ remote sites.

Our fully licensed option for iHost ownership is installed on your servers, behind your firewalls. iHost is now an integral part of your IT infrastructure, seamlessly linking with other systems, creating the opportunity for maximum operational benefits.

Product upgrades and new features are included in the licensing costs with technical support offered to suit individual customer requirements. This will usually involve regular site visits and preparation of performance reports and suggestions.

## OEM branded

For selected partners we are able to offer a combination of the above options as a "OEM branded" or white labeled solution. This is ideal for companies who wish to offer Remote Pump Station Monitoring as a service for their customers under their own brand.



Train your staff and customers to use the system with our live training sites.

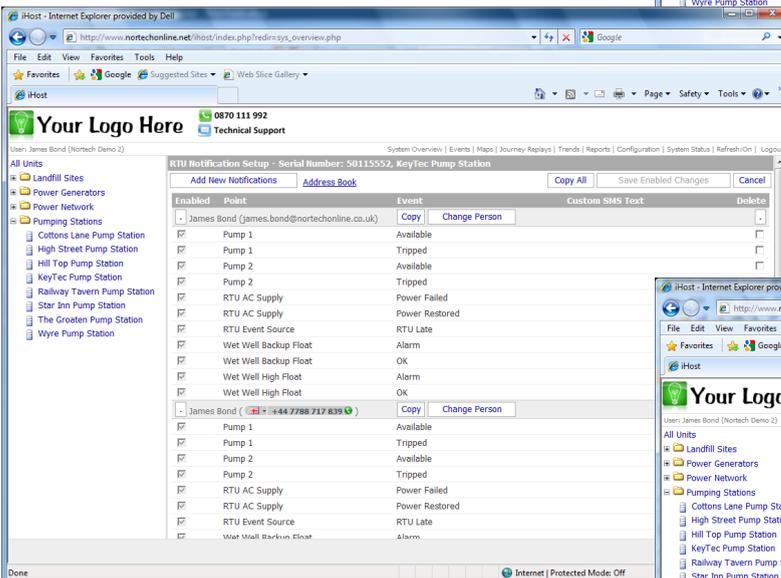
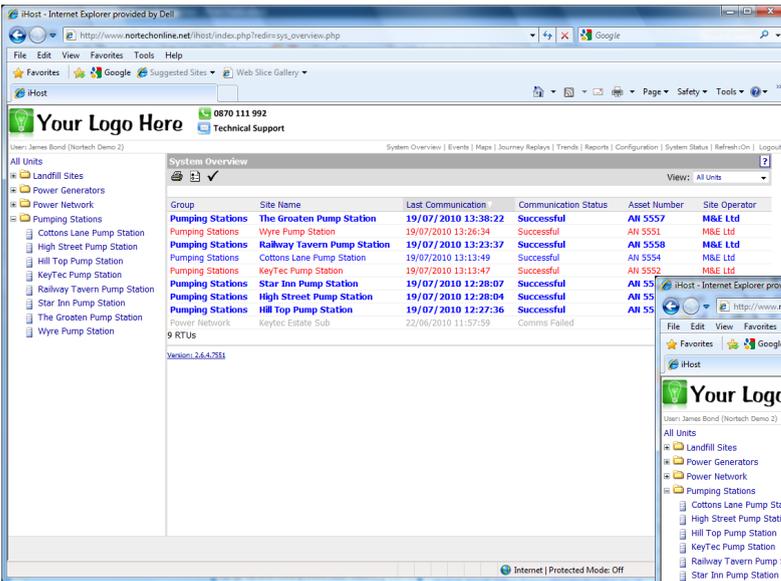
## User Training Area

We provide users with access to a live training area on iHost. There are several fake pumping stations reporting alarms and routine data throughout the day. Users can experience what the system looks and feels like without having to wait for a real emergency.

The following screen shots are taken from the iHost training area.

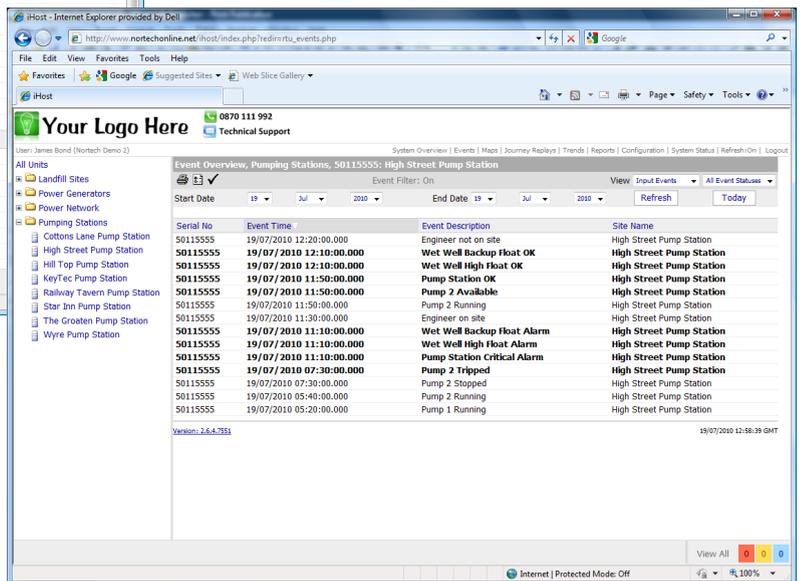
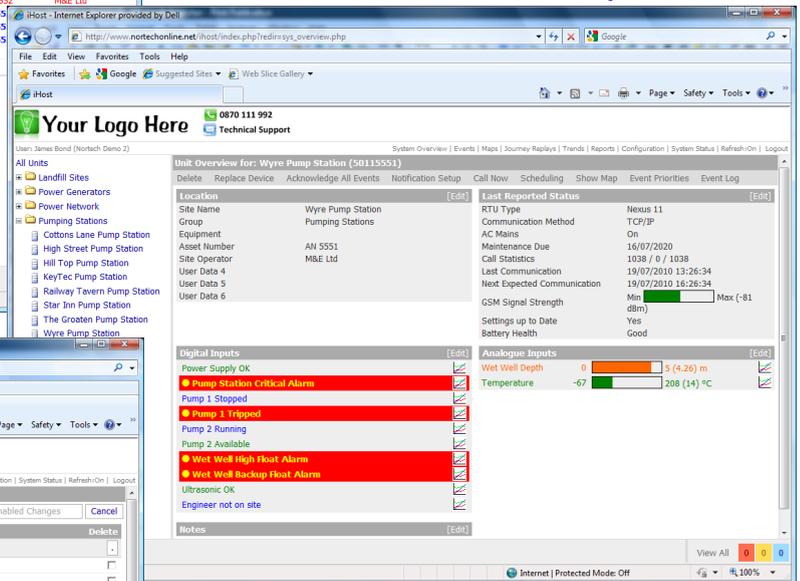
List all the sites being monitored along with their current status. The list can be filtered and sorted.

Click on an entry in the list to open the site overview page showing the latest information from just one site.



Set up notifications for each site: Who gets what email/SMS notifications for which alarms.

iHost keeps an event log of everything that has happened on every site; the log can be filtered and sorted.



# Benefits for your business

## Putting customer requirements first

We work very closely with our customers and end-users to make sure the design of our products and systems continue to deliver business benefit long after installation. This close collaboration means that you can be confident of achieving reductions in overall asset operation and maintenance costs.



Some of our customers and end-users...

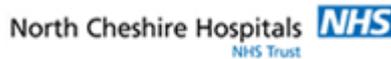


### Site Electrical

*“Remote monitoring not only provides Site Electrical, and the user, with real time monitoring, but also a record of the pump stations’ operating performance. Analysis of these results shows pump and system performance trends / slippage. This information can be used to reduce whole-life operating costs.*

*When the unexpected does happen, duty service engineers are notified of an alarm in real time by email and / or SMS text. They can react immediately with knowledge of the identified fault: the valuable time saved potentially sparing the user any additional costs of tankering or spillage clear up!”*

**Mick Brindle, Commercial Director**  
Site Electrical Ltd.



# Remote Monitoring Applications

- ▶ Remote MV Fault Indicator Systems
- ▶ LV Substation Monitoring
- ▶ Pump Station Monitoring
- ▶ Renewable Generation Monitoring and Control
- ▶ Generator Set Monitoring and Control
- ▶ Remote Tank & Silo Inventory Monitoring
- ▶ Smart Grid Applications
- ▶ Primary & Zone Substation Monitoring

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