20th December 2016

Re. 16/244 - Framework for Groundwater Drilling, Pump Testing and Remediation Works Associated with Water Supply Boreholes

The Institute of Geologists of Ireland (IGI) and the Irish Group of the International Association of Hydrogeologists (IAH) is pleased to submit this response to the Irish Water specifications for trial well drilling and testing that was presented at the Spencer Hotel on the 17th of November 2016 and subsequently distributed to interested parties on the 22nd of November 2016 (Ref. 16/244).

It is the understanding of the IGI and IAH that the four generic templates provided in the specifications are "*notional projects…to aid in the evaluation of applicants to the drilling framework*". We understand the objective of establishing a common platform for tendering and appreciate the intent of the specifications in a procurement context. However, the documents have elicited comments and/or concerns from well drillers and hydrogeologists, which can be distilled as follows:

1. Drilling projects should be specified on an individual project basis, using terms of references and specifications (with bills of quantities) that are prepared and subsequently supervised by suitably qualified hydrogeologists;
2. The specifications that are provided in the above-referenced document do not allow for the necessary flexibility in methods, procedures and compensation terms that may be required for a specific project; and
3. Potential references to the framework evaluation specifications in a project-specific context could be misused or misapplied, resulting in confusion or conflict (e.g. over compensation terms or claims).

Regarding Point 1, the concern is that a lower-cost contractor on a framework may be asked to carry out work for which the available equipment or experience may be unsuitable or unjustified. Implementation of drilling projects is case-specific, and how a project is implemented depends on case- and location-specific circumstances. Different approaches, methods and equipment may be needed. Hence, available drilling equipment, past demonstrated experience in similar application or settings, as well as the field-based knowledge, skills and experiences of the personnel who would conduct the work should be taken into consideration.

Regarding Point 2, the specifications provided should be broadened, notably a wider range of depths and diameters (including larger diameters, e.g. up to 16 inches, to allow for telescoping of boreholes) and adding compensation events that are best measured by time (e.g., hourly or daily rates). We have included, in Attachment 1, comments or suggestions received from members (e.g., it is noted that for a trial well, a pump that will give the required flow rates may not fit into the proposed test well diameter).

Point 3 is directed at how the framework specifications would be applied or managed. The concern is that the framework specifications would dictate the terms of reference for a given project and constrain the ability of drillers and hydrogeologists to respond to actual field (subsurface) conditions and findings. The specification for any given project should be determined by the appointed hydrogeologist in advance of the works, with flexibility to allow for amendments in the field according to the conditions encountered. Accordingly, we recommend that the notional specifications be discarded following the establishment of a framework, and not be applied to future projects.

We wish to point out that Advice Note No. 14, which is published by the Environmental Protection Agency (EPA) and is aimed at Water Services Authorities, already addresses how the drilling and construction of water supply boreholes should be approached, by adapting "internationally accepted standards and protocols" to the wide range of Irish hydrogeological settings. We recommend that Advice Note No. 14 be adopted by Irish Water as the guidance document for drilling and testing of water wells intended for public supply.

Finally, we note in Section 1 of the referenced specifications document that Irish Water may engage a "designer" [third party] to develop "these templates into project specific documents". The IGI and IAH infers and deems critical that such a designer or third party would be a suitably qualified hydrogeologist with relevant field experience, which is consistent with our recommendations in this letter. Input from hydrogeologists in both the planning and implementation stages of projects will assist Irish Water in achieving project objectives, including cost control, and will benefit Irish Water generally, in terms of managing the large number of water supplies that are groundwater-sourced. In this context, a separate hydrogeological services framework should be considered. We also wish to point out that hydrogeologists can provide a wide array of water-resources services to Irish Water, which are both separate from and additional to water well drilling and testing.

We would welcome the opportunity to discuss these topics further, and would be happy to attend a joint meeting of the IAH, IGI and Irish Water. In the meantime, please call us anytime should you have any questions or require clarification.

Yours Sincerely,

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President of the IGI

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President of the IAH Irish Group

ATTACHMENT 1: Member Comments To:

"Framework for Groundwater Drilling, Pump Testing and Remediation Works Associated with Water Supply Boreholes"

Section 1: Please clarify the reference to the Construction Regulations and how this would apply to the drilling framework or role of the hydrogeologist.

Section 1.1: Advice Note 14 by the EPA is intended for Water Services Authorities, and the guidelines prepared by EPA should be adopted by Irish Water for water well drilling and testing projects. The guidelines are sufficiently broad that they address approaches of trial well drilling also.

Section 2: A trial well can become a production well and does not necessarily have to be abandoned. In fact, a favourable trial well can be, and often are, converted into a production well as a cost-saving measure. The cost of reaming may outweigh the cost of abandoning and re-drilling.

Section 2: A trial well can become a supply well. It is inefficient to assume that all trial wells need to be abandoned.

Section 2: In bedrock aquifers, the drilling of two successful trial boreholes does not guarantee that a third well drilled as a production well will be (as) successful. The results of the trial well testing should determine if a separate borehole is drilled or the trial well is installed as a production well.

Section 2: The description of a trial well as being of limited use neglects the fact that the trial wells can serve as a monitoring well or production well with modifications. It could also be converted as a standby well. As such, the trial well may serve other purposes.

Section 2: The cost in well drilling come in mobilising the rig to site and drilling at a wide diameter whether for a trial well or production well. A small amount of money might be saved by drilling a trial well cheaply, but any saving would be significantly offset if production well is needed and the trial well could have been fit for purpose. The need for a trial well should be based on the advice of a hydrogeologist.

Section 2.1.3: Gravel may still be needed during the installation of the screen and may be preferred over a naturally developed gravel pack which can take time to develop and add project costs. It might be cheaper (and safer in terms of outcome) to add a gravel pack.

Section 2.2: Gravel should be added from the base of the hole to 10mbgl to allow the top 10m to be backfilled with a concrete grout.

General: Diameter references should be nominal. For example, a 200 mm drill bit will not fit into a 200 mm diameter casing.

General: A broader range of diameters and depth should be included in a framework contract to make sure sufficiently large rigs and telescoping of boreholes can be accounted for.

General: Drilling diameters and methods are fundamental to drilling costs. Some rigs and methods use far more fuel than others which affects rates, but may also be more efficient than others, which also affects rates. Thus, drilling methods have to be specified along with diameters in order to have a common platform for comparison.

General: Unless further clarification or specificity is provided, subjective terms such as “provide silt containment measures” must be removed. In the example, “silt containment measures” can be many things.

General: Hourly or day rates are sometimes more appropriate and preferred over per metre costs, especially when shallow wells are involved or work items that involve time. An example is grouting, where a prolonged period of cement curing follows the cement injection. As well, the cost of air-lifting during or following drilling, as well as well development, depends on what is found. Air-lifting cost increases with depth of application. Further details on specific work items are needed to avoid unrealistic low cost estimates to ensure all framework contractors provide costs on the same basis.

General: The drilling framework needs to make clear how unforeseen circumstances will be handled – both in terms of process and compensation. It is unfair if events happen that imply real costs but may not be covered in the framework bill of quantities. A supervising hydrogeologist should be present to witness and consult with Irish Water for actions that may be required. This also applies to avoid costly and unproductive standing time.

General: Drilling of trial wells serves to demonstrate proof of concept. Following the drilling of the trial well, additional test pumping of the trial well or pumping well will be required to verify if the required abstraction rate can be sustained. If a separate production well from the trial well is installed, then test pumping has to be carried out twice. This is not a cost savings.

General: Often a water supply well will be drilled as part of larger structure or infrastructure project and will require planning permission and potentially an EIS. Hence any initial testing should replicate or be greater than the pumping rate that will be achieved from the proposed production well. This would require the first well to be drilled in the same way as the production well and it could become the production well.

General: The document should state that any trial or production well would need to have at least two associated monitoring wells. These would be necessary to monitor aquifer response to pumping, assess the long term viability of the abstraction, and monitor for potential impacts on nearby water sensitive features or other wells.

General: Borehole geophysics and camera surveys should be added to the specifications. These are not drilling related items per se, but would be carried out in context of a drilling contract. Hence, this should be added. At a minimum, it should include 3-arm caliper, natural gamma and TV/video survey (downhole and 360 degree side-wall view).

Health and Safety: It is not clear what is expected for the drilling contractor vs a supervising hydrogeologist. Please clarify. A reference is made to IW procedure IW-HSQE-SOP- 065. This should be made available or explained.