

CASE STUDY: Trevenson Gateway – JSL (Trevenson) Limited (2017-19)

In late 2016, we were approached by developer JSL (Trevenson), who had purchased a brownfield site in Cornwall (Trevenson Gateway, Camborne). Being an old mine-working site, there were significant contamination issues. In addition to several old capped mine shafts on site, there were high levels of copper, tin, arsenic and other heavy metals in the soil. There was also a substantial infestation of Japanese knotweed.

The land was considered to be visually important as a gateway to Camborne, being on the main entrance from the A30, but the contamination issues were so serious that development was not considered to be financially viable. To place matters in context, this large site had been sold to our client for £1.00 and prior to this had been lying empty for more than 20 years. Attempts to develop it in the past had failed, due to the high costs associated with dealing with the on-site contamination issues.

Our client had already gained planning permission for a Travelodge, a Costa Coffee, a Kentucky Fried Chicken and a Marston's Brewery Family Public House to be constructed on this site. All of these would generate considerable employment opportunities in the area – **if** the site could be developed within a feasible budget.

We were employed in early 2017 as consultants to produce a cost-effective and robust strategy that could be used to enable the development. As part of this, we had to evaluate the extent of the Japanese knotweed issue. The full site history was not available to us, but we were made aware that some Japanese knotweed remediation had been undertaken in the past (unsuccessfully) by English Partnerships. Later extensive ground works (to create an embankment onto Gas Lane and to level the site) were carried out by Cornwall County Council. These works had (on the evidence available to us) spread viable knotweed fragments across the site. We were able to collate some information about this remediation, including an herbicide programme that had been implemented by the previous site owners.

We conducted a site investigation in March 2017, involving the creation of over 30 test holes. This investigation confirmed that the Japanese knotweed on site had not been eradicated, but had rather been spread by the previous works due to fragmentation of the rhizomes and crown material, followed by soil movement across the site. This meant the knotweed locations had been multiplied and could be found at depth – possibly deeper than 5 metres. The onsite investigation also revealed that the made up ground was extremely soft in much of the site and had a low bearing capacity.

Using this information, we considered the options available to the client.

Firstly, we considered the possibility of removing the controlled waste from site. This was quickly dismissed, as the level of soil contamination limited the choice of landfill sites and meant the waste would need to be taken to facilities at either Merthyr Tydfil or North Wiltshire. The cost of this work would have been prohibitively expensive.

Secondly, we considered such options as cell burial or stockpiles. However, the site was insufficiently large and the quantity of contaminants too high for these to be workable options.

Thirdly, we considered screening, but dismissed this as the viable Japanese knotweed fragments were too small. Consequently, screening would not have been an effective option (root barrier would still have been needed post-screening in any eventuality) and would not have resulted in any significant improvement on site.

Our client needed to reduce ground levels and also had high construction costs associated with working on soft ground, which included piling of all buildings and extensive use of geogrids under hard surfaces (e.g. car parks, etc.). At this stage, development was looking unlikely to be financially viable.

We then considered a twofold approach for this project. Would it be technically feasible to consolidate the loose fill on site and to use root barrier under all hard surfaces and buildings? This approach was considered a significant possibility and we discussed this with the potential ground workers for our client.

Ground consolidation (in this instance) involves compacting the soil by repeatedly dropping a heavy, specially-shaped concrete weight, according to a specially designed plan, by use of a crane. The consolidation continues until the agreed weight-bearing capacity has been achieved. Ground consolidation is a little-used technique in the UK (it is mainly used in France for brownfield sites), but it created a number of advantages for this site. These included:

- Piling foundations would not be required, as ground bearing levels could be increased by the consolidation.
- Geogrids would not be required for hard surfaces, as ground bearing levels could be increased.
- Site levels would be reduced by the consolidation.
- Either no materials would need to leave site, or the quantity of materials to be removed would be substantially reduced.
- The use of an in-situ technique such as this is considerably more sustainable and environmentally friendly than removing materials from site.
- There are tax advantages for developers using in-situ techniques for managing Japanese knotweed on a development site as opposed to the removal of controlled waste.

We approached the Environment Agency with our Knotweed Management Plan and received their approval for our recommendations for the site remediation.

The above techniques (consolidation and root barrier) created substantial financial savings on the development budget, even after the additional costs associated with consolidating the site and supplying and installing root barrier for the Japanese knotweed. The development plan now became financially viable and works commenced in the autumn of 2017.

By April 2018, the site consolidation had taken place. This was conducted by a French company. It reduced the site level and compacted the ground to the required levels to such an extent that piling and geogrids are no longer considered to be necessary. Extensive amounts of root barrier are being used on site to protect all the buildings and hard surfaces. The site is also to be subject to an extensive monitoring and herbicide treatment programme.

Development works were completed on this site by the end of 2018, and the site is open for business as of January 2019.

We are proud to have pioneered a new combined approach to Japanese knotweed remediation on brownfield sites. We are in discussion with developers about other sites in Cornwall that have comparable issues and are similarly considered to be financially untenable for developers.

The Property Care Association (PCA), recognised this as the Project of the Year 2018, which recognised our innovative thinking and practical approach. The site is now open for business and is an important gateway into Camborne.



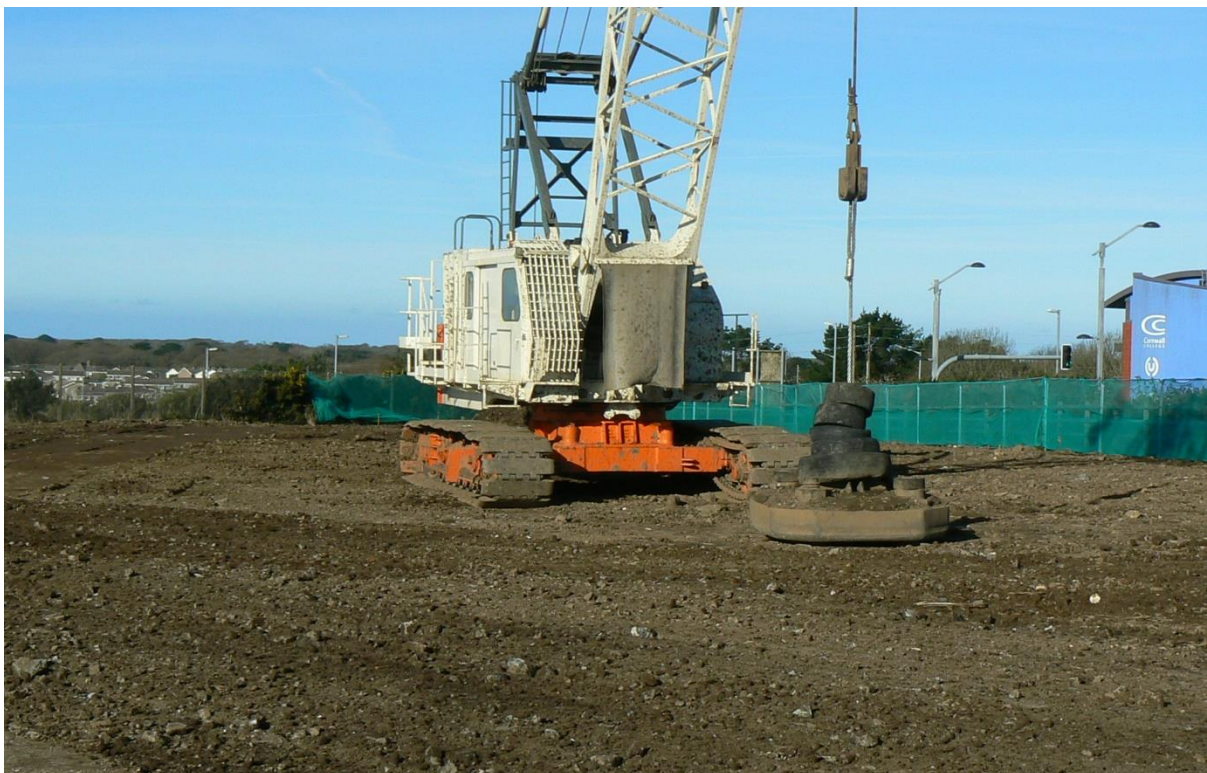
March 2017: Trial hole investigation in progress.



March 2017: Viable Japanese knotweed fragments identified. Fragment recovered from 2.6 m depth.



Nov/Dec 2017: Dynamic compaction on site.



Nov/Dec 2017: Compaction equipment when lowered.



January 2018: Japanese knotweed barrier fitted under foundation.



February 2018: Works in progress for new Travelodge. Note radon barrier (red) and Japanese knotweed root barrier (black).



15th June 2018: Receiving the PCA Project of the Year Award.
From left to right: Jim Glaister (TKC Southern Regional Manager), representative of Pam Ties Ltd (award sponsor), Brian Taylor (TKC Director) and Steve Hodgson (PCA Chief Executive).