

The Appraisal of Underground Easements

by Max J. Derbes, Jr., SR/WA

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The appraisal of real estate at times involves some unusual circumstances, particularly relating to underground land uses. Ordinary appraisal problems involve the total bundle of rights which we refer to as fee simple interests. We all tend to think of the use and enjoyment of real property rights as pertaining to the surface of the land. But there are a number of below-surface uses of land that the real estate appraiser may be called upon to value. In this regard, there are instances where the proposed use of the underground may have an impact upon the value of the surface of the lands involved or adjacent lands.

At issue is not the fact that the cellar of a house or even its foundation invades the subsurface of the land. For appraisal purposes, when referring to the surface use of land, some invasion of the subsurface is allowed to accommodate the use and enjoyment of the surface itself. The foundations of buildings go below the surface. Some of our utilities such as water, sewer, drainage pipes or structures and other appurtenances dip into the subsurface a few feet. And, there are more exotic uses of the underground such as subways, water diversion channels, and even the superconducting super collider.

NEAR-SURFACE USES OF LAND

There are a number of near-surface uses of the underground which are not a part of the buildings as foundations are. These uses are reasonably familiar, especially to right-of-way people. Included in this category are

product pipelines, gas pipelines, water, sewer and drainage mains.

When considering these types of uses of the underground, two things come to mind: 1) these items are constructed near the surface of the land usually involving penetration of the surface during construction; and 2) such near-surface uses have an impact that directly restricts the future use and enjoyment of the surface in some way. The most obvious restriction on use is that no structures can be built on the surface within the width of the path or right of way of the underground utility. Another restriction may be to disallow trees.

In the near-surface use category can be the strip mining of lands for coal, limestone, lignite, gravel and so forth. In cases when such materials are found near the surface, it may be necessary to remove the overburden and excavate the subsurface and the sought material. In many cases, the overburden is replaced to reform the surface after the mining operation is completed. The mining category is included here in order to mention all underground uses of land. Obviously, some mining operations, typically underground, are not near-surface uses of land.

VALUATION FOR NEAR-SURFACE USES

Many near-surface uses of land are not typically valued. Rather, they are donated by the developer or the homeowner to the sovereign or utility company in order to accommodate the utilities which will service the house or other type of improvement. Utility mains are placed underground to make the development more attractive. The user of the land gets the benefits of the utility services and gives away certain portions of the rear or side yard. In some instances of new sewer mains or even water mains along the side lines of properties, there may be circumstances

where the owner of an existing structure seeks payment for giving up some rights to the surface land area such as making improvements or growing trees.

In many instances of underground uses of land, the amount of the payment is less a function of the diminution in market value resulting from the existence of the right of way and the utility than it is a function of custom. Numerous studies have been made to show that there is no actual negative impact on market value of a five-foot easement along the side line of a residential property for a sewer main. The utility companies are willing to pay for these rights of way rather than go through the costly process of litigating them. Paired sales show no losses. When they are litigated, appraisers and courts have by custom given the property owner from 25 to 100 percent of the market value contribution of the strip of land.

Throughout all history relating to underground land uses, there appears to be a difference between the actual market value impact and what practically goes on in the real world. The consideration for such non-obnoxious easements more often than not exceed the true market value impact. Many young appraisers have so accustomed themselves to paying 50 percent or more for such rights of way that they tend to believe this is the market value impact.

At the same time, many Realtors and salespeople make the buyer aware of the easement's existence and readily admit that it seldom, if ever, affects the price that is negotiated between the parties. In measuring the true impact on value of these side line rights of way, the appraiser must take into account the fact that the easement does not really affect the use and enjoyment of the land to any great extent. Maybe not at all.

Of all the near-surface uses of land, the ones that have the greatest potential for causing market value diminution are pipelines. The existence of a high pressure natural gas pipeline or a products line can affect the current or near-future highest and best use of land. By disallowing the growth of trees, the right of way causes diminution to the value of timberland. Pipeline rights of way are typically substantial enough in width to affect subdivision layout and utilization. If there is severance damage to the remainder by virtue of the type of underground use for these reasons, it is referred to as orientation damage.

Orientation damage is limited to the added costs of development based upon the optimal layout with the pipeline in existence and compared with the cost of development and layout if there were no pipeline. This damage is related to the effect on the current acreage value of the land. The current value of the acreage, of course, is related to the appropriate time of development of the tract. The riper the land is for development, the higher the impact on value of a badly oriented pipeline.

DEEP UNDERGROUND USES

At the far end of the spectrum in terms of depth of underground uses of land are the wells for water, hydrocarbons, salt and sulphur extraction. In these cases, a small amount of the surface is needed for the well on a permanent basis and a larger areas during exploration; however, the actual areas containing what is being extracted is many times larger.

Drilling for water or hydrocarbons involves a limited amount of surface use; however, some of the other deep underground uses require considerable surface areas. The solution mining of salt require compressor and measuring stations, numerous pipelines for fresh water and for brine. Shaft mining of

salt requires surface areas for shafts, for hoist houses, for storage of the salt on the surface, and may even include processing buildings.

Popular thinking does not relate to surface value or even diminution of adjacent lands or improvement values when considering the use of lands for hydrocarbon exploration. The product to be extracted is such a valuable benefit that it overshadows other considerations such as market impact on other land uses nearby, in spite of the fact that there is considerable danger to the highly volatile products being produced.

Popular thinking does not relate to surface value or even diminution of adjacent lands or improvement values when considering the use of lands for hydrocarbon exploration.

Products such as water wells and dry salt mines do not produce hazardous substances, although brine does kill vegetation. Therefore, their wells and appurtenances are underground uses which normally do not involve a potential for market value damage to adjacent properties. Solution mines for salt and sulphur typically are accomplished by entities that have control of the surface in the vicinity since such control is needed for these operations. Beyond the boundaries of the properties, there tends to be no known impact on the market value of adjacent real estate.

Within the last three decades, commercial uses of excavated salt strata and even depleted gas fields have been developed for the storage of products underground such as LPG (liquefied petroleum gas) and LNG (liquefied natural gas). Salt domes in the Gulf Coast of the United States and underground stratified salt layers have been found to be ideal storage facilities for seasonal demand products. Peak load winter require-

ments are met by storage in these salt caverns.

Appraisers seldom are called upon to value the rights of way for water wells, oil wells, and some other underground uses which require limited surface areas. What most often happens is that the mineral rights already provide for use of limited surface areas for exploration. Even so, in some instances, the mineral exploration is done by the surface owner or (partially) on behalf of the surface owner. Appraisers may be required to assess damages to the surface owner by the mineral right owner or

the mineral right owner's assignee who is doing the drilling. In these cases, the damage is the market value loss to the use of that portion of the surface utilized by the drilling company plus a diminution to the market value of the proximate lands.

VALUATION FOR DEEP UNDERGROUND USES

Producing oil wells do sell. Typically, the value is negotiated at a price which represents a number of years royalty payments. For instance, if the reserves are estimated at 12 years, then the price might be fixed at the royalty payment level for four to seven years. The buyer takes the risk of the well drying up or other possible problems. But, the buyer likewise receives the royalties beyond the "years time" factor. And, if a well is expected to produce for 12 years, it is likely that this is a conservative figure and the well lasts longer than 12 years.

The valuation of salt domes in the Gulf of Mexico area of the United

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States is a most interesting problem. Caverns which were created by extracting brine from these solid salt masses can be used to store LPG and LNG. The federal government is storing crude oil for the Strategic Storage Program, but this type of use is typically not a viable commercial use.

SEMI-DEEP UNDERGROUND USES

The superconducting super collider (commonly referred to as SSC) proposed to be constructed about 35 miles south of Dallas, Texas was to be accommodated in a 54 mile circular tunnel about 70 feet underground. This was a unique valuation problem. A contractor was commissioned to do two things: 1) to furnish the market data research to the various appraisers who were going to appraise both the fee takings and the stratified fee takings; and 2) to do a national impact study on various

semi-deep underground uses. The second study was the more interesting one.

Since other semi-deep underground uses played a part in the research for the SSC project, it is appropriate to elaborate on such uses as subways, deep utility and drainage mains, and other semi-deep uses.

The purpose of the SSC is to accelerate neutrons around in this lengthy tunnel of about 12 feet in diameter in opposite directions and then to collide them. This accelerator process is supposed to produce a "big bang" and allow physicists to learn more about the subparticles of matter. The actual taking was a stratified fee which is 1,000 feet wide and 300 feet high. There was no taking of any other part of the property owner's rights. Research by SSC safety engineers of the project clearly indicated the future use would not in any way

be hazardous to the health of anyone standing on top of the 300 feet. And, in addition, there was 35 to 140 feet of caulk (the natural limestone in the area) on top of the stratified fee.

The job required research of other underground takings. To that end, it was necessary to find instances where strictly underground takings had taken place. The criteria was that the surface should not be disturbed in connection with such a taking. Surprisingly, there were instances of such takings.

For instance, recently in San Antonio, Texas, there were takings for two underground tunnels which would divert river water from the central business district downstream in periods of flooding. In Grand Prairie, Texas, there was a deep underground sewer main which was constructed without disturbing the surface. And, in Atlanta, Georgia, and Washington, D.C., there were subway takings.

There is an accelerator in Illinois which is much smaller than the one proposed near Dallas. But, it exists on lands totally owned by the user of the accelerator. There was another, larger one in Europe; however, this could be discarded as being a reliable indicator because the real estate economy in Europe is vastly different from that in the United States.

VALUATION OF SEMI-DEEP UNDERGROUND USES

The nature of the taking for the SSC was a stratum of the underground 300 feet high and 1,000 feet wide. The taking was in fee. Therefore, the SSC would own in fee this stratum and the property owner would own the lands above and below. While there is a legal difference, there was practically no difference economically than the taking of an easement. In our research, there were no stratified fee takings underground aside from the government in some salt dome takings for the Strategic Petroleum Reserve Program.

The contractor was charged with

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ascertaining the impact of such a stratified fee taking. While it was necessary to develop some methodology to ascertain the value of the stratified fee for use by the many appraisers who would work on such a project, the main job was to ascertain what impact this had on the value of the properties both as to the part taken and also as to any possible diminution in value to the remaining property.

It is interesting how this work was obtained. The Texas National Research Laboratory Commission, TNRLC, the governmental agency charged with acquiring the property rights of this project advertised in the papers in Texas for appraisers to give them a proposal on such a study. The only response they received was from a very prominent appraiser who indicated such a study could not be done. Somehow, a way had to be found to do it.

Obviously, it was impossible to study data of an exact nature. There had not been any other taking of stratified fee for a 54 mile tunnel to convey neutrons at near the speed of light. It was necessary, therefore, to ascertain what other strictly underground takings for any purpose had already occurred, and what experiences were available to study in these instances.

Research began with the most recently constructed subways in Washington, D.C., and Atlanta, Georgia. Information was obtained about all the appraisals for these projects involving strictly underground takings. Every appraiser in every appraisal of deep, underground subway takings concluded that there was no diminution in the market value of the property. In Washington, D.C., the token awards allowed were \$100 per parcel, regardless of the surface use. In Atlanta, Georgia, the token awards were \$500 per parcel.

If there were any potential that the taking could have an influence on foundation construction cost, the

property owners were compensated for the cost of engineering studies they had obtained.

In the case of the SSC, most of the takings were from ranch lands or super-suburban small acreage homesites and small subdivisions. The subsoil conditions were Austin caulk which was quite solid. Therefore, the area intended for the proposed tunnels had as its highest and best use holding the earth together. And, it would serve the same purpose after excepting for this 12-foot diameter tunnel deep underground. Incidentally, excepting for the part taken within 150 feet more or less of the center of the tunnel, the property owner could get a permit to drill a water well or even an oil well through the stratified fee (although the area was served by small water companies and had no mineral potential.)

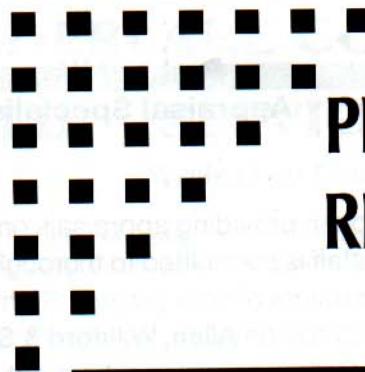
The contractor explored the poten-

tial that the caulk itself could be merchantable. Findings showed that inasmuch as there are thousands of acres of this type of material, the potential was nil to sell the material. If anyone wanted to make cement out of the caulk, they could buy acreage at competitive prices and mine from the surface or near the surface without digging 40 to 150 feet to obtain the material.

Research led to San Antonio where the U.S. Army Corps of Engineers had a project under construction to divert water from the river which flows through downtown. These large tunnels (42 feet in diameter) were 150 feet underground and passed under many substantial buildings downtown. The San Antonio River Authority obtained a number of appraisals. All the appraisers indi-

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cated that there would be no diminution to the market value of the properties as a result of the construction or existence of these deep channels. Here they also paid a token value of \$500 per parcel. This \$500 was an amount set by the Texas Highway Department in significant cases of token value payments.

One thing that became clear as a condition of the study was the project posed no long term detriment to anyone's health or safety. Also, purchasers and sellers were assumed to be prudent, and not vulnerable to irrational hysteria about the project.

The TNRLC formulated a policy to compensate the landowners \$500 per parcel plus \$300 per acre in order to equalize the payments to large and small landowners. This was not a value payment; rather, this was considered a token payment.

The process of researching all sales in the vicinity of the stratified fee path for the 54 miles is ongoing. Already, considerable evidence exists that the project causes no diminution in the market value of either lands or residences. On the negative side are those with fears and prejudices against the project. Also, some local commissions have made awards in excess of the stipulated token payments of TNRLC. But, many of these cases are going to have to stand full


trials and appeals.

Other underground utility mains were studied, specifically, high voltage transmission lines and gas pipelines in addition to lands near a nuclear plant. All of the empirical evidence studied showed no impact.

Ironically, that the Texas Supreme Court said that lands near a nuclear plant were damaged as a result of a railroad spur which might transport hazardous waste. Subsequent market evidence showed that these lands actually increased in value. The increased economic activity in the area caused lands in the vicinity of the nuclear plant to accelerate in value at a much higher rate than lands not in the vicinity, but with the same original attributes of the lands near the nuclear plant.

The studies conducted were among the most interesting of this author's career. What was touted as a study which could not produce results lead to substantial evidence that deep underground uses of land do not diminish the value of the properties affected. This is consistent with the theory of highest and best use. Obviously, the greatest benefits of most parcels of land are in the surface of the land, the air space above the surface for a short distance and the first four to 10 feet for the foundation or basement.

The highest and best use of the lands below those needed for construction can best be described as holding the earth together. That is, unless they contain minerals or salt domes or some other unusual use. In normal circumstances, the benefits to be derived from most urban, suburban or rural properties comes from the surface. There is no way to parcelize on a rational basis layers of the land and assign values to each layer. If this were done, nearly all of the benefits would come from the surface use of the land. This method was abandoned early in the study. Other researchers working on subways and underground channels had come to the same conclusion.

Which offers insight into the easements for underground utilities in a residential subdivision. The property owners get benefits from these utilities. They do not perceive any market value damage. Therefore, no market value damage exists. In Washington, D.C., the subway goes about 50 feet under a series of bungalows in a beautiful subdivision with tree-lined streets. Studies comparing the sales prices of houses fronting this street with houses away from this area concluded that the subway caused no diminution in market value. 

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