

Which Is the Most Cost-efficient Alternative, a New Build or the Rehabilitation of a Cultural Heritage Site?

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Abstract

Given the choice between the rehabilitation of a cultural heritage site and a new build, recent history in Norway shows that the new build is often chosen, with the justification of cost efficiency.

This paper compares approaches to cultural heritage sites from a property development and a protection of cultural heritage point of view to test this judgment. These two professional fields overlap and need to cooperate. Thus, a closer look at their similarities and differences should provide valuable insights.

This paper applies a case-study method to a large country estate building at a NATO air base in need of office space. The building has legal protection at the national level. Costs are calculated for three scenarios for new offices: rehabilitation of the protected building, a new build, and renting. All alternatives include legally mandated maintenance of the protected building, as the same public body carries out both tasks.

Of the three alternatives, the new build and renting were the most expensive over a thirty-year time span. Rehabilitation was the most economical. These findings indicate that owners of protected buildings should investigate possibilities to activate such buildings, due to not only their cultural heritage values, but also their economic potential.

Keywords: Cultural heritage, architecture, real estate development, real estate management, economic analysis

Introduction

Cultural heritage sites form part of the common heritage of our communities, and are to be safeguarded for future generations (Lovdata, 2017a). There has been a series of disputed decisions to vacate and even demolish cultural heritage sites in Norway in the last decennium (Aftenposten, 2016). This includes sites such as the government quarter and the National Gallery (Stendebakken and Olsson, 2017a). A key argument in Norwegian decision-making regarding larger building projects, nationally and regionally, is economic



Of the three alternatives, the new build and renting were the most expensive over a thirty-year time span. Rehabilitation was the most economical.



Photo 1. Typical room on ground floor.

analysis, and costs have been a deciding factor in many of these projects (Concept, 2017). This paper is an academically based analysis to investigate actual costs and whether prejudice is in force. There are challenges connected to applying economic analysis to cultural heritage sites. Among the shortcomings related to economic analysis, we wish to highlight these four issues:

1. Economic analysis de-emphasizes unquantifiable values. Although they may be included as positives, neutrals, or negatives, they cannot be numerically incorporated in calculations (Finansdepartementet, 2017).
2. Economic analysis typically applies a time span comparable to the expected technical lifespan of a new build, such as thirty years. This is inadequate in dealings with buildings that are significantly older than thirty years and are to be safeguarded for future generations (in accordance with cultural heritage legislation) (Standard Norge, 2013).
3. Costs for rehabilitation of existing buildings differ significantly. While new builds have relatively similar costs when taking into account purpose, build quality, building ground, etc., this is not the case with rehabilitation projects. While new-build project cost potential in early project estimates can be tested top-down through standards, rehabilitation projects need to be estimated bottom-up based on technical analysis of the existing building at hand (Standard Norge, 2012).
4. Economic analysis depends on its assigned scope. There is a convention of limiting this scope to isolated building projects. However, if a public body needs to keep and reactivate the vacated building in addition to the new building that came at a lower cost than the rehabilitation project, as in the case of the National Gallery, this scope does not fully capture the economic consequences a given project

decision has for the public body's total economy (Administrasjonsdepartementet, 1997).

Economic analysis is lacking as a decision-making tool in projects regarding cultural heritage sites today, as are other tools for analysis of cultural heritage sites, if one aims to grasp the fuller picture of reality. The DIVE model (Describe Interpret, Valuate, Enable) model promoted by the Directorate for Cultural Heritage in Norway is a cultural historic analysis model. It promotes a thorough analysis of a cultural heritage sites' historic values and their limits of tolerance (Riksantikvaren, 2009). The model does not emphasize architectural quality, potential for use, or economics. The lack of emphasis on architectural quality seems to be due to a notion of architectural quality as artistic, and of artistic qualities as being subjective and fluctuous while historic values are more objective and stable. This perception goes back to the art historian Alois Riegl (Stanley-Price, Talley, and Melucco Vaccaro, 1996). The DIVE model's analysis of limits of tolerance can be seen as the necessary opposite of looking for potential for use, while the model's multifaceted analysis of unquantifiable values can be seen as antagonistic to economic analysis and the plain language of the grand total. This suggests that both the economics and the protection of cultural heritage fields have blind spots in their dealings with building projects related to cultural heritage. This paper addresses these differences in focus. This is done through a single-case study of a vacated, state-owned, nationally protected cultural heritage site in Norway, "Værnes Hovedgård". Værnes Hovedgård is a 700 m² wooden building from the early 19th century, situated in Trøndelag in Norway on a NATO air base, with associated access limitations, and is not presently in use. The building is managed by the Norwegian Defence Estates Agency (NDEA) (Forsvarsbygg, 2017). The site has been the subject of an independent cultural heritage-based analysis (Stendebakken, Grytli, and Olsson, 2015) conducted for academic purposes. The cultural heritage-based analysis deemed the building suitable for conversion to offices, deemed less invasive than quarters or a guest-house as it mainly allows for the original floor plans to be kept. Civilian uses, such as a private home or gallery, were excluded due to the access limitations. Due to the access limitations applying to a NATO air base (Wikipedia, 2017), the analysis recommends acknowledging both the air base's needs and the building's potential by using the building for offices. This choice of purpose can render the access limitations, currently blamed for the building being out of use, an asset rather than an obstacle to alternative uses. Coincidentally, the air base needs more office space and has requested a new office building.

In this paper, the cultural heritage site will be subject to an independent property development analysis conducted for academic purposes in dialogue with the NDEA. The aim is to provide insights on the similarities and differences between the fields of property development and protection of cultural heritage by comparing the two analyses. Property developers are often seen as promoters of change, whereas representatives from the protection of cultural heritage field's main aim is to protect existing values. Descriptive of the protection of cultural heritage field's image as static, protection of cultural heritage is also referred to as preservation, and the cultural heritage as preserved. We do not use these terms in this paper, as true preservation of cultural heritage sites is not only an old-fashioned approach unsuitable for the majority of today's numerous cultural heritage sites and the challenges they meet; it can also be described as a utopian dream, as the task of ideal preservation would require the ability to stop time. Within the protection of cultural heritage field today, there are proactive initiatives to ensure that the measures which will inevitably be taken with the passing of time are suitable (Miljødepartementet, 2016). Property developers work with cultural heritage values for added value in development projects (Aspelinramm, 2017). Still, cooperation between property developers and protection of cultural heritage professionals holds unrealized potential (Starr, 2013). Dynamics between the two fields have been regarded unconstructively, with the two in a chauvinistic deadlock in which property developers are perceived as the "gas" and

protection of cultural heritage representatives as the “brakes”. Obviously, this cannot be the complete picture. Property developers also have an interest in stopping disadvantageous actions, and protection of cultural heritage representatives continuously initiate activities that are perceived to be beneficial.

Instead of the term “preservation”, this paper refers to the professional field of “protection of cultural heritage”. This aims to cover the diversity of professions working with the protection of cultural heritage sites with safekeeping of cultural heritage values as a main aim. Protection of cultural heritage is a professional field in constant development.

The term “cultural heritage sites” covers both sites with formal protection as cultural heritage and other sites that have perceived cultural heritage value, as formal protection is a status that may change.

The term “site” as used in this paper covers both isolated buildings and larger sites containing buildings. It does not include archeological sites or underwater sites.

In this paper, the term “property development” refers to professionals working with building projects promoting change with economic profit as an aim.

Norwegian legislation presented in English in this article has been translated from Norwegian.

Method

The method applied is a property development analysis of the cultural heritage site Værnes Hovedgård and its potential for future use as offices. The theoretical framework is early phase property development theory. The aim is to provide insights on the similarities and differences between the fields of property development and protection of cultural heritage. Værnes Hovedgård has been the subject of a cultural heritage-related analysis of the site, including a preliminary architectural design for the transformation of the building into offices (Stendebakken, Grytli, and Olsson, 2015). The associated report will be referred to throughout this text.

The cultural heritage analysis recommended rehabilitating Værnes Hovedgård into offices. From a property development point of view, this initiative needs to be evaluated in light of economic aspects and compared to alternatives for providing office space for the air base. The property development analysis will evaluate several economic aspects for a transformation of the site Værnes Hovedgård into office areas, along with other alternatives for providing office areas for the air base. The economic aspects this paper will investigate are as follows:

- investment cost
- project cost
- time perspective for the project
- time perspective for use of assets
- quality of result
- alternatives analysis

Investment costs and project costs will be estimated, or existing estimates will be referenced. The time scope for economic analysis will be compared to expected useful life for the alternatives for providing office areas for the air base. Quality of result will be compared for the alternatives to avoid comparing economic cost for alternatives of different use quality as though they were the same. These aspects will be discussed and summed up in the alternatives analysis.

All traces of human activity are actually defined as cultural heritage (Lovdata, 2017a). Formal cultural heritage status for cultural heritage sites varies; a site may be legally preserved under the Cultural Heritage Act (Lovdata, 2017a) as an object of national importance, which is a strong juridical protection. It can also be protected locally through area planning and the Planning and Building Act (Lovdata, 2017b). While protection by law establishes that a given site is indeed a cultural heritage site, lack thereof does not imply that it does not entail significant cultural heritage value; a given site can have important cultural heritage value without legal protection (Lauvland and Aasen, 2017).

There are different types of tangible cultural heritage. Built traces of human activity are present in a variety of forms spanning from detailed interiors to larger outdoor areas.

All sums are given in NOK and calculated in USD, using the currency calculator of Norway's largest bank (DNB, 2016). Tables and figures use NOK. 1 USD ≈8,40 NOK.

Property development

Stages

Property developers typically go through eight steps (Miles, Netherton, and Schmitz, 2015), though not always linearly; depending on the feasibility of a given project, for example, the sequence might be discontinued or rearranged. The typical sequence of steps is as follows:

1. Idea inception
2. Idea refinement
3. Feasibility
4. Contract negotiation
5. Formal commitment
6. Construction
7. Completion and formal opening
8. Property, asset, and portfolio management

This is a simplified and idealized version of such a development process. It is vital to consider all remaining steps at any point in the development process to give the process direction, seize opportunities, and handle difficulties at the earliest possible point. It is basic project management theory that a project's flexibility and ability to adapt are at their highest in the early phases (Samset, 2008).

Even in prosperous times, large investments such as property developments contain risks. A truly successful project includes several kinds of added value. Besides the monetary benefit for the developers, there are also other kinds of added value, such as urban development and safeguarding cultural heritage. Safeguarding cultural heritage is a value in its own right and may affect other values, such as image and reputation. Successful property development projects might prove themselves to such a degree that the finished project seems self-explanatory. This is seen in urban development projects where prices increase rapidly as new urban areas gain popularity in the market; in hindsight, this might seem obvious, and those uninvolved might think that they easily could have done the same. However, a successful urban development requires interdisciplinary cooperation, risk taking, and above all, timing. This might easily be forgotten when one walks the vibrant streets of successfully transformed urban areas.

Operating parameters

To test a given idea, one looks at the associated parameters. These include square meters or floor area ratio, building cost, market prices for the finished project, management of the project after completion, and time spent retaining funds, staff, and technical assets over the project period.

Concept development

Choice of concept is often based on alleged effect (Rolstadås et al, 2014). The starting point of a project is likely a need that has arisen. One should address real problems, not possible problems, and the problem should be defined in a way that enables several alternative solutions.

Concept development should then be based on alternatives analysis. It is important that the alternative solutions are genuine alternatives, i.e. mutually exclusive. It is vital to also consider the zero alternative, the current situation, comparing it to the proposed alternatives.

After choosing one or more promising concepts, a process development in which the concept is rendered concrete and framework conditions are defined is due.

Risk analysis

In forming a property development project, there is typically an emphasis on time, cost, and quality (Samset, 2008). For enhanced project effectuation, risk analysis is also vital. The object is to target risks in connection to the project, the consequences associated to a given risk, and the probability that the risk will occur. Risk can be both systemic and non-systemic. Non-systemic risks need to be addressed on a project level and systemic on a superior level, typically with diversity in a property developer's project portfolio.

Certain risks are characteristic for property development projects involving cultural heritage, such as those connected to the rigid constancy that is a main goal for management of cultural heritage values (Senter for eiendomsfag, 2010). These risks should be treated thoroughly on a project level, and on a systemic level if the property developer has a significant number of projects involving cultural heritage values, in which case cultural heritage-associated risks become systemic.

Cultural heritage and property development

Traditionally, protection of cultural heritage has taken a museum approach to protected buildings. Today's protection of cultural heritage field began in the late 18th and 19th century and was institutionalized in the 20th century. In the 19th century, protection of cultural heritage depended on individual volunteers and private interest groups. In the 20th century, the field gained wider recognition and legitimation established through national initiatives and juridical framework.

From its juridical platform, the protection of cultural heritage field widened its scope and protected an increasing variety of sites. In its early years, the protection of cultural heritage field was employed as a tool to build national identity in young nations, such as Norway, by protecting rare monuments; time-honored, beautiful, grand elements of our built heritage suitable to strengthen the desired national self-image.

The devastations of the two world wars, social change, and the rapidly changing building industry have changed our built surroundings quite dramatically. Parallel to these changes, the scope of the protection of cultural heritage field has broadened to include more modest objects and larger, continuous areas such as old town centers, where each building appears quite modest but the whole has significant cultural heritage value. The juridical framework has adapted and presents updated requirements which property development on cultural heritage sites today must comply with.

The Norwegian project for legal protection of state-owned cultural heritage sites

In 2007, the Norwegian project for legal protection of state-owned cultural heritage sites claimed that "No building is too small, ugly or anonymous, if it documents an important part of state history" (Statsbygg). Until then, Norwegian

state-owned, profane cultural heritage sites had not been protected by law, in contrast to private cultural heritage sites. The exception was a relatively small number of sites that received “administrative protection” in the years 1933 and 1934. The project for legal protection of national property was started around the turn of the millennium. State-owned property was legally protected through a tailored regulation (Lovdata, 2017c) to ease the juridical process when the state is both landowner and deciding authority.

The project reviewed all state-owned profane sites to evaluate their cultural heritage values; if they were deemed of value according to a set of criteria, they were protected by law. The tailored regulation involved new wording, slightly affecting the selection of cultural heritage sites worthy of legal protection.

The criteria were to not only protect architectural and cultural heritage values, but also show governmental history, ensure examples from different time periods, promote understanding of state sectors, preserve historic document value, original elements and later additions representing historical developments and safeguard structures, interrelations, open space, and visual connections.

The set of criteria is listed below (Lovdata, 2017c, translated from Norwegian for this article by the authors):

Preservation regulations of the State-Owned Cultural Heritage Properties

§ 1.1. The purpose of conservation

The protection under the Regulation is intended to ensure and preserve a representative sample of cultural heritage in the form of structures and sites related to government activity. The listing will help to

- a) ensure that architectural or cultural heritage values in buildings and sites are preserved*
- b) show the governmental sectors’ historical development and their importance, such as social development, building of Norway as a welfare state, and the relationship to indigenous peoples and minorities*
- c) ensure that representative examples from different periods of development are preserved*
- d) convey understanding of the sectors and eras they represent*
- e) preserve the buildings and facilities as historical references and sources of knowledge*
- f) preserve original elements and later additions, if these are considered to have an independent value as a representative of a historical development*
- g) ensure that the structures’ and sites’ interrelations are safeguarded*
- h) ensure that open areas are preserved and that the functional and visual connection with the protected complexes are maintained.*

The project was expected to produce a significant increase in the number of protected buildings in Norway. This should be unsurprising, considering the criteria listed above. However, this was not addressed as a major issue in the early phases. No ceiling was placed on the number or share of sites to be protected to force prioritization. Ideally, the protection by law of a state-owned cultural heritage site should not lead to added costs, as the state should take proper care of their sites regardless. In hindsight, one can argue that a protection by law prohibits neglect of unused or even unusable buildings, that it adds quality requirements for the work carried out, and that it adds paperwork, uncertainty, and administrative burden, as one cannot make irreversible changes to a cultural heritage site protected by law without applying for dispensation. This requirement also applies to minor interventions, such as drilling in walls.

The need for new use in abandoned cultural heritage sites

Today, there are thousands of buildings with legal protection in Norway, more than 8,000 of which have the strongest form of legal protection (Riksantikvaren, 2017a), under the Cultural Heritage Act (Lovdata, 2017a). We use the unit “building” here, as our source, the Department of Cultural Heritage’s database Askeladden (Askeladden, 2017), does.

The share of Norway which is under some form of legal protection has risen to 25% of the country (SSB, 2017a). However, this includes national parks, nature reserves, etc. Fifteen per thousand buildings are under the strongest form of legal protection. Additionally, thousands of buildings have other kinds of legal protection.

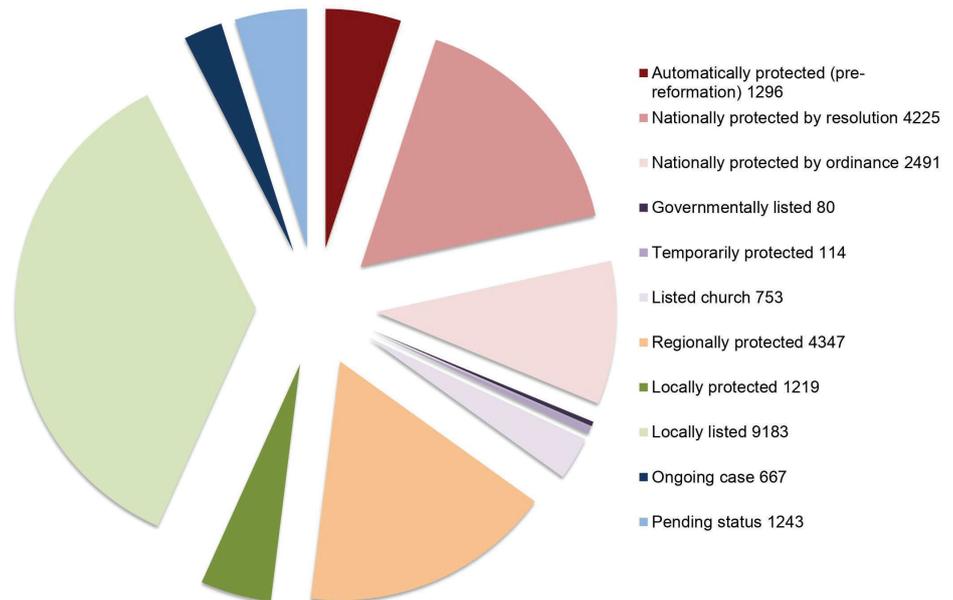


Figure 1. Buildings in Norway with formal legal protection as cultural heritage. The table in Figure 1 is based on the Directorate for Cultural Heritage’s database Askeladden (Askeladden, 2017). Search performed on 2 August 2017 from 2:00 pm. The database contains information on archaeological sites, architectural monuments and sites, and cultural environments. As we investigate potential for rehabilitation, we have included buildings and churches. We have excluded technical/industrial heritage, ships, ruins, archeological sites, rock art, and outdoor elements from the search (“Protected” is by the Cultural Heritage Act, on national level, regionally and locally protected are by the Planning and Building Act).

In the early years of the protection of cultural heritage field, buildings were typically approached as entities without great consideration for surroundings and could be protected in a museum manner. Buildings were even moved to outdoor museums as out-of-size museum objects. This goes against today’s preference for maintaining original fabric, historic document value, context, and (ideally) continuous yet conservative maintenance, an approach often credited to John Ruskin (Ruskin, 1880). Logically, the aforementioned museum approach is also not viable with today’s number of protected buildings. There is an increasing focus on initiating new activities in cultural heritage sites. Today this is considered the best alternative for the majority of cultural heritage sites. Naturally, being in use and being adapted to new use causes some deterioration of cultural heritage sites, but this is considered less damaging than being left empty, even if one has the resources to simulate use, e.g. through heating (Riksantikvaren, 2017b).

The protection of cultural heritage field wishes to activate its assets. Property developers recognizing the potential in transforming cultural heritage sites have concurrent interests. The two fields also have potentially conflicting interests originating in their main goals; the protection of cultural heritage field sees new activity as a tool for protection of cultural heritage, while property developers

mainly see new activity as a goal in itself and a premise for profit. In property development, a cultural heritage site needs to adapt to its potential for use. In protection of cultural heritage-based management, the situation is reversed; the use needs to adapt to the cultural heritage site and its limits of tolerance. Profit is not a major focus for the protection of cultural heritage field, which sometimes lacks attention to economic consequences. This ignorance exists despite the comprehensive economic consequences legal protection of a given cultural heritage site has for the current owners, future projects on the site, and the responsible authorities due to administration. By assigning legal protection and its attendant restrictions on a given site, the state takes on an (admittedly vague) joint economic responsibility. Cultural heritage authorities may cover additional costs due to legal protection, but they are not obliged to do so (Finne, 2015). State funds are nevertheless used in the safekeeping of both public and private cultural heritage sites. This should encourage an economic awareness related to legal protection both among legislators and those managing protected properties.

Contrary to common beliefs, legal protection does not hinder all possible initiatives at a given cultural heritage site. However, as mentioned above, in relation to a growth in administrative needs and added costs for the state, a dispensation has to be applied for all irreversible interventions. As the law says, one can get a dispensation by meeting the requirements but is not automatically entitled to a dispensation even when meeting the requirements: To be granted dispensation, an intervention needs to be insignificant and a particular case. Assessment is left to the state administration's judgment. Cultural heritage authorities are relatively free in their decision-making. Property developers, fearing the unpredictability and added costs this uncertainty might add to a project, may dread the application process for such dispensations. The regulation for protection of state-owned cultural heritage properties, paragraph 1-4 on Dispensation, is listed below (Lovdata, 2017c, translated from Norwegian for this article by the authors):

Preservation regulations of the State-owned Cultural Heritage Properties (...)

§ 1-4. Dispensation

The administrative authority in § 1-7 may in special cases grant dispensation from protection and conservation regulations for measures that do not have a significant impact on the monument.

In deciding what constitutes such special circumstances, attention should be given to which degree the measure is necessary to achieve the purpose of the protection, including

- a) repair and restoration*
- b) replacement of damaged material and or vegetation*
- c) recoveries to original or previous appearance and structures under the assumption that the measure can be done in a secure documented basis and in accordance with traditional methods and materials*
- d) fire precautions*
- e) other measures to protect the monument.*

In assessing what constitutes special circumstances, measures of major importance for society, such as security, may also be emphasized.

The thought of such an application process might seem demotivating, but, as noted by German philosopher Gadamer, legal protection is a confirmation and formalization of existing values in a cultural heritage site, and is, according to Gadamer, inferior to the core qualities of the site. (Gadamer, 2014). The site's core values came to exist independently of the protection of cultural heritage field, but may depend on it for further existence. Thus, legal protection should

be regarded as a hallmark for significant values in connection to a given site (Stendebakken and Olsson, 2017b).

Case: Værnes

This article is based on a single-case analysis of what used to be the main building on a large farm in central Norway, which dates back to pre-historic time. The farm, "Værnes", was bought by the Norwegian Armed Forces and gradually turned into the combined civilian airport and military air base of Værnes. Today, the old main building from 1818 is located on the air base. The building, "Værnes Hovedgård", is the oldest building on the air base and the only remaining building from the previous farm. Due to Værnes Hovedgård's position within the clearance zone at a NATO air base, it is inaccessible to civilians. The building is constructed and clad in wood, with a masonry foundation and slate roof, measures 36 x 9.5 meters, and has two main floors in addition to a loft and cellars. There are 25 rooms on the ground floor and 21 on the first floor. Most rooms are of similar sizes. The rooms are arranged in two rows, without hallways; access is through adjacent rooms.

The building is an example of local building tradition. Comparable buildings, although typically much smaller, are widely distributed throughout the area, still inhabited as main buildings on surrounding farms. Værnes Hovedgård is not in use; since 1992, the building has only been used a few times, and then quite intensely as an urban warfare training site.

The old, unused wooden building's survival for decades in the stern environment of a military base is due to its build quality and the fact that Værnes Hovedgård was legally protected in 1934. As mentioned, state-owned profane cultural heritage sites were rarely formally protected. Because Værnes Hovedgård has enjoyed this rare formal protection, the Norwegian Armed Forces, as its owners, have been obliged to maintain the building. In 1934, the typical site to receive protection was the main building on a larger farm, such as Værnes Hovedgård. The building was protected for the second time in 2004, along with the old yard and other, newer buildings surrounding it.

Due to their juridical obligation to maintain Værnes and an earmarked governmental subsidy, the armed forces have quite recently carried out comprehensive maintenance of the building, repairing the foundations, cladding, roof, and chimneys and removing newer building materials exposing the building to moisture. This maintenance work cost 9 million NOK (≈1,1 million USD) (Forsvarsbygg, 2012). The building remains empty, and extensive further work needs to be done before it can be used, according to today's legislation and standards. This work is calculated to cost 10 million NOK (≈1,2 million USD).

There is a pronounced goal in today's protection of cultural heritage field that the majority of protected buildings should be in use, raising the questions of why this has not yet come through for Værnes and how it can be achieved.

The air base is in dire need of more office space, a use suitable for the building. The generic structure of the building, with many rooms of similar and quite good size, aligned in two rows, gives it flexibility in adapting to new use, as functions can be distributed in a variety of ways.

The cultural heritage analysis of Værnes Hovedgård recommended rehabilitating the building for office areas. The general floor plan of the building would quite easily adapt to office areas, with a majority of work stations in office landscape. The building's original larger rooms were divided throughout the 19th and 20th century, and some can justifiably be re-opened. There will be some sacrifices regarding wearing indoor surfaces and some openings will have to be made in construction and cladding. Additional inner windows and wall insulation could be required due to both temperatures and the noise from

the air base. However, the main attribute of the building, surfacewise, is its exterior. On the inside, the repetitive series of similar rooms with copious daylight is a key quality. This would be preserved. A dreaded intervention in cultural heritage sites is the lowering of ceilings to allow for ventilation and other technical installations. The ceiling height would allow for this, but a preferable solution, which is recommended in the cultural heritage analysis, is to do these technical installations mainly vertically, giving up selected square meters rather than ceiling height everywhere. The most demanding technical rooms are put in the smaller and lighter timber-frame construction part of the building rather than the larger main cog-work part.

Because the building is legally protected, dispensation has to be granted for all interventions affecting the existing built fabric. The NDEA has regular, professional contact with the Directorate for Cultural Heritage due to their extensive portfolio of cultural heritage sites and experience with protection and development of cultural heritage sites. This should allow for a less complicated design and application process.

Applying property development theory to Værnes

Værnes Hovedgård's two main floors have an approximate floor area of 700 m² combined. The size of a rehabilitation project is determined by the size of the existing building. The other alternatives for office areas, a new build and renting, would not suffer this limitation. Still, we choose to compare costs for each alternative based on a project size of 700 m² for comparability.

Other properties at the airport have been sold in recent years. As property prices have increased recently (SSB, 2017b), we have included those from 2014 (newest available) to 2008 (Eiendomspriser, 2016). Prices spanned from 1-19,5 million NOK (≈120 000–2.3 million USD). The statistics regrettably do not provide square meters for the buildings; however, they do provide insight into the sums one is dealing with for commercial buildings within the airport.

Based on the building's square meters, address, and original domestic purpose, its value is estimated (Eiendomsmeglerguiden, 2016) to be between 11,240,000 and 16,950,000 NOK (≈1.3–2.0 million USD) according to the general standard for domestic buildings in the area. The building is statelier than the average domestic building but also needs extensive work before it can meet today's standards.

Today the building and its cultural heritage values are secured, but the building is not in use. Safekeeping of the building includes inspections, maintenance, heating, alarm systems, and pipework for fire hoses. This costs ≈500,000 NOK (≈60,000 USD) per year (Nilsen and Reiersen, 2010). Nilsen and Reiersen calculated the costs of operating the building if it were transformed to office space at 1,100,000 NOK (approximately 130,000 USD). The calculation presupposes an initial investment for the rehabilitation of 10 million NOK (approximately 1.2 million USD).

The cost per square meter for construction of new office space is roughly estimated to be between 20,000–30,000 NOK (≈2,400–3,600 USD), adding up to 14–21 million NOK (≈1.7–2.5 million USD) for 700 m² of office area. New build office areas seem to come at a higher cost than a rehabilitation of the existing building. One should keep in mind that a new construction offers the possibility to tailor that the transformation of an existing building does not allow, so office areas in Værnes Hovedgård might have a lower work station ratio than comparable new office areas. Still, these are alternatives with some degree of compatibility, although not identical in creation or in result.

The relatively recent comprehensive maintenance of Værnes Hovedgård was funded with a grant of 9 million NOK (≈1.1 million USD) directly over the national budget, reserved for this building. As these works have been executed,

and because the purpose was to cover decades of maintenance lag, the cost is not included in the calculations in this paper. Further work done on the building will probably have to be paid from the NDEA's own budgets.

Alternatives for providing office areas at the air base

The NDEA have a number of possible means both to provide more office areas at the air base and to keep the protected building Værnes Hovedgård safe. The alternatives considered by this paper are listed in table 1. Some of these alternatives ignore the legal obligations under the Cultural Heritage Act to maintain the existing building. The authors emphasize that this is an independent, academic analysis performed for research purposes. The NDEA is a reputable manager of cultural heritage sites with a sought-after specialist environment on protection of cultural heritage in house. The unacceptable alternative of doing nothing, Alternative 1, is included in this paper to exhaustively list alternatives that might be applied to cultural heritage sites in society in general. This alternative of doing nothing comes at the tempting cost of nothing. Still, this does not qualify as a zero alternative, as referred to earlier in this paper, under concept development, as it does not achieve the minimum requirement of obeying laws and regulations. Alternative 1 will therefore not be discussed as a viable path in this paper. This also applies to alternative 2. The zero alternative at the air base is actually Alternative 3, which maintains the status quo. This is generally referred to as a zero+-alternative, or doing as little as possible.

Table 1. Alternatives for maintaining Værnes Hovedgård and acquiring more office spaces at the air base, by means of investment

Alternative	Approach	Cost in NOK	Is it legal?	Benefit
1	Do not build new offices; do not protect the existing building	0	No; it is illegal under the Cultural Heritage Act	Zero cost
2	Build 700 m ² new office areas; neglect the old building	14–21 million + annual expenses, estimated at 600,000 ⁹ p.a.	No, it is illegal under the Cultural Heritage Act	Provide office spaces
3	Protect the old building against damage; neglect the need for office space	500,000 per year	Yes, it fulfills obligations to the Cultural Heritage Act	Fulfill legal obligations
4	Transform the existing building to office areas	Initial investment: 10,500,000 + annual expenses estimated at 1,100,000 p.a.	Yes, it fulfills obligations to the Cultural Heritage Act	Fulfill legal obligations and provide office space in a rare building of high value
5	Protect the old building against damage; build new office areas	14–21 million + annual expenses estimated to 1,100,000 p.a.	Yes, it fulfills obligations to the Cultural Heritage Act	Fulfill legal obligations and provide office space in a modern building

The calculated costs for rehabilitation of the existing building into office areas are based on a bottom-up analysis of the existing building performed by employees in the NDEA in 2010. They found the cost for rehabilitation to be ≈1.1 million USD (≈1,500 USD per square meter).

By Norwegian standards, 1,500 USD per square meter is not a high cost for a rehabilitation project in a protected building. The Eidsvoll building, an important cultural heritage site in Norway due to its centrality in the creation of Norway's constitution, exemplifies a high-cost rehabilitation project of a comparable building. The Eidsvoll building, from 1770, is constructed of wood, like Værnes Hovedgård, and was also originally a private home. It was restored in 2014 for the Norwegian constitution's 200th anniversary celebration (Kwetzinsky, 2017). The ambitious restoration of the 1,800 m² building came at the cost of 350

⁹ The same costs as the office-specific costs for the protected building

million NOK (≈ 42 million USD, $\approx 23,000$ USD per square meter) (VG, 2017). Both the ambitions and the costs can be presumed to be higher at Eidsvoll than at Værnes Hovedgård; at Eidsvoll, the restorers sought to recreate the built frame around the composing of the constitution. At Værnes Hovedgård, the aim is to adapt to new use. This allows for more flexible solutions. Still, as sums involved in cultural heritage sites, these vastly different numbers invite questions. The NDEA's comment was that the calculated costs might be conservative, but nevertheless, it should not be problematic to rehabilitate at a lower price than that of a new build, as the margins between the two alternatives' costs are considerable. The exact final cost of a new build or a rehabilitation project also depends on the level of quality chosen for the project.

Renting offices in the vicinity of the air base

A larger investment in in-house areas is merely one alternative for new office areas. Another is to rent such areas. Based on the notion that the state should be able to pay directly for its investments, the NDEA is not authorized to take up loans. Given that, a direct payment seems the optimal option. However, when direct funding is inaccessible, for example when the armed forces have other priorities, the limitation on loans can lead to unfortunate results. The restrictive policy on taking up loans can seem incomprehensible to the public if it leads to seemingly unnecessary costly or impractical solutions. The NDEA received strong criticism for renting office areas in Oslo while owning 11,000 m² of unused office areas in the vicinity (300 meters away from the rented office areas) (Aftenposten, 2015).

The NDEA could choose to rent office space for use by the Værnes base. The office area in Oslo was rented at market rate for high standard office areas, 2,700 NOK / m² (≈ 321 USD). We thus use market prices at Værnes in our calculations. Market prices were estimated based on a new office building in Stjørdal, 2 km from the airport (FINN, 2016). Office areas are available in the span from 350 m² to 4,500 m². These offices had the highest price per m² in the area Stjørdalen. The rent would be between 1,700 and 1,800 NOK / m² (≈ 202 – 214 USD) per year. The option of renting office areas offers the advantages of low obligation, high flexibility, and low investment costs. As the legally protected building still has to be maintained by the NDEA in accordance with Norwegian law, these costs should be included in the calculation, as demonstrated in Table 2 below.

Table 2. Alternatives for acquiring more office space at Værnes, by means of investment at the air base or renting in the vicinity of the air base.

Alternative	Approach	Cost in NOK	Is it legal?	Benefit
A	Renting offices, paying rent, no or little investment costs	1490 NOK/m ² in rent; 1,043 million/year	No	Low investment costs, less commitment than a larger investment project, but fails the legal requirement to safekeep the protected building
B	Renting offices, paying rent, no or little investment costs, and maintaining the legally protected building	1,043 million/year in rent + 500,000/year for maintaining the existing building	Yes	Low investment costs, less commitment than a larger investment project, and meets the legal requirement to safekeep the protected building

For comparability, all costs should be from the same year. As the detailed calculations from the NDEA are from 2010, we have chosen to adjust the costs for renting to 2010, using Statistics Norway's index for rental costs for offices (SSB, 2017c). The alternative would be to use a series of different indexes to recalculate the costs for rehabilitation and new build, making the numbers less accessible and the comparison less transparent. The authors have chosen

transparency over newness. The costs for renting are based on the index for 2010–2015, adding an expected price development for 2015–2016 based on the previous years 2010–2015. The costs for renting in 2016 should thus be divided by 1,177, which gives a calculated cost of 1,750 (average of 1,700–1,800) / 1,177 = 1,486.83093, rounded up to 1,490. As with Table 1, we will abstain from discussion of Alternative A, which fails to fulfill legal obligations under the Cultural Heritage Act.

Comparing costs

The differences in cost between alternatives will be affected by time. To illustrate this, they are compared in a line chart in figure 2. A thirty-year timespan has been applied, as this is the estimated life span for new buildings. It is also an estimated timespan for major rehabilitations of older buildings of quality indicating the time until the next major rehabilitation needs to be done to accommodate further use. The need for additional costs could thus be the same after 30 years, while the actual residual values may differ.

The difference in costs between alternatives changes with time. The differences in costs can be deemed dramatic. But several of the alternatives do not absorb the complexity of the situation, as the NDEA are obliged to maintain their legally protected buildings. This applies to the zero-cost alternative, renting only, and new build only (low and high estimate). These alternatives do not include the costs for mandatory maintenance of the existing building. While all these alternatives are seen in the reality of management, which is that protected buildings may be inadequately maintained, these examples represent a violation of the Cultural Heritage Act.

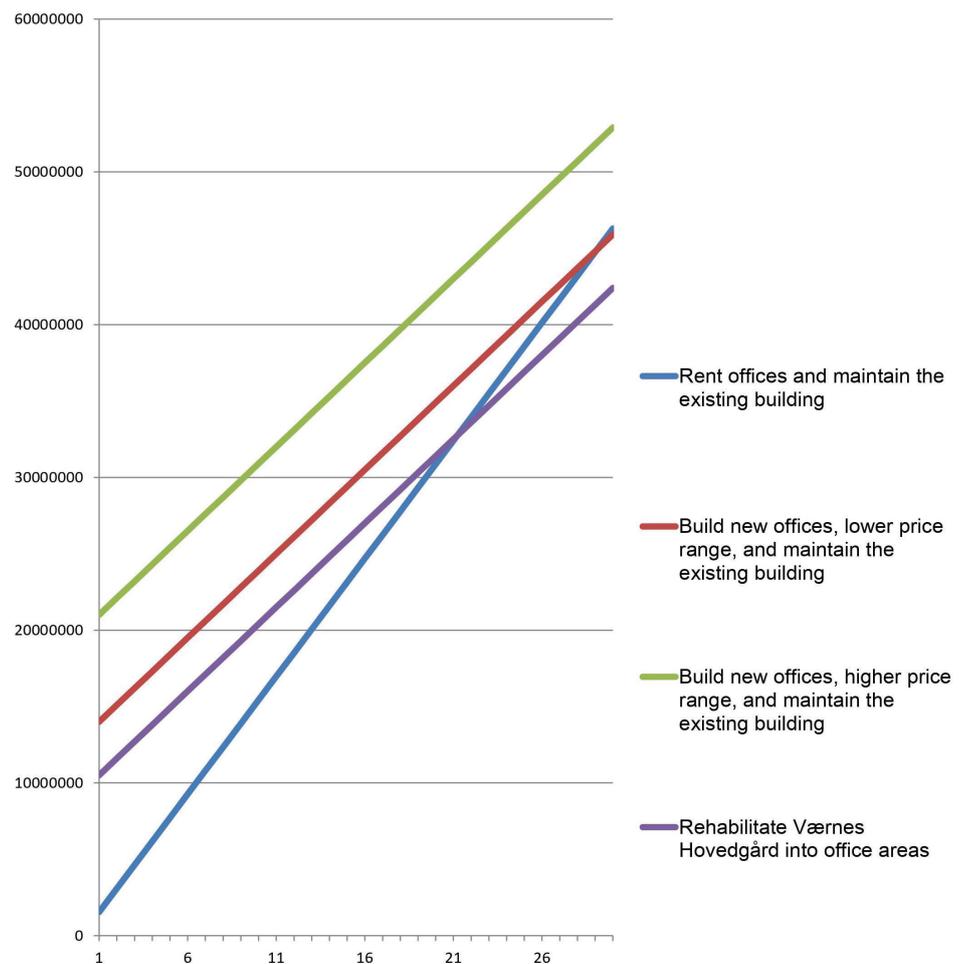


Figure 2. Valid alternatives for maintaining Værnes Hovedgård and acquiring more office areas for the air base by means of investment or renting. The y-axis represents NOK in millions, x-axis number of years.

Including only lawful alternatives changes the span in costs. These alternatives are given in Figure 1.

The incalculable value of cultural heritage should be considered and certainly not set to zero, as it is a recognized value of national importance, as demonstrated through the building's legal protection under the Cultural Heritage Act. Cultural heritage values are defined in the law as irreplaceable. One could argue that irreplaceable values are of infinite value. But, if we set all cultural heritage values to infinite value, it will paralyze calculations. With 8,000 buildings in Norway having the highest form of protection, this might not be a viable solution from an economic or even from a holistic point of view. Reality and management entail prioritizing.

Office areas at a cultural heritage site that are strongly connected to the history of the airbase have a value that is not found in a new build. Such office areas can provide identity and attachment in an otherwise stern and internationalized environment. A new build will likely provide better flexibility in the design phase, and possibly more comfort in the use phase. When the expected life span of the new-build has reached its end, the cultural heritage site is expected to turn the page for another chapter. This difference in life expectancy is mainly due to the changing building industry (Lauvland and Aasen, 2017). The point is that while costs for the different alternatives are directly comparable, the inherent qualities of the resulting office areas differ.

Concluding discussion

This paper poses the question "Which is the most cost-efficient alternative, a new build or the rehabilitation of a cultural heritage site?" The finding in this case study is that it may be the rehabilitation project. Alternatives with lowest costs were illegal. Rehabilitation emerged as the least expensive option by far. Rehabilitation is the best option for creating more office areas at Værnes from an economic viewpoint and with margins. However, prejudice regarding costs may be decisive, albeit wrongfully so.

This paper examined costs for a number of alternatives for new offices and the maintenance of Værnes Hovedgård at the air base. This overview has shown that the alternatives with the lowest costs did not meet both the juridical obligations connected to cultural heritage values and the Norwegian Defense Estates Agency's need for more office space at Værnes. Alternatives that fail to maintain the cultural heritage values are ruled out in this research. Sadly, this is not always the case in the actual management of cultural heritage sites. Attention should be given to the alternatives that maintain cultural heritage values but fail to meet the NDEA's need for more office areas at Værnes. Generally, prioritization of cultural heritage values at the expense of the organization's other needs might undermine the regard for cultural heritage in an environment over time.

We have included the cost of mandatory maintenance of the cultural heritage values in all viable alternatives, something organizations do not always do. Failing to include such seemingly unrelated, yet actually relevant costs in an alternatives analysis can lead to inexpedient conclusions.

Economy is a key factor for decision making in property development projects and in relation to cultural heritage sites. Precise estimates are important for correct decisions from a cost perspective. As a project's flexibility is at its highest in its early phases, these estimates should also be available early in the process. In the transformation of cultural heritage sites, one has less flexibility than in a new build project, as the existing site is defined as invaluable. This consolidates the importance of correct cost calculations at an early stage in the project.

Cost escalation is a risk connected to cultural heritage sites, which should be managed. It is also relevant to analyze the possible tolerance within a given project; which savings can be had within the juridical framework. It is not a goal in itself to do cultural heritage rehabilitations as low-budget projects, certainly not for our outmost valuable cultural heritage sites. Still, with the thousands of protected buildings we have in our society today, it is vital to understand that for a majority of cultural heritage sites in need of rehabilitation, the probability of such a rehabilitation decreases with every requirement that raises the costs.

The importance of an open and honest dialogue should be emphasized; from a short-term protection of cultural heritage perspective focusing on a given cultural heritage site, it could be tempting to sell in the lowest price estimate, although the real costs might be higher. This is inadvisable, and not only due to the risk of cost overruns. Over time, such a tactic can be destructive for the protection of cultural heritage field and its reputation.

The earliest formally protected buildings were typical bearers of the desired national identity. With the rising number of protected buildings in Norway, there are a growing number of protected buildings that are less recognizable, containing cultural heritage values that are undercommunicated or even inaccessible to the general public. Pairing high numbers of less esteemed cultural heritage sites with repetitive cost overruns or disproportional costs could severely damage the protection of cultural heritage field over time.

The opposite approach, dismissing cultural heritage sites for property development based on prejudice regarding costs, can cause damage both at project level for individual projects and to the profession's reputation. On the other hand, an enlightened valuation of cultural heritage sites in property development could lead to true social development.

To make informed decisions, decision makers need to have access to adequate information and calculations. Lack of information can obstruct decisions and thereby maintain the status quo. There are many reasons why calculation of costs for alternatives in the management of cultural heritage sites should be done at an early stage.

Transformation projects tend to be complex, involving numerous fields of expertise, and might have a higher cost than new construction. These added obstacles should be seen in connection with the invaluable gain from protecting our cultural heritage. If those paying the costs of protecting cultural heritage do not appreciate the non-monetary gain or perceive it as too expensive, it damages not only the given cultural heritage site, but also the protection of cultural heritage field as a whole. Over time, such negative perception has the potential to weaken protection of cultural heritage's position in society.

In the long term, demands that are perceived as rigid and exacting could weaken the protection of cultural heritage field at its core, the institute of legal protection of cultural heritage. There needs to be a degree of accordance between the protected cultural heritage values and the heightened cost level. This applies equally to private investors and public bodies aiming to utilize tax money in a justifiable manner.

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Dismissing cultural heritage sites for property development based on prejudice regarding costs can cause damage both at project level for individual projects and to the profession's reputation. On the other hand, an enlightened valuation of cultural heritage sites in property development could lead to true social development.

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