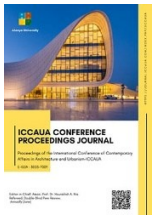

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Route as a Tool for Holistic Understanding of Industrial Heritage Areas: Kelham Island and the Furnace Trail

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A b s t r a c t

Kelham Island is a historic industrial area in Sheffield, England, representing the innovative initiatives of its time that transformed the city into a globally significant hub for iron and steel production. While industry shaped the city's identity, from its architecture to daily life, Kelham Island hosted technological discoveries that played a key role in industrial history, such as the mass production of steel and the invention of stainless steel. However, from the mid-20th century, as the steel industry entered a period of decline, the area was gradually abandoned. Conservation efforts initiated by the Sheffield Council in the 1980s designated Kelham Island as an "industrial conservation area." More recently, preservation work has revitalised the area, turning it into a key attraction. This study will explore industrial heritage routes that highlight the values of such areas and foster their holistic understanding, focusing on Kelham Island and the defined Furnace Trail within it.

K e y w o r d s : Industrial Heritage; Route; Kelham Island; Furnace Trail; Conservation.

1. Introduction and Conceptual Framework

1.1. Conceptual Framework: Industrial Heritage and Cultural Route

The Industrial Revolution, which triggered profound technological, socioeconomic, and cultural transformations, not only initiated the process of modern urbanization but also gave rise to new debates in the field of conservation—particularly concerning the preservation of traditional urban fabric. Early approaches to conserving industrial buildings and sites first emerged in Britain, largely in response to the demolition of railway structures. By the 1960s, the scope of industrial heritage conservation had broadened to include canals, mills, mines, quarries, and iron foundries (Trinder, 1981). A pivotal moment came in 1973 with an international meeting held in England, attended by participants from around the world. This event marked the first step towards the establishment of a global organization dedicated to the study, interpretation, and protection of industrial heritage. That same year, TICCIH (The International Committee for the Conservation of the Industrial Heritage) was founded, with the aim of promoting international cooperation in the protection, documentation, research, interpretation, and advancement of industrial heritage. Since its inception, TICCIH has served as an expert partner to ICOMOS on industrial heritage matters, contributing to the organization of numerous international meetings, reports, charters, and declarations (Ifko & Stokin, 2017).

The concept of a cultural route emphasizes cultural exchange along historically significant paths with defined geographical scope, integrating both tangible and intangible heritage elements (Blair, 2013; Aziz Amen 2017; Aziz Amen and Ahmad NIA 2021; Aziz Amen and Nia 2018). These routes connect regions, continents, and cultures across extended periods of time. Representing a qualitative shift in heritage conservation, cultural routes were officially recognized in 2005 as a category within the World Heritage List, acknowledging their role in reflecting key aspects of global heritage (Taylor M. R., 2013).

An industrial heritage route represents the intersection between industrial heritage and cultural routes, emphasizing not only the preservation of historically significant industrial sites but also the promotion of cultural exchange. These routes illustrate how industrialization has shaped regions over time by combining tangible features—such as factories, machinery, and infrastructure—with intangible elements like workers' stories, craftsmanship, and community traditions.Kelham Island, with its rich industrial legacy and well-preserved historic environment,

exemplifies this approach and is officially recognized as an anchor point on the European Route of Industrial Heritage (ERIH). Established in 1999, ERIH is a prominent pan-European initiative dedicated to the protection of industrial sites and the promotion of public awareness regarding their historical and cultural value (ERIH, 2021). The network features thematic routes across Europe aimed at fostering tourism and education in the field of industrial history. To be included in the ERIH network, sites must meet several criteria, including historical significance, symbolic value within European industrial development, tourism potential, and accessibility by various forms of transportation (ERIH, 2019).

1.2. Aim and Method

This article aims to explore the potential of a route-based approach in presenting industrial heritage sites through a holistic conservation framework. Specifically, it investigates industrial heritage routes as a method of conservation that supports a comprehensive understanding of historic industrial areas by revealing their cultural and spatial values. The objectives of the study are:

(1) to discuss the concept of industrial heritage routes as a conservation method,

(2) to examine Kelham Island and the Furnace Trail as a case study representing a holistic conservation effort, and

(3) to provide a foundation for proposing strategies for the preservation and presentation of similar industrial sites in Turkey.

By focusing on the examples of Kelham Island and the Furnace Trail in Sheffield, this study demonstrates how such routes can enhance the perception of spatial continuity and historical integrity, while simultaneously raising awareness of cultural heritage within local communities. It also assesses the applicability of this route-based model to similar industrial sites elsewhere.

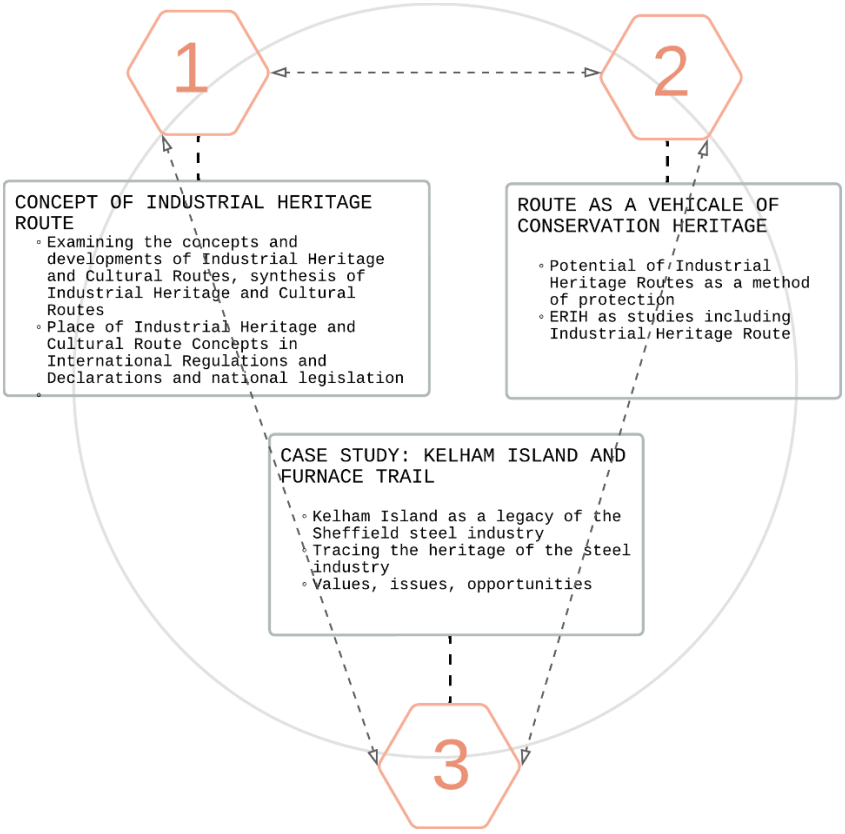

Figure 1. Structure of the Study (Developed by Author).

In this study, as can be seen from Figure 1, the Furnace Trail route in Kelham Island was followed, the route was experienced, and data was collected using observation and on-site survey techniques within the scope of field studies. The data obtained were discussed with value problems and potentials on the role and importance of presenting industrial heritage areas with a holistic approach within the scope of conservation.

2. Kelham Island as Heritage of Sheffield's Steel Industry

2.1. Historical Background

Sheffield, a post-industrial city in South Yorkshire in northern England, was one of the first cities to mass-produce iron and steel and has been nationally recognized for cutlery production since the 16th century (Linton, 1956). ts distinctive urban identity is shaped by the presence of seven rivers, a strong legacy in metal manufacturing—particularly steel—and the natural resources found in the Yorkshire region. Before the mid-1970s, Sheffield was considered the heart of the UK's steel industry (Zuyue & Yan, 2024). However, from the late 1970s onwards, widespread layoffs and industrial closures triggered a period of sharp decline, leading the city through successive stages of industrialisation,

deindustrialisation, and post-industrial restructuring. Kelham Island, a man-made landmass within the River Don, is one of the city's oldest manufacturing districts. Following the industrial decline of the late 20th century, the area was abandoned and neglected. In recent years, however, it has been revitalized through the adaptive reuse of historic industrial structures, transforming it into a popular and vibrant urban quarter.

Sheffield's geographic and environmental features have also played a significant role in shaping its identity. Built on seven hills and partly situated within the Peak District National Park, the city enjoys a central location in the UK with excellent rail and road connectivity. Its natural geography historically provided ideal conditions for steel production, earning Sheffield its dual reputation as both "The Steel City" and "the greenest city" in the UK. The city's industrial heritage is visible in the many historic buildings across the city centre—structures that, while often modest in appearance, stand as enduring witnesses to its manufacturing legacy (Zuyue & Yan, 2024). Sheffield remains widely known for its contributions to metallurgy and steel innovation (Ortiz, Duarte, Fernandez, & Talocci, 2023).

The city's urban regeneration strategy, initiated in the late 1980s, marked a deliberate effort to rebrand Sheffield through partnerships with the private sector and large-scale commercial developments—most notably the construction of the Meadowhall Centre on the former Hadfield Steelworks site. While this shift aimed to modernize the city's image by downplaying its industrial past, elements of Sheffield's steelmaking legacy continued to surface. Cultural initiatives such as steelworker reenactments at the 1991 World Student Games and the commissioning of Robin Bell's bronze sculpture Teeming reflected a nuanced approach to regeneration—one that promoted economic renewal while still acknowledging the city's industrial roots (Miskell, Orange, & Almond-Brown, 2024).

Kelham Island, in particular, offers a compelling historical narrative. Its origins trace back to the 12th century when a millrace was constructed to divert water from the River Don, setting the stage for centuries of industrial activity. Over time, the area evolved into a centre for manufacturing cutlery, edge tools, iron grates, and precision machinery. The expansion of the railway network in the mid-19th century further intensified industrial development, especially in the Lower Don Valley, which became the most densely concentrated steel-producing region in the world for nearly two decades. During this period, Kelham Island solidified its role as a key site in Sheffield's globally renowned cutlery and silverware industries (Hoare, 2019).

2.2 Deindustrialisation and Abandonment

Following the industrial decline in the second half of the 20th century, many areas in Sheffield, including Kelham Island, were abandoned and neglected. The rapid pace and scale of deindustrialisation in the final quarter of the century forced city planners to make difficult decisions regarding the increasing number of redundant industrial sites (Ortiz, Duarte, Fernandez, & Talocci, 2023). The collapse of traditional industries such as coal and steel also sparked renewed interest in Britain's industrial past, leading to the emergence of industrial archaeology and the establishment of museums dedicated to preserving and showcasing the physical remnants of these sectors (Miskell, Orange, & Almond-Brown, 2024). From the mid-20th century onward, Sheffield's steel industry entered a prolonged period of decline, driven by technological change and intensifying global competition. The deindustrialisation of the 1980s and 1990s led to the dismantling of major portions of Sheffield's industrial base, causing the loss of numerous manufacturing and production jobs (Gherhes, Vorley, & Brooks, 2020). In response, a range of strategies were implemented at both the local and national levels to mitigate these effects. As part of broader urban regeneration policies focused on identity and intra-city competition, Sheffield launched a place-branding campaign in the late 1980s, repositioning itself from the "Steel City" to the "City of Sport" (Emery, Olner, & Pryce, 2023). Kelham Island, once a hub of heavy industry, was significantly affected by this downturn. As industrial operations ceased, the area fell into disrepair and became associated with crime and urban decay. Derelict buildings attracted squatters and illicit activity, and the neighbourhood developed a reputation for social problems. By the late 20th century, it had become known for low-rent businesses and red-light activity, a reality famously referenced in the Arctic Monkeys' 2005 song When the Sun Goes Down. However, in recent decades, Kelham Island has undergone substantial regeneration. Many of its historic industrial buildings have been adaptively reused, transformed into residential units and spaces for hospitality and creative enterprises. To guide this transformation, Sheffield City Council launched the Kelham Island Action Plan in 2008, aiming to attract investment by reimagining the area's industrial past in a more refined and appealing form. While some critics regard the transformation as a clear example of gentrification, others view it as a successful revitalisation effort that preserved the area's historic character while repositioning Kelham Island as a vibrant and creative urban district (Emery, Olner, & Pryce, 2023).

2.3 Revitalization and Adaptive Reuse

Following an extended economic downturn, Sheffield has undergone a significant revival, with many formerly declining industrial zones rejuvenated through redevelopment initiatives and innovative business strategies. After the collapse of the steel industry in the early 1980s, Sheffield City Council emerged as one of the first local authorities in the UK to promote cultural industries as a means of generating employment and revitalizing the urban environment (Biçer & Yaman, 2016). The city has since successfully transitioned from its industrial roots into a vibrant and livable urban centre, with the Council playing a central role by actively preserving and promoting Sheffield's distinctive industrial heritage (Zuyue & Yan, 2024). A notable example of this transformation is Kelham Island**,** one of Sheffield's oldest industrial districts, which has been revitalized through the adaptive reuse of historic industrial buildings. Once a hub of manufacturing, the area has been reimagined as a lively and modern neighbourhood that continues to showcase numerous historic features (Zuyue & Yan, 2024). Recognizing its cultural and historical value, Sheffield City Council designated a substantial portion of Kelham Island for industrial

and craft-based uses, ensuring the preservation of long-standing businesses and preventing the displacement of the area's traditional manufacturing community.

In 1982, the Council further reinforced this commitment by establishing the Kelham Island Industrial Museum in a former power station. Uniquely positioned within one of Sheffield's most historically rich manufacturing zones, the museum benefits from its authentic setting. Unlike other parts of the city that have seen modern redevelopment, Kelham Island retains much of its 19th-century industrial character, including features such as the goit, old furnaces, and original factory architecture. Surrounding landmarks like Globe Works and Green Lane Works have been partially restored for contemporary use, while others remain untouched, offering visitors a powerful, unfiltered view of Sheffield's industrial past. The museum's surrounding environment enhances its atmosphere, serving as a poignant tribute to the city's manufacturing legacy before further redevelopment transforms the landscape (Tweedale, 1992). Notably, the museum also acted as a catalyst for broader urban renewal, leading to Kelham Island's designation as an industrial conservation area.

2.4 Risk of Gentrification

In the first of these cases, opening urban spaces to tourism activities can lead to a city becoming detached from its original character and functional structure, often resulting in the withdrawal of local residents and turning the area into an empty, commodified space. The regeneration of Kelham Island provides a compelling example of urban gentrification, characterized by substantial demographic and socioeconomic changes. Formerly a primarily industrial area with little residential presence, Kelham Island has evolved into a lively hub for students and middle-income professionals, particularly those working in creative fields such as design and architecture. This transformation stands in stark contrast to the surrounding neighbourhoods, many of which remain among the most deprived areas in the UK (Hoare, 2019). Although economic revitalization through bars, galleries, and upscale restaurants has brought new life to the area, concerns have been raised about the inclusivity and long-term sustainability of this development. Critics argue that regeneration may have displaced longstanding working-class communities in favour of more affluent newcomers—a claim that remains difficult to verify without comprehensive demographic data. Additional concerns include rising traffic congestion and pressure on local infrastructure, especially on the island's historic streets.

3. Route as a Tool for Holistic Conservation

The growth of Sheffield's steel industry was largely driven by numerous small-scale enterprises that operated with limited financial resources and in restricted spaces. By 1856, the city hosted approximately 135 steel-producing firms, most of which had been founded by cutlers or other tradespeople who depended on steel for their work (Linton & L., 1956). Sheffield also emerged as a centre of innovation in coal, steel, and related industries. A significant breakthrough that boosted the city's trade was Thomas Boulsover's invention of silver plating (Vickers, 1987). In the 18th century, Benjamin Huntsman further revolutionized Sheffield's steel industry by developing the crucible steel process, enabling the production of superior-quality steel. His innovation firmly established Sheffield as a global hub for steel manufacturing, helping the city achieve dominance in British and European steel output by the mid-19th century (Hey, 2010). In this context, the development of heritage routes—such as the Furnace Trail—serves as a valuable tool for holistic conservation, linking tangible industrial structures with intangible cultural narratives and encouraging integrated preservation efforts.

3.1. The Furnace Trail: Tracing the Industrial Heritage 'Steel City'

The Furnace Trail in Kelham Island, Sheffield, is a heritage walking route that showcases the city's rich industrial past through a series of historically significant sites. Located in one of Sheffield's oldest manufacturing districts, the trail highlights key locations involved in steel and cutlery production, offering visitors a glimpse into the processes, architecture, and people that shaped the city's global industrial reputation.Stops along the trail include cementation and crucible furnaces, early factory complexes like Globe Works and Cornish Place, and iconic landmarks such as the Green Lane Works Gateway. Each site reflects different phases of Sheffield's industrial development, from the 18th century to the modern era. Some buildings have been restored and repurposed for residential, commercial, or cultural use, while others remain as evocative remnants of the city's manufacturing heritage.

The Furnace Trail not only preserves the memory of Sheffield's industrial achievements but also connects past and present by integrating historic spaces into the city's contemporary urban landscape. It serves as both an educational route and a cultural experience, celebrating Sheffield's legacy as "The Steel City.

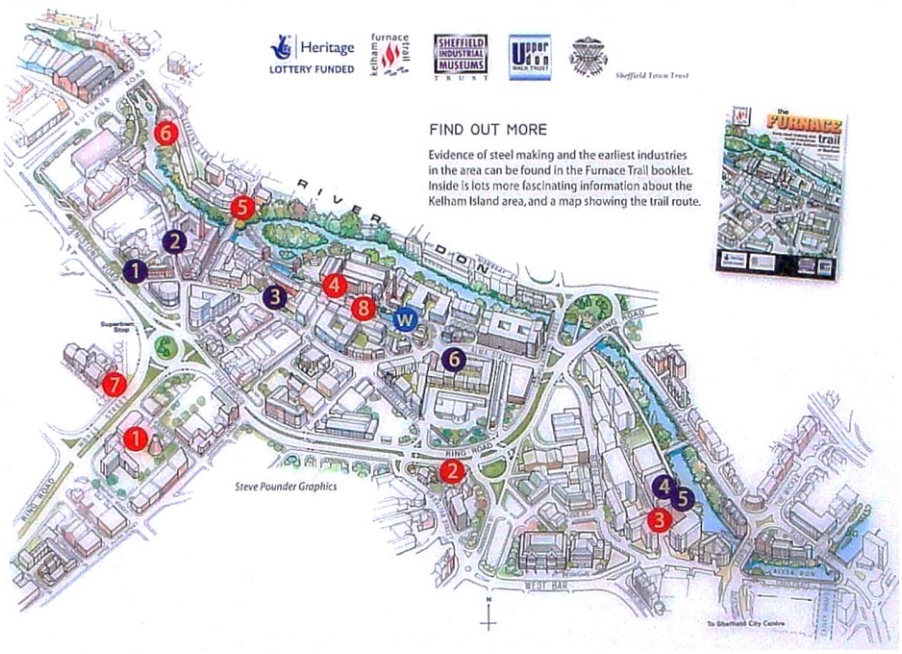

Figure 2. The map of Furnace Trail.

Table 2. The Furnace Trail, The Route and Buildings.

The Furnace Trail		On Trail	Authontic Use	Current Use
Ways of Making Steel	Cementation furnaces	1,2,3	Introduced to Sheffield in the 1690s. Converted Swedish pig iron into steel.	The only complete surviving example in Britain is at site
	"the Steel City"	4,5,6,7	Benjamin Huntsman invented the crucible proc in Sheffield in 1742. Crucible steel became globally renowned throughout the 19th century, establishing Sheffield's reputation.	Sheffield is still known as "The Steel City" due to its historic legacy in steel production, despite its mode more diversified economy.
Early Factorie	Globe Works	1	Built in 1825 by William Ibbotson. Named 'Globe' to reflect the goal of selling steel and cutlery worldwide.	Reused likely for business o creative industry spaces.
	Cornish Place	2	Built around the same time as Globe Works. Us steam power to manufacture plated silverware a cutlery.	Preserved and redeveloped, possibly used for residential or commercial purposes.
	Green Lane Worl Gateway	3	Built by Henry Hoole, who made ornamental ca iron fire surrounds. Constructed the gateway wl he became Mayor of Sheffield in 1860.	The gateway remains as a historic landmark.
	Marshalls at at Millsands	4	Largest steelworks in Sheffield by the 1770s. Features included conical furnaces for blister steel and multiple crucible furnace chimneys.	It was demolished but remnants like conical and crucible furnaces are still visible.
	Millsands	5	Later known as River Don Works; home to Vickers & Sons. Produced steel bells and guns; company still operates today as Sheffield Forgemasters.	It was demolished but remai are visible.
	Sheffield Workhouse	6	Began as a water-powered silk mill in 1758. La used for cotton, then as a workhouse. Eventuall became part of Globe Steel Works before being demolished in the 1940s.	It was demolished in the 1940s.

3.2. Values, Problems and Opportunities

In the context of industrial heritage, Kelham Island holds significant value across multiple dimensions. It has been the site of globally important technological developments, such as the introduction of mass steel production and the invention of stainless steel, making it a landmark in industrial innovation. The area has played a defining role in shaping the historical and cultural identity of Sheffield, embedding itself deeply in the city's urban fabric. Architecturally, it preserves rare examples of 18th- and 19th-century industrial buildings, which provide insight into the spatial organization and aesthetics of early production sites. As a space of collective memory, Kelham Island sustains the historical consciousness of local residents by preserving traces of past industrial life. Moreover, it functions as an educational platform that raises public awareness about industrial history and cultural heritage. Through adaptive reuse and regeneration efforts, the site also promotes cultural continuity, enabling the transmission of values, skills, and narratives from past generations to the present.

Despite its heritage value, Kelham Island faces several ongoing challenges that complicate its preservation and integration into the contemporary urban landscape. A number of buildings within the area remain abandoned and structurally neglected, posing risks to both safety and conservation efforts. There is also a spatial and perceptual disconnect between the historical site and the modern urban fabric, which limits its accessibility and visibility within the city. The area suffers from a lack of user diversity, as it is not yet widely utilized by local residents, young people, or tourists, resulting in limited community engagement. Additionally, public awareness about the site's historical significance remains low in certain segments of society, weakening support for long-term conservation. A further concern is the risk of gentrification—as restoration and adaptive reuse projects increase property values, there is a growing threat of displacing long-standing local communities, potentially altering the area's social fabric and undermining the inclusivity of heritage preservation.

Kelham Island presents a range of valuable opportunities that can enhance both the preservation and sustainable development of the site. One of the most significant potentials lies in the adaptive reuse of underutilized industrial buildings, which can be revitalized for cultural, educational, tourism, or community-based purposes. As a site rich in industrial heritage, it offers strong potential for cultural tourism, contributing to the local economy and increasing public interest in the area. Additionally, the site can serve as a hub for education and research through collaborations with universities, museums, and academic institutions, making it a living laboratory for industrial history and heritage studies. Community engagement also represents a key opportunity—encouraging participation from local residents and younger generations can foster a sense of ownership and ensure long-term sustainability. Lastly, Kelham Island's inclusion in international networks such as the European Route of Industrial Heritage (ERIH) enhances its global visibility and opens the door to international support, partnerships, and recognition.

4. Conclusions

Kelham Island demonstrates the necessity of holistic approaches in preserving the industrial environment. The rich industrial past of the area, its architectural structure and social memory have been re-emerged with conservation efforts. In this context, Furnace Trail is a significant application that encourages learning by immersing users in the stories of the past through a spatial route. The trail has both contributed to understanding the early industrial production of steel and created new opportunities for sustainable use by revealing the potential of re-functioned and abandoned structures. However, issues such as abandoned structures, spatial disconnection, and gentrification risk also need to be addressed, so a holistic conservation policy for the area becomes more important. As a result, the Kelham Island and Furnace Trail experience provides a strong model for future projects by revealing the scope of a holistic approach to the evaluation of cultural, social and economic dimensions in the preservation of historical industry.

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Conflict of Interests

The Author(s) declare(s) that there is no conflict of interest.

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