CLAIMING DEBRIS EPISTEMOLOGY IN ARCHITECTURE

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ABSTRACT

CLAIMING DEBRIS EPISTEMOLOGY IN ARCHITECTURE

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Doctor of Philosophy, Architecture
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This study presents debris as an epistemological inquiry for architecture by looking at the conditions and processes emerging during the afterlife of the built environment. Destruction as a continuum of space-making harbors the capacities of logistics while mobilizing matter and exerting violence. By exposing a relational ground, the thesis offers debris in the ecology of logistics as the material witness of destruction. Logistics of debris is a process requiring infrastructural capacities and ecological engagements, which causes slow and positive violence. The violence in debris logistics points out an epistemological opening to transform the knowledge of architecture. Post-disaster environment of February 2023 Earthquakes in Türkiye provides the conditions and processes of debris logistics in a tense environment in condensed timelines. The cleanup and reconstruction operations in a post-disaster environment create a logistical ecology with traces of violence. The thesis aims to uncover the logistical violence of debris, which is a fatal consequence of mobilization mechanisms under the control of authoritarian regimes. Following the reports from institutions and independent media outlets, this study situates a knowledge of debris with in-situ investigations by mappings and photographic documentation. With debris epistemology, thesis challenges (A)rchitecture by foregrounding mobilization of destruction as a critical process in space-making

practices. Therefore, debris informs an extended course of architecture that continues from pre-construction to post-destruction, while challenging the conventional assumptions of space-making with fixity, completion, and intention. By discussing materiality, temporality, and scale of debris, debris epistemology proposes to include the residual and mobile matter as an onto-epistemological inquiry in architecture.

Keywords: Debris, epistemology, logistics, ecology, destruction.

ÖZ

MİMARLIKTA ENKAZIN EPİSTEMOLOJİSİ

Arıkboğa, Caner
Doktora, Mimarlık
Tez Yöneticisi: Assoc. Prof. Dr. Esin Kömez Dağlıoğlu

Eylül 2025, 257 sayfa

Yapılı çevrenin yıkımı sonrasında ortaya çıkan malzeme, sunduğu koşullar ve süreçler aracılığıyla mimarlığın sonraki yaşamına işaret eder. Bu tez, "enkaz" olarak nitelendirilen malzemeyi mimarlık bilgisine yönelik epistemolojik bir sorgu olarak ele almaktadır. Lojistik sistemlerin enkazı harekete geçirme biçimlerine odaklanarak, mekân üretiminin sürekliliğine ve bu süreçte uygulanan şiddete dikkat çeker. Enkazın lojistiği ekolojik bir olgu olarak tanımlandığında, bu hareketlendirilmiş malzeme ilişkisel bir zeminde tartışılabilir hale gelir. Bu bağlamda, enkaz lojistiği altyapısal kabiliyetleri ve ekolojik etkileşimleriyle, yavaş ve kimi zaman olumlu bir şiddetle sonuçlanmaktadır. Bu lojistik şiddetin görünür kılınmasıyla, mimarlık bilgisini dönüştürebilecek bir epistemolojik tartışma mümkün olur. 2023 Şubat Türkiye Depremleri sonrasında oluşan afet ortamı, bu lojistik şiddetin yoğun biçimde gözlemlenebileceği bir zemin sunmaktadır. Afet sonrası temizlik ve yeniden inşa operasyonlarının lojistik ekolojisine odaklanan bu çalışma, şiddetin izlerini kaydeder. Otoriter rejimlerin denetimindeki hareketlendirme mekanizmalarının vahim bir sonucu olan lojistik şiddeti görünür kılmayı amaçlamaktadır. Kurumların ve bağımsız medyanın raporları doğrultusunda yapılan arazi çalışmaları, haritalamalar ve fotoğrafik belgeler aracılığıyla enkazın yerleşik bilgisine ulaşılmaktadır. Bu noktadan hareketle, mekân üretiminde yıkımın

hareketlendirilmesini elzem bir süreç olarak ele alan bir epistemolojik tartışma üzerinden (M)imarlığa yönelik eleştirel bir katkı sunulmaktadır. “Enkazın epistemolojisi”, mimarlıkta süregiden sabitlik, tamamlanmışlık ve ereksellik kabullerini sorgulayarak; inşa öncesinden yıkım sonrasına kadar uzanan genişletilmiş bir sürecin bilgisini mimarlığa taşımayı amaçlar. Enkazın maddesel, zamansal ve ölçeksel boyutlarını tartışan bu yaklaşım, geride bırakılmış ancak aynı zamanda hareketli olan maddeyi, mimarlık bilgisine onto-epistemolojik bir sorgulama olarak eklemeyi önerir.

Anahtar Kelimeler: Enkaz, epistemoloji, lojistik, ekoloji, yıkım.

To my family

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LIST OF ABBREVIATIONS

ABBREVIATIONS

AFAD: *Afet ve Acil Durum Yönetimi Başkanlığı* (Disaster and Emergency Management Presidency)

CDW: Construction and Demolition Waste

CIAM: *Congrès Internationaux d'Architecture Moderne*

ÇED: *Çevresel Etki Değerlendirmesi* (Environmental Impact Assessments)

GTS: Geological Time Scale

IGBP: International Geosphere-Biosphere Programme

KBA: Key Biodiversity Areas

MM^3: Million Cubic Meters

MTA: *Maden Tetkik ve Arama Genel Müdürlüğü* (General Directorate of Mineral Research and Exploration)

TAÇDAM: *Tarihsel Çevre Değerlerini Araştırma Ve Uygulama Merkezi* (Centre for Research and Assessment of Historical Environment)

TMMOB: *Türkiye Mühendis ve Mimar Odaları Birliği* (Union of Chambers of Turkish Engineers and Architects)

TOKİ: *Toplu Konut İdaresi Başkanlığı* (Housing Development Administration)

TTV: Türkiye Tasarım Vakfı (Türkiye Design Council)

UN: United Nations

UNDAC: United Nations Disaster Assessment and Coordination

UNDP: United Nations Development Programme

CHAPTER 1

INTRODUCTION

In the report of World Bank Group, expectation of the solid waste generation will be around 3,4 billion tons per year by 2050.[1] The amount of municipal waste is expected to increase fiercely; however, it is nowhere near the estimations for solid waste of construction industry. In 2019, annual amount was ten billion tons.[2] When we consider the global production of concrete has reached to thirty billion tons per year in 2023, many destructions will mount to an unexpected degree.[3] Although many of these estimations and calculations come from economic, social and ecological recuperations of the waste, there is a little attempt to signify the underlying principles of making and unmaking the built environment.[4] In addition to that, how and where this unfading matter is mobilized also seems unquestioned. There is a concerning issue within the scholarly work done in the field that architecture is not part of the story. However, inclusion of architecture will display the bounding principles of mediums and flows that will outline the networked practices of space-making. Therefore, this thesis looks at the aftermath of destructions making the mounting *debris* of destroyed buildings an issue of architecture. While doing so, it mobilizes a body of text in-between the theories and studies of infrastructure, ecology and violence that concern their role as a major contributor to the built environment and

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[1] Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden, What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, Washington DC: World Bank, 2018. doi:10.1596/978-1-4648-1329-0.

[2] Wu H, Zuo J, Zillante G, et al. "Status quo and future directions of construction and demolition waste research: A critical review," *Journal of Cleaner Production,* 2019, p.240.

[3] Sinoh, Othman & Onn, Circular economy potential of sustainable aggregates for the Malaysian construction industry. *Sustainable Cities and Society,* 2023, p.89.

[4] Magnus Lindskog "Mythbusting in the logistics domain: a second look at systems theory usage," *Logistics Research*, Vol.5, No.1-2, 2012, p.3–20. doi:10.1007/s12159-012-0078-9

its destructions. In that, this study aims to present a new *reality* to the theory where "afterlife" of architecture can be questioned in its continuum.

There are many points in the history and theory of architecture where life time of buildings are reduced to the span between their erections and collapses. Even the studies which avoid such reductionist apprehension of making cannot go beyond the design processes, cognition of the built environment and the autonomy of the discipline.[5] Current perspectives can widen by asking a simple question for simplistic reckonings of making. For instance, was the story of Pruitt-Igoe over when we have seen the iconic image of its destruction? Or, was the film was still rolling while the residue was present in the site, children playing around it after school?[6] Another question might be, how many of architects are aware that clearance of the Pruitt-Igoe residue is recently finished? Apart from the well-known instances of architectural theory, it is a striking enigma in general, for architects and scholars not indulging with the things that do not "melt into air."[7]

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[5] Cairns and Jacobs provide insights from architectural theory as a way to criticize the making and unmaking process of the built environments. They gather claims and criticisms within the disciplinary boundaries of architecture and ideas from Venturi and Brown, Lynch, Koolhaas, Tschumi, Easterling, Picon and many more. They carefully pinpoint some well-known terms such as event, choreography, junk-space, rust, dross, etc. Cairns, Stephen & Jacobs, M. Jane, Buildings Must Die: A Perverse View of Architecture, MA: MIT Press, 2014, p. 47.

[6] There are not many recordings of Pruitt-Igoe's destructed material. There is a case in 1994 stating: "The court ultimately had to join the St. Louis Housing Authority and HUD as parties to the school litigation to force an agreement on the site. Meanwhile, construction costs have escalated and the cost of the Pruitt-Igoe site will be substantially more than the Howard site because undemolished foundations and tons of rubble were left on the site, and the School District must bear the cost of removing this material." Justia Law Article, U.S. Court of Appeals for the Eighth Circuit - 20 F.3d 326, law.justia.com/cases/federal/appellate-courts/F3/20/326/523266 [Accessed on: July 11 2025] For more: Michael R. Allen & Heidi Aronson Kolk, "The Painful Persistence of Pruitt-Igoe's Long Goodbye," *The Common Reader,* 2018. commonreader.wustl.edu/c/the-painful-persistence-of-pruitt-igoes-long-goodbye [Accessed on: March 15 2024] Allen states: "But earlier negative characterization of the neighborhood had already triggered its erasure, and the photographs suggest a degree of willed neutrality that is absent from earlier reform images and later depictions of Pruitt-Igoe. Children playing in an alley, groups of men sitting on sidewalks gossiping and families gathered on stoops and porches capture community life that embodies the traits (…)"

[7] Marshall Berman, All That is Solid Melts into Air: The Experience of Modernity, NY: Penguin Books, 1982.



Figure 1.1 Debris of Pruitt-Igoe Housing Complex in 1976 (left) and 2018 (right) [Accessed via St. Louis University Digital Archive and Michael Allen's article in The Common Reader on June 13 2025]

A thirty-five percent of the construction and demolition residue ends up in landfills.[8] The technology of landfills varies in many ways. Some are designed to protect the soil, water and air pollution, some are leftovers. The rest of it, sixty-five percent, threatens livelihood of ecologies.[9] When we consider the life cycle of the matters that buildings are erected with, it is relatively a short time, not even longer than a human life.[10] Considering the material ecologies starting with extractions, this timespan elongates. Mining activities, construction, demolition of the built environment leaves lasting impacts while severely harming our surroundings.[11] In

[8] Kabirifar K, Mojtahedi M, Wang C, et al., "Construction and demolition waste management contributing factors coupled with reduce, reuse, and recycle strategies for effective waste management: A review." *Journal of Cleaner Production,* 2020, p.263.

[9] Several examples can be listed. Waste and pollution crisises of last two years: GPGP, Korle Lagoon, Thailand's Chemical Factory Fire, East Palestine Train Derailment, Plastic Pollution in Indian Rivers, Toxic Wastewater Spill in the Dominican Republic, Guangxi Cadmium Spill.

[10] Authors state "Most standards provide a design service life of 50 years for reinforced concrete structures." Medeiros-Junior, Ronaldo & Lima, Maryangela & Medeiros, Marcelo, "Service life of concrete structures considering the effects of temperature and relative humidity on chloride transport. Environment," *Development and Sustainability*, Vol.17, 2014, p.1-17. doi:10.1007/s10668-014-9592-z

[11] Demolition and destruction can refer different meaning, especially in the construction industry. Demolition often conveys a controlled unmaking process, while destruction can vary according to the context. Thesis regards demolition as part of destruction where disasters, accidents, bombardment, renewal, and even construction occurs by termination things and causing damage.

fact, one can see the resemblance in the methods of how resources are taken from the land and filled back in.



Figure 1.2 Panorama of Karaburçlu debris site in May 2023. Taken by the author.

Defining the processes and spaces of the built environment, starting with the extraction processes until the disposal, has become a necessity to understand how destruction is internalized within the practices of humanly existence.[12] First and foremost, it is the systems of mobilization in the making the built environment that supports the destructive practices. The knowledge of architecture, therefore, should provide the necessary provision to be able to counter the destructive forces. In that, this thesis follows such an ideation to provide the necessary tools and perspectives to understand the lengths and widths of anthropocentric mobilization. However, destruction has become a globally acknowledged phenomena, making it hard to abandon for the Capitalist mechanisms.

[12] Thesis refers the totality of these activities as space-making.



Figure 1.3 Aerial image of Altınözü debris site in May 2023. Taken by the author with the help of Kenan Kantarcı.

The world is crumbling with destruction. In its aftermath, we see the change from a hostile planet to a dominated one by a single species. In-between the appreciations of the Earth as idyllic and lavish—as it is not, humans create a world which is prone to their destruction. As the spectrum of destructions enlarge day by day, crises of wars, oil spills, waste, and toxic contaminations become humanly constructs of

domination.[13] The wide array of humanly destructions has become the problem of handlings, regulations, and their controlling mechanisms working hand in hand. Globalized wars set the rather overlooked example of human made disasters.[14]

Disputes among the interest groups from diverse geographies have globalized the effects of war. In the wake of emerging war technologies, the urban has seen several transformations from central to polynucleated, from linear to networked, from diverse to standardized.[15] These transformations have been framed both as necessities and as enduring consequences of the socio-technological advances driven by processes of depletion, failure, and fragility. Vulnerable geographies have been continually tested by the incremental growth enabled by infrastructural expansions in mobilization, communication, and distribution technologies since the industrial revolution of the mid-nineteenth century.[16] Recent conflicts and instabilities in mid-African geographies of Ethiopia, Sudan, Sahel, Congo, Somalia; in Caspian region of Nagorno-Karabakh, Iran, Afghanistan; around Arabian and Mediterranean Sea with Lebanon, Israel, Syria, Iraq and Türkiye, in addition to South Asian crises of North-Korea, Taiwan, Myanmar and Caribbean regions of Haiti, Venezuela and Northern Triangle pinpoint the power struggles on the expansion of mobilization

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[13] The statement is grounded on disasters being social constructs with under the influence of political registers. Exchanging the social with the human directs the statement towards a domination of nature with social ecologies. Kathleen Tierney, Disaster as Social Problem and Social Construct, "The Cambridge Handbook of Social Problems," ed. A. Javier Trevino, Cambridge University Press, 2018, p.79-94 https://doi.org/10.1017/9781108550710.006 Murray Bookchin (1982). The Ecology of Freedom: The Emergence and Dissolution of Hierarchy, Palo Alto: Cheshire Books, p.1.

[14] Modern wars cascade the environmental and social crises. Shaw warns us about the interplay of energy policies coinciding at oil-rich regions of Middle-East, Mid-Africa, and South-Asia. Benita Shaw, (2018). Posthuman Urbanism: Mapping Bodies in Contemporary City Space, London, Rowman & Littlefield, p. 36.

[15] Stephen Graham & Simon Marvin, Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, London: Taylor & Francis, 2002.

[16] The study of Wienthal and Sowers shows the integration of distribution networks and environmental infrastructures within the geographies of war. They succeed by analyzing "the targeting of environmental and civilian infrastructures which are to essential forms of slow violence that accumulate over time, carried out by both state authorities and settlers." Erika Weinthal, Jeannie Sowers, "Targeting infrastructure and livelihoods in the West Bank and Gaza," *International Affairs,* Vol.95, No.2, March 2019, p.319–340, https://doi.org/10.1093/ia/iiz015

domains.[17] It is no coincidence that emerging supply-chain corridors across continents juxtaposed with the struggles on those territories. One might map these insurgencies and campaigns as the aftermath of globalization technologies in the trajectory of planetary interconnectivity. Likewise, the destructions which occur due to the power struggles between nations, interest groups, guerillas and civil society reflects such inclinations towards the reconstruction efforts.

Ultimately, war means construction. Not in the direct sense, but for a very long time, the markets have grown the instinct. Since the industrial revolution, the processes of globalization have utilized infrastructures to operate cities. Operations of cities include the handlings, regulations and control of space-making. Post-war eras witnessed the initial global infrastructures of intercontinental logistics which revolutionized the methods of flow managements. Intercontinental logistics added distribution as part of the politics of production and consumption. By then, logistics has been altering the politics of handling materials, regulating time, controlling technologies to pursue capital intensifications whose outcomes engages in violence opposed to the planetary ecologies.

The effects of the dissolved demarcations between the geographies transcended the paradigmatic distinctions between the "natural" outside and the forms of urbanization.[18] The planetary crisis, accompanied by the new context of degraded socio-ecologies, leans towards the narratives of an end.[19] Various disciplines both from humanities and natural sciences are in search of provisions and imaginaries that will conclude the ending of planetary continuum. Scholars from geology, biology, geomorphology, and ecology are in search of terminologies that combine the human

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[17] Global Conflict Tracker. 2024. https://www.cfr.org/global-conflict-tracker [Accessed on: 08.12.2024]

[18] Neil Brenner & Christian Schmid, Planetary Urbanization, Implosions/Explosions: Towards a Study of Planetary Urbanization, ed. N. Brenner, Jovis, 2013.

[19] This use of the term context should be taken as a continuation of the context debate in architecture. For more, Esin Kömez Dağlıoğlu, "The Context Debate: An Archeology," *Architectural Theory Review*, vol.20, no.2, pp.266-279, 2015.

and non-human habitats. Terms, such as "neoenvironment," "technosphere," and "Anthropocene," delegate the issues of planetary urban regarding the need of inter-disciplinary perspectives on habitability.[20] Changing acidity of the hydrosphere, rising carbon dioxide and methane levels in the atmosphere, instabilities in cryo- and pyro-spheres, contaminations and deformities in lithosphere, decreasing diversity and biomass in the biosphere have reached to the concerning levels that lead scholars to think about urgencies of an end. The most urgent need to prevent the "end" requires recognition of the multivalent trajectories by which the program can elude the narratives of necrophage rather focus on ends and edges.

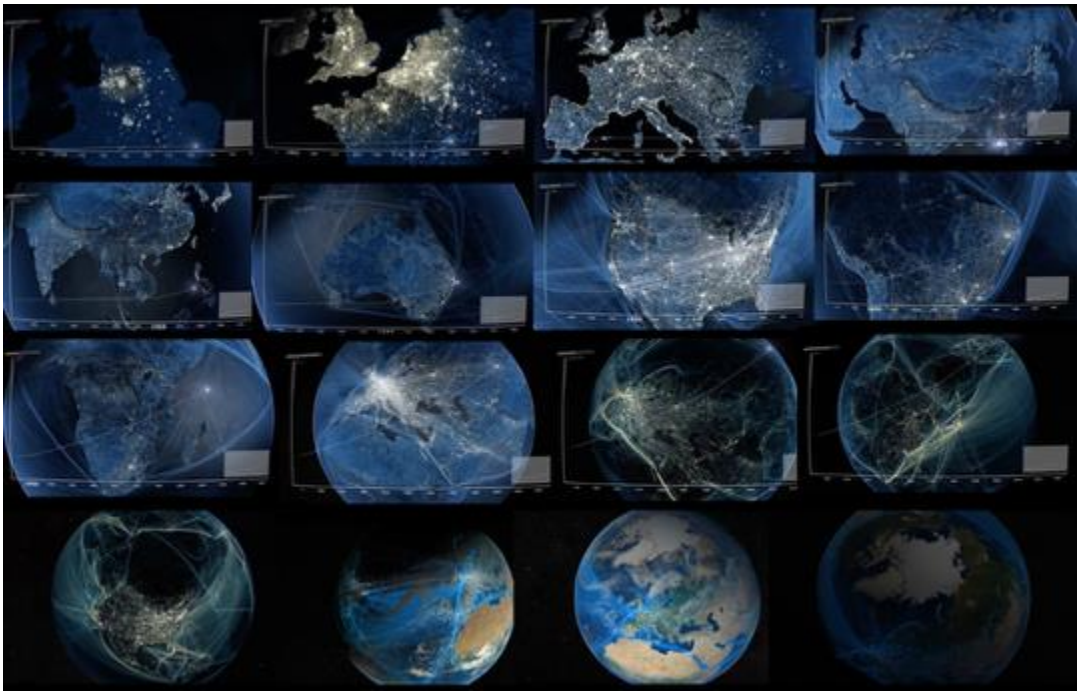


Figure 1.4 Captions from the film: Welcome to the Anthropocene. The film was commissioned by the Planet Under Pressure conference, London 26-29 March, a major international conference focusing on solutions. [Taken from planetunderpressure2012.neta]

[20] Peter K. Haff, "Technology as a Geological Phenomenon: Implications for Human Well-being," *Geological Society*, Vol.395, 2014, p.301-309 https://doi.org/10.1144/SP395.4 Paul Crutzen, "Geology of mankind," *Nature,* Vol.415, 2002, p.23. https://doi.org/10.1038/415023a

Such trajectories of elusion prevent misconceptions and fallacies on disciplinary autonomy which delimits the inclusion of the *other*. Additionally, negating the discursive strategies will help such trajectories of thought to pinpoint the deficiencies that happen between natural and social sciences. Many forms of knowledge that add up to the "rift" between programs comes from linguistics, anthropology, ethnomethodology, cognitive and social psychology, communication studies and law. As a scholar who travels in between those areas of studies, Latour draws the critique of navigation in-between the threats of mobilization, communication and distribution.[21] The regime in the changing face of the Earth, for Latour, points out an end, either in the making diversions or combinations in the *critical zone*.[22] This "zone" defines the disciplinary rift that prevents the praxis/actions/projections towards the politics of elusion. As Latour mentions critical zone as part of understanding the new "shift in the paradigm of habitation" via changing the practices, it seems that architecture—among the many other—has a responsibility to meet the ends and edges between positive and social sciences.

Architecture *of* the critical zone and architecture *in* the critical zone is the two sides of a coin.[23] There is the metaphor of architecture which horizontally travels into the territories of scientific knowledge. Most known example use of term is in coding structures in computational sciences. There is the "architecture" as a discipline itself, conveying the connectivity of other disciplinary knowledges in the making of the built environment. To elude such ends, architecture as a discipline of making and a way of learning from the made and unmade is an urgent necessity.

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[21] Bruno Latour, Down to Earth: Politics in the New Climate Regime, MA: Polity Press, 2017. p.42.
[22] Latour refers to "the term Critical Zone designates the thin layer in which life has radically modified the earth's atmosphere and geology – as opposed either to the space beyond or to the deep geology below" by referring to Susan L. Brantley et al., "Designing a Network of Critical Zone Observatories to Explore the Living Skin of the Terrestrial Earth," *Earth Surface Dynamics*, Vol.5, 2017, p.841–60.
[23] In fact, critical zone can be referred as critical "territory." Territory as a term to understand the multi-scalar disciplinary knowledge between programs coincides with the reformulating the relations between space and time between the differences.

For now, architecture as it has been operationalized in other disciplines and "disciplined" to meet the needs of profit-driven economies does not equip the requisite tools. In that, there are authors who mention the end and they start with etymological reformulations by bringing meanings with new attire. Rather than asserting "kainotecture," "xenotecture," "symbebekotecture," and "tychotecture" to problematize the changing times, the *otherness*, the accidents and disasters, and the fortune to finalize the arche- of the origin, this thesis problematizes the inclusion of *telos* - the end with a purpose.[24]

There have been many assertions which meant the end of architecture; however, those imaginations never approached the aftermaths of destructions as part of a means of architecture. Here, end does not necessarily comply with the "death of architecture" but as its split thread in its narratives, a continuation of existence with a competency in the afterlife.[25] Jean Baudrillard is one of the many who declares the death of values in politics, sexuality, and aesthetics with emergence and release of Modernist thought. This death, unlike the Nietzschean collapse, happens through secondary forms of existence, in disappearances, transparencies, extenuations, and

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[24] Mckenzie Wark, "From Architecture to Kainotecture," *E-flux,* 2017. https://www.e-flux.com/architecture/accumulation/122201/from-architecture-to-kainotecture/ [Accessed on: March 18 2024]

[25] Brand, in How Buildings Learn, offers a pragmatic version of this idea. Brand observes that architects and clients often treat a building's "completion" as the climax of its life. Stewart Brand, "How Buildings Learn: What Happens After They're Built," *Building Green,* Vol.3, No.5, 1994, https://www.buildinggreen.com/newsbrief/how-buildings-learn-what-happens-after-theyre-built [Accessed on: June 11 2025] Architectural historian Patricia Morton explicitly uses the term "afterlife of buildings" to describe how structures continue to tell stories after their initial life. Patricia A. Morton, "The Afterlife of Buildings: Architecture and Walter Benjamin's Theory of History," Rethinking Architectural Historiography ed. by Dana Arnold, Elvan Altan Ergut, Belgin Turan Özkaya, NY: Routledge, 2006, p.222. Rumiko Handa proposes instead that what comes after completion – use, change, weathering, adaptation – constitutes the building's true life. Rumiko Handa, "The Incomplete – Synecdoche I" Allure of the Incomplete, Imperfect, and Impermanent: Designing and Appreciating Architecture as Nature, London: Routledge, 2014. Caitlin DeSilvey, in her approach of "curated ruination," the building's slow transformation is foregrounded rather than seen as failure. DeSilvey suggests that material persistence – rusting metal, rotting wood – can be interpreted as a form of continuing life, Caitlin DeSilvey proposes an "ongoing story" written in weathering and collapse (though in her text this is couched in ecological terms). Caitlin DeSilvey, Curated Decay: Heritage Beyond Saving, Minneapolis: University of Minnesota Press, 2017, p. 3–4, 80–85.

saturations. Baudrillard warns us about "a kind of hysteresis of the political reigns" that manages dispersions by controlling the visibility of continuums rather than destructions.[26] The continuum of existence after the destruction, also for Baudrillard, is an enigmatic phenomenon which dilutes the possible critical ground for reflection. The hysteria that arises from the lack of aftermath brings destruction more powerful than ever.

Elongating the life-span of buildings is the attempt, here, to bring the edges and ends of the rift. This elongation helps resurfacing the relations between material movements and the built environment by taking ecologically diversification of logistics and infrastructures to its core. In that, the aftermath of logistics during the management of debris frames architecture as a necessity to understand the underlying principles of destruction. Investigative research on the dominant medium of policy-making as the major means of the processes during extraction, construction, and destruction will highlight violations towards social and ecological registers. Architecture, here, is a bounding discipline that addresses the shifting paradigm of habitation by relocating the domains of logistical regimes. To relocate the knowledge of logistics from neutral, positive, and invisible to political, negative and visible, it is necessary to recognize the possible trajectories and programs towards a habitable planet. To do that, architecture needs to direct its gaze on an onto-epistemological case, for which debris logistics is fitting.

[26] Jean Baudrillard, The Transparency of Evil: Essays on Extreme Phenomena, tr. James Benedict, London: Verso Books, 1993.

1.1 Logistics and Destruction

Logistics was an art of war.[27] It has been in the center of both constructions and destructions. “Armies march on their bellies.”[28] They have been marching with a belly filled with logistics. Till then, logistics governed the battlefields, penetrating tactics and strategies into the cities in global scale. Now, it is the controlling means to manage the flows of global chains. Nothing is outside the territory of logistics—or there is no commodity that is not part of the logistical network.[29] Since logistics plays an invisible role, its failure, too, is obscured via calculations, standardizations and rationalizations of time and matter.[30] While doing so, it contributes to existing norms of marginalization, and ultimately engage in violent acts and dispositions.[31]

Infrastructure is the medium of policy making by controlling territories.[32] As the major means of exchange infrastructure, logistical operations generate income by organizing extractions, exploitations, and exclusions. Logistics organizes exchange both by operationalizing and by altering infrastructures. Matter travels in varying stages through logistical infrastructures, from raw resources to waste. This staging complies a vast range of scales between micro to macro forms of infrastructures handling multi-scalar materiality. Logistical operations control the scales of infrastructures to assert power on matter. In its material dimension, infrastructures fail to deploy meaning over destruction, yet they continue to work hand-in-hand with logistics.

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[27] Virilio initiates the discussion on logistics and speed to highlight the regimic forces under the control of flow management. Paul Virilio, Speed and Politics, London: Verso, 1969.
[28] Famous words of Napoleon emphasize the provision of supplies in sustaining and enabling wars. Andrew Robert, Napoleon: A Life, NY: Penguin, 2014.
[29] Benjamin H. Bratton, The Stack: On Software and Sovereignty, MA: MIT Press, 2015.
[30] Negar Sanaan Bensi & Paul Cournet, “Introduction: On Datapolis,” Datapolis: Exploring the Footprint of Data on Our Planet and Beyond, ed. by Paul Cournet and Negar Sanaan Bensi, Nai010 Publishers, 2024.
[31] Deborah Cowen, The Deadly Life of Logistics: Mapping Violence in Global Trade, Minneapolis: University of Minnesota Press, 2014.
[32] Keller Easterling, Extrastatecraft: The Power of Infrastructure Space, London: Verso, 2014.

Scale of control deploys a multi-scalar mechanism; from planetary to micro-particle. Material dimension of logistical infrastructures includes operations between from raw resources to waste. Temporality of logistical infrastructures starts by detection, continues with assembly and delivery and ends with disposal.[33] Together, logistical infrastructures control multi-scalar territories between planetary to landscape to micro-particle scale, embedding into the geological timescales and controlling microseconds.

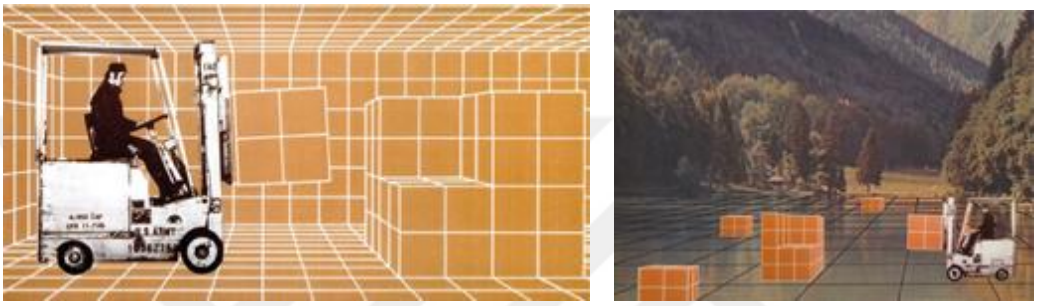


Figure 1.5 Logistics as a mechanism of control Left: An illustration from Army Logistician describes a warehouse building's enclosure and its inventory in the same manner. Right: an infinite smooth area supposedly receptive of every kind of life activity. [Digital collage: Jenny Lazari and George Papam Papamattheakis]

Ecology is the nested relations between the actants and their habitat, projecting an idea of habitation with and within the environment.[34] As a discipline of interconnectedness, ecology is a form of intermediary knowledge that actively

[33] This was evident in work of late Gökçe Önal, "Image Operations of Extraction." In the seminar, Ecology of Logistics, organized with Assoc. Prof. Dr. Esin Kömez Dağlıoğlu in June 2023, Önal presented how image making apparatuses starts the detection of resources with its equipment and under logistical protocols.

[34] Drawing on Bruno Latour's terminology, Bennett defines "an actant can be human or not, or, most likely, a combination of both." In Bennett's view, every-"thing"—plants, animals, objects, forces—participates in the "web" of an ecosystem, and none exist in isolation. This perspective supports the idea that ecology is a nested set of relations: humans and nonhumans alike are interlinked actants shaping each other's existence. Jane Bennet, Vibrant Matter: A Political Ecology of Things, London: Duke University Press, 2010, p.9

shapes both its environment and itself.[35] Not only wars, but disasters and catastrophes are solved within destructive interventions to ecologies which initiates the reconstructions. Logistics, as the dominant form of material management, solves the problems of destructive interventions, both during the crises and their aftermaths. In that, whether in times of crisis or daily duties of transport, infrastructure of logistics is the dominant medium in shaping of the planet.

In such context, logistics is a brittle system that is prone to failure. There is an ecology of destructive and disruptive methods of the distribution infrastructures. It is an ecology which is risk-free, lubricated, mechanized, automatized environments based on measures of efficiency, speed, and rationale. Such re-formulations of the nested relations between habitants of the Earth and its rationalization overcomes the conditions of life by violence.

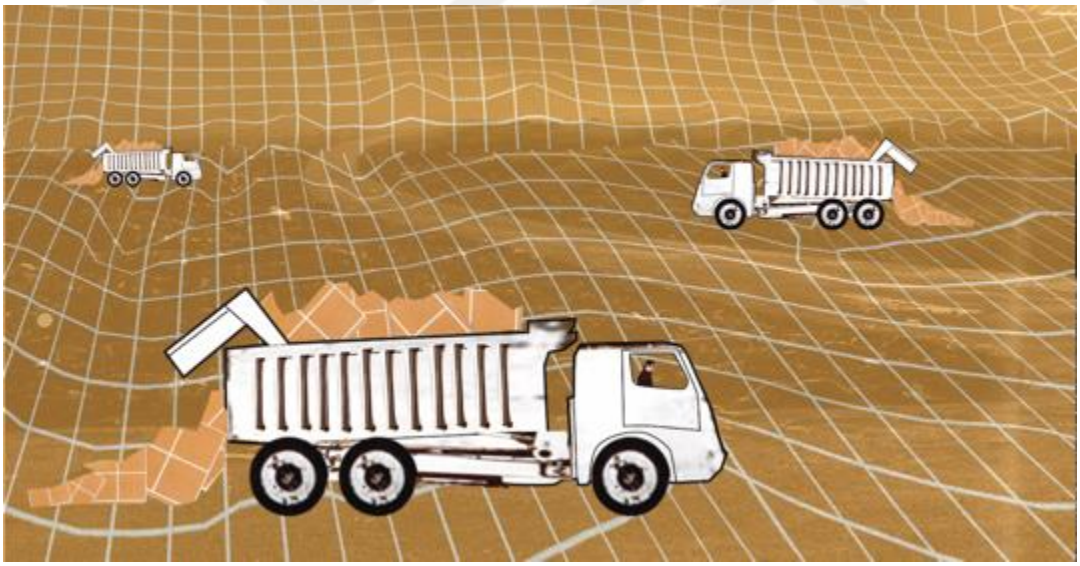


Figure 1.6 A collage showing the distribution of destruction debris by trucks to display both the inventory and its disposition as their extensions. Produced by the author.

[35] Timothy Morton defines "the ecological thought" as "the thinking of interconnectedness." Timothy Morton, The Ecological Though, MA: Harvard University Press, 2012, p.7.

The outcome of logistics is violence. There is a cooperation between the actors and agents of logistics that consolidates integrity and continuity by rationalizing violence. Apart from the crises due to the accidents, forces of the industry regulate the domain of logistics with the violence. Violence in social and ecological registers is changing phenomena from visible, real, and brute to invisible, virtual, and mediated. Destructions due to disasters, wars and in any kind of catastrophic events harbors both social and ecological categorizations of violent logistics. One might argue that logistics is an essential part of *recovery* in the case of a catastrophe. The question is why the early planning of the sector work better than the state-driven systems points out a case for both categories. Profit-driven economy of destruction is the way of sustenance that marks a larger scale, a programmatic problem in the handling and knowing the planet through mobilization of destruction and take the advantage of crises.

On February 6 and 20, 2023, devastating earthquakes struck Türkiye, resulting in more than fifty-thousand deaths, displacing over ten million citizens, and causing the collapse of more than three-hundred-thousand buildings and city-scale infrastructure systems.[36] The disaster is recorded as the most destructive one in the year.[37] The magnitude of the catastrophe, which occurred in a region known for its seismic activity, surpassed even the advances made in building resilience by the country, which large earthquakes had tested in the 2000s[38]. The chaotic nature of the high-energy fault movement, which was not foreseen by the profit-driven policies based

[36] There is an abundance misinformation about the exact numbers of losses and demolished buildings. These approximations will be further discussed in the following parts of the text.
[37] EMDAT Report 2023, 2023 Disasters in Numbers, March 2024. In this report, disasters are related to natural hazards, excluding biological and extra-terrestrial hazards, reported at the country level in Emergency Events Database. Loss of Türkiye (50,783 human lives) is shown as the largest impact in the infographics of EMDAT.
[38] There have been several appropriations in the building codes and regulations after the Earthquakes of 1999. For more: Oktay Ergünay, "1999 Depremleri Afet Mevzuatını Nasıl Değiştirdi: Mevzuat Açısından Neredeyiz," *1. Türkiye Deprem Mühendisliği ve Sismoloji Konferansı*, 2011.

on rapid urbanization, was captured candidly on social media.[39] Despite attempts to control the flow of information during times of such tensions, news of the earthquake spread globally through images and videos of debris and people trapped under the *rubble*.[40] The response to this disaster included aid campaigns organized by social projects and organizations, such as foundations and associations, which served as localized logistics centers for collecting, sorting, and distributing goods to areas in need.[41]



Figure 1.7 Human chains of volunteers during the informal aid efforts. Left: volunteers forming a human chain for the smooth movement of the donated goods during the aid campaign in METU Alumni Association, February 2023. [Taken from: youtube/cengizpamuk Video Credit: Cengiz Pamuk A photo of stacked aids in a sports hall in Ankara] Right: A photo of stacked aids in a sports hall in Ankara. [Taken from: sendika.org]

Stored goods that were still usable for immediate and urgent needs were collected, sorted, packaged, and loaded onto high-capacity vehicles for distribution in affected areas.[42] However, the speed at which these aid efforts addressed the need for shelter,

[39] Yeşim Argın, "Doğal Afetlerde Sosyal Medya Kullanimi: 2023 Kahramanmaraş Depremi Özelinde Twitter Örneği," *İnsanat Sanat Tasarım Ve Mimarlık Araştırmaları Dergisi*, Vol.3, No.1, 2023, p.140-165.

[40] Özlem Songül Abayoğlu, "Deprem sonrası sosyal medyada kısıtlama," Evrensel Gazete, https://www.evrensel.net/haber/481557, 2023, [Accesed on: May 28 2024]

[41] Ozbilgin, M., Erbil, C., Şimşek Demirbağ, K., Demirbağ, "Afet Yönetiminde Sorumluluğun Yeniden İnşası: Deprem, Sosyal Dramalar, Sosyal Politikalar," *Sosyal Mucit Academic Review*, Vol.4, No.1, 2023, p.71-112.

[42] Erdi Mert Türk, "Evaluation of Legislation on Response to 6 February 2023 Earthquake and Intervention of Armed Forces," *Ankara Barosu Dergisi,* Deprem Özel Sayısı, Vol.2, 2023, p.302-323.

security, water, and food cannot be compared to the speed of the reflexes observed in creating new stocks to replace the destroyed structures.[43] During the ongoing process, local associations and partnerships were able to organize major logistics processes informally, transferring materials from hand to hand, while formal state-driven organizations struggled to create a cohesive and effective response due to slow and congested logistics. The informal logistics activity helped many considering both the survivors and outraged public.[44] The earthquake survivors in the affected cities were unable to keep up with the speed at which information was flowing, resulting in a chaotic and disorganized response from the government. This logistical disorganization highlights the political, social, and environmental effects of logistics, urbanization, displacement, and ecological degradation. It took two more months for formal organizations to take control of the area.[45] For more than a year, removal of debris in earthquake-affected cities continue in remote areas with sorting and extrication.[46]



Figure 1.8 A small portion of logistical violence in which uncontrolled donations are left over the roadsides [Taken from: evrensel.net & polemikhaber.com]

[43] ODTÜ Mimarlık Fakültesi Seminerleri: Deprem ve Sonrası, 2023.
[44] Robert Cervero & Aaron Golub, "Informal transport: A global perspective," *Transport Policy*, Vol.14, No.6, 2007, p.445-457.
[45] Şerif Süveydan, "17 Ağustos ve 6 Şubat- Deprem Sonrasında Yaptıklarımız ve Yapamadıklarımız," *Arkitera*, 2023.
[46] This article is one of the first scholarly attempts to depict the quantity of construction waste after the Earthquake. Gamze Doğdu & Seda Nur Alkan, "Management of Post-earthquake Construction and Demolition Waste: 6 February 2023 Kahramanmaraş Earthquake Disasters," *Artvin Coruh University Journal of Engineering and Sciences,* Vol.1, No.1, 2023, p.38-50.

This thesis aims at claiming debris epistemology in architecture by formulizing logistics as the major force of space-making. With debris epistemology, architecture gains an analytical lens that exposes the afterlives of its objects. By foregrounding the logistical life of debris, thesis advances on the architectural knowledge of afterlife which engages with the unresolved tensions in heterogeneities, stabilizations, deferrals, dispersals, forced convergences, cyclic returns, displacements and material entanglements. Debris epistemology shows an architecture that persist beyond the fixed and complete perception of built environment in moments of catastrophe, situating architecture within planetary scales of matter and time. In that, this thesis advances eight interrelated claims. First, logistics acquires a renewed significance when understood as a process governing the production and distribution of built environment, in addition to being the active agent in their disposal. Debris situates logistics as the medium of space-making which disposes not only refused matters but also itself. Second, redefining ecology through its entanglement with logistical operations is necessary to grasp the shifting trajectories of socio-material and environmental events. Debris, as a mobilized object of logistical ecologies, depicts an entrenched methods of making with capacities and processes of mobilization systems. Third, logistics must be situated within its violent means, modes, and outcomes, recognizing the systemic harms embedded in its functioning. Debris is an agent of violence in logistics which showcases the systematization of harm in planetary and local scales. Fourth, reframing debris within the framework of violent logistics offers a critical lens for examining the impacts of a globalized planetary condition. These conditions emerge in local ecologies requiring a multi-modal engagement with logistics providing aid and recovery in problematic areas. Fifth, debris constitutes a waste problem that engages and challenges multiple disciplinary fields. This challenge is a composition of epistemologies that reconfigures debris in the context of space-making. Sixth, repositioning debris as an accumulation of “urban” knowledge reorients disciplines from an external observer’s stance to an embedded, participatory position. Debris, as a complex accumulation, is a reflection of mobilization systems, transforming

through logistics while gathering different materialities and temporalities along the way. Seventh, logistics operates simultaneously within materialities and temporalities, a finding inferred from field observations. Looking at debris as a case of logistical violence, architectural knowledge gains an intersection point where the meaning of relationality changes by adding afterlives of matters. Finally, the inspection of the material, temporal, and scalar dimensions of debris—and its logistical organization during the February 2023 Türkiye-Syria earthquakes—provides a necessary vantage point for understanding the political, social, and ecological interplay of infrastructures.

Thesis follows three major chapters. In that, **Chapter 2** investigates how logistics participates in the reconfiguration of the planet, extending its systems of movement and control into the temporal and material rhythms of cities and ecologies. Framed through the concepts of infrastructure, ecology, and violence, the chapter draws together a body of theoretical and critical literature to reveal the built environment as an inseparable component of global logistical chains, and as a field to exert of violence. The discussion begins by situating infrastructure and logistics within their historical and terminological contexts, emphasizing their military origins and their inherently destructive potential. It then traces the recent transformations in infrastructural theory and practice, forming the critiques that have emerged with the breakdown of idealized infrastructure. These shifts, propelled by revolutionary—or "killer"—technologies, have expanded the scale of logistical operations, moving beyond global connectivity toward planetary-scale interventions that transform ecological systems. In doing so, the chapter develops an ecological reading of logistics, one that links its material and temporal operations to the harm it produces. To bridge the conceptual gap between logistical operations and ecological transformations, the chapter engages with environmental research to conceptualize mobilization as a force capable of reshaping the conduits through planetary ecologies. This framing captures logistics as the material imprint of human onto the Earth's surface, pointing out a distribution mechanism in the pursuit of power. And

its violence reveals an embedded governance mechanism controlling the material and temporal ordering of the planet.

Chapter 3 examines how logistics operates simultaneously as a tool of circulation and as a crisis response, serving as a central mechanism in producing, managing, and obscuring the very conditions of crisis. Framed through the notion of logistical violence, the chapter traces the intertwined dynamics of infrastructure, ecological disruption, and political control, showing how these systems extend their reach into both the material and temporal fabric of post-disaster contexts. It demonstrates how logistical violence not only intervenes in the aftermath of catastrophe but also generates harm, embedding itself in the conditions that make disasters possible. Through the lens of the 2023 Türkiye-Syria Earthquakes, the chapter interrogates how logistical systems reproduce authoritarian control, accelerate ecological degradation, and fragment the knowledge needed for accountability. Particularly within Türkiye's contemporary construction ecology, the chapter demonstrates that the making and unmaking of the built environment are deeply entangled. By shifting the focus from production to include the logistical organization of disposal, it frames debris as both a residue of destruction and an active agent in consolidating power. While doing so, it proposes distinct case studies based on a route following the earthquake's fault line, which later expose four tension points where violence crystallizes. Following the movement of debris across disaster zones, ecological corridors, and contested jurisdictions, the chapter situates logistics at the heart of the violence, revealing how often-invisible operations re-order space, suspend legal protections, and displace responsibility under the guise of emergency management, while leaving enduring imprints on ecologies.

Finally, **Chapter 4** returns to the central outcome of logistical ecologies—violence—and interrogates its "positive" form, concealed beneath claims of technical neutrality. Neutrality, here, is approached as a structural gap between logistical operations and their environments, where knowledge is abstracted, perfected, and disembodied from situated realities. Chapter addresses this gap by

countering neutrality with situated knowledge, positioning the objectives of technoscientific reasoning—precision, smooth coordination, and abstraction—against the embodied particularities of lived conditions. It exposes how logistical reasoning reduces complex, contingent realities into calculable movements by neglecting the ecological, material, and political contexts from which they emerge. Then chapter reframes debris not only as a byproduct of destruction but as a record of violence that collapses distinctions between body, land, and infrastructure. In doing so, it situates debris at the intersection of materialities and temporalities, showing how its mobilization extends beyond disposal to become an active mechanism within globalized planetary transformations. Here, debris emerges as both a waste problem crossing disciplinary boundaries and an accumulation of urban knowledge that shifts disciplinary perspectives from external observation to internal engagement. Finally, chapter takes scale as an epistemological tool to identify the tensions embedded in the conditions of debris, reflecting on post-disaster field records as moments of intensified spatial, material, and political contestation. In doing so, the chapter positions the knowledge of debris as an onto-epistemological extension of architecture—one that resists abstraction by insisting on the material, temporal, and ecological specificities of violence.

CHAPTER 2

DOMAINS OF LOGISTICS: INFRASTRUCTURE AND ECOLOGY

> Let me show you a day in the life of a robot (in an Amazon warehouse) […] here, so how does it work it starts with a collection of thousands of pods containing tens of thousands of inventory items and collection of pack workers on the side of the building. […] whole process began when Mrs. Smith goes to the website order a red t-shirt […] our job becomes find the pod with the red T-shirt that we want to use, match it up with the station, match it up with the robot, and then we hand out a mission to the robot […] to go and fetch that pod, and we ask it to drive in *Manhattan type* North-South-East-West trajectories, and to tunnel underneath the other pods (shelves) as much as possible leaving the *highways* clear for inventory traffic […] to lift the pod just a little bit off the ground so we can carry it and then it will actually step out onto *the local street* […] make its way up to the front of the building where that highway is […] to arrive in the queue in time for the next pick […] supporting the pick worker they reach in pick scan pack […] and now it needs to return to storage […][47]

Inventories in logistical hubs have been under the control of automated systems. The automation systems coordinate the flow of goods within the warehouses while connecting the built environment inside itself. An algorithm of codes interconnect data of human to non-human registers, initiating a choreographed response in the warehouse. In a world where robots respond "in real-time" to external demand, logistics signals for attention. Not because of a robotic uprising through logistical means, but because of the changing paradigm of spatial logics.

[47] Taken script from a talk at WIRED Business Conference, by an officer of Amazon Company, talking about Kiva robots that are instrumental in automatization of the company's warehouses. Reached via: https://kottke.org/12/03/a-day-in-the-life-of-a-warehouse-robot

The quotation illustrates how external infrastructural elements influence the logistical spaces. This influence can be observed with the use of the word “highway” as a connective element to define the centers as emergent spaces of logistics both inside and outside. This hefty coincidence not only mark how logistics captures the notions of making through distribution but also manage the networks by adding an autonomous system to both end of communication and transportation. Local streets, highways, and traffic inside them have long been digitized in a “warehouse” which are captured by logistical imaginaries. Apart from the fact that these automated systems regulate the spaces with a consumption and deposition logic, by turning the rhythms into a tightly managed logistical ballet is orchestrated while distribution. In doing so, they reveal how automated logistics translates the uncertainties of the market in seamless precision.

This chapter asks how logistics has been actively involved in reconfiguring the planet itself. These systems of movement and control extend their reach into lives of cities and ecosystems with changing their temporal and material rhythms. By pursuing the three terms—infrastructure, ecology, and violence, chapter brings together a review of ideas to convey how built environment as an inseparable part of global logistical chains assert violence through the actions of logistics.

The selected reviews enable to point out the issue of logistics as an agent of change in the planet. To do so, the chapter examines the operations, impacts, and conditions that arise from human domination within the planet's material ecologies through their relation to logistics. Firstly, it draws an initial frame around the meaning derived from the terminological exposition of infrastructure and logistics. In parallel with the military connotations associated with these terms, this initial framing highlights their character as inherently destructive. Then, it moves to recent changes in both literature and practices of infrastructure, and their criticism. The critical reflections emerging with the collapse of idealistic infrastructures, the chapter presents a selection of theories that encompass a shift in the changing logistics. Highlighting the shift points out to the changing scale of the logistical operations. Accompanied by the

revolutionary technologies, shift in the practice of logistics, scale of distribution transcends into a global size effecting the planetary flows. To compensate the gap between logistics and ecology, the study focuses on the terms and analyses from environmental research to form a notion of logistics' ability to change ecologies of material and temporal conduits. This framing captures how logistics leave material imprints on the planetary surface as distribution mechanism of power and violence.

Lastly, chapter supports the idea of logistics as a major contributor to the planetary change by adding another definition to its of violence. Critical inquiries into logistics reveal how distribution networks have come to dominate by instrumentalizing an often-invisible form of violence. The optimistic portrayal of logistics as a purely efficient and rational system of mobilization obscures these embedded forms of violence. Moreover, examining these dynamics requires scholarly outlook that will engage with climate change and waste problem, where architecture and logistics have an agency in both.

2.1 Infrastructure and Logistics

The term "infrastructure" is primarily associated with physical networks of exchange, transportation, communication, and utilities. Despite its technical dimension, the term has been appropriated by various disciplines and even became part of the common language in everyday life. The term appears in the early twentieth century defining the inventory of public works of post-war military installations.[48] Transportation facilities, communication centers, power and energy distributors, irrigation, and flood control facilities included in its definition, marked the extent of infrastructures in the systems of built environment. The term logistics, however, has

[48] Post-war military installation after the WWI in the late 1920s. William Batt, "Infrastructure: Etymology and Import," *Journal of Professional Issues in Engineering*, Vol.110, No.1, 1984, p 1–6.

a long history defined to its derivation from the Anciet Greek word *logizomai*, meaning "to calculate, to reckon, to organize rationally."[49] Such connotations are widely attested by the literature of one of whom is the initial critique of Paul Virilio.[50] Since Virilio's encounter with logistics was with military origin, there have been many efforts to frame the systematizations and strategies for organizing goods and troops with the materialization of the built environment. With their connotations to defensive structure and the control of battlefield, it is critical to examine these terms with their destructive implications. Newer logics of control over space with calculation, automation, communication and distribution, the processes of mobilization, shows a relation between movement with strategies and their infrastructure has been evolving since antiquity.

We can focus on two different approaches to trace the early relationship between logistics and its destructive imperatives on space and infrastructure. Firstly, Marullo emphasizes that "De Architectura" by Vitruvius outlining the key principles of Roman architecture as a source of the first theoretical link between logistics and the built environment. Marrulo frames his outlook from the Vitruvius' city planning principles in Rome which are carried into the fifteenth century by the discovery of the De Architectura. For him, Dürer and Serlio, two canonic figures of architecture from fifteenth century, applied military planning techniques from Vitruvius' work to urban design, preparing the ground for a shift in planning concepts. Marullo notes that cities in the fifteenth century cities utilized under the term *distributione* which is the controlled circulations of people and energy. With *distributione*, becoming a matter of spatial calculation, the built environment started to reflect "logistical" reasoning as a core organizational method.[51] Secondly, Aureli's exposition of

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[49] Negar Sanaan Bensi & Francesco Marullo, Introduction, Architecture of Logistics: Trajectories Across the Dismembered Body of Metropolis, Footprint, Vol.23, p 1-6.
[50] Paul Virilio, Speed and Politics, 1969.
[51] The title of Marullo's article is a reference to Gideon's Mechanization Takes Command, from which we can endure the discussion by drawing a frame which includes mechanization processes and their effect on architecture of logistics. After the historiography Gideon provides, these effects de-

Roman and Greek cities offers a different lens, providing the infrastructural control over built environment. [52] Aureli marks that Roman cities were shaped by the *lex*—the Roman legal system, which enabled expansion by extending both law and infrastructure simultaneously. Greek cities, on the other hand, followed the concept of *nomos*, which defined spatial boundaries and imposed limits of inclusion. For the author, while Roman cities expand limitlessly with *urbs*, Greek cities conflate its parts by creating spatial and dismissive boundaries. These differences show two types of spatial and statutory infrastructures where one integrates outward, while the other bounded and separating. Aureli highlights two contrasting infrastructural strategy which suggest distinct modalities between the distribution of energy and the organization of habitation. He proposes Greek *oikonomike*, or household management, as the distinction between public and private spaces, Roman *lex* and *civitas* extend this into a separation between political administration and economic management of the city. Marullo's and Aureli's expositions of cities in their developing distributional shift and changing understanding to control lay a groundwork to the modern strategies where the distinction between outside and inside has collapsed.

Today, logistics is a governing force in shaping the growth, connection, and ultimately functioning of the cities with the aid of large networks. These networks determine what gets built, who gets included, and where things move, sustaining the strategic concerns of global governance. The foundations of modern logistical thought are deeply embedded in military history, where the imperative of mobilization emerged as a strategic concern. Long before these theoretical articulations, the Roman army institutionalized the logistical function through the

humanizes the territories of logistics as in docks, data centers, etc. Francesco Marullo, *Logistics Takes Command,* Log 35 (Fall), 2015, p.104.

[52] Pier Vittorio Aureli, The Possibility of Absolute Architecture, Cambridge: MIT Press, 2011, p 5.

role of the *logista*, an official responsible for managing the army.[53] The commanders of logistics operated as the silent engine behind the empire's expansive campaigns, embedding reasoning into the very fabric of imperial mobilization. The Roman state developed a complex logistical system that enabled sustained military campaigns across vast territories. This system relied on state-planned provisioning, infrastructure (roads, depots, ports), and legal frameworks, all designed to support the army.

Such executions of imperial mobilization can also be seen in the Ottoman military system. Ottoman logistics was embedded in statecraft, provisioning both civil society and the military, especially during crisis periods. Institutions like the *Nüzul Emaneti* (Logistics Trust) mirror the Roman emphasis on an existing bureaucratic organization.[54] Logistics was not only a matter of provisioning but a complex exercise in calculation and infrastructural coordination. Long-distance campaigns required the precise management of supply chains, necessitating the optimization of *anbar* (warehouses) and logistical nodes along the anticipated routes of movement. The advance of the army was designated on a network of storage depots, caravanserais, and road systems that were carefully mapped and maintained to ensure a continuous flow. These conduits were not left to improvisation; instead, detailed surveys and calculations were made in advance to determine the quantities. The Ottoman supply chain organized a vast capacity of items, including food,

[53] Logista for Jonathan P. Roth, "the commander administered the various tactical aspects of logistics. "There were routine procedures but "the commander had to specifically order and organize foraging for provisions, the *frumentatio.*" Jonathan P. Roth, The Logistics of Roman Army at War, Boston: Brill, 1999. p.244-256.

[54] Erkal argues that Istanbul's early modern state granaries were more than storage buildings—they were material manifestations of state power, infrastructural rationality, and urban resilience. Their architecture combined tradition and innovation, adapting over time to the city's evolving needs and reflecting the complex interplay of empire, logistics, and architecture. For more about Kilar Emaneti, Arpa Anbarı Emaneti, and Buğday Emaneti, see: Namık Günay Erkal, "Reserved Abundance: State Granaries of Early Modern Istanbul," *Journal of The Society of Architectural Historians*, Vol.79, No.1, 2020, p.17-38.

ammunition, shelter, and animal feed, calculated in quantities and stored at rest points to match the rhythm of the marching army.

Centuries later, Antoine-Henri Jomini advanced this idea by framing *logistique* as a precise and disciplinary approach rooted in calculation.[55] For Jomini, logistics was the science of movement, a rational system for managing the deployment and provisioning of armies through pre-established routes and geometric reasoning. In this formulation, war became not only a matter of strategy but also of efficient flow—a vision that closely aligned with Enlightenment ideals of order and measurability. In the early nineteenth century, Carl von Clausewitz recognized the significance of movement and supply within the broader, unpredictable context of war.[56] Although he did not formalize logistics as a distinct discipline, he recognized that sustaining military force across time and terrain required organizational foresight, infrastructural planning, and material coordination. These genealogies mark the transition of logistics from a practical necessity to a formalized regime of calculation. The logic of movement and control continues to shape conceptual approaches, raising practical issues that eventually lead to the appropriation of logistics as a civilian measure.

Logistics is often undermined as a conceptual tool in the formation and functioning of infrastructures. Although they have no hierarchical relationship, especially in terms of the human and non-human dispositions in crises, both terms provide allegories, figure-ground relationships, and imaginative extensions for semiotic possibilities within everyday life. While infrastructure provides an operational basis for practice, the use of the term logistics implies the calculation of movement within the basis. Therefore, it is crucial to clarify the manifold meanings of the term. In that, both terms differ according to their physical objects. This physicality of disposition

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[55]Antoine Henri de Jomini, The Art of War. trans. by G.H. Mendell and W.P. Craighill. Philadelphia: J.B. Lippincott & Co., 1862.
[56] Carl von Clausewitz. On War, ed. and trans. by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976.

help resolve the layers that logistics intervene with infrastructure as distinct, yet interconnected disciplines.

The disciplinary boundaries of logistics are delimited by external relations to the fields, which take "logistics" either to their center or one of its multiple focal points.[57] On the one hand, urban planning practices, economic and financial efficiency concerns, technological innovations, institutional mechanisms, diplomatic relations, and warfare heavily depend on logistical achievements. These fields describe logistics with idealistic and purely utilitarian conceptualizations. On the other hand, theories from philosophy, culture, sociology, political geography, and architecture counter such problematizations with the vague condition of flows, degradation of spatialities, fragilities, and domination of networks.[58]

Physical objects are often assumed to be part of a technicity problem, for which various kinds of engineering solutions are proposed in the name of utility and comfort. There is a spatial work between the underlying principles of making and the interface of this system of utilization, to the point that neither logistics nor infrastructure signifies a material construction and organization without the other. In her book, Extrastatecraft, Keller Easterling marks this mutuality by stating;

> Infrastructure space is a form, but not like a building is a form; it is an updating platform unfolding in time to handle new circumstances, encoding the relationships between buildings, or dictating logistics. There are object forms like buildings and active forms like bits of code in the software that organizes building. Information resides in the, often undeclared, activities of this software —the protocols, routines, schedules, and choices it manifests in space. McLuhan's meme, transposed to infrastructure space, might be: the action is the form.[59]

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[57] Neil R. Southern, "Historical Perspective of the Logistics and Supply Chain Management Discipline." *Transportation Journal,* Vol.50, No.1, 2011, p.53–64.
[58] For critiques emerging from political geography, cultural theory, and architecture that highlight the uneven, infrastructural, and often violent dimensions of logistical flows, see Deborah Cowen, The Deadly Life of Logistics; Keller Easterling, Extrastatecraft; and Brian Larkin, "The Politics and Poetics of Infrastructure," *Annual Review of Anthropology,* Vol.42, 2013, p.327–343.
[59] Keller Easterling, Extrastatecraft, p.10.

For Easterling, infrastructure doesn't just support buildings but it organizes them by determining how they're connected, placed, and accessed. Infrastructure also dictates logistics, such as the flow of goods, labor, and data as logistics does the same. In this way, infrastructure becomes a hidden but powerful spatial script. Referring to Marshall McLuhan's idea that "the medium is the message," Easterling suggests that in infrastructure, what infrastructure does (its action) is what defines its form. The effect, operation, and influence of infrastructure is its most important attribute—not its physical appearance. However, together—logistics and its infrastructure—refer to an organization that is distributed between the principles to the interactions where terms gain agency to manipulate disciplines and systems of thought.[60] Since they are not isolated from each other, both in the physical and systemic sense, logistics and infrastructures do not behave autonomously. Instead, they inform, manipulate, and disrupt each other, as well as their environment. The appropriation of the concepts allows us to expand this discussion into the theorization of how mobilization change the built environment. Moreover, concepts depict a discursive character despite their mere practical dimensions. This practicality, subsequently, calls for critical engagements with design-related disciplinary outlooks.

In the book "Learning from Logistics," Clare Lyster presents a framework for logistics that incorporates genres of design. She lists the tendencies as "the analysis of corporate logistical systems, […] investigations of the infrastructure, […] indexing the landscapes of logistics."[61] She claims that such tendencies serve as a ground to bring out "the chance to use logistics to articulate a comprehensive research position vis-à-vis design and urbanization."[62] Introducing logistics as a disciplinary challenge to architecture and urbanism logistics disturbs the focus on

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[60] Stan Allen, Infrastructure Urbanism, Points + Lines, 1999, p. 49. James Corner, Terra Fluxus, *Landscape Urbanism Reader,* ed. by Charles Waldheim, Princeton Architectural Press, 2006, p. 31.
[61] Clare Lyster. Learning from Logistics: How Networks Change Our Cities. Basel: Birkhäuser, 2016, p.12-15.
[62] Clare Lyster, Learning from Logistic. p.10.

place, form, and permanence, by privileging movement, speed, and efficiency. This inversion disrupts the spatial logic of the city by emphasizing flows over stasis, and networked systems over bounded sites. Lyster frames logistics as a networked mode of operation that exceeds traditional architectural and urban practices, revealing new forms of spatial production shaped by circulation, computation, and standardization, which redefines it as a new spatial regime.

Apart from the studies that emblemize logistics as a form of intelligence, its engagement with corporate infrastructure has become a rising phenomenon. Twilley's analysis highlights how logistical infrastructures serve as extended sensory systems for corporate control over perishable goods, Richmond's examination of the hyper-commercial and entertainment-driven developments in Los Angeles and LeCavalier's investigations into Walmart's logistical infrastructure complement this perspective.[63] Some studies encompass types with Waldheim and Berger, structures and aesthetics with Fischli, and operations with Bélanger.[64] Drawing on the discursive engagements of design studies with logistics, the critical literature necessitates a closer examination of infrastructures as an evolving concept. Therefore, historical accounts of infrastructure collapse provide insights that inform the discourse around logistics and offer the first hints of its disciplinary boundaries.

The infrastructure is initially problematized within the realm of engineers. As in 1928, the *Congrès Internationaux d'Architecture Moderne* (CIAM), twentieth century engineers have witnessed a discourse of calculation, rationalization, and

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[63] Nicola Twilley, "The Coldscape," Logistics, *Cabinet,* Vol.47, 2012, p.78–84. Deborah Richmond, "Consumers Gone Wild," *Infrastructural City: Networked Ecologies in Los Angeles*, ed. Kazys Varnelis, Barcelona: Actar, 2009, p.208–219.

[64] Charles Waldheim & Alan Berger, "Logistics Landscape*," Landscape Journal*, Vol.27, 2008, p.226. Pierre Bélanger, and Alexander Arroyo, Ecologies of Power: Countermapping the Logistical Landscapes and Military Geographies of the U.S. Department of Defense. Cambridge, MA: MIT Press, 2016. Nils Olsen, Ian Chin, Tomáš Říha, and Karolína Frejlachová. "On Logistics Landscapes." *Canadian Centre for Architecture*, Vol.23, 2020. https://www.cca.qc.ca/en/articles/87563/on-logistics-landscapes

standardization imposed on the conception and realization of cities.[65] In Splintering Urbanism, Stephen Graham and Simone Marvin describe the period from the mid-nineteenth to the mid-twentieth century as one of infrastructural domination.[66] Throughout the end of the nineteenth century, referring to Pascal Preston's analyses of Britain, authors depicted the infrastructural developments as juxtapositions of standardized networking elements that connect fragmented islands of cities. For the authors, the ideals of modern infrastructures are based on "the positive transformative powers of modern science and networked technologies," "the standardized, (and) compartmentalized notions of space and time," and "the abstract Cartesian understanding of space (and cities)."[67] Likewise, Banham suggested that urban planning practices were supported by the rational and scientific knowledge, as well as the machinic aesthetics, of modernity.[68] The hygiene reforms transforming public spaces into an opaque and homogeneous environment can be considered one of the most discussed examples of modernist idealism in urban planning.[69] As far as grid plans becoming the norm in North American cities, cases such as Barcelona propels a notion of the city without limits.[70] Projections of Ebenezer Howard with garden cities and Frank Lloyd Wright with Broadacre City model sets exemplary projections of similar infrastructural planning of harmony, order, and coherence.[71] The spatial practices of Modernist ideals of production, as well as Fordist and Taylorist modes, during the postwar reconstruction period provided an imaginative

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[65] Katrina Stroll & Scott Lloyd, Performance as Form, Infrastructure as Architecture, p 4. The book tries to redraw the boundaries of infrastructures by compiling practices of urban design and architectures from different regions in addition to theoretical dispositions by several authors. For more, *La Sarraz Declaration* by CIAM, 1928.

[66] Stephen Graham & Simone Marvin, Splintering Urbanism: Networked Infrastructure, Technological Mobilities and The Urban Condition, Routledge, London, 2001.

[67] Graham and Marvin, Splintering Urbanism, p.42.

[68] Reyner Banham, Theory and Design in The First Machine Age, NY: Praeger Publishers,1960, p.23-35.

[69] Beatriz Colomina, X-Ray Architectur. Zürich: Lars Müller Publishers, 2019, p.42.

[70] Pier Vittorio Aureli, The Possibility of Absolute Architecture, p.1-47.

[71] Robert Fishman, "Metropolis unbound: the new city of the twentieth century", *Flux,* Spring, 1990, p.43-55.

framework for these practices.[72] As these idealistic notions were exported to developing cities in the construction of national identities, global integration came under criticism by the mid-twentieth century.

The preceding discussion demonstrates how logistics and infrastructure have historically co-evolved through military, urban, and disciplinary systems. Together they shape the built environment with a calculative and organizational logic. This convergence is visible in strategic mobilizations, city planning doctrines, and the shifting boundaries between movement and stability. The conceptual ground that we are working on requires for understanding infrastructure and logistics as more than technical substrates of comfort. As idealized infrastructural visions began to deteriorate by the mid-to-late twentieth century, particularly in the wake of North American urban crises, the collapse of modernist planning paradigms prompted a broader disciplinary examination. Here, infrastructure became a medium of socio-political and spatial operation, both as a material system and a platform for control. The multifaceted critiques that depend on how military and urban emerge under infrastructure and logistics highlight how their convergence encode the operational logic of mobilization networks. Aforementioned contributions provide a notion infrastructure as a programmable medium, revealing a site where logistics manages future possibilities. This shift situates logistics not only as a technical concern but as a critical lens through which infrastructure is now understood across multiple disciplines.

[72] Graham and Marvin, Splintering Urbanism, p.66-68.

2.1.1 Collapse of Infrastructures

Much of the criticism was generated worldwide, particularly after the 1970s.[73] The cities in North America are among the most publicized cases of crisis in terms of the physical decay of transportation, water, and sewage systems.[74] Such paradigmatic shifts in the planning discourse reveal the infrastructures of socio-cultural movements towards oppressive governments and the environmental consequences of car culture. Defragmentation and multiplication of city centers and networks under expansionist regimes lead to disputes among geographies. Eventually, the economic stress during the Cold War can be attributed to the pressuring notions behind the collapse of infrastructures.[75]

Following the collapse of idealisms, several studies have influenced the trajectories of disciplines by their perspective of infrastructures. Criticism following the collapse of modern, ideal, and hygienic layouts exposed a complex combination of disciplinary outlooks. By then, infrastructure has been an essential topic for anthropology, planning, architecture, economics, politics, finance, sociology, and history. Among those critical perspectives, depicting infrastructure as the medium of urban operation is a prominent one in understanding the role of logistics. Urban infrastructures can be understood as connective networks that function through mediums establishing the formats and rules of space-making. These infrastructures do not merely support physical development; they encode temporal and spatial interrelations that define the limits of what can operate, circulate, or emerge within a given environment. [76] As such, they are not passive backdrops but active systems

[73] Graham and Marvin, Splintering Urbanism, p.92.
[74] Graham and Marvin, Splintering Urbanism, p.93.
[75] Graham and Marvin, Splintering Urbanism, p.36.
[76] Keller Easterling, Extrastatecraft, p.11.

that organize, regulate, and extract power through their embedded protocols and operational frameworks. Stan Allen marks,

> Urban infrastructure saws the seeds for future possibility, staging the ground for both uncertainty and promise. The preparation of surfaces for future surface construction. It is more strategic, emphasizing means over ends, and operational logic over compositional design.[77]

The operational logic of urban infrastructure, as seen with Allen, can be inferred as the medium for creating conditions. His redefinition positions infrastructure as an active, temporal agent shaping urban futures. By contrasting "means over ends" and "operational logic over compositional design," the quotation distinguishes infrastructure from traditional concerns with form to a strategic function and sustenance over time. Infrastructure as a medium of operation values adaptability, performance, and process, marking the principles of system-oriented logic.

The two important notes on infrastructure bring together a definition of logistical means of operation from Allen and Easterling. Their separate works highlight the core element of criticism of idealized infrastructure by bringing out its embedded operational logic—revealing how infrastructure functions less as a static form and more as a dynamic system of organization, circulation, and control that conditions future spatial and material outcomes. The concepts of surface and medium reveal a shared understanding of infrastructure as an active system that assembles, records, distributes, and organizes spatial conditions to shape and anticipate future developments. In both senses, infrastructure can be determined as a critical engagement that emerges as the means of operation and the interface of underlying principles and calculations. The scope of these studies encompasses the analysis of material mobilization within the discipline of logistics.

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[77] Stan Allen, Points + Lines, p.31.

2.1.2 Shift in Definitions

Research on logistics as a technical object has primarily emerged within the domain of science and technology studies, driven by its capacity to organize systems of communication, comfort, security, and exchange. Over time, logistics has evolved from a function of material coordination into a comprehensive mode of governing movement and infrastructure. This transformation is deeply tied to advances in digital technologies—including the Internet, social media platforms, electronic banking, surveillance systems, and e-commerce. These advancements have restructured everyday urban life through both virtual interfaces and physical instruments with credit cards, ATMs, mobile phones, security cameras, and shipping containers. These technological developments have increased the complexity of infrastructures altering the meaning of logistics to a logic of spatial and temporal organization.

Alex Roland's discussion on the emergence of the stirrup helps illustrate the role of technology in organizing movement. Roland asserts that the reconfiguration of production and control systems was determined by the invention of new horse-riding equipment, the stirrup, in Frank territory.[78] This assertion portrays the stirrup as a device that facilitated the shift towards the feudal system in Europe. The stirrup functions as an infrastructural element by redefining the relational surface between bodies. Drawing on the endurance of the carrier animals, it becomes a logistical technology—one that enables both speed and comfort, effectively transforming mobilization into an organized infrastructure.

A comparable example in terms of how components are configured can be found in Pierre Bélanger's work. Bélanger mentions the chemical study of asphalt by Edward

[78] Alex Roland, "Once More into the Stirrups," *Technology and Culture*, Vol.44, No.3, 2003, p 574-585.

de Smedt as having a revolutionary effect on road construction.[79] The chemical study of asphalt enabled transportation infrastructure to spread more efficiently by achieving less friction and resulting in decreased energy loss. Less friction and seamless distribution enabled higher capacities of control. In White's example, the invention of the stirrup represents a discovery at the biological level, while in Bélanger's case, the shift occurs through chemical innovations—indicating a change in scale. The altered mobilization capacities brought about by the new relationship between human and horse bodies, as well as the transformation of durability through the interaction between road materials and weather conditions, reveal a shared logic. Beneath all of this lies the shaping of logistical activity through the transformation of technological devices.[80] While the stirrup secured distance through bodily control, the chemistry of the roads ensured the security of that distance. It is not necessary to reconcile these two seemingly distant examples; instead, they allow us to grasp the impact of the shifts occurring within logistical and infrastructural organizations. More recent technological developments, however, present a transformative effect on infrastructures, impacting logistics simultaneously across multiple dimensions.

Charles Fine's analysis of computer hardware markets presents a valuable opportunity for the investigation of these dimensions. Although his work falls short of providing a comprehensive critique, it offers insights that help understand the recent techno-political shifts in logistics. The global scale of telecommunication infrastructure has developed industries with what Charles Fine would call “high clockspeed.” The concept of clockspeed describes the speed at which businesses can launch new goods and technologies and adjust the fluctuations in the hardware market.[81] His cases of IBM, Intel, and Microsoft show the changing organizational

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[79] Pierre Bélanger, “Synthetic Surfaces,” *The Landscape Urbanism Reader*, ed. by Charles Waldheim, NY: Princeton Architectural Press, 2006, p 244-246.
[80] Georgeen Theodore, ″Visualizing Infrastructure,” *Infrastructure as Architecture: Designing Composite Networks*, ed. by Katrina Stoll & Scott Lloyd, Jovis, 2010, p.62.
[81] Charles H. Fine, Clockspeed: Winning Industry Control in the Age of Temporary Advantage, Perseus Books, 1998, p.45, 71.

structures of supply chains. The author suggests that strategy designers should focus on identifying weak links within organizational structures. Supply-chain design as a way to commercialize the "killer" technologies in the computer market marks the evolving paradigms of the logistical revolution.[82] Fine asserts the idea of a logistical organization in which the speed of calculations plays a central role in the flow of materials and information. A revolutionary moment for Fine occurs in a high-clock-speed environment, where competition and innovation are simultaneously high. Learning from his analysis, it is visible that the change in the distribution systems stems from the capacity to process and distribute larger amounts of data. The aid of computer technologies increased the volumes of material that is in circulation. Virilio, renowned for his earlier works that anticipated this most recent development, describes this shift in depth.

Virilio's exposition of speed as a means of deploying power is a crucial point to understand the logic of speed in logistics. His study of "dromos"[83] extends the understanding of urban as the "smooth surface" of exchange.[84] His "study and analysis of the increasing speed of transport and communications on the development of land-use"[85] forms an understanding of urbanization governed by logistics.[86] Virilio's writings position logistics as a process of degradation by its capacity to enable speed and control. In *Speed and Politics*, Virilio frames logistics as a non-neutral system that is inseparable from its spatial context. Logistics, in this

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[82]The term is often used in the context of high-tech industries such as semiconductors, telecommunications, and information technology, where the pace of technological change is particularly fast. used to describe a technology that can disrupt or change an industry in a significant way. It is often associated with a new product or service that is significantly superior to existing ones, and as a result, it can quickly capture market share and make existing products or services obsolete.
[83] Dromos (δρόμος) means “racecourse” in Greek
[84] Paul Virilio, Speed and Politics, trans. by Mark Polizotti, MIT Press, 2006, p.65.
[85] Paul Virilio & Architecture Principe, *M Documents 3: The Function of the Oblique*, Architectural Association, 1996, p.13.
[86] Benjamin H. Bratton, Logistics of Habitable Circulation: A brief introduction to the 2006 edition of Speed and Politics*, Speed and Politics* by Paul Virilio, trans. by Mark Polizotti, MIT Press, 2006, p.12.

sense, abstracts movement from the spaces that are connected by its infrastructure. Stripping logistics out of spatiality has turned its spaces into an optimized technicality. The warehouse, the highway, the port, and the fiber-optic cable all become instruments in a regime where speed is a form of power. Logistical space is flattened into a surface of circulation. For Virilio, this is not just a transformation of infrastructure but a paradigmatic shift—a regime of motion where speed becomes the dominant metric of value. In logistics, Virilio sees the ultimate expression of a world governed by instrumental rationality, in which movement is no longer lived but calculated.[87] Movement is no longer about travel or encounters but about calculation.

Calculations of speeds connect infrastructures and logistics in a domain where they co-constitute the built environment. This condition is visible with the emergence of rapid information exchange, which implies a "revolution" in logistical activity in the late twentieth century.[88] The first shift occurred with the opportunity created with media technologies, resulting in a consumption-based industrial production. A second shift is marked with the emergence of automation technologies with which the industry deployed mass-production techniques. Finally, global trade routes have led to an industry of manufacturing. Logistics has gained the utmost importance led by information technologies.

The overlapping of communication and transportation infrastructures in the 1990s provided a new framework for logistics to operate within.[89] As urban infrastructures mediate the distribution of materials, information technologies help prioritize a

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[87] Virilio, Speed and Politics, p.52.
[88] A series of works can be listed to summarize the implications of a logistical revolution briefly. See Peter Bolstroff & Robert Rosenbaum, Supply Chain Excellence, American Management Association, 2003. Donald J. Bowersox, David J. Closs & Bixby Cooper, Supply chain Logistics Management, McGraw-Hill, 2002. Michael Hugos, Essentials of Supply Chain Management, John Wiley, 2003. Among those books, Joseph Roussel's and Shoshanah Cohen's Strategic Supply Chain Management is the one that profoundly implies a change of culture and logistics.
[89] Phina Ohana Plaut, "Do Telecommunications make Transportation Obsolete," *The Cybercities Reader* ed. by Stephen Graham, 2004, p.162-66.

system that controls their speeds. The ability to conduct logistical calculations at high speeds has also triggered the discovery of incremental velocities. This condition has simultaneously accelerated the development of computational technologies, the flow of information, the volume of circulating materials, and the intensification of regime-driven control over spaces.

Bonacich and Wilson define the revolution of logistics by emphasizing the "chronic problem of the capitalist system, the disjuncture between production and distribution." They mark "the logistics revolution" as an "attempt to bridge the gap between supply and demand more effectively."[90] Their claim aligns with a shift in logistics that gives rise to emergent spatial configurations. Logistics, as a spatiotemporal practice, connects spaces, cities, territories, and environments. With its immanent connection to infrastructure, logistics provides the internal dynamics of spaces that are efficient and smooth. On the one hand, logistics intervenes with physical layers of infrastructures, connecting and distributing material and information. On the other, it sustains an ecology of operations.

2.2 Ecology of Logistics[91]

Ecology is the study of the relations between organisms and their environment. The term displays a relational ground where biotic and abiotic “things” simultaneously becoming the environment and the actor in complex relationalities. The term emerges with the Ernst Haeckel’s introduction from biology to convey the logic of *oikos*.[92] Its original conception, ecology is derived from the Greek word oikos,

[90] Edna Bonacich & Jake B Wilson, Getting the Goods: Ports, Labor, and the Logistics Revolution, Cornell University Press, 2008, p.5.
[91] This is coined in the seminar, “Ecology of Logistics” in June 2 2023. Presenters, Dr. Negar Sanaan Bensi with “Infrastructural Space: Between Biosphere and Technosphere,” Dr. Hamed Khosravi with “The Aesthetics and Politics of Logistics,” Gökçe Önal with “Image Operations of Extraction,” and I with “Mediums of Logistical Violence: Architecture of Debris” contributed to the seminar.
[92] Remember the oikos in *oikonomike* in Aureli. Ernts Haeckel says “By ecology, we mean the whole science of the relations of the organism to the surrounding external world, in which we include, in a

meaning place to live, combined with *-logy*, study or discourse. This etymology positions ecology as fundamental the study of the relationships between organisms and their environment internalizing the conditions that constitute their *habitat* to the *habitants*.

Understanding ecology as the study of the relations between organisms and their environments foregrounds a mode of thinking rooted in interdependence, co-constitution, and embeddedness. The Ecological Society of America defines ecology as "the study of relationships between living organisms, including humans, and their physical environment," emphasizing the interdependence of organisms and surroundings.[93] Ecologist Barry Commoner captures this principle in his "First Law of Ecology:" "Everything is connected to everything else," describing nature's complex, interconnected web of life.[94] These relations are not linear nor hierarchical, but dynamic exchanges between biotic and abiotic elements, where boundaries between actors and environments are continually negotiated.[95] Thinkers like Gregory Bateson and Félix Guattari have advocated a broad relational understanding of ecology across domains. Bateson argued that "the unit of survival is a flexible organism-in-its-environment," stressing that an organism is inseparable from its environment and mutually co-constituted with it.[96] Guattari, in "The Three Ecologies," similarly proposed an "ecosophy" linking environmental, social, and mental ecologies into a relational framework, extending ecological thinking beyond biology and into culture and consciousness. This approach treats space, flow, and connectivity across disciplines, whether in natural ecosystems or social systems,

broader sense, all the conditions of existence." Ernst Haeckel, Generelle Morphologie der Organismen, Vol.2, Berlin: Georg Reimer, 1866.

[93] Ecological Society of America, "What Is Ecology?" https://www.esa.org/about/what-does-ecology-have-to-do-with-me [Accessed on: June 29 2025]

[94] Barry Commoner, The Closing Circle: Nature, Man, and Technology, NY: Alfred A. Knopf, 1971, p.33.

[95] Timothy Morton, The Ecological Thought, MA: Harvard University Press, 2010, p.28–35.

[96] Gregory Bateson, Steps to an Ecology of Mind, Chicago: University of Chicago Press, 1972, p.457

highlighting an ontology of interrelation.[97] These relational ontologies position ecology not only as a biological framework but as a conceptual structure applicable across disciplines that associate with spatial organization, flow, and interconnection.

Critical logistics research shows that global supply chains form extensive networks of circulation and infrastructure that actively reshape geographies.[98] These logistical networks create what some scholars call "operational landscapes"–zones of transit, resource extraction, and control (e.g. ports, pipelines, rail corridors) that structure how goods (and people) move.[99] In doing so, logistics networks don't just traverse environments. They produce their own environments, reordering natural and built spaces into interconnected circulation systems.[100]

Modern logistics, thus, reconfigures spatial relations by accelerating connectivity while simultaneously enforcing new exclusions. In Manuel Castells's terms, the high-speed "space of flows" of information and goods links together valuable nodes globally, but can bypass or marginalize those deemed less relevant – a process of inclusion and exclusion built into network dynamics.[101] When extended into the domain of logistics, this ecological lens reveals how logistical systems themselves constitute relational environments—networks of circulation, extraction, and control that reshape both natural and built ecologies. In this context, logistics does not merely move goods; it reconfigures spatial relations and infrastructural habitats, producing new ecological conditions through speed, connectivity, and exclusion. To

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[97] Félix Guattari, The Three Ecologies, trans. Ian Pindar and Paul Sutton, London: Continuum, 2000, p.27–34.
[98] Cowen, The Deadly Life of Logistics, p.30-43.
[99] This reference uses the logistical ecology as a terminology to refer landscapes of logistics. This relatively short text opens up a discussion in critical logistics discourse, yet does not provide the theoretical background to how ecologies sustain and change with mobilization networks. For more: Conor O'Shea, Luke Hegeman, and Chris Bennett, "Logistical Ecologies of the North American Operational Landscape," web log, *Mas Context (blog)*, 2015. https://mascontext.com/issues/hidden/logistical-ecologies-of-the-north-american-operational-landscape [Accessed on: May 14 2025]
[100] Donald Weber, Published Doctorate Thesis, "The Bureau of Operational Landscapes," Leiden University, 2024.
[101] Manuel Castells, The Rise of the Network Society, MA: Blackwell, 1996, p.440–48.

articulate a concept of logistical ecology, it is thus necessary to trace how these engineered systems of distribution organize their own relational fields—how they create, manage, and delimit environments through infrastructural operations. In effect, the drive for speed and seamless connectivity in logistical systems produces uneven geographies and new ecological conditions. Hyper-connected hubs and corridors on one hand, and excluded peripheries on the other transforms both the natural environment and human settlements through a logistical imperative.

Ecology, with such connotations, is inherently linked to infrastructure, urban studies, waste, architecture, and logistics. Logistics, by establishing a network of interrelations and forming its ecological system, also imposes standardized approaches on the physical realities it excludes—thus producing ecological effects. Starting from the claim that ecology, as a science emerging to comprehend relationality, has transformed the understanding of space in a globalizing world. Then, it becomes essential to explore how logistics alters the spatiality of ecology in order to develop a more precise definition.

One helpful starting point is to list the spaces logistics engages with—spaces whose impact intensifies incrementally through technological change in infrastructural systems. Foremost among these spaces are the operational nodes of logistics, including warehouses, logistics hubs, ports, distribution centers, and headquarters. Based on the urbanization dynamics outlined in infrastructure literature, it is possible to extend the spatial reach of logistics from these controlled points of distribution to cities, landscapes, and, ultimately, the planet itself.

Studies on logistics and spatiality appear to have firmly established its relationship with the built environment. These works, for the most part, tend to posit a fixed relationship between space and its inhabitants. The studies referenced in the earlier sections of this text can also be included within this tendency.[102] However, a dynamic

[102] A list of studies can be added. Dana Cuff, Architecture as Public Work on infrastructural role of public spaces; Urban Think Tank, Alfredo Brillembourg, Hubert Klumper, *Slum Lifting: For*

configuration emerges from the relationship that logistics establishes with infrastructure—and that infrastructure, in turn, establishes with space. This dynamic allows us to speak of an ecological logic embedded within space-making practices shaped by logistical infrastructures. While the preceding section of this text focused on the immanent entanglement of infrastructure and logistics, the following section shifts attention to spatial readings that arise when this immanence is approached through an ecological framework.

Developing a concept of logistical ecology requires mapping how distribution infrastructures actively create and regulate environments through their operations. For example, large inland ports and freight corridors in formerly rural regions illustrate logistics organizing its own relational field: standardizing landscapes for efficiency (wide roads, rail yards, warehouses) while overriding local ecosystems and land uses. These engineered hinterlands become distinct urban environments in themselves, where global supply chains collide with local ecologies to form novel hybrid systems. With that, logistical networks manage space and its making by routing flows, concentrating facilities, excluding disruptions. In short, these ecologies show how logistical infrastructure delineates and governs its own environment. Studying these processes across the sites of how mobilization networks exert its conditions—in the harshest ways—reveals the emergent logistical ecologies with a patterned, system-level environments that its operations continuously produce and modulate.

Architecture as Infrastructure on infrastructure of slums in relation to urban; Geoffrey Thün & Kathy Velikov, *Conduit Urbanism: Retooling Regional Ecologies of Energy and Mobility* a proposal about diminishing the environmental effects highway corridors; Alexender D'Hooghe, *The Objectification of Infrastructure: The Cultural Project of Suburban Infrastructure De*sign on urban transformation and automobile logics, Jesse LeCavalier, *Let's Infrastructure* on challenging the distribution networks with infra-logistics; Stephen Read & Patrizia Sulis, *Infrastructure as World Building* on the example of Milan metro system, Mark Campbell & Deane Simpson, *The Lost Highway* on Interstate highway system of U.S. For more: Infrastructure as Architecture: Designing Composite Networks, ed. by Katrina Stoll & Scott Lloyd, Jovis, 2010.

The spatial dimension of logistics[103] is an environment of negotiations that clear out obstacles. Therefore, fluidity is an important concept in the logistical ecology. The fluidity of logistical activity is where calculations and standardizations demarcate the potentials and setbacks of its environment. This environment encapsulates a large network of spaces, actor, bodies, and information where fluidity and friction can be defined. Fluidity directs an understanding of the actors and actants moving in the spaces of logistics with friction, making the two terms inherently connected. Therefore, these two concepts—fluidity and friction—provide a ground for a depiction of logistics where its agencies and their environment in a relational ground. Since logistics encompasses all production cycles with systems of transportation, communication, collection, managing the factors that slow down the movement involves eliminating the frictions caused by external systems of finance, technology, and bureaucracy in addition to mechanical and environmental forces. These forces can be defined as the emergent nodes of activity where non-human and human activity merge.[104] For instance, friction occurs while opening a new mining area in a restricted zone—both in its legal procedures and in its physical transformation of the land. Fluidity, then, is achieved by overcoming of its legal boundaries, obscuring its damage to ecologies, as well as the use of technological equipment to open roads, process resources in its physical reality. The friction and fluidity, then, become important challenges for logistics to identify the constraints of its ecology, in the sense that it manipulates spatial factors and agencies at the same time. Therefore, the activities that engage with limits regarding the administration of logistics, in addition

[103] Many researchers have been dwelling on the issue of spatial organization of logistics. Such as Keller Easterling, "The New Orgman: Logistics as an Organizing Principle of Contemporary Cities," *The Cybercities* ed. by Stephen Graham, Routledge, 2004, p.179-189. Clare Lyster, "Landscapes of Exchange: Re-articulating Site," *The Landscape Urbanism Reader* ed. by Charles Waldheim, Princeton Architecture Press, 2006, p.219-238. Charles Waldheim & Alan Berger, "Logistics Landscape," *Landscape Journal*, Vol.27, 2008, p.226. Jesse LeCavalier, "The Restlessness of Objects," *Cabinet*, Vol. 47, 2012, p.90-97.

[104] See, for example, the study of "friction space" as depicted with a new road extension in Ankara Yüzüncüyıl district. Funda Baş Bütüner and Gizem Deniz Güneri Söğüt. "Friction Space and The Re(Dis)Covery of Urban Roads," *Urban Design International*, 2022, p.1-27.

to the construction of physical installations not only aim to ease the ways of transportation but also lubricate the legal, bureaucratic, state-driven grounds. The logistical spaces, therefore, extend over the ones that require architectural planning and construction practices. Meaning it encompasses an array of spaces that encapsulate architecture not as a solution to its operation but as a critical ground to its damage.[105]

The architecture of logistics deals with spatial configurations—not only the transformed versions of harbors and terminals brought about by the advent of pallets and containers but also the spatiality of urban areas under the impact of computerized and mechanized circulation systems that comes from such transformations. In this way, logistics is a spatiotemporal framework, enabled by measurement, coding, and barcoding protocols for transportation and storage practices.[106] Logistics, in that sense, provides an abstract system that is concretized in immediacies. The architecture of logistics follows generic methods in its material culture with unilateral programming, which is devoid of memory and restrictive in terms of temporality.

Two studies on the architecture of logistics—from the field of critical logistics—provide two characterizations to define the logistical spaces in terms of its internal/external occupation and its expression. Firstly, with LeCavalier, the architecture of logistics take part in creating units for the circulation in urban, as well as the transformation of the urban through changing mobilization derivatives.[107] Secondly, with Young, the architecture of logistics and the urban becoming more

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[105] Bateson puts forward an idea of "ecology of bad ideas." This is particularly useful to define logistical ecologies as a way to achieve its potential violence that will be unfolded in the following part.
[106] Bensi and Marullo, The Architecture of Logistics, p.6.
[107] Jesse LeCavalier, The Rule of Logistics: Walmart and the Architecture of Fulfilment, Minneapolis: University of Minnesota Press, 2016, p 54-58.

and more intermingle by being devoid of expressions with a pure utilitarianism.[108] These two perspectives explain how changing mobilization operations undermine the architecture of the built environment by signifying the need for an ecological outlook.

Jesse LeCavalier and Liam Young offer critical perspectives that help unpack the spatial and architectural logic of logistics. LeCavalier, in The Rule of Logistics, distinguishes between the "spaces of logistics"—such as warehouses, ports, and distribution centers designed for operational efficiency—and the "spaces by logistics," which are broader spatial conditions produced by logistical reasoning, including fulfillment centers, intermodal corridors, and retail zones. These two categories reveal how logistics is not confined to isolated infrastructures but actively produces urban and territorial arrangements. Liam Young complements this understanding by emphasizing the aesthetic and symbolic neutrality of logistical architecture. The architecture of logistics, according to Young, is defined by its expressionlessness: vast, generic structures stripped of formal ambition, optimized solely for efficiency. These structures reflect a paradigm where architecture serves logistical function over meaning, reproducing a silent, utilitarian spatial order that extends across both operational and urban scales.

Within this dual framework, the concepts of fluidity and friction emerge as key spatial dynamics. In the controlled environments of the "spaces of logistics," fluidity is engineered to enable seamless circulation, while friction—manifesting as bottlenecks or breakdowns—is managed or absorbed to preserve flow. Conversely, in the "spaces by logistics," the pursuit of fluidity generates frictions that materialize as externalities: social displacement, environmental harm, and infrastructural asymmetry. These frictions are not anomalies but systemic consequences of a logistical logic that prioritizes speed, control, and precision. The absence of aesthetic

[108] Liam Young, “Introduction: Machine Landscapes in the age of Post-Anthropocene,” *Architectural Design*, Vol.89, No.1, 2017, p.1-4.

articulation in logistical architecture further reinforces this regime, deferring the visibility of its consequences while embedding its operations deeper into the urban fabric. Thus, logistics does not merely organize movement—it produces spatial regimes in which fluidity becomes a model of governance, and friction becomes both a residue and a signal of resistance.

Recognizing logistics as an ecological force—capable of shaping environments through its infrastructures of circulation, standardization, and control—demands a broader spatial and epistemological lens. As logistical systems scale and entangle with global chains, their operation zone extends from cities to the material and ecological conditions of the planet. The distinctions between spaces of logistics and spaces by logistics demonstrate how logistics generates spatial regimes. Within these regimes, the dynamics of fluidity and friction emerge as operational logics. These concepts are the functional concerns that reveal the methods of governance through logistical spaces. Taken together, they serve as precursors to the planetary scale of logistics, illustrating how logistical operations, initially embedded in localized infrastructures, expand outward to format entire landscapes, ecologies, and the *spheres*. This expanded field of operation redefines the boundaries between the urban and the non-urban, as logistics extends into remote hinterlands, oceans, and biospheric systems, rendering the Earth a governable through infrastructure. The emergence of logistical ecologies, therefore, sets the stage for rethinking urbanization beyond the demarcation of traditional notions. Ecology of logistics prepares the ground for a planetary understanding one in which ecological transformations converge into a dissociable concern to mobilization. From this perspective, the planetary condition is not only defined by the expansion of cities, but by the global reach of logistical infrastructures that reconfigure the Earth as a continuous operational field.

2.2.1 Logistics against Planetary Forces

The concept of the global city reveals how urban formations express the underlying principles of human existence on Earth through the built environment. There are number of studies that demonstrate cities as spatial repertoires of global processes, projecting economic, cultural, and political power across scales, to reconfigure how space, capital, and life itself are organized on a planetary level.[109] These views help us introduce the "planetary" outlook as an epistemological inquiry on the change of the urbanization processes.[110]

As one of the major contributor to the changing paradigms Harvey points out the relationship between the industrial economy and spaces of urbanization in his book “The Condition of Post-Modernity”.[111] He remarks that the compound rate of past financial growth is significant to understanding the future of urban infrastructure.[112] The growing accumulated interest rate shows that the continuation of current infrastructural practice will "dwarf" the existing one.[113] Moreover, the extensive character of urbanization, not in a quantitative sense but in the sense that occupants' daily lives are increasingly influenced by the hegemonic procedures of political interactions and socio-cultural change, highlights a vital vulnerability of infrastructures.[114] Brenner and Schmid’s call for an epistemic change takes a step

[109] A list of books can be recalled on the discussion of global city. Starting with The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change by David Harvey in 1989, The Global City: New York, London, Tokyo by Saskia Sassen in 2001, The Global City: On the Streets of Renaissance London by Peter Ackroyd in 2001, Spaces of Capital: Towards a Critical Geography by David Harvey in 2001.
[110] Neil Brenner & Christian Schmid, Planetary Urbanization, Implosions/Explosions: Towards a Study of Planetary Urbanization, Jovis, 2013, p.160-163.
[111] David Harvey, The Condition of Postmodernity, John Wiley and Sons, 1991.
[112] Harvey, The Condition of Post-Modernity, p.222.
[113] Harvey, The Condition of Post-Modernity, p.228.
[114] AbdouMaliq Simone, “Maximum exposure: Making sense in the background of extensive urbanization,” *Environment and Planning D: Society and Space*, Vol. 37, No. 6, 2019, p.990-1006.

forward in depicting the vitality of the crisis that comes with the ever-growing infrastructures.

Neil Brenner and Christian Schmid highlight four significant changes in urbanization over the last 30 years, emphasizing the "creation of new scales," "re-articulation of territories," "the disintegration of the hinterland," and the "end of the wilderness."[115] In their texts, they call for an epistemological change in the analysis of urbanization by stating;

> […] transoceanic shipping lanes, transcontinental highway and railway networks, and worldwide communications infrastructures to […] 'natural' spaces such as the world's oceans, deserts, jungles, mountain ranges, tundra, and atmosphere.[116]

When Brenner and Schmid refer to “transoceanic shipping lanes, transcontinental highway and railway networks, and worldwide communications infrastructures” reaching into “natural” spaces such as oceans, deserts, and atmospheres, they are underscoring how even the most remote or supposedly untouched geographies are now integrated into global logistical systems. With the guidance of Harvey and Brenner, it becomes evident that the domain of logistics now operates at a planetary scale—one that cannot be disentangled from ecological registers. The infrastructural transformations driven by logistics are not merely technical or economic processes. Logistical infrastructures, in that sense, reorganize spatial relations, alter environmental conditions, and inscribe new forms of territorial control across the globe. This relational dimension must be understood not in isolation but as part of a broader ecological and urban logic that redefines the conditions of life on Earth. What were once perceived as external to urbanization are now embedded within planetary operational networks. This erasure of the wilderness signals a shift in how territory, infrastructure, and nature are conceptualized as fully entangled components

[115] Brenner & Schmid, Planetary Urbanization, p.162.
[116] Brenner & Schmid, Planetary Urbanization, p.161.

of logistical space. The proliferation of logistical ecologies signals a new mode of spatial intervention extended across oceans, deserts, atmospheres, and orbits.

While orchestrating complex ecological exclusions, logistics redefines spatial agency through the very mechanisms that facilitate circulation, enclosing the world not in borders, but in operational containers of flow. Brenner (et.al.) provide a metaphor for a "container" that controls political territory by marking:

> [thus] each individual state is represented as a kind of container that separates an "inside" of domestic political interactions from an "outside" of international or inter-state relations This container metaphor also underpins conventional depictions of intra-national political spaces. Thus, each regional or local jurisdiction is viewed as a self-enclosed political territory within a nested hierarchy of geographical arenas contained within each other like so many Russian dolls.[117]

The argument is that conventional spatial imaginaries portray political territories as enclosed "containers." Each with a distinct interior separated from external relations, this metaphor reinforces a nested understanding of jurisdiction. The jurisdiction ranges from local to global, human to animal, and planet to planet— as a series of bounded spaces. This container is destabilized when considering logistics not merely as a neutral system of movement. As a political technology of control, logistical organizations bypass thresholds.

What Micheal Mann articulated as the shift in logistics as a powerful instrument of statecraft. He outlines how "logistical techniques"—from the division of labor to the practices of storing and distributing goods—enhance the effectiveness of state power.[118] Mann emphasizes that the act of storing constitutes a vital mode of

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[117] Neil Brenner, Bob Jessop, Martin Jones, and Gordon MacLeod, "Introduction: State Space in Question," *State/Space*, Blackwell Publishing, 2003, p.1.
[118] Michael Mann, "The Autonomous Power of The State: Its Origins, Mechanisms And Results." *European Journal Of Sociology / Archives Européennes De Sociologie / Europäisches Archiv Für Soziologie* Vol.25, No.2, 1984, p.185–213.

governance, enabling the regulation of surplus, value, and access.[119] Under the state's guarantee of coinage, commodities simultaneously enter and exit containers circulating with the logistical techniques—of measuring, coding, and barcoding. Emergence of such capacities in logistics aims to create control in rapid environments in domains with varying scales. With regulated speeds, logistics accelerates the scale of control across interconnected spatial domains. These domains are the terrains of storage, and active environments of the containing. As a standardization effort, containers do not merely hold things; they modulate relationships between modes of governance.

Easterling, by referencing Meyer's work, puts through a different approach to state-driven modulations by a globalized world where organizations—rather than states—are now imagined as the primary actors shaping the world.[120] For the author, this is a mirroring of the state who once carried power and legitimacy. Easterling articulates a dispersed network of organizations of corporations, digital platforms, and protocols as the dominant structure of the global spatial and political order—than a system of sovereign nation-state. Keller Easterling critiques how their zone of operations—such as specialized economic or industrial districts—has overtaken the city as the dominant spatial and organizational form of global urbanism. The global city, as a complex, heterogeneous, and historically layered entity, is now increasingly replaced by zones that mimic the aesthetic and economic formulas. They represent a kind of spatial software: modular, repeatable, and detached from local context—what developer Stanley Gale calls a "city in a box." These zones are no longer marginal or exceptional; they have become the new template for city-making.

Easterling describes a city enacting a profile of highly efficient circulation systems, which are made possible by the data-tracking systems, elevators, and climate control

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[119] Anthony Giddens, The Contemporary Critique of Historical Materialism, Berkeley: University of California Press, 1984.
[120] Easterling, The Extrastatecraft, p.157.

systems. The city is under the control of generic systems of global financial networks, repeating the same algorithm all over the globe. The logistical mode of planetary organization unsettles the traditional view of space as a set of nested, self-contained territories of mobilization. Rather than operating within rigid political or geographic enclosures, logistics generates flows that dissolve the distinction between inside and outside, between local and global. In this regime, planetary space becomes a field of operation, where movement is prioritized over location. This shift marks not only a transformation in scale but a fundamental reconfiguration of how ecologies are inhabited. Logistical systems generate a planetary spatial order, dissolving the distinction between the natural and the built, the urban and the non-urban.

What is defined above as the distinctions between the dualities of logistical spaces still grows what I will be calling outward and inward the planetary conditions of mobilization. In that, interplanetary transportation is a recently emerged discipline known as *space logistics*.[121] Space logistics refers to the systematic planning, optimization, and execution of the movement and sustainment of resources—such as cargo, fuel, personnel, and information—within and across space missions, particularly in long-duration and interplanetary operations.[122] When logistics is defined as the organization of material movement, then activities ranging from the assembly and supply of rockets to methods of storing materials in space fall within this new disciplinary framework. In this context, the rocket functions as a technological infrastructure that not only calculates logistical volumes, degradation rates, masses, and vibrations but also tests standardized configurations through clusters of knowledge. This includes managing the supply chain from Earth to orbit, cislunar space, and interplanetary destinations, like Mars. The frictional forces that

[121] Koki Ho, "Space Logistics Modeling and Optimization: Review of the State of the Art", *Journal of Spacecraft and Rockets,* 2024, p.1. https://doi.org/10.2514/1.A35982
[122] IAA Space Logistics Technical Committee, "AIAA Space Logistics Technical Committee," https://www.aiaa-sltc.org/. [Accessed on 15 June 2025]

determine the thrust required for lift-off also activate the knowledge of fuel and payload ratios. This informational and technological infrastructure offers an indication of how a SpaceX rocket can possess fluidity. The rocket's ability to separate seamlessly from the tower, travel through space, and reattach indicates an emerging scale in logistics. Therefore, space logistics represents the backbone of expanding human and robotic presence in space, treating planetary systems as a multi-node supply chain to be optimized across *space* and *time*. The development of the planetary scale in terms of external connections signals another perspective, the internal relationalities offered through the case of drone-bees.

Second example is about the attempts of micro-scale transportation with the idea that asserts logistics diminish the scale of transportation into a biology. Despite its small agricultural land area, the Netherlands has become a notable actor in the sector. Alongside its long-standing efforts to regulate water infrastructure, it has also begun developing productivity infrastructure in greenhouses, where most agricultural activity takes place.[123] Through the elimination of pests and the controlled genetic selection of crops, a highly regulated and hygienic production system has been established.[124] Building on centuries of experience in water management, Dutch agriculture integrates water recycling, controlled irrigation, and closed-loop systems. This integration supports not only flood protection but also precision agriculture. Drone-bee technology as part of the precision agriculture, refers to the development of micro aerial vehicles designed to imitate the role of natural pollinators in agricultural environments.[125] These robotic bees are engineered with optical sensors, flapping or rotary wings, and autonomous navigation systems to locate, approach, and pollinate flowers with mechanical precision. The drone-bee technology is

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[123] Hans J. M. van Grinsven, Martha M. van Eerdt, Henk Westhoek, and Sonja Kruitwagen "Benchmarking Eco-Efficiency and Footprints of Dutch Agriculture in European Context and Implications for Policies for Climate and Environment" *Front. Sustain. Food Syst,* Vol.3, 2019, p.3-8
[124] Grinsven, et al. Benchmarking Eco-Efficiency and Footprints of Dutch Agriculture, p.9.
[125] Roberto Furfaro et al., "Robotic Bee Technologies for Pollination: State of the Art and Future Prospects," *Agronomy* Vol.13, No.6, 2023, p.1351, https://doi.org/10.3390/agronomy13061351.

characterized as a zone of friction in its collaboration with other life forms. In order to ensure fluid transition, a new technological infrastructure for pollen logistics has been developed. The preservation of pollen after production, its loading onto carriers, and determining the path to reach and fertilize the target all fall within the domain of logistics. In this way, planetary thresholds are being tested outwardly through rocket technology while they expand inwardly through pollination technologies.

The two examples—space logistics and drone-bee technologies—extend and concretize the theoretical claims made by the authors above regarding the spatial governance of logistics at a planetary scale. In line with Harvey's view of infrastructure as a historically compounded logic, logistics marks a scalar leap by dwarfing terrestrial infrastructure in complexity and ambition for interplanetary travel. At the same time, the micro-logistics of pollination systems exemplify Brenner and Schmid's claim that no space remains outside this integration. Their notion of "the end of the wilderness" is illustrated by engineered as total environments where biological reproduction is synchronized with logistical precision. Both cases exemplify Easterling's critique of space as increasingly governed by repeatable, protocol-driven systems that function as containers—standardized modules of control. Whether it is the rocket as a mobile capsule or the drone-bee as an airborne carrier in agricultural logistics, these systems operate through infrastructural logics that bypass conventional boundaries and enact governance through circulation itself. They reveal how logistics is the dominant spatial paradigm, transforming both the material and ecological conditions of the built environment. Therefore, the global city is enacted through logistical ecologies that modulate movement across both interplanetary space and biological life, collapsing the scale into a planetary container of control. Logistics emerges as the operative force that brings ecological to infrastructural. In the meantime, forces of the planet itself are continuing to be shaped under the effect of logistics.

2.2.2 Logistics as a Planetary Force

The expansion of logistical ecology as a planetary force reveals that logistics operates across scales—moving both outward into orbital infrastructures and inward into micro-biological and agricultural systems. The planetary condition shaped by logistics demands an ontological examination of logistics' spatial agency. Planet has been regarded as an entity that entangle biologic, geologic, atmospheric movement in itself, forcing logistics and its infrastructures to be shaped by the conditions of the Earth. Therefore, we can talk about the shifts that position logistical movement inside the planetary forces in addition to its conflict with them. These shifts can be better understood with the human-technological systems as an Earth system that folds both the animate and inanimate into new geophysical forces.

Haff's formulation, grounded in geoscience, allows us to grasp how logistical ecologies reorganize planetary processes. In coining the term "technosphere," geoscientist Peter Haff aims to characterize the physical attributes of a human-technological system, which he views as analogous to the layering of Earth systems, such as biosphere, lithosphere, and hydrosphere.[126] During a discussion Erich Hörl, Haff gives a clear understanding of the nuances of this idea as they explore the ethical and philosophical questions it raises.[127] In the interview, Haff explains the term technosphere as follows:

> The technosphere is my way of constructing a concept to try to understand and analyze the sum of humans and their technology, essentially all of its ramifications and all of its parts, on a scientific basis. It would include individuals, it would include these bottles of water on the table, it would include the Internet, and it would include art museums and the art within the art museums. Basically, we are talking about civilization when you sum up all of these endeavors and impacts. The approach is, if you have a system that

[126] Peter Haff has a book dedicated to the term technosphere. His approach initially directs human ecology. Peter K. Haff, Technosphere: The World's Largest Machine, Columbia University Press, New York, 2014.
[127] Peter Haff & Erich Hörl, Technosphere & Technoecology, Technosphere Magazine, 15 November 2016.

> you can define well enough then there is a procedure for dealing with that, which we often take in science, and that is to try to derive some physically-based rules or principles that would apply to it.[128]

Haff realizes how scientific measures take a toll on the lack of definition of the aspects and impacts of human ecology.[129] He pinpoints a critical position in which human participation changes the direction of scientific revelations. One such observation is the relationship between the animate and inanimate spheres of the Earth.

The sphere is the foundation of these relations, with a connection to geology that cannot be separated from life.[130] The relationship between the geological surface and living matter, as its predecessor or contender, has been a critical understanding in natural conservation studies. We see Vernadsky's coinage of the term "biosphere" in early twentieth-century Russia as the first attempt to understand such relational grounds. Vernadsky's empirical generalizations serve as a kind of manifesto marking the disciplinary origins of this perspective. Vernadsky asserts that life starts on a sphere, life starts geology, and finally, living matter changes its effect on the planet, which together defines the spherical assumption that Haff refers to.[131] Haff does not necessarily cite Vernadsky, yet their approaches complete each other after more than a century. In this sense, Vernadsky's definition of the sphere is, ultimately, a

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[128] Haff, Technosphere & Technoecology.

[129] This subdiscipline of ecology studies emphasizes how patterns of human behavior adapt to and transform their environments. Changes in the organization of movement within these human ecologies—through intensified circulation, distribution systems, and networked coordination—have fundamentally altered our modes of interaction with the planet.

[130] Vladimir I. Vernadsky, The Biosphere, trans. David B. Langmuir, Copernicus, New York, 1998, p. 142. Vernadsky is a Russian scientist who has been neglected by the Western scientific societies for about half a century. He is one of the few people of his time acknowledging the biota as a film covering the mantle and directly effecting the geology of the Earth.

[131] To be specific about the issue, Eduard Seuss first uses the term biosphere; however, with Vernadsky the term reaches to its semantic capacity still understood today. For more: Vladimir I. Vernadsky, The Biosphere, trans. David B. Langmuir, Copernicus, New York, 1998.

reflection of biotic and abiotic relations, where Haff position a layer of technology that alters those relations in planetary scale.

Building on this, the field of eco-criticism underwent a significant shift in direction, shaped since the Vernadsky's connection with the Western scholarly fields. By reaching his work, conservationists and eco-critics started pursuing ways to associate problems of the sphere as a concept.[132] In those conceptualizations, sphere emerged as the abstract geometry of habitability, as an alternative to Cartesian geometries. Although they did not necessarily mention the term' infrastructure,' the disposition of abstract ideas of emerging technocracies in the natural world raised many questions.

In those studies, several issues are pursued by ecologists and preservationists. Misuse of chemicals, increase in human population, and misunderstanding of ecological communities are the most significant issues till the late twentieth century.[133] Until the 1990s, studies on the relationship between ecology and infrastructure as primary causes of misconceptions between technological and environmental perspectives did not emerge. However, eco-criticisms that link political and social infrastructures to the devastation of the natural environment paved the road to depict the relationship between hygiene regimes and technology.

One of the first examples of this, Rachel Carson's Silent Spring, was also one of the most influential at the time. Silent Spring is a book about how agricultural sterilisms

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[132] A list of studies; on crisis, Lynn White Jr., "The Historical Roots of Our Ecologic Crisis," *Science,* Vol.155, No.3767, 1967, p.1203–1207. On machines in nature: Leo Marx, The Machine in the Garden: Technology and the Pastoral Ideal in America, Oxford: Oxford University Press, 1964. On the notion of nature as spheres: Peter Sloterdijk, Spheres I: Bubbles: Microspherology, trans. Wieland Hoban, Los Angeles: Semiotext(e), 2011.

[133] On population increase as a crisis of ecology: Paul R. Ehrlich, The Population Bomb. NY: Ballantine Books, 1968, on misunderstanding of ecologies by "land ethic:" Aldo Leopold, A Sand County Almanac: And Sketches Here and There, NY: Oxford University Press, 1949. As a side note: Leopold's writings raised a significant impact on ecology and conservation studies by offering the land ethic in the continuing years.

change the habitation on Earth, confined to the cases from the United States rather than a global image. Nevertheless, the book consists of creative perspectives and introductions to technology of hygiene regimes, by which Lord Shackleton states:

> This is the story of the use of toxic chemicals in the countryside and of the widespread destruction of the wildlife in America (caused by pesticides, fungicides and herbicides.) Silent Spring is not merely about poisons; it is about the ecology or the relation of plants and animals to their environment and to one another.[134]

Silent Spring became a symbol of narration in the "spherical" thinking of popular media, despite its intention to tell the tale of aggressions that humans were previously unaware of. Carson's book finalizes with a chapter named "The Other Road." Her insight into the dualism between the domination of nature and purist perspectives, as well as creative ways of understanding the Earth's crust as a complex living being, opened up new approaches.

The work of James Lovelock depicts a shift—of planetary mode of existence—through his Gaia hypothesis, which proposes that "the Earth functions as a self-regulating living organism."[135] This living organism creates the space for biological and geological processes to co-evolve, maintaining the conditions necessary for life to exist. Studies in *geophysiology* and Earth system science have since built upon this framework.[136] Showing how feedback loops between the atmosphere, lithosphere, and biosphere operate in a delicate balance, they depict intricate

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[134] Lord Shackleton, "Introduction," Silent Spring by Rachel Carson, London: Penguin Books, 1965, p. 17.
[135] James Lovelock, Gaia: A New Look at Life on Earth. Oxford: Oxford University Press, 1979.
[136] A more through approach to the Gaia hypothesis is put forward by Tyler Volk. Volk tries to find a ground for the Gaia to have an anatomy and physiology in geological and biological sense. The ideas we are discussing here is not the coherence of biological entity that coordinates the life as a planet, but the entangled relation between its strata. Tyler Volk, Gaia's Body: Toward a Physiology of Earth, NY: Copernicus Books, 1998.

cooperations.[137] In parallel, Lynn Margulis's contributions to *symbiogenesis* focus on the cooperative, rather than competitive, basis of evolution. The concept of symbiogenesis reinforces an image of Earth as an entangled *metabolism*.[138]

Following those, there are study groups of data scientists and geologists working together to create a coherence by measuring the impact of the change in the feedback loops. One of the most striking is the study on carbon density in the atmosphere and its geophysical accumulation.[139] The community in the International Geosphere-Biosphere Programme (IGBP) prepared the first graphs, now known as the 'Great Acceleration' showing the inflection points of human impact as carbon accumulation. These graphs gather the historical evidence by examining sedimentation and accumulation on the Earth's surface. The graphs were initially created as part of the interdisciplinary data synthesis project of IGBP between 1999 and 2003.[140] The increasing population and accumulation of greenhouse gasses provided the set of evidence for IGBP starting in the eighteenth century.[141] Crutzen states that:

> This is the period when data retrieved from glacial ice cores show the beginning of a growth in the atmospheric concentrations of several "greenhouse gases," in particular CO2, CH4 and N2O. Such a starting date coincides with James Watt's invention of the steam engine in 1782.[142]

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[137] This is also evident in Silent Spring in terms of accumulations in biological levels. In the context of geophysics and human ecology: Tim Lenton and Andrew Watson, Revolutions That Made the Earth, Oxford: Oxford University Press, 2011.

[138] Lynn Margulis, Symbiosis in Cell Evolution: Life and Its Environment on the Early Earth. San Francisco: W. H. Freeman, 1981.

[139] Waters, Zalasiewicz, Williams, Ellis & Snelling, A. M. A stratigraphical basis for the Anthropocene? Geol. Soc. Lond. Spec. Publ. Vol.395, 2014, p.1–21. Authors' study stratigraphy displays the start of change which coincides with what we know as Great Acceleration.

[140]IGBP, Climate Change Index 2011
http://www.igbp.net/globalchange/climatechangeindex.4.56b5e28e137d8d8c09380002241.html
[Accessed on: June 13 2024]

[141] This study reveals the chronostratigraphic markers that are thought be initiators of a new epoch after Holocene, defining the Anthropocene coincident with Industrial Revolution.

[142] Paul J. Crutzen, The Anthropocene, p.3

The committee of scientists decided whether geological formations and human interaction with the tectonic plates are consistent with past studies of the geological time scale (GTS).[143] It is still a topic of discussion in the natural sciences. The synthesis aimed to consolidate research from IGBP's core projects and to enhance the understanding of the Earth System's overall structure and functioning. The trajectory of such scientific endeavor moves beyond descriptions of individual components. Now, it is no longer possible to deduct the complexity of Earth in spherical imagery, rather its emblem. However, it is safe to state the connection between the rise of large networks of mobilization are coined as a start of the atmospheric and geophysical change—if not *technospherical*.

The ecology of logistics is embedded within and across the components tracked by Earth system science. Logistics, which acts as the mediator between humanly flows of materials, energy, and information, orchestrates the movements that shape carbon cycles, sedimentation patterns—with the increasing speeds of harmful land-use, hygiene transformations and suffocate the wilderness, as well as communities and local social ecologies. It supports and shapes the major components of waste[144] (CO2, CH4 and N2O) release in industries, in addition to the extraction activities deteriorating the forests, oceans, and other natural habitats. These disrupted cycles are intimately linked with the increasing number of shipping routes where logistical ecologies tie resource extraction to global consumption. Moreover, as the interface between urban growth and planetary-scale supply chains, logistical ecology is not a separate domain but a transversal field that cuts through biospheric, geospheric, and

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[143] S. C. Finney, "The 'Anthropocene' as a ratified unit in the ICS International Chronostratigraphic Chart: fundamental issues that must be addressed by the Task Group." *Geol. Soc. Lond. Spec*. Vol.395, 2014, p.23–28. To define an epoch within the GTS there are several requirements needs to be fulfilled. This paper showcases definitions of the initial committee questions the formality of abstract proposal of Anthropocene.

[144] In the following parts of this study, we will refer this as debris instead of waste. As quick summary, debris is what remains after the human activity as the disposed, refused and abandoned matter. Chapter 3 focuses on its relations in political landscapes of destruction while Chapter 4 reflects on its epistemological potential.

technospheric registers. It mediates the thresholds between the animate and the inanimate, the mobile and the fixed, the ecological and the economic.

2.3 Outcome of Logistical Ecologies

Studies of the Anthropocene have been dealing with energy use, industrial development, and demographic growth, which are based on the extraction of finite resources and energies.[145] Examining the progress of industrialization reveals this escalation of factors as the utilization of resources by turning them into energies, ranging from water to coal to petroleum.[146] Additionally, the shift in resource utilization from local to global increased the reliability of logistics' demand and supply networks. Here, we argue that this shift is towards a "global-planetary" perspective that results in a domino effect of consequences where logistics aligns the pieces.

Until here, this study collects the works and arguments around what we define as domains of logistics with infrastructure and ecology. The global-planetary conundrum of logistics comes with the tendencies in those studies where infrastructure is apprehended by the globalization whereas ecology implies planetary conditions. Global and planetary denote fundamentally different orientations—especially in understanding logistics. The global refers to interconnected networks, markets, and flows shaped by human systems such as capitalism, trade, and geopolitical boundaries. It emphasizes control. However, the planetary foregrounds the Earth as a dynamic, entangled system of more-than-human processes—geological, ecological, atmospheric—that exceed and condition the human activity. To understand logistics through a planetary lens is to see how mobilization is

[145] Mikhail V. Chester, Samuel Markolf & Braden Allenby, "Infrastructure and the environment in the Anthropocene," *Journal of Industrial Ecology*, 2019, Vol 23, No __, p.1006-1015
[146] See, Neeraj Bhatia, The Petropolis of Tomorrow, Actar Publishers, 2013.

embedded in, and transformative of, Earth systems, rather than being a sole operation on global grid. What we refer—as the shift—reveals that ecological, temporal, and material consequences are obscured when logistics is framed only through the abstractions of global connectivity. Therefore, logistical ecology refers to the entangled operations between mobilization systems and Earth's dynamic processes, revealing how infrastructures navigate by actively transforming the planetary condition beyond and within the abstractions of global connectivity.

The following part introduces violence as a term to support the discussion of logistical ecology by presenting the harm as a vital outcome with an evidentiary potential. Throughout the text, this potential is uncovered by how systems of logistics control the conditions of catastrophe. In sequence, the discussion unfolds around how logistics partakes in methods of establishing domination, how it instrumentalizes violence within this context, and how it renders this violence invisible. It concludes with an examination of how logistics internalizes a form of violence that is often referred to by its own name. At this point, the study brings this *logistical violence* into proximity with *slow violence*, contributing to the literature that occupies within the global supply chains with an addition of ecological one. This proximity helps elucidate the shifting perception and definition of violence—from negative to "seemingly positive"—enabling a better understanding of logistics' impact in both catastrophes, as well as in local crises and disasters.

Nature is not ahistorical or primordial—it is socially and historically constructed through relations of labor, knowledge, and production. What we call "nature" is always—and already—mediated by human action and ideology. Catastrophes, therefore, are inseparable to ideology of the "natural" operation of things.[147] In that, what we understand from a catastrophe is not merely a study of natural calamities but rather a framework that interrogates how disturbances are embedded within the

[147] Natural in the sense of being the condition of norms, neutral.

systems that ideology forms them.[148] Rather than external events, disasters are human constructs which are inherently tied to infrastructures.[149] When viewed as sudden, unexpected, and isolated events, discussions on disaster disregards the historical and material of dispositions of infrastructures. The idea here, naturalization of catastrophe functions ideologically—it depoliticizes suffering by attributing harm to nature.[150] Thus, the term "ecology of disasters" signifies the relational mesh between humans and non-humans, infrastructure and terrain, policy, and climate.[151] The ecology of disasters does not simply describe how natural events disrupt human systems but how those systems themselves shape the conditions of disaster.

This is most evident in infrastructural disposition in colonial lands where Haiti earthquakes in 2010 opened the discussion for disaster studies. In Haiti, the devastating earthquake was less a "natural" crisis than a human tragedy enabled by impoverished infrastructure, a history of colonial extraction, and the absence of effective urban planning.[152] Yet, these ecologies of vulnerability are not confined to postcolonial contexts. Disasters in non-colonial geographies—such as Hurricane Katrina in the United States—reveal how racialized neglect, infrastructural abandonment, and spatial inequality operate within advanced economies as well.

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[148] A list of Works can be mentioned to in the study of disaster ecologies. In urban ecological narratives shaping disaster experience, Davis, Mike. Ecology of Fear: Los Angeles and the Imagination of Disaster. New York: Metropolitan Books, 1998. In integrative ecological systems framework for disasters, Nathaniel Gibson, (et. al.), Toward an ecology of disasters: a primer for the pursuit of ecological research on disasters. Ecology and Society. Vo.26, 2021. In developed disaster ecology model focusing on hazards–population–context, Shultz, James M., Sandro Galea, and Zelde Espinel. "Disaster Ecology: Implications for Disaster Psychiatry." In Textbook of Disaster Psychiatry, edited by Robert J. Ursano et al., 2nd ed., 37–50. Cambridge: Cambridge University Press, 2017.

[149] Scheba & Millington, "Crisis temporalities: Intersections between infrastructure and inequality in the Cape Town water crisis," *International Journal of Urban & Regional Research*, 2018.

[150] Muhammad T. Chaudhary & Awais Piracha, "Natural Disasters—Origins, Impacts, Management" Encyclopedia Vol.1, No.4, 2021, p.1101-1131. https://doi.org/10.3390/encyclopedia1040084

[151] Rusca, Maria, Maurizio Mazzoleni, Alejandro Barcena, Elisa Savelli, and Gabriele Messori. "Speculative Political Ecologies: (Re)Imagining Urban Futures of Climate Extremes." *Journal of Political Ecology*, Vol.30, 2023, p.582–598. https://doi.org/10.2458/jpe.4827.

[152] There are a considerable number of studies that questions the Haiti earthquakes causing high losses despite low magnitude. For an effective text: Pinto AD. "Denaturalizing "natural" disasters: Haiti's earthquake and the humanitarian impulse," *Open Med*. Vol.4, No.4, 2011, p.193-6.

Neil Smith's provocative claim that "there is no such thing as a natural disaster" underlines a similar understanding.[153] In his essay—written in the wake of Hurricane Katrina, Smith argues that while the triggering events may have geophysical origins, the scale of destruction and suffering is largely socially constructed. "Vulnerability," he writes, "is socially differentiated," meaning people experiencing poverty, the racialized, and the infrastructurally marginalized suffer most—not due to nature's indifference, but due to political and economic design. In this sense, disasters are not natural occurrences but rather "unveilings" of latent inequalities and neglected systems. Smith's intervention reframes disaster not as a rupture but as a revelation—exposing the violence in ideologies.

To convey an image of violence in the catastrophes of the globalized world, the concept of domination brings out the connections between control and ideology, focusing on dominance as the primary object of criticism.[154] Adorno and Horkheimer paves the way for how dominance as a concept that reveals the instrumental reasoning between society and nature. Authors state:

> If it were only a question of the obstacles resulting from the self-oblivious instrumentalization of science, then a critique of social problems could at least attach itself to trends opposed to the accepted scientific mode, yet even these are effected by the total process of production.[155]

In this passage, authors argue that the problem of instrumental reason is that it is embedded in the totality of the production system. Instrumental reasoning, for them, even forms of critique or alternative approaches are themselves shaped and

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[153] Neil Smith, "There's No Such Thing as a Natural Disaster," in Understanding Katrina: Perspectives from the Social Sciences, NY: Social Science Research Council, 2006.
[154] As a side note to follow the discussion of how dominance and violence play a part to control the nature, we will, shortly, be tracking the seminal works of major names from Frankfurt School. A short review starting with "The Dialectic of Enlightenment" by Max Horkheimer and Theodor Adorno, then "Domination of Nature" by William Leiss, "Ecology and Revolution" by Herbert Marcuse will provide the ground to understand how the term violence gains elevation in more recent studies.
[155] Theodor Adorno & Max Horkheimer, The Dialectic of Enlightenment, trans. John Cumming, NY: Continuum, 1972, p.xii.

constrained by it. Not because science has become instrumentalized in a way that forgets its original purpose (self-oblivious instrumentalization); it is because intellectual effort, including those which try to resist the ideology, are still in the broader logic of capitalist modes. The "total process of production" exerts that opposition cannot fully escape the conditions. This reflects their larger thesis where instrumentality turns into domination, giving a definition of the logic that sovereign systems and their critiques fall under their category. Therefore, the domination of nature occurs when reason is used as the instrument of production and consumption logic. They argued that the disenchantment of the natural world was accomplished by stripping away the moral aspects of human internal nature.[156] The domination of what is not internal to the human being displays the repression surrounding the environment.[157] Adorno and Horkheimer argue that such instrumentalizations ultimately lead to the domination of nature, which in turn leads to the domination of society.[158] Authors distinguish the Enlightenment as a process of rationalizing nature, creating a barrier of objectification.[159] The kind of objectification we are dealing with should be realized in the command of the ruling class or a sort of understanding that does not comply with unified "men." Although struggles among humans can— or will —be overcome with scientific and technological advancements, the posited issue of the dominated nature remains divided between social classes.[160] Horkheimer's theory suggests that domination exists in three forms:

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[156] Max Horkheimer and Theodor Adorno, Dialectic of Enlightenment, trans. John Cummings, NY: Herder and Herder, 1972

[157] Horkheimer and Adorno, Dialectic of Enlightenment, p.54. “In class history, the enmity of the self to sacrifice implied a sacrifice of the self, inasmuch as it was paid for by a denial of nature in man for the sake of domination over non-human nature and over other men .... With the denial of nature in man not merely the telos of the outward control of nature, but the telos of man's own life is distorted and befogged.”

[158] Adorno & Horkheimer, Dialectic of Enlightenment, p.4.

[159] Adorno & Horkheimer, p.10 Authors state: “Because the distinctions in functional science are so fluid that everything is subsumed in the same matter, the scientific object is petrified, and the fixed ritual of former times appears flexible because it attributed the other to the one.”

[160] Habermas is one of the thinkers who support the forms of scientific knowledge and technology as a shared domain of humanity. Jurgen Habermas, Technical Progress and the Social Life-World, in Toward a Rational Society, p. 52.

domination over humans, domination over nature, and social conflict.[161] Leiss attests to this hypothesis by stating;

> So long as the material basis of human life remains fixed at a relatively low level and bound to premechanized agricultural production, the intensity of the struggle for existence fluctuates between fairly determinate limits. The material interdependence of men and women in different areas under such conditions is minimal, and the lack of any appreciable control over the natural environment also constricts efforts to extend the hegemony of particular groups permanently beyond their local borders.[162]

Dependence beyond interest is a counter-motive that transcends the barrier of objectification. Under these conditions, people's lives are shaped by subsistence needs, and their ability to manipulate the natural environment is minimal. As a result, human groups remain largely localized and isolated, with little capacity to project sustained power or dominance beyond their immediate surroundings. Marcuse depicts a similar condition while discussing the student movements during the Vietnam War. In his short essay, Marcuse analyzes the ecological movements of the time. He concludes that counter-movements are directed forces against the violation of nature to diminish the "living spaces" of capitalism. He says,

> This is not an organized opposition at all, but rather a spontaneous movement which organizes itself as best it can, provisionally, on the local level. But the revolt against the war in Indochina is the only oppositional movement the establishment is unable to co-opt because neocolonial war is an integral part of that global counterrevolution, which is the most advanced form of monopoly capitalism. […] But in a broader sense, monopoly capitalism is waging a war against nature-human nature as well as external nature.[163]

The connection to nature—both human and external—is crucial here. In the final line, Marcuse claims that monopoly capitalism is waging a war against nature, and this has a double meaning. First, external nature refers to the environment: land, forests, ecosystems, and resources subjected to extraction, destruction, and

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[161] William Leiss, Domination of Nature, NY: George Braziller, 1972, p.155.
[162] Leiss, Domination of Nature, p.155.
[163] Marcuse, Ecology and Revolution, p.12.

commodification. War, deforestation, pollution, and displacement are part of this war. Second, “human nature” refers to the essential qualities of human life with dignity, freedom, cooperation, care, and embodied existence. These are undermined by capitalist rationality and militarism. According to Charles Reitz, Marcuse foresaw the rise of conservative economic and political policies before his death, a concept now embodied in Trumpism and the global authoritarian-populist reaction.[164] This ideal commonwealth also conveys Marcuse's idea of the Great Refusal, which involves "activist opposition to needless institutional destructiveness and advocacy for goals connected to utopian practices of human freedom."[165] Reitz specifically defines this as "a global alliance of transformational forces in pursuit of a life-affirming and humanist future of intercultural solidarity within a new eco-socialist political order."[166]

In this context, logistics operates at the intersection of what this study defines as the global-planetary conundrum. While the global dimension of logistics refers to the engineered systems of control, the planetary consequences emerge in the disruptions, degradations, and disasters that logistics both contributes to and attempts to govern. The instrumental rationality that Adorno and Horkheimer critique is embedded in logistical systems, which transform nature into a programmable substrate and disasters into opportunities for the recalibration of movement. Here, logistics must be understood as a mechanism that enforces and extends the very conditions of domination, instrumentalization, and ecological degradation. Then, logistical ecology frames how logistical systems are inseparable from the planetary conditions that capitalist modes of making exploit. This framing positions logistics as both a product of ecological transformations and a producer of new ecological realities of the Earth under capitalism.

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[164] Charles Reitz, Ecology and Revolution: Herbert Marcuse and the Challenge of a New World System Today, Routledge, New York, 2019, p.12.
[165] Marcuse, Ecology and Revolution, p.16.
[166] Reitz, Ecology and Revolution, p.2

There is a paradox that reveals the recursive role of logistics where the same infrastructures that deteriorate vulnerability through neglect, extraction, and inequality are reactivated as essential tools for managing the crises. Meaning, logistics is often regarded as an urgent need in disaster zones within which it utilizes the existing inventories of infrastructures. On one hand, the systemic fragility of logistical infrastructures reflects uneven planning, leaving communities vulnerable when disaster strikes.[167] On the other, the logistical system creates a self-dependent setting for the delivery of aid and relief during disasters. What emerges is a recursive dynamic in which the very logistical ecologies that contribute to the production of disaster are rearticulated as indispensable mechanisms for the response.

2.3.1 Positive Violence

This paradox is not unanswered. Emerging forms of resistance, often grouped under the banner of *counter-logistics*, confront the logistical infrastructures that reproduce vulnerability and capitalize on crisis. This movement exposes the false neutrality of logistical systems and reveals their role in sustaining regimes of control, inequality, and ecological harm. Jasper Barnes defines counter-logistics as follows:

> […] we might imagine, then, a logistics against logistics, a counter–logistics which employs the conceptual and technical equipment of the industry in order to identify and exploit bottlenecks, to give our blockaders a sense of where they stand within the flows of capital. This counter–logistics might be a proletarian art of war to match capital's own *ars belli*."[168]

Rather than accepting logistics as a necessary response to disaster, counter-logistical strategies seek to interrupt the flows that uphold capitalist exploitation which turns the crises in a zone of exploit. For instance, imagining war-broken cities as future

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[167] Holguín-Veras, J., M. Jaller, L. N. Van Wassenhove, N. Pérez, and P. Jankan, "On the Unique Features of Post-Disaster Humanitarian Logistics." *Journal of Operations Management,* Vol.30, No.7, 2012, p.494–506.

[168] Jasper Bernes, *Logistics, Counterlogistics, and the Communist Prospect,* Short-Circuit: A counter-logistics reader, ___, p 37

tourist attraction points, as delivered by Trump administration with AI generated videos for Gaza, is a strategy of logistical campaign to be countered. Apart from recent logistical disordered "movements" domination that logistics exercise on ecologies is a "strategic" concern, as we see protests of couriers and logistical workers all around the world. The anonymous reader, “Short Circuit,” compiles the studies that focus on finding efficient ways to interrupt capital flows and spread the uprisings and riots of logistical systems of exploitation. One of the anonymous authors states,

> As partisans of disorder, the study of logistics becomes strategic for us as well. That shift is taking place; the last three years have seen in-depth investigations into logistics and transportation infrastructure, accompanying an increasing turn towards interrupting those networks as a primary strategy.[169]

Counter-logistics is not only oppositional, yet, it is diagnostic. From this perspective, the current practice of logistics is something to be countered and leveraged to disrupt the capitalist economy. “A proletarian art of war” situates counter-logistics as a practice that mirrors the precision and scale of capitalist logistics. With those, there is a possibility of redirecting disruptions rather than optimization. These framings depict this possibility as an epistemologically grounded form of understanding where logistics and the violence adhered to it can be depicted.

Counter-logistics, as the logistics of logistics, offers a critical lens for understanding how systems operate upon other systems. These operations both organize movement, and maintain regimes of control through concealing their power. It reveals how violence is not a failure of logistics but a structural condition: enacted silently through latency, fragmentation, and recursion. Logistical order of circulations regulate by dividing, govern by postponing, and manifest comebacks and protrusions while managing an economy based on violence. While naturalizing crisis as a

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[169] ___, Short Circuit: A counter-logistics reader, ___. p.vii.

problem of logistics, counter-logistics exposes a normalization that violence is too an operation embedded in it. In its primary mode, logistics instrumentalizes violence, yet, as an operation on other systems it is rather concealed or neutral.

The concept of instrumental violence is crucial for understanding how logistics enacts harm while claiming neutrality which is the basis of its power. In "On Violence," Hannah Arendt distinguishes violence from power by stating;

> Since violence—as distinct from power, force, or strength —always needs implements (as Engels pointed out long ago), the revolution of technology, a revolution in tool-making, was especially marked in warfare. The very substance of violent action is ruled by the means-end category, whose chief characteristic, if applied to human affairs, has always been that the end is in danger of being overwhelmed by the means which it justifies and which are needed to reach it. Since the end of human action, as distinct from the end products of fabrication, can never be reliably predicted, the means used to achieve political goals are more often than not of greater relevance to the future world than the intended goals.[170]

Arendt emphasizes, following Engels, that violence is always exerted through tools —or technologies. For the author, violence is never "natural" which always requires an *apparatus*—such that of weapons, machines, or their combined efforts as a system; such that of logistics. Arendt is warning us against the instrumentalization of violence through politics. When violence becomes the dominant method for achieving political ends, the tools have the possibility to outlive the objectives, creating systems of control or destruction. Meaning, the means-end, as she mentions, is a loose method that reach to an unknown trajectory while the capacity to procure self-sufficient acts is never achieved. Logistical systems are often framed as technical means to human ends—of efficiency, relief, clearance, or aid. But as Arendt points out, when these means become dominant, they constitute a capacity to obscure the goals they claim to serve. For instance, logistical ecology in disaster zones may produce harm through displacement and misplacement—while claiming

[170] Hannah Arendt, On Violence, NY: Harcourt, 1970, p.4.

to deliver aid. Arendt's exposition of instrumental violence helps frame the paradox of logistical ecologies as a danger within which the tool dominates, while violence becomes embedded in its structure.

Byung-Chul Han's "Topology of Violence" offers a nuanced conceptualization of violence by situating it within a spatial and structural framework, rather than direct acts of force. Han argues that violence today is not primarily eruptive or visible but dispersed, internalized, and systemic, conforming to a new topology, with a spatial logic, that marks a shift from negative to positive forms of violence. Han declares violence is initially;

> […] the archaic violence of sacrifice and blood, the mythical violence of jealous and vengeful gods, the deadly violence of the sovereign, the merciless violence of torture, the bloodless violence of the gas chamber, the viral violence of terrorism, and the verbal violence of hurtful language.[171]

For Han, the definition of violence is bound to spatial structure or logic within which violence takes place. This idea adds to how Arendt distinguishes power from violence. For Arendt, "power corresponds to the human ability not just to act but to act in concert."[172] Han agrues that power functions through internalization, order, and symbolism. Adding to the collectively created power, the author establishes a relation with boundaries and differences to the structures of meaning. These differences are not necessarily violent; however, they are the mechanisms through which power embeds itself in social and spatial organization. He completes what he states by "an increase in power is an increase in space," which declares the violence as the destruction of space "and leaves emptiness in its wake."[173] This, for Han, is inseparable to the "macro-logic of violence" which is situated within "the tension between self and other, friend and enemy, interior and exterior."[174] Giving a

[171] Byung-Chul Han, Topology of Violence, trans. Amando DeMarco, MIT Press, 2018, p.vii
[172] Arendt, On Violence, p.44.
[173] Han, Topology of Violence, p.70.
[174] Han, Topology of Violence, p.64.

definition for the topological change of violence where instead of taking place in isolated zones—of prisons, war zones—violence is now diffused through everyday infrastructures. Han argues;

> The situation in which an act of violence occurs often arises from the system and the systematic structure in which it is embedded. Thus, manifest, expressive forms of violence can be traced back to these implicit structures, which establish and stabilize a system of domination but which withdraw from visibility. […] Because of their invisibility, the victims of the ruling system's violence may not be directly aware of it. That is what makes it so efficient.[175]

Violence becomes invisible, smooth, and normalized which works not through repression but through excess, overproduction, and internalization. The macro-logic is what enables this invisibility, by embedding violence in the very structure of freedom, positivity, and performance. Violence, Han argues, has gone from the negative—explosive, massive, and martial—to the positive, wielded without enmity or domination. This, he says, creates the false impression that violence has disappeared. Anonymized, desubjectified, systemic violence conceals itself integrated into the systems.[176] Han's investigation of the macrophysical manifestations of violence, the form of negativity, develops from the tension between self and other. From this perspective, an externalized version of violence can be developed. These manifestations include;

The violence of positivity, Han warns, could be even more disastrous than that of negativity as he introduces the concept of "positive violence" as a form that is often hidden or obscured and that operates through systems and processes rather than through visible acts of aggression or domination.

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[175] Han, Topology of Violence, p.77.
[176] Han, Topology of Violence, p.3-7.

2.3.2 Logistical Violence

Logistical violence is often characterized by its mediation and dispersion, as well as the difficulty in tracing or attributing responsibility for it. Several examples of logistical violence, including the violence that is inherent in the global division of labor and the exploitation in developing countries, the violence of environmental destruction and the destruction of ecosystems, and the violence of surveillance and control that is exerted through technologies such as CCTV and data tracking can be listed as violent activities in positivity.

Deborah Cowen's work should be re-read together with such topological shift. In "The Deadly Life of Logistics: Mapping Violence in Global Trade," Cowen examines the role that logistics systems play in the violent practices and outcomes of global trade.[177] Her remark on the emergence of logistics as a transition in the global space economy is a critical one where "just-in-time production and distribution that there is now an urban form named in its honor."[178] According to Cowen, the city of logistics is a conception of urban space that is reduced to a singular function, ensuring the secure management and movement of global trade inventory. Moreover, violence is an integral part of logistical cities rather than merely an accidental feature of these systems. The use of violence to maintain and control access to resources, impede and control the movement of people and goods, and defend property rights and territorial boundaries are just a few examples of the violence that Cowen discusses concerning international trade and logistics systems. She also examines how violence is frequently hidden or obscured in these systems and how it is frequently difficult to pinpoint or place responsibility for it.

Logistical violence becomes an invisible one, shifting from the visible to the virtual and unacknowledged. Violence of logistics is a positive, wielded without enmity,

[177] Cowen, The Deadly Life of Logistics, p.231.
[178] Cowen exemplifies Dubai Logistics City (DLC) Cowen, The Deadly Life of Logistics, p.171.

however, continues to perform in the networks of domination. This creates the false impression that logistical violence is anonymized and desubjectified. Nevertheless, it is systemic and concealed in the ecology of logistics with a guise of positive-ness.

Logistics operates not merely as a neutral system of movement coordination but as a governing rationality. Infrastructure serves as the means of logistics: the compartmentalized, modular, and often invisible substrate through which logistical operations are enabled. Ecology becomes the mode of logistics — not in the romantic sense of nature, but as the dynamic medium through which matter, energy, and life are modulated, extracted, or made to adapt. Logistics navigates and reshapes ecologies through feedback and exhaustion. Ultimately, violence emerges as the outcome of logistics, not as an aberration but as a systematic effect: in the displacement of bodies, the erasure of communities, and the uneven exposure to harm. Violence is not incidental to logistics but is its externality—the optimization protocol of circulation and control. In that, the infrastructure of logistics dictates the underlying principles of ecological registers leading to a question of power and violence. What can be utilized, and how is it not separable from what is within reach and what it takes to achieve it? Logistics acts as a regime that manipulates by creating fluidities, overcoming frictions, and sacrificing lives for the sake of low viscosities, shortcuts, and high profits. The logic surveys the margins of fast movement without incorporating the needs of the marginalized and immobilized, instead dwarf them. Moreover, by accelerating the speeds of mobilization, logistics fragments communities, creating barriers by mobilization while simultaneously perpetuating the environments. Therefore, it does not merely instrumentalize violence to function—it calculates it as an efficiency protocol. When existing infrastructures fail to conform to efficiency protocols, logistics invents, bends, and reconfigures them, generating an ecology of systemic violence.

CHAPTER 3

RECORDING DEBRIS LOGISTICS

The term *record* refers to the act of inscribing information across time and space. At its most basic, a record is a trace—material or immaterial—that provides a ground to discuss the conditions so that it can be interpreted, and acted upon. Epistemologically, records function as instruments of knowledge: they organize the relationship between what is known, what is visible, and what is *sayable* within a given regime of truth. The record here functions as a counter measurement towards the regime of "logistical truth." From site excursions to geological strata, records mediate the boundary between occurrence and meaning, event and memory, matter and time.

This chapter examines how logistics operates as a tool of circulation and as a crisis response, which is the central mechanism in producing, managing, and obscuring the conditions of crisis itself. Following the notion of logistical violence, chatper traces the intertwined dynamics of infrastructure, ecological disruption, and political violence. In that, it aims to demonstrates how logistical violence produces particular conditions in post-disaster contexts as a function of intervention and as a generator of harm. Through the lens of the 2023 Türkiye–Syria Earthquakes, it interrogates how logistical systems participate in the reproduction of authoritarian control, ecological degradation, and epistemic fragmentation, especially within Türkiye's contemporary construction ecology. Rather than treating logistics as a neutral conduit, the chapter reveals it as a governing force that reorders space, suspends legal protections, and displaces responsibility under the guise of emergency management.

Mobilized debris serves as a material witness to these operations—both as residue of destruction and as an active agent in the consolidation of power. Following the movement of debris across disaster zones, ecological corridors, and contested

jurisdictions, the chapter situates logistics at the heart of the violence, showing how its invisible operations reshape the politics of reconstruction, accountability, and environmental futures.

3.1 Destruction by Logistics: Fault Lines of a Regime

Demonstrating how logistics, within its domains, accompanies various crises—particularly altering the planet's functioning and the rules of habitation. The fact that logistics simultaneously reveals the infrastructures, ecologies, and violence does not imply that it alone carries the agency of the crises by itself. Logistical agency is, in fact, connects distribution policies preparing the ground for mobilization.[179] On one side, crises are caused by breakdowns within logistics itself—such as the Suez Canal blockage impacting global supply chains, the Russian invasion disrupting food networks, and the bombing of Iran affecting energy distribution.[180] On the other side, disruptions happen because of the logistical interventions to crises. Activities that are often perceived as contribution to the damaged environments are open to such disruptive consequences. For example, colonization of Korle Lagoon by Western fast fashion donations, mobilization of Syrian refugees working on imported plastic waste of Türkiye, and even the military operations blocking the aid efforts to Gaza can be listed to show the extent of such interventions. Studies on logistics neglect this secondary relation and overlook its significance as a complementary role in

[179] Easterling formulates the relation between logistics and infrastructure. For the author, infrastructure being the means of policy-making, prepares the ground for logistics to manage flows. With Cowen's remarks it becomes evident that logistics' agency lies its capacity to coordinate flows of people, goods, and information and organize infrastructures to effectively govern mobility and access. For more, see Chapter 2, 2.1 Infrastructure and Logistics and 2.3.2 Logistical Violence Keller Easterling, Extrastatecraft, 2014. Deborah Cowen, The Deadly Life of Logistics, 2014.

[180] The intentions emerge from the techno-scientific knowledge of logistics. To be later presented in Chapter 4, the proposals from reverse logistics provide solutions by perspectives within logistics, while the criticism on techno-science depicts the conditions that logistics bring with neutrality claim.

defining the spectrum of the violence in logistics.[181] Therefore, this chapter brings these two roles by taking the intervention to crisis as a primary connection to depict a neglected side of logistical violence. To make that connection visible, thesis offers destruction *debris* as the material evidence of logistical violence. Following cases of debris mobilization, chapter aims to unfold the violence starting by the relation between politics and logistics. Creating the backbone of the chapter by informing with the local political landscape of the construction industry in Türkiye reveals how local interplays can reflect global patterns. The uninspected environment, uncertainties in jurisdictions, interrupted condition of democracy are presented as the framing attributes of the local politics converging with the idea of logistical regime.

Study follows the mobilization networks of the recent tectonic activity along the fault line of the 2023 Türkiye–Syria earthquakes. Tracing the logistics after the destruction of the earthquakes uncovers several registers accompanying mobilization networks. This tracing is conducted by mapping the afterlife of the destroyed built environment—revealing the dysfunction of inspection mechanisms, restrictions on information, site selections made without precaution, designation of priorities, and overlooked vulnerabilities as problems generated in human and nonhuman contexts. In that, agency of logistics intersects with the inclinations in the local political landscapes. Since logistics is the organization that systematize the aid efforts and regulations in disaster-struck geographies—authoritarian regimes frequently turn to it as the chief *apparatus* of crisis management.[182]

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[181] Following the work of Claire Lyster who deploys discursive connections between infrastructure, ecology, violence and logistics through analyses, investigations and indexes. Clair Lyster, Learning from Logistics, 2014.

[182] Logistics as an Althusserian state apparatus commodifying the disaster environment by extrication value through the management of distribution. Logistical activity is an example to material existence of ideology represents exercise of hegemony (or domination). Louis Althusser, On the Reproduction of Capitalism: Ideology and Ideological State Apparatuses, Verso Books, 2014.

Logistics strikes as a significant component for the current authoritarian political regime in Türkiye to control the infrastructural expansion. In this regard, post-disaster logistics acts as an invisible specialist in cases where it is a controlling agent of harm. Compared to its manifestations in heavily inspected geographies, its relationships with unregulated built environment, provide contextual grounding for the rest of the study. Providing the snapshots of cataclysm locate a meaning for the residue in the context of politics in Türkiye. Within such context, how debris logistics has become an exceptional activity and why its information has been obscured provide the analytical entry points to understand the governance of material crisis in 2023 Earthquakes of Türkiye.

In recent years, Türkiye's economy has been transformed by state incentives centered on the construction industry, shifting into a zone of growth and profit.[183] From the early 2000s and onward, expansive sectors were created around companies taking contracts of highways and bridges, and government-affiliated institutions such as Housing Development Administration.[184] In the 2010s, with major contractor firms emerging, expenditure on housing and transportation infrastructure has fostered a monopoly on means of production in construction sector.[185] Resulting as a closed construction ecology and unmonitored built environments, this monopoly produced a susceptibility to disasters.[186] Throughout the past two decades, the built

[183] Seda Demiralp, "Making Winners: Urban Transformation and Neoliberal Populism in Turkey." *Middle East Journal,* Vol.72, No.1, 2018, p.89–108.
[184] First issue of International Planning Studies Journal Vol 16 focuses on the expenditures of TOKİ, acting under state authority. The institution has become the main actor and sector of state-driven construction economy. "Urban Development and Planning in Turkey: The Case of TOKİ and the Politics of Urban Renewal," *International Planning Studies,* Vol.16, No.1, 2011,
[185] Yeseren Elicin, "Neoliberal transformation of the Turkish city through the Urban Transformation Act," *Habitat International*, Vol.41, 2014, p.150-155.
[186] Construction ecology is the relational ground of its agents and their environment. Other complementary terms such as industry, sector and market fall under the category of construction ecology. For Türkiye, this is an ecology of recently-grew large firms controlling the flows of construction, their addressing, and the built environment that materializes under their command.

environment of this ecology has been tested repeatedly by destructive and unexpected events.

Recent unexpected events exemplify the "means and ends" of this construction ecology. Kartalkaya fire, as a recent snapshot, offers how inspection mechanisms behave in need of an action—or inaction. The fire happened in Grand Kartal Hotel led to an inexplicableness due to the poor reasonings of the incident. The Grand Kartal Hotel fire came to public attention through reports suggesting that it was caused by the failure to implement and enforce fire safety regulations. Located in Bolu Kartalkaya—a region known for its concentrated ski tourism—the hotel was reportedly operating without a fire suppression sprinkler system, and with malfunctioning heat sensors. These deficiencies mark the origin of the crisis, but the real issue lies in how control and accountability are tied to enforceable sanctions. Lack of monitor and sanction turned a fire incident into disaster showcasing the inability of construction ecology to meet the standards.[187] Following the incident, public outcry intensified as reports surfaced, but efforts to deflect responsibility among actors sought to oppress the backlash. This and earlier disasters reveal that inspection mechanisms disappear under certain conditions.[188] These conditions are crafted to fit technical means which renders them inefficient.

One of the striking examples of the technical means is the ambiguous markings of jurisdictions. The uncertainty of jurisdictional responsibility in the Kartalkaya disaster—marked by blame being passed between the governorship and the municipality—points to a politico-technical problem that reminds the role logistics

[187] In the incident, where 78 people lost their lives, public outrage was redirected by various authorities—from the highest officials down to the lowest-ranking employees—as an attempt to diffuse responsibility. Susan Fraser, "At least 76 people killed in a hotel fire at a ski resort in Turkey," *APNews – World News Section,* January 2025. https://apnews.com/article/turkey-ski-resort-hotel-fire-dead-ec925fbe132455d4bf13e470aca79f0d [Accessed on: March 13 2025]

[188] Fundanur Öztürk, "Kartalkaya otel yangınında yetki tartışması: Uzmanlar ve mevzuat ne diyor," *BBC News Türkçe,* January 2025. https://www.bbc.com/turkce/articles/cn4mglwgrmro [Accessed on: March 13 2025]

in post-disaster environment.[189] National conducts suggests that building practices cannot legally proceed without inspections and approvals following regulations and contracts. In regular processes, construction sites are routinely monitored by building inspection agencies. Projects—managed by teams of architects and engineers—cannot begin without municipal approval. Each building is subject to regulatory documents, on seismic resilience, excavation management, recycling standards, and environmental impact assessments and so on. However, in some cases these inspections remain merely formal—they exist only on paper—and developers' permissions and flexibilities open large leeways.[190] As accidents and collapses occur, they lay bare the extent to which standardization has been breached and subordinated to the will of the actors. As in the case of Kartalkaya fire, political landscape consolidates by bending the technical means of inspection and sanction for the benefit of status quo. The failure to prosecute the crimes and covert violence signals future crises of growing scale.[191]

One can argue that this is one of the contradictions of capitalist economies which is frequently observed in the global stage where states pump dispute between the actors to consolidate its power.[192] In the case of Türkiye, such disputes not only trigger

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[189] Tierney discusses how disasters often expose the underlying failures of fragmented governance and institutional overlap. Her analysis of "governance gaps" is directly applicable to cases where municipalities and central authorities blame one another. Kathleen Tierney, The Social Roots of Risk: Producing Disasters, Promoting Resilience, Stanford University Press, 2014.

[190] There are several examples on expropriations of beaches, dismissal of environmental impact reports for mines, impropriety on parcel factors in Türkiye, creating a new and fast technocratic status among the shareholders.

[191] Tansel demonstrates how neoliberal policies and authoritarianism in Türkiye has rendered institutions functionless and ineffective. This dismantled mechanism of accountability, leading to the paralysis. For Tansel, this situation paves the way for structural crises. Cemal Burak Tansel, "Authoritarian Neoliberalism and Democratic Backsliding in Turkey: Beyond the Narratives of Progress." *South European Society and Politics*, Vol.23, No.2, 2018, p.197–217.

[192] Harvey says: "Contradictions when they erupt into a crisis of capital generate moments of 'creative destruction'. Rarely is it the case that what is created and what is destroyed is predetermined and rarely is it the case that everything that is created is bad and everything that was good was destroyed. And rarely are the contradictions totally resolved. Crises are moments of transformation in which capital typically reinvents itself and morphs into something else." Harvey, David. Seventeen Contradictions and the End of Capitalism. Oxford: Oxford University Press, 2014, p.4.

capital control but also adjust the social registers. The failure of inspection mechanisms and ambiguous interpretations of jurisdictions adapt social registers to concede and survive with them. Another example of an incident displays how such conditions lead to logistical violence.

After the earthquake, the disconnection of the region from logistical networks caused great concern among the public, leading to the creation of civilian aid campaigns. Large sports halls, associations buildings, and all spaces that allowed the local population to organize and get together were filled with donation boxes for the earthquake zone. Materials were mobilized through informal logistical networks, all with good intentions to reach to the survivors. Immediate needs such as water, canned food, pads, tents, heaters, baby diapers, and blankets were carried from halls to trucks through human corridors. Although most of the donations could reach to the zone, many materials were found scattered along the roads, due to the failure to establish correspondence. Discussing such occasions through the agency of logistics points to a significant issue regarding the secondary crisis in the post-disaster environments.

The situation where a truck driver drops off the goods at unexpected point is actually an expected occurrence. Logistics as a system that creates connections does not concern the content of the goods, rather it solely makes connections in-between the destinations. This is evident considering the utilization of the formal logistics web for illicit smuggling activities.[193] Formal logistics networks succeed to the extent that they can control the speeds of circulations while reducing the risk factor in terms of security of the goods. This sole connection-making does not include the risks that can change the ecological changes in the connected nodes. In informal examples,

[193] There are many news articles, scholarly studies and known cases of human and drug traffic in formal logistics companies. Officials in logistics business record crime organization making use of logistical networks since their spaces of operations are devoid control are likely to be open to misuse. As an example: Gautam Basu, "The role of transnational smuggling operations in illicit supply chains," *Journal of Transportation Security*, 2013, p.6.

these factors cease to be part of logistical organization, rather imitate the formal protocols, such as human corridors for pallets. The driver, while connecting the destinations, disengages the goods to the point where his jurisdiction ends. This ambiguous condition is a small but a meaningful example of logistical violence to understand the coupling of Türkiye's current corruption mechanisms adapting to the logistical ecology.

The failure of the responsible parties of the inspection mechanisms to be held accountable for the hotel fire, due to the uncertainty of technical infrastructure after the fire, shows the similarity to logistics in the inspection mechanisms. Logistical organization does not include concerns with the emerging conditions, once they complete the transportation and transaction. This leads to a responsibility-free environment engaging with actors in anonymity. Agencies in logistics, therefore, can easily challenge the sanctioning mechanisms. On one side, we see logistics moving in post-disaster environments without control. On the other side, we witness how logistics evolves to escape accountability for the benefit of the status quo. These two examples show the logistics' ability to avoid accountability in both pre- and post-crisis situations, as it mobilizes or fails to mobilize technical documents, needs, and crisis prevention systems.[194]

Though this environment logistical violence emerges with the obstruction of perpetrator's identity, definitions of crimes, and causes of loss, it also generates uncertainty about the nature of the problem itself—instigating a "crisis of crisis."[195]

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[194] These do not have be only about technical documents but inscriptions of data with maps, graphs, images etc. with a central node that collects and interprets them. Logistics of information is discussed in Chapter 4, 4.1. Technoscientific Knowledge of Logistics.

[195] Joseph Masco defines the "crisis in crisis." For the author there is a condition in which the concept of crisis no longer prompts structural change but instead functions to stabilize existing systems. This condition of crisis acts as a counter-revolutionary force. It does not enable transformation, yet, produce a constant state of emergency that narrows political imagination and reinforces the very conditions it claims to address. Crisis of crisis on the other hand is a complementary condition to crisis which supports the counter-revolutionary act. Continuous occurrence of crises, therefore, is

For Türkiye, the secondary crises arise with the disappearance of accountability and the rise of an omnipotent, abstracted common sense in so-called "consensus democracy."[196] Rancière defines,

> consensus democracy is a reasonable agreement between individuals and social groups who have understood that knowing what is possible and negotiating between partners are a way for each party to obtain the optimal share that the objective givens of the situation allow them to hope for and which is preferable to conflict.

Rancière completes the critique of the "post-political condition" showing how consensus-driven governance replaces contestation with technocratic "common sense."[197] Logistics determines the mechanism that defines the conditions of the situation within a consensus democracy by depoliticizing responsibility and intensifying systemic exclusion. The movement of logistics and its ability to establish relationships, such as determining the price of fire prevention materials, the location of abandoned donations, and the possibilities of technical specifications cannot be considered a neutral act. It achieves success not through capitalist motives, but by creating and guiding these motives, thereby charting the course. The optimal agreements, subsequently, arise not from logistics' mere transportation of goods, but from the solidification of its methods of creating politics and subjugating technicalities. In the light of logistics as a policy-making tool, attesting the local construction ecology in Türkiye, conveys the condition of logistics intervening with the crisis of earthquakes.

Türkiye's history of earthquakes provides many well-known examples: Varto (1966), Lice (1975), Çaldıran (1976), Erzurum (1983), Erzincan (1992), Adana (1998), Bingöl (2003), Van (2011) along the East Anatolian Fault; and Tosya (1943),

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supported by secondary and unintentional form of crises. Joseph Masco, "The Crisis in Crisis." *Current Anthropology* Vol.58, Supplement No.15, 2017, p.65–76.

[196] Jacques, Rancière. Disagreement: Politics and Philosophy. Minneapolis: University of Minnesota Press, 1999, p.102.

[197] Jacques, Rancière. Disagreement, p.103.

Bolu (1944), Yenice (1953), Gölcük (1999), İzmir (2020) along the North Anatolian Fault all mark this region as an active seismic geography. Then, there occurs a question of how and why is destruction still inevitable, in a land frequently tested by earthquakes?[198] The regulation, thought to meet the country's needs technically in the construction sector after the earthquake in 1999, remains a real question mark for why it was unable to prevent the disaster that occurred in 2023. Why were the technical specifications designed to prevent the crises arising from the destruction and the movement of the destruction unable to prevent the suffering experienced in recent earthquakes or other disasters? The protection of rights and resources, and the prevention of the crisis appeared to be possible on paper, yet what layers of shortcomings or changes prevented the disaster from being natural? In response to these questions, the role of logistics as the instigator of crisis becomes a significant marker for how it navigates within the fault lines of the political regime in Türkiye.

Reiterating the lack of inspection within logistics and its domains: infrastructure developed—guided toward status quo—has created growth zones insulated from scrutiny.[199] The established forms of governance in Türkiye reveal that crisis-control happens through such methods. The physical manifestations of the infrastructure connect cities, produce housing, and solve energy problems while simultaneously imposing oppressive operation with dispossession and displacement of communities. The control of material mobilization under the autocratic regime appears as a violence peculiar to logistics. However, logistical regime results in many forms of crisis—zoning amnesties, rapid urbanization, ecological destruction, irregular

[198] Chile comes to mind—a country that, despite economic and social motivations, also tightened its building and inspection regulatory system. Its response to the 8.8-magnitude earthquake in 2010, which lasted three minutes, and resulted in markedly fewer casualties compared to lighter tremors in Türkiye, indicates a far more effective infrastructure and inspection mechanism. American Red Cross Multidisciplinary Team, "Report on the 2010 Chilean Earthquake and Tsunami Response: U.S. Geological Survey Open-File Report 2011-1053," v. 1.1 https://pubs.usgs.gov/of/2011/1053/ [Accessed on: June 24 2023]

[199] Begüm Özkaynak, Ethemcan Turhan, & Cem İskender Aydın. "The Politics of Energy in Turkey: Running Engines on Geopolitical, Discursive, and Coercive Power." *In The Oxford Handbook of Turkish Politics*, ed. by Güneş Murat Tezcür. Oxford: Oxford University Press, 2020.

urbanization, displacement, irregular migration, gentrification—by prioritizing distribution of materials, goods, capital, information and people.[200]

In a region that historically and geopolitically generates logistical regimes, one can observe how capitalist built-environment reproduces itself at territorial scale.[201] Although authoritarian systems may activate the necessary technical infrastructures during crises, they re-emerge as logistical regimes that conceal one crisis beneath another. In autocratic regimes where inspection systems are often viewed as frictional, logistics dictates such neutrality more abruptly. This neutral perception reflects the deep entrenchment of logistical rationality within infrastructural paradigms that depoliticize the spatial and material conditions of violence and inequality.[202] Logistics as the precursor of economic growth through construction in the political context of Türkiye provides a global motive of material mobilization. Considering how the logistical ecology manages crises by handling the aging, instability, necessity, and renovation of the built environment become more susceptible to disasters, showing the "fault line" of mobilization.

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[200] In 2018, TMMOB published a report detailing how the changing building inspection practices have become commercialized and transformed into procedures without considering the public interest. The report, which also addresses topics such as zoning amnesty and earthquake inspections in detail, summarizes the situation with the following sentence: "Undoubtedly, building inspection is not only a matter of legal regulations. The determination of the practitioners in this area is as important as the legislation itself." TMMOB, "TMMOB Yapı Denetim Raporu," 2018. https://www.tmmob.org.tr/icerik/tmmob-yapi-denetim-raporu-yayimlandi [Accessed on: March 3 2023]

[201] As being in a connective part between three continents shows, in addition to two straits connecting the northern and southern seas of Eurasia, Anatolian geography has been a conduit in global connections. During a discussion between Namık Erkal, known for his studies in the history of distribution systems, we talked about how logistics has been a significant source of political decisions in Türkiye. The exhibition of Kanal Istanbul, a project of secondary strait parallel to Bosphorous, depicts an example for strengthening the infrastructural expansions of the logistical regime. Bi'Özet, "Kanal İstanbul'u Kesitler Üzerinden Düşünmek Sergisi Açılıyor," February 2025. https://bi-ozet.com/2020/02/25/mimarlar-dernegi-1927nin-duzenledigi-kanal-istanbulu-kesitler-uzerinden-dusunmek-sergisi-aciliyor/

[202] Brian Larkin, "The Politics and Poetics of Infrastructure." *Annual Review of Anthropology*, Vol.42, 2013, 327-43.

3.2 Debris of Destruction: Residual Matter of Logistics

The residual materials cover a significant portion of the planet's technosphere signaling a global problem with local fabrications. Particularly in the case of Türkiye, residual matter is growing by the production of wasted compounds with every incident and crisis. Exported waste, forest fires, desertification, erosion, and dried lakes indulge in different forms of residual matter.[203] Residual matter of disasters is not a lost material but continue to exist in logistical systems. We will call this circulating material as *debris*.

In the final chapter of "Expulsions," Saskia Sassen describes "a global multi-sited array of dead patches of land and water in the tissue of the biosphere" while questioning the globally distributed conditions shaped by systemic violence and infrastructural operations around mobility.[204] For Sassen, *dead patches* emerge with the circulation of matter—from logistical systems that reorganize terrain through extraction, waste disposal, and accumulation.[205] Author calls for understanding the networks of "land grabbing"—a territorial act executed through the mobilization of things.

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[203] The listing of environmental disasters asserts that logistics has a potential to play a part in every kind of catastrophic event. For instance, studies show that increasing numbers of forest fires exceeds both the number and scale of the seasonal occurrences. As this cannot be taken apart from global array of logistical activity, recovery and precaution systems in the disaster sites are operated around logistical ecologies. Another example for the integration of logistics can be the stripping of the forests with logistical corridors. However, this study continues its discussion around the mobilization of residue after the disaster. Byrne, B., Liu, J., Bowman, K.W. *et al.* "Carbon emissions from the 2023 Canadian wildfires," *Nature* Vol.633, 2024, p.835–839. https://doi.org/10.1038/s41586-024-07878-z

[204] Mobility and mobilization are two different terms. This study focuses on mobilization – alignments, organizations, politics and strategies–while embarking on different aspects of mobilities – patterns, forms, freedoms and equalities of movement. For the study mobilization is a way to embark on logistical movement. For more mobility as a socially distributed movement: Tim Cresswell. "Towards a Politics of Mobility," *Environment and Planning D: Society and Space*, Vol.28, No.1, 2010, p.17-31. https://doi.org/10.1068/d11407

[205] Although she does not stress the significance of logistics as one of the main contributors. However, she mentions it as follows: "Today's [capitalism] is a form of primitive accumulation executed through complex operations and much specialized innovation, ranging from the logistics of outsourcing to the algorithms of finance. Saskia Sassen, Expulsions: Brutality and Complexity in the Global Economy, MA: Harvard University Press, 2014, p.12

Sassen's call shows two important aspects of the residual matter. Firstly, it signals a post-mortem condition. Residual matter emerges as the pieces of land that is being grabbed and loses its ability to sustain the life inside. Secondly, this grabbed land is in motion, by which she identifies a global array of circulatory mechanisms that contributes to the killing of the grabbed pieces of land. Dead patches emerge as a condition when materials depart from a place and relocated on another.[206]

This study introduces debris as a term to reflect on the materiality of the lands in motion and the lost patches of the Earth. Debris initially refers to mobilized destructed material in post-disaster environments. Meaning, debris relates to a range of ecologies between geological sedimentation to mobilized rubble. Such trans-scalar definition of debris depicts this range across the material registers, adapting to the flows of logistics while resisting temporal ones.

Etymologically, debris refers to the "accumulation of loose matter from some destructive operation or process."[207] Emerging in early nineteenth century French, this definition underscores the key characteristics of debris—its looseness, its detachment from structured use, and its association with devastation. On one side, debris is a matter existing as an accumulation after destructive rationale, on the other, it has a correlational past to the forces of destruction. This definition further develops with its connotations in geology.

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[206] Place as in "displacement." In the context of debris, residual matter displaced with logistical systems is the "place" itself. Debris mobilization by carrying the elements of a place; dwellings (Heidegger), atmosphere and topography (Norberg-Schulz) are displaced with logistical technologies ending up in non-places (Augé) and a feeling of placelessness (Relph). Thesis does not abstain from place-related discussions yet prefer to embark on logistics with such postulate. For more: George Papam Papamattheakis, "The Floor Is Not the Ground: Ecologies of Interruptions in Transportation Infrastructure." *Footprint (Delft Architecture Theory Journal),* Vol.12. 2018. doi:10.7480/FOOTPRINT.12.2.2040.

[207] Harper Douglas, "Etymology of debris," Online Etymology Dictionary, 2024, https://www.etymonline.com/word/debris. [Accessed on: March 18 2025]

In geological studies, debris is often conceptualized as the residual material resulting from weathering and erosion processes. These materials, ranging from fine sediments to large boulders, are mobilized by agents such as water, wind, and gravity, contributing to the dynamic reshaping of Earth's surface.[208] Debris in such context is a moving entity, without a distinct form. This formlessness directs a definition with mobilization and transformation. They are both the effect of a process and the medium through which further change occurs.[209] At the same time, debris depends on stability to start the processes of sedimentation. Caught between motion and capture, debris becomes both transported and embedded object. Mobilized and relocated through logistics, debris ends up in landfills, riverbeds, or unregulated dumping grounds. Unfolding via geological equivalent, debris is the remainder of former condition within which stratification changes its form, location and movement. As a material entity, its components change according to the context that debris indulges with.

Debris of destructed environments harbors a complex materiality. When faced with a catastrophic event, built-environment produce debris with of the destruction buildings and infrastructures. Destructed materials are gathered during the post-disaster cleanup activities to be relocated away from the epicenter. For instance, debris cleanup after 2023 Earthquakes started after a month, mobilizing rubbles of destructed concrete blocks to mountain tops, riverbeds, sand beaches and grooves.[210] Concrete, being the common component of construction industry, constitutes the majority of residual matter after the destruction. However, post-disaster debris of the

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[208] Shanmugam, G., Slides, Slumps, Debris Flows, Turbidity Currents, Hyperpycnal Flows, and Bottom Currents, *Encyclopedia of Ocean Sciences,* 3rd ed. Vol. 4, 2019, p.228-257. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/debris-flow [Accessed online on: May 25 2025]

[209] In geology, debris and debris flows are distinguished differently. However, in the discipline of geology, debris is also not considered apart from flows of materials and their movement patterns, risks, and accumulation. USGS, "What is a debris flow," 2025. https://www.usgs.gov/faqs/what-a-debris-flow [Accessed online on: May 25 2025]

[210] Sedat Gündoğan, "Felaketin Felaketi: Enkaz-Moloz-Afet İlişkisi," *Mekan için Adalet, Atık Sayısı*, Vol.15, 2024.

earthquakes maintained a combination of materials, with plastics, insulation, woods, organic components, paints, metals, toxic materials. Material qualities of component show different processes of decomposition and decay, creating different temporal responses in their dumping zone.

Material index of debris, moreover, consists of organic life. Humans, cows, trees, pets, bugs and every kind of living being that is inside the logistics end up as debris. Debris with an organic disposed components transcends material ecologies by embodying a larger context of *becoming*. Integrating itself onto terrain, debris changes the conditions towards the outside. Meaning, debris as mixture of components does not only affect the things within its reach, but also encompass past and present conditions that will continue to deprive the future possibilities.[211] These absorptions of living matter are sudden and unexpected and causing violence in a way that differs from several connotations of residual matter of rubble, trash or waste. These conceptions of residual matter situate debris as a distinct connotation that evokes its connection to mobilization in material and temporal dimensions.

Operations and processes that produce debris can be widened to encapsulate all forms of anthropocentric disposal methods. Instances such as marine waste, microplastics, rubble mountains, and degraded agricultural soils represent diverse yet interconnected forms of debris—once-functional materials now embedded as neglected and mobile remainders of the ecology of built environment. Terminology of waste, regarding the various classifications that highlight efficiency and utility, produce hazard regulations rather than prioritizing violence as a conceptual ground.[212] Being defined by disposability, waste as a term utilizes markings,

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[211] This study resists the pragmatist and utilitarian refunctioning efforts of broken pieces of the past structures. As an early side note, these kind of approaches with which "green," "sustainable," and "cyclic" logistics operationalizes debris as a recoverable item. In that, this thesis is in favor of a theoretical opposition that upholds debris as the product of logistical ecologies.

[212] USEPA, "Resource Conservation and Recovery Act: Overview," *Resource Conservation and Recovery Act Laws and Regulations,* September 2024. https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview [Accessed on: May 26 2025]

categorizations, and management of refusal and disposal. Research focused on *recycle, upcycle,* and *sustainability* within risk analyses and reintegration processes follows biased perceptions of the waste. Construction and demolition waste (C&DW), being one of the most acknowledged classifications in waste studies, focuses on mitigating the impact of wasted matter by providing solutions within the industrial economy of removal.[213] Such frameworks often operate under the assumption that waste can be rendered benign. Moreover, those studies cannot go far in terms of a global problem from being multiplying as local atrocities.[214] As scholars like Sarah Moore and Josh Lepawsky have shown, sustainability discourses frequently displace waste onto marginalized geographies under the guise of global responsibility, creating colonial circuits of disposal.[215] Rather than reforming the narrow classifications, waste is stabilized under liminal imagination.[216]

Many forms of wasted matter are presented as neutral, inevitable byproducts of progress. Detached from their violent genealogies, waste of extraction, destruction, and abandonment cannot go beyond technical operations. Framed as disposable residues of industrial or urban processes, rubble, toxic ash, e-waste, or plastic detritus are often managed through efficiency, recycling, and sanitation. Although there are

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[213] Research on debris points out that annual production of destruction debris is fifteen times more than municipal waste, marking the significance of scaling the global disposal activity. These studies do not use the term debris yet consider construction and demolition waste as the problematic product. There is an abundance of textual material from the research on the science of logistics. A broader scale of the analysis on logistics as scientific discipline can be found in the 2nd chapter of the thesis. For debris related waste research: United Nations Environment Programme, "Global Waste Management Outlook 2024: Beyond an age of waste -Turning rubbish into a resource," 2024. E.K. Petrović & C. A. Thomas, "Global Patterns in Construction and Demolition Waste (C&DW) Research: A Bibliometric Analysis Using VOS viewer," *Sustainability*, Vol.16, No.4, 2024, p.1561. N, Al-Sakkaf A lshaboury, E. Mohammed Abdelkader, G. Alfalah, "Construction and Demolition Waste Management Research: A Science Mapping Analysis," *Int. J. Environ. Res. Public Health*, Vol.19, No.8, 2022, p.4496.

[214] Alexander Clapp, Waste Wars: The Wild Afterlife of Your Trash, Little Brown and Company, 2025.

[215] Remember the waste export of Türkiye in Adana. Although Sarah Moore do not take this a case, she provides a frame to understand the concepts of such activities. Moore, Sarah A. "Garbage Matters: Concepts in New Geographies of Waste." *Progress in Human Geography,* Vol. 36, No. 6, December 2012, p.780–799.

[216] Christopher Woodward, In Ruins, London: Chatto & Windus, 2001, p.15.

efforts to surface the obscured socio-political systems that produced them, this framing often depoliticizes waste. By separating it from the labor, displacement, and ecological devastation that produced it, waste becomes something to be measured, classified, or reintegrated, rather than contested. As one of the prominent examples of such efforts, William Viney explains the act of discarding as "simply peculiar windows into the past" which also "offer a model of the future."[217] Similarly, Anna Tsing suggest, waste is a relational category, produced through regimes of value and neglect.[218] In this light, wasted matter must be re-read not as the end of a material cycle but as a continuing agent of harm—circulating through bodies, landscapes, and infrastructures long after its use has ended. What is presented as inert is, in fact, mobilized—governing space, defining zones of exposure, and reinforcing hierarchies of whose environments are rendered livable and toxic.

As debris travels across terrains, its movement leaves patches of gray marks on the land. The presence of debris patches as chaotic superpositions of materials adds up to the human marking in the geological timescales. This geological perspective lays the groundwork for thinking about debris beyond the natural sciences to its spatial agency in logistical ecology. In this way, debris exceeds the status of a passive remainder by becoming an active force in geophysical formations. While in geology this former unity is an eroding hill, in construction-related environments it is the building.[219] Slow time of eroding hill is grabbed and integrated into distribution networks which transforms it into a part of built environment. Transformation of geophysical bodies happens through a cascade of logistical activities in extraction

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[217] William Viney, Waste: A Philosophy of Things, London: Bloomsbury, 2014, p. 58.
[218] Anna Tsing, "Contaminated Diversity in 'Slow Disturbance': Potential Collaborators for a Liveable Earth," in *Why Do We Value Diversity? Biocultural Diversity in a Global Context*, ed. by Gary Martin, Diana Mincyte, and Ursula Münster, RCC Perspectives 2012, No.9, 95–97.
[219] This far-fetched analogy brings out from the idea that asserts debris as a recursive matter in construction ecology. Debris does not leave the logistical environment even after its disposal, especially when it meets with a context where resources has not become a debris.

industry to construction and eventually destruction.[220] In that, debris signifies a paradoxical position: once fluid—sedimenting across terrains via rivers and erosions—and stable, as its sediments into the ground, forming recoils of nutrients. When put in the context of logistics, debris becomes a construction matter in fast cycles of building market. Then, it is mobilized by being integrated back into the distribution networks, by being rendered as a mobile—or fluid—waste matter dripping into the soil.

Since 2023 Earthquakes Türkiye has been experiencing a logistical regime in the disaster-stricken zone, taking side with power mechanism of construction industry. The condition, being backed up by geopolitical position, corrupting mechanism signals an increase in debris production. Debris is the material evidence of crises, eventually creating a secondary crisis by its mobilization within the logistical accounts of monopolist construction ecology. As crises reset the conditions of this ecology, earthquakes, too, surface how exceptional this power mechanism behaves.

3.2.1 Debris Logistics in States of Exception

The state of emergency declared in the earthquake zone highlights the principles of logistics under crisis.[221] The decision of state of emergency brings about a *state of* exception which informs us with the legal and spatial orders that suspends the normalized and continuous actions. As theorized by Giorgio Agamben, the state of

[220] Sassen depicts extractive capitalism as the main economic model of "territorial degradation and making of the dead land." Saskia Sassen, Expulsions, p.173.

[221] Translated excerpt from the notice of (OHAL in Turkish): "According to the decision signed by President Recep Tayyip Erdoğan, within the scope of Article 119 of the Constitution and Article 3, paragraph 1, subparagraph (a) of the State of Emergency Law numbered 2935, a state of emergency was declared in Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye and Şanlıurfa for 3 months as of 01:00 today." News article from Department of Communication on the second day of the disaster. TC İletişim Başkanlığı (Ministry of Communication) "Depremden etkilenen 10 ilde kararlaştırılan OHAL ilanı, Resmî Gazete'de," February 2023. [Accessed on: May 12 2023] https://www.iletisim.gov.tr/turkce/haberler/detay/depremden-etkilenen-10-ilde-kararlastirilan-ohal-ilani-resmi-gazetede

exception is a juridical paradox in which law operates by suspending itself often in the name of security, recovery, or efficiency.[222] His framing of state emphasizes how sovereign power becomes most visible when it claims the right to suspend law in order to preserve its continuity. This is a significant concept to point out the methods of governmental apparatuses acting on legal boundaries in the crisis environment. As such logic frequently parallels with mobilization strategies, logistical management during wars, emergencies, and disasters often operates through the spatiality of the state of exception. How the bodies will be carried, destruction will be handled, and aid will reach to the site does not include optimized solutions, rather provided with chances of extraregular operations on the environment. As an example, there is an article from the presidency of the republic which was published immediately after the start of the cleanup activity in the Earthquake Zone. Article No. 126 states,

> (13) The dumping of debris waste from disaster areas shall be carried out in areas designated by the relevant governorate, provided that environmental protection measures are taken. Debris waste may be used in infrastructure and superstructure investments by subjecting it to recycling, in accordance with the relevant standards and necessary conditions. These dumping sites and the works and procedures to be carried out in these areas are exempt from the documentation provisions of the relevant legislation.[223]

Framed as a pragmatic measure to expedite the disaster response, this clause of presidential decree introduces a fitting example to state behaving under exceptional terms. Legal ambiguities overcoming administrations of the site revealed that suspending the laws to protect the environment has not ended up in favorable results in the zone in terms of profitability. Being exempt from the documentation

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[222] Agamben derives state in "state of exception" as a term to define the (S)tate in exceptional temporal conditions to legitimize its actions. Since this might cause confusion in English translation, state only as a temporal condition will be highlighted throughout the study if necessary. Giorgio Agamben, State of Exception, trans. by Kevin Attell. Chicago: University of Chicago Press, 2005.

[223] Translation from: Cumhurbaşkanlığı Kararnamesi (Presidential Decree), 2023, 126 no'lu Olağan Üstü Hal Kapsamında Yerleşme ve Yapılaşmaya İlişkin Kararname, Resmi Gazete, No: 32114.

provisions, logistics of debris could benefit from the disorder to dismiss harmful material in unrestrained areas without the binding of inspection and sanction.

A critical reading reveals that such exemptions allow material flows to enable an unregulated spatial policy of debris management. Under normal circumstances, the dumping, transport, and reuse of disaster debris are subjected to a range of documentation provisions defined by Turkish environmental legislation. These include Environmental Impact Assessments (Çevresel Etki Değerlendirmesi – ÇED) under the Environmental Law No. 2872, waste transport manifests and disposal certificates as outlined in the Waste Management Regulation (Atık Yönetimi Yönetmeliği), and operational permits such as Temporary Activity Certificates and Environmental Licenses governed by the Environmental Permit and License Regulation (Çevre İzin ve Lisans Yönetmeliği).[224] Additionally, soil and groundwater protection measures, as well as public disclosure requirements during site selection and mobilization, are also part of the suspended legal procedures. The exemption from these provisions effectively deregulated the debris logistics, creating a legal grey zone in which environmental degradation, untraceable contamination, and institutional unaccountability become real and lasting risks in the zone.[225]

Enabling sovereign powers to act outside legal constraints while still claiming legal authority, these mechanisms are frequently mobilized during both war and disaster. Urgency as the justification of fast logistical interventions allows the state to override the rights and public deliberation. Agamben states;

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[224] The list of laws and regulatory documents is, in fact, longer. M. Selçuk, a geotechnical engineer who worked in assessment studies of debris site selections, provides a list of 18 documents including topics such as oil disposal, e-waste, polychloride and so on. Murat Ergenekon Selçuk, "Soil Mechanics and Geotechnical Engineering Association," *February 6 Earthquakes Geotechnical Observations and Evaluations Webinar Series*, 2023. https://www.youtube.com/watch?v=ZMK-fa0VmNg&t=3978s [Accessed on: June 26 2025]

[225] The hazards from this condition are doubled, even tripled, with additional legal exemptions on mining activities and construction industries, which will be discussed thoroughly in the following section.

> The aim of this investigation—in the urgency of the state of exception "in which we live"—was to bring to light the fiction that governs this arcanum imperii [secret of power] par excellence of our time. [226]

For Agamben, the hidden secret of sovereign power lies in state's ability to suspend the law while still claiming legality. The result is the emergence of zones of exception—temporary camps, rubble fields, militarized peripheries—where normative governance is replaced by technocratic rule.[227] These zones are not outside politics; they are its intensifications. Sovereign power becomes visible in its ability to determine who is protected, who is exposed, and whose suffering is rendered necessary or invisible. In this sense, states of exception reveal the deep entanglement of law, logistics, and violence in shaping contemporary spatial and material politics.

In addition to policies that prioritizes strategic reconstruction and resource extraction, long-term public welfare of the zone is also dismissed. Therefore, state of exception declared in the earthquake zone is not merely a legal instrument to accelerate relief. It is a spatial technology that suspends procedural rights, and enables extraordinary logistical interventions under the guise of urgency. By overriding environmental measurements and regulations, public laws, and housing codes, the state gains power to reterritorialize space.

In this framework, logistics becomes the operative force of the exception by deploying the infrastructures of debris removal, displacing populations, and managing material flows without supervision.[228] The earthquake, then, is a reason which becomes the condition for infrastructure asserting power.[229] As Agamben argues, the fiction of legality is preserved through its calculated suspension, making disaster governance a paradigm of contemporary power. Such paradigms are

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[226] Agamben, State of Exception, p.87.
[227] Agamben, State of Exception, p.33.
[228] Remember the logistics as the force of planetary change in Chapter 2. For more, see: 2.1.1 Logistics against the Planetary Forces and 2.1.2 Logistics as a Planetary Force. Here, we see logistics as a state-driven force in the local context of 2023 Earthquakes of Türkiye as a controlling measure.
[229] Infrastructure as a way to constitute state with capacity to "craft" power out of the its spatial mediums. Easterling. Extrastatecraft, p.14.

nurtured under unrestrained forms of urgencies in parallel with the movements of destructive forces whether in wars or disasters.

Debris—whether from bombardment or seismic collapse—materializes the convergence of war and disaster. As the common denominator, debris is both the product and the medium of destruction. Within states of exception, debris becomes the product of suspension which emerges from decisions that override legal codes. It becomes the medium of logistical reordering, through which power is reasserted. Similarly, logistics functions as the shared operational grammar of both military campaigns and disaster responses. In both cases, logistics orchestrates the movement, sorting, and management of matter—bodies, ruins, aid, and equipment—transforming destruction into a governable process. Together debris and logistics forms the borders of exceptionality.

Clearing of space is the utilization of debris to govern the populations in crisis environment. For instance, epidemics presented as the fundamental reason behind cleanup urgency in the earthquake zone. However, the clearing activity in Hatay's—and other cities'—earthquake debris was mostly mobilized in vulnerable zones such as near disadvantaged communities, on river banks, ecological protection areas causing hygiene problems. These hygiene-based arguments depend on the urgencies of the site cloaked as a social and environmental health project. The reality strikes as the problem becomes a mobilizable occurrence. Such logistical activity highlights the formulation of urgency through debris. In this formulation, debris is not only what remains after destruction, but also what enables new configurations of authority. This authority decides where outbreak will be diminished and rise somewhere else. It marks the site where law is suspended and replaced with emergency operations, where bodies are buried and displaced, and where terrain is reorganized to serve new logistical functions. The state of exception thus renders debris a tool of governance: a material witness to the violence and a substrate for its

reconstruction.[230] As a medium, it is the material through which destruction continues to operate. By obstructing movement, contaminating ecologies, and masking bodies or histories beneath its weight, logistics supports the prolonging of the disorder.

Debris as a refused material suggests that logistical systems are the agent of disownment. Before-mentioned classifications of waste render the activity of distribution with a system of disposal and reintegration. Logistics taking part in such systems produces methods for collecting, describing, categorizing, selecting, and evaluating the refused materials. These methods compile the refused material to create an upstream towards the logistical flows.[231] Many of these efforts are, simply put, chasing a tail. In fact, procedures and protocols produced within those methods often play into the hands of distribution regimes both creating and managing the crisis. This condition becomes evident by looking at the infrastructures of these methods. The proposals that suggest to reverse the logistical flows rely on the infrastructures and ecologies that create logistical regimes. Since they are not capable of proposing an in-depth theoretical position towards refusal, the problem of refusal solidifies rather than it mitigates.

The theoretical approach that prioritizes debris as a mobilized material aims to disrupt the ecologies of refusal and disposal. Condition of debris in 2023 Earthquakes shows how logistics is an inert regimic force that deepens when allied with state of exceptions. Debris as an entity that maintains connection with a multitude of agencies, starts with grabbing of the matter and continuing with various

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[230] According to the Ministry of Environment, Urbanization and Climate Change's article, Presidency declared the repurposing of the post-disaster debris as infrastructural material.

[231] There is a growing interest in the concept of Reverse Logistics (RL) in the last 20 years. Manuel Vargas, et al. brings out a definition of reverse logistics in the literature review of their paper, by stating: "Reverse supply chains can be defined as the steps and means through which goods or part of them are produced, that is, the return to the production cycle recovering value in secondary markets through the reuse or recycling of its material components." Vargas, Manuel, et. al, "Reverse Logistics for Solid Waste from the Construction Industry," *Advances in Civil Engineering*, 2021, p.11. https://doi.org/10.1155/2021/6654718

forms of exceptions it operates. Standing at the top of the logistical heap, debris unfolds the conditions to reveal the tensions in the crises of the crisis.

3.2.2 Obstruction of the Knowledge in Debris Logistics

The logistics of debris suspended transparency and public accountability. Exception, when reformulated as a logistical device, operates with the sovereign act transforming debris management into an epistemic control.[232] This sovereignty decides what is visible, what is counted, and what is allowed to persist as evidence.

Obscuring debris data through inconsistent terminologies, withheld statistics, or restricted site access functions to split public understanding. With these methods of obstruction, state strengthened the conditions of epistemic fragmentation. With inconsistencies, data is fragmented into incommensurable parts. The use of *household*, *housing unit, independent unit,* and *estate* as terms to define separate spatial functions deployed an ambiguity around the actual number of destructions.[233] This incommensurability continues to split the information by withheld statistics of debris amount and number of sites. There are no clear and comparable approximations by the state. The ones they provide contradict the estimations done by third parties. [234] Additionally, wide ranges of volume approximations further the

[232] The idea of territorialization as a tool of epistemic control matches with several authors. Debris management by obscuring its information recalls several points in the literature, such as a spatial arrangement (Weizman), unaccountable networks (Cowen), and conditions of observation (Latour). Latour, Bruno. Science in Action., Cowen, Deborah. The Deadly Life of Logistics., Weizman, Eyal. Forensic Architecture.

[233] These are multivalent terms without direct translations to English. *Konut* is a singular housing unit with the function of dwelling. *Hane* simultaneously means digit and dwelling unit. *Bağımsız bölüm* is a real estate term to define an independent section divided for separate function. There is a slippery situation between the terms that shifts the meaning of units to become an excuse for errors.

[234] There is also a continuing discussion in Türkiye about the statistical studies about economic regression. State continuously drives a policy to lower the income of citizens by publishing low percentages of inflation rates. Since it does not provide a referenceable and detailed result, this

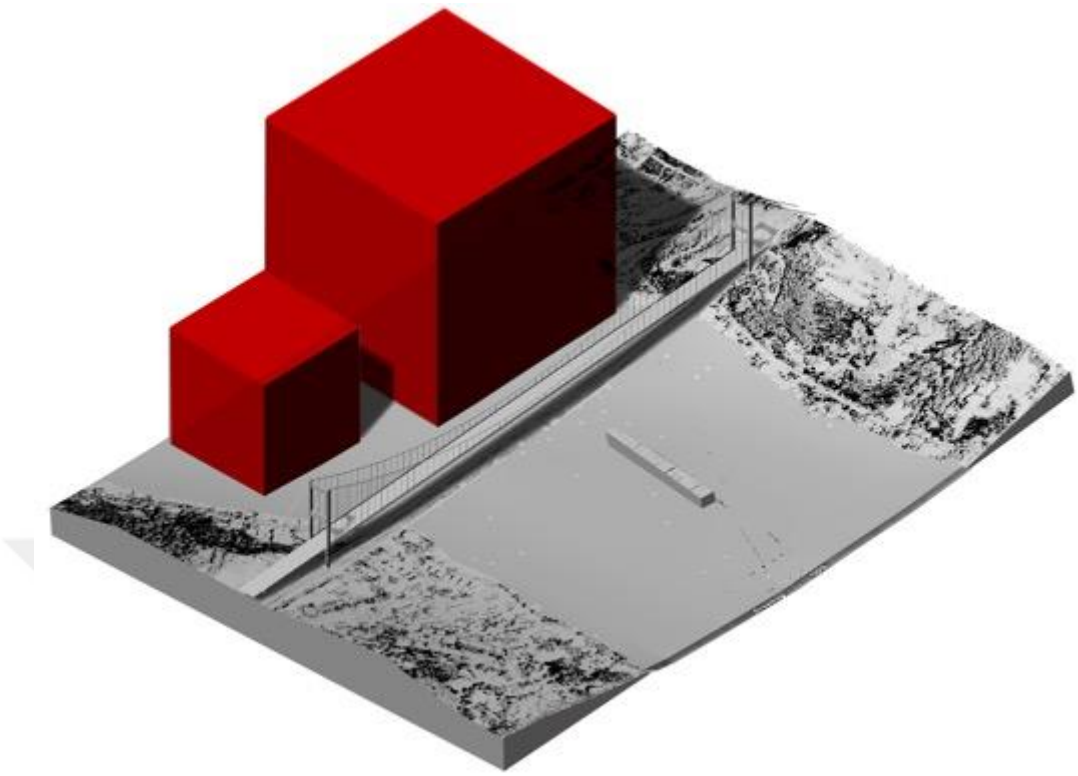


Figure 3.1 Representation of destruction debris as a cube. On the right, 80 Mm^3 of February 2023 Earthquakes, on the left 16 Mm^3 1999 Earthquake next to Fatih Sultan Mehmet Bridge in İstanbul Bosphorous. Produced by the author.

problem. While such problems prevented measuring a more precise volume, site restrictions disabled the experience of public visit. In such climate, state not only controlled the logistics of debris, but also affected the flows of information, silencing civil actors to create a unified narrative of crisis.

In the months following the earthquake, we learned that the scale of debris would grow significantly with the decision to demolish moderately damaged buildings.[235]

condition developed a mistrust in state's statistical studies. Nevertheless, total size of debris has become an unassertive issue in such context.

[235] We will also consider buildings with moderate damage as severely damaged. We will demolish them all, without reinforcing them." Murat Kurum, X Post, Ministry of Environment, Urbanization and Climate Change. 9 March 2023. https://x.com/murat_kurum/status/1633745647957336065 [Accessed on: June 1 2023]

With that, totalizing the magnitude of debris requires assembling comparable data across sources became an insolvable problem. Since the notices from institutions responsible for documenting destruction—such as the Ministry of Environment, Urbanization and Climate Change, the Parliamentary Commission, and the Presidential Strategy and Budget Office—reveals substantial inconsistencies, the answer to this question became perplexed by each report. Reports, using different figures and varying terminologies for destruction, prevented a projection for coherent estimate of debris volume.

The Ministry of Environment, Urbanization and Climate Change, for instance, reported rising numbers of demolished structures between February 6 and 11, expressed in terms of "independent units" (bağımsız birim) and "buildings" (bina).[236] In a 2024 report using the ministry's own data, the Strategy and Budget Office presented a decrease in the number of independent units while simultaneously reporting an increase in demolished buildings—despite relying on the same terminology. Meanwhile, the Parliamentary Commission's figures, reported in terms of households (hane), vary by more than twenty-thousand compared to other estimates. [237]

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[236] On the first week of the disaster the numbers announced by the Presidency was significantly smaller. Erdoğan declared that forty-seven thousand buildings were demolished with two hundred and eleven thousand independent unit. Ministry of Interior News Letter, "Cumhurbaşkanımız Sn. Erdoğan: "Hiçbir Vatandaşımızı Maddi-Manevi Açıdan Sahipsiz Bırakmayacağız" 14 February 2023. [Accessed on: February 18 2024]

[237] Data from the Ministry changes in time. First report gives 153 thousand independent units, while second one gives 279 thousand buildings. Third estimation 817 thousand independent units and 300 thousand buildings. Ministry of Environment, Urbanization and Climate Change Report, 13 February 2023, https://www.csb.gov.tr/13-ilde-153-bin-506-bagimsiz-birimin-acil-yikilmasi-gereken-agir-hasarli-ve-yikik-oldugu-tespit-edildi-bakanlik-faaliyetleri-38425 [Accessed on: June 13 2024] and Ministry of Environment, Urbanization and Climate Change Report, 11 March 2023, https://csb.gov.tr/bakan-kurum-11-ilimizde-279-bin-binanin-acil-yikilacak-agir-hasarli-yikik-veya-orta-hasarli-oldugunun-tespitini-yaptik-bakanlik-faaliyetleri-38479 [Accessed on: June 13 2024]. Presidential Strategy and Budget Office, Kahramanmaraş and Hatay Earthquakes Reconstruction and Development Report, https://www.sbb.gov.tr/wp-content/uploads/2024/02/Kahramanmaras-ve-Hatay-Depremleri-Yeniden-Imar-ve-Gelisme-Raporu-1.pdf [Accessed on: June 13 2024]

If we treat “independent unit” as a term encompassing household functions, this discrepancy becomes more problematic: the inflated number cited by the Commission contradicts the lower figure reported a year later. On one hand, the steady increase in the number of buildings slated for destruction suggests an expanding intervention on the ground; on the other, the decreasing number of independent units per building points to a narrowing field of destruction. These contradictions reflect not just gaps in data collection, but also the state's role in actively fragmenting the visibility of destruction.

Information about the number of debris sites in the field was shared in the early months following the earthquake by a parliamentary commission. In a presentation delivered to the commission, Eyyüp Karahan, Director General of Environmental Impact Assessment, Permit and Inspection at the Ministry of Environment, Urbanization and Climate Change, outlined the organizational framework for how debris would be managed. In the presentation, Karahan mentions a total of 91 temporary debris sites across the earthquake zone.[238]

According to the report, selection of these sites was made by academicians from national universities with care that they will not be placed on agricultural lands, lands with flood, avalanche and landslide risks, conservation sites and irrigation sites.[239] On the contrary to what is planned in the presentation, in-situ observations show otherwise. Several sites and irregular debris dumping activities were documented in

[238] Parliament Reports, Türkiye Büyük Millet Meclisi, Parliamentary Investigation Commission Established by the Grand National Assembly of Türkiye for the Purpose of Investigating All Aspects of the Earthquakes Centered in Kahramanmaraş, Creating an Earthquake-Resistant Building Stock, and Identifying Measures to Enhance the Effectiveness of Urban Transformation Practices. 5th Meeting, 22 March 2023. Also, Eyyüp Karahan, “Kahramanmaraş Depremleri Sonrasında Enkaz ve Atık Yönetimi.” (Debris and Waste Management After Kahramanmaraş Earthquakes), Kriter Dergi, 2023, Vol.7, No.28. 2023. https://kriterdergi.com/yazar/eyyup-karahan/kahramanmaras-depremleri-sonrasinda-enkaz-ve-atik-yonetimi [Accessed on: June 13 2024]

[239] This was stated in several other reports from Presidency of Strategy and Budget, Istanbul Technical University Earthquake Report, the news article of Ministry of Environment Urban and Climate Change.

the wake of debris removal.[240] Therefore, total number exceeds what is stated in the presentation by the inclusion of informal dumping activities. In fact, these activities raise the risk of deprivation significantly, since they are not recorded and hidden from public. Karahan's presentation also includes volumetric estimations of the total debris in cubic meter.[241] He declares an approximately 32 million cubic meters (Mm^3) of debris for Hatay, Kahramanmaraş, Gaziantep and Malatya which he mentions as the most susceptible cities. Even when this estimation doubles by the number debris sites in other cities which, again, falls short in providing a commensurable data. The rest of the cities Şanlıurfa, Kilis, Adana, Osmaniye, Diyarbakır and Adıyaman has a total of 19 debris fields. Karahan depicts this calculation as a total 46 Mm^3 which does not match with third party accounts.

The Flash Appeal of UN which is a combined effort of several bodies of organizations.[242] Initial frame of the potential problems and early recovery studies were done with budget estimations, reflecting a range between a volume of 100-200 Mm^3.[243] In addition to press releases and early estimations, UN's quarterly and monthly reports help to follow ongoing recovery management. In the overview report of UNDAC, number of destroyed buildings which is "more than 298,000" contributes to the confusion about the estimations, since the number contradicts the studies done by the ministry.[244] Additionally, UNDP's estimation of total the debris volume is 100 Mm^3 while the number of debris fields is given as 86 instead of 91.[245]

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[240] The site visit I made was after the presentation in May. Before May, there are several social media accounts and reports from various NGO's showing the reality is different from the expectations in the assembly. For more: TMMOB Mimarlar Odası 6 Şubat 2023 Depremleri Tespit ve Değerlendirme Raporu, 22 Feb 2023 (Report of Chamber of Architects in 2023), p.73

[241] The reports of the assembly do not include the mappings and images of Karahan probably showing during the presentation. However, his speech includes directions towards a visual reference. Therefore, some of the information that we can take from the report is missing, yet this situation does not constitute an obstacle to depict a totality. Parliament Reports, 2023.

[242] UN, Flash Appeal Türkiye, February-May, UN, 2023[Accessed on: May 5 2023]

[243] UN, Flash Appeal, p.20.

[244] UNDAC, UNDAC Deployment to Türkiye Infographic, November 2023, www.unocha.org/undac [Accessed on: June 13 2024]

[245] UNDP, Press Release 6 Feb 2024, p.3. [Accessed on: June 13 2024]

This wide range of debris volume enlarges with the studies conducted by news agencies with reaches to 650 Mm^3.[246] Likewise, Reuter's infographic help visualize the total amount with a calculation of 301 thousand destroyed building, resulting in 200 Mm^3.[247]

The Turkish academic scene embarks on calculating the volume of debris in the zone shows that variety of estimations is a conduct of principle in CDW (construction and demolition waste) studies.[248] In those studies, different varieties of mass and volume proportions provide a consistent scaling of material compositions. Unfortunately, these studies, serving to calculate the economic profit of the steel recycling, fails to accommodate consistent numbers as well and did not get enough attention. Even when, they provide a better understanding compared to studies of the institutions and commissions that do not publicize the calculation methods, instead diminishes the numbers by a great gap.[249]

When dealing with such a multitude of mass, despite its qualitative embodiment, numbers provided by the governmental bodies becomes part of an ideological problem. In that, one can argue the possibilities oscillating between an instrumental reasoning behind obstruction or incompetence. All in all, the wide array of calculation efforts shows that volume of total debris ranges between 46 Mm^3 to 650

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[246] Teyit.org, Earthquake Folder, 2023. https://teyit.org/dosya/buyutec-depremde-yikilan-binalarin-molozlari-ne-kadar-buyuk [Accessed on: June 13 2024]

[247] Equal to the 38 pyramids of Giza and 10 times more than Haiti's debris in 2010 Earthquakes. Ece Toksabay, Adolfo Arranz, Jitesh Chowdhury, Sudev Kiyada and Simon Scar, Turkey's Toxic Dust, Reuters, May 2023. www.reuters.com/graphics/turkey-quake/toxins/znvnbmyrzvl/ [Accessed on: June 13 2024]

[248] There have been two scholarly articles that depends on methodological analysis. (Temelli and Doğdu) These analyses cannot go beyond the profit-based schemes by calculating the amount of extricable metals, logistical cost analysis etc. More comprehensive works reveal that CDW production in the earthquake zone is nearly annual production of U.S. Nurşen Sönmez & Sibel Maçka Kalfa, "Investigation of Construction and Demolition Wastes in the European Union Member States According to their Directives," *Contemporary Journal of Economics and Finance,* Vol.2 No.1, 2023.

[249] Total numbers in the tables of parliament reports does not add up correctly. There is a difference of 17441 households (hane) missing in the calculations. On top of that, those tables do not match with the equations in multiplication, surfacing the level of imprecision. For more: Eyyüp Karahan, Kriter Dergi.

Mm^3. Furthermore, number of independent units ranges between 150 thousand and 850 thousand, number of households between 650 thousand and 840 thousand and number of buildings between 260 thousand and 306 thousand. Although these ranges change unfittingly, one can expect a steady increase with the duration of surveys and upcoming documentations from the earthquake zone. In addition to this not being the case, how the volume and mass should be calculated does not reflect a precise method.[250] Such ambiguous context of debris volume of the destruction reflects an abstracted knowledge that is produced within the logistics.[251]

Obscured data transforms debris from a traceable aftermath into a logistical abstraction.[252] This abstraction not only hide the physical evidence of a failed state intervention, but also resurface the infrastructural collapse that persist as a growing condition. This collapse is buried in landfills under the layers of opaqueness by state mechanisms. In this way, debris logistics operates at the intersection of material violence and epistemic control, making residue a site not only of loss, but of struggle over meaning. Once severed from its material specificity—its volumes, locations, histories, and human costs—debris is no longer understood as the evidence of destruction.

Ecology Organization has shared an immediate response that brings together concerns that resurfaces debris as the evidence of crisis of destruction. Report uses "secondary destruction" to refer to the neglect of post-disaster debris and its

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[250] The calculation in the CDW studies makes use of several approximations on total footing area, heights of the individual units, material composition density of concrete, separation of housewares and other components, cavities between the destructed parts, a standardized usage of construction materials.

[251] This is similar to the case of smuggling activity of formal logistical operations mentioned in the beginning of the chapter. Debris as a censored object, has gone through processes of obstruction, leaving us without certain details.

[252] Abstraction in logistics can vary in terms of actors, substance and means. Here, logistical abstraction is reflected on the practice level where actors, substance and means are regulated through state-driven mechanism. Stentoft Arlbjørn, & Halldorsson, "Logistics knowledge creation: reflections on content, context and processes," *International Journal of Physical Distribution & Logistics Management,* Vol.32, No.1, 2021, p.22–40. doi:10.1108/09600030210415289

accumulation in high volumes.[253] By highlighting the concerns over chemical contamination, asbestos exposure, and the leaching of hazardous materials into soils and waterways, the report concludes by stating that collected debris has turned into a risk of "ecocide."[254] Report shows that rather than treating as a material of ecological care, debris is hastily removed and deposited. Dumping happens in unmonitored ways onto the ecologically sensitive areas such as riverbeds, agricultural zones, and forests.[255] Revealing the contradiction between emergency operations and local environmental regulations, in Hatay's Samandağ district, rubble and waste were deposited into the Mileyha Wetland.[256] There are many critical ecological sites located along migratory bird routes, home to endemic plant species and endangered animals being transformed into debris dumping sites. This process reflects a broader logic in post-disaster logistics, which is framed in terms of urgency

[253] Secondary destruction - as in crisis of crisis, is used in the report of Ecological Organizations (Chamber of Environmental Engineers, Ecology Union, Climate Justice Coalition, Mesopotamian Ecology Movement, and Ecology Association). Ekoloji Örgütleri Deprem Raporu, 2023, https://iklimadaletikoalisyonu.org/ekoloji-orgutleri-deprem-raporu-2023/ [Accessed on: May 21 2023]

[254] Ecocide is the systematic degradation of ecosystems as a result of state-led infrastructural decisions. Falk uses the term to describe deliberate destruction of the environment with pesticide sprays as a weapon of mass destruction in Indochina forests, during Vietnam War. Falk, Richard A. "Environmental Warfare and Ecocide — Facts, Appraisal, and Proposals." *Bulletin of Peace Proposals*, Vol.4, No.1, 1973, p.80–96. http://www.jstor.org/stable/44480206. [Accessed on: June 13 2025]

[255] Report includes, for instance, observations from Adıyaman where debris was dumped into a riverbed marked with a municipal sign explicitly stating "Dumping Debris is Prohibited."

[256] First publicized by an Instagram account, namely birddetective. Owner of the account and an independent birdwatcher Emin Yoğurtçuoğlu conducted a series of in-situ observations, resulting the re-clearence of debris from Mileyha. However, up until 2025 aerial photos show that re-clearance of the debris in Samandağ could not be completed. Yeşil Gazete, "Deprem yetmedi: Hatay'da biriken çöpler ve enkaz artıkları Milleyha Kuş Cenneti'ne atıldı," February 2023. https://yesilgazete.org/deprem-yetmedi-hatayda-biriken-copler-ve-enkaz-artiklari-mileyha-kus-cennetine-atildi/ [Accessed on: May 13 2023]



Figure 3.2 Photo of a debris site near a creek. Taken by the author.

while ecological consequences are externalized. Speed, then, becomes a major factor and the excuse for ecological violence which is driven by hiding the evidence, and build a reputation at the same time. Therefore, such logic of the recovery becomes a logistical abstraction by privileging operational metrics over the lived and ecological impacts. In this abstraction, the complexity of ecological systems is flattened into a technical problem to be solved through mobilization. Ecology Organization's report overcomes this abstraction with a collective work that depends on site observations and interviews. Site visits, in that sense, reveal the nature of debris mobilization in the zone with a first-hand experience.[257] However, on top of obscuring of debris with inconsistencies, officials in those sites declared an exclusion order.[258] The reason for

[257] I have also experienced several occasions in which security forces prevented the documentation of the site. In some cases, I could document the activity with discretion.

[258] Pelin Ünker, DW Haber, "Enkaz kaldırmada çevresel risk uyarısı," February 2023. https://www.dw.com/tr/kahramanmara%C5%9F-depremi-enkaz-kald%C4%B1rmada-%C3%A7evresel-risk-uyar%C4%B1s%C4%B1/a-64730378 [Accessed on: February 12 2024] For

confidentiality is later declared as a need for decreasing the risk of valuable goods being stolen.[259] However, such confidentiality also masks the irregularities. These irregularities consist of mismanagements of site selections, unchecked execution of the cleanup, ignored cautions to be taken before and after the displacements of the debris.[260]



Figure 3.3 Photo of a debris sites over olive groves.



Figure 3.4 Aerial photo of a debris sites near settlements. Taken by the author

more prohibitions and exclusions: Expression Uninterrupted, Deprem Bölgesinde Gazetecilik (tr: Journalism in the Earthquake Zone), February 2023. https://expressioninterrupted.com/tr/deprem-sorusturma-gozalti-saldiri-ve-engelleme [Accessed on: June 3 2023]

[259] In some of my site visits, there were visitors reclaiming their personal belongings. During the interviews with the security personnel, they also declared that current government does not want to reveal the conditions of the sites. They were told to comply with security measures, although it is evident that conditions are severe in terms of debris dumping and possible hazards.

[260] In his presentation, Selçuk implies that there are not so many sites fitting to any of these regulatory protocols. M. E. Selçuk, Geotechnical Webinar Series, Youtube, 2023.

3.2.2.1 Overcoming the Obstruction: The Route to Reveal Debris Violence

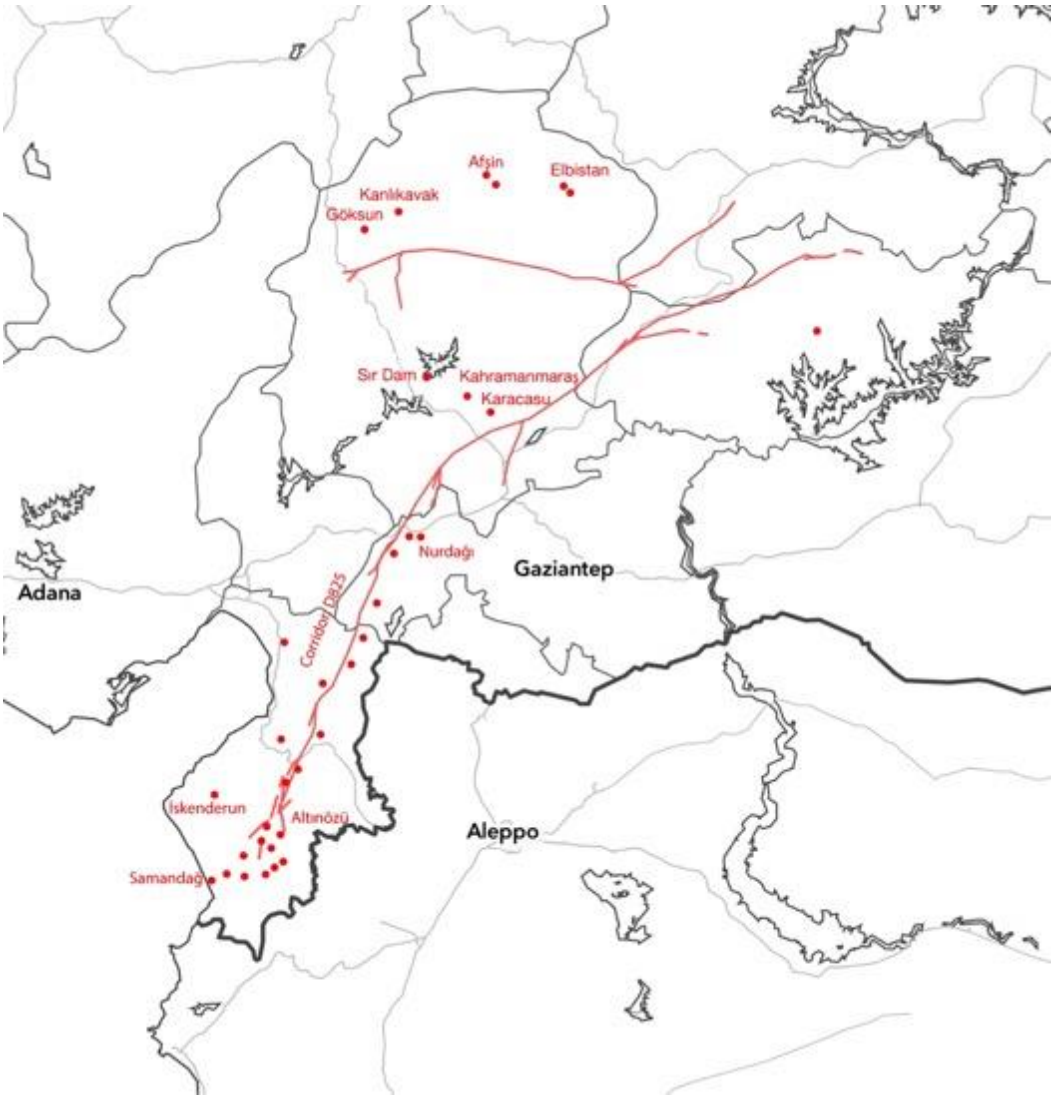


Figure 3.5 Mapping of the route following the fault line with debris site locations. Produced by the author.

Building on the preceding discussion of opacity and control, this section turns to the challenge of overcoming the obstruction. While state-led recovery operations often dominated public discourse by controlling the narratives through media, there are inquiries which frequently point out the ecological, material, and social complexities

of cleanup and its management.[261] Critical perspectives that emerge through site visits reveals the debris' persistence remains fragmented and localized.[262] Lacking a comprehensive perspective, research on debris can overcome the obstruction by a situated account based on site visits.[263] Visits, made during this study, involve the mapping of debris sites, documenting the evolving conditions of landscape, and attending to the changing surfaces of infrastructure and ecology.

The route of this investigation follows the fault line stretching from Kahramanmaraş to Hatay. Traveling through a geography that is marked by seismic rupture as well as infrastructural density, Key Biodiversity Areas (KBAs), dense water networks, agricultural and husbandry lands display a multitude of agencies in the history, formation and distribution of materials. Following the fault line enables a spatially grounded understanding of how disaster unfolds not merely as an event, but as a continuous and distributed process of transformation. The fault line, therefore, acts as both a physical scar of geological rupture and a structural spine of tension of violence revealing how vulnerability, destruction, and recovery are unevenly distributed across space.[264]

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[261] There are articles who embark on the mismanagements which focus on ecological and social complexities of debris disposal from analytical and critical perspectives. Mutlu Yılmaz's (et.al.) study depends on GIS analysis on Hatay and shows why the locations of debris sites are problematic. Yılmaz, Altundal, Güney & Dağlı, "Determining suitable lands for demolition waste management with GIS in the Kahramanmaras earthquakes on February 6, 2023: Case study of Hatay province," *Turkish Geography Review*, Vol.83, 2023, p.179-193. While Sedat Gündoğdu reminds us with the calamity of calamity while discussing the agencies in debris removal as a waste in post-disaster zone. Sedat Gündoğdu, Felaketin Felaketi: Enkaz-Moloz-Afet İlişkisi, Mekânda Adalet ve Atık, 2024, No:15.

[262] I have contacted activists, conservationists, local news agencies, reporters, architects, urban planners, map-makers, lawyers and engineers who are working on the mismanagement of debris in the zone. In those conversations, lack of a comprehensive approach to the issue debris was stated repeatedly in terms of material contents and mapping of debris dumping areas.

[263] These site visits are two times, first one after two months of the first earthquakes and second after two years to finalize the observations on debris sites and bring a snapshot of the construction processes. Second visit focuses on Hatay and surrounding cities.

[264] Tension as a term that give the cue of violence as mentioned in 2.3.1. Positive Violence and 2.3.2. Logistical Violence in Chapter 2.

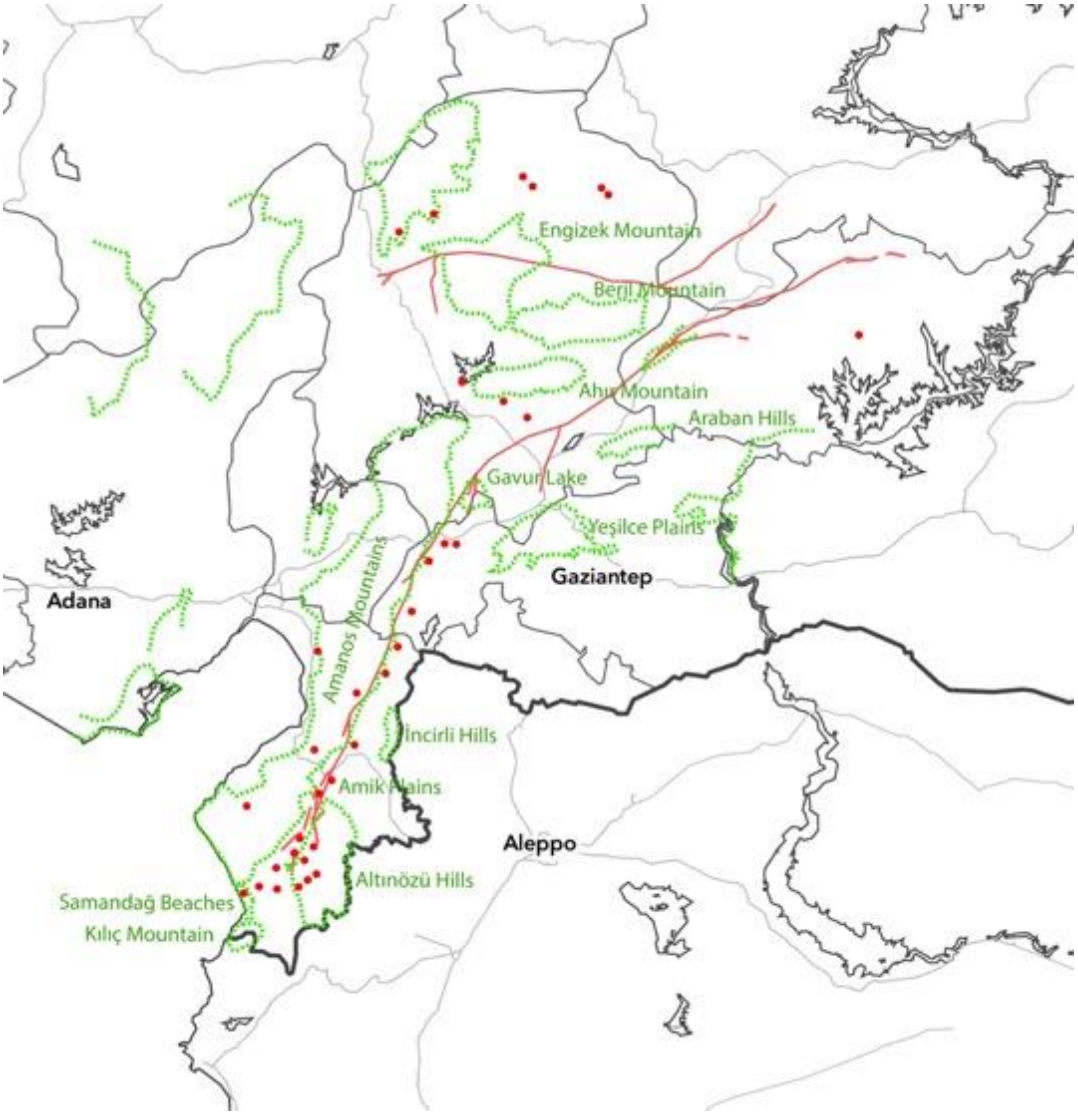


Figure 3.6 Mapping of KBAs following the fault line with debris site locations. Produced by the author. [Based on Doğa Derneği's mapping]

To start with, one of the most striking outcomes of the geodynamic tension in the geography is the uplift of the Amanos Mountains. Forming a narrow, linear range running in a north-south direction along the East Anatolian Fault, this uplift has generated a large valley and tectonic depressions along its eastern flank. This natural

corridor has historically guided human settlement, agriculture, and trade routes.[265] It connects multiple urban centers, logistical corridors, ecological zones, and labor systems, making it possible to trace how the effects of the earthquake reverberate through interconnected systems. The Asi River (Orontes), which cuts across these valleys, intensifies the region's geomorphological complexity. Originating in the Beqaa Valley and flowing north to south, it carves through fault-induced depressions with a network connecting to Karacasu and many other smaller creeks. The plains forming around the water network are shaped by both fluvial erosion and tectonic subsidence.[266] Serving as a fertile land, these plains provide accessible strip that connects agricultural activity with roadways, pipelines, and other logistical infrastructures. The convergence of active faults, mountainous relief, and riverine pathways has provided the opportunity to harbor infrastructural growth in a geography with geological instability. Therefore, fault line displays a geological boundary and an inscription for an epistemological inquiry where entanglement of ecology, infrastructure and logistics becomes visible through the lens of material mobilization.

Traveling across various scales, cities, counties and villages can be observed within this route. Counties such as Göksun, Afşin, and Elbistan mark the key inland nodes along the fault-aligned corridor. Smaller settlements such as Kanlıkavak, Karacasu, and Karaburçlu reveal the granular, often overlooked layers of rural habitation. Apart from large urban settlements in the disaster zone, Hatay embodies the convergence

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[265] Meriami et al. provides a study of Amik Lake's paleoclimatic changes by looking at the sedimentations in Bronze Age, Roman, Ottoman and Modern sections. The study highlights the similar sedimentation profiles in Roman and Modern times, revealing a similarity in the infrastructure of agricultural practices. Meriam, Aurélia & Fagel, "Lacustrine clay mineral assemblages as a proxy for land-use and climate changes over the last 4 kyr: The Amik Lake case study," *Southern Turkey. Quaternary International*, 2017, p.438. 10.1016/j.quaint.2016.11.032.

[266] MTA Geological Formation Maps (General Directorate of Mineral Research and Exploration) marks the region as Unsorted Quaternary sediments which is consists of gravel, sand, silt, and clay and local organic matter. Robert C. McDowell and Wayne L. Newell, Quatenary Systems, USGS. https://pubs.usgs.gov/pp/p1151h/quat.html [Accessed on: June 25 2025]

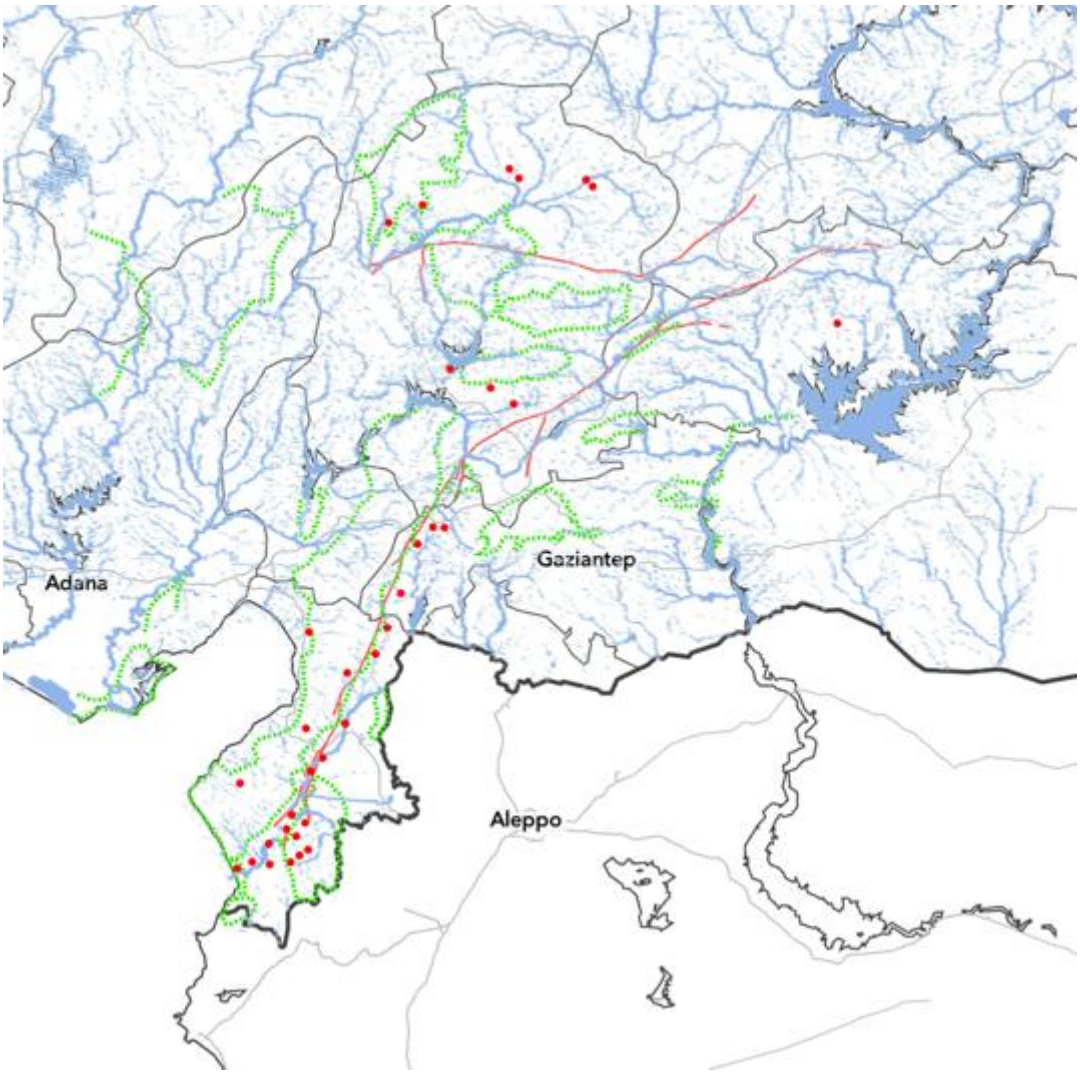


Figure 3.7 Mapping of hydrological water networks following the fault line with debris site locations. Produced by the author based on the hydrological map of Agriculture & Forestry Directorate of Türkiye.

of urban density, ecological vulnerability, and geopolitical complexity all together. Functioning as a frontline of environmental degradation and cross-border tensions intensified by post-disaster logistical operations, Hatay is a regional hub of commerce that connects inlands to the Mediterranean Sea.

From İskenderun, the port city of Hatay, to Kahramanmaraş, the region connects Mediterranean trade network to East Anatolia. İskenderun Port serves as a major node for maritime trade, particularly in bulk cargo, construction materials, and oil

derivatives.[267] Additionally, region is connected via land routes in which Gaziantep and Hatay are major industrial hubs for transferring goods into both domestic and international markets through Syria. Hatay's location near the Syrian border intensifies its geopolitical importance, acting as a corridor for cross-border trade, humanitarian aid, and migration flows.

These corridors have been in use for a very long time.[268] From the ancient trade networks of the Roman roads and Ottoman *derbent* routes, this corridor has continuously facilitated geopolitical and commercial connectivity.[269] These historical layers of mobility are sedimented into the region's spatial fabric.[270] Contemporary infrastructures that still follow the paths carved by centuries of movement via roads and railways, today, traverse the same valleys and passing down the principles once used by merchants and armies.[271] The persistent logic of passage and exchange interpolates the region's logistical presence with a contested geography. Infrastructures of modern mobilization are inscribed upon terrains already conditioned by imperial, colonial, and authoritarian ambitions of the past and present regimes of logistical conduit. This continuity reinforces the region's role as

[267] The port that is recently reviewed for its connecting to the trade with Israel's war efforts. According to the news in SoLHaber, volume of trade via steel exportation gradually increases after the extrication of metals in the earthquake zone. SolHaber, "İsrail ticaretinin utandıran kılıfı: Türkiye, yerseniz, Filistin'e 5 ayda 579 ton dikenli tel ihraç etmiş," October 2024. https://haber.sol.org.tr/haber/israil-ticaretinin-utandiran-kilifi-turkiye-yerseniz-filistine-5-ayda-579-ton-dikenli-tel [Accessed on: June 19 2025]

[268] Downey renders the conditions of Ancient Antioch. His work includes ancient road systems in connection to Orontes, neighboring cities, and towards the inlands of the city. Glanville Downey, Ancient Antioch, New Jersey: Princeton University Press, 1963. A closer historical inspection is drawn by the Peter H. Christensen whose work starts with 19th century German infrastructural development also covering the nearby regions of Antakya, Aleppo, Gaziantep. Peter H. Christensen, Germany and the Ottoman Railways: Art, Empire and Infrastructure, London: Yale University Press, 2017.

[269] Cengiz Orhonlu, Osmanlı İmparatorluğ unda Derbend Teşkilâtı, İstanbul, İstanbul Üniversitesi Edebiyat Fakültesi, 1967.

[270] Mihçioğlu Bilgi & Uluca Tümer, "Building Typologies in Between the Vernacular and the Modern: Antakya (Antioch) in the Early 20th Century," *SAGE Open*, Vol.10, No.2, 2020. https://doi.org/10.1177/2158244020933318

[271] Mihçioğlu B., 2020.

both a conduit and a zone of contestation—where mobility has always been intertwined with conflict and territorial reorganization.

The region is not only active as a contesting land but also interlaced with a dense and diverse ecologies and water networks, including rivers, wetlands, lakes, and mountains. The infrastructural density is embedded within the Key Biodiversity Areas such as the Amanos Mountains, Amik Lake Basin, and Samandağ coastal wetlands, İncirli Hills, Gavur Lake, and Ahır Mountain. Generating great risks due to the debris mobilization, these areas are subjected to intensified pressure, where habitats are fragmented. Running parallel to the East Anatolian Fault, the Amanos range hosts rich forest biodiversity of endemic plant species and large mammals. It forms a climatic and ecological buffer zone but faces increasing fragmentation due to road expansion and informal debris disposal. Located on the Hatay coast, the coastal ecosystem of Samandağ has been directly threatened by debris dumping. The water systems of these areas are ecologically significant for biodiversity. However, starting with the cleanup, they have been opened to increasing degradation via logistical conduits. As in the case of Orontes, they have been particularly vulnerable to pollution, sedimentation, and infrastructural developments following the 2023 earthquakes and subsequent debris operations. Similarly, local creeks and drainage channels extending from Sır & Kılavuzlu Dam Lake have been utilized as landfills into debris network. Amik Lake Basin, Gavur Lake and other hydrological network started embodying heavy metals, and plastics and toxic pollutants, and degrading water quality.

Fault line does not simply trace the geological stress points of the disaster; however, it juxtaposes major infrastructural corridors and ecologically sensitive zones. With that, a complex spatial interlace is created where material, ecological, and logistical systems entangle. Traversing this route allows for situated observations of how debris was both mobilized and accumulated, revealing not only the physical displacement of matter but also its embeddedness in wider territorial processes. Along the way, debris sites appeared as relational nodes which are entangled with

conservation areas, agricultural lands, highways, and energy lines and reshaping the ecological character of their surroundings. The fault line thus emerges not solely as a geological zone of rupture, but as a dynamic corridor of interaction between cities, between human activity and nonhuman processes, and between destruction and reconstruction—exposing a convergence of agents that together configure the material politics of post-disaster space.

3.3 Debris Logistics in Earthquake Zone: Site Visits

Up until this point, the thesis has provided a definition of logistics by situating it within its operational mediums with infrastructure and mode of operationality with ecology. Its obscured knowledge in governance systems and its connection to construction practices are producing abstractions which problematizes debris not merely as a byproduct, but as a material manifestation of logistical rationality in destructed environments. Within this framework, debris is understood as both outcome and evidence of positive violence that prioritizes circulation, clearance, and neglect accountability, traceability, and secondary destruction. In the following part, thesis depicts why logistics is a pivotal actor in the processes of built environment by addressing its concrete methods of practice. Drawing on the literature examined in Chapter 2, it continues to challenge the notion of logistics as a neutral connector by which it hides violence under positiveness.

Debris sites, in that sense, are the destinations of destructive forces where mobilized matter ends up. Being the ideologically informed technocratic spaces, debris sites shape the spatiality of the zone. Those sites operate as accumulation of multiple agencies revealing the combination of expertise, bureaucracy, and spatial authority as well as more-than-human context. Disaster and Emergency Management Authority, Mass Housing Administration, and the Ministry of Environment, Urbanization and Climate Change execute reconstruction and recovery efforts through their authority in states of exception with debris sites. In this way, the debris

sites emerge with legitimacy where technocratic rationality masks the ideological production of space.

The following section brings together situated knowledges to push the boundaries of the obstructed and abstracted knowledge regimes that currently define debris following the endemic conditions in each site. By grounding analysis in field observations, local testimonies, and material encounters across the disaster zone, this section provides a perspective of dominant logistical rationalities in the earthquake zone, rendering debris as its matter of mobilization. The field observations position debris as a charged material witness, one that carries the imprints of governance, labor policies, displacements of people and material, and environmental risks. Through this lens, the following section focuses on situated perspectives that challenge the silencing of debris which is imposed by official narratives. Moreover, it opposes to the centralized infrastructures of knowledge making, aiming to reframe debris as a beginning of new inquiries rather than an end of architecture.

Aiming to bring out the particularities in each site, following section focus on cases both with terminologies and mapping studies. To do so, it uncovers the contextual embodiment of debris which are entangled characteristics as multiplicity, latency, fluidity. To expose the conditions produced by the processes of debris logistics, marking the symptoms of ecological disruption chapter defines those with fixation, perpetuation, fragmentation, recursion, and amalgamation. The cases are not strictly different from each other; in fact, they share similarities and overlapping conditions. The terms, in that sense, seldomly refer back to each other not to confuse the reader but to display the iterations and entanglement of debris logistics in the earthquake region. These overlaps between the terms does not necessarily mean that each of them can be applied to one another, on the contrary, they arise from specific site conditions which are not enclosed to their area of effect but confined to a scalar definition of their context.

These terms are supported by mappings for each case. They are prepared as images to depict the textual information and photos from the sites. Main intention is to bring out the conditions, so that they make the particularities of the sites.[272] In that sense, they benefit from the architectural methods of image making. Architecture's ability to surface concepts by creating diagrams, photos, maps, plans provide a ground for counter-abstractions.[273] In that, these maps have collage-like characteristics that benefit from aerial photography, diagrammatizations, mappings and site plans study to surface the associated term with the case. In that, maps depict wilderness, agriculture, and urban patches in contrasting forms to help differentiate their boundaries. Their methods of abstraction are thought to be complementary in displaying the destructive operations that are bound with. For instance, agricultural areas are shown with grids and settlements with solid-void patches. For agricultural areas, this grid conceptualizes the continuation of logistical networks on the landscape. For the settlements, solid-void patches accompany blunt red colorings to highlight the destructions of the earthquake as a changing figure-ground relations in cities.[274] To highlight the infrastructure of debris logistics only significant roads are shown for the trajectories of logistical flows. Topographical changes do not follow familiar usage of curves, instead they are drawn with the erosion channels which is intended to support depict the surfaces of erosion channels with debris. The site visits, on the other hand, start with how the related term is situated followed by the concrete conditions. To bring out the material and temporal conditions of the debris, each record show terms with physical realities of debris reflect material and temporal conditions of violence.

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[272] As a side note, thesis brings those particularities together to spot the tensions that are emerging between them. For more, see: Chapter 4, 4.3.1 Material Scaling of Debris and 4.3.2. Temporal Scaling of Debris.

[273] This notion of counter-abstraction aligns with the counter-logistics movements in an epistemological level. For more, see: Chapter 2, 2.3.1. Positive Violence.

[274] The grid and solid-void surfaces benefit from the ideas of the planetary urban as discussed by Brenner earlier in the Chapter 2. For more, see: 2.2.1. Logistics against the Planetary Forces.

3.3.1 Göksun: Site of Multiplicity

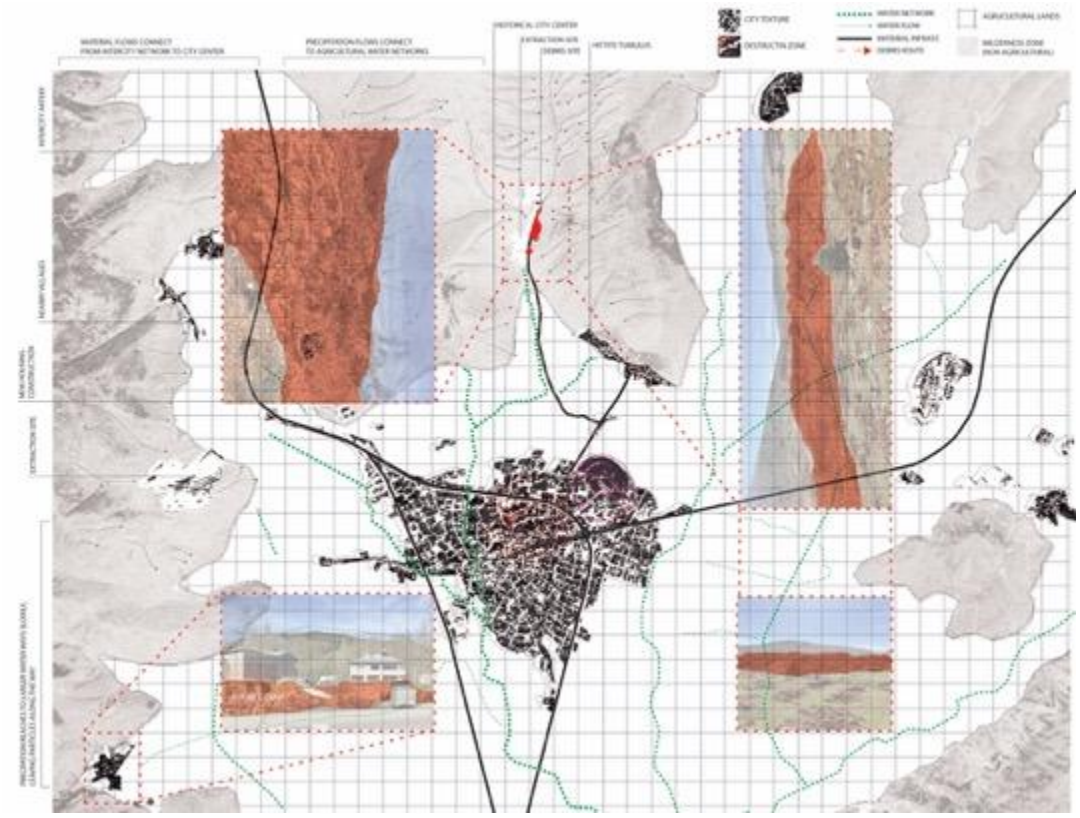


Figure 3.8 Mapping of Göksun's ecology with debris site. Produced by the author.

Multiplicity in the context of debris is the contingency of various forces, traces, uses, and meanings. Multiplicity as a conceptual mode to define debris as the heterogeneity of multiple material and temporal conditions. As a spatial formation, debris dictates overlapping temporalities and fragmented matters where resource, contamination, and infrastructure coexist. Debris site in Göksun exemplifies such heterogenous overlaps and fragments by assembling the remnants of destruction into a field of material logics and contested futures.

Göksun is a province of Kahramanmaraş, with a fifty-thousand population. The population of Göksun has been occupied with agriculture, husbandry, lumber, and mining industries. The hinterland of the city is mostly consisted of agriculture and

pasture lands with several quarries located in its vicinity. Starting with the mobilizations by the prioritizations of land-use value, the historical city center of Göksun has been the first to be cleaned. The dated housing units in the center are mostly reinforced concrete structures which are mobilized through municipal cleanup efforts. Destructed adobe housing in the rural parts, however, are still waiting for intervention after two years of the earthquakes.

Another issue with Göksun is debris clearance rates. While debris clearance rates in other earthquake-affected provinces generally increased toward the summer months of 2023, no such trend can be observed in Göksun. One year after the earthquake, adobe rubble still remains unremoved in rural areas, indicating that the pace of the process is shaped by factors such as land price with a fluctuating index within and beyond the city limits. Additionally, the accessibility of mobilized material to the recycling market, and Göksun's economic distance from the networks that govern this market play as significant markers in the mobilization of the debris. These factors collectively constitute the city's ecology of building production and governance, within which urban residents are managed through the imperatives of a logistical hierarchy.

Debris site of Göksun is located on one of its quarries, one that is located in northern part of the city. To convey how debris is placed contingent to multiple agencies, the forces reveal the interactions in the site. Forces that interact with the destruction debris of Göksun are geological formations, erosion channels, and water networks. These forces enlarge the spectrum of logistical violence on agriculture and pasture lands and wild steppe ecologies by creating a composite terrain. Surrounding terrain is an entanglement of natural and constructed systems within which debris is distributed in varying intensifications.

Debris is disposed next to the quarry and the limestone crushing plant towards the northern hills of the city. Quarry is a significant part of the composite terrain, defining multiplicity in a geological context. The location of the limestone quarry is at the tip of the folded carbonate ridge system called Koyungediği Tepe. The fold is

visible by a stratified formation southward into a wavy terrain. The quarry marks the southern extent of the wavy, hogback-like geomorphology and exposes the layers of limestone that constitute the ridge.

Quarry is positioned at the convergence of multiple erosional channels, made by the water drip coming from the top of the hills. Therefore, the geological formation where debris site is placed plays a significant role in the agricultural production in the city. Göksun plains have a semi-regulated water infrastructure for agriculture, supported by the branches of Göksun Creek. The creek spans the south-west to south-east agricultural lands and ends in Adatepe Dam. Türbüzek creek, being one of the major streams, collects the falls from the Koyungediği Tepe to reach Göksun Creek and consequently to the dam. The erosion channels of Koyungediği Tepe conjoins on the debris site, becoming the medium that distributes contaminated water. Joint channels carry the contaminated soil with the destruction debris reaching to the city center. Passing through the city center, Türbüzek Creek redistributes the fragments of debris towards the hinterland.



Figure 3.9 Aerial photos of Göksun's before and after earthquakes. Left: June 2022, Right: July 2023 [Retrieved from: Google Earth, Accessed on: April 23 2025]

The topographical formation of Hittite tumulus in the city is an emblem of past destruction creating meaning for debris reaching into the future. In terms of formation and mixed material ingredients, tumulus and destruction debris resemble each other. This resemblance brings tumulus to surface as a reflective object which

resonates with destruction debris of the present. Therefore, as present and future archeological sites, debris highlight two positions in the city; one in the center and one in the periphery. These locations of the tumuli imply that absorption of the destruction debris will also be a future expansion of the city.



Figure 3.10 Photos from Göksun's debris site. Left: Stone crushing plant, Middle: Destruction debris, Right: Pastures with goats and quarry site [Taken by the author on: May 3 2023]

With Göksun's debris site, we see the neglect of social and environmental forces while prioritization of the profit channels both in local and regional sense. During the past two years of the disaster, Göksun is excluded from the major debris cleanup activity in the region regarding the low number of destructions. Despite the fact that Göksun's debris scattered around its rural and urban built environment, the priority of the cleanup efforts mostly focused on the city center where destruction happened in its historical buildings the most.

Göksun's debris site exemplifies multiplicity as the condition of material heterogeneity. This heterogeneity is configured with the spatial and ecological materialities of uneven logistical interventions to the crisis. Located on the ridge of Koyungediği Tepe debris meets with limestone extraction, water erosion, and agricultural life. This convergence gathers the residues of destruction back into the geological matrix from which material of the construction once emerged. Here, debris functions both as a pollutant and a commodity factor altering the hydrological and ecological systems that sustain Göksun. As a pollutant, debris disperses onto the sedimenting earth, while as a commodity it becomes value-based dictation of

mobilization. The neglect of rural adobe ruins, contrasted with the prioritized clearance of the historical city center, reveals a logistics driven by the value of the land. Göksun's debris is a dispersed material archive of recovery, a witness of the asymmetries in post-disaster governance of logistical violence.

Göksun's debris site also exemplifies multiplicity as a condition of temporal entanglement. The site brings together temporal layers that do not align. The sudden rupture of the earthquake, the slow decay of adobe structures, the seasonal rhythms of agricultural life, and the delayed -or quickened- timelines of bureaucratic recovery merge heterogenous temporalities with debris. In Göksun, debris is not bound to a singular moment of destruction; rather, it persists and mutates across uneven durations. Sedimenting into soil, eroding through water channels, and waiting in clearance cycles, logistics of debris neglect the multiplicity of temporal dimensions. The abandonment and the accelerated removal of debris reflect a hierarchy dictated by logistics, instead of the needs and vulnerabilities.

3.3.2 Kanlıkavak: Site of Fixation

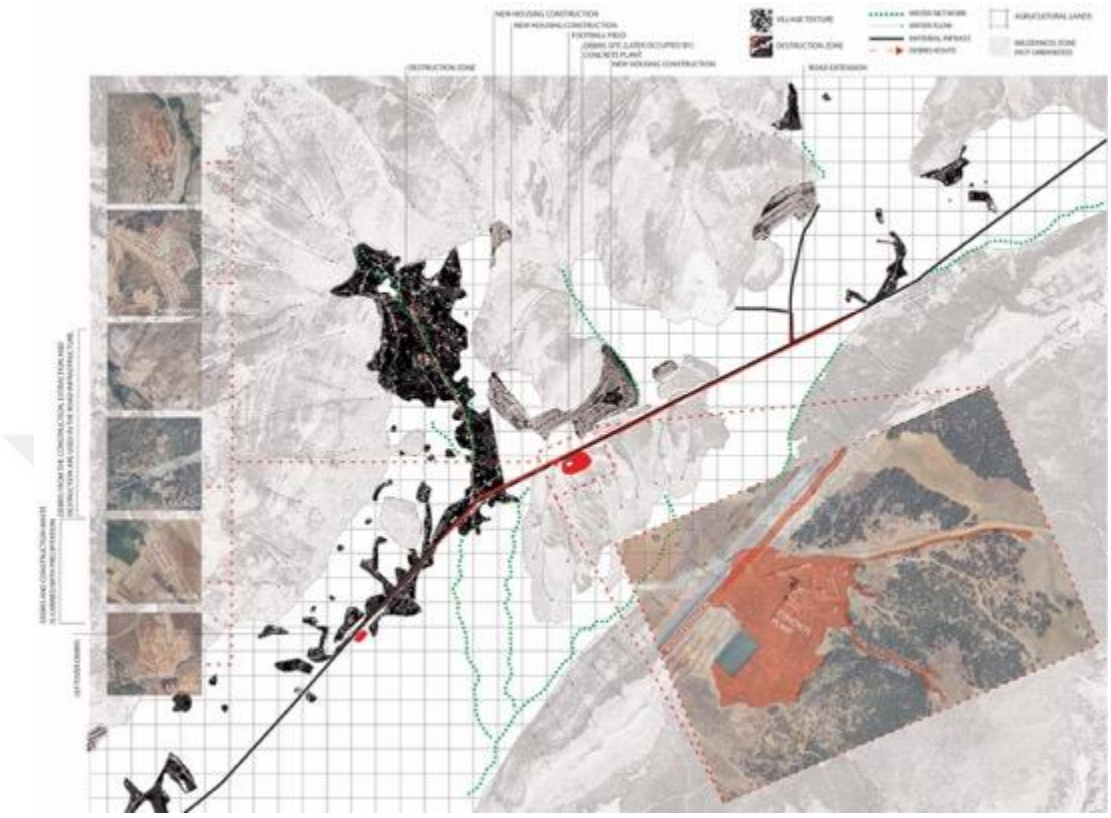


Figure 3.11 Mapping of Kanlıakavak's ecology with debris site. Produced by the author.

Fixation is the solidification of forces with which debris and its processes become anchored in place. Immobilization renders the land with a static occupation with logistical means. As a spatial formation, fixation becomes a bounding process of controlled and isolated processes from the dynamic systems of ecology. It reflects the overcoming of uncertainty, to turn debris site into a managed inventory—a risk management. Debris site in Kanlıkavak reveals how debris becomes both the material and the tool of fixation, harboring the logistical occupation of the land.

Kanlıkavak is a small village of nearly two-thousand inhabitants. The inhabitants of the village are occupied with agriculture as a supporting economy to Göksun. Debris

site of Kanlıkavak is located next to the highway connecting the east and west parts of the region.

The debris content was mostly made of adobe with changing amounts of everyday wares, plastic pollutants, timber parts, and construction materials such as stone and brick. The content of debris points out the material culture in the nearby villages. The sizes of the piles were perceivably small compared to other examples in the earthquake zone, indicating a mobilization done with low-capacity vehicles. Since the village depends on agricultural economy, it is probable that the equipment in usage is tractor-trailers. The debris was distributed unevenly in the site. Apart from the larger examples in the earthquake zone, there is a lack of organization in the distribution of debris to the sites. Piles were not stacked on top each other, rather placed next to one another. Moreover, Kanlıkavak debris site did not have any regulatory system of passages, any smoothing on the surface and sorting mechanism. Considering such factors, it seems that the cleanup was operated by the villagers with an informal organization.



Figure 3.12 Aerial photos of Kanlıkavak before and after earthquakes. The image on the right shows the concrete plant and the newly constructed housing units. Left: December 2020, Right: July 2024 [Retrieved from: Google Earth, Accessed on: April 23 2025]

Fixation operates in Kanlıkavak's debris site through the logistical immobilization and spatial stabilization of post-disaster material flows. This fixation can be unfolded by three stages; fixations of debris on the road bank, by the operations of concrete plant and then construction projects of the highway and the new housing units. In the summer of 2024, a construction facility is placed on top of the debris site. Being utilized as the foundation for the concrete plant, debris site has transformed into a point of conduit that operates the materials from the nearby quarries. After the reconstruction efforts, the quarry on the eastern hills of Kanlıkavak has significantly expanded its extraction site. The materials removed from the hills travels to the concrete plant to be processed for the housing construction and road infrastructure. Debris site, being at the center of new construction infrastructure, becomes the center of fixating operations.

Initially characterized by informal, low-capacity mobilization, debris site presented a loosely organized accumulation. However, by 2024, this unorganized piece of land gave way to a formalized spatial occupation. Being on the banks of the highway, the debris site presented an opportunity for the mobilization of processed materials. With the fixation of the concrete plant, logistical operations between nearby quarries and new housing developments gave way to a transformation of the settlement in Kanlıkavak. The local housing texture of the village faced with a radical implementation with construction of the new units started on the hills next to highway. This new expansion is an imperative of logistics by being adjacent to the concrete plant, extraction site and highway. This adjacency shows how logistics operates a closed circuit of material mobilization between the extraction and construction sites, rather than prioritizing the reconstruction inside the village. In this transformation, debris became both the medium and material of fixation by embedding the closed-circuited logistics under the guise of reconstruction and relief.

The site was converted into a node, rendering an inert terrain which is a subordination of extraction and construction infrastructure. Fixation here does not only denote the immobilization of debris movement, but the reconfiguration of the site for the fixation of new inventory of housing, as well as future of the region.



Figure 3.13 Photos from Kanlıkavak's debris site showing the soccer field, the highway and the village in the background. [Taken by the author on: May 3 2023]

Occupying the banks of transportation infrastructures, the logistical conduct of new construction also expanded the road infrastructure in Kanlıkavak. Beyond these material interventions, the alignment of new housing developments along the main road—rather conserving the village texture by rebuilding—transforms Kanlıkavak into a commodifiable corridor along the transportation route to nearby settlements. This spatial reconfiguration is likely to weaken the parts of the village extending toward the mountain foothills over time, effectively turning these areas into emergent debris zones. Just as the plant's machinery operationalized the village's rubble by assimilating it into its own infrastructural expansion, the concrete industry has similarly instrumentalized the incoming physical infrastructure. These operations leveraged debris production to turn Kanlıkavak into a site of expansion. The shifting material ecology of the village, alongside the exploitation of vital sources—water, soil, and other environmental registers—stands as clear evidence of this transformation.

In addition to the degradation of livelihoods and social ecologies, the widening of the Elbistan road after the earthquake has also pushed the threshold for the destruction of natural formations. The contamination of underground water sources—flowing from the mountain slopes across fault ridges, towards the dam—, the environmental pressures posed by the increasing (or anticipated) population, and the weakening of traditional rural life cycles, all contribute significantly to the

disruption of ecological balances. The expanded road network has similarly accelerated ecological degradation in surrounding villages: the settlement of new housing within forest lands in Karaömer; the dumping of debris onto agricultural fields in Temürağa; the construction of more than twice the original number of houses in Kaleköy and Saraycık; and the environmental destruction caused by lakeside housing projects in Gücüksu. Moreover, villages linked to Kayseri province are also facing similar patterns of destruction, whereas mountain settlements like Kavşut, Esenköy, and Ağcaşar—distant from the main road networks—remain relatively excluded. These patterns of inclusion and exclusion reveal the underlying motivations driving the operationalization of debris through logistical fixations.

Fixation in Kanlıkavak unfolds the anchoring of debris into the mobilization regime. Transforming debris into a logistical foundation, the site reflects the material culture of logistics in rural parts of the earthquake zone. Initial uneven distribution turns into a spot for further fixations of materials and value which gradually overwrites the social and environmental ecology of the village. In this transformation, debris as the medium of infrastructural permanence subordinates its fragmented materiality as a force to homogenize its environment. What was once a site of disorder and contingency becoming a link for extraction zones in the eastern hills and the construction of housing units along the expanded highway. The utilization of the site as a stabilizing base fixes debris as the infrastructure of logistical flows. Therefore, logistics overcomes the need for a conduit space by utilizing heterogenous materiality of debris to operate a homogenizing circuit of extraction and construction.

This act of embedding debris within new development reflects fixation not merely as containment, but as a logistical system in temporal dimension. Fixations in Kanlıkavak operates as temporal interventions, arresting the multiplicity of post-disaster durations and imposing a linear future oriented toward infrastructural expansion. The slow and informal clearing activity expresses a vernacular temporality—marked by seasonality, community labor, and memory. In that sense, adobe debris is a witness of delayed recovery. Yet this temporality was overwritten

by the state-sanctioned reconstruction agenda, which fixed the site within a scheduling that is inscribed with logistics. The alignment of new housing along logistical corridors reveals this temporal logic in which the village is restructured by the speeds of logistical regime. This temporal fixation of the village starts with the occupation of debris site and expands into the future with the construction of infrastructures. This forward fixation isolates debris from its lived past and repurposes it as a functional asset in an infrastructural future. Fixation replaces ecology of the village with an imposed future of commodified land and regulated circulation, transforming Kanlıkavak into a node of logistical governance rather than a site of social repair.

3.3.3 Afşin: Site of Latency

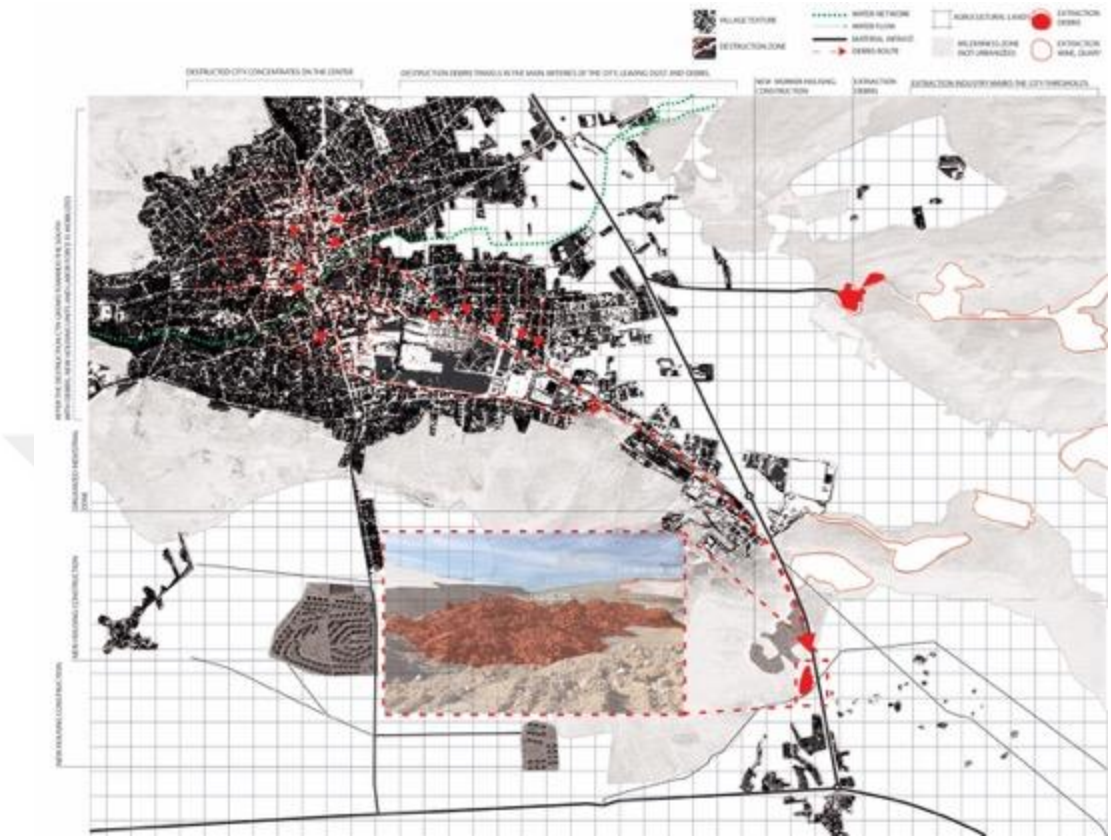


Figure 3.14 Mapping of Afşin's ecology with debris site. Produced by the author.

Latency, in the context of debris, refers to the condition in which matter and labor are suspended in a state of deferred utility. Logistics holds debris in reserve for future mobilization. Therefore, latency defines debris by its potential for selective activation within logistical operations. As a spatial formation, latency becomes a strategic condition of containment where land is reserved for reintegration. In this condition, debris is not treated as a fully refused matter rather as an externalization of management, abandonment, and uncertainty by controlling the timing and location of activation. The juxtaposition of labor housing and debris fields, as observed in Afşin, illustrates latency as an operational mode to calibrate postponement of matter and life.

Afşin has a relatively larger population compared to Göksun with nearly eigthy thousand people. Before earthquake, Afşin was mentioned with the largest thermal power plant of Türkiye—in Çoğulhan village—covering more than forty square-kilometers of open-mining area. The lignite mining area is located within the Afşin-Elbistan coal basin. The open-pit mine cuts deep into the flat basin, exposing these sedimentary layers that are usually hidden beneath farmland. The mining zone follows a tectonic depression, bordered by folded sedimentary hills. The spoil heaps and ash deposits from mining and power generation pile up on top of the natural sediments, reshaping the land and water patterns. The lignite extracted illustrates a



Figure 3.15 Aerial photo of Afşin and the power plant in Çoğulhan [Retrieved from Google Earth Accessed on: April 23 2025]

latent ecological problem where contaminant matter covers the landscape and mixes into the air, reflecting an ongoing cycle of extraction and environmental change in Afşin.[275]

The thermal power plant in Afşin represents the initial and major latency of a crisis where environmental harm, infrastructure, and labor are continuously postponed. Its extraction cycle creates a layer of contamination that will unfold slowly. This system does not simply discard the residual matter but holds them in place to manage the risks of contamination, public health and ecological deprivation, yet postpones the intervention. As such, the plant transforms Afşin's terrain into a zone of latency, where both land and labor are suspended in a state of prolonged utility. The operational logic that has been shaping the futures of Afşin's ecology for about 30 years, lays the groundwork for how destruction debris was later managed and positioned following the earthquake.

Destruction debris sites are located on the southern edge of the city. Towards the south the city limit is defined by a hill formation where industrial park is located at its skirts. Mayor of Afşin—of the time—points to this location as a "logistically efficient" position for labor and infrastructure of the city.[276] The statement highlights an efficiency in terms of housing units for workers' travel time to the industrial park. Same protocol manages efficiency concerns for the mobilization of debris. Intercity belt that connects Afşin to nearby cities works as the main artery for disposal and extraction activities. The destinations for new Mass Housing Administration housing for workers and destruction debris are converging as projections for the future

[275] This complex, being the major producer of industrial debris, causes major public health problems. For a more detailed report: Amicus Curiae Brief by Human Rights Watch on Afşin Elbistan A Coal Plant Expansion Project, June 2025. https://www.hrw.org/sites/default/files/media_2025/07/T%C3%BCrkiye%20Amicus%20Curiae_eng.pdf [Accessed on: 05 July 2025]

[276] Aksu Haber, "Afşin'de 50 Yıllık Şehir Planlaması Hayata Geçiriliyor" (tr: 50-Year Urban Planning is Being Implemented in Afşin), August, 2023 https://www.aksutvhaber.net/afsinde-50-yillik-sehir-planlamasi-hayata-geciriliyor [Accessed on: 16 March 2025]

development zone of the city. These projections mark the development zone as the southern lands for an efficient logistical conduct.

The logistical conducts that underpin Afşin's development govern both the management of the city's labor force—central to its ecology—and the decisions regarding the siting of the city's waste, all under the same infrastructural layout shaped by claims of efficiency. This layout extends through two transport corridors on the south of the city traverse the terrain while facilitating an expansion which repurposes destruction debris as part of the infrastructural development. The threshold where this development overcomes the terrain becomes a boundary, and the logistical regime selectively determines the placement of participants and remnants. The same regime designates the dumping grounds for destruction debris. This indicates that the city's infrastructural design is predicated on the co-location of labor and waste. The logistical regime imposes an exploitative order that stretches from thermal power plants to the scale of individual buildings within the urban fabric. We observe that this mechanism of multi-scalar movement organizes the earthquake-triggered development zones through the visible manifestations of material, social, and ecological deprivation, all embedded within the infrastructural layout.

From this perspective, the movements of labor power, debris, and industrial formations produced within the city—together with the Çoğulhan village, agricultural land, and river basin governed by the thermal power plant—share a similar fate. This fate is shaped by logistical imperatives that underpins the optimization of supply chain efficiency, the facilitation of labor mobilization, the overcoming of terrain thresholds imposed by urban settlement, the extraction and circulation of geological resources. The distribution of energy produced at larger scales is generated through destruction slowly revolves back into the continuous reproduction of these processes.

Latency in the context of labor housing refers to the strategic positioning for deferred activation within logistical operations. In Afşin, the construction of labor housing

adjacent to industrial parks and debris fields illustrates how logistics spatially externalizes worker to remain outside the rhythms of everyday urban presence. This placement transforms labor into a dormant logistical resource. Latency, therefore, governs not only materials but also bodies, embedding labor into the same material and temporal structures of postponement.



Figure 3.16 Photos from Afşin's debris site showing the labor housing, the highway and the extraction site in the background. [Taken by the author on: May 3 2023]

In Afşin, latency materializes through the co-location of debris, labor housing, and industrial infrastructure within a spatial logic of containment. The thermal power plant at Çoğulhan, with its vast lignite extraction fields and accumulating ash deposits, exemplifies how matter is not discarded but layered—held in place as an unresolved residue of production. This industrial landscape sets a precedent for how post-earthquake debris was later managed. Here, debris becomes a material reserve, treated not as waste but as a stockpile for future infrastructural use. The same southern zone also accommodates newly constructed labor housing units, revealing how both matter and life are bracketed as logistical assets. This condition turns the terrain into a site of material latency, where extraction debris, destruction waste, and labor settlements are stabilized in service of logistical efficiency. Latency thus renders debris an infrastructural layer reinforcing Afşin's long-standing relationship with sedimented matter.

The temporal dimension of latency in Afşin unfolds through the prolonged deferral of resolution—where both environmental harm and infrastructural transformation

are suspended rather than completed. The thermal power plant introduces this temporality through its cyclical extraction process: lignite is mined, combusted, and its waste sedimented back into the land, layering contamination without closure. This unresolved accumulation becomes a temporal template for the post-earthquake management of destruction debris. Debris is not promptly cleared or reintegrated into reconstruction cycles; instead, it is temporarily displaced to peripheral zones, where its future use remains undecided. Likewise, labor is mobilized not for immediate rebuilding but stationed in housing complexes aligned with logistical corridors within an unfolding reconstruction agenda. This convergence of matter and labor into a zone of latency reflects a governance logic that treats time not as urgency, but as deferral: recovery is slowed, and futures are suspended. In this temporal regime, latency becomes a tool of control, regulating when and how resources—human or material—are called upon. Afşin's ecological transformation thus proceeds not through rupture and renewal, but through the slow, recursive temporality of logistical postponement.

3.3.4 Elbistan: Site of Perpetuation

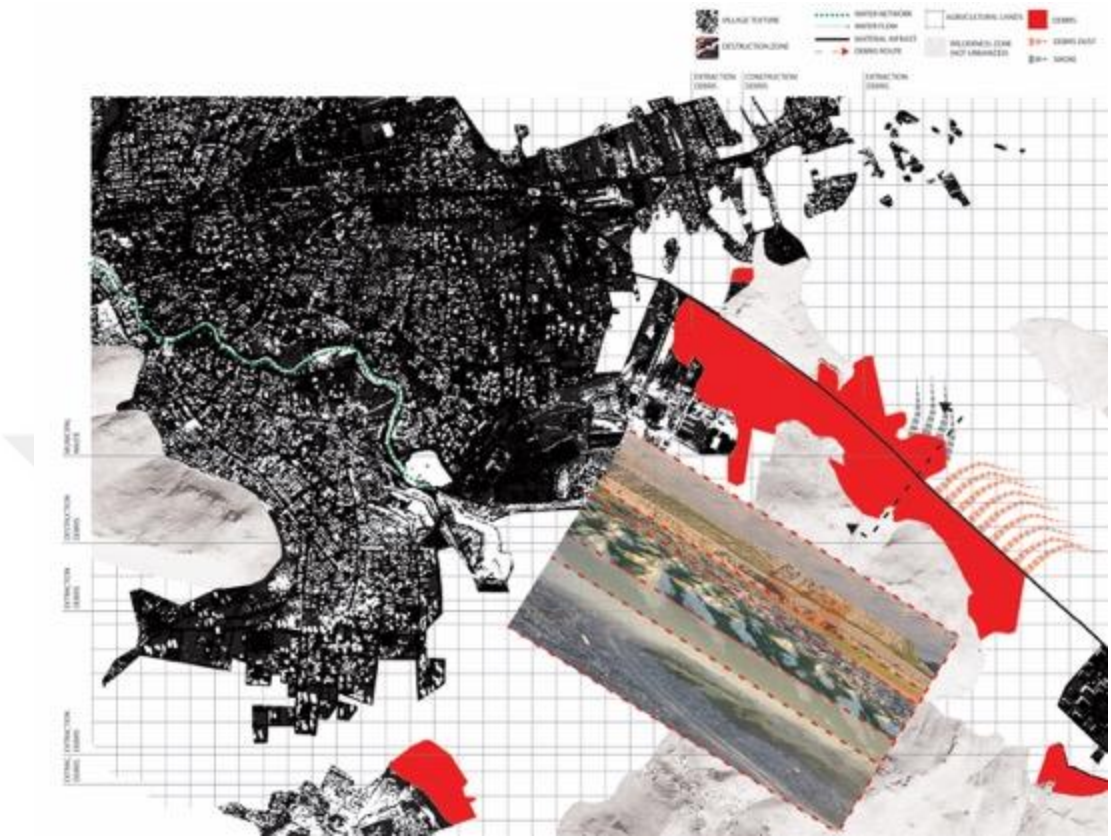


Figure 3.17 Mapping of Elbistan's ecology with debris site. Produced by the author.

Perpetuation, in the context of debris, refers to the sustained and self-reinforcing continuity of environmental and spatial harm. Unlike acute destructions and finite disposals, perpetuation describes a condition where debris marks moments of crisis by being continuously integrated into a system of degradation. As a conceptual mode, perpetuation defines debris as a material that extends its impact across time and space, embedding itself into the everyday life. As a spatial formation, perpetuation emerges where debris is not removed or remediated, but allowed to linger under the guise of necessity. Elbistan's debris site exemplifies this logic: what began as an emergency response space has gradually transformed into a site of long-

term exposure—merging earthquake rubble, municipal waste, and extraction residue into a continuous field of pollution and risk.

Debris site of Elbistan is located next to the municipal waste disposal area on the south-east axis connecting to the county of Nurhak. Unlike previous examples, Elbistan debris site spreads on the surface without creating a rising accumulation. According to the law enforcement personnel, this spread enables survivors to come search for their remains of their lost ones and their valuables. However, this stretch is not a newly emerging phenomenon on the eastern section of the city which has been utilized as a disposal area for extraction industries.



Figure 3.18 Aerial photos from Elbistan's debris site. Left: Extraction sites before the earthquakes in May 2020, Right: Destruction debris covers the site while municipal waste and extraction industry grows in November 2024. [Retrieved from Google Earth, Accessed on: June 16 2025]

The site, stretching for two kilometers along the Nurhak highway, conjoins with the disposal areas of limestone quarries and their disposal sites. Elbistan debris site, in that sense, is another example where extraction and destruction debris meet. However, this time, the heaps of waste rock and debris of the earthquake create two different patches. While older extraction debris sites are covered with vegetation, patches of destruction debris stay exposed, creating dust clouds around their perimeter. Additionally, the municipal waste area that is continuously burning adds to the problem of dust and smoke. This pervasive smell of burned plastic mixes with

the dust from the post-earthquake rubble and the concrete plant, forming spatial markers of the site's materiality.

Limestone and other materials extracted from nearby quarries that are brought together within the perimeter show how debris enters into perpetuating conditions of the site. Therefore, in Elbistan, the location of the destruction debris site is a continuation of the disposal activities of the city, which merges extraction, construction and municipal refused matters on the same spot. This co-existence is an infrastructural layout that consolidates the city's "dirty work" in a single locus. When viewed once again through the lens of logistical conduct, the destruction of living environments in the areas chosen as storage sites for residual matter which in return reveals the extent of how materials accumulate harm over time.



Figure 3.19 Photos from Elbistan's debris site showing the rising dust clouds, the highway and the extraction debris site and the fields in the background. [Taken by the author on: May 3 2023]

Originally introduced as a solution to meet the needs of earthquake survivors and to ensure their post-catastrophe welfare, this spreading zone has ultimately become a massive landfill. The debris site along the Nurhak road is a major example of airborne dispersal, especially since no precautions have been taken to prevent dust generation. The dispersal of materials as airborne dust which are excavated from the ground and scattered across the environment, now extends its impact far beyond the covered soil. Northern winds carry the dust over the limestone ridges, reaching the container settlements, grazing animals, and nearby agricultural fields. It is fair to say that the chemical substances contained in the debris—most notably asbestos—

negatively impact the habitability of the city and its surroundings. This adverse effect significantly increases during the uncontrolled processes of breaking down debris into manageable pieces and transporting it.

The investigation conducted in Elbistan present cross-sections of the relationship between physical infrastructure and logistical conduct at the intersection of site selection. With the resources offered by geological formations and the forced reshaping of both social and environmental ecological life around debris shows the entangling of logistics with its surroundings. The accumulation of the residual matter of the city showcases logistical efficiency protocols as disregard environmental and social ecologies. In this regard, the context of small districts offers the most overlooked examples of logistics dominating the space-making practices.

Perpetuation in the material context refers to the durable presence and unresolved dispersal of debris. Destruction does not culminate in clearance and yet, perpetuates the landscape as a logistical force. In Elbistan, debris is spread thinly across a two-kilometer corridor along the Nurhak highway, merging with the region's concrete production and municipal waste systems. This horizontal dispersal reveals a mode of material perpetuation where debris is discarded to coexist with the previous forms of refusal. Then, the debris, as a whole, becomes the persistent layer in the city's material culture. The result is a material condition in which destruction debris becomes an active part of the landscape that continuously includes destruction as a strategy of control.

Perpetuation in the temporal context describes a condition in which the effects of debris are prolonged across time. In Elbistan, the decision to spread debris produces a different effect in the landscape by presenting a temporal regime of chronic exposure and gradual harm. This prolonged disposal activity constitutes a slow violence, where debris sustains as a *de facto* condition of disposal. The burning waste from nearby municipal facilities and the adjacent operation of a concrete plant further creates risks that are visible within short-term impacts. In this context, Elbistan's debris is not a remnant of the earthquake's past but a temporal infrastructure which

normalizes the environmental degradation. Therefore, perpetuation of debris reveals how disaster debris site gradually extends deprivation, rather than a singular moment of exception.

The first part with Göksun, Kanlıkavak, Afşin and Elbistan—focuses on cross-sections from the historical centers, neighborhoods and streets of small districts to their hinterlands—tracking debris from the point of its mobilization to its final deposition, showing the movement of infrastructural elements along the way, and highlighting the logistical violence. The subsequent sections aim to deepen the discussion by embarking on a change of scale, exploring the impact that debris mobilization leaves as a practice of producing the built environment in larger settlements.

3.3.5 Kahramanmaraş: Site of Fragmentation

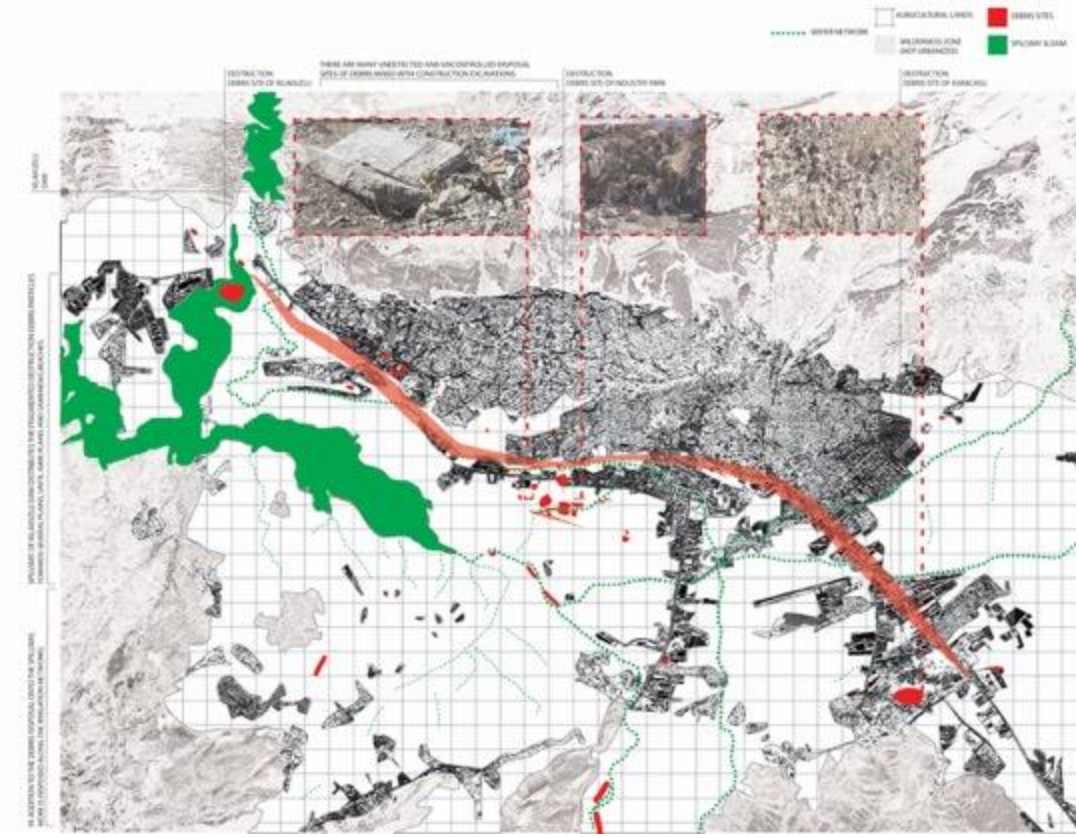


Figure 3.20 Mapping of Kahramanmaraş's ecology with debris sites. Produced by the author.

Fragmentation refers to the spatial and material division of destruction into manageable units, enabling the dispersion of debris across the region. As a conceptual mode, fragmentation defines the "splinters" in the city which are operated by the mobilization of debris. As a spatial formation, fragmentation emerges through the disaggregation of debris into dispersed sites, peripheral zones, and infrastructural corridors, where its visibility is minimized and its value recalibrated. As well, fragmented debris allows the formation of the site for future operations by changing the topography, smoothing the surfaces and regulating the labor force. In Kahramanmaraş, fragmentation of debris is visible with disposal sites in the spillway of Kılavuzlu Dam, industrial park and Karacasu.



Figure 3.21 Aerial photos from Kahramanmaraş's debris sites. Left: Spillway of Kılavuzlu Dam, Right: Destruction debris covers the site while municipal waste and extraction industry grows in November 2024. [Retrieved from Google Earth, Accessed on: June 16 2025]

Kahramanmaraş has a population of six-hundred-thousand people in its metropolitan core. On 6 February 2023, the city lay near the epicenters of the earthquakes while the shocks fatally damaged thousands of buildings across the province. Kahramanmaraş being one of the most damaged cities in the region, has resulted in large amounts of destruction debris. During the site visits, two of the destruction debris sites were spotted. Visiting the site in industry park has shown how debris accumulated near existing circuits of production. Next visit was to Karacasu, where most of the destruction debris was accumulated near a neighborhood that includes a university campus, new housing construction and an industry park. People in Kahramanmaraş also mentioned dumping activity in the spillway of the dam. Although, there was no visit to the site, satellite imagery helps to conduct an analysis based on the changing water levels and the dumping area.

Satellite images of the spillway show a dry land piece that is utilized as a debris dumping area. With the images between before and after 2020, it is evident that this debris site has been a site reserved for excavation and earthworks residue. The difference between destruction debris and other residues can be spotted in the aerial images through their visual characteristics. Destruction debris usually appears as a grey compound with multiple small color changes between broken larger pieces and heaps of dusted particles. Depending on which stage of its fragmentation, destruction

debris slowly loses this dotted colorization. While appearing as a more split in the early stages of mobilization, as time passes, the material changes its hues and contrasts between the parts and turns into a uniform heap. Nevertheless, it is not likely that destruction debris loses its grey patch, as well as its toxicity with its fragmentation. The satellite images provide a number of recordings within which destruction debris can be differentiated. Since there are no additional split-looking debris heaps after 2023, the dumping activity in spillway must have been probably stopped. Yet, contamination of the waters continues with the destruction debris dumped in the riverbanks. The sites in riverbanks varies in size and content with a considerable amount mixed with excavation debris. When they are not directly disposed inside the bedding of the rivers, destruction debris can be spotted on the vacant areas near the rivers.

Satellite imagery and field observation show that what began as isolated dumping grounds has evolved into a distributed debris infrastructure, where fragments of destruction travel through irrigation networks, enter agricultural plains, and sediment into biodiversity corridors. These accelerated fragmentation processes enable debris to be carried via flow of rivers. Destruction debris embedded in Asik and Deli streams travels to the Maraş Plain, and through the Aksu River into the Sağlık Plain, eventually reaching the Narlı Plain to south. These plains, where agricultural activity is heavily concentrated, depend on river systems and the surrounding dams and irrigation infrastructures for continuity. At the same time, they constitute the primary means of subsistence for the communities within KBAs.

The logistical scattering is not accidental, but it is engineered through fragmentation to ensure debris remains moveable, divisible, and extractable. Fragmentation starts with the cleanup activity where buildings are broken into pieces for initial transport. This initial fragmentation is operated by excavator machines which slowly digest the structures into a heap of concrete. This heap, then, is loaded onto the high- capacity trucks to deliver the debris on a site where second phase of fragmentation starts. In this phase debris is further diminish in size with the extrication of steel parts. This process requires manual labor in addition to the operated machines.



Figure 3.22 Aerial photos from excavation debris in the spillway site of Kılavuzlu Dam, zooming into the material from November 2020. From left to right material composition does not show to be a destruction debris. However, it seems that it is an excavation debris. [Retrieved from: Google Earth, Accessed on: June 16 2025]



Figure 3.23 Aerial photos from destruction debris in the spillway site of Kılavuzlu Dam from February 2023. From left to right material composition show to be a destruction debris with particles and the prevailing grey color. [Retrieved from: Google Earth, Accessed on: June 16 2025]



Figure 3.24 Aerial photos from destruction debris near and over riverbanks from June 2025. From left to right debris sites show magnitude of the disposal by zooming out. [Retrieved from: Google Earth, Accessed on: June 16 2025]

Final phase of the fragmentation of debris happens in recycling and repurposing factories where the material turns into infrastructural aggregate for further construction purposes. This process provides standardized scales of aggregate for varying types of utilizations, such as road construction, building foundations and filament for reinforced concrete structures. As destruction debris travels within the logistical chain, process of fragmentation not only diminish its size, but also creates divisions by the very sites of its accumulation. The sites often neglect the continuity and connectivity in-between the parts of the city and its ecology, embedding fragmentation in the texture of the built environment. Moreover, the fragmentation of the city into manageable parts cannot be separated from the processes of debris breaking, since it functions as a barrier by being a mobile element.

For debris sites in Kahramanmaraş, fragmentation of the city happens by the mobilization of debris through the D825 highway. Spillway debris site connects to the highway as a separate unit of energy infrastructure. Site in industrial park benefits from its proximity to the center and the overall neglect over the irregular dispositions of material. For Karacasu, debris site divides the neighborhood and surrounding built environment of university, industry and other nearby settlements. In this sense, fragmentation facilitates logistical control while externalizing connectivity, embeds debris into the infrastructural thresholds—roads, waterways, and settlement layouts—that once supported the region's continuity.

To understand the fragmentation done by the destruction debris in the region, it is crucial to consider the layout of the transportation infrastructure. Two arterial highways—D825 and D835—marking the ring road of Kahramanmaraş, emerge as key axes. These highways form the heavy transportation corridor between Kahramanmaraş, Hatay, and Gaziantep, and simultaneously regulate the flow of debris. Notably, the three debris sites are located on D825 making use of an infrastructural link between the spillway of the Kılavuzlu Dam and Karacasu with debris. These three debris sites align with the city's distribution layout reinforcing a spatial tendency which fragments the city into zones. These sites are placed in



Figure 3.25 Photos from destruction debris in the process of fragmentation. Left: Fragmentation of large debris pieces in the site of destruction in Doğukent Kahramanmaraş. Right: Second phase of the fragmenting into further smaller pieces in the debris site of Karaburçlu. [Taken by the author on: May 4 2023]



Figure 3.26 Photo of recycling factory in Hatay, showing the product of the final physical fragmentation of debris. [Taken by the author on: March 7 2025]

negligible zones, such as industrial zones, waste collection areas, and peripheral neighborhoods, often remaining in the margins. Furthermore, two of these sites are located close to the container settlements, evidencing how the survivors and remnants are mobilized and dispersed are placed into the fragmentation process. This cluster of mobilization through D825 corridor, indicate a critical dynamic in terms of debris logistics. Once the debris is collected from the city, its relocation is guided by a spatial strategy that prioritizes locations distant from the center yet in close proximity to major roadways. These sites must be accessible to ensure continued operation of vehicles mobilizing the debris while remaining within logistical reach of potential labor pools and nearby industrial or informal residential zones. Therefore, logistical account of debris in the region cannot envision beyond the guidance of technological infrastructure as well as proximity to the sources of labor.

During my fieldwork, I had the opportunity to chat with law enforcement officers, truck drivers, stone-crushing workers, and machine operators. These conversations revealed that labor requiring expertise was being brought in from other provinces. One truck driver explained that he was employed recently and came from outside the region. Similarly, soldiers assigned as security forces stated that they had been deployed to the area through transfers outside the city. The influx of labor into the destruction zone invites us to rethink the post-disaster mobility—not only as displaced residents fleeing from the catastrophe but also as incoming work force involved in the processes after the disaster. This brings us to the fact that jobs requiring no specific expertise, such as crushing, carrying, and placing materials, was attained often by those who lost their mobility due to the disaster.[277] While the mobilization of debris draws in labor force from the region, it simultaneously creates

[277] Several workers in the site shared their experiences of the earthquake, and how they became part of the cleaning activity. One worker stated they were working in the excavation facility and transferred to the debris site. Other, a relatively younger than others, was employed after the earthquake with the help of his relatives. They stated a 12-hour shift starting with sunrise and ending with sundown. When asked about their accommodation, they replied with varying locations of tents. However, this was before the deployment of container cities.

a working class for its breaking apart and extrication processes. Meaning, the expertise of drivers, operators and soldiers is imported from the surrounding cities, while work of *layman* is provided by the remaining local labor force. This condition reveals the social repercussions of fragmentation with debris where the work requiring for the operation in the site is divided into two segments. The first segment, representing the logistical operations, is distant to the material and its uses, traces and meaning. For instance, they use the word *moloz* (rubble) and talk about its quantifications as well as its legal boundaries and checkpoints. They either patrol in-between the debris site and destructed environment, or around them. Their major duty is to secure the travel of debris. However, the second segment, representing the ground operations, is directly related to the material both by providing the heavy-duty work force for its handling and by living the continuous disaster it brings. They prefer *enkaz* (debris) that is a reflection of destructed environment in the city.[278] Their duty does not include a logistical expertise, instead they have become a logistical element that is brought to the site.

Fragmentation, as a material condition, refers to the systematic breaking down of debris into transportable, processable, and redistributable units. In Kahramanmaraş, this material logic is visible both in the form and geography of destruction debris. The process beginning with the mechanical disintegration extends towards a further control of the geography. The divisions created by the mobilized debris reveals a multi-phased process where peripheral disposal sites, crushing facilities, and new constructions play as the physical manifestations of control. Therefore, this process not only physically transforms debris but also fragments the landscape. Sites like Karacasu and the industrial zone accumulate debris alongside housing development, turning material remnants into infrastructural inputs. The spillway of the Kılavuzlu

[278] During the studies of the thesis, I preferred to use the term enkaz (with Arabic origin: *naḳḍ* نَقْض) that encapsulates a meaning of invalidation, destruction and deprivation. Although it does not connotate mobilization, enkaz provides the connection between the destruction and debris site as a continuation. Sevan Nişanyan Dictionary, "nakz," 2015.
https://www.nisanyansozluk.com/kelime/nakz [Accessed on: May 13 2023]

Dam, long used for dumping excavation waste, becomes the locus where debris mixes with water systems, redefining fragmentation as a method to cross ecological thresholds. Thus, material fragmentation in Kahramanmaraş is a technique of territorial reorganization, where debris is repurposed to render destroyed environments operable within the logistical regime.

The temporality of fragmentation in Kahramanmaraş reveals a governance structure that manages destruction through sequential breakdown and spatial displacement. Fragmentation stretches the disaster across time by extending its presence through how it systematizes the labor force. As debris is progressively atomized by the survivors, its temporality shifts into to a delayed aftermath of continuous survival. Meaning, how victims of fallen infrastructures due to the earthquakes are integrated into their process of cleanup. These are not mere survival stories but their aftermath, showing how debris fragments into a temporal continuity. Additionally, we see the spillway and riverside as disposal areas showing how fragmented debris and the survivors travels in an out of the disposal sites. The staging of these temporal fragmentations across mental and environmental thresholds produces a logistical rhythm in which debris is never fully removed but exponentially increase its impact. Fragmented debris is in a phase of becoming which transforms into infrastructure and aggregate from being a memory. This is a logistical organization of time where events fragment into moment of crisis, therefore, becoming an extended regime of violence. In this way, fragmentation becomes a temporal device through which disaster is latent, fixed, and perpetuated as an ongoing mode of governance where survivors become debris—to deal with debris.

3.3.6 Karacasu: Site of Fluidity

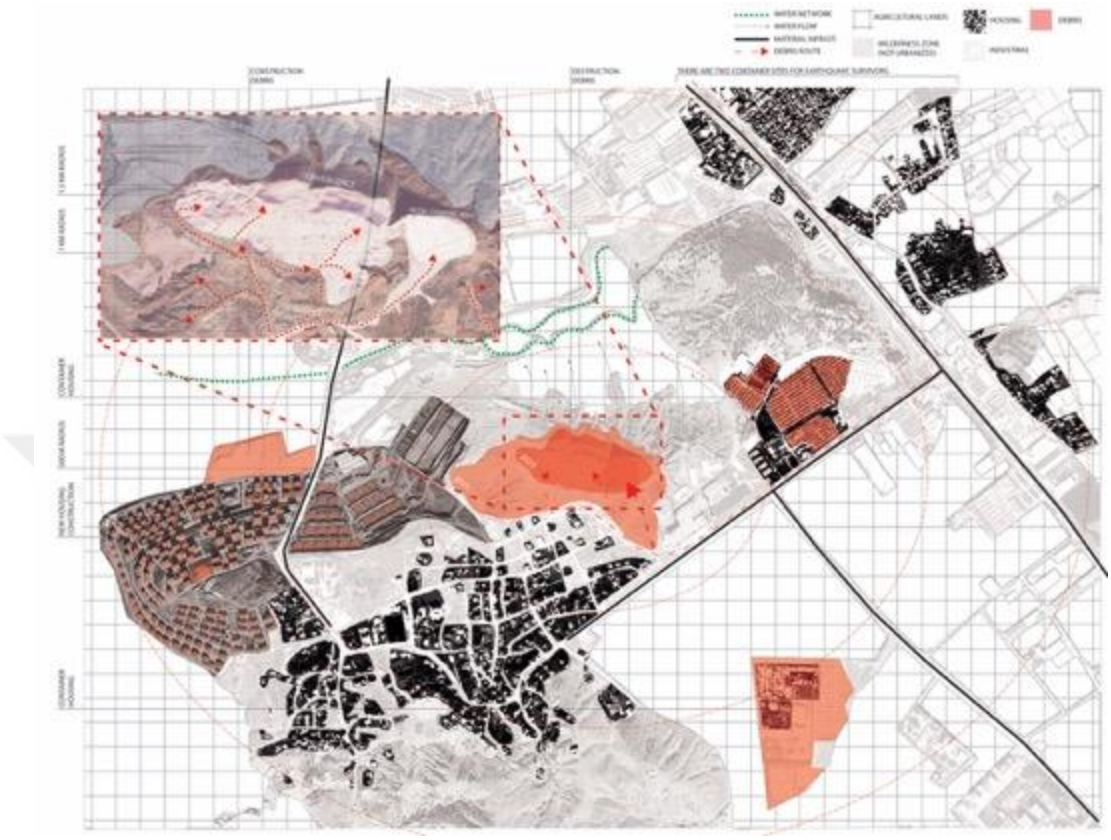


Figure 3.27 Mapping of Karacasu's ecology with debris sites. Produced by the author.

Fluidity, in the context of debris, refers to the condition in which solid matter transforms into a moving, malleable, and unstable format. Debris in this format becomes capable of reshaping both terrain and infrastructure through its dispersed—and often uncontrolled—movements. As a conceptual mode, fluidity defines debris as a substance in constant transformation without an anticipation on its behavior on the site. When it is crushed into finer particles, debris loses its rigid form and gains a pliable quality, enabling its particles to be poured on top of each other. In many debris sites, this fluid-like material is used to smooth surfaces, fill voids, raise topographies, and connect new roadways to uneven terrain.



Figure 3.28 Aerial photo from destruction debris in Karacasu spilling between the two hills. From left to right, dates of photos are April 2022, February 2023, June 2023, and October 2024 [Retrieved from: Google Earth, Accessed on: June 16 2025]

Following debris trucks from the center of Kahramanmaraş along the D835 highway toward the Karacasu industrial zone leads to a site located between two small hills. Dumping activity started accumulating from the slopes of the hills behind the villages of Ferhuş and Kırım, forming a barrier by rising above the terrain. By 2023, the debris had formed a pyramidal mass extending from the foothills upwards and ending in a sharp linear edge. By 2024, this accumulation had nearly doubled in size, covering the terrain while matching the levels of the edge and the road. Elevations started appear as the debris site accumulated material on top of the road level. This is because the "dump and drag" operation which provides logistical accessibility in the organization of the space. Logistical organization of the space makes use of the fluid qualities of the material to bring such configurations, also benefiting from solidity of the debris.

The logistics of debris in Karacasu produces a spatial form constrained by the infrastructural capabilities of the equipment. In sites such as Göksun, Elbistan, and Afşin, debris is only designated by the ease of access for trucks and proximities to the destruction zone. These sites, resulting in passive spatial configurations, exemplify the abandonment of debris. However, with the Karacasu, the debris site presents a more active spatial condition, where the material quality of debris enables operations on the site. These spatial conditions occur by horizontal dragging of the crushed particles and vertical accumulations of pouring the debris on the slopes of the topography. Horizontal dragging allows debris to spread toward the skirts of nearby hills, while vertical pouring creates elevations. Together with dragging and

pouring, fluidity of debris allows for semi-coordinated configurations of accumulations in the site. In such configurations, debris functions both as a binding surface and as the material to be processed on the very surface that it configures.

Deposition in both directions organizes the uninterrupted movement of logistical equipment. The horizontal spread levels the terrain, smoothing the topography to allow continuous dumping, with the highest edge of the debris mound aligning seamlessly with the adjacent road. In doing so, sorting activities are conducted with minimal friction, ensuring the operational efficiency for stacking of reusable materials, the transport of extricated metals. Vertical stacking occurs only when horizontal expansion reaches to natural or built thresholds—bounded by housing and the village to the west, and by agricultural fields and steep terrain to the north.



Figure 3.29 Photo of the changing level of debris in Karacasu depicting the scale of accumulation. [Taken by the author on: May 4 2023]

By 2025, Karacasu had evolved into a recycling facility, where rising heaps of debris created a condensed operational zone. Following the recycling activity, the vertical segmentation of the debris hill becomes apparent. In that, debris with steel and debris in the form of dust behaves differently in the site. Once debris is crushed, dragged, and reworked into the terrain, it transforms the site into a rising heap where trucks and other machines can gather materials with ease.



Figure 3.30 Photo from destruction debris in Karacasu poured on the skirts of a hill with Kahramanmaraş city center on the background. [Taken by the author on: May 4 2023]



Figure 3.31 Photos from destruction debris accumulation in Karacasu. Left: Photo of the site from a distance with two levels. Right: Cracks appearing on the surface. [Taken by the author on: May 4 2023]

The irregular dispersion of the material depicts the mechanism that designates how terrain is abstracted. This designation depends on how particulate debris materiality is and which stage debris is in, in terms of fragmentation. The abstraction happens with leveling of the topographical features where debris either fills the cracks or pours over the terrain as a thick cover. As logistical configuration of the site designates accessible surfaces and paths, this thick cover creates a space where various scales of debris fragments act as filaments for the inaccuracies of the topography. Unlike the passive accumulations where operation is organized around the debris, logistical space created by debris internalizes the logic of mobilization. This mobilization logic follows the temporal and material strategies of logistics as seen in the leveling of the road. The operation with the road marks the strategy of spatial production which is an interplay between topographical characteristics and liquidized debris mass.

The deposition of debris in Karacasu slowly flattens the terrain starting from various offset points. This results in various disposal points that slowly converge into a singular accumulation. Different outcomes of the logistical abstractions follow this convergence to the point where they create a new condition in the site. For Karacasu, disposal activity starts from a singular approach. With the increase in the disposal activity new paths are designated to prevent blocking the flow of trucks. As the disposal activity progresses, accumulation of the material and paths diverging from the road connection slowly converges as the distances between poured material decrease.

Highlighting fluidity as both the spatial logic of the construction and the material quality of debris show how disposal of a solid mass can behave like a spillage. Its instability under changing weather conditions further supports this condition showing the interaction between debris mass and natural forces. Causing cracks and erosions, these forces bring fluidity as a condition where debris creates a volatile surface. In this way, debris as a fluid mass becomes not only a logistical tool but a risk vector. Karacasu debris site exemplifies how fluid mass is operationalized debris to perform both as the material and the spatial tool to manage accumulation.

3.3.7 Karaburçlu: Site of Recursion



Figure 3.32 Mapping of Karacasu's ecology with debris sites. Produced by the author.

Recursion, in the context of debris, refers to the cyclical movement of matter through space, wherein debris returns to its point of departure. Recursion shows the alterations of debris by its passage through logistical systems. As a conceptual mode, recursion defines debris as a mobilized raw matter, circulating within infrastructural loops. Recursion adds another layer to debris logistics with the connection between the extraction and disposal activities. In post-disaster cities, debris travels outward from the site of excavation, only to reappear in other spatial forms. By filling roads, grading construction sites, or entering supply chains as recycled aggregate, logistics excavates debris and its components from the destructed environments—both in the sites of extraction and demolish. Logistics facilitates a return by structuring debris

as a circulating resource, detached from the identities it gained and reinserted into the terrain it once departed. Through recursive movement, debris accumulates by being mobilized, restructured, destructed and finally broken down to fragments. This cyclical logic collapses the boundaries between destruction and production, waste and resource, casting debris as both remnant and the material input that arise before and after the built environment. With this collapse, loop follows alterations of debris while asserting harm during its mobilization. Karaburçlu exemplifies this recursive movement by presenting a concurring debris site of disposal and extraction.

Karaburçlu is a small village of Nurdağı county in Gaziantep located next to the D825 highway. There are two debris sites near the village one of which operates as the primary collection site where steel and other valuable metal parts are extricated. Within this site, debris is fragmented and later disposed in nearby hills. Second debris site can be reached by a dirt path that reaches to west towards a deserted mining pit. Here, debris is disposed into the pit filling nearly half of its void. Although such disposal placements are considered more efficient in terms of low permeability of soils, trapping dust dispersion and occupation of the already-damaged zones, such practices cannot go beyond hiding the debris and its environmental impacts. In fact, these seemingly rational dispositions of debris lack surface barriers and water collection channels which cannot control the leakages of toxic matter. Therefore, these sites disregard the basic monitoring measurement rather tucks the debris away. Apart from such reasonings and their overall damage, there can be found a stronger cyclic logic that proceed with mobilization of materials.

Karaburçlu debris site is one of the many cases where extraction and disposal activities intersect. During the fieldwork, I realized that there is an abundance of cases where debris is rather located in mining pits or operated with their initiatives. In addition to Karaburçlu, there are conjunction of debris and mining sites in Fevzipaşa, Altınüzüm, and Kırıkhan. Disposal of debris is mainly operated by mining companies, related with their capacity to operate the equipment of cleanup and their logistical capabilities.

Mine operators are specialists in minimizing friction within environments defined by high rates of material attrition. Mining sites, often located on the peripheries of cities, function as extraction nodes that supply urban centers with raw materials. In these sites, friction arises both during and after excavation of the surfaces. During extraction, it is a physical force between the machinery—such as excavators and wheel loaders—and the resistant surfaces of the earth. These machines are designed to counteract the friction generated through scraping, cutting, and lifting dense material. However, after excavation, friction becomes logistical—it emerges in the transport and mobilization of materials, influenced by terrain, gradient, load, and infrastructural availability. This type of friction is not fixed; it fluctuates based on the logistical systems that govern routes, regulate slopes, determine widths, and connect extraction points to distribution networks. These works as minimizations of friction which are achieved through the deliberate shaping of surfaces—a design practice embedded in mining and logistical expertise.



Figure 3.33 Photo from destruction debris inside the mining pit of Altınüzüm. [Taken by the author on: May 4 2023]

This understanding of friction can also be applied to debris mobilization in the earthquake region, where debris behaves as an inverted form of excavation. Unlike mining, debris logistics does not remove material from the Earth but instead

accumulates it onto the terrain, often filling valleys or constructing the surfaces for accessibility. Friction here emerges not from the act of scraping, but from the handling, sorting, and transportation of broken material. The cleanup and relocation phases require navigating irregular, unprepared ground—making friction an operational challenge. By reversing the logic of extraction, debris operations mirror mining practices in how they manage the movement of crude matter through terrain. In both cases, the material—whether excavated ore or destruction debris—must be shaped, routed, and positioned to minimize resistance and maximize efficiency.[279]

With debris, we realize that logistics either works in additive or in subtractive fashion. In both modes, the material that generates the surface of the friction is the same. What was once an extracted from the soil returns to its site of excavation. With this recursive logic debris travels through different phases of materiality to reach to the very same point, yet with an amalgam of mixed matters, or logistical traces.



Figure 3.34 Photo from destruction debris inside the mining pit of Karaburçlu. [Taken by the author on: May 4 2023]

[279] As a side note, we are not looking at the wasted materials of extraction as seen in Elbistan case. What we see here is a total outcome, a material circulation changing aspects within a frictive envrionment.

In Karaburçlu, the extraction industry facilitates frictionless movement by re-appropriating the surfaces it had once rendered workable. This friction-minimization process extends through a wide set of operations: the awarding of contracts to mining companies, the selection of low-visibility roadside locations, and the post-dumping leveling of terrain. The separation of debris into processed and unprocessed forms allows us to observe the material transformations occurring at the ends of logistical chains as a space-making practice. The recursion of the material shows that the pit and the city is in an interconnected chain of operations. Through this lens, debris enters the logistical network starting from the pits, loaded into trucks, broken apart, and reenters in moments of crisis.

This chain is a series of shifting material assemblages distributed across multiple temporalities. This observation suggests that while debris is not a stable entity, transient compositions of elements are subjected to constant mobilization. Therefore, these shifts are not only material but also temporal. Meaning, both the operational frictions and the surface deformations that occur during transport and disposal are synchronized within scheduled transitions in logistics.

3.3.8 Hatay: Site of Amalgamation

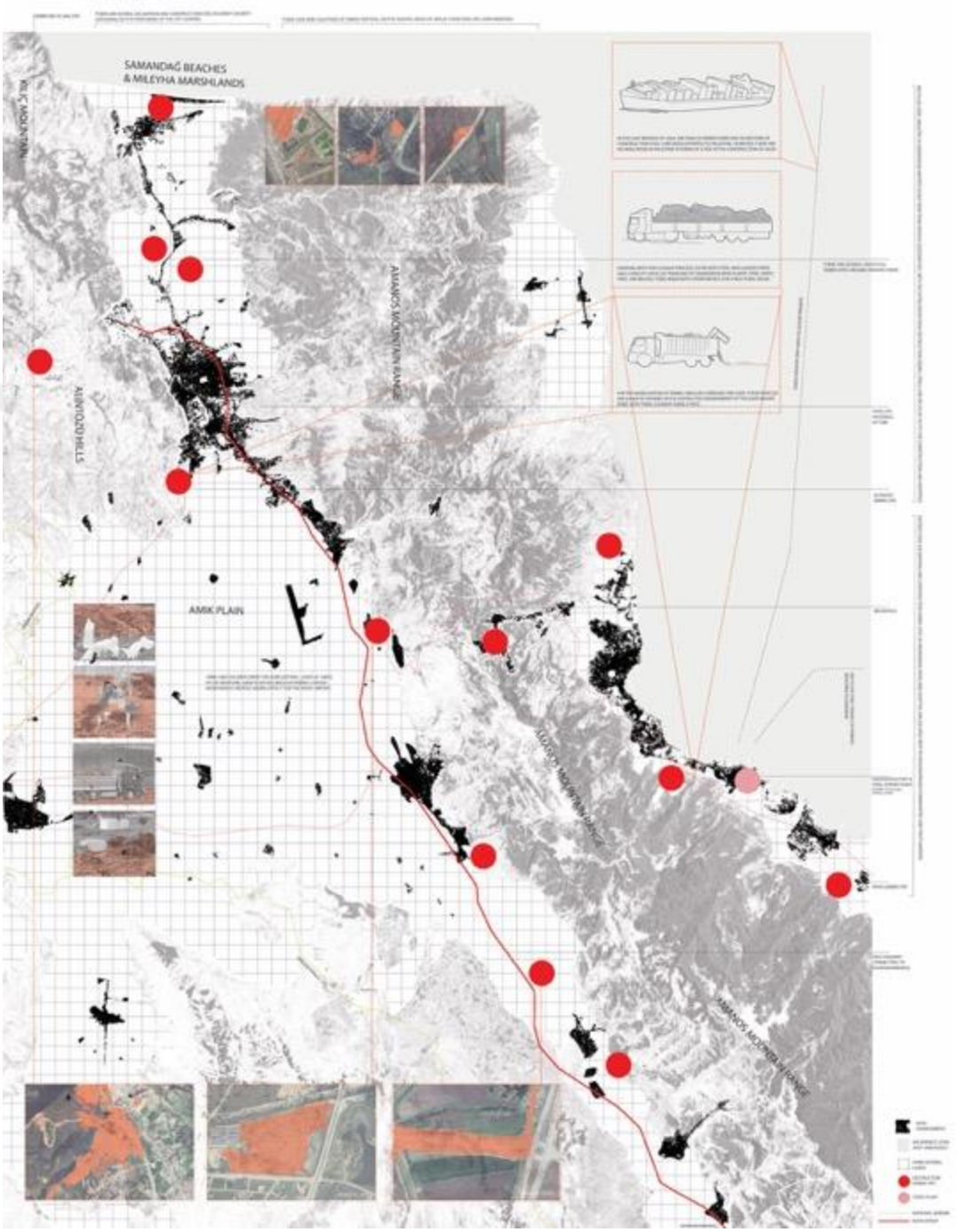


Figure 3.35 Mapping of Hatay's ecology with debris sites. Produced by the author.

Amalgamation, in the context of debris refers to the forced convergence of materials, bodies, systems, and times into a logistical formation. As a conceptual mode, it defines debris as a composite entity under which logistical pressures routinize ecological deprivation for its mobilization. This composite form is not a crisis-born entity, but it is most visible in the aftermath of crises. As a spatial mode, debris amalgamates in places where logistical reach and political neglect intersect. It circulates through zones of abandonment, recovery, and reconstruction providing the contradictions of the space-making practices. As debris amalgamates around roads, excavation and constructions sites, peripheral grounds of the ecologically diverse and vulnerable communities, it brings out the scale of space-making. The divergent temporalities that amalgamation of debris converge breaks the bodily and environmental scales: the same dust that fills riverbeds coats workers' lungs, and the same concrete that props up access roads embeds toxic residues in agricultural soil. Therefore, amalgamation is not only about holding together matter. It is about sustaining a regime of visibility and control where politics of debris makes a shifting material and temporal scales of recovery to coexist.

As one follows the road stretching along the fault line, successive debris sites emerge, turning the axis between Kahramanmaraş and Hatay into a medium of condensation. This corridor operates as a device for orchestrating the movement where logistical control strengthens while visibility decreases. Along this route, the debris flows constitute some of the roads as elongated centers of abandonment. When physical logistical infrastructure—the road—allows to displace wasted material away from the city, it ironically becomes the zone of disposal. In simpler terms, debris accumulation transforms into a road. There are many undetected unofficial debris sites in Hatay, where the road is more than a navigation element. Movement that concentrates on these roads creates a condensation of vehicles through which debris constructs paths and environments.



Figure 3.36 Aerial photo of a disposal creating a road to debris site in Karağaçlı village of Kırıkhan March 2024. [Retrieved from: Google Earth, Accessed on: June 16 2025]



Figure 3.37 Aerial photo of Altınözü debris site showing the truck traffic on the road. [Retrieved from: Apple Maps, Accessed on: June 16 2025]

These debris sites transform ecological corridors—such as the Amanos Mountains, Amik Plain, and the tributaries of the Orontes River—into logistical infrastructure. The infrastructure that connects the Mediterranean to the inner geography, the cities that have developed around it, and the geological and aquatic systems that sustain these cities also define the limits of logistical trajectories, as debris sites tend to cluster around them. Nevertheless, the roads remain trapped in defining its surroundings as operational zones. In this sense, the periphery of the road becomes a zone of cohesion where logistical agencies mark as site of operation, while the ecological systems turn into navigable fields within which proximities unfold. Therefore, debris is in a condition that renders the conveniences of navigation and

proximity for the inconveniences occurring in the earthquake region of Hatay. Meaning, it is only useful for the infrastructures that define debris useless.

Hatay, being the epicenter of the disaster, harbors the most severe conditions than the rest of the earthquake-broken cities. I first entered Hatay two months after the earthquake. Traveling along the route, sizes and intensities of debris sites was significantly increasing. What we experience in the sites of Karacasu can be seen multiple times in several counties of Hatay. Debris sites in Defne, Samandağ, Altınözü and Antakya creates large accumulations as well as the problems that comes with.

The accumulation of debris in Hatay exceeds the limits of clearing and containing, becoming a material surplus that establish a base for the reconstruction of the city. These sites no longer resemble transitional zones of clearance; instead, they operate as two-sided installations of mobilization. On one side, there are destruction debris sites which exceeds the known thresholds of the city. Such spatial growth of debris extends towards the areas where people live next to, work within, and breathe through. These landscapes overcome the social and ecological saturations of Hatay by implementing debris into the life of the city. In Samandağ, debris presses against the wetlands; in Defne, it skirts agricultural fields; in Altınözü, it shares ground with orchards and grazing routes. On the other, there are cleared site of bare flat grounds. Logistics of debris increases the material congestion in the city by opening up the "destructed environment" for new interventions. These interventions are worsened with the additional construction activities and their infrastructures; concrete plants and quarries. Each of these sites become an amalgamation zone where logistics, ecology, and dispossession intertwine. What we encounter in Hatay is not the aftermath of a single disaster, but the durable infrastructure of amalgamation which is operated by logistics of debris. Therefore, Hatay becomes the zone of amalgamation through clearing and reconstruction.



Figure 3.38 Photo of Samandağ debris site. This site has been relatively cleared of destruction debris, yet a significant amount of debris remains on the ground. [Taken by İrem Senem Büyükkoçak on: July 8 2025]



Figure 3.39 Photo of Altınözü debris site. This site has been one of the largest destruction debris sites in the Earthquake zone. It sits on top of olive groves and grazing lands. [Taken by the author on: March 7 2025]



Figure 3.40 Aerial photos of Antakya, the city center of Hatay. Left: Antakya on the day of the first earthquake, February 2023. Right: Antakya after a year of the earthquakes, March 2024 [Retrieved from: Google Earth, Accessed on: June 16 2025]

Antakya, the historical center of Hatay province, was home to four-hundred-thousand residents before the earthquakes. Settled along the Orontes River and the Amanos Mountains, the city carries deep layers of civilizational continuity, from ancient Antioch to its multiethnic modern form. Antakya had long been recognized for its cultural pluralism with its architecture and social fabric. However, the earthquake catastrophically ruptured this continuity—flattening vast portions of the city center and turning one of Türkiye's most layered cities into a field of absence.

Looking at what remains of Antakya, the meaning of debris undergoes a radical transformation. Unlike peripheral towns where debris appears as the remnant to be moved and managed, Antakya after the earthquake becomes the debris itself. After months of clearing operations, what remains are not mountains of debris but a void. The surviving fragments of the city linger as spectral remainders of a lost urban texture. In Antakya, debris is not just material displaced from buildings, but the very disappearance of the city, made legible through absence. The shifting meaning of remnant in the city helps extend the conceptualization of debris with its cleanup in Hatay.

The cleanup finalized the undoing of the city, presenting a brute case of disaster. The void that is left behind testifies to a kind of destruction which does not pile up, but subtracts. What persists is not an architectural ruin but logistical severance. In this way, Antakya has turned into the debris which remains after the destruction. With changing scale of destruction, debris structures a totalizing condition. This inversion displaces the usual logic of post-disaster recovery within which city is a surface scraped clean by the force of logistics.

With the debris circulating across the peripheries of Hatay, the boundary between debris and city collapses. What remains as the void of a city is not the trace of what was removed, but a scar of removal. The cleanup finalized not just the physical dismantling of buildings, but the forced logistical convergence of Antakya to its hinterland. Therefore, amalgamation in Hatay, especially in the case of Antakya, happens by the imminence between two kinds of debris. In this sense, Antakya becomes a voided landscape where debris is both what stays, but what has been taken. Transformed into absence, debris emerges as the material and temporal condition during the displacement of terrains, reverberating in the forms of space-making practices.

Extraction, construction and destruction, as space-making practices of the post-disaster environment converge in Antakya not as successive stages, but as simultaneous operations. These days there is an ongoing march towards the regeneration of anew urban tissue in Hatay.[280] Having a mostly demolished city center, authorities from different disciplines are gathered in small study groups creating a master plan.[281] Additionally, the new "Reserve Building Area" (Rezerv

[280] There is a report providing comprehensive analyses of multilayered cultural heritage within which urban tissues are also discussed. METU Centre for Research and Assessment of Historical Environment (TAÇDAM), Report v.2: Antakya'nın Çok Katmanlı Kültürel Mirasının Deprem Sonrası Belgelenmesi, Hasar Tespiti Ve Değerlendirmesi, May 2023.

[281] An NGO named Türkiye Design Council (TTV) is operating the urban scale design initiatives and the meetings. In her news article, Cansız, remarks how TTV is operating a narrow planning process based on centric and non-clear stagings for revitalization. For more: Ada Umay Cansız. "Türkiye Tasarım Vakfı'nın (TTV) Düzenlediği "Hatay Yeniden Canlanıyor" Toplantısı Üzerine" Arkitera.

Yapı Alanı) is introduced via Law No. 6306 creating the legal infrastructure for simultaneous operations of space-making.[282] On November 9, an amendment to this law was published in the Official Gazette of the Republic of Türkiye (Türkiye Cumhuriyeti Resmi Gazetesi) which declared dismissal of the previous regulations. In the old regulation, legal boundary for an area to be designated as a reserve building area, it had to be unbuilt and located outside of inhabited zones. With the new amendment, the phrase "new settlement area" was removed from the definition of reserve building area, thereby eliminating the requirement that such areas should be outside inhabited zones. Therefore, in November 2023, new law amended an infrastructure that permits undamaged or lightly damaged building to be included as urban transformation areas "against earthquake risk". Empowering the authorities to designate populated zones to be displaced, the law reforms under liminal connection to the environmental and social ecologies. NGO's and communities are still demanding an inclusive approach, yet what is presented as urgent displays and top-down conclusive master plans.[283]

In the aftermath of the earthquake, Türkiye Design Council (Türkiye Tasarım Vakfı) declared a collaboration with globally acknowledged architecture firms. One of them, Foster and Partners, approached the reconstruction of Hatay with a familiar optimism, proposing a sleek and orderly masterplan that emphasizes renewal through design clarity.[284] Yet, this proposal while being opaque and ambivalent in terms of

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May 2024. https://www.arkitera.com/haber/turkiye-tasarim-vakfinin-ttv-duzenledigi-hatay-yeniden-canlaniyor-toplantisi-uzerine/ [Accessed on: June 13 2025]

[282] Under the scope of the Reserve Area Law, according to Law No. 6306, the areas designated for implementation as new settlement zones are those determined by the Housing Development Administration (TOKİ) or the Administration upon their request, or ex officio by the Ministry. https://www.mevzuat.gov.tr/mevzuatmetin/1.5.6306.pdf [Accessed on: May 23 2025]

[283] Ecevit Alkan who is an attorney in Hatay Baro, working in the extraregularities in Hatay has given an interview with Evrensel News Agency about the reserved zones. Volkan Pekal, Evrensel Gazete, November, 2023. https://www.evrensel.net/haber/503196/av-ecevit-alkan-deprem-bolgesi-hukuk-degil-kararnamelerle-yonetiliyor [Accessed on: June 13 2025]

[284] The image and the details of the masterplan is not shared in their respective website. We can reach it through local architecture news outlet. For more: Arkitera, "Foster + Partners, Antakya Masterplanının Detaylarını Açıkladı," July 2024 https://www.arkitera.com/haber/foster-partners-antakya-masterplaninin-detaylarini-acikladi/ [Accessed on: July 17 2025]

funding and priorities, also reflects a specific redundancy. This is evident in the masterplan which solely relies on standardized spatial strategies that overlook the complexity of what was lost. Rather than responding to the specific social, cultural, and ecological fabric of Antakya, the design leans into universal gestures that risk flattening local memory. The optimism embedded in the proposal, while visually compelling, sidesteps the uneven and unresolved realities of the post-disaster landscape. Notably, in the corner of their main aerial render, we see the Altınözü destruction debris site—a subtle but telling presence that underscores the unresolved reality just outside the frame of architectural optimism.



Figure 3.41 Aerial render of Antakya showing the Altınözü debris site in the distance. [Retrieved from: arkitera.com, Accessed on: July 16 2025]



Figure 3.42 Photo of a quarry near Hatay. [Taken by the author on: March 7 2025]



Figure 3.43 Photo of a concrete plant in Hatay. [Taken by the author on: March 7 2025]



Figure 3.44 Photo of Altınözü debris site from inside. [Taken by the author on: March 7 2025]

Construction activity started on August 2023 with the reserve area law which expropriates the agricultural lands owned by nearby farming communities. In the meeting of Disaster and Emergency Management Presidency (AFAD) the committee of Hatay Governorship Environment and Urbanization Climate Change Province renounced the judgment of Local Environmental Board on vulnerable land regulation. According to this new condition, Environmental Impact Assessment Report (ÇED) won't be a necessity for mining activity. Authorities state logistical efficiency as the main reason of the renouncing. According to the local news outlets, a total of 90 quarry started their operation.[285]

Before long, the local population began to protest, claiming that the environmental impacts of the quarries were causing the collapse of both social and ecological systems, and initiated a struggle to shut them down. In Döver neighborhood, the local community that organized against this situation and won its legal struggle. Although, the 3rd Administrative Court of Hatay prohibited the execution, local sources report that the company has not ceased its operations.[286] The number of incidents has increased with the acceleration of construction activities, such as the gendarmerie intervention against rightful landowners in Dikmece who gathered to protest the expropriation of their lands, or the clashes that occurred during the protest against the concrete plant in Sarıseki, which began operations without an Environmental Impact Assessment Report.[287]

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[285] Nisanur Yıldırım, "Hatay deprem sonrası madene teslim oldu," *Nefes Gazetesi,* March 2025. https://www.nefes.com.tr/hatay-deprem-sonrasi-madene-teslim-oldu-24726 [Accessed on: July 17 2025]

[286] Nefes Gazetesi, "Mahkeme durdursa da taş ocağı çalıştı: Mahalleli gözaltında," July 2025. https://www.nefes.com.tr/mahkeme-durdursa-da-tas-ocagi-calisti-mahalleli-gozaltinda-47962 [Accessed on: July 17 2025]

[287] Vecih Cüzdan on Bianet, "Dikmece'de nöbetin ikinci günü: Askerler bizi değil kepçeleri koruyor," *Bianet,* July 2023, https://bianet.org/haber/dikmece-de-nobetin-ikinci-gunu-askerler-bizi-degil-kepceleri-koruyor-282215 [Accessed on: July 17 2025] and Yeşil Gazete, "Hatay'daki 'kaçak beton santrali' mühürlenmesine rağmen zehir saçmaya devam ediyor," October 2024. https://yesilgazete.org/hataydaki-kacak-beton-santrali-muhurlenmesine-ragmen-zehir-sacmaya-devam-ediyor/ [Accessed on: July 17 2025]



Figure 3.45 Photo of the excavated construction sites in Dikmece. [Taken by the author on: March 7 2025]



Figure 3.46 Photo of the new housings in Dikmece. [Taken by the author on: March 7 2025]



Figure 3.47 Photo of the construction debris accumulating near the housing in Dikmece. [Taken by the author on: March 7 2025]

As of 2023, Dikmece and its surroundings have started to fill with Housing Administration (TOKİ) housing developments on former agricultural lands. These areas, located at the foothills of the Amanos Mountains, north of Antakya, were designated as developable zones through the removal of the Environmental Impact Assessment requirement and under the Reserve Area Law. Within this planning framework, the construction of 255 thousand housing units and workplaces is leading to the emergence of a debris mass mobilized by extraction and construction activities during the establishment of satellite towns on the city's outskirts.

During the fieldwork in March 2025, I observed that the soil excavated from the construction sites in Dikmece was being piled up in nearby areas. It is clear that this practice falls outside the scope of regulations and official requirements. Normally, the soil is supposed to be transported to designated dumping areas located in mountainous or remote zones, as determined by the municipalities. However, dumping the soil near construction sites constitutes an extra-regular practice. We see that the volume of the excavated soil displaced at the ongoing housing construction sites in Dikmece and elsewhere in Hatay is comparable to the massive debris mounds resulting from destructions.

After the earthquake, President Erdoğan announced that the resulting debris would be recycled into infrastructure components. However, following this declaration, no public disclosure or transparency was provided regarding the planning of such infrastructure projects. The process has unfolded without a clear plan, and its details have been made known primarily through accounts from field workers. In Hatay and Kahramanmaraş, recycling sites were established, where debris is processed through crushing operations. This handling process reflects a globalized model of debris management and material recovery, and similar procedures are evident at these

sites.[288] Materials broken down into various sizes were intended to be used as fill material, yet this process has been disrupted at both locations. As a visible outcome of these operations, large mounds of aggregate in varying sizes have accumulated at the sites. Workers on the ground report that these are crushed materials left without any designated destination, and since the aggregates are not being transported or utilized, they have accumulated in place—prompting a halt in the processing activity. Additionally, after the announcement of presidency, criticism against the use of building materials as infrastructures emerged stating a lack of empathy for the ones who lost their life to the very infrastructures of pre-earthquake.[289]

The mobile residual matter generated through extraction and construction activities is intimately linked with amalgamation. Although the fact that these operations often proceed without the necessary permits or environmental reports reveals a breakdown in regional governance and inspection mechanisms, it also reflects a broader acceptance within human-centered construction practices of the exploitation of ecologically vulnerable zones. In Hatay, the regional governance mechanism operates within a rhetoric of urgency; therefore, the practices of constructive and extractive industries display the dominating discourse on more-than-human context.

Payas provides an illustrative case where multiple spatial and ecological disruptions converge. Payas, one of the less acknowledged counties of Hatay, received relatively less damage and loss compared to counties such as Antakya, Defne, and Samandağ. Official data does not include the extent of damage in Payas; however, according to residents, the number of demolished buildings did not exceed a hundred.

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[288] Batuman's introduction of tumuli in Berlin presents a well-grounded reformulation of debris. Debris becoming a place for healing, for Batuman, repossess the topography as a memorial, rather than a dead patch. Bulent Batuman, "Deprem Tümülüsleri," *GazeteDuvar*, June 2023. https://www.gazeteduvar.com.tr/deprem-tumulusleri-makale-1623744 [Accessed on: December 5 2023]

[289] A writer in Gazeteduvar, Berrin Sönmez, exemplifies this criticism towards recycling of the debris as a vulgar practice. Berrin Sönmez, "Enkaz artığıyla yeni yapılara dolgu malzemesi öyle mi," *Gazete Duvar*, February 2023. https://www.gazeteduvar.com.tr/enkaz-artigiyla-yeni-yapilara-dolgu-malzemesi-oyle-mi-makale-1605091 [Accessed on: June 13 2024]

Reconstruction efforts in Payas exemplify how multiple space-making processes converge, exposing ecological fragility and infrastructural instability. Two key sites in Payas illustrate how debris-scale exposes the logic of space-making as a disruptive force. Firstly, the housing complex planned by Housing Development Administration has started the construction in 2016 in the neighborhood called Çağlalık. It is located on outskirts of the city, on the foothill of Mount Amanos. Prior to the construction project, the site functioned as both a dumping ground and a stone quarry. Being located next to main artery connecting the extractive industries and dumping site to the industries and port, this part of the city was designated as a satellite settlement. Moreover, the site is near the creeks coming from the mountain, meeting the water needs of small animal husbandries and orange groves. The debris from extraction and construction activities is casted in the dumping site covering the pond of the creek. Second area of concern is the debris site of destruction which is, again, in a stream bed of a near the village Kozludere. Before destruction debris, the higher altitudes of the site were occupied by another construction debris dumping activity. On the lower levels, where destruction debris fills, there is a water reservoir next to groves and the city cemetery of Payas. The presence of debris at these sites poses significant environmental and social risks, contaminating local water sources and disrupting fragile ecosystems. Additionally, increased truck traffic has turned surrounding settlements into transport corridors, straining local infrastructure and further marginalizing affected communities.

Çağlalık, a small neighborhood in Payas, has long been on the periphery of large-scale industrial and infrastructural expansion, serving as a node of logistical network of extraction, waste disposal, and construction. Even before the earthquake, the region bore the material footprints of industrial displacement, with its hinterlands used for dumping and stone quarrying. The presence of such pre-existing industrial activities has deepened its post-earthquake role as a debris accumulation and redistribution hub, reinforcing patterns of ecological marginalization. Payas functions as an overlooked node within the large networks of debris mobilization.



Figure 3.48 Aerial photos of Çağlalık Payas in 2016 and 2024, showing the housing construction and the debris site. [Retrieved from Google Earth, Accessed on: July 19 2025]



Figure 3.49 Aerial photo of Kozludere 2024, showing the destruction debris site. [Retrieved from Google Earth, Accessed on: July 19 2025]



Figure 3.50 Photos from Payas showing the extraction, construction and destruction debris sites as well as truck traffic flowing inside the villages. [Retrieved from Google Earth, Accessed on: July 19 2025]

The transformation of debris reveals the layered temporalities of space-making practices. The prioritization of Çağlalık as repurposing reflects the uneven distribution of environmental harm across disaster-struck regions. State-driven planning, corporate interests, and informal economic networks enable the externalization of debris-related risks onto peripheral communities.

The absence of official data on Payas' destruction further highlights the asymmetrical power dynamics that govern post-disaster reconstruction efforts. As debris sites continue to accumulate in Payas, the long-term consequences of these transformations remain uncertain. The slow infiltration of debris into water bodies and agricultural zones suggests that the environmental consequences of current practices might will be visible to eye in long term. Debris, in that sense, showcases the material entanglements disrupting the linear narratives of reconstruction in Payas, pointing toward an extended temporality in which debris continues to act long after its perceived obsolescence. Revealing how debris of Payas does not disappear but becomes embedded in material flows.

Amalgamation in Hatay manifests materiality through entanglements. The material form of debris is continuously shaped by logistical routines that bind disparate beings and becomings. Crushed stone, working bodies, soil, animals, asphalt, parts of the deceased, wood, crushed olive trees, rebar, grazing fields, glass, dust, and residue amalgamate into debris. The accumulation of destruction debris with construction waste, industrial byproducts, and excavation soil creates a hybrid field that continuously enters and exists highlights their entanglement with logistical accounts. These materials adhere physically through logistics, where roads, routes, and clearings turn into agents of aggregation. The materiality of amalgamation is marked by inconsistency and unpredictability. Amalgamation is granular and structural, in the way that logistical regime performs a mobilization in the infrastructures of legal dismissals and neglect. What holds these heterogeneous components together is cohesion and proximity of debris within itself and a larger context where city is debris itself. In Hatay, amalgamation becomes a condition in which the substance of the crisis, its infrastructure, its origin, its paths are materially indistinguishable.

The temporality of amalgamation in Hatay unfolds with conflicting timescales. While logistics demands speed for the cleanup, the materials they mobilize are unknown in terms of their reactions and persistence of their impact. Debris, once amalgamated across ecologies, enters into longer temporal registers with slow degradation, sedimentation, leaching, and contamination. Simultaneously, the temporality of amalgamation enables the overlapping of extraction, destruction, and construction as simultaneous operations. In the timeline of disaster recovery, reserve area laws, construction permits, and expropriation orders unfold with urgency. This urgency collapses the boundaries between emergency response and urban planning, resulting shifts material mobilization as well as memory and future. As a result, the debris of the past, the materials of the present, and the risks of the future are entangled in the temporal stagings of logistical violence. In Hatay, amalgamation does not simply happen in an instant, yet, it reorders the instances of multiplicity, fixation, latency, perpetuations, fragmentation, fluidity, recursion, and the aspects of temporality where ruin and rebuilding are made to converge.

In the post-disaster landscapes of Hatay and Kahramanmaraş, the conditions of debris are articulated through interrelated terms that capture both the spatial operations and epistemic consequences of destruction. Multiplicity points to the diverse agencies entangled in debris mobilization encapsulating municipal authorities and contractors to informal laborers, residents, and nonhuman actors, while each is shaping the handling, circulating, or contestation. Fixation marks the dominance of formal logistical infrastructures over informal spatial practices, where stabilization of debris into a usable form while marginalizing local response. Perpetuation reflects how destruction is prolonged with debris which is continually shaping the environments and decisions. Fragmentation is the calibration of debris into logistical value as aggregate and fill material allowing debris to be an apparatus of infrastructure and economic priority. Fluidity describes the transformation of debris into malleable forms that reshape topographies, slip into ecologies, and cross spatial boundaries. Recursion shows the return of debris to its original departure point transforming it into an equivalent zone. Finally, amalgamation defines the scale

of totalization in which debris consolidates disparate materials, bodies, and timescales into condensed landscapes of recovery, saturated with overlapping crises and logistical violence. Taken together, these terms reveal the post-disaster zone not as a field of resolution, but as an extended condition of material and temporal entanglement, where the debris epistemology emerges through logistical operations.

Table 3.1 Table for concepts and logics of debris logistics in the earthquake region.

Site	*Concept*	*Logic*
Göksun	Multiplicity	Diverse Agencies
Kanlıkavak	Fixation	Prioritization of Value
Afşin	Latency	Acute Destruction
Elbistan	Perpetuation	Value Calibration
K.Maraş	Fragmentation	Manageable Units
Karacasu	Fluidity	Constant Transformation
Karaburçlu	Recursion	Looping Movements
Hatay	Amalgamation	Overlaps of Crisis

Debris, as an unusable yet made usable by mobilization networks, juxtaposes disciplinary efforts of space-making. Post-disaster environment draws the systematizations of material flows which consequently connects planetary scale to local ecologies. Adjacency of space-making practices in Hatay uncover the non-linear narratives of extraction, construction, and destruction. Instead of treating debris as an endpoint in space-making, its perpetual, fixed, fragmented and fluid re-emergence reveals the amalgamations and multiplicities in mobilization networks. This material-temporal disposition of debris constitutes the scales at which space-making is conceptualized through logistical violence, demanding a shift towards an ecological and scalar understanding of mobilization. Debris, therefore, provides an epistemological projection by presenting the thresholds of material-temporal scales in the ecologies of architecture. Challenging human-centric models of temporality and materiality, debris extends beyond projected cycles of progress.

CHAPTER 4

TOWARDS A DEBRIS EPISTEMOLOGY

This chapter returns back to the outcome of logistical ecologies: violence. The positive violence, as discussed previously, is under the guise of a technical neutrality with which following part unfolds to answer the question of what we learn from debris. Chapter locates neutrality as one of the central issues in logistics as a gap between its operation and its environment. After defining this gap between knowledge accumulations and logistical mobilization—as well as through military systems, chapter counters neutrality by asserting situated knowledge. By setting one foot on the objectives of technoscientific knowledge with perfection and abstraction and another on the claims of rational operations by smooth coordination, first part negotiates a discussion on disembodiment, particularity and situatedness. First part concludes by exposing how logistical reasoning reduces complex, situated realities into abstract calculations of movement. Second part of this chapter introduces debris as a category to expand architectural knowledge by taking fixity, intention and completion as central motives. Then, it reframes debris as both a product and a record of violence one that collapses the boundaries between body, land and infrastructure. By foregrounding debris mobilizes across scales and durations, second part argues for a situated architectural knowledge of debris violence that unfold slowly in the ecologies of degradation. Finally, last part takes scale as an epistemological tool to spot the tensions in the conditions of debris. By reflecting on the records of post-disaster study as the intense conditions, chapter concludes knowledge of debris as an onto-epistemological extension in architecture.

4.1 Technoscientific Knowledge of Logistics

Technoscience, as an epistemological mode of knowledge, operates through rationality, abstraction, and smooth coordination, producing a seamless interface between scientific authority, technological instruments, and logistical control. It constructs and legitimizes regimes of communication and standardization that conceal violence behind neutral claims, enabling the management of destruction and mobilization of debris across shifting scales of materiality and temporality.

Technoscience emerges as a pivotal marker in the articulation of debris epistemology because it reveals the knowledge, power, and material systems are inseparable and entangled in space-making. Rather than viewing science and technology as neutral and external to the crisis, the critique of its logistical processes exposes how managery systems maintain military modes of knowing and governing.

In the post-disaster environments, technoscientific rationality constructs the reality by adopting methods that abstract, standardize, and instrumentalize destruction with the regimes on changing scales of materiality and temporality. This framing allows us to see how logistics functions as an epistemological apparatus that controls with a standing claim of neutrality. Technoscience provides the conceptual scaffolding to trace how ecology and infrastructure coincides epistemic frameworks both in the mobilization of debris and the management of destruction. In this sense, the constructions of ecology and infrastructure, technoscience and military, body and politics are taken as backbone for the situated knowledges of debris.

Orit Halpern and Robert Mitchell, in “The Smartness Mandate,” bring ecology and infrastructure together by reframing both as epistemological and operational categories. What they refer as the "smartness mandate" is an epistemic paradigm

where the planet is a data-generating, self-regulating system.[290] They claim that planetary technologies have created a shift in how we understand both ecological systems and infrastructure as interdependent, recursive feedback systems that manage populations, environments, and crises in real-time.[291] They treat infrastructure as both a material apparatus and a temporal experiment zone that hosts "evolutionary computation" of data optimization.[292] They argue the studies on data optimization starts with the simulations of evolutionary biology studies, later transform into a search for method of control.[293] Their approach help embrace a model of knowledge where perception and action are distributed across machines, environments, and populations.[294] This marks a shift from centralized governance to adaptive, zone based modulation.[295] Thus, ecology as a zone of operation becomes a computational mode of organizing life—one increasingly indistinguishable from infrastructure itself.

[290] This claim alligns with the proposition of Peter Haff with technosphere, as discussed in the Chapter 2. While Haff's technosphere stems from an epistemological search to understand the sum of human existence on Earth, the authors note the changing paradigm of "machinic" intelligence to operate on Earth. We can argue that the difference between their approach to the "crisis" depends on how they reflect on the knowledge of technology and science.

[291] Orit Halpern & Robert Mitchell, The Smartness Mandate, London/MA: MIT Press, , 2023, p. 49.

[292] They refer to David Fogel, a computer scientist coining the term, to define optimization problems in fluid modelling systems. These systems are the zone of experiments on interdependent particles. Halpern & Mitchell, The Smartness Mandate, p. 32.

[293] Authors discuss this issue with resilience as term to define "the goal of smart infrastructures of ubiquitous computing." They regard logistics as "the dominant method for engaging with possible urban collapse and crisis." Thesis aligns discussions on computationality and cybernetics as part of its debate on calculation. Halpern & Mitchell, The Smartness Mandate, p. 27.

[294] They draw on Foucault's biopolitics and Deleuze's control society to frame how smart systems learn from populations and environments, treating both as data infrastructures.

[295] This shift is discussed in Chapter 2, by making connections with the advents in infrastructural layouts based on speed, computation changing the rules of habitation and continuity.

4.1.1 Neutrality in Technoscience

Neutrality in technoscience refers to the false appearance of objectivity and political detachment within the systems that mediate the relationship between infrastructure and ecology. Technoscientific frameworks actively shape what becomes visible, knowable, and governable. By that, it claims neutrality in the co-constitution of infrastructure and ecology. Neutrality here is not an absence of politics but a mode of epistemic erasure, where the power dynamics, exclusions, and violent consequences embedded in knowledge production are rendered invisible. Displaying infrastructure and ecology as relational concepts reveals the shift that adjust epistemology with technoscience.

This condition leads to a notion of an infrastructure composed of different layers where one infrastructure can complement another. Star and Ruhleder states that relatable infrastructures exert interchangeability to the reciprocal positions of the ecology as infrastructure—or infrastructures as ecology.[296] Their argument shows that on the one hand, ecology regulates what is knowable depending on the infrastructure of extracting knowledge. On the other, infrastructures are the ground with which ecology is the resource of knowledge. However, this reciprocal relation should not be underestimated, especially with an idea that neutralizes the politics of technoscientific search.

In "Science in Action," Bruno Latour shows that technoscience is far from being a neutral pursuit of knowledge. Rather, for Latour, it is a networked process entangled with institutions, machines and people for strategic decisions. Latour states;

[296] Susan Leigh Star and Karen Ruhleder, "Steps Toward and Ecology of Infrastructure: Design and Access for Large Information Spaces," *Information Systems Research,* 1996, Vol.7, No __, p.111-134

> Every time an instrument is hooked up to something, masses of inscriptions pour in, tipping the *scale* once again by forcing the world to come to the centres - at least on paper. This mobilisation of everything that can possibly be inscribed and moved back and forth is the staple of technoscience and should be kept in mind if we want to understand what is going on inside the centres.[297]

Latour asserts that the power of centers depends on their ability to mobilize inscriptions to produce, collect, and manipulate data representations of the world. Similar to the mandate discussion, Latour is describing the moments of instrumental connections, that are the transmissions between sensors, probes, satellites or logistics trackers defining a real-world entity such that of a molecule, a volcano, a shipping container, or a battlefield. However, Latour's focus on inscription—maps, graphs, datasets, and protocols, displays them as connections of control making use of infrastructures—the networked systems of sensing equipment and actors.[298] They are the means through which certain versions of reality gain authority and operational force. When Latour writes about how Earth systems become visible through planetary instrumentation, he draws attention to the political and epistemological implications of this visibility.

Later in his work "Facing Gaia," Latour reveals that these inscriptions are not simply representations but acts of the "natural world."[299] There is a distinction between scientific and political depiction of the nature as called for externalized ecology. Therefore, natural world in dentations is a call for a political stance for nature and culture divide to be released from reductionist notion of ecology. Meaning, centers for Latour are the points of calculation where inscriptions of ecologies about the "natural world" to mobilize through and within. In the following parts of his theory,

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[297] Bruno Latour, Science in Action: How to Follow Scientists and Engineers Through Society, Cambridge, MA: Harvard University Press, 1987, p. 233.
[298] Latour's challenge against intentionality with Actor-Network Theory. For more: Bruno Latour, Reassembling the Social: An Introduction to Actor-Network-Theory, Oxford: Oxford University Press, 2005.
[299] Bruno Latour, Facing Gaia: Eight Lectures on the New Climatic Regime, trans.by Catherine Porter, MA: Polity Press, 2017, p. 179.

he uses the term logistics as a metaphor for the mobilization of data between instruments, entities and their inscriptions through the centers of calculation.[300] Such use of the term indicates how techno-scientific knowledge of logistics is deeply embedded in calculations of control. In the context of logistics, it is a regime of mobilization that shows the notion of nature as distributable entity. Logistics of inscription attends to centralization by statistics, economics and other forms reading, regulating and applying space-time intervals. In that sense, inscriptions are the accumulations of knowledge transmitted through connective points, structured to deposit moments of change in the form of a calculation.

Logistics of data gathered by the sensing equipment is, then, the mobilization that control the mobilizations. Such epistemic structuring of movement is deeply embedded in the power mechanisms to control the complex networks of flow, making logistics a system of systems.[301] This is evident by taking logistical organization of knowledge in global tracking of shipping containers through satellite and sensor-based logistics systems. For instance, a container is equipped with global positioning systems (GPS), radio-frequency identification (RFID) tags, and environmental sensors that continuously transmit data—its location, condition, and movement—into centralized digital dashboards. These data points, or "inscriptions" in Latour's terms, are mobilized through logistical platforms that visualize and regulate the container's journey in real-time. Decisions about rerouting, customs, or delivery are made not based on conditions on the ground but on abstract representations circulating within control rooms in distant centers of calculation. This transformation of material movement into legible data renders abstract data into

[300] In the Chapter 2, there is a part that conveys how logistics and infrastructure are culturally acknowledged and distinct metaphors of connective networks that build on movements and underlying principles of making.

[301] Bousquet uses the term, by referring to Adm. William Owens, to explain computer technologies, intelligence systems and the cybernetic advents in military to define what we connote by logistics of knowledge. Owens uses system of systems as a definitive explanation of such condition of logistics. Bousquet, Antoine. The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity. 2nd ed. Hurst / Oxford University Press, 2022.

a composition of inscriptions, making the knowledge and its environment operable. This seemingly neutral systems conceal the political nature behind what becomes visible is what is measurable. What is not measured remains outside the logic of interventions and usually these exclusions are hand-picked to conceal the complex environments.

In the aftermath of the disaster, debris became a technoscientific object subjected to logistical abstraction. Through inconsistent terminology, withheld statistics, and fragmented data flows, the state mobilized a regime of inscription that redefined debris as a manageable category. The movement and management of debris were mediated by inscriptions—volume estimates, spatial categorizations, GIS maps, statistical dashboards—that calculates its accumulation through the centers that selectively produced visibility. These inscriptions did not merely reflect the reality of destruction but actively shaped it by turning debris into a distributable entity. While erasing its human, ecological, and political contexts, debris is handled with competing figures from ministries, commissions, UN agencies, and news outlets. This is how debris is abstracted as a technoscientific object within a technocratic regime who suspends public accountability and conceals violence. Meaning, debris has turned into a logistical metric to conceal the infrastructural failure.

Looking at logistics as a system that control the patterns of distribution is a critical point for the study. In the previous chapters, we see how crisis is endured with another crisis, creating a sense of perpetuating urgency. This sense of urgency is the capitalistic way of sustaining the mobilization with which the systems can protect its profit margins by making things move faster. By accelerating the flows, logistics provide the toolset for the provisions of the decision mechanism in which state subdues the mindsets through its own media. System of systems does not refer to a myth where it is managing things above material and temporal realities. Logistical systems are different from other systematizations just because it directly handles material and temporal flows in real-time. Its presentation as fast, efficient, and smooth operations of movement provides an image of neutral logistics. This

neutrality, as we discussed earlier, is another reason for its capacity to control other systems. In fact, it is most evident when we compare logistics with its counterparts in military and how they control their environment, as well as other systems of knowledge.

Antoine Bousquet's analysis in his book named "The Scientific Way of Warfare," is built on the continuous communication and the distribution of command in information environments of military. He identifies four historical regimes of technoscientific rationality in military thought. These regimes—mechanistic, thermodynamic, cybernetic, and *chaoplexic*—frame how war is organized, conducted, and imagined.[302] For the author, organization of wars evolved into navigations in asymmetric and complex emergences from mechanistic, linear and central knowledges with the advances of computer technologies and reconceptualization of information. Bousquet asserts cybernetics as a transformation in military systems into closed loops where executions are seamless through real-time automations of conducts. He says,

> As the intensity and breadth of the battlefield grew along with its logistical requirements, communication technologies became necessary to achieve the required coordination of increasingly large and intricate military systems. […] This 'science of communications and control' [cybernetics] promised to manage chaos and disruption through self-regulating mechanisms of information feedback. […] The computer, another product of the war effort, became the new dominant technology and abstract model through which the world came to be understood through the lens of information processing.[303]

[302] For the latest development in the technoscientific conducts, Bousquet observes that overcoming methods for the unpredictable, fast and decentralized nature of wars in last two decades is through momentary adaptation towards chaos. 'Act first, think later.' He later comments on such reflexive operations as "vibrant transmutability of reticular organisation:" an effort to combine hierarchies of military command chain and imaginations of units as swarms-like entities. Bousquet, The Scientific Way of Warfare. p. 317.
[303] Bousquet, The Scientific Way of Warfare. p. 54-55.

This model collapses the gaps between observation and intervention, allowing for abstractions to control the chaotic environment.[304] With self-regulation, the battlefield is no longer a chaotic site of risk, where knowledge is smoothened by the calculation through computer technology. We see this advent in the late 20th century revolution of logistics where accelerating speeds first emerged in the processor market of Microsoft and IBM.[305] This new infrastructure also changed how information technologies could comply with communication. Military communication, as Bosquet highlights, becomes a technical function of rationality disregarding the knowledges emerging in and out of battlefield to the world. As such, the technoscience of military logistics coordinate the conditions under which certain lives become visible, governable, or disposable through communication.

The desire for seamless coordination, real-time oversight, and control without accountability in the post-destruction environment summarize the logistical method of domination.[306] Both in civilian and military versions there is always a gap between execution/practice and command/order. While in the battlefield, this gap is between the units and command center, in civilian order this is a gap in trade markets between supply and demand. Logistical rationality of supply and demand abstracts knowledge from the ground by ignoring the embodied suffering that shape the afterlife of disaster environment. The post-disaster subjects become data points in a logistical network, where material ruin is treated as a friction. What is regarded as demand in post-disaster logistics emerges from an apathy towards bodies, politics and situated histories. In both forms of logistical operation, the uninterrupted synchronization of

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[304] A more detailed account on how logistical abstractions act as a force of operation can be found in Chapter 3 with the discussion of flattened ecological knowledge. There, logistical abstraction is a way of obscuring the physical evidence of the destruction as well as method of state-driven control. With disembodiment, logistical abstraction expands into a delusion; the condition of state apparatus where its knowledge cannot be obscured but always in reach by the situated position of the body.

[305] For more, see Chapter 2, 2.1.2 Shift in Definitions.

[306] Domination is the exercise of power to control without leaving no space but repression of the environment and its inhabitants. Therefore, usage of nature reflects a relational environment here. In Chapter 2, domination discussion is initiated to reflect on the relation between violence and ecology.

bodies, machines and their flows fail to shrink the gap. This is evident in mobilization operations failing to compromise with the emergent conditions in crisis, disaster, war and other forms of violence-laden events.

Logistics, as the system of systems, emerges as the system of data circulation that operates on knowledge through complex networks. The system divides knowledge into manageable parts for the control of complexities. Such systematization of knowledge ensures an orchestration in networks with multiple factors. Complexity of these networks is due to the involvement of multiple agencies with humans (planners, drivers, military actors), nonhumans (sensors, infrastructures, containers), and inscriptions (maps, schedules, data), creating the flows of command and execution. Therefore, what inscriptions works to stabilize is the flow between agencies with fragmented pieces of information depending on their designated role in the flow. The connections between agencies, Latour reminds, have a center of control, dictating the order of flows. The circulation in the complex networks becomes dependent to an authority which controls the epistemic claims that render how knowledge and power are enacted, managed, and normalized.

4.1.2 Countering Neutrality with Situated Knowledges

Logistics never produces neutral knowledge. Deborah Cowen, explain why logistics cannot stay in a neutral ground, rather, it is structured by the political conditions under which it emerges.[307] Cowen challenges the claim that logistics is a pure technical occupation by exposing its political and historical entanglements. She argues that logistics presents itself as a domain of calculation and coordination to detach from power and conflict. However, this technoscientific link conceals the fact

[307] Cowen, The Deadly Life of Logistics, p.4.

that logistics has emerged through violent struggles with geopolitical conflicts, and colonial trajectories. Cowen states;

> The growth in the power of logistics' technoscientific knowledge occurred alongside the rise of logistics as a social and institutional force, particularly visible over the last twenty years.[308]

The very forms of knowledge that logistics employs its data, models, and operational maps are not neutral tools, but products of historically situated power relations. Through abstractions, agencies, hierarchies and constraints, systems of knowing operate within the limitations shaped by its historical moment, political context, and embodied perspective.

Harraway clarifies this perspective in her known article "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." Knowledge, for Harraway, is never from nowhere. She asserts that knowledge is always produced by bodies, located in space and time, shaped by context, gender, race, and institutional structures. Haraway uses this argument to confront the false neutrality of technoscience. A key intervention by Harraway is the redirection of objectivity claims in "White Capitalist Patriarchy" by a feminist discourse of situatedness.[309] From such perspective, she asserts a counter argument to technoscientific habits;

> I am arguing for politics and epistemologies of location, positioning, and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims. These are claims on people's lives. I am arguing for the view from a body, always a complex, contradictory, structuring, and structured body, versus the view from above, from nowhere, from simplicity. Only the god trick is forbidden. Here is a criterion for deciding the science question in militarism, that dream science/technology of perfect language, perfect communication, final order.[310]

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[308] Cowen, The Deady Life of Logistics, p.32
[309] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies*, Vol.14, No.3, 1988, p.590, 592.
[310] Haraway, Situated Knowledges, p. 589.

With the refusal of "god trick," Harraway criticizes the myth of objectivity with omnipotent and all-seeing capacity of science. This critique helps us argue partialities and positions in the practice of knowledge making. Position with body, politics, and history further calls to reimagine the epistemology that is embodied, accountable, and ethical—especially in the case logistics as a system of knowing. The quotation further brings a connection to militarized technoscience (the dream) which provides a link between logistics and its violence.

Harraway's language as a form of underlying grammatical rules, and its operational form as the communication positions logistics with a military baggage.[311] This, small yet effective, depiction of perfection in military puts forward a notion of technoscience to understand it in logistical terms. Her terms unfold the urge of the dream into a desire of seamlessness (smooth) and control without responsibility—of embodied knowledge. Harraway's depiction, too, provides an understanding of a gap in the science of communication and control. With such tendencies of seamlessness, military technoscience is able to provide the technology of weapons as well as create command chains with which it distributes information and communicate, and fall short in completion. Disembodied rationalization with abstracting knowledge from bodies, places, and politics fails to account for an ethical ground.

This mode of reasoning allows violent interventions, in fact, normalization of violence especially under the guises of rational conducts with aid and necessity. Rationalization, in this sense, organizes the means and ends in a world where positions are disregarded when they are not in line with orders in mobilization networks. These conditions are more visible with the idea that logistics creates orders by operating motion.

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[311] To put them out of emphasis, I did not want to delve deeper into the discussion of language and communication. However, I would like to make an entry on how these two atone infrastructure and ecology relation where communication is relational and language is operational.

Isabelle Stengers references Lagrangian systems in “Cosmopolitics Vol. 1” to illustrate a critique of scientific abstraction and disembodiments.[312] She highlights Lagrangian formulations of motion that claims a representation of a universal explanation for configuration of space. [313] She explains the formulation of motion by saying;

> Every time a body moves in a space defined by a potential function, rational mechanics can measure "work," work being defined as the product of the displacement of the body by the force that resists it. Within the context of Lagrangian mechanics, work is a state function, just like the potential function V, live force T, and the Lagrangian operator L. Like the change in potential function, it supplies the "cost" of the transition from one state to another, and the work of the forces that correspond to that transition is independent of the path it takes. But this cost can be generalized outside mechanics. Provide me with a force, atmospheric pressure p, for example. Provide me with a piston that produces, against this pressure, a change V in the volume of an enclosure. I can tell you the amount of work performed: pV. Or, if you provide me with a worker who carries twenty bags of sand over a slope of ten meters, or twenty workers each carrying one bag over the same slope, I can tell you that the same amount of work has been done.

This principle determines the behavior of a system by identifying the path that minimizes a certain quantity of action. This passage from Isabelle Stengers outlines the logic of Lagrangian mechanics and its capacity to generalize the concept of "work" across physical systems. In classical mechanics, work is calculated as the product of force and *displacement.*[314] Lagrangian terms frames the function of motion with a quantifiable "cost" associated with movement from one state to another, regardless of the path taken. Stengers critiques this formalism not for its

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[312] Isabelle Stengers, Cosmopolitics Vol. 1, trans. by Robert Bononno, Minneapolis: University of Minnesota Press, 2010, p. 133.

[313] The Lagrangian formalism allows to derive the equations of motion of a system by applying the principle of least action. Instead of tracking forces directly (as in Newtonian mechanics), the Lagrangian method finds the path a system takes that minimization to its center. For more: Gerd Wagner, Matthew W. Guthrie, “Demystifying the Lagrangian of classical mechanics,” *Classical Physics Entry,* 2022, https://doi.org/10.48550/arXiv.1907.07069 [Accessed through: arXiv:1907.07069v4 on: July 22 2025]

[314] In physics, displacement refers to objects change of position regardless of the paths it has taken.

mathematical rigor, but for how it abstracts material and embodied specificity. This allows technoscientific measures to calculate an optimal effort in terms that erase who or what performs the labor, how it is distributed, or under what conditions it occurs. Stengers critiques this model as emblematic of the "ideal of intelligibility" that characterizes much of technoscience.[315] This form of reasoning treats knowledge as detached from the obligations of care, context, and politics. In the context of destruction and logistics, this abstraction becomes a problem of violence. From a technoscientific logistical viewpoint where materials depart from point A to point B may be calculated in terms of work done, measured as energy and time, regardless of the health issues, ecological deprivation, prolonged harm. The "cost" in the Lagrangian motion, the consumption of capital and time do not concern the bodies, the political context, the meaning in its calculation. Just as in Stengers' example where the work is executed whether one worker carries 20 bags or 20 workers carry one bag each points out the gap of command with the movement.

Mobilization, then, becomes a zone of reduction to bypass measurable transitions between physical states. Logistical disposition renders human exhaustion, environmental degradation, forced displacement, as unnecessary inputs within its knowledge. What matters is the movement of mass, consumption of energy and force, which ultimately abstracts the entanglements within the geography from their situated realities. [316] This logic strikes an epistemic notion of motion where logistical violence in post-disaster clearing operations can be rationalized as efficient based on input-output calculations. Ignoring the ethical consequences of erasure, motion of debris is an inscription of violence. The Lagrangian abstraction, in this sense, legitimizes destruction as transition, and logistical debris movement as progress, neutralizing the political questions it entails.

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[315] Stenger, Cosmopolitics Vol. 1, p. 136.
[316] Hervé Corvellec and David Bevan, "Introduction," in *Waste as a Critique*, ed. by: Hervé Corvellec, Oxford University Press, 2025.

4.2 Architectural Knowledge of Debris

Debris as a resistance to the classifications of waste, dilutes the boundaries between ruin, rubbish, garbage, sludge, junk by proposing mobilization as a central concept in activities of refusal. Stillness and monumentality of ruins, uselessness and invisibility of rubbish, decay of garbage, toxicity of sludge, salvagability of junk resonates with destructive rationale, loose materiality and violent disposition of debris. Disposed materials moves within the networks of mobilization making interactions and changing the spatial conditions of habitation with logistics. Debris of soil erosion, debris of army, debris of disasters are all in movement within the principles of logistics. Debris embraces all refused matters which paradoxically surrounds the makings and markings of the world.

With logistical ecologies, we see how material movements operate on the global-planetary conundrum—along with their violent consequences. With its record in local ecologies, we acknowledge how these material movements tend to create amalgams of mixed materialities defying the time scales in the cases of disaster. By taking the technoscience of logistics to its side, the knowledge of debris aims to deepen these issues by introducing a category of critical thinking for architecture. This category challenges architectural assumptions rooted in fixity, intention, and completion. Architecture, at its core, is a practice of regulation. It organizes bodies in space by regulating material and temporal dimensions on Earth. In theoretical terms, this aligns with notions where buildings and cities serve as instruments to manage populations by regulating their environment and daily lives.[317] In this view, architectural design is not neutral; it actively structures material and temporal dimensions of human life by making and ordering space.

[317] FD. Scott, Outlaw Territories: Environments of Insecurity/Architectures of Counterinsurgency. New York: Zone Books, 2016.

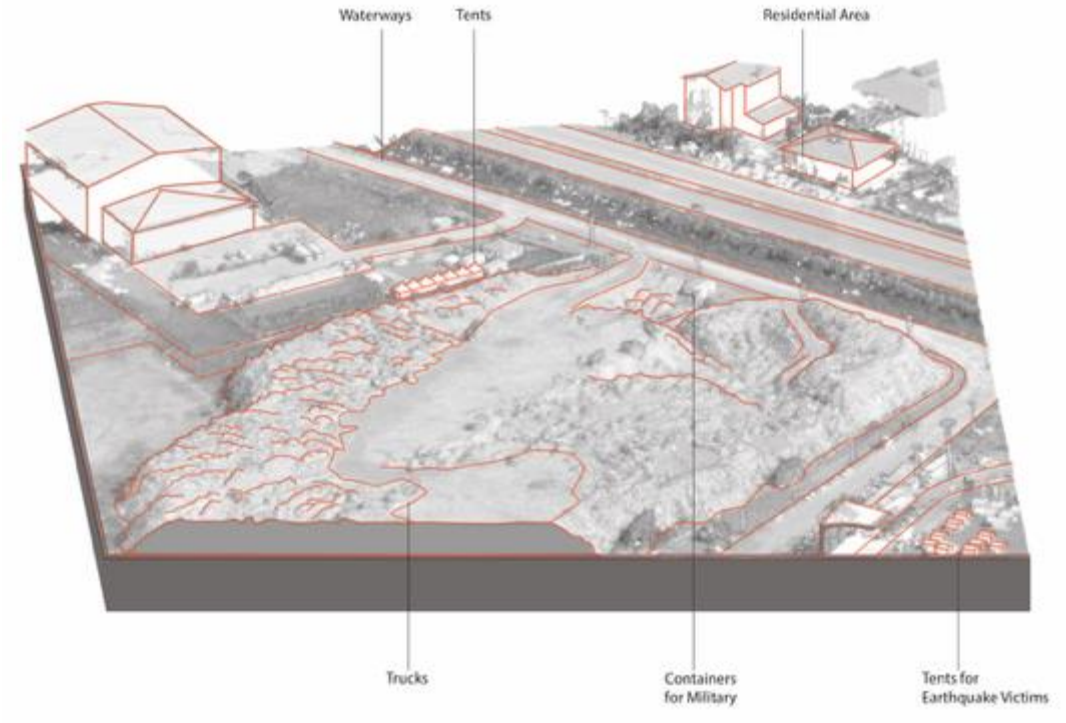


Figure 4.1 Isometric-section of Samandağ debris site towards city. Produced by the author.

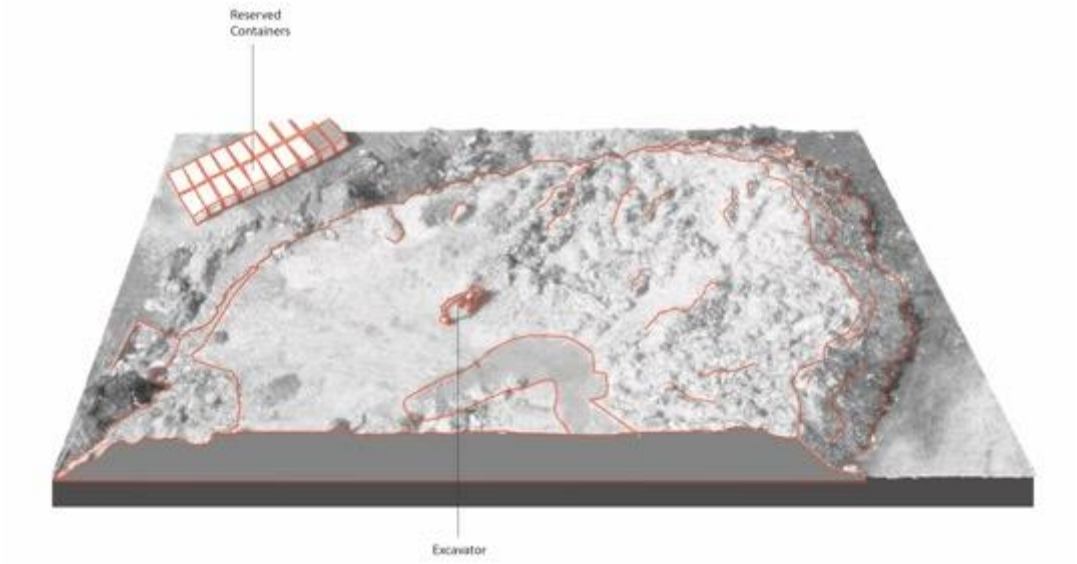


Figure 4.2 Isometric-section of Samandağ debris site towards sea. Produced by the author.

As architect and theorist Léopold Lambert puts it, architecture is inherently political and "organizes bodies in space" with all the power implications that entails.[318] This regulatory function implies that creating architecture is about mobilization of matter, time, and society. Conventional architectural practice often fixates on the final product–the building as a static object–emphasizing solidity, permanence, and visual completeness. We see fixated product of architecture as material accumulations, intentions before the constructions and completion as the drive to reach a final product. To counter the conventional practices, there are works that discusses the possibility of "Non-extractive Architectures."[319] Architect Charlotte Malterre-Barthes notes that contemporary construction "devours" land and resources–urbanization consumes hectares of land and relies intensively on mining and material extraction, with devastating environmental impacts.[320] Space-making as an entry point to discuss the "secondary facilitations technologies allowing for architecture" to dominate material ecologies are based on mineral and resources of "barium, chromite, coltan, copper, dolomite, feldspar, gallium, germanium, gold, halite, indium, lead, lithium, manganese, mercury, mica, nickel, quartz, silicon, silver, sulfite, tantalum, tin, tungsten, uranium, and zinc."[321] Yet, the dominant mode of architectural practice through the accumulation of materials in singular locations; its shaping of environments through volumetric manipulation; and its desire to finalize projects either on paper or built, often followed by a professional detachment—represents a narrow epistemic framework. In other words, the apparent fixity,

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[318] Leopold Lambert, "The State of Architecture," *Lina Community,* 2024 [Accessed on: July 1 2025] https://lina.community/notes/leopold-lambert-the-state-of-architecture

[319] Space Caviar, "Non-Extractive Architecture: On-Designing Without Depletion", ed. book by architecture studio Space Caviar, Sternberg Press, 2021.

[320] Charlotte Malterre-Barthes, "A Moratorium on New Construction? Beyond the Provocation: A Call for Systemic Change from Access to Housing to Construction Protocols," *GSD Harvard News Website*, 2023, https://www.gsd.harvard.edu/2023/02/a-moratorium-on-new-construction-beyond-the-provocation-a-call-for-systemic-change-from-access-to-housing-to-construction-protocols/ [Accessed on: July 4 2025]

[321] Charlotte Malterre-Barthes, "Architecture of Extraction: Space and the Political Economy of Construction Materials, Mineral Wealth, and Resource Exhaustion." *Charlotte Malterre-Barthes Official Website,* 2020. https://www.charlottemalterrebarthes.com/practice/research-practice/architecture-of-extraction/ [Accessed on: June 29 2025]

intention and completion of a building is enabled by dynamic processes of resource mobilization and environmental disruption that remain out of sight by the detachments that comes with the "expertise."

In a world where architecture and violence are inseparable from its systems of knowledge, the frameworks that the discipline presents without encompassing outcomes of space-making practices is insufficient. Architects tend to step away once a project is built or documented, treating the building as a discrete, completed artifact. Jeremy Till in "Architecture Depends," states "all architecture is but waste in transit!"[322] The reason Till argues such a condition comes from the idea that states every building will someday become debris, whether through aging, disaster, or demolition. By focusing only on final forms and images of completeness, architects risk ignoring the continuous material flows and transformations (extraction of resources, emission of waste, eventual ruination) that truly characterize the built environment.

The index of spaces omitted by architectural knowledge far exceeds those it claims to organize. The spaces emerge by the mobilizations of matter should be included into architectural space, rather than the search well-intended and compositionally complete images of spaces. When architecture fantasizes about the permanence of materials, it ignores the displacements and dislocations that precede the built environment. The index of spaces omitted by orthodox architectural knowledge far exceeds those it designs. Consider, for instance, the vast landscapes shaped by resource extraction (mines, oil fields, logging zones), by logistical ecology (shipping routes, warehouses, data centers), or by informal settlements and vernacular building. These spaces emerge through the mobilization of matter and labor on a

[322] Jeremy Till, Architecture Depends, Cambridge: MIT Press, 2009, p.67.

planetary scale, yet they are often treated as external to "Architecture" with a capital A.

These displacements generate spaces through extraction, construction, and destruction—not only of materials and sites, but of (A)rchitecture itself. Debris epistemology reveals that contemporary (A)rchitecture produces dead zones rather than addressing ecological entanglements. This becomes evident through the lens of debris: the mobile remainder of violent space-making. Debris, as a critical remainder, exposes the layered refusals embedded in these processes and reveals how architecture's epistemic frameworks are complicit in the violence they fail to name. The narrow focus is not just incomplete which can be complicit in various forms of violence. The term "architectural violence" has been used by theorists to describe how architecture can impose control, exclusion, or harm. Bernard Tschumi noted decades ago that there is a violence of architecture in how the built environment disciplines bodies and enforces social order. Tschumi states:

> By violence I do not mean the brutality that destroys physical or emotional integrity but a metaphor for the intensity of a relationship between individuals and their surrounding spaces […] Architecture's violence is fundamental and unavoidable, for architecture is linked to the events in the same way that the guard is linked to the prisoner, the police to the criminal, the doctor to the patient, order to chaos.[323]

The argument that architecture as a discipline is inherently violent because of "the way it dissects space" and orders bodies, and this violence is always instrumentalized by a political regime.[324] One key arena where architecture's epistemic limits become evident is in the displacements and dislocations required to construct the built environment. Before an architectural project ever appears on-site, materials must be quarried, forests cleared, factories powered – often leading to environmental damage and social upheaval elsewhere. By stating that architectural violence is inseparable

[323] Bernard Tschumi, "Violence of Architecture," in Architecture and Disjunction, 1978, p.122.
[324] Leopold Lambert, The State of Architecture.

from its systems of knowledge, debris epistemology presents the tense environment by looking at that the way space-making works through exclusion of situated knowledge.

As we have exemplified previously, the study continues to integrate debris into architecture not as a remainder of making but as a violent and mobile entity. To theorize on that that, the study discuss debris as a situated material and temporal dimension of body, politics, and *death* in space-making. Drawing on the discussions on the previous chapters, this part seeks to highlight tensions between human and non-human.[325] Meaning, violence with debris situates the tensions in the ecology of space-making—with logistics. Mobilization of debris, therefore, informs with an extended processes of architecture continuing in the pre-construction and post-destruction of its ecologies.

Looking at debris provides an epistemology for re-examining architecture. Debris is the material trace of architectural violence and hubris: from rubble piles left by demolitions to polluted soil and *junkspace*, these remains tell the story. Debris can be seen as a critical reminder that forces us to confront what has been disavowed in architectural processes. In that, by architecture, violence and tensions (intense environments and intensifications) become visible by the manifestations of tempers in the destruction of "ecologies" in fixations, fragmentations, perpetuation, recursion and amalgamating them through fluidities, latencies and multiplicities.

[325] Tensions drawn by the Byung-Chul Han's Topology of Violence where violence is without enmity, invisible and systematic in the sense that it destructs spaces. For more 2.3.1. Positive Violence.

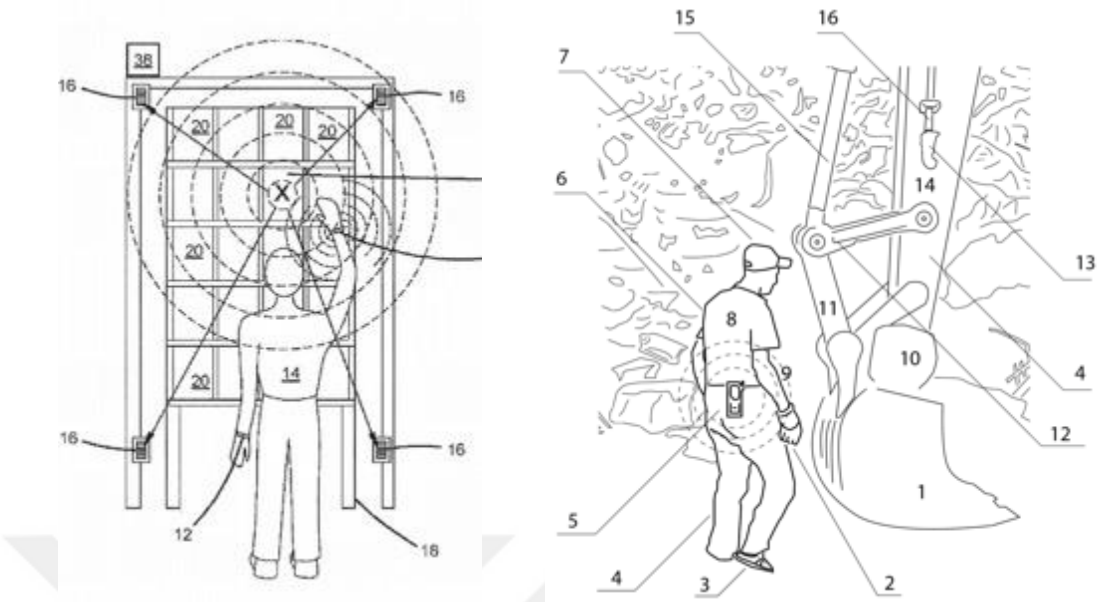


Figure 4.3 Diagrams showing position of body in logistics systems and debris. Left: A diagram shows how an ultrasonic wristband can track a warehouse worker's position in relation to a given inventory bin, (Retrieved from: Amazon USTPO, 2017) Right: A counter-illustration for the patent studies of warehouse workers' "position." Produced by the author.

Donna Haraway critiques traditional frameworks of human exceptionalism by emphasizing decomposition across material and temporal scales. By declaring "We are compost, not posthuman," Haraway suggests humans are inherently internal to the ecological cycles of deprivation. Haraway thus destabilizes conventional divisions between nature, culture, humanity, and nonhumanity, offering an onto-epistemological approach rooted in the material and temporal interdependencies of ecological coexistence.[326] The strength of the term ecological coexistence lies in its foundation within the dual meaning of ecology—as both a scientific discipline and a political concept. This duality allows the term to articulate material interdependencies while also addressing questions of power, governance, and

[326] Donna Harraway, Staying with the Trouble: Making Kin in the Chthulucene, Duke University Press, Durham, 2016, p. 97.

justice.[327] In contrast, for those ecologists whose commitment falls within a political register, not all "ecological" situations are equal, especially when they include members of the human species among their protagonists. Ecological practice is, then, related to the production of values, to the proposal of new modes of evaluation, new meanings. But those values, modes of evaluation, and meanings do not transcend the situation in question, they do not constitute its intelligible truth. They are about the production of new relations that are added to a situation already produced by a multiplicity of relations.

This is most evident in *slow violence* of Rob Nixon.[328] Nixon's work suggests an epistemological frame where violence requires new narratives that can render distributed and deferred harms. The value that his work searches for compasses to an underlying urgency of political action to make it sensible. He states;

> […] a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all. Violence is customarily conceived as an event or action that is immediate in time, explosive and spectacular in space, and as erupting into instant sensational visibility.

For Nixon, this violence erodes life slowly. Slow violence is similar to attrition warfare, but on ecological and bodily levels. It's not only slow, but misrecognized because it lacks the immediacy that is typically associated with violence. In the chapter of his book "Ecology of the Aftermath," Nixon questions the paradoxical condition between the precision in destructive operations in contrast to approximations of time and casualties. Despite the fact that his work brings together ecological violence, he criticizes the precision within the context of military, in Gulf

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[327] More on situated knowledge being more realistic by being both scientific and political at the same time on Latour, Facing Gaia, p.263

[328] Nixon's work completes the definition of logistical violence by extending the framing of invisibility. Rob Nixon, Slow Violence and the Environmentalism of the Poor, Cambridge: Harvard University Press, 2011.

War.[329] Nixon is challenging the event-based, spectacle-driven understanding of violence. His theory of slow violence argues for a recalibration of epistemology that recognizes the invisible harm. Debris and destruction, in that sense, revolve around the extended temporality of warfare. This is an extension of battlefield where domination of ecologies creates aftermaths with contaminated soils, ruined infrastructures, dispossessed bodies. Debris epistemology starts by the enduring archive of violence, sedimented into both landscapes and memories.



Figure 4.4 Diagrammatic collage showing the debris site as a contamination node near the roads. Produced by the author.

[329] The Gulf War is always considered to be a turning point for the representation of the war. The literature that focuses on the representation often disregard how Gulf War reshaped the logistical infrastructures, global speeds in addition to the distribution of information and media. Jean Baudrillard The Gulf War Did Not Take Place, Bloomington: Indiana University Press, 1995.

Both, Harraway and Nixon, offer frameworks that challenge conventional understandings of violence, ecology, and materiality, which directly relate to how debris functions in architectural epistemologies. By destabilizing the boundaries between nature and culture, nonhuman and human, their discussion directly influences how we approach the material and temporal dimensions of architecture—and of debris. They reveal the residue of architecture with hidden effects of space-making and the destruction that comes with.

Gissen is one of the few architects that reflect on debris. His article does not gather definitions from an interdisciplinary context, yet focus on debris in architecture. His article depicts the interwoven meanings of debris with ruin, rubble, and waste. He approaches debris as a new material context for creative thinking and opportunity for architecture. Gissen refers debris "as the consequence of the rational and destructive engineering apparatuses that punctuate a history of warfare." [330] Debris for Gissen remarks a mnemonic character apart from its material combinations and temporal stagings. What he refers as its memory is a transcending entity connecting remembrance and knowledge of debris. Violence and destructive forces are recorded via debris, creating an *epigenetic* ground to inspect the fundamental problems of making.[331] We can say that by bringing out the "destructive rationale" behind debris, Gissen distinguishes the direction in this mnemonic character as its method of production in the history of military. He presents Viollet-le-Duc as one of the former authors to provide an image of debris, stating: (debris for Le-Duc) is "an index of destructive forces and violence."[332] Viollet-le-Duc, a historical figure in late

[330] David Gissen, "Debris," *AA Files*, Vol.58, 2009.
[331] In general, epigenetics refers to changes in gene expression or cellular phenotype that do not involve alterations to the underlying DNA sequence. Here, it implies that debris holds traces of violence and destruction that accumulate over time, providing a layer of memory through which the fundamental problems of space-making are subdued.
[332] David Gissen, Debris.

nineteenth century architectural theory, shows this index with the bodies of soldiers, cloaking environment and the broken walls.

Le-Duc's usage of debris brings together the accounts which unearths a deeper connection to destructive rationale. In *Annals of a Fortress,* Le-Duc employs a dual reflection of the term's meanings as broken remains of a structured organization in two closely related contexts. With Le-Duc, debris becomes both a material trace of structural collapse and a metaphor for the disintegration of organized force. In both *débris de ce corps,* and *de fleurs et revêtent d'un manteau charmant les debris* remnants of an organized entity go through a process of fragmentation.[333] In its first form, debris is what is left of an army. Following parts of his text depicts the "harassed, famished, and frozen soldiers" in "sad period of (our) disasters" waiting for "an asylum and assistance." In the second, debris is a heap of broken walls, covered by natural growth. This heap has "accumulated by human passion" as "successive ruins" forming the soil "with centuries of struggle, […] layer upon layer of the bones of the dead."[334] His focus on war and death brings the debris to light as a remnant of disasters leaving their marks on soil. His deliberate focus on the movements around and inside the residues of war gives the extends of debris image.

The image of debris according to Viollet-le-Duc, as Gissen names it, extends beyond the broken pieces of a destroyed wall. It is a combination of agents that take part in its production. Debris for Le-Duc is covered with nature; it is inside and outside it. Debris embody natural elements not as inert matter, but as mobilized remnants shaped by both natural forces and human interventions. With a slightly thick vegetation, mobilization of the remainders locates on top and inside of the organic

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[333] Translations of the phrases are as follows "remnants of this corps" and "flowers covering the wreckage with a charming cloak." As a side note, in the 1875 translation of Benjamin Bucknall debris is left in its French form (*débris*) and often written in italics. Eugène-Emmanuel Viollet-le-Duc, Histoire d'une forteresse (Paris: J. Hetzel, 1874), digitized by the Internet Archive in 2010 with funding from LYRASIS Members and the Sloan Foundation [Accessed on: June 13 2025] https://archive.org/details/histoiredunefort00viol.

[334] Eugène-Emmanuel Viollet-le-Duc, The Annals of a Fortress, trans. Benjamin Bucknall, London, Lionel Levanthal Limited, 2000, p. 382

life. Debris devours human bodies reminding of silent asylum yet been perished in battles. In both war and disaster, the body entangled in debris is no longer fully legible; it becomes part of an indistinct mass. Being reduced to a casualty figure bodies become an obstacle to clearance. Therefore, the violence of debris is not only physical but becomes ontological by stripping the identity.

Foucault's coinage of the term, *biopolitic*s, unearths Le-Duc's the background of the image drawn in 19th century. In a Foucauldian reading, the shift of debris between bodies of humans and spaces is not merely institutional but epistemological. What Le-Duc portrayed as the residual matter of warfare is the soldier's body indistinguishable from the terrain. This conceptual articulation situated in Foucault's understanding of power managing body. Debris, in this sense, becomes a materialized form of biopolitical residue, embodying how bodies are stripped of meaning and reduced to logistical abstractions. The corpses of humans and animals become terrain while the terrain becomes a logistical problem. In "Discipline and Punish," Foucault tracks how disciplinary rationalities render the body legible, useful, and governable.[335] In the case of debris, a reversal occurs where the body is made illegible, stripped of identity, fragmented, and repurposed as part of the built environment's breakdown.

Achille Mbembe extends to a radical asymmetry between those allowed life and those condemned to death, abandonment, or slow degradation is the essence of necropolitical power. Mbembe suggests the concept of *necropolitics* to convey the power over life which often operates through abandonment rather than execution.[336] Mbembe, situating necropolitics within the framework of the state of exception, argues that sovereignty lies in the "capacity to dictate who may live and who must

[335] Foucault, Michel. Discipline and Punish: The Birth of the Prison, trans. by Alan Sheridan, NY: Pantheon Books, 1977.
[336] Achille Mbembe, Necropolitics, trans. by Steven Corcoran, NC: Duke University Press, 2019.

die."[337] The author builds a definition of necropolitics on *biopolitics* where body is the object of a "disciplinary technology."[338] Mobilization of bodies in a necropolitical environment asserts an idea of logistics of power moving away from sovereign displays of force toward the regulation of life.

In this framework, death is not only an event but a material and temporal condition imposed through militarized borders, occupation zones, and forms of infrastructural abandonment. Necropower emerges from a fusion of sovereignty, exception, and violence, resulting in the systematic management and orchestration of death as a political instrument. Debris becomes the material condition of abandonment while logistics is its mechanism of power where to put the necrotic tissue of urban. Drawing on material and temporal record of violence, debris emerges as a collapse of organized knowledge. This collapse associates the afterlives of epistemologies which asserts the mobilization of broken bodies, ruins, and ecological layers into a necropower. What becomes visible, measurable, or knowable is never universal, but always situated: produced from somewhere, by someone, through specific tools, categories, and exclusions. The illusion of objectivity obscures the power dynamics which are embedded in epistemic practices. Instead, recognizing the situatedness of knowledge emphasizes responsibility, positionality, and particularity—foregrounding that how we know is deeply entangled with what infrastructures we know. This recognition of infrastructures reshapes the conceptual field through which we approach debris. Debris is no longer only the remainder of destruction; it becomes an epistemic object that destabilizes the coherence of infrastructural paradigms. By attending to the partial, distributed, and historically contingent ways

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[337] The extended version of 'state of exception' can be found on Chapter 3. Ibid. Mbembe, Necropolitics. p 66.

[338] A historical account on how logistics emerges a discipline can be found in Chapter 2. Here with Foucault, the study aims to initiate an epistemological reflection on the disciplinary power of logistics considering debris as its object of inquiry. Michel Foucault, Society Must be Defended: Lectures at College de France, trans. by David Macey, NY: Picador, 2003, p.242.

in which debris is rendered visible, classified, and managed, we begin to trace the shifting epistemic terrain that makes debris legible across architecture.

Materiality and temporality are two interconnected concepts that shape an epistemic ground for architecture by determining how debris is understood. Materiality portrays the physical world of architecture how things are organized and processed. Debris, as a part of material culture in architecture, informs with the processes of mobilization creating approximated knowledges for the handling of matter. Temporality brings out how time is organized around the relations that make architecture. With temporal dimension, we understand that debris is not an end point in architecture but a continuous product that is engineered to be obscured. Together, materiality and temporality of debris bring out how logistical handling of the world is in need of an epistemological ground to discuss the consequences of mobilization by its impact on the planet. Remarking the local crises to understand the material and temporal dimensions of debris updates the planetary ones. In that, the way that logistics gets involved in the disasters showcases under the regimes of its material and temporal cultures reveals the conditions of debris and a vis-à-vis condition of space-making practices.

Following part brings together debris materiality and temporality as a ground for debris epistemology with the notions that site visits has presented. In those visits, there are subtle, yet significant, couplings of the terms throughout the text; as multiplicity and fixation, latency and perpetuation, fragmentation and fluidity, recursion and amalgamation. These couplings follow scalarities and proximities between the different sites. Meaning, there are debris sites of large settlements matching with the smaller ones, in addition to their capacities to constitute one another by being in the close encounters of their logistical network. For instance, Kanlıkavak is one of the villages of Göksun within which discussions of multiplicity and fixation unfolds, while Karaburçlu is a distant site to Hatay to understand how recursion and amalgamation work in debris mobilization. These scalar couplings are

reinforced with similar scales of Afşin and Elbistan, Karacasu being a small district inside Kahramanmaraş, and finally Karaburçlu another small district outside Hatay.

The scalar relations become significant for the rest of the text since it aims to bring together contrasting, yet interdependent tensions of debris. Main approach in both "debris materiality" and "debris temporality" is to frame the architecture of debris and the violence that comes with. To open up the violence of debris in architecture, materiality and temporality give a chance to understand the organizational construction behind the sites. Terms expose the epistemological ground within which debris violence is nested. In that, claiming debris epistemology in architecture depends on the tensions that are discovered in materiality, temporality, and scalarity of debris.

4.2.1 Debris Materiality

Materiality emerges from the interactions of materials with both human and non-human forces, granting them meaning and agency beyond their physical properties. Antoine Picon distinguishes between matter, material, and materiality by engaging with the multifaceted nature of built environments within the confines of space-making practices. [339] Matter, for Picon, refers to the fundamental physical substances that existed before human intervention, while material emerges through human processes that give a function, shaping it into elements of infrastructure.[340] Moreover, material culture—formed through the mobilizations within the built environment—shapes disciplinary perspectives toward matter, which in turn reinforces the epistemologies of architecture.[341]

[339] Antoine Picon, The Materiality of Architecture, University of Minnesota Press, Minneapolis, 2020.
[340] Picon, The Materiality of Architecture, p. 8-12.
[341] Easterling, Extrastatecraft, p. 69.

These are mobilized matter which remains embedded within more-than-human ecologies.[342] This points out the states of matter and material beyond human control and classification. Debris exemplifies such out-of-reach conditions by its approximations—or abstractions, as we have discussed earlier in this chapter. As a matter, debris encapsulates the conditions and processes of mobilized substances. When taken as a matter in motion, it becomes impossible to differentiate debris from what it is not. Meaning, "debris in motion" disregards the conditions and processes that are conjoined to it by mobilizations, as an operation of logistical ecology. Therefore, debris exists as mobilized matter—shaped by human processes and capabilities and no longer confined to a structured utility of being a material.

Debris, however, continues to function within material flows, interacting with and reshaping its surroundings as it moves through networks of extraction, construction, and destruction. Thomas Nail illustrates a theoretical expansion on the material flows of Earth. The *pedesis* of waste for Nail is "the concrete place where all the other spheres breakdown, commingle, mix, and directly coproduce one another." Nail's proposal of *pedosphere* is "a kind of woven, braided knotwork" where "the other spheres touch, translate, and transform one another."[343] Debris in pedosphere, as it is a refused matter in the technosphere, reflects the inherent dynamism as a material entity that persists beyond the contexts that produced it. Its ability to move and connect within the built environment highlights that it arises from the material interactions between other spheres, networks, sites, and particles. In that sense, the debris epistemology reflects the mobilizations controlling the materiality that create scalar transformations of the matter.

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[342] Umut Yıldırım, "War-torn Ecologies: Human and More-than-Human Intersections of Ethnography and the Arts", in *War-torn Ecologies, An-Archic Fragments: Reflections from the Middle East,* ed. by Umut Yıldırım, Cultural Inquiry, 27 Berlin: ICI Berlin Press, 2023, p.1–25. doi.org/10.37050/ci-27_1

[343] Pedesis is the motion of fluids which is hard to track, almost random. Thomas Nail, Theory of Earth, Stanford: Stanford University Press, 2021, p.27.

One might argue that the mobilization of debris is a temporary condition where debris is moving after the destruction for a period of time to be deposited in landscape. The discussion on debris materiality in this thesis does not oppose to such ideas, yet proposes a larger perspective by making additions. Firstly, discarding destruction residue is a portion of debris mobilization. This mobilization continues simultaneously with the unassociated forms of destruction in space-making by extraction, construction and so on. Secondly, debris continues its movement after its disposal. Parts of debris are sorted and re-assembled for further use. These parts, as extrication of steel and recycling of concrete as mentioned in previous chapter, re-enters into the material circulation infrastructures. Finally, what is left of debris after its repurposing continues to move by the external forces of nature. Weather events such as rains, slides, and wind keep debris as an active material, which is often disregarded within the material culture of space-making. Such aspects of debris materiality are visible in the site visits which links the observations and concepts to the discussion of its epistemology.

Multiplicity and fixation, as defined through the cases of Göksun and Kanlıkavak, mark two contrasting yet entangled conditions of debris materiality. In Göksun, multiplicity emerged as the spatial and ecological heterogeneity of matter which entangles with erosions, agricultural life, and ruin. In Kanlıkavak, fixation appeared through the stabilization of debris and its transformations into the foundations for new logistical infrastructures. These terms frame how material culture of logistical conduits is a production through material disorder and infrastructural control. Multiplicity refers to the presence of varied and often conflicting material agencies, making debris a dense convergence of residues from ecological, geological, and constructed systems. Fixation, by contrast, is the process of heterogeneous materiality creating static infrastructures to provide logistical movement. Together, they expose the first tension. This tension is the need of a material complexity in architecture where debris mobilization is not only an act of fixation within a field of value, function, and visibility. This tension further requires to unfold the processes of debris mobilization where the archive of crisis is reassembled as a stabilizing

force. This is valid for architecture where logistics overwrites the diversity of matter with infrastructural permanence which exerts violence through positiveness. Architectural knowledge of debris, in this sense, emerges from the contested practices of material sorting, anchoring, and revaluation.

Latency and perpetuation, as described through the cases of Afşin and Elbistan, express two material conditions that govern debris with its deferral. In Afşin, latency is shaped by the co-location of power plant ash, earthquake debris, and worker housing, producing a landscape where things are stored without being resolved. In Elbistan, perpetuation is materialized through the widespread dispersion of debris along a logistical corridor, merging with existing infrastructures of concrete plants, extraction industries, and municipal waste zones. Within architectural knowledge of debris, these terms point to material formations of debris contributing to knowledge not through immediate transformation but through reserving. Latency defines debris as an inventory of strategic action where value is anticipated through thresholds and zonings. Perpetuation, by contrast, names the continuity of debris as a material condition, where destruction becomes embedded in the ground through repetition and layering. These processes inform one another. The latency of debris enables its perpetuation, while perpetuation reinforces its latent status by normalizing its presence. In this sense, space-making is sustained not through the erasure of debris but through a tension in the markings of material maintenance. Architectural knowledge of debris, therefore, embeds material condition through layering, repetition, and storage.

Fragmentation and fluidity, as observed in the cases of Kahramanmaraş and Karacasu, represent two contrasting yet interdependent material conditions through which debris is processed and transformed into a tool of territorialization. In Kahramanmaraş, this process not only disassembles buildings but also reshapes the geography, imposing new boundaries through the placement of crushing plants, disposal zones, and industrial sites. Fragmentation refers to the systematic breakdown of debris into controllable pieces that can be transported and reassigned within the logistical conduits. It is a logic of segmentation, where matter is isolated

with which sites are made operable by implementation of debris. Fluidity, on the other hand, describes the continuous and directional movement of debris across a landscape. As we see on the site, the dispersal of debris begins from multiple offset points and gradually gathers through flows dictated by logistical access, truck circulation, and terrain. While fragmentation works through division and categorization, fluidity works through dispersal. Yet they rely on each other: fragmentation creates the divisible matter that enables movement, while fluidity distributes and transforms these fragments into new spatial arrangements. In architectural epistemology, this tension reveals how knowledge emerges not only from the act of designing fixed forms, but from negotiating between breakdown and flow, between material disintegration and spatial expansion. Debris mobilization reveals a tension by division and reformation, shaping environments through the simultaneous logics of adaptation and disintegration.

Recursion and amalgamation, as seen in the cases of Karaburçlu and Hatay, represent two contrasting yet interconnected modes of material behavior that inform how debris operates within logistical systems. In Karaburçlu, recursion marks the return of matter to its origin. This cyclical movement reveals how debris is a recursive element in the production of space with loops through extraction, circulation, and disposal. It is a condition where architectural materiality is governed by repetitive infrastructures logistical networks. Amalgamation in Hatay signifies a material logic of convergence and entanglement. Here, debris is not returned to origin but gathers into a composite form, binding heterogeneous materials of organic and inorganic, living and dead into a singular mass. Amalgamation reconfigures the crisis as a material continuum in which origins and boundaries dissolve into a mixed and disordered space. While recursion stabilizes through patterned return, amalgamation destabilizes by merging incompatible fragments. Yet, they, too, inform one another. Meaning, recursion enables the patterned circulation that feeds amalgamated zones, while amalgamation absorbs recursive flows into material aggregations. Together, they show how architectural knowledge emerges from material behaviors of debris with loops of accumulations, and convergence points.

Debris, as an architectural object of tension, is between the recursive cycles and an amalgamated fields that condition the space-making practices, dealing with their own crisis-born matter.

4.2.2 Debris Temporality

Temporality, the organization of time, is not the movement toward an end, nor the infinite continuation of the same, but the disjunctions of open-ended processes. As an ecological concept temporal dimension of debris moves beyond human-centric models, bringing a dynamic force that conditions material entanglements. Conceptualizing time as a force of differentiation and transformation challenges the idea of linear and sequential scheduling.[344]

Temporality emerges not as a neutral container of events but as a generative force that configures the possibilities of matter, bodies, and spaces. Elizabeth Grosz reframes time not as a backdrop to action but as an active, open-ended process of differentiation.[345] Grosz unpacks the notion of time from a neutral continuum to a one that generates difference, invents and disrupts fixity. Time, in this formulation, is inseparable from material life by which it enables transformation, emergence, and decay. She challenges Cartesian divisions between time and matter, showing how they are inherently connected. Grosz's definition of time as "the force of invention and innovation" locates temporality within the flux of the natural and built environments.[346] By displacing the notion of singular progression in built environment, time as a formulation of differentiation situates how debris is a

[344] Elizabeth Grosz, The Nick of Time: Politics, Evolution, and the Untimely, NC: Duke University Press, Durham, 2004.
[345] Elizabeth Grosz, Time Travels: Feminism, Nature, Power. Durham, NC: Duke University Press, 2005.
[346] She elaborates by referring to Adam Smith's argument on "An Inquiry into the Nature and Causes of the Wealth of Nations" about how "value is not found in the natural wealth of the earth" Grosz, The Nick of Time, p. 35.

continuum of forces that shapes landscapes through delay, recurrence, and persistence.

This framing of temporality in built environment of debris reveals that the aftermath of destruction is a site of indeterminate durations. Just as Grosz insists on the indeterminacy of the future, debris resists closure—or completion. Its temporality cannot be captured through bureaucratic clearance schedules and logistical protocols, since it exists in the conditions of latency, where ruin and renewal are entangled. Debris lingers, recurs, sediments, and is repurposed as a temporal agent embedded within ecological rhythms, infrastructural shifts, and political delays. In this sense, debris marks time differently than what is proposed in the timelines of architecture. These timelines neglect how architectural dispositions actually change the surface of the Earth, rather they focus on design epistemologies limited with before and during the life of its objects. Meaning, architects disregard what happens before and after the completion of a building. This neglect is challenged by debris epistemology which surfaces an invisible and slow violence caused by architecture and logistics. With debris epistemology, logistical violence reveals the slowness of ecological harm. It offers a way of thinking on a temporality which foregrounds interruption, suspension, and return as conditions of post-disaster ecologies, as well as in the making of built environment.

To convey the slowness in the debris violence, debris situates the geological timescales that are often neglected in architectural knowledge. In that, the geological timescales demonstrate the persistence of matter beyond human interventions. As first noted by Hutton, geology is the study of a matter that keeps a record of accumulations, structures, and events as timelines that architectural knowledge neglects.[347] This conception reveals debris temporality within the *deep time* of

[347]Dennis R. Dean, James Hutton: The Founder of Modern Geology (Revised Edition). Edinburgh: National Museums Scotland, 2022. James Hutton, The Theory of Earth, originally published in 1795 and republished by Zinc Read in 2023.

geological sedimentation. Likewise, geological enunciations of debris locate the temporality of space-making practices as a mark in the thick surface of industrial residue in future formations. Here, debris is a stratigraphic signal that is embedded into the earth as a sedimentation mass of built environment. This sedimentation links anthropogenic activity to planetary durations, where the remains of logistical temporalities reach beyond their lifespans. The temporal force of debris mobilization, in this sense, cannot be measured solely by cycles of rebuilding and clearance. Debris epistemology unfolds in the geological entanglements as a material trace of past destructions it carries with its presence.

Multiplicity and fixation, when reconsidered through the lens of temporality, reveal how debris converge between the conflicts of ecological time and imposed linearities of construction. In Göksun, multiplicity emerges through the coexistence of temporal agencies in earthquake rupture, slow decay, seasonal life, and bureaucratic delay. Leaving their traces as debris, these temporal entanglements are disrupted by debris accumulation, resisting the synchronization. Meaning, debris accumulation shows how destruction does not occur in singular moments, yet dispersed across layered timescales of ecological life and logistical control. In contrast, fixation, as observed in Kanlıkavak, imposes a singular temporal trajectory onto this heterogeneity. Deriving from the operations it persists with; debris is no longer a witness to the memory of communal labor and recovery. In fact, by being projected as an infrastructural expansion, debris is an evidence of logistical timelines that neglect the consequences of thorough construction, disposal and abandonment. While multiplicity shows the possibility of recovery with synchronization with ecology, fixation directs debris toward the commodification of the future. Therefore, two conditions depict how time itself becomes a site of logistics where heterogeneity is an obstacle for operation. This tension between multiplicity and fixation reveals how knowledge is produced by organizing time through space. Therefore, architectural knowledge of debris looks at the conflict between heterogeneous durations and the linear timelines of reconstruction. In this sense, debris epistemology situates a

regulated circulation in space-making practices which neglects the possibility of synchronization, rather imposes erasure.

Latency and perpetuation, as temporal conditions of debris, reveal interconnected strategies of how debris mobilization governs time in the aftermath of disaster. In Afşin, latency manifests through the suspension of resolution by marginalizing the labor force. Latency delay closure. To do that, it treats threshold conditions between industrial extraction, labor and debris. Time, here, is a strategic source that stretch in management to delay uncertainty and future activation. In Elbistan, perpetuation takes a different form where debris territorializes with a continuous and growing presence. Such act of sustenance enmeshes a temporal condition within which a new threshold slowly emerges through environmental degradation. The slow dispersion of waste and the various kinds of debris take part in an infrastructure of chronic harm. While latency delay resolution, perpetuation embeds destruction. Informing each other, what is delayed through latency becomes normalized through perpetuation. Together, they expose a tension which is a disjunction between delayed recovery and the enduring presence of destruction. Debris is both postponed in recovery and prolonged via destruction, marking its geography through continuous holds. This condition challenges architectural knowledge with an extension of durations where notion of completion becomes the dismissal of continuum. The unresolved temporality of debris reveals how built environments can, in fact, live longer than the architectural spaces. Debris epistemology, thus, insists on the notion of residue as an infrastructure of resistance.

Fragmentation and fluidity reveal interrelated temporal organizations of destruction. In Kahramanmaraş, fragmentation operates as a governance mechanism in which labor is segmented by survivors as a force of breaking debris. Here, debris is not a singular event but it is broken down into sequences for the survivor by disassembling it during acts of disposition. Moreover, temporality of debris can also be traced by the scattering of the residues in landscapes of spillways, riverbeds, villages and industrial sites. This produces a temporal condition in crisis where debris fragments time into an infrastructure of fixity. In contrast, fluidity introduces

a volatile relation with time. As seen in Karacasu, debris behaves like a liquid mass which shifts into destabilization of surfaces. Its movement on the terrain is reactive which responds to logistical scheduling. These schedules start with the bringing of the remaining bodies as labor force and dictates the movements of the deceased, residual matter and the equipment. Labor, here, becomes an issue of harm occurring with the neglect over body and the site, yet prioritizing the work, profit and political power. The tension between these two conditions of debris lies in the contradiction between segmentation and overflow. Therefore, the regulation of time through fragmentation contradicts with the unpredictability through fluidity in terms of their participation in time management. While fragmentation depicts a sequencing of containment and displacement, fluidity works in favor of the irregularity and erratic movements. Architectural knowledge of debris, in this sense, is the contested interactions between space-making practices participating fragmented and fluid control of time where residue is an infrastructure of control. Debris epistemology insists that the temporality of destruction cannot be separated from the forms it takes. By that, fragmentation and fluidity are not just material conditions but temporal instruments through which disposal of debris participates in the knowledge of making and unmaking processes.

Recursion and amalgamation reveal how debris participates in reordering time through repetition and convergence. In Karaburçlu, recursion appears as the looping trajectory of materials traveling between processes of extraction, construction and destruction, to be disposed back to its departure point. This cyclical movement of debris across logistical chains exposes an organization that operates between past and future. Debris enters into mobilization networks as a resource of making, and exits as a carrier of logistical processes that it traveled through. The loops that are structured by logistics, returns debris as an amalgam of mixed materiality with various temporal conditions. In that, amalgamation in Hatay reveals a chaotic structure, where timing of making and unmaking collide. While logistical systems respond to rapid space-making demands, the result of converged timelines is a landscape of simultaneous violence of making and unmaking. Collapse of timelines

entrench debris as a mark of urgency into a dense material condition where ruin and rebuilding converge. The tension between linear sequencing and composite accumulation challenges the architectural knowledge based on completion and fixity. Meaning, the architectural knowledge of debris displays the return and the accumulation at the same time, proposing an entangled past, present, and future conditions as repetitive and complex. Debris epistemology, here, proposes an account for both the rhythms and the durations of mobilizations to produce a built environment shaped by convergence rather than completion and fixity.

Analysis of the site visits helps us to understand the traditional practices of space-making. However, there exists a question of method with which we can operationalize these analyses to frame the problems of architecture with fixity, completion and intention. As an answer to the question of method, we can reflect on the terms—multiplicity, fixation, latency, perpetuation, fragmentation, fluidity, recursion and amalgamation—since they are comprised of their interrelations both in-between and with the sites. I aimed to present these terms to reflect a scheme of ecological registers found in biological, geological and possibly in hydrological and atmospherical registers towards the logistical ones. Therefore, selection of these terms and their interrelations in-between come from their connotations in such contextual backgrounds. For instance, multiplicity is a term that connects studies in ecology to the logistical realities with heterogenous juxtapositions of slow occurrences with fast degradations. As another example, fixation can be found in the perceptions of metabolisms with the solidification processes of carbon, nitrogen, and other vital elements in biological and geological processes. Nevertheless, we can find the connotations of these both in ecological studies and infrastructural ones. However, I should stress that these connotations are not the primary—and intended—meanings that these terms hold onto in debris epistemology. In fact, they gather a multitude of meaning with their reflections in logistical ecologies and the layers that debris can interact with.

What I want to stress is that they should be taken with their togetherness.[348] these terms gains new meanings apart from their possible reflections. Therefore, I should clarify that they do not exist without their couple, or otherwise they lack their total connotations. As a methodological explanation, they can be applied to any logistical ecology of debris. Debris epistemology utilizes their most visible sites, apart from the fact that they can posit overlapping conditions and processes. One can configure a narrative these terms to depict the mobilization of debris, which will eventually reveal an epistemological understanding. Therefore, I will list these couplings to convey how can be later operationalized for future studies.

With multiplicity and fixation, debris epistemology reveals how violence is shaped by the tension between material heterogeneity and logistical stabilization. With latency and perpetuation, debris epistemology identifies how materials are not erased but maintained through temporal deferral and spatial embedding. With fragmentation and fluidity, debris epistemology positions architectural knowledge as the negotiation between material breakdown and spatial redistribution. Finally, with recursion and amalgamation, debris epistemology reveals how architectural materiality is governed by cycles of return and processes of convergence.

By looking at the debris as a precursor of violence embedded in the logistical ecology of architectural space-making, we can deduce the processes and conditions happening as the continuum in "destructed environment." Architectural knowledge, when situated in the post-disaster environment, is revealed to be deeply entangled with logistical violence which is a brute and invisible force of material and temporal regulation under the guise of recovery. Debris makes this violence legible by exposing a material of crisis—matter of logistics—where residues resist erasure and accumulate beyond the intentions. As a dispersed archive of entanglements, debris

[348] As a side note, this togetherness also unfolds in the 4.3 Knowledge with Debris-scale text. Since these sites are couples of small and larger settlements, these terms also combine their scales, revealing how they act together.

informs architecture through a narrative of a destruction, not as a singular condition but as a continuous process of crisis. Debris epistemology offers the critical ground for revealing tensions between material and temporal intersections of space-making that orchestrate the violence. Offered terms—multiplicity, fixation, latency, perpetuation, fragmentation, fluidity, recursion, and amalgamation—situate a possibility of an architectural knowledge within these processes that reorients new ways of knowing, seeing, comprehending "things" around the crisis-born material life.

4.3 Knowledge of Debris-scale[349]

With debris epistemology, (A)rchitecture is shifting from a purely anthropocentric and utilitarian role toward an ecologically oriented approach that grants agency to non-human factors. We observe a reversal in aims of architecture where the discipline is transforming into a method of support for the "natural, rather than reverse.[350] In other words, the human-centered worldview is inclining by giving way to an ecological perspective in which the environment is an active agent. There are critical voices who note that ideal of the human body as the measure of design now appears "irrelevant, perhaps even irresponsible," given the magnitude of environmental crises.[351] These critical voices bring human body in relation to space that surrounds it cannot set the scale for architecture in a world where there are ecological crises more than solutions. Rania Ghosn and El Haid Jazairy, in their book

[349] Parts of this study was presented in Acts of Scaling Conference of Harvard GSD with the title "Debris-scale: An Epistemological Tool for Rethinking Architectural Ecologies." Parts of it were revised with the contribution of participants, especially with the moderation of Ana Maria Leon Crespo.

[350] Miguel Eufrasia, "At the Crossroads of Sustainability: The Natural Recompositioning of Architecture," *Architecture MPS*, Vol.14, No. 1, 2018. https://doi.org/10.14324/111.444.amps.2018v14i2.001

[351] Peder Anker and Nina Edwards Anker, "Anthropocene Architecture: Design Earth's Geostories," *Avery Review* No.29, 2018. http://averyreview.com/issues/29/anthropocene-architecture [Accessed on: June 15 2025]

"Geostories: Another Architecture for the Environment" mentions a need for a study of range of scales "to truly understand the shape of the Earth." This study for them includes "a range of industrial landform typologies, all drawn in their integrated context."[352]

In architecture, "scale" traditionally refers to the measured relationship between the human body and its surrounding space. In architectural practice, referring to human scale means that spaces and elements are proportioned in harmony with human-based measurements. This concept of scale guides architecture to bring an intention in making space only legible to humans. For instance, a direct utilitarian scaling ensures door heights, stair dimensions, and furniture are tuned to body dimensions. Scale, in this sense, is a tool of comparison and control in which the discipline internalizes the calibration of environments to a human-centered notion over its environment. This body–environment scale linkage has long been central to architectural theory, from Vitruvius's canon of proportions to Le Corbusier's Modulor system, both of which set design metrics based on an ideal.

Scale is also an important marker in the technoscientific inscriptions. Those inscriptions tend to neglect the trans-scalar conditions and processes that debris unfolds. Architecture, too, attends to such technoscientific utilizations of scale even though it is an onto-epistemological reality of its practice. Meaning, every architectural effort looks for a compatibility between events and modes in different scales: of brick to arch, of human to volume, of city to planet. Therefore, any definition of scale marks the ways of existing relating to the ways of knowing. In that, scale in architecture frames the aspects of space and its making are considered relevant and visible. This is visible with the discussions outside, yet interconnected, the discipline of architecture. Katherine T. Jones argues that scale is a category to

[352] Rania Ghosn and El Haid Jazairy, Geostories: Another Architecture for the Environment, Actar Publishing, _, p.19.

conceptualize and order and knowledge about the built environment.[353] As well, Zach Horton's argument in the scalar study of biotic and abiotic elements of ecological systems is a chance to destabilize conventional categories of order and knowledge of scales in architecture and its ecology. Horton defines the initial steps of scalar challenge in the discipline of ecology by stating;

> From the beginning, then, ecology emerges from its Darwinian roots as a radical mutation in disciplinary knowledge production. To answer Haeckel's call for a discipline that would examine the totality of relations between an organism and its environment, we must grasp not only the scale of deep time, but the scale of the virus' lifeworld, the scale of oceanic nutrient cycling, the scale of protein folding, the scale of the gravitational dance between the Earth and the Sun.[354]

Horton enmeshes the temporal dispositions and material interactions into an issue of scale in ecological warps. For him, scale is not a mere tool of measurement but it has been acknowledged as a mediating structure to embody control over knowledge. Horton insists that the abstracted knowledge of scale leads to typical actions over space and time.[355] He shows the typical actions as a neglect of the intermediary scales. For him, scalar movement between micro and macro is an illusion of transition without transformation is a focal point for understanding the constructed perception of ecological events. With Horton's exposition of scale as an organizational tool to direct the knowledge of ecology, we can deduce the scalar position of debris as a unit in space-making.

The shift anticipated in this study, refers to the anthropocentric space from its central role of being utilitarian to an active agency in the ecological perspective. Such a

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[353] Jones states: "As epistemology, scale may be intimately linked to our knowledge of power and space. And, as a concept, it will also be contextualized both socio-culturally and historically." Jones, Katherine. "Scale as epistemology." *Political Geography*, Vol.17, 1998, p.28.
[354] Zach Horton, The Trans-Scalar Challenge of Ecology, *ISLE: Interdisciplinary Studies in Literature and Environment,* Vol:26, No:1, 2019, p.10.
[355] Zach Horton, The Cosmic Zoom: Scale, Knowledge, and Mediation, University of Chicago Press, Chicago, 2021, p.191.

notion stems from the prior understanding of relationality between the scales. In architecture, scale refers to measuring the relations between body and environment. Traditionally, it functions as a tool of proportion that displays spatial hierarchies, design intentions as the form of relationality in its context. However, scale also operates epistemologically and ontologically by shaping architectural knowledge of framing the relevance and visibility within a given spatial order. Debris-scale overlays such understanding of relationality within which anthropocentric scales of space-making can be destabilized.

Debris-scale initially emerges as a question for the consequences space-making culture in Anthropocene. In simpler terms, debris-scale asks; what will happen to the cities that will be—sooner or later—destructed? What is the scale of the debris when the totality of the built environment eventually collapses? Won't they be slowly but surely changed with newer constructions? What more of this change will continue to end up in landfills? How many landfill areas do we have in reserve if a sudden a catastrophe happens—as we see in cases of earthquake, flood, hurricane and wars? What if these sudden moments of crisis are, in fact, the intensifications of slow degradations in space-making practices of our time? For how long our current understanding of debris mobilization continue to shape the infrastructures and ecologies?

This narrative destruction is not an omen neither a call for catastrophe but the observation of this thesis on the neglected intersection of making and unmaking, which is made visible in a post-disaster environment. Introducing debris-scale provides the perspective by focusing on the remnants and byproducts of human activity. Emerging out of debris epistemology, the notion of scale collects the evidences of violence—body in more-than-human context, material and temporal by bringing ecology of logistics. Then, debris-scale introduces dynamic process through different levels of material and temporal relationships with scaling. By questioning these dynamic processes, scaling inquires with tensions in materiality and temporality of debris.

Scaling is an active process to "measure" the ecological thinking and being behind, across, and beyond the built environment. In that, debris-scale is not necessarily a positivist terminology nor a practical activity to bypass critical territories of crisis. Debris-scale, however, offers an epistemological shift that challenges the constraints of anthropocentric knowledge and the spatial frameworks it produces. In doing so, it exposes how built environments, shaped by human-centered logics, obscure the ways material and temporal dimensions intersect in knowledge production.

In environmental philosophy, debates about scalarity span multiple spatial scales and timeframes. These discussions have drawn contributions from numerous thinkers of *new materialism*.[356] Drawing on the observation as an act of measure, new materialist thinkers, such as Jane Bennet, expand the issue of scale as a correlation between things- objects.[357] For Bennett, the vibrant reality of matter endorses a scalar change between subjective perceptions of things and their assemblage in space-making. The neglect of more-than-human agencies determines a system of space-making whose contingent existence with others is impossible. This is not separable from temporal and material scalings that are still—and slowly, becoming apprehensible for human perception. Entangled intra-relations between the things and individuals (objects and subjects) shift the understanding of space and time from a backdrop to active synthesis in scalar co-existence.[358]

Within this framework, debris serves as a crucial conceptual lens for reconsidering the residual impacts of technoscientific (logistical) scalings. Its materiality manifests in two primary scales. Firstly, debris is a displaced matter: the Earth's crust is extracted and integrated into mobilization networks distributing debris along the

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[356] Yuk Hui, "Form and Relation: Materialism on an Uncanny Stage," *Intellectica Revue de l Association pour la Recherche Cognitive*, 2014.
[357] Jane Bennett, Vibrant Matter: A Political Ecology of Things, Duke University Press, Durham, 2010, p.11.
[358] Karen Barad, Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning, London: Duke University Press, 2007.

way. On one side, the margins of this scaling reach to microparticle level, infusing into biotic and abiotic ecological systems. On the other, debris has a *hyper-object* scale, by being as large as infrastructure networks and complex webs of water bodies and microscales in the transformation of the planetary.[359] This is valid for all the stages of debris as the displacement of topsoil changes the cycles of micronutrient elements. Soil mobilization alters lithospheric oxygen levels and disrupts nitrogen, phosphorus, and sulfur cycles, negatively affecting broader ecological food webs.[360]

Secondly, debris is embedded in ecologies. The displaced matter of debris is integrated into processes that serve the production of debris. The reintegration processes utilize debris as a filament material on the transportation networks. As recycling practices predominantly facilitate infrastructural expansion, these operations often perpetuate exploitation by positioning marginalized areas as convenient locations for debris processing and disposal. Local communities are often employed in physical labor without the necessary protection. Therefore, it is safe to state that the formulation of debris produces a stationary object that emerges by mobilization of matters. As debris perpetuates mechanisms of mobilization, it simultaneously introduces a trans-scalar dimension, situated within the material boundaries of human-centered processes.

With debris, the stratigraphical epoch called the Anthropocene gains a surface thickness that varies through the topographies.[361] Space-making practices alter the

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[359] Timothy Morton, Hyper-objects: Philosophy and Ecology after the End of the World, Minneapolis: University of Minnesota Press, 2013.

[360] For a positivist approach: Bouwman, Beusen, & Billen, "Human Alteration of The Global Nitrogen and Phosphorus Soil Balances for The Period 1970–2050," *Global Biogeochemical Cycles*, Vol.23, No.4, 2009.

[361] As a side note, geological formation of "strata" also appears as a seminal concept in Deleuze and Guattari's work. Colebrook states that "Rather than accept the globe and its stratifications as the strata that explain all others, one might say—following A Thousand Plateaus—that events should be considered stratigraphically, as creating thresholds that tend in contrary directions; concepts, events, and encounters create multiple tendencies that unfold various worlds, some of which are not readable in terms of the the other." Claire Colebrook, 'a grandiose time of coexistence': Stratigraphy of the Anthropocene, *Institute for Interdisciplinary Research into the Anthropocene*, 2019, p.3.

topographies of the Anthropocene in correspondence with the intensifications of the built environment.[362] Therefore, debris acts within the differences of ecological systems regarding the density of logistical scaling. The denser of logistical ecologies become, the longer and the debris of extractive, constructive, and destructive industries stays impactful. Moreover, debris as part of the built environment remains systematically embedded, and it "keeps coming."[363] Perpetual accumulation of debris does not produce finished environments but operates in an uncertain temporality. The temporal dimension of debris continuously involves fluid interactions between the "spatial frontiers" of the Anthropocene.[364] Therefore debris as a temporal scaling, transverses the clear-cut boundaries of built and un-built frontiers via destruction.

Within this framework, debris neither dissolves nor reintegrates back into the material culture, making it an unperishable entity of the built environment. Therefore, the lifetime of debris extends beyond the timeframes of anthropocentric models envisioned by space-making practices. The disciplinary encounters between then-structured and now-destroyed structures remark debris as evidence of projected lifespans, revealing how the built environment is shortlived. As the trans-temporal character of debris informs of a growing entity across multiple categorizations, endurance of residue, both as a mark on the ground and a prerequisite in space-making practices, points out a scaling in the temporal dimension.

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[362] The study of Ford (et. al) disturbs the narratives of uniform scale of stratigraphics of Anthropocene. Such condition is made visible through "anthrostratigraphical" approach that depicts the closer examinations of industrial debris in their surroundings. Jonathan Ford, J. Price, A. Cooper, C. Waters, An assessment of lithostratigraphy for anthropogenic deposits, *Geological Society*, Vol.395, No.1, 2014.

[363] Reno exposes the working conditions and possible futures of Four Corners landfill in Michigan, Harrison. His journal-like writing records the conventional narratives of landfills. Joshua O. Reno, Waste Away: Working and Living with a North American Landfill, The University of California Press, 2016, p.227.

[364] Bruno Latour, Down to Earth: Politics in the New Climatic Regime, trans.by Catherine Porter, Polity Press, Cambridge, 2018, p.73.

Debris, all in all, occupies an intermediary state, one that mediates between scales of material transformation. Its scalar status is small—and large, regarding the fact that it is made of particles and networks. It produces airborne fragments and water-soluble chemicals, at the same time creates geographies of disposal as large as hills and valleys. It is both immediate and enduring—made visible by disasters. Debris embodies a large list of components with biotic and abiotic entanglements of waste, trees, water bodies, construction residue, belongings while its recognition stays hidden in the political registers. It travels in whether in cycles or long trajectories of dispersal. Its transport produces a fluid-like matter although it can stay intact for long periods of time.

Debris epistemology offers four lessons for architecture, with the introduction of scale. Firstly, it shows how logistical knowledge organizes time and matter by scaling the violence through disasters. Architecture can synchronize with material complexities in ecological durations (multiplicity) which are dismissed through logistical stabilization and singular futures (fixation). Secondly, logistical knowledge neglects certain scales, preventing resolution and prolonging destruction. Architecture can resolve these delays of activation (latency) and endurance of destruction (perpetuation) by changing its notion of completion to a processual debris-laden scaling. Thirdly, logistical knowledge makes use of mobile substance to modify environments into its own scalings. Architectural knowledge should identify the sequenced breakdowns (fragmentation) and overflows and volatile movement (fluidity) to adapt to the scale of debris. Lastly, debris as a medium of violence is repetitive and overwhelming. Architecture should confront the scale of its “death” including the ruins and the lost lives inside and around. Without such confrontation, architectural knowledge cannot escape the cycles of crisis (recursion) and aggregation of space and time by logistics (amalgamation).

Bringing together the four lessons of debris epistemology with the scale of debris introduces a critical lens that recalibrates architectural knowledge across entangled temporal and material registers. Each lesson reveals how debris unsettles dominant

epistemic frameworks exposing the multi-scalar operations of destruction, circulation, and return embedded within space-making practices. Debris is not merely an aftereffect but a spatial and temporal agent that loops together immediate crises with geological continuities, architectural delays with infrastructural convergence. In doing so, it challenges anthropocentric metrics of value and design, requiring an epistemology that can trace scalar shifts in both perception and production. Debris-scale, therefore, names this epistemological intervention: a mode of knowing attuned to the convergence of material fragments and temporal thresholds. It invites architecture to confront the residues it produces—not as waste, but as indicators of its embeddedness in planetary processes. By resisting the simplifications of conventional mediation, debris-scale repositions what counts as knowledge in architectural ecologies, making visible the invisible, revealing the particulate within the monumental, and rethinking duration beyond human-centered timelines.

CHAPTER 5

CONCLUSION

This thesis navigates the entangled terrains of space-making through a perspective that prioritizes material mobilizations of debris. It approached debris not simply as a remainder of destruction but as an active agent in the formation of political, spatial, ecological, and epistemological registers. By drawing how logistics plays a part in the exertion of violence, it showcases the agency of debris as a medium of space-making. It positions post-disaster logistics as the case of violent dispositions of debris by recording February Earthquakes of Türkiye in 2023. Thesis forms a theoretical frame to convey the debris as epistemological object of space-making in logistical ecologies. Through this, the thesis aimed to expose how architectural imaginations are reformatted by logistical operations.

The literature around logistics, and critical logistics, reveals that mobilization networks are strongly tied to ecology. On one hand, logistics creates ecological relations between the actors and their environment. On the other, it changes the ecologies by exerting violence under the guise of positiveness. This violence is a slowly occurring one and often regarded as invisible. Thesis traces the slow and invisible violence of logistics by recording the residues of disaster, which brings forth debris as an agent of change. This change is not only spatial but also epistemological; in the ways of human-centric space-making practice.

The thesis aims to make a contribution to the discourse of critical logistics, by recoding logistical ecology, debris epistemology and debris-scale as an expansion to the terminology. Logistical ecology refers to the configurations infrastructural habitats that produce ecological conditions through speed, connectivity, and exclusion. There the term traces the engineered systems of distribution that organize fields, environments and geographies through infrastructural operations. In that,

logistical ecologies harbors architecture as a participant to the changing conditions of ecology. Debris epistemology reflects to the participation of architecture by bringing out the human-centric processes of space-making. By building on logistical ecologies, debris epistemology frames multiplicity and fixation, latency and perpetuation, fragmentation and fluidity, recursion and amalgamation as tension points in architectural knowledge. Debris-scale is an attempt to understand these tension points by putting forward the ontological and epistemological potential of scale, especially in architecture. The four lessons of debris-scale showcase logistical ecologies creating an effect of scaling in cases of violence. In that, violence is a significant term to define the logistical ecology in Türkiye.

Türkiye's construction ecology is defined by uneven regulation. The thesis identifies how zoning amnesties, failed inspection systems, and disaster coalesce into a regime where building and demolishing are part of the same continuum. Here, logistics is not just a means of circulation but a force of materialization. The debris emerging after the disasters in Türkiye is not a matter of disposal but of redistribution. Logistics thus defines the construction ecology in Türkiye by managing the life and afterlife of materials, reordering geographies of value and neglect. Especially the southern geography of Türkiye has been subjected to a logistical regime in the aftermath of disaster, aligning with the power structures of the construction industry. This situation, further reinforced by geopolitical factors and corrupt mechanisms, has led to a sudden increase in debris production. Debris ultimately generated a secondary crisis as it is mobilized within the logistical networks of a monopolistic construction ecology. This and other crises revealed the outcomes of this ecology; the earthquakes highlighted a fault line of these power structures that forms the borders of exceptionality. This fault line is more than just a geological rupture; it acts as a dynamic space of interaction between cities, human actions, and nonhuman forces, as well as between destruction and reconstruction. This convergence of agents reveals the material politics that shape post-disaster spaces.

The logistics of waste, particularly construction and demolition debris, is revealed in this thesis as a mode of governance. Debris is managed in ways that align with state

strategies and infrastructural capacities. It is a reflection in state of exception, which the neglect of risk, and an obstruction through state mechanisms of control. As such, debris becomes an abstraction of politics acting in destruction with techniques that normalizes violence.

Debris is a term that uncovers the normalization, invisibilities, slownesses, neutralities of violence embedded in the planetary ecologies. It presents a way to face the end(s) of the human-centric model of making. In post-disaster environment, debris reveals that it is different than other forms of discard. Debris sites are a collection of many things. Debris brings together an array of bodies; survivors, labor force, security personnel, truck drivers as well as journalists, lawyers, activists, cartographers. With them, an extensive range of know-how travels back and forth the debris sites. This is just one depiction that focuses on the activities around the debris site. Inside, there are deceased people, crushed olive trees, contaminated soil and water. It is impactful and hard to control. Its particles travel great distances, reaching to underground waters, agricultural lands, erosion channels, and ecologically vulnerable areas. In that, it not just threatens the memories and lived experiences but the life itself to its core.

This is a systemic problem about the ways in which material culture of human-centric space-making presents as a solution to habitat. In this solution, we see an amalgam of materials, mixed and converged in dissociable ways. From afar, debris looks like a broken down concrete pieces, although it consists a complexity of materials that technosphere has to offer. Our current technologies does not even bother to sort this amalgam to the fullest.

Lastly, nothing stays outside the logistics. Everything we eat, touch, sit on, see, and live within has, in one way or another, traveled through networks of mobilization. The papers, laptop, pen on the side of the table, the coffee mug, the brick separating the kitchen from the living room, and the plants in the pot have all passed through logistical channels at least once. They will not be free from logistics even after they are discarded. Though often invisible, logistics dictate the lives of the objects we

interact with daily. Now we see a matter that leaves nothing outside. The systems that relate logistics is extensive. From planetary travel to, micro-organisms logistics internalizes movement happening everywhere. As such, debris is not just the discarded end product, but rather the material that is rejected at various stages of the life cycle of objects. With logistical systems, debris becomes a problem of everywhere. It touches a series of contexts including labor, body, place, and ecology, extending from the metabolic processes of cities to the planetary sedimentations of waste. In this sense, debris is not a marginal or accidental condition, but a continual and systemic output that travels alongside commodities, often occupying the same infrastructures, routes, and storage spaces. Moreover, debris is not temporally bound to the moment of disposal: it is a recurrent condition embedded in processes of extraction, manufacturing, transportation, consumption, and decay. Being the material and temporal condition, every matter reaches to the scale of debris through logistics. Debris is the ultimate object of logistics.

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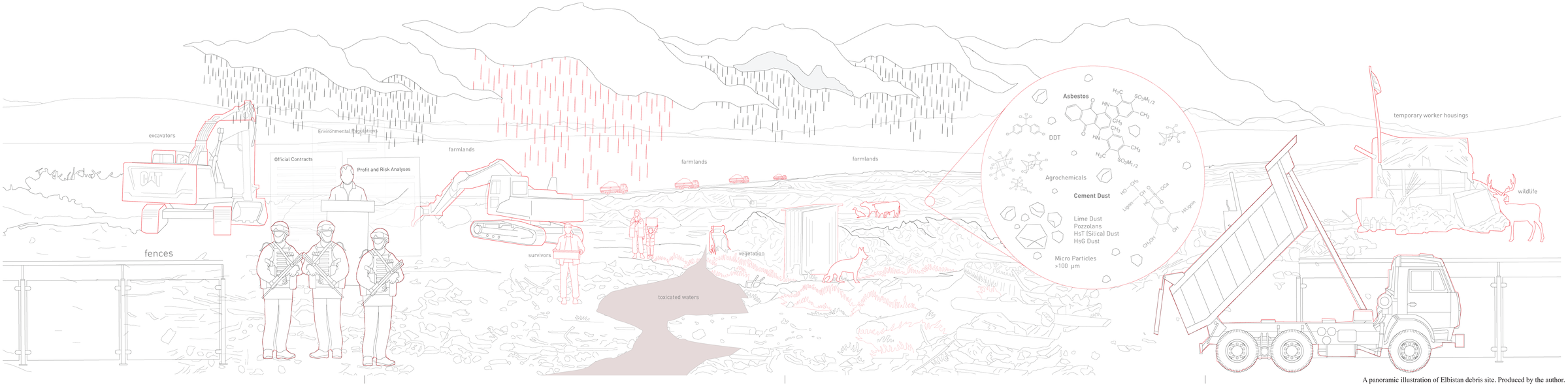
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APPENDICES

A. Debris Site Panorama



A panoramic illustration of Elbistan debris site. Produced by the author.

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Arıkboğa, C., "Debris-Scale: An Epistemological Tool for Rethinking Architectural Ecologies," Cambridge Talks: Acts of Scaling, Harvard GSD, April 2025, Boston, USA

Arıkboğa, C., "Violence in Debris Logistics: Local Infrastructures of Post-Disaster Cleanup," ARCHTHEO '24 / XVIII. The International Conference on Theory and History of Architecture, December 2024, İstanbul, Türkiye.

Arıkboğa, C. "Mediums of Logistical Violence: Architecture of Debris," Ecology of Logistics, Online Seminar, METU Architecture Department, June 2023, Ankara, Türkiye