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OBJECT

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Please see updated PDF attachment below (endnotes). Previous version had footnotes.

Moss Vale Plastics Recycling Facility (Plasrefine) proposal

Wingecarribee Shire, NSW

SSD-9409987

Submission to NSW Independent Planning Commission

November 2024



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About Doctors for the Environment Australia

Doctors for the Environment Australia (DEA) is an independent, non-government organisation of medical doctors in all Australian states and territories.

DEA's work is based on the premise that humans need a future with clean air and water, healthy soils capable of producing nutritious food, a stable climate, and a complex, diverse and interconnected humanity whose needs are met in a sustainable way. We are therefore interested in environmental protection and restoration to promote human health and social stability.

Acknowledgement of Country

Doctors for the Environment Australia's members live and work around Australia. We would like to acknowledge Aboriginal and Torres Strait Islander peoples as the Traditional Owners of these lands, in the spirit of reconciliation.

We recognise that First Nations peoples have cared for Country and lived sustainably for millenia, and that sovereignty of this land was never ceded. We pay our respects to First Nations Elders past and present, and to emerging leaders.

Recommendations

The current proposed Plasrefine facility site presents an unacceptable health and environmental threat to the immediate residents of Moss Vale, the wider Southern Highlands community, and greater Sydney and its surrounds.

To be clear, DEA, and the community of Moss Vale and the Southern Highlands fully support recycling facilities as one method to address the plastic waste crisis in NSW. However, the site of the current proposed Plasrefine Plastics Recycling and Reprocessing Facility is an excessively high risk site in terms of potential risks to human and animal health and the local and wider environment.

Based on the information presented in this document, DEA strongly opposes the SSD Plasrefine Recycling Facility proposal in Moss Vale, NSW (SSD-9409987) and recommends that the NSW Independent Planning Commission reject the proposal on the grounds outlined in this submission.

Summary

The proponent, Plasrefine Recycling Pty Ltd proposes to build a waste plastics sorting and plastics recycling facility in Moss Vale, NSW, to convert mixed plastics to plastic flakes and pellets, and produce resins and other more advanced plastic products from these. The company proposes to have an ultimate capacity to receive and process up to 120,000 tonnes per annum of mixed plastic materials, with 100 x heavy vehicle (20-tonne) truck movements per day (Monday to Friday between the hours of 7am and 6pm), between the major Canberra-Sydney highway (the M31, Hume Motorway) located 12 kilometres away from the facility, and ~280 light vehicle movements per day. Plasrefine Pty Ltd proposes it will operate its waste facility internally 24 hours a day, 7 days a week.

The site proposed for the Plasrefine building (proposed to be 3 hectares in size) sits less than 150-200 metres from residential homes and the Garvan Institute Australian Bioresources (ABR) facility, 750m from an early childhood learning centre, and only 10 metres from riparian waterways that feed directly into Warragamba Dam, Sydney's

primary drinking water catchment. It is co-located next to agricultural zones and within habitat corridors for multiple local wildlife species.

Plastic waste and recycling facilities have a high frequency of spontaneous fire risk, often resulting in unsalvageable emergency situations. For this reason, facilities are sited in secure industrial areas, many kilometres distant from residential zones and vulnerable sites. The Plasrefine facility proposes to house up to 20,000 tonnes of plastic waste at any given time, will be five times larger than any current plastics facility in NSW or Australia, and is situated within a designated bushfire prone area. This represents a huge potential fire risk, with no adequate safety buffer zone.

The current proposed site for the Plasrefine facility in Moss Vale, NSW, is an inappropriate and potentially hazardous location for a recycling facility of its size and nature. It poses unnecessarily dangerous risks to the immediate local environment of the region, the health and wellbeing of local residents and wildlife, and puts over 5 million individuals that access water from Warragamba Dam (Sydney's primary drinking water catchment) at potential risk of increased micro and nanoplastics ingestion and other potentially hazardous chemicals that may be released from the facility in the event of a system malfunction.

Introduction

Without firm measures by the NSW Government, plastic waste may exceed landfill spaces in NSW by 2030. DEA advocates for reduction of plastic at all points of its life cycle, in particular banning single use and non-recyclable plastics, and switching to reusable and/or compostable products.^{1 2} Mechanical plastic recycling is one avenue that may extend the life of some plastics, *but is not an effective longterm solution*, as recycled plastic materials frequently become too degraded for safe ongoing recycling,^{3 4} can become contaminated and contain dangerous chemicals that may be released during the recycling process,^{5 6 7} and can be a limited but “costly endeavour that necessitates substantial investments in infrastructure, machinery, water and energy.”⁸

Mechanical plastic recycling facilities are also likely to have a time-limited lifespan, where processes may be superseded in the next 5 - 10 years by more advanced technology,⁹ and requires high energy consumption.¹⁰ In addition, plastic recycling may appear to temporarily ‘save resources,’ but may in fact lead to increased consumption of plastics by consumers, as they believe the plastic crisis is being ‘solved’ and are therefore abrogated of personal responsibility.¹¹ Unfortunately, plastic recycling only delays the inevitable – by ultimately ending up in landfill, litter, or pollution in our waterways.^{12 13 14}

There may be a role for recycling facilities while we transition to more biodegradable, non-plastic options, targeting the plastic crisis at its core, but these need to be sited in an appropriate industrial zone, with an adequate buffer zone from residential properties and riparian waterways. The rationale for this requirement is due to the high risk of spontaneous fires at plastic recycling facilities and potential morbidity and mortality,^{15 16} and extremely high risk of air, water and soil contamination in the event of filtration equipment malfunction. [3]

Overview - Risk to human health

Plastics have significant deleterious effects on human health. Increased mortality rates due to cardiovascular, respiratory disease and cancers have been found in individuals working in extraction of raw materials used to create plastics as well as those working in plastics production and recycling.¹⁷ Similar health issues have been reported in “fenceline communities” of individuals living in close proximity to these facilities.¹⁸

Plastics do not readily disintegrate, but instead break up into microplastics (tiny fragments of plastic less than 5 millimetres in length) and nanoplastics (plastics between 1-1000 nanometres in length). Microplastics and nanoplastics are now ubiquitous in our environment, found in oceans, rivers, soil, drinking water and air, marine and terrestrial

animals. In adults, microplastics have been found in samples of breastmilk,^{19 20} blood,²¹ sputum,²² saliva²³ and stool samples,²⁴ brain,²⁵ cardiac,²⁶ lung,^{27 28} liver,²⁹ testicular³⁰ and placental tissue³¹ and meconium/faeces of infants.³²

The analysis of microplastics in human faeces' study revealed a correlation between faecal microplastic presence and inflammatory bowel disease status [19] and potential links to chronic immune disorders and disruption of healthy gut function.³³ Patients in whom micro nanoplastics (MNPs) were discovered in carotid artery plaques had increased risk of myocardial infarction, stroke, or death from any cause at 34 months of follow-up than those in whom MNPs were not detected [20], while presence of MNP in sputum/saliva samples was correlated with impaired function of normal physiological processes. [18] Other studies have shown an increased carcinogenic risk from chronic exposure to MNP,³⁴³⁵ asthma-like reactions, and longer exposure concerns related to chronic bronchitis, lung disorders including extrinsic allergic alveolitis and chronic pneumonia, pulmonary emphysema and the development of interstitial lung disease or autoimmune conditions,^{36 37 38} while presence of MNP in human placentas has been associated with increased rates of pre eclampsia, foetal growth restriction in utero [25] as well as concerns regarding foetal developmental abnormalities and future infant health.³⁹ Mammalian studies of MNP in rodent, dog and human testicular tissue have also shown disruption of endocrine signalling pathways, testicular function and sperm quantity and quality, implicating potential longterm effects on male fertility.⁴⁰ There is also evidence that nanoplastics may be associated with the development of Parkinson's disease and other dementias.⁴¹

These studies show that micro and nanoplastics (MNP) can enter the body via multiple routes, including ingestion, inhalation, and topical (via the skin) routes. MNP are ubiquitous in small amounts in our environment, but increased exposure can occur in environments where there is increased release of MNP in air, water, food or presence of plastic products. Proximity to a plastics recycling and reprocessing facility, despite proposed air and water filtration systems, will still pose a significant health threat to nearby residents and riparian waterways if there is a breach in the function of operating systems, or a significant fire, explosion or natural disaster (eg. flood, bushfire, of which both occur as a 'high risk zone' in the region of the proposed Plasrefine site).⁴²

A further concern is that microplastics in the environment can adsorb harmful chemicals and serve as a substrate or vector for bacteria and/or toxic biofilms, which may compound health risks associated with inadvertent consumption or inhalation of MNP by interfering with human or animal tissues on a cellular level.^{43 44 45}

Water Risk

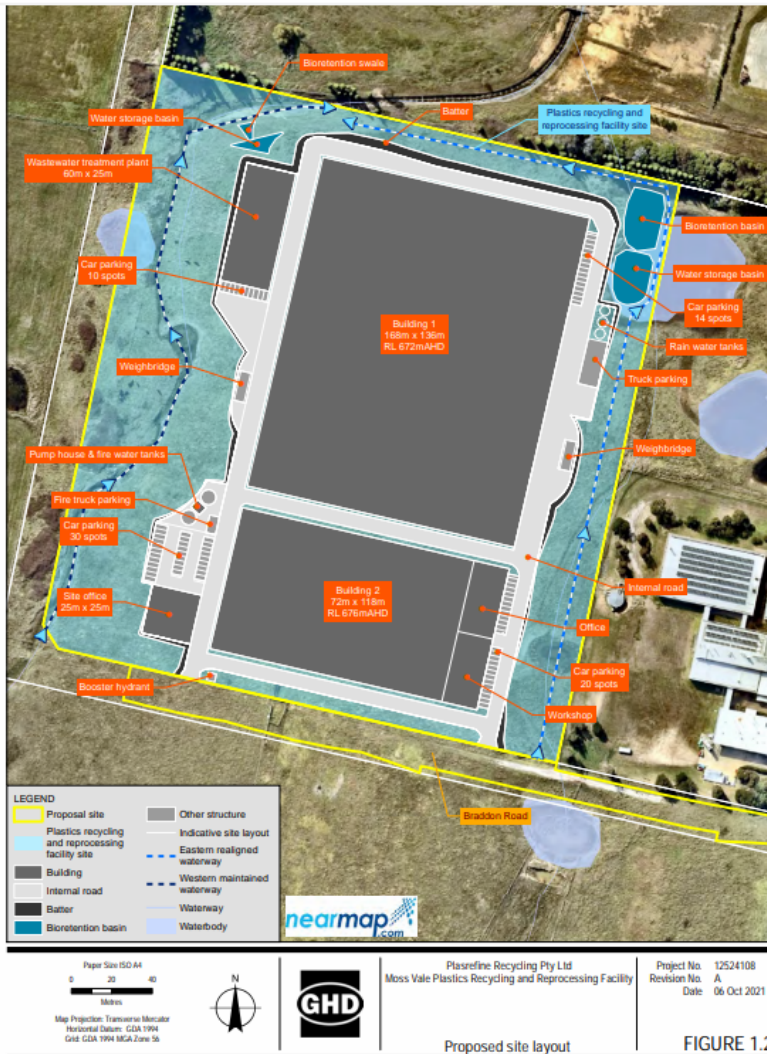
The Environmental Impact Statement by Plasrefine Recycling Pty Ltd in their appraisal of 'Water and Soils' states that "the proposal site is located within the Sydney drinking water catchment. The catchment covers 16,000 square kilometres and services more than four [likely now 5-6] million people in Sydney, Wollongong, Goulburn, Lithgow, the Blue Mountains, Bowral and Nowra. (DPIE 2020a). Four ponds are located in the low points of the plastics recycling and reprocessing facility site, and two watercourses run along the western and eastern boundaries."⁴⁶ (see Figure 1.2, below)

In addition to the risk of high volume MNP in riparian waterways directly feeding into Sydney's primary drinking water catchment and the potential health risks outlined above, there are other concerns related to the Plasrefine facility's proximity to vulnerable water sources that sustain the soil and agricultural land of the area, flora, fauna, amphibians and water source and habitat corridors of local wildlife and stock.

**Plasrefine Recycling Pty Ltd
Proposed site layout**

Taken from Moss Vale Plastics Recycling and Reprocessing Facility

Technical Report 4 –
Preliminary Site Investigation
(Contamination)
Figure 1.2 ⁴⁷



Plastic recycling facilities, transport of plastic products to and from facilities, and chemicals used in the process of recycling have a legacy of contaminating the local environment. Plasrefine Recycling Pty Ltd proposes to use “a natural cleaning agent.. on the site, a tea tree oil-based process ingredient.” ⁴⁸ Although seemingly benign on first regard, this is of significant environmental concern, as tea tree essential oil (*melaleuca alternifolia*), is classified as an Acute Aquatic Toxicity Category 2 Risk (H401 - Toxic to aquatic life, N - Dangerous for the Environment, R51 - Dangerous to aquatic organisms, R53 - May cause longterm adverse effects in the aquatic environment) and also a Chronic Toxicity Category 2 Risk (H411 - Toxic to aquatic life with long lasting effects). ⁴⁹

In addition, tea tree oil is considered a physical and chemical hazard, with potential physical impacts on human health, including acute toxicity 4 (H302), skin irritation 2 (H315), eye irritation 2 (H319), skin sensitivity 1 (H317) and aspiration toxicity 1 (H304). It is unclear what effect discharge of wastewater potentially contaminated with tea tree oil will have on human, aquatic and animal health, including the 5 million+ individuals in Sydney and other parts of NSW receiving tap water from the Warragamba Dam catchment.

Tea tree oil is also a highly flammable liquid (H226), and may produce irritating, toxic and noxious fumes, smoke and carbon monoxide in the event of a fire. It is insoluble in water, needs to be kept <15 degrees celsius for stability, and is not readily biodegradable. As a qualified environmentally hazardous substance and marine pollutant, it should not be released to the immediate environment (“do not allow product to enter streams, sewers or other waterways.”) ⁵⁰

Plasrefine Pty Ltd has described how they will manage wastewater - “the vast majority would be treated and reused. Initial estimates of wastewater discharges related to the washing process are of the order of 10 kilolitres per day.”⁵¹ This is concerning, as DPHI appears to have approved this proposal without due diligence of the potential serious environmental effects of wastewater release by Plasrefine Pty Ltd.

The other major concern regarding wastewater from Plasrefine’s Plastic Recycling and Reprocessing Facility is the very serious risk of microplastic pollution due to mechanical recycling of plastic waste.⁵² Large amounts of microplastics are generated during this process, particularly during the crushing phase.^{53 54} In 2017, mechanical recycling of plastics was estimated to account for approximately 3.1% of total microplastic emissions. This percentage is likely to increase significantly over time however if plastic recycling becomes more commonplace, for example, global microplastic emissions are estimated to increase from 17 kilotonnes in 2000 to 749 kilotonnes in 2060, while the amount of total microplastics will increase from 41 kilotonnes in 2000 to 1397 kilotonnes by 2060. Clearly the issue here is *not* producing plastic in the first instance, as in whatever form plastic comes in, whether as virgin plastic or in recycled form, this crisis will not be solved without targeting the issue at its very core, of reducing production as a far better primary goal.⁵⁵

In terms of impact on the direct local environment, the Plasrefine Plastic Recycling and Reprocessing Facility believes that their “DAF [Dissolved Air Flotation] process is capable of removing more than 90 percent of suspended solids, including any entrained microplastics, which may or may not contain trace amounts of PFAS... Any processed water discharged to sewer would be received at the soon to be upgraded Moss Vale Wastewater Treatment Plant (WWTP) that will further treat discharged process water that might contain any residual microplastics. [Wingecarribee] Council has indicated in its letter of 8 March 2024 to GHD that it expects the upgrade Moss Vale WWTP to be able to remove approximately 90 percent of microplastics, and said that any industrial scale source for microplastics should be addressed at the source, rather than the treatment works. It [is] estimated that the addition of Plasrefine wastewater could increase the total amount of microplastics received at the plant by between 10-50%, based on an estimated microplastics concentration of 40mg/l after treatment.”⁵⁶ [NB. the Moss Vale Sewage Treatment Plant Upgrade was due to commence construction in mid 2024, yet nothing has been confirmed to date, late in 2024]⁵⁷

Based on wastewater release estimates from the Plasrefine Plastics Recycling and Reprocessing Facility of “10 kl/day discharge, the Plasrefine facility would contribute 0.4 kg/day [of microplastics]... Testing to confirm that the concentrations of PFAS in wash water discharged to sewer meet [Wingecarribee] Council’s trade waste agreement limits will be performed during commissioning of the facility. Most PFAS present would be expected to remain entrained in the plastic and therefore captured for appropriate disposal. It is understood that there are no limits currently for microplastics or PFAS, but a limit of 300mg/l exists for suspended solids, which the onsite Plasrefine WWTP can easily achieve (less than 40mg/l of suspended solids is expected.)” [19, Opinion letter as above, *ibid*]

The discussion on the presence of PFAS in drinking water is extremely timely, with the NHMRC’s recent release of its statement on PFAS (per- and polyfluoroalkyl substances) in drinking water. Based on recent international guidelines (including the US EPA, Health Canada and the WHO), the safe amount of PFAS in drinking water that a person can consume on a daily basis over a lifetime without any appreciable risk to health (‘health based guideline values’) has been drastically reduced (eg. PFOA <200 nanograms per litre (previously 560ng/L), PFOS <4 nanograms per litre (previously 70ng/L), PFHxS <30 nanograms per litre (previously nil recommendation) and PFBS <1000 nanograms per litre (previously nil recommendation)).⁵⁸ This truly represents that minute, if not trace amounts of PFAS will be considered unacceptable for safe drinking water in Australia, due to potential increased health risks in humans including affects on our immune, hormone, endocrine, liver, renal, thyroid, metabolic, gastrointestinal and reproductive systems, and potential carcinogenic risk.^{59 60 61 62}

The proponent suggests that to “ensure positive controls of microplastics and PFAS, steps are being taken under the National Packaging Covenant with industry to progressively phase out the use of PFAS within plastics that may be sent to the plant.” [Ref, opinion letter by Dr Mark Bowman]⁶³ This is an extremely unrealistic expectation, given that the

NSW Government and NSW EPA are not planning on commencing this process until the end of 2025. Even if regulations were made to Australia's plastic packaging market immediately, it is likely that we will see PFAS-containing plastics for the next two decades at the very least, and is the reason that waste management organisations designing recycling sites plan for at least 15 to 20 years of presence of legacy products. Given his research knowledge into the field of PFAS and its potential detrimental effects via water and soil, and his extensive career history in the field of waste and contaminant management, it appears disingenuous of Dr Bowman to suggest that packaging adjustments will be able to adequately and emphatically ensure safe levels of PFAS in wastewater released to Warragamba Dam in Plasrefine's current proposal design.

Fire Risk

Plasrefine's Technical Report 5 - Fire and Incident Management Review, erroneously states that "the proposal is not on bush fire prone land."⁶⁴ This however is in direct contradiction to the NSW Government Rural Fire Service's bushfire prone mapping tool which notes that the Plasrefine Facility's address, at 74-76 Beaconsfield Road, Moss Vale, NSW, is indeed in a designated bushfire prone area.⁶⁵ This is extremely concerning as the proponent and DPHI, by approving this project without due diligence, has completely failed to address the significant potential risks of harm to human and animal life, and environmental damage from release of potential toxic and noxious chemical fumes from dioxins, VOCs, benzopyrenes and polyaromatic hydrocarbons that can be released into the air, soil and groundwater when plastics are incinerated. Two devastating examples of this are highlighted by the wildfires in Paradise, California in 2018, and Santa Rosa, California in 2017, which resulted in widespread contamination of the areas' drinking water supply by the carcinogen, benzene. Water contamination was directly attributed to not only the formation of benzene during wildfire-related combustion of biomass, but also due to burning of plastic polymer products, including PVC, used in municipal water pipes and residential buildings.⁶⁶

Additional concerns are highlighted with regards to immediate risk to human life. There are only four fire stations in the immediate vicinity of the Southern Highlands region, with a total of 4 x Class 2 fire trucks (Moss Vale, Bowral, Mittagong) and 1 x Hazmat tanker (Mittagong).⁶⁷ These operate as 'retained fire stations', ie. all fire stations in Wingecarribee Shire are unmanned 24/7. Unlike permanently staffed stations, firefighters are on call and respond from their nearby home or work place when emergencies arise. During fires at plastic recycling facilities in Australia and overseas, between 10-33 fire vehicles, and between 49-300 firefighters were needed to control the blaze.⁶⁸ Additional fire vehicles, specialist Hazchem response resources and aerial appliances (eg. helicopters) are at least 1 hour away in Wollongong and Campbelltown, highlighting an exceedingly dangerous situation for residents and commercial facilities situated just 150-200 metres away from the Plasrefine site. Other recycling facilities in Australia are far more appropriately situated away from residential/business areas, by a distance of at least 2-10 kilometres on average. For this reason, the proposed site of the Plasrefine Recycling and Reprocessing Facility is untenable from a human risk and safety perspective, and should not proceed in its current placement.

Risk to Air Quality and Greenhouse Gas Emissions

Direct risks to air quality from fire and/or bushfires and potential release of noxious chemicals and fumes from plastics, cleaning fluid and other feedstock or equipment present at the Plasrefine facility are outlined above.

The energy required to operate the Plasrefine Recycling and Reprocessing facility 24 hours per day, 7 days a week, in addition to high volume heavy vehicle movements (including 100 x 20-tonne heavy vehicle truck movements per day (Monday to Friday between the hours of 7am and 6pm) and ~280 light vehicle movements per day for staff and other deliveries, will contribute to a significant increase in greenhouse gas (GHG) emissions. Operational emissions associated with landscaping and construction of the site will also contribute significantly to GHG emissions.⁶⁹

The NSW Government's Climate Change Policy Framework delineates clear objectives to halve current greenhouse gas emissions by 2030, and work towards net zero emissions by 2050.⁷⁰ The Plasrefine Technical Report 9: Greenhouse Gas Assessment, fails to acknowledge the State Government's policy context on climate change, and additionally fails to assess the project's alignment with NSW Government targets and objectives for reducing greenhouse gas emissions.

The annual estimated operational emissions for Plasrefine’s construction and operation activities for the proposal total 91,033 t CO₂-e/year, well above the facility reporting threshold of 25,000 t CO₂-e/year per annum under the National Greenhouse and Energy Reporting (NGER) scheme. As such, the Plasrefine facility will be regarded as a large emission project, and therefore subject to the requirement to obtain a development consent or other planning approval, and an EPL (Environment Protection Licence).⁷¹

4.1 Estimated GHG emissions

A summary of estimated scope 1 and 2 GHG emissions occurring as a result of construction and operation activities for the proposal is presented in Table 4.1.

Table 4.1 Summary of emissions – construction and operation phase

Activity	Activity data	Units	Emissions (tCO ₂ -e)*		
			Scope 1	Scope 2	Total emissions
Construction					
Total diesel consumption	953	kL	2,583	0	2,583
Total construction emissions (t CO₂-e/ year)			2,583		2,583
Operations					
Electricity consumption (NSW) - Operations	87,430	MWh/year	0	70,818	78,818
Backup generator	10	kL	26	0	26
Employee commuting	697	kL	1,894	0	1,894
Transport of plastics to site	3,366	kL	9,147	0	9,147
Transport of product	3,366	kL	9,147	0	9,147
Total annual operational emissions (t CO₂-e/ year)			20,215	70,818	91,033

*Emissions are rounded up to the nearest whole tCO₂-e

Figure 2. Estimated GHG emissions, Moss Vale Recycling and Reprocessing Facility, Technical Report 9 : Greenhouse Gas, Plasrefine Pty Ltd (Figure 4.1, p.12) [ref 67]

There is a definitive need to reduce plastic waste, and recycling may play a part in this difficult crisis, as we navigate how to evolve towards a truly circular economy in NSW.⁷² However a recycling facility that emits gross quantities of greenhouse gas emissions, well above above the national reporting thresholds of 25,000 t CO₂-e/year per annum, situated approximately 270-320 kilometres return from Sydney or Canberra, seems environmentally inefficient and counterintuitive, in direct opposition to the NSW Government’s goals to drastically decrease GHG in the next 6 to 25 years, in addition to being potentially hazardous to the health and wellbeing of the local community, and detrimental to the greater environment of our planet’s health.

The Precautionary Principle in Environmental Decision Making

“When an activity raises threats of harm to humans or the environment, precautionary measures should be taken, even if some cause and effect relationships are not fully established scientifically.” - Wingspread Conference, 1998⁷³

The four key tenets of the precautionary principle include

- Taking preventive action in the face of uncertainty
- Shifting the burden of proof to the proponents of an activity
- Exploring a wide range of alternatives to possibly harmful actions
- Increasing public participation in decision making

The current site of the proposed Plasrefine Plastics Recycling and Reprocessing Facility has been staunchly opposed by all 9 locally elected members of the Wingecarribee Shire Council, the community, as well as numerous federal and state members of parliament for the region, including Stephen Jones, federal member for Whitlam, Judy Hannan, Wollondilly independent, Wendy Tuckerman, Liberal member for Goulburn, and the Southern Highlands and NSW Greens.

The proponents of Plasrefine Pty Ltd have been offered assistance to find and view a number of alternative sites for their proposed plastic recycling and reprocessing facility, including by members of parliament and community members of the Southern Highlands. ⁷⁴ Unfortunately these offers have been declined to date.

In the past five years, the Wingecarribee Shire Council has experienced no less than fifteen natural disasters in the last five years, placing it as the LGA with the highest rate of natural disasters in all of NSW. ⁷⁵ This includes bushfires, storms, floods, drought and damaging heavy rainfall. The Southern Highlands region is often on High Fire Danger Alert throughout periods of the year and spontaneous scrub fires are not an unusual occurrence, ⁷⁶ while significant fires affected properties next to Plasrefine's nominated site (74-76 Beaconsfield Rd, Moss Vale) in the 2019/2020 'Black Summer' bushfires. The Plasrefine site is also in flood prone land, and has had frequent and significant groundwater flow across its site with heavy rain. ^{77 78 79} These risks of bushfire and flooding significantly increase the threat of Plasrefine's current site, through inadvertent release of potentially dangerous chemicals and/or microplastics into air, soil and/or water.



Figure 3. Design Flood Extent, Moss Vale Plastics Recycling and Reprocessing Facility. Technical Report 10 - Soils and Water. Plasrefine Recycling Pty Ltd. 22 December 2021. Figure 3.3, p.13 [ref 75]

The current site of the Plasrefine Plastics Recycling and Reprocessing Facility poses an unnecessarily high risk to the local population and environment of Moss Vale, NSW, through potential contamination of water, soil and air from inadvertent microplastic and PFAS release, and significantly high greenhouse gas emissions. Despite the company's attempts to mitigate these risks, natural disasters including flood, inadvertent fire and bushfire risk pose direct and immediate harms to human life, wildlife and the environmental health of local ecosystems. In addition, sequelae of an unplanned disaster, either human, equipment-related or natural, poses significant risks to the populations of Sydney, Wollongong, Goulburn, the Blue Mountains, Lithgow, the Southern Highlands and Nowra, due to the Plasrefine building's proximity (within 10m) of key riparian water zones that feed directly into Warragamba Dam, which supplies approximately 80% of all drinking water for 5-6 million+ people living in the communities listed above.

DEA strongly opposes the proposed SSD Plasrefine Recycling Facility proposal at its current site in Moss Vale, NSW (SSD-9409987) and recommends that the NSW Independent Planning Commission reject the proposal on the grounds outlined in this submission.

REFERENCES

- ¹ DEA R. Reform of Packaging Regulation DEA submission Oct 2024.pdf [Internet]. Google Docs. 2024 [cited 2024 Nov 19]. Available from: https://drive.google.com/file/d/1Z_lI2g4HE9yH2pBi7IRbB5gsy7ZfjFPB/view
- ² National Packaging Solution [Internet]. Boomerang Alliance. 2024 [cited 2024 Nov 19]. Available from: https://www.boomerangalliance.org.au/national_packaging_solution
- ³ Hahladakis JN, Iacovidou E, Gerassimidou S. Plastic waste in a circular economy. *Plastic Waste and Recycling*. 2020;481–512. <https://doi.org/10.1016/B978-0-12-817880-5.00019-0>
- ⁴ Lange JP. Managing plastic Waste—Sorting, recycling, disposal, and product redesign. *ACS Sustain Chem Eng*. 2021;9(47):15722-15738. doi:10.1021/acssuschemeng.1c05013
- ⁵ Landrigan PJ, Raps H, Cropper M, et al. The Minderoo-Monaco Commission on Plastics and Human Health. *Annals of Global Health*. 2023;89(1). doi:<https://doi.org/10.5334/aogh.4056>
- ⁶ Widespread chemical contamination of recycled plastic pellets globally. Ipen.org. Accessed November 24, 2024. https://ipen.org/sites/default/files/documents/ipen-recycled-plastic-pellets-v1_2.pdf
- ⁷ Carmona E, Rojo-Nieto E, Rummel CD, et al. A dataset of organic pollutants identified and quantified in recycled polyethylene pellets. *Data Brief*. 2023;51(109740):109740. doi:10.1016/j.dib.2023.109740
- ⁸ Jiao H, Ali SS, Hussein M, Tamer Elsamahy, Abdelkarim E, Schagerl M, et al. A critical review on plastic waste life cycle assessment and management: Challenges, research gaps, and future perspectives. *Ecotoxicology and Environmental Safety*. 2024 Feb 1;271:115942–2.
- ⁹ Dai L, Zhou N, Lv Y, et al. Pyrolysis technology for plastic waste recycling: A state-of-the-art review. *Prog Energy Combust Sci*. 2022;93(101021):101021. doi:10.1016/j.pecs.2022.101021
- ¹⁰ Carmona E, Rojo-Nieto E, Rummel CD, et al. A dataset of organic pollutants identified and quantified in recycled polyethylene pellets. *Data Brief*. 2023;51(109740):109740. doi:10.1016/j.dib.2023.109740
- ¹¹ Heidbreder LM, Bablok I, Drews S, Menzel C. Tackling the plastic problem: A review on perceptions, behaviors, and interventions. *Science of The Total Environment* [Internet]. 2019 Jun;668(1):1077–93. <https://doi.org/10.1016/j.scitotenv.2019.02.437>.
- ¹² What do plastics have to do with climate change? - United Nations Development Programme. Exposure. Accessed November 23, 2024. <https://stories.undp.org/what-do-plastics-have-to-do-with-climate-change>
- ¹³ United Nations Development Programme. Why aren't we recycling more plastic? - United Nations Development Programme | UNDP [Internet]. Exposure. 2023. Available from: <https://stories.undp.org/why-arent-we-recycling-more-plastic>
- ¹⁴ Parkinson L. Australia plans major overhaul of packaging regulation. Food Packaging Forum, Food Packaging Forum Foundation, FPF. October 22, 2024. Accessed November 24, 2024. <https://foodpackagingforum.org/news/australia-plans-major-overhaul-of-packaging-regulation>
- ¹⁵ News ABC. Why plastic is building up at recycling centers and catching fire [Internet]. ABC News. Available from: <https://abcnews.go.com/Technology/plastic-building-recycling-centers-catching-fire/story?id=89125707>
- ¹⁶ Why Recycling Plants Keep Catching on Fire [Internet]. TIME. 2023. Available from: <https://time.com/6271576/recycling-plant-fire-indiana/>
- ¹⁷ Human Rights Watch. “It’s As If They’re Poisoning Us”: The Health Impacts of Plastic Recycling in Turkey. Human Rights Watch. Published September 21, 2022. <https://www.hrw.org/report/2022/09/21/its-if-theyre-poisoning-us/health-impacts-plastic-recycling-turkey>
- ¹⁸ Landrigan PJ, Raps H, Cropper M, et al. The Minderoo-Monaco Commission on Plastics and Human Health. *Ann Glob Health*. 2023;89(1):23. <https://doi.org/10.5334/aogh.4056>
- ¹⁹ Ragusa A, Notarstefano V, Svelato A, Belloni A, Gioacchini G, Blondeel C, Zucchelli E, De Luca C, D’Avino S, Gulotta A, Carnevali O, Giorgini E. Raman Microspectroscopy Detection and Characterisation of Microplastics in Human Breastmilk. *Polymers (Basel)*. 2022 Jun 30;14(13):2700. <https://doi.org/10.3390/polym14132700>.
- ²⁰ Saraluck A, Techarang T, Bunyapipat P, Boonchuwong K, Pullaput Y, Mordmuang A. Detection of Microplastics in Human Breast Milk and Its Association with Changes in Human Milk Bacterial Microbiota. *Journal of Clinical Medicine*. 2024; 13(14):4029. <https://doi.org/10.3390/jcm13144029>

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- ²¹ Leslie HA, J. M. van Velzen M, Brandsma SH, Vethaak D, Garcia-Vallejo JJ, Lamoree MH. Discovery and quantification of plastic particle pollution in human blood. *Environment International*. 2022 Mar 24;163(107199):107199. <https://doi.org/10.1016/j.envint.2022.107199>
- ²² Huang S, Huang X, Bi R, Guo Q, Yu X, Zeng Q, et al. Detection and Analysis of Microplastics in Human Sputum. *Environmental Science & Technology*. 2022 Jan 24;56(4):2476–86.
- ²³ Przekop R, Michalczyk U, Penconek A, Moskal A. Effect of Microplastic Particles on the Rheological Properties of Human Saliva and Mucus. *Int J Environ Res Public Health*. 2023 Nov 8;20(22):7037. doi: 10.3390/ijerph20227037
- ²⁴ Yan Z, Liu Y, Zhang T, Zhang F, Ren H, Zhang Y. Analysis of Microplastics in Human Feces Reveals a Correlation between Fecal Microplastics and Inflammatory Bowel Disease Status. *Environmental Science & Technology*. 2021 Dec 22;56(1):414–21. doi: <https://doi.org.10.1021/acs.est.1c03924>
- ²⁵ Amato-Lourenço LF, Dantas KC, Júnior GR, et al. Microplastics in the Olfactory Bulb of the Human Brain. *JAMA Netw Open*. 2024;7(9):e2440018. doi:10.1001/jamanetworkopen.2024.40018
- ²⁶ Marfella R, Prattichizzo F, Sardu C, et al. Microplastics and nanoplastics in atheromas and cardiovascular events. *New England Journal of Medicine*. 2024;390(10):900- 910. <https://doi.org/10.1056/NEJMoa2309822>
- ²⁷ Chen Q, Gao J, Yu H, Su H, Yang Y, Cao Y, et al. An emerging role of microplastics in the etiology of lung ground glass nodules. *Environmental Sciences Europe*. 2022 Mar 17;34(1). <https://doi.org/10.1186/s12302-022-00605-3>
- ²⁸ Amato-Lourenço LF, Carvalho-Oliveira R, Júnior GR, dos Santos Galvão L, Ando RA, Mauad T. Presence of airborne microplastics in human lung tissue. *Journal of Hazardous Materials*. 2021 Aug;416:126124. Doi: <https://doi.org./10.1016/j.jhazmat.2021.126124>
- ²⁹ Horvatits T, Tamminga M, Liu B, Sebode M, Carambia A, Fischer L, Püschel K, Huber S, Fischer EK. Microplastics detected in cirrhotic liver tissue. *EBioMedicine*. 2022 Aug;82:104147. doi: 10.1016/j.ebiom.2022.104147
- ³⁰ Hu CJ, Garcia MA, Nihart A, et al. Microplastic presence in dog and human testis and its potential association with sperm count and weights of testis and epididymis. *Toxicol Sci*. 2024;200(2):235-240. doi:10.1093/toxsci/kfae060
- ³¹ Ragusa A, Svelato A, Santacroce C, et al. Plasticenta: First evidence of microplastics in human placenta. *Environment International*. 2021;146(106274):106274. doi:<https://doi.org/10.1016/j.envint.2020.106274>
- ³² Liu S, Guo J, Liu X, et al. Detection of various microplastics in placentas, meconium, infant feces, breastmilk and infant formula: A pilot prospective study. *Science of The Total Environment*. 2023;854(158699):158699. doi:<https://doi.org/10.1016/j.scitotenv.2022.158699>
- ³³ Hirt N, Body-Malapel M. Immunotoxicity and intestinal effects of nano- and microplastics: a review of the literature. *Part Fibre Toxicol*. 2020;17(1):57. doi:10.1186/s12989-020-00387-7
- ³⁴ Facciola A, Visalli G, Pruiti Ciarello M, Di Pietro A. Newly Emerging Airborne Pollutants: Current Knowledge of Health Impact of Micro and Nanoplastics. *International Journal of Environmental Research and Public Health*. 2021;18(6):2997. doi:<https://doi.org/10.3390/ijerph18062997>
- ³⁵ Goswami S, Adhikary S, Bhattacharya S, et al. The alarming link between environmental microplastics and health hazards with special emphasis on cancer. *Life Sci*. 2024;355(122937):122937. doi:10.1016/j.lfs.2024.122937
- ³⁶ Amato-Lourenco L, dos Santos Galvao L, de Weger L, Hiemstra P, Vijver M, Mauad T. An emerging class of air pollutants: Potential effects of microplastics to respiratory human health? *Sci Tot Enviro*. 2020, 749, 141676.
- ³⁷ Saha SC, Saha G. Effect of microplastics deposition on human lung airways: A review with computational benefits and challenges. *Heliyon*. 2024;10(2):e24355. doi:10.1016/j.heliyon.2024.e24355
- ³⁸ Lu K, Zhan D, Fang Y, et al. Microplastics, potential threat to patients with lung diseases. *Front Toxicol*. 2022;4:958414. doi:10.3389/ftox.2022.958414
- ³⁹ Zurub RE, Cariaco Y, Wade MG, Bainbridge SA. Microplastics exposure: implications for human fertility, pregnancy and child health. *Front Endocrinol (Lausanne)*. 2023;14:1330396. doi:10.3389/fendo.2023.1330396
- ⁴⁰ D'Angelo S, Meccariello R. Microplastics: A Threat for Male Fertility. *International Journal of Environmental Research and Public Health*. 2021; 18(5):2392. <https://doi.org/10.3390/ijerph18052392>
- ⁴¹ Liu Z, Sokratian A, Duda AM, et al. Anionic nanoplastic contaminants promote Parkinson's disease-associated α -synuclein aggregation. *Sci Adv*. 2023;9(46):eadi8716. doi:10.1126/sciadv.adi8716
- ⁴² Check if you're in bush fire prone land. Gov.au. Accessed November 22, 2024. <https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/> bush-fire-prone-land/check-bfpl
- ⁴³ Abeles SR. Downstream — Water Pollution, Health, and Medicine's Duty to Engage. *New England Journal of Medicine*. 2024;391(1):3-5. doi:<https://doi.org/10.1056/nejmp2312988>

-
- ⁴⁴ Gruber ES, Stadlbauer V, Pichler V, et al. To waste or not to waste: Questioning potential health risks of micro- and nanoplastics with a focus on their ingestion and potential carcinogenicity. *Expo Health*. 2023;15(1):33-51. doi:10.1007/s12403-022-00470-8
- ⁴⁵ Barceló D, Picó Y, Alfarhan AH. Microplastics: Detection in human samples, cell line studies, and health impacts. *Environ Toxicol Pharmacol*. 2023;101(104204):104204. doi:10.1016/j.etap.2023.104204
- ⁴⁶ Moss Vale Plastics Recycling and Reprocessing Facility. Volume 1. Plasrefine Recycling Pty Ltd. January 2022. <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9409987%2120220222T220226.206 GMT>
- ⁴⁷ MossV Vale Plastics Recycling and Reprocessing Facility. Technical Report 4 - Preliminary Site Investigation - (Contamination). Plasrefine Recycling Pty Ltd. 3 November 2021. [Microsoft Word - 12524108-REP Preliminary Site Investigation-Contamination \(new template\).docx](https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-12524108-REP_Preliminary_Site_Investigation-Contamination_(new_template).docx)
- ⁴⁸ New South Wales Government Independent Planning Commission. Transcript of Meeting : Moss Vale Plastics Recycling Facility SSD-9409987, Applicant Meeting. [applicant-meeting-transcript.pdf](https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9409987%2120220222T220226.206 GMT)
- ⁴⁹ Safe Work Australia : Classifying Hazardous Chemicals - National Guide. July 2020. https://www.safeworkaustralia.gov.au/sites/default/files/2022-03/classifying_hazardous_chemicals_national_guide.pdf
- ⁵⁰ NHR Organic Oils Safety Data Sheet, Organic Tea Tree Essential Oil (*Melaleuca alternifolia*). EU regulation 1272/2008. https://www.nhrorganicoils.com/uploads/20221202134851e_Tea_Tree_SDS.pdf
- ⁵¹ Moss Vale Plastics Recycling and Reprocessing Facility. Volume 1. Plasrefine Recycling Pty Ltd. January 2022. <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9409987%2120220222T220226.206 GMT>, p7-7
- ⁵² Suzuki G, Uchida N, Tuyen LH, Tanaka K, Matsukami H, Kunisue T, Takahashi S, Viet PH, Kuramochi H, Osako M. Mechanical recycling of plastic waste as a point source of microplastic pollution. *Environ Pollut*. 2022 Jun 15;303:119114. doi: 10.1016/j.envpol.2022.119114. Epub 2022 Mar 8. PMID: 35276247.
- ⁵³ Stapleton MJ, Hai FI. Recycling process produces microplastics. *Science*. 2024 Mar;383(6686):958. doi: 10.1126/science.ado1473. Epub 2024 Feb 29. PMID: 38422149.
- ⁵⁴ Stapleton MJ, Ansari AJ, Ahmed A, Hai FI. Evaluating the generation of microplastics from an unlikely source: The unintentional consequence of the current plastic recycling *Science of The Total Environment*. 2023;902:166090-166090. doi:https://doi.org/10.1016/j.scitotenv.2023.166090
- ⁵⁵ Suzuki G, Uchida N, Tanaka K, et al. Global discharge of microplastics from mechanical recycling of plastic waste. *Environ Pollut*. 2024;348(123855):123855. doi:10.1016/j.envpol.2024.123855
- ⁵⁶ Opinion on the proposed Moss Vale Plastics Recycling and Reprocessing Facility - Response to Concerns Regarding Microplastics and PFAS Emissions. Dr Mark Bowman, Technical Director, Environment and Contamination. GHD. Accessed November 23, 2024. <https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2024/10/moss-vale-plastics-recycling-facility/case-correspondence-to-and-from-the-commission/correspondence-from-applicant--email-attachment-1-redacted.pdf>
- ⁵⁷ Moss Vale sewage treatment plant Upgrade. Gov.au. Accessed November 23, 2024. <https://www.wsc.nsw.gov.au/Council/Projects-and-Capital-Works/moss-vale-sewage-treatment-plant-upgrade>
- ⁵⁸ Draft fact sheet on Per- and poly-fluoroalkyl substances (PFAS) | NHMRC [Internet]. Nhmc.gov.au. 2024. Available from: <https://www.nhmrc.gov.au/health-advice/environmental-health/water/PFAS-review/draft-fact-sheet>
- ⁵⁹ *ibid*
- ⁶⁰ Woodruff TJ. Health effects of fossil fuel-derived endocrine disruptors. *N Engl J Med*. 2024;390(10):922-933. doi:10.1056/NEJMra2300476
- ⁶¹ Fenton SE, Ducatman A, Boobis A, et al. Per- and Polyfluoroalkyl Substance Toxicity and Human Health Review: Current State of Knowledge and Strategies for Informing Future Research. *Environ Toxicol Chem*. 2021;40(3):606-630. doi:10.1002/etc.4890
- ⁶² Maradonna F, Vandenberg LN, Meccariello R. Editorial: Endocrine-disrupting compounds in plastics and their effects on reproduction, fertility, and development. *Front Toxicol*. 2022;4:886628. doi:10.3389/ftox.2022.886628
- ⁶³ Food Packaging Forum. (2024). *Australia plans major overhaul of packaging regulation | Food Packaging Forum*. [online] Available at: <https://foodpackagingforum.org/news/australia-plans-major-overhaul-of-packaging-regulation> [Accessed 23 Nov. 2024].
- ⁶⁴ Moss Vale Plastics Recycling and Reprocessing Facility. Technical Report 5 - Fire and Incident Management Review, Plasrefine Recycling Pty Ltd. 1 November 2021. [Microsoft Word - 12524108-REP Fire Safety Review.docx](https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-12524108-REP_Fire_Safety_Review.docx)

-
- ⁶⁵ NSW Rural Fire Service. Check if you're in bush fire prone land. Accessed November 22, 2024. <https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection/bush-fire-prone-land/check-bfpl>
- ⁶⁶ Chong NS, Abdulramoni S, Patterson D, Brown H. Releases of fire-derived contaminants from polymer pipes made of polyvinyl chloride. *Toxics*. 2019;7(4):57. doi:10.3390/toxics7040057
- ⁶⁷ NSW Fire Station List. Accessed November 25, 2024. https://www.fire.nsw.gov.au/station_list/
- ⁶⁸ Greg Hickling. Moss Vale Plastics Recycling Facility. Oral submission to NWS Government Independent Planning Commission. 12 November 2024. <https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2024/10/moss-vale-plastics-recycling-facility/public-submission-rounds/speaker-presentations/greg-hickling-presentation.pdf>
- ⁶⁹ Moss Vale Plastics Recycling and Reprocessing Facility. Technical Report 9 - Greenhouse Gas, Plasrefine Recycling Pty Ltd. 27 January 2022. <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9409987%2120220127T045237.296%20GMT>
- ⁷⁰ Net Zero Plan Stage 1: 2020–2030. Gov.au. Accessed November 25, 2024. <https://www.soe.epa.nsw.gov.au/all-themes/climate-and-air/net-zero-plan-stage-1-2020-2030>
- ⁷¹ Wild E, Thornton-Dibb M. NSW EPA releases Climate Change Assessment Requirements and guidance for large GHG emitters. Published online 2024. Accessed November 25, 2024. <https://www.nortonrosefulbright.com/en/knowledge/publications/5bcd2137/nsw-epa-releases-climate-change-assessment-requirements-and-guidance-for-large-ghg-emitters>
- ⁷² NSW Government, NSW Environment Protection Authority. NSW Plastics: The Way Forward. Draft for consultation. September 2024. Accessed November 24, 2024. <https://hdp-au-prod-app-nswepa-yoursay-files.s3.ap-southeast-2.amazonaws.com/2017/2578/6913/NSW-plastics-way-forward-consultation-draft.pdf>
- ⁷³ Precautionary principle: The wingspread statement. Collaborative for Health & Environment. Accessed November 24, 2024. <https://www.healthandenvironment.org/environmental-health/social-context/history/precautionary-principle-the-wingspread-statement>
- ⁷⁴ Fuller K. Moss Vale Plasrefine plastic recycling plant proposal moves forward, sparks calls for better regulation [Internet]. Abc.net.au. ABC News; 2024 [cited 2024 Nov 23]. Available from: <https://www.abc.net.au/news/2024-10-16/plastic-recycling-plant-approval-recommendation-moss-vale/104467550>
- ⁷⁵ Clinton McAlister, Director of Service and Project Delivery, Wingecarribee Shire Council, Ordinary Council Meeting 20th November 2024. at 1:02:49. <https://www.youtube.com/live/517eDUcQy14>
- ⁷⁶ Hazards near me NSW. Gov.au. Accessed November 24, 2024. <https://www.rfs.nsw.gov.au/news-and-media/stay-up-to-date/hazards-near-me-nsw>
- ⁷⁷ Moss Vale Plastics Recycling and Reprocessing Facility. Technical Report 10 - Soils and Water. Plasrefine Recycling Pty Ltd. 22 December 2021. Accessed November 24, 2024. p.13, Figure 3.3. <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-9409987%2120220127T045239.689%20GMT>
- ⁷⁸ Instagram video. Instagram. Accessed November 24, 2024. <https://www.instagram.com/reel/DCwv-Y2yZJr/?igsh=MTZ0a2tmbnN1eXoydw%3D%3D>
- ⁷⁹ Instagram video. Instagram. Accessed November 24, 2024. <https://www.instagram.com/reel/DCwvE7xSRDi/?igsh=MXR6NWIhMHBtcmxwMw%3D%3D>